Dialogues Across Disciplines

From the NIAS Archives

Volume One

Edited by
Roddam Narasimha
Dilip Ahuja

National Institute of Advanced Studies
Bangalore, India
DIALOGUES ACROSS DISCIPLINES
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NATIONAL INSTITUTE OF ADVANCED STUDIES
Bengaluru, India
To the Memory of

J.R.D. Tata
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I do not want my house to be walled in on all sides and my windows to be stuffed. I want the cultures of all lands to be blown about my house as freely as possible. But I refuse to be blown off my feet by any.

Mahatma Gandhi

(Young India 1-6-1921, p.170)
Preface

The National Institute of Advanced Studies (NIAS) Bangalore was established primarily to enable persons of exceptional quality to address complex and important problems facing society. The NIAS Society came into existence on June 20, 1988, and NIAS moves into its Silver Jubilee Year this June 2012. In keeping with the original vision of its Founder Chairman, the late Mr. J.R.D. Tata, the Institute has emphasised right from its foundation a multi-disciplinary approach, bringing together the natural and social sciences, technology and the arts, industry and management, administration and civil society. The Institute has done this not only through its own faculty but also through guest faculty and its unique outreach programmes such as public lectures and the Senior Associates Programme involving peers from all walks of life.

We recognise that NIAS is a small institution. To fulfil its multi-disciplinary mandate, the required expertise for any specific study is not always available in-house. We have been fortunate in being able to attract several distinguished scholars and visitors to NIAS. Over the years, we have built up an impressive corpus of publications drawing on lectures that were given at NIAS and it has been my concern that the best of these lectures should be available to a wider audience than the persons who had the privilege of listening to them. The occasion of the silver jubilee year provides us with an opportunity to bring out some of the earliest and the best of these talks in the first volume which is in your hands.

I am grateful to Professor Roddam Narasimha, who despite the multiple demands on his time, agreed to edit this volume in a remarkably short time. It contains memorable lectures from some of those who provided NIAS its foundational genes—Mr. J.R.D. Tata, Dr. Raja Ramanna, Professors M.N. Srinivas, R.L. Kapur and
B.V. Sreekantan, and several visitors from India and overseas. I am sure that readers will benefit from these lectures as much as the listeners did. We expect to bring out the second volume in June 2013.

Clearly inter-disciplinary research, relevance to national needs, and human resource development will dominate our efforts as NIAS now moves into its next phase.

Professor V.S. Ramamurthy
Director, NIAS
June 2012
The publication of this volume would not have been possible without the active participation of several individuals. The Editors would like to acknowledge the support received from Ms. Revathi Sampath Kumaran in the preparation of this volume. Ms. Hamsa Kalyani, the librarian at NIAS provided material from the Archives. Ms. V.B. Mariyammal helped with converting old texts into electronic forms, and with Sanskrit diacritical marks. Several colleagues from NIAS helped with the proof-reading. Professor Ramamurthy provided enthusiastic support for this exercise.
Introduction

This collection of essays contains talks delivered at NIAS. In the book they have been arranged in chronological order. We did not attempt to group essays on related topics. We summarize briefly these essays here and link similar ones together. A reader may consider reading them in the order indicated here.

JRD Tata’s piece provides the historical background to how NIAS came to be established, and demonstrates his pursuance of the idea over a period of 24 years.

R. L. Kapur delves into the psychological bases for both violence and its inverse, which he calls empathy. He proposes several principles which could be invoked to reduce violence in India. His analysis still has an uncanny relevance today.

Romila Thapar clearly demonstrates that communal ideology is not something that grows out of our ancient or medieval history; rather it grows out of our colonial past and out of the present, often with devastating consequences.

T N Madan traces the ups and downs of religion’s estimation in the intellectual debates since Comte and Marx, Durkheim and Weber. Today, he finds, there are two kinds of people: those who are fanatic in their adherence to religion, and those who are fanatic about the avoidance of religion altogether. Drawing on Nietzsche’s powerful caricature of the ‘mad man,’ Madan argues that nihilism is not going to take us anywhere; rather it is likely to frustrate us and leave us questioning our efforts to live.

Charles Townes argues that the ‘assumptions’ of science and the ‘faith’ of religion indeed are very similar. And there are many questions that science yet has to answer about this ‘intelligently designed’ universe of ours.
M. S. Swaminathan feels that the values inherent in the idea of religion can help science remain morally rooted. In this context he alludes to the Indian notion of karma – doing actions consciously that their effects are to be borne by the doer. At the same time, Swaminathan also cautions against getting bogged down by questions pertaining to the worth of a scientific endeavour, as there are always opposing views; not everyone and every view can be given credence, nor all opposition satisfied before something can be done.

Ramanath Cowsik feels that the Indic tradition, with its emphasis on empirical evidence, would be easily able to accommodate the paradigm shifts that are happening in modern science, as even the eighth century philosopher-saint Sankara was clear that “an inference is no authority against perception”.

Roddam Narasimha considers Needham’s question–how is it that modern science failed to grow from India or China rather than from the West when the Orient was so much ahead of the Occident science for some 14 centuries? He finds an explanation in the contrasting way of approaching mathematics in the two regions: the west being inclined towards drawing general principles for universal application, based on a few overarching axioms; and the east shunning this grand picturisation of the universe and speculative model-making in favour of developing more rooted explanations or more effective algorithms for individual observed phenomena.

Kumar traces the history of the representation of the atom in the Greek and Indian traditions, besides other philosophies of the world. While some believed in the indivisibility of the atom and its ultimate state as the smallest intrinsic element of matter, others did not even consider the notion of its existence more than a fanciful idea.

Roger Penrose explores the possibility of bringing within the realm of computation the subtle element of ‘understanding’ which underlies the mind’s conscious appreciation of the Platonic ideals of truth, beauty, and morality.
B V Sreekantan’s essay on consciousness, which he describes as that indescribable, unknown something that makes us not only perceive a rose and immediately cognise its beauty, its fragrance, its softness, but also dwell on its metaphorical value related to love or to a specific incident from our personal histories. “The real problem for the scientist is to figure out how these two different kinds of experiences, one in the form of electrical signals and chemicals with which he becomes familiar in his laboratory, generates the feelings, sensations, emotions, etc., which cannot be described in terms of physical parameters,” he says.

U. R. Ananthamurthy writes how Indian literature is one because it is written in many languages, and how it continually strives to find a balance between diversity and unity, between poetry and prose, between emotion and rationality. Drawing on the metaphor of his own home, with a front-yard where matters of business and intellectual discourses took place, and a back-yard where matters of the heart and light-hearted fun and gossip were the standard fare, Ananthamurthy says that the folk tales of India draw naturally on the atmosphere of the backyard.

Long before globalisation became part of our lexicon, India was already home to many languages, many cultures – all excellently preserved and mutually respected. So India can be an example for the world to resist the ‘McWorldisation’ of the globe, in which the English language and American culture play so dominant a role. But this is possible only if more attention is paid to making localisation a very important aspect of the governance agenda and human and material resources are pledged for the purpose. As the world becomes increasingly electronic, it is crucial to reduce the technology divide and make the information age more inclusive and beneficial, says Kenneth Keniston.

Taking off from Keniston and Ananthamurthy, Shashi Deshpande makes a case for the inviolability of the local and the regional in this age of globalisation. At the same time, she recognises that globalisation is a feature that has always been there in
the world of literature – with world literature piggybacked on the English language, much as it continues to do today. Yet, the marker of these books is their ‘universalism’. Universal themes do not have to be monocultural. They can arise in their own ethnic specialities, retain their individualities and yet aspire to reach audiences across continents, according to her. There is a space for the unique in the universal, which is the way to view the globalisation of literature.

Gopalkrishna Gandhi argues that we are all actors, and are acting at all points of our lives, donning roles and accoutrements to go with our various roles as we live life as parents, children, employees, employers, embattled citizens, activists, and so on. What marks out those who become memorable in this constantly evolving drama of life is the action of the actor. Some undertake such actions that make the actor remembered for the significance of the actions. It is for each of us to be inspired by such actors and to make our actions meaningful, he says.

Sharada Prasad dwells briefly on his ringside experience as a political analyst and as adviser to three prime ministers. He leads us through much inside history from the days of Gandhi-Patel-Nehru, through Shastri, Indira Gandhi, Rajiv Gandhi to the present [Vajpayee]. And he has pithy comments on the functioning of Morarji Desai, VP Singh, and Narasimha Rao, and on the stop-gap tenures of Chandrasekar, Deve Gowda, Charan Singh and Gujral.

“A leader is a person who has a vision of a better life for the people around him as well as a strategy to bring it about, and the ability to communicate that vision to others and inspire them to work with him for the realisation of the objective. His courage, his character, his sense of justice, his understanding and his dedication should be such that large numbers of people will place their future in his hands,” he says. And in this definition of a ‘leader’, perhaps, lies the reason why today’s political leaders seem like ‘bonsais’ compared to the ‘banyans’ at the time of the new republic.

Dhruv Raina provides an intellectual biography of Visvesvaraya as an engineer-sociologist who was trained in the methods of
industrialising, bustling Bombay province and was inspired by the development trajectory of Japan, USA and Sweden. Nevertheless he had a people-friendly vision very much in *resonance* with his regent, the Maharaja of Mysore, Nalwadi Krishnarajendra Wodeyar. Raina describes the approach that resulted from Visvesvaraya’s visionary tripartite view of development, with education, rural industrialisation and industrial development going on simultaneously, and feeding each other.

M N Srinivas talks of the trend of present-day production related changes to the rural landscape, which is contributing to the death of caste as known – i.e., its hierarchical and traditional norms. This demise of the system of caste is something that could not be achieved even by movements that were intrinsically against caste – Buddhism, Jainism and the Bhakti movement. With modern methods of agriculture, improved communication and related migration, as well as mechanisation of rural manufacturing and practices, the traditional dependence on the owner-client relationship – the jajmani system – has disappeared. The non-monetary nature of the rural economy is transformed into a cash-exchange one, and the subsistence economy, characterised by contentment with one’s lot, is giving way for an aspirational existence driven by market forces.

Anindya Sinha and Charudutt Mishra take us through every moment of their exciting and rewarding adventure as they trace, track and study scientifically their new discovery – the species *macaca munzala*, a rare addition since it is almost incredible that a large primate species could have remained unknown to the scientific community for so long.

Drawing on her close observation of chimpanzees’ reaction to the beauty of nature, their dance which seemed to be motivated by awe and wonder, Jane Goodall wonders if this is not indeed an almost spiritual exhibition of their feeling of oneness with nature. She clarifies that it may be that they are not ‘aware’ that they may have souls, but she asserts that chimpanzees may be more in tune with spiritual power than we are. The other important point she
makes is that she is able to talk about this because she herself was not yet a trained scientist when she began her investigations, which is when her first impressions were formed.

John Marr traces the literary linkages of flowers in the poetry of the Sangam age and finds that they were representative of a geography – the topography, the climate and so on. The flower acquired a value as an exclusive symbol of the region it represented. Marr also finds linkages in the literature between flowers and romance and valour.

“In many ways, American perceptions of India in the nuclear arena have been and continue to be out of step with actual Indian thinking and policy practices,” say Deepa Ollapally and Raja Ramanna, putting forth several arguments in support of their view, such India’s extraordinary restraint in not ratcheting up its defence expenditure. They demonstrate how the Indian quest for autonomy has been shaped by specific historical circumstances and not by a desire to be a hegemonic power.

After describing fun and boredom in the various ways it can be expressed and felt, Arindam Chakrabarti concludes that boredom – in the sense of vairagya – can be fun, as the practitioner of this form of boredom is continuously amused at life and its foibles and refuses to engage with life as if it were a battle to be won or lost. In its deepest sense, therefore, boredom becomes fun. Similarly, fun at its most extreme – with constant indulgence in it becomes boring.

Inferring from the immense courage shown by victims at the Truth and Reconciliation Commission’s hearings, Desmond Tutu says that despite the grim reminders from various parts of the world that we do not learn from history that violence begets violence, still, humanity is largely good. The majority of people are humane, so there is hope for humanity.

Bon Voyage.
Madame and Gentlemen,

Our distinguished Director, Dr. Ramanna, has welcomed you; but I would like to add my own personal welcome, a very warm personal welcome, because as the first participants in this new and, to me, exciting venture, your presence is very important to me.

It is to me a source of great pleasure, not untinged with amusement, that someone who has not even had a university education should be inaugurating an Institute of Advanced Studies.

I would like to tell you the historical background of this institution because I think you will find it an unusual and interesting one. For that I will have to go back a little in time, in fact, about a quarter of a century back.

When Pandit Jawaharlal Nehru died, the usual Memorial Committee was formed and I was put in charge of collecting money for a memorial fund. Through twisting the arms of colleagues, businessmen and industrialists, I was successful in collecting about two and a half crore rupees, which today would be equivalent to at least rupees twenty crores. Thereafter, as a member of the Memorial Committee and Fund, I was somewhat concerned at finding that no important project was proposed to perpetuate the memory of that very great man.

Now it happened that I had a French mother; so I was half French and educated in France. And there I happened to learn

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1 Address to participants in the inaugural course of the National Institute of Advanced Studies held in January 16, 1989 at the Tata Management Training Centre, Pune. Text Courtesy: Tata Central Archives, Pune.
Mr. J.R.D. Tata was the founder-chairperson of the National Institute of Advanced Studies, Bangalore.
that the French system of higher education was a rather special one, founded strangely enough by none else than Napoleon I, who created a very high grade school or college, which he called Ecole Polytechnique, to produce engineers and technical officers for his armies. In the subsequent years, what became known as the Grandes Ecoles – or ‘the Great Schools’ – followed. The most recent one, created only after the last war, was the ‘Ecole Normale d’Administration’ (E.N.A.). Almost all top government officials, including ministers from the Prime Minister down, have gone through these so called great schools.

The most remarkable fact I happened to learn, to my surprise at the time, was that whereas their alumni represented only about 1% of the annual output of all graduates from French Universities, they actually held about 75% of all the top jobs in France – whether in government, in commerce or industry, in banking, or in the armed forces. They were, and remain even today, the educational elite of France. I remember that on one occasion when I was there, every single member of the French Cabinet, from de Gaulle down, came from one of these great schools. Some people think that it created an understandably elitist system which produced remarkable results, and it showed at least an intention to provide for outstanding boys and girls an opportunity to reach the highest possible standards of their potential, and to compete with others similarly gifted. As I had learnt at that time that there were in the universities no comparable opportunities in India for brilliant young Indians, it struck me that perhaps the Nehru Fund could create one or more similar institutions somewhat patterned on the French system.

So to study that idea I went back to France, and I found and invited for advice a very distinguished academician, Prof. Jean Capelle, with whom I created a Committee consisting of a number of people, including one Russian – because in those days one got better support for ideas if there was a Russian involved – and one American, and a couple of Indians, including Dr. Satish Dhawan, who later became head of the Department of Space. Uneducated as I was, I naturally stayed out of it. I got them to prepare a detailed
scheme which I got printed and took to Delhi, and presented to the whole assembled Nehru committee, which consisted of all the leaders of the Congress in those days – including Mrs. Gandhi, of course – and the Secretary happened to be Dr. Karan Singh, the Maharaja of Kashmir.

I got my colleague Prof. R. D. Choksi, to present it, and I waited with some pride and expectation for some members to react to it. To my dismay the one who reacted was Dr. Karan Singh, who I learnt later had a fine academic record but only in the humanities – history, sociology, religion, languages and the like. He was a good friend of mine and happened to be the Minister for Aviation at the time. Karan Singh said to me: “Jeh, what is this nonsense about mathematics”? Unfortunately, in the Report on that scheme was a clause which made it a requirement for admission that the student had to have a strong grounding in mathematics. Maybe Dr. Karan Singh did not know that the French people, or the French academia, believed that a mathematically trained mind was a mind that was best capable of dealing with difficult problems requiring strong concentration, logic and deep thought. Applicants were therefore expected to be reasonably good mathematicians to be admitted into any of these Grandes Ecoles. So when Dr. Karan Singh said, “Do you mean to say that if this school of yours had been there when I was a college student I would not have been admitted”? All I could say was: “Well Karan, if you were as poor at mathematics as I was, then neither you nor I would have been admitted”. Dr. Karan Singh did not take it too well. He threw the brochure on the table and said “Nonsense!”, as a result of which the proposal was summarily rejected. So that ended that particular venture, to my regret.

Fortunately at about that time the first IITs and IIMs were coming up, which did give to brilliant, young Indians greater opportunities than they had had in the past in Indian Universities or Institutes. Except for the one like the Mathematics School of the Tata Institute of Fundamental Research, there were very few highly scientific establishments which gave a chance to the most brilliant of our Indian students.
From then on it became the practice after the death of Sir Dorab Tata that his Trust, of which I happen to be the Chairman and my colleague Jamshed Bhabha is the Managing Trustee, should every few years, create some institution or other of national importance in the educational or other fields.

So a series of them were started over the years until a very few years ago, including the Tata Cancer Hospital and Centre, the Tata Institute of Social Sciences, the Tata Institute of Fundamental Research and the last one, a pet of Mr. Bhabha, its real creator, namely the National Centre for the Performing Arts in Bombay, the purpose of which was mainly to perpetuate India’s dying old heritage of drama, dance and music and also encourage new ones. So about five years ago, when we felt that the time had now come to think of another new institution of national importance, I wondered whether the one we thought of twenty-five years ago could be considered again, perhaps in an amended form. Having talked to my co-trustees and finding them fairly positive, I decided that I should first consult the most outstanding personalities that I could gather into a new committee.

So I went back to France and to Jean Capelle, who said he was too old now but would get someone equally competent; this turned out to be Prof. Philippe Olmer, himself a product of one of the Grandes Ecoles, in fact of the one that is known to produce professors for the other ‘great schools’.

So Prof. Olmer came and I was fortunate to be able to recruit the following eminent men to join him in a Committee to advise us: Prof. M.G.K. Menon; Mr. L.K. Jha, the famous economist and administrator; and Dr. Satish Dhawan, Head of the Indian Space Research Organisation, and Prof. R.D. Choksi, both of whom were members of the First Committee. These erudite gentlemen produced a brief but outstanding report which recommended that there was a case for reviving the earlier scheme, but somewhat different in character.

The Committee came to the conclusion that there was indeed a need for an Institute for Advanced Studies that would bring
together exceptionally gifted and able persons from the different streams of national life – the civil service, business and industry, the academic world and from the professions. Unlike the 1966 project, the revised Institute’s scheme would not be for students but for participants in a programme of continuing learning through lectures and discussions.

The Committee criticised over-specialisation in all walks of life and the tendency to regard education mainly from the one aspect of acquiring more degrees and more diplomas. They pointed out that no amount of academic education can any longer prepare a person for a career which will last another forty years at least.

We accepted the Committee’s recommendations and decided that the principal objective would be for participants to be drawn from government and non-government sectors and the professions, thus bringing together promising young administrators and executives in order to help them get a better understanding of each other’s tasks and problems, and to assist them in developing the best means of dealing with the many inter-related problems arising from the complex changes taking place in our fast evolving world.

Another objective goes back to the original philosophy of Jamsetji Tata who, when creating the Indian Institute of Science, visualised it not only as a great centre of scientific research and learning but one which would also provide its students with opportunities to nourish their minds with the study of philosophy, history, archaeology, statistics and philology.

In keeping with his original vision, in the aims of this Institute has been included the belief that there is both the need and desire amongst young, educated people, who in their excessively specialised academic studies are so often denied the opportunity to be exposed to what is loosely called the humanities – the arts, music, poetry, history and philosophy – which though unconnected directly with their active working life are important elements in the make-up of a liberally educated person such as Jamsetji Tata conceived.
Whereas the decision was taken to proceed with the project, the three principal issues to be considered were: where to locate the Institute; how to finance it; and who should lead it. Nothing could be more important for an establishment like this, if it had to evoke confidence, respect, and even admiration if possible, than the choice of its leader; and it should be someone of considerable stature. It was agreed that, considering the record of Dr. Ramanna, we could not have done much better. We are very proud of his being in charge of this Institute from the very beginning.

We were anxious that the Institute should be located at Bangalore, in fact in the premises of the Indian Institute of Science if they could spare four or five acres from their very large campus area. We are fortunate that they responded generously and are very grateful to their distinguished Director, Prof. C.N.R. Rao. If we are inaugurating the Institute today in Pune, and not in Bangalore, it is only because we do not have a building of our own yet, and it will take a couple of years to put one up in Bangalore. We are therefore taking advantage of the facilities generously offered by the Tata Management Training Centre for holding our inaugural session.

Dr. Ramanna in his introductory speech has already thanked many kind people and the Government of India as a whole, but I think I should personally express my gratitude to the Prime Minister himself, without whose support the approval of the government would not have been obtained.

I myself would like particularly to thank the Government of Karnataka, who not only welcomed us, but also promised us a tax-free loan of one and a half crores of rupees for ten years.

Dr. Ramanna has mentioned Jamshed Bhabha. Jamshed Bhabha is one of those beings who, when he sets his mind on something or adopts a proposal, will never give up. He has all the qualities of the species of the crab or the crocodile. And he has from the start been a great help to me and to the scheme as a whole.

I am grateful also to Dr. Menezes, Director-in-Charge of the Tata Management Training Centre, who very readily put the whole
of his establishment and its facilities at our disposal. He would have agreed even if it had been for a longer period – perhaps three months. But even so, we are extremely grateful and I hope you will find yourselves reasonably comfortable, the surroundings pleasant, and the sort of atmosphere that will encourage the kind of thinking and the kind of valuable cross fertilisation of minds that we want to see.

So Madame and Gentlemen, this ship has been launched at last, after nearly four years of consideration and discussions. It will sail in largely uncharted seas but I hope that you, my dear young people, as the first passengers on its maiden voyage, will find the trip a pleasant, useful and enriching experience.

I shall, therefore, end my overlong remarks merely saying “Bon Voyage”.
I have decided to speak on communalism and history for two reasons: one because it is a topical subject, although it has been with us for some years now, and takes the form of the increasing communalisation of Indian society; and also because as a historian, I feel, as many historians feel in this country, that the link between communalism and history is a false link and that there is a tendency for communal ideology of all kinds, - the Hindu, Muslim, Sikh, etc. - to erroneously claim legitimacy from history. Therefore, historians have to continuously point out that there is a distinction between what actually happened in the past and the way in which people in the present represent it and use it for legitimising their ideologies of the present. I would say categorically that the ideology of communalism is something that has grown out of the politics of the nineteenth and twentieth centuries in India, encouraged by colonial views of these centuries and even more by the politics of recent decades. It is not, in fact, a product of the historical evolution of our society.

Let me try and give a brief definition of what I mean by communalism. It is the kind of ideology which first of all perceives Indian society as always having been constituted only of religious communities. That is, the concept of what constituted Indian society, in the past and today, are and have been religious communities. Other categories of communities, such as those of caste and language and region, do not matter to the same degree. Secondly, that these communities are projected as always having been hostile to each other. Further, that it is an ideology which

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1 Lecture delivered on September 16 during the Fifth Senior Executives Course held between September 16 and October 13, 1991 at the National Institute of Advanced Studies, Bangalore.

At the time of the talk, Prof. Romila Thapar was Professor of Ancient Indian History at Jawaharlal Nehru University, New Delhi.
seeks to give reality to politics by basing politics on religious communities. Politics is also viewed in terms of benefits and disadvantages to religious communities. Political allegiance relates to a religious community and political actions are designed to further the interest of that particular communal ideology. Religion, therefore, becomes a mechanism of political mobilisation. There is also a re-ordering of religion to suit this new role of becoming a mechanism of political mobilisation.

Most importantly, historical justification is claimed for a particular identity and this identity is often arrived at by resort to numbers. The concept of majority and minority communities developed from taking a census which counted religious identities in terms of numbers, and from separate electorates based on religious representation. What I am saying is that religious identity by itself is not communal; therefore one has to make a distinction between religion per se, and the use of a religious identity for political mobilisation. The latter introduces the communal element. It also assumes the posing of historical hostility between the communities and justifies aggression between them.

Furthermore, these religious communities are treated as monolithic. If you are a Hindu, you have to identify with all Hindus all over the sub-continent, and similarly with Muslims and Sikhs. To be anti-communal therefore is not a denial of religious identity but recognition of differences. It is the denial of using the religious identity for political purposes.

There is a further historical dimension to this and that is the difference over the last hundred years (from the late 19th century to now) between the way in which colonial historians have interpreted communalism in India – and the term has a particular meaning in Indian politics – and the way in which nationalist historians have interpreted communalism. Colonial historians largely argued that communalism was present from the beginning of Indian history. It was normal to the pre-colonial past and history is therefore reduced to the history of the relationship between these large monolithic religious communities. Nationalist historians on the other hand
assert that communalism is a problem that has come about in recent times. It has been brought about by colonial rule, by the economic and political conflict that was introduced by colonial rule; it is an expression of a certain kind of elite colonial control of Indian society and that relations between different religious communities do not alone constitute the history of the past. The history of the past must be seen from other aspects as well.

I would like to argue that two perspectives are intertwined in this debate. Firstly, what are the themes which have encouraged the communal view of Indian society? In other words, in what way have we interpreted our past which has encouraged the communal position? Secondly, what is the evidence which we have from our past that has been ignored, or not given much attention to by historians and others, which might have prevented a communal view, and which today questions the communal view of the Indian past? The two themes are interlinked. They are extremely important because Indian society today is facing not only the communalism of minority groups, such as Sikh, Muslim and other communalisms, but we are now facing what is more serious in many ways, the communalism of the majority group, that is the Hindu communalism.

History becomes relevant to communal ideology when communalism tries to seek legitimacy from the past. This is done in various ways. One is the rather crude level of seeking legitimacy through an abuse of history. For example, the claim that Indian society was always divided into religious communities. One of these religious communities was always the demon and misbehaved and the other was always the moral community, i.e. the one that was the victim of this misbehavior. This is done at many levels: one level for example is that all great achievements of Muslim activities in India are to be explained by saying that they are in essence Hindu and not Muslim. Thus you get the theory that the Taj Mahal is in fact a Rajput Palace, a theory which no self-respecting historian supports. It has been put forward by a person who has done no historical investigation. And this is often the case with such theories.
But these are distortions which catch on, they come into the media, papers like the *Illustrated Weekly* give publicity to this theory and then they also enter text books.

There is another aspect to this abuse: if certain events took place in the past which were hurtful to a particular community, they have to be reversed in present times. Therefore, if in the past Muslim conquerors broke Hindu temples and built mosques in their place, we set right the wrongs of history by breaking those mosques and building temples where those mosques once stood. This is supposed to be the logic of the dispute over the Babri Masjid. From the historical point of view this is an obviously fallacious position. One cannot change history. History is something that has happened in the past. One may judge what has happened in the past, but one cannot undo the past and redo it so as to forget one kind of past and try and overcome it by constructing literally another kind of past. Historically, we have to come to terms with what is actually there. There is also a deliberate treatment of the past for propagating an emotional position in which the antagonism of one community towards another is also encouraged. Therefore, in a Hindu-Muslim conflict the heroes are always those that took an anti-Muslim position. Hence, the emphasis is on people like Rana Pratap as the greatest hero from the past. This is really an unthinking argument trying to simplify history into positive and negative sentiments and a misuse of history, which, unfortunately, the media picks up with great alacrity and enthusiasm.

But there is another fundamental level at which one has to reconsider and re-analyse the history of our society and this is what I was talking about when I said “What are the themes that have encouraged a communal approach to Indian history”? One of these is a very basic theme, it seems to me: the periodisation of Indian history into Hindu, Muslim and British. This is a periodisation which was unknown to India and invented by James Mill in the early nineteenth century. Mill divided Indian history into Hindu civilisation, Muslim civilisation and the British period. Interestingly, he does not call it the Christian civilisation and for obvious reasons.
Mill was a utilitarian and great believer in law and legislation as a factor of social change and Mill was convinced that Indian society, whether Hindu or Muslim, was civilisationally extremely backward; and that the coming of the British was a kind of release which was going to introduce a new civilisation which would be the right kind of civilisation with a utilitarian emphasis.

The interesting thing is that this interpretation which has dominated Indian history as the first periodisation, was put forward by an English writer who had little information on India. Mill was employed in the East India Company in London, he never visited India and never studied India on the ground as it were. His access to information was in any case very limited because he was writing in 1819-1823, at a time when the amount of information on India was small. The book became a hegemonic text, the dominant text on Indian history. The periodisation therefore (Hindu, Muslim and British) came to be established and all historians, whether Indian or British, accepted it. In fact, it is now being heavily underlined by communal ideology because it poses the difference between Hindu and Muslim civilisation as being fundamental. What is interesting is that historians of various persuasions have, in the last last thirty or forty years, been accused by communal Indians of endorsing foreign theories and of being purveyors of foreign ideas. The Marxists in particular have been attacked for this. Yet the major theory which is entirely alien to the historiography of the Indian sub-continent, that of Mill and his periodisation, is accepted without hesitation by communal groups as being indigenous and unquestionable. It is anything but that. What is also important about this periodisation is that the term Hindu includes everything that is non-Islamic and non-Christian; it includes Buddhists, Jains, Sikhs and every other religious group which may even have risen in opposition to Hinduism.

The notion of the majority and the minority communities is again an entirely nineteenth century concept. It begins with the Census, and with the introduction of separate electorates, and counting the people who constituted the electorate, arguing that the
larger number is the majority community and is to be defined again by religion as the Hindu, and the lesser numbers are the minority communities, to be defined by a variety of religions. The notion of a single community did not exist in the past, nor any that were defined as Hindu until about the fifteenth century. There were multiple notions of community: there was community by caste, by religious sect (Vaishnava, Virashaiva, Pashupatha, and so on), by village, by language, by location and region. But references to Hindus begin in about the fifteenth century or so in texts in the indigenous languages. As a concept this was unknown earlier. Nor was race an identity, and therefore the theory of the Aryan race, which was also enunciated in the nineteenth century, is an equally unacceptable concept.

The term Hindu comes into use in the writings of Arabs who speak of Al Hind, the land which lies on the other side of the Indus river. The name Indus, derived from the Greek, Indos, is based on the Sanskrit, Sindhu. The Arabs aspirated the name and it became Hind and Al Hind. It is essentially therefore a geographic concept for at least five centuries. It was first extended to refer to all the people that lived in Al Hind. They were all referred to as Hindus irrespective of their actual religion. When it was found that the religion practised by the people of Al Hind was not Islam nor was it Christianity, nor Judaism, which were three religions that West Asia was familiar with at this time, the term Hindu also came to be applied in a religious sense, and it came to acquire a religious definition. But it is important to keep in mind that it was in origin a geographical concept.

There is another distinction which we have to remember: that when we talk about a religion called Hinduism today (the term is first used in the colonial period), it would be historically more correct to refer to not a single religion but to the plurality included in this term – as originally defined. More correctly we should speak of the Hindu religions. There were in fact distinct religions and practices contained within this umbrella term. It is important to remember that Hinduism is not a historically evolved religion in
the same way as Islam and Christianity. There is no founder, there is no ecclesiastical organisation that is obeyed by and serves all Hindus, and whose dogma and theology are accepted by all those who call themselves Hindus. Because there is no historical point at which it was founded, sects do not necessarily branch off from an original teaching; many are founded independently. The multiplicity of sects are frequently created through cults or through deities that are brought together and may attach themselves or may be sub-sects of once existing religious sects, or may be independent. But the notion of a particular point in time, when a historical founder preaches a teaching from which dogma, theology or a historical revolution follow – this is, in fact, alien to what we call Hinduism. This therefore influences the social role of religion and makes issues of religious identity and conversion marginal to religious practice. Identity was anyway tied to caste, particularly to jāti, as it was to be in all the religions, to a greater or lesser extent, that were and are practised in India. This social function of religion makes the definition of religion different in India and China from that of Europe and west Asia.

In the pre-colonial period religion and politics were often close, but this is not the same as the use of religion for political mobilisation as in the politics of today. Hindu communal ideology argues that prior to the coming of Islam there was complete religious tolerance in this country. This is explained as due to the absence of an intolerant religious group, such as any of the Semitic religions – Judaism, Christianity and Islam. There is, however, evidence of conflict which historians have either underplayed or ignored. There was conflict between the Buddhists and Shaivas in Kashmir; Kalhana in the Rajatarangini, his history of Kashmir written in the twelfth century, gives descriptions of the killing of Buddhist monks, and the destruction of Buddhist monasteries. In Karnataka there are inscriptions recording conflict between Jainas and Shaivas. Such conflicts occur elsewhere too as in Tamil Nadu, Gujarat, Bengal and other places. What is interesting about this expression of intolerance is that it does not occur simultaneously
in other parts of India. The Shaivas in Kashmir do not issue a call that all Shaivas in the country should destroy the Jaina and Buddhist temples. In each case it is a local issue of contention between what were regarded as local religious sects. Nevertheless they have to be analysed historically and explained.

The historian has to ask why there was this expression of intolerance, violence and hostility. The reason is frequently the competition for royal patronage. Most of these sects received royal patronage in the form of land, villages, wealth, and income of various sorts. It was therefore a competition over acquiring wealth as well. Given the acquisitive instincts of religious institutions, the competition was fierce. This is demonstrated in the way some of these sects made a profit from trade and among them the control over trade routes was crucial. What I am trying to underline is the distinction between personal religion which can be tolerant, and the role of religious institutions and organisations which have both political and economic agendas which makes them competitive and intolerant. The two have to be differentiated.

Communal ideologists argue that once the Islamic element enters, the scene becomes violent, intolerant and aggressive. So the historical question is how the indigenous population viewed the entry of those who are identified as Muslim in religion. They enter India in various ways. We have been taught to recognise them only as invaders. But they come in many other ways: there was a regular circuit of pastoralists who came from Afghanistan into the north-west and had a symbiotic relationship with local farmers and this has been continuous for many centuries. There were traders who had close relations with local traders all along the trade routes. The most prominent of these were Arab traders who from the eighth century settled along the west coast and established new communities of mixed religions such as the Khojas, Bohras, Navayats and Mapillahs. Some among them held administrative office in the Rashtrakuta kingdom. There were Sufis who came with a different kind of Islam and had close relations with religious
sects in the sub-continent. And there were armies that came as invaders, but soon settled in northern India.

The terms used for those who came into India consisted in the main of four terms. Interestingly there is sparse mention of Islam or Muslim or Mohammedan. Mohammedan and Muslim come into use later. These groups are referred to either as Shakas, Yavanas, Tajikas, Turushkas and Mlechhas. Shakas and Yavanas were traditional names regularly used in ancient times for the Scythians, Greeks and West Asians. Shaka goes back to the Shaka rulers of the north-west and has a central Asian association. Sanskrit inscriptions of the thirteenth and fourteenth centuries found on Turkish monuments from regions around Delhi, Rajasthan and western UP, list the succession of dynasties as Tomara, Chauhana [both Rajput] and Shaka, where the last refers to the Ghoris and Shahis – all those that we today indiscriminately call Muslim dynasties. Yavana is the sanskritisation of the term Yona which is the Prakrit form of Ionia and therefore refers to the Greek settlements in west Asia. It came to be used frequently in later centuries to mean anyone from west Asia, or even from the west. Turushka is an ethnic term referring to central Asians and to Turks. This can be used to include a variety of Turkish and Afghan people. Tajika was used more frequently for the Arabs and why this word was chosen remains unexplained as it usually refers to people of central Asian origin.

A commonly used term that goes back to earliest times is Mlechcha. Mlechcha means someone who is outside the social boundary where the definition of the boundary is based on language and caste identity. Mlechcha could be local persons such as forest dwellers or foreigners until the time they were absorbed into the language and caste identity. Thus Yavanas, initially the Greco-Bactrians, were called Mlechcha until such time as they were absorbed into Indian society and given the caste status of vratya-kshatriyas, degenerate kshatriyas, when they started using Sanskrit and Prakrit and settled in India and became rulers in some areas. Historically, therefore, people in India did not see the coming of Turks, Afghans and Arabs as completely
alien people. There was a tendency to see them in terms of a continuing movement from central and west Asia, which in fact goes back to Harappan times. What is interesting is that the term that was applied to religious dissenters was not used for Muslims. This was *pashanda*, initially meaning any sect and later meaning a fraudulent sect. The brahmans used it for the Buddhists, Jainas and other heterodox sects, and these retaliated by using the same term for the brahmans. The use of the term Hindu in the chronicles of the Sultanates of Delhi, Gujarat and Bengal, refers to Hindus as a term that covers the entire non-Muslim population and means the people of Al Hind, and includes religion as well as social and linguistic categories.

Let me now turn to another aspect which is frequently referred to as being characteristic of the period of Hindu-Muslim relationships from the twelfth century onwards. The breaking of idols and destroying of temples is generally treated as a stereotype of all Muslim rulers, forgetting of course that this activity is associated with non-Muslim rulers as well. Destroying temples is not something that is confined to the coming of Turks, Afghans and Arabs. Admittedly the incidence of breaking temples is less frequent among non-Muslim rulers. But there are important incidents of other times that we should keep in mind. Kings of Kashmir after the eighth century looted temples and a particularly remembered king in this connection was the eleventh century king Harshadeva, referred to at length in the famous history of Kashmir, the *Rajatarangini* by Kalhana. He writes that Harshadeva suffered a financial crisis, and the only way he could get wealth was by destroying temples. So he appointed a special category of officers who are referred to as the officers in charge of uprooting the gods. Their work was to officially take away the wealth of temples, destroy or carry away the idols and if need be revoke the royal grants of earlier kings which had provided land and tax revenue to the temple. This was an extreme situation of financial crisis. The interesting point is that it is done politically. There are references to the twelfth century Parmara rulers of Central India.
who destroyed the temples of the Jainas in Gujarat, and, of course, Jaina temples frequently suffered at the hands of Hindu rulers in other parts of the country as well. It is not always clear as to who started the trouble.

Another interesting case involves the Chaulukyas/Solankis, who built a mosque in Cambay in Gujarat for a local Muslim. A Parmara ruler who went to war against the Solankis destroyed this mosque in order to get even with the Solankis. Here there is a conflict of two Hindu dynasties in which one destroys the mosque which the other had built not because of antagonism against the Muslim, but because of enmity against the other Hindu. The building and destruction of temples and mosques is because these monuments, apart from their religious function, were statements of power and are not limited to being just religious monuments.

This is also seen in another example where temple building was embroiled in politics. What happened to the Krishna Janmabhumi temple in Mathura is, historically, a case of how an area regarded as sacred changes hands. The area where it was built, called Katra, originally had Buddhist monasteries and not surprisingly much of the sculpture that has come out of excavations and incidental findings was Buddhist. At some point it ceased to be Buddhist and we don’t know why. Was it just a process of decline? Was it a part of the general attack on the Buddhists, by not only the Shaivas but also the Huns from central Asia who were ardent Shaivas? It was turned into an area with Hindu shrines. With the increasing popularity of the Krishna cult in the mid-second millennium AD, various Vaishnava sects settled in the area and worked out a sacred topography involving the legends of the life of Krishna. The Janmabhumi temple was built by Bir Singh Bundela, the ruler of the small principality of Orchha located in Bundelkhand.

Bir Singh claimed to be a Rajput and was a close friend of Jahangir, for whom he built a palace at Orchha which to this day is called Jahangir Mahal. The temple was built at a cost of thirty-three lakhs, a huge amount at that time, which he collected by various techniques, by legal and illegal extortions for which the Bundelas
were quite famous. And everything went well until much later when, subsequent to the reign of Shah Jahan, there was a problem over succession, intensified by the politics of various factions. The Bundelas supported the party that was opposed to Aurangzeb. Finally, when Aurangzeb became king, the Bundelas instead of making peace with him led a Jat revolt against him. The revolt was not against the Mughal administration but against Aurangzeb himself. Aurangzeb suppressed the revolt and to demonstrate his authority destroyed the temple of the Bundelas, and built his Idgah at the same place.

Once again, one cannot view this episode as a purely religious conflict. It was tied into the politics of the Mughal court. And the question we need to ask is what is gained today if we break that Idgah and build the likes of a Birla temple in its place, as is becoming the demand. Are we thereby going to really change history?

Yet another contention is that of the periodisation of Indian history. Colonial writers argued that Hindu and Muslim societies were two uniform monolithic societies. Muslim society had a ruling power behind it and Hindu society had less political power, and these two monolithic societies were constantly in conflict. This image is supported by some of the chroniclers writing at the courts of the Sultans. But history is not based only on the chronicles of rulers. If that were so we would in fact have a distorted picture of the past. History is also based on evidence that we can collect from other strata of society, from other interests and activities. Looking at other social levels during this period, there is a reflection of other situations and answers to questions relating to similarities among those that have been identified as Muslims and those that are being identified as Hindus. In fact, lower down in society, among the broader mass of the people, the dichotomy of Hindu and Muslim begins to get blurred.

I am not arguing that there was co-existence and complete tolerance. This would be untrue of any period of Indian history, pre-Islamic or Islamic, or later. We know the complexities of social groups, even those that identify themselves with the same label.
What I am trying to say is that instead of looking at these groups as monolithic groups, it is more important to analyse the kind of differences that existed between them and see what emerged from this interaction. It is frequently said that there was no interaction. The Hindus and Muslims went their separate ways and constituted two absolutely separate societies. But this is belied by a large body of literature that records popular expression and concerns. In Maharashtra for example, history at the elite level sees only conflict between the Mughals and the Marathas, yet in the society at large the sentiment is quite different. There is a text recording these sentiments written by the sixteenth century brahman, Eknatha, called *Hindu Turk Samvad*, the dialogue between Hindu and Turk. This is a use of the term Hindu by a Hindu for himself. In this dialogue Eknatha poses a range of questions about deity, ritual, belief, religion, social practices and frank discussions on the different or similar manifestations of these. At the end he states that since we are all living together we are clearly borrowing each other’s ideas and customs and there has to be a continuing dialogue.

This living together is also demonstrated in inscriptions located in mosques and similar buildings. Among the earlier monuments associated with a mosque perhaps the best known is the Qutub Minar in Delhi. It has many inscriptions, most of which were engraved by the masons working at the site. One long inscription in Devanagari dates to the fourteenth century when the structures were renovated and is a eulogy to the god Vishvakarma. Another in the mosque at Jaunpur has verses in praise of Ganesh. There are texts in Sanskrit giving instructions on how to build a mosque because such texts were needed, given that the building supervisors and craftsman were local. The mosque is described as a *prasada*, a temple to the deity, so building it required devotion, dedication, and adoration of the deity on the part of the builders.

I am giving these examples because such facts do not find their way into the media or history text books. They remain hidden in the research papers of scholars. There are many situations where what is actually happening is what might be called cultural
translation, and it is important to understand what form this took at that time.

Another important question relates to the notion of conversion. One constantly reads about chroniclers saying that there was a battle and 50,000 people were given the choice of either death by the sword or conversion to Islam. In fact, when one reads the texts one finds that conversions are generally not carried out at the end of the battle. It is the Sufis in their khanqahs, centres of worship, who are responsible for most conversions and this is a long drawn out process. Secondly, conversions are generally by caste. There are fewer individual conversions except among the elite. Generally a jati in an area would convert. And then there is also the question of how the notion of conversion was understood by the local people. The situation was one where conversion is important to one group of people but is absent among those constituting the host society. One was born into a particular jati and observed its rituals and derived religious knowledge and behaviour from caste practice more than anything else. There is in fact no ritual of conversion and yet there was now a new group of people for whom conversion was central. What do the local people, and those coming to settle, make of this? Everywhere else in west and central Asia there has been conversion to Islam, but in India they are meeting with problems regarding conversion. This is a sensitive issue that needs to be analysed.

Another aspect of the problem is that today with the increase of the communalisation of various groups, and particularly the increasing communalisation of the Hindu majority community, there is also a change in the understanding of Hinduism itself. Historically, there are always redefinitions of a religion in times of historical change. No religion is static. The change in Hinduism is an attempt to make it similar to Semitic religions since it then becomes easier to use for political mobilisation. In this process some new ideas are seeking support. There is a concern for identifying a historical founder. Mention is made of the avatars in Vaishnavism – Rama and Krishna – as being equivalent to the founders of Semitic religions. There is also the notifying of the
single sacred book, which again is an alien idea. Since Hinduism is not a religion of the book, many books are regarded as sacred. Do all Hindus regard the same book as the most sacred? There are interesting legal discussions in the nineteenth century when the British legal system was introduced. In the British legal system, Christians swear on the Bible, the Muslims swear on the Koran. What single sacred book do the Hindus swear on? But this is beginning to be discussed now, the choice often quoted as being between the Valmiki Ramayana, or the Bhagavad Gita. Congregations and institutional bodies were once alien to the Hindu religions, but now there are decisions taken by the Council of Shankaracharyas, and the Dharmasansads. Problems in the Ayodhya conflict are referred to these bodies. Indicative of the alien nature of this change is when Ayodhya is described as the Vatican of Hinduism. Conflicts tended to be localised in the past and would be settled at that level. The attempt now is to create a religion that will cut across sectarian and caste differences and allow a kind of unified expression in the name of Hinduism. This of course suits political purposes.

Finally, one has to analyse in detail as to why there is an increase of communalism in India today. Why should Indian society have to be seen only in terms of religious communities? In the pre-British period religious conflicts were of a localised nature, where other factors could be more important as factors of identity. The two nation theory developed in the colonial period drew on religious symbols and used them for mobilisation. This up to a point also influenced nationalism. Historians are debating the degree to which the Indian National Movement encouraged the use of religious symbols; or were these essentially cultural symbols given a nationalist meaning? The thrust of the two-nation theory came from the interpretation of Indian history by colonial scholars, such as the periodisation of Mill.

Today there is a different situation in which there is a large-scale mobilisation of communal identities with repercussions which will be very different to what we have known. It is not just adjusting to the partition of the country into separate states, but a change in the
very nature of Indian society. Therefore it is important to analyse it. Those that are frontally involved in communal ideologies are largely members of the middle classes with new identities, with economic success and with closeness to power. All of this is then wrapped into the framework of a communal ideology, which is a convenient ideology, nurtured on a believed emotion and not requiring careful thought. Religion has answers that are ready made. Finding alternate answers requires intensive thinking and discussion.

A characteristic of communalism is the generation of riots involving increasing numbers of people. The riots also aim at destroying the economic bases of the other community, as for example, in the major riots at Meerut and Bhagalpur, in which the weaving community suffered because of the destruction of their looms. The killing of people apart, the life-line of the community is destroyed. This marks a departure from earlier antagonisms.

At another level, the crisis of modernisation and westernisation requires an answer to the question of whether it is necessary to have to give up one’s tradition in order to modernise. What is one giving up? What does it do to conservatism? Is it an attempt to retain conservatism? Or is it an attempt to work out new hierarchies which are important to a society that is changing in the way in which we are changing? Is it tied to a sense of guilt, when giving up one’s tradition and conservatism and taking on new values or ways of behaviour that are antithetical to the earlier ones? There is a sense of insecurity - both economic in a highly competitive society as well as the insecurity of losing the old order and not knowing quite what to replace it with.

Related to these questions there is now an important new element which is setting the fashion, as it were, for the middle-class. This is what is known as the diaspora, the Indians, whether Sikh, Muslim or Hindu, who are settled particularly in the first world countries like Canada, USA, UK, West Germany, and who face a crisis of identity which is in many ways much worse than the crisis which middle class Indians face in our society here. Diaspora Indians live in the midst of other people who tend to
regard them as alien. The crisis is how to bring up Indian children in this ambience – as citizens of the country where they have settled but whose culture is unfamiliar, or as representatives of a culture that they have left behind and from which they are also slowly becoming somewhat alienated. There is a sense in which this crisis of identity turns them into defenders of an imagined tradition, which is anyway changing in the homeland. This is a crisis that all immigrants face in the first couple of generations after migration. Their success in the first world, which has become the pace-setter for middle-classes, generally makes them role models for the middle-class at home.

My final point is that, given these facts, we have always to distinguish communal ideologies from history per se, and understand that communal views of the past arise out of problems of the present and have to be understood as the inter-play of the past and the present. We have to be wary of one other aspect which I touched on briefly and that is the combination that this ideology tries to suggest between religion and nationalism.

This is the combination which leads logically to the establishment of a religiously based nation state. I think that this is something that is extremely crucial because it is this kind of combination which is going to determine the quality of the society that we will have in the next century. Therefore it is necessary that we make our choices very carefully. Do we really want a religion-based nation state, or do we want a nation state of another, more secular kind? But again I would like to re-emphasise the fact that communalism and communal ideology is not something that grows out of the ancient and medieval past of our society; it grows out of the present and it does have devastating consequences if it is not questioned before we move into the future.
Violence in India:  
A Psychological Perspective

R. L. Kapur

Introduction

It is a matter of great concern that there is an increasing tendency amongst the Indian youth to adopt antisocial and violent means to attain, what they believe, are legitimate goals. No day passes without newspaper reports of indiscriminate destruction of public property and murderous frenzy erupting in different parts of the country.

The situation is frighteningly complex. No one can underestimate the hurt caused to regional pride or the pain caused by economic disparities, religious bigotry and caste hierarchies. No one denies the role of political forces both within and outside the country which exploit our youth in the name of injustice.

But how does one explain the senselessness of violence, for example that shown against the innocent families of Punjab policemen or that shown in self-immolations which followed the proposed implementation of the Mandal Commission recommendations? What purpose could this kind of violence serve, however worthy the cause? And how does one explain the wayward destruction of public property which emerges when students are not allowed to indulge in copying in an examination or when tickets to a coveted cinema show are not available – surely the flimsiest of reasons for such an outrageous response?

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1 Under Creative Commons licence from the Indian Journal of Psychiatry, 1994, 36(4), 163-169. The paper is based on the D.L.N. Murthy Rao Oration award acceptance talk delivered by the author at the 46th Annual National Conference of the Indian Psychiatric Society on January 6, 1994. Prof. R. L. Kapur was then Professor at the National Institute of Advanced Studies, Bangalore, and Deputy Director of the Institute.
**Ethological Basis of Violence**

Violence is a part of nature. One living being survives by committing violence against the other. But what about violence against members of one’s own species? Is that also a part of nature? According to ethologists, it is, the purpose being as follows:

1. Distributions of population over large areas so that there is greater access to food.
2. Selection of the best and strongest genes.
3. Defense of the young.

In higher animals, especially amongst human beings, the development of culture has devised other methods of achieving the same purpose. But, sub-programs of aggression still exist in our nervous system and are unleash when triggered off by specific environmental cues.

One form of intraspecific violence relevant to our discussion, which is programmed in our nervous system is what Lorenz (1963) calls Militant Enthusiasm. According to him, Militant Enthusiasm is the basis for communal aggression. “A shiver runs down the back ... along with the outside of both arms. The instinctive inhibitions against hurting or killing one’s fellows lose, unfortunately, much of their power. Rational considerations, criticisms and all reasonable arguments against the behaviour dictated by militant enthusiasm are silenced by amazing reversal of values, making them not only untenable but base and dishonourable. Men may enjoy the feeling of absolute righteousness even while they commit atrocities ...” Lorenz believes that this communal defence response must originally have been made to protect a community of concrete individually known members of a group, held together by a band of personal love and friendship. But over time, through a process of conditioning, the same response would now occur when the group’s values, rites, customs or symbols are challenged.
Environmental Triggers to Aggression

What are the environmental cues which trigger off aggression programs in the nervous system? It requires little more than common sense to understand that such cues would be provided by the frustrations and provocations of everyday life. However, not everyone responds to frustrations and provocations with aggression and violence. People learn to be aggressive through the process of identification with aggressive models, especially in societies where being aggressive carries a positive status level and where aggression brings rewards (Short, 1968).

The aggressive models need not be alive. Symbolic models as shown in films and television have been demonstrated to increase the aggressive response amongst viewers. Research has shown that film and television violence can have at least four different effects. Firstly, it teaches newer techniques of committing violence (Bandura, 1973). Secondly, it loosens one’s natural restraints especially when ‘super’ heroes do the killing and good triumphs over evil by violent means (Berkowitz, 1970). Thirdly, it desensitizes and habituates people to the consequences of violence (Cline et al, 1973). Finally, it distorts the experience of social reality; heavy viewers of television violence are less trustful of others and over-estimate their chances of being criminally victimised (Gerbener & Gross, 1976).

While frustrations resulting from deprivation are the main instigators of violence, it is also known that most impoverished people do not aggress, but instead react with helplessness and apathy. Discontent in fact produces aggression only amongst those who have had some success in raising their living conditions. Davies (1969) has pointed out that revolutions occur when rising expectations which accompany this success somehow meet with blocks and sharp reversals. It has also been shown that people judge their status not by comparing themselves with their own past but with those around who seem to be doing better. It is this relative deprivation which seems to matter.

One of the most powerful releasers of aggression is membership of a crowd. In a sociological classic written in 1896, Le
Bon describes the psychological characteristics of a crowd. Prentice-Dunn and Rogers (1983) have reviewed more recent research on the subject. It seems that there are two major mechanisms which promote aggression in a crowd. The first is a sense of anonymity which allows persons to feel that they may not be held responsible for their actions. This is a conscious mechanism. The second is an unconscious process of deindividuation which undermines self awareness. As a result, the crowd becomes highly suggestible to external stimuli which can sway its mood and behaviour from one extreme to another in quick succession.

Perceptions and emotions get distorted imparting an almost religious significance to the issue at hand. The tendency is to become dogmatic and there is a desire to spread the dogma. Contradictions are not tolerated. Not prepared to tolerate obstacles between desire and its realisation, the collective mind is willing to commit aggression of a kind otherwise impossible if the members of the group were on their own. A leader who is himself intoxicated by his message and is able to convey it through vivid imagery backed by convictions which are affirmed repeatedly can lead this collective mind as far as he chooses. If he is also astute enough to use cultural symbols like flags or much loved mythological figures – which according to Jung (1978) are ultimately derived from essential archetypes thus having an immense psychic charge – he becomes unstoppable.

**Psychological Basis of Morality**

If violence is so pervasive, has deep psychological basis and is constantly in danger of being triggered off by environmental factors, why is it that the human species has not annihilated itself?

This annihilation is prevented by another program which is also a part of our biological heritage, though in our evolutionary history it appeared much later than aggression. This is the program of Empathy. According to Fenichel (1945) empathy consists of two acts: (a) an identification with the other person and (b) an awareness of one’s own feelings after the identification, and in this way awareness of the object’s feelings. There are good reasons to believe
that the basic capacity for empathy is present in some precursor form at birth (Brothers, 1980). It is subsequently elaborated by cognitive maturation and social experience, so that by the age of two, a child is able to put herself in another person’s shoes and say, “let me not hurt her because she is like me” (Kagan, 1983).

Empathy is the base on which the future moral standards of the person are built and for the blossoming of which this program needs systematic nurturing by the society. Parental training of the do’s and don’ts are important for the strengthening of this faculty. Also important is the availability of role models such as parents, teachers, friends, mythological figures – with whom the child can identify. Healthy societies use these models to propagate the values of friendship, togetherness and mutual give and take. Parents and teachers talk about these values, often reinforcing the words with suitable rewards and punishments. Stories are available from history and mythology eulogising heroes and heroines who exhibit these qualities. Most importantly, people around the growing child – parents, teachers, relatives, friends – must exemplify these qualities themselves.

By the age of ten, a child starts looking for a match between what is said and done. When role models practise differently from what they preach, it creates tremendous anxiety in the mind of a child. It must be understood that his need to fashion himself on a role model is very strong in growing children, especially during adolescence. So strong is this need that when cultural values are weak or when models are inconsistent, the young feel a sense of hopelessness and helplessness. The cultural values become weak when society is undergoing rapid social change. The weakening of these values leads to a sense of isolation, confusion, personal disorganisation and alienation. Alienation in turn gives rise to a sense of powerlessness. Major social institutions like government, political parties, leaders and judiciary appear unresponsive, remote, ineffective and untrustworthy. Life starts appearing meaningless. The young then respond either by withdrawing from adulthood, leading an escapist existence or by allowing the aggression program to take over. The consequence here is lashing out in violence at the
slightest frustration or following small men with limited vision only because they appear to be clear and consistent.

**Violence in India: Marxism, Communalism and Terrorism**

Something of the sort described above is happening in India today. Relative deprivation is too obvious. Aggressive stance often gets rewarded. Television and film violence is on the increase. Small men appear to be exploiting the minds of crowds assembled around genuine or imagined ‘injustices’. There is a weakening of cultural values, bringing about a sense of meaninglessness. Just like nature abhors a vacuum, human existence abhors meaninglessness; hence the young of India have created new meanings to live by. Seeing the immense social and economic disparities, some of them have adopted a consciously violent ideology to wipe out these differences, as is evident in the leftist violence of Bengali Naxalites or in the People’s War Group of Andhra and northern Karnataka. Others have seen meaning in ethnic ideology.

According to Hobsbawm (1992), there is in a rapidly changing society a social disorientation and a “fraying, sometimes snapping, of [the] network which bound people together ....” Under these circumstances, one way of acquiring meaning is identification with one’s ethnic group. The differences between people become exaggerated and history is twisted to provide illustrations which distinguish ‘them’ from ‘us’. Ethnic identification has in many cases led to communal tendencies which have often been expressed violently.

A number of young people have chosen the path of terrorism, whether in support of the leftist or in support of communal ideology. This is not the place to examine the historical, political and sociological dimensions of terrorism but let us examine the mind of a terrorist. There are those like Crenshaw (1990) who see terrorism as a conscious, intentional decision of a group, reached deliberately. As opposed to Crenshaw, Post (1990) believes that terrorists are driven to commit acts of violence because of psychological pressures. In his opinion, the terrorist has suffered narcissistic wounds in childhood which implies that the self is not
able to integrate its own good and bad parts. The individual idolises the grandiose aspects and projects onto others the bad parts – the hated and devalued aspects of his psyche. The ‘other’ obviously must be destroyed.

Sprinzak (1990) thinks that it is more important to understand the group dynamics rather than personal psychology. He sees three stages in the development of terrorist dynamics. Firstly, there is a crisis of confidence with the established political system. Next, the legitimacy of the system is questioned. It is not just the leaders who are seen to be manipulative but the system itself. Finally, the individuals and the society identified with the existing system get depersonalised and dehumanised. Dehumanisation allows one to commit atrocities. What is important here is that there is a psychological transformation of the members of the group. Not only do they get isolated from the world, but each individual act acquires a collective meaning. Often this group is the first to which the individual has ever belonged. Greater the isolation of the individual, greater is the need to belong. Greater the relief felt on joining, greater is the likelihood that one will agree to take part in atrocities.

**Constructive Response to Frustration**

Fortunately not all the young in India have seen meaning in following a destructive ideology. Some have taken to constructive programmes. The frustrations in their case appear to have instilled in their minds a desire to rebuild social and moral values. One sees heartening examples in voluntary movements for women’s upliftment, health care, environmental protection, adult literacy and so on. What makes some people respond to the social turmoil in India with violence and others with moral and social commitments is not very clear.

One sees the similarity of their anti-establishment views but why they take separate roads from that point onwards needs to be analysed. It is important that we do so, for only then can the energy of youth be channelised more productively. A study in progress (Kapur & Sen, 1992) addresses this issue.
Crisis in Indian Leadership

An account of the psychological basis of violence in India will not be complete without reference to the crisis in Indian leadership. It has been mentioned earlier that the young look up to elders to provide role models on whom to fashion themselves. While in western culture, by the end of adolescence one assumes one’s own identity and internalises moral standards, in the Indian, traditionally hierarchical society, the elders continue to interpret the social and moral values for the young. This gives the older generation an authority before which the younger have always bowed. When this authority related to age is combined with authority of rank in an organisation, it becomes a very powerful tool. This did not matter too much when social values were clear and the leaders were only the interpreters. But, with social change, these values have become unclear and all that is left with the leaders is the authority without reference to any clear guiding moral code.

Very few leaders are able to handle this power in a sane manner. Some become tyrants where selfish interests and changing moods determine the codes others have to follow; the codes themselves change with shifting interests and new arguments are produced for the consumption of juniors to support these shifts. This is one model. The other model is that of leaders who, because of the absence of guiding principles, become anxious and start compiling rules and regulations dealing with every possible situation. These rules are enforced in a rigid fashion forgetting that rules were made to serve human beings and not the other way around.

One sees both models of leadership in families, educational institutions, work situations and even at the national level. It is no wonder that people are angry with the leadership. However, since they feel too powerless to assert themselves against a hierarchical system, their aggression comes out in the form of malicious gossip, severe paranoia, groupism, strikes and acts of indiscriminate violence like burning of buses and destruction of public property.
Control of Violence
Are there strategies, firmly rooted in psychological principles, which could be offered to reduce violence in India? Before examining this any further we shall have to first answer another important question. Is violence always wrong? Must it always be controlled? Ted Honderich (1989), the famous Oxford philosopher, looks at this question squarely in its face and concludes that violence may be justified in reducing certain kinds of inequalities. It is my personal view, however, that even in the most extreme cases, violence need not be the best or the only solution, though those compelled to indulge in it might deserve an understanding response from us. I present two arguments in support of this view.

Firstly, there is the simple argument that violence begets violence. A group may supersede the other at one juncture, but as history shows, the see-saw of violence will go on till the dominance of the other remains the dominant program in our nervous system. Happily, history has also shown that human beings have slowly, faltering, often imperceptibly but decidedly, developed moral values and supporting socio-political strategies which put a squeeze on this program. The idea of human equality, for the defense of which Honderich advocates violence, is itself a revolutionary idea – crystallised during the French revolution – which has acted as a bulwark against many kinds of violence. As I have mentioned earlier, this idea of the other being the same as myself has a psycho-biological basis in the neural program of empathy.

There is another dimension of human psyche which rebuts violence. I refer to the spiritual dimension. As we all know there are moments in our life, e.g. listening to music, watching a beautiful sunset or sexual union with a beloved partner when we lose the sense of self and feel one with our surroundings, sometimes with the whole universe. Maslow (1973) calls these ‘peak experiences’. These experiences can be enhanced and brought under voluntary control by a variety of methods and, in my opinion, the spiritual dimension is cultivated out of these. So similar is the description of these experiences by different people in different cultures and
in response to different environmental cues that I believe these are rooted in human neurobiology. The biological correlate is of a higher order than empathy, for here we are not only talking about seeing another as oneself but about losing the boundaries of self, mingling with both living and non-living nature.

This experience is non-violent by definition, for how do you disagree with someone or something with whom or which you feel one! Many movements across the world designed for personal and social transformation (Ferguson, 1981) provide evidence for this dimension.

Having argued forcefully in favour of controlling human aggression, I find myself at a loss when faced with the challenge of finding sound psychological strategies for controlling the current spate of violence in India. It is not that there is a dearth of such strategies but so difficult is their implementation and so many are the vested interests against invoking these that one feels despondent and helpless. Nevertheless, here are some suggestions which derive from proven psychological principles:

1. With the increase in communication brought on by scientific advancement, everyone is getting to know how his neighbour lives and the feeling of relative deprivation is getting more and more pronounced. This feeling must be reduced through socio-political strategies as quickly as is possible in a democratic setup. One insists on the maintenance of a democratic set up because, though in the short term an autocratic regime could cut down obvious inequalities more easily, only a democratic set up can keep its eyes and ears open to the new inequalities which always crop up when a social system is tinkered with. Sound psychological principles tell us that anything done with force, even a benevolent act, will produce repercussions which one must know about and deal with on a continuing basis. Only in a democracy is this possible.

2. We cannot have a true democracy if we do not allow adulthood in our society. Unfortunately, all the pressures of our society – all its traditions of obedience to the older – enforce the indefinite prolongation of adolescence. It is extremely
difficult to train a family to change its child rearing practices. However, society can instil independence in thinking by encouraging a spirit of inquiry at the school level. Students who ask questions and teachers who answer them in an open manner should be suitably rewarded. One important step in the direction of independent thinking would be to allow academic credits for students who wish to live away from their families, travel around the country and actively mix with ethnic groups different from their own. Suitable programmes can be built up to instil and evaluate ‘education through experience’.

3. Another step we must take is towards introducing value education in our schools. One of the most powerful methods of value education is through role models. While it might be difficult to produce live role models which fit our prescription, it is possible in a country with such a strong multi-cultural heritage as India to introduce in the curriculum, stories about characters who exemplify the values of friendship, compassion and mutual give and take instead of highlighting, as is now done, stories about winning and losing battles. Mental health professionals can take up research projects to cull out such stories from the almost limitless repertoire we possess in this country.

4. There is an urgent need to stop the depiction of violence on films and on television. As mentioned earlier, there is a clear proof that screen violence encourages real life violence. A voluntary movement against film and television violence supported by documentary proof of its ill effects must be started. Who better than members of the Indian Psychiatric Society to lead such a movement!

5. It is a well known psychological principle that one’s identity at a lower level must be strong enough before attempting to achieve a higher order identity, just as the foundation of a house must be strong before the ground floor is built, that of the ground floor before the first floor is built and so on. One’s identity as a member of a family, a village, a language group or a religious group must be strong before attempting to foist as abstract
a notion as membership of a nation. Decentralisation in the cultural sense must be seen as a necessity and not as a source of danger. In this context, the story of how Bhiwandi maintained peace during the last Bombay riots seems very relevant.

Bhiwandi has a high representation of both Hindus and Muslims. Previously, whenever there was tension between these two communities anywhere in the country, Bhiwandi would see the outbreak of communal violence. This time, religious leaders of both groups endorsed the Bhiwandi identity by pointing out that the residents of this small township had a duty to see that the name of their town was not sullied once again. As a result, in spite of all pressures and temptations from outsiders, peace was kept.

In conclusion, it is the author’s intention to point out that psychiatrists, both during their training and later during their active professional career, develop skills and insights which could be used more broadly than just for the service of psychiatric patients. One hopes that this paper will encourage some of them to undertake research or carry out intervention tasks – some of them based on the suggestions given above – which could be useful in the process of building a healthier nation.

References


U.S.-India Tensions: Misperceptions on Nuclear Proliferation

DEEPA OLLAPALLY AND RAJA RAMANNA

Relations between India and the United States have improved considerably since the end of the Cold War, but they are still punctuated by controversies over nuclear nonproliferation. To a significant extent, these conflicts seem to be the result of persisting American beliefs that India is obstinate about the Nuclear Nonproliferation Treaty, that India is vulnerable to technology-denying efforts, and that it can be equated with its neighbour, Pakistan. These perceptions take on added import because of the assumption by American policymakers that South Asia is the most dangerous nuclear hot spot. Implicitly, India’s image also continues to be that of a revisionist state destined to be at odds with the United States, a status quo global power. These are misperceptions that deserve attention, as only four months remain for constructive dialogue before the NPT conference convenes to review the expiring 30-year-old treaty.

The NPT has come to represent the core of U.S. nonproliferation efforts. The Clinton administration has promised to spare no effort to get an indefinite extension. The United States sees India’s continuing opposition to signing what New Delhi considers an inherently discriminatory NPT as symptomatic of India’s tendency to obstruct global arms control efforts. This view, however, discounts India’s numerous disarmament initiatives (in the United Nations and elsewhere) and its adherence to the principles that underlie the NPT.

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1 The article appeared in *Foreign Affairs*, January/February 1995. Reprinted here with permission from the journal.

At the time of publication of the article, Dr. Deepa Ollapally was in the Department of Political Science at Swarthmore College, and Dr. Raja Ramanna, having retired as Chairman of the Atomic Energy Commission of India, was Director of the National Institute of Advanced Studies.
In India’s view, the NPT curbs the spread of nuclear weapons to non-nuclear states without providing adequate security guarantees. Furthermore, it fails to reduce or eliminate stockpiles of the weapon states and thus legitimates them. India regards vertical and horizontal proliferation of nuclear weapons as equal threats to peace, and contends that elimination efforts ought to proceed in tandem. It also believes the United States unfairly singles it out from Pakistan and Israel, two other key NPT non-signatory states. Although undeclared, Israel is surmised to have a sizeable nuclear arsenal. While controversy surrounds the Pakistani nuclear programme, Pakistan is on record as having the components of at least one bomb and was identified in reports last summer as smuggling weapons-grade contraband plutonium from the former Soviet Union through Germany.

India’s Restraint

For its part, India has remained at the threshold level. In the two decades since the Pokharan test explosion, India has neither tested nor deployed nuclear weapons. Nor has it transferred sensitive nuclear technology or trained nuclear experts from other countries. Within India there is a broad consensus for protecting the country’s nuclear option but no significant lobby for ‘going nuclear’ among the scientific and political elites. India’s support of nonproliferation has received little U.S. acknowledgement, although its record is better than the United States’ from this perspective.

Given that military planners assess capabilities rather than intentions when making strategic choices, India’s restraint could be viewed as exceptional. Neighbouring China has steadily advanced the size and sophistication of its nuclear weapons programme, and until recently the superpowers continued their intense competitive buildups. The second Strategic Arms Reduction Talks treaty ceiling of 3000 to 3500 warheads for the United States and Russia by the year 2000 — and even the lower ones recommended by some American strategic analysts — fail to assuage India’s concerns about the potential for a nuclear holocaust or the security of nuclear
have-nots. India’s goal of eliminating all nuclear weapons through a non-discriminatory regime is gaining adherents (former Defence Secretary Robert McNamara is one) and precedents (including the convention banning chemical weapons).

Almost twenty years of painfully slow negotiations were capped in 1993 by the signing of the Chemical Weapons Convention. The CWC would subject all countries’ chemical industries and facilities to verification, with sanctions against violators. Previously, the United States insisted on maintaining a two-percent security stockpile until all states possessing chemical weapons destroyed their stocks to an equivalent level. Until it shifted its policy after the Persian Gulf War, Washington’s insistence was regarded by India as yet another nonproliferation instrument that would create two unequal classes for the purpose of controlling the spread of weapons rather than eliminating them.

The all-or-nothing attitude attributed to India by some American observers tends to neglect or under-estimate the flexibility, even initiative, that Indian policymakers have demonstrated on several arms control measures. India has championed a ban on prospective plutonium production and highly enriched uranium for weapons, even though it would result in highly unequal stockpiles of materials among nations. Although details are still to be worked out, India is co-sponsoring with the United States a U.N. resolution that accepts in principle a global ban. A backdrop to such a proposal has been the ongoing controversy regarding the disposition of spent fuel at the Tarapore atomic power station, India’s first power reactor built with American assistance. Although the reactor falls under the purview of the International Atomic Energy Agency, the reprocessing of its plutonium must be approved by the United States, even if it is recycled for use in the same reactor. The United States has refused to grant permission, and as a result large quantities of unprocessed plutonium are accumulating, which goes against all safety regulations. This safety hazard, which is causing increasing concern in India, could rival the problem of diverting materials for weapons production and needs to be addressed more seriously by the United States.
Favorable U.S. policy shifts concerning a comprehensive test ban treaty, long proposed by India, could be undermined by the U.S. Energy Department’s 1994 nuclear weapons research and development budget, which includes a request for studying precision low-yield war-heads, dubbed ‘mininukes’. Proponents of nuclear testing are reportedly pushing for a one-kiloton-threshold version of a comprehensive test ban, which would accommodate more sophisticated laboratory tests, a capability countries such as China and India lack. The development of mininukes would leave the distinct impression that, whereas the larger ones were arguably for pure deterrence purposes, the newer ones could conceivably be for actual use, most likely against developing countries. If such exemptions are sought, it will create a unilateral advantage for the United States that others will likely challenge.

It is becoming increasingly clear that the NPT by itself is unable to contain proliferation. The Iraqi and North Korean cases reveal the shortcomings of the NPT approach and of America’s coercive strategy against the so-called rogue states. In the more uncertain post-Cold War period, in which some states may feel more pressure to adopt self-help measures, the United States is likely to be tested elsewhere. During such a time, the support of a stable and democratic country like India could be valuable. Even with the NPT as the core of its nonproliferation efforts, the United States would better serve its interests by recognising India’s continued support for measures consistent with the spirit of the NPT.

Isolating the Subcontinent
The American tendency to equate India and Pakistan, especially pronounced in the past, artificially reduces Indian security concerns, making any wider strategic calculations by India appear unreasonable. Sino-Indian relations are now clearly on the upswing, but the memory of the 1962 war and the continuing border dispute between the two countries in the face of significant Chinese military superiority suggest that Indian concerns have not been baseless. The strategic links between China and Pakistan, especially the sale
of M-II missile components, indicates that China views Pakistan as one instrument of its foreign policy toward the subcontinent. China has reportedly provided assistance to Pakistan’s nuclear programme, and Chinese missiles and nuclear weapons can reach India. This has increased the existing imbalance in China’s favour. Although China formally acceded in March 1992 to the NPT (as a nuclear weapon state on terms different from those offered currently to other countries), it is not a member of the Nuclear Suppliers Group, which delineates guidelines calling for restraint in exporting sensitive technologies like production of heavy water, enrichment, and reprocessing. The U.S. policy of isolating arms control initiatives to the Indian subcontinent does not match the strategic realities of the area.

The most recent five-power proposal put forth by the United States continued to focus on nuclear issues in South Asia as an Indo-Pakistani problem. Chinese participation was premised on the exclusion of its nuclear arsenal from consideration. Meanwhile, China continues to engage in nuclear testing despite moratoriums by other nuclear states, and it appears disinclined to forgo tactical nuclear weapons, unlike many other nuclear powers. Not surprisingly, India rejected the American proposal (as it had before), adding fuel to the opinion that India is obstinate.

From the Indian perspective, America’s outlook on South Asia’s present and potential nuclear capability is based on faulty assumptions. There is a strong fear in the United States that a nuclear-capable Pakistan and India have made South Asia “the most dangerous place on earth”. Such a view fits what some have termed the nuclear theology of the West: that developing countries are more prone to go to war with each other and that these wars are more likely to escalate to nuclear war if the nations have such a capability. Beneath this view seems to be the unstated assumption that leaders of developing countries are more irresponsible, volatile, and cavalier with the lives of their people. In the case of India and Pakistan, Kashmir is seen as the probable spark.
But the behaviour of Indian and Pakistani leaders suggests otherwise. In the three Indo-Pakistani wars since independence, considerable restraint was exercised in avoiding civilian targets and in not pushing the military advantage to gain territory in the heartland or disputed areas — for example, India’s decision not to thrust forward in the western sector in 1971 or to ‘liberate’ Kashmir. There is little reason to believe that the two countries will change their behavior after obtaining nuclear capability and act with less caution than before. Indeed, a strategy of ‘nuclear realism’ by India and Pakistan has given rise to bilateral confidence-building measures, including a mutual agreement not to attack each other’s nuclear installations, reciprocal notification of key military exercises, and a hot line between the nations’ army generals. The United States’ policy in the region gives a hollow ring to its current nonproliferation exhortations. Throughout the 1980s, at the height of Pakistan’s nuclear weapons project, the United States pursued a policy of strategic alliance and military largesse without which Pakistan’s success would have been unlikely.

**No Know How**

In the post-Cold War period, there are signs that the United States is stepping up efforts to limit the transfer of dual-use technologies to developing countries. Technology denial is considered a workable form of containing proliferation. This assumption seems misplaced, especially in the case of India, which already has a mature technological base. The policy of closing the technology door to new entrants does not appear to be a viable or verifiable way of managing destabilising technologies that will inevitably be developed. Moreover, the multilateral technology control regimes that have evolved under the American umbrella resemble cartels rather than global institutions from India’s vantage point.

American optimism regarding limiting dual-use technology is questionable in the case of India. The vast majority of technologies that fall into this category are state of the art and crucial to industrial modernisation. Leading-edge technologies are a pre-
condition to global economic competitiveness, and it is only logical to expect India, which is poised to harness the latest generation of technical know-how as part of its economic liberalisation drive, to resist unwarranted constraints. Indian objections to such schemes are in part related to the perception that they spring not only from America’s strategic compulsions but also from economic motivations aimed at eliminating or disabling potential second-tier competitors in the most lucrative sectors of the global economy.

When the Missile Technology Control Regime was formed in 1987, India already had a fairly ambitious space and missile programme. Since then India has successfully tested the Prithvi short-range, ground-launch missile and the medium-range Agni. While analysts disagree on the exact extent of the MTCR’S impact on India’s missile programme, its most lasting effect has been to spur greater self-sufficiency, with signs of eventual success. As with its nuclear capability, India has exercised restraint in missile deployment. In many ways it exemplifies India’s tendency to have technology ‘demonstrators’ as part of its strategic posture for sending strong signals of its capability without necessarily ratcheting up the arms race.

While the United States depicts missiles as inherently destabilising, it has not convincingly spelled out why they are more so in India’s arsenals than in more powerful countries’. Most of India falls within the range of Chinese and Saudi Arabian CSS-2 missiles. America’s enhanced fear of missiles seems to be generated more by Iraq’s use of SCUD missiles in the Persian Gulf War than by a considered analysis of India’s intent and capability.

A Search for Autonomy
The various strands of U.S. policy toward India seem rooted in the implicit attitude that India is somehow a revisionist power bent on restructuring the international system at the expense of America’s global interests. This negative view of India arises from a misreading of the meaning of India’s drive for self-reliance and national sovereignty. It is also tied to the paradoxical streak of universalism
in America’s philosophy of liberal individualism, which implies that “those who are not with us are against us”.

As an ancient civilisation subjected to prolonged British colonial rule, India is vigilant about both territorial and political autonomy. Even at the height of Cold War bipolarity, India opted for non-alignment, seeking accommodation to and compromise with both worlds, unlike the revolutionary approaches of the Soviet Union and China, which envisioned fundamental transformations in the world system. It is important for the United States to recognise that India’s independent stance has been much more defensive than offensive. Indian aspirations for autonomy should be seen as the product of specific historical circumstances, and not as a function of some unique Indian ambition.

Excessive ambitions ascribed to India need to be seen in light of its actual behaviour. India’s restraint in the nuclear arena since 1974 does not seem typical of an aspiring hegemon. Its defence expenditures do not point to committed militarisation. For nearly two decades after the Sino-Indian war, India’s military spending was approximately 3.6 per cent of GDP. While it went up slightly in the wake of the Soviet intervention in Afghanistan in 1979, in the past six years Indian spending declined, to 2.5 per cent of GDP in 1993, despite the collapse of its erstwhile partner, the Soviet Union, and Pakistan’s drive to acquire a nuclear capability. Neither Pakistan nor China have publicly available defence figures, but it is estimated that Pakistan’s spending has remained steady at approximately 7.5 per cent of GDP and that China’s expenditures have been rising annually at a rate of 10 to 15 per cent.

In many ways, American perceptions of India in the nuclear arena have been and continue to be out of step with actual Indian thinking and policy practices. In the light of the approaching NPT Review Conference in April 1995 and the potential for misrepresentation and misunderstanding between the United States and India, genuine and sustained dialogue will be all the more critical.
I want to begin my talk with a simple observation about languages in India: we live in an ambience of languages. And this situation is unique to India. It is very likely that a less literate person will know more languages and vice versa. If a person becomes literate in English then he may not know any other language. A typical example of a less literate person knowing several languages would be a coolie in the Mysore bus stand. More often than not he would be able to speak Urdu, Telugu, Tamil and Kannada, as well as English to a certain extent. Even in the past, I presume Shankaracharya must have spoken Malayalam on the streets and Sanskrit to his equals. Madhvacharya must have spoken Tulu in Shivalli village, Kannada outside his village and Sanskrit to his equals. It is evident that people could do their work in Sanskrit in spite of living in small places such as Melkote and Udupi because they had an access to libraries in a way that is not possible anymore.

Today, Prof. Narasimha has asked me to talk about Indian writers. We find that some of the best Indian writers like Salman Rushdie write in English. Rushdie’s writings have a value in the western world because they contain the spirit of Bombay Hindi. Likewise the celebrated Malayalam writer, Arundhati Roy, writes in English which emerges from a Malayalam context. Therefore, regardless of the language of Indian works, some sensibility which is inherent in one language gets into another language. This is not true of many other countries in the world.

A.K. Ramanujan, who has been my translator, has a very interesting short poem in which he says that he spoke Tamil in the kitchen, Kannada on the streets and English upstairs. He spoke

1 The talk was delivered on April 24, 1998 at the National Institute of Advanced Studies.

Mr. U. R. Ananthamurthy is a writer in the Kannada language. He is a recipient of India’s highest literary honour, the Jnanpith award.
in English upstairs because his father, who was a mathematics professor, had a room upstairs and insisted on speaking to his son in English, which he thought would help him get around the world. A hundred or hundred and fifty years ago his father would have spoken to him in Sanskrit or Persian, but now it is English. In the kitchen the language is Tamil because if he is very hungry he uses the house language. I don’t use the word mother tongue anymore because there is nothing like a mother tongue in India as there is for Europeans. Occasionally, in Europe, there are writers such as Conrad, who wrote in English although his mother tongue was Polish. But it is not so in India. Some of our best writers in Kannada have been Tamil and Marathi speakers. Masti was a Tamil speaker, while Bendre, perhaps the greatest among our poets, spoke Marathi. Bendre’s rhythms and images are so fascinating that it would have been probably even beyond him to explain how he got them into his poetry. I had once asked Bendre about this question of being a Marathi speaker and writing such great poetry in Kannada. Then he told me that he was not aware of the fact that he was speaking two languages until he was 12 or 13 years old. While he was saying this to me, his daughter-in-law, who was perhaps from Maharashtra, had whispered something to him and then he talked to her in Marathi without knowing that he was talking in Kannada to me and Marathi to her. He would shift from one language to another easily. So, while he was talking to his daughter-in-law, I got confirmation of what he had said a moment earlier.

Therefore we have a house language, a street language and a language for intellectual communication. The street language here is the language of Karnataka, that is Kannada. The language at home could be Marathi, Urdu, etc. And there are many reasons for keeping our home languages or so called mother tongues alive. One reason would be to facilitate relationships based on language; for instance, an Iyengar girl knowing Tamil can get married to somebody in Tamil Nadu while a Muslim girl can get married to someone in Hyderabad. Ramanujan has done excellent work in three languages i.e. Tamil, Kannada and English. He is a marvellous poet in English.
He has done translations into English of Tamil classics, and these have become so important that Harvard University has recognised Tamil as a classical language. Sanskritic India was known to the rest of the world through Schopenhauer and others. In recent times Ramanujan has been one of the great interpreters of non-Sanskritic India. He has written a fascinating book *Folk tales from India.* This was again possible because he lived in an ambience of languages in Mysore. Such an ambience has nurtured creativity in India. I therefore believe that we should not politicise and emotionalise the language issue.

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When Prof. S. Radhakrishnan was the President of the Sahitya Akademi, he said, “Indian literature is one although written in many languages”. I once mischievously changed this sentence into “Indian literature is one *because* it is written in many languages”. I would say this because the civilisation and culture of India are unique in many ways. I shall explain this by taking the example of the concept “Unity in Diversity” which is often used to describe India. If we think that India is essentially one and only one, then India will assert its diversities. States like Assam, Tamil Nadu and Punjab have asserted themselves because our rulers in Delhi wanted to impose on us a certain concept of the Centre. But when all the diversities begin to assert themselves too strongly, we begin to assert that there is only one reality in India: the ‘one’ gets importance. Unity gets importance when too much emphasis is laid on diversity, and diversity becomes important when too much emphasis is laid on unity.

This is so in civilisational questions as well. If somebody were to say that Kannada literature is born out of Sanskrit and does not have a distinction of its own, I would say “No, Kannada literature is like Italian or French or Spanish literature with a strength of its own”. To explain this we can take the example of *Kavirajamarga* which was written in the 10th century. This is a work delineating the art of writing poetry and creating literature. The writer, who was a Kannada theoretician, has said, “*Dhwani embudu alankara*”, which
means *dbhvani* is also another *alankara*. *Dhvani* means suggestion and *alankara* means rhetoric. In poetry, the literal meaning of *dbhvani* is not suggestion but the meaning that comes through when words are put together. So the writer is of the opinion that *dbhvani* is not a new theory and it need not be given any special status. This reveals that in the 10th century a Kannada writer had contested a Sanskrit view.

Another example is that of Pampa Mahakavi of the 10th century who wrote the *Mahabharata* in Kannada, in a work called *Vikramarjuna Vijaya*. Pampa was a Jain, the conversion having taken place in his grandfather’s time. While on one hand he was proud of the fact that his grandfather was a well-known brahmin, known for having conducted big yagnas, on the other he had a problem with making Krishna the hero in his *Mahabharata* because it went against his religious principle and ideological position. So instead he made Arjuna the hero and equated Arjuna with his own Hindu king Arikesari! This shows that *dharma-nirapekshata* was practised in India all the time. Pampa practised it by writing a poem without making Krishna the hero and shifting the centre stage to Arjuna, and at the same time extolling his own king. Pampa also introduced into his work an *alankara* which is absent in Sanskrit and called it *samasaalankara*. Using this *alankara* he made parallel comparisons between the achievements of his own king with achievements in the Mahabharata. The *samasaalankara* has not been appreciated by English-educated critics like T.N. Srikantaiah, who like many of us was influenced by western literary notions. But there are many interesting indigenous critics without any education in English. One such critic of Pampa in Udupi considers the *samasaalankara* as his major contribution because with this *alankara* he could make the *Mahabharata* contemporary. In other words, it means that there was somebody in the 10th century who had the courage and was not frightened to intervene into a mega-text like the *Mahabharata* and make his king Arikesari a hero, like some English novelists of today who are putting Indira Gandhi and others as characters in the *Mahabharata* and making parallels. But Pampa did it in his own way.
Therefore, if one were to assert that there is only one truth in India, i.e. Sanskritic India, then I would disagree because Kannada has its own truth. Neither is it true that Kannada and Tamil are mutually exclusive, or that they are incomparable with languages of the rest of India. If this is argued then I will take up the other position. This is the essence of intellectual cultural debates in India. That is why unity in diversity is a meaningful thing.

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The next point I would like to make about Indian languages is that there is a hunger of the soul like hunger of the body and mind, and this also brings about creativity in languages. In any society, the ruling classes achieve a certain amount of knowledge and a sense of well-being. But then they begin to be very contented, and sometimes so ignorant of life beyond them. This happens to all of us in India, which is why we say there are two Indias. One is that India to which the upper classes (like the scientists) belong, and the other is Bharat to which the lower classes belong. This is one of the criticisms against the intellectual classes in general and not scientists alone, but I mention ‘scientists’ because of the presence of so many of them here in the audience! This has been true throughout Indian history. One can become a great logician and get lost in the intricacies of vedic interpretation; such a person will forget the “soul-hunger” which sometimes manifests itself in the poorer classes. This happened in the 12th century in Karnataka when there was that soul-hunger in shudras and other lower classes. There were some people who belonged to the upper classes but - as it happens in every age - they committed themselves not to their own class but to the lower class. They felt a need for an immediate sharing of the urges of the soul. Thus began the Veerashaiva or Lingayat movement. Basava who was a brahmin gave up his pride and talked to the very poor. When Pampa wrote his epics, perhaps those who could read must have been a limited class and those who could read Kannada could perhaps also read Sanskrit.

This happened in western society as well; for example, before Shakespeare’s time, the literate in England could read English as
well as Latin. Thus, Mulcaster wrote very scholarly topics that can be written only in Latin. He says in his introduction that it was easier for him to write in Latin because it has correct grammatical rules, while English has no rules and proper spelling. Then he asks, “Why should I write in English? Those who can read English can also read Latin. Yet, I write in English”. I think civilisational creativity belongs to people like Mulcaster. Though it would have been easier for him to write in Latin, he chose to write in English, thereby beginning a great Renaissance. Shakespeare, Wordsworth, Shelly and Keats came later on, bringing in a richness to the language which it did not have earlier. English had to triumph over the language of the ruling classes. Similarly Pampa wrote in Kannada with an overall Sanskrit model though he had made some changes in the model like the introduction of samasalankara. This was because the frame of expectations of the reader is unconsciously present before a writer who is aware that the reader has read Sanskrit and hence will expect some of the qualities that he admires in Sanskrit works to be present in Kannada. Similarly, in the present day, a person reading Kannada or Tamil may also have read English and therefore may expect some qualities of one language to be present in the other. But this is not the case with the vachanas or with Kumaravyasa.

The Marxists of today talk about the concept of mass audience and Soviet writers had an abstract concept of mass audience and mass needs which was given to them through the cultural secretary of the government. A lot of foolish things can happen when one has this abstract concept of mass audience. I don’t believe in that concept although there is a mass audience for commercial purposes like popular cinema and the popular novel.

The hunger of the soul led to movements like that in the 12th century which attracted an immediate audience cutting across both the lower and higher classes. The movement drew an immediate audience because great values, such as Kayakave kailasa (which means manual work is holy), were asserted by people working close to nature. Mahatma Gandhi could do it during the freedom movement by drawing ordinary farmers as well as intellectuals into a
movement devoid of caste and class. The Bhakti movement also did it with poets like Tukaram in Maharashtra, Meera in Rajasthan and Krishna Chaitanya in Bengal. Therefore we find that the medieval period in India was not the dark ages that it was in Europe. It was the time when the shudras and women were empowered. During the Veerashaiva movement women were told that menstruation is not polluting. This was a great act for change in one’s concept of pollution, because unless the concept of pollution is changed one cannot change the caste system. The Veerashaiva movement did it and hence it was a purposeful movement. Also, since there was an immediate and remarkable response, there was no expectation of a Sanskritic model which had become essential for the old classical writers like Pampa, Ranna, Janna and others.

Some of this vachana poetry has been translated by A.K. Ramanujan in his book Speaking of Shiva. This book has influenced poets the world over. It contains Basava’s vachanas which can be taught anywhere in the world without much cultural explanation. Allama, who was one of the vachana poets, reads very much like a modern French poet. The poetry is very sharp and words are not wasted. There is no descriptive indulgence at all. It is immediate, and has the brevity of sutras. A sutra is considered to be an alpakshara; i.e. it does not have too many aksharas. So alpakshara was the aim of vachana poetry. I think the modern mind is unable to achieve it.

All kinds of people wrote vachanas. There is even a prostitute who has left some vachanas but unfortunately we do not have all the vachanas she has written. Her name is Sangavva; and she says, “I am Sulay Sangavva”, which means “I am a sex worker”. Basava preached that one should not be ashamed of one’s occupation. So she is not ashamed of being a prostitute.

All these poets have a signature line. Basava calls himself Kudala Sangama Deva, which means “the lord of the meeting of two rivers”. Allama is a very abstract poet. His signature line is Gubeshwara, which means “the lord of the caves”. Akkamahadevi is another poet who is in love with Shiva. Her signature line is Chennamallikarjuna, which
means “the lord white as jasmine”. There are only two \textit{vachanas} of Sangavva, with the signature line \textit{Nirlajeshwara}, which means “the lord of the shameless.”

This is the profound creativity which entered into a language like Kannada. It also entered into Marathi, Hindi, Bengali, and in medieval times we find that what was exclusively Sanskritic, like the knowledge of the Upanishads, also entered into our languages. In some of my writings, I use the word \textit{jirnagni} for our languages. This is a concept of \textit{dwaita} philosophy, it is said that there is a \textit{jirnagni} - a little fire - inside us. So the Indian languages are like this little \textit{agni} which digested Sanskrit. Now these languages are digesting English. Basava and Allama were great \textit{jirnagnis}. They got everything from the Upanishadic lore into Kannada. It became \textit{dhyana} of a very deep kind.

The \textit{dasas} were another group of poets who came later on. Purandaradasa lived at the time of the Vijayanagar empire. Purandara has written on almost everything in the world. Like Whitman, Purandara has written on almost everything. Hegel in his great philosophical work said that a great dialectic will be born in India, but its growth into maturity and completion can happen only in Europe and that too in Germany. And then he has said, “In my king’s time it has reached its peak”. But Purandara, who lived in the Vijayanagar empire, when it is said that there was \textit{swarnavrishti} (which means a raining of gold), has an amazing poem describing supreme rule. This poem has the line \textit{Uttama prabutva lolalotte}. \textit{Uttama} is a Sanskrit word which means excellence, and \textit{prabutva} is also a Sanskrit word and means rule; \textit{lolalotte} is a nonsense word which means something that is empty, trivial - a word that children may use. Purandara is greater than Hegel to me. He says “In the Vijayanagara empire you may say it is \textit{uttama prabutva} (excellent rule) but it is \textit{lolalotte} (there is nothing in it)”. He may mean two things. One would be to think that \textit{prabutva} can become \textit{uttama} because this is an adjective; the other is that to think that any \textit{prabutva} can become \textit{uttama} and find solutions for all our problems is \textit{lolalotte}. It is an answer to all the Marxists, because Marxists dream that when
there is a good prabhutva, all our problems will be solved. According to Karl Marx a time will come when there will be no conflict and we can sit on the bank of a river and go on fishing for ever. All these antimonies are solved. So prabhutva can become uttama. And then also, it is like a flower when it becomes seed, the petals - the state will wither away. But all the good communists withered away in Soviet land, not the state. So Purandara says that to think prabhutva can become uttama is lolalotte. Also, even if prabhutva is uttama then uttama prabhutva lolalotte. And then the poem goes on chhatri chamara lolalotte. All the insignia of power are meaningless. Basava also has a tremendous vachana which says “When a rabbit is killed and this dead rabbit is taken on the street, people hanker after it. They want to buy and eat it. But when a dead king’s body is taken out, it is worse than the dead body of a rabbit”.

So the Bhakti movement at the level of revolutionary thought was profound. I think we can go on even with a bad government in the Centre or anywhere only because we also have another tradition like the Bhakti tradition. Despite many political upheavals, India has sustained itself because there is a certain contempt for that kind of glory. This is not so in the best of Sanskrit literature, Kalidasa was a great admirer of the state. The idea of the state was important for the classical poets, whereas it was not important for the Bhakti poets. That is why they say that even Tukaram refused to go and see Shivaji. I sometimes think that it is better to take the idea of the state more seriously, particularly because one can never ignore the modern state as it is much more powerful than it was at the time of Basava, when it could be ignored.

Therefore we know that the Indian languages have asserted themselves whenever there was a need to change the audience and speak to other classes. When languages cannot be read and understood by an audience then mnemonic devices have become important. Works like those by Kumaravyasa are wonderful because when they are sung one may even learn them by heart and carry them in one’s memory. The vachanas also have mnemonic devices. During the emergency when we could publish nothing, some of
my friends wanted to go back to these mnemonic devices. Oral literature therefore has tremendous power and can work against any dictatorship, whereas when a novelist writes a book, it has to be published for people to buy and read it. It can also be banned. One does not face these problems in the case of mnemonic devices like vachanas, because they are carried from person to person. Some civilisations develop the capacity to fight against evil forces through devices of this kind. And all the Indian languages including Sanskrit, of course, have this capacity which developed over a period of time.

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I would like now to finish my lecture by putting before you another metaphor which I used a few months ago when I had to speak at the Nehru Centre in London. This very arrogant person who wrote Midnight’s Children had said that Indian literatures have produced nothing worthwhile. I think he can hardly read Urdu. The arrogant statement was published in some American journal; I was unaware of it because I never get the journal in Mysore. But some people in Delhi had read it and began to worry about it. Apparently, he had said that despite people like me, literature in Indian languages is poor compared to the Indian literature in English. So I was asked to speak about it.

A metaphor then occurred to me and I would like to share it with you. I drew that metaphor from my father’s house in a Malnad village. The house has two prominent areas. One is the back yard and the other is the front yard. The middle and upper class people came to the front yard to consult my father about good days according to the panchanga. Sometimes, Kumaravyasa was read there and people listened. Since my father knew English he would read and translate Gandhi’s weekly, Harijan. So the vyavahara world and the political world dominated the front yard. Inside the house, there is a cool inner yard where women even of lower castes can come and sit on the mats. Farther inside is a kitchen which even Father could not enter if he was wearing a shirt. It was Mother’s domain. And then there is the back yard. I have become a writer because I frequented
the back yard much more than the front yard. In the front yard I heard all things connected with the state. My father was a great admirer of Goldsmith, and would talk about him in Kannada. I got my education in the back yard because women talked about their aches, menstrual pains, the love affairs of other women and so on. I got to know that this little village was a very complex world. Caste never mattered in the backyard. Women from all castes came and confided in my mother, and my mother confided in them. They came there to draw water, and the well was like a club. Mother would make a gift of something cooked at home to somebody’s child. The backyard was also the place where herbs were grown. My grandfather, who was an Ayurvedic pandit, knew some of these herbs which he always gave to other villagers. He would tell me that when I grew up he would teach me about them. It was a great secret. Unfortunately I got educated in English and did not learn anything about these herbs from him.

In my speech at the Nehru Centre, I said the following. Indian languages have a front yard and a vast backyard. Many of our folk stories originate from the backyard. Some of Girish Karnad’s plays are based on these folk tales. There used to be a joke that whenever A. K. Ramanujan came from Chicago to Bangalore, he brought all the Kannada folk tales from there and two writers got pregnant from his tales when he came here. They were Kambar and Girish. These folk tales are very rich in oral tradition. Also, whenever a new writer emerged in these languages, for instance, a dalit writer, he would bring a vast experience of dalit life into the language. A village Muslim writer would bring a vast experience of the village life of his people. When women began to write, they brought a vast experience which male attitudes would never pay much attention to. I don’t think this will happen in English because Indian English writers do not have much of a backyard. They have a vast front yard and they are very conscious of it. The New York Times is in their front yard; they write to satisfy the New York Times. Salman Rushdie is condemned to be clever forever because he has to sell his wares to the West. But I don’t have to be clever. In England some
of the best writers came from Ireland: Ireland was their backyard. Yeats and Joyce were Irish who brought a lot of Irish rhythm into English literature. London did not produce many great writers. The only great Londoner was Dr. Johnson. Even for America, the South has been its backyard with writers like Faulkner.

In order to be a writer it is important to live a life in a community, because with too much individualism creativity disappears in literature. There has to be a sense of a fertile community. English had it in all those countries that the British ruled. Although Sanskrit did not have its own backyard, it got enriched through the other languages. Today many of the noble things written in Sanskrit are cherished through the other Indian languages.

So Rushdie was being silly when he said that nothing happens in these languages. Many things that happen here can’t be sold in the west. A very sensitive British writer who had come to the Nehru Centre meeting said, “I don’t want to read clever Indians who write to satisfy our curiosity about their own people. But I would like to read a writer who writes about his own people, for instance, about how the tribals live, their dreams and what they think about”. Unfortunately Indian writing in English is written mainly for export. One can make iron implements or clothes for export but not literature. Unconsciously literature has become export material. This is not the case with writers like R.K. Narayan, Raja Rao or Mulk Raj Anand. Narayan wrote for an Indian audience in English. Later on, he became famous in the West. We find that Raja Rao’s great novel *Kanthapura* could have been written in Kannada easily because it has all the rhythms of the Kannada language. In recent times huge investments are made by publishers to promote a work with advertisements. Therefore when one becomes aware that somebody has made such a huge investment, it raises curiosity and the novel is read. But for the great writers of the past it took years for people to read them; and the recognition came after a while. It always took time. But now even before the novel is published, people are looking for it, because I think modern marketing has come into it. Fortunately it cannot come into our languages, because
it takes years to sell 2000 copies of a novel. This is a disadvantage, but at the same time such literature cannot get corrupted as easily as Indian literature in English.

There is a lot of talent in English and the best of it comes from an ambience of languages. But unfortunately, a writer like Salman Rushdie living in London cannot write a novel with London as its backdrop because it will not be well received. He becomes like a Korean restaurant in America where you have to perpetually bring Korean food to satisfy the taste of the American boys and girls. So Salman Rushdie is like an Indian restaurant in London. He is expected to supply Bombay stuff by writing about Indian corruption and the dark things in India marvellously. Then the writer loses his freedom. No writer should lose his freedom. The market makes a writer the constant supplier of ‘ethnic material’. Ethnic material is a horrible phrase. I dislike that word ethnic when it is used for our languages. Our languages are called bhasha and have a history of thousands of years. Tamil is a great language with a history of two thousand years. Kannada has a history of a thousand years, and Marathi has had such giants like Gyanadev who is one of the great minds of the world. So one should never use terms like ethnic material for our languages. I can write a novel about London in Kannada or about my village. But the poor successful English writer has to write about India and live in the west. It is a very odd kind of a combination that is created by the capitalist west, purely for commercial purposes.

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But I am of the opinion that English is one of the languages of India like Sanskrit and Persian. It is a language among other languages. The Eighth schedule of our constitution has recognised some languages. When I was the President of the Sahitya Akademi, I took the stand that the Eighth schedule should be scrapped. All that happens with this schedule is that some languages begin to agitate for inclusion. The only outcome of inclusion of a particular language is that the constitution gets translated into that language; nothing else happens. And the Eighth schedule is used by politicians
to create conflict and to get votes. Now that Konkani has been included there will be an agitation for the inclusion of Tulu. When this is done, Tulu votes are guaranteed. So the Schedule gets exploited for political purposes. Gandhiji wanted Hindi to develop, making use of elements from every other Indian language. So the Eighth schedule was meant as a list of languages from which Hindi will grow. That has not happened. Hindi is a language of a particular province and it will grow only there. Since that has not happened, there is no use in having the Eighth schedule. As President of the Akademi I had said that we are not here to recognise languages but we are here to recognise literature, because great literature may occur in a language which may not even be a written language. We know that quite a few tribal languages are rich in oral literature. So we began to honour literatures produced in tribal languages.

I would like to make a humble submission to the people in the field of science here, that there is no connection between progress and quality as far as literature is concerned. When Homer wrote his great epic, his language was like Tulu. When Shakespeare wrote his great plays, English was not a respected language and Latin was being used for many purposes. So progress and great literature are not necessarily connected. Nineteenth century Russia, which was backward, struggling and furious, produced Dostoyevsky and Tolstoy who are giants, greater than the European writers of the time. A great combination which produces great literatures is pride and backwardness. Latin American literature is much superior to European literature today. After Sartre died, there are no great names in Europe, but there are great names in Latin America. So there is nothing which can prevent a great writer emerging in Tamil or Marathi or Kannada.

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In the past India was never considered as having one centre. Although Kashi was a holy place, there were holy places everywhere. If one goes to a village in Karnataka, some lingayat saint or other will be buried there. That is a holy place where people go on pilgrimage. Similarly the dasas have made certain other parts holy. Ramanuja
has made Melkote holy, Madhvacharya has made Udupi holy, Shankaracharya has made several other places all over India holy. India is multi-centred. So imposition of the concept of one centre will make all of us rise in revolt. When I got the Jnanapith Award, I quoted the poem that we all grew up with, _Govina Hadu_. My father was a stern man, and the only time I saw tears in his eyes was when he read _Govina Hadu_ to me. In this poem the cow wins over the tiger. This is the first Gandhian poem in any language, narrating the triumph of non-violence over violence. It is an extraordinary poem. 

_Dharani mandala madhyadolage Mereyutiba Karnatadesbadolu Iruva Kalinganemba gollana Paria nanentu pelvenu_. The description is almost like a camera from above which narrows down from the whole globe and focuses on one cowherd in Karnataka. On a globe any place can be the centre. Culturally it is so; politically it may not be true. Tumkur may become the centre, Mysore may become the centre. Dharwad was the centre of giants when Bendre lived there. So Indian languages never lost their belief that they can embody a central experience. Any Indian language, big or small, can embody a central experience. That again made for unity in diversity.

Let me explain this a little further. In the Soviet Union, it was always claimed that all the languages were honoured. But that was not true: only the Russian language was truly honoured. When Kazakhstan became independent, the Minister for Culture came to Delhi. My book has been translated into Russian with an introduction by a very great novelist from there. The minister told me that my novel gave them confidence because I had written about a small community, in a small language and not the national language, and yet it had made a name. So he felt Kazakhstan could also do that. I agreed. But under Russia they were told that the universal will happen in Russian, and the ethnic or local will happen in the smaller languages. Capitalist America is also trying to give the same idea through this talk about Indian writing in English, emphasising that anything great will happen only in the language of the ruling classes. And some interesting ethnic things will happen in Tamil, Telugu, Marathi etc.
Our belief is that any language of the world, anywhere, even if it is spoken by a small group of people, may produce Homer’s *Iliad*. That is how Homer’s *Iliad* was in fact produced. I will tell you what it cannot produce. A language like Tulu may have a great epic poem, but a Bertrand Russell can’t write in it. Prose is artificial and can only grow with civilisation and thought. Poetry is not. So perhaps a small essay with great intellectual ideas and rational thought is possible in Sanskrit. A language takes a long time to develop that kind of capacity in prose, to write like Bertrand Russell. A British poet once told me when I was a student there, “Unfortunately, I can’t write like Blake because there are too many people like Bertrand Russell who have abused my language”. Once a language develops great intellectual vigour and rational thought, some metaphoric energy that it had is lost. Blake can express the most subtle metaphysical thoughts in a line. Purandara could also do that with the line *Uttama prabhutva lolalotte*; it is difficult to say this politically. But modern times also require the other use of the languages in the development of various sciences and so on. That is the difficulty that Indian languages have. But the plus point is that they are still close to experience. So I told the Kazakh Minister that it is not possible to translate *Das Kapital* because *Das Kapital* has first to be translated into good German! That is what Gandhi said when he read *Das Kapital*. He asked “Why doesn’t he say these things in simpler language?” This is said also of Kant and others who write in very abstruse language. Our quarrel with intellectuals has been that there is nothing which cannot be put in simpler language. Some intellectuals will agree and try to talk in a very simple way. Some people hide in very abstruse thought. There is a vast amount of literary criticism today which cannot be understood by anyone. I wonder sometimes if there is anything worth understanding either, because languages can become very abstract and abstruse. Indian languages are not like that.

That is the way I see literatures in India as they stand in modern times.
Visvesvaraya as Engineer-Sociologist and the Evolution of his Techno-Economic Vision

DHRUV RAINA

In recent years, sociological approaches to the history of technology have interposed new aspects that have brought the history of technology to the notice of policy research and policy makers. In particular, this renewal is encountered in studies on the sociology of techno-scientific innovation, and is reflected in publications appearing in journals such as Social Studies of Science, Technology in Society, Technovation, Technology and Innovation, and even Technology and Management. Traditionally, the history of technology was designed to address different audiences and serve different functions. In the first instance, the history of technology chronicled the progress of technological development. In this capacity it addressed both science and technical education, providing a frame and a repository of relevant technological objects for practising engineers and technologists. However, during the 19th century a particular genre of history emerged: the genre of heroic biography emphasising the persona and contributions of several ‘technological heroes’. For example, the contributions of James Watt, Stephenson, Edison, Marconi and innumerable others. This genre persisted into the 20th century, playing a significant cultural role in positioning technology at the centre of contemporary culture. While the primary problems addressed by the history of technology related to the genesis

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1 Lecture delivered on January 7, 1999 at the thirteenth course for senior executives on ‘Leadership and Society: An Integrated Approach to Knowledge and Information’, at the National Institute of Advanced Studies.

At the time of the talk, Prof. Dhruv Raina was a scientist at the National Institute of Science, Technology and Development Studies, New Delhi.

The author had noted that some of the material presented here was obtained from the Visvesvaraya papers at the Nehru Memorial Museum and Library. The research on which this lecture is based had been sponsored by the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore.
of invention, the process of innovation, the transmission of innovation, and finally the impact of technological innovation on society, the new sociology of technology, on the contrary, established that the process of technological invention and innovation is much more complex than hitherto discussed in the history of technology. Furthermore, innovation is a social process, involving a multitude of actors, resources and circumstances rather than the result of the effort of a uniquely endowed individual. In other words, serendipity and genius have been underplayed by a more carefully elaborated contextualism. Thus, in short, the focus of this history of technology includes communities, workers, women, unsung laboratory assistants, and engineers, and in the process has questioned fundamental assumptions underlying the earlier history of technology, such as technological and social progress. But, more significantly, it has rejected the Eureka approach to the history of technology and instead focused upon understanding the complex interactions taking place between the science and technology system and society.

A few weeks ago, I received a wonderful book for review: *Edison: A Life of Invention* by Paul Israel. Initially, I assumed that this was another paean to a technological hero of the modern era, but halfway through the first chapter I realised, to my relief, that this book was an exceedingly careful detailing and analysis of Edison’s life of invention, this time told not as the history of a mythologised Edison (though the shadow of that iconic presence remained in the background) but rather as a figure shaped by and shaping the competitive American environment of technological invention. This led me to rethink through an extended piece of research I have been involved with, namely an intellectual biography of the Indian engineer Mokshagundam Visvesvaraya. Visvesvaraya was not strictly an inventor in the sense of Edison, but he certainly was a very remarkable innovator. The primary difficulty which confronted me in this project was to identify those elements within his socio-cultural environment which provided a medium for the realisation of a vision that he was instrumental in giving form to,
but which could not in any sense be localised or restricted only to his persona. But even if such a piece of research was realisable – given the absence of a detailed archive that Israel had access to in the case of Edison – it is still possible to indicate that writing an intellectual biography of Visvesvaraya is indeed difficult, since he survived in a culture that was not in any sense enabled by the market or driven by the State.

In the talk that follows, I shall attempt to identify the factors that were instrumental in enabling the realisation of Visvesvaraya’s project: I say project since what we do have today are concretely inscribed (in more ways than one) monuments and institutions as evidence of his project in the erstwhile princely state of Mysore, and in Karnataka more generally. On the other hand, while he had an important role to play in the All India Manufacturers’ Organization and the Bombay Plan, I would like to see these as ventures towards the realisation of a vision that may have given rise to various other projects.

1. Internal autonomy and indirect rule: The opportunity for alternate development under a colonial regime
Colonial India was divided into directly administered British India that included the Presidencies of Bombay, Madras and Calcutta, the Provinces; and the native states or the Princely India of the Nawabs and Maharajas that were under indirect rule. There were a number of disparities marking the latter, hence even these cannot be seen together. By the end of the 19th century, and the early decades of the 20th century, four of these princely states had managed to acquire the status of ‘model states’ within the British imperial dispensation. This was further reflected in a certain degree of internal autonomy accorded to them in matters of internal administration and decision making. The four states were Mysore, Travancore, Cochin and Baroda. Their subsequent social development record has given economists cause to wonder whether it was the degree of freedom available to these states which was responsible for realigning their trajectory towards modernisation in a less convulsive manner
than what happened in other parts of India. The thesis is rich in possibilities and needs further exploration. Moreover, it would be interesting to situate the success of Visvesvaraya’s vision against the backdrop of such an evolutionary framework.

However, studies of British imperial policy have not carefully examined developments in Princely India that in extent occupied a third of the British Indian Empire. Although by the end of British rule many of these states were degenerate versions of 18th and 19th century kingdoms, nevertheless, other states had made considerable progress towards attaining self-sustaining administrative and political growth, emerging as viable and cohesive monarchies under the leadership of prime ministers or dewan, who were the product of a combination of Eastern and Western traditions. Thus the introduction of modern technology, education and administration in these regions was accomplished without disturbing the fabric of their socio-cultural life drastically.

A study undertaken by the economist John Hurd – concerning the evolution of population, economic and social conditions in thirty-one British Indian districts and twenty-eight indirectly ruled neighbouring states – reported that two-thirds of the latter were less developed. However, more recent statistical studies have suggested that most states registered a general, though not striking improvement. The central provinces, however, proved to be an intractable exception. Some of these states developed faster than the British-Indian provinces; possibly due to greater availability of capital and less stringent regulation regarding income-tax and labour. However, for the period 1925–1937, Hurd’s theory of the backward states does not apply to Mysore, Baroda, and Hyderabad which showed better growth rates than Bombay, Bengal and Madras.

Mysore was a native state under indirect British rule, and under the stewardship of Visvesvaraya, as Dewan of Mysore (1912–18), struggled for more autonomy. Furthermore, it was during Visvesvaraya’s tenure that the Instrument of Transfer of 1881 was replaced by the Treaty of Mysore. The attempt to achieve this
autonomy in internal administration was pursued by the two most influential Dewans of Mysore: Visvesvaraya and Mirza Ismail. This minimum autonomy ensured that interference from the Centre was restricted, and that it became possible to develop a cultural unity consistent with the local conditions and traditions. By 1927, Mirza Ismail had taken a small step towards reducing the annual subsidy to Rs.2.55 million. Although the demand for autonomy had first surfaced in 1881, the attempts of Visvesvaraya and Mirza Ismail succeeded because they were able to enlist the support of their respective maharajas in negotiating autonomy with the British.

The year 1910 was one of economic and political crises in the state of Mysore. The Mysore administration was perceived by the populace as alien, consisting largely of Tamil Brahmans who, having trained under the British-administered Madras Presidency, landed plush jobs in the Mysore administration. The Swadeshi movement that had begun to sweep Bengal after 1905 echoed very weakly in Mysore, in part due to the absence of a commercial class to respond to the Swadeshi movement. The influx of foreign goods precipitated the marginalisation of local manufacturers and artisans; consequently, there was little or no expansion in the domains of metallurgy, pottery, carpentry and textiles, and at the same time the state did little to support commerce and agriculture either. Thus, although the socio-political situation of the times may have demanded a policy similar to that proposed by Visvesvaraya at the time, yet Visvesvaraya realised that the opening up of Mysore could create opportunities for economic development. The engineer-sociologist, a term I shall define later, possibly recognised that promotion of technological systems could have the power to penetrate and shape wider cultural expressions by drawing these values into alignment with a technologically inspired social trajectory. On the other hand, Visvesvaraya’s view of development was nominalist. According to

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2 It is important to note that the citizenry of the princely states did not join the freedom struggle till quite late. While the rulers of the states may not have sabotaged the participation of the citizenry in the struggle, they did little to encourage the cause either.
this view, underdevelopment was evident in the visible gap between the industrialised West and the backward colonies. Furthermore, that development necessitated that India follow in the footsteps of the Western industrialised nations. This analysis of his, based on a comparison between dynamic Western society and India, eventually shaped the emergence of the inevitable state-capitalist model of development to be adopted in a primarily agricultural economy in order to restructure the economy on the lines of the then existing industrial capitalist nations, although his exemplar was Japan after the Meiji revolution of 1868.

In 1919, after a trip to Japan, he published his *Reconstructing India*, wherein he argued for the “wise assimilation” of modern methods of production, marketing and distribution. In this scheme, social reform amounted to building the nation from the village level through primary and technical education. The economic restructuring of the villages was necessary to economic progress. A common feature of this book and his later *Planned Economy for India*, was that Japan, the United States and Sweden appear as the developmental exemplars for India. However, for very different reasons, Japan turned out to be a model worthy of emulation for many an Asian nation, largely due to the manner in which it had leap-frogged into the modern industrial era. According to him, both Sweden and the United States had vast resources as India did. The former had learnt to harness them appropriately and efficiently. In addition, the governments of these nations had intervened during the initial years to develop capitalist industry and, by the end of the century, had caught up with the developed nations of Europe.

Economists have argued that Visvesvaraya was a “developmentalist”, who recognised that the realisation of his vision necessitated more autonomy for the state. The Treaty of Mysore resulted in reasonable independence in internal affairs and conferred a higher status on the state. He could thus initiate such projects as the building of the Krishna Raja Sagar dam, the Bhadravathi Iron and Steel Works, and the railway line established between Mysore and Arsikere. The years 1910–1918 were fascinating
in the economic history of Mysore on two counts. First, the state witnessed the initiation of far-reaching industrialisation, which in turn was accompanied by strident efforts to achieve economic self-reliance. During Visvesvaraya’s stewardship as Dewan, Mysore witnessed the rise of economic nationalism in the state. However, the local administration sought to reverse the gains of economic independence so acquired. Despite these countervailing tendencies, the foundations of a modern industrial state had been laid, the first steps to which were taken in the last decades of the 19th century.

2. The apprenticeship of an innovative civil engineer
Before he donned the mantle of the engineer-sociologist in Mysore State, Visvesvaraya worked as an engineer in Bombay Presidency. Little attention has been paid to the importance of these years in shaping his views and his vision. My own feeling is that his exposure to the industrialising and technical culture prevalent in Bombay Presidency and his travels abroad, in particular to Japan, during these years were of prime significance in the development of his vision which he gave concrete form to in Mysore. Pune was home for him: he obtained his training in engineering here, and subsequently it became his headquarters for fifteen years; it was also the seat of the Government of Bombay. I shall briefly inventory his technical and social exposure during these years.

He was responsible for the design and installation of automatic sluice gates, which he patented at Khadakvasala, that enabled the control of flood waters on the Mootha canal. This technological accomplishment put him amongst the experts on flood control in India. The Madras Mail, of May 8th 1903, speaks of his invention of automatic shuttlers, study of which was the hobby of numerous irrigation engineers. Despite which, the shuttlers installed on the dam near Bhabghar were an ingenious modification. More than anything else, he earned a footnote for himself in the subsequent history of irrigation technology.

His introduction of novel irrigation schemes in the drought-prone regions of Bombay Presidency were a success. The success was
in part ascribable to the inclusion of farmers in the implementation of these schemes and a policy of open dealing and transparency. He was already converted to two ideas that characterised his persona – the idea of public transparency and the image of the faceless bureaucrat. The scheme for drought irrigation has been seen as a modern revision of the traditional ‘thal system’ prevalent in Nasik and Khandesh, wherein the establishment of irrigation systems had been hindered by the topography of the country, since it involved exorbitant rock cuttings and construction of canals of immense lengths. This was compounded by the undulating character of the country that required special levelling and preparation of fields for irrigation. Historians of technology have still to study how Visvesvaraya creatively adapted a traditional system within a modern technical practice.

It was during these years that he was called upon to design the barrage at Sukkur, now in Pakistan, on the Indus. He then went on to design the drainage system for Aden, and gradually came to be recognised as an advisor on drinking water and drainage schemes for urban conglomerates. Gradually, he earned a reputation outside India as well. As a technologist and technocrat, his vision had acquired substance; by the time he had quit his position in Bombay Presidency, and moved to Hyderabad, where he initiated legendary flood-control schemes that saved the city of Hyderabad from annual floods. The forty-six-year old technocrat had a well-painted picture in mind when he entered the services of the Mysore Maharaja as Chief Engineer. In addition, while at Pune and Bombay he socialised with leading industrialists from Bombay, particularly Thackersey who was his good friend. Visvesvaraya’s ideas of the nation, public and citizenship developed amidst his camaraderie with Ranade, Gokhale and Tilak.

3. The birth of the engineer-sociologist
One course a sociologist treads towards understanding the changing profile of contemporary society is by following the path of innovators in their investigations and projects. The procedure
developed by Michel Callon, who has made ample contributions to the literature of techno-scientific innovation, has proved to be successful in the study of radical innovations and engineers who are forced to develop explicit sociological theories. He has coined the notion of the ‘engineer sociologist’, which serves as a model to which the sociologist turns for inspiration. Along with Bruno Latour he has developed the theory of the actor-network, that is central inasmuch as it recognises the sociological style of the ‘engineer-sociologist’.

It is my firm conviction that this notion, and its concomitant theory, would prove fruitful in trailing the unfurling vision of Visvesvaraya. That the idea is not too far-fetched in discussing Visvesvaraya is reflected in his biographies written in the 1960s and 1970s, long before the sociology of technology acquired a certain acceptability. Sitaramaiyah thus speaks of the Visvesvaraya project as that seeking to “engineer the economic welfare of the whole of India”. We may well propose a sort of periodisation to the creation of this persona. The period from 1890 to 1907 was that of the professional engineer. The engineer-sociologist comes out in the open well after 1912 when he takes over as the Dewan of Mysore. In any case it would be interesting to briefly recapitulate the influences that shaped the emergence of this role, by identifying the various dimensions ascribable to his project.

3.1 The persona of the administrator in the realisation of the vision

It may reasonably be suggested that as administrator he introduced the Weberian style of bureaucracy to the culture of Mysore. His personal code of conduct, and his relations with his colleagues, was meant to be an exemplar of this sort of institution. Narendar Pani, in his introduction to the diary of a bureaucrat, K.R.S. Iyengar, of Princely Mysore and a contemporary of Visvesvaraya, points out that the source of conflict between the two appears to have arisen from two distinct views of the bureaucracy. The Western ideal of bureaucracy was premised on the differentiation between the
personal and the official. In the Weberian notion of bureaucracy, the bureaucrat was personally free and subject to authority only with respect to their impersonal official obligations. Prior to Visvesvaraya’s appointment as Dewan, personal relationships were reflected further in the complete acceptance of nepotism in the bureaucracy which extended to the personalised reactions to corruption as well. The functional deviations from the Western ideal were complemented by structural differences: the powers of the Deputy Commissioner in the state covered both executive and magisterial functions. The monarch rarely vetoed the decision of his Dewan, and finally the state lacked financial resources to ensure that the Deputy Commissioner could exercise the powers invested in him. Visvesvaraya, as Dewan, pressed for the institution of a Westernised bureaucracy that clearly distinguished between the personal and the official, while K. R. S. Iyengar, his colleague was opposed to Visvesvaraya’s development schemes. The role of the bureaucrat, according to Iyengar, was that of an administrator and not of one proposing innovative and creative development schemes.

The fact that Visvesvaraya developed in the mode of the modern bureaucrat was further reflected in the two central events of his life. He resigned from his post in Bombay Presidency when he was superseded by a British official to the post of Chief Engineer that he felt he had right to on the merits of the case. A year later he was invited to take over as Chief Engineer in Mysore by the then Dewan, T. Ananda Rao. Visvesvaraya initially expressed some reservation of working with a monarch and his array of

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3 Narendar Pani in his introduction to the diary he has edited writes with reason that the bureaucrats (in Mysore) in 1881 were among the most powerful individuals in the state, exercising administrative control and having a say in the decision-making, with the Dewan, who too was a bureaucrat.

4 As Dewan, it was often pointed out that his conception of bureaucracy was founded on the ideal of merit, and that if an official was efficient then all other considerations, including personal ones, had to be ignored, and even seniority mattered little.
courtiers. Ananda Rao had to convince him that the Maharaja’s vision coincided with Visvesvaraya’s vision of developing vast irrigation works and of encouraging the development of industries and of technical education. A year later he took over as Dewan of Mysore and proposed large-scale government investment in Mysore to build a base for industrialisation along the following lines:

* the construction of a reservoir to generate hydroelectric power and irrigate 100,000 acres of land;
* the establishment of an iron and steel factory in Bhadravathi, and the commencement of a soap factory using locally available sandalwood; and
* a scheme for industrialisation based on the spread of higher education, thereby founding Mysore University, the first in Princely India.

This programmatic transformation could only be affected through a more efficient bureaucracy in tune with Western ideals. Hence the conscious projection of an apolitical image facilitated his implementation of various schemes and projects, even though he was often the victim of his political views – for one, he was never associated with the Congress or the politics of the freedom struggle, though implicitly he was quite in tune with the scientific and technological agenda of the nationalist scientists. A qualification is nevertheless in order. During the emotional upsurge following the partition of Bengal, he never followed the theosophists in the glorification of India’s past. At an address at an engineering college he spoke of India’s grievously low per capita income and the need for an economic plan to eradicate poverty, with the government playing an important role in its enforcement. Bjorn Hettne calls Visvesvaraya the most brilliant Dewan in the history of Mysore, even though he was far too Westernised for his times. One of the factors that influenced his choice as Dewan was his distance from the power struggles at the central and local levels.
3.2 The triptych painted by Visvesvaraya

Visvesvaraya’s technological vision may be schematised as a triptych. This inveterate innovator felt that the vision could never achieve realisation if he pursued the implementation of each panel of his triptych sequentially. The developmental process could only be bootstrapped if steps were taken towards implementing components of programmes from each of the panels simultaneously. The fascinating feature of the triptych is Visvesvaraya’s integrated perspective which recognised that all three programmes should be commissioned simultaneously. The relationship between these programmes was, therefore, symbiotic; the installation of one component in the panel would catalyse the initiation of programmes in another panel. Thus, in order to initiate so many programmes in parallel, the state exchequer would certainly have been strained, which explains why in his own times he was criticised severely for extravagance and wastefulness by the traditional bureaucracy. But he managed to carry the monarch along with him, and one might say that his public image stood him in good stead. By the 1920s, long before the benefits accruing from his schemes began to trickle down to the populace, his figure began donning the walls of common households in urban and even rural Mysore.

Through his books, programmes and pamphlets, it becomes evident that there were three core components of this vision of transformation: the domains of education, industrialisation, and rural modernisation. As pointed out earlier, India’s backwardness was ascribed to illiteracy and the consequent lack of skill and working capacity. Industrialisation became an instrument of change reflected in his slogan: “Industrialise or perish”.

This vision of development of the state, very clearly articulated in his writings, was deeply interconnected with cross-linkages between the three panels, and with developments in one closely stimulating developments in the other. Thus education was essential to produce a cadre of trained professionals to administer the state, a cadre of engineers who ensured the industrialisation of the state at a number of levels. The significant feature of the university was that it was
Table 1. Visvesveraya’s triptych for development\textsuperscript{5,6}

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Realisation</th>
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</thead>
<tbody>
<tr>
<td><strong>Technical and technological education</strong></td>
<td></td>
</tr>
<tr>
<td>University of Mysore (1916)</td>
<td>Augment administrative autonomy in the state</td>
</tr>
<tr>
<td>Bangalore College of Engineering (1917)</td>
<td>Promote indigenous industrialisation</td>
</tr>
<tr>
<td>Jayachamarajendra Polytechnic (1942)</td>
<td>Development of indigenous technical skills</td>
</tr>
<tr>
<td><strong>Rural industrialisation</strong></td>
<td></td>
</tr>
<tr>
<td>Irrigation Works</td>
<td>Increased acreage for agriculture</td>
</tr>
<tr>
<td>New Crops</td>
<td>Introduction of sugarcane and mulberry</td>
</tr>
<tr>
<td>Rural Industry</td>
<td>Development of industries for sandalwood oil, silk weaving and distilleries</td>
</tr>
<tr>
<td><strong>Industrialisation</strong></td>
<td></td>
</tr>
<tr>
<td>Hydroelectric works</td>
<td>Increased power for expanding industrial base</td>
</tr>
<tr>
<td>Bhadravathi Iron and Steel Works</td>
<td>Development of railways in the state, and later automobile and subsequently aircraft industry</td>
</tr>
<tr>
<td>Banking institutions and professional societies</td>
<td>Mysore Bank, professional bodies with linkage with the All India Manufacturers’ Organization</td>
</tr>
</tbody>
</table>

designed to be a teaching university and not merely an examining body with post-graduate classes. Mysore thus became the arts centre of the state, and the Central College, Bangalore, the science centre, drawing upon the expertise resident at the Indian Institute of Science. And much later, he conceived of a polytechnic that would turn out trained students.

\textsuperscript{5} In addition to developing agriculture, he proposed the founding of agricultural schools in the state, and the school in Hebbal with a large farm was opened in 1913. Similarly, training institutions in mechanical engineering were founded in district headquarters.

\textsuperscript{6} He was president of the AIMO for several years and co-director of the Tata Iron and Steel Co. Ltd.
technicians. This panel thus provided the human resources inputs to sustain the programmes to be undertaken in the other two panels. The hydro-electric scheme was also visualised in such an integrated manner. While approval for the project was obtained on the pretext of supplying reliable power to the Kolar Gold fields, the Maharaja was convinced that the real benefit lay in the increased acreage of land to be brought under agricultural cultivation.

However, true to the economic thinking of the time, an industrialising economy had to reduce its dependence on agriculture. Visvesvaraya’s conundrum was to accomplish this without neglecting the agricultural economy. Hence his scheme for rural industrialisation. The emergence of the silk industry in Mysore and the sugarcane-related industries were seeded programmatically. Technical personnel were sent to Japan for training in modern methods of sericulture. Looked at another way, this component of rural industrialisation was a sort of intermediate stage in industrialisation, wherein small industries would develop around rural villages and absorb unemployed rural workers in medium-sized workshops. This was to be accomplished through local initiative and government assistance. Finally, his most problematic project, concerning the Bhadravathi Iron and Steel Works, was conceived as a first step in the larger-scale industrialisation of the state. The project itself did not prove to be economically viable till the mid 1930s for a number of reasons that were addressed by Visvesvaraya himself long after he had retired. One of the primary reasons was that during the post First World War years there was a disastrous fall of prices of iron and steel which jeopardised the iron and steel industry. However, despite this setback, the subsequent stage in the industrialisation of Mysore, as visualised by Visvesvaraya, was to establish a car factory. On a trip to the United States with other members of the All India Manufacturers’ Organisation, he negotiated a deal with Chrysler\(^7\). The project fell through primarily

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\(^7\) In any case, much else came out of that trip. The delegation visited the Ford factory in Dagenham, and subsequently founded Hindustan Motors in Calcutta and Premier Automobiles in Bombay.
because the British administration torpedoed the proposal. But destiny had other things in store. During the Second World War, the allied forces needed a unit for servicing their aircraft in the Eastern sector. And Visvesvaraya played an instrumental role in negotiating a deal with the industrialist group Lalchand-Hirachand and the government in setting up Hindustan Aeronautics, which initially was to be a car factory, at Bangalore.

Furthermore, the Bhadravathi unit was located very carefully. It was close to Kemmanagundi from where the iron ore would be shipped; the plant was on the Bhadra River that would provide the water source; and the wood for the furnaces would come from the surrounding forests. The railways provided the connection between the Presidency towns. The Mysore-Arsikere line was laid down during his time, reducing the distance between Mysore and Harihar, the latter thereby provided the rail connection with Bombay Presidency. The Bangalore-Kolar line linked the interior of the state with Bangalore.

Looked at differently, as an administrator, Visvesvaraya believed that a bureaucracy in the Western mode, stimulated by the work ethic of capitalism, would not go berserk. This is not to say that he was not aware of the possibility that capitalism possessed the potential to run amuck. Which is why he was to write: “The unfettered spirit of industrialism will result in anarchy and violence unless the employing class meets the problem of peaceful methods of negotiation and conciliation”. Secondly, as has been indicated repeatedly, his vision of the technology society relationship was an engineer’s vision: technologically determinist, i.e. the advance of technology brought in its wake social development. He thus attempted to socially engineer change through technology. His economic programme has been categorised as state-capitalist – inspired by Japan and the United States – the State invests in education and in industry till private companies no longer need the support of the State. Finally, his central ideological orientation, if there was one, was to decrease the State’s dependence on agriculture.
The clarity of his vision has often rendered him vulnerable to the criticism that it had the precision of an engineer – a rather euphemistic way of saying that his ideas about society were often simple and at times naïve. Captive to the idea of technological efficiency he was quite naïve about the complexities underlying social causes and concerns. An apocryphal story is told by the leading journalist from Mysore, Gundappa, when he was deciding a name for his newspaper. He chose: ‘The Citizen’, ‘The People’, ‘The Karnataka’. Visvesvaraya quizzed him about why he did not decide upon: ‘Progress’, ‘Forward’, ‘Advance’. Gundappa writes: the first list suggested political democracy and historical tradition, the second the gospel of material regeneration, and the urge for modernism. The paper in its day attacked the deliberations of Visvesvaraya’s Mysore Economic Conference for its “amateurish planning of the Conference and its promises to extract moonbeams from cucumbers”. Through the Economic Conference, Visvesvaraya stressed the need for the organisation of statistical abstracts that were meant to help the planning of agriculture and other economic activities.

3.3 Building KRS: the engineer-sociologist at work

The genesis of the Krishnarajasagar (KRS) Dam is very interesting because it marks a milestone in the unfurling of Visvesvaraya’s vision. If the founding of the Mysore Economic Conference of June 1911 and the passing of the resolution of June 1912 for establishing the State Bank of Mysore marked one stage in the elaboration of Visvesvaraya’s economic agenda, the proposal for the KRS Dam that was much criticised in its time for being too extravagant financially marks another one. However, history and economics have since vindicated his plan, but the more important aspect is how despite opposition from within the Mysore administration and the British resident he was able to effectively translate his vision into a realisable project. The sociology of technology has thrown interesting light on the manner in which technologists focus their inventive or innovative effort to overcome reverse salients. Much
like generals channel their forces, the engineer defines the salient as a set of critical problems that when solved will correct the situation. Prior to 1912, there existed the pressing need to modernise the Sivasamudram power station that fed the Kolar Gold Fields – this modernisation plan was tied up with the modernisation of the mines themselves. Visvesvaraya recognised that this was an opportunity to push for his scheme that was much larger than that of the immediate requirements of the British and would simultaneously persuade the Maharaja who was more interested in the development of the state. The justification for the KRS Dam simultaneously intersected with three programmes. In the first instance, it would provide the reliable power needed for a modernised KGF, and would in the process neutralise any opposition from the British. Secondly, Visvesvaraya effectively translated his proposal into a scheme for extending irrigation in the region in and around Mysore thereby expanding the domain of agriculture. This would have appealed to the Maharaja who had in any case empowered Visvesvaraya with the task of initiating development projects in the state. Thus the idea of a reservoir at KRS was a master move that would have appealed to the Maharaja’s agricultural constituency as well. And finally, the surplus power generated from KRS would enable the industrialisation of the region which was, in a manner of speaking, a central element in his vision of the technological development of the state. Many years after the construction of the KRS, issues relating to its technical or financial feasibility continued to be debated and were the source of much criticism, but the agricultural and industrial transformation of the Mysorean landscape over the subsequent decades stand out as proud testimony to the wisdom underlying that vision.

4. Visvesvaraya as the inaugurator of planning in India
Any discussion of Visvesvaraya and planning must take cognisance of the fact that before the achievement of independence, planning was not anathema to the Indian industrialist class, and that it was Visvesvaraya who gave the notion a great deal of deliberation and
concrete form in his book of 1936 and through his association with the Bombay Plan. However, his approach to planning must be distinguished from Mahalonobis’ Soviet-influenced approach, in that it stressed a more capitalistic planning effort. However, what is most germane is that an important strand of the Nehruvian legacy was inherited from the work of Mokshagundam Visvesvaraya. His Planned Economy for India that appeared in 1934 bears evidence of two important insights: (1) The recognition on his part of the importance of estimating national income (2) His appreciation of the decline in the population dependent on agriculture with the introduction of structural changes in an industrial economy. While his vision recognised the potential for the agricultural growth of the economy, he felt that the primary increase in productivity and output would result from industrial development. Industrialisation would in turn accomplish three things: augment production; provide employment; and make available more goods at cheaper rates. Education was a means to achieving this end. As far as planning was concerned, it was essential to acculturate the population to the new industrial culture such that it could contribute to a developing industrial society. Planning necessitated the collection of data at the district level, and these efforts could be complemented by departments such as the Department of Industries which were indeed established after his tenure as Dewan came to an end. While economists have long debated his contributions as an economist, they do not deny that the recommendations he submitted to the Congress Committee on Planning in 1936 provided for Nehru’s contributions in the post-independence era. It would be interesting to briefly contrast the role of planning as conceived by Visvesvaraya and Nehru respectively (see table 2).

8 In the Planned Economy for India, Visvesvaraya wrote: “… a planned economy is required to ensure the rapid advance of industry, agriculture, commerce, finance, and particularly for increasing production, and earning power, reducing unemployment, and encouraging self-sufficient and closer interdependence between various parts of India. It should provide for the material resources and manpower of the country and the application of the latest inventions and discoveries of economic interest to the fullest extent”.
Table 2: Two visions of technology and planning

<table>
<thead>
<tr>
<th>Visvesvaraya (first half of the 20th century)</th>
<th>Nehru (second half of the 20th century)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canvas: Mysore</td>
<td>Canvas: the nation</td>
</tr>
<tr>
<td>Vision: national</td>
<td>Vision: international, non-aligned</td>
</tr>
<tr>
<td>Functioned in Mysore when the state had a certain degree of autonomy quite uncommon under colonial rule</td>
<td>Headed Independent India</td>
</tr>
<tr>
<td>A technocrat, imitating western ways, in a society where he assumed that groups functioned in harmony</td>
<td>Conscious of class differences and conflicts. His socialism resulted in mixed economy</td>
</tr>
<tr>
<td>To break monopoly of upper castes in skilled jobs he set up a revolving fund to award scholarships to students from the non Brahmin castes</td>
<td>Nehru advocated a reservation policy wherein a percentage of jobs for the oppressed castes were enshrined constitutionally</td>
</tr>
<tr>
<td>Reasonably successful in fostering cooperative linkages between research, industrial and financial institutions. Instituted the Mysore Chamber of Commerce to ensure coordination between industry and government policy</td>
<td>Linkages didn't quite work as Nehru desired - the IIT graduates ended up going abroad, no satisfactory linkages forged with research institutions</td>
</tr>
<tr>
<td>Mysore Economic Conference performed functions similar to Planning Commission</td>
<td>Nehru’s Planning Commission performed functions recommended in the 1943 Plan</td>
</tr>
<tr>
<td>Underlined importance of education and commerce</td>
<td>Expanded educational system, linking it with planned development</td>
</tr>
<tr>
<td>Admired the first Soviet Plan, but was certain that this was not what India needed</td>
<td>Emotionally attached to the socialist model of planning, but achieved State-led capitalism</td>
</tr>
<tr>
<td>Rural industrialisation could solve rural unemployment</td>
<td>Sought to operationalise community development</td>
</tr>
<tr>
<td>State theory of economic development, and his plans were directed at leapfrogging</td>
<td>Nehru’s vision of development was based on historical and international perspective</td>
</tr>
</tbody>
</table>

9 This table has been extracted from the paper by Vinod Vyasulu on the Nehru legacy.

10 Visvesvaraya was President of the Indian Institute of Science for five years, and suggested the need to establish an All India Organisation for Scientific and Industrial Research with national laboratories attached to it: “Science is a rising force, it is creating a new world about us that needs to be watched and pressed into service, and in any case it would be courting disaster to ignore it … the intelligence of the people, natural resources and available capital should act and react on each other so that with its cumulative effect, the country can make permanent progress”.
This vision was not technological but was a frame for social engineering – of embedding a new technological culture in order to achieve social transformation. And it is here that Visvesvaraya appeared as a visionary, whether it was his emphasis on planning for the nation, or on district level planning, or the Bombay plan, or his guidance of the All India Manufacturers’ Organization etc.

5. Some questions from our own vantage point
With the benefit of hindsight, we may well ask whether he placed excessive emphasis on industrialisation, or did he conceive of a balanced relationship between the development of agriculture, industry and education? It appears from the foregoing discussion that while he was a proponent of large-scale industrialisation, he was not oblivious to the needs of agriculture. It must not be forgotten that he started his career as an irrigation engineer and that he recognised full well the strengths and weaknesses of the agricultural economy. He identified six bottlenecks in the advance of Indian agriculture: (i) the high population pressure on the land; (ii) the repeated fragmentation of land holdings; (iii) the primitive methods of cultivation; (iv) the wasteful use of farm manure; (v) the poor utilisation of women in the work force; and (vi) the rural indebtedness of the farmer. This appreciation of the agricultural economy shaped his prescriptions for the agricultural economy which maybe summed up in two propositions.

* An agricultural economy that sells merely grains and raw materials remains poor.
* The degree of development of an economy is inversely proportional to its dependence on agriculture.

Between the years 1900 and 1930, the percentage of the Mysore population involved in agriculture increased, possibly for two reasons. More areas came under agriculture, and sections of rural industry were marginalised.

However, did the inability of Bhadravati to reach viability vindicate Chatterton’s appropriate technology thesis? Alfred
Chatterton was brought to Mysore from Madras Presidency, but after a short period the two fell out. But more than personal idiosyncrasies, they were separated by distinct visions of industrialisation. As is evident, Visvesvaraya was totally committed to modernisation and the introduction of large-scale industry as encountered in the developed nations. Chatterton was of a different persuasion and felt that modern technology could be re-crafted to work at different scales where they would prove viable, once cognisance had been taken of the cultural embodiment of technology. In other words, he may have been an early proponent of appropriate technology, although this clearly was not in the 1970s variant of it. But this gives us cause to re-think the original thesis, namely that the indirectly ruled states did embark on a trajectory of modernisation and industrialisation that was different from that of British India only in its impact. As far as the Bhadravathi Iron and Steel Mills was concerned, the demand for steel fell after the War, accompanied by a drop in the price of steel, that sent the company into loss. Moreover, there was still no ample demand for steel in the country at the time. Chatterton’s remark to the Royal Society in London in 1925: “unfortunate enterprise, the Bhadravathi Iron Works will have to be shut down”, was premature. For within a decade the fortunes of the Iron Works turned for the better. Did Visvesvaraya’s experiment in Mysore have any impact on post-independence India?

Technocrats from Mysore – in fields such as irrigation, sugar, paper, fertiliser and steel, worked in industries at the all India level and contributed substantially to the development of these fields. Visvesvaraya emphasised the development of indigenous talent, while at the time Tata depended on foreign expertise. In fact, those who built the Iron and Steel Works were the very ones who built the Tata Iron Works. Visvesvaraya’s contributions need to be appreciated at a number of levels and along different dimensions. Two important levels are those of the State of Mysore and that of India. At the level of the Princely State of Mysore under Visvesvaraya as Engineer-Sociologist and his Techno-Economic Vision under
indirect British rule, his contributions must be measured alongside that of Nehru against the backdrop of the nation fifty years later.

References
I am greatly beholden to the authorities of the Institute for the privilege they have given me of addressing this distinguished group. I must confess I am also somewhat nervous. The subject assigned to me is a challenging one – one to which even a trained historian cannot do justice. But there is one thought that emboldens me. That is that history does not happen only for the sake of historians. It happens for all of us.

It is one of the virtues of democracy that we are free to hold whatever views we want to about events and about our rulers. It is not so under other forms of government. A cat may look at a king, goes an old saying. But we cannot be sure how the king would have reacted if the cat had spoken out what it thought of him. There was of course an exceptional king who did not punish the washerman for saying what he thought about the queen. That is why, one supposes, it was ‘Ram Rajya’.

If an opinion survey were carried out in the country in the 52nd year of Independence, you would find that the people do not have a particularly high opinion of their elected representatives. Few ministers command respect. Most of them are regarded as figures of ridicule when they are not figures of downright revulsion. If the young have any heroes at all, they certainly will not be from the political world. This is not true only of our country. All over the world there is a great shortage of tall leaders. A Nelson Mandela is an exception.

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1 Lecture given on January 21, 1999 at the National Institute of Advanced Studies.
A newspaperman by profession, Mr. Sharada Prasad was chief editor of Yojana, journal of the Planning Commission (1959-66), and Information Adviser to Prime Ministers Indira Gandhi, Morarji Desai and Rajiv Gandhi (1966-78 and 1980-88). At the time of this talk he was Vice President of the Indian Council for Cultural Relations.
It was all so different until only yesterday. The British have just declared that in their view Churchill is second only to Shakespeare as their choice for the Englishman of the millennium. There are any number of people around in Britain who pine for return to the Age of Churchill. If a similar poll were conducted in our country, it would be found that most people look back with nostalgia to the days when Mahatma Gandhi and his great contemporaries walked this land. The question that puzzles and haunts many people is: Why has India lost its capacity to beget and foster greatness? Why do we find bonsais instead of banyans?

A satisfactory answer may never be found. But if you looked at the history of nations, you would discover a very remarkable concentration of creativity and greatness occurring right when the nations came into being – and not equalled thereafter for decades. The histories not only of large countries like the United States of America, the erstwhile Soviet Union, the People’s Republic of China and our own Republic, but of smaller countries like Unified Italy, Egypt, Israel, etc. bear this out. If you take U.S.A., it took eighty years – until Lincoln came along – to produce a person matching the stature of some of its Founding Fathers. As for our next-door neighbour, Pakistan, it is doubtful if it will in the foreseeable future give birth to a person who can come anywhere near even Liaquat Ali Khan, not to mention Mohammed Ali Jinnah.

The men who made the American, Russian, Indian and Chinese revolutions were indeed men of extraordinary political calibre. Many would remember the quip of President Kennedy that there was never a greater concentration of intellect in the White House than when Thomas Jefferson dined there by himself. But Adams, Madison and Hamilton were no midgets. But the man who towered above them all and commanded their respect through his sheer grit was George Washington. A perusal of the speeches, articles and correspondence of these people is a fine course in political education.

I should like to put forth the proposition that our own Founding Fathers were easily the equals of the American Founding
Fathers in intellect and in their understanding of human nature and the nature of political processes and institutions, and were their superiors in what, for want of a better expression, can be called the spiritual dimension. Mahatma Gandhi and all those who came into his magnetic circle thought deeply about ends and means, about the problem of man’s injustice to man. Freedom was not merely an abstract political value for them; it was the very sine qua non of liberating the people of India – and of the colonised world, from their economic misery. Above all, through their concern for non-violence, they were grappling with one of the basic problems of civilisation. Freedom by itself did not suffice; man could not survive unless he learnt to conquer hate.

Speaking in the heart of the Kannada country, I cannot but recall the great line from the great Karnataka sage and reformer, Basaveshwara, who spoke of antaranga shuddhi – babiranga shuddhi: purity within and purity outside. To bring the public and the private into open alignment was one of the great aims of the Gandhian movement. I am not suggesting that there were no scamps and hypocrites among the followers of Gandhi. Or [denying] that many Gandhians in later years were corrupted by power and fell away from their own earlier standards of probity. There are cynics who have called Gandhi himself a humbug. But the fact is that his life was an open book. Of how many figures of history can you say this? When going through the private and intimate letters exchanged among our Founding Fathers, we cannot but be struck by the unfailing nobility of their utterance and the total absence of pettiness in their thinking. This could not be claimed even for Lokamanya Tilak. A senior leader once told me that he had known only two people – Gandhi and Nehru who did not fall victim to the common human failing of making snide remarks the moment a person left the room. Even in the private asides of Gandhi, Nehru, Patel, Azad and Rajen Babu we shall never encounter the vulgarity that you will find in the personal conversations (taped for the benefit of posterity) of statesmen like John Kennedy, Lyndon Johnson, Richard Nixon and Bill Clinton.
Let us go back to Jefferson himself and some of his private dealings. I am not referring to the case of Sally Hemmings, one of his slaves, and the reports current in his own lifetime – and now confirmed by history – that he was the father of her children. We should be more disturbed by the fact that this great champion of freedom of the press did not hesitate to hire editors to go after his political rivals – or that he did not find slave-owning incompatible with his subscription to the belief that all men are created equal. Nehru, Patel, Rajen Babu and Azad had differences but they were bound by an extraordinary moral bond of the kind that subsists only among the co-disciples of a spiritual guru. Whoever wishes to find an example of political leadership at its best cannot do better than spend some time on the Gandhi-Nehru-Patel story.

The manner in which Gandhi came to dominate the national scene in such a short period is one of the miracles of history. Just a few years earlier he had met Pherozeshah Mehta, Tilak and Gokhale and had been awe-struck. Among them he chose Gokhale as his mentor. He wanted to join Gokhale’s Servants of India Society. It is at his behest that, when he returned to India in 1915, he spent a year going round the country and learning about it before plunging into politics. Within a few months of his doing so, Tilak prophetically declared: “He, Gandhi, and not any of us will lead India to freedom.”

Jawaharlal Nehru has described Gandhi’s advent in a passage which is so famous that I need not repeat it here. The historian S. Gopal has spoken of Gandhi’s Christ-like gift of seizing men and their minds. People much older to him threw away their all to follow him. To the young he was the veritable Pied Piper. Few could resist his compelling magnetism. The greater mystery is how, in the pre-

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2 The allusion here is to the following passage from Jawaharlal Nehru’s The Discovery of India: “And then Gandhi came. He was like a powerful current of fresh air that made us stretch ourselves and take deep breaths; like a beam of light that pierced the darkness and removed the scales from our eyes; like a whirlwind that upset many things, but most of all the working of people’s minds…” Editors.
radio, pre-television era, without the aid of the mass media, with the largest circulating newspapers of the land ranged against him, Gandhi could spread his message to the remotest village. (Novelists like Raja Rao can explain this phenomenon better than political scientists could perhaps do.)

It is small wonder that Jawaharlal Nehru felt attracted to Gandhi. From his youngest days, Nehru had been critical of the policies of petitioning and prayer that the Moderates in the Congress had practised, and he was waiting for a messiah who believed in action. As Nehru has put it, what attracted him to Gandhi was that behind his soft words there was steel. That reminds me of a remark made by one of the followers of Martin Luther King to me in America one day back in the late fifties; “I like your Gandhi, man. He has the killer instinct”! The remark recognises that non-violence is indeed the moral alternative to war; that it is a weapon. It is this deadly earnestness of Gandhi that attracted yet another westernised barrister, Vallabhbhai Jhaverbhai Patel, to him. When Gandhi spoke to a group of Ahmedabad lawyers, Patel interrupted a game of bridge to hear him in amused indulgence. But he found this strange man’s ideas and words going straight into his heart like so many arrows. Within a week, gone were Patel’s Western suits. He had become a follower of Gandhi.

It is easy to know what Jawaharlal Nehru found in Gandhi. But what did Gandhi find in Nehru? Why was he so attracted to him? When Gandhi was a member of the Congress Committee which inquired into the Jallianwalla Bagh firing, he watched Nehru closely: Jawaharlal worked as the committee’s secretary. Gandhi was intrigued to find a young man who had everything going for him – affluence, youth, good looks, a bright future – but was yet so withdrawn and lonely. Very soon he formed a high opinion of Nehru’s absolute, transparent integrity and dependability. If disciples seek out gurus, gurus seek out disciples, and in Jawaharlal Nehru, Gandhi must have found a disciple who had something of his own master, Gohkale.
Within ten years, Jawaharlal Nehru was to become the president of the Congress. Gandhi said of him at that time: “In bravery he is not to be surpassed. Who can excel him in the love of the country? He is rash and impetuous, say some. This quality is an additional qualification at the present moment. And if he has the dash and rashness of the warrior, he has also the prudence of a statesman. He is humble and practical enough not to force the pace to the breaking point. He is pure as crystal, he is truthful beyond suspicion. He is a knight *sans peur, reproche*. The nation is safe in his hands.”

Throughout the twenties there had been a great deal of comment on Jawaharlal’s spectacular rise in the Congress. At the time of the Lahore Congress, it was common knowledge how Motilal Nehru had pressed his son’s choice on Gandhi (which makes Motilal Nehru the true founder of the Dynasty!) It is doubtful if Gandhi, who did not do much for his own sons, would have gone along with the paternal principle if he had not been convinced of Jawaharlal Nehru’s worth and value. The son owed his ascendancy not so much to the father as to the Holy Ghost.

The person who lost out at Lahore was Sardar Patel. For he had been the delegates’ first choice. This was to be repeated eighteen years later when he had to step aside to let Nehru become free India’s first prime minister.

There is a considerable body of opinion in the country which holds that India would have fared better if Patel, instead of Nehru, had been the first Prime Minister. We need not go into the debate here, but shall try to find out what Gandhi’s reasons were for preferring Nehru. In integrity and courage, Patel was as notable as Nehru, but Nehru’s mass appeal, especially his hold on the young people (which he shared with Subhas Bose), was far greater than Patel’s. As the first true mass leader of India, Gandhi knew how important a mass base was for building a party. There were several leaders of exceptional ability who had no mass base; for example C. Rajagopalachari, who had a Victorian liberal’s suspicion of the crowd and who hesitated to fight a single direct election in all his
life – even when the electorate was limited. Nehru’s very youth was a plus point in Gandhi’s eyes, for he knew that in politics, if the choice was between a young man and an older one, the younger should be preferred for the simple reason that he would have a longer tenure and there would be no need to make a choice again soon. Experience may be an argument in the civil service, but in politics, energy is the deciding factor. As a western epigram has put it, parties are built around men with a future…

There was yet another consideration, namely Nehru’s international appeal. If what made Gandhi prefer Nehru to Patel was his youthfulness, what made him prefer him to Subhas Bose, who also had youthfulness going for him, was Nehru’s acceptance of non-violence. Gandhi was convinced that Nehru would never compromise with non-violence. Hence his assertion in 1942: “After I am gone, he will speak my language”. Nehru by and large fulfilled that trust.

When Gandhiji once asked Patel what he would do after freedom had been won, Patel replied: “Take sanyas”. Patel, masterful though he was, had a strong self-abnegatory streak. His master’s wish was law to him. “Whatever parental love fell to my lot I got from Bapu and Ba”, he once declared. If in his younger days Patel had allowed his elder brother Vithalbhai to take his own P and O ticket and travel to England, in his later years in the forefront of national politics, he cheerfully stepped aside for his political younger brother because that was Gandhi’s preference. He remarked to Azad once: “If I had been Jawaharlal’s age, I would have said I will run the government”. But time and again he told the people of India: “Jawaharlal is our leader. Bapu appointed him as his successor. It is the duty of all of Bapu’s family to carry out the bequest”.

It is well-known that when Nehru and Patel pulled the national cart as yoked animals, there were strong differences between them. There was a showdown just before Mahatma Gandhi’s

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3 As an aside the speaker added: “That is only half the epigram; the second half goes: and women with a past!”
assassination. One of the last things Gandhi did was to call Patel over and persuade him to continue to work with Nehru. The three were to meet to seal the compact but Godse’s bullets did not let that meeting take place.

A couple of days after the tragedy, Nehru wrote to Patel:

With Bapu’s death everything is changed, and we have to face a different and more difficult world. I have been greatly distressed by the persistence of whispers and rumours about you and me, magnifying out of all proportion any differences we may have. It is over a quarter century that we have been closely associated with one another and have faced many storms and perils together. I can say with full honesty that during that period my attention and regard for you have grown, and I do not think anything can happen to lessen it.

Anyway, in the crisis that we have to face now after Bapu’s death, I think it is my duty, and if I may venture to say, yours also, for us to face it together as friends and colleagues, not merely superficially, but in full loyalty to one another and with confidence in one another. I can assure you that you will have that from me.

To which Patel replied:

I am deeply touched, indeed overwhelmed by the affection and warmth of your letter. We both have been lifelong comrades in a common cause. The paramount interests of our country and our mutual love and regard, transcending such differences of outlook and temperament as existed, have held us together. I had the good fortune to have a last talk with Bapu for over an hour, just before his death. The opinion also binds us both and I can assure you that I am fully resolved to approach my responsibilities and obligations in this spirit.

Nehru and Patel kept the compact even when there were strong differences of opinion, as for example over the election of
Purushottamdas Tandon as Congress President. Working together, the two laid the firm foundations of the Indian State and the Indian political system. This is not to minimise the contributions of Rajendra Prasad, Azad, Ambedkar and the other makers of the Constitution, but if Nehru and Patel had not held together, we could not have survived as a credible, viable, democratic nation and withstood the later challenges. The Nehru-Patel decision not to wind up the Congress must be seen in this context of immediate and long-term imperatives.

Jawaharlal Nehru was fortunate in his colleagues and never more so than in Sardar Patel. The Nehru-Patel duumvirate has few parallels in history in terms of the quality of their personal relationship as well as in terms of capacity and achievement.

Nehru’s own reputation has in recent years greatly declined. With the world-wide setback to socialism, his strategy of state-led planning is seen as a producer, not of wealth but of poverty and backwardness. The end of the cold war should have been interpreted as a justification of his policy of non-alignment, but the disappearance of the Soviet Union is adduced as proof of his unrealistic reading of international relations. His secularism is anathema to a vocal section of the people – and they happen to have now risen to power. He is not even remembered for his role in building up parliamentary democracy; more often he is held responsible for building up an over-centralised state.

The Kashmir dispute is held up as the millstone he put around the nation’s neck. Above all he is not forgiven for being Indira Gandhi’s father. He is also charged with responsibility for inaugurating an extravagant life style. (Remember Dr. Lohia’s booklet which said that the Prime Minister costs the country 25,000 rupees a day?) Nehru was probably ill-advised to choose Teen Murti House to live in. Indira Gandhi wisely decided not to move in there. Her decision to stay on in 1 Safdarjang Road, probably the smallest house that any head of government lived in anywhere in the world, won the admiration of people all over the country. It is not generally known that even while living in Teen Murti House,
Jawaharlal Nehru led a spartan life. He had no air conditioning, for example. Many habits he had practised in prison continued with him – like darning his clothes when they tore, and sticking to *khadi* clothes and hand-made paper, *swadeshi* soap and tooth paste, and so on. The daughter also shared these habits. She was a great one for switching off the fans and lights whenever she left a room, whether at home or in her office. She was a frugal housewife.

Jawaharlal Nehru is accused of grooming his daughter as his successor; he has also been compared to the banyan which allows no other tree to come up in its shadow. I just said that Nehru was lucky in his colleagues. But there was one exception. He was particularly unlucky with a group which started off being identified with him, the Congress Socialist Party, whose members became some of his most trenchant critics outside the Mahasabha (who called him a “maulana”) and the communists to whom he was the running dog of the imperialists.

It is well-known that Nehru had hoped that Jayaprakash Narayan would share his political burdens and eventually succeed him but his efforts to bring him into government came to nought. Jayaprakash remained, to the end of his life, a very attractive but very baffling philosophical anarchist, ready to fight the aberrations of the state but reluctant to assume any office of responsibility himself.

In his lifetime, particularly in the pre-independence days, Nehru was often called the ‘Hamlet of Indian politics’. The label was a clear sign of lack of understanding either of Hamlet or of politics. No man who had Nehru’s will to power could be a Hamlet. He never said “O cursed Spite, that ever I was born to set it right.” He revelled in the chance to set things right. He was one of those men of action who were also men of thought. If he discussed the alternatives in public, that is because of his doubts about the morality and practicality of a particular course of action, not the result of any doubt about the need for action or about his own capacity. Even Jayaprakash Narayan, to whom the Hamlet tag came to be attached later, had no hesitation about his duty. But his
persistent refusal to assume political authority was a real waste of a vast and unusual national resource.

Grooming does not work in democracies. It has often failed even in monarchies. Choices in democracies are often determined by the configurations at the final hour, not by horoscopes cast in advance. We need only to recall the sad case of Anthony Eden whom Churchill himself had groomed as his heir but who proved a woefully inadequate man for crises. Time and again we find a good No.2 failing as No.1 (just as in the film world a fine supporting actor or actress need not turn into a top star.)

Nehru planned his succession very ingeniously through the Kamaraj plan. Morarji Desai, one of the leading claimants, always believed that the Kamaraj plan was Nehru’s plot to do him out of his due. The other leading claimant was Lal Bahadur Shastri. It would have been ideal for the nation if there had been a candidate who combined in himself the best qualities of the two. But that was not to be. Shastri and Desai were wholly different in temperament and endowments. Both were divested of office (along with a few others) under the Kamaraj plan, and asked to work for the party. The whole country had a chance to see which of the two would prove more acceptable to the Congress rank and file, to whom they would turn for settling their disputes.

They turned to the affable, humble Shastri rather than to the stern and rather imperiously aloof Morarji.

A vivid example of Shastriji’s style comes to mind. It happened at the first meeting of the Planning Commission to meet under Lal Bahadur’s chairmanship after he had become Prime Minister. I was at that time editing the Planning Commission’s journal and attended the meeting. Lal Bahadur was no orator. His prose was plain, but his manner was warm and made a deep impression because of his earnestness. He began by referring to the loss that the nation and the world had suffered in Nehru’s death. When he went on to allude to his own personal association with Nehru, he was heard with rapt attention. A few eyebrows went up when he said: “I once told Panditji: ‘Panditji, I am more intelligent than you. Ask me
how’. Panditji asked me: ‘How’? I told him: ‘Panditji when people come to you and tell you their stories and give you their version in disputes, you with the bigness of your heart, believe them. I, being nearer to their level, am able to see through them. That is why I am more intelligent than you!’ It was a wonderful way of paying tribute to his mentor and also making the world aware of his self-confidence.

Lal Bahadur was a living disproof of the banyan tree theory and the dynasty charge. Who would have imagined – it certainly was not part of Nehru’s design – that this little big man’s life would be cut short so soon? If he had been in office for the full term, there is no knowing whether Indira Gandhi would have become Prime Minister at all, although she had emerged, even during Lal Bahadur’s tenure, as a rival centre of power.

I worked with Indira Gandhi from the first day of her Prime Ministership until the last day. In fact I began working for her a few days before her election as leader of the Congress Parliamentary Party on 19th January 1966. (I was one of the last persons to speak to her. I had seen her a few minutes before her death on 31 October 1984.) She was more forthcoming in the early days than in later years in talking about herself. More than once she told me that it was Govind Ballabh Pant and U.N. Dhebar, and not her father, who had persuaded her to take an active part in the party councils, and that Pant also showed her many files. There was one corroborative piece of evidence to support her assertion that she had not foreseen that she might one day be called upon to hold the top spot. And that is, she, who took great care about her father’s papers, took none whatever about her own papers – her letters, her speeches, etc. There were no papers with her of her own months as Congress President. She was truly torn between remaining a private person and becoming a public personage.

But there is little doubt about her political acumen even in her younger days or her deep understanding of the strange organism called the Congress. She had known all the important leaders and party workers since her childhood in Swaraj Bhavan, which was also
the AICC headquarters. And she had a natural gift for reaching out to party workers at the field level. She had, of course, the advantage of being her father’s daughter and his hostess in Teen Murti House and his companion on his travels within the country and abroad. The two recently published books *Freedom’s Daughter* and *Two Alone, Two Together* (edited by Sonia Gandhi and published by Hodder and Stoughton), a compilation of the letters which were exchanged between Nehru and her, show what a keen political mind she had developed even during her student days in England, a fact which made Laski advise her not to become her father’s satellite.

When Indira Gandhi became Prime Minister, there was not much of a public record to go by about her thoughts and views, so the label *goongi gudiya*, dumb doll, came to be attached to her. Within a remarkably short time, she was able to turn the tables on her tormentors within her party, Parliament and the country at large. Indira Gandhi was a tremendously quick learner. One of the reasons for it was that she was a good listener. She had the advantage of being underrated. She was an adept at converting handicaps into strengths. When she hit, she hit hard, with several times the force needed. The opponent was caught off guard but there were many unintended consequences too. If we keep this in mind we shall be able to understand why she did some of the things she did and the way she did them.

Let me not act as Indira Gandhi’s PRO so many years after her death. One observation about her stays in my mind. That is a remark made by Gen. Thimayya’s sister, Amie Crishna. Mrs. Crishna was Indira Gandhi’s personal secretary for more than two decades. When a biography of Indira Gandhi appeared, Mrs. Crishna told me: “Look at those people. I have worked for Indira Gandhi for 24 years, yet I don’t know her. But these authors claim to know all about her!” It is wise not to play a know-all. Indira Gandhi was one of the most complex of people and she elevated inscrutability into a fine art.

By contrast, the next Prime minister I worked for, Morarji Desai (-I worked as his Information Adviser as well, for almost a year and a half) was an easy book to read. His predictability gave
a big advantage to his adversaries in politics. Morarji Desai looked every inch the leader. He had a strong and impressive mien and bearing, with authority exuding from every pore. The trouble was that the top spot came to him too late in life. He looked upon Prime Ministership as something that fortune had wrongly withheld from him time and again but could no longer do so. It was not a challenge or an opportunity for him to justify himself. He was a fatalist. He made no attempt to defend himself when attacked. He had undoubted administrative ability, but lacked the first ingredient in a politician’s make-up, namely the art of winning and retaining people. He snubbed his friends and antagonised his followers. He had a peculiar way of cross-examining them. When a journalist once asked him: “Prime Minister, why do you always answer a question with a question?” he replied “Why not?” When a health faddist met him and argued about the superiority of her remedy to his, he told her: “The trouble with you is that you are too rigid and opinionated; you seem to think you are always right. You should learn to have an open mind.”

If power came too late to Morarji Desai, it came too early to Rajiv Gandhi, the third Prime Minister I worked for. In contrast to his mother, who had a long apprenticeship, Rajiv Gandhi had virtually none. In fact he had set his face against a career in politics. When it was forced upon him, however, he took to it with zest and relish. His youthfulness was attractive and infectious. The flip side of it was that he lacked patience. He worked hard. He had a sharp mind, although it lacked the intellectual sweep of his grandfather or the intuitive flair of his mother. Like them he entered politics at the top and had to work his way down. The people took to him as they had to his mother and grandfather. A politician has to learn by his mistakes. It was Rajiv Gandhi’s tragedy that his learning process began after becoming Prime Minister, when the penalty for mistakes was too large. He would have done far better in a second term – he was sure to get it if death had not claimed him. He did possess the basic qualities of leadership – energy, self-assurance, grasp and the ability to dominate.
Of the four stop-gap Prime Ministers we have had, Mr. Charan Singh, Mr. Chandra Shekhar and Mr. Deve Gowda were not wanting in self-assurance; and Mr. Gujral was too suave to make a show of it. What the four had in common was that Prime Ministerial office came to them through party brokerage. It had not been earned by them in open battle. The cases of Mr. V.P. Singh and Mr. P.V. Narasimha Rao fall into a different category – they had a solid bloc in parliament with them. As Prime Minister, Mr. V.P. Singh was a restless soul, always in search of some new miracle drug. He started with a great reservoir of goodwill for his idealism, but soon dissipated it. Mr. Narasimha Rao was a more conventional chess-master. He achieved what few had thought he would be able to – last the full term, with a minority government. His tactical skill and his depth were not under-rated by his colleagues or adversaries. What he lacked was the gift of generating deep loyalty. Neither Mr. V.P. Singh nor Mr. Rao could be called a Man of the People.

As for Mr. Vajpayee, courtesy demands that we should not dissect him. He might still spring surprises. His trouble is that damage will not come to him from the front, that is, from his open opponents, or from the sides, from his allies, but from the back, from his own supposed supporters. There is a trident pressing on his spine.

I have confined this discussion of leadership to Prime Ministers. They are not the only leaders in a society. The subject being so large, I had to cut it down to the size of my own limited knowledge. I shall conclude by doing what I should have perhaps done at the beginning – namely give a definition or description of leadership as I see it. To the question who is a leader, my answer would be: A leader is a person who has a vision of a better life for the people around him as well a strategy to bring it about, and the ability to communicate that vision to others and inspire them to work with him for the realisation of the objective. His courage, his character, his sense of justice, his understanding and his dedication should be such that large numbers of people will place their future in his hands.
An Obituary on Caste as a System

M. N. Srinivas

I shall be arguing in this paper that the localised system of production of foodgrains and other necessities (from now on ‘basic needs’) based on a caste-wise division of labour is fast breaking down all over rural India, and is likely to disappear in the near future. This event is of momentous importance for it augurs the end of a social order which has continued for 2,000 years or more. The lineaments of the new social order – if it can indeed be called an order – are already visible.

I am aware that in regarding the subsistence economy of rural India, dependent upon a jati-based division of labour, as the essence of caste, I have made an assumption which may be unacceptable to some of my colleagues, sociologists, anthropologists, and Indologists. However, I hope that the rationale for my assumption will become clear as I proceed with my argument.

I shall now describe the main features of the system of production of basic needs. First, it was local, a cluster of neighbouring villages forming a unit rather than a single village even when the latter had several jatis. Each such cluster included one or more weekly markets, where villagers and itinerant traders would gather to exchange goods, or buy paying cash. The cluster could claim a large degree of self-sufficiency as far as the production of basic needs was concerned, with the overarching value in the culture being contentment with one’s lot.

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1 This paper, published in the ‘Economic and Political Weekly’, February 1, 2003, was delivered as a talk by Prof. M.N. Srinivas on October 7, 1999 at the National Institute of Advanced Studies. Srinivas was then Professor of Social Anthropology at NIAS, and held the J.R.D. Tata chair. Since he passed away soon after, some thoughts are therefore not elaborated upon. The paper was jointly prepared for publication by Tulasi Srinivas [then at Harvard University], and Lakshmi Srinivas [then at Wellesley College], who had stated that Prof. Srinivas did not think the paper was ready for publication. It is printed here with permission given by Prof. Tulasi Srinivas.
Cash was scarce and used minimally, the artisan and servicing castes being paid with grain at the annual harvest. The rate and quantity of grain was determined by local custom. Further, members of the serving castes such as the barber and washerman had roles in life-cycle rituals in the landowning patron’s household. In other words, economic relations were embedded in social relations sanctioned by custom and morality. Relationships between patrons and clients, if not between everyone living in the village, were multi-stranded and durable. Durability itself was valued, and relationships often continued from one generation to the next. This applied not only to friendly relations but also to antagonistic ones. One inherited one’s friends as well as enemies.

Another essential characteristic of the system of production was hierarchy. The local sections of the jatis which came together to produce the basic needs of daily living, related to each other hierarchically. A vast amount has been written about hierarchy in recent years, and I shall confine myself to the points relevant to my argument. That the hierarchy expressed itself in the idiom of ritual purity and impurity is a matter of common knowledge. As also the fact that, speaking generally, the higher jatis and everything associated with them was pure while the opposite was true of the lower jatis with untouchability marking the apex of impurity. But along with the ancient and higher articulated principles there was another, much less articulated but no less real and pervasive principle, namely, a jati’s relationship to land. Landowners occupied the top of the pyramid while the landless were at the bottom. There was a graduation among landowners depending upon the amount of land owned by a household followed by tenants and sharecroppers, both categories being formally contained in the land reforms following independence.

When a jati owned the bulk of land in a village, and enjoyed numerical strength, it exercised dominance in village affairs, everyone obeying its decrees, even castes marked ritually higher. Such jatis existed in most parts of rural India, and I called them ‘dominant castes’. Another pan-Indian phenomenon was the
existence of a large overlap between landlessness and traditional ‘untouchable’ castes, a fact which enhanced their poverty, misery, and exploitability.

Traditionally, every big landowner had, besides his tenants and sharecroppers, a few servants who worked for him and his household as tied labourers. A tied labourer generally spent a few years working for the landowner-master paying off a debt which he, his father, or guardian, owed the landowner. Such relationships also frequently continued from generation to generation. This is referred to as ‘bonded labour’ in the literature, and it was legally banned in 1976, but manages to continue here and there surreptitiously.

The intermeshing of hierarchies based on ritual criteria and the nature of the group’s access to arable land renders the hierarchy more complex, and if to this is added mercantile wealth and political power in urban areas the system becomes bewilderingly complex. Monistic interpretations of caste hierarchy, however indigenous, are doomed to failure.

The existence of a measure of congruence between land ownership and high ritual rank has led some interpreters to equate caste with class, representing a gross over-simplification of the reality. On the other hand, the existence of disjunction between status (ritual rank) and power is the hallmark of caste according to Louis Dumont (1970). I have discussed the inadequacies of these formulations elsewhere [Srinivas 1989:26-40] and I shall not repeat them here. I shall confine myself to making a few points about the nature of jati hierarchy which have not received enough attention.

**Position in Rank Order**

The first point I would like to make is that there is frequent disagreement regarding the position of a jati in the rank order, between the rank that a jati claims for itself and the rank conceded by others. Such disagreement is not confined to the middle regions of the hierarchy but may pervade the entire rank order. This is especially seen in parts of south India where jatis are grouped in ‘right hand’ and ‘left hand’ divisions. Thus a ‘right hand’ Dalit would
claim to be higher not only to the ‘left hand’ Dalit but a Brahmin of the ‘left hand’ division. Violent clashes between the two divisions used to erupt in towns in south India in the 18th century. These confrontations took the form of battles over deceptively trivial matters of ceremonial rank or temple honours [Bayly 1999:107-08]. Bayly proceeds to write: “this left hand ideology was apparently unknown outside the Telugu and Tamil country and it had virtually disappeared as a focus for so-called honour disputes by the mid-nineteenth century”. I found that the right-left division was alive and kicking in Rampura in Kannada country in 1948 [Srinivas 1955:23].

It is necessary here to mention the existence of certain Brahmin jatis which are regarded as low in ritual rank. Some Brahmin groups, who are in their culture and behaviour indistinguishable from other Brahmin jatis, carry a stigma for reasons that are obscure, such as the Marka Brahmins in Karnataka. Further, all Brahmins who perform funeral rites are looked down upon all over India, and Jonathan Parry (1980) had recorded that Brahmins who perform funeral rites in Benaras are actually referred to as ‘achchut’ (untouchable).

The fact that the rank order of a jati in the local hierarchy is frequently a matter of doubt and ambiguity is, in my opinion, evidence of the dynamism of the caste system at the macro or all-India level. It enabled individual jatis to move up in the hierarchy over time. This was especially true of the dominant castes which could, in times of political fluidity at the lower levels, seize power and in course of time lay claim to being Kshatriyas. It was the consolidation of British rule in the nineteenth century that put an end to endemic local wars and closed a most important avenue for upward mobility.

Historically viewed, the category of Kshatriya in the varna system has always been occupied by groups which managed to capture political power. According to K. M. Panikkar (1955), “the Nandas were the last ‘true’ Kshatriyas, and they disappeared in the fifth century BC. Since then every known royal family has come from a non-Kshatriya caste, including the famous Rajput dynasties of medieval India”. He also points out that “the Shudras seem
to have an unusually large number of royal families, even more in recent times. The Pals of Bengal belonged undoubtedly to that caste. The great Maratha royal houses, whatever their function today, could hardly sustain their genealogical pretensions connecting them with Rajput descent” [Panikkar 1955:9].

According to Romila Thapar even the Nandas hailed from lower origins: “Curiously enough the Nandas were the first of a number of non-Kshatriya dynasties. Most of the leading dynasties of northern India from now on belonged to castes other than Kshatriya, until the coming of Rajput dynasties a thousand years later” [Thapar 1966:57]. It is clear that for the period for which clear historical evidence is available, the category of Kshatriya was occupied by groups of low origin who were able to capture power.

To recapitulate: after making the point that production of basic needs of people occurred in a hierarchical social framework, I considered the nature of hierarchy mainly to dispute a few widely held myths about it. I shall now discuss the form of the relations prevalent among the groups involved in the production process.

The most widely held prevalent mode in the 1930s-40s was one in which particular households of artisan, servicing and labouring groups were rewarded by their landowning patrons with agreed upon quantities of grain. The relationship was dyadic, between the patron and the client, and each region had its own word for it. The first anthropologist to provide a full description of it was W. H. Wiser who studied a village in the Hindi region and wrote about it in a book titled The Hindu Jajmani System [Wiser 1936]. Wiser considered the system to be one of great antiquity and traced its origins to the laws of Manu. The term ‘jajmani’ gained wide currency and anthropologists writing about rural India accepted uncritically Wiser’s assumptions about the system’s antiquity. However, Wiser’s assumptions were refuted by the political scientist Peter Mayer in 1993 in an extensively researched paper entitled, ‘Inventing Village Tradition: The Late 19th Century Origins of the Jajmani System’ [Mayer 1993:357-95]. He wrote: “I argue that the jajmani system is of relatively recent origin and is
essentially a feature of the Gangetic plain”. He pointed out that the system became popular only in the latter half of the 19th century. Two forces of change converged to facilitate the emergence of jajmani: the first of these was the growing partition of zamindari and bhaiyacharya villages into individual holdings, the second was the mounting pressure on landholders to offer significant incentives to village artisans to retain their services. Mayer seems to assume that all over the Gangetic plain, all land in villages was owned either by a body of agnatically related males (bhaiyacharya or biradri) or by a zamindar, with the result that artisans and others served the entire village and not the households of individual landowners. The relationship between artisan and servicing castes was ‘demi-urge’ *a la* Max Weber and became dyadic only at a later stage when land came to be owned by individuals.

**Jajmani Relations**

While jajmani relations may represent a later development in the Hindi region, the same does not hold good for raiyatwari areas where land is owned by individual households with the result that relations between landowners and their clients are necessarily dyadic. Thus in villages in princely Mysore, landowners paid their client castes in agreed upon quantities of grain, and it was known as ‘adade’. Similar arrangements obtained in the non-zamindari areas of Telugu country where it was known as ‘marey’. But even in raiyatwari areas there were a few functionaries who served the entire village and they were rewarded with grants of land. They included a few temple priests and village servants. The last mentioned hailed from the scheduled castes and their official duties included assisting the village headman and accountant in the collection of land revenue, their caste duties required them to beat traditional drums at festivals of village deities, sweeping the village after a collective feast, and removing the carcasses of dead animals. These caste duties are increasingly looked upon as a symbol of oppression and resistance is building up to the performing of them.
I discuss Mayers’ argument in some detail because it was about *jajmani* but I must make clear that the issue of whether the services are performed for individual landowners, or for the entire village, is really irrelevant to my central thesis. However, what is of vital concern to me is that money was used minimally, service and labour were rewarded with grain, or grain producing land and economic relations were an integral part of more inclusive bonds. Production was local, subsistence oriented, and occurred in a hierarchical framework.

**From Status to Contract**

I am convinced that this system which has endured for over two thousand years is on its way out. I am confident that production will become freed from *jati* based division of labour, economic relations will become autonomous, and grain payments will be replaced by cash. Indian rural society will move, or is moving, from status to contract.

The replacement of the traditional, grain-based subsistence economy bound up inextricably with castewise division of labour, happened over a period of nearly two hundred years beginning with the establishment of British rule in India which brought a host of new technologies, ushered in new institutions, and radically transformed some old ones. Modern knowledge, the ideal of equity of human beings before the law, democracy, and human dignity were a few of the new ideas. What is perhaps even more important, after India became independent in 1947, the new government of India pursued with determination the goals of democracy, equality of all citizens before the law and, in turn, the goals of development and social justice. The single most important engine of India’s social revolution has been democracy based on adult franchise [Srinivas 1996].

New technologies and their products are transforming the lives of villagers in India. I shall confine myself to the changes that have occurred since 1950 though their roots go back to the latter
half of the nineteenth century. Some changes are easily seen and I shall begin with them.

Edible oil is now mass produced in factories and they have rendered defunct the old oil presser and his bullock drawn wooden press. Plastic and aluminum vessels have replaced mud pots and pans and urban textiles have marginalised hand-made cloth which survives in areas where weavers have formed cooperatives. Factory produced tiles are becoming popular and driving out traditional tiles made by local tilers. Sugar is replacing locally produced gur though in this case gur continues to be used as a sweetener for some favoured Indian dishes. Big wooden wheels fashioned by village wheelrights are giving way to much smaller factory-made wheels with rubber tyres – at least in the more prosperous agricultural areas. The barber and the washerman, two essential service castes, have had to change their working styles. The use of the safety razor is reducing the barber’s work while the washerman has been forced to use detergents and soaps and to abandon his traditional and inefficient methods of washing. Both barber and washerman are paid cash for their services instead of annual payments in grain.

The effects of these changes which began with what has been called the ‘green revolution’ in the Punjab in the late 1960s have been profound and wide ranging. The ‘green revolution’ began with Punjab farmers growing high-yielding varieties of wheat and gradually the use of high staples such as rice, bajra, jawar, maize and ragi, and to vegetables and fruits. The new agriculture required farmers to change their methods and techniques drastically. The new crops needed a continuous supply of water, the intensive use of fertilisers and pesticides and frequent weeding. Success in the new agriculture called for not only a mastery of the new techniques, but free access to fertilisers, pesticides and credit. While rich farmers were able to commandeer all the resources including labour, poor farmers found themselves at a great disadvantage. Lacking access to quality seeds, fertilisers, pesticides, water, and credit, they found to their utter dismay that the cultivation of hybrid seeds had rendered their knowledge of traditional methods of cultivation totally useless.
The suicide of several cotton farmers in Karnataka in 1999 reveals the negative side of the agricultural revolution.

The 'green revolution' has been followed by a ‘white revolution’ giving rise to a tremendous spurt in milk production and other dairy products. There was also a sharp increase in the production of eggs, poultry, and fish, all of which have resulted in changes in the food habits of the urban middle classes and the richer peasantry in villages. Rural prosperity during the last three decades accompanied as it has been by increased prices of foodgrains has led to rural wages going up sharply. A new class of tractor owners, who hire out their vehicles to farmers for ploughing, has emerged in the more prosperous rural areas. Tractor ploughing renders bullocks redundant, and if this trend becomes widespread there will be a decline in the use of cattle for agricultural and draught purposes.

A new feature of village life is the emigration of large numbers of people both seasonally and on a long-term basis. Prosperous agricultural areas are attracting labourers from poorer areas. The migration of large numbers of labourers from Bihar, Uttar Pradesh, and Orissa during harvest time in Punjab and Haryana is well known. But less spectacular seasonal migrations do occur from poorer to more prosperous areas all over the country. Fast growing cities also attract migrants from rural areas. The construction industry, garment and other factories, restaurants, and domestic services, all act as magnets as the rapid proliferation of the urban slum settlements testifies. Rapid population growth and the breakdown of the jajmani system are some of the ‘push’ factors for emigration. All in all, migration is now accepted in rural areas as a fact of life, and the development of roads and communications and ever expanding urban frontiers have facilitated this phenomenon. All in all, the social and mental spaces of villagers have increased considerably.

**Weakening Link**

In a word, the improvement of communication, the spread of education, a host of governmental policies favouring the weaker
sections, political mobilisation of the people, and the many technological changes referred to above have all had the effect of greatly weakening the link between *jati* and traditional occupations. Even where it lingers in an attenuated form, monetisation and market forces have combined to free economic relations from the baggage which they have traditionally carried.

In addition to the technological and institutional changes, new ideas of democracy, equality and individual self-respect are contributing to altering the nature of social relationships. This is evident in the behaviour of members of the so-called ‘lower’ castes and Dalits towards the higher. It is not an exaggeration to state that the higher castes in general resent the ‘uppity’ behaviour of the ‘lower’ castes and the concessions and benefits conferred on the latter by the policy of affirmative action adopted by the central and state governments. Resentment is however greatest with Dalits and Tribals since they enjoy special representation in all legislatures from village panchayats to parliament. Where Dalits are organised politically they refuse to perform chores which they consider degrading and this has provoked the wrath of the locally dominant castes who have traditionally exploited and humiliated them. Clashes between assertive Dalits and aggressive dominants are likely to increase greatly in the immediate future giving rise to bloody conflicts in innumerable villages. What is tragic is that there is no attempt on the part of those in power to anticipate and prevent such conflicts. Since it is unrealistic to expect Dalits everywhere to escape into the anonymity of cities, nothing less than the planned rebuilding of villages which deliberately violate the time-honoured architectural tradition of caste ghettos will prevent rural violence and ensure the physical and psychological safety of the Dalits.

**Buddhism and Jainism**

It is necessary to reiterate that an ideological attack on hierarchy, however widely supported, is unable to alter the ground realities, unless it is backed up by creating an alternative system of production that ignores, if not deliberately violates, the *jati* based division of
labour. For, contrary to widespread belief, anti-Brahmanical and anti-hierarchical movements did exist in pre-British India but they failed to bring about an end to the caste system. For instance, quite early in the history of India, in the sixth century BC, both Buddhism and Jainism rejected Brahmanical claims to supremacy over the others. According to G.S. Ghurye: “both Buddhism and Jainism appear to me to be movements started by Kshatriyas of exceptional ability preaching a new philosophy which was utilised by their immediate followers for asserting the social supremacy of the Kshatriyas over the Brahmins” [Ghurye 1994:69]. D.D. Kosambi has written that Buddhist scriptures “...argue against Brahmin pretensions and specialised ritual with consummate skill but in simplest words. Caste may exist as a social distinction, but it has no permanence, no inner justification” [Kosambi 1970:113].

Both Buddhism and Jainism in their origins were protest movements against not only the Brahmanical claims to superiority but also against the Brahmanical predilection to perform elaborate sacrifices involving the killing of animals, in the course of propitiating their many gods. Buddhism emphasised the importance of right thoughts and conduct (the eightfold path) while Jainism made non-killing (‘ahimsa’) central to the faith. Both were non-theistic sects, and both anti-Brahmin. A third strand that was within Hinduism, organised in the south-western part of the Gangetic region (‘madhya desa’), took a theistic turn, first in favour of Shiva and later in favour of Krishna Vasudeva. All this happened in the early post-Vedic years, and it was this third strand that the Brahmins, presumably thrown on the defensive by the Buddhist and Jain attacks, made their own and developed. According to Govind Prasad Upadhyay, “it is, however, to be noted that the traditions of the eastern region crystallised in Jainism and Buddhism and that of theistic Bhagavatism of the west developed independent of the orthodox culture, but both of them differed in their relations with the Vedic culture. The heterodox east revolted against Vedism, but the theistic character of Bhagavath was congenial to the orthodox aspirations. Although some degree of tension between Vedism and Bhagavatism cannot
be ruled out, the Brahmans adopted the system for revitalising the Vedic orthodoxy which was encountering the challenge posed by heterodox cults” [Upadhyay 1979:33].

According to Louis Dumont, the idea of ‘abimsa’ was propounded by the renouncers or sanyasi, whom he regards as the creative forces in Hinduism, and this became a central idea of the Jains. The bloody sacrifice of animals during the performance of elaborate and complicated ritual over which the Brahmins had a monopoly coupled with Brahmanical claims to being gods on earth led to the emergence of Buddhism and Jainism, both of which were the creations of the Kshatriyas. Brahmins responded to the new challenge by hijacking ‘abimsa’, abandoning animal sacrifice, and declaring the cow ‘avadhya’ or unkillable [Dumont 1970]. Another strand of the strategy was the adoption of the emerging theistic trend and supporting it as against the heretical sects of Buddhism and Jainism. It is from this theistic strand that the Bhagavad Gita emerged which became the fountainhead of the later Bhakti movement which incorporated within itself anti-hierarchical and anti-ritualistic elements which over the centuries encompassed every region of India. The Gita emphasising faith and love of god in the form of Krishna was enough to earn salvation and also simplified and internalised the notion of sacrifice declaring that a leaf or flower offered with devotion was enough for Him. Implicit in this was a criticism of the elaborate ritualism and bloody animal sacrifice.

**Bhakti Movement**

While Jainism and Buddhism both started out as protest sects, non-theistic in character and rejecting Brahminical claims to supremacy, the Bhakti movement grew from within the Hindu fold, and was characterised by a strong anti-hierarchical and anti-ritualistic stand, using local language as against Sanskrit, and was monotheistic in orientation. It surfaced first in the Tamil country during the seventh to tenth centuries AD encompassing both Shiva and Vishnu in their various manifestations. The Bhakti saints came from all the castes and both the sexes. Thus the Shaivite hagiology of Tamil
Nadu included Nandanar, a Dalit, Appar, a Vellala, and Sambunder, a Brahmin. The Veerashaiva movement of Karnataka initiated by Basavanna in the 12th century had saints from a variety of castes. This was indeed true of the Bhakti movement all over the country. Among the woman saints were Andal of Tamil country, Meerabai in Rajasthan, and Akkamahadevi in Karnataka. The Bhakti movement gave the hope of salvation to millions of people from among low caste groups and women. The Brahmin was ridiculed for his preoccupation with ritual, and purity and impurity; and his claims to supremacy. The Bhakti saints proclaimed that a non-intellectual love of God was all that mattered.

But powerful as these movements were, they failed to make a dent on caste hierarchy, for at the village level, the system of production of foodgrains and other necessities was inextricably bound up with a caste-based division of labour. The moral is that ideological attacks on hierarchy and Brahmanical claims to supremacy failed to create an egalitarian social order since at the local level the production of basic needs was inextricably bound up with jati. It was only with the establishment of British rule and the many forces it let loose that the idea of an alternative system of production not based on caste emerged, and this acquired salience in the first few decades of the 20th century. The post-independence years have brought the country closer to a system of local production freed from a caste-based division of labour. It is the government of independent India which mounted a determined, comprehensive and sustained attack on the institution and set in motion a programme of development which culminated in smashing the link between caste and traditional occupation. The jajmani system is beginning to disintegrate. In its disappearance lie the true seeds of equality.

But the paradox is that while caste as a system is dead or dying, individual castes are thriving. In my 1957 address to the Anthropology and Archaeology section of the Indian Science Congress in Calcutta, I pointed out that since the 1920s castes have organised themselves to obtain representation in the provincial legislatures. This phenomenon
became strengthened in the 1930s, and after independence political leaders discovered that people could be mobilised on the basis of caste, ethnicity and religion, and this has resulted in what I called ‘horizontal stretch’ of caste. In fact, what are called castes today are more accurately described as congeries of agnate sub-castes which have come together to compete more effectively with other similar formations for better access to such scarce ‘resources’ as political power, economic opportunities, government jobs and professional education. With competition getting more difficult, even ruthless, the ‘horizontal stretch’ is more stretch than ‘horizontal’, for discrete caste groups find it convenient to come together and assume new names. I cannot go into this in detail but I content myself with reiterating that while caste as a system is dead, individual castes are flourishing. And on the positive side the idea of hierarchy has lost legitimacy both at the all-India and at the state levels. What is more viable, especially in urban areas, is the idea of difference. Differences are articulated and the articulation is bound up with questions of group identity. There is considerable differentiation, economic, social, and cultural, within each caste, though it is far more visible among the higher, and the dominant castes, than among the others. But every caste is differentiated. Furthermore, secularisation has made strides in India such that ritual is usually confined to home, temple and pilgrimage.

Pull of Middle Classes
Linked to all this is the phenomenon of the middle classes of urban India. While the middle class is primarily urban, and it is dominated largely by the upper and dominant castes and elite sections of minorities and ethnic groups, all sections of Indian society are represented within it, thanks to the spread of education, and massive affirmative action policies by the state. There are different levels within the middle class, but once members of any caste group reach even the lower levels, they aspire to and work to reach the higher levels.

Thanks to the fact that dominant landed castes are represented in politics, bureaucracy and other professions, the middle class has
reached the rural hinterland. Maruti cars, two-wheelers, cycles, and colour televisions are no longer just an urban phenomenon. Consumerism is an important characteristic of the middle classes and it is spreading to other sections of society. The urge to become part of the middle class is now widespread, cutting across religion, language, and caste. Upwardly mobile families or sections of castes want very much to become part of the middle class and once this happens, education, professions and lifestyle become indicators of status, putting caste in the background. And it is among the middle classes that marriages are increasingly crossing traditional barriers of all sorts. Young people are found announcing with pride that their parents belong to different castes or even different ethnic and religious groups. Colleges, work places, conferences, athletic meets and places of entertainment have become places where friendships are formed between men and women, often culminating in marriage. The cultural gap between generations is widening, with the result that parents often cannot, and do not, control the lives of their offspring. The latter have more freedom than their parents ever aspired to. Among the middle classes, similarity of education, lifestyle and proximity are becoming increasingly more important than caste in forming friendships, and in marriage. It is true that this is currently mainly confined to the middle classes but they are over 200 million strong, and are a model for the rest. As the middle class gets bigger, caste will get less important in selecting life partners.

A massive assault on mass poverty plus rapid economic growth will be the best dissolvers of caste identities. Membership of the middle class seems to provide a solvent to caste divisiveness. In the large-scale embourgeoisement of its people seems to lie the dissolution of caste identities, even as politicians are busy trying to preserve every kind of divisiveness to keep themselves in power.

The situation may be summed up by saying that a variety of forces are bringing about the destruction of the caste-based system of production in the villages and at the local level. The system served India well for two millennia, but it is giving way. On the other hand, individual castes are competing with each other for
access to secular benefits. The conflict is likely to become sharper. India’s revolution seems destined to be a slow, bleeding one, largely unrecognised by the middle classes in urban areas.

The Bhakti movement of medieval India was really pan-Indian, attracting a large number of men and women from the lower orders, it even crossed the religious divide between Hindus and Muslims as with Kabir and, much later, Shirdi Sai Baba. But the tragedy or the irony of the Bhakti Movement was that it not only failed to make a dent on caste hierarchy but actually ended up by becoming a caste, or worse, a series of castes, palely imitating the master system of jati.

The moral to be drawn is that an ideological attack on caste that is not backed up or underpinned by a mode of social production, ignoring or violating caste-based division of labour, is totally inadequate. A combination of wholly new technologies and institutions based on new principles, and a new ideology which includes democracy, equality and the idea of human dignity and self-respect, has to be in operation for a considerable time in order to uproot the caste system.

References
Religion in the Modern World

T. N. Madan

Professor Narasimha, Mrs. Srinivas, Ladies and Gentlemen,

I stand before you this evening to honour the memory of Professor M.N. Srinivas. I do so at your invitation, and do not therefore stand alone, but together with you in this act of remembrance and homage.

I met Professor Srinivas twice in 1999, first here at the National Institute of Advanced Studies, when I was privileged to have him chair my lecture to one of your refresher courses, and a few weeks later in Delhi where he came to give the inaugural golden jubilee lecture of the Delhi School of Economics. On both occasions he reiterated in person something that he had earlier written to me in a letter, namely that a legitimate concern about religious fanaticism in India had, in recent times, uncritically led to a generally negative attitude to the place of religion in society. He particularly regretted the fact that the study of religion seemed to have fallen out of favour with students of sociology. In the last conversation I had with him in Delhi he told me that he was planning to hold a seminar, in about a year’s time, on the theme of religion and society and that he would like me to participate in it. Sadly he did not live to bring his proposal to fruition. In choosing to speak today on religion in the modern world I am fulfilling, in a sort of way, my commitment to him to present a paper at his seminar.

Srinivas’s first major book was Religion and Society among the Coorgs of South India. Published by the Clarendon Press at Oxford in 1952, it was soon recognised in scholarly circles in India and the West as a major contribution. Indeed it has since acquired the status

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1 This is an extended version of the first M.N. Srinivas Memorial Lecture, delivered on January 9, 2001 at the National Institute of Advanced Studies. At the time of the talk, Dr. T.N. Madan was at the Institute of Economic Growth, New Delhi.
of a modern classic in social anthropological literature. Its principal strength lay in a clearly articulated theoretical framework that derived the understanding of social institutions from their role in the maintenance of solidarity in society. Known as ‘functionalism’, he had come to appreciate its merits at Oxford, where he wrote a doctoral dissertation under the guidance mainly of the doyen of British social anthropologists, A.R. Radcliffe-Brown. It was this work that was published as the book I just mentioned. In a sensitive autobiographical essay that he wrote many years later, Srinivas confessed that, on reflection, he had realised that functionalism tended to be overly neat, leaving no loose threads to be tied, and narrow, and even dogmatic (see Srinivas 1973).

One of the failings of British functionalism, it is by now well established, was a narrow exegesis of French sociology as it was shaped by Emile Durkheim and his collaborators and pupils in the late nineteenth and early twentieth centuries. Durkheim, the author of one of the greatest books ever written by a sociologist, *The Elementary Forms of Religious Life* (first published in 1912), did indeed consider social solidarity an outcome of assemblies of people and the rituals they perform together – somewhat like what is happening here just now! But his conception of the social significance of religion was much broader. According to him, it was historically, and everywhere, the source of morality, law, science and much else. And, as he put it, “If religion gave birth to all that is essential in society, that is so because the idea of society is the soul of religion” (Durkheim 1995, p.421). Durkheim’s ‘sociologism’ has been criticised for its excess and exclusivism, but the deep insights into the nature of religious phenomena that he offered have stood the test of time.

The fact that the processes of secularisation had gradually seen such domains as art, law and science move out of the ambit of religion did not basically alter Durkheim’s vision of the importance of religion to the human condition in terms of what it does. “Its true function”, he asserted, “is to make us act and to help us live”, not only routinely but, more significantly, in the face of “the trials
of existence” and in enabling us to be “lifted above the human miseries” (ibid., p.419). “Furthermore, insofar as religion is action and insofar as it is a means of making men live, science cannot possibly take its place”, just as religion is not “able to tell science what do”. But in the face of the advance of science, Durkheim observed, “religion is itself an object for science!” With its scope delimited but not exhausted, “religion seems destined to transform itself rather than disappear” (ibid., p.432).

This was a profound conclusion to arrive at, particularly for a French scholar. The spirit of the Enlightenment in France, in contrast to the German version, was uncompromisingly secularist. Denis Diderot’s ringing call to man to “Have the courage to free [himself] from the yoke of religion” (see Cassirer 1968, p.135) went beyond the advice of his great German contemporary Immanuel Kant to man to “Dare to know [and have] the courage to use [his] own understanding”, which was, according to him, “the motto of the Enlightenment” (ibid., p.163). The total war which French Encyclopaedism began against religious faith in all its forms was reinforced by the Revolution with its strong anti-clericalism. Europe had come a long way since the time Isaac Newton had acknowledged a Supreme Intelligence and René Descartes had attempted to provide a rational proof for the existence of God.

In the anarchic aftermath of the Revolution and later, some perceptive social thinkers, such as Auguste Comte (who conceived of a positive science of society and gave it the name of sociology), while sure that theological and metaphysical varieties of knowledge had had their day, still recognised the need for functional equivalents of religion to hold together society which stays in place not by any natural law but by morals and symbols. Although intellectually obsolete, religion was socially necessary (see Preus 1987, p.109). Comte’s thinking was not, however, radical enough. As Durkheim pointed out, Comte’s “attempt to organize a [new] religion using old historical memories” was doomed to failure. “There are no immortal gospels”, he added, “and there is no reason to believe that humanity is incapable of conceiving new ones in the future”
(1995, pp.429-30). But, as already stated, the future scope of religiosity would be limited: religion was already being privatised. Civic morals and secular education respectively would, Durkheim believed, provide new bonds of social solidarity and new models of socialisation.

The importance of secular education in the realisation of the Enlightenment vision of the perfectibility of social institutions on the basis of reason and reasonableness to constitute the modern world was obvious. Kant even allowed religion in a kind of compromise, but “within the limits of reason alone”. He stood steadfast against traditional (revealed) religion (see Cassirer 1981, pp.383-97). The efforts to understand and redefine religion in the light of the Enlightenment co-existed with the attempts to explain it away (à la David Hume, see Hume 1947).

It was left to Karl Marx in the mid-nineteenth century to give the revolutionary call for the ending of “false consciousness”, and for constructing the socio-economic conditions under which this task could be accomplished. Arguing that “man makes religion”, and using the metaphor of “a reversed world”, in which it may seem that religion makes man, Marx observed that religion was “the sigh of the oppressed creature” and “the heart of a heartless world”, that it was “the opium of the people” that kept them in chains. And hence: “The abolition of religion as the illusory happiness of the people is required for their real happiness. ... Religion is only the illusory sun, which revolves round man as long as he does not revolve around himself” (Marx and Engels 1959, pp.262-3). In place of divine dispensation Marx installed dialectical materialism as the engine to change the course of human history. His teachings were to be reinforced, in course of time, by the findings of Charles Darwin and Sigmund Freud. Together all three were the gravediggers of religion – or so they believed.

That the reign of religion in society was over seemed compellingly obvious to most acute western thinkers at the end of the nineteenth century, but among them there were some who felt deeply uncomfortable about the implications of this critical turn of
the wheel of history. Marx had not been dead a year when Friedrich Nietzsche published his *Gay Science* in 1882, in which he included a disturbing parable about a madman talking about another madman. He talked about a madman who ran into the morning, sunlit market place, with a lantern in his hand, asking where he could find God. The atheists among the crowd there made fun of him, suggesting God may be hiding, or he may have got lost, or perhaps he may have just gone away:

The madman jumped in their midst and pierced them with his eyes. “Whither is God?” he cried. “I shall tell you. We have killed him — you and I. All of us are his murderers. But how did we do this? How could we drink up the sea? Who gave us the sponge to wipe away the entire horizon? What were we doing when we unchained this earth from its sun? ... God is dead. God remains dead. What was holiest and most powerful of all that the world has yet owned has bled to death under our knives: who will wipe the blood off us?...”

Astonished by what he had said, the listeners fell silent, hearing him say as he departed: “I came too early, my time is not yet” (see Kauffman 1974, pp.96-7). The narrator of the parable, we may safely assume, is Nietzsche himself; and we know that in the last decade of his life he was a madman. What engaged him all his life was not the expectation that the idea of God could be revived — in fact he considered traditional religions generally and Christianity in particular a blight — or the conviction that a new religion should be founded. In the words of Walter Kauffman, Nietzsche’s “greatest and most persistent problem” was how to “escape nihilism”: if one affirms the presence of God, one denies the ultimate significance of the secular world; if one denies the idea of God, everything else is robbed of meaning and value (Kauffman ibid., p.101). Either way one is a nihilist: there is no escape. It is arguable that Nietzsche’s problem is indeed the predicament of modern man/woman, echoed in Ivan Karamazov’s lament (in Dostoyevsky’s great novel): everything is allowed when God is dead.
The influence of Nietzsche’s thought on Max Weber (a German sociologist of the same stature as Marx and Durkheim) may not be exaggerated, but there is no denying the fact that these two German thinkers share a tragic view of the implications of loss of religious faith. Not that Weber considered the concerns of different religions similar or the consequences of religious values the same everywhere. Thus, while he believed that the Christian Puritan’s anxiety about his salvation led through a chain of unforeseen causality to the emergence of the spirit of capitalism in Europe, he regarded Indian religions as the source of ethics “which have abnegated the world, theoretically, practically, and to the greatest extent” (1958, p.323).

These are large and controversial theses which I cannot discuss here. More relevant is Weber’s vision of the nature of human existence in modern society, “a world robbed of gods” (ibid., p.282). He saw no future for religion. While the decline of mystery, magic and ritual, which he described as “disenchantment of the world”, was a good thing in itself, the long-term consequences of progressive rationalisation were likely to entail heavy costs. He foresaw modern society overcome by a scientific-technological and manipulative worldview and a consumerist lifestyle, deprived of legitimacy in terms of ultimate values and thus rendered meaningless. As he put it, “the ultimate and most sublime values have retreated from public life either into the transcendental realm of mystic life or into the brotherliness of direct and personal human relations” (ibid., p.155). The only values that a secularised world knows are instrumental, and its conception of perfection is synonymous with efficiency.

Expressing scepticism about science and its techniques being capable of leading modern man to happiness, Weber quoted Leo Tolstoy to the effect that science is “meaningless” because it does not answer the most important question of “What shall we do and how shall we live?” Taking the example of “modern medicine”, and generalising from it, he said in 1916:

Whether life is worth living and when – this question is not asked by medicine. Natural science gives us an answer to
the question of what we must do if we wish to master life technically. It leaves quite aside, or assumes for its purposes, whether we should and do wish to master life technically and whether it ultimately makes sense to do so (ibid., p.144).

In my reading of the sociological classics, I know of few formulations regarding modern life that are more insightful and more unsettling than the foregoing. Questions of this kind have continued to be asked throughout the twentieth century. Although some social scientists consider them false issues, along with such concerns as “freedom” and “dignity” (see Skinner 1972), a secularised consciousness has sought to evolve a grammar of humanist values to guide everyday life.

One of the best known of such attempts was the Humanist Manifesto of the American Humanist Association issued in 1933. Prepared under the guidance of the famous philosopher John Dewey, it proclaimed that “the nature of the universe depicted by modern science makes unacceptable any supernatural or cosmic guarantees of human values”. Further, it held, “Man is at last becoming aware that he is responsible for the realization of the world of his dreams, that he has within himself the power of its achievement” (see Hitchcock 1982, p.11). Forty years later, a second Humanist Manifesto, signed by distinguished scientists, philosophers and others, reiterated: “While there is much that we do not know, humans are responsible for what we are or will become. No deity will save us; we must save ourselves. We affirm that moral values derive from human experience. Ethics is autonomous and situational, needing no theological or ideological sanction” (ibid., pp.13-14).

These manifestos were identified as religious, though non-theistic (the term secular humanism came into vogue only in the 1960s); they were grounded in empiricism, pragmatism and relativism. A truly religious perspective need not be theistic, but it has to have the conception of ultimate values and a transcendent point of reference.
The decade of the 1960s was a kind of watershed in the West in as much as it was marked by a resurgence of interest in the religious legitimation of human life in a recoil, as it were, from the regulative mechanisms of the State. One of the remarkable affirmations of the religious perspective was contained in the inaugural address of John Kennedy as President of the USA in January 1961. He invoked God three times, but it is customary for American Presidents to do so on such occasions. What is more noteworthy is that, while he pointed out that power had passed into the hands of a new youthful generation in his country, he also proclaimed: “The rights of man come from not the generosity of the State but from the hand of God” (see Bellah 1976, p.171). The master metaphor of “the hand of God” was employed to stress that, while sovereignty rests with the people in a democracy, there is something higher than the verdict of the people, a higher criterion of the legitimacy of the state than the reasons of state that Machiavelli had nailed to the masthead of modern political thought.2

Kennedy’s words were echoed by Martin Luther King Jr. in his own celebrated “I have a dream” address at the ‘March on Washington’ in August 1963. He demanded freedom and justice for all Americans – “black men and white men, Jews and Gentiles, Protestants and Catholics” – on the ground that they were “all God’s children” (Lewis 1970, p.229). The religious inspiration of the Civil Rights Movement was no ordinary thing. Incidentally, the metaphor of the dream, of the dream converted into reality, might well have been borrowed by King from Mahatma Gandhi.

2 Eleven days after this M. N. Srinivas Memorial lecture was delivered, George W. Bush was sworn in as the forty-third President of the USA. His inaugural address went well beyond the usual invocations to God and contained elements of the Christian faith, which were a departure from convention. He also mentioned Judaism and Islam, although only indirectly: “Church and charity, synagogue and mosque lend our communities their humanity, and they will have an honored place in our plans and in our laws”. This statement repudiates secular humanism which derives a person’s humanity from his own self, certainly not from religious sources. Moreover, it espouses a pluralist position similar to that of Indian secularism, *sarvadharma samabhAvA*.
I need hardly remind you that the cardinal principle of Gandhi’s politics was that it should be grounded in morality, not expediency.

Politicians were not alone in recognising the abiding place of religious values in public life, a wide range of scholars also were inclined the same way. The 1960s saw the emergence of a highly complex ‘counter-culture’ movement in the West, spearheaded by the youth. At its centre lay a deep dissatisfaction with the basic assumptions of the Enlightenment and the resultant technocratic view of the world. It had a broad range of expressions including, at the one extreme, self-destructive and antisocial activities and, at the other, a turning towards the mystical and the spiritual. It was in this setting that the Hare Krishna Consciousness (see Gelberg 1983), and Zen too, took root on American university campuses. Those scholars who applied themselves to a serious study of the phenomena concluded that the quest of the youth was not “how shall we know?” but “how shall we live?” It was “to discover ways to live from day to day that integrate the whole of our nature by way of yielding nobility of conduct, honest fellowship, and joy” (Roszak 1969, p.233). One hears echoes here of Weber’s concern about the importance of ultimate values and of Durkheim’s observation that historically such values have come from the religious traditions of humanity.

As the 1960s drew to their close, efforts were still on to reconcile the religious and secular points of view. Some Christian theologians argued that secularisation must be welcomed for it would not have occurred unless God willed it (Cox 1965). At the same time, perceptive sociologists began to wonder whether the “dessication” of modern culture, which was “what secularization [had] often meant, might begin to be reversed”, and religion as “an imaginative statement about the truth of the totality of human experience” reinstated (Bellah 1970, p.244). The return of the sacred to the secular world seemed a genuine possibility.

There were other things happening, too, and other perceptions of the prevailing social reality. Thus Robert Bellah, the distinguished...
American sociologist (from whose work I have already quoted), pointed out that shared historical experience of a people may generate values and principles that enshrine, as it were, a kind of consensus on national identity expressed in a religious idiom. The longing for celebratory togetherness that seems to be universal may be fulfilled through ceremonies (such as the inauguration of the President at which it is customary to invoke the blessings of a non-denominational God on the American people), commemorations (Thanksgiving, Memorial Day), and holidays (the birthdays of national heroes like Abraham Lincoln and Martin Luther King Jr.). The commonalty thus conceived is the vision of a perfect society, a yearning for ultimate values, clearly differentiated from the teachings of the churches, but elaborated and institutionalised as what Bellah calls “civil religion” (1970, p.168-89). Actually he sees little scope for a complete rupture with the religious mode of thinking even among the votaries of secularism. He writes: “The notion of secularization is far from a simple empirical generalization. It is part of a theory of modern society, a theory that can almost be called a myth because it functions to create an emotionally coherent picture of reality. It is in this sense religious, not scientific at all” (ibid., p.237).

What seemed marginal phenomena for quite some time forced their way to the centre of the stage in many parts of the world as the 1970s drew to their close. Not that the processes of secularisation were wholly reversed – far from that – but alongside them, and in some respects in opposition to them, there was a resurgence of religion in public life, particularly in the political arena. The year 1979 was marked by a number of major events of such resurgence, the most remarkable of which were, of course, the Iranian and Nicaraguan revolutions. The same year the Pope, head of the

3 An American scholar of comparative religion, Gerald Larson, has suggested that, as in America, “a Gandhian-Nehruvian Indic civil religion ... exists in India alongside the various particular religious traditions”. It is marked by national celebrations (Independence Day, Republic Day), and birthday holidays commemorating, besides the founders of religions, Mahatma Gandhi (see Larson 1995: 202-3).
world’s largest Christian church, travelled to Mexico at a time when a new movement of the 1960s called “liberation theology”, which sought to combine Christianity and Marxism-Leninism, had spread among local Christian communities in a number of Latin American countries. Later that year the Pope also travelled to Poland, lending his support to the Catholic church there in its struggle against the communist state. In India, it was around this time that Sikh fundamentalism made its appearance as a political force, followed in the mid-1980s by a retreat into traditional Islamic civil law by sections of the Muslim community, on the one hand, and an aggressive assertiveness by a number of Hindu organisations, in support of a Hindutva-based national culture, on the other. As José Casanova puts it, apropos of Europe and the Americas:

What was new and unexpected in the 1980s was not the emergence of new “religious movements,” “religious experimentation” and “new religious consciousness” – all phenomena which caught the imagination of social scientists and the public in the 1960s and 1970s – but rather the revitalization and assumption of public roles by precisely those religious traditions which both theories of secularization and cyclical theories of religious revival had assumed were becoming ever more marginal and irrelevant in the modern world (1994: 5).

In Iran it was the Shia clerics, led by the fundamentalist Ayatollah Khomeini, who wrested from liberals and Marxists the leadership of the gathering storm against the campaign for rapid modernisation that the Shah’s regime had sought to impose on society from above. Calling the bloody end of the regime a “sacred”, “one hundred per cent Islamic” movement, the Ayatollah, as the spiritual guide of the Islamic republic of Iran, claimed inspiration from the example of the early Islamic governance inaugurated by the Prophet Muhammad himself. He proclaimed the end of the era of westernisation (which some Iranian intellectuals had characterised as ghārībzādeh, ‘being stricken by the West’) and its replacement by
‘the culture of the Quran’. The book Fundamentals of Islamic Thought (1985), authored by Khomeini’s protégé Ayatollah Mutahhari, which served as the manifesto of the revolution, is a strong challenge to modern, secular, scientific discourse and worldview (see also Amuzegar 1991). The Iranian revolution showed no mercy towards those it considered the enemies of the Islamic way of life. It replaced terror by terror and shed blood to avenge the blood of those it considered martyrs. To commemorate the latter, a fountain was erected in a public square in Tehran: lit up at night, the water looked red like blood.

If the symbol of the Iranian revolution was the fountain of ‘blood’ – surely an awesome sight – the legitimising ideology of the Sandinista revolution, which overthrew the police state in Nicaragua, and the subsequent reconstruction of society, was “liberation theology” (see Lancaster 1988). Essentially a form of praxis, it was evolved by theologians who worked together with the poor and with political workers at the grass-roots level, the so-called ‘base communities’. The dispossessed were the ‘flock’ in their care and keeping. The higher rungs of the church were not involved in this interaction and were even opposed to it. Gustavo Gutierrez, who elaborated the notion of liberation theology in the 1970s, wrote of the “eruption of the poor” into the history of Latin America, not as some kind of a secular revolt of the masses but as “an expression of the presence of God within the tumult of real human history” (Cox 1984, p.140). The Sandinista leadership originally looked upon the ‘popular church’ at the community level in purely pragmatic terms (even as the liberals and Marxists had looked upon Shia clerics in Iran), but eventually the relationship between the guerilla strategies of Sandino, Marxism and Christianity become an organic one, making it difficult to separate politics from religion. Christianity became “the master plan around which other plans and blueprints were organized” (Lancaster 1988, p.57).

The Polish story of the political role of the Christian church is of another kind. Poland found itself a predominantly Catholic country at the end of the Second World War with a church that had
a long standing record of standing up for the people (see Casanova 1994, chap. 4). The communist state was an imposition from Moscow, engineered through a planted Workers’ Party. Its objective was to abolish religious faith, allegedly a form of false consciousness, and to end the threat to the State from institutionalised religion. The church was engaged in a battle of survival from 1948 to 1956. The people’s discontent boiled over in what came to be known as the “bread and God” uprising of October 1956 (“the Polish October”). Thereafter the church opened out to espouse the human and civil rights of agricultural and other workers. It presented itself not merely as the nourisher of the Christians, but also as the protector of Polish culture and the nation’s keeper. In doing so, the church acknowledged the legitimacy of material wants within a framework of morality, and the values of religious freedom and freedom of conscience (after Vatican II). It even associated itself with the Workers Defence Committee in 1976. All this led the way to the national resistance and Solidarity movements and eventually to the collapse of the dictatorial state. The role of the Roman Catholic church since then has been rather controversial: it has taken an anti-pluralist stand in relation to other Christians (notably Greek Catholics). It is not quite as vocal in support of popular discontent as before, and seems to have become “an instrument in the aggressive assertion of national identity” (Hann 2000, p.17).

If the 1980s were marked by the emergence of religious fundamentalist movements around the world, grounded in scripturalism, questing for political power, intolerant of dissent, and often violent (see e.g., Martin and Appleby 1991, 1995), the last decade of the century saw the collapse of the communist empire and the eclipse of the most rigorously worked out secularist ideology of society and philosophy of history that have ever existed.

Revolutions, whether accompanied by terror or more benign in nature, are of course big news, and they are not all lies. It is not they alone, however, that have rendered religion visible again in our time. There is much evidence of the tenacity, even vibrancy, of publicly observed private religious faith, not only in countries that
have been known for the religiosity of their peoples – the examples of India and the USA come readily to mind – but even in those that were not so inclined in the past, such as Japan. The return of the sacred in China and Russia only testifies to the coming into the open of what was formerly suppressed. Ironically, the accoutrements of modern society itself – economic well-being of increasing proportions of national populations; quick, comfortable and affordable travel; ready information and easy communication, etc. – facilitates the practice of religion.

I remember hearing a lecture by the late Professor A.L. Basham, distinguished historian, at the Institute of Advanced Study, Shimla, in 1973, in which he remarked that the emergence of the cult of Santoshi Ma as a new Goddess in the Hindu pantheon bore witness to the vitality of some religious traditions. One hears little about this cult nowadays, but yet another Goddess, by no means new, Vaishno Devi, draws pilgrims in their thousands to her cave in Jammu from all parts of India virtually throughout the year. Many of them come to bargain with their Goddess for mundane favours, pledging gratitude for gift. The fact that the government, the biggest employer of people in the country, and other corporate employers, offer paid holidays to their personnel has resulted in the combination of religiosity and recreation. Pilgrimages within countries and across countries are attracting larger number of devotees than ever before. While the multitudes move, millions watch them on their television sets, fulfilled through vicarious participation, or simply entertained by the spectacle. The midnight Christmas mass in St. Peter’s Square in Rome is watched by millions of Christians and non-Christians the world over. The same is true of the annual Haj pilgrimage to Mecca in which Muslims from all over the world participate. The Mahakumbha Mela at Prayag this winter has been named by the media as “the greatest show on earth”; it too is being read and heard about and watched worldwide. By the time it is over more than twenty five million people will have visited Prayag, including pilgrims hoping to wash off their sins,
tourists seeking amusement, merchants making money, and media persons producing sensational news.

Looking at it in whichever way we may religion survives in the world at the beginning of the twenty first century, belying the expectations of those modern rational men and women of a hundred years ago – and in fact of most of the twentieth century – who were convinced that its days were coming to their end. It not only survives as private faith but has also re-emerged as public religion (see Casanova 1994). It is a sign of the times that a scholarly work published in the last year of the twentieth century bears the title *Why Gods Persist* (1999). The author, Robert Hinde, biologist and psychologist, characterising his approach as “scientific”, “examines why so many religions continue to persist at a time when the answers they provide to the basic questions of life are unacceptable to many in the modern world”, and turns to “basic human propensities” for answers (p. 206). Needless to emphasise, a reasonable answer to this and similar questions does not have to be – indeed it should not be – in exclusively religious or secular terms. The “totalizing propensity of reason to absolutise the tension between sacred and profane realms ... into irreconcilable contradictions” (Seligman 2000, p.132) has been the bane of discussions of the place of religion in the modern world. But a “theo-ethical equilibrium” – “a kind of integration between a religious outlook and secularly grounded moral or political principles” – is now coming to be considered “achievable” (Audi 2000, pp.212-3). This is a long way from the earlier certitude (whether stated in Marxian or Weberian terms) about the fateful transformation of religious into secular culture. Indeed, it has been suggested that it is not all that unlikely that future historians “will look back on the period from roughly

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4 Jayant Narlikar, the distinguished astrophysicist writes: “... It is necessary to recognize that religion and science fulfil complementary urges of the human mind. The problems come when there is a trespass of the area of either one by the other. Thus, scientists should avoid passing value judgements on religious thoughts without appreciating their very different contexts. And religious thinkers should not try to look for postfactual justification for their thoughts in the findings of science” (2000, p.285).
1750 to 2050 as a brief three-hundred-year secular parenthesis in a history of humanity that has always been religious” (Seligman ibid.). I do not have the time this evening to examine these arguments in any detail. I have referred to them only to point out that, currently, there is considerable evidence of serious rethinking of the place of religion in modern society.

It is time to conclude. Let me begin with a clarification. If I have spoken about the persistence of religion in modern society, I have neither meant to suggest that religions have not changed in response to the challenges of secularisation, nor wanted to recommend that religious conceptualisations of the limitations of modernity be uncritically accepted. Even less have I wanted to suggest that we all become religious, whatever that means. I do not believe that ethically commanding directives issue from the social sciences generally any more than they do from the natural sciences. I know that the notion of a value-free social science is not defensible in all contexts and situations: for instance, we have seen a fruitful coming together of ethics and economics in recent times (see Sen 1994). But I do believe that, while sociologists should study the value preferences of people, and spell out their likely consequences, they may not, as sociologists, recommend any selections. Such choices may truly be made by one only on the basis of moral or political convictions that are personal even when they are shared.

In an article published in *The Times of India* on 9 July 1993, Professor M. N. Srinivas wrote about the troubled times, marked by runaway gadgetry, frenetic consumption, and conflicts of various kinds, through which India was then (and is now) passing. He observed:

> It is in this overall context that the need for a new philosophy and social ethic becomes urgent and imperative. And that philosophy cannot be secular humanism. It has to be firmly rooted in God as creator and protector and the sustainer of human societies. The fraternity of all human beings cutting across divisions of race, ethnicity, caste, class, religion and
gender follows logically from the idea of God as creator. The idea of human free will is [present] in all religions, and it provides the basis for individual liberty without which there can be no true democracy.

Many sociologists were taken aback by Srinivas’s rejection of secular humanism and by his plea for a God-centred fellowship of human beings. Sociology is after all a child of the European Enlightenment. Several years later (in 1998), he told me that he had learnt from more than one source that his article had evoked sharp criticism from some of the ablest of his professional colleagues. But he had no complaints, he said, nor had the criticism made him change his opinion. What he had written were his considered views, indeed his convictions, and he regarded it as his duty to make them known.

Just as Professor Srinivas pursued his sociological studies in the most rigorous manner, and tried to state his conclusions without presuppositions or prejudice, he had similarly given expression to his personal convictions without fear or compromise. Nowhere in the article, it should be noted, did he invoke sociological authority for his views, but it may not be denied that many among the reading public knew of his tall stature as the doyen of Indian sociologists. He took the risks of misunderstanding and disapproval, guided by his conscience, Atma tuShti, alone. I put it to you, Professor Narasimha, ladies and gentlemen, that M. N. Srinivas was a person of great intellectual and moral integrity, deserving of high honours.

It is, therefore, in the fitness of things that the National Institute of Advanced Studies, where Professor Srinivas worked during the last years of his life, should have instituted a Memorial Lecture in his honour. I applaud the Institute’s decision. I am deeply indebted to NIAS, and to Professor Narasimha in particular, for having afforded me the rare privilege of delivering the first such lecture. And I am profoundly grateful to Mrs. Rukmini Srinivas for her gracious presence in our midst this evening.

Thank you.
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The Globalisation of Literature

SHASHI DESHPANDE

Realising that in order to speak of globalisation, I needed to know the exact meaning of the word, I went to the Oxford Dictionary, which told me that ‘global’ is worldwide and that ‘globalisation’ means making global. These dictionary meanings, however, are no more than the bare bones of a word, for words have meanings that go beyond their dictionary definitions. The flesh and the soul of a word comes from us, from the way we use the word, from the context in which we use it and from the values we set on the concept the word stands for. Words can change their meanings in the course of the years, though the dictionary definition remains the same, because the values attached to the concept have changed. Sir Ernest Gowers in his *The Complete Plain Words* cites the revealing example of the word ‘imperialism’ which, from being regarded as ‘a larger patriotism’, became a word with a rather unpleasant connotation, because of a change in the ideology that no longer regarded empire building or colonising as a noble enterprise. These being looked at with askance, the meaning of the word was debased as well.

The word globalisation too, within the sense of ‘world-wide’ itself, can be looked at in two ways, one positive and the other negative. I’d like to illustrate this with two very personal experiences.

Growing up in Nehru’s India, when imports went against both the policy of ultimate self-reliance and our economic situation, good fountain pens were one of the many things of which there was a great dearth. The locally made ones were few and these were terrible, with bad nibs and leaking bodies. In the late sixties, when we went abroad for the first time, one of my prized purchases was a Parker pen. In

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Ms. Shashi Deshpande is a novelist and writer, mainly in the English language. Her book, *That Long Silence* was conferred the Sahitya Akademi award.
later years, each time I went abroad I bought myself a good pen. Now, in the last few years, all these pens are available in India and available all over the place. This, the result of the policy of liberalisation, is to me also the best of globalisation. Good things available everywhere and easily.

An example of the other view of globalisation: years ago in Bombay we found the vegetable sellers excited about a new kind of French beans, which they said were foreign. Being a rarity, they were both desirable and expensive. But later, in the next twenty years, more and more of such varieties took over and nudged out the indigenous species, which are now almost extinct. This means that, without our knowledge and without our having any choice in the matter, we have lost our store of indigenous seeds; we have no choice now but to buy what is produced from the seeds made available in a global market. This, then, is the negative face of globalisation, a process which snuffs out the regional and the indigenous, which imposes a conformity.

However, I am going to speak today not of pens and vegetables, but of Literature, which is a part of culture. And culture, one imagines, is an entirely different matter. Or, is it? Looking at the world around us, the question is bound to arise: when the world is so closely linked as it is now, when increasing and easier mobility, when satellites, TV, e-mail and all such things have knitted us closer than ever before, can we remain closeted in our own small worlds? Can anyone be untouched by this explosion in the exchange of information and ideas, by the rapid and constant movement of people around the world? When one goes abroad today, nothing is entirely strange. Young people dress in almost the same way in all countries, when we switch on the TV, whether it is Cairo or Amsterdam, we get the same programmes, McDonalds and Pizza Huts stand out like familiar landmarks everywhere, whether in Johannesburg or Kathmandu. Even earlier, the Beatles and Elvis Presley had connected the world with their music, girls were swooning over them in all countries. And, of course, through the greater part of the last century, there has been Hollywood, the
most successful invader of the world. In recent years, Hollywood has moved a step further towards being global. While earlier, the movies that the world saw were only US-based, now we have movies which feature not only different countries, but different cultures as well. And, apart from the small movie makers like Merchant Ivory producing movies about an Anglo-Indian in India, or about Jefferson in Paris, or Mira Nair embracing India or Cuba in her folds, Hollywood blockbusters have been made on Gandhi, on the last Chinese Emperor. Even serious culture went global with Peter Brooke’s *Mahabharata*, which had a cast of international actors and shows in different parts of the globe. Coming to books, some books are everywhere as well — not only books like Chicken Soup for the Soul, or a John Grisham, a Dick Francis, or a biography of Princess Diana, but serious literary books too. Our own Indian writers are part of this; Vikram Seth, Arundhati Roy or Amitav Ghosh are read all over the world, their books are translated and sold in countries everywhere.

Yet literature is set apart from other cultural expressions by the fact that it uses language. Movies need language too, but the visual component is equally, if not more important; whereas for literature, language is not only the container, the sheath, it is, to a great extent, also the substance of literature itself. And the world is and will continue to be multi-lingual. How then can literature go global? Perhaps, a look at India, a multi-lingual country, is a good entry point to an understanding of this very complex and odd concept of global literature.

The first thing to note is that, even today we are not sure that there is such a thing as ‘Indian Literature’. The debate whether there is or is not such a category goes on, the arguments continue to rage. There is a theory that each language’s literature is distinct and unique, since, in the words of a scholar, Nihar Ranjan Ray, literature is absolutely language-based, and language itself is shaped by its locale and the socio-historical forces that have operated on it through the years. Another theory is that the literatures of the various Indian languages have much in common and are linked by
‘a common core of metaphors and symbols, myths and legends, conventions and norms that have evolved in the last 1000 years’ (Prof. Sisir Kumar Das). Examples of this cultural unity are the two epics which have been told and retold in all the languages and the Bhakti movement which spread through the entire country. Prof Umashankar Joshi points out how Andal in Tamil Nadu (before the 8th century) and Meerabai in Rajasthan (16th century) both accepted Krishna as their spouse, while there is a very close similarity between Akka Mahadevi’s (Karnataka, 12th century) and Lal Ded’s (Kashmir, 14th century) Shiva bhakti songs as also their lives. With these uniting factors and an integrated cultural milieu, Indian literature, even if in different languages, can be regarded as one. There is also the third theory that lies between these two, which regards the geographical factor as being the unifying one; that is, all these literatures can be called Indian because they are all part of the geographical entity called India.

In a sense, these theories can be used in debating the idea of a global literature as well. But, above all, there is one curious component in the idea of Indian literature which sheds much more light on what global literature means. This oddity is the place of English within the literatures of this country. English, unlike the other languages, was not born in this country. It was brought in by the colonisers, imposed at first, then enthusiastically embraced and adopted, so that we began, not only to use the language for working purposes, but to produce literature in this alien language. Now, after more than a century and a half, we have a sizeable literature in the language, and though still regarded as an upstart, as alien and elitist, it has established itself as part of the writing of this country. Nevertheless, it is very different from the other languages, most of all in this: that it belongs to no one region. While all the other major languages have a region, a state, English belongs nowhere. Which, oddly enough, has given it an advantage: since it is read all over the country, this writing has become the only pan Indian writing. And being in English, it is the only writing that is visible to the world outside, which has given it, even if wrongly,
the label of ‘Indian writing’ in the international sphere. For years R. K. Narayan, Raja Rao, Anita Desai or Nayantara Sehgal were the only Indian writers for the world, just as now it is Vikram Seth, Arundhati Roy and the rest, while the language writers continue to remain unknown. English writing also became part of a category called Commonwealth literature. Perched on this raft, it floated out to join English writing from other once-colonised countries to form a group called post-Colonial writing or third world writing. Today, this writing, together with the writing from Britain and the United States, and translated literature from some other countries, is what can be regarded as international writing. Is this then global writing?

A fact that we need to remember is that this is not an entirely new phenomenon. Literature has always travelled. Stories from the Arabian Nights, or Aesop’s Fables or even the Panchatantra went beyond their countries of origin and were current in a great number of countries. I was fascinated to learn in an article by the Marathi writer Gauri Deshpande, written on the project she undertook of translating the Arabian Nights into Marathi, that the first Marathi translation of the Arabian Nights was published in 1890. And this translation was based on the English translation of an original French translation! Equally interesting is the story of the global movement of the Panchatantra, stories which originated in India. They passed into Arabic from a sixth century Persian translation, from the Slavic languages into Greek, from Hebrew into Latin and thence to German and Italian, from which last language it entered Elizabethan England. These stories are now, according to Amitav Ghosh (from whom I take this account), part of a global heritage. In our own country, the epics travelled easily through the country and beyond to South and South East Asia. The poet and scholar, the late A.K. Ramanujan, in an essay titled “Three Hundred Ramayanas”, asks, “How many Ramayanas? Three hundred? Three thousand?”

But these were oral narratives. Written texts are somewhat different. Not only is their movement more difficult, the written or printed text is rigid. And the secret of the mobility of the oral
stories was that they were adapted by each people, making them
more suitable to their own contexts, their locales. Appropriating
them, in other words, and making them their own. Which is not
easily possible with written texts.

Nevertheless, books too have made their way across the
world. As Amitav Ghosh says, in his delightfully written and
equally delightfully titled essay (“The March of the Novel through
History: the testimony of my grandfather’s bookcase”), fiction
has been thoroughly international for more than a century. In his
grandfather’s bookcase, for example, there were, apart from the
Bengali novels of Bankim Chandra, Sarat Chandra, Tagore, etc. the
Russian novels – Maxim Gorky, Dostoevsky, Tolstoy, Turgenev, the
Europeans like Maupassant, Flaubert, Victor Hugo, the Americans
– Steinbeck, Upton Sinclair, etc. Most libraries of the time would
have also had, I imagine, Dickens, Thackerey, the Brontes. And later,
there would be Galsworthy, E. M. Forster, Sartre, Camus, Kafka,
Hemingway, James Joyce, Fitzgerald and so on. I can remember the
bookshelves of my own childhood, in my own home and in others,
most of which had some of these, as well as Daphne du Maurier,
P.G. Wodehouse, Somerset Maugham, Graham Greene, etc. Today,
as Amitav Ghosh points out, people would have Marquez, Nadine
Gordimer, Michael Ondaatje, Ben Okri, Salman Rushdie, Gunter
Grass, etc. on their shelves.

The curious paradox about the fact that fiction has travelled
so easily and so much is that the novel is, in its nature, inherently
regional. It is, as Ghosh says, “founded on a myth of parochialism in
the exact sense of a parish”. Jane Austen’s words, in a letter to a niece
who was writing a novel, “three or four families in a country village
is the very thing to work on”, have now passed into literary legend.
Literature, specially the novel, is a writer’s response to society. Ideas
are worked out through people and their lives. And these lives are lived
in a particular region which has a social, political and cultural
context – all of which is intrinsic to the novel. The writer, in other
words, creates a definite world. Since identification is one of the
major doorways through which a reader enters fiction, how did the
novel reach readers for whom the world so created by the writer was an unfamiliar one? How could I as a girl living in a small town in India identify so easily with Jane Austen’s 18th century England or Dickens’ 19th century England? What is or what are the factors that make it possible for a novel to go globetrotting?

At the most basic level, there is the language. For the novel to be read by readers all over the world, it will have to be in a language that a great number of readers can read. Today, English is such a language. The philosopher and scholar George Steiner calls English a planetary language, the only rival to which now is Spanish. All those books in Ghosh’s grandfather’s cupboard, all the classics in my father’s library at home, were in English – either originally written in the language or translated into it. This language, like the literature it embraced, travelled to us in India and to many others through the world, on the backs of the British Empire. English education brought us the classics which were studied by us in school and college, it gave us the entry to all other English books, to the translations which were plentiful in the language. American literature, in the shadows at first, became part of the reading diet of the English reader throughout the world because of the proliferation of fairly cheap paperbacks that flooded all countries. Today, the strength of American publishing, as well as the increase in American cultural domination, means that readers everywhere have a great number of American books on their shelves as well. And the quick response of the publisher to the market means that a prizewinning author – a Nobel or a Booker Prizewinner, for example – is translated into many other languages almost immediately after, making it possible for readers all over the world to get quick access to the book.

This means that a book needs to be in English to enter the global market. Nevertheless, this is not enough. I will take the example of two books, fairly recent publications, to probe into this. The first one, originally written in English, is The Ground Beneath her Feet – the latest Salman Rushdie novel. The other is a very recent translation by Prof. Ramchandra Sharma of an old Kannada novel, Kanooru Subbamma Heggadithi by Kuvempu. Both are vast and sprawling novels,
with large canvases and a great number of characters. Kuvempu’s novel is, however, deeply rooted in a region, in a particular part of Karnataka. The language – and here I mean the way the language as used by the people – the customs, the references are all very local, rooted not only in the region, but in the communities the characters belong to. The author makes no attempt to simplify or to explain anything to a reader, possibly because he knew that his readers were those who would be familiar with the things he was speaking of.

Rushdie’s novel, on the other hand, is global in a literal sense, for it is set in different parts of the globe. The characters too are global, being from all parts of the world. The points of reference here are those most English readers today in any part of the world would be familiar with. For example: Nehru, Indira Gandhi, the Beatles, the Kennedys, popular contemporary music and the world of music. People like Michael Jackson, Madonna, John Lennon, Princess Diana, etc. are seen in some of the characters and are again easily identified by a great many readers the world over.

Now, while both the books are in English, Rushdie’s book clearly presumes a larger and a more cosmopolitan readership, while Kuvempu’s novel, though a classic in Kannada and excellently translated, is not accessible to this kind of a global readership. The ordinary reader would be confused by the world the characters inhabit. The clue that one gets hold of after comparing these two books is that to be global there has to be just enough of the unfamiliar to make it seem exotic and such of the unfamiliar as can be explained and understood by a varied readership. Being in English is obviously not enough. Being considered an excellent novel is also not enough; to be accessible to a large readership, the novel has to be shaped for that readership, the unexplainable removed, the awkward stumbling blocks put aside.

I am not implying that Rushdie has done this kind of thing deliberately. He does not need to. Being the kind of person he is, a truly international figure, a man who is at home in any part of the world, this international frame of reference
comes naturally. A writer like him can address the world with ease. Today, in an age of migration, there are a great many writers with this mindset, writers who are, in effect, citizens of the world. As the writer Pico Iyer puts it, “I am an example of a new breed of people, an intercontinental tribe of wanderers. Nothing is strange to us, nothing is foreign – visitors in our own home”. If we look at the list of writers whose names are known through the world, whose books sell everywhere, we will notice that a great number of them belong to this “new breed of people”, as Pico Iyer terms them. While they originate from a number of different countries – the West Indies, India, Sri Lanka, Pakistan, China, Japan, etc., all of them have settled in a Western country. The India-based writers, who are part of the internationally known group, are those who spend a great deal of time outside the country. This means that their experiences and their sensibilities are those of very cosmopolitan persons. But even more significant a fact is that they also have access to Western agents and publishers – another must for any book to become global. “I think the biggest mistake we have made is not to have an agent”, a writer friend wrote to me after a visit abroad; which is true. Publishing is big business today. The small publisher is an almost extinct species – only those who have specialised and found their niche manage to cling on precariously to survival. It is only the big publisher who can sell books on a global scale. And it is only the agent who knows what this publisher wants, the agent who can shape the author’s material for such a publisher.

This kind of globalisation of writing has also been helped by the migration, not only of writers, but also of intellectuals and scholars from all over the world to Western capitals and universities. From their vantage points in reputed institutions and universities, they have been able to give validity to writing from their own countries. Edward Said’s theory of Orientalism, as also the theory of post-Colonialism, have brought into the limelight books from the once colonised countries. These have ensured that such texts from countries other than the West which have been endorsed by these scholars have entered the academic canon. It is through Gayatri Spivak’s
translation and her appraisal that Mahashweta’s works became known internationally, a service which A. K. Ramanujam did for Ananthamurthy’s *Samskara* and many other Indian texts. It made a difference that these books were translated and praised by scholars who had a standing in Western academia. The conclusion one is forced to draw is that literature can enter the realm of the global only if stamped and authenticated by the West. In a recent review of the *Oxford Guide to Contemporary Literature*, the reviewer, Vijay Nambisan, notes with chagrin the inaccuracies in the entry on Indian literature, the perspective that is so wholly that of an outsider. Who is this contributor and what are his credentials, the reviewer asks. Could they not have found an Indian scholar who knows the subject infinitely better? Aijaz Ahmed uses the term “cultural imperialism” to describe such a phenomenon. That the literature of these countries is also termed ‘third world literature’ would certainly support such a view.

The most essential element of globalisation is however marketing. In fact, globalisation itself is a concept that has been successfully marketed by those who want to sell their goods worldwide. To watch the advertisements on TV during the World Cup was a revelation; it showed how well and how successfully this is now being done. I began by saying that I am speaking of literature, not of pens or vegetables. But the book is sold today in the same way a fountain pen is. And so is the author who is part of the selling of the book. The author’s personality and looks are used to sell the book; the better the showperson the author is, the greater the sales. The huge advances given to some authors call for a global market; it is the only way that the publisher can recover the money. And therefore, world wide readings, signing sessions, interviews, appearances on TV become essential points of the marketing of a book. Incessant publicity about the book, ensuring that it is constantly talked about, also helps. Books are sent into the world with the tag of ‘great’ or ‘the best’ already attached to them. The very publicity surrounding these books ensures that they are reviewed everywhere and quickly.
What will this kind of globalisation of literature do to a national or a regional literature? Will it lose its place, its value? Rushdie, who is perhaps the most global author today, has through his writing, his life and his statements like “the migrant is the central, the defining figure of our century of wandering” put global writing right in the centre of the literary map, pushing others into the margins. In fact, in his famous (or rather infamous) article, in which he gave English writing the pride of place in Indian literature, he refers to the writing in the Indian languages as being parochial – using the term in a derogatory sense, as being insular and limited. One thing is certain: regional isolation is no longer possible. It is also true that with the increasing speed and ease of communication, the world is to a great extent coming closer in the matter of tastes. But to imagine that we will all read the same kind of literature is like saying that, because Coca Cola is available world wide, we all drink only Coca Cola. To state that literature will become global and that global writing is the best writing, is to make as rash a generalisation as saying that the best writing is regional. The best writing can never be straitjacketed. And while humans share much more with people all over the world than ever before, it is wrong to imagine that our national, our regional identities will cease to matter. However much the world opens out to us, there is an intrinsic human sense of rootedness, of wanting to belong, a desire to stake out our own little territories, which leads to a greater involvement with all that is closest to our homes. Our major concerns will continue to be those closest to our lives, arising from our immediate environment, from our individual situations. The fierce ethnic conflicts in different parts of the world, even at a time of erasing of national boundaries, seem to indicate that in a world of increasing globalisation, ethnic identities are, as a matter of fact, becoming increasingly important.

And it is through our culture that we define our identities even to ourselves. Which is why our response to a Kishori Amonkar, a Bhimsen Joshi, a Balamuralikrishna, or even to a song from ‘Kuch Kuch Hota Hai’, will be greater than our response to the musician who was, some time back, promoted
fiercely and persistently on TV and who performed through the globe against a backdrop of the most exotic locales. Slightly twisting the title of a recent article on Indo-Anglian writing by Vikram Chandra, ‘Nowhere and Everywhere’, I would say such a musician is everywhere and nowhere. Literature, more than any other cultural expression, carries the identity of a people. It is Shakespeare who even today defines the English identity, Tagore the Bengali identity and so on. Therefore the literature that defines this identity to our own selves will continue to exist, will continue to matter. The writer herself writes from a rootedness and it is from this rootedness that universalities emerge. As Ghosh puts it, “to locate oneself through prose, one must begin with an act of dislocation”. It is with this dislocation that the writer moves from the particular to the universal. The human universalities that we can respond to enable us to make even a book set in a strange society, or a different time, our own; certain books can transcend both time and space. But if we look at the books that have done so, whether it is Tolstoy or Dickens or Jane Austen, we will see that these books are deeply rooted in their own society. Yet they reach across time and space and speak to us directly because they speak of our own concerns. As Terry Eagleton says, “We are incapable of doing anything other than reading our own preoccupations into works of literature. This is why certain works of literature retain their value across the centuries”. These I would call universal books as opposed to global. Undoubtedly, in the contemporary world of hard sell, books sold aggressively and skilfully become global in the sense of being sold and read all over the world. A Dick Francis or a Ruth Rendell is sold the world over, but without in any way detracting from the skill of these writers, the fact remains that these are mere entertainment, soon forgotten. But universal books enter the consciousness of readers and become part of their lives.

“The greatness of an author has little to do with the subject matter itself, only with how much the subject matter touches the author”: a statement made by the Russian writer Boris Pasternak. Which is true, for it is only if the author is deeply
involved, committed to what she/he is saying, that the book will touch the reader. But such a book, even if it is great, may not reach readers the world over, unless it gets a prize, is marketed and sold aggressively. Some of the books I have read in the recent past, books which have deeply touched me, which have become part of me, are nowhere on the lists of the best sellers that have now become a regular feature of our times; yet I know that they will have become as important to many readers all over the world as they have to me. Familiarity with the locale is not the only point of entry for the reader. There is also an identification with the issues, with the characters, their predicaments, their ideas. And there is the magic window of a writer’s genius. In an essay titled ‘Dislocations’, the writer Rose Zwi, whose parents had moved from Eastern Europe to Mexico and then to South Africa, speaks of how strange the children’s books she found in the library in South Africa seemed to her. With her Jewish background of persecution and rejection, she just could not relate to the English school children’s cosy world of midnight feasts and games. And then, she says, “I stumbled upon Dickens. Laughing and crying my way through his novels, I decided to become a writer”. The world of Dickens was actually just as strange to this child in South Africa, but the genius of the writer drew the reader into it.

Undoubtedly the fact of publishing having become a big industry puts an enormous pressure on the publishers to sell as widely and as much as possible in order to recover their money. It means that economics controls and dictates the spread and availability of books. It means that a certain common denominator is used as the standard for what will sell. It means that literature has to be shaped for universal acceptance, like the beauties for the Miss World or Miss Universe contest are. Such writing will have as little to do with good literature as the winners have to do with real beauty. There is in all this a celebration of mediocrity, of which the success of the movie ‘Titanic’ is to me an outstanding example. So that global writing ultimately means shelf after shelf of sameness, the easily marketed, the easily displayed, apparently
the easily read. This kind of globalisation is, in effect, just another face of what Prof. Umashankar Joshi calls a “super Colonialism”. Looking at the things that the world now has in common – jeans and pizzas and cokes – we will notice that most of these come from the most powerful country in the world today – the United States. This is the new, the super Colonialism. The developing countries are the markets where the goods of the developed countries are sold, they are the consumers. It is never an equal exchange.

But there is also the positive side of globalisation, which means that today it is increasingly possible for people from all over the world to share things. To have access to one another’s cultures. Why not books then? But if it has to be a kind of globalisation most readers would welcome, it would be a healthy exchange, not erasing differences, but keeping them alive. It would mean more translations, it would mean a greater mobility of books. It would mean that books encircle the globe on the wings of their own merit and excellence, instead of being pushed around through fierce promotion and aggressive selling strategies. This is the kind of globalisation we need. Unfortunately, economic factors impose their own curbs on such a possibility; because the trendy, the facile and the well-marketed will always sell faster. And since, obviously, the publisher needs to recover the money invested as quickly as possible, the books that will go global will continue to be those which will appeal to the largest readership, those which a large readership is manipulated into believing are significant and must be read.

But, if the recent protests at the WTO meeting at Seattle are a sign of the times, there is a growing resistance to the conformity that globalisation means, to the crushing of the regional, to the imposition of a uniform drabness in the name of globalisation. Globalisation, we are slowly beginning to understand, is not only a commercial concept, it also means the imposition of standards and norms – whether in trade, in beauty, or in culture – which are really the standards of the powerful nations. And literature, specially, can never be global in the sense of being the same the world over,
because the liveliness of literature lies, as Rushdie says, “in its exceptionality”, in its being, “the individual idiosyncratic vision of a human being”.

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Can the Cultures of India Survive the Information Age?¹

KENNETH KENISTON

The coming of the Information Age is the topic of thousands of books, articles, and conferences. Predictions range from outrageous optimism to dire pessimism; we have analyses from a Marxist, a neo-liberal, an anthropologist, and many other perspectives; we have advocates and critics; we have more words on the subject than any human being could possibly absorb.

But what we do not have, at least not in sufficient quantity or depth, are analyses of the cultural implications of the new information technologies. By cultural implications I mean their relationship to the basic presuppositions, fundamental myths, unstated assumptions, linguistic taken-for-granteds, historic grounds and creation myths that unite a society: all of those conceptual, linguistic, imaginative, literary, musical, artistic, and intellectual threads that bind people together to make them feel of one kind.

Culture in this anthropological sense, then, is a core part of our identities as human beings, connected to our mother tongues, to our families as children, to our root assumptions about life and the world, to our links to our ancestors, and to the fundamental texts, written or unwritten, of our social world. It is the glue that binds us together with those whom we recognise as being people like us. It is what makes a set of individuals a people and not simply a gathering of strangers. In centuries ahead, when the history of


At the time of the talk, Prof. Kenneth Keniston was Andrew W. Mellon Professor of Human Development Programme in Science, Technology and Society at the Massachusetts Institute of Technology, and Sir Ashutosh Mukherjee Visiting Professor at the National Institute of Advanced Studies.
these early years of the Information Age is written, I believe that its relation to culture will be among the features most discussed. The relation of the new technology to culture is especially vivid and pressing in this nation of India. For of all modern states, India is the one which has most successfully preserved, and even enhanced, multiple languages and cultures, plural literatures and traditions, extraordinary cultural diversity. The official recognition of eighteen languages is only an outer manifestation of a far deeper heterogeneity, of the co-existence of multiple cultures, each with ancient literatures, valued traditions and historic arts and monuments. The question I want to pose is whether these rich multiple cultures of India can survive the Information Age. And by the Information Age, I mean most particularly the age brought about by the new technologies of computation and computer mediated communication, but also television, film, radio, and all of the new media.

Given the widespread fear of a kind of cultural imperialism spread through the new media, one would expect that there would be rich and thoughtful discussions of this question. Yet if we search through books, conference proceedings, and meetings about the Information Age, we find precious little on the subject. The technological challenges of rapidly developing information technology are so fascinating, so intellectually demanding that they alone are worth lifetimes of individual effort, to say nothing of countless international meetings. The economic implications of a world of global networks, of instantaneous communication, of electronic commerce, of households wired at a rate that doubles every year, of international monetary markets and economies linked electronically – these implications, too, are worthy of and receive intensive study. And not least important are the legal problems of reconciling the standards for the Information Age of more than one hundred countries, of determining what is right, proper, secret, public, pornographic, militarily dangerous, privately owned, obscene, subversive and so on. These problems (what is sometimes called the new electronic world order) increasingly attract some of
the best legal minds in the world. Were the German authorities right to arrest the German head of Compuserve for permitting the electronic entry of allegedly illegal materials from abroad via Compuserve? Is the U.S. justified in trying to prevent the electronic export of encryption devices? How can we develop international rules to deal with transborder confidentiality, pornography, the drug trade, national security, subversion, terrorism, censorship, and property rights in an era of electronic communication? These cross-national legal problems merit to receive attention.

But culture is rarely mentioned – in South Asia or for that matter in Europe. I serve on the German-American committee of the American National Academy of Science and the German Max Planck Institute whose agenda is Global Networks and Local Values. Apart from myself, the German and the American members of the group are extremely competent technically. Some are international lawyers; others are economists and economic historians. Still others are the men and women who can anticipate (indeed are designing) the technologies of the future. Our discussions of the technological, economic, and legal problems of the Information Age are enormously informative.

But there is a cultural issue in this committee which is only rarely discussed. Specifically, it is the issue of American cultural hegemony even vis-a-vis so similar, so technological, so advanced a partner as Germany. It is related to the commanding technological and economic position of the American hardware industry; it is connected with the dominance of American software even when translated into German. It is related to the fact that, according to one estimate, more than 90% of all Web sites in the world are in English. And it is connected to the broader worry that what is often called American culture sometimes seems (even to Europeans who by Indian standards are very much like Americans) to be an invasive, alien, or even subversive force that weakens, undermines or overrides traditional cultures – even of Western nations like Germany, France, Italy, or Spain. One latent question in the German-American group, then, is: How does one preserve cultural
diversity (i.e., local values in an era of global networks in which the English language and American culture play so dominant a role?

This is the issue I wish to address, with particular reference to India. I need not belabour facts that are obvious to all of us. Since Partition, India has been not only the world’s largest democratic state, but the most linguistically and culturally diverse. It has preserved its unity as a federal nation, while at the same time encouraging the distinctiveness of the separate Indian states. Moreover, as you know, India has two unusual characteristics. First, it has the world’s second largest pool of scientific manpower, reflected in the dynamic information technology industry. Second, it is a nation where the English language plays the special role as the link language of the nation. But precisely for this reason, some fear the vulnerability of India’s traditional cultures to an Anglophonic tide. This threat may be defined in different ways: by pointing to the role of English as the language of power and wealth in India, or by analysing satellite TV that brings the antics of American millionaires in Hindi to thousands of Indian rural villages, or to turn to the Information Age, by acknowledging the hegemony of English-language, American-based information technology and software. To think intelligently about the relationship of technology and culture, we need a broader framework, which I will try to outline, recurring to India as the prime example of as yet undetermined potentials of the Information Age.

As an oversimplification let us imagine a spectrum on which we place the outlooks of the cultures of the modern world. At one extreme is what we may call ‘cultural imperialism’. This is the policy, extant in some nations today, of insisting legally on a single culture and prohibiting all other cultures, including all languages that are not the language of the dominant group. There are, as you know, nations where to speak or write publicly in a language deemed subversive may mean years of imprisonment. More commonly, linguistic imperialism entails making it simply impossible to do business, to be educated, or to conduct any but the most intimate aspects of family life in any language other than the mandated and official language.
One author has claimed that the teaching of English as a second language after the World War II in developing countries had many features of linguistic imperialism. Others might argue that in India, the role of the English language as the link language of the nation, the language of the higher courts, the Lok Sabha, the higher civil service, of nationally-based as well as international business, and of higher education – that this role amounts to a de facto linguistic, and by extension cultural, imperialism because it effectively excludes from power, wealth and influence the great majority of those Indians – perhaps 95% – who do not speak fluent English.

I will return to this argument, which is in my view debatable. For now, it is enough to note that against the role of English as a link language, we needed to set the opposite linguistic policies of the Indian states, the extraordinary linguistic and cultural pluralism of India as a nation and of India’s great cities, and the multicultural tolerance which, ever since Partition, has characterised India more, I believe, than any other major nation.

Let us now turn to a second point along the spectrum, an orientation which we may call ‘global monoculture’. By global monoculture I mean the de facto dominance of a single culture across all the important sectors of the world.

Coercion is absent (this is not naked imperialism); many languages are tolerated; multiculturalism is officially extolled. But the power of the dominant global culture is such that it tends to overwhelm, or reduce to a status of inferiority, all local cultures. Such was the case with Roman-Latin culture during the apogee of the Roman Empire; such was the status of Moslem culture and the Arabic language during the greatest epoch of Islam. And such, some claim, is the power of today’s global monoculture, embodied in satellite TV, World Cup games, CNN, the Three Tenors at the Baths of Caracalla, Hollywood, Murdoch, Bollywood, Microsoft, Intel – a culture where 90+% of all Web sites are in English, and a world where, in contemporary India, unless one speaks, reads, and writes good English it is virtually impossible to use a computer much less send email.
The political scientist Barber terms this world “MacWorld”, combining McDonald’s and Macintosh into a single epithet. Barber notes that even in France, with its proud cultural nationalism and its brilliant tradition of film-making, 90 to 100% of the most popular films each year are American. We could add today the role of CNN, the popularity of American dramas translated into languages like Hindi or Swahili or Spanish, or even Indian MTV, hosted by a laid-back young Indian who speaks English with an American accent. The singers and the languages of the songs, to be sure, are Indian; but the concept is not in origin Indian.

How should we evaluate this global monoculture? The Japanese scholar, Toru Nishigaki, argues that despite its appearance of multiculturalism (e.g., “The many cultures of Benneton”), today’s global culture is in the last analysis an American monoculture, founded on the enormous appeal of Hollywood films and American TV, on the dominance of the American entertainment industry and on the technological, economical, and military power of the United States. Nishigaki argues that we are witness to the spreading, subtly or directly, of ‘American’ values of ‘free enterprise’ materialism, consumerism, political liberalism, and so on. For Nishigaki, this American plague threatens to infect or relegate to insignificance all other cultures.

An alternative view has been stated by Samuel Huntington in a recent controversial work. He claims that far from being unified into one ‘Western’ or ‘American’ monoculture, the world is increasingly polarised around multiple regional cultural-religious centres – a neo-Confucian world in East Asia, an Islamic world in the Middle East and North Africa, a Latin American world in South America, etc. Huntington’s work is popular with leaders of nations like Singapore, Malaysia, and the People’s Republic of China, who claim that there exist something called ‘Asian values’ (distinct from so called ‘Western values’). ‘Asian values’ allegedly stress patriarchal family deference, community unanimity, a disciplined and obedient citizenry, and an authoritarian state. According to this view, ‘Western’ values like human rights, human dignity, freedom
of the press, religion, and speech are alien impositions that have no rightful place in an ‘Asian’ context.

As is often true, the experience of India puts such views to the test. How can it be, if an obedient citizenry, cultural unanimity, and an authoritarian state are ‘Asian’ values, that Indians are so firmly attached to political democracy, that Indians are almost as undisciplined as Americans, and that Indians have shown so dedicated a commitment to free speech, multicultural tolerance, and freedom of religion? The experience of India to date affirms the possibility of preserving multiple cultural patterns, and it raises doubts that values can be neatly classified as American values, Indian values, Asian values, or what have you. Indeed I myself believe that such values as the dignity of human life, the right to a decent living, the right to choose one’s rulers, to education, to literacy, to freedom of speech, the press and religion – that these values are not American, Islamic, Asian, or Indian, but simply human.

But many, including myself, would agree with Nishigaki that there is at least a danger of a global, covertly American monoculture that relegates all other cultures to inferiority, antiquity, or second place. And it is easy, and not entirely inaccurate, to caricature this global monoculture, especially as seen in television and the World Wide Web. It is a world of individuals with platinum Visa cards checking into five star hotels, of glittering luxury sports cars whose dashboards sparkle with subtle green gauges, of viscous shampoos that promise fragrance, body and romance, of soaps that turn filth to pristine whiteness, of politicians who promise whatever they think will enable them to win. It is a world of freely downloadable pornography, of search engines encumbered with advertisements, of information so vast in quantity as to overwhelm the most brilliant and devoted computer user.

It goes without saying that this world is offensive, even obscene, when 300 million Indians and a billion other humans go to bed each night hungry. Indeed, so shallow is this monoculture that we are within our rights to ask whether it is truly a culture at all or, as my colleague, Claude Pesquet, has proposed, “only an interface”.

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But we also need to ask whether the average person, rich or poor, really takes these tele-worlds and cyber-worlds very seriously. More plausible is the claim that these worlds occupy the same place in the minds as ancient mythologies and foundation myths, popular fictions and rituals. Indeed, I suspect that the Indian villager who watches ‘Dallas’ does so with the same mix of amusement, interest and distance with which he previously viewed the televising of the great Indian epics. Neither are models to be emulated in his ordinary life, but legends, cautionary tales, entertainment.

In any event, there is another side to how we evaluate the ‘globalisation’ of culture, and once again, India proves a test case. In the last half century it has been convenient for Indians to use English as a link language for the diverse peoples of this subcontinent. Indeed, in the absence of some language that in a sense has ‘belonged’ to no one state or people in India, it is hard to see how the business of this diverse nation could have been conducted. Moreover, the strong ties of India with the rest of the world would have been difficult if this subcontinent did not possess the second largest English speaking population in the world. There are obvious advantages to sharing a common culture and language, even as a second culture and language, with much of the rest of the world. Without that second language, India’s vibrant software industry could not have happened.

A personal anecdote may be relevant. Through a mutual friend, I read the scholarly work – in English – of a Pakistani author. His book was so outstanding that I found his email address and thanked him for his work. Not knowing Urdu, I naturally wrote in English. (In any event, email in Urdu is difficult if not impossible.) He replied in the fluent English for which educated South Asians are famous. An email friendship resulted: We now exchange writings, views, and even fragments of our autobiographies; I truly feel that I today have a new friend in Pakistan.

All of this indeed presupposes a ‘global monoculture’ in which we both participate, based on email and the English language. My Pakistani friend remains in Pakistan because it is his homeland and
he wants his children to be reared there. Is he the less a Pakistani because his English is fluent and we communicate in that language? Do Indians cease to be Hindus, Jains, Muslims, Parsis, or Christians because they can also speak excellent English? Does the desire for an electric fan, a refrigerator, a television set, decent medical care, a motor scooter, a car, shampoo, or a computer constitute capitulation to the consumerism of ‘global monoculture’?

As I said, India provides a test case. As I have said, to a foreign observer like myself, it seems that Indians live more peacefully, more comfortably, with multiple cultural identities than any other people on earth. Long before contemporary ‘global monoculture’ was imagined, Indians lived easily with multiple cultural frameworks, shifting languages, and even plural personal identities. The Indian experience, if I understand it, suggests that it is possible to take part in a global culture which has, as Nishigaki indicates, many ‘American’ or ‘Western’ aspects, yet at the same time to retain identity and rootedness in one’s own particular culture.

The next point on the spectrum is also well defined by contemporary India. I will call it ‘cultural diversity’. This is a society – or a world – that contains and supports many distinct cultures, each with its own particular strengths and weaknesses, its own language and educational system, and its own capacity to instil in its members a sense of identity based on rootedness in their culture.

Such a world is not one in which people are necessarily monocultural or monolingual. It is possible to be rooted in one’s culture and yet to collaborate with, to understand, to participate in, other cultures as well. India is again the world’s best example of the possibility of multilingualism, which is a proxy for multiculturalism. In no other country of the world do people live so easily as in the major Indian cities with multiple linguistic and cultural groups. In no other country can people shift so easily from one to another cultural frame of reference, including that of their childhood and their mother tongue. India can provide a model for what the rest of the world could be like.
Finally, at the far end of the extreme of this cultural spectrum, we have what Barber calls ‘Jihad’ and what I will term ‘exclusionary cultural nationalism’. By this I refer to the emergence of regimes, groups, or parties – in a few countries the ruling parties – which make the purity of their culture, their religion, their ethnicity, their tradition, and/or their language the central theme of their ideology and their politics. Cultural pride, in itself a benign and probably necessary base for community and identity, is here perverted into an intolerant and even violent exclusion of all that is not orthodox. In Western Europe and America we have examples of this in the Medieval Inquisition, in American anti-Communist ‘witch hunts’, or in Soviet efforts to extirpate ‘revisionists’ and ‘agents of imperialism’. Such tendencies exist, needless to say, in many other countries.

The characteristics of exclusionary cultural nationalism are well known. First is the creation of an imaginary past in which the culture was unsullied, in which foreign and modern influences did not exist, when cultural power extended over vast regions, and where the cultural, social, and political rules of society were uniformly obeyed. Compared to that Golden Age, the present suffers, and the cultural goal is to return to that imagined past. Fortunately, according to the exclusionary myth, a ‘saving remnant’ has preserved the authentic culture in its pristine and unperverted form. Compared to them, the enemies are therefore aliens, foreigners, subversives, cosmopolitans, infiltrators, fifth columnists, disloyal citizens. Their crimes are to introduce subversion, to challenge the hegemony of the culture, to produce pornography, to defile women, to violate sacred places and customs, to seduce children, to consort with foreigners and adopt foreign habits, foreign dress, foreign ideas. Purity is the supreme goal, and the pursuit of that holy goal may even justify holy wars or movements of exclusion and even extermination – what Barber calls Jihad.

Where does exclusionary cultural nationalism come from? In part, from the sense that one’s culture is threatened, undermined, disvalued, and depreciated; in part from the belief (or fact) that the members of one’s core culture are disabled, blocked,
disenfranchised, or disempowered. This is understandable: to support our core sense of our own values and identities, we need to know that they rest on a valued culture. When a culture is disvalued or deprecated, it is not surprising that people turn ugly, intolerant, vicious, even murderous and genocidal. To explain is of course not to justify, but it is to warn that if cultural diversity is undermined by global monoculture, then a kind of ugly exclusionist cultural nationalism can result.

With this framework in mind, let me now return to the question from which I began, namely whether the extraordinary diversity of India’s cultures can survive the impact of the Information Age. As you might expect from a professor, my answer will be an equivocation: it all depends. But let me try to clarify one or two of the factors on which it depends. First, I noted earlier that one of the defining facts of contemporary India is the extraordinary role of the English language amongst Indian elites and the inaccessibility of the Information Age to the average Indian who does not speak good English. For some time, I have been interested in the accessibility of computation to the 95% of Indians who do not speak, read and write fluent English, and who therefore cannot use English language software. The simple fact is that, at present, it is almost impossible to use a computer, to access Internet or the Web, unless one speaks, reads and writes good English. There are, of course, many creative solutions that have been proposed; an Indian standard called IISCI exists and is currently under modification; there are many creative solutions for local language computation. The Government of India has tried to promote local language software in a variety of ways.

But to an outsider, it would appear that there is a long way to go before these efforts achieve their goal. Hindi, with at least 400 million first and second language speakers, is probably the third or fourth most widely spoken language in the world (after Chinese, English, and Spanish). Yet the major international software firms like Microsoft have not produced fully localised versions of their operating systems in this language, and the average Hindi speaker,
no matter how gifted, wealthy, and motivated, must almost invariably turn to English language software if he is to use a computer. The same situation obtains with regard to other languages like Bengali, Telugu, Marathi, Gujarati, Kannada, Tamil, etc. Parenthetically, it is striking that in the current enthusiasm for the likely consequences of the liberalisation of Internet service providers recently announced, there has been much talk about impact on villages, local schools, small farmers, tradesmen, etc. – but almost no recognition that, at present, most villagers, school children, teachers, and merchants have no software they can possibly access in their own languages.

As seen by this outside observer, India faces very critical choices with regard to local language computation. There are probably more inventive, creative and energetic software engineers and designers in India than in any other country except possibly my own. But most major Indian software firms, no doubt for excellent reasons, have chosen to focus on the export market rather than the domestic market. And the major American software firms (with the exception of IBM’s DOS localisation to Hindi) have not produced, and as far as I know have no plans to produce, full localisation to any of the Indian languages – not even to Hindi, with as many speakers as live in the entire European Union. The Indian Internet situation is even more confusing, with many creative proposals, but few following the standard of IISCI, and most incompatible the one with the other. IISCI itself has been challenged, and efforts to modify it so as to adapt it to contemporary computing needs and to the languages of the southern states have not yet borne fruit. CDAC and NCST pursue different approaches to localisation; and there are also at least a dozen more. The result for Internet in Indian languages is, at present, an emerging tower of cyberbabel. There is an urgent need, recognised by many at the September CDAC conference in Pune, and the November IT.COM conference in Bangalore, for Indians to come together to standardise codes for the most important of India’s fourteen, sixteen, or eighteen official languages.

So a partial clarification of ‘it all depends’ is that it depends on the apparently technical issue of localisation. In a word, lacking
local language software, computers in India in the Information Age are likely to be merely one more aspect of a move toward global monoculture.

Only English-speaking Indians, already the most powerful and wealthy group in India, will have access to the power-increasing Information Age. The gap between the empowered and the powerless will grow, and so will the devaluing of local languages and cultures. For this to happen is to risk the transformation of India’s benign and generous cultural diversity into uglier forms of intolerant cultural nationalism, forms that are visible in my own country, in Europe, indeed in every country of the world. Localisation (and its prerequisite standardisation) is therefore critical if the Information Age is to reach and benefit broad sectors of the Indian population – what my friend Venkatesh Hariharan terms “the forgotten 95% of Indian computing”.

Another conclusion emerges from conversations with major American software producers and with officers of some of India’s cutting edge firms. In America, for complex reasons, the Indian ‘market’ is not currently seen as sufficiently large as to justify the expenses of full localisation of, let us say, Windows NT to languages like Hindi, Kannada, Telugu, or Tamil. I believe this belief is incorrect; but it means that what we are likely to see in the near term (and indeed already see) is the lesser step of ‘locale coding’, which still presupposes a knowledge of English in order to run the computer (although it permits using the Qwerty keyboard to enter, for example, Devanagari script). In India, as I have noted, the most dynamic firms have concentrated on the export market, and their long-term strategic plans usually involve shifting toward packaged software rather than focusing on the potentials of the domestic market.

These economic decisions mean that the most creative approaches to localisation are not likely to be taken by major firms in the U.S. or India, but rather by small, ‘back-street’ operators in India – smart people with a dozen or so collaborators who are already producing innovative email programmes, localisations, etc. The problem is, of course, that they are small, that they lack venture
capital, and that the solutions each proposes is incompatible with the solution of his neighbour. But the inventiveness is there, and I suspect that it is from these ‘back alley’ operators that eventually localisation will come. For example, from one such firm I have already begun to receive email in Gujarati, Marathi, and Hindi (none of which I can read, unfortunately), and indeed even the embedded code and keyboard layout which would permit me, were I fluent in these Indian languages, to reply in one of them.

A second factor on which it depends is, to put it too simply, vision and commitment to cultural diversity of India’s gifted technologists, entrepreneurs, and government officials. The relationship between economics, market forces and the role of public authorities is of course complex. My friend Harsh Kumar, best known as the inventor of the localisation code known as Bharat Bhasha, sees a vast potential market for local language software in, for example, the small and medium sized merchants who work in Gujarati or Marathi in Bombay, who have the financial means to buy a computer but not the English to use English-based small business packages. Kumar rightly points out that in software, potential demand does not necessarily generate supply in the short run. If there is no software in Gujarati, there can obviously be no demand. Kumar tells the story of the two shoe salesmen who visit a rural Indian village of a thousand inhabitants. The first salesman returns to his company headquarters deeply depressed. “It is hopeless”, he says. “There is not a single person in the whole village who wears shoes”. The second returns to his company headquarters excited and jubilant: “What a marvelous opportunity”, he says. “We can sell a thousand pairs of shoes! The market is untouched!”

Kumar is doubtless right that if the local language software existed there would be many who would buy it. But my own prediction is that the driving force behind the creation of standards and localisation will be public authorities, and in particular the Indian states. You are doubtless familiar with the ambitious and brilliantly-publicised plans of Chief Minister Naidu, and the ongoing work to computerise all land records in Andhra Pradesh. But if this work is
to be useful to the average Andhra Pradesh peasant, then it must be in Telugu rather than, or in addition to, English. Or, to take another example, you doubtless know that the government of Maharahstra has plans to link via email all of the district offices in that state. I recently had the privilege of speaking with one of the officials in charge of this plan, and asked what language would be used. “Marathi, of course”, he said. I asked if they had Marathi email software up and going to permit communication between all of the many dozens, indeed hundreds, of district offices. “CDAC will provide it”, he said. But at CDAC it emerged that this software is not yet fully functional.

My point has to do not with the work that remains to be done, but with the fact that only the state governments, and at the Centre, only the Government of India, have the authority, the capacity, and the economic power to produce that standardisation which is essential for the production of software in the rich and ancient languages of India. The technical problems of local language software in South Asia are, I am told, no more complicated, perhaps less so, than those of localising to French, German, or Spanish – to say nothing of a language like Finnish, which is a localiser’s nightmare. Indian languages are phonetic; the Northern languages have a common root in Sanskrit; the study of the grammar and structure of Indian languages from Panini onwards is very advanced; and localisation, although it is always costly and time-consuming, presents no special technical challenges. Thus I think that the push underway from states like Karnataka, Andhra Pradesh, and Maharahstra is the force most likely to produce usable local language software and thus to make the Information Age accessible to the peoples of India.

My colleague at MIT, Michael Dertouzos, the Director of the Laboratory for Computer Science, has written a book entitled What Will Be. Michael is a technophile; he believes that the Information Age will empower people; he and his group have been at the cutting edge of technological innovation for the last thirty years, and remain so with, for example, the location of
the Web Consortium at MIT. But Dertouzos makes the critical point that whatever the benefits of the Information Age — and he believes there are many — the Information Age will not solve the traditional problems of humankind. The gap between the poor and the rich, political oppression and injustice, hunger and disease, cultural intolerance and genocide — none of these have a necessary connection to the Information Age. Indeed, these problems may grow in importance in the Information Age, he suggests.

To be sure, every new technology awakens utopian hopes. It was said that the telegraph and telephone, by encouraging communication, would prevent all future international misunderstandings. It was written that the automobile would eliminate the chief problem of the cities by eliminating horse manure (as indeed it did, but at some cost). Many claimed that electricity would eliminate factories and permit the decentralisation of production to agreeable rural sites. The nuclear age would bring “electricity too cheap to meter”. And now, the Information Age will produce a time when, as another of my MIT colleagues puts it, we will all be better for “being digital”.

Dertouzos’s warning is well taken with regard to culture, and can serve as epilogue and conclusion to my comments. The impact of every technology “always depends”. Technologies are not autonomous forces, they do not have any necessary social or cultural effects. Technologies indeed offer us new opportunities, possibilities, problems and choices. But how they are deployed, how they are used, how they are shaped and perceived depends upon human, social, cultural political will and decision. In our current euphoria about economic liberalisation and the market, we cannot rely exclusively on blind market forces. We also need the active intervention of corporate and business leaders who possess vision and commitment to the well-being and the vitality of their cultures, and of political leaders who know how, and are willing, to moderate the forces of the market so as to achieve goals of which the Information Age knows nothing — the elimination of poverty, the universalisation of education, political freedom and democracy, and, yes, the preservation and deepening of cultural diversity.
The Idea of the Atom

N. Kumar

The idea of the atom (Greek: a = No, tomos = cut) as an indivisible constituent of matter, informs, for all practical purposes, much of physics and all of chemistry that we know today, including presumably the biology of the living and the sentient too. This despite the fact that over the past century the atom has been resolved and actually split. Indeed, it has turned out to have an elaborate internal structure – with electrons orbiting the nuclei made of protons and neutrons, structured in turn on still finer scales that seem inward bound – an infinite regression perhaps. The atom has lost the certainty of its sharp edges, and has been replaced by the uncertainty of probabilistic waviness. In point of fact, the quest for the ultimate indivisible constituent has moved on far beyond the sensible and the naive realism that appeals to our classically imprinted mind. One now speaks seriously of the reality of the Unobservable – of the point-like quarks and the tiniest of the strings (~10^{-33} cm) that may well be the stuff that our universe is made of. The indivisible atom has thus become a metaphor, – extremely useful and creative for the exposition of Nature, regardless of whether it existed or not – an instrumentalist viewpoint held firmly by Francis Bacon (1561-1626), regarded by many as the father of modern Science. And, of course, what good is a metaphor if it has to be literally one with the reality it points to!

However, it does come as a surprise that, until very recently, the idea of the atom was far from being accepted universally. It was certainly the case as late as the turn of the last century. Listen thus to Ostwald, the leading physical chemist of the late 19th century, who had won the 1909 Nobel Prize for Chemistry, and who contrived

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1 Lecture delivered on March 8, 2002, as part of the series ‘History of Ideas’, at the National Institute of Advanced Studies.
At the time the talk was delivered, Prof. N. Kumar was Director of the Raman Research Institute, Bangalore.
to write a whole text book of chemistry without using the word atom, which to him was a mere analogy. This is what he had to say of the unseen atoms in 1895: “… thou shalt not make unto thee the graven image or any likeness of anything! Our task is not to see the world in a more or less clouded mirror, but to see it as directly as the constitution of our being possibly allows …”

Only bare facts! Analogies only save appearances. (The realisation that there are no bare facts, and that all experiments are theory-loaded, came later, with Boltzmann in fact (ca. late 19th century C.E.). Contrast this with what Feynman, one of the greatest physicists of our times, considered as the most important statement we could possibly make, “… Everything is made of atoms… everything that animals do, atoms do... There is nothing that living things do that cannot be understood from the point of view that they are made of atoms acting according to the laws of physics”. Add to this the permanence and the immutability of the atom that Dalton (ca. 1766-1810 C.E.), regarded by many the Father of Chemistry, claimed, “... We might as well attempt to introduce a new planet into the solar system, or to annihilate one already in existence as to create or destroy a particle of hydrogen” (A New System of Chemical Philosophy, 1808).

The idea of the atom as centre of all material existence can be traced back to the early Greek and Indian thoughts of the five centuries before the Christian era. The Greek school was founded by Leucippus of Miletus, and propagated by his great pupil Democritus of Abdera in ca. 5th century B.C.E. Democritus was a great expositor of the Atomic Theory, and one of the most universal thinkers of the ancient world. It is said that his public lectures on the atomic theory raised golden talents\(^2\) unmatched in value in the 19th century West! Later, the Athenian philosopher, Epicurus of Samos (ca. 4th century B.C.E.) elaborated the Atomic Theory into a philosophical enquiry. This was followed by Lucretius, the Roman poet of ca. 1st century B.C.E., who sang the Epicurean

\(^2\) Talent was the equivalent of a monetary unit of those times.
philosophy (but not his ethics!) in his inimitable *De Rerum Natura* (on the Nature of Things). By then, the Greek Atomic Theory was complete.

The Indian Atomic Hypothesis was advanced by the sage Kanada (earlier known as Kashyapa) who founded the Vaiseshika School of atomism, ca. 6th century B.C.E. The *Vaiseshika-Sutra* (peculiarity aphorism) envisages *paramanu* (atom), the ultimate constituent, as point-like in space, indeed as a limiting image of a grain of rice (the *kana*) – indestructible, incessantly in motion, and with property peculiar (hence the *Vaiseshika*) to the primary substance that it constituted. The primary substances were the five Vedic *Pancha Mahabhootas* - Earth, water, fire, air with ether (space) added on later. He even spoke of *dwinuka* (the diatomic molecule).

Clearly, both the Greek and the Indian thinkers of those ancient times were in quest of the ultimate constituent of matter – the One in terms of which the diversity and plurality of the Many could be resolved. This great reduction – of the many Why’s and How’s to a relatively small number of Why’s and How’s that may then be taken as the ultimate facts – had led them to Atomism as a minimal hypothesis. The basic tenets of the Atomic Theory of the ancient Greeks, and more or less of the ancient Indians, were:

1. Is matter infinitely divisible? No, they answered. Matter is finitely divisible. The sub-division must stop at the Atom that cannot be cut in two, terminating thus the infinite regression.
2. Atoms are all of one kind – having no essential property other than that of extension. All are made of the same primal substance. This was the monistic base of the early atomism, traceable to the Ionian philosopher Thales (634-546 B.C.E.) of Miletus.
3. Atoms are of different, but finitely many shapes/sizes – insensibly small, interlocking shapes, concave/convex, and so on.
4. Atoms are infinitely many in number.
5. Atoms are hard, not hollow, and impassable.
6. There is void (vacuum) – an independent permanent reality – separating the atoms. This allows atoms to move in the void – the elbow room.

7. Void is infinite and accommodates infinitely many atoms.

8. Atoms are constantly moving, colliding, and interacting only by contact – elastically – their Motion taken as an ultimate fact. No arguments regarding its causation. No external forces, or innate tendencies.

9. Primary qualities, e.g. hardness, impassability, etc. are the objective, true attributes of matter made of the atoms.

10. Perceived qualities (or qualia or affections), e.g. colour, smell, taste, sound, are subjective and secondary:

   Colour exists by convention,
   Sweet by convention,
   Bitter by convention.

   Nothing in truth exists, but the Atoms and the Void – the reality. (Thus chanted Democritus, quoted verbatim by the Greek physician Galen, ca. 2nd century C.E.).

11. Objective basis of sensations – simply and solely by contact with the unseen atoms.

   Needless to say that the Greek/Indian atomism was not derived inductively from any detailed, systematic experimental observations/empirical data, nor arrived at deductively from a set of given/assumed axioms. It was, therefore, not scientific in the modern sense of the word. It was nevertheless a serious attempt at rationalisation of Natural Philosophy that had logic to it. The compelling reason of these ancients for their atomism was to be found in the general question of the observed stability of matter – how could the perceived small changes in the sensible objects around us be consistent with the unchanging, essential (taxonomic) identity of the objects themselves. Only an object made of a large number of unchanging smaller-units can change without changing essentially. This change-without-changing was the real reason for their Atomism. The sharp discreteness of the Atom,
as opposed to a fuzzy continuum, was ultimately responsible for their stability. (In the modern context, just think of the discreteness of quantized orbits that stabilise Bohr’s atoms against decay into the otherwise classical continuum. It is also much the same as the idea of polymorphic stability of a population/species despite the allelogenetic variations, as in modern molecular biology of the genome. Or more generally, it is perhaps a question of the discrete robustness against the analogue fuzziness).

One may well be inadvertently biased towards reading much more into the records of the ancients than what there actually was. But, at the risk of making this systematic error, one can reasonably say that the stability of matter was very much in their thoughts. A related issue was that of the conservation of matter: Atoms, just like integers (or now as rational fractions too!), could be counted and accounted for in any reckoning. Such book keeping was hardly possible for a continuum (or now for the irrationals too): Such fractions could be lost irrevocably! Another significant point to be noted here is the finiteness of the number of shapes/sizes of the atoms envisaged by them (After all, the Period Table of Mendelev (ca. 1869 C.E.) too contains only finitely-many types of atoms – ninety-two, or some more if one counted the twenty-five odd transuranium elements, occurring naturally or created artificially). Still another point of note is that the Atoms interacted only by the hard-core contact (excluded volume effect) – reminiscent of the force-less mechanics of Heinrich Hertz (1857-1894), subject only to constraints. And yet they spoke of the compounding of the Atoms – due to the Atoms scattering multiply against one another giving a long-lived Epicurean *Concilium* – a molecule in communal motion in the narrow space bounded by the neighbours. Again, strongly reminiscent of the modern idea of the Ruelle-Pollicot resonances of the 20th century! As to how an object of sensible magnitude, made of these Atoms racing at high velocities, could move rather slowly, they simply pointed to the clouds! And, as for the evidence for the Atomic motion itself, they pointed to the mote (of dust) dancing in the sunbeam. Interestingly, but for the effects
of air convection, this zig-zag motion was no different from that of the plant pollen observed by the Scottish botanist Robert Brown (1773-1858) some two thousand years later.

There were, of course, variations on the main Atomic theme of the ancient Greeks so as to accommodate other features as they occurred to them. Thus, one such feature was the Epicurean swerve wherein the Atomic motion, originally deterministic, was made intrinsically random and unpredictable in principle, to preserve reverence for the human free will. The greater the swerve, the greater the degree of spirituality. Critically poised atoms (the clinamen) were explicitly introduced for this purpose. Present day efforts to derive free will from deterministic chaos bear a close resemblance to these clinamen. The atoms could also be viewed as comprising the primal substances – the air, water, earth and the fire – of Empedocles (ca. 490-430 B.C.E.), but without invoking his forces of love and hate for interaction. But the general picture was that of the Atoms of Democritus (the ameres) moving in the Void, or perhaps in the continuum of ether (the apeiron of Anaximander of Miletus, ca. 600 B.C.E.)

Despite, however, its great appeal to physicists, the Atomism of the ancient Greeks lost out to the Continuism of Aristotle (384-322 B.C.E.), who was totally opposed to Atomism. Aristotle was a realist/empiricist who questioned the reality of the sensibly unobservable Atom. He opposed the actual or achieved infinitesimal and infinity in principle, and admitted only the sensible objects. The Void separating the Atoms too was inadmissible – Nature abhors vacuum! And finally, the random motion of the Atoms, without any divine assistance and without the innate tendencies and potentialities within the matter as the final cause, was down-right atheistic to him.

To Aristotle, chance and disorder was an abnegation of the created order. Also, Aristotle viewed space not as a vacuum, but as filled with plenum – universal material. Matter was identified with extension. As to how motion was possible at all within such a continuum, he proposed the idea of antipetistalsis – motion by
exchange of places, of what is \textit{a priori} (to the fore) with what is \textit{a posteriori} (to the aft). Parts moving into one another. (Just imagine a fish swimming through water by displacing it as it moves). This is what the fluid-dynamicists of today would call the back-flow.

Some of this continuist viewpoint can be detected in the rather sophisticated thinking of Anaxogoras, ca. 500-428 B.C.E., who considered a continuum which was infinitely divisible and, very importantly, infinitely differentiated. This could give the observed plurality of things that are nevertheless sensibly homogeneous – his \textit{Homoeomeria}! This plurality can be pictured rather vividly as a re-arrangement of a pointillistic quasi-continuum. (Just imagine a variegated silly putty or plasticene).

Aristotle, however, did allow for the minima, e.g. the cells for the living things below which size there is loss of identity. This idea was preserved and perfected through the Middle Ages, even though the Greek Atomism \textit{per se} was vehemently opposed. (By the Middle ages, the Atom had in fact become Latinised to mean the smallest unit of time.) He was also struck by the analogue of letter-atoms (the\textit{ stoicheio}) and the word-compounds. Because, after all, weren’t tragedy and comedy both composed of letters from the same alphabet! Order (sequence) of letters in a word matters, much as the arrangement of the Atoms in a concilium (compound). There, the meaning (of the word) as also the property (of the concilium) is encoded in the order of the letters/atoms. Such an information-theoretic viewpoint is quite modern! Physical Atoms were, however, not acceptable to Aristotle.

And, so great was the damning influence of Aristotle that the Atomism of Leucippus, Democritus, Epicurus, and Lucretius was suppressed completely by the turn of the first Christian era, and remained so for almost 1000 years through the Dark Ages and most of the Middle Ages, while theology and scholasticism prevailed, firmly opposed to Atomism. (Much as the Darwinian idea of evolution is still being opposed in some of the southern states of the USA). It was revived by William of Occam in the late Middle Ages. There followed the rediscovery and reprinting of the ancient
texts in the early 15th century, and the Atomism eventually became a force in the course of the renaissance (14th-16th century) and the post-Newtonian period, and, of course, in the modern era.

The Greek Atomism and the associated mechanical worldview exerted a deep influence on the chemists and the physicists of that time and beyond. Of course, initially at least, one had to introduce here the external Cosmic Law-Giver (to replace the Aristotelian innate tendencies and the final causes) so as to order the random motion of the atoms. This helped remove the traditional, somewhat repugnant atheistic association of the past and made the thus tempered mechanical worldview more acceptable. But still, there was fierce disagreement and debate. Thus, in his Opticks, Isaac Newton (1642-1729) wrote, “It seems probable to me, that God in the Beginning form’d Matter, in solid massy, hard, impenetrable, movable Particles, of such Size and Figures, and with such other Properties, ... , so very hard, as never to wear or break in pieces; no ordinary Power being able to divide what God himself made one in the first Creation”. Quite inevitably, Gottfried Wilhelm Leibniz (1647-1716) differed. He was for continuum, and held that matter is infinitely divisible and the universe infinitely extensive: “Atoms are the effect of the weakness of our imagination, for it likes to rest and therefore hurries to arrive at a conclusion in sub-division or analyses; this is not the case in Nature; which comes from the infinite and goes to the infinite. Atoms satisfy only the imagination, but they shock the higher reason”.

The great Rene Descartes (1596-1650) who gave us the Cartesian coordinates too was a continuist, opposed to Atomism and Void. (For him the space was filled with a plenum – in fact in a vortex that moved the entire planets). Also, the positivists like Ernst Mach (1838-1916) could never reconcile to the insensible atoms. The Machian sensationalism was rejected by Boltzmann (1844-1906) and Maxwell (1831-1879) who at once took to Atomism. Indeed, Maxwell’s kinetic theory of gases was manifestly Atomic. There was also an ingenious attempt by the 19th century physicists von Helmholtz and Lord Kelvin at deriving a stable atom-like discrete
object from the fluid continuum in motion – a concrete unification of the otherwise conflicting atomism and continuism. The resulting Helmholtz-Kelvin Vortex-Ring Atom was finite, permanent and could form a compound through entanglement that was stable topologically against decay or dissociation. This, however, required an ideal inviscid ether-fluid, and had to be finally abandoned.

There were also remarkable novel applications of the Greek Atoms and the Void, notably the one proposed by George-Louis La Sage in the 19th century, to Gravitation. He postulated such Atoms (the ultramundane corpuscles) racing around in the Void at random, and colliding with any sensible object elastically. Mutual shadowing of any two such objects then resulted in a force of attraction that had the Newtonian form. Detailed consideration, however, led to a cancellation of the effect for the simple models. This was a bold first attempt to derive a force of interaction from exchange of particles.

An important development of note that helped the general public acceptance of Atomism was the publication of Hooke’s *Micrographia* in 1665, revealing the finer-scale details of tiny life-forms imaged with the help of the newly developed microscope – demystifying thus the unseen minuteness (\(\sim 10^{-4}\) cm) and by extension the unseen Atoms. For the 19th century chemists like Dalton, Cannizzaro and Avogadro, Atomism had great, instant appeal. So was the case with the 17th century chemist Robert Boyle (1627-1691) with whom started modern chemistry. Dalton introduced his Lego-like models of molecules made from the atoms, and published *A New System of Chemical Philosophy* at the turn of the 19th century, to which the Atomic Hypothesis was central. Lavoisier (1743-1794), however, found the Atoms impossible in principle but convenient in practice. (It has been suggested that this resistance to the Atomic picture correlated with the sudden demise of French science in the early 20th century).

Finally, the reality of the unseen Atoms/Molecules was unambiguously confirmed by the phenomenon of and the theory for the Brownian motion as developed by Einstein.
in 1905 (though he wasn’t really aware of the work of the Scottish Botanist Robert Brown (1773-1858) who had observed the thermal motion of the floating plant pollen under a microscope). The scientific revolution of the late 19th and early 20th century changed dramatically the course of history of the Atoms. Thus, J. J. Thomson’s discovery (1897) of the negatively charged light particle, the electron, detachable from the atom, and Lord Rutherford’s discovery (1911) of the positively charged, heavy atomic nucleus, pointed to an internal structure of the Atom. Early attempts to successively refine the model structure were somewhat like the great Ptolemy adding on his epicycles. And then came the revolution with the new Framework Theories – Relativity and Quantum Mechanics. Relativity did away with the ether (the apeiron) in which the atoms (ameres) would move, and quantum mechanics took away the sharp-edges of the Atoms, replacing these with a probabilistic fuzziness/waviness. Stability was now provided by the discreteness of the allowed quantum numbers – the Bohr atom. The subsequent history is known all too well. Today, the Atoms can really be seen and touched – by the finger-tip of a Scanning Tunnelling Microscope. But the ancient quest for the Atom as the ultimate constituent of matter has moved on to a different domain of the subtle and the minute – to the point-like quarks and the tiniest strings (~10^{-33} cm, the Planck length) – far from the madding laboratory scales, where experiments may no longer be do-able. Self-consistency, beauty and simplicity – almost pure thought – may well be the only guide. A situation not very different from the one in which the Ancients with their obvious limitations found themselves in – but nearly two thousand years ago! But that is a different story.

Philosophically speaking, the conflict between Atomism and Continuism goes much deeper, perhaps into the mathematics of number theory. And it goes back to Pythagoras (ca. 585-495 B.C.E.), the arithmetic discreteness of integers, rational fractions, the commensurable, and the countable – and to Zeno (ca. 490-430 B.C.E.) with his celebrated paradoxes – the geometric continuum of a line interval, the irrational, the incommensurable and the
The Atomic worldview of the Ancient Greeks and Indians, that tried to assemble the sensible universe out of the insensible Atoms, however, stands basically unchanged. Nature seems to have no architectural (aufbau) excesses. It repeats it just the same, over and over again:

Now the smallest particles of matter may cohere by the strongest attraction, and compose bigger particles of weaker virtue; and many of these may cohere and compose bigger particles whose virtue is still weaker; and so on for diverse successions, until the progression ends in the biggest particle on which the operations in chemistry and the colour of natural bodies depends and which by cohering compose bodies of a sensible magnitude. (Isaac Newton in *Optiks* (ca. 1700))

**Postscript**

The Idea of the Atom is based almost entirely on a general acquaintance with the ancient Greek and Indian thoughts on the subject that I have gathered informally as a theoretical Physicist, and not formally as a professional historian of science. The selection of issues discussed, as also the discussion itself, reflects my personal bias. There are serious omissions too – notably of the Jain, the Arab and the Chinese world-views. One may note in passing, however, that clearly the Indians, but also the Arabs, much like the Greeks, were generally receptive to the idea of Atomism. Indeed, it was the 12th century Arab philosopher Averroes who considered the physical infinite divisibility (as distinct from the mathematical infinite divisibility) unphysical as it could not be realised in practice. The Chinese under the holistic influence of Confucius (ca. 600 B.C.E.)
believed in the harmony of homogeneity and continuity, and were thus opposed to the atomic discreteness. Indeed, the moods were different – the mood of the Chinese was in the imperative (ethical/moral), while the mood of the Greeks, and certainly of the Indians, was in the infinitive (a-moral). The Chinese had difficulty with the idea of the externally imposed universal laws of Nature governing the universe. Only the ethical/moral (legal) laws were admissible to them. The Jain system with its great elements and the elaborate cosmology was, however, very different; but I must let it pass for now. Completeness of any kind is, of course, out of the question here. None was intended. I have, however, checked for correctness of the dates, the places and the people, and their ideas quoted here. For this, I have depended heavily on the following texts, besides the World Wide Web:

(1) S. Sambursky, *The Physical World of Late Antiquity* (Princeton University Press, New Jersey, 1961);

(2) S. Sambursky, *The Physical World of the Greeks* (Princeton University Press, New Jersey, 1956); and

Platonic Ideals and the Real World

ROGER PENROSE

1. Three worlds and their connecting mysteries

We have become accustomed to the enormous changes that advances in technology have made to our lives, over the past several centuries. These advances owe much to careful observation of the workings of the world, to ingenious experimentation so as to reveal these workings at ever deeper levels, and to clever technological exploitation of some of the results of these endeavours. But they depend also on the huge strides that have been made in our profound mathematical understanding of the world in terms of the accurate laws that seem to govern the behaviour of all physical things. This understanding could not have come about, had it not been for the remarkable fact that physical behaviour actually accords with the enacting of certain mathematical procedures to an extraordinary precision. Not only this, but also there is the fact that these mathematical procedures are of such a kind that human sensitivity and ingenuity has, so far, been sufficient to comprehend their broad principles, in good measure, if not always their detailed implications. As had been forcefully remarked by the outstanding 20th century physicist Eugene P. Wigner (1960), this reflects “the unreasonable effectiveness of mathematics in the physical sciences”.

To me, this is one of the profound mysteries of physical existence, and I like to express this graphically in terms of the relation between two ‘worlds’, as depicted in Figure 1. At the top, I have represented the ‘Platonic world of ideal mathematical notions’ and to the right, the ‘world of physical things’. Although some

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1 Public lecture delivered at the National Institute of Advanced Studies, on January 8, 2003 and published by the Institute in Science and Beyond: Cosmology, Consciousness and Technology in the Indic Traditions. (S. Menon et al., ed)
Sir Roger Penrose retired as Professor of Mathematics at the University of Oxford.
people are reluctant to accept the idea that mathematical entities can have any actual existence beyond being mere constructions of mathematicians’ minds, it is common for mathematicians themselves to regard the objects of their professional concern to have a kind of existence of their own, which is as real as that of ordinary physical objects, though of a different kind, so that there is no actual spatial or temporal location for mathematical entities. Mathematical truth, after all, is completely independent of the physical location from which it is perceived, and is an utterly timeless and objective thing on its own, subject to no alteration with the passage of time. To find a deep mathematical truth is thus to be viewed as an act of discovery, rather than of invention. Although many find difficulty in accepting an independent ‘reality’ for these ideal mathematical entities, this Platonic existence is, to me, merely an assertion of the objectivity of mathematical truth. Moreover, without some kind of independent existence for this Platonic mathematical world, it is hard to see how the physical world itself could – apparently since the beginning of time – have accorded so precisely with particular mathematical laws, laws which must have been operative long before there were any human or other animal observers.

Nevertheless, mathematical truths are conceptual entities, and they need the existence of conscious minds in order actually to perceive them. Accordingly, in Figure 1, I have depicted a third world, namely the world of conscious mentality, where I have indicated this mysterious connection between the Platonic world of mathematical concepts and the conscious minds that are necessary to perceive them. This mental world is to be regarded as distinct from the world of physical objects, as represented in Figure 1. Indeed, I am making a clear distinction between minds and the physical brains which seem to be necessary – at least as far as common experience goes – in order that mentality can become manifest. The existence of this distinction between conscious minds and physical brains is an obvious one to those brought up in Indic traditions, although it is, perhaps, often overlooked by those whose culture is based on Western scientific ideals. Yet, as one who
comes myself from such a scientific culture, I remain unpersuaded of any evidence for mentality beyond that which is familiar to us, occurring in conjunction with living, wakeful, healthy, animal brains (not necessarily human ones, as I believe that there is good evidence of conscious mentality in many animals other than ourselves). I am not, in principle, against the possibility of conscious mentality arising in other ways, however, and I am open to any indications which might point in such a direction.

Figure 1: Three worlds and the three mysteries connecting them.

All this notwithstanding, I would argue for conscious mentality to be not independent of physical reality. In Figure 1, I have drawn the third of our mysterious connections, namely, that which expresses the fact that when matter is organised in an appropriate way – and here I refer to that organisation that is present in our wakeful and healthy brains – then conscious mentality seems to come about. Thus, Figure 1 attempts to represent not only these three worlds, the physical, the Platonic mathematical, and the mental, but also the three profound mysteries which underlie the connections between these three worlds.

It may be noted that, in Figure 1, I have stressed the fact that although I am taking each world to lie within the compass
of the preceding one, where we regard the worlds cyclically in an anticlockwise direction, it is only a small part of this preceding world which seems to be involved in the relationship. Thus, whereas the behaviour of the physical world seems to be governed by precise mathematical laws, there are many areas of mathematics that appear to have no relation to physical behaviour. (A glance at the papers in virtually any pure-mathematical journal will illustrate the point. Almost none of the material that is described has any significant connection – at least no expressed connection – with laws governing the behaviour of the universe.) Likewise, passing to the second of our mysteries, it is clear that although our mentality has access to the Platonic world of mathematics, the vast majority of our mental activities are concerned with quite other matters. Finally, although the physical matter of our brains is so organised as to be capable of evoking conscious mentality, the vast majority of physical material – e.g., ordinary rocks – seems to be incapable of supporting consciousness.

I should remark, however, that in drawing Figure 1 as I have done, I have expressed certain prejudices of my own that need not be shared by others. For, in depicting the connection between the Platonic mathematical world and the physical worlds as encompassing the latter in its entirety, I am implicitly assuming that all physical behaviour is governed by mathematical laws. This is an assumption which could turn out to be false. It implies, in particular, that human actions are ultimately governed in this way, which seems (at first sight) to leave no scope for free will. It is my personal viewpoint that there need be no real conflict here, if the relevant mathematical laws turn out to have a sufficiently subtle and sophisticated form. We shall be coming to an issue of this nature in section 2, but I certainly make no claim to understand fully what could be involved here.

Passing to the other two mysteries, we see that my prejudices also demand that there are no mathematical truths that lie in principle outside the potential scope of human understanding. Again, this could well be false, although I do not believe that there is evidence
against this prejudice from our understanding of the foundations of mathematics. I shall return to this issue, also, in section 2. Finally, Figure 1 incorporates my prejudice, as highlighted above, that there is no conscious mentality other than that which is rooted in physical structures of the appropriate kind. This prejudice, like the others that I have just referred to, also might be false.

In accordance with these further possibilities, Figure 1 would have to be redrawn, and in Figure 2 I have indicated how the diagram would appear, if all three of these prejudices of mine are violated. It is my view that none of these mysteries is lessened, if we broaden our perspective to allow for these possibilities, and, in the discussions which follow, I shall make the simplifying assumption that these three prejudices of mine hold true. But the following discussion will have relevance even if we deny this assumption and adopt the broader perspective of Figure 2.

![Figure 2: A re-drawing of Figure 1 in which violations of some of the author's prejudices are allowed for.](image)

2. Computation and understanding
Let us now turn to a separate but related question, namely, that of the possibility that a computer, in the sense that we use that term today, could ever evoke conscious mentality, merely by virtue of
its performing appropriate computations. It is a not uncommon viewpoint, particularly in some Western scientific circles, that whatever it is that enables consciousness to arise, as a result of the activities of our brains, must be a consequence of some form of computational activity. Such a viewpoint is sometimes referred to as *computational functionalism* or *strong artificial intelligence* (strong AI). I have written at length elsewhere (see Penrose 1989, 1994, 1996, 1997) to argue strongly against this viewpoint. A key ingredient of this argument is Gödel’s incompleteness theorem, which can be paraphrased in the following terms:

Given any (sufficiently extensive) system $R$ of computational rules of mathematical proof, which one is prepared to trust as enabling one to derive only mathematical truths and no falsehoods, then one can construct a specific number-theoretic proposition $G(R)$ which one must also accept as true, yet not derivable by actual use of the rules $R$.

Thus, Gödel tells us that, whatever rigorous computational procedures we may lay down as acceptable methods of accessing mathematical proof, these will always fall short of what our understanding is able to achieve. More precisely, once we have formalised some of our mathematical understanding in the form of a set of computational procedures $R$, Gödel shows us how we can *transcend* $R$ to obtain further rules that are not contained within the direct scope of $R$ itself. In detail, it is the same collection of insights that enabled us to trust $R$ in the first place, which also allows us to perceive truths that lie outside the scope of $R$.

There is, indeed, something mysterious about this – and it is one reason that I refer to the connection between the world of conscious mentality and the Platonic mathematical world (as illustrated in figure 1) as a ‘mystery’. This mystery has to do with the very nature of the concept of ‘understanding’, here in the specific context of mathematical understanding. Although I do not believe that we yet have any real scientific comprehension of what ‘understanding’ actually is, we can at least perceive that
it is something that is dependent upon the phenomenon of consciousness. It makes no sense, it seems to me, to say of some entity that it possesses an ‘understanding’ of something if it is not even ‘aware’ of that thing. This does not, in itself, get us very far towards a scientific appreciation of either ‘understanding’ or ‘consciousness’, but at least it tells us that the former seems to be dependent on the latter.

Moreover, Gödel’s theorem appears to be telling us that whatever kind of a quality ‘understanding’ might be, it is not something which is of an entirely computational nature. In other words, a computer, no matter how powerful it might be, will not possess this quality. In fact, this is very much in accordance with the way that computers are used in modern science and society. The understanding is supplied by the human operator or programmer, and this understanding is necessary in order to provide the ‘meaning’ and ‘interpretation’ of whatever computation that the computer is undertaking. Even chess computers, which can now play the game extraordinarily well, seem to possess no understanding whatever of what they are doing. Believers of the strong-AI standpoint would argue that this is merely a temporary situation, and that when computers get more powerful and are programmed in an appropriate way, then the quality of ‘understanding’ will begin to emerge. But as the preceding arguments indicate, my own position is not only to regard this as unjustified optimism, but to claim that actual understanding will never emerge simply from computation, and that something else must be involved – a ‘something else’ that is also responsible for consciousness itself.

A few words are necessary, here, about the limited scope of computation within the realm of mathematics. It is probably a common misconception amongst non-mathematicians that mathematics itself is essentially a matter of computations of various kinds. However, I must stress that this is very far from the case. Although, computation is certainly an important part of mathematics, the vast majority of mathematical problems, it is
fair to say, are non-computational in a precise mathematical sense. In the 1930s, a number of mathematical logicians – and most particularly Alan Turing (1937) – were able to formalise the ideal notion of what is meant by a ‘computation’. Turing’s description was in terms of what is now known as a ‘Turing machine’ which is, in effect, a mathematical idealisation of a modern general-purpose computer, the idealisation being such that it has an unlimited storage capacity, never makes mistakes, and can run indefinitely without loss of effectiveness. Turing, and others, showed that there are classes of mathematical problem which cannot be systematically solved by computation and, in a sense, the majority of families of mathematical problems are of this nature.

One example of a computationally unsolvable problem, (as was effectively demonstrated by Robert Berger in 1966), is the general problem of deciding whether a finite set of tile shapes (say of ‘polyominos’ - made from equal squares in a plane, glued together along certain of their edges), will or will not tile the plane without gaps or overlaps. Thus, there is no computer program which can systematically answer this question for all such sets. Using such an unsolvable mathematical problem, it is possible to construct a toy model of a ‘universe’ whose evolution is entirely deterministic, yet for which there is no computer simulation whatever (see Penrose (1997), pp. 118-122). According to the arguments given earlier in this section, it would follow from the assumption that, when conscious understanding is present, our brains must act precisely according to some mathematical laws, that these laws must be non-computational in character, whether or not they are deterministic. This conclusion is a consequence of the Gödel-type arguments that I referred to. I have tried to illustrate this in Figure 3, where the black mark is to indicate the part of the Platonic-mathematical world which is computational in nature. The claim that I make from my arguments is that the scope of this computational mathematics within the actions of the physical world does not include that part which is responsible for mathematical understanding. And,
if mathematical understanding is not explainable in terms of computational mathematical physics, then it is hardly likely that any other kind of understanding can be either. Still less may we expect a computational origin for other features of consciousness, such as the perception of pain, or of a musical tone, or of the colour green. Yet, our present view of mathematical physics is that the behaviour of the physical world is essentially something that could, in principle (if not in practice), be simulated on a computer. Non-computability is not part of our present-day physical world-view.

This notwithstanding, I would still hold to the viewpoint that it is the Platonic realm that is somehow guiding the behaviour of all physical actions. For this to be possible, there must be something fundamentally missing from our present-day physical world-view. In fact, there are, in my opinion, good reasons for believing this in any case. Our present procedures fall uncomfortably into three different regimes. When we consider the motion of large bodies, such as cricket balls or planets, we use classical (deterministic, computable) physics, such as the equations of Newton, Maxwell, or Einstein. When we consider small bodies, such as molecules, atoms, or fundamental particles, we use the (deterministic, computable) dynamical equations of quantum theory: essentially the Schrödinger equation. To straddle these two levels of description, we require a third (probabilistic, but otherwise computable) procedure, referred to as the “measurement process”, or “the reduction of the state-vector”. Modern physics consists of a hybrid, in which all three procedures need to be invoked, as judgement demands, despite the fact that they are, technically speaking, mutually inconsistent with one another. Although the resolution of this (seeming?) paradox is a highly controversial matter, it is my own firm opinion that all three procedures must be (albeit excellent) approximations to some as yet unknown physical theory. Moreover, the preceding comments would lead us to believe that it must be within this missing theory that the required non-computability resides. For further information, see Penrose (2000), Marshall et al. (2002), Hameroff and Penrose (1996).
Figure 3: Only a small part of mathematics can be treated in terms of entirely computational processes. The author’s ideas as to the scope of computational mathematics within the laws governing the physical world are illustrated.

3. Platonic ideals of the “beautiful” and the “good”

In the preceding sections, I have been taking the Platonic world of ideal concepts only in its capacity of representing mathematical truth. Mathematical truth is ‘truth’ in its purest form, namely necessary truth. There is also contingent truth, which is dependent upon the details of the actual universe, as opposed to those necessary truths which must hold in any universe. Still, these notions are concerned only with the Platonic ideal of truth alone, whereas there are the other classes of Platonic ideal, namely beauty and morality.

Here, the issues are complicated by the fact that subjective elements undoubtedly enter. Particularly, in the case of beauty, it is clear that aesthetic judgements can differ greatly from person to person, yet, I believe that a good case can be made that there is, nevertheless, an absolute ‘Platonic’ component to beauty, which is independent of the tastes of those who perceive it. In the case of music, for example, tastes can vary greatly, partly because of cultural background and partly as just a matter of individual differences. Yet, I believe that great music can only be great because of something that stretches far beyond such issues, transcending cultural and individual differences. In the case of morality, I believe that the case
can be made more strongly for an absolute (Platonic) component, far transcending those particular conventions of culture and society that may lead us to accept various seemingly arbitrary distinctions between ‘good’ and ‘evil’.

There is a clarification that should be made at this point. To take the stand that there is, indeed, some absolute criterion of morality is very different from making dogmatic assertions as to what these criteria must be. I believe that tolerance is a vital part of morality. To assert that there is some irreducible truth about what is right and what is wrong – and that this implied morality is something to strive for – is a very different thing from asserting that one knows this truth, thereby condemning any deviations from one’s particular views as to what constitutes ‘moral behaviour’. Perhaps, a time may come when the absolute elements of morality will be revealed to us more clearly than they are today. But, for the moment, we must do our best to understand and to act accordingly, and to be sensitive to particular factors that may be unfamiliar.

Can one say anything ‘scientific’ about the Platonic elements within beauty and morality, or must these issues remain outside the compass of science? To my own way of thinking, ‘science’ just means ‘clear logical reasoning, objective observation and experimentation, rigorous mathematical argument, judgement, and solid good sense’ – or things of this general nature. There is nothing that bars the methods of science from being applied to issues of aesthetics or morality. Nevertheless, it is true that present-day science has little or nothing to say about these issues. With the state of scientific knowledge as it stands at present, this is as it should be. To move outside the present restrictions on science – that it is concerned with revealing the truth about Nature and not with the beauty or ugliness of Nature, nor with its morality – would be to change what we presently mean by ‘science’. But, to some extent, this is just a matter of terminology, and I do not have strong feelings as to how the word ‘science’ is to be used, if we find that scientific method can be usefully applied in the broader areas of aesthetics and morality also. Caution is to be recommended, however, as, no doubt, there could be many
unwarranted claims to a ‘scientific proof’ of one or another aesthetic or moral concern.

Perhaps, there is one point of personal opinion that I might voice at this juncture. It is often said that science, as we know it today, is indeed concerned merely with truth, and it is of no concern to the scientist whether some discovery (e.g., nuclear energy) can be put to work for good or for evil. I do not completely agree with this position.

For the scientist who makes such a discovery will be in a better position (at least temporarily) than his/her contemporaries to try to judge any social implications of that discovery. Thus, there is a duty for the scientist to address this question, and not simply to regard scientific discovery as something that can be treated completely divorced from its possible social implications. Having said this, however, I am well aware that (even famous) scientists responsible for important discoveries may completely misjudge their likely social implications. Yet, I believe that it is the duty of the scientist at least to try!

Finally, I wish to make some points that seem to show that the Platonic issues of beauty and morality are deeply interconnected with the Platonic issue of truth that I had been concerned with in the first two sections. In the first place, it is an undoubted fact that aesthetic judgements play a vital role in scientific discovery. This is particularly clear in pure mathematics, where the whole subject is essentially driven by the search for beautiful theorems and elegant demonstrations, with the issue of applications being secondary. Not only do such aesthetic criteria provide the main reason for doing mathematics for its own sake (where the issue of applications may be regarded as secondary), but they also provide powerful ingredients in the search for mathematical truth. For some reason, which is to a large extent mysterious, there is a much better chance of finding results that are deep and true when a sensitivity to mathematical beauty is allowed to play its central guiding role (See Hardy 1945). It is clear, also, that aesthetic criteria can play a key part in finding laws that, at a fundamental level, closely govern the behaviour of physical
things. The great physicist, Paul Dirac, made no secret of his reliance on aesthetic criteria in his search for the equations of physics, most particularly in his finding of the equation for the electron which bears his name. Perhaps, the most eloquent accounts of the role of beauty in scientific discovery are to be found in the later writings of the great Indian theoretical astrophysicist, Subramanyan Chandrasekhar (1987, 1992). See also Weinberg (1992) for a leading particle physicist’s view on this issue. In Penrose (2003), I too attempt to address this issue (and see Penrose (1974)).

In Figure 4, I have tried to illustrate the guiding influence that aesthetics has, in helping us to uncover the mathematics that seems to underlie the behaviour of physical things. It plays an important role as a guide because, for some reason, the mathematics of the universe is just beautiful. I believe that this connection reflects something deep about the order in the universe, rather than it reflecting merely a feeling of satisfaction that a theoretical physicist might feel in finding some equation that reflects reality more accurately than that which had gone before. The implied inter-relation between the Platonic ideals of beauty and truth are intended to be suggested by the way in which I have drawn Figure 4.

**Figure 4:** The Platonic Ideals of beauty and morality are brought into the picture of Figure 1, with some suggested connections indicated.
What about the Platonic ideal of morality? How does this relate to the issues that I have attempted to address in sections 1 and 2 of this article? It seems to me to be clear that the issue of morality is intimately bound up with the issue of consciousness – i.e., with the mental world of Figure 1. I would say, even, morality would lose all meaning were it not for consciousness. For example, there is every difference in the world, from a moral perspective, between maltreating a slave and being brutal with one’s computer! The slave suffers because he or she is conscious, whereas the computer feels nothing. On the other hand, if I am wrong, and the proponents of strong AI are right, and the computer can actually be programmed to be conscious, then there we do have a moral responsibility towards it. This would have relevance to those who try to design robots to explore distant planets. If such robots could be programmed actually to possess a genuine understanding of the environment of some remote planet, then (according to the arguments of section 2) they would have to be conscious. We would then have the moral responsibility to treat them well and to return them to a congenial environment (presumably on Earth) after they had completed their tasks. Such a moral requirement might well involve prohibitive additional expenses!

I provide this example largely to show one important reason to have a scientific theory of consciousness, if science – or some extended discipline going beyond what we mean by science today – is to be able to say something deep and non-obvious about morality. An issue of considerably more immediate relevance is that of animal consciousness. I have already stated, in section 1, that I believe that at least some non-human animals are conscious. They would consequently have moral rights, in my opinion. At our present stage of scientific understanding of consciousness, we can do little more than guess at these issues. But, if eventually some significant relevant scientific progress is made, then the scope (and the burden) of science – or of what comes beyond science – will be enormously extended.
End Notes

1. I first used a diagram like Figure 1 in Penrose (1994). The versions of Figures 1, 2, and 4 that appear here are modelled on figures taken from my forthcoming book Penrose (2003).

2. There is still much controversy about what can be rigorously inferred from Godel’s theorem about the nature of human mentality, and I have given only the basic line of argument here. For further discussion, see Penrose (1996) and the nine commentaries given in Psyche 2(1) 1-88, with which this essay was concerned.

References


Faith and the Pursuit of Understanding in Science and Religion

CHARLES TOWNES

I am very pleased to be here. I am also a little hesitant to give this talk, because the subject is one which involves many subtle and difficult problems and questions. In addition, I will be speaking largely from a Western European and American point of view. I wish I were more familiar with Indic philosophy and culture, because I know that you have a long history of very deep religious and scientific ideas and experience in your tradition. In fact, I want to quote a translation by V. V. Raman of one of the early Vedas. It says:

Who really knows, and who can swear how creation arose, when and where? When and how did creation start? Did He do it, or did He not? Only He up there knows. Maybe, perhaps not, not even He.

Raman goes on to comment that the Vedas are among the very first articulations in human culture of the synthesis of science and spirituality. Now, of course, particularly in the nineteenth century, science and religion seemed to split. People began to feel that they were inconsistent. In the modern period, there has been a good deal of struggle back and forth, particularly in the West. I believe the Indic tradition has always looked at the world as united, and at science and religion as united. For my part, however, I must approach the topic as a scientist from the United States. I wish to reflect on the significant changes of the last few decades and the new discoveries in science, which I think are making a difference for the discussion of science and spirituality.
Now, to do this clearly, I will first have to define what I mean by science and what I mean by religion. Science is the attempt to understand the structure of our universe and how it works, including ourselves. We try to understand what particular objects are, how they work, and so on. That is science. Religion is the attempt to understand the purpose and meaning of the universe, including our own lives. Now, if there is a purpose and meaning to the universe that must have something to do with its structure and behaviour. So, clearly there is a relationship between science and religion that can be inferred if we study the matter carefully. There is a necessary connection between the structure of the world and any existing purpose.

This relationship was not seen very well for some time. Particularly in the nineteenth century, science seemed to many people to destroy the beauty of the universe and its mysticism. Here, for example, is what the great poet Edgar Allen Poe said at that time:

Science! True daughter of Old Time thou art!
Who alterest all things with thy peering eyes.
Why preyest thou thus upon the poet's heart,
Vulture, whose wings are dull realities?

*(Sonnet To Science, 1829)*

And Wordsworth wrote:

Sweet is the lore which Nature brings;
Our meddling intellect
Misshapes the beauteous forms of things:
– We murder to dissect.

*(The Tables Turned, 1798)*

Now, those were common views in the modern period. But there was also a different view; it is the one I wish to emphasise, for I think it is a more accurate one. This is what was said by Pope:

He who through vast immensity can pierce,
See worlds on worlds compose one universe;
Observe how system into system runs,
What other planets circle other suns,
What varied beings people every star,
May tell why Heaven has made us as we are.

(Essay on Man, 1733)

Pope’s view, I think, is more in line with the contemporary view of science and its relation to our understanding of the universe and of religion.

There are two fundamental reasons why I believe that religion and science must be parallel and must interact. One is that, if there is purpose and meaning in the universe, then the purpose must be related to its structure – and in fact must determine its structure. The second is that in both fields we use all our human abilities in a quest to understand the world we inhabit. Religion and science are more similar in terms of our efforts to understand than we normally think. Among the general public, it is very common to believe that scientists simply design their experiments, write their equations, use logic, and then conclude, objectively and without questioning, what the truth is. And that is it. Religion, on the other hand, is often viewed as a matter of faith alone. In this view, religion is about things we do not know and cannot prove, things that belong to the domain of the emotions. In fact, though, we use all our human abilities in both endeavours. In both realms, we want to understand. The Nobel Laureate scientist, Bridgman of Harvard University, who was also known as something of a philosopher as well, was once asked to define the scientific method. Bridgman said, “The scientific method? Why, that is to work like the devil to find the answer, with no holds barred”. Well, that is just what it is. We use our every instinct, our every ability, to do the best science of which we are capable. I deeply believe that the same is true in religion. The emphases may be different, but the striving to understand is similar. And this striving to understand, using all our abilities, represents a broad parallel between these two great activities of the human spirit.

One fairly recent development, which has received increasing attention over the last few decades, is that we are increasingly
recognising what is frequently called ‘intelligent design’, by which I mean the intelligent design of the universe. Although this idea is sometimes questioned, I find the data to be fairly convincing that somehow our universe is very special – so special that it could only have been intelligently designed. We have only recently recognised that the laws of physics have to be very, very precisely what they are for us to be here at all. The ratio of the force of gravitation and the nuclear forces (of all things) have to be precisely what they are in order for the wonderful stars to exist, and for nuclear energy to continue to provide energy for our star, the Sun, over billions of years, and also for such stars not to explode or collapse too rapidly, and so on. We recognise that electrical forces and nuclear forces must also have very close to the exact ratio they do in order for all the chemical elements that we enjoy to exist – the very chemical elements out of which we are constructed. Most of these chemical elements are made in the interior of stars. We ourselves are thus stardust, manufactured during the long lives of stars, which then burst and throw their manufactured chemicals out into space. But for all of those chemical elements to exist, including the common nitrogen and oxygen on which we are so dependent, the laws of physics have to be almost exactly what they are. One could go on to list many, many other features of the physical world we see around us; in each case, science has come to recognise that the underlying physical laws and constants have to be very precisely what they are. Somehow, this is a very peculiar, strange universe: it comes out exactly right for us to be here. If it were any other way, we simply would not be.

Fred Hoyle, the famous British scientist, who was something of a sceptic concerning religion, discovered how carbon is made inside of stars. He discovered a very unusual relation between carbon and oxygen, compared their energy levels, and demonstrated how these features allowed for nuclear reactions to make both carbon and oxygen, resulting in the large quantities of these two elements in the universe. And, of course, it is these two common elements on which we are very much dependent. After Hoyle discovered these
facts, he was absolutely amazed what a remarkable accident it was that these precise features would exist, that the universe would be constructed in just this way. He wrote the following:

Would you not say to yourself: some super-calculating intellect must have designed the properties of the common atom. Otherwise, the chance of my finding such an atom through the blind forces of nature would be utterly miniscule. Of course, you would. A commonsense interpretation of the facts suggests that a super-intellect has monkeyed with physics – as well as with chemistry and biology – and that there are no blind forces worth speaking about in nature. The numbers, one calculates from the facts, seem to be so overwhelming as to put this conclusion almost beyond question.

But that is not the whole story. We have now discovered the Big Bang as well. The Big Bang says, yes, there was a unique moment in the history of our universe, a first moment at which it began. In any case, it was a unique moment about fourteen billion years ago, followed by a period of rapid expansion, creation of the stars, and so on. This whole series of events had to happen in precisely the way it did in order for us to exist. If you add up all of these things, the probability of our existence seems miniscule, as Hoyle said of even the common atom. Most scientists, I think, have to agree with that conclusion.

If one wishes to say that this still does not mean there is any purpose in the universe, that it is just an accident, then he has to say that there must be billions of other universes out there somewhere (the so-called multiverse theory). Of course, we cannot contact them; we are separate. But, somehow, lots of universes have been created, each with different physical constants. They are out there, and it is just by chance that we are here, that we are in the one where life can exist. The multiverse theory is a possible postulate, but it is a rather remarkable and extreme postulate. For example, we do not know how the physical constants can vary. Nor do we know what makes them what they are. There are about eighteen different constants that define what we know now as Physics and Chemistry,
constants that make this universe what it is and allow us to be here. Why do they have the values they do? How could you vary them? How can you make them different? If we had other universes, would they have different values, and what would they be? Furthermore, one can postulate that there is an infinite number of universes out there somewhere, but we cannot test this postulate. That is hardly normal science! Nevertheless, it is a possible postulate. If one does not accept it, as I do not, then one has to admit that, in fact, this very special universe seems to be ‘designed’.

The classical view of science has generally been that there is nothing special about our universe, and nothing special about us. We are just accidents, the result of atoms being created, and coming together, stars making chemical elements that fall together and produce humans. It is just all an accident with a reasonable probability of happening, and that is why we are here. Religion, of course, says no: there is something very special about us, about our world, and about our universe. Recent scientific discoveries and examinations of the results have to agree, in my view, that there is indeed something very special about the universe we inhabit. Yes, there is something very special here, something that is difficult to explain away. Only by making the extreme postulate of many otherwise undetectable universes can one avoid this conclusion.

I have to say, however, that this is particularly the view in the physical sciences. The biological sciences have not, in my view, come to recognise this point so fully. Biologists will say, “Sure, life has to be found on a planet, of course. Such a planet has to have a reasonable climate, but given appropriate conditions, molecules will eventually fall together and form life”. I think biologists are rather inclined to say that the process works all by accident. Of course, there is a Darwinian theory about how life develops in different forms, which represents our best scientific account of the process. Nevertheless, we do not really know how life formed on earth. Yes, molecules came together somehow. But, if we simply estimate the probability of the right number of molecules coming together to form the smallest bit of life, that probability is so small
that we can hardly conceive it would have happened. I think it is more reasonable to conclude that the molecules are specially made so that they tend to come together in a particular way. As a result of the laws of physics, which reflect intelligent design, molecules have a particular nature so that, when they touch together and react, it is somewhat likely that life will develop. Perhaps, there are other special features of design and history that we do not yet understand, which also increase this probability.

We know, furthermore, that all life on earth is related. We know this because our critical molecules are all left-handed. These critical molecules are extremely complex, and one of their features is that they can be either left-handed or right-handed. If the right hand is just as good as the left hand, we could presumably have right-handed molecules that could make life. But, we all are made of left-handed molecules. So we are all related. Hence, we know that life could not have started more than may be once or twice. Maybe a right-handed form of life started once, and then died out. But, since it cannot have started more than a few very few times, we know that the formation of life is in fact very rare and special. How it happened at all, we just do not know.

Let me conclude with a few final words about the parallels between science and religion, since they are crucial for our understanding of these two different human responses. I mentioned already the popular view that science and religion are completely different. It is often said, for example, that religion depends on faith. Well, yes, there is faith in religion; but there is also faith in science. Usually, we call it an ‘assumption’ – an assumption we believe in. Scientists make assumptions, and from them we conclude that this and that ought to happen. One of the assumptions we make, and which religion also makes, is that this universe is reliable and consistent (the so-called principle of the uniformity of nature). Monotheistic forms of religion have, in particular, insisted that our world and our God are reliable and consistent. Interestingly, science also needs the same assumption of consistency, which serves as a fundamental postulate for scientific research. For example, if I were
to drop my pen, you would know in advance that it will fall on the floor. One can repeat the experiment at any time and obtain the same results. Indeed, we also know that it will fall at a certain rate of acceleration and speed. We presuppose this sort of knowledge all the time in our everyday lives. Why is the physical world so reliable? We can’t exactly say why. We cannot prove that the physical laws will be the same tomorrow as they are today, but we have every faith that they will be. In the end, this is a postulate, a fundamental assumption, an act of faith. The principle of the uniformity of nature is a rather extreme case, perhaps. But one could list many others as well.

One of the common assumptions that scientists have made in the past is that this universe has always been here. This is the hypothesis of the steady-state universe; it was Einstein’s assumption, for example. When he first created general relativity, he had to put in a special constant to keep the stars from falling together. He added this constant to his equation, and then later he learned from Hubble’s measurements that actually our universe is expanding. Einstein later admitted that he had made a terrible mistake by adding the constant. Nevertheless, most scientists assumed or had faith that the universe has been and will always be here. Fred Hoyle was another scientist who struggled very hard with this dilemma. He had evidence to believe that ours is an expanding universe, yet he held the assumption that it had always to be the same. The only answer he could imagine was that new atoms were being created all the time in interstellar space. In the end, Hoyle could not live with this conjecture, and eventually he abandoned it. The story of Hoyle is a good example of how a core faith or assumption – the assumption that our universe has always been here and is always the same – can be a source of great struggle for scientists over a long period of time.

The belief that our universe has always been here has been a common belief, and in my view a common anti-religious belief. It entails that there is no creation involved. Interestingly, it was Chairman Mao’s view as well; among his philosophical beliefs was the conviction that the universe has always existed as it is. When I first went to China and began to talk to astronomers there, I learned
a good deal about his views. Chairman Mao had emphasised the point that astronomy was one of the most important sciences for the Chinese to study. “Why?” I asked. “Well”, I was told, “because it disproves the existence of God”. If you study the universe, you know there are lots of stars and all kinds of planets. Scientific study makes it clear, Mao thought, that the universe has always been here and there is nothing unusual about humankind. He believed that such a view disproves the existence of God, and for that reason it was important that Chinese astronomers should study it. The trouble was, by then the Big Bang had already been discovered. My Chinese colleagues, whenever they spoke in public, had to speak against the Big Bang, in order to fulfil Mao’s dictum. Of course, that restriction has changed now.

I have tried to show how our instincts and assumptions operate in science and in religion. Contrary to a certain popular myth, we make assumptions in science as well as in religion. In both fields, practitioners rely on a deep faith, which plays a large role in motivating what they do. In the 20th century, scientific faith included belief in the uniformity of nature, belief in the permanence of the universe, and belief in the reliability of physical laws. This included a completely deterministic universe, which has now been disproved by the discovery of quantum mechanics. Scientists no longer believe in a world for which the future can be completely predicted by physical laws. As in these cases, sometimes our scientific faith turns out to be not right. But there is no doubt that faith is crucial in science just as it is in religion. We can also recognise that the quest for understanding and the use of intuition are fundamental in religion, as they are in science. These parallels – and there are others that we could discuss as well – help to show how science and religion can be compatible. Given the parallels, we should never treat these two great dimensions of the human spirit as fundamentally different or fundamentally opposed. As our understanding of each increases, my own faith is that they will increasingly grow together.
A response to the address of
Prof. Charles Townes

M. S. SWAMINATHAN

We have had an intellectual as well as a spiritual treat during the last one hour. Prof. Townes began his lecture with an analysis of the convergence of science and religion. He went on to make incisive remarks on the structure and purpose of the universe. The late Prof. Cyril Ponnamperuma, who was one of the 20th century leaders in exobiology, used to remark that one reason for his interest in life on other planets was to understand whether DNA as the chemical substance of heredity on our planet was a biological accident or biochemical necessity.

Rabelais once said, “Science is but the conscience of the soul”. The confluence of science and religion should be reflected in all areas of human enquiry. The growing violence in the human heart that we witness today underlines the urgency of ensuring that science and technology are employed for human happiness and not its destruction. The Pugwash movement, which I am now privileged to lead, has been constantly reminding scientists of their ethical responsibility for the consequences of their research, and governments of the immorality, illegality and peril inherent in nuclear weapons. Advances in recombinant DNA technology provide opportunities for causing even greater harm to human health and security through new forms of disease-causing organisms.

The much misunderstood Indian concept of karma provides an opportunity throughout one’s life for self-analysis, self-criticism and self-correction. It helps one to go deep into the question – what is right and what is wrong? Not far from this beautiful auditorium,

1 Dr. M.S. Swaminathan is the founder-chairperson of the M.S. Swaminathan Research Foundation, Chennai, a centre for sustainable agriculture and rural development. At the time, Prof. M.S. Swaminathan was the Chairperson, NIAS Council of Management.
there is an even more beautiful shrine devoted to the life and message of Ramana Maharshi. He did not talk much, much less preach. He asked each one of us to undertake a voyage of discovery: who am I? He also urged that we should control our ego, since ego prevents one from growth, both spiritual and scientific. This calls for a culture of humility and respect for views not in agreement with one’s own. Erwin Schrödinger’s book *What is Life?,* published nearly 60 years ago, highlights the scientific significance of the *advaita* (non-dualism) philosophy of the *Vedas,* so well-articulated by Adi Sankara. According to Schrödinger, the concept of *advaita* is the one closest to the facts of genetics. We in India have, therefore, been inheritors of great wisdom from Vedic times. Therefore, we should provide leadership to the movement for blending science and spirituality, so well articulated by Prof. Townes.

Talking about the control of ego and thereby avoiding spiritual and intellectual self-destruction, I wish to cite an event which took place at the Physical Research Laboratory at Ahmedabad on the occasion of Prof. C. V. Raman’s 80th birthday. Vikram Sarabhai and his wife Mrinalini had arranged an excellent dance-drama on that occasion. When someone asked Prof. Raman why he wears a turban all the time, his reply was: “The turban helps to avoid my head getting swollen up with the encomiums being paid to me all the time”. I feel this is a profound statement in the sense that a person is conscious of the fact that succumbing to praise will only bring one down and not take one to greater heights of achievement.

Pascal said long ago, “Science is like a sphere in space; the greater its volume, the greater its contact with the unknown”. John Maddox in his book *What Remains to be Discovered* has made the same point. Scientists like Alexis Carrel have also underlined the need for humility which alone can lead to an understanding of what we do not know.

Today, we need, along with humility, love of diversity and pluralism in thought and belief, compassion and tolerance. NIAS was founded to convert Jawaharlal Nehru’s concept of scientific humanism into reality. Prof. Townes is an outstanding
representative of this breed of scientists. He has always believed in the dictum “remember your humanity”. He has had the courage of his conviction and has followed the path of what we call dharma. There is much we can learn from his life and work. I would like to conclude with a quotation from Samuel Johnson, who wrote single-handed the first English Dictionary: “If all possible objections had first to be met, nothing new would ever be attempted”.

I know the wisdom behind this statement from my ‘green revolution’ days.
A response to the address of 
Prof. Charles Townes¹

RAMANATH COWSIK

ā nō bhadṛāḥ kratavō yantu viśvataha
Let good thoughts come to us from all directions
(Rīg Veda I.89.i)

The remarkable similarities between the methods and practice of science and religion, and the growing need to develop a holistic approach in our attempts to understand Nature, have been brought out with remarkable clarity and emphasis in the address by Prof. Townes. From his address, it is clear that the same physical, intellectual and spiritual struggles are involved in the pursuit of both science and religion. He is a man of extraordinary distinction in science and has been deeply concerned about the interplay amongst science, society and human values – all this scholarship and introspection has produced the beautiful synthesis that was brought out in his presentation.

Since the ultimate truth is but one, there is a universality to the essential thesis he has presented, traversing across not only space and time, but also social and cultural diversity. The emphasis might change and the nuances may evolve but the fundamentals of the thesis remain the same, whether we look at the truth at the time of Buddha, Christ, Sankara, or today. Yet, I thought that it would be appropriate to highlight the same truths from the Indian perspective.

Elsewhere, Prof. Murli Manohar Joshi has pointed out that, “In the long history of civilisations, the Indian civilisation is one of the few for whom the scientific impulse to enquire and to know has been the defining feature of its existence. The task or the ‘dharma’ of each individual was to pursue through a breathtakingly wide

¹ Prof. Ramanath Cowsik was the Director of the Indian Institute of Astrophysics, Bangalore at the time of the talk.
choice of methodological options the ends of true knowledge and enlightenment”.

As a matter of detail, it is to be noted that the Cartesian dualism between the material and the spiritual domains did not occur in India; by and large, a holistic approach was invariably taken until very recently. On the same count, India sadly missed the influences of Galileo, Descartes and Newton, which would have infused a new dynamism into Indian thought; the seeds of their ideas were indeed present in the early philosophical works and these would have been welcomed warmly here, had they reached us during the post-Renaissance period. *Karma*, as Prof. Swaminathan has said, is one of the deepest underlying concepts of Indian philosophy. It means right action, action which is sustaining – or *dharma* to use another word from Sanskrit. Indeed, the need for the conjoined influence of Science and Spirituality to carry us forward was brought out beautifully in the analogy by Prof. Roddam Narasimha that they are like the two wings of a bird. It is, perhaps, only during the last 100 years, under the pressure of specialisation in the variegated fields of knowledge, that the beginnings of a separation may be noted. However, science today is bringing out so many issues that demand a holistic approach to the truth that an actual dichotomy may not occur at all and instead a new synthesis may be re-established in the spirit of the pithy remark of Einstein, “Science without religion is lame and religion without science is blind”. We need the eye of science to see and the goading of religion to drive us into right action.

Science, time and again, has thrown up challenges for our understanding. For example, even though the evolution of the wave function in quantum mechanics is as precisely deterministic as the evolution of a trajectory in Newtonian mechanics, the observation process leads to the so called collapse of the wave function. Further, the wave nature associated with particles and quanta gives rise to the Einstein-Podolsky-Rosen Paradox, the apparently acausal correlations related to which have been observed in the famous experiments conducted by Aspect. We have to view this as a
conundrum to be solved, rather than ascribe an acausal non-locality to quantum mechanics, and we should examine the various aspects of wave function collapse through well-designed experiments. For there exists a remarkable harmony and unity in all of physics – if any part has acausal behaviour, then we should be able to concatenate arguments to show acausal behaviour in any other branch we might choose. Such universal laws like causality were termed *rtam* in the *Vedas*. Once God has made these laws, which are *anādi*, i.e., always in existence without beginning, he just allows the world to evolve in accordance with them without interference.

Either by a fortuitous coincidence or by an intuitive leap from the springboard of calendric astronomy, the early Indians recognised the existence of the universe over billions of years. The long periods needed for multi-planetary conjunction also gave rise to the idea that the universe itself may be oscillatory with extremely long periodicities, the universe recreating itself each time from some primal energy. Thus, the modern findings of science became easily acceptable, including the great vastness of the physical universe. Also, by the time of the *Vishnupurana*, the *Dasavatara* depicted the origins of the species as fish, tortoise, boar, man-lion beast, pygmy, giant, militant man, man, divine man, fully enlightened man: *Matsya, Kūrma, Varāha, Narasimha, Vāmana, Trivikrama, Parāśurama, Rāma, Krishna, Buddha*, this again helping us to accept Darwinism and the findings of modern science.

This acceptance of scientific findings without undue prejudice was also due to the great influence wielded by the philosopher of the 8th century, Sankara. Amongst his many *sutras* or aphoristic rules I would like to quote two:

*na ca drṣṭe anupapannam nāma, drṣṭvāt eva*

Meaning: Facts of perception cannot be challenged on the ground of improbability, because they have been perceived.

*na ca anumānam pratyakṣa virodhe prāmāṇyaṁ labhate*

Meaning: An inference is no authority against perception.
To put it in the modern language of science, beautifully conceived theories may have to be abandoned when they contradict the findings of carefully performed experiments.

Having shown that there were no traditional barriers in the acceptance of science in India, I now turn to a very perspicacious remark by Prof. Townes: Progress in science has occasionally negated both strong scientific assumptions and strong religious beliefs. It is in this context that Sankara’s sutras are especially helpful in adopting the correct perspective, in our efforts towards greater understanding. Thus, the responsibility of all of us, especially my young colleagues, is to respond energetically to the clarion call sounded by Prof. Townes, unfettered and unhindered by philosophical misgivings.

Further, emphasising the similarities of the methodologies of science and spiritual quest, Prof. Townes lists faith or postulates, experiments and observations, intuition and revelation, logic and reason and finally aesthetics, as the essential ingredients of both. On these, he also rightly brings to bear the limitations of logic, even mathematical logic, as exposed by Gödel’s theorems, which state the inadequacy of a finite set of axioms. We may view this apparent limitation positively and note that science is an open-ended quest for knowledge. We may be compelled to postulate additional axioms under dire necessity, imposed on us by new experimental results or even at times by philosophical, conceptual or mathematical aesthetics, and thus proceed further towards an even increasingly deeper appreciation of the truth.

Despite these apparent limitations, there obtains in Nature a beautiful harmony which made Einstein refer to the presence of a Cosmic Intelligence; wondering about the fine balance and harmony with which different parts of physics fit together, he remarked: “What really interests me is whether God had any choice in the creation of this world”. The physical world is like a jigsaw puzzle; you can put it together only one way and you cannot move the pieces in any arbitrary way. For example, I have already mentioned a fundamental difficulty in quantum mechanics, which has given
rise to the Einstein, Podolsky and Rosen paradox. Should we take the stand that quantum mechanics includes acausal non-locality? The Indian perspective with its adherence to the concept of rtam, as noted before, would rather struggle, if need be with an additional axiom, to construct theories which encompass and extend quantum mechanics. A natural law, when it allows violation at any one place, through a concatenation of processes, leads to violation at some other place of choice, and will thus no more be a natural law.

The workings of this world, harmonious as they might be, are very subtle, and observations repeatedly bring out aspects that pose great challenges to scientific explanation. The ultimate amongst these is the very creation of life on this planet, especially of human life, with the intelligence and capacity for articulation and organisation. Often, faced with such challenges, one is tempted to attribute our inability to find an explanation to various scientific phenomena and say “this proves the existence of God”. Addressing such kaleidoscopically changing doctrines of the ‘God of the gaps’, which are hypotheses to account for phenomena as yet only partially explained or not explained by science, Einstein forcefully rejects them as “not only unworthy but also fatal” to be proved wrong with every step-wise progress in science. Professor Townes has subtly cautioned us against this.

This brings us to the last aspect of science and spirituality that I would like to comment upon here. The general Indian attitude towards this is succinctly captured in the expostulations of Arjuna to Krishna on the battle fields of Kurukshetra.

vyāmiśreṇeva vākyena buddhim mohayasya me
tadēkam vada niścītya yena śreyōbamāpnyām

(Bhagavad Gita 3.2)

Arjuna demands that Krishna abstract the ethical principles that emerge from all this ratiocination of religion, science and spirituality. This is the demand that every man places upon both science and the spirituality of religion. An answer to this demand in the modern idiom would be useful: The reductionist approach
to science and the observations of astronomy have clearly pointed out our connectivity with the rest of the universe and with grand events like the Big Bang and supernova explosions that occurred in the depths of time. Similar is the message of modern biology, and indeed our close interconnectivity with both the living and the non-living universe is deep and intimate. But as Whitehead has lamented, “Science can find no individual enjoyment in nature; ... it finds mere rules of succession”. We can resolve this impasse only by augmenting the reductionist approach with an additional axiom, namely, “All actions and attributes that support the positive evolution along the arrow connecting the big bang to man are endowed with a positive value, and our efforts should be directed to favour this positive evolution”. For example, love of humanity, as emphasised earlier by Prof. Ellis, non-violence and efforts towards betterment of the world will now be endowed with positive value, just as the spiritual and religious leaders have been telling us all along. With this extra axiom, jñāna becomes sujñāna or prajñāna or suprascience, to translate it loosely. This extra axiom thus allows us to bridge the gap between science and spirituality and gives meaning to lives dedicated to bringing peace and tranquility to this world and to lives dedicated to the quest of truth and beauty in nature. It guides us into mindful action which will bring us sréyas.

I want to close my brief response, expressing my great admiration and respect for Prof. Townes. I have learnt a lot from him, not only today, but over the last several decades. I have been one of his students just like Ekalavya was Dronacharya’s.

I conclude this brief response by congratulating and expressing our indebtedness to Prof. Townes for eloquently pointing out the commonality of the spirit behind religion and science.
Do Chimpanzees have Souls?
Possible Precursors of Religious
Behaviour in Animals

JANE GOODALL

Do animals have souls? Do chimpanzees show any sign of religious
behaviour? These questions are seldom topics of discussion among
scientists studying animal behaviour. Indeed, for the most part,
they will deny the existence of ‘soul’ and deem the subject of
religion inappropriate for scientific debate. It was not my intention
to become a scientist when, in 1960, I went to Africa to learn about
wild chimpanzees. Thus, I went about my study in a different and
unorthodox manner. Probably this is why, despite the fact that I
acquired a doctoral degree in the end, I am not at all reluctant to
explore the intangible concept of ‘soul’ and the possible precursors
of religious behaviour in chimpanzees and other animals.

I arrived in Gombe with no scientific training. I watched
the chimpanzees with a mind unbiased by reductionist scientific
theory. I was not afraid to let intuition play a part in my gradually
evolving ability to interpret the complexities of chimpanzee society
and behaviour. Knowledge gained from the Gombe study, now
in its forty-third year, and information from other studies of the
great apes, has helped us to redefine our own place in the animal
kingdom. These studies demonstrate, on scientific as well as intuitive
grounds, that we humans are not, as was once believed, the only
living beings with personalities, minds capable of rational thought,
and emotions similar to – and sometimes perhaps identical to –

1 Reprinted with permission from Spiritual Information: 100 Perspectives, edited by
At the time of the talk at NIAS on January 11, 2003, Dr. Jane Goodall was
Trustee of the Jane Goodall Institute, an international environment and wildlife
conservation organisation founded by her.
those that we call happiness, sadness, fear, anger, and so on. The great apes have brains more like ours than that of any other living creature. They demonstrate the ability to make as well as use tools. They are capable of intellectual performances that we once thought unique to ourselves, such as recognition of self, abstraction and generalisation, cross-modal transfer of information, and theory of mind. They have a sense of humour. Chimpanzees form affectionate and supportive bonds between individuals, especially family members, which can last throughout a life of up to sixty years. They show compassion and true altruism. Sadly, all too much like us, they also have a dark side and are capable of extreme brutality. They are aggressively territorial and may attack ‘strangers’ from neighbouring social groups, leaving them to die of their wounds. They may even wage a kind of primitive warfare.

Clearly, the line dividing humans from the rest of the animal kingdom, once thought so sharp, has become extremely blurred. Perhaps, after all, it is not so ridiculous to speculate as to whether chimpanzees might show precursors of religious behaviour. In fact, it seems quite possible that they do.

In one of the remote, steep-sided valleys in Gombe, there is a glorious, hidden waterfall. As one approaches, moving quietly through the forest, the roar of the falls gradually gets louder. Suddenly, through the vegetation, one glimpses the living, moving water as it cascades down from the stream bed some eighty feet above. Over time, the water has worn a perpendicular channel in the rock. Vines hang down on either side, and ferns move ceaselessly in the wind created by the falling water. For me, it is a magical, spiritual place. And sometimes it seems that the chimpanzees too are strangely moved. As they approach, their hair may bristle, a sign of excitement. And then they may start to display, charging with a slow, rhythmic motion, often in an upright position, splashing in the shallow water at the foot of the falls. They pick up and throw great rocks. They leap to seize the hanging vines and swing out over the stream in the spray-drenched wind. For ten minutes or more, they may perform this magnificent ‘dance’. Usually it is the males who display thus, but I have seen females react in the same way.
It is not only a waterfall that stimulates such performances. Quite often, the chimpanzees display thus when they cross a stream, charging rhythmically up and down, stamping through the shallow, racing water, picking up and throwing rock after rock. And even more often, we see the ‘rain dance’ that takes place at the sudden onset of a heavy downpour. Strangely, the most incredible ‘dance’ of this sort ever observed at Gombe occurred right at the start of my study. I had a grandstand view of no fewer than seven adult males displaying on the other side of a narrow, steep-sided valley opposite me. Each of them charged down, dragging huge branches, leaping up to sway vegetation, while the thunder growled and crashed, rain teemed down from purple black clouds, and a group of females and youngsters watched from trees on the skyline. Every performer charged down at least twice, some more often, pausing briefly in trees at the bottom of the slope before plodding up, then starting their magnificent dance all over again.

What triggers these marvellous performances? Is it possible that the chimpanzees have a sense of awe, a feeling generated by the elements – rain, thunder, falling water – or even, as I witnessed once, the sudden onset of a fierce wind that raced up the valley from the lake? Certainly, all these things generate intense feelings of awe and wonder and excitement in me.

After a waterfall dance, a chimpanzee may sit on a rock in the stream gazing up at the sheet of falling water, water that seems alive, always rushing past yet never going, always there yet ever different. Was it perhaps similar feelings of awe, or wonder, that gave rise to the first animistic religions, the worship of the elements and the mysteries of nature over which there was no control? Only when our prehistoric ancestors developed a spoken language would it have been possible to discuss such internal feelings – discussions that could create a shared belief system.

My years spent in the forests of Gombe crystallised my own spiritual awareness. Day after day I was alone, sharing the wilderness with the animals and the trees, the gurgling streams, the mountains, the awesome storms, and the star-studded night skies. I became
one with a world in which, apart from the change from day to
time was not important. I became
attuned to the great Spiritual Power that I felt around
me, the Power that is worshipped as God, Allah, Tao, Brahma,
the Great Spirit, the Creator, and so on. I came to believe that all
living things possess a spark of that Spiritual Power. We humans,
with our uniquely sophisticated minds and our spoken language,
call this spark, in ourselves, a ‘soul’. If this is so – and it cannot
be proved either way – then it follows that chimpanzees and other
animal beings have souls also. Certainly, we cannot prove that they
do not.

As most scientists do not admit the possibility of a soul in
humans, a study of the animal soul is hardly a subject for scientific
investigation! But religious behaviour in humans is a fact. A study
that compared religious rituals across a variety of human cultures,
searching for elements shared by most (or all) such rituals, would be
scientifically respectable. And, in this context, we could ask whether
chimpanzees (or other animals with complex brains and behaviour)
might show precursors to human ritualistic behaviours.

Careful documentation of the contexts and behaviours
involved in the elemental displays of chimpanzees would be
extremely interesting. Our videography records of waterfall, stream-
and rain displays would provide valuable information because
they allow detailed analysis of movement patterns and social
interactions. And these filmed sequences are typically accompanied
by field notes that describe behaviours leading up to and following
the displays.

Such investigations might throw new light on the emotions
that trigger the displays and whether they sometimes resemble
those that we describe as awe and wonder.

It seems most unlikely that animals other than ourselves are
aware of their souls or are concerned about the existence of God.
They are concerned with going about their lives, finding food and
shelter, propagating their species. But most of them are probably
far more in tune with their spiritual selves than we are, more aware
of the great Spiritual Power in which we all “live and move and have our being”.

It is important that science dares to ask questions outside the prison of the biased mind, dares to explore new areas of animal being. Such explorations might not only increase our understanding of and respect for other-than-human mental states, but also illuminate aspects of our own spiritual development.
The Indian Half of Needham’s Question:  
Some Thoughts on Axioms, Models,  
Algorithms, and Computational Positivism\textsuperscript{1}

RODDAM NARASIMHA

As his monumental enterprise of documenting the achievements of Chinese civilisation in science and technology continued over the second half of the twentieth century,\textsuperscript{2} Joseph Needham kept asking the question that is now associated with his name. In what may be considered its canonical form Needham pointed out that:\textsuperscript{3}

With the appearance on the scene of intensive studies of mathematics, science, technology and medicine in the great non-European civilizations, debate is likely to sharpen, for the failure of China and India to give rise to distinctively modern science while being ahead of Europe for fourteen previous centuries is going to take some explaining.

He also wondered about “how Galilean science could come to birth in Pisa but not in Patna or Peking”. It is interesting that in framing his question Needham confined himself to “distinctively modern” science, and easily acknowledged that the East was ahead for more than a millennium before the European scientific revolution of the sixteenth and seventeenth centuries.

\textsuperscript{1} Published in \textit{Interdisciplinary Science Reviews}, Volume 28, Number 1, March 2003, pp. 54-66(13). Reproduced here with permission. At the time of publication of the article, Prof. Roddam Narasimha was Director of the National Insitute of Advanced Studies, and Chairperson of the Engineering Mechanics Unit at the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore.

\textsuperscript{2} J. Needham \textit{et al.: Science and Civilization in China}; Cambridge: Cambridge University Press, 1954-

\textsuperscript{3} J. Needham: Foreword, in \textit{Science at the Cross Roads} (Papers presented to the 2nd Int. Cong. of the History of Science and Technology); London: Frank Cass, 1931.
* ‘Idealist’, ‘speculative’ philosophies
* Inward looking, other-worldly culture
* No ‘Protestant ethic’
* Social rigidity, caste system, lack of professional mobility, no cross-fertilisation of ideas
* Weakness in observation, data keeping
* Relative insularity: no foreign travel
* Military and political subjugation
* Economic weakness
* Inadequate public patronage
* Conflict between science and religion
* Civilisational complacency
* Oral traditions, resistance to documentation, closed education systems
* Inherent cultural tendency to live with contradictions

**Fig. 1:** Reasons often offered why the scientific and industrial revolutions did not occur in India

In actual fact, ‘Needham’s question’ has vexed Indian thinkers for more than a hundred and fifty years. Among the first to have realised that the rapid expansion and consolidation of British power in India by the early nineteenth century was not the isolated success of another casual raider, but that it represented in part the advent of a new cultural force based on novel knowledge systems, was the Indian scholar and leader Raja Rammohan Roy (1772-1833). This realisation lay behind his deep concern over the poor state in India of the “mechanical arts” (as he called them), in contrast to their “perfection” in England. This concern led him to urge his countrymen to learn English to gain access to the new knowledge, and even to propose that Europeans must be encouraged to settle in India. When he went to England in 1830, the reason (according to a young contemporary of his)

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was that “He longed to see … the country of the Lockes, of the
Bacons, of the Newtons, of the Hampdens and of the Watts”.
Note the conspicuous absence in this list of the empire builders
like Clive and Hastings: Roy appears to have realised that behind
the merchants, writers, and soldiers he saw in Bengal was a world
of new ideas and thinkers in science, technology, and philosophy.
Roy was probably the first person in today’s developing world
to wonder about the nature of the knowledge revolution then
sweping the West.

The standard explanations
The same question bothered the first great Indian chemist to have
been trained in the Western scientific knowledge system, P.C. Ray.5
His explanations had to do with such factors as the inequities of
the Indian caste system and the idealist philosophies of India. An
excellent summary of the explanations offered by various scholars
has been presented by Udgaonkar.6 These are listed, along with
various other proposed sociocultural explanations, in Fig. 1. I shall
briefly discuss the economic factor towards the end of this paper
and will not consider the political-military issue at all. It is the other
factors that are of interest here, but the first point to be made
is that, while there may be truth in some of these sociocultural
explanations, there are serious difficulties with most of them. We
will consider them briefly.

The first major difficulty is that the ‘philosophical’ explanations
in the list do not recognise the diversity of Indian civilisation,
and in particular its philosophies. Thus, while one may argue
that Vedantic (more specifically advaitic or monist) philosophy is
idealistic or speculative, one must remember that there were many

5 Prafulla Chandra Ray had a PhD from Edinburgh, and was author of the two
volume History of Hindu Chemistry (1902-09). These issues are discussed at length
in D. Chattopadhyaya: ‘Science in ancient India’, Journal of Scientific & Industrial
Research, 1981, (40), 689-698; History of Science and Technology in Ancient India; Cal-

6 B. M. Udgaonkar: ‘Scientific tradition and other traditions’, Current Science, 1995,
(69), 197-206.
philosophical systems in India: the Sāńkhya, Nyāya, or Vaiśeṣika systems and the dualist (dvaita) school were realist in many ways, and cannot be accused of being anti-science; there was also at one time a vigorous materialist school (known as Lōkāyata).

Similarly, while the impression still prevails widely that Indian culture is inward looking and other-worldly (following the German sociologist Max Weber’s analysis), we must remember that this could certainly not have been true for the vast majority of the population. India is also the land of Kautilya’s Arthaśāstra and Vātsyāyana’s Kāma-sūtra, and Indian merchants have been entrepreneurial for thousands of years (from Indus Valley days, c. 2000 BCE). ‘Protestant’ movements in India are so ancient that they are almost part of the mainstream, as the long history of Buddhism and Jainism shows, for example, and as the continuing emergence of new systems such as Sikhism and Vīra-śaivism confirms.

Again, while it is true that the Indian caste system has been there for centuries, survives to this day, and has undoubtedly inhibited mutual reinforcement of science and technology, it has been less rigid than is often thought, and social stratification elsewhere in the world was not always more dynamic or flexible. As for relations between science and religion, there indeed were clashes between

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7 M. Hiriyanna: *Outlines of Indian Philosophy*; London: George Allen & Unwin, 1932.
11 On the caste system, see M. N. Srinivas: *The Remembered Village*; Delhi: Oxford University Press, 1976 for a vivid account of how the system actually operated in a village in southern Karnataka. N. B. Dirks: *Castes of Mind*; Princeton: Princeton University Press 2001, discusses how early colonial accounts made only brief mention of the caste system – apparently it did not seem particularly “striking, important or fixed” (p. 20) to them. Dirks himself is convinced that “caste has at times been the necessary vehicle of social and political mobilization”.

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‘rationalist’ and ‘conservative’ views (e.g. Ārya-bhata and Brahmagupta, sixth and seventh centuries CE), but the conflict never reached the intensity of Western violence (as for example when Bruno was burnt at the stake for his irreligious beliefs). Incidentally, while on this subject, we need to recall that the great star of the scientific revolution, Isaac Newton, spent much more time and wrote far more words on theology than he ever did on science.\(^{13}\)

The second difficulty with the sociocultural explanations is that they ignore the presence of strong scientific traditions in India at different periods in history. For example, the eleventh century Spanish-Arab astronomer and first world historian of science Said al-Andalusi said:\(^{14}\)

> Eight peoples have interested themselves in the sciences: the Hindus, the Persians, the Chaldeans, the Hebrews, the Greeks, the Romans, the Egyptians and the Arabs. The premier nation among these in the sciences is that of the Hindus.

This comment was made only five centuries before the scientific revolution in Europe may be said to have begun; and there were many others who said similar things at the time.

The third difficulty is that for nearly fourteen hundred years after certain fundamental developments in Greece (as the quote from Needham recognises), European science was stagnant; no great advances – certainly in terms of fundamental ideas – were made in what indeed have come to be known in Europe as the Dark Ages. This was incidentally a period that was a classical age for

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\(^{12}\) See the discussion by Al Biruni in E. C. Sachau: *Alberuni’s India*; Delhi (reprint) 1964.


India – in spite of all the ‘reasons’ listed in Fig. 1. Many favoured explanations would seem to have been operative during that creative Indian period as well, suggesting that we must look elsewhere to find genuine answers to Needham’s question.

The European miracle
The standard explanations may thus not be convincing, but the Needham question cannot be brushed under the rug. I would like to propose that it may be far more rewarding to approach the question from a very different perspective. Namely, before asking why India and China did not give rise to modern science, we need to ask how it happened that Europe did so. Given the long Dark Ages that Europe went through, it is appropriate to think of what happened there in the sixteenth century and later as a European miracle. This miracle included a great flowering of art and literature, and a critical re-examination of Europe’s recent as well as ancient religious and cultural heritage, leading to what has been widely celebrated as a renaissance. What was it that triggered the scientific part of that miracle, the great and brilliant scientific revolution of the sixteenth and following centuries? To answer this question it is necessary to look at the period immediately preceding the birth of modern science, which may be said to have occurred during the two centuries 1500-1700.

That of course would be a vast project on its own, and has indeed been the subject of some study. For our present purposes we confine ourselves to looking at some interesting pointers of the kind collected by Ernst Gombrich. Gombrich suggests that “it was the Western response to the technical inventions that reached Europe from the East that undermined and finally swept away the belief that in Bacon’s words, ‘excluded all theory of Progress’”. This event would seem to have been an essential prerequisite to the occurrence of the scientific revolution in Europe. Those technical inventions included the famous trio about which Francis Bacon wrote (in 1620):

15 P. Rossi: The Birth of Modern Science (see Note 13).
Consider the force and effect of inventions which are nowhere more conspicuous than in those three which were unknown to the ancients, namely printing, gunpowder and the magnet. For these three have changed the appearance and condition of the whole world, the first in letters, the second in warfare and the last in navigation and from these there sprang innumerable changes so that no empire, sect or star appears to have exercised a greater power and influence on human affairs than these mechanical matters.

And this powerful trio came from China, as did silk, the clock escapement mechanism, possibly the watermill, etc. all listed in one of the paintings of the period. Gombrich points out that there were two important omissions in the painted list: one was the paper on which the list was written (which also came from China), and the other the numerals that listed them (which came from India). He quotes Samuel Purchas writing, as late as 1625 (only eighteen years before the birth of Newton): “Others, therefore, look further unto the East, whence the Light of Sunne, and Arts, have seemed first to arise to our World…” *Ex Oriente lux,* it was said – ‘light came from the East’. The ‘invention of invention’ that occurred in Europe around this time must at least in part have been triggered and inspired by the technological flood from the East – from China through West Asia.

The second clue comes from mathematics. This is vital, for one of the most striking features of the scientific revolution was the mathematisation of science. Galileo used mathematics to describe his experimental findings, and Newton’s great and epoch making book was titled *Principia Mathematica Philosophiae Naturalis* (“the mathematical principles of natural philosophy”).\(^{17,18}\) Where did this mathematics come from?


See also P. Rossi: *The Birth of Modern Science* (Note 13).
It is here appropriate to quote from the renowned mathematical physicist Hermann Weyl, who wrote in 1929, in the preface to his pioneering book on quantum mechanics and group theory:  

Occidental mathematics has in past centuries broken away from the Greek view and followed a course which seems to have originated in India and which has been transmitted, with additions, to us by the Arabs; in it the concept of number appears as logically prior to the concepts of geometry.

(He went on to say that, with the advent of group theory, the trend in mathematics was returning to the Greek standpoint. However, the advent of the integrated circuit in the late twentieth century may well be restoring the position of number.) Although the *Principia* is couched in the language of geometry, it appears that Newton did this because he was following the Euclidean ideal; he almost certainly derived many of his results by quite different methods, involving algebra and equations, tools that were clearly imported from India and West Asia – and, of course, subsequently greatly improved in Europe. The tortuous trajectory of the spread of the Indian numeral system and associated methods of calculation – by way of West Asia, Islamic Spain, and Jewish scholars and merchants to Christian Europe, involving such famous figures as Fibonacci (of ‘sequence’ fame) – has been brilliantly described by Georges Ifrah.

We can see the impact of the key idea that Weyl puts his finger on – namely the logical priority of number over geometry – in the work of European scholars of the time, for example Descartes and his algebraic geometry. To simplify matters, one can say that in the Greek view if \( a \) was a length, \( a^2 \) was an area (so the spatial dimension increased from one to two); in the Indian view \( a \) was just a number, which could be a length, but so could \( a^2 \) be: the squaring was not necessarily a dimension enhancing process. Once the viewpoint has

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changed, one can see that the scope for mathematisation increases enormously.

One can therefore argue that the long Dark Ages of Europe were broken with the help of technical and mathematical inventions imported from the East. Europe came into contact with these through the violent conflict that took place with the Arabs during the Crusades. Indeed Europe had often to rediscover some of its own Greek scientific heritage through translations that were more easily available in Arabic than in European languages – a reminder of what happened in India in the eighteenth and nineteenth centuries when British scholars began to present ancient Indian texts in English to an Indian readership.

A mathematical revolution in India?
The mathematical imports to Europe were the outcome of what may legitimately be considered a mathematical (more specifically algoristic or computational) revolution that occurred in India, beginning around the fifth century CE and heralded by the great figure of Ārya-bhaṭa (born 476 CE). In the succeeding centuries India saw the development and perfection of the decimal/place value system with zero integrated into it and given the status of a numeral. Special notation for writing equations was introduced, and algorithms were discovered for solving linear and quadratic equations, both determinate and indeterminate. Ārya-bhaṭa introduced the trigonometric sines in virtually their modern form, and gave brief tables. Brahma-gupta (born c. 598 CE) showed how to derive the (non-unique) solutions of the indeterminate quadratic equation that came later to be known after the seventeenth century scholar Pell; he also discovered, more than a thousand years earlier,


the second order interpolation formula now called the Newton–Stirling. Similarly, the roots of a protocalculus were also present; for example, Munjāla proposed (932 CE) a formula for interpolation\textsuperscript{24} that in present notation would be written \( \Delta \sin \theta = \Delta \theta \cos \theta \). It was also realised that the maximum of a function occurred where a ‘derivative’ (such as the limit of the ratio \( \Delta \sin \theta / \Delta \theta \) above) vanishes.

The early centuries of the second millennium witnessed an extraordinary burst of new and creative mathematics in Kerala (south India). Mādhava (1340-1425 CE) discovered series expansions for the trigonometric functions that were equivalent to the Maclaurin series of early eighteenth century Europe. He also computed for pi the ‘approximate’ value of 3.1415926536, to a much greater accuracy than anything that had been achieved in previous work.\textsuperscript{25} These and other developments unleashed a new and unprecedented computational power that would become a valuable tool in the pursuit of the exact sciences.

This algoristic mathematics, from India and the Islamic lands, combined with the classical Greek penchant for axiomatised modelmaking (retrieved again through Islamic science), and a technology empowered experimental philosophy, appear to have led to the revolution of the “distinctively modern” science that Needham talks about. In retrospect, we can say that the centuries around 1600 CE saw a remarkable series of episodes of cultural fusion from East and West, resulting in the scientific (and later the industrial) revolution.

**What is science?**

Before we proceed further we need to examine a fundamental question concerning our concept of science. How different was what Needham calls “distinctively modern” science from science as it was practised earlier? Did the scientific revolution make such

\textsuperscript{24} G. G. Joseph: *The Crest of the Peacock* (see Note 22).

a difference that the pre-revolution position of science – anywhere in the world – was rendered irrelevant? The answer to the latter question appears to be no, at least according to those who insist (for example) that the Greeks invented science.26 This however is a position that has become popular in the West only during the last two centuries, for Francis Bacon, the patron saint of modern science, was scathingly critical of the Greeks, and indeed led an enterprise whose philosophy he propagated as a distinct departure from the Greek tradition.27

Underlying these arguments are different notions of what science is. One view is that science represents a systematic, parsimonious, predictive organisation of public (at least non-private), consensible knowledge; the second has to do with a quest for the ability to predict the behaviour of nature using the fewest possible universal principles, laws, or models. If the former, science was certainly not invented in Greece; it is probably as old as man. If the latter it might well have taken birth in Greece, but then in periods when the quest for universal laws or models begins to look unfruitful – as it must have done in the Europe of the Middle Ages – progress may become impossible. (And pre-Darwinian biology would not be science at all.) It seems certainly true that the Greeks had a remarkably powerful way of thinking about nature which characterises their best scientific work. However, as we shall discuss below, they often got carried away by their philosophies and models, and in the sixteenth century of Francis Bacon, Greek knowledge systems were in disrepute.28

Styles in science: Greek and Indic
The Needham question now rephrases itself to ask why the Indian mathematical revolution did not lead to a corresponding

26 A recent example is L. Wolpert: ‘The well-spring. About 3000 years ago, the Greeks invented science’. Nature. 2000, (405), 887.
28 S. Gaukroger: Francis Bacon (see Note 27).
“distinctively modern” scientific one. One reason is that the other ingredients of the scientific revolution – the idea of physical models and the development of technology enabled experimental methods – did not obtain in India. (The word ‘model’ is currently used in many different senses; here it denotes a combination of general principles or laws explicitly stated in mathematical terms and the process of deduction of consequences therefrom for quantifiable physical variables.) It is also likely that (unlike in Europe) no social, economic, or political pressure for it was felt in India at the time: the spirit of Baconian dominationism over nature was (and indeed largely remains to this day) alien to a culture that has always respected nature as bountiful rather than regarding it as an adversary. The proposal here is that there were some fundamental philosophical reasons as well.

Accepting for the moment a view of science as parsimoniously organised predictive public knowledge, it is clear from a reading of Eastern and Western scientific literature that, at the very least, there are strong differences between different civilisations in the style in which they build that organisation. These differences appear to reflect deep epistemological differences, in other words differences in the philosophical approach to knowledge.

To illustrate, let us compare two approaches to geometry. One comes from the Śulba-sūtras, dating at least as far back as the seventh or eighth century BCE, and the other from Euclid (third century BCE). The former is basically a manual of ritual geometry, its objective being to provide instructions on how to construct various fire altars that were part of Vedic sacrificial rites. (Sūtras are basically strings of concise, aphoristic statements, rules, or directions holding a work or subject together: in Western literature we could say that Wittgenstein’s Tractatus is written in the sūtra style.) Euclid on the other hand gives a collection of ‘theorems’ in geometry derived from

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Box 1

Śulba - sūtras

1.1 The various constructions of sacrificial fires are now given.
1.2 We shall explain the methods of measuring areas of their [different] figures [drawn] on the ground.
1.3 Now the measure of an aṅgula is 14 anus [grains of Panicum millaceum]; according to others, [it is] 34 tials [grains of sesamum indicum] placed broad side on. One small pada is 10 aṅgulas each: one prādesa 12 aṅgulas; one prbhā and one uttarayuga 13 aṅgulas each; one [big] pada 15 aṅgulas. One īṣā measures...
1.12 The areas [of the squares] produced separately by the length and the breadth of a rectangle together equal the area [of the square] produced by the diagonal.
1.13 This is observed in rectangles having sides 3 and 4, 12 and 5, 15 and 8, 7 and 24, 12 and 35, 15 and 36.

Euclid’s five postulates (‘axioms’)

1. Given any two points, there is a straight line containing them.
2. Given any straight line segment, we can extend it indefinitely to both sides.
3. There is a circle with any given centre and radius.
4. All right angles are equal.
5. Given a straight line and any point not in it, there is exactly one straight line parallel to the given one and containing that point.

a set of definitions, postulates (‘axioms’), and common notions. Box 1 shows part of the first page of the Śulba-sūtras alongside the set of five axioms from Euclid (as they are stated today). The contrast could not be stronger. The Śulba-sūtras start with a listing of the units of length measurement, and go on to make a variety of propositions, including the so called theorem of Pythagoras (who came much later, in the sixth century BCE; it is not certain that he was, in fact, the original author of the famous theorem even in Greece). The result is stated in general terms, but (significantly, I believe – we shall return to this point) with explicit examples. No attempt is made to prove the result: it is clearly considered a valid conclusion – a confident
inference rather than a logical deduction. The Sūtras also consider the problem of how to construct a fire altar that is twice as large in area as a basic one. We know of course that this can be done by increasing the linear dimensions by $\sqrt{2}$, for which the Sūtras give the (excellent) approximate value of 1.4142.

On the other hand, Euclid begins by stating five axioms which he considers would be widely accepted and can provide a suitable basis for deriving, purely by deductive logic, a variety of “new” results. Euclid avoids introducing measures of distance or area: in this sense he may be said to be non-metric, whereas the Sūtras are metric from the word go. Euclid also states the theorem of Pythagoras, but derives it from the axioms that he accepts at the beginning of his book. The idea of $\sqrt{2}$ was a puzzle to the Greeks, because it could not be expressed as a fraction. To the Indians on the other hand the question was one of finding an adequate approximation; there is no evidence that it caused any great intellectual agonisation.

Figure 2. Listing of sines in the Āryabhatīya of Ārya-bhaṭa, verse i.12: the text, in Kannada script, is reproduced from a manuscript in the possession of the Oriental Library at Mysore, through the courtesy of the Vice-Chancellor, University of Mysore.

We might similarly compare the two great astronomers Ptolemy (second century CE)\textsuperscript{32} and Ārya-bhaṭa (fifth century

\textsuperscript{31} S. N. Sen and A.K. Bag: *The Śulbasūtras* (see Note 29).

\textsuperscript{32} R. Catesby Taliaferro: *The Almagest by Ptolemy*; Chicago, IL: University of Chicago/Encyclopedia Britannica, 1952.
Astronomy is of special interest because it was considered the queen of the exact sciences in antiquity, and was the object of serious study in all the great civilisations; so comparisons between them can be revealing.) Ptolemy proceeds with a basic physical/kinematic model in mind. The model is geocentric, and the planets move in epicycles. (The circle was a perfect figure for the Greeks, and all celestial bodies had therefore to move on circles, or circles on circles. As an aside, I cannot resist the temptation to say that this kind of Hellenistic ‘perfectionalism’ (if one may coin that word) persists in the West to this day, for e.g. when Dirac made the famous statement\(^{34}\) that “it is more important to have beauty in one’s equations than to have them fit experiment”.) According to Aristotle,\(^{35}\) space could not be empty (for “nature abhors a vacuum”, he said). There was therefore a set of layered crystalline spherical shells each of which carries along one of the planets. (The shells had to be crystalline (transparent) because one had to be able to see through to the stars.) The universe is finite, and outside the last shell is an unmoving ‘Mover’ who rotates the shells. At any rate, utilising the special hypotheses he makes as well as observations made by himself and others before him, and by geometrical deduction appealing to Euclid for example, Ptolemy proceeds to derive an astonishing series of results on planetary motions.

Now Ārya-bhaṭa also uses epicycles, but by splitting planetary motion into a mean and a rapid epicyclic fluctuation superposed over it. It is very likely that the basic idea of epicyclic motion was borrowed from the Greeks, but the interesting point is that Ārya-bhata does not set out or justify any underlying physical or geometrical model at all, although he is aware of physical concepts relating to eclipses, relative motion, and so on. His book starts with

\(^{33}\) K. S Shukla and K. V. Sarma: *Aryabhata of Aryabhata* (see Note 23).


a short introduction describing a system by which he is going to express numbers, and a list of the numerical parameters (including the trigonometric sines\textsuperscript{36}) needed to perform the calculations that form the bulk of the book. The values he chooses for the parameters are not justified in detail either, but a series of instructions are provided on how to make calculations to predict planetary motions. (Such sets of instructions got to be called ‘algorithms’ following the Iranian mathematician Al-Khwarizmi (ninth century CE), who transmitted many Indian mathematical ideas, along with his own very significant additions, to West Asia.) In the process, however, several brilliant new mathematical ideas are introduced by Ārya-bhata, but his objective is to make the calculations straightforward and rapid. We could say that he laid the foundations of a new ‘algorithmic astronomy’, and proceeded to present its first exposition in 499 CE.

Equally striking are the differences in style or rhetoric between our two authors. Ptolemy’s \textit{Almagest} (from the title of its Arabic translation, whence it was first translated into European languages) is magisterial, monumental (nearly five hundred pages of dense prose). It is divided into thirteen ‘books’, of which the first discusses and justifies the assumptions underlying the postulated model. The presentation is systematic, and indeed its rhetoric can be recognised in the scientific treatises of today. In contrast, the \textit{Āryabhatiya} is terse, even cryptic; it is written in verse (there are a total of only a hundred and twenty-one \textit{slokas}), and is divided into four sections. A hand-written version of the work available in the Oriental Library at Mysore fills all of three sheets of paper, and so can easily be slipped into a shirt pocket. The text was of course written so that it could be memorised, so to understand it one needs a guru or at least a good commentary (see Fig. 2).

There are some conclusions we can draw from these comparisons. In the first place we realise that there were scientific contacts very early on between Greece and India, but what was

borrowed or taken was extremely selective. One fascinating puzzle is why India apparently borrowed the idea of epicycles (though neither the underlying Ptolemaic model nor its details), whereas it totally ignored Euclid, who made no impact at all; in fact, he was not translated into Sanskrit until the eighteenth century.\footnote{The translation, titled \textit{Rekha-ganita}, was commissioned by Maharaja Sawai Jai-singh, well known for the many observatories he built in India, including the famous Jantar-Mantar in Delhi.} I consider this fact to be of fundamental significance for two reasons. First, Euclid has been the ideal in the West: his \textit{Elements} are next only to the \textit{Bible} in readership over the centuries. Second, the Indic refusal to be impressed by Euclid survived centuries of Muslim rule in different parts of the country, even though Islamic scholars were also admirers of Euclid. It almost looks as if the Indians took the view that (for example) the theorem of Pythagoras was a matter of observation and inference: its deduction from a set of axioms seems to have been considered neither useful nor interesting, because they were sceptical about the reliability of the axioms. Similarly, although Ārya-bhata does not say so, it would seem that he would have had great reservations (in retrospect mostly justified) in accepting the Greek physical models; after all, Indians had no philosophical problems with the concepts of infinity, vacuum, surds, etc. as many Greeks did. But then, Ārya-bhata finds in the epicycle a most convenient idea that helps to discern patterns in planetary motion and make computations, and proceeds to devise clever algorithms to carry out such calculations.

We may summarise the situation by saying that the Greek ideal was to proceed from axioms or models, through logical deduction, to theorem or result; the Indian ideal seems to have been to proceed from observation (\textit{dr̐k}), through algorithm (\textit{ganita}), to validated conclusion (\textit{siddha-anta}). Contrary to popular perceptions, Indian astronomers appear to have been good at observation; the parameters in Āryabhata’s algorithms were repeatedly fine tuned over the centuries, as observation revealed
discrepancies.\textsuperscript{38} (So verification was very much part of the Indian approach.)

We may recall here a comment made by the eighteenth century British mathematician John Playfair, then a well known professor at Edinburgh, now remembered chiefly as the author of ‘Playfair’s axiom’ (this formulated the notorious fifth axiom of Euclid in the form in which it is most widely used today, namely as it appears in the box above). In a review he published in 1790, Playfair examined the predictions made by Indian astronomers of the time on nine planetary parameters; these predictions turned out to be so astonishingly accurate that he had to dismiss the possibility that they were coincidences; they were better than Ptolemy’s, and were only just then beginning to be matched or surpassed by Newtonian mechanics. He concluded:\textsuperscript{39}

Of such high antiquity, therefore, must we suppose the origin of this astronomy, unless we can believe, that all the coincidences which have been enumerated, are but the effects of chance; or, what indeed were still more wonderful, that some ages ago, there had arisen a Newton among the Brahmins, to discover that universal principle which connects, not only the most distant regions of space, but the most remote periods of duration; and a Lagrange, to trace, through the immensity of both, its most subtle and complicated operations.

I believe that the accuracy that impressed Playfair so much was basically due to the willingness of Indian astronomers to ‘tune’


model parameters, and their computational facility in carrying out such tuning. If the epicycles served only to seek and describe patterns in the planetary motion, there did not have to be a ‘model’ that was either true or false. The algorithm was not something so sacred that its parameters could not be altered to suit observation; they were not like, for example, the ‘universal’ constant of gravitation.

**Computational positivism**

This general analysis of the Indic style of doing science receives strong and specific confirmation from the very illuminating studies that have recently become available of a remarkable work known as *Tantra-sangraha*\(^\text{40}\) (composed in 1502 CE in Kerala by Nilakantha). Indeed, the philosophical attitude of Indic astronomy is articulated most clearly in the later work of this school, a remarkable institution that blossomed into a creative and powerful enterprise in the first half of the second millennium. A flavour of the work of this school, and of Indian work in mathematical astronomy more generally, can be obtained by looking at the ‘buzzwords’ that punctuate the texts: *prayōjana* (utility, application), *upāya* (means, technique), *yukti*, *tantra* (ingenuity, skill, technique), *anumāna* (inference), *nyāya tarka* ((inferential) logic, reasoning, debate), *ganita* (reckoning, mathematics), *dṛg-ganita* (the seen and the computed), *siddha-anta* (processed, validated conclusion). These may be contrasted with occidental scientific buzzwords: axiom, proof, theorem, deductive logic, law of nature, symmetry, perfection, beauty, universalism, etc. The Indian schools declared that their objective was *dṛg-ganit'-aikya*, literally meaning the identity of the seen and the computed. It was understood that an algorithm which gives good agreement with observation at one time may not do so at a later time; it could gradually become weaker (*ślatha*), i.e. discrepancies with observation.

\(^{40}\) M. S. Sriram, K. Ramasubramanian and M. D. Srinivas (ed.): *500 Years of Tantrasangraha: A Landmark in the History of Astronomy*; Shimla: Indian Institute of Advanced Study, 2002. This volume contains several interesting studies of Kerala astronomy. Madhavan (pp. 103-111) and Rao *et al.* (pp. 113-126) discuss in particular orbits with two elliptic arcs patched together; Srinivas (pp. 83-102) has an excellent discussion of epistemological considerations.
could emerge. What one had to do at that time was in fact to change or ‘tune’ the algorithm. One member of this school, Paramēśvara, explicitly points out that in course of time (about once in a century) corrections will become necessary and will have to be considered by the best mathematicians. Nīlakantha (1444-1545 CE), a great leader of the school, declared that “astronomy is primarily a discipline of observation, [numerical] experimentation and computation, and deserves to be revised periodically”.

The importance of constant comparison with observation (darśana-samvāda, dialogue or confrontation with observation) was emphasised again and again. It was equally well understood that the notions used for computation did not necessarily represent ‘truth’; they were useful rather than truthful; in fact the word asatya'-ōpāya, used by Bhāskara (c. 629 CE), almost literally translates to ‘useful lies’, a notion that modern modellers such as Mees have discussed.

This strategy of continuous algorithmic development is coupled with a distrust of formal logic. Indeed Nīlakantha declares that logical reasoning “is of little substance, endless and often not decisive”. I propose that this whole attitude and philosophy may legitimately be called ‘computational positivism’, namely an approach in which the primary objective is to make computation agree with observation. Physical or geometrical models were not necessarily absent, but were clearly considered secondary, and even irrelevant – what was the point of a model, no matter how beautiful, if it did not result in quantitative agreement with observation? Models need algorithms before predictions can be made, and algorithms may imply models. But in one view model is king, algorithm a slave; in the other algorithm is king, model a slave.

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42 K. Ramasubramanian, M. D. Srinivas and M. S. Sriram: ‘Modification of the earlier Indian planetary theory by the Kerala astronomers (c. 1500 AD) and the implied heliocentric picture of planetary motion’, *Current Science*, 1994, (66), 784-790.
In pursuit of this computational positivist goal of ‘identity between the seen and the computed’, Indian mathematicians were willing to try mathematical options that would probably have shocked the Greeks. For example, Indian epicycles had time varying parameters, and orbits could even be taken as cut and pasted elliptic arcs (so they were non-differentiable at two points), undoubtedly seen as asatya'-āpāyas, useful fiction. This would not conform to Greek ideas of beauty, but a short algorithm that led to excellent agreement with observations would clearly conform to Indian ideas of effectiveness and elegance.  

Sanskrit grammar, Indic logic
A penetrating analysis of Indian logic and linguistics, due to Frits Staal, sheds much incidental light on the Indian epistemological approach to the exact sciences. In a paper full of insight, Staal proposes that the Indian approach to philosophy had grammar as the ideal: what Euclid was to the Greeks, Pāṇini (the famous Sanskrit grammarian, c. 500 BCE) was to the Indians. For Pāṇini’s grammar, the Aṣṭa-adhyāyi (‘the eight chapters’), was a monumental, formal, and creative systematisation of Sanskrit grammar. As Staal points out, Pāṇini’s is not a grammar of ideas: it is instead a set of rules organised in a very compact and systematic way. It sets out all of Sanskrit grammar in under four thousand terse rules — if printed end to end, Sanskrit style, it would occupy some thirty-five pages, and it can be recited in toto in a few hours. There is no space here to discuss Pāṇini in any detail, but it is necessary to note that there was an Indian razor (the counterpart of Occam’s) that relentlessly sought

43 See the papers by Madhavan and Rao et al. in M. S. Sriram et al. (ed.): 500 Years of Tantrasangraha (Note 40).
44 Gregory J. Chaitin defines the shortest possible algorithm as ‘elegant’ (Conversations with a Mathematician; London: Springer-Verlag, 2002).
the shortest possible expression for a grammatical rule. There is a famous Sanskrit saying: “If the grammarians can save even half a syllable from one of their rules, they celebrate it like the birth of a son”. Indeed, I believe that this grammar is best seen as algorithmic in spirit, and the structure of Pāṇini’s effort has similarities with that of a computer program. As Staal remarks, “these [grammatical] methods often possess a degree of systematization, formalism and conceptualism which in the West is generally associated with mathematics and mathematical science only”. But when Staal goes on to say that the mathematical method is characteristic of much of Western philosophy whereas the grammatical method is characteristic of much of Indian philosophy, he is clearly taking too narrow a view of mathematics. A more appropriate formulation would surely be that Western philosophy is characterised by the axiomatic method whereas Indian philosophy is characterised by the algorithmic method. Both are mathematics, but of two different kinds.

All these issues are connected with the subject often called logic. There were several schools of logic in India, but both Indian and Western scholars seem agreed that there was no truly formal deductive logic, or at least that it was not greatly valued. On the other hand Indian logic focused on inference, clearly considered its central problem. An excellent collection of papers by Jonardon Ganeri gives valuable insight into the Indian approach to the subject. For example, the well known authority on Indian logic B. K. Matilal points out that “In India ... validity must be combined with truth”. Similarly, Schayer comes to the conclusion that “The Indian syllogism is not a logical theorem but a combination of two rules of inference”. The great Indian logician Diṅnāga (400-480 CE) declared, “There are only two means of cognition (pramāṇas),

47 Jonardon Ganeri (ed.): Indian Logic: A Reader; Richmond; Curzon Press, 2001.
49 S. Schayer: ‘Studies in Indian logic’, in Indian Logic: A Reader (see Note 47).
50 B. K. Matilal: The Character of Logic in India (see Note 48).
I mean inference and direct perception”; no wonder the stock example of the Indian syllogism goes from the perception of smoke on the hill to the inference of fire on the hill. The Indian insistence on providing examples in any syllogistic argument has been seen by some Western scholars as superfluous and irrational, but the chief purpose of examples could well have been to avoid unnatural axioms. It is not easy to justify by examples the assumption that planets are embedded in crystalline spherical shells. To oversimplify matters somewhat, we could say that in the Indian view the only reliable axioms would themselves have to be the result of valid inference.

As time passes, it is not at all clear that this rather fastidious Indian position on logic (to use an adjective that Hiriyanna\(^5\) applies to Indian philosophy) was either unjustified or inferior. Developments in physics and mathematics in the twentieth century have often been seen as vindicating the sceptical position that Indian philosophers frequently took on two-valued logic. These developments are of course conveyed in precise mathematical statements, but when they are translated into obviously inadequate literary prose they make statements that would not be philosophically disturbing to a classical Indian mind. Many examples can be quoted: Heisenberg’s uncertainty principle, wave-particle duality, dynamical chaos, and Gödel’s theorem, to name only a few. This of course does not for a moment mean that these precise statements were in any sense anticipated in India – a claim that is unfortunately far too often implicitly made in India, as well as by some of its occidental admirers. All one can say is that these twentieth century discoveries were philosophically acceptable, and even gratifyingly confirmatory, to a mind reared in classical Indian systems of thought.

**Newton as epistemological revolutionary**

From this point of view what a classical Indian logician would have found disturbing is not the science of the twentieth century,

\(^5\) M. Hiriyanna: *Outlines of Indian Philosophy* (see Note 7).
but that of three centuries earlier, namely the spectacular success of Newton in providing a physicomathematical model, stated in four universal laws, that was algorisable and so often agreed with observation or experiment to a most remarkable degree in widely differing situations. The power of Newtonian mechanics, both terrestrial and celestial, was of course amazing to his European contemporaries; in India it would further have been considered philosophically mysterious, puzzling, and disturbing. The fact that one could go so far with just three laws of motion and the law of gravitation was something that I believe was the result of an enterprise that Indian scientists were epistemologically unprepared to contemplate. (Interestingly, however, the idea of gravitation was already present in Brahma-gupta’s work of the seventh century CE, but there is no evidence of intellectual agonisation over action at a distance.) From the classical Indian viewpoint it is not Copernicus, Darwin, Heisenberg, or Gödel who wrought revolutions; Newton was the true epistemological revolutionary. We can say that Indian civilisation paid its ultimate tribute to the genius of Newton when the renowned astrophysicist Chandrasekhar, who considered Newton the greatest figure in the history of science, produced what can legitimately be considered a twentieth century bhāṣya (commentary) on the *Principia*.\(^{53}\)

To complete the picture, however, one must note that what for long had been considered the extraordinary predictive power of Newtonian mechanics has been qualified and limited by recent developments in the theory of ‘deterministic’ chaos. It is now well known that chaotic motion may be exhibited by special non-linear (but strictly Newtonian) dynamical systems whose behaviour displays exquisite sensitivity to initial conditions, and which consequently possess only a limited predictability horizon. Systems of this type are by no means a small or singular class, and include such classical archetypes of predictability as the pendulum, the string, and even

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\(^{52}\) See literature cited in Notes 12 and 14.

\(^{53}\) S. Chandrasekhar: *Newton’s Principia* (see Note 18).
heavenly bodies. Intimations of this limited predictability (and the accompanying weak causality) of Newtonian systems were being heard already around the turn of the twentieth century, but it is only in recent decades that the roots of the phenomenon have been fully understood. In 1986, almost exactly three hundred years after the publication of Newton’s *Principia*, James Lighthill, occupant of the same prestigious Cambridge chair that Newton had held, went so far as to render a public apology on behalf of the scientific community of mechanicians for having misled the world at large into such a fundamentally incorrect perception of Newtonian dynamics. But the point for us here is that these recent discoveries of the twentieth century once again would be philosophically gratifying to the classical Indian mind; indeed, it is even possible that the chaotic motion in air and water that they so often observed with fascination predisposed them philosophically towards not seeking a purely deterministic set of ‘laws’ that could govern the whole universe.

On the whole, the Indian approach to scientific problems seems to have been severely practical. The classical Indian scientist would have applauded what some Western scientists have recently said not only about models being ‘useful fiction’ but about mathematics being not unlike botany; if and when they turn out to be more it is legitimate cause for astonishment. In retrospect, however, this fastidiousness of Indian philosophy and logic has been historically expensive for the country. Thus, while there are philosophical reasons why modern science did not emerge in India, these are (in my view) deeper and not fundamentally unsound, compared with the explanations normally offered.

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56 A. Mees: ‘Useful lies’ (see Note 41).
Modern science - Indian and other
This analysis leads to an interesting aside on modern Indian science, which (during the first hundred years or so of its emergence) has very largely followed the Western style, and can claim some very significant contributions. These have been both experimental and theoretical, but truly innovative modelmaking still appears to be rare. A fascinating exception would seem to be the work of S. N. Bose, whose formulation of a new statistical model for the kind of particles that have now come to be known as bosons was very much high science in the Western spirit.\(^{57}\) Paradoxically, though, the Bose model was really the outcome of a counting exercise – a calculation based on combinatorics, a subject with a long history in classical Indian mathematics. Bose implicitly made fundamentally new and pathbreaking assumptions in deriving his results, but did not seem aware that he was doing so – he seems to have taken an algoristic rather than an axiomatic approach to the fundamental problem that he solved. Was this a fusion of the Indian passion for algoristic procedures with Western type modelmaking – and does it demonstrate that behind very successful simple algorithms may lie simple and profound physical models? But the very rarity of this kind of achievement shows the enduring power of culturally determined patterns of thought. So too does the work of the mathematician Srinivasa Ramanujan, who discovered brilliant new results but could rarely provide ‘proofs’ for them.\(^{58}\)

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\(^{57}\) G. Venkataraman: Bose and his Statistics; London: Sangam Books/Hyderabad: Universities Press, 1992. Bose introduced three radical new assumptions in his work: (i) photons are indistinguishable (ii) each photon has two degrees of polarization (iii) photon number is not conserved. But these new assumptions were not openly displayed: Bose said later, “I had no idea what I had done was really novel ... [and] was really different from what Boltzmann would have done”. Bose used combinatorics, a subject with a long Indian tradition going back to Brahma-gupta in the seventh century and to Bhaskara II in the twelfth.

\(^{58}\) Littlewood said (in his Mathematician’s Miscellany, p.88), “Ramanujan had no strict logical justification for his operations ... If a significant piece of reasoning occurred somewhere, and the mixture of evidence and intuition gave him certainty, he looked no further”. 

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While the great Indian mystery, therefore, is how Newtonian science got so far using deductive logic on the basis of a model with four laws, we can also see that it was not completely successful: relativity and quantum mechanics upset the Newtonian system. It is now a commonplace to say that science is only tentative; or as the British physicist J. J. Thomson is reported to have said, (modern) science is policy, not creed. It may not be able – ever – to give us the truth, whatever that may be, but it has to be admitted that it has been extraordinarily successful. It has the property that the great Buddhist philosopher Nāgārjuna called prāpakatva: in other words it delivers what it promises; it may not be Truth, but it is honest.59

I believe it is this success of modern science that Einstein had in mind when he talked about how the greatest mystery about the world is that it is comprehensible. Something similar was at the back of Eugene Wigner’s mind when he wondered at the “unreasonable effectiveness of mathematics” in man’s attempt to understand nature.60 Is it possible that the great pragmatic civilisations of the East misjudged how far the quest for truth might go based on what they considered inadequate foundations? Were their rules of inference too stringent – their pursuit of absolute truth so demanding – that they missed the power and insight that could be gained from what they considered was a less fastidious approach to knowledge – which (again mysteriously) turns out not only to be often ‘correct’ (as for example with the heliocentric theory), but also to lend itself to such systematic but astonishing enlargement of scope and power of self-correction? Could this not be part of the reason for the great Eastern failure noted by Needham?

To conclude, the epistemological view that a culture takes may well depend on the physical and intellectual tools that it has. If the phenomenon is too complex and complicated (e.g. meteorology, biology, social science), one is forced, even today, to resort to data analysis to infer patterns, without the aid of axioms or models: if

59 M. Hiriyanna: *Outlines of Indian Philosophy* (see Note 7).
on the other hand the phenomena are simpler (physics, chemistry, aerospace science), it seems worthwhile to try to construct suitable minimalist models or to discover the most parsimonious set of axioms, so that ‘axiomatisation’ becomes a worth-while goal, a feasible approach. Modern science will presumably go ahead pursuing both paths simultaneously. It is, in the final analysis, a question of choosing the most appropriate strategy (Thomson’s ‘policy’) to tackle any given problem with the physical and intellectual tools that one happens to possess at a given point in time – as we continue with the long history of humankind’s attempt to organise the reality of nature.

**Computational positivism again**

I argued above that the Indian philosophical approach to astronomy can be characterised as one of computational positivism. The defining characteristics of this approach may be said to be that only observation and computation matter – the data of observation or experience, and the computational procedures and algorithms that yield best agreement with it. The approach places little value on a priori models or theories (seeing them rather as the logical positivists viewed metaphysics); at best models are a posteriori constructs to be derived from successful algorithms. More generally, it highlights (exact) science as a parsimonious description of nature through the shortest possible algorithms. Discrepancies between observation and algorithm may remain, but (when they do) are seen as indicating the need to ‘tune’ or ‘improve’ the algorithm, or to search for better ones, rather than as agents of philosophical crises.

Does computational positivism make sense? It seemed certainly to have been very effective in astronomy from the fifth to the eighteenth century, going by Playfair’s analysis. It avoided the excesses of the unjustified axiomatisations and ‘proofs’ of late Hellenistic science of the kind that so irritated Francis Bacon.61 But then computational positivism vastly underestimated the potential

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61 S. Gaukroger: *Francis Bacon* (see Note 27).
power and universality of appropriate physical models, of the kind that Newton so brilliantly constructed and solved. The spectacular successes of modern science following Newton – in particular those of Maxwell and Einstein – may be said to have provided dramatic confirmation of the validity of the philosophical underpinnings of modern science.

But in the last half century computational positivism may have been raising its head again, triggered by the advent of the large scale integrated circuit and spectacular advances in computer technology. This computational power has raised new questions and provided new answers, led by the fundamental work of Turing, Chaitin, and others. Stephen Wolfram’s proposal\textsuperscript{62} that “the universe is in essence a simple program” – albeit heavily criticised – is a sure sign that computational positivism is certainly not dead, and could experience a revival – though a revival that may be partial because it will have to be consistent with all the successful theories of modern science. Chaitin’s work in algorithmic information theory,\textsuperscript{63} his conclusion that “any given set of axioms only captures a tiny finite amount of this [infinite] information. And that’s why we are in trouble ... that is the real dilemma”, and his demonstration of the link between Gödel’s theorem and LISP programming – all these show that computation is at the least moving closer to centre stage again than it has been for much of the last five centuries. The computer is not just a powerful slave, nor even only a powerful ally: it will probably alter the way we look at knowledge just as such other powerful inventions as the telescope, the microscope, and the steam engine did in earlier centuries.

It only remains to note that Babylonians may have been early computational positivists: as Neugebauer notes,\textsuperscript{64} Ptolemy’s


\textsuperscript{64} O. Neugebauer: \textit{The Exact Sciences in Antiquity} (see Note 35).
grand enterprise would have been impossible without Babylonian computational techniques, which had in the late centuries of the first millennium BCE already built an impressive base of observation and calculation. What (if any) were the intellectual links between Babylon and India would be a fascinating question to study in the history of science.

Conclusion
In summary, therefore, the present proposal is that, apart from the various factors that have been extensively discussed, there are two that played a major role in why the scientific and industrial revolutions did not take place in India.

First, the Indian scientific and logical tradition had a deep distrust of highly specific physical models for nature, in part because there was strong philosophical scepticism about the validity of such models. From a fundamental point of view this scepticism is indeed not unjustified, but in the three centuries between 1600 and 1900 it was discovered in Europe that spectacularly successful models could be devised. This European enterprise would not have been possible without the injection of Eastern inventions – major technological ones from China and brilliant mathematical ones from India, both via the creative mediation of West Asia. These inventions were married to an old Greek faith in universal principles, also served up with a new fragrance by West Asians, in a remarkably creative episode of cultural exchange, transfer, and fusion. The resulting synthesis, cooperating with a technology enabled experimental method, turned out to be unreasonably successful, and revived science in Europe after a long period of nearly fifteen hundred years of stagnation. No such synthesis occurred in the East, which in many ways was epistemologically unprepared for it.

Perhaps the East was not in need of a scientific revolution either. For there is a related factor that has not been discussed at all here, but which it is necessary to mention to complete the present explanation. This has to do with economics. Up to the eighteenth century, the East in general was strong and prosperous, the status
quo was comfortable, and there was no great internal pressure to change the global order. In particular India’s ‘tropical’ productivity in agriculture was so high that land revenue was a sufficient source of income for government, because the country was largely (although not solely) a thriving ‘sun and water’ economy. There was therefore no great pressure to promote foreign trade, but in spite of this India’s trade balance was in general highly favourable, and industry (e.g. textiles, iron and steel) played a major role in generating this surplus. According to André Gunder Frank, the global economy was dominated until the mid eighteenth century by China and India, who between them accounted for some eighty per cent of the world’s GNP at the time. Even if this figure may be considered rather high, there can be no doubt that there was little that the East really needed from the West until the industrial revolution changed everything. One amusing piece of evidence in this connection is the letter issued towards the end of the eighteenth century by the Chinese emperor Ch’ien Lung to the King of England (George III), arrogantly dismissing the British petition to open factories in China on the grounds that the Chinese had the best of everything they needed and the Europeans had nothing worth-while to offer. Europe had to pay for Indian goods in silver because India would not accept – i.e. did not need – anything else: and so the silver discovered in the Americas was crucial for sustaining commercial ties between India and Europe.

Furthermore, Indian rulers had no ambitions to subdue countries beyond their borders, if only because their immediate neighbours on the other side had perforce to live in the hostile environment of desert, high mountain, or dense jungle. The only attractive neighbourhood was South East Asia, where Indian influence did indeed spread in the second half of the first millennium, but – it is important to note – not through the sword.


Correspondingly, to West Asians India must have seemed like a subcontinental oasis, to Europeans like a subcontinental hothouse. Here may lie the roots of Western cultural dominationism, and of Indian cultural accommodationism.

It is of course not the intention to suggest here that the factors highlighted in this paper explain everything – the ‘failure’ of India that Raja Rammohan Roy worried about and Joseph Needham so extensively articulated, as well as the roots of what an Indian might see as a European miracle. These historical events are surely very complex. But it is hoped that the present argument will help to dispel some of the mystery surrounding these issues.

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The Flora of Tamil Sangam Poetry*

JOHN R. MARR

Two recent events, one catastrophic, the other floristic, have called to mind two ingredients of the Tamil Sangam tradition: kaṭārkol, ‘seizure by the sea’, and the karuppōrul, ‘distinctive attributes’ of the Aintīnai – the five regions of the Tamil country.

The catastrophic event was the Indian Ocean tsunami of December 29th 2004. The floristic happening was, in 2006, the twelve-year cyclic flowering of Strobilanthes kunthianus T. Anders (Acanthaceae), the Cone Flower.

While kaṭārkol is not the main subject of this paper, one of its implications, that of a “lost continent”, is relevant, since the principal candidate in the Indian Ocean, Lemuria or Gondwana(land), has been used by botanists as a term to describe floral elements common to East and South Africa and Madagascar on the one hand, and the Indian peninsula on the other. Prominent among the karuppōrul of Tamil Sangam Aintīnai rhetoric is Kāntal, Gloriosa.*

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At the time of publication of the article, Dr. John Marr had retired from the School of Oriental and African Studies, London, and was the honorary general secretary of Bharatiya Vidya Bhavan’s UK centre.

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3 Though frequently added, land is perhaps tautological, since Gondwana is ‘region or forest of the Gonds’. See: Kenrick Paul, and Davis Paul, Fossil plant. London, Natural History Museum, 2004, pp. 154-161 and map on p.158.
superba Linn. This spectacular flower is a member of the Gondwana flora since it occurs widely in south India and in East and South Africa.\(^4\) This flora is also termed *Glossopterid* after an extinct family of Seed-ferns known from Permian fossils. The subjects of the “continent’s” name and of the other lost “continents” have been exhaustively studied by Sumathi Ramaswamy.\(^5\)

Her main thesis revolves around her excellent term “Labors of Loss”. Lost continents such as Lemuria/Gondwana and, in the Atlantic, Atlantis, began to lose credibility since Wegener’s theory of Continental Drift (1924) was confirmed by our modern knowledge of Plate Tectonics and Subduction.\(^6\)

We are left with the term *Gondwana* which is correctly attributed by Ramaswamy to the geologist H. B. Medlicott who, writing in 1872, used the stratigraphic term to describe Permian coal-bearing formations in Central India.\(^7\) No doubt Medlicott coined the term with the forest-dwelling Gond tribes of the present Madhya Pradesh in mind. For the etymology of the term Ramaswamy leaves us to Sorkhabi writing in 1996.\(^8\)

Since Ramaswamy wrote originally in 2004, the very likely agency of tsunamis for the *katarkol* of Tamil literature and of her consequent “labors of loss” was missed. Thanks to Prof. S. Settar this has now been rectified in his paper ‘Myths, legends and traditions associated with Tsunami’.\(^9\) But it should be pointed out that *Gondwana* had not been postulated by Eduard Suess as “a botanic species” nor has *Gondwana* denoted either Genus or Species


\(^{5}\) *Fabulous geographies, catastrophic histories: the lost land of Lemuria*, Delhi, Permanent Black, 2005. I am much indebted to Prof. S. Settar of NIAS for drawing my attention to this book.


\(^{8}\) *Ibid*. See also Kenrick and Davis, *op.cit.*, p.159.

\(^{9}\) See Menon, Sangeettha, ed., *op.cit.*, pp.1-10.
in botany.\textsuperscript{10} But as already mentioned, Gondwana is widely used to denote a palaeobotanic floral region now widely split as a result of plate tectonics. Prominent in this flora is the family Proteaceae, represented in East and South Africa, Australia and South America with a few genera in India.

So, the spectacular Gondwana flower \textit{Gloriosa superba} figures in the Tamil Sangam literary tradition as will be seen. But it needs to be stressed at the outset that our sources particularly in regard to the \textit{karuppōru} that include flora and fauna are entirely literary, unsupported by any archaeological or epigraphical evidence, nor is there any iconography that might assist. Next, these primary literary sources fall into two: the grammar’ \textit{Tōlkāppiyam} and its commentaries, and the poems in \textit{Ēṭṭuttōkai}, ‘Eight Anthologies’, that may safely be described together with \textit{Tōlkāppiyam} as comprising Sangam literature.\textsuperscript{11}

\textit{Tōlkāppiyam} survives along with several commentaries, the principal ones being those of  İlampūranar and Naccinārkk’iṇiyar who differ from each other over the encoding of  the Five Region names as will be seen.

The other principal source for \textit{karuppōru} is the poetry of  the eight anthologies wherein, by a process of  allusion analogous to Dhvani, mere mention of  a \textit{karuppōru} sets the tone of  the whole poem within a frame of  reference to ‘Aspects of  Love’, \textit{Urippōru}.\textsuperscript{12}

However, perhaps the most striking feature of  this language


\textsuperscript{12} See Marr, \textit{op.cit}. Chap.2. pp.19-30 for a survey of  these. The book was in fact mainly concerned with the aspects of  Heroic Poetry known as \textit{Puṭṭinai}.
of plant-symbolism is the fact that it was also applied to the other genre of Sangam literature, Purattinai - 'Heroic Poetry'. Moreover, with that love of schemata, matrices and lists that all of us who have been involved with and love Indian scholarship have encountered, these Purattinai that literally signify aspects of battle are formally matched with the Akattinai aspects of love. This phenomenon is amply demonstrated in Pōrulatikāram, the third book of Tōlkāppiyam, that deals with the subject-matter of poetry in a binary classification of Love and Battle.¹³ For two reasons, one of which is intrinsic to the conventions of Akattinai¹⁴ the other metrical, the author of Tōlkāppiyam gives the Aintinai in a convoluted manner:

\[
\text{kaikkilai nutalā p̱p̱eruntinai irtuvay}
\]
\[
murpata kki̱lanta ējutinai ē̱upa.
\]

“avarrul -
naṭuvaṭ aintinai natuvaṇṭi ē̱liya
ppaṭutirai vaṭya̱m p̱ṭiṭya̱ p̱anpe”.

– Tōl. Pōru Akattinai, vv. 1 and 2.

Meaning:

as formerly laid down, they say (there are) seven tinai, beginning with Kaikkilai and ending with Pēruntinai among them, the middle five tinai, excepting the middle one (of those five!) are of the nature of sea-girt land.

Only in verse 5 are we told what the “middle five” (still excepting the middle one of these) are:

\[
mullai ku̱ri̱nci marutam nēytal ē̱na…
\]

– Tōl., ibid., v.5, line 5.

We are now confronted with four words signifying plants that have cognates in other Dravidian languages.¹⁵ A fair consensus

¹³ This need not be taken in a metaphorical sense!

¹⁴ v.i., p.10.

¹⁵ For some of these cognates see Marr, op.cit. chap.2, p.17, fn.1.
regarding the identities of these is borne out by the Madras *Tamil Lexicon* and modern writers in both Tamil and English:

Mullai: *Jasminum malabaricum* Wight (Oleaceae)\(^{17}\)
Kuṇiṇci: *Strobilanthes kunthianus* T. Anders (Acanthaceae)\(^{18}\)
Marutam: *Thespesia populnea* Corr (Malvaceae)\(^{19}\)
Nēyta: *Nymphaea lotus alba* Linn. (Nymphaeaceae)\(^{20}\)

For all four the primary meanings are floristic but they encode respectively:

Mullai: The forest region, signifying Patience in Separation and appropriate to the *Muta*ṟṇ, ‘season and time’, of Rainy Season and Evening.
Kuṇiṇci: The hill-tract, signifying Lovers’ Union and appropriate to the Cool Season and Depth of Night.
Marutam: The cultivated lands, signifying Lovers’ Quarrel and appropriate to Dawn.
Nēyta: The seashore, signifying Anguish in Separation and appropriate to Afternoon.

Tōlkāpiyaṇār\(^{21}\) is almost coy in regard to *Pālai*, the omitted one of “the middle four” in his v2.\(^{22}\) Finally in verse 11 he states:

\[
\text{nāṭuvunilai tiṇaiye nampakal veṇilōtu}
\text{mutivu nilai marunkin muṇniya nējitte.}
\]

The function of the *tiṇai* in the middle is related to midday, the spring and high summer.

The commentaries supply the term *Pālai* and a subsequent verse supplies the *urippōrul*, *Pirital*, ‘separation’. This, taken with

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\(^{21}\) See *Ṭōl. op.cit.*, *Pōrul*. vv 5-7, 9 and 10, 16.

\(^{22}\) *s.s.*, p.3.
the uncomfortable time and seasons, may be the reason for Tolkëppiyāqār’s reluctance! Other portions of the text suggest that Pālai signifies the Desert Tract, common to any one of the other four. There seems to be some uncertainty as to which plant or tree was meant by pālai. A likely contender is Minusops elengi Linn., since pālē in Kannada signifies this tree.23

There would seem no undue problems in the identities suggested above.24 While it is true that mullai is also glossed as Jasminum sambac Ait.,25 this species is not really a forest or woodland plant and indeed may be of doubtful provenance, cultivated as widely as it is.26 Ordinary Tamil usage confirms mullai or mallikai as ‘wild jasmine’.

The difference of opinion between Iampūraṇar and Nacciṅarkṅ’inyaar over the basic meanings of these plant-terms was already mentioned.27 In view of their root-meanings as plants though it would seem reasonable to support Ilampūraṇar’s commentary rather than Nacciṅarkṅ’inyaar’s based as this is on the metonymy and allegory of these terms.28 Subsequent references to karuppōrul, itemised both as maram, ‘tree’, and pū, ‘flower’, taken together with the flower language of the Purattinaṅai,29 would confirm the botanical status of the five Akattinai questioned by Nacciṅarkṅ’inyaar.30

Coming to the karuppōrul, we find a large list in Ilampūraṇar’s commentary that covers other matters as well as tree and flowers.31

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24 v.s., p.4.
27 v.s., p.3.
28 For a discussion see Marr, op.cit., pp.16-17.
29 v.i, pp.12 & seqq.
30 See Tōl. op.cit. v 20 for karu [ppōrul] including maram, and Ilam’s extensive commentary this verse, and for pū, Tōl., ibid., v 21, l. 1.
31 Beyond the scope of this paper: such as food, fauna, avia, drum, profession, etc. see Ilam on Tōl. ibid. v20, TSS edn., pp.18-19.
It will be convenient to list the relevant floral karuppōrul region by region as does Ilampūranar:

1. Mullai, the forest region:
   
   trees: kōnraї, kuruntu, putal
   flowers: mullai\textsuperscript{32}, pitaυu, kilavu

   Kōnraї is well-known as the Indian Laburnum.\textsuperscript{33} It is sacred to Lord Śiva, and a Sībalavrksa ‘site tree’ of this species is at the Śvetāraṇyeśvara shrine at Tiruʋenkātu, Nagapattinam Distt., Tamil Nadu.\textsuperscript{34} The Śiva association figures in the invocation that prefaced one of the Eight Anthologies, Puژ'naνuɾu v1, and in another Anthology Patirrụppatru, poem 67, line 13.

   Kuruntu:\textsuperscript{35} is either Atalantia racemosa Corr. (Rutaceae) Hooker, vol i, p.512 gives its distribution from the Konkan to Travancore suggestive of the forest region); or: Hiptage madablota Gaert. (Malpighiaceae) - Hooker, vol i, p.418 states that it is “a tall climber throughout the hotter parts of India”. It may be noted that the specific name is Latinized Sanskrit: mādhavīlātā.

   Pūtak: is glossed simply as “bush, thicket, grass, bud”. See TaLex., vol v, p.2763.

   Pitau is glossed as ‘emetic nut’. TaLex. vol v, p.2653 i.

2. Kuɾiĩci, the hill tract:
   
   trees: kongu, venkai
   flowers: kānta, kuɾiĩci, venkai

   Kongu\textsuperscript{36} is given as Hopea wightiana Wall. (Dipterocarpaceae), the

\textsuperscript{32} Such a listing confirms the meaning of mullai as floristic. But such eponymous karuppōrul will not be considered individually here since many textual occurrences refer to the allegories and referential symbolism noted, rather than the plant themselves.

\textsuperscript{33} Cassia fistula Linn. (Leguminosae, Caesalpiniaceae), Hooker, vol 2, p.261.


\textsuperscript{35} TaLex. vol 2, p.1017 i.

\textsuperscript{36} TaLex. vol 2, p.1171 i.
common Caung. Hooker, vol 1, p.309 states that it occurs in the Concan (sic) and the Western Peninsula.

**Venkai**\textsuperscript{37}: Pterocarpus marsupium Roxb. (Leguminosae) - Hooker, *op.cit.* vol 2, p.239. It will be noticed that both tree and flower of *venkai* are *karuppurul* of *kurići*. In two of the heroic poetry anthologies confirmation of *Pterocarpus* as a hill-tract species seems to be given. In *Pura’nāyūr* it is stated that the *venkai* with its dark trunk was flowering on the mountain Arimalai.\textsuperscript{38} *Paripatāl* poem 7 tells us that “In dense groves where fragrant grasses spread is the bright-branched *venkai* with drooping clusters of flowers. Upon every hill bathed in mist and rain, trees, buffeted by the gale, are torn up by the roots leaving everywhere great pits”.\textsuperscript{39}

**Kāntal**: Gloriosa superba Linn. (Liliaceae).\textsuperscript{40} The Malabar Glory Lily and one of the most striking members of the entire Sangam flower repertoire. Curiously the *Tamil Lexicon* gives its colour as “red or white”,\textsuperscript{39} and one wonders whether some other liliaceous species was confused here. A possible candidate could be *Lilium neilgherrense*, which is a true montane species endemic to the Nilgiris and Palanis.

**Gloriosa superba**, now regarded as a single species that includes the former *G.rothschildiana*, is found according to Hooker “throughout tropical India from the NW Himalayas to Assam, Burma, Malaccas and Ceylon, ascending to 5,000 ft.” – and in tropical Africa.\textsuperscript{39} In reality it is not truly a montane plant at all and this author has found it in coastal Tamil Nadu at sea level. It does however appear most spectacularly at middle altitudes: The illustration is of a plant in a hedge on the way from Bhagamandala to Madikere. Unfortunately, by the rules of botanical nomenclature, the Linnaean name takes precedence over that proposed in *Lamk. Encycl. iv*, p.133, *Methodica superba*. Clearly this is Latinized from Malayalam *Mentionni*, ‘conspicuous above’ which in usage is paired

\textsuperscript{37} *Ta.lex.* vol 6, p.3820i.
\textsuperscript{38} *Puram*. 202, ll. 17 and 18.
\textsuperscript{39} Marr, *op.cit.* p.383 and fn.5 *ibid*.
\textsuperscript{40} Hooker, vol vi, p.358; *Ta.lex.* vol 2, p.866i; see fig.1.
with Kīltonni, ‘conspicuous below’, presumably in reference to the long, oddly-shaped brittle tubers.\(^{41}\) In his beautifully illustrated book *The language of flowers*,\(^{42}\) the floral designer Shane Connolly has this to say about *Gloriosa superba*:

“We must travel to its original home the exotic subcontinent of India, to explore the symbolism of the Gloriosa. The flower is mentioned in many old Tamil Sangam poems. It tells of the mountains where the Lily grows and where Indian lovers were inclined to meet”.\(^{43}\)

As will be seen Kāntal features also in the Heroic Poetry as being sacred to the god Murugan or Skanda.\(^{44}\) Both flowers and tubers are referred to in one of the anthology poems *Patiṟṟuppattu*, poem 15:

The bows of the Maṟavar are bloodstained. In that place the scarlet Gloriosa’s roots have withered in channels bereft of water.\(^{45}\)

One of the love poems, *Aka’nānūru* poem 4, tells of the heroine’s companion emphasising the love the hero bears for the heroine by calling him “lord of the hills” and by mentioning the Kāntal, the Gloriosa that grows in the hill.\(^{46}\) Mention of the Gloriosa is enough to indicate the desire of the hero for the *Urippōrul Punartal* ‘union with the beloved’.

As with *Mullai*, the Kurjūci flower also appears as a Karuppōrul of its eponymous region.\(^{47}\) *Strobilanthes kunthianus* is truly a montane species, the most striking feature being its well-nigh cyclic flowering

\(^{41}\) I am indebted to Mrs. Shreeja K.G. of NIAS for the information on Malayalam usage.


\(^{43}\) Connolly, S., *op.cit.* pp.88-89.


\(^{45}\) *Patiṟṟ.* 15 by Kumāṭṭukr Kkaṇṇanār.

\(^{46}\) *Akam.* 4, ll. 13-15

every twelve years. One of these occurred in 2006 as mentioned at the beginning of this article. It may be that this phenomenon, giving a bluish tinge to the hills, gave rise to the name Nilagiri.

3. Pālai, The desert region:
   
   trees: pālai, iruppai, kalli
   flower: marāmpū

   Herein the tree rather than a flower is synonymous with Pālai as the desert region.

   Iruppai: Bassia longifolia Linn. (Sapotaceae) The south Indian Mahua.49
   kalli: Euphorbia tirucalli (Euphorbiaceae)50

4. Marutam, the cultivated lands:
   
   trees: marutu, kāñci
   flowers: tāmarai, kalunir

   Marutam is again named for a typical tree rather than flower, Marutu being but an alternative for Marutam.51 This tree is generally identified as Thespesia populnea Corr. (Malvaceae), and Hooker states that it occurs on the “tropical shores of Bengal, Ceylon and both peninsulas. Distribution: tropical Asia, the Pacific Islands and Africa”.52 This meshes well with the Sangam tradition connecting Marutam with the cultivated tracts, “The territory of sweet streams…”53

   Kāñci: this appears to be a synonym of Marutam being glossed as River Portia, Hibiscus populnea Linn. which is an invalid name for Thespesia populnea Corr. As will be seen, this tree’s flowers are worn

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48 See figs. 2&3. But the author has seen it in flower rather sparsely in interstitial years eg. 1969.
49 Hooker, op.cit. vol iii, p.544; Ta.Lex. vol i, p.331i. An alternative for iruppai is glossed: Calamus rotang Linn., The Common Rattan.
50 Hooker, vol v, p.254; Ta.Lex. vol ii, p.809ii.
51 Ta.Lex. vol v, p.3093ii.
52 Hooker, op.cit. vol i, p.305.
as indicating one of the seven Puṭṭṭinaɪ ‘Aspects of warfare’.
A good indication of Kāñci’s habitat is provided by the following:

“My lady desires that there should be a fine rice crop and that gold may be plentiful but I wish that the lord of the village where the Kāñci is in bud, where the pools are well stocked with fish and where there is much fresh produce may flourish…”

Tāmarai: there seems no reason not to agree this is lotus, and the Tamil Lexicon derives Tāmarai from Sanskrit Tāmarasa, id. Lotus is Nelumbium speciosum Willd. (Nymphaeaceae)

Kalunir is glossed as purple or blue Indian water lily which would suggest Nymphaea stellata Willd., since Nymphaea lotus alba Linn., which will be encountered under Nēytal does not have a blue-mauve variety.

5. Nēytal, the seashore or maritime tract:
   trees: punnai, kaitai
   flower: nēyal

Punnai is usually held to be the Mastwood or Alexandrian Laurel, Calophyllum inophyllum Linn. (Guttiferae). One of the Anthology poems, Akam. 126 confirms that the Punnai flowers were fragrant and shamed gold:

“Pōninar narum palar ppunnaï…”

Nēytal: White Indian water lily: Nymphaea lotus alba Linn. (Nymphaeaceae). This is a plant common throughout India and indeed could hardly be said to be peculiar to the seashore, unlike

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54 - the 6th Puṭṭṭinaɪ, v.i., p.15
55 Ainkugungu I, decade 1, v1: see Marr, op.cit. p.353, fn.2 ibid.
57 Hooker, vol I.
59 Akam.126, l. 15.
60 Hooker, vol i, p.116; Ta.Lex. vol iv, p.2342i.
Ațumpu, Ipomea biloba Forsk. (Convolvulaceae),\(^6\) another Karuppōru of Nēyal that occurs in anthology poems.

While Nēyal is the last of the Akattinai to relate to a region and to incorporate plant symbolism, the first verse of Tŏl.Pōru reminds us that there were two other Akattinai. Kaikkilai and Pēruṇtinai respectively.\(^6\) It is striking that these two standing for Unrequited Love and Forced Love were held to lie outside this frame of phyto-regional symbolism.\(^6\) It is not within the scope of this paper to speculate on the exclusion of these topics that are the stuff of so much romantic and ecstatic longing in all world literatures – for example the troubadour songs of the twelfth and thirteenth centuries in France – nor are they relevant in the sense that neither term involves any plant name in its etymology. However Pēruṇtinai does involve ‘plant material’ in as much as the unfortunate hero apparently exhibited his anguish by mounting a hobby horse of Palmyra palm\(^6\) leaves and garlanding himself with the flowers of a noxious weed, Calotropis gigantea. One of the Akattinai anthology poems, Kṛṇṭokai poem 17, incorporates both these features:

“Thinking it to be a real horse he will ride the Palmyra leaf; thinking it a fine flower he will put on the ĕrukkam with the clustered flowers as a chaplet. He will suffer derision in the street and other things, since love has smitten him”.

The two plants involved here are the Palmyra palm Borassus flabellifer Linn. (Palmaceae),\(^6\) and Calotropis gigantea Br. (Asclepiadaceae).\(^6\)

\(^6\) Hooker, vol iv, p.212.
\(^6\) ibid., p.3 and quotation.
\(^6\) Tŏl. op.cit.ibid. v54, l. 1.
\(^6\) Hooker, op.cit. vol vi, p.482; The Tamil term for Palmyra was Pontai and the hobby horse was matal.
\(^6\) Hooker, op.cit. vol iv, p.17; Ta. ĕrukkam/ĕrukku, Skt. arku. This latexiferous weed is avoided by cattle. In one of the charama-s of his Kīrtanā Telisi Rāma Tyāgarāja, by śleṣā, ‘puoking’, contrasts the meanings of arka, Calotropis, and the Sun! See fig.4.
A further point in this somewhat bizarre aspect of early Tamil love poetry is that the anthologisers and rhetoricians were inclined to regard them as so unconventional that they consigned them to the realm of Puṟattinaī.67 We have seen that this term signifies aspects of warfare that will shortly be examined for their flower symbolism. Yet it should be stated that the literal meanings of Akam and Puṟam are ‘interior’ and ‘exterior’. It is clear from an overview of the literature that these terms are in part at least a reflection of the psychology of societal convention. The commentator Nacciṅārk‘in̄iyar labels as Pĕruntinai another long anthology-poem, Kalittōkai poem 139, despite it being included by the redactor in the section on Nēyal, Nēytaṅkāli.68

We come next to the aspects of warfare, Puṟattinaī. These are similarly seven in number and indeed are matched by Tōl. with the seven Akattinaī, sometimes it must be said in a rather artificial manner. In the case of the seven Puṟattinaī only one, the seventh, Pāṭāṅ, does not have a radical plant meaning. All the prior six involve wearing chaplets or garlands of the relevant flowers as indicative of aspects of warfare. For instance if warriors were seen wearing the scarlet flowers of Ixora it would be realised that they were engaged in cattle-raiding. Two of the six add “reciprocal” garland flowers, Karantai and Nōcci and thus there are eight plant names involved.

Happily, the list is given in a straight sequence by Tōl. avoiding the complications that we saw at the beginning of the Tōl.Pōrul. Akattinaī. It will perhaps be convenient to list the seven Puṟattinaī together with the formally-matched Akattinaī first before considering their plant identities:

67 See for instance: Aiyaṅ Āritaṅār, Puṟappōrul vēnpāmālai, paṭalam-s 11 and 12, Madras 1946, pp130-155.
Puṟattinai
1. Vĕṭci: Cattle raiding
2. Vañci: fight of two kings over disputed land
3. Uḷiṇai: attack on enemy fort
4. Tumpai: open warfare of two equal kings
5. Vākai: praise of the spotless
6. Kāṇci: transitory nature of the world
7. (Pāţan): Poets’ profit motive

Akattinai
3. Kuṟiṇci: Union of lovers
2. Mullai: patience in separation
5. Marutam: lovers’ quarrel
6. Nēyal: anguish in separation
4. Pālai: Separation of lovers
6. Kāñci: transitory nature of the world
7. (Pĕruntai): Forced/unequal love
1. (Kaikkilai): unrequited love

In the above lists the three terms in brackets have no radical meaning as a plant, as has just been seen in the case of Kaikkilai and Pĕruntai.70

Each of these seven Puṟattinai is accompanied by verses setting out Tuṟai ‘Poetic Themes’ appropriate to each that are beyond the scope of this paper. However in the case of two such expansions, verse 63 giving the Tuṟai-s of Vĕṭci and verse 69 giving further Tuṟai-s of Uḷiṇai, two plants for chaplet-wearing Karantai and Nŏcci are given as indicative of recovery of cattle and defence of the besieged fort. Thus the complete list of plants involved in Puṟattinai is eight, as follows:

Vĕṭci: Ixora coccinea Linn., Roxb. Flora Ind. i, 375 (Rutaceae)71, Hooker, op.cit. states that it is cultivated throughout India a native of the Western Peninsula in the Konkan, etc… commonly ascending to 2000 ft. It is hardly therefore the case that Vĕṭci is a montane flower but the point of formal matching with Kuṟiṇci is that the cattle are stolen in a manner reminiscent of the abduction of the beloved by her lover in Kuṟiṇci tiṇai. Traditionally the Ixora flower

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70 n.s., p.10.
71 Ta.Lex. vol vi. P.3768i. See fig.4.
has been sacred to Lord Śiva.\textsuperscript{72} Vĕtci has the “reciprocal” tinai Karantai worn for the recovery of stolen cattle. Karantai is glossed as \textit{Ocimum sanctum} Linn. (Labiatae).\textsuperscript{73}

It is of interest that Īḷam. commenting on verse 63 of \textit{Pugat.} that lists the Turai poetic themes of Vĕtci points out that three plants mentioned therein, line 4 viz. pontai, vempu and ār are respectively the royal flowers of the Cera, Pāṇṭiya and Coḷa kings of the Tamil country.\textsuperscript{74} Pontai is glossed as Palmyra Palm \textit{Borassus flabellifer} Linn. already met with in connexion with the unfortunate lover riding the hobby horse made from its leaf.\textsuperscript{75} Vempu ‘nim, margosa’ \textit{Melia azadirachta} Linn. (Meliaceae).\textsuperscript{76} Ār is \textit{Bauhinia racemosa} (Caesalpiniaceae).\textsuperscript{77}

Vañci: this is paired with Mullah. Vañci signifies the ferocious advance of one king against another. Wives are separated from their warring husbands and the theme of Patient Separation, \textit{iruttal} is the characteristic of mullah.\textsuperscript{78} \textit{Vañci} is glossed as \textit{Bassia malabarica} Bedd. (Sapotaceae).\textsuperscript{79}

\textit{Uḷiṅai}: The plant \textit{uḷiṅai} is invariably glossed as \textit{Cardiospermum balicacabum} Linn., the balloon vine.\textsuperscript{80} Wearing the balloon vine

\begin{footnotes}
\textsuperscript{72} viz. \textit{Īśvara}. Romanised according to Portuguese orthography this gave \textit{Ixora} valid to this day as the genus but almost invariably mispronounced!

\textsuperscript{73} Hooker, \textit{op.cit.} vol i, p.114. For this Recovery of Cattle see \textit{Tōl.Pōrul.Pugat.} v63, l. 14., and \textit{PPVM}, Pātalām 2.

\textsuperscript{74} He quotes \textit{PPVM Pōtu.}, v1,v2 and v9 respectively in support. TSS edn., p.82.


\textsuperscript{76} \textit{Puγam.} 81, l. 3, \textit{Puγam.} 82, l. 6; \textit{Puγam.} 45, ll. 1-4 alludes to all three lineages’ Royal flowers. See Marr, \textit{op.cit.} p.104. It was possible to wear both the requisite royal flower as well as that of the phase of battle: see \textit{Puγam.} 76, lines 4 and 5, in praise of the Pāniyaṅ Nētuṅceliyaṅ’s prowess in battle, garlanded with both \textit{Vempu} and \textit{Uḷiṅai}.


\textsuperscript{79} Hooker, \textit{op.cit.} vol i, p.670; \textit{Ta.Lex.} vol i, p.468i&ii. Mal. \textit{uḷiṅa}, \textit{id}.
\end{footnotes}
signified that the soldiers were besieging an enemy fort. On this verse, *Töl.Pöru.Purat*. v66, the commentator Nacc. states that the connexion with Marutam is because forts are situated in the cultivated tract and dawn the time both for attacking the fort and for Quarrel, the urippōru of Marutam. Uliṇai is the other Puṛattinai having a Reciprocal: the flowers of Nōcci were worn for the recovery of the fort.\footnote{Nacc. on *Töl.Pöru.Purat*. v69 (Ilam. Comm. v70) TSS edn. 1, p.191.} Nōcci is glossed as *Vitex negundo* Linn.\footnote{Hooker, vol iv, p.583. In *Patiṟṟu. patikam* VIII, the Ceral king is said to have the Nōcci flowers worn by the besieged. See also PPVM section 5, vv86-94.}

Tumpai: there seems no doubt about the identity of the plant and indeed *tumpai* is still current in modern Tamil for the ‘White dead-nettle’, *Leucas aspera* Spreng. (Labiateae) surely one of the commonest weeds of South India. The wearing of *tumpai* signified open warfare and since this was liable to take place in open sandy battlefields, the rather artificial connexion with the Akattinai Nēyal, seashore, was established.\footnote{Töl.Pöru,Purat. vv73 and 74 and Ilam. Comm. TSS dn. pp.108-110.}

Vākai: the fifth Puṛattinai. *Vākai* means Śirīṣa, *Albizia lebeck* Benth. (Mimosaceae),\footnote{Hooker, vol ii, p.298, under the now-invalid spelling *Albizza lebbek*: Ta.Lex. p.3574ii. See figs 6 and 7.} wearing the flowers of which signified praising heroes and worthy people. Since this could occur in any stage of battle it is formally paired with Pālai the desert tract in the Akattinai that is shared by other tracts.\footnote{Töl.Pöru,Purat. v76, the subsequent verse lists twenty poetic themes all of a}

Kāṇci is the sixth Puṛattinai. The plant *Kāṇci* has been noted\footnote{N.s., p.9.} as a synonym of *Marutam Thespesia populnea* Corr. Although *Kāṇci* denotes a plant, Kāṇci-wearing was held to stand apart from the other Puṛattinai just as Pĕruntinai stands apart from Akattinai. It signified a fatalistic acceptance of death and of the transitory nature of the physical body particularly with reference to fallen warriors.\footnote{See *Töl.Pöru.Purat*. v76, the subsequent verse lists twenty poetic themes all of a
This concludes the survey of the floristic Puṟattinai since the seventh, Pāṭān, simply means ‘encomium’ and has no origin in a plant name. It is clear from the above that flowers played an important part in early Tamil society indicative as they were both of states of mind of lovers in relation to society and convention and the consequent use of flowers as a referential symbolism. It is impossible to believe that this was purely a construct or mere poetic fancy for the complexity of the flower language would belie such a trivialisation by literary or social historians. The specific nature of this floral language is further confirmed by the use of flowers to indicate phases of warfare indicating both purpose and identity. Such practices are not unique to early Tamil warfare. One recalls the use of ‘war paint’ by Native Americans to indicate battle purpose. In medieval Europe knights in armour wore crests on their helmet and heraldic coats of arms on their shields valorously to indicate to their opponents who they were as worthy adversaries.

A reading of these and other poems of the Tamil Sangam leads one to a number of considerations. First is a sense of a territory that, bounded by the sea, is determined by a sense of language rather than one of politically divided kingdoms. In Puṟam 357, Piramaṇār says:

The days are numbered of those who rule without the thought that this land though ruled by three is one.

The three kings referred to are Cera(l), Pāṇṭiya and Coḷa. They figure prominently in all early Tamil literature, and subsequently throughout the early and medieval history of south India. A further allusion to this sense of solidarity is afforded by the fatalistic nature that make depressing reading. Tōl., ibid., and Iḷam. Comm. TSS edn. pp.126-135.

88 Tōl.Pōru.Akat., v2. v.s. p.4. That the sea boundary is set by the east and west is alluded to in Puṟam 31, lines 13 and 14 where Kovūr kilār says that the king’s horses range from the eastern to the western seaboard.

89 For the form of this name, usually given as C(h)era, and connexions with the Keralaput(r)a of Aśoka edicts, see Marr, op.cit., p.262.

90 v.s. p.13 and fn.74.
Sangam poetess Auvaiyār, in a Sangam poem, *Puṟam*. 367, where she tells us that though they quarrel among themselves the three unite when threatened from outside!

Ruled by the three lineages referred to who by and large occupied the lowland regions, and by a number of tribal chieftains who occupied hilly tracts provides an interesting parallel with the ancient kingdoms of northern India whereby the four major kingdoms were broadly in the Gangetic plain and the sixteen Mahājanapadas such as Gandhāra were in the hillier areas towards the west of north India. Examples of hill chiefs in ancient Tamilakam (cp Damirica of the *Periplus* of 1st C AD) are Añci who ruled Kutirai malai, the Horse Mountain, near Takaṭur, and Ori who ruled the high hill Kōlli (see *Puṟam*. v352). As an agrarian culture, the early Tamils were keen observers of nature as is very clear from the entire floral referential symbolism considered in this article. However other references make this point even clearer. *Puṟam*. 67 is addressed to a gander: on his northward flight from the “Kumari river”, usually taken to mean the Cape, Kanyakumari: he should speak to the Coḷa king Kili about the great poet Picirāntaiyār, Picir being a village near Madurai. Observation of migratory bird flight would have been natural, but one recalls comparable observations of the Monsoons’ direction when considering Kālidāsa’s *Meghadūta*.

Close observation of nature is discernible in the following:

“Round as the fruit of the small-leaved myrobalan are the starring eyes of short-furred hares that eat the seeds from the arched stems of millet. They nibble at the grain in the bent ears of corn and then lie down to sleep among the stalks. Then they get up and lope with their mates to drink from water pots standing in the courtyards of houses in the many forest-villages that surround that hill”.

Trees were clearly revered: we have seen that a number were directly involved in the *Akam* and *Puṟam* symbolism. Moreover they had a protective role that may indeed have given rise to the

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91 *Akam*. 284.
normal practice current in temples of a ‘Site Tree’, Sibha vrksa. (Tamil: Katimaram or Kāvalmaram) which were the terms for a tree that specifically protected a ruler: it was symbiotic with him and his fortunes in that its withering was a bad omen: the uprooting of it signified the actual defeat of a ruler. Pugam 23, by Kallatānār describes how the Pāṇṭiya king Nēṭuṅcēljyan uprooted the katimaram of his enemy. Perhaps the most vivid illustration of such a defeat is reported in Patirruppattu, Patikam V, where Ceral Čēnkuṭṭuvaṇ uprooted the Margosa tree – Azadirachta indica – that protected Paḷaiyaṇ. To do this he tied to the tree a rope made from the tresses of Paḷaiyaṇ’s womenfolk which was attached to an elephant.

In some cases it is clear that a specific tree was also the emblem of a dynasty. A well known instance from beyond the Tamil area is that of the Kadambas of Banavasi. As a historical dynasty they were founded by Mayūraśarman around 340 AD. They may well have been preceded in the Sangam period by the kings whose emblem was the same Kadamba, Anthocephalos cadamba, Ta. Kaṭampu. One of them was Nanthan who ruled in the northwest area Kŏṅkāṇam. Several Sangam poems referred to this tree being hacked down by the Ceral king.92

A rather amusing anecdote concerning a protective tree survives in Pugam. poem 162. The younger brother of the dying chieftain Iḷavēlimān, ordered to give largesse, distributed this stingily. On receiving such a miserly gift the poet Pĕruṅcittiraṇār scornfully tied to Iḷavēlimān’s protective tree the elephant he had been given earlier by a more liberal patron Kumaṇaṇ, and left that village in disgust. Little has changed perhaps in the psychology of patronage!

Let the final words come from the gentler side of the Sangam flora, conveyed by the rare flowering of the Kuriṇci, Strobilanthes, witnessed in Coonoor, Nilgiris by M.B.Rajani in Nov 2006. She wrote her reminiscences in prose and verse and I am much indebted to her for permission to quote her concluding lines:

92 Patirru. Pat. IV; Akam. 127 and Akam. 347.
“We are a rare phenomenon but we make an impression that lasts long; people wait for us to happen again, because we play a small part in something that is much larger than our individual self” said Kurinji.
Can I make a difference to the world that I live in by being a part of something much larger than myself?

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Fig. 1: *Kàntak* *Gloriosa superba* Linn. (Liliaceae)
Kodagu: roadside between Bhagamandala and Madikere, alt. c 3500’. 25.viii.2002
Fig. 2: *Kurinći*: *Strobilanthes kunthianus* T.Anders
nr. Dolphin's Nose, Coonoor, Nilgiris. Nov 2006  (photo courtesy M.B.Rajani)

Fig. 3: *Kurinći*: *Strobilanthes kunthianus* T.Anders, Close-up.
Nilgiris, *ibid*. Nov 2006  (photo courtesy M.B.Rajani)
Fig. 4: Foreground: Ėrukku: Calotropis gigantean Br. (Asclepiadaceae)
Background: Pontai: Borassus flabellifer Linn. (Palmaceae)
- Plants of Pĕruntinăi nr. Nagapattinam, Tamil Nadu, 08.iii.2007
Fig. 5: Vēṭci: *Ixora coccinea* Linn. (Rutaceae)
Cultivated, Golf Club nr. Airport, Bangalore. 22.viii.02

Fig. 6: Vākai: *Albizia lebeck* Benth. (Mimosaceae) – flowers and fruit Mohenjodaro, (Rest House), Pakistan, 08.iv.85
Fig. 7: Vākai. Albizia lebeck – deciduous, in fruit
Bihar, E. bank of River Sone. 03.ii.1961
What Euclid is to Europe, Pāṇini is to India –
Or Are They?¹

FRITS STAAL

The topic of this evening is the thesis that Euclid is to Europe what Pāṇini is to India: It is a baffling topic because it causes havoc to a widespread prejudice: the myth of the two cultures of sciences and humanities. The sciences, it is said, are exact and rigorous; the humanities seem to lack those qualities and what they offer instead is not very clear. Since Euclid was a mathematician and therefore a scientist, he belonged to a species that is highly regarded and for good reasons. Pāṇini, on the other hand, was a grammarian or linguist – according to some a more marginal occupation. So must we accept the myth and draw the conclusion, that Europe addressed basic and substantial issues but India dabbled in trivialities?

I hasten to add that I am not attributing any belief in that outlandish myth of the two cultures to academic institutions such as the National Institute of Advanced Studies that has honoured me with an invitation. Modern academia includes numerous recent disciplines that transcend such boundaries – I mention only the cognitive sciences and many that deal with information and communication. All the same, popular imagination adheres to the picture and if you want money, especially in the United States, you better claim that what you are doing is science. I am therefore especially grateful and pleased that I am allowed to address the Associates of a National Institute of Advanced Studies and not just Sciences. Perhaps, in the final resort, those studies are just sciences since it is, at least in part, a matter of words and definitions.

¹ Lecture delivered on May 6, 2005 at the National Institute of Advanced Studies.

At the time of the talk, Prof. Frits Staal was Professor Emeritus of Philosophy and of South and Southeast Asian Studies, University of California, Berkeley.
I am very happy also that I am in a position to visit Bangalore. It is not for the same reason as the prime minister of China, who preceded me in entering India at your cool and leafy city, spurning a red-carpet arrival in New Delhi in order to delve into the heart of India’s information technology and globalising economy. Mr. Wen Jiabao did not come to announce my impending visit and I shall not follow him and proceed to New Delhi, but return to Thailand.

I spent much time in South India but do not know Bangalore well. I missed a rare chance to spend some years here and if I had been able to do it, my Sanskrit would be better. As a graduate student of Advaita Vedanta at the University of Madras, I visited the Shringeri Matha where I was introduced to the then Sankaracarya, Jagadguru Swami Abhinava Vidya Tirtha. He was quite young himself and was studying a difficult late Advaita text, Vidyāranyā’s Vivaranaprameyasamgraha, under the tutelage of Panditaraja V.S. Ramachandra Sastri of the Sankara Matha of your beautiful city. Among the other luminaries, all University professors, Ramachandra Sastri was the only traditional Pandit member of the first Sanskrit Commission of the Government of India. He did not speak to me but the Jagadguru addressed me in Sanskrit and must have noticed that I did not always get it. Having heard me stutter, His Holiness graciously suggested that I spend some years studying myself with that same great Pandit. But when I went back to the University of Madras, my Professor did not like the idea since I was a Government of India scholar. The government might not approve such a transition, or approve it soon enough. And so I missed those golden opportunities to learn Sanskrit well and spend some years in Bangalore for which I now must make up fast.

But you came to hear about Euclid and Pāṇini – so where were we? I was holding forth on the difference between the sciences and humanities, arguing that we should not make that distinction. I must now explain briefly how anyone could have come up with such a preposterous idea. It was the pet theory of a nineteenth century German philosopher, Wilhelm Dilthey. Dilthey was basically a historian and did not know much about what he called
the natural sciences. His more famous colleague Edmund Husserl, the founder of phenomenology, considered him chiefly as a man of genius for intuition, not of rigorous science and theory. Dilthey himself preferred to call the sciences of culture Geisteswissenschaften or “sciences of the spirit,” even though no one knew or agreed on what a Geist or Spirit was. Whatever it is, or precisely because of that aura of mystery, the idea about the distinction between sciences of nature and sciences of culture caught on as if with a vengeance.

Then, a century later, Dilthey’s ideas were rather unexpectedly supported by the British author and physicist C.P. Snow. It is he who introduced the phrase of “the two cultures”. Snow wrote several novels about scientists but that does not mean that he knew anything about the science of literature, let alone the sciences of language, just as an elephant, himself an animal, does not know anything about zoology, let alone the life sciences in general. And so we are left with a distinction between two things, A and B, based upon the ideas of two people, one who knew A but not B, the other B but not A. A shaky foundation.

My conclusion is that we should not make sharp distinctions between large groups of scientific disciplines. Yes, there are many, like pebbles on the beach, but they are not only painted in two colors, red and blue. If you want a substantial foundation on which to base this negative conclusion, you need only glance at the history of science. During the European middle ages, the distinction did not exist. Music, for example, was regarded as a science. If you look at China, India, or the Arab world, there is no trace of that distinction either. I conclude that we can only study the subject of this evening dispassionately if we accept a very flexible notion of the concept of science. I have found it fruitful to regard as science all forms of systematic knowledge of ourselves and the universe in which we live.

So let us try to turn to Euclid with an open mind. It is not known where he was born, but he was probably taught geometry at Athens by pupils of Plato, and taught and founded a school at Alexandria. His famous Elements, which were written around 300
BC, are a systematic treatise on geometry. He may not have been a
great mathematician, like some other ancient Greeks, and has been
called an excellent schoolmaster. He did indeed write a textbook
that incorporated many theorems that others had discovered before
him. But I believe that he was more than a schoolmaster because his
axiomatic method was new and has so far lasted for almost two and
a half millennia. Of course, few things are totally “new”. Euclid’s
text starts with what he calls “common notions”, a concept that
comes from Aristotle, Plato’s star pupil. Common notions are what
we now call axioms. Let us take a look at an example: Things which
are equal to the same thing are also equal to each other. It means that if 3
+ 2 equals 5, and 7 - 2 also equals 5, then it follows that 3 + 2 and
7 - 2 are equal to each other. But Euclid was not, or not primarily,
thinking of numbers. He was thinking of lines or line segments.
His work is first and foremost about geometry though it includes
some chapters on numbers. In both areas, his innovation and great
contribution was to prove or demonstrate mathematical propositions
by deriving them from axioms.

Let us look briefly at one of his propositions. It is not
formulated as a statement, as you might expect, but as a construction
and says: “To draw a straight line at right angles to a given straight
line from a given point on it”. The demonstration starts with the
sentence: “Let AB be the given straight line, and C the given point
on it”. This is accompanied by a figure, which depicts a triangle that
stands on the line. In the printed editions of translations of the
Elements, these points are marked A, B, C, D, etc. In the medieval
manuscripts they are indicated by the letters of the Greek alphabet,
alpha, beta, gamma, etc. The proof ends with Q.E.D. or rather the
Greek equivalent of the Latin Quod erat demonstrandum, “which is
what had to be demonstrated”.

You must not rush to the conclusion that all propositions are
constructions. Following Aristotle, Euclid distinguished not only
propositions from common notions or axioms. He also introduced
other concepts such as hypotheses, postulates and other terms or
ideas that he did not always use clearly or even consistently and that
specialists continue to discuss. I therefore propose to leave it at that but you need to know one more thing: Euclid paid much attention to definitions. They are actually nicer to quote. The first is: “A point is that which has no part”. The second: “A line is breadthless length”. And so on it goes.

What were Euclid’s shortcomings? There is, of course, a celebrated one: the fifth postulate. The formulation of that postulate by Euclid is quite complex so I shall replace it by a simple approximation. Euclid wrote something like: “Through a point outside a line you can draw only one line that is parallel to the first”. That proposition defines flat geometry, it does not apply to the surface of a tennis ball, let alone a mango, and was ousted by the discovery of curved spaces, first in geometry and then in physics and cosmology where they are now used as playthings, more or less. Implicit in the fifth postulate is a deeper and more interesting misconception: the idea that everything in the universe, including ourselves, must be evident to us. It is, of course, a preposterous claim. How presumptuous on our part! We as humans are part of the universe. But why should we have been selected in order to understand it, or even evolved in that direction?

I am not quite finished with Euclid. He may have been refuted here or there, but he also demonstrated many things that are simply true. One of them is the so-called theorem of Pythagoras. It is not something that humanity owes to Euclid, or to the Greeks for that matter. It is well known that such theorems are also found in China and India. In India that particular theorem is often, and with equal justification, called the Theorem of Baudhāyana.

Thousands or more such theorems have their place in what is now called modern mathematics and illustrate, in passing, that modern science is not simply a product of the European Scientific Revolution, but that the way was paved by the earlier history of ancient and medieval science. That history can only be adequately understood if the Eurasian continent is treated as an undivided unit. During that period, the sciences of the Babylonians, Indians, Chinese, Greeks and Arabs were all in contact with each other.
It does not follow that Pythagoras, Baudhāyana and the Chou Pei borrowed from each other. It would be enough for there to have been borrowings or influences in the area of geometry, one would have led to the other and it is a topic that deserves serious investigation. If, incidentally, you don’t believe that that famous and multinational theorem is true, you better give a reason. The best reason is to prove that it is false. It will not earn you a Nobel Prize but you may end up with the Field Medal in mathematics.

I conclude that Euclid’s legacy is the axiomatic method which does not belong to Europe but to modern science and therefore to the world.

We are now in a position to make a momentous leap and jump to Isaac Newton, the paragon of modern science, though he regarded himself, like some of his colleagues, as a Natural Philosopher. Newton’s *Principia* follows Euclid’s method entirely and in all details. He derives propositions from axioms. He accompanies each proposition with a picture and ends with Q.E.D. But his subject matter is different. He adds what were later regarded as physical entities such as force. It was a topic about which Aristotle had already speculated, but in the seventeenth century, the discussion about force was infused with new life by philosophers such as Descartes and Leibniz who were better informed than Aristotle had been. Both these thinkers went beyond Newton in matters of method. The reason is that they made use of the language of algebra. Descartes founded what is now called *analytical geometry*, which established a relationship between geometrical figures and algebraic expressions. Leibniz created the largest number of symbolic expressions and notations that are still in use today. As for Newton, he sometimes wrote equations, for example, to express infinite series, but he formulated his most famous laws in Latin which was not always clear. Formulas such as “\( f = ma \)” which we are now taught in school, were created by later mathematicians such as Euler. It is true that we, today, can easily read them into Newton’s Latin expressions, but we do so by hindsight.
Many of the great philosophers and mathematicians, the natural philosophers of the seventeenth century, including Newton and Descartes, preferred the geometry of the ancients, that is, Euclid’s *Elements*, to the algebra of the moderns. At the same time, most of them, except Leibniz, regarded that algebra as a barbaric art. The case of Descartes is remarkable and paradoxical because he had himself established a link between geometry and algebra. The dislike of algebra may be due to the fact that it had been introduced by aliens, *paradeśis*, in the first place the Arabs who did not only use what they had inherited from ancient Mesopotamia, India and China, but made substantial new contributions. The ambivalence about algebraic expressions of the seventeenth century had entirely disappeared a century later, when awareness of the mathematisation of physics had reached the point where Lagrange, in his work on analytical mechanics, could declare: “I require neither constructions, nor geometrical arguments, but only algebraic operations”.

The case of Newton, the one that concerns us, is the most interesting. He stood on the edge between old and new. Gravity demolished his view of flat space and turned out to be no force at all. It was replaced by a curvature of space-time in which all other particles and forces were subsequently housed. But Newton’s view was a simple leftover of Euclid’s parallel postulate with its implicit presumption. Newton stood at the end of the geometrical tradition in physics and hesitated to enter the new era of artificial languages. That is an important part of what the economist Maynard Keynes, a lifelong student of Newton, had in mind when he wrote that Newton, who was obsessed by alchemy throughout his life, was the last of the Magi rather than the first modern physicist.

We should not conclude that, because of Newton, Euclid is now done with. There remains his axiomatic method which others applied in different contexts. Spinoza, a kind of Advaitin as you know and another excellent mathematician, applied the art of demonstration from axioms to what he called ethics – a subject that covered a much wider area but included what is nowadays called by that name. Whether such an approach is fruitful remains to be seen.
Let us retrace our steps. Inspired by Aristotle, Euclid introduced the axiomatic method. He applied it to geometry and Newton extended its use to physics. Its applications to physics and the life sciences are still rather limited, but its applications to logic and mathematics have been spectacular and have led to some of the most celebrated theorems of the last century. One of these is Gödel’s incompleteness theorem.

We are now ready to take another, not necessarily greater jump, and go to the second truncated half of the thesis that we are considering, namely: what is Pāṇini to India? Looking at him from the Greek perspective, Pāṇini did something that is tantalisingly similar to Euclid. He composed a grammar of Sanskrit which starts with a list of syllables or sounds, called the Śivasūtra, from which all of his grammar can be logically derived.

Since we are in India, I shall be brief about Pāṇini’s background. He was, roughly speaking, a contemporary of Euclid. It is a matter on which I expatiated yesterday during the discussion meeting on Nature and Culture that some of you may have attended. If I had to summarise what I said there and try to adapt it to our context, I would say the following. The background of Pāṇini is the linguistic analysis of the Vedic Prātiśākhya treatises, which started with a discovery that was crucial to the canonisation of the Vedas: namely, Śākalya’s fixation of the precise form of the Rigveda. That took place one or two centuries before Pānini and was the paradigm that the other three Vedas adopted – the decisive step that led to the canonisation of what were subsequently referred to as “The Four Vedas.”

Pāṇini, in other words, did not start from scratch. But he was more innovative than Euclid. His grammar incorporated what his predecessors had done, but it revolutionised the science of language. He did not compose separate treatises on the languages of the different schools or sakhas of the Vedas like the Prātiśākhyas and from which they derive their name: prātiśākhya, “one for each school”. Pāṇini wrote a totally different kind of grammar for the spoken language of his day and thereby laid the foundation for Classical Sanskrit as well as modern linguistics.
If you contrast the discovery of Śākalya or Vidagdha Śākalya, ‘Clever Śākalya’, as he was called, with Pāṇini’s Śivasūtra you are in a position to appreciate how Pāṇini’s grammar turned the science of language upside down. His Vedic predecessors started with KA, KHA, GA, GHA; NA in one direction, and KA, CA, TA, TA, PA in another; that is they constructed a *varga* or square. To this they added the vowels and diphthongs: A, AA, I, II, U,UU, R, RR, L, E, O, AI and AU. You do the same in Kannada insofar as I have been able to find out. If I had to summarise what the composers of the *Prātiśākhyas* contributed to linguistics I would say: they discovered the natural order of the sounds of language – *any* language – as articulated in the mouth and the surrounding regions, moving from the larynx to the lips, unvoiced to voiced, non-aspirate to aspirate, etc.

To a modern Indian that insight may still be obvious but the Vedic analysis of the sounds of language was a major discovery and a contribution that seems to have been made only once in world history. It was adopted by most of the languages of India and adopted or adapted by many other Asian languages and scripts.

The Śiva sutra

Pāṇini was, of course, familiar with these achievements. His Śivasūtra starts: a i u N/ r/ K / e o N / ai au C / ha ya ra T / la N /

The Śiva sutra
consonants I mentioned just now. They are listed as: ña ma na ṇa na M (I mark the retroflexes or mūrdhanya in my Roman transliterations with a dot underneath) jha bha ṇ / gha ḍha ṇa S / ja ba ga ḍa da Š / kha pha cha tha tha ca ta ta V/ ka pa Y / and so on. This is rather odd, to say the least.

If you listen to and/or look at these enumerations carefully you will find two strange deviations from what I have called the natural order of the sounds of language. First, Pāṇini garbles or scrambles the order; and second he inserts all kinds of other sounds. The latter can be easily recognised because they are consonants such as ā, K, C, that are not followed by a short a. Moreover, I have in my recitation stopped after each of these latter sounds to mark a boundary, and the written texts that are before you do the same by making use of vertical bars. I have given this list in Nagari and in Roman, simplifying a little, not only because I cannot do it in Kannada, but because the Roman has one practical advantage over the Indian scripts: it possesses capitals. I have used them to mark the sounds that are not followed by a short ‘a’ more clearly.

European and American scholars have assumed as a matter of course that Pāṇini’s grammar was composed in writing which I consider extremely unlikely. As for the earlier analysis of the Vedic treatises, it was not only about the mouth, but it was certainly done orally, not merely because it belonged to a strictly oral tradition, but because the art of writing had not yet been invented or imported from elsewhere. Pāṇini does refer to writing, that is, he was familiar with the fact that some people write. He was born, after all, in Salatura, near Attock on the Indus, an area that was then part of the Achaemenid Empire where several kinds of writing had been known for a long time and where an Aramaic script was commonly used for administrative and commercial purposes. Pāṇini was a great scientist and he had, of course, heard of, and may even have been familiar with some shapes or features of that Aramaic script. But he was also a Vedic Brahman and that is one reason for assuming that he composed his grammar orally.
In Europe, Japan, or the United States, I must tell my audiences that the ancient Indians did everything orally which, to them, is astounding; but to you it is nothing new. For me it is, in fact, a stumbling block. The pandits from whom I must learn what I want to know, know everything by heart. They rattle off their Sanskrit at a speed that I do not only fail to comprehend, I can barely follow it. I am sometimes regarded as a specialist in oral traditions but, unfortunately, I myself have to look up everything in books and papers. I am at this point not even referring to my advanced age, at which my memory, which has always been bad, seems at times to have totally given out.

Back to the Śivasūtra. It has been called by that name at a much later time, closer to the bhakti period and perhaps in order to suggest that it was revealed by the god Śiva. I have retained that attractive appellation, but at Pāṇini's time, and for many centuries thereafter, that initial list was called Pratyāhārasūtrāṇi (‘The Rules of Condensation’) or Aksarasamāmnāya (‘The Enumeration of Syllables’). I must now account for its two strange deviations from what I have called the natural order of the sounds of language. Both can be explained by introducing the concept of pratyāhāra or ‘condensation’ that I have just mentioned. Pāṇini condenses a set of sounds because he needs them, and only them, for the statement of one of his grammatical rules. That was a momentous innovation and was expressed by means of two other equally great innovations: the use of metalinguistic markers, and the use of metarules which are rules about rules, in Sanskrit paribhāṣā. The latter concept probably antedates Pāṇini.

I am able to explain these two concepts together, because the consonants followed by a short ‘a’ are metalinguistic markers, and their use is explained by the following metarule:

“An initial sound joined to a final metalinguistic marker denotes the intervening sounds as well”.

It works as follows. Please look at the picture on page 283. If Pāṇini needs the sounds a, i and u he simply says aN. If he needs i, u, r, / he says iK. If he needs ya, va, ra, la he says yaN. The two latter condensations are combined to state a rule that explains something
with which I am sure many of you are familiar. In Sanskrit, *dadhi* followed by *atra* becomes *dadhyatra*, “milk here”, and similarly, *madhu* followed by *atra* becomes *madhvatra*, “honey here”. Pāṇini combines these facts with many others and arrives at a general rule which says: “*iK* (that is, *i, u, r, h*) becomes *yaN* (that is, *ya, va, ra, la*), respectively, when *aC* (that is, any vowel) follows”.

Paul Kiparsky, who worked with Chomsky at MIT and with S.D. Joshi at Poona, has shown that Pāṇini introduces abbreviatory conventions into his metalanguage, if and only if they make it possible to bring out significant generalisations in the grammar. Economy, in other words, is Pāṇini’s way of achieving generalisation. It is a long demonstration and provides a rational explanation for the popular maxim, that grammarians rejoice over the saving of half a syllable as over the birth of a son. It should perhaps be quoted in Sanskrit: *ardhamātrālāghavena putrotsavam manyante vāyākaraṇāb*.

I have a few more things to say about Pāṇini before we shall change course and revert to the original thesis. First of all, Pāṇini needed, like Euclid and as a matter of course, definitions. Even if they deal with simple things, as some definitions should, they are not simple and sometimes deeply embedded in the grammar. I like the definition of *padam* or ‘word’. It basically says that a word is a nominal or a verbal form, that is, a noun or a verb. Pāṇini defines both these categories in terms of their endings since Sanskrit is, as you know, a language with a rich system of declensions and conjugations. The list of endings of the nominal declensions are condensed and referred to as *suP*. The list of endings of verbal conjugations are condensed and referred to as *tiN*. Now comes the definition of ‘word’: “a word is what ends in *suP* or *tiN*” or in the original Sanskrit: *suptinantam padam*.

Quite as succinct and attractive, I think, as “a point is that which has no part”, and, more importantly, an equally significant generalisation about our world in which humans and their languages are included. Also another artificial expression that goes beyond Euclid in not being merely stated in a natural language such as Sanskrit or Greek.
Pāṇini’s Sanskrit grammar was composed in *sūtra*-form. The genre of *sūtra* or ‘rule’ was destined to have a great future in Sanskrit scientific and philosophic literature. It was later defined as “a brief and concise statement which should capture the essence, be undoubted and face all directions”. *Sūtras* are often expressed by a formalised kind of Sanskrit. The Sanskrit of Pāṇini’s rules is unintelligible to someone who knows Sanskrit but has not studied Pāṇini. They are highly formalised and resemble formulas. Since they are generally unintelligible in isolation, that is, outside the system in which they played a role, they need to be explained. This led to other new forms of Sanskrit literature, in particular the genre of writing commentaries or *bhāṣya*, subcommentaries, glosses, *vṛttī, varttika, tika* and so on. All these works use expressions and linguistic conventions that are to some extent formalised and have their counterparts in medieval Latin, though Latin is less formalised than the language of Indian linguistics. As for the *sūtras* themselves, Pāṇini’s grammar was not only the paradigm, but it remained their most perfect example.

Pāṇini permits himself an occasional joke, or perhaps pleasantry is a better term. One is the final rule of his grammar which is: *a a*. It is, like many other rules, interrelated with many others and I shall not try to explain it. But it happens to illustrate a recent event in the history of linguistics, a subject on which I shall be even more sketchy than I was in the case of Euclid and Newton.

Pāṇini’s grammar led to a vast output of works on grammar, in different schools and with ramifications into other disciplines such as poetics. Grammar was, in India, the Science of the Sciences, and the number of works on grammar may be as large as that of all the other Indian sciences together. One reason is that all writers of Sanskrit studied Pāṇini’s grammar or later incarnations such as the grammar of Candragomin that Buddhist authors used. Pāṇini is similar to Euclid also in another respect. Euclid had a great commentator, the Neo-Platonist Proclus who lived seven centuries later. Pāṇini had an even greater commentator, Patañjali who lived two or two and a half centuries later. Perhaps the pace
of progress was greater in India than in ancient Greece toward the end of its flourish. Patañjali stated clearly that Sanskrit is infinite, a basic property of language that was implied by Pānini’s grammar but never stated explicitly since Pānini left us nothing but his rules.

Philosophers of language depended on Pānini and I should mention at least Bhartṛhari, the greatest and most original of them. Indian linguistics was also influential in other Asian countries, especially in Tibet. In Europe, it led via Franz Bopp to the beginning of modern linguistics. There is a curious reason for the importance of Pānini’s grammar to the development of synchronistic linguistics in Europe. That type of linguistics, that treats language not as a development but as a system, was a reaction against the diachronic or historical philology of textual scholars. Its founder, Ferdinand de Saussure, did not like or understand Pānini’s grammar which is structurally similar to his own. But the reasons, in the case of Pānini, were different and based upon an erroneous belief: that of the eternity of Sanskrit. It illustrates that science can grow out of mud just like the lotus which is pankaja.

Pānini’s witticism is repeated by the only other linguist who is of a similar stature: Noam Chomsky. Chomsky has never mentioned the name of Pānini in any of his numerous writings, as far as I know. But the major work on phonology of the 1960’s, a large volume that was written by Chomsky in cooperation with his closest colleague at MIT, the phonologist and Indo-Europeanist Morris Halle, ends with a rule of the same form: a a. I would not be able to explain it, but it is a small bow to the Indic master that not every reader may appreciate or understand.

Chomsky is well known in India and you may be familiar with his politics, if not his linguistics. When he returned from his first visit to this country, I asked him what did strike him most. He said: “I was immediately invited for lunch by Indira Gandhi, but would have to wait very long or for ever before I would be able to see (US) President –”, and here followed a name that I have forgotten.
can imagine one reason. Chomsky is as clever as were Śākalya and Pāṇini. That does not generally hold for an American president.

I conclude that Pāṇini’s greatest contribution was the structural system of his grammar which was based upon a unique method and led to deep generalisations, many of which are valid across languages and may be linguistic universals. Insight in the infinity of language was part of that package.

I must now change course and place early Indian grammar in the scientific context in which it belongs and fits most closely: that of the science of ritual or kalpa. It is the first in the Vedic list of sciences and includes geometry. You may wonder whether there exists such a science and where it comes from. It is a large topic and I don’t have much time but shall treat one example: the notion of default. It is, like the concept of metarule, a feature of both the science of ritual and that of language. The two sciences share many structural features. In many cases, the ritual analysis seems to have preceded that of the grammarians and that may apply to the discovery of default options also.

The clearest account of the notion of default occurs in the Śrauta Sūtra of Āpastamba. The Āpastambas lived on the banks of the Yamuna river in the region of Mathura during the Kuru period, but their Śrauta Sūtra was composed further east and later, perhaps as late as Pāṇini. It singles out the default options for oblations, priests and ritual implements. It specifies that the default oblation is clarified butter (jubotiti codyamāne sarpirājyam pratīyāt; I shall continue to quote them in Sanskrit so that you can appreciate how brief most metarules of ritual are). The metarule on the default oblation means that if an oblation is prescribed, but it is not specified what it is an oblation of, it has to be assumed that it is an oblation of clarified butter. If it is an oblation of anything else, it will be stated explicitly. The default priest is the Adhvaryu (adhvaryum kartāram). That means that if a sūtra says that ‘he’ has to perform such and such an act, the ‘he’ refers to the Adhvaryu. If another priest has to perform an act, the name of his office will be specified. Among the ritual implements, the default implement is the jubū ladle (jubūm
There are degrees of default: when the *jubhū* is already used, and no other implement is specified, the oblation has to be made with the help of the *sruva* (*vyaprtayam sruvena*).

The notion of multiple default echoes Pāṇini’s metarule: *anabbibite*, “(the following rules apply) when it [i.e., the *kārakaï*] is not (already) expressed”. It is a very abstract metarule that appears in the section on syntax in which *kāraka* relations are studied. These are relations that are similar to the relations between subject and object, subject and indirect object, and the like. It is a rather technical topic in any grammar, and certainly in that of Pāṇini. There exists an extensive literature on *kāraka* in the Sanskrit tradition, in modern Indian languages such as Hindi and Marathi, English, French, German and Japanese. I shall not attempt to explain any of it. All it shows is that the notion of default is an early notion that seems to have travelled from the science of ritual to that of language. And there is a technical term for it: *anabhidhānam*.

Young Bangaloreans may be inclined to believe that the concept of default originated in Bangalore. They are partly right, since it happened in India, not in Karnataka but in Kosala or Videha, now eastern Uttar Pradesh and Bihar north of the Ganges. That is, it happened at the eastern extremity of Vedic India and at the end of the Vedic period.

Back to our thesis: “What Euclid is to Europe, Pāṇini is to India”, but we must now address the question I added in the title of my talk: “Or Are They”?

To begin at the end – we must, in the case of India, add the science of ritual to the science of language. It is not redressing the balance, but rather the opposite: add qualifications to what seemed to be a balanced comparison between two sciences in two civilisations. It is really two in one and one in the other.

We have seen that Pāṇini was preceded by clever Śākalya in the discipline of grammar. If the science of ritual is equally important, we are entitled to know the name of an equally clever ritualist. It is easy, for it can only be Baudhāyana, who was far more important than Āpastamba, since he was the author of the most
detailed and authoritative of the ritual sūtras. His name is the same as that of the author of the geometrical theorem that is also called after Pythagoras, for both Baudhāyanas belonged to the same Vedic school of that name and their apparently personal names reflect that affiliation.

These additions amplify and complicate the symmetry of the original thesis, that Euclid is to Europe what Pāṇini is to India. But there are other asymmetries in store.

One is concerned with the position and status of the sciences we have considered within their respective traditions. The science of grammar or linguistics that was put on a firm foundation by Pāṇini seems to constitute a unique event in the history of mankind. No other civilisation has created anything similar until we come to modern linguistics, which was not only influenced by the Indian tradition, but would not exist without it. We cannot say the same about the geometry of Euclid, but it does apply to his axiomatic method. So here we have a unique science on the one side, and a unique method on the other. An interesting but asymmetrical relationship.

This particular asymmetry is related to another: while the mathematician Euclid in Europe was not accompanied or followed by numerous systems of linguistics, the linguist Pāṇini lived in a country that can boast of a great tradition of mathematicians. Apart from the Baudhāyanas and their Vedic colleagues, I need only mention Āryabhaṭa and Brahmagupta in addition to the extraordinary geniuses of Mādhava in the fourteenth and Ramanujan in the twentieth century. But India also made the anonymous contribution of the Indian numerals and the zero. These appeared elsewhere in the world in some form or other, but are in their Indian form an essential part of civilisation. If the natural order of the sounds of language, that was discovered in India and adopted and adapted in many writing systems of Asia, had also reached the Near East and Europe, there would not be so many irrational and messy alphabets like the ABC, and the modern world would have rational and practical Indian syllabaries as well as rational and practical Indian numerals.
We would like our life and our sciences to be simple but it did not happen for reality is often more messy than it appeared to be at first. There may be more to it, but with these imbalances I have explained the Or Are They of my title and take my leave.

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Is There Hope for Humanity?\(^1\)

Desmond Tutu

Preamble
It has become a cliche that the 20th century was one of the most violent in living memory. That is saying quite a mouthful when one has regard for how past centuries have been red in tooth and claw, when people were burnt at the stake on suspicion of being witches; and those who were regarded as heretics and mavericks who bucked whatever system held sway in that particular status quo, who refused to toe the line rocking the boat of the prevailing orthodoxy, were given short shrift, imprisoned, scourgèd, and drawn and quartered. Those past centuries were indeed gory, but though many, many thousands were killed those figures pale into insignificance in contrast to what we managed to do with such brutal efficiency. The numbers get to be mind boggling. There have been two so-called World Wars. In the Holocaust in Germany alone six million men, women and children were done to death simply because they were either Jewish, or homosexual, or gypsies.

Previous centuries did not have at their disposal the devastating power of weapons of mass destruction. The 20th century saw a civilised Christian nation unleash the horrific death dealing power of the atom bomb on Nagasaki and Hiroshima killing over 80,000 civilians at one fell swoop. Many survivors are still suffering from the after effects of radiation 60 years after August 6th 1945.

It has seemed as if we want to prove the cynic right who declared we learn from history that we do not learn from history: World War II happened only twenty years after World War I. We have demonstrated, it appears, the incapacity to learn from our mistakes, repeating them almost with gay abandon. And so the holocaust

\(^1\) J. R. D. Tata Memorial Lecture, delivered on December 12, 2005 at the National Institute of Advanced Studies.

Archbishop Desmond Tutu was awarded the Nobel Peace Prize in 1984.
in Germany was followed by the so-called ethnic cleansing in the former Yugoslavia. The atrocities committed during that bloody chapter in the Balkans almost defy description: women raped as a deliberate weapon of war, many being callously infected with the HIV/AIDS virus, family members mown down in front of their relatives; and we are now being appalled by the mass graves being uncovered. It just seems as if there are no depths to which we cannot sink in our depravity and inhumanity to one another.

There have been episodes such as the Armenian genocide and the ghastlinesses that happened during the Rwandan genocide. But the catalogue does not end there. We learned during the processes of the South African Truth and Reconciliation Commission that we have a remarkable capacity, all of us, to commit some of the most gruesome atrocities. For, the perpetrators did not have horns or tails. They were seemingly ordinary human beings who to all intents and purposes behaved like most of us. The banality of evil indeed!

And we have not mentioned the many regional or intra-national conflicts. We know what happened after India gained her independence which led to the partition that spawned Pakistan and Bangladesh, fuelled by sectarian disagreement between Hindus and Muslims – still simmering today with an uneasy truce between the two major nations. We know of the awful things that have happened between Indonesia and East Timor and the civil war in Sri Lanka. And then there has been the conflict in the Middle East and the strife between Roman Catholics and Protestants in Northern Ireland. And you might want to say tell us about only the countries that are not in turmoil in Africa, don’t tell us about Algeria, Burundi, Liberia, Sierra Leone, DRC, Sudan, Angola, Zimbabwe, etc., etc. No, don’t tell us about the turmoil in Latin America.

And then there has been the scourge in so many lands of the HIV/AIDS pandemic which is mowing down huge sections of the population especially in sub-Saharan Africa.

We had hoped that the end of the Cold War would usher in a period of peace, stability and prosperity for all. We felt a euphoria
when the nations of the world adopted the Millennium Development Goals, so idealistic and yet apparently achievable. But it has all been shattered by the immoral invasion by the USA with her satellites – Britain and others – of Iraq for the spurious reason that Iraq had weapons of mass destruction. When this turned out to be a lie, the invaders scrambled to find other excuses and so they concocted the notion of a beneficial regime change. What would happen if countries decided there had to be a regime change in their enemy’s territory? Would we not have monumental global chaos? A new century that had promised much began with a horrendous, totally unnecessary war which has left Iraq in a shambles. The first post-Saddam Hussein Prime Minister, Mr. Allawi, has declared that human rights violations are as bad as in the days of Saddam, if not worse.

And here is the blot, on the world’s only super power’s image, of the abuse of prisoners at Abu Ghraib and the erosion of the rule of law represented by Guantanamo Bay. I never thought I would live to see the day when I would hear the rulers of the USA and Great Britain use the same argument for the use of detention without trial that the apartheid government employed, and that there should be so little outcry in the lands that we thought were paragons of democratic values.

Today, the world seems a great deal less secure and far more violent than before September 11th and its aftermath. Now there is a war against terrorism and some use the unfortunate paradigm of the West versus the Muslim world, and we glibly speak of Muslim or Islamic terrorism. No one ever described the IRA or the Protestant para-militaries in Northern Ireland as Christian terrorists. And the world is now as polarised as it ever was during the Cold War period and the tensions are growing.

So is there hope for humankind in this dolorous situation?

The Stark Reality
There is no doubt that the situation is fraught. There are riots in Manchester and Birmingham and in France and at their heart is the frustration of an under-class, of those who have been left behind:
the poor, the marginalised, the voiceless who almost always are people of colour. It was revealed so starkly that there were gross inequalities in some of the most affluent nations: hurricane Katrina revealed that this was so in the USA. Yes, we cannot pretend that it is otherwise. What is the case in many nations is replicated globally. There is a chasm between the haves and the have-nots, and that gap between the rich and the poor is widening. There is poverty and disease and ignorance abroad in the global South as there is plenty and affluence and prosperity and good health in the global North. But just as the riots in France and the United Kingdom demonstrate, those inequalities will spawn instability, no, not will spawn, but are already causing instability and turmoil. So we should heed the warning lights flashing; there is no way that we will win the war against terror as long as there are conditions in so many parts of the world that make people desperate. People want to know and feel that they matter, but in the world of big business and the G7 they know that, on the whole, they count for very little. They are very small beer indeed. They are of little account. They feel humiliated and sidelined and that can’t be good for the world. The eradication of poverty and disease and ignorance by those with the means to do so is not altruism. No. It is the best form of self interest. We can be free only together. We can be secure only together. We can be prosperous only together.

A Moral Universe
Yes, there are, without any doubt, many horrendous things happening and that have take place. But is that the whole picture? When we were involved with our TRC [Truth and Reconciliation Commission] we were often devastated by the gory details of the gruesome atrocities perpetrators revealed, showing the human capacity for committing great evil. But we were exhilarated to discover that this was not the whole story, nor the most important. When we witnessed those who had suffered grievously not consumed by bitterness, not baying for the blood of their tormentors, it was oh, so wonderful to witness the magnanimity of victims as they offered forgiveness and not
retribution. Yes, it said it wonderfully: we also had this remarkable capacity for good.

We realised afresh that indeed we inhabit a moral universe. That good and evil, right and wrong matter. That there is no way that injustice and oppression, lies and evil could ever have the last word. We had seen just how the perpetrators of wrong had strutted over the stage of the world seemingly invincible and oh, so cocky, and then, and then, as sure as anything, they would bite the dust comprehensively and become the flotsam and jetsam of history. Where are Hitler, Stalin, Mussolini, Franco, Amin, Boukassa, Verwoerd, Malan, P.W. Botha, and myriads of others of their ilk? They have become quaint footnotes to history.

We are shocked when we see evil happening and we are even more appalled if it goes unpunished. We are distressed to witness suffering on a huge scale, such as that caused by natural disaster and war. Witness the amazing outpouring of compassion and sympathy for those who are victims of man-made or natural disasters. There was such an outpouring for the people of the United States after September 11th: a wave of sympathy they dissipated wantonly and quickly when they behaved so badly in their desire for revenge. Witness the amazing sympathy for those hit by the tsunami disaster and Katrina. It seems odd that we should care so much about evil and wrong and disaster if it was not that we believe we know that they cannot be the norm. They are aberrations. The norm is the good, the just, the beautiful, the right.

Even in hardnosed cynical cultures it is amazing that those we admire, indeed revere, are not the macho, the aggressive, the successful. No. The people we hold almost universally in high regard are such as a Mahatma Gandhi, the Dalai Lama, Mother Teresa, Nelson Mandela, Martin Luther King Jr. And why? Because they are good. We have internal antennae which home in on goodness because, you see, we are created for goodness, for love, for gentleness, for compassion, for sharing. We are almost the ultimate paradox: the finite created for the infinite. St. Augustine of Hippo said: “Thou (God) hast created us for thyself and our hearts are
restless until they find their rest in thee”. We are created by God, like God, for God. We have each a God-hunger which only God can satisfy; we have a God-shaped space which only God can fill. The *Upanishads* declare about the human soul that it is ultimately divine: *Tat tvam asi* (that thou art: the divine).

Yes, and so I believe fervently that there is hope for humankind.
Phenomenology of Fun and Boredom

ARINDAM CHAKRABARTI

Imagine Socrates, reincarnated in 2006, gate-crashing into a nightclub or dance-party in Boston or Bangalore. Picture him striking up a conversation with a slightly bored and recently jilted rich youth, handsome and fashionably dressed, sitting in a dark corner, nursing a tall glass of beer. As they both watch the boisterous crowd floating on the dance-floor, Socrates, with his famous fondness for young boys and dialectical conversation, asks our fidgety young man:

“Now, clearly you are not happy my friend! You look more like the man whom both your sage Buddha (Magandiya Sutta, Majjhima Nikaya, 75.17) and I myself (Gorgias 494, 4c) compare to the itching and scratching fellow whose itch increases the more he scratches until it begins to hurt! Why do you come and spend time and money in this place? What do you think those slightly inebriated boys and girls are doing over there in the middle of this deafening music which is about to give me a heart-attack?”

The courteous and natural response, I guess, would be: “I have no idea Grandpa what you mean by ‘happy’ and why you bring up this disgusting analogy of a skin-disease, but we are here to have FUN; those kids over there are trying to have a good time. Do you have a problem with that? And you have no business prying into whether or not, personally, I am having a good time”.

The stereotypical image of Socrates requires him, at this point, to latch on to the words “good” and “time” and go off into all sorts of metaphysical tangents about whether time could be good or bad, or only people, and whether goodness of times could be purchased at a price and so on. I would not develop the thought experiment on those lines. Instead, for the sake of this lecture I shall imagine

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1 The paper is a version of the talk given by the author on August 3, 2006 at the National Institute of Advanced Studies.
At the time of the talk, Prof. Arindam Chakrabarti was Professor of Philosophy at the University of Hawaii, Manoa.
Socrates to be more intrigued by the first and natural typically 21st
century remark: “We are here to have fun” and ask his irritatingly
basic question: “What is this fun?”

Thanks to the nearly irresistible Americanisation of the earth,
or at least of the affluent youth culture in both East and the West,
and thanks to the role of television and the internet with which, in
the words of Neil Postman, we have nearly amused ourselves to
death, a new set of values or even life-goals has come to take the
place of the old ones. Knowledge, Eudaimonia (being deservedly
happy because of being ethically virtuous), fairness, honour – even
freedom or long life – have become much less important for a very
large section of younger people than having fun. Indeed, they would
prefer to have fun all the time, if possible. Just as the new aesthetic
value of the ‘cool’ has taken over the place of the old-fashioned
beautiful, the category of the ‘awesome’, ‘amazing’ has replaced
the older category of the sublime; this new intrinsic value “fun”
seems to have taken over the place of old-fashioned piety, power or
pleasure – dharma, artha, kāma. I say ‘intrinsic value’ because money,
relationships, jobs, cars, houses, travels – all these things are said to
be coveted for they lead to a fun life or fun times, but one is not
supposed to ask: “What purpose does fun serve?” It is supposed
to be an end-in-itself. My colleague Lee Siegel (who wrote a classic
study on Humour in Sanskrit Literature and more recently a best-
selling novel Love in a Dead Language) thinks that this omni-presence
of fun as the single most important secular value can be traced back
to early childhood indoctrination. He claims that several generations
of American children starting from the early nineteen fifties have
been brought up on these illustrated first-books which reinforce
the paramount importance of ‘fun’ with family, with toys, with
pet animals, at work, and with friends. So the personal, domestic,
environmental and social life of a child has been subconsciously
shaped to seek fun in everything. This is reflected in two rather serious
matters of considerable importance to modern, that is, Westernised,
life. One is education and the other is business management. A
humourless teacher has much less chance of success in the field
of higher education, now, especially in the Humanities and Social Sciences, than a humorous one. A joke or two is routinely planned even by a popular science lecturer. Even a physics teacher hopes to reach her brighter students more easily if she starts a lecture by asking how many quantum physicists it takes to change a light-bulb. The expected answer that it takes two physicists and a cat, one to screw in the bulb, the other to observe the first doing it, while the cat, dead and/or alive, actually jogs the memory and imagination of the students in a way mere dry theories cannot. The omnipresence of jokes and the avalanche of funny remarks in mass media has spilled over to the atmosphere of the classroom. Education has to be fun. Similarly, big companies urge their managers to take ‘structured fun’ courses. For more than a decade now, professional stand-up comedians are regularly hired by big offices to entertain and train their personnel, to relax them and to teach them how to relax and befriend clients. Fun is a marketing mantra. Hence more and more advertisements such as the AMUL cheese hoardings in Kolkata try to make people laugh with current affairs jokes or simple puns like “kya cheeze hai?” Vernacular equivalents of the word such as ‘mazaa’ or ‘masti’ are regularly used in local product-promotion in India.

This gives us the first clue into the nature of fun: Perhaps, at the heart of fun lies humour or laughter, since to be funny is to be laughter-evoking or humorous. Now, laughter, of course, can be of many kinds. And it is not clear at all that all of them are constitutive of fun. Bharata in his Natyashastra distinguishes between six kinds of laughter and each of them can be either originating in oneself or caught by a natural contagion (sankramana) from another person, since even when the reason is not fully understood, laughter can spread from one person to another. Thus Abhinavagupta says that there can be twelve kinds of laughter. The basic six kinds are:

1. *smita* (slight smile of somewhat introspective pleasure, which does not reveal the teeth)
2. *hasita* (with a little glimpse of the teeth, a flash of a merry grin)
3. vihasita (with creases around the eyes and on the cheek, a sweet sonorous giggle)
4. upahasita (with slightly inflated nostrils, a peal of laughter with some shaking of the head)
5. apahasita (inappropriate cheeky loud laughter which brings tears to one’s eyes)
6. atibasita (an unstoppable hysteric conceited guffaw which makes one roar)

A chart of pictures used by Charles Darwin in his *Expression of Emotions in Man and Animals* illustrates at least the first three kinds. Now I doubt that the first and the last kind, smita and atibasita or attabasya can be called fun. The latter is commonly enacted by villains in village theatre, or even Hindi films, when they are enraged and disdainful of their adversaries – which is not fun for either them or the victims. Such thunderous laughs can be scary rather than funny. The bashful face of a girl in love may, on the other hand, break into the first kind of touch of a smile, when there is pleasure but no fun.

Indeed, Rabindranath in his masterly collection of conversation - essays called *The Five Elements* (published in the late nineteenth century) clearly distinguishes between pleasure and mirth, comparing pleasure with light and mirth with lightning, and trying to give reasons why we smile for pleasure but laugh in mirth. His word for mirth is “kautuk-basya” whereas his word for fun is “aamod”. The reason why mirth or fun that makes us laugh cannot be identified with pleasure or happiness is clearly stated by Tagore: “Amusement and mirth are not exactly happiness: rather they are mild degrees of pain or sadness. We may feel some pleasure when sadness impinges on our consciousness in small measure”. He takes the example of a funny poem about Krishna appearing in front of Radha’s door in a winter night with his hukkah asking for a light or some tobacco. This incongruity strikes a mild blow stimulating our sensibility and that yields the unique kind of pleasure which we call mirth.
But surely Rabindranath Tagore’s theory of the comical as a mild self-infliction of pain has nothing to do with any masochistic practice of taking pleasure in pain. That is why the next essay picks up the topic of the limits or measure of mirth. If these limits are crossed, teasing laughter turns into painful torture. The central idea is that humour and jollity come out of excitement, any stimulation of our dull sensibility. Those who find the risk and panic of very dangerous roller-coaster rides or fast merry-go-rounds too much to take do not derive any fun from them. But those whose threshold of ‘tolerable fear/pain’ is higher enjoy such risks as fun. The oddity or jolt such as a man slipping, or dropping his pants awkwardly, but not hurting or humiliating himself can stimulate or titillate us and any excitement is fun, in a minimal sense.

Now, humour is a vast subject. Philosophers such as Abhinavagupta and Henri Bergson have very interesting and controversial things to say about different forms and causes of humour. But it may not be a necessary or sufficient condition of fun. Some fun activities such as rock-climbing or going for a vacation in Egypt and seeing the tomb of Tutankhamen, for those who enjoy those sorts of things, may involve not a single laugh, and there may be nothing funny at all about some forms of fun such as a game of chess. On the other hand an avalanche of very humorous jokes can get on someone’s nerves—as many Groucho Marx movies or Shibram Chakraborty stories do—such that it becomes no fun at all in spite of being so uniformly funny. Rabindranath himself helps us here by supplying another clue to the essence of fun. Not just any slight pain is adequate for mirth, he says, but one that is due to a playful breaking of a rule or routine. In the second essay on Mirth he remarks: “Fun cannot be experienced without the slight distress caused by breaking rules. Fun is not subject to normal everyday rules: it is occasional and intermittent, and requires effort. The excitement generated by friction between the distress and the effort is the main ingredient of fun”. In these self-consciously inconclusive dialogues, Tagore expresses considerable sense of mystery around the concepts of amusement and fun: “Mirth is a somewhat mysterious thing.
Beasts, too feel joy and sorrow, but not mirth. Perhaps one finds some trace of this *rasa* (of humour) in the nature of the ape, but apes resemble humans in many other respects as well”. When does this entertaining, amusing degree of incongruity and pain exceed the limit and become cruelty or suffering? Rabindranath comes up with a puzzling example: “Curiosity is often cruel: there is cruelty in humour too. It is reported that Siraj-ud-Daulah used to tie two men together by their beards and put snuff up their nostrils; when they both started to sneeze, he would feel amused.” Farces and circus-jokers often walk a fine line between laughable misadventures and pitiable suffering. Tagore ends his essay on measures of mirth with a very unexpected twist which makes it as a philosophical essay itself a lot of fun, simply because he forces us to imagine a mockery of the greatest human suffering by a cruel devil of a cosmic satirist. This entire concluding passage is worth quoting:

> When people die in hordes during a famine, no one finds it a farcical matter of joke. But we can easily imagine that this might be a highly comic scene for a humour-loving devil: he may glance laughingly at all those emaciated beings possessed of immortal souls and say: “See, your six systems of philosophy, your poetry of Kalidasa, your 330 million gods are all around you: you lack nothing but two lowly fistfuls of rice, and simply because of that your immortal souls, your world-conquering humanity are fluttering at your throats, waiting to fly out of your mouths”.

This is, of course, an extreme scenario of fun at humanity’s expense. But verging on the absurd or bizarre, it shows how Tagore takes the idea of the co-existence of suffering and humour to its logical culmination.

Can we then say that humour and rule-breaking together, or disjunctively, capture the essence of fun? In so far as escape from the drudgery of daily rituals seems to be a big element in the notion of fun, that seems plausible. But very soon, if we observe fun behaviour, we realise that fun has its own rules and rituals. With its
cousin ‘games’ (as in fun and games), though fun is engaged in for
distraction, most parties, festivities, dances, dinners, even watching
funny talk-shows on television, to come to think of it, have pretty
rigid rules of their own. Just as games cannot be played whimsically
by making up “private arbitrary rules”, the participatory social
aspect of fun such as playing that singing game called ‘antyakshari’
or the intelligent game called ‘20 questions’ or such non-game like
festivities such as the colour festival – Holi – or Diwali are rituals
of a different sort and come with their own rules. So fun cannot be
a total release from rules. Perhaps also, one has to keep following
some rules just in order to give public notice of which rules one is
occasionally flouting. That is why the clown actually masters trapeze
and other difficult gymnastics in which he periodically bungles and
fails in a crafty and studied manner.

There seems to be another very important element in fun
which neither humour nor rule-transgression can quite cover. Fun
is the opposite of work. It is closely tied to the not all that clear
a notion of ‘leisure’, which consists in taking a break from work.
Abhinavagupta’s most favorite phrase while discussing the aesthetic
attitude of marvelling at a charming work of art is “camatkara”, a
certain stirring or quickening (druti) of the melted heart. But he
also uses the phrase: “repose of the heart” (hrdaya-visranti). Fun, like
charm, is enjoyed when the heart finds rest in a sort of “this is it”
feeling. Yet the search for fun makes people restless: well there is
only one way a restless heart can find fulfilment, by resting. Hence
the importance of the notion of leisure as against work.

But many creative kinds of hard work such as cooking, painting,
gardening, sculpture, even fairly labour-intensive physical exercise
such as weight-lifting –remember Shasthicharan from Sukumar
Ray’s “Rhymes without Reason” who used to throw up and juggle
with elephants just for fun? – can be great fun. Not all fun is the
opposite of work in the sense of energy-burning movement of
muscle. Indeed fun is almost always exhausting. Simple lying about
and lack of exercise is seldom fun. It is an effect and cause of
boredom, the real enemy of fun. Fun is more a function of sattva
and rajas among the *Samkhyya guna*-s, rather than of *tamas*. An all-time expert on idleness, Jerome K. Jerome, makes the wise observation: “It is no fun doing nothing when you have nothing to do”.

Perhaps, then, the secret of fun lies, not in worklessness or leisure but in the notion of flippancy, unseriousness, shallowness and frivolity. This also explains its crucial distinction from pleasure which often comes with the claim of depth and seriousness. After a very thickly pleasurable or erotic evening with a serious lover or wife or husband, if one remarks that that was fun, then that may be taken as an insult. One is then rightly suspected of having flirted rather than loved. Well, what then is flippancy?

Someone might have felt the objection to my choice of topic that fun is such a frivolous idea that it does not deserve to be the topic of a serious lecture. In self-defense I want to say this: The concept of frivolity is not easy to unpack. It is by no means an unimportant concept. Just as the idea of error occupies a very major part of the *Advaita Vedanta* theory of knowledge, serious philosophy of reality and value is at its deepest when it tries to understand the notion of fiction and flippancy. The mystery of such insubstantial things as rainbows, mirages, shadows and reflections on mirrors constitute the central concerns of substantial philosophy. [We all know that there is no semi-circular substance with a seven-hued surface out there on the sky when we all unmistakably ‘see’ the rainbow. Such shallowness of a public illusion merits the profoundest philosophical meditations.] Thus, laughter and mirth, the rituals of mildly risky collective rule-breaking, those pleasurable packets of weak pain, those exhausting respites from work, the celebration of self-mockery, make excellent topics of moral psychology.

With a touch of confessed trickery and make-believe, do our funs also have an element, not only of release from the pressure of rules and work but a sort of taking leave of morality? There is a strong element of amoralism in the cult of fun: Everything is fair not only in love and war but most notoriously in fun and festivity. Mikhail Bakhtin in his study of Rabelais has dealt at great length on this dissident, ethics-rupturing norm-flouting nature of
a carnival and all the frolic that goes with it. (Mardi Gras?) This is also the reason why solemn moralists cannot stand the valuation of fun. Certain forms of Protestant Christianity, rigid Islam and Brahmo Dharma historically have frowned upon fun as vulgar and devilish. It is a bit hard for a practicing traditional Hindu not to value fun as a good thing since the two major gods in her pantheon are puckishly or crazily addicted to fun. Krishna or Vishnu is called ‘Ranga-natha’ the lord of play or amusement, and Shiva is called ‘Nataraja’ the king of Actors/Dancers. Pretending and make believe and God’s playing magic tricks on His audience seem to lie at the heart of Hindu theology and metaphysics! Yet recent nationalistic misappropriation of neo-Hinduism has slipped into a sort of funless teeth-clenching seriousness which is always angry (and envious). It feels self-important enough to want to protect its own endangered Dharma than feel relaxed and safe being protected by it. If these Hindutva zealots ever dance, that is no dance of fun but a communal death-dance of cruel carnage which Rabindranath would never have condoned as “kautuk” or “aamod” but would have perhaps lashed out against as sheer bestiality in the name of patriotic or religious seriousness. This is the kind of seriousness that we need to make fun of rather than treat as fun.

This use ‘making fun of’, brings out a different edge to the notion of fun. Often fun is a collective activity consisting of teasing another group or individual who forms the butt or target of fun. Such fun is not revelry but raillery, more mockery than mirth. Satire or prabasanam is a literary form which derives from this aspect of fun at the expense of some one or some community. Our ethnic or racist jokes, our political humour, Bankim Chandra’s incomparable Kamalakanta sketches are examples of this kind of pungent fun. And sometimes such ridicule is directed to oneself as when Tagore writes the poem with the theme: “In my next birth, I shall have to become my own sharpest critic” or Sri Ramakrishna Paramhamsa anticipates about he and his wife appearing together in public eliciting the public criticism: “Look, the Hamsa (swan) and Hamsi (she-swan) have come!” Making fun of oneself then
becomes a wonderful antidote to egotism and pride. This is what Bankimchandra was so good at when he wrote the life of Mr. Muchiram Gud.

**Derision and Hedonic Error, Mixed Pain-Pleasure, Self-Ignorance**

In *Philebus*, 48-50BC, Plato has a very clear conviction that derisive fun is pleasure at the expense of the pain of another. At a deeper level, he seems to suggest that the apparent titillation at the spectacle of another person suffering is at heart a mixed state of empathic suffering at the sight of a fellow-human, blended with a pleasure at one’s own claimed superiority in so far as one is not the butt of the joke. But, Plato exposes an emotional error behind such mixed pleasures. It is only to the extent that one does not know what one is feeling at the time that one feels fun at such satire or ridicule. One covers up the painful nature of this confused state by the convulsive laughter which verges on tears. This theory of comedy as based on foolish self-deceptive painful pleasure, though not entirely accepted by Aristotle, had profound impact on his theory of comedy as well (in so far as we can reconstruct his theory of comedy, that is).

Since fun is a search for a liberation from drudgery or tedium, there is also an element of yearning for novelty and a tendency to get easily bored in the pursuit of fun. “O! Whatever!!” an interjection made popular by Bollywood movies and FM or MTV culture shows what has been called a certain blasé or “who cares” attitude, which may well be a direct fall-out of the amoral, shallow, frenetic search for variety and novelty, or even gimmicks, just for change’s sake.

A balanced view of the concept of fun thus needs to pay attention to this family-resemblance character of that concept, which cannot be precisely defined. But it seems to have the above features: humour, rule-breaking, leisure, frivolity/shallowness, amorality, ridicule (including self-ridicule), and novelty. But is it still worth counting as an ultimate value or is its prevalence to be lamented as a tragic decline of our ‘weighty Indian values’ as a consequence of Western influence?
At this point we should turn to Rabindranath Tagore’s own philosophical corner-stone: the idea of surplus, extra or left-over. To quote from his piece in *Contemporary Indian Philosophy* 1936:

Life is perpetually creative because it contains in itself that surplus which ever overflows the boundaries of the immediate time and space, restlessly pursuing its adventure of expression in the varied forms of self-realisation. Self-forgetting, and in a higher degree, self-sacrifice is our acknowledgment of this our experience of the infinite.

Looked at from this angle, our love of fun has the same source as our love of useless knowledge or unself-interested creative activities, and indeed of all such acts of sacrifice which leave a surplus as the sacred left-over, the ‘Hutasheshha’ which we call ‘prasaada’!

Tagore has insisted that the religion of man springs from the craving for “more”, the yearning for something beyond the pragmatic, practical, needful, measured scientific truth. It consists in the limit-crossing exuberance that he rightly sees celebrated in the *Upanishads*. It is too bad that Tagore did not get exposed to Abhinavagupta. Finding an unending source of self-marvelling in the exuberance of creative energy right here in the sensuous life of the body is something that Abhinavagupta talks about in the *Paratimsika Vivaranam*. Life becomes a constant celebration when one realises that the self is an actor on the stage of an insubstantial shadow world where the sense organs are one’s own spectators. A deeper spiritual sense of fun then emerges which, in all its musical ecstasy, pours itself out in such songs as:

*bodro dboom legechbe bredi-komol-e/
moja dekhichbe aamaar mon-paagole/

O What a carnival has started today in my heart-lotus
My mad mind is having a lot of **fun** witnessing this!
Seeing all this, the sense-organs and all the inner distracting enemies are speechless in awe.
Taking this chance, the doors of wisdom have opened up
One then realises what precisely our imaginary youth, whom Socrates found to be unhappy and restless, is really thirsting for. This is the fun, referring to which Sri Ramakrishna had said: “the world may have to be rejected as a snare of illusion to the mere possessor of knowledge (jnani). But to those who possess higher wisdom (vijnani), the world is a great “fun-place”. This world is a fun-factory – here, we eat, share, and lap up as much fun as possible (e shongshaar mojar kuti, khaai daai aar moja luti!), with minimal – nearly non-existent – expectations out of it. One can then laugh at the fact that people laugh at such unfunny things and seek pleasure in such pathetic possessions as cars and bungalows, jobs and careers when death makes a joke out of all that. With the taste of that genuine fun of what Tagore calls “the Exuberant Extra”, the world’s laughter appears to be only a mimicry or semblance of laughter and hence gives rise to a sense of cosmic absurdity which promises to be fun at its infinite best.

PART TWO: PHENOMENOLOGY OF BOREDOM

Fun and boredom are contrary emotional states. They are not logically contradictory, since many emotional states are neither fun nor boring. If I am not bored, it does not follow that I must be having fun. I may be in excruciating pain or running for my life chased by a tsunami. Similarly, any negation of fun does not give us boredom. Everyone who is not having fun is not necessarily bored. A surgeon engrossed in a risky kidney-transplant operation is not having fun; but normally he is not bored by it, for boredom makes focusing and caring impossible. So we need to make an independent inquiry into the nature of boredom. Just knowing what fun is, is not going to make us understand boredom.

Even the concept of boredom seems to be as indecisive, self-referring and vacuous as the emotional tenor of boredom itself. As a family-resemblance across certain types of feelings and attitudes, it seems to show some or all of the following features:

1. Initially boredom seems to be a neutral hedonic state between pleasure and pain, a bland affect. At first it seems better
to describe it as lack of all emotional reaction, or cool un-enthusiasm (epitomised in the expression: “O! whatever!”) rather than a distinct emotion. But the matter is much more complex than that.

2. Since a bore is neither loathed nor admired, the typical attitude towards a bore is that of indifference, tilting towards irritation. Bored persons can also themselves be bores, if they talk enthusiastically and interminably about how bored they are. But usually, people who are not that bored but are over-sociably enthusiastic and chirpily curious about too many things, are found to be bores by less sociable, aloof and fashionably cynical people. If we are seeking mystery, amusement, and cleverness then we may be disappointed or disgruntled with the sincere, repetitive, earnest bore, especially when the bore claims or promises to be entertaining – albeit infelicitously. If we have no particular expectation of excitement, we may simply tolerate or suffer the bore. This feeling of lack of options: “what to do, I have to somehow bear this” is the heart of most forms of boredom (with people).

3. So, often boredom is not quite a neutral feeling, it has a definite negative tone. It is sometimes described as a feeling of lack of feeling (which is quite distinct from simple lack of feeling). Unlike deep sleep – defined in the Yogasutras of Patanjali as that modification of the mind which assumes the form of awareness of absence – boredom is not a pleasant (and refreshing) awareness of absence, but an unpleasant sense of lack of feeling. The bored person has a yearning for feeling something, but a frustrated yearning.

4. Since interest or motivating desire is needed to move someone to action, the felt lack of interest, or want of want, typically results in an inactivity, and lethargy, or sloth. Hence the medieval notion of Acedia, lack of keidos or care (see Aquinas on Acedia in Summa Theologiae).

5. Somewhat conflicting with this inertia, boredom also shows signs of restlessness and a nervy impatience with itself. A
fairly accurate description of the phenomenology of boredom would equate it with an inchoate urge to be free from boredom. The routine rejection of one’s current object of attention as tiresome, and the consequent seeking of newer novelties, is the root of the tedium that the bored person wallows in. That is why opposites seem to meet. If we are unable to focus on even our pleasures, and treat desire-satisfaction as a mere routine of ticking off one item after another in a list of objects to be gained and consumed, we are bored right in the middle of our most well-planned binges of fun. Festive frolic turns imperceptibly into fidgety flagging of interest. Adam Phillips calls it “the mood of diffuse restlessness which contains that most absurd and paradoxical wish, the wish for a desire.”(p 68)

6. Not all boredom is caused by lack of occupation and excess of leisure. Even the daily grind of routine chores can form the basis for the feeling of boredom. Here, lack of novelty is the core of tedium.

7. At a deeper level, this sort of boredom may lead to a certain feeling of disgust with life itself. Such boredom is no longer a bland feeling, but is an intense – occasionally suicidal – sense of self-alienation and is sometimes diagnosed as clinical depression.

8. Attention deficit syndrome: distractedness, inattention, lack of focus.

9. Without attention, there is no finding of meaning. So, a sense of meaninglessness about one’s own existence.

10. Alienation or disconnectedness from the immediate context of the experience.

11. The German word for boredom: “langeweil” literally means – “a long while” signals another aspect of boredom. It is a feeling of time weighing heavily on you. Through boredom we seem to experience slow passing of time.

12. Most importantly, a diffuse self-conflicted feeling of vacuity
in satiety, of starvation in fullness, being “thirsty in the rain” as a recent writer has put it.

To be deeply interested and dedicated to something, regarding some ideal, which is not immediately profitable and ego-centric, important and urgent, is positively uncool; and what is uncool is boring. Thus, the only cool thing is to be uninterested in things except in what is of use to one’s own vegetative existence. The logic of boredom is frankly self-stultifying. Not to be bored is boring, so only self-ironical tongue-in-cheek or subversive interest in ideas and ideals can be “interesting”. Genuine social or moral zeal or zest, unconcealed outrage at rampant social injustices is the most uncool thing.

Of course coolness itself comes with its own unconcealed Euthyphro circle. A certain trait, taste, or posture is cool because it is assumed by cool people. But what makes those people cool in the first place? Someone is cool if she has a cool trait, taste or posture. Liberalism, bracketing out of seriousness as a private quirk, and the equation of the public life of objective truths with the frivolous, light-hearted and non-serious, from which standpoint the committed believer in anything is a bore. The only way to get out of this vicious rut of emotional fashion is to embrace the uncool, to dare to be boring and be interested in boring things. Great things, and indeed great real fun, would then come out of such immersion in tedium and ennui.

(I suggest four “C”-s as a cure to the four “A”-s of boredom. The four A-s of boredom are Acedia, Apathy, Anxiety and Alienation. The cures are much more down-to-earth: Choosing the common, Curiosity, Crisis and Care.)

The Antinomy of Objective versus Subjective Boredom

Outside analytical philosophy, the adjective ‘true’ is often used interchangeably with the adjective ‘real’. A real friend or real gold is loosely called a ‘true friend’ or ‘true gold’. But real gold does not come in two varieties, true and false gold, whereas real
firm belief does come in at least two varieties, true belief and false belief. When a belief, proposition or statement is said to be true, even a false belief or false statement is taken to be as genuine or real as a true one. Now, initially it may seem that to call a feeling like pleasure or boredom false is a careless way of saying that it is not really pleasure or not really boredom. Of course, one can fake pleasure – remember Meg Ryan (Sally) faking an orgasm to prove a point to Billy Crystal (Harry) in a restaurant?– or pretend to be bored. But here, when I talk about true and false boredom I don’t mean fake and genuine boredom. Even a real feeling of boredom, with no pretense, deception or make-believe, I submit, can be false or true.

Plato talks about several senses in which real pleasure can be false. If someone takes pleasure in a false proposition, taking it to be true, then Plato would call it a false pleasure; not unreal pleasure, but real and false pleasure. For example, if I am now genuinely overjoyed that I have got the Chair of Logic at Oxford then my joy will be real, but in Plato’s sense, false. Similarly, if I am genuinely proud that P when P is false, my pride is real but false. If Jane is afraid that she has cancer, and she does, her fear is not only real, it is true. This is the distinction I am trying to draw first about boredom as a feeling. Some real boredoms are false, some others are true.

First, at an unreflective level we think we can draw a distinction between truly objectively boring things and things which appear to be boring because of some immaturity or deficiency in the experiencer. Lots of people find the most thrillingly electrifying Khayals by Ustad Amir Khan very boring. Even if there is no way we can agree on which things are objectively boring, the distinction between objectively boring and only subjectively (mistakenly) deemed boring must be available for such controversies to make sense. If we could not draw such a distinction then we would not have had serious disagreements or debates as to whether a certain person or book or play or journey is or is not boring. When you find X (say Wittgenstein or Harry Potter) boring and I disagree with you, I don’t deny the fact that you have the feeling of boredom.
when you are exposed to X. I deny that X is boring. I try to show you that while there are some objectively boring things, X is not one of them. If someone finds an enthralling Hitchcock film such as “Birds” or “SpellBound” boring, we will tend to correct that affective judgment and diagnose the causes of such subjective boredom coming from within the aesthetically challenged viewer. On the other hand, if someone finds a four hour lonesome occupation-less wait at the dentist’s chamber or a 1000 page novel written in the style of Thomas Mann boring, we shall most probably agree with that emotional judgment.

But, in practice, this distinction between correct boredom based on objective properties of the world or a slice of life in it, and incorrect boredom based on subjective faults or deficiencies, seems to break down. The same mental state of apathy or disgust towards one’s life may be judged to be a moral failure or even as the first sign of a psychological illness by some, while some others may find in it the dawning of a healthy attitude of detachment or even call it the first glimmers of an experience of the emptiness of existence. So, let us try to generalise the two opposite reactions to a pervasive life-weariness or existential boredom and consider arguments for both the following – mutually contradictory – conclusions:

1. Reality is objectively boring, so to find it boring is to get it right. (All existential boredom is true.)
2. Reality in itself is inexhaustibly enjoyable or interesting, so to find it boring is always an emotional mistake – a cognitive failure. (All existential boredom is false.)

When we consider the arguments first for position (1) and then for position (2), we must remember that like most deep and somewhat dispositional emotional states (such as hating, loving, fearing, getting disgusted by or taking pride in), being bored has a cognitive evaluative core. It tells us that the situation, person, object, or activity is humdrum, uninteresting, valueless, meaningless or insignificant, or even absurd. The question is how to distinguish those boredoms which tell this correctly, and those that tell this
equally earnestly but falsely; when, as it were, we should ‘listen’
to this feeling as a guide to the nature of reality, and when we
should ignore it and try to ‘cure’ it by repairing our own emotional
receivers.

Argument for (1) True Boredom
1. If we have to know the true nature of something, some person
   or some type of event, we need to get prolonged acquaintance
   or repeated encounter with that thing, person or event.
2. If we have prolonged acquaintance or repeated close encounter
   with something, some person, or some type of event, then we
   tend to become bored with it.
3. If we know the true nature of something or someone then we
   would be bored with it. Nothing is known properly until one
   is bored with it.

   The true nature of things and people and events is boring, and
   boredom is a veridical revealer of the objective pallor of things.

The Argument for (2) False Boredom
1. If one has to know the true nature of something, then one
   needs to pay acute attention to and take keen interest in that
   thing.
2. If one is bored by something then one cannot take keen
   interest in or pay acute attention to the thing, because you
   cannot care about that which you are bored by.
3. Therefore, if one is bored by something then one cannot
   know the true nature of that thing.

   Therefore, boredom is cognitively disabling and typically
   causes false judgment or ignorance about the real worth of people
   or things in the world or our life in it.

   So, which of these arguments should we heed and which one
   should we reject?
Does repeated contact consist in polishing, sharpening, honing of the mind and rubbing off the veneer of the object revealing its real essence or does it mean a habit-induced thickening of the veil of ignorance, a flagging of interest and blurring of the vision, helping the real object elude our cognitive capacities?

Solutions

If we feel the power or pull of both the above arguments then we should feel torn between them. I can think of three alternative solutions or reactions to this antinomy.

First, it could be said that both sides are mistaken. Both arguments presuppose – as we explicitly confessed – that boredom tells us something which could be correct or incorrect. And that presupposition may be false. The question of boredom being true or false simply does not arise, because boredom, like fatigue or a rage rush, does not tell us anything. Boredom is an emotion or affect – at best a colouring added to our intellectual assessment of a situation. No affective colouring – whether darkly negative, or brightly positive, or neutrally grey – is a correct or incorrect assessment of the real value or lack of value of a situation or thing or person. As long as our cognitive representations of the world are coloured by such biases and affective tints, we are either doomed to ignorance or not in the business of judging or believing. Boredom cannot be relied upon as a true indication of the vacuity of life, nor can it be systematically distrusted as a false judgement. It is simply not a judgement or indication of anything. If I am feeling bored by something, that thing is simply one of the causes of my nausea. My deep boredom is not a representation – hence neither a true nor a false representation – of the thing or its properties, any more than a dizziness brought about by a pill is a judgement about, or representation of, the pill.

This response is not to my taste, since my whole approach to emotions and hedonic states is that they can be true or false without being reducible to judgements, and boredom surely is a hedonic and affective state with a cognitive content.
Second, it could be said that there is no universal answer to the question: “Is boredom correct or incorrect?” In some situations boredom tells the truth, in some it clouds our judgement and makes us miss the real value of things. In fact, in some situations the second premise of the first argument, that familiarity breeds contempt, is not even factually true. When familiarity does not bring tedium, instead, repeated encounter enhances interest and caring attention, the lack of boredom in an otherwise sensitive observer proves that the thing is intrinsically valuable. Whether boredom is true or false depends upon whose boredom it is and with how much exposure to the object it has been brought about. This solution has a lot of empirical wisdom in it, but it is not philosophically that interesting, because it refuses to see that there is a paradox to be solved in the first place.

Third, one may hold that though boredom is a subjective feeling, it not only makes things appear insipid and sour but actually makes them really become insipid and sour. Thus, if we decide or choose to reject the world as absurd or valueless, we can make it so by permitting the sense of boredom to set in and by neglecting all chances to revive our interest in it through curiosity, celebration of everydayness or through caring. The first argument will then be useful for us. If, on the other hand we choose to live fully in the world and get the best out of our lives by keeping at chewing on it, we could buy the second argument and make the world interesting by taking all our inevitable feelings of tedium and apathy as subjective errors.

When Naciketas, the young boy who went up to the door of Death to find out whether there is any life after death was offered an extremely long life by the God of Death, he refused. “Having meditated upon the fragile wilting nature of all colourful romances and fun and frolic,” he explained, “who will be foolish enough to want a very long life?” (ati dirge jivite ko rameta?) He was afraid, it seems, that even the most fun-filled life may turn terribly boring if it goes on for ever! Yet, a deep awareness that life is truly boring, and is engulfed by death on both ends and perhaps every moment,
instead of leading to existentialist Angst or Ennui or Nausea, can actually lead to a wonderful lightness of being. It is our lust for constant variety, our hope for more and more excitement and fun in an ever-lasting body, that makes us so dejected in the face of utter repetitiousness of our death-smitten life. It is a sick boredom which makes us falsely and desperately desire new desires, alienating us from our present and making us mistake cosy familiarity as cloying, stifling closeness. A healthier, more insightful – and I would say – true boredom makes our yearnings lighter, lowers our expectation out of the world and others, and enables us to enjoy life with a lighthearted sense of insignificance. This deep boredom of a disinterested witness, thus, can turn into deep fun. Such boredom is called ‘vairāgya’ (dispassion) in Sanskrit. It is not the opposite of fun. It itself is the deepest variety of quiet fun.

Summary of Conclusions: Phenomenology of Fun and Boredom

‘Having fun’ has replaced most other end-in-itself concepts, including the concept of being happy, at least for the ‘cool’ part of contemporary society. Unpacking this momentous concept we can begin to see the inter-connections between the many faces of fun, such as: humour, relief from tedium, leisure, rule-breaking, derision, excitement, play, short-lived pleasure, and a serious immersion in carnivalesque frivolity. Using resources as diverse as Plato, the 10th century Indian aesthete philosopher Abhinavagupta, Rabindranath Tagore’s, Bergson’s and Freud’s theories of hilarity and self-ridicule, we passed from an analysis of shallow fun to an appreciation of deep fun.

Fun is contrary to boredom. But the habitual rejection of one’s current object of attention as tiresome is just another face of continuous seeking of novelty that fuels our fun. Opposites seem to meet: we are bored in the middle of constant entertainment.

In the second half of the lecture, we look at two opposite attitudes to boredom: treating boredom to be a subjective failure and treating it as a truth-conducive eye-opening feeling. Insightful
boredom makes our yearnings slacker and adds that dispassion to our pursuits which enables us to enjoy our own lives with lowered expectations and a light-hearted sense of insignificance. *Opposites meet at this deep level too*: the tranquil, detached, existentially bored witness enjoys the fun of freedom from novelty-seeking. Deep boredom leads to deep fun, just as shallow fun leads to shallow boredom.
Actors, Acting and Action

GOPALKRISHNA GANDHI

I thank the National Institute of Advanced Studies, Dr. Kasturirangan and Smt. Achala Mohandas Moses for their gracious invitation to me.

I did not know Mohandas Moses personally. One does not have to know a man or woman of action to feel the impact of their work.

I offer his memory my tribute; I offer his example my salutation.

But I do so as chaff might – to grain. Mohandas Moses’ life-work justified the choice of his first name; mine fails the chance of my surname. He brought to every office he held a vision of what he could do from it, of what he could make of that opportunity to serve the ‘larger good’. The Food Corporation of India must run profitably. Mohandas Moses saw that it could also serve the cause of food security. Today, when circumstances are obliging us to import wheat, which we exported not too long ago, Mohandas Moses’ is more than a memory to honour. It is an example to learn from.

As I pondered over a suitable subject for this talk, the word ‘action’ kept coming unbidden to mind – only natural in Mohandas Moses’ context. As did the word ‘acting’ – only natural in the context of a Governor who has become adept at quick dress-changes – kurta without jacket, kurta with jacket, bandgala to dhoti, dhoti to achkan, achkan to lounge-suit depending on the stage he is on and the speech he is to make. I am reminded of what Orhavan Veli of Turkey said once: “What have we not done for our country!

1 Second Mohandas Moses Memorial Lecture delivered on December 18, 2006, during the ninth UGC Course for University and College Teachers at the National Institute of Advanced Studies.

Mr. Gopalkrishna Gandhi was the Governor of West Bengal at the time of the talk.
Some of us gave our lives, some of us gave speeches!” And with that let me enter straightaway the theme of this lecture – Actors, Acting and Action.

We are all, consciously or unconsciously, actors. For we do, at the very minimum, have a sense of ‘appearance’. If we can afford to, we often dress to make a statement. Even the most enlightened and enlightening of us.

Michael Krohnen gives an account of a lunch with the extraordinary philosopher Jiddu Krishnamurti:

An Indian actor and actress came to see Krishnamurti and were invited to take lunch. She was fairly tall, with stunning, classical Indian features and lustrous dark hair falling below her shoulders. Dressed in an exquisite sari, with gold threads running through the azure silk, she moved with elegant poise. A crimson bindi dot between her eyes embellished her exotic beauty.

During lunch the lady, a beauty queen turned movie star, said that both of them were on their way to Hollywood – she to make her US debut in a major science fiction film, he to play the hero in an adventure film for television. She went on to tell us that her role required her to shave off her luxuriant hair. Seeing it cascading down to her shoulders, it was hard for me to imagine that she would actually go through with it and for a moment I thought she was just telling a tall story.

As the conversation idly flowed around films, acting and actors, Krishnamurti remarked quite generally, “Actors are terribly vain”. At this, the actress stopped chewing her food and her dark eyes flashed, perhaps because she took his remarks as being directed against her. Composing herself, she retorted without anger but with a somewhat cool intonation, “But, Krishnaji, aren’t you also a little vain? After all, you comb your hair to conceal the bald spot on your forehead”.

Her matter-of-fact, calm delivery softened the forthright statement and resulted in a minuscule silence around the
I, for one, was taken by surprise, both by her acute observation and by the fact that until then I simply hadn’t noticed that he did have a large bald spot which was covered by an adventurous sweep of hair.

Krishnamurti didn’t react at all. For a breathless second he quietly looked at her, not batting an eyelid, nor uttering a word. With a tiny smile around his lips, he brought the fork to his mouth to take food. The conversation continued amiably.

After lunch, Krishnamurti took the couple on a walk through the Oak Grove, lush-green after recent rains.

Months later, I went to see the film in which the lady starred, ‘Star Trek One’.

At first I had some difficulty recognizing her with a shaved head. Despite baldness, or perhaps because of it, she came across as stunningly beautiful.

It would be instructive to recall that in the 1920s, Hollywood had offered Krishnamurti – who was a sensationally good-looking youth – one million dollars to play the role of the Buddha for a feature film. Needless to say, this Renouncer of Renouncers declined the offer – a loss to Hollywood but what a gain to philosophy!

So, it may be said that we are all part-time actors. But, if we are part-time actors, let us also be clear that we do not thereby become part-time hypocrites. We practice what may be called a form of natural cosmetics, not to disguise or to deceive but just to protect or enhance our dignity. There is nothing wrong in that. The wearing of clothes is of course the most basic of this form. Even the psychologically challenged, unless they suffer a total breakdown of mental controls, we know, retain the human instinct of covering the body. They are certainly not acting, not deceiving.

Before Gandhi’s family joined him in South Africa he took great care about the way they should be attired. He got his wife to wear a sari in the Parsi style so as to fit in with the section of society they were to relate to in South Africa, and he got his children to wear socks and shoes even on the long humid journey across the Arabian Sea.
But in 1914, when the large Gandhi family was returning to India, he asked his nephew to arrange a totally different sartorial appearance for the various children:

…I want every child to land in India with Indian-style clothes on. The very young should have a lungi, a shirt and a cap like the round one of velvet we have and the others should have a dhoti, a shirt and a cap. The grown-ups like you should wear a safu and a long coat... I see no need for the boys to have shoes. However, if they have sandals they may keep them. I think new ones should not be made….

Emma Tarlo, who has written highly regarded books on clothes and clothing, says:

By the time he left South Africa in 1914, Gandhi had already learned to weave hand-loom cloth and had already made public appearances dressed in simple Indian styles of white cotton dress as a means of political protest and identification with oppressed peoples. When he arrived back in India the following year, he staged a dramatic appearance dressed in a white turban, tunic and dhoti, an adaptation of Kathiawadi peasant dress which visually challenged the well established hierarchies that elevated Western over Indian, urban over rural and elite over popular.

It is easy to underestimate just how radical Gandhi’s appearance and clothing policies were. Not only did he challenge long established hierarchies through his own dress but he also proposed a complete re-clothing of the nation as well as a full scale reorganisation of the textile industry.

This was not ‘acting’ in the ordinary sense but it was about appearing in a certain way, to make a statement and a very big one at that. Tarlo adds:

…Gandhi’s decision to adopt a short dhoti or loincloth in 1921 was partly... (because) he had been preaching that it were better for people to reduce their clothing to a mere loincloth made of khadi than to wear more ample garments made from
foreign cloth but he felt that his words did not hold weight as long as he himself was fully dressed. It was the plight of the poor combined with what he considered the failure of the *khadi* campaign that finally drove him to reduce his own clothing, initially on a temporary basis “as a sign of mourning” that *swaraj* was still far off and as means of “making the way clear” for those who could only afford a minimum quantity of *khadi*... Whilst the subtleties of what Gandhi wished to evoke were often misunderstood, his humble appearance had a profound impact on his followers both in India and abroad.

There was a distinguished political figure in India who had held high positions. But nature had made his physical height short. He compensated it with a Gandhi cap that was so tall as to pass for a ship. This was an innocent Green Room touch.

Some of course are obliged to dress in a particular way as, for instance, soldiers and priests. When they do so, are they acting? When I see a *jawan* or a military officer, something within me stirs to respect them. A soldier, a padre, a monk – why, even a lawyer in his black gown or a doctor in his white ‘overshirt’ with a stethoscope around his neck – behaves in a certain way in which he need not, when he is not in those role-defining clothes. There are some things which are ‘simply not done’ when you are wearing a prescribed attire. In fact, you become something else when you are wearing those. You become part of an ‘Order’, with codes of behaviour which also bring or inspire respect. In fact, certain Christian orders have consciously substituted the traditional attire of priests and nuns to ‘normal’ clothes so as not to receive any unfair special status. So, when we observe a code which is connected to what we wear, we are playing a role, we are acting a part. Not deceiving, not pretending, but nonetheless playing a part different from what is our ‘natural self’.

What of those who do not have a prescribed professional attire? They too play parts no less, act no less.

So, all of us are actors. Some are so more consciously than others.
Image, image-making and image-keeping are natural triggers in humans. All of you have read and been moved by George Orwell’s timeless work *Animal Farm*, have read and been nightmared by *1984*. Some of you have also read his lesser-known but profound autobiographical essay ‘Shooting An Elephant’. As a police officer in Burma, Orwell was called upon to ‘do something’ about an elephant in *musth* that had strayed into the habitation. For no reason other than that he was expected by the throng behind him to kill the elephant, Orwell did so. As he poured bullet after bullet into the pachyderm’s puzzled head, he was ashamed. Orwell records the event almost with self-loathing. He ends the essay by saying the only reason he, a *sahib*, shot the animal was “to avoid looking a fool”. He had to fool himself into acting a *sahib*.

There is a similar experience recorded by Edward J. Thompson, a young English poet who became a friend—and critic—of Tagore’s from 1913. EJT’s first visit to Santiniketan saw the following experience:

Three groups were playing football. I went to another, who were cricketing. I found they played really well, especially as they were small boys. After a time, I said I would show them how to bowl off-breaks. A great crowd gathered, to see the exhibition ball. A master was batting. I tossed down a dolly, which pitched a good foot outside the off-stump. He swiped wildly, the ball broke a foot and knocked the off-stump flat. The crowd was tremendously impressed; had I been wise, I should have bowled no more. I was fool enough to be persuaded later to take the leather in hand again. The pitch was very short, so I sent down a few overpitched balls, which a master moved to considerable distances. The boys began to think the *sahib* was very small beer as a bowler, so seeing the prestige of my race at stake, I took my coat off and whopped down a few fast ones which soon leveled all the haughty fellow’s sticks.

Orwell, for the prestige of his office had to shoot hard and shoot well. Thompson, for the prestige of his race, had to bowl fast, and bowl well. Both were acting and acting well.
So, acting, which is not easy, is part of all our lives. Persons in high office, if they are naïve, ‘act high and mighty’. But if they are subtle, they act humble. The supremely self-assured Golda Meir, Prime Minister of Israel, no example of humility, once rebuked a pretender by saying “Oh, don’t be so humble-humble; you are not that great!”

I would like to share with you one other great exposure of ‘acting humble’. In this case, mine. In 1989 or 1990, Mother Teresa came to Rashtrapati Bhavan to call on President Venkataraman. I was Joint Secretary to the President. I sought and got the President’s permission to receive Mother Teresa as she alighted from the car in the grand North Court of that palace – a task which would normally have been left to the able hands of the President’s ADC. My objective was simple and selfish. I wanted to use the opportunity to invoke her blessing for myself and my family. As she emerged from the car, I bent down to touch her feet and eyes closed, prayed for Grace. I imagined beams of light moving from Mother Teresa’s eyes into my head as she stood there, unmoving, for several seconds. But then when I straightened myself – as I had to – I realised that during all those blessed seconds, Mother Teresa had not been looking at this feet-toucher at all. She was, instead, taking a visual measure of Rashtrapati Bhavan’s dimensions and it was only when she had finished with that exercise that she looked at me to say with a glint in her eye: “This building will do nicely for a hospital!” My illusions – or what remained of them – were finally and fully dispelled when, opening a little pouch, she proceeded to say “Let me give you my business card”. Silver beams of Grace I did not get, but I certainly got a lesson in the absurdity of my ego wanting to exploit a Great Being’s public visit to gain a personal blessing. Mother Teresa is blessed; she will soon be declared a saint. But as for her practical role, her natural role, that day outside Rashtrapati Bhavan, was that of a ‘buildings inspector’ and ‘space manager’. She had not been deceived. Not by the grandeur of the place she was visiting, nor by the extravagant ardour of the man who was receiving her. And I, of course, stood as de-deceived as a stage-actor who has been robbed of his costly costume.
The unfortunate truth is that we choose, ever so often, to act in roles we ought not to be playing. For then we are playing with others’ feelings, others’ chances, others’ choices, others’ lives. We self-deceivingly alter our natural behaviour or, in other words, we act in order to look smart before others. The Orwellian ‘elephant’ we destroy or the stumps we whop down can be anything from shareholders’ trust, a rival’s business plan (you must have seen the film Corporate), the consumer’s interest in terms of health (vide pesticides in products), a human vulnerability (has anyone thought of the psychological havoc that can be caused by advertisements of creams said to make skins fair!).

Those who are required to act and react in public have to be, in part, actors. They have to impress, if not awe; to affect if not influence. Some, luckily very few, do it to harm others in this competitive world.

The very witty and equally mischievous Oscar Wilde said, “I love acting. It is so much more real than life”. I think he had a point. ‘Acting’ can be part of the unavoidable action of our lives, our real action which one is obliged to do. A bonded labourer has to act his part though he hates it; a trafficked woman has to be something she loathes. There, acting does become more real than ‘life’. Or, real action can be what one wants to do, or is called upon from within to do – like the Buddha, who took to the robes of a monk after giving up the garments of a Prince; or Gandhi, when he changed from ‘Plus Fours to Minus Fours’. That kind of self-presentation to the beholder is part of the action, the karma and the dharma that one has given to oneself. It facilitates what Jack Lemmon called ‘energy exchanges’ and is a presentation that does not become histrionic. Lemmon said: “Energy exchanges between people are far more impacting and meaningful than word exchanges. Words often do not even matter. It is not what you say that matters, it is who in you is saying it – which self, or sub-personality….”

I would add that this is not just about becoming a great actor, but also a fuller human being.
It has been said that actors who have tried to play Churchill have failed abysmally because Churchill was a great actor playing himself. “True power is an individual’s ability to move from failure to failure with no loss of enthusiasm”. Churchill personified that principle and, in a sense, it was a histrionic principle – be and appear to be enthusiastic at each rung of your failure. But he could do so for he had had a moment of glory that was unsurpassable – 1945. For a politician, a defeat in an election is what a bad review is for an actor – akin to an execution. But for one who has already become immortal, it is impossible for an electoral reverse to be an execution.

What could a bad review of a particular concert by her have done to M. S. Subbulakshmi’s image?

M.S., as we all know, had acted on the silver screen. We know of Meera as a great film. But not so much because of her acting as because of her singing in it and, then again, not so much for her singing as much for the inner being in her that sang as she sang – with transporting effect. M.S. had a talent, which was a gift. The talent was used by the screen; the gift used the screen. “We become actors without realizing it”, Kin Hubbard has said, “and actors without wanting to”. Someone we do not know the identity of, is quoted in the Internet as saying: “You are more likely to act yourself into feeling than feel yourself into action.”

I would say M.S. and old time actors like K. L. Saigal did the opposite: they could feel themselves into the action.

I was at the book launch the other day of a new biography by Shrabani Basu of the extraordinary Noor Inayat Khan, the Europe-based descendant of Tipu Sultan whose half-Indian and half-American origins had begun in her Sufi family of great gentleness but also led her to a commitment for an inclusive world order of which Fascism was the anti-thesis. By a series of circumstances, Noor became the first woman wireless operator to be flown into occupied France by the Allies, and the only Asian secret agent in Europe in World War II. Noor changed her appearance often, dyed her hair, used the languages she knew, passed off as Norah Baker,
as Madeleine, gave the Nazis the slip for an incredibly long time, until she was betrayed, captured, tortured and executed at Dachau. And right up to her brutal end, she did not give out one iota of information about her unit, her contacts, her Command. The Nazis could not even get her real name from her when they killed her.

Noor Inayat Khan was a supreme example of a woman of action, and though never on stage she had to employ, for her great commitment, every article of an actor’s skills. Acting and Action of the highest type combined in her.

I do not know who Sanford Meisner is but I found this quote of Meisner’s most apt: “The truth of ourselves is the root of our acting”. He also said to actors, “If you have the emotion, it infects you and the audience. If you don’t have it, don’t bother; just say your lines as truthfully as you are capable of doing. You can’t fake emotion”. That was, as I said, addressed to actors. It can be addressed to all of us.

And this, therefore, is the point when I move from ‘Actors’ and ‘Acting’ to the final word in my title – ‘Action’. And I do so, dedicating this concluding part of my talk specifically to the memory of Mohandas Moses, who was above all a man of true action.

At an earlier point in this lecture, I had talked about the uniformed Services and Orders. Aristotle has said: “Men acquire a particular quality by constantly acting a particular way. You become just by performing just actions, temperate by performing temperate action, brave by performing brave actions”. I believe the word “performing” can be seen as a synonym for “acting”. But, more significantly, it can be seen as a description of following one’s natural bent or hearkening to one’s inner call – the outer expression of it (in terms of dress or specific acts) being matters of detail. And when a person finds her or his field of action, the form of action becomes progressively less important.

Today’s India is a forest on fire and a sea of calm. The first is seen by the flames or rage around us; the second by the ice of complacency. Both call for action.
There are five tests, I think, that must be passed by any society to be considered just or humane. These are about the way it treats five categories: its old, its children, its women, its prisoners and its animals.

Babasaheb Ambedkar said memorably: “Goats are slaughtered, not lions”. Hindus and Muslims display an identical energy in slaughtering goats at altars of piety. That terrified creature knows no difference between the two. William Blake has the unforgettable line: “A robin redbreast in a cage/ Puts all heaven in a rage”. If I am one or more of those – old, child, woman or prisoner – and happen, further, to be poor, uneducated and unbenefted by the laws of reservation, I am in difficulty. And if I belong to what was traditionally a ‘low’ caste, I will rage. Indeed, I must rage.

Newspapers and the visual media report rage extensively. Day after high-decibel day, we hear the din of agitations. The recent rage over the statue desecration was spontaneous – there were no leaders orchestrating it; indeed, there was no time for them to do so. It was action – not acting. I must salute, here, the so-called ‘ordinary’ people of India who act to help fellow-citizens in distress instinctively, intelligently and effectively. Their ‘acting’ is not ‘acting’ but ‘taking action’. In this, they should be seen as true leaders. Whether in Varanasi, Delhi, Mahim or Malegaon, they acted in the face of terror with uncommon zeal. And I must salute, too, our media which with its 24x7 capability made the country aware of this timely action of the people. These people had every reason to fly into destructive rage. But no, they regulated their rage, they turned it to energy.

But we also know – in other situations, not this one – of professional agitation-fixers bussing-in fist-wavers and shouters, with food packets arranged, like clockwork. Rage has acquired a theatre today. I do not mean good Street Theatre – that is a fine genre. I mean the histrionic hypocrisy of rage-manipulators, its advertisers, wholesalers, retailers, peddlers, creating a debris of its own – broken furniture, shattered glass, burnt doors, buses. I find it deplorable that the genuine agonies of our people get co-opted.
by manipulators with ‘agenda’ed action which is the worst form of acting. Exploiting, manipulating and inflaming grievances passes off too lightly in the guise of dissent. I regret this all the more because our civil society today has some true dissenters of heroic mould whose concerted action has led to major legislative breakthroughs. I have in mind, for instance, Aruna Roy’s movement for the Right to Information. There are others of equal stature.

But if the Rage of the deprived has its theatre, the Calm of the upwardly mobile classes has its equivalent – malls and multiplexes where the ‘cool’ are made cooler. For calm-seeking viewers and readers, popular rage is an irritation, reflecting a waste of time and energy, an exploitation of the democratic freedoms. They opt for crunchies, fizzy drinks and skin creams that make you look fair-and-something advertised on the telly between ‘spiritual’ channel shows, where calm is enacted by godmen who are expert actors, encouraging their audiences to sway to chants, breathe with one or both nostrils, pumping a collective abdomen. I speak as a practitioner and beneficiary of yogic procedures and meditative exercises. My problem is with the crass theatricality of individual yogic messages and the uncritical, escapist absorption of these by people who should be seeing the need for action in India – urgent action.

Here, I cannot but mention the off-stage acting done by our great actors for commercial endorsements. Likewise, by our great sportspersons. Our cities have perhaps the largest hoardings. They are like giant walls, end to end, completely cutting off the skyline. An enormous amount of money goes into that form of acting – the payment to the actors, the payment to the space-provider... I would suggest that a Board of Commercial Endorsement Control be set up which obligates the personalities to part with a reasonable share of their earnings through acting in advertisements for the redirection of urban squalor and destitution, for the problem of urban management is severe.

We must remember that simple people, in one individual trauma or the other, in the course of their daily travails are asking:
Is anyone listening? And what are they getting by way of an answer from our society? Inertness, dormancy, and a lull that precedes another lull – of stagnation, passivity and languor, the dead-calm, the deathlike calm of the doldrums of total unconcern.

Friends, unemployment in India occasions rage, misgovernance occasions rage, the reek of corruption occasions rage. But this rage is not a tsunami of one elemental surge. It is seen here now; there, next. And so, the employed, the misgoverning and the corrupt tell themselves to calm down, there is nothing to worry about.

India’s accomplishments in terms of its continuously evolving technological prowess and its amazingly energetic entrepreneurship do us proud. Our prosperity grows. And not just in the cities of malls and multiplexes but in the countryside as well.

The fact that India now ranks number seven in the world’s short list of ‘dollar billionaires’ with 36 of them named with éclat – a Forbes finding – is good news not just for the billionaires and the Income Tax department but for India as a whole. It is not good news for those who have had the experience of reading another finding – the UNDP’s – which tells us that the India which ranks a high seven in terms of dollar billionaires ranks a low 127 in the index of human development. And it is positively worrying news for those who are aware of the finding – in a recent Round of the NSS – that the average monthly per capita income for farm households across the country is Rs. 503. Referring to this figure, the pioneering biographer of rural India, P. Sainath, asks with unconcealed rage: “How many of our dollar billionaires would have on their persons anything, including the smallest item of clothing, that costs less than Rs 500?” Seventh at one level, one hundred and twenty seventh at another. One India, two truths. One freedom, two realities.

Sainath recently brought a brilliant photo-exhibition to Kolkata. It was on Women and Work in Rural India. Each picture was startling. I will read captions from two photographs:

1. Fetching water, fuel and fodder. Three chores that take a third of a woman’s life. In parts of the country, women spend up to seven
hours a day just getting water and fuel for the family. Fodder, too, takes time to collect. Millions of women in rural India walk several kilometers each day to gather those three items.

2. The loads are usually very heavy. The adivasi woman, also walking up a slope in Malkangiri, has around 30 kilograms of firewood on her head. And she still has three kilometers to go. Many women trudge similar or greater distances to bring home water.

Friends, water is going to be crisis number one in India and, indeed, the world …

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Women form 32 per cent of the work force that prepares the land for cultivation, 76 percent of those sowing seeds, 90 percent of people engaged in transplantation, 82 percent of those transporting the crop from field to home, 100 percent of workers processing food, and 69 percent of those in dairying.

Most of these activities mean a lot of bending and squatting. Besides, many of the tools and implements used were not designed for the comfort of women.

The work women do in the fields sees them move forward constantly while bending and squatting. So, severe pain in the back and legs is very common. Often standing shin-deep in water during transplantation, they’re also exposed to skin diseases.

These women are being obliged to play parts. We – you and I – are like the people who supervise their work. Action is called for. And if action does not come, rage will.

Films have been made about Gandhi, Ambedkar, Bhagat Singh, Netaji. One is to be made on Noor Inayat Khan. Actors have tried to do justice to men and women of action. And if those films have had a good audience response it is because the action they showed is needed today as well.

Actors are people, with the same share of faults and sorrows, qualities and happiness as anyone else. And people who have nothing to do with the screen or the stage are also, in some part, actors. So let us look at actors be they ever so glamorous or rich as
one of us – and let us know that each one of us is also acting a part, perhaps more than one.

Just as there is a Higher Rage and a True Calm there is a point where acting goes beyond histrionics to Righteous Action. This has to be taken by people everywhere, irrespective of their ‘position’ in society. There is, as someone said about acting, no such thing as a small part; only a small actor. Every part beckons for Right Action.

Acting is no easy task, whether on screen, on the stage or in the larger theatre of life. It is demanding of more than skill; it asks for an investment of a personal commitment, of beliefs and emotions. We cannot act our way to feelings; we have to feel our way to acting. And when that ‘acting’ is not histrionic, but real, when that ‘acting’ inspires and helps, not manipulates other people, it is Righteous Action.

I have a final word yet: And this is addressed to professional actors: Please take note of the fact that domestic violence and child labour have recently become the subject of path-breaking laws. We should be proud of those two Acts. Let no film show violence being practiced on women, even if the intention is to criticise that violence because I know and you know that many a viewer – especially the male – has a voyeur inside him that is not seeing the spectacle of a woman being slapped, kicked or raped with horror but with something else. If smoking is not ‘on’ for the screen, violence being practised on women need not be ‘on’ either. And let no theatre or film unit unwittingly employ children on the sets or off them. For, howsoever talented histrionically, their place is in school, not on the screen or the stage – unless the stage is located in the school. You may ask: who will then play a child’s role in a film? Good question. I do not have any answer for that. But I would like to say this: Very well, if a good story has a child in it let a play or film invite a child to play that part. But must commercial ads use children to sell products that have nothing to do with childhood?

Ladies and Gentlemen, let the actor in me thank the actor in each of you and salute one whose life of action touched the mind and conscience of his times.
Scientific and Philosophical Studies on Consciousness

B. V. Sreekantan

Lao Tsu, the Chinese philosopher of 6th century BC is reported to have said, “A journey of a thousand miles begins with a single step”! The Big Question about consciousness is whether even one step has been taken so far in this journey!

To ramify the many facets of consciousness, the theme of this seminar, I would like first to list the types of people who are all interested in studies on Consciousness:

* Those interested in Disciplining of the Mind through Meditation, Yoga, Zen, ...
* Philosophers: Western, Eastern
* Computer and Artificial Intelligence Scientists
* Scientists involved in SETI (Search for Extra-Terrestrial Intelligence)
* Physical Scientists: Physicists, Chemists, Mathematicians
* Instrumentalists: CT-Scan, and other Tomographic instruments like MRI, fMRI, PET, and LASER, EEG, Microelectrodes, etc.
* Life Scientists: Neurobiologists, Neurosurgeons, Evolutionary Biologists, Psychologists, Psycho-linguists, Animal consciousness investigators, and those looking for paranormal phenomena
* Druggists, Anaesthetists
* Those who would like to make a Consciousness Meter
* Those who are holding the view that consciousness is a Non-entity, does not exist as such.

Clearly, the interested people belong to widely different professions; scientists, medical men, philosophers, instrumentalists

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1 Keynote address delivered at the seminar on “Facets of Consciousness”, March 2, 2007 at Jayendra Saraswathi Diamond Jubilee Hall, Kanchipuram. Prof. B. V. Sreekantan is a Visiting Professor at the National Institute of Advanced Studies.
and so on, whose understanding of what consciousness is and the purpose for which they would like to understand what it is are itself quite different. Some are interested in individual consciousness and others in universal or cosmic consciousness and connection between the two. We have to bring into consideration the role of body, brain, mind and environment to explain consciousness.

In this article we will consider only the philosophical (eastern and western) and scientific approaches including the most important neuronal ones in this endeavour.

Let us begin with a brief review of the philosophical approaches on consciousness which began much earlier than the scientific studies.

In western philosophies the Mind is not different from Consciousness. Also, most of the early western philosophers were also scientists. The two broad classifications in western philosophy are (a) Monism (b) Dualism. Under these there are many subgroups. We will list only a few of them.

(a) Monism

* Idealism (Spiritualism): Everything is Mental (Berkely, Fichte, Hegel, Fechner, Mach, and W. James and (in the later period) Whitehead, Tielhard de Chardin and B. Rensch).
* Neutral Monism: The mental and physical are so many manifestations of an unknowable neutral substance (Spinoza, W. James, B. Russel, R. Carnap, Schlick, Fiegel).
* Eliminative Materialism: Nothing is Mental (J. B. Watson, B. F. Skinner, A. Turing).
* Reductionstic Materialism: Mental Events are Physical or Physico–Chemical (Epicurus, Lucretius, Hobbes, La Mettrie, d’Holbach, Pavlov, Lashley, Smart, Amstrong, Quine).
* Emergentist Materialism: Mental Events constitute a subset of processes in the brains of higher vertebrates (Diderot, Darwin, Ramon y Cajal, Schneirla, Judson, Henrich, Hebb, Bindra, Mountcastle).

(b) Dualism

* Autonomism: The Mental and Neural are uncorrelated (Bradley, Wittgenstein).
Psychophysical Parallelism: Every mental event is accompanied by a synchronous neural event (Leibniz, Lotze, Wundt, Jackson).

Epiphenomenalism: Mental events are caused by neural ones (T. H. Huxley, Vogt, Broad, Ayer, Puccetti).

Animism: Mental events cause neural and physical ones (Plato, Augustine, and computational cognition psychologists).

Interactionism: Mental events cause or are caused by neural or physical ones, the brain being only the tool or “material basis” of the mind (Descartes, McDougall, Freud, Penfield, Sperry, Eccles, Popper, Chomsky).

These views as we see have been held by scientists and philosophers across the last several centuries in the Western World.

Box 1 shows the various systems of Indian philosophy, their dependence, independence of the scriptures (the Vedas), and their status as theistic, atheistic.

The Charuvaka philosophy is extreme materialism, perhaps the earliest. There is nothing other than matter. No karma and death is equal to nirvana. The concept of self is physiological. Consciousness is an epiphenomenon that subsists with the body and disappears on death.

The Nyaya-Vaisesika system insists on the reality of both material and immaterial substances, and consciousness is an evanescent product that emerges in the assemblage of happenings in suitable locations. It is an adventitious product of self that makes objects known, and cannot exist without self. It is not a quality of the body. In this system the self is ‘knower’, ‘doer’ and the ‘enjoyer’. The self’s association with mind and body gives rise to consciousness.

In Sankhya-Yoga (Plurality of Souls), Purusha is self; Prakriti is primary substance; Matter is predominantly tamsic part of prakriti; Psyche (mind), predominantly satvic part of prakriti; Mind is always fleeting and consciousness co-ordinates the fleeting states and cognizes pleasure, pain, etc.
Numbers 1-6 are orthodox systems owning allegiance to *Vedas* and Numbers 7-9 are heterodox systems – no allegiance to the *Vedas*. (Vedas: Rig, Yajur, Sama, Atharva (*Samhitas – Mantras; Brahmanas – Rituals; Aranyakas – Contemplatives). Upanisads: End portions of Aranyakas of each Veda.)

The accepted sources of knowledge (*Pramanas*) in Indian philosophies are *Pratyaksha* (Perception); *Anumana* (Inference); *Apta Vakya* (Testimony); *Upamana* (Comparison); *Arthapatti* (Postulation); *Anupalabdhi* (Non-cognition)

Vedanta accepts all 1-6; Nayyayikas only 1-4; Sankhyas only 1-3; Vaiseshikas only 1-2; Bauddhas only 1-2; Charuvakas only the first.

Yoga accepts all this and maintains that practice and non-attachment lead to supernatural powers of the mind – control over body telekinesis, ESP, etc.

There are many versions of the Vedanta philosophy. But the three main versions are – Advaita, Dvaita and Visishtadvaita. The essential difference between them is the relation between Brahman, Self and Reality. The relation between these is spelled out in the four Mahavakyas as follows.

* **Prajnanam Brahma** Rig Veda Aitreya Upanishad
  (Consciousness is Brahman)
* **Aham Brahmasmi** Yajur Brihadaranya Upanishad
  (I am Brahman)
Ayam Atma Brahma
(The Self is Brahma)

Tat Tvam Asi
(That thou art)

According to Advaita philosophy of Shankara, we have essentially to consider two viewpoints – Vyavaharika and Adhyatmika.

Vyavaharika is a transactional point of view – the world exists and is real for all of us. Adhyatmika is a transcendental point of view – for the realised soul, there is only Brahman and no world. Brahman is Absolute Consciousness; Individual Consciousness arises when this Absolute Consciousness interacts with the individual mind.

Clearly these are profound insights in both systems [orthodox and heterodox] of philosophy on the ontological status of consciousness as the substratum from which everything has arisen. As we shall see, modern science has come to a very similar conclusion on the ultimate substratum. Only some scientists have reservations about the type of connection between the substratum and consciousness. We will consider the significance of these parallelisms between insights in philosophy and science later.

Let us now move on to consider the current scientific views of consciousness. The way scientists look at the problem of consciousness is shown in Box 2 and Box 3.

Box 2. The paradigm of scientists looking at the problem of consciousness

The Nobel Laureate Francis Crick in his famous book, The Astonishing Hypothesis, states “Your joys, your sorrows, your memories
and your ambitions, your sense of personal identity, your free-will are all in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules”.

But what is consciousness? A working definition may be arrived at by our experience: I see, I hear, I smell, I taste, I feel hot, cold, I think, I decide, I control my acts, I enjoy, I get angry, I calculate, I remember, …; whatever is ultimately responsible for all these and many more, I call consciousness. Why? Because none of these is possible when I am unconscious.

**Box 3. The process of cognition according to scientists**

In humans there are $10^{11} - 10^{13}$ neurons, each neuron passes through $10^3 - 10^4$ synapses and releases 60-70 neurotransmitter chemicals which have been identified. Any single event involves the combined firings of hundreds of thousands of neurons. The example of neuronal excitation of 80,000 synapses feeding into a Purkinje cell of the brain during a “Discus Throw” is shown in Figure 1.

**Figure 1.** A Purkinje cell of the human cerebellum. This cell receives about 80,000 synaptic inputs during a Discus Throw. (After Ramón y Cajal, 1952).
Table 1 illustrates the two kinds of experiences generated in an individual when he looks at, say, a rose flower. The real problem for the scientist is to figure out how these two different kinds of experiences, one in the form of electrical signals and chemicals with which he becomes familiar in his laboratory, generates the feelings, sensations, emotions, etc. which cannot be described in terms of physical parameters.

<table>
<thead>
<tr>
<th>A (Physicalism)</th>
<th>B (Mentalism)</th>
</tr>
</thead>
<tbody>
<tr>
<td>What happens in the Brain and its accessories</td>
<td>What happens in the Mind</td>
</tr>
<tr>
<td>• Formation of ‘image’ of the flower on the retina.</td>
<td>• Distinctive perception and recognition of the flower as a rose.</td>
</tr>
<tr>
<td>• Activation of rods and cones in the retina’s various layers.</td>
<td>• Evokes sense of beauty - Smell of the rose flower</td>
</tr>
<tr>
<td>• Generation of action potentials - electrical pulses.</td>
<td>• The awareness and recognition of the colour of the flower.</td>
</tr>
<tr>
<td>• Transmission of pulses through axons in neurons.</td>
<td>• The softness and smoothness of petals on touching the same.</td>
</tr>
<tr>
<td>• Happenings in Synapses and Dendrites.</td>
<td>• Appreciation of symmetry, beauty and aroma.</td>
</tr>
<tr>
<td>• Releases of Neuro-transmitter chemicals at various locations.</td>
<td>• Earlier happy associations flood the mind.</td>
</tr>
<tr>
<td>• Activation of Cortices. Electrical Signals in various Oscillations, chemicals locations time sequence.</td>
<td>• Emotions triggered. The mind is able to gauge the size, distance, shape and other physical characteristics as well.</td>
</tr>
</tbody>
</table>

The relation between specific mental functions and the anatomical parts of the human brain are illustrated by Figure 2. It is now established that the left brain puts things sequentially
in a logical order, forms thoughts, into words, controls speaking, reading, computing, quantitative skills; is responsible for keeping our life sensible, organised and on schedule; and the right brain is host to motor skills, intuition, emotion, musical cadence, ability to look at the whole situation and leaps of imagination.

**Figure 2. Left Brain**

We all use the curvature of the contours of the lips to interpret whether the person we are looking at is serious and unhappy or is smiling and happy. What is interesting is that the interpretation depends on the handedness of the observer as illustrated in Figure 3, taken from the book by Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p.120.

**Figure 3. Interpretation depends upon handedness**

<table>
<thead>
<tr>
<th></th>
<th>For RHS</th>
<th>For LHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smiling Happy</td>
<td>Serious Unhappy</td>
<td></td>
</tr>
<tr>
<td>Serious Unhappy</td>
<td>Smiling Happy</td>
<td></td>
</tr>
</tbody>
</table>

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Figure 4 illustrates further the Location Specificity of Functions (Still Plasticity Exists). Circuit diagram for some routes from sense organs to the brain. SC, superior colliculus, IC, inferior colliculus. Small circles represent nuclei of the thalamus as follows: (1) medial dorsal, (2) medial ventral, (3) ventral posterior medial, (4) ventral posterior lateral, (5) medial geniculate, (6) pulvinar, (7) lateral geniculate. In all this the chief concern is the binding problem: Who collates the information located in the different cortices? Who recalls the memory? And How?

The spectacular advances made in the neuroscience of vision and the extent of detail to which modern technology with scanning instruments has enabled the scientists to unravel the intricate neuronal connections is illustrated by Figure 5. Till recently it was held that all the neuronal connections are made before the baby comes out of the womb. This view has changed recently. It has been found that new neuronal cells and connections continue to be made even at advanced ages.
Figure 5. Diagram showing how different parts of the brain deal with different aspects of vision.

Over the past few decades the following features have been established by neuroscientists:

* The human brain comprises $10^{12}$ cells out of which $10^{11}$ of them are neurons linked to networks that give rise to perception, intelligence, creativity, emotions, memory, etc.
* Large anatomic subdivisions of the brain offer a rough map of its activities.
* The brain is bilaterally symmetric, its left and right hemispheres are connected by the corpus callosum and other axonal bridges.
* The Medulla regulates autonomic functions – respiration, circulation, digestion, etc.
  - The Cerebellum: co-ordinates movement
  - The Limbic System: Emotional behaviour, long term memory
  - The Cortex (1.5 m² area, 0.2 cms thick): The ancient evolutionary part of the cortex is part of the Limbic system.
  - The younger Neo-cortex: (i) frontal (ii) temporal, (iii) parietal (iv) occipital → thought, perception
  - Motor cortex, somatosensory cortex, visual cortex, …
The neurons which are connected to all parts of the body, carry the messages in the form of an action potential.

A very interesting feature is that all the different sensors – retina, eardrum, skin, nose membranes – produce identical action potentials. The information is coded in the form of frequency modulation – bursts of action potentials, spacing within the bursts and between the bursts, and multiple neurons firing at the same time, etc.

The neuronal signals have to pass through a number of gates and check posts – the synapses – which regulate the passage or inhibition of the signal by the emission of neurotransmitter chemicals.

The synapses are connected to other neurons and dendrites.

There is no electrical transmission of the signal through the synapse. It is chemical transmission by the neurotransmitter chemicals.

Till recently it was held that there is no evidence for a central processor to which all the information is channelled. There is no Homunculus or Little Man inside the brain receiving, interpreting and sending out messages and triggering the necessary motor action. This view has undergone change recently, as will be discussed below.

The information even about one event – seeing a picture – is distributed all over the visual cortex. There is no discernible order or sequence in the locations – the colour is in one place, the intensity in another, the angle of viewing in yet another place, the distance is in yet another location …

The information within a single cortex and from the different cortices has to be processed accessing the requisite memories, which again are distributed all over. This is the central role of consciousness.
In his book *The Quest for Consciousness: A Neurobiological Approach*, Christof Koch\(^3\) writes:

“The intermediate theory of consciousness accounts well for a widely shared and persistent feeling: That there is a little person a *homunculus*, inside my head who perceives the world through the senses, who thinks, who plans and carries out voluntary actions. Frequently ridiculed in science and philosophy, the idea of a homunculus, is nevertheless profoundly appealing because it resonates with the everyday experience of who “I” am.”

Francis and I believe that somewhere in the confines of the frontal lobe are neural networks that act to all intents and purposes like a homunculus. This is a *non-conscious homunculus* who receives massive sensory input from the back of the cortex (Olfaction is an exception to this rule), makes decisions and feeds these to the relevant motor stages.

The homunculus is a real *physical* system … There is no infinite regress since the homunculus is *not meant to explain qualia*. It is more a computational entity.

The concept of non-conscious homunculus is not trivial. It is responsible for many complex operations such as thoughts, concept formation, intentions and so on … Supramental processes beyond conscious perception.”

In 1990, Crick and Koch had argued in favour of 45 Hz oscillations being responsible for synchronisation (Binding Problem). In 2004 in the same book referred to above Koch says “We no longer believe that 40 Hz oscillation are necessary for consciousness to occur. What is needed is the record of simultaneous activity of ten thousand or one hundred

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thousand brain cells. However the exact mechanism by which this occurs is not spelled out.

The achievements and limitations of biological science on the anatomical aspects involved in consciousness and the molecular approaches to its explanation as of now can be summarised as follows:

Experiments have established considerable redundancy in the signal transmission channels and also plasticity in the brain functions – for example on special occasions the auditory cortex has taken over partially the functions of visual cortex.

The famous neurosurgeon Penfield has shown that by touching with microelectrodes specific points in the brain of the patients on the operating table, old memories of songs, places etc. have been revived indicating correlations between specific memories and specific locations. The mechanism of trigger and storage of memory are not known.

The power of molecular approach to mind functions has been illustrated through the effect of drugs that ameliorate hallucinations, delusions, disoriented thinking. (The puzzle is the slowness of the reaction.)

Max Delbrück states: “Human beings are organisms capable of manipulating internal representations of the World by means of concrete operations and can transcend the bounds of their biologically given perception. They can liberate themselves and construct a view of reality that conflicts with intuition, yet gives a truer, more encompassing view” (Figure 6).

![Figure 6](image)

The figure is a two dimensional drawing. However, the perception is that of a cube. The questions that arise are: What is
the biological basis for this three dimensional perception? Is there a gross difference between this and the four-dimensional intuition of a professional relativist who talks in terms of 3+1 dimensions?

While constituents are important, the greater importance of structures is being realised in many fields, particularly from the point of view of emergence of new properties. Consider the example of the three compounds of three chemicals carbon, hydrogen, oxygen. They give rise to alcohols, sugars and fatty acids with very different properties. Same constituents but different structures. You cannot deduce the properties from the constituents.

P.W. Anderson (Physicist) says: “I believe that at each level of organization or scale, types of behaviour open up which are entirely new and basically unpredictable from concentration on the more and more detailed analysis of the entities which make up the objects of these higher level studies”.

Peter Medawar (Biologist): “Starting with atoms, building up through molecules, cells and organisms to conscious individuals and society, each level contains and enriches the one below, but can never be reduced to it”.

In the context of the connection between neural correlates and consciousness, the well known quantum coherence phenomena illustrated in phenomena associated with Lasers, Superconductivity .... Downward causation becomes relevant. Efforts are on to look for quantum coherence processes in the neurons.

William James (Psychologist, Philosopher): “Taking a purely naturalistic view of the matter, it seems to me reasonable to suppose that unless consciousness served a useful purpose it would not have been superadded to life”.

Miller (Biologist): “All motile creatures must be ‘conscious’ in some form because their motility requires it for safe navigation and indicates it behaviourally – down to Protozoa which have no separate nervous system – if this is unconscious functioning, then unconscious must evolve as much or more than consciousness.

Sperry (Neurosurgeon): “Consciousness is a higher order emergent from holistic properties that will in turn exercise ‘downward’ control over neural functions”.

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To the question whether physicists rather than biologists can help us to move forward with regard to consciousness problem asked by Nancy Cartwright (Professor of Philosophy), Roger Penrose (Astrophysicist) answers:

I claim that we must search for structures in the brain with some very clear cut physical properties. They should be such as to enable well shielded spatially extended quantum states to exist, persisting at least for something of the general order of a second, where the entanglement in this state gives it a spread over fairly large areas of the brain, probably involving many thousands of neurons all at once. To support such a state, we need biological structures with very precise internal construction, probably with a crystal like structure and be able to have an important influence on synaptic strengths.

I do not see that ordinary nerve transmission can be sufficient on its own because there is no real chance of obtaining the needed isolation. Things like pre-synaptic vesicular grids, as has been suggested by Beck and Eccles could be playing a role, but to my way of thinking, cyto-skeletal microtubules appear to have more of the relevant quantities. It may be that there are many other structures on this sort of scale (such as clathrins) which are needed for the full picture ….

As we have already stated, in his book, *The Astonishing Hypothesis*, the Nobel Laureate Francis Crick starts out with his astonishing hypothesis

Your joys and your sorrows and your ambitions, your sense of personal identity and your free-will are in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules.

Well, at the end of 262 pages in which he has elaborated in a masterly way how this hypothesis is supported by neurosciences, he remarks:

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4 Roger Penrose. *The Large, the Small and Human Mind*, Cambridge University Press, 1997, p. 179,
The astonishing hypothesis may be proved correct. Alternatively some views close to religious ones may become more plausible. There is always a third possibility that facts support a new way of looking at the mind-brain problem that is significantly different from the rather crude materialistic view many neuroscientists hold today and also from the religious point of view. Only time and much more scientific work will enable us to decide.

Daniel Danin (Physicist): “Quantum physics by taking human mind deep into matter could never ‘touch the bottom’. It is just looking for it and will look for ever”.

Weinberg: “If neuroscientists ever explain consciousness for example ‘they will explain it in terms of the brain’ and the brain is what it is because of historical accidents and because of the universal principles of physics and chemistry.”

Max Delbruck (Physicist turned biologist): “The feeling of absurdity evoked by the question of mind from matter is perhaps similar to the feeling of absurdity with which we have learned to cope when we permit relativity theory to alter our intuitive concepts of space and time and quantum theory to alter our intuitive concepts of objects and causality.”

Essentially these views are regarding individual consciousness. Let us now consider the views of some of the other scientists who take a much broader perspective on consciousness and its ontological relation to the world:

Max Planck (Physicist): “Consciousness, I regard as fundamental. I regard matter as derived from consciousness. Everything we talk about, everything we regard as existing postulates consciousness. We cannot get behind consciousness”.

Wheeler (Physicist): “Reality might not be entirely physical. Our cosmos may be a participatory phenomenon, requiring observation and thus consciousness itself”.

Heitler (Physicist): “What physics gives us is a ‘sort of projection of the world’ on to a causal-quantitative plane just as a
photograph is a projection of the 3-dimensional landscape on to a plane paper. Principles of Life, Will, Action, Perception, Memory, Purpose cannot be reduced to physico-chemical processes”.

John Wheeler: Physical reality has thus moved from matter → molecules → atoms → protons, neutrons, electrons → quarks and leptons → space or vacuum and geometry of space → matter. We have seen that matter and radiation are equivalent and transform to each other. So ultimately, the physical substratum of everything is just one entity – quantum mechanical vacuum. The question arises – does it help to reduce life consciousness, mind, etc. to the motions of subatomic particles similar to matter? It looks that such a step even if realised is not likely to give any different insight to reality. All that again will be reduced to “empty space”. (In what way is this insight different from . . . everything is Brahman: sarvam khalvidam brahma)?

Schrödinger (Physicist): Consciousness is the very basis of all creation.

Eddington (Astrophysicist): “The stuff of the world is mind-stuff. The mind-stuff is not spread in space and time. Recognising the entire world is abstract and without ‘actuality’ apart from its linkage to consciousness, we restore consciousness to a fundamental position.

Von Weizacker (Physicist): Consciousness and matter are different aspects of the same reality.

Dyson (Physicist): I think our consciousness is not just epiphenomenon carried along by chemical events, but is an action against forcing the molecular complexes to make choice between one quantum state and another. In other words, mind is already inherent in every electron.

Paul Davies (Physicist): “... These and other considerations have convinced me that there are new processes, laws and principles which come into play at the threshold of mental activity. I do not believe that behaviour, let alone psychology can ultimately be reduced to particle physics.

I find it absurd to suppose that the migratory habit of birds, not to mention many personal sensations and emotions are all
contained in the fundamental Largrangean of superstring or whatever”.

Michael Polanyi (in “Life’s irreducible structure” in Science, New Series, 160 (3834), Jun. 21, 1968, 1308-1312.): …Life transcends physics and chemistry, there is no reason for suspending recognition of the fact that consciousness is a principle that fundamentally transcends not only physics and chemistry, but also the mechanistic principles of living beings.

David Hodgson (in Mind Matters): “Mind to some extent be said to be a function of brain, but only if brain is understood not as detectable macroscopic object, but as the quantum reality underlying both this object and the mental events of consciousness. Mind and brain are manifestations of and view points towards, a “single reality”, but with important differences, in particular in relation to the development over time of this reality and (specifically) the causes and explanations of such developments”.

Albert Einstein (Physicist): “All knowledge of reality starts from experience and ends in it”. Experience remains, of course, the sole criterion of the physical reality of mathematical construction. But the Creative principle resides in mathematics. In a certain sense therefore, I hold it true that pure thought can grasp reality as the ancients dreamed”.

Erwin Schrödinger: “The world is a construct of our sensations, perceptions, memories. It is convenient to regard it as existing objectively on its own. But it certainly does not become manifest by mere existence”

Conclusions

Technological advances in the field of sophisticated instrumentation (micro-electrodes, lasers, EEG, fMRI, PET, etc.) and brain surgeries have led to remarkable developments in brain research – in mapping the different parts, in correlating their functions, in understanding the plasticity of the brain, in discernment of time sequences and location specific responses, likely sites of memory, the identification of the
neurotransmitters and the neuroreceptors and analysis of the patterns of neuronal signals, etc.

* There are some indications that some of the brain processes are quantum mechanical in nature. This opens up a new dimension to brain research, both in terms of further investigations and interpretations, and will necessarily require the active collaboration of scientists in the areas of life sciences and physical sciences. Again, new technological advances like the realisation of single photon sources and supersensitive interferometer and recording techniques are enabling scientists to verify the intriguing predictions of quantum mechanics. These developments will necessarily find echoes and applications in Brain Research.

* Developments in the field of ultimate constituents of matter and radiations and the nature of physical forces lead to new fundamental ideas of quantum mechanical vacuum, multidimensional space, etc. and have implications to the nature of mind and consciousness as has been emphasised by some of the outstanding scientists. These become particularly important if the present attempts to understand mind and consciousness in terms of molecular activities alone fail and one has to go to deeper levels.

* The possibility of an equivalent of ‘Homonculus’ a Central processing Network to which all information is channelled and is processed is being considered again.

* It is fair to say, that from the scientific point of view, no clear cut understanding has been reached yet on what exactly is consciousness and at what stage of evolution it became a vital aspect of a living system.

* The establishment of the connection between emergence of language and consciousness may be a crucial line of approach – this brings in the whole question of animal consciousness and levels of consciousness.

* The idea that the brain may be a sophisticated parallel processing computer is being hotly pursued – particularly by
A.I. scientists. It is difficult to see how they will succeed since there is no understanding of what sort of a machine is the brain.

* There is no evidence yet of any extraterrestrial intelligence.

* Further insights might emerge from more sophisticated studies on the different states of the mind – the waking, dreaming and sleeping and more importantly on higher level mental states that are reached through the practice of Yoga, Zen, Meditation, etc.

* The domain of the unconscious – Is it different? What is the connection between the conscious, sub-conscious and unconscious states – these need to be investigated using the modern instruments and methods of analysis.

* On the philosophical front, what is interesting is the increasing recognition of certain overall parallelisms of modern findings and ancient insights which pursue entirely different approaches: the oneness of the substratum of all physical activity from the time of origin of the universe to the present day – the space-time continuum – the quantum mechanical vacuum – in comparison to the Urstoff – Brahman, Shunya, Tao, ... What is the meaning, significance of this parallelism?
Munzalas in the Mist: The Discovery of the Arunachal Macaque

Charudutt Mishra and Anindya Sinha

In a remote corner of western Arunachal Pradesh, sandwiched between the Kingdom of Bhutan on one side and the People’s Republic of China on the other, it was another wet and misty monsoon afternoon. One of us was behind the wheel, while several pairs of eyes, including those of colleagues Aparajita Datta and M. D. Madhusudan, gazed intensely through the blanket of mist, desperately looking for signs of the road. Visibility was reduced to just a few metres. There were moments when even the last few visual references along the mountain road disappeared. Yet, we kept moving, pushed to rather unintelligent limits by feelings of anticipation and anxiety.

There was anticipation in the air because we had just started exploring the little-known high-altitude regions of Arunachal Pradesh, arguably India’s richest region in terms of her terrestrial biodiversity. There was immense excitement, as the biological wealth of these parts had hitherto been only poorly documented or explored. In a refreshing deviation from field experiments and statistical tests that are the bane of any field ecologist’s life, in this forgotten corner of India, all of us felt transported back a few centuries earlier, to the age of discovery.

But we were also anxious. The anxiety stemmed from the nagging need to justify the time, the effort, and the society’s

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resources that make field research and conservation possible. It is an anxiety that any scientist or conservationist constantly feels, particularly at the beginning of a project, before meaningful results start trickling in. That can take months, sometimes even years. Emotions were strong, only instinct and driving experience, and indeed luck, embanked us from the Nyamjangchu River flowing several hundred metres below, rushing its way into Bhutan.

Suddenly, the mist cleared magically, and a small troop of equally magical monkeys ran across our path into the understorey. The vehicle screeched to a halt. Through our binoculars, the animals looked large and impressive, and they looked different from any other monkey we had ever seen. It was 19th of August 2003, our first sighting of what would later come to be known to the world as the Arunachal macaque. This troop of four to five monkeys disappeared from our view as quickly as it had appeared, leaving us thrilled but also a little disappointed at not having been able to observe them at length.

I don’t think the significance of the moment hit us then, but we realised that we were onto something important.

Yet, we were unsure.

Was it our imagination? Wishful thinking, perhaps? That these primates were unlike any others on the planet? A new species? It was just too remarkable, too inconceivable a notion – that a new species could be discovered in a land of a billion people, and its wild habitats shrinking.

In the weeks that followed, we were to sight eight more troops of this monkey. It took some effort though, as our biological expedition involved over 800 km of driving and more than 200 km of trekking and camping in slushy forests and meadows, often in wet sleeping bags and dripping tents. Throughout the expedition, we remained uncertain about what this primate was. Was it, for instance, a different-looking representative of the Assamese macaque that is reported to occur in this part of the country?

The expedition got over after a few weeks, and we headed back, almost as confused. But we soon got busy; we had our data
to analyse, papers to publish, and reports to send to our funding agencies. In addition to this primate, we had recorded, during our expedition, a fascinating assemblage of high-altitude species that included the snow leopard, bharal, Chinese goral, red panda and others. We had, in the process, also identified and mapped an important site for wildlife conservation in Arunachal Pradesh, where the state government is now trying to set up a biosphere reserve.

The secrets surrounding the identity and other aspects of this primate’s life, however, kept nagging us. After just a few months, in April of 2004, the two of us found our way back to Arunachal Pradesh, to conduct more field observations on this mysterious monkey. Another 200 km were surveyed by road and 80 km on foot. We made detailed field-observations, and captured the monkey in photographs and videos. Then, in 2005, in a paper published along with Aparajita and Madhu in the *International Journal of Primatology*, we described this monkey as the Arunachal macaque, a species new to science.

This description of a new species of monkey from the Eastern Himalaya, with its characteristic short tail and distinctive facial markings, caused much excitement and generated much debate among scientists, conservationists, and people at large across the world. After all, it is not common for a species as large as the Arunachal macaque to have remained hidden and undiscovered in today’s day and age. This happened to be the only new macaque to be discovered in over a century since the Pagai macaque was last described from Indonesia in 1903.

Indeed, ours wasn’t a ‘discovery’ in the true sense, as the species had always been known to the local Monpa community who share its habitat. These monkeys have been in their neighbourhood for a long time, much before the sixth Dalai Lama was born in the region, or the celebrated Tawang monastery was built. The Monpa have known the Arunachal macaque from the time that they inhabited these lands and started cultivating their crops. The monkeys, as they have perhaps always done, even today cause damage to the
crops of millets, wheat, buckwheat, and barley that are grown in the region. The Monpa even have a distinct name for this primate. The ‘munzala’, literally ‘monkey of the deep forest’, is the local name of the species in the Dirang Monpa dialect. Yet, the species had remained unknown to science. We described it scientifically and named it, giving it the official scientific name – *Macaca munzala* – in honour of the traditional knowledge of the Monpa people.

It was after almost one and a half years of sighting our first troop of this monkey that we stumbled upon a specimen of this species that we could actually physically examine and measure: A dead adult male Arunachal macaque, killed by villagers when he entered a house searching for food. We found it at the end of a cold day in the beginning of March 2005, in the remote village of Sokchen, close to the China border. Having spent the day searching for live troops, this was sudden and unexpected, and a rush of emotions took over as we looked at the inert primate. We felt sick in our hearts – to see such a fine animal dying before its time. For several moments, we stood there, disoriented, watching his lifeless body, and felt a deep sorrow. Such a rare animal, now gone.

Over the next few minutes, the mist, this time in our heads rather than in the air, slowly cleared up. Scientific curiosity and cold rationality took over. This was, after all, the first specimen of the Arunachal macaque that would ever become available to the scientific world. Earlier, while describing the new species, because of ethical reasons, we had deviated from the standard practice of sacrificing individual specimens while naming a new species, and had been among the first people to report the discovery of a mammalian species on the basis of photographs alone. We realised that we had to rush with the specimen to the Itanagar Zoo, several hundred mountainous kilometres away, where we would treat the specimen, preserve its skin and bones, measure them, and deposit them at a museum.

What transpired over the next few days is difficult to describe, though the memories are clear as if it all happened last week. Small stuffy hotel rooms en route to Itanagar, shared by two adult human
primates along with a full-sized, albeit dead, 15-kg non-human primate.

Attempts to conceal our booty from the hotel staff lest we get thrown out in the middle of the night. Even more desperate attempts to ignore the intensifying stench of the specimen.

Getting our hands numb at the Sela pass, at an altitude of about 13,700 feet, collecting ice from a frozen river to prevent the specimen from rotting. Pleading with fish-sellers at fish markets en route for more ice. And, in the midst of all this, informing the relevant government authorities and getting permissions to transport and treat the specimen.

The two of us and our primate companion finally reached Itanagar Zoo, just in time, for a quick post-mortem by the zoo veterinarian Jikom Panor. This was followed by the long tedious process of treating the specimen.

Thus began our quest to unravel the mystery surrounding the evolutionary origins of the Arunachal macaque and the validity of its identity as a distinct species. We sought the help of our friend Uma Ramakrishnan and her colleagues at the National Centre for Biological Sciences, who were as excited about the possibility of uncovering the evolutionary secrets of this fascinating monkey as we were. Then began the laborious process of extracting the monkey DNA (the genetic blueprint of any species), amplifying it, sequencing it, and finally, comparing it with that of other closely related macaque species. We also included, in our analyses, the Assamese and Tibetan macaques of Eastern Himalaya and the bonnet and toque macaques of south India and Sri Lanka, respectively.

The results of all this work have surprised us and fascinated us even more. To start with, our studies confirmed our belief that the Arunachal macaque was indeed a different species. This result was only the beginning. Our measurements of the specimen showed that, in its anatomy, the Arunachal macaque was relatively closer to the Assamese and Tibetan macaques, species with which it shares its geographical distribution and ecological habitat. Yet, genetically,
it was distinct from them, and, in fact, was surprisingly close to the bonnet macaque of south India, a monkey, which not only looks distinctly different but also occurs at least a thousand kilometres away!

We could also estimate that the Arunachal macaque, as we know it today, originated about half a million years ago, partly as a result of hybridisation between the ancestors of the modern-day Assamese macaque and the predecessors of the bonnet and the toque macaques. Finally, we now know that these species, including the bonnet and toque macaques of the southern latitudes, have all originated from a common ancestral macaque that inhabited the region of present-day Myanmar some four and a half million years ago.

The Arunachal macaque has taught us much. Little had we anticipated that the much celebrated discovery of the species was only the first step in a journey of a thousand miles, as aptly put by the Chinese philosopher Lao Tzu. The search for this enigmatic primate has truly been a most wonderful and rewarding experience for us. Of course, with each new research result, more intriguing questions seem to confront us rather than any easy answer.

We will perhaps never know enough, but it is gratifying to see at least a few pieces of this infinite jigsaw puzzle of nature fall into place.
I do not want my house to be walled in on all sides and my windows to be stuffed. I want the cultures of all lands to be blown about my house as freely as possible. But I refuse to be blown off my feet by any.

*Mahatma Gandhi*