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Dr. D. S. Kothari: A Modern Rishi

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Dr. D. S. Kothari: A Modern Rishi *

Shantipeeth has, over the years, been stressing the need for dialogue between Science and Non-Violence and the need for science to be tempered with moral and ethical values.

I have entitled this lecture with volition 'Dr. D. S. Kothari: A Modern *Rishi*'. A question was asked, 'Kapilaji, why 'modern'; why not just '*Rishi*'?' I said, in the Indian psyche we associate *'rishi'* with a class of people of a bygone age who are not concerned with the 'here and now'. By using the adjective 'modern', I only wanted to stress that *rishi* can belong to a bygone age and *rishi* can belong to this, our age and our time. In the Indian tradition the word *rishi* has a history. I do not have to refer to the composers of the Vedic hymns which are considered to be 'revealed truth'. There are of course many types of *rishis* and there is a long classificatory list. Each of the different types of *rishis* denotes a class of people who are holders of knowledge, thinkers, *gyan, vigyan and pragya*, and are concerned with the 'here and now', as in the case of Rajrishis. They represent the wisdom tradition of knowing the world, being in it but not of it.

The question of power and knowledge has engaged humanity both in the East and the West, at many levels and in many disciplines—philosophy, social sciences, politics, science and much else

The question of power and knowledge has engaged humanity both in the East and the West, at many levels and in many disciplines—philosophy, social sciences, politics, science and much else. A thread which runs through these discussions, ancient and

* Ninth Dr. D. S. Kothari Memorial Lecture delivered by Dr. Kapila Vatsyayan at the India International Centre on Friday, March 30, 2012, under the auspices of Shantipeeth India, Udaipur and India International Centre, New Delhi.

modern, is the relationship of knowledge and power and the use of knowledge for wielding power. Who is not acquainted with Thomas Hobbes' (1588–1679) or Francis Bacon's (1561–1626) oft-quoted statement, 'Knowledge is Power'? This has been debated for centuries. In our times, the subject has received the attention of philosophers, scientists and politicians alike. There have been discussions in regard to the relationship of knowledge and power, and how knowledge has been used for positive or negative purposes. Michel Foucault's (1926–1984) work on the subject has been internationally debated—knowledge and power are central to his analysis. This raises the question of moral and ethical values. Need I elaborate further? All I want to say about this modern *rishi* is that he had knowledge, he exercised power in his different roles of a certain type, and eschewed power of another type. So, as I said in the beginning, Dr. D. S. Kothari was a man of wisdom, being of this world, but not of it.

The relationship of knowledge and power has been the subject of investigation in India over many centuries. Understandably, India explored many levels of this relationship. Amongst what was considered most important was another plane of knowledge which neither asked for nor held terrestrial power, the power to transform human in a manner that the human became the custodian of a body of not only knowledge, but introspection, sifting the grain from the chaff, and identifying the perennial as opposed to the ephemeral. This was the wisdom tradition of India embodied in texts and transmission of knowledge from generation to generation without seeking power. Dr. Kothari belonged to this lineage of wisdom tradition.

Dr. Kothari's life, his contributions and his journey—childhood in Udaipur, schooling in Indore, university education in Allahabad under Professor Meghnad Saha, higher education in the Cavendish Laboratory in Cambridge, then to the University of Delhi, Scientific Adviser to the Ministry of Defence, Chairman of the University Grants Commission, Chairman of the Education Commission, and many other preoccupations—and his personality are convincing proof of the appropriateness of my title, 'modern *rishi*'. As a scientist, educationist and thinker, he was wise; more, he was noble and, even more, he was a most humble, self-

effacing human being who eschewed power. Besides these, what are the other attributes of a *rishi*? It is to this *rishi* of our time that I pay my humble tribute through this lecture.

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Forgive me for taking the liberty of presenting this memorial lecture not as an outsider reviewing, assessing, commenting on his work and life objectively, but let me share some memories from my long and continued association with him for nearly half a century—to be precise, from 1943 to 1992. Perhaps at this stage I can take that liberty.

Let me begin with some reminiscences which may be amusing, but for me these memories are indicators of how seeds of enquiry for seeking knowledge were sown in our young minds in a world which was socially and politically charged.

Date: 1942. I entered college at a tender age judging by today's standards. There were others. What was the political climate? The Second World War had begun while we were still in school. We had become sensitive to the polarity between the Axis and the Allied powers. We may not have understood much, but we knew that this was a war, a war of different ideologies, which led to a war of weapons. Concurrently was the call of Mahatma Gandhi on 9 August 1942:'Do or Die'. This was also a war but a war of non-violence. We may have been pursuing different disciplines—the science or the humanities stream—but we were never insensitive or immune to the charged political ambience of our growing self.

I joined Delhi University as a student of English literature, which was a coveted course, despite my burning desire to be a scientist, having done the first preliminaries of F.Sc. This is only to say that one was not totally unaware of the compulsion to make a choice between science and humanities. One would have liked to pursue both. The University of Delhi was an energising place, where Sir Maurice presided. There were very few faculties and an atmosphere of dialogue and friendship between teachers and students and among disciplines prevailed. There was only one staff room, adjacent to the Vice-Chancellor's office. It was

here that everybody came together: Dr. S. Dutt, the first professor of English literature who taught Shakespeare and Coleridge but had Pali books hidden under English literature books; the visiting professor from Lucknow N. K. Siddhanta, who also combined the study of literature and had written a book, *The Heroic Age of India: A Comparative Study;* Narendra Nath Choudhry, professor of Sanskrit, who could argue with teachers of Western philosophy; the economist B. N. Ganguli; C. V. Seshadri, the biologist; the wonderful, tall figure of S. R. Ranganathan who encouraged us to peruse books of all disciplines in the library of the university situated in the erstwhile ball room of the Viceregal Lodge (Dr. Kothari had been responsible for bringing him to the University of Delhi); and above all, the gentle, small-built Dr. D.S. Kothari with his genial smile and inviting affectionate eyes. There were no restrictions on students walking in, because we were only about two dozen at that level. Some avoided the staff room, but some students spent more time there than in the classrooms.

There are many reminiscences of the staff room, the library and the experience of physics in Dr. Kothari's laboratory. Here we were given the *samskar* of pursuing knowledge for the sake of knowledge. Perhaps not relevant and entirely personal, and yet a memory which I want to take the liberty of sharing, is that of watching and participating in experiments in Dr. Kothari's laboratory while being a student of English literature. As I look back, perhaps Dr. Kothari was trying to communicate the principles of ionisation of matter and the break up of particles. Of course, one had conducted childish experiments in school on sodium chloride and hydraulic acid, but it was Dr. Kothari who could communicate in a simple fashion the various processes.

Fascinated as I was, little did I realise that I was in the laboratory of a person who was recognised internationally by scientists for his work on ionisation, and also stellar subjects and spiral nebula.

Both the principles of breaking up matter as also pursuing nebulas were matters which continued to tickle my mind for many decades.

Perhaps it would be relevant to draw attention to the recognition of the importance of his work on ionisation and stellar subjects. His work on pressure

ionisation was highly acclaimed. It found wide-ranging applications. Sir A.S. Eddintgon wrote:

> *I mentioned that we only gradually came to realise that ionisation could be produced by high pressure as well as high temperature. I think the first man to state this explicitly was Dr. D. S. Kothari. Stimulated by some work of H. N. Russell, what Kothari has made I think is an extremely interesting application.*

Commenting on Dr. Kothari's work, Arnold Sommerfeld wrote:

> *During the times of Galileo and Kepler the planets were at the focus of astronomical interest but in view of the developments of the last few decades the interest has shifted to stellar subjects and spiral nebula. It is noteworthy that the Indian D.S. Kothari has developed an audacious relationship between the old fashioned planets and the now discovered newest heavenly bodies, the white dwarfs.*

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One day I crawled up to Dr. Kothari and said, 'Sir, I am a student of literature, I love it, but I want to be a scientist'. He said, 'no problem, why don't you just come to my laboratory, which is below, and we will do some experiments together'. Well, whenever there was time and whenever he was free, I found myself in his laboratory. Whether I learnt physics or not (what I learnt does not need be recounted here), I did learn the principles of science, principles which have carried my little self very far in trying to make bridges between the domains of science and those of philosophy and the humanities: the seeds were sown then.

I cannot help but narrate an amusing incident. It had not occurred to me that I had even received the Makhanlal Gold Medal for the best student of the year, which was being announced without my having got the degree. Sir Maurice was calling out my name—'where is this Kapila, she has got a gold medal, locate her'. I was in Dr. Kothari's laboratory, perhaps trying to understand the

principles of ionisation. Looking clumsy as some acid had fallen on my dress, I rushed, received the medal and looked up, and in the balcony was Dr. Kothari, with a glint in his eyes, smiling and giggling. From that time to the last, till 1992, I had access to this scientist, professor, and more. This is a long story of being a recipient of his knowledge and wisdom for over four decades, intermittently no doubt.

Today's presentation can only be limited. I shall try, perhaps very inadequately, to share with you Dr. Kothari's views, practically in his own language, particularly on education, science, national development and, above all, values. I joined the Ministry of Education as a first batch of educationists in the early 1950s who had been brought in after a stint of teaching. We were in North Block under the umbrella of the great Maulana Azad. Dr. Kothari sat in South Block as Scientific Adviser (1948–1961). Maulana Azad and Dr. Kothari were in communication on matters of education, although Dr. Kothari was not explicitly connected with the Ministry of Education. My privilege of knowing him in the university enabled me to continue my contact with him.

An easy access—sometimes one heard the voice of Dr. Kothari—'why don't you walk across and come?' Each conversation was a gift which I treasure. In the course of these conversations I learnt about Dr. Kothari's initiatives in establishing several laboratories under the aegis of Defence Sciences Organisation. These included Institute of Armament Studies, Pune; Indian Naval Physical Laboratory, Kochi; Defence Food Research Laboratory, Mysore; Defence Institute of Physiology and Allied Sciences, Chennai; and Solid State Physics Laboratory, Delhi—which was an area of special attention for India at that stage. For independent India, the 1950s was a period when it took steps to establish many institutions in the field of defence science, in which Dr. Kothari played a seminal role, as he did in the case of other institutions in the broad field of education. For me, this was a learning experience and, when I look back, I am conscious of the achievements as also the complexities of establishing and running institutions.

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But no more reminiscences. My presentation is divided into the following broad sections:

- Dr. Kothari's tenure and contribution as Chairman of the University Grants Commission (UGC) (1961–1973) and as Chairman of the Education Commission (1964–1966).
- His Dadabhai Naoroji Memorial Lecture in 1968 on 'Education, Science and National Development'.
- His Dr. Zakir Husain Memorial Lecture in 1974 on 'Science and Man'.
- Dr. Kothari's association and contribution in several international conferences and seminars when I was in the IGNCA where his personality as a modern *rishi* was revealed.

UGC and Education Commission

After he relinquished his office as Scientific Adviser to the Ministry of Defence, Dr. Kothari succeeded Dr. C. D. Deshmukh as Chairman of the University Grants Commission. Need I say anything about Dr. Deshmukh who combined in himself the acumen of an economist and the profundity of a Sanskrit scholar? His conversation and exchange of views with Maulana Azad on many issues are well known. Again, as a person serving in the Ministry of Education, one was aware of both the coherence as also the difference of opinion between them. Even if it is out of context, I do want to record here that Dr. C.D. Deshmukh's views on the Visva-Bharati Bill which was introduced in 1951 have contemporary relevance in regard to the establishment of institutions or the taking over of institutions by the Central Government.[1]

Dr. Kothari continued with the policies largely within the framework laid down by Dr. C. D. Deshmukh. However, as was to be expected, he enlarged the scope of the UGC. As we know, the UGC was set up by an Act of Parliament in 1956 in pursuance of the recommendation of the Radhakrishnan Commission on Higher Education (1948). He was aware that the UGC was a central organisation, but

A moot question is, what is the relationship between statutory bodies established by the Government of India through Acts of Parliament or Resolutions of Parliament and which have the status of autonomous bodies, and the Ministry's accountability to the Parliament?

also a national organisation for setting standards for pursuing knowledge in frontier areas. It is not for me to comment on the achievements of the UGC or the complex issues of the relationship of the UGC and the Universities as a policy-maker and fund-giver in the presence of Professor Yashpal at this lecture. But perhaps it would not be out of place to again voice the concern and anguish of these pioneers on the rigidity of the educational system. Dr. Kothari continued to lament this.

Dr. Kothari was also conscious of the structural relationship between the UGC and the Ministry of Education. A moot question is, what is the relationship between statutory bodies established by the Government of India through Acts of Parliament or Resolutions of Parliament and which have the status of autonomous bodies, and the Ministry's accountability to the Parliament? I raise this question here because this continues to be a matter which needs discussion on the principles of autonomy and accountability. This is not the occasion to elaborate further on the role of the UGC in tertiary education, but I must draw attention to the Yashpal Committee's report 'Renovation and Rejuvenation of Higher Education' (submitted to the Minister of HRD on 24 June 2009), in which, among others, it recommended that the plethora of regulatory bodies like the UGC, AICTE, NCTE, etc., be replaced by a seven-member Commission for Higher Education and Research (CHER).

Those of us who have had experience of teaching and running colleges were aware of the rigidity of the educational system and the syllabus. As university teachers we had urged for a modification in the syllabus, and the establishment of the UGC brought hope and expectations of change. We watched the policy orientations of the UGC very closely. From the *samskar* that D.S. Kothari gave, some of us wanted to stress the need for a systematic dialogue between science and humanities and flexibility in syllabus. Alas, while many changes have taken place, this is an area which continues to need attention. I hesitate to add one

word more in the presence of Professor Yashpal who tried to break many walls of insulation *inter se* education during his tenure. There is a vast field yet waiting to be ploughed properly for multiple flowerings within the same field.

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While he was Chairman of the UGC, Dr. Kothari was also appointed Chairman of the Education Commission set up by the Government of India by a Resolution dated 14 July 1964 to 'advise Government on the national pattern of education and on the general principles and policies for the development of education at all stages and in all aspects'.

The report of the Education Commission was submitted to Shri M. C. Chagla, then Minister of Education, in 1966. In a remarkable letter which he wrote to Shri Chagla while forwarding the report,[2] Dr. Kothari said:

> *Education has always been important, but, perhaps, never more so in man's history than today. In a science-based world, education and research are crucial to the entire developmental process of a country, its welfare, progress and security. It is characteristic of a world permeated by science that in some essential ways the future shape of things is unpredictable. This emphasises all the more the need for an educational policy which contains a built-in flexibility so that it can adjust to the changing circumstances. It underscores the importance of experimentation, and innovation. If I may say so, the single most important thing needed now is to get out of the rigidity of the present system. In the rapidly changing world of today, one thing is certain: yesterday's educational system will not meet today's, and even less so, the need of tomorrow.*

After 46 years of the submission of this report and despite reiteration in the 1986 National Policy on Education (and after the exercise of Professor Yashpal and Professor Krishna Kumar in curricular reforms), perhaps it is necessary to emphasise that some of the crucial recommendations remain unimplemented. This holds good for a major recommendation in the case of school education,

namely neighbourhood schools. This has only recently received adequate attention. This policy would have ensured equity among different social classes. Another recommendation related to education in moral and spiritual values. The summary of the report on this said: 'Organised attempt should be made to imparting moral education and inculcating spiritual values in schools through direct and indirect methods with the help of the ethical teachings of great religions'.

Dr. Kothari was not a man to express deep dissatisfaction, but there were occasions when he wondered whether the perspectives and the recommendations of the Education Commission had received adequate attention. His emphasis on moral education and value education was a matter of conviction throughout his life. He had raised the question of science and non-violence in many forums. It was no education, he felt, if it could not mould character, instill altruistic values, be it from the pursuit of science, technology or humanities. The bridge between science and humanities was not explicitly stated, but it certainly was in his mentalscape.

I also take this opportunity to voice some anguish about the neglect of certain disciplines in the vastly expanding university system, e.g., a proper study of traditional knowledge systems, communities, and languages not listed in Schedule 8 of the Constitution, the woeful neglect of disciplines such as epigraphy, certain aspects of archaeology, and a study of pre-modern civilisations, be it the Mayan, the African or the Asian. There is understandably a marked bias in favour of contemporary history and politics, but the neglect of the study of ancient civilisations has led to a dearth of specialists of ancient South Asia, Southeast Asia, West Asia and others.

We are aware that there are many important centres in the West which are assiduously studying the ancient past: Mesopotamia, Assyria, China or Southeast Asia, and of course Latin America and Africa. These centres play an important role in the making and shaping of policies of international relations in the modern world. It is well-known that there are think tanks in the university system which are directly connected with the evolution of contemporary policies of diplomacy.

In India there is a comparative neglect of this aspect because of a general emphasis on economics and trade of the modern period in a globalised world. True, but more true that the trajectory of civilisations in different parts of the world shapes contemporary dialogue. I voice this here because I have been aware of this both as an instrument within government, and as one who has shared the anguish with colleagues in the university system in regard to the relative neglect of these subjects, particularly humanities, in India.

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Dr. Dadabhai Naoroji Memorial Lectures

Let me now turn to a seminal lecture (in two parts) entitled 'Education, Science and National Development', delivered by Dr. Kothari in memory of Dr. Dadabhai Naoroji, in Bombay in 1968.[3] As always, it was short, precise and piercingly insightful. The contents of the lecture have a bearing on many contemporary issues. Understandably he focussed attention on many aspects of the educational system ranging from policy, structure, disciplines, etc. We must remember that the lecture was given when Dr. Kothari was Chairman of the University Grants Commission and after he had submitted the report of the Education Commission as its Chairman in 1966.

Presenting a brief survey of education since independence, he mentioned some of the major problems India faced. To quote:

> *Sir Charles Wood's famous dispatch of 1854 set out, and in a sense sealed, the British educational policy in India. We have still not quite got out of the dismal limitations and orthodoxy of that imposed system. Its key-notes were diffusion of western knowledge and culture, and training of people for subordinate administration and secretarial services in a government controlled and directed by the British rulers. Oriental studies were ignored.*

> *Shakespeare was more important than Ramayana and Shakuntala. … With the passage of time, ignorance of their own heritage led people to believe that it was not worthy of serious study and attention. The centre of gravity of India's intellectual life, whatever it was, moved away from India, and has not been recaptured yet. …. The system turned out 'educated' Indians, but without roots in their soil and culture. It discouraged identifications with the community. It provided 'English education' but smothered the souls. … The system lacked, even rejected, 'Indianness', and the country is paying dearly for that neglect and aberration.*

Let me divert for a minute to mention that when the Education Commission was established in 1964, India was also host to the 26th International Conference of Orientalists at which nearly 1,800 delegates participated. The questions that Dr. Kothari had raised in respect of education, beginning with Charles Wood's report, and of course the famous Macaulay's Minutes on Education in India (1835), have to be juxtaposed with European interest in the Orient. The debate on orientalists and orientalism has occupied the minds of not only those who attended the 1964 conference (I happened to be its Joint Secretary), but also historians—from Edward Said to the Chicago school, to Indian scholars situated in the West.

Why did I divert for a minute to juxtapose the Charles Wood's dispatch, the holding of the 26th International Congress of Orientalists, and the establishment of the Education Commission in 1964? This was only to point out that the issues raised by Dr. Kothari, the debates and discussions in the 26th International Congress of Orientalists, and the decision of the nation-state to establish the Education Commission have to be viewed in their totality. To put it briefly, on the one hand the education system becomes an instrument of alienation and, on the other, there is a continued interest in what is called the Orient by not only those who established the Orientalists Conference in Europe, but also contemporary scholars who actively continue to interrogate orientalism.[4] There are also books on neo-orientalism.

The establishment of the Education Commission was to bring about a new balance; a balance which would enable the Indian to be deeply rooted and capable of negotiating the modern world. Today, after more than half a century after the conference and the establishment of the Education Commission, we stand at a threshold where, through education and technology, we are an important member of a globalised world, but concurrently we are also in real danger of not being equipped intellectually to delve deeply into the primary sources of the extraordinarily rich storehouse of knowledge systems, introspection, not to speak of the wisdom tradition. Concerns have been expressed by both Indian and foreign scholars. Some have even opined that India is perhaps self-consciously erasing the memory of its rich and varied intellectual traditions. Dr. Kothari's concern anticipated the contemporary debates by half a century.

Equally significant is his questioning of whether the role of education was for developing character and inculcating moral and ethical values, or was it only a tool for livelihood. This continues to engage educationists, policy makers and planners. This juxtaposing of the role of education as a character-builder or an instrument not only for livelihood but economic development, really points the finger to the tension between moral and ethical values and monetary gain. Dr. Kothari was not blind to the fact that education can only be supported by and flourish in an economically viable nation-state, but not at the cost of ethical and moral values. He said:

> *Education, as repeatedly stressed here, is essential to the progress of the national economy. But education needs resources, and it cannot progress without an improvement in the economy as that alone can, in the end, make possible increased resources for education. It is becoming increasingly clear that education on a large scale, and with any pretence to quality, can be supported only if education itself makes a direct contribution to national productivity. There is a symbiotic dependence between education and national productivity.*

Dr. Kothari also emphasised the need for technology. Yes, it was the acceptance of this perception which, as we know, led to the establishment of major Institutes

of Technology. I happened to be involved in associating foreign governments in the establishment of some of these institutes. His contribution, as also his concern with the migration of highly qualified technologists to the West, is undeniable. But there is a deeper concern: whether the emphasis seems to have gradually shifted from a study of the basic and fundamental sciences to technology. This concern has been voiced by the scientists. As we know, it is from amongst fundamental scientists that many thinkers have emerged in the world. It is the scientists who postulate principles which then affect our perceptions and influence the theoretical positions in many domains and disciplines.

Dr. Kothari drew attention to technology, as also to computational methods; but he wanted a balance between fundamental sciences and technology. His reference to technology, and in some lectures to computational methods, has to be seen in the context of his emphasis not only on fundamental sciences, but also on mathematics as the foundation of scientific investigation. Mathematics to him was universal, trans-local and trans-cultural. He drew attention to the transition in science from being local or parochial to its being universal.

In the lecture Dr. Kothari referred to a report of a panel of the UK Council for Scientific Policy (1967–1968) under the chairmanship of Dr. F. S. Dainton, Vice-Chancellor of Nottingham University, which analysed the reasons for the drift away from science in schools in the UK. The report assigned the major responsibility to failure in mathematics. Dr. Kothari noted that in a sense India faced a somewhat similar problem in our secondary schools. He said:

> *May I refer to the need to raise the level of teaching and research in mathematics? A new dimension has been added to this subject, as we stand on the threshold of a scientific revolution, based on cybernetics and automation, likely to be in full swing by the end of the century. Its impact on man may be even greater than anything that has happened so far in history. A concerted effort should be made, as the Education Commission has recommended, to place India in the near future on the world map of mathematics.*

It has taken more than 40 years for us to declare 2012 as the National Year of Mathematics in honour of the achievements of the great Indian mathematician Professor Srinivasa Ramanujan. It is hoped that the activities will endeavour to ensure that the teaching of mathematics receives the attention that Dr. Kothari had alluded to.

There is a hiatus between the libraries in the university system, libraries of scientific institutions, and Oriental libraries outside the university system

Dr. Kothari also drew attention to the sorry state of affairs of Indian libraries. He noted that the situation in universities and colleges regarding availability of even indispensable books and journals, which had always been far from satisfactory, was now as near as deplorable. He pleaded for a special grant to universities and colleges for the development of libraries, phased over a period of five to ten years, as a matter of the highest priority.

The role of libraries and of librarians was a matter of great concern to him. There has been a long struggle within the UGC about giving appropriate scales and prestige to librarians. I will not raise this question here because I have raised it elsewhere. It will be recalled that it was Dr. Kothari who had invited Dr. S. R. Ranganathan to suggest a reorganisation plan for the university library. Dr. Kothari emphasised the need for well-equipped libraries both within the university system and outside.

It is pertinent to mention here in passing the sorry state of neglect of the most precious libraries, called Oriental libraries, of this country. There is a hiatus between the libraries in the university system, libraries of scientific institutions, and Oriental libraries outside the university system. There is need for greater synergy between and amongst these libraries if knowledge is indeed to be promoted through not only the printed word but also the vast storehouse of unpublished manuscripts in this country. There is a lack of attention to this problem at the policy level and programme level. I have raised this question elsewhere. Unless there is research in fundamental sciences, technologies, archaeology or the history of science and mathematics, as evident in the unpublished material still waiting to be perused and analysed, there cannot be a pursuit of knowledge systems of this country in

relation to modern disciplines. This also holds good for area studies, for the study of the ancient and medieval past. It is necessary to equip the younger generation with the skills for deciphering scripts and for perusing these manuscripts. There is a gradual depletion of scholars who are equipped to do so.

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While Dr. Kothari was conscious of the role of education in national development, the future of technology, computational sciences and mathematics, he was also, above all, concerned with the perennial questions of the predicament of man. The lecture includes a re-narration of his dialogues with modern scientists, particularly post-Einstein scientists. The conclusions that he draws from these conversations reveal Dr. Kothari the thinker and the carrier of the wisdom tradition. In one such conversation, Dr. Kothari was anxious to draw attention to the need for inculcating moral and ethical values, whether he was speaking on education, science or the pursuit of knowledge. In this lecture he mentions his dialogue with post-Einstein scientists, such as Niels Bohr. As we know, he had many conversations with Niels Bohr, whom he calls the incomparable master of modern physics. He draws moral and ethical lessons from these conversations. One amongst these conversations that he recalls in his lecture is a Danish story narrated by Niels Bohr. It ran as follows:

> *There were two brothers, a philosopher and a business man. The business man collected a big fortune and was fond of saying: 'I have acquired this property today, tomorrow I shall acquire that and so on'. He would tell his philosopher brother who had practically nothing and was living from hand to mouth: 'Why not join me in business, and I can easily help you to acquire much wealth for yourself". To this exhortation frequently repeated, the philosopher after much deliberation one day replied: 'Can you tell me, brother, what is this "I" for which you are collecting these things, big and small, with so much effort, trouble and anxiety? Can you tell me where you come from, why are you here, and whither are you going?'*

When recalling this story Dr. Kothari draws attention to the teachings in the Gita, especially Chapter XVI. Here Krishna tells Arjuna of the two types of human

nature, one acquisitive and the other detached. Dr. Kothari extends Niels Bohr's principle of complementarity to juxtapose the two types of characters. A perusal of Dr. Kothari's lectures and his conversations clearly reveal that he was always making a connection between knowledge and wisdom in the Indian tradition, particularly the *Gita*.

Further, he quotes the remarks of Erwin Schroedinger that the ultimate aim of all science is to make a contribution, however modest, towards the understanding of the deepest and oldest of all questions: What am I and why I am here?

He also quotes the thoughts expressed by Theodosius Dobzhansky (*Science*, 29 November 1963) in speaking about some of the recent work in the field of molecular biology: 'One thing, however, seems safe to say: genetics, both molecular and organismic, is now in a period of rapid development. Its development promises to lead to a better understanding of life and to a better understanding of man. To help man understand himself and his place in the universe, may be the ultimate purpose of genetics, of biology, and perhaps of all science'.

Dr. Kothari never forgets to draw attention to India's commitment to the principle of *ahimsa*, non-violence. Whether it was his upbringing as a Jain and the value of *parigraha,* or his subscription to Gandhian values, he often juxtaposed developments in science and the fundamental importance of *ahimsa*. He said:

> *One of India's greatest contributions to world civilisation has been the concept of ahimsa or non-violence, to which, in our times, Mahatma Gandhi added a new dimension of far-reaching significance. The greatest contribution of the West is no doubt science and technology. What the world desperately needs today is a creative and symbiotic combination of science and non-violence—science and spiritualism—so that man can progress towards the realisation of what Huxley has called the 'fulfilment society', based not on power and exploitation, but on scientific knowledge, humanism and humaneness.*

Many lessons can be learnt from his Dadabhai Naoroji lecture. The first is in regard to structures within the university system and the dire need to break rigidity and allow flexibility. Today we talk of inter-disciplinary and multi-disciplinary studies or trans-disciplines. In this respect, Dr. Kothari's thoughts are a forerunner. His identifying education as a crucial tool of national development needs no reiteration.

Of even greater importance is what Dr. Kothari extracts from developments in modern science, be it Niels Bohr's principle of complementarity or Heisenberg's assertion of the uncertainty principle of quantum theory, and of course, Schroedinger's questions on the observer and the observed of the cat, alive or dead. Science has moved beyond Einstein and even beyond the heralders of post-Einstein science. Much of these developments in science have a direct bearing on our thinking, and what happens in science filters to the other disciplines. Questionings on Cartesian dualism are as relevant to the fields of science as they are to the fields of social sciences, humanities and artistic theories.

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Dr. Zakir Husain Memorial Lecture

A few years later, in 1974, Dr. Kothari delivered the Dr. Zakir Husain Memorial Lecture.[5] Paying rich tribute to Dr. Zakir Husain, Dr. Kothari said his name 'brings to mind vision of a person of uncommon compassion, sensitivity and graciousness, selflessness and personal charm…. His personality had a certain beauty and wholeness reminding us of what Gandhiji said: "True beauty after all consists in purity of heart …. There is no Beauty apart from Truth".'

Understandably Dr. Kothari drew attention to Dr. Zakir Husain's contribution to the field of education. He notes that it was Dr. Zakir Husain's conviction that education should be 'an organic fusion of faith and knowledge'. Dr. Kothari was aware of Dr. Zakir Husain's contribution to Gandhi's concept of basic education. Basic education was a policy credo in the Education Ministry during the tenure of Maulana Azad. However, I also recall the gradual but certain dissipation of

this policy initiative. Professor M. Mujeeb has, in his biography of Dr. Zakir Husain, given a vivid and moving account of the history of basic education and finally its abandonment.[6]

Dr. Kothari drew attention to Professor Zakir Husain's anxiety that education should not be a tool for alienating the Indian from his own cultural mores. In this connection he quotes Dr. Zakir Husain:

> *It is essential to Indianise our whole educational system….It is essential to change education as to render it impossible that young men should be condemned to live as foreigners in their land… incapable of thinking their own thoughts; with borrowed speech, as the poet has said, on their lips, with borrowed desires in their hearts.*

Nearly 40 years later, at the threshold of a globalised world where India is playing an important role, the question of identity remains an issue and will continue to do so. The recommendations of the recent Knowledge Commission have a direct bearing on the issue raised by Dr. Zakir Husain.

In the lecture Dr. Kothari also reiterated that education should be concerned not only with *knowledge*, but also promotion of *conduct*, and *faith* in man and his future, and to encourage *austerity* (identification with the people).

Dr. Kothari had entitled his lecture 'Science and Man'. He asks the rhetorical question, 'Why not Man and Science?' He adds: 'Perhaps, the first one is more topical of our times. We often tend to give *first* place to science and technology and the *second* place to man. (This is the sign of an *un-scientific* age.)' Dr. Kothari goes on to say:

> *By science, I mean experimental science, that is objective knowledge. It is an outcome, continually expanding, of systematic confrontation of theories (based on abstract concepts including mathematics) and facts (experiments and observation). What is man we all know. It is the least known and 'the most wondrous' of all things. I say the least known for we do not know the generally acceptable answers to the elementary questions: What is 'I'?*

> *What is the relation of the 'I' to the body? Has man a soul? The answer of the Upanishads or of Plato, or say of Newton no longer enjoy the status, and the conviction, these once did. And there are no new satisfying answers to take their place. This at bottom is responsible for much of the agony and unrest of spirit in our age.*

He elaborates on what he considers to be the world of phenomena, the universe and the place of man in that universe. Pointedly he refers to what constitutes the world of science at the level of matter, whether physical or biological. This leads him to refer to the field of astronomy, the astronomical configurations, biology, psychology, the vegetative, animal and human world. He then distils the principles from this relationship of science and man or, more, the place of man in the universe. His theme is constant, to draw parallels between scientific development, the scientific vision, and the wisdom tradition of India, especially from the Gita. A corollary, an act of faith then, is his question on the relationship of science and non-violence or *ahimsa*, which he had referred to also in his Dadabhai Naoroji Lecture, as mentioned earlier.

Noting that science and technology is expanding at a fantastic pace, he suggests that we live in an *unscientific* age. Rational decisions are rare. There is more violence and crime than at any time in history. He laments that we tend to ignore or grossly undervalue the human implications of technological solutions to our problems. However, he says that despite the abuse of science and technology and despite all the *inhuman* applications of science, *science, and more of it, is the only hope of mankind.* What lies at the root of man's troubles and suffering, he says, is not pursuit of knowledge but greed and worship of power. This echoes Gandhiji's remark: there is enough for everybody's need, not everybody's greed. He adds:

> *If science and technology are to benefit Man, science must become a part, an integral part, of culture. The wise use of science and technology, and the progress of science itself, is, in the long run, possible only in a society which values and actively encourages freedom of discussion and dissent:*

which tolerates and not liquidates opposition. In other words, science and ahimsa (which are perhaps the greatest achievements of the East and the West) go together.

Dr. Kothari refers time and again to developments in science and technology which have been responsible for the atom bomb, now nuclear warheads. His anxiety is in regard to the use of knowledge and power for beneficial or destructive purposes.

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Dr. Kothari's Association with IGNCA

Let me share with you Dr. Kothari's association with the IGNCA during my tenure as its Academic Director. From the mid-1980s, or 1986–87 to 1992, Dr. Kothari was in and out of my office—as always, gentle, self-effacing. He would walk in and say, 'Kapila, I have come'. He would have his charts and equations to bring home the symbiosis between the domains of science and those of philosophy and of course moral values and *ahimsa*. Possibly it was the *samskar* which he had given me way back in the 1940s which was responsible for my conceiving the first five international seminars at the IGNCA revolving around fundamental concepts such as Space (*akasa*), Time (*kala*), Form (*akara*), Primal Elements (*panchamahabootha*), and, finally, Mind, Man and Mask (*roop-pratiroop*).[7] In these multi-disciplinary and cross-cultural seminars there was a confluence of some of the greatest scientists—physicists, mathematicians, astronomers, molecular biologists, philosophers, poets, archaeologists, architects and art historians. In the first of these seminars on the 'Concept of Space', many dimensions of this single word 'space' (*akasa*) were explored, ranging from cavity, cave, aperture, fountainhead, to body, air, sky, vacuity, cipher, point and fullness. The scientist and the technologist explored the concept through their method of empirical investigation; the philosopher and the metaphysician and artist through perennial questioning, speculation and modes of expression. The two approaches were not in conflict.

The next seminar was on the 'Concept of Time' (*kala*). The gathering was similar, again a confluence of scientists, philosophers, archaeologists, poets, musicians and others. Multiple dimensions of Time were explored, ranging from examining molecular time, micro time through the lens of the microscope to macro time, movement of galaxies, the question of origin and theories of the big bang to cosmic time, with an incomparable intensity and extensiveness. My editorial to the book endeavours to capture some of these dialogues and discussions. No written word could encapsulate the heightened moments of these exchanges between scientists, poets and philosophers. One moment of the climax was the dialogue or inter-change between Dr. Kothari—who had been gently walking in and out of this seminar, making piercing remarks at crucial moments—and His Holiness the Dalai Lama. Here was a meeting between a modern *rishi* and a great spiritual leader of our times.

Most moving and meaningful of all was his presence in the series of five seminars on 'Prakrti: The Integral Vision'. Five interlocked seminars were held on exploring both at the theoretical level in different disciplines as also on the fundamental importance of the primal elements in the living traditions, specially of cohesive societies. Needless to add, 'Man and Nature', i.e., whether man in nature or man against nature, is not a matter of speculation or discussion. It is a matter of the crisis that looms large before humanity if the earth and man have to survive. Dr. Kothari encouraged me in no small measure to conceive and launch these seminars because of his unshakable faith that if the future of this world lies in 'science, and more of it', it lies even more in the responsibility vested in man to ensure not only maintenance of eco-balances between man and nature, but in the exercise of the one human faculty of austerity, inter-dependence, of the material and non-material, or the distinctive attribute of man as a moral and ethical being.

Dr. Kothari inaugurated the first of these seminars on 'Primal Elements: The Oral Tradition'. Again, I have tried to record in my Preface to a recent book the nature of the discussions. I shall not elaborate on the summary record but instead quote a few paragraphs from it. Since it was written in a moment of intensity and no re-narration can match the moment, I thought it fit to include it in conclusion to this lecture.

Dr. Kothari began by asking the question:

'Why do we feel warm in the sunlight?' 'Why does the sun feel warm?', he asked. This is the first and the last question. An attempt to give an answer to this question has been the history of civilisations, he said. Is it a physical phenomenon? Is it the body that feels warm? Is it nature that provides the warmth? Is it only the sun that provides the warmth? Or are there other elements in interaction with the body which produce the warmth? If it is the body that feels warm then what is body? Is it matter? Is it an aggregation of the five elements?

These are simple, child-like questions and within them is embodied the history of philosophy, science and the arts. Turning his attention from this, a very simple question, he elaborated lucidly on the eighth, thirteenth and the eighteenth chapters of the *Bhagavad Gita*, especially on sarira (body) as defined by the *Gita*. The question asked was: what is sarira? What are the epithets chosen even in seeking an answer to this fundamental question?

Krishna calls Arjuna 'Kaunteya', i.e., the son of Kunti—that is the biological link. But is sarira only a physical organism? Sarira is the ksetra (field). Krishna enjoins upon Arjuna to be the 'knower of the field'. He who has the capacity of 'knowing' (comprehending) the field is the ksetrajna.

Body, therefore, is equal to the ksetra. And what is this field? The field is the fivefold body—the sheath of nature, comprising the five elements. Almost as a scientific equation, Professor Kothari extracted the essence of the Gita by stating, body = ksetra, ksetra = five elements. And where from do these five elements come? They come from nature, nature here understood by its Sanskrit name prakrti. Is nature dead without attributes? No, there is no absolute dead matter, because nature itself is psycho-physical, psycho-somatic because it is gunatmaka (i.e., with attributes and qualities). Thus the system by which man comprehends nature and its elements is not just physical or material, it is a psycho-physical system. It

begins with the wholeness. Professor Kothari continued to remind us that the material component of the universe is always changing from moment to moment, body to body, the macrocosm to the microcosm, and yet there is something which remains constant. What is that something? He continued, is it not logical that 'I am more than the assembly of the parts and the moment I am more than the assembly of the parts, the implications are clear?' I am part of ananta and infinity, and infinity and a continuity despite every moment of flux and change. Consciousness is the eternity and the immutable, he said.

From an enumeration of the thirteenth chapter of the Gita he took us to the eighteenth, where nature of the consciousness of total surrender and of meditation and reflection is articulated. It is thus consciousness and not dead matter, but the combination of consciousness and matter which makes us feel warm in the Sun.

Modern science, he reminded us, has realised for the first time that the atom has a wholeness of its own. It is also ananta, its growth is a dynamic process and it is not merely an aggregation of electrons and protons. Time has now come, said he, when science has to be spiritualised, just as the ritual of the indigenous people had been spiritualised so as to sacralise nature. Science and the perceptions at the level of textual traditions, the metaphysics and the arts and those lived by cohesive communities must converge. Science, he said, has arrived at the dictum that the velocity of light is absolute. It is only modern science which is linking physical matter with consciousness, and if the IGNCA has begun this exploration then it must be complimented and congratulated for its courage. Such questions can only be asked in a spirit of humility, modesty and with an openness of mind where the barriers of disciplines and cultures, ideologies and positions are transcended. The symbiosis of knowledge, vision and values alone can bring about a consciousness of the wholeness. How can this happen? It can happen with a sense of feeling, bhavana, of reflection and of meditations. All this is possible only if man lives by the perennial

consciousness that he is one amongst all particles of nature, and is also conscious of the probability and possibility that he can be Brahman.

The audience was blessed and stood in silence and in grace because a scientist and mystic had spoken. The journey of the Seminar had begun.

After the seminar which he inaugurated, I wrote him a letter. I was moved beyond words to know that Dr. Kothari preserved this letter and his grand-daughter Deepika Kothari has now included it in the volume entitled *Sunhari Smratiyan*.[8] I reproduce this letter here only to re-emphasise my sense of gratitude and also to mention that Dr. Kothari seems to have kept a diary most meticulously since the age of 18. That my letter should find a place in it is a blessing most precious.

April 9, 1991

Revered Dr. Kothari,

No words of formal thanks will ever contain what I want to communicate to Guru, Guide and Philosopher. I was not joking when I said that the samskar that you gave us as students is the great heritage by which we live. It is said 'If you have great parents and great teachers, your life is made'. I have been fortunate, more than fortunate, in both. I hope that in some small measure we shall be able to be equal to the tasks which you had laid before us. We shall never be able to match the work and dedication and selflessness of your life. I pray for your blessings and more, I pray that maybe you continue to give us light, to see and light, to be.

***

Conversation with Scientists

At the end let me also share with you a few occasions when I was a silent but attentive listener to the conversations between Dr. Kothari and other great scientists, specially the Nobel Laureates Pyotr Kapitsa and Ilya Prigogine. I found myself at these meetings on account of being in the External Cultural Relations

Division of the Ministry. These conversations were most enlightening and educative, even if I did not understand the technical nature of the discussions with my limited knowledge, but keen interest in understanding the principles of science or the developments which transcended the domains of science to filter into other disciplines.

Kapitsa's work as founder of the Moscow Institute of Physics and Technology was well-known. His contribution to the field of low temperature physics had far-reaching implications. More engaging was the discussion I had heard between Dr. Kothari and Ilya Prigogine. I also had occasion to meet Ilya Prigogine separately. I was fascinated by his theory of dissipative structure which led to pioneering research in self-organising systems, as well as philosophical inquiries into the formation of complexity on biological entities and the quest for a creative and irreversible rule of time in the natural sciences. These theoretical formulations have a bearing on knowledge systems outside science, as I have mentioned many a time in this lecture. As important and meaningful are his observations on the determinism and indeterminism on the arrow of time.

As I observed earlier, many theoretical formulations filter into other disciplines, be it the interrogation of Cartesian dualism or in respect of the debate on linear and non-linear systems. I cannot resist the temptation of placing before you extracts from a book by an eminent young scientist, Dr. Ranjit Nair (Director, Centre for Philosophy and Foundations of Science, New Delhi), on his conversations with great scientists, particularly Roger Penrose and Ilya Prigogine.[9] In these conversations, questions on similarity and dissimilarity, the confluence and divergence between the science and philosophy, between the scientist and the seer, or the *rishi* tradition of India, are poignantly narrated.

There is a conversation between Ranjit Nair and Roger Penrose who visited India for an important astrophysicists seminar in Pune. In this conversation Penrose said to Ranjit Nair:

> **Ranjit Nair**: But you know, for the layman, mathematics is a specialised art which is not accessible to everybody—there are people who are good

at it, and there are people who are not so good at it. It might seem rather strange to make a case for the nature of consciousness based on the nature of mathematical thought given that the latter is not accessible to everyone.

Roger Penrose: Yes, that's true and in a sense I apologise that many of my discussions are based on mathematical considerations. I think the answer is—in fact it's rather surprising—that mathematics is the area where one sees most clearly that one has to go outside the computational models. But I suppose it is partly because mathematics is such a precise subject that one can make clear statements. In many other areas, it is almost impossible to make a definitive statement: to say this or that is outside the scope of computation, whereas here, one can clearly state that understanding mathematics (admittedly a very limited area of our conscious activity) is something beyond the scope of purely computational activity. And from there I would spread outwards to say okay, other aspects of our conscious thinking also cannot be part of computational activity.

We will recall Dr. Kothari's view on mathematics and computation in his lecture. Of great significance is the conversation between Ranjit Nair and Ilya Prigogine:

Ranjit Nair: I had heard Prigogine cite the dialogue between Einstein and Tagore in his lectures in Brussels and Delhi, and had given him a paper on the topic. 'It is remarkable', I said to him, 'that you unequivocally take the side of Tagore in his insistence on the human dimension of time and of reality'.

Ilya Prigogine: Well, you know, there was something in which Tagore was right and Einstein was following, without knowing it, a mistaken dualistic approach. Einstein says (I read this in your paper that it was Einstein, I had assumed it was Wigner who said it) that it is a miracle that the universe is comprehensible. This is a miracle, a dualistic view, because then you separate man from the universe. If man is the outcome of the universe, if he is a part of it or an expression of it, then it is not astonishing. This is the holistic point of view that is more common in the Indian tradition

and which Tagore expresses. Einstein, unlike Tagore, very much separated man and nature.

In my memory is also the poignant meeting between Ilya Prigogine and Dr. Kothari where, in the simplest manner, Prigogine elaborated his theories of a dissipated, self-organising system, a lesson which I shall not forget.

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All through my narration I have attempted to bring home the fact that Dr. Kothari's concern, as Niels Bohr's which comes out in the Danish story, as also of Schroedinger, was: 'who's is this "I"?' The question was raised by *rishis* of all times, beyond times, and in our times, in one manner by Sri Aurobindo and in another manner with great profundity by Ramana Maharishi—he was indeed a *Maha Rishi*. I also recall the exposition in Chapter 13 of the *Bhagavad Gita* by Swami Ranganathananda and Sri Krishna Prem, especially in his book, the *Yoga of the Bhagavad Gita*.[10] Who did not know that Ramana Maharshi repeatedly asked the question: 'who am I?' and 'where did I come from?' He referred to the five sheaths of the body an aggregation of the five sheaths. *Rishis* of yore, *rishis* of this century or the modern *rishis*, such as Dr. Kothari, have asked this one perennial question 'Who am I?' 'Who is this "I"?'

It is to this modern *rishi* that a tribute is being paid beyond the little 'I'.

Note:

* Delivering this lecture in the presence of Dr. Karan Singh and Professor Yashpal is not easy. Professor Yashpal's eminence as a scientist is internationally acknowledged. He is deeply committed to human values, and combines in himself an uncanny capacity for communicating the principles of science to the younger generation. Also he has been a successor to Dr. Kothari as Chairman of the University Grants Commission (1986–1991). Dr. Karan Singh has a universal vision, has made bridges between different planes of living. His commitment to Sri Aurobindo and The Mother as also his contribution to the Inter-faith movement—dialogues among different faiths—is well known. He is a Patron

of Shantipeeth. Dr. L. S. Kothari is a worthy successor of a father and has contributed to the discipline of Physics.

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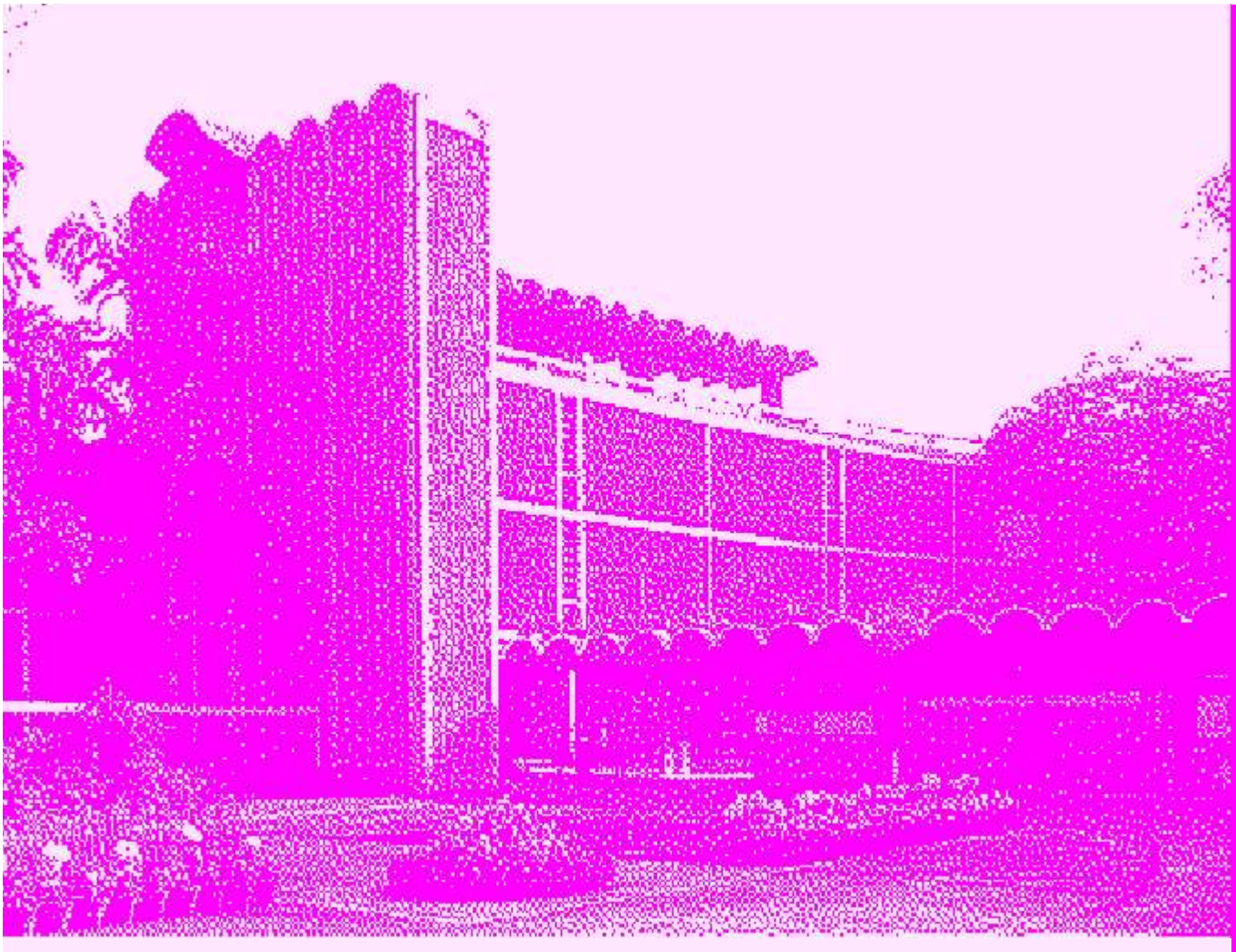
Dr. Kapila Vatsyayan is internationally recognised for her outstanding work in the diverse fields of Culture and the Arts. As a distinguished advisor to the Government of India on matters educational and cultural for many decades, Dr. Kapila Vatsyayan spearheaded policy framework for programmes of art history, education, Sanskrit, Buddhist and Pali Studies. Dr. Vatsyayan is the recipient of the second highest national award Padma Vibhushan and several other awards, nationally and internationally, for her work in national integration and in promoting international understanding.



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