

CONVOCATION ADDRESS

OF

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Environment and Forests

Government of India

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NEHRU'S SCIENTIFIC TEMPER RECALLED

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I

I am delighted to be here this morning. When I was invited for this the 13th Convocation I readily accepted but after asking Dr. Gautam Barua only one question—will I be asked to wear the uncomfortable gowns and hats normally associated with such functions. When I was reassured that you follow a more civilised dress code, I relaxed.

I am not without personal links with IIT Guwahati. I was taught Applied Mechanics in 1971 and 1972 at IIT Mumbai by your first Director Dr. D.N. Buragohain who, in turn, had been a student of my father for well over a decade. Your present Director was one year my junior. The Chairman of your Board of Governors was my colleague when I was in the Ministry of Power in 2008.

I was last in this campus some three years back along with a couple of senior TCS executives to see how your Institute could be the anchor of IT investments for the benefit of Assam and the northeast as a whole. Some progress appears to have been made and over 1700 young men and women have been trained by TCS. This is a good beginning and I am hopeful that this initiative will now take off in a significant manner.

II

Today also happens to be the 47th death anniversary of India's first Prime Minister whose vision and leadership was responsible for India's extensive infrastructure of science and technology. It is, therefore, only appropriate that I use this convocation address as an opportunity of revisiting a key Nehruvian concern—that of “scientific temper”.

Nehru's contributions to the establishment of the IITs, of the large network of research laboratories as part of CSIR and DRDO and of the atomic energy establishment are all very well known. A number of people contributed to the idea of the first generation of IITs—Sir Ardeshir Dalal, Nalini Ranjan Sarkar, J.C. Ghosh, and Humayun

Kabir. It was Nehru's sustained and spontaneous political support that translated the idea into a reality. Over 45 laboratories in different fields were launched during his 17 years in office. It was also during the last two years of his tenure that the first steps were taken to launch India into the electronics and space era.

But more than brick and mortar—the hardware as it were—it is Nehru's preoccupation with what he at different times called the “scientific method”, the “scientific approach”, the “scientific outlook” and the “scientific temper”—the software if you will-- that I wish to speak about today. The phrase “*scientific temper*”¹ has come to define Nehru--like the memorable “tryst with destiny”, his wonderful description of khadi as the “*livery of freedom*”, his moving tribute to Mahatma Gandhi that begins with “*The light has gone out of our lives*” and his call for a “*socialistic pattern of society*” at Avadi in 1955.

That Nehru was wedded to the use of science in national development is evident from his work as the Chairman of the National Planning Committee set up in September 1938 by the then-President of the Indian National Congress Netaji Subhas Chandra Bose at the suggestion of his friend, the distinguished astrophysicist Meghnad Saha. The committee effectively functioned till 1940 although it was formally dissolved only in 1949. Nehru assembled a fifteen-member team of businessmen, economists, scientists and others. There were five scientists including Meghnad Saha and J.C. Ghosh. The task of this Committee was made difficult, it is generally not widely appreciated, by Mahatma Gandhi's somewhat inexplicably strong

¹ A JSTOR search reveals that the term “scientific temper” was used way back in October 1907 in the British Medical Journal but not in the term that Nehru meant. The Journal used it to refer to irritation or anger of scientists who are denied recognition of their works!!!

opposition to the very idea of the Committee and his veto of the publication of its final reports of the Committee in 1941.²

Nehru has little to say on science in his *Autobiography* that came out in 1936 other than to assert “*To the British we must be grateful for one splendid gift of which they were the bearers, the gift of science and its rich offspring*”. His first articulation of his larger thinking on science was contained in a message sent to the silver jubilee session of the Indian Science Congress in Calcutta held in January 1938 in which he said:

Though I have long been a slave driven by the chariot of Indian politics, with little leisure for other thoughts, my mind has often wandered to the days when as a student I haunted the laboratories of that home of science, Cambridge. And though circumstances made me part company with science, my thoughts turned to it with longing. In later years, through devious processes I arrived again at science, when I realised that science was not only a pleasant diversion and abstraction, but was of the very texture of life, without which our modern world would vanish away. Politics led me to economics, and this led me inevitably to science and the scientific approach to all our problems and to life itself. It was science alone that could solve these problems of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom and

² Nehru was on a different wavelength from Gandhiji on science. Earlier, in his *Autobiography* referring to the 1934 Bihar earthquake Nehru writes “*During my tour of earthquake areas, or just before going there, I read with great shock Gandhiji’s statement to the effect that the earthquake had been a punishment for the sin of untouchability. This was a staggering remark and I welcomed and wholly agreed with Rabindra Nath Tagore’s answer to it. Anything more opposed to the scientific outlook it would be difficult to imagine*”.

tradition, of vast resources running to waste, of a rich country inhabited by starving people.

Nine years later in his *The Discovery of India*, Nehru returned to this theme and it is worth quoting at some length since it was to figure in many of his speeches as Prime Minister:

The applications of science are inevitable and unavoidable for all countries and peoples today. But something more than its application is necessary. It is the scientific approach, the adventurous and yet critical temper of science, the search for truth and new knowledge, the refusal to accept anything without testing and trial, the capacity to change previous conclusions in the face of new evidence, the reliance on observed fact and not on pre-conceived theory, the hard discipline of the mind—all this is necessary, not merely for the application of science but for life itself and the solution of its many problems.The scientific approach and temper are, or should be, a way of life, a process of thinking, a method of acting and associating with our fellowmen.The scientific temper points out the way along which man should travel. It is the temper of a free man. We live in a scientific age, so we are told, but there is little evidence of this temper in the people anywhere or even in their leaders....Science deals with the domain of positive knowledge but the temper which it should produce goes beyond that domain.

Subsequently, Nehru never lost an opportunity to drive home these sentiments. For instance, speaking at the opening of the National Physical Laboratory in New Delhi in January 1950, he had this to say (and he could have been talking of the contemporary scene as it turns out)

I often wonder if science is not going to meet the same fate as religion, that is to say, people talked in terms of religion,

but they seldom behaved as religious-minded people. Religion became a set of ceremonials and forms and some kind of a ritual worship. The inner spirit left the people. Large numbers of people talk glibly about science today and yet in their lives or actions do not exhibit a trace of science.....But science is something more. It is a way of training the mind to look at life and the whole social structure...So I stress the need for the development of a scientific mind and temper which is more important than actual discovery as it is out of this temper and method that many more discoveries will come.

III

It was at Trinity College in Cambridge that science became an integral part of his formal education when he decided to do a Natural Science Tripos - with chemistry, geology and botany as his subjects. There is also no question that in later life Nehru, an extraordinarily well-read man, was influenced by progressive British intellectuals who wrote on science and society like Bertrand Russell³, P.M.S. Blackett, J.B.S. Haldane, the Huxley brothers—Julian and Aldous—A.V.Hill, and J.D. Bernal. There is also little doubt that he was impressed by what he saw in the Soviet Union during his visit there in November 1927, a time described by his biographer S. Gopal as *'the last days of its first, halcyon period'*. Few know that Nehru's first literary work was *Soviet Russia, some random sketches and impressions* published in early 1928.

But in January 1957 he dug deep into our history to convey the idea that the science and the scientific method was not alien to the Indian ethos. In his customary annual address to the Indian Science Congress in Calcutta (he spoke every year in early January from 1947 to 1964 starting a tradition that has continued) he said:

³ Bertrand Russell had, in fact, used the term “scientific temper” in his essay “On Education” that was published in 1926

I am coming here today from Hirakud where I performed or helped in the opening ceremony of a very magnificent piece of work of Indian engineers, the great Hirakud dam... A day before that I performed or participated in an entirely different function at Nalanda, a great university centre of 1500 years ago in Magadha, which is now Bihar. At this place, where the ruins of the university still exist, my mind went back to the days of the Buddha...I thought of his message which, apart from its religious significance, was a message of tolerance, a message against superstition, rituals and dogma. It was a message essentially in the scientific spirit.

Almost exactly a year later speaking to students at the Gauhati University not far from here, Nehru once again drew attention to the Indian tradition of the scientific approach when he said:

....the spirit of the Upanishads and the teachings of the Buddha, basically, were the method of science: search, enquiry and applying your mind to it, and maybe something more than the mind but it was search by experience, by reasoning.....we live in an age of science very much. Almost everything you see roundabout you is a product of science and technology, which has come out of science. But I am particularly referring to the temper of science, the mental approach, that is, not an approach of a bigot, not the approach of a closed mind, but of an open mind, of enquiry, realising a special way of thinking as it used to be in India.

There is another probable source of Indian influence on Nehru which has been little studied. In 1934, the Indian Science News Association got established in Calcutta very largely at the initiative of the eminent astrophysicist Meghnad Saha. The Association founded a magazine called *Science and Culture* which, in the words of Shiv Vishwanathan the noted sociologist and science historian,

‘was to present some of the most forceful arguments for a society based on the scientific method’. During its heyday which was till the late 1940s, *Science and Culture* was one of the most important science policy journals in the world. Incidentally, it still comes out but it is a pale shadow of its former glorious self.

The Science and Culture Group was a remarkable galaxy of Bengalis most of whom who studied in Presidency College during 1909-11—apart from Saha, there were Satyendranath Bose of Bose-Einstein and ‘boson’ fame, J.C. Ghosh, one of the key founders of the IIT system, Nikhil Ranjan Sen, the noted mathematician, J.N.Mukherjee later to become the Director of the Indian Agricultural Research Institute, Nilratan Dhar and P.C. Mahalanobis, the physicist-statistician and founder of the Indian Statistical Institute and the man closest to Nehru from among this group. It was Saha, Vishwanathan has uncovered in his *Organising for Science*, who got the-then President of the Indian National Congress Netaji Subhas Chandra Bose to get Nehru appointed as chairman of the National Planning Committee instead of the distinguished engineer Sir M.Visvesvaraya⁴. The *Science and Culture* Group and Nehru shared many affinities on the role of science and technology in national development as well as on the social and economic achievements of the Soviet Union. But unlike the Group, Nehru was more conscious of the limitations of

⁴ Saha, reportedly nominated for the Nobel Prize four times, was to turn into a bitter critic of Nehru in later years when Homi Bhabha’s influence on the Prime Minister was at its peak. Saha also had major differences with C.V. Raman. Many of Saha’s concerns, incidentally, on the transparency and accountability of our atomic energy programme and the impact of independent stand-alone research laboratories on our universities, have great relevance today. He was responsible for the idea of the Damodar Valley Corporation built along the lines of the Tennessee Valley Authority and his work in the early 1950s on reform of the Indian calendar was very significant.

transplanting the Soviet Union model in the Indian political and social milieu.

Nehru's return to the Upanishads and the Buddha to give an "Indian" flavour to the concept of the scientific temper was to find resonance decades later in Amartya Sen's well-known book *The Argumentative Indian* where he demonstrates that the method of reason and reasoning, that the method of sceptical argument, that the acceptance of heterodoxy were, at various times, a defining characteristic of Indian civilisation. Like Nehru, Sen rightly refuses to see Indian traditions through the prism of modern-day religious categories. This, of course, should not be construed as a romanticisation of our past, as is the normal tendency, but an acceptance of the enormous diversity of our intellectual and cultural legacy, something that has been under sustained assault by certain ideologies and forces.

Nehru's return to Indian traditions of the scientific method should also not be taken to mean that all answers can be found by excavating our past. Nehru himself was open to ideas from different sources. Immediately following Independence, he invited the British Nobel-laureate P.M.S. Blackett to advise the Government of India on the organisation for defence research. In the 1950s and the early 1960s, India was a Mecca for economists from all over the world who came to advise the Planning Commission on the Second and Third Five Year Plans. You name the economist of any repute and he had been in India then. An American engineer Harvey Slocum was the driving force behind the construction of the Bhakra-Nangal dam.

Nehru's recalling of Indian traditions in the scientific method should sensitise us to another aspect of Indian philosophy that has been hugely neglected. We see ourselves as essentially a spiritual civilisation and indeed the world has seen India largely through the lens of spirituality. We pat ourselves on the back often by juxtaposing our spirituality with the crassly materialistic Western

values. But that there has been a strong materialist trend in our own thought is beyond question, a materialist trend that Debiprasad Chattopadhyaya showed in his brilliant book *Lokayata* that was always committed to secularism, rationalism and science-orientation. Unfortunately, the scripture-oriented view of India completely overshadowed the materialist view with grave consequences for our image of ourselves let alone the perspective of others. Chattopadhyaya's book appeared just four years before Nehru passed away and at a time when he was pre-occupied with many other pressing national, regional and international issues. I have no doubt in my mind that Nehru would have backed the book's revolutionary thesis.

IV

In 1976, through the 42nd Amendment Part IV-A Article 51-A on Fundamental Duties got added to our Constitution. Of particular interest is Article 51-A(h) which reads:

(It shall be the duty of every citizen of India) *to develop the scientific temper, humanism and the spirit of inquiry and reform.*

Soon thereafter, there was a public debate on scientific temper generated by the statement issued in July 1981 by a group of scientists and academics under the aegis of the Nehru Centre in Mumbai. This statement triggered by what it called "a retreat from reason" and the growth of superstitious beliefs and obscurantist beliefs" had a foreword by one of Nehru's most fervent admirers P.N. Haksar. It led to counter-statement being issued by the noted intellectual Ashish Nandy in which he called for a "humanistic" as opposed to a "scientific" temper. Actually, when you read Nehru, you find that he did not position "humanistic temper" against "scientific temper". Indeed to Nehru, humanism with its respect for was very much part and parcel of scientific temper itself. Nehru himself was acutely aware of the limits of science and could in no way be accused of falling prey to scientific hubris. The philosopher Bhiku Parekh has written that though Nehru wanted to awake

India from its “*deep slumber when it come to grief because it had become dogmatic, mystical, speculative, uncritical, inward-looking and addicted to undisciplined fantasy*” he was equally “*anxious to “avoid the positivist mistake of regarding it (science) as the only valid form of knowledge*”.

In light of Nehru’s frequent exhortations and in light of this Constitutional obligation, where are we in regard to “scientific temper”? India has made huge strides since the Nehru’s times. Its economy is now amongst the fastest growing in the world. Its scientific and technological capability in diverse fields is widely recognised and acknowledged. But where are we placed in regard to the development of the “scientific temper”? Have we, individually and collectively, become more tolerant and accommodating of diversity? Have we, individually and collectively, shed ourselves of dogma and superstition, given up outmoded ways of thinking subjecting phenomena to critical enquiry? Have we, individually and collectively, opened our minds and, as Tagore prayed, not lost ourselves in the “dreary desert sands of dead habit”? Have we, individually and collectively broken the chains of obscurantism and bigotry of whatever kind?

V

To Nehru, of course, scientific temper was something to be inculcated in society at large. But why take society? Just have a look at our institutions of higher learning—our IITs, our universities, our numerous research laboratories—and ask yourself the question—where are they in relation to the inculcation of the scientific temper? Are the true values of science—the values of relentless questioning, logical argumentation and humility, for instance—being propagated? Are our intellectual institutions as a whole anchored in what Sen called “internal pluralism and external receptivity”? During Nehru’s time itself, things had not quite gone the way he wanted. J.B.S. Haldane, one of the greatest geneticists of the 20th century emigrated from England to spend the last years

of his life in India, in part, because of his admiration for Nehru. Haldane was to warn Nehru in the late 1950s that his beloved CSIR was not the Council for Scientific and Industrial Research but actually the Council for the Suppression of Independent Research! And one of his key scientific colleagues was later to give respectability to a godman who produced ash and watches from thin air.

What has gone wrong? Why have we strayed so far? How is it that we are recognised as a major power in some knowledge-based industries and yet when it comes to scientific temper, we are found wanting—not just ordinary citizens but scientists and engineers as well? How is it that a number of national institutions set up with a grand vision, now have become parochial? How is it we cannot have a cool and composed public debate on any issue without abuse and vitriol being hurled? Why can't we disagree, if we have to, without being disagreeable? Personally, I think Nehru set too high a standard for us. He under-estimated the hold of prejudices and atavistic passions on us—passions, in the words of his cousin B.K. Nehru the noted administrator, “*that do not yield to rationality or the wider interest of the nation*”. Nehru was the supreme rationalist who expected others to be so as well. His strict demarcation of private views and public positions, for instance, led him into conflict with his own colleagues on the issue of rebuilding of the Somnath Temple—Nehru was not against the reconstruction but was against the President of India being associated with it in his “official” capacity.

It was being suggested even during Nehru's time that his obsession with the idea of a scientific temper went against the spiritual nature of our society. That Nehru was himself aware of this murmuring is borne out by the fact that he returned to this theme in his later years. On the occasion of the golden jubilee celebrations of the Indian Institute of Science in Bangalore in 1959, he stated:

There is something in life, let us say, like goodness, like truth, something like beauty...which presumably are very important in life. And when we put it in this way, how far can science be allied, without destroying its basis, to certain fundamental values in life? If it is not concerned with life as such—if it is independent of these values—then we may make the greatest advance there divorced from these values, but presumably the ultimate result will not be good....On the other hand, we cannot merely talk of these values without science coming into the picture. These are difficult problems and certainly a little beyond my depth. But I do not myself see any essential compatibility between the temper of science, the spirit of science, the approach of science, and these higher values—provided that even in the search for these higher values the temper of science is maintained”

Clearly, Nehru’s tremendous fascination for the Buddha came out this.

Nehru saw the state as the instrument of building the scientific temper in society. With the benefit of hindsight, it could be argued that he gave too much importance to the role of the state. But don’t forget that the primacy of the state reflected the *zeitgeist*, reflected the times as it were in which he functioned. Civil society organisations had yet to emerge in large numbers as they have today, although I must say that many of these organisations are dangerously anti-science and technophobic. Nehru perhaps did not bargain for changing political values. Where are the political leaders and parties today who will confront obscurantism? Who protested when a young woman committed sati in Rajasthan in 1986? Who called into question the frenzy surrounding the gushing forth of milk from the Ganesha idol in the nation’s capital? How is it that leaders across the political divide continue to tacitly support institutions like *khap panchayats*? We had the extraordinary spectacle of a Minister a couple of years ago—a physicist to boot—

who wanted to introduce astrology as a subject of study in universities. Surely, scientists should not be seen as accomplices in nourishing an irrational anti-modernist culture!

It is also often overlooked by his critics that Nehru saw the state not only as the instrument but, more importantly, as the *democratic* instrument of fostering the scientific temper. The “left” critique of Nehru emanates from the frustration that he did not do enough to propagate the scientific temper except open laboratories and institutes. But let us not overlook the political framework which he helped establish so painstakingly—the framework of parliamentary democracy. He never sought to coerce but instead tried to persuade. There was never any attempt at imposition. He was the Great Communicator when he easily could have become the Great Dictator as he himself had feared in his famous piece of 1936 that appeared under the pseudonym of Chanakya.

With the spread of education and with economic development itself, he believed that the values that animate the scientific temper would get embedded in our lives. This has turned out to be a heroic assumption and professional education, it turns out, very often has not led to a broadening of horizons but to a narrowing of outlooks. I am not suggesting that we can look to Nehru and his ideas to give us specific answers to all our contemporary questions about science. But what we can learn from a study of India's first prime minister's concerns is something about how essential it is for people like you and me especially to see as our continuing responsibility the advancement and diffusion of an open, questioning, liberal, humanistic and rational intellectual culture.

VI

Finally, what do I tell the graduating class? I am expected to do so this being a solemn Convocation Address. In light of what I have pointed out earlier, the only thing that remains for me to say is try and imbibe the spirit of what Nehru's scientific temper in whatever you do. You don't have to be follower of his political party to

acknowledge and appreciate the true value of Nehru's obsession with the idea of a "scientific temper". The essence of Nehru's fixation on scientific temper was this—a questioning mind, pushing the limits, not getting encumbered or structured by narrow limited concerns, not afraid to be inconsistent with changing facts and circumstances but always proceeding on the basis of objective realities, not prisoner of any dogma, modern or archaic. And let me tell you—modern-day dogmas can be as devastating as ancient ones. I speak from experience as someone who has to confront them daily both from the "GDPists" on the one hand and "environmentalists" on the other.

You must all be aware of how your institution came into being. Other than the Central University in Hyderabad set up in the 1970s in response to the Telangana agitation, your IIT is perhaps the only educational institution, the demand for which was part of a political peace accord. So the responsibility on all of you to do something for this region of our country is that much greater. This is a region of not only great physical beauty but also a region that is rich in natural and human resources as well. You will, of course, go out from here and leave your imprint elsewhere. Four years of your life and more in some other cases would have been spent here and I am sure you will leave with pleasant memories. I wish you all the very best in your endeavours. In these endeavours, however, I hope you will spare a thought for the immediate milieu in which this institution, started with great hopes, is located and that you will become the harbingers of a transformed Northeast as well.

Thank you.