JAWAHARLAL NEHRU
CENTENARY LECTURE

Shri K.R. Narayanan, Minister of State for Science & Technology & Vice-President, CSIR, delivered the Jawaharlal Nehru Centenary Lecture, titled, “Nehru’s role in the promotion of Scientific Temper in Indian Society”, on Sept 27, 1989 at the National Physical Laboratory, New Delhi.

Nehru was intimately associated with NPL. It is an institution he loved and admired and held up as a model of a scientific laboratory in the country. Its contributions have been very notable and are known to you all. Jawaharlal Nehru’s role in the development of science in India was too well-known for me to explicate upon. His contribution was not limited to scientific education, the building up of a chain of great laboratories and the application of science and technology to development. Jawaharlal Nehru had thought of a wider role for science. He has conceived of science as something that is applicable to production, education, health etc., indeed to every aspect of life for the development and improvement of the human being and of society as a whole. All this is crystallised in the phrase “scientific temper”. I quote Nehru from his “Discovery of India” on the subject.

“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 preconceived 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. 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. It is, therefore, with the temper and approach of science, allied to philosophy, and with reverence for all that lies beyond, that we must face life”. This sums up Nehru’s entire approach to science and technology both in its practical applications and in its philosophical and cultural dimensions.

Today we know that the discoveries of science have more or less extinguished the distinction between mind and matter. One of my professors used to emphasize this distinction by the following question and answer “What is mind, No matter. What is matter, Never mind.”

Search is going on in science for the ultimate mystery of life. In Physics, the search is for the final particle and for the underlying “super-force”. No less a scientist than Einstein has said how it was possible to grasp some of the truths about life in the way the ancients have dreamt, through abstract thinking and through the application of mathematics. What I am trying to say is that the scientific spirit, the scientific approach, was inherent in the Indian tradition, though it got marred through the social distortions and deterioration that took place in our country during its long and chequered history. It is this scientific temper that is at the root of Jawaharlal Nehru’s approach to life. Nehru wrote: “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 as a result of all this that in 1937 he became the Chairman of the National Planning Committee of the Indian National Congress. The interesting thing for us is that within this Committee he formed a group of scientists to work out the methods of applying science for India’s development. It is during the same period that he addressed the Indian Science Congress. “It is science alone that could solve the problems of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by a starving people”.

The culmination of all this was in the Scientific Policy Resolution of 1958. The most important application of scientific approach by Nehru was in the realm of planning. The entire planning process itself under Nehru was in the best sense of the world a vast application of the method and the spirit of science to the development of India as a whole. Talking about people working in our laboratories, he said: “I think that with a large number of bright young men and young women working in these laboratories, will help gradually to spread the temper of science, the temper of dispassionate study, the temper of the
search for truth, regardless of consequences, that is so much needed today.” Without scientific education there could be no meaningful dissemination of scientific temper among the people.

As the founder of Indian democracy in the modern sense, Nehru believed that democracy and science were interlinked. Another way he expressed his attachment to scientific temper and scientific values was through his efforts at social transformation whether it was in respect of the status of women in the Indian society, or the development of backward and depressed classes. It is important to remember that Jawaharlal Nehru combined in himself in a very unique manner the approach of humanism with the spirit of science.

Nehru looked at science without fear, in a very audacious manner. He did not want scientists to shy away from anything in the pursuit of truth. He advocated full freedom for scientific research with a boldness that was startling. The true scientist is a sage unattached to life and the fruits of action, everseeking truth wheresoever his quest may lead him. Today for a man to be considered educated he has to know something about science. It was as a result of the realisation of this modern predicament of the common man, as well as for paving the way for the modernisation of Indian society that Nehru advocated so incessantly the need for the creation of scientific temper and the popularisation of science in our society. So if we are to bridge this gap and disseminate scientific knowledge and promote scientific temper, it has become necessary for, at least, some of the important scientists to turn to popularisation. It is time that some scientists entered the field of scientific journalism.

One of the areas in which Nehru’s scientific spirit manifested itself most gloriously and eloquently was in his campaign against the abuse of science and technology for war-like purposes. Nehru spoke at the J.C. Bose centenary celebrations. “We have arrived really at the brink of hell and the scientist has to think. Am I right in doing a work which drives the world in this terrible direction? ... The scientists are tied up hand and foot to the chariot of the State to make more bombs, to do this and that and then they do not know how to escape.” And it is in this context that scientists have the social and world responsibility of not co-operating with or positively taking part in this armament race by providing good advice to the Presidents and Prime Ministers who are scientifically and technologically ignorant.

**KRISHNAN MEMORIAL LECTURE**

The 20th Krishnan Memorial Lecture was delivered by Prof. S. Chandrasekhar, NL, University of Chicago, Illinois, USA, on Nov. 29, 1989. The topic of the lecture was “The Intellectual achievement that the Principia is”.

Dr. Chandrasekhar described Charles Newton’s Principia as a work of great mathematical genius which was a subject of derision instead of praise by his contemporaries. It was unfortunate that Principia, an immortal treatise on pure mathematics, was dubbed by the mathematicians of Newton’s age as “occult in physics” and “aburd theories beyond human comprehension.”

Some of the prepositions included in the Principia, like the Theory of Infinite Series, Binomial Theorem, etc. are of perennial relevance to mathematicians, the laureate said.

Earlier, Prof. Chandrasekhar recalled his association with Sir K.S. Krishnan, when he was working at the Indian Association for the Cultivation of Science, Calcutta with Prof. C.V. Raman. He donated copies of Dr. Krishnan’s letters written to him over a period of 30 years to the archives of NPL, which were received by Dr. S.K. Joshi.

Dr. A.P. Mitra, Director General, CSIR presided over the function. The audience included physicists, scientists, research students and others. Dr. S.K. Joshi, Director, NPL presented a memento to Prof. Chandrasekhar on the occasion.
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<th>Speaker</th>
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<tr>
<td>Dr. Jaroslave Sestak, Inst. of Physics, Czechoslovakia.</td>
<td>Phase relations Y-Ba-Cu-O superconductors.</td>
<td>April 4.</td>
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<tr>
<td>Mr. B.C. Moss, National NDT Centre, Harwell, UK.</td>
<td>Laser interferometer and its application to non-destructive testing.</td>
<td>April 5.</td>
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<tr>
<td>Dr. E.L. Ivchenko, Physico-technical Inst. of the Academy of Sciences, USSR.</td>
<td>Optical spectroscopy of semiconductor superlattices.</td>
<td>April 6.</td>
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<tr>
<td>Dr. B.V. Smith, Deptt. of Electronic and Electrical Engg. Birmingham University, UK.</td>
<td>Sonar systems for mapping the sea floor.</td>
<td>April 26.</td>
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<tr>
<td>Dr. D.S. Parmar, Physics Deptt., Kashmir University, Srinagar.</td>
<td>Design and applications of monomeric and polymeric ferroelectric liquid crystals.</td>
<td>July 13.</td>
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<tr>
<td>Prof. M. Kimata, Waseda University, Tokyo, Japan.</td>
<td>MBE growth of superlattices and their device applications.</td>
<td>August 1.</td>
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<tr>
<td>Prof. N.F. Ramsey Higgins, Harvard University, USA.</td>
<td>Cold fusion and time reversal symmetry.</td>
<td>September 1.</td>
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<tr>
<td>Prof. Nagakura, Graduate University of Advanced Studies, Yokohama, Japan.</td>
<td>Magnetic field effects on photophysical and photochemical processes.</td>
<td>October 4.</td>
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<td>Dr. F. Waeldele, PTB, FRG.</td>
<td>Development tendencies in the improvement of coordinate measuring machine performance.</td>
<td>October 27.</td>
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<td>Dr. F.L. Pratt, Clarendon Lab, Oxford University, UK.</td>
<td>Optical properties of organic conductors.</td>
<td>November 6.</td>
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<td>Dr. T. Zdanowicz, Polish Academy of Sciences, Poland.</td>
<td>Characterization of silicon solar cells and solar cell batteries.</td>
<td>November 16.</td>
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<tr>
<td>Prof. K.C. Wali, Deptt. of Physics, Syracuse University, USA.</td>
<td>Glimpses from the life of Prof. S. Chandrashekar.</td>
<td>November 17.</td>
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<tr>
<td>Prof. A.P. Balachandran, Syracuse University, USA.</td>
<td>Fractional statistics, anyons and high Tc.</td>
<td>November 20.</td>
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<tr>
<td>Dr. S.C. Jain, Clarendon Lab., Oxford</td>
<td>Physics of Ge&lt;sub&gt;x&lt;/sub&gt;Si&lt;sub&gt;1-x&lt;/sub&gt; strained epitaxial layers and devices.</td>
<td>November 27.</td>
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<tr>
<td>Prof. M. Inagaki, Toyohashi University of Technology, Japan.</td>
<td>Recent trends in R &amp; D on carbon and other materials in Japan.</td>
<td>November 30</td>
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<tr>
<td>Dr. R.C. Chivers, Surrey University, UK.</td>
<td>Ultrasonic propagation in suspensions</td>
<td>November 30.</td>
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<td>Acoustic sea-bed characterisation.</td>
<td>December 5.</td>
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<td>Speaker</td>
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<td>Prof. R.K. Panday, Texas A &amp; M University, USA.</td>
<td>Research in high Tc materials at Texas A &amp; M University-single crystal films and ceramics.</td>
<td>December 21.</td>
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<tr>
<td>Dr. V.P. Aneja, North Carolina State University, USA.</td>
<td>Characterizing the ozone climatology at high elevations in the Southern Appalachians, USA.</td>
<td>December 22.</td>
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<tr>
<td>Dr. Thomas R. Lettieri, NIST, Gaithersburg, Maryland.</td>
<td>Surface and particle metrology at the U.S. National Institute of Standards and Technology.</td>
<td>January 10.</td>
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<tr>
<td>Dr. H. Maeda, National Research Institute of Metals, Tsukuba, Japan.</td>
<td>High critical current densities in high Tc Bismuth Compound wires.</td>
<td>January 16.</td>
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<tr>
<td>Dr. B. Batlogg of AT &amp; T Bell Labs, USA.</td>
<td>Survey of experiments on high Tc Cuperates.</td>
<td>January 18.</td>
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<tr>
<td>Dr. Virender Mahajan, M/s Aerospace Corporation, California, USA.</td>
<td>Optical imaging interference.</td>
<td>January 24.</td>
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<td>Dr. Y.V. Vasiliev, Institute of Inorganic Chemistry, Novosibirsk, USSR.</td>
<td>Low-thermal-gradient Cz technique. Modelling of some low pressure CVD processes</td>
<td>January 30.</td>
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<td>Prof. G.B. Donaldson, University of Strathclyde, Glasgow, UK</td>
<td>Recent developments in SQUIDS and their applications.</td>
<td>January 31</td>
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<td>Harmonic generation and granularity in YBCO-a new role for the critical flux state model.</td>
<td>February 1.</td>
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<tr>
<td>Dr. M.P. Das, Australian National University, Australia.</td>
<td>Understanding high Tc superconductivity-3 years since Bednorz and Muller.</td>
<td>February 1.</td>
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<td>Dr. Stefan Benacka, Slovak Academy of Sciences, Czechoslovakia.</td>
<td>Weak Superconductivity research at Slovak Academy of Sciences.</td>
<td>February 2.</td>
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<tr>
<td>Dr. Y. Sudhakar, Max Planck Inst. Stuttgart, FRG.</td>
<td>Transport properties of a two dimensional electron gas.</td>
<td>February 15.</td>
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<tr>
<td>Dr. N. Anantaraman, National Superconducting Cyclotron Lab., Michigan State University, USA.</td>
<td>An outsider’s impressions on status of physics and astronomy in India.</td>
<td>February 16.</td>
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<tr>
<td>Scientist &amp; Country</td>
<td>Purpose &amp; Month</td>
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<td>Dr. H.N. Dutta, UK</td>
<td>Presented a paper in the Intl. Conf. on Antennas and Propagation, University of Warwick, Caventry, April.</td>
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<tr>
<td>Dr. R.B. Tripathi, USA</td>
<td>Raman Research Fellow, worked in AT &amp; T Bell Laboratory, New Jersey, April-Jan.</td>
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<tr>
<td>Dr. S.P. Singal, USSR</td>
<td>Indo-USSR Programme in the S &amp; T area of theoretical and applied mechanism, May-June.</td>
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<td>Dr. D.R. Lakshmi, USA</td>
<td>Presented a paper at the ‘SUNDIAL’ workshop at Virginia and visited world warning agency of SESC, Boulder, May.</td>
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<td>Dr. P.K. Gupta, China</td>
<td>Presented a paper at the Intl. Symp. on Certified Reference Materials (ISCRM89) at Beijing and visited NIHSMR Centre, May.</td>
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<tr>
<td>Dr. V.S. Tomer, Czechoslovakia</td>
<td>Under CSIR-Czechoslovakia Academy of Science Exchange Programme, May-June.</td>
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<tr>
<td>Italy</td>
<td>For equipment training on UHV load-lock system, Feb.</td>
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<tr>
<td>Dr. R.G. Sharma, Japan</td>
<td>Participated in the Intl. Electrochemical Commission group meeting on superconductivity held at Tokyo, May.</td>
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<tr>
<td>Sh. Vijay Kumar, FRG</td>
<td>Fellowship of GAES for study/training under DAAD Programme, June-Sept.</td>
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<tr>
<td>Dr. S.K. Joshi, FRG</td>
<td>Attended the steering committee meeting of the NPL-II Project-augmenting the National Standards of measurements, June.</td>
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<tr>
<td>USSR</td>
<td>Attended the joint council meeting of I LTP at Leningrad, July.</td>
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<td>UK</td>
<td>Attended 2nd meeting of the Intl. Advisory Committee of Commonwealth India Metrology Centre, July.</td>
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<td>France</td>
<td>Attended the 4th Scientific Council meeting of Indo-French Centre for the promotion of advanced research (IFUAR), Sept.</td>
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<td>FRG</td>
<td>For discussion regarding the areas of collaboration under INSA-DFG, Exchange Programme, Dec.</td>
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<tr>
<td>Dr. K. Chandra, FRG</td>
<td>Attended the steering committee meeting of the NPL-II Project-augmenting the National Standards of measurements, June.</td>
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<tr>
<td>UK</td>
<td>Attended 2nd meeting of the Intl. Advisory Committee of Commonwealth India Metrology Centre, July.</td>
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<tr>
<td>Dr. B.N. Srivastava, Japan</td>
<td>Attended the Intl. Seminar on ozone layer protection held at Tokyo, May-June.</td>
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<tr>
<td>Dr. T.R. Tyagi, USSR</td>
<td>Under Indo-USSR programme in the area of Radio Physics and Astro-physics, May-June.</td>
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<tr>
<td>Argentina</td>
<td>Presented papers at Intl. Symps. on Equatorial Aeronomy, and Beacon Satellite and visited MPAE Lindau, March-April.</td>
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<tr>
<td>Dr. V.N. Bindal, UK &amp; Spain &amp; Indonesia Pakistan</td>
<td>Delivered a talk at Ist. congress of ultrasonography held at Karachi, Jan. Under Indo-Soviet programme for cooperation in S &amp; T, July.</td>
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<tr>
<td>Dr. V.D. Dandavate, USSR</td>
<td>Attended the Inter Society Energy Conversion Engg. Conf. at Washington D.C., Aug.</td>
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<tr>
<td>Dr. A.P. Jain, USA</td>
<td>Attended the Intl. Symp. on Geoscience and Remote-sensing at Vancouver, July.</td>
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<td>Dr. S.K. Sarkar &amp; Canada</td>
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<td>Dr. G.S. Uppal</td>
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Dr. Krishan Lal, FRG
Peru
Japan

Dr. K.S. Zalpuri, Japan

Dr. S.C. Jain, USSR

Dr. A.B. Ghosh, Japan

Sh. H.P. Gupta, USSR
Dr. N.D. Kataria, FRG
Dr. A. Sengupta, USA & UK

Dr. B.S. Mathur, China
Dr. P.C. Jain, FRG
Dr. J.R. Anand, FRG
Dr. Vasantha Raman, FRG

Dr. Janardhan Singh, UK
Dr. J.K.N. Sharma, Egypt & FRG

Dr. S.V. Gupta, FRG
Sh. Ram Prasad, Greece
Dr. B.M. Reddy, Australia
Sh. N.K. Babbar, Japan
Dr. V.R. Singh, Malaysia

Dr. B.K. Das, UK
Dr. A.K. Hanjura, USA
Sh. Rajeev Chopra, USSR
Dr. A.K. Gupta & Italy & UK
Dr. Neeraj Khare
Sh. Raj Signh, FRG

Dr. K.C. Nagpal, FRG
Sh. S.M. Khullar & USSR
Dr. Satbir Singh,
Dr. D.C. Prashar, USA

Under CSIR-KFA Programme and also visited few Institutions, July-Aug.
Visited under CSIR-CONCYTEC, Exchange Programme and CNRS, France on the way, Dec.
Visited M/s Rigaku Intl. Corpn. and National Lab. for high energy physics at Tsukuba; participated in CODATA task group meeting in Kyoto, February-March.
For discussions on the nitric oxide rocket data at the Geophysics Research Laboratory, University of Tokyo, July-Aug.
Under Indo-USSR programme of cooperation, Sept.-Jan.
On scientist assignment at PTB, Braunschweig for a period of 2 years, Aug.
Under INSA-Chinese Academy of Sciences Exchange Programme, Sept.
Under PTB-AID Programme (NPL-II), Sept.
Presented a paper in the 3rd Intl. Symp. on highway pollution held at Munich, Sept.
For training in underwater acoustics under Indo-UK Project on ultrasonic standards, Sept.-Nov.
Attended the executive committee meeting of IUVSTA and the Intl. Conf. of vacuum and solid surface physics, Sept.
Attended the Intl. Symp. on scientific cooperation at Athens, Oct.
Presented a paper at the Solar Terrestrial Prediction workshop at Leura, Oct.
Presented a paper at the Intl. Symp. of cryosurgery at Tokyo, Oct.
Presented a paper at the Intl. Chem. Conf. on silicon and tin at Kuala Lumpur, Oct.
Under CSIR-British Council Exchange Programme, Nov.
For training on UHV load-lock system in Italy and visited Deppts. of Phys., Universities of Strathclyde, Glasgow, and Birmingham, Feb.-Mar.
For training in the field of fluid flow measurement under NPL-PTB Technical Coopn., Mar.-Sept. 90.
For equipment training on D-500, X-ray diffractometer at M/s Siemens Corpn., March.
Under S & T cooperation in the area of electronic materials, Mar.-Oct. 90.
Presented a paper at the Chapman Conf. on global biomass burning atmospheric climatic and biosphere implications, at Virginia, March.