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# Organizational News

# Obituary

### **Prof P M Bhargava**

Prof P M Bhargava is widely regarded as the Father of modern Biology in India. In his death, India has lost one of the most vocal advocates of scientific temper and rationality in India. He was highly influential in the development of scientific temper in India, and argued that scientific temper is needed to be cultivated as a civic duty. At the same time, he stood for ethical values in science.

He was an institution builder who founded Centre for Cellular and Molecular Biology in Hyderabad which spearheaded research in Biology in India, and designated as a 'Center of Excellence' by UNESCO. The technical achievements of CCMB include discovery of a heart disease mutation carried by 6 crore Indians, development of the first artificial insemination in India, and many more. Prof. Bhargava also played a pivotal role in policy making in science and technology in the past four decades.

While he believed in doing and promoting world class biology and biotechnology research in India, he opposed the way biotechnology was used to further commercial interests.

He never compromised with values and was never afraid of questioning the high and mighty when he felt things were going wrong. He was critical of the Janata Dal Government (when it dismantled the wonderful 'Method of Science' exhibition meant for inculcating scientific temper by showing how science works and showing why pseudoscience fails), the NDA gov-



Prof P M Bhargava (22 February 1928 – 1 August 2017)

ernment of 1998 to 2004 (for introducing astrology and vastushastra in the school curriculum), the UPA government (as Vice-Chairman of National Knowledge Commission and chose to quit over difference in opinion rather than compromise to keep the position) and the current NDA Government (returned the coveted Padma award when he felt safety of certain sections of society was compromised) when he found things were not going well.

Even when he was not well, he involved himself with activities in public interest, exposed malpractices in health care industry and ran a public clinic for victims of the gas tragedy in Bhopal. In his death, India not only lost a great scientist and a staunch

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advocate of scientific temper but also a great human being whose place is assured in the history of Science and technology in India.

### Prof. U R Rao

Prof. U R Rao, was not only a leading space scientist of India, but also championed the propagation of scientific bent of mind among the people of the country.

His contributions to the development of India's very successful space programme includes the development of the first indigenous satellite Aryabhata and many other projects that he led as the Chairman of ISRO for a decade. In fact, he laid the foundation for the work that led to the creation of indigenous satellite launching capability, whose evidence is the recent launching of GSLV Mk III. He was equally keen on educating the public about the progress made by the Indian space programme and taking them along the journey.

In spite of ill health, he always was available to inspire the younger generation, to instil in them a love of science as well as scientific mindset. He was very concerned that even educated people including scientists and people in high positions believe in astrology, superstitions and unscientific ideas and was openly critical of such tendencies. As Chairman of ISRO, he did not encourage mixing religious practices with the official activities of the space programme.

He would say "Believe in astronomy and not astrology" and was deeply worried that "despite major contributions by Indians in space science, even today radio and TV channels broadcast programmes on astrology".

In his death, the nation has lost a great champion of not only science research and application but also of scientific temper.



Prof U R Rao (10 March 1932 – 24 July 2017)

# **Prof. Yash Pal**

The tweet from 'Teachers of India' – a vibrant community of teachers on twitter – on the demise of Prof Yash Pal said : "Science education and popularisation in India took a 'Turning Point' when Prof. Yash Pal helmed it'. That, in many ways, summed up his contributions to science education and popularization in India and what the grateful teachers felt about him. In academic science circles, he was known for his contributions to the study of cosmic rays but in public life, he was identified with one of Doordarshan's flagship programmes in the nineties: 'Turning Point'!

When Television was just being introduced, Prof Yash Pal realised its potential for reaching out to the masses with the message of science. He took up the challenge of popularizing science and fighting superstitions through the medium of TV, at a time when its programmes were beamed in black and white and that too only in

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metros like Delhi, Kolkata and Mumbai. He was such a visionary.

He devised 'Turning Point' as a weekly TV programme to explain scientific concepts in layman's language. With Prof Yash Pal as the host, the programme became immensely popular.

His 'Learning without burden' report is a great example of how to make learning fun, and is a document of fundamental importance. Most children join school very early, at the age of 2.5 years, and most parents believe that that is a recipe for success. In contrast, Prof. Yash Pal identified that as a major problem. He also found the increasing loads of homeworks, tuitions and coaching classes as another major problem while most parents wanted to push their children beyond their capacities to succeed.

He also criticized the examination system that focuses on a child's ability to reproduce information rather than his/her ability to think and to apply concepts on new and unfamiliar situations. He found learning from a child's perspective to be boring, unpleasant and sometimes even a bitter experience. He criticized the style of writing in text books which is mostly terse rather than lively.

He felt that classroom realities should be taken into account when writing text books. He recommended that at least 10% of the salary bill should be given to schools as 'contingency amount' for buying teaching equipment. He advised that text books to be 'school property' and should be kept in the school rather than children carrying them home everyday in heavy bags. He was strongly against giving too much homework and recommended no home work in primary classes and only modest homework load in the higher classes. He laid more stress on exploration of the environment around one's home to learn better. He



Prof Yash Pal (26 November 1926 – 24 July 2017)

advised that the language in text books to be as close as possible to the language that children are familiar with.

As far as science is concerned, he was very emphatic that it should be based on hands-on experiments.

His fight against private universities in Chhattisgarh which were set up without proper infrastructure or approvals with the sole motive of earning profit, finally led to the closure of 112 such private universities and saved thousands of students from disaster.

He firmly supported developing scientific temper and spirit of inquiry among children. He objected when there were attempts to introduce astrology in the education system. He supported the move to control the practice of harmful superstitions through legislation. He was critical of scientists who would not respond to the larger need of taking science to the people. In his death, India has lost a doyen of science education and popularisation.  $\Box$ 

# Report of the India March for Science In different cities

August 9, 2017 became an important milestone in the history of science movement in India. For the first time in 70 years after independence, in over 40 cities, thousands of scientists, teachers, research scholars, students and science loving people marched under the banner of India March for Science (IMFS). The voice in defence of science and scientific temper echoed in various parts of the country. The India March for Science was hailed by the organisers of the International March for Science that took place on 22 April 2017.

# Kolkata

The Marchers assembled in front of Rajabazar Science College at 3 pm. Prof. Amitabha Datta, Chairman, Advisory Board of IMFS Kolkata Organizing Commit-



Prof. Amitabha Datta, President of the Advisory Committee of the IMFS Organizing Committee, addressing the gathering before the start of the March in Kolkata



The famous physicist Prof. Amitabha Rauchoudhuri flagging off the March in Kolkata

tee, Prof. Amitabha Raychoudhuri, Professor Emeritus, Calcutta University, Prof. Dhruba Mukhopadhyay, President of Breakthrough Science Society, and Dr. Nilesh Maity, Secretary of the IMFS Kolkata Organizing Committee, briefly addressed the gathering and explained the purpose of the March. Prof. Amitabha Raychoudhury flagged off the March. It proceeded through Sealdah station and Moulali Crossing to reach Esplanade.

A delegation comprising Prof. Dhruba Mukhopadhyay, Professor Anindita Bhadra, Professor Sugata Roy, Professor



The March advancing towards Esplanade in Kolkata

Ayan Banerjee and Prof. Nilesh Maiti went to the Raj Bhavan to submit a memorandum to the Governor. In the meantime Dr. Debabrata Bera, Prof. Pradipta Bandopadhyay, Prof. Anindita Bhadra, Shri Subrata Gouri (Vice-President, BSS West Bengal), Shri Arghya Das (Democratic Research Scholars' Organization) addressed the Marchers at Esplanade.

The March ended when the delegation returned from Raj Bhavan. Around 4000 scientists, professors, teachers, research scholars, students and science-loving people participated in the March.

Two other marches were held in the state, one in North Bengal University, Siliguri, and the other in Asansol Girls College.



The assembly before the start of the March at Bengaluru



View of the India March for Science in Delhi

# Bangaluru

At 11am on August 9, more than 1500 people including scientists, teachers, research scholars, doctors, engineers, students and general public assembled at the Town Hall. Prof. Japhet (VC of Bangalore Central University), Dr. H S M Prakash, Deputy Director (retd.), Geological Survey of India, and Mr. Nagesh Hegde (Popular Kannada science writer) paid homage to the eminent scientists Prof U R Rao, Prof Yash Pal, and Prof Pushpa Bhargava who had passed away recently. Prof. Japhet flagged off the March. Dr G.S.D. Babu (Director, M.P.Birla



A marcher with placard in Bengaluru

Institute of Fundamental Research) handed over the message "Celebrate, nurture and protect science. Promote Scientific temper" from senior scientists to junior research scholars.

Scientists, professors and research scholars from various research institutes like IISc, RRI, JNCASR, ICTS, TIFR, NCBS, NIAS, ISI, BU, BCU etc, participated in the march. Ms. Rajani. K.S (State Secretary, Breakthrough Science Society) coordinated the March.

### Delhi

In Delhi, the March began at 4.30 pm from Mandi House and ended at Jantar Mantar. A large contingent of scientists, professors, teachers, research scholars, students and science-loving people numbering more than 400 joined the March with colourful banners and placards. The participants were from Delhi University, JNU, IIT Delhi, CSIR labs, AIIMS, MDU-Rohtak and other leading science and research institutes in the city.

At Jantar Mantar, Prof. Soumitro Banerjee (IISER-Kolkata, Bhatnagar Awardee and



The March in Chennai proceeding from the North end to the South end of Elliots beach.

General Secretary of Breakthrough Science Society) congratulated the Organizing Committee and the participants. He spoke on the demands raised by the March and the necessity to take this movement forward. Mr. Prabir Purakayastha (Delhi Science Forum), Dr. Vinay Kumar (Zakir Husain College, D.U., and In-Charge of Delhi BSS) and Mr. Chanchal Ghosh (Executive Committee Member of BSS) spoke on the occasion. The participants paid tribute to the eminent scientists Prof. U R Rao, Prof. P M Bhargava and Prof. Yash Pal who had



The famous science popularizer Mr. Arvind Gupta flagging off the March in Chennai

passed away recently. The message from the organisers of the International March for Science was read out.

# Chennai

The March began at 5 pm from the North end of Elliots Beach, Besant Nagar. Shri Arvind Gupta, the well known science populariser flagged off the March. The marchers carrying placards displaying various slogans marched to the south end covering a distance of about one km and then returned back to the starting point.

Prof V Sunder, Shri Arvind Gupta, Prof T R Govindarajan, Prof Hema Murthy, Prof Ramanujam, Dr Suresh Govindarajan, Dr Arul Aram, Dr Pramesh and Mr Arjun (Research scholar) spoke on the various demands of the March. Mr George Joseph (Secretary, BSS Tamilnadu) read out the message received from the organisers of the International March for Science. Dr Uma Ramchadran, Convenor of the Organising Committee thanked the marchers for making the event a big success. More than 400 people participated in the March. News & Views



The gathering before the March in Mumbai

# Mumbai

The March started at 4 pm from Kranti Maidan and ended at Bharatiya Bima Nigam office near Chowpatty. Around 300 scientists, professors and researchers joined the March. Addressing the gathering Prof Deepak Modi, National Institute for Research in Reproductive Health, Mumbai, said "The problem arises when the government or its agencies do not come out and condemn statements made by public officials that are far removed from fact." "The rally is not just to demand more funds for science. It is time scientists come together to speak about the shift we are seeing in allotting government funds for fanciful things like cow urine rather than for research in basic sciences. If we do not speak now, people will believe in validation of cow urine without evidence", said Professor Aniket Sule, Astrophysicist attached with Homi Bhabha Center for Science Education. Many people involved in the march felt that this event has set up a history and should be continued in future.

### Thiruvananthapuram

On August 9, before the start of the March, a talk was arranged at the Public Library Hall, Palayam at 9.30 am. Dr. Umesh Kadhane presented the talk "Turning good students to good scientists - From text book to life". After the talk, the inaugural function was held at the same venue to flag off the march. Sri P Radhakrishnan, former Deputy Director, LPSC, ISRO and Chairman, Organizing Commit-P.N. Thankachan tee, presided. Prof. welcomed the gathering. Prof Indulal read out the memorandum addressed to the Prime Minister of India. Dr Rajan Gurukkal, former Vice Chancellor, Mahatma Gandhi University in his inaugural address explained the crisis faced by science in the present social order.

Led by Dr Rajan Gurukkal, Sri P Radhakrishnan and several other prominent personalities, the march began from the entrance of the Public Library and ended at Asan Square, in front of the administrative building of the Kerala University. Sri. D. Krishna Warier, former Deputy Director, C-



The marchers pressing ahead in Thiruvananthapuram

DAC, Prof. C.P. Aravindakshan, a leader of popular science movement in Kerala, Prof. Gireesh and Sri. G.S. Padmakumar, President, BSS, Kerala Chapter addressed the gathering. A good number of scientists, teachers, research scholars and students from institutions like NIIST (CSIR), IISER, IIST, JNTBGRI, CET and Kerala University participated in the march.

# Hyderbad

The March started from the Press Club, Basheerbagh and proceeded to the Liberty Circle in Hyderabad. Prof Mohan Rao, Former Director, CCMB inaugurated the In the inaugural address, he March. appealed to the people to acquire the scientific way of thinking. He said that the government should encourage research in basic sciences. He also emphasized that the science courses in school curriculum must be strengthened and the spread of unscientific ideas be stopped. He also stressed that science must be used for improving the lives and living conditions of the common people. Breakthrough Science Society State Convener, Mr. R. Gangadhar addressed

the gathering and spoke in support of the demands of the March. The March ended at the Liberty Circle where Prof Mohan Rao, Dr. C. Krishna Kumari (science communicator), Dr G Rajitha and Mr. S. Janibasha (Githam University) addressed the marchers.

### **Bhubaneswar:**

The March began at 4 pm from the main gate of Sainik School and covered one and half kilometres to reach Pathani Samanta Planetarium. Scientists, faculty members, researchers, students and science enthusiasts numbering more than one thousand from various institutions of Odisha such as Institute of Physics, Bhubaneswar, NISER, IIT Bhubaneswar, Utkal University, Ravenshaw University, Bhubananda Orissa School of Engineering. Many science-loving people also joined the march. A public meeting was held in front of the Pathani Samanta Planetarium. Prof. Swadhin Pattanaik. former Director. Institute of Mathematics, Bhubaneswar, Prof. Ajit Srivastav, Prof. L. P. Singh, Prof. Karmadev Moharana, Prof. Birendra Navak, Prof. Anadi



Prof Mohan Rao, Former Director, CCMB, starting the March at Hyderabad

Das and Dr. Subhendu Pattanaik (Deputy Director of the Planetarium) addressed the gathering. The program was coordinated by Dr. Sidhartha Varadwaj.

# Allahabad:

On August 9, more than 300 people including scientists, professors, scholars, and students from Harishchandra Research Institute (HRI), Indian Institute of Information Technology (IIIT), Motilal Nehru National

Institute of Technology (MNNIT), Allahabad University and its affiliated colleges, and science loving people assembled at the Vijayanagaram Hall, Science faculty, Allahabad University. Prof. Anupam Dikshit, Prof. Hari Prakash, Dr. Pramod Pande, Prof. Anita Gopesh, Dr. Anand Pathak and Mr. Deepak Tiwari addressed the gathering. They appealed to all the participants to make the march a grand success. Mr. Dipyaman Pramanik read out the memorandum.



Eminent scientists addressing the gathering at Bhubaneswar before the start of the March



The March passing through the Allahabad University

The March began at 12 noon with the participants carrying placards displaying the demands of the March and ended at the historic Chandrasekhar Azad Park. Prof. Ramendra Kumar Singh addressing the gathering appealed to all to strengthen the movement to save science. Mr. Dinesh Mohanta, Coordinator, India March for Science, Allahabad Chapter and All India Executive Committee Member, BSS, thanked the participants for making the March a grand success. A memorandum, signed by eminent personalities, was submitted to the Prime Minister through the District Magistrate.

# Lucknow:

On 9th August, a seminar was organised at UP Press Club, Lucknow, in support of the India March for Science. Mr. J. P. Maurya, Secretary, Breakthrough Science Pune Society, UP State Chapter, welcomed the gathering. Padma Shri Dr. Nitya Anand, former Director, Central Drug Research Institute (CDRI) initiated the proceedings.

He said that science understands events in a cause-and-effect framework making a person logical. Higher allocation in the budget to science & technology as well as to education, particularly for the young, is the need of the hour, he said. Dr. J. K. Johri, and Dr. Nikhil Kumar from the National Botanical research Institute (NBRI), Dr. Saman Habib, Sr. Scientist at CDRI and Dr. C M Nautiyal, retd. Sr. Scientist at the Birbal Sahni Institute of Palaeosciences were the other speakers. The meet ended by paying tributes to the city scientist Dr. B. N. Dhawan and the eminent scientists Prof. U. R. Rao. Prof. Yash Pal and P. M. Bhargava, who had passed Dr. away recently. The meet was followed by a symbolic march with placards displaying messages and slogans to promote scientific temper and support for science.

The March started from Pune station at 5.30 pm and ended at Ambedkar statue near the Collector's office. A large con-

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tingent of scientists, teachers, researchers and students numbering around 600, carrying placards displaying various demands participated in the March. Students walked with placards saying 'August 9, 1942 – Quit India, August 9, 2017 – Quit Ignorance' and 'If science is expensive try ignorance'.

Vinita Bal, Hamid Dabholkar (Maharashtra Andhashraddha Nirmoolan Samiti), Vivek Monteiro and several others addressed the gathering. "India cannot progress without scientific temperament. Superstitions, mixing up mythology with history etc are leading to a feeling that we as a country are backward. Even educated people are following superstitions. Instead of taking up scientific outlook we are going backwards. Did we get Independence for this?" 93-year-old Shanta Ranade said.

# Ahmedabad

On August 9, a Human Chain in support of India March for Science was organised at 11am near Gujarat University, Ahmedabad. More than 70 faculty and students from CEPT University, students from different universities and colleges, educationists, writers and eminent citizens participated in the human chain. All of them put their signatures on the memorandum to the Prime Minister. The memorandum was submitted to the Governor of Gujarat.

### **Bhopal**

On August 9, a rally was organized at Shahpura Jheel in Bhopal. Scientists, teachers and science loving people as well as activists of science organizations like ISPN, EKLAVYA, IDWA and Breakthrough Science Society participated in the rally. Mr. Vikas Bansal, State coordinator of BSS appealed to the gathering to spread the message of the India March for Science and strengthen the movement. Ms Asha Mishra of ISPN coordinated the program.

### Agartala

In Tripura, the March for Science was held in the capital city Agartala on August 8, 2017. The March began from Rabindra Shatobarshiki Bhawan at 5 pm and ended at the City Centre. More than 100 participants including professors, teachers, students, researchers and science loving people took part in the March. On behalf of BSS Tripura Chapter, Prof. Alak Satpati



Dr. Nitya Anand, Padma Shree and former Director of CDRI addressing the meeting in Lucknow in support of the India March for Science. Seated on the dias are Dr. Chandra Mohan Nautial, Dr. Saman Habib, Dr. Jayendra K Jouhri, and Dr. Nikhil Kumar.



The human chain in Ahmedabad

spoke about the importance of the demands raised by the India March for Science. Shri Harakishore Bhowmick spoke on behalf of All India Save Education Committee. Shri Raju Acharjee, Secretary, BSS Tripura Chapter coordinated the program.

# Pondicherry

The March began at 4.30 pm from the BSNL Head Office and proceeded to Gandhi statue on the beach. The marchers carried placards displaying the demands of the India March for Science. A large number of teachers, students and general public participated in the March. At the end of the March Mr. Dakshinamurty from Pondicherry Science Forum addressed the gathering. Mr. Prasanna Venkadesh coordinated the program.

# Chandigarh

On August 9, scientists, teachers and research scholars from IISER, INST, PU, PGIMER, GMCH, UIET and PEC, Chandigarh gathered at Plaza, Sector-17 and took out a decorative silent march holding placards displaying the demands of the India March for Science. In spite of heavy rains in Chandigarh, more than 500 people participated in the March. Members of the scientific community representing different institutes addressed the gathering and spoke on the demands raised by the India March for Science. Among those who addressed included Prof. Arvind, Prof. Manjit Singh, Inderjit Singh, Amol Amodkar, Nishat Fiza,



Public meeting at the end of the March at Chandigarh



A view of the March at Gangtok, Sikkim

Rohan Sharma, Aswin G.S, Satnam Daun, Yashpal, Dr. Pyarellal Garg, Dr. Hardev, Dr. Anuradha, Manu Kant, Avocate Loveneeth Thakur and Jashvinder Ruppal. A memorandum addressed to the Prime Minister was submitted to the Governor.

# **Other Marches**

Marches were also conducted in Patna (Bihar), Guwahati (Assam), Gangtok (Sikkim) and Ranchi (Jharkhand), and Srinagar (Garhwal). Science Marches and solidarity programs were also organised in various towns in different states.

#### Andhra Pradesh

**Tirupati:** A Science March was organised in Tirupati city on August 9. Scientists, professors, teachers and students numbering around 300 participated in the march. Prof O. M. D. Hussain, HOD, Dept. of Physics, S. V. University inaugurated the March. Prof N. V. V. Jyothi, Mr. Vijay Kumara, Dr. Ramesh, Sri Nagaraju, Sri Azmal Basha and Sri Sharma addressed the gathering.

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**Kurnool:** A rally was organized in Kurnool city on August 9. Teachers and students numbering 300 participated. Kurnool city BSS President Mr. Sriman Narayana spoke about the demands raised by the India March for Science. Mr. Harish, Dhanunjaya, Sarath and Mithra also spoke.

#### Karnataka

Breakthrough Science Society organised science marches and solidarity programs in several districts in association with other science organisations in the state. In Karnataka, around 6000 people hit the streets in 12 cities on August 9, at the call of the India March for Science to defend science and scientific temper.

**Dharwad:** Around 800 people including professors, scientists, college and school students as well as general public marched from Kalabhavan Maidan to Patil Puttappa Sabha Bhavan. Dr. Iqbal Shaik (Renowned Cardiologist and physician) flagged off the M. I. Savadatti (Former march. Prof. VC of Mangalore University), presided over the hall meeting at Patil Puttappa Sabbha Dr. Chandragirish (Principal, Bhavan. Vidya Nidhi PU College, Raichur and State Vice-President, BSS) and Dr. Gopal Dabde (President, All India Drug Action Network) spoke on the occasion.

**Mysore:** Around 300 scientists, research scholars, students, school children and general public participated in the March. Prof. P. Venkataramaiah (Former VC Kuvempu University) flagged it off. The march started at Ramaswami circle and culminated at Vishwamanava Park. Prof. P. Venkataramaiah, Sreemathi Hariprasad (KRVP and Chief editor of Balavignana), Dr. M. M. Shenoy, Dr. G. Sudha (BSS) and research scholars from the 'People for Science Forum' spoke on the occasion.

**Kalburgi (Gulbarga):** Around 800 people including professors, research scholars,



The demonstration in Munich, Germany, in support of the India March for Science

college and school students participated in the India March for Science event in Kalburgi. Prof. G. R. Naik, Pro VC of Central University of Karnataka flagged off the March and spoke at the public meeting. Prof. Ramesh Londonkar and Abhaya Diwakar (District President, BSS) also spoke. The march was held from Mini VidhanaSoudha to Indira Smaraka Bhavana.

**Bijapur:** Around 800 professors, lecturers, teachers and students marched from Siddeshwara Temple to Ambedkar Circle. Prof. Sanjeevkumar Yaliballi (Akkamahadevi Women's University) flagged off the march. Sharath P. K. (Convenor, Bijapur, BSS), Gururaj Bommanahalli, Geeta Patil (BSS), Raghavendra (KJVS) and Jagadish Gulaganji spoke on the occasion.

Chitradurga: The event was organised by Breakthrough Science Society in association with Chitradurga Science Centre, Lions Club, IT Dealers Association and Gubacchi Nature Club. The march began from the Government Science College and culminated at the District Commissioner's office. Prof. K. K. Kamane flagged off the march. Litterateur Mr. Chandrashekhar Talva, Mr. Vivek Madhure (District In-charge BSS), Mr. Dasegowda (Secretary, Chitradurga Science Centre), Mr. Vijay Kumar (Lions Club), Mr. Mahesh (IT Dealers Association) and Mr. G. S. Ujjinappa (Senior Journalist) spoke on the occasion. More than 500 people participated in the March.

**Tumkur:** Teachers, science activists, students and general public numbering more than 200 participated in the India March for Science at Tumkur which started from the Town Hall and culminated at Bal Bhavan. Mr. Yathiraj, Mr. Dorai Raj (PUCL), Smt. B. H. Ramakumari (Kannada Sahitya Parishat President), Mr. S. N. Swamy, Ms. Ashwini (BSS), Mr. C. Vishwanath (Tumkur Science Centre) and Mr. Nitish (Signa centre) spoke on the occasion. Ms. Rajeshwari (BSS)



The March in Bhubaneswar, Odisha, proceeding towards the Planetarium



The demonstration in Barcelona, Spain, in support of the India March for Science

### coordinated the program.

**Davangere:** The March began at Vidyanagar Gandhi Circle in Davangere. Prof. B. B. Nandyal flagged off the march. Dr. S. Shishupala (HOD of Microbiology Dept, Davangere University), Dr. Vasudhendra (State Secretary, Medical Service Centre), Mr. Manjunath (District Convenor, BSS) and Mr. Santhosh addressed the gathering. **Ballari:** Around 1000 lecturers, doctors, students and general public participated in the India March for Science at Ballari.



The Marchers at Srinagar, Garhwal

**Raichur:** More than 200 students, lecturers and general public participated in the India March for Science at Raichur.

**Hospet and Belgaum:** In Hospet and Belgaum marches were conducted. Around 100 people participated each program.

### Kerala

**Palakkad:** A "Vilambara Jatha" was organized on 7th August at Chittoor by the Madame Curie Science Club affiliated to Breakthrough Science Society. Adv. P. Jayapalamenon inaugurated the meeting at Anicode junction which was presided over by K. M. Beevi, State Executive Committee member, BSS. President of the Science Club, A.Hazeena addressed the gathering.

**Ernakulam:** A "Walk for Science" was organised at Marine Drive, Ernakulam, on 6th August. Sri. P. P. Sajeevkumr and Sri. Salvin addressed the gathering. Another meeting was organised at Tripunithura on 8th August as part of the campaign work for India March for Science. Sri N. R. Mohankumar presided over the function.

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Sri. P. P. Sajeevkumr and Aswathi G. Babu spoke on the importance of the India March for Science.

**Alappuzha:** A district level programme was organized at Alappuzha Beach in support of the India March for Science. Dr. K. G. Padmakumar, an environmental scientist inaugurated the programme. Dr. K. Hariprasad and Sri. K. Sivanutty were the other speakers. The meeting was presided over by Sri. T. Viswakumar.

Thrissur: A Seminar was organized in Kerala Forest Research Institute (KFRI), Peechi, Thrissur district on 8th August 2017. Dr. M. P. Parameswaran, science activist and former President, AIPSN, was the main speaker. Dr.S.Sankar, former scientist, KFRI also spoke. Dr. P. S. Babu, presented the programme of the India March for Science. Director, staff and researchers took part in the interactions. A seminar was also organised in Model Girls' Higher Secondary School, Thrissur, on 8th August, 2017. Dr. Babu and Dr. Mukundan were the speakers.

**Kottayam:** On 5th August 2017 a March for Science was organized at Kottayam town. The march was inaugurated by Dr. Punnan Kurian, Principal St. Marys College, Manarkadu, Kottayam. On 6th August, Breakthrough Science Society, Thiruvarppu unit organised a convention in sup-



The March at Jorhat, Assam



Scientists in Bonn, Germany, expressing solidarity with the India March for Science

port of the India March for Science. Adv. V. K. Sathyavan Nair inaugurated the convention. Prof. P. N. Thankachan, Secretary BSS Kerala chapter, Sri. Sudheesh A.N., Kunjumon Kurian and Mr. E. V. Prakash were the speakers.

**Kannur:** A solidarity meet was organised in Kannur on August 7 in support of the India March for Science. Sri Saji K P, Govt College of Engineering, Kannur, inaugurated the program. Speaking on the occasion, Dr. Shajahan T. K., Dept of physics, NIT Suratkal, said that even though science in India is facing grave dangers, it is satisfying to see scientists coming out of their cosy laboratory spaces and offices in support of science and scientific temper. Dr. Sreekumaran E., Head, Dept of Life Sciences, Calicut University, Dr. D. Surendranath, an eminent environmental and social activist also spoke on the occasion.



The march at Pune, Maharashtra

### Madhya Pradesh

**Gwalior:** A science seminar was organized on August 12. Professors, teachers and students from various colleges and schools participated in the program. Tributes were paid to the eminent scientists of our country Dr. U. R. Rao, Dr. P. M. Bhargava and Prof. Yashpal who had passed away recently. Prof Santosh Yadav of Kamala Raja Girls College addressed the gathering. Video clippings of the India March for Science on August 9 from different parts of the county were shown to the audience. The Program was coordinated by Ms. Sadhna.

Guna: On August 13, a convention was organized in Modern Children Higher Secondary School, Guna. Ms. Suman Kirar welcomed the participants. Dr. Ghanshyam Srivastava, Former Principal, Govt. Higher Secondary School and district coordinator of National Children Science Congress congratulated the organizers and spoke on the issues raised by the India H. N. Jatav, March for Science. Mr. Principal, Myana Higher Secondary School, in his speech appealed to the students to fight against the all kinds of superstitions in the society. Prof. Ravindra Goliya and Mr. S. K. Rajoria also spoke in the

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convention. Around 200 students from different schools and colleges participated in the convention. Mr. Vikas Bansal thanked the speakers and the participants. An advisory committee was constituted to take the movement further.

**Ashoknagar:** Two seminar programs were organized on August 14, one in Tara Sadan Senior Secondary School and the second one in Govt. Polytechnic College. In Tara Sadan School, Dr. P. Mishra was the main speaker. He appealed to the students to cultivate scientific approach in day to day life for eliminating the superstitions prevalent in the society. In the program at the Govt. Polytechnic College, Professor K. N. Jha spoke about the objectives of the India March for Science. Mr. Vikas Bansal and Er. S. K. Rajoria also spoke.

**Dewas:** Students from two colleges and three schools participated in the solidarity meet organized in Thribhuvans Science College, Dewas on August 11. Around 150 students and 10 faculty members participated in the program. Dr. P. Mishra, the main speaker explained the issues raised by the India March for Science. Mr. Manohar from Dewas and Mr. Vikas Bansal, State co-coordinator of BSS, also spoke.



The march at Agartala, Tripura

**News & Views** 

### Message from the Organisers of the International March for Science

Today, by joining the more than one million people around the world who marched for science on April 22, 2017, you send a strong and indisputable message:

### Science marches on.

The March for Science movement is not about one day, or one country, or one politician. It is about things that matter to people around the globe: expanding your understanding of the world through scientific discovery, protecting the environment and our health, and creating a better future for our communities and our shared planet.

The March for Science brought together more than 600 communities around the world, demonstrating the incredible power of international collaboration. Some of the most exciting scientific advancements in human history were made possible because of partnerships between scientists that stretch around the world. Science knows no borders—research and innovation occur everywhere—and history teaches us that we are stronger together.

We stand with you in your call for greater funding of scientific research and education, and in your efforts to ensure that policy-making in our communities and governments is informed by scientific evidence.

Thank you for coming together today to send a message shared by March for Science supporters around the world: science will not be ignored, and cannot be silenced. As science marches on, so do we.

### Tamilnadu

Madurai: In Madurai a solidarity meet was organised on August 9. Professors, teachers and students from various colleges assembled at the Gandhi Museum hall at Ms. P. Selvi. the Convenor 2.30 pm. presided. The meeting began by paying homage to the eminent scientists Prof. U. R. Rao, Prof. Yashpal and Prof P. M. Bhargava who had passed away very recently. Prof. P. Rajamanickam (All India Peoples Science Network), Dr. Krishnasamy, Prof. Barnabas and Mr. Voltaire M. J. spoke on the various demands raised by the India March for Science.

**Villupuram:** In Villupuram, a solidarity Udayakumar addressed the gathering. Mr. meet in support of the India March for K. Prasad of AIPF coordinated the program.

Science was organised on August 9 at Bothi IAS Academy, Shanthi Nilayam. Mr Noor Ahmed, President, Consumer Protection Association, presided. Mr. Sakthivel, Mr. Gotham Surendran, Mr. R. Ramamurthy and Mr. A. Anavaradhan spoke on the necessity to support the demands raised by the India March for Science.

**Nagercoil:** India March for Science and a candle light vigil to remember Hiroshima and Nagasaki were organised at Meenakshipuram bus stand, Nagercoil on August 9. Dr. Sundaram and Dr. S. P. Udayakumar addressed the gathering. Mr. K. Prasad of AIPF coordinated the program.



Scenes from the Marches at (left) Patna, Bihar, (right) Tirupati, Andhra Pradesh



Scenes from the Marches at (left) Ranchi, Jharkhand, and (right) Kurnool, Andhra Pradesh

### Maharashtra

**Wardha:** On August 9, the March started from Magan Sangrahalay and concluded near the Collectors Office, Wardha. About 150 people from different walks of life scientists, teachers, researchers and students participated in the March. Dr. Alok Bang addressing the gathering said: August 9, is the day the Quit India movement began exactly 75 years back, today it serves as a great symbol for demanding that "Unscientific and pseudo-scientific attitudes quit India". He also stressed that scientists need to take science out of the labs to the people so as to spread scientific temper in the society.

# Support from abroad

The India March for Science received support from the international community—Indian scholars working or studying abroad—giving the programme an international dimension. Solidarity programs were held in Barcelona (Spain), Colorado, Boulder (USA), Rochester, New York (USA), Dartmouth, New Hampshire (USA), Bonn (Germany), Technion (Israel), Munich (Germany), Helsinki (Finland) and Melbourne (Australia).

# India March for Science Memorandum Submitted to the Prime Minister Through the Governors of different States

To:

The Prime Minister of India

9 August 2017

Dear Sir,

On many recent occasions, you have placed high expectations from the scientific community in terms of research output as well as technological innovations. While this in no way goes against the wishes of the scientific community in India, we are very anxious that the funding support for scientific research is sorely inadequate, having remained stagnant in the range 0.8%- 0.9% of the GDP for far too long. Other countries with similar aspirations have provided financial support for science exceeding 3% of GDP. For example, South Korea spends 4.15% of its GDP on scientific and technological research; Japan spends 3.47%, Sweden 3.16%, and Denmark 3.08%, when calculated on the basis of purchasing power parity.

Even out of the paltry sum provided for R&D, only 7.5% is allotted to the DST and 7% for the CSIR which account for the greater part of scientific and technological work done in India. With such insufficient financial support, would it be possible to compete with these countries in terms of scientific infrastructure and productivity?

Moreover the financial support for institutions and scientific organizations has not been increased in view of the 7th Pay Commission recommendations, as a result of which most organizations have been pushed into financial crisis as they have hardly any money left for research or to build a strong science ecosystem necessary for consistently high quality research output. We, the scientific community of India, urge that the financial outlay for research and development be increased to 3% of GDP. Needless to say, we assure you of our moral commitment and accountability for the funds given for R&D.

The education system supplies the scientific manpower of any country, and robust health of the education system is an essential prerequisite for a country's success in science and technology. In India the education system has been seriously neglected, resulting in a large section remaining illiterate or semi-literate even after 70 years of independence. The public school system, where a majority of Indian children get their education, is in a very bad shape, as many schools are without proper buildings, toilets, and playgrounds, have overcrowded classrooms, face acute shortage of teachers and are without laboratory facilities. As a result, a majority of children are deprived of the opportunity of being a part of the scientific manpower of the country.

The college and university system is also reeling under acute shortages of infrastruc-

### News & Views

ture, teaching and non-teaching staff, and funds for carrying out research resulting in a lack of atmosphere for pursuit of excellence and in falling standards in the quality of education. Even in the IITs, NITs and IISERs the funding is insufficient, and now they have been asked to raise the operational expenses from students' fees, thus taking these systems out of reach of students coming from poor and lower middle class families.

The situation is crying out for urgent redressal, and our country's need for support for education should not be compared with that of those countries which have already built up infrastructure to a very large extent and are mainly in 'maintenance' mode. At present the United States spends 6.4%, New Zealand 6.9%, North Korea 6.7%, Norway 6.5%, Israel 6.5%, Denmark 8.7%, Belgium 6.6%, Finland 6.8% and Cuba 12.4% of GDP while India's spending on education hovers around only 3% of GDP.

The scientific community of India urges that the Central and State Governments' combined expenditure on education be raised to 10% of GDP to build the necessary infrastructure to impart quality education to our children until we can also cruise into maintenance mode.

The content of education is another area of concern. We notice that students coming out of the present school and college systems do not acquire a scientific bent of mind, and hence are typically unsuitable for fruitful careers in science. To make things worse, even untested and unscientific ideas are being introduced into the school textbooks and curricula.

We believe that the focus of the education system should be to equip students to think in a rational and scientific way, free from prejudices, rather than cramming them with 'information' from various sources. Untested personal beliefs of educational administrators and textbook writers should not be allowed to infiltrate the education system.

In recent times the attempts to spread unscientific beliefs and superstitions are on the rise. Sometimes, unscientific ideas lacking in evidence are being propagated as science, patronised by persons in high positions. This is vitiating the cultural atmosphere of the country.

The scientific community expects the Government to uphold Article 51A of the Constitution, and to restrain the attempts that run counter to the development of scientific temper, human values and spirit of inquiry enshrined in the Constitution.

Science is not a set of beliefs. Science tries to understand the laws governing the material world and society following a wellestablished methodology where nothing is accepted without evidence. Thus science has created a body of knowledge that has been tested by practice, which provides the basis for advancement of society. That is why it is now an established canon of governance that all decisions that impact people's lives should be based, not on personal beliefs, but on scientific evidence. Therefore, such policy decisions should be taken through consultations with the scientific community, possibly involving the scientific bodies like the Academies. We urge you to follow this practice and to put in place an adequate administrative mechanism to ensure its adherence.

We sincerely believe that your government will take the above measures to ensure a bright future for the country through advancement and utilization of science.

Submitted by the Organizing Committees of the India March for Science in different cities

# **Discovery of Noble Gases**

# Basab Adhikari\*

Helium, neon, argon, krypton, xenon and radon — these six gases are known as noble gases. Previously these gases were called inert gases because no compounds of these gases were known. The first xenon compound was synthesized in 1962, about half a century ago. Since then quite a few noble gas compounds were synthesized in the last fifty years. Now let us see how these gases were discovered.

We know that nitrogen is the main constituent of air. Besides nitrogen, air contains oxygen, carbon dioxide and water vapour. If we remove oxygen, carbon dioxide and water vapour from air, what remains is nitrogen gas. On the other hand, we can also prepare nitrogen from nitrogen containing compounds, for example, by heating an aqueous mixture of sodium nitrite and ammonium chloride or by passing ammonia gas over hot cupric oxide. The British scientist Lord Rayleigh observed that density of nitrogen gas collected from air is always slightly higher than the density of nitrogen gas prepared from nitrogen containing compounds. Thus he arrived at the conclusion that an unknown gas must be present with nitrogen collected from air, which has density greater than nitrogen.

With knowledge of this observation, another British scientist William Ramsay started research to find out that unknown gas. He heated magnesium metal with nitrogen gas collected from air. All nitrogen was converted to solid magnesium nitride ( $Mg_3N_2$ ). Ramsay observed some gas residue in the reaction chamber which did not react with magnesium. He concluded that the residual gas is a new element. It was named 'Argon' (symbol Ar). In Greek language 'argon' means 'lazy'. In this way the first noble gas was discovered in 1895. Argon constitutes nearly one percent of the Earth's atmosphere.

Total solar eclipses provide opportunities to the scientists to collect new information about the Sun. In 1868, during such a total solar eclipse, two scientists Jansen and Lockier found a new element by observing the solar spectrum. At that time the presence of this element on Earth was unknown. Sun is called Helios in Greek, so the element was named Helium (symbol He). In 1896 Ramsay discovered helium from uranium ore. That was the first time helium was discovered in Earth. Now we know radioactive materials emit  $\alpha$  particles, which are actually  $He^{2+}$  ions. These  $\alpha$ particles form helium atoms after gaining two electrons.

After that Ramsay and Morris Travers jointly discovered three more noble gases by low temperature distillation of liquid air. The gases were named Neon (symbol Ne), Krypton (symbol Kr) and Xenon (symbol Xe). Later Rutherford and Soddy discovered the last noble gas Radon (symbol Rn) from radioactive mineral.

In Mendeleyev's periodic table there was no place for noble gases. Ramsay added a

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### Students' Section

new group named Group 0 in the periodic table and placed the noble gases in that group. Now, in modern periodic table this group is called Group 18, according to IUPAC recommendation.

In 1904, William Ramsay was awarded Nobel Prize in chemistry for discovery of noble gases and ascertaining their place in the periodic table. Lord Rayleigh also got Nobel Prize in physics in the same year for his research in gas densities and contribution in the discovery of argon.

Are these elements totally inert? In 1962, N. Bartlett synthesized the first noble gas compound. A red crystalline solid was formed by reacting xenon with  $PtF_6$  vapour. Bartlett reported the formula of the compound as XePtF<sub>6</sub>. Later on it was established that the product contains [XeF]<sup>+</sup>[PtF6]<sup>-</sup> and [XeF]<sup>+</sup>[Pt2F11]<sup>-</sup>. Xenon

reacts directly only with fluorine. Depending on xenon to fluorine ratio and reaction conditions, three different xenon fluorides are formed: xenon difluoride (XeF<sub>2</sub>), xenon tetrafluoride (XeF<sub>4</sub>) and xenon hexafluoride (XeF<sub>6</sub>). All three xenon fluorides are solid compounds, but sublime at room temperature. Hydrolysis of  $XeF_4$  and  $XeF_6$  gives xenon trioxide (XeO<sub>3</sub>). Other important compounds of xenon are xenon oxofluorides (XeOF<sub>4</sub> and XeO<sub>2</sub> $F_2$ ), sodium xenate (NaHXeO<sub>4</sub>), sodium perxenate (Na<sub>4</sub>XeO<sub>6</sub>, xH<sub>2</sub>O) etc. The only known compound of krypton is krypton difluoride (KrF<sub>2</sub>). Radon is a radioactive element with very short half-life, so chemical reactivity of radon cannot be studied.

So, these gases are not really inert, but they have very low reactivity. We now call them 'noble gases' instead of inert gases.  $\Box$ 



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# What is Scientific Temper?

# Soumitro Banerjee\*

FUNDAMENTAL DUTY of all Indian citizens, as enshrined in Article 51A(h) of the Constitution of India, is "to develop the scientific temper, humanism and the spirit of inquiry and reform." The 'Science, Technology, and Innovation Policy-2013' also declares as one of its objectives "promoting the spread of scientific temper amongst all sections of society." Yet, we are currently seeing attempts from various quarters to promote and propagate ideas that run counter to scientific temper. That is why one of the main demands of the 'India March for Science' was to stop propagation of unscientific and obscurantist ideas and to develop scientific temper, in conformance with the Article 51A of the Constitution.

But the problem is, most people do not have a proper understanding of the term. It is not taught at any stage of the education system. Using this loophole, antiscience forces are spreading various shades of unscientific beliefs, while at the same time speaking eloquent about the need for scientific temper. The purpose of this article is therefore to clarify the issue, to explain what constitutes a scientific bent of mind.

Going through our education system, most people get the impression that science is just a collection of different subjects like physics, chemistry, zoology, botany, etc. It is definitely not so. Science is a way of thinking—a way that is completely different from the prevalent modes of thinking in our society. That is why it has to be learned. And in that process one has to shake off the wrong ideas and prejudices that one inherits from the society.

Physics studies the *general* properties of matter and the laws governing the interaction between bodies. Chemistry studies the *particular* properties of matter and the laws governing interaction between specific atoms and molecules. Biology studies the properties of and interactions among *living* matter. These are particular branches of science. If you leave out the particularities studied by these branches of science, what remains? It is that science asks questions about different forms of matter and its motion, and seeks answers to those questions following well defined procedures.

Everybody faces different questions in their lives. If one adopts the method followed by science to obtain the answers to his or her own questions, *that* reflects a scientific bent of mind. And then one has to conduct one's life conscientiously adhering to the truths found this way, and by systematically weeding out the unscientific notions and beliefs that one may have inherited from the society. In fact, this can be taken as the process of developing scientific temper.

Therefore, to develop scientific temper, one has to understand how science teaches us to *think*.

The dominant mode of thinking prevailing in our society is to believe and not to question. Ideas and notions that have been believed by people around us for

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generations are generally believed without question. In contrast, science teaches us to question everything and not to believe anything without evidence. This calls for a drastic change in the way we are used to thinking.

People naturally have questions in their But what is the right way of minds. seeking answers to these questions? In ancient times, each individual would think and speculate on a question at hand and would arrive at some answer. That would be the answer for him. Another person could speculate on the same question and might arrive at a different answer. Thus, on any question, there could be a number of possible answers. Most people would trust the wisdom of this or that man and tend to believe in his view of the world or events. Thus, there would be plural answers to every question, and there would be several schools of thought. Most importantly, nobody bothered to check if an idea was right or wrong. This mode of thinking is called 'subjective' thinking.

In contrast, Galileo introduced a new method of thinking that considered the possibility that one's ideas could be wrong, and therefore every idea has to be tested against reality. The way to test the correctness of any idea, according to him, was through observation and experiment. This way of thinking is called 'objective thinking'.

Science believes in objective thinking. That is why, in science every idea has to be tested. An idea is accepted only when it passes all the tests. In science nothing is accepted without evidence. The role of the person who is doing the thinking the subject—is secondary, while that of the material world—the object—is primary.

In science there is no infallible *guru*. However eminent a scientist may be, his or her idea will not be accepted unless one can obtain evidence in support of it. Even after a theory passes such a test, scientists keep on checking and rechecking it in different conditions. If one finds a situation where a theory does not give satisfactory results, that indicates the need for a new theory.

That is why, in science there is no plurality of truths. On every question there is one correct answer. If many answers are proposed by different scientists, the objective tests will eliminate the wrong ones and the remaining one will be the correct answer. It is also possible that the experimental or observational tests might contradict all the theories proposed up to that point of time. In that case scientists would realize that an entirely new theory is needed to explain the observations. When such a theory is proposed, scientists would again perform tests to check if that one gives the correct answer. That is how science works: progressively approaching the correct answer to every question, checking against objective reality at every step of the process.

What do we learn from all this? Scientific bent of mind implies thinking in an objective way. Faced any question, a person with scientific bent of mind would not believe outright in what other people say. He may speculate, let his imagination soar but even then would be inspired to seek evidence, and would believe in an idea only when he or she finds evidence in support of it. All the while he would keep his mind open to the possibility that his own ideas may be wrong, and would keep checking and rechecking.

If one says that the Vedic *rishis* flew in aircraft seven thousand years back, a person with scientific temper would simply demand evidence, possibly in the form of some broken piece of such a craft in an archaeological site. If one says that the *Mahabharata* war was a historical fact, a scientifically minded person would simply

demand evidence, possibly the remains of a chariot or a weapon like a *gada* in the archaeological excavations in Kurukshetra (a town in the state of Haryana). One can multiply examples, but the main point is that a person with scientific temper would demand evidence before believing anything.

Now let us come to another aspect. There are two major lines of philosophical thought—idealism and materialism. Materialism says that the world is made of matter, and that there is nothing supramatter in the material world. From that perspective, a materialist directs all his enquiries into the properties of different forms of matter and their interactions. On the other hand, idealism believes in the existence of some primordial idea from which all matter is born. So an idealist's queries are directed at that supra-matter entity whose existence he supposes, and not at the material world.

Materialists say that mind, thought, etc. are products of matter. Thought exists in the human brain, which is a material entity-a very high form of organization of matter. Therefore idea is a product of matter. For the materialist, matter is primary and idea is secondary. In contrast, the idealist would contend that idea is primary and matter is secondary. More importantly, a materialist would maintain that matter exists independent of our consciousness while an idealist would say that matter exists in our consciousness. According to the idealist, matter is what we perceive it to be, while for a materialist, the character of matter does not depend on our perception.

After much debate, science has become firmly rooted in the position of materialism. All developments in science have resulted from inquiries into the character of different forms of matter and their interaction. That is why a person wishing to acquire a scientific bent of mind has to come to terms with the fact that the material world exists independent of our consciousness. Our task is to try to know it as best as we can, following some well defined procedure that avoids the pitfalls of subjective thinking.

One of the basic stepping stones of science is the law of causality: the understanding that behind every event there must be a cause. Much of science is directed towards trying to find the causes behind different events or phenomena. Therefore, one of the stepping stones of scientific temper is also the understanding that nothing happens without a cause. And a scientifically minded person tries to locate the causes of the events that happen around him.

But where to look for the cause? Here comes a major difference between the two major philosophical lines of thought mentioned earlier. Materialism demands that the cause of an event must be found in the material processes and phenomena, while an idealist contends that there may be a supernatural hand behind the event. On this issue science strongly sides with materialism, because all the cause-andeffect relations found by science so far can be explained by material processes and phenomena.

Therefore, scientific temper demands that whatever events one may encounter in one's life, however strange these may appear to be, the causal explanation must be found in material processes and phenomena, not in supernatural intervention.

Let us give an example. In the year 1996, one day there was a rumour that *Ganesha* idols were drinking milk. Thousands of people queued up at temples with pots of milk in hand, and spoonful of milk was found to be disappearing when the spoon touched the idol's mouth. For most people it was a miracle, a *chamatkar*, which defied explanation. How would a person with

scientific temper approach the issue?

He would have to say, "even though I cannot immediately figure out how this is happening, there must be a material process causing the disappearance of milk." And then he would set about investigating what is really happening.

But how does he investigate? That also must be learned from the way a scientist approaches a question. Faced a question, a scientist first guesses what the underlying cause might be. A scientist's guesses are not wild guesses or fanciful imaginations. They are firmly rooted in what is already known regarding the properties of matter. Moreover, they must satisfy the initial clues that are obtained by first-hand observa-Such scientific guesses are called tion. After having formed a few hypotheses. such hypotheses, the scientist sets about testing these, so that the wrong ones can be eliminated.

A person with a scientific approach would also proceed in the same way, by guessing at possible explanations. And the guesses would have to satisfy what he already knows about the properties of matter. For example, he might know about the law of conservation of matter. So he would argue, if the milk is disappearing from the spoon, it must be found somewhere else. He might have learned about capillary action that causes liquid to rise in narrow tubes and causes sap to flow to the top of a tree. He might also know that liquids may travel upwards through porous substances, the way chalk can absorb ink. So he might guess some of these processes individually or together may be in action. Then he has to test his hypotheses. For example, to test his first guess, he might simply check if the water flowing into the drain has turned white, implying that the milk hasn't really disappeared; it is actually flowing out of the drain. To test the other guesses,

he might have to perform some simple experiments. Through these, he would be able to eliminate the wrong guesses and would be able to home on to the correct explanation.

Important is the fact that on the first day he may not be able to provide an explanation. But that should not deter him from insisting that there must be an explanation based on material processes and phenomena. That is the most important element of scientific temper.

Many babas and yogis often perform simple tricks to convince people of their supernatural powers. Mostly these are sleight of hand that is difficult to see at the first go. Professional magicians do the same thing. The only difference is that the magician would plainly say that I have fooled you with a trick, while a charlatan posing as a god-man would claim to have supernatural powers. But in both cases the viewer may not be able to catch the trick. A scientifically minded person should nevertheless confidently say that there must be a materialistic explanation of the event.

Thus, in a nutshell, scientific temper is nothing but following the same thought process in one's daily life that a scientist is supposed to follow in his laboratory. One has to practice thinking this way, to make it one natural style of thinking when faced with a problem. One acquires scientific temper when, through practice in daily life and thinking in a scientific way, it becomes part of one's personality, so that one behaves in a certain manner and one approaches every issue with a particular outlook. Scientific temper is a way of life. Unfortunately our education system does not train a student to think this way. That is why the cultivation of scientific temper has to happen outside the classroom also, in course of a science movement.  $\Box$ 

# Iswar Chandra Vidyasagar: Pioneer of Secular Scientific Education

Pradip K. Datta\*

# Introduction

The year 2016 saw the country observing the 125th memorial year of Pandit Ishwar Chandra Vidyasagar (September 26, 1820 – July 29, 1891). Vidyasagar was a Sanskrit scholar, writer, educationist, great humanist, relentless crusader for change in Indian society, social reformer, and pioneer of modern education in this country.

He was a polymath and a key figure of Indian Renaissance that had begun with Raja Rammohan Roy. He spent his endless energy for awakening awareness of his countrymen and for the emancipation of his nation. Throughout his life he worked for the spread of secular scientific education in the country. He fought for eradicating various bad customs prevailing in the country such as child marriage, polygamy, and for introduction of widow remarriage, spread of female education and secular humanism. His efforts to simplify and modernize Bengali prose were significant. His principles, determination and courage were unparalleled. He never deviated from his goals in the face of all adversities, even physical assault. He did not compromise on any matter and was fearless.

The historical situation prevailing during the life-time of Vidyasagar was that the emerging Indian capitalist class was becoming prominent, displacing the decaying feudal aristocracy. At the cultural level, liberation of human mind was taking place through the triumph of secularism over religion and of science over superstition. Vidyasagar emerged as the pivotal figure in this change.

### **Early Life and Education**

He was born on 26 September 1820 in a very poor family in the village Birsingha in the district of Hooghly (now in Paschim Medinipur district). His father was Thakurdas Bandyopadhyay and mother was Bhagabati Devi. At the age of five Ishwar Chandra was admitted to a village *pathshala*. He was a brilliant student and completed his education in the *pathshala* at the age of eight.

His father took him to Kolkata for higher education. In those days there was no transport for going to Kolkata and they had to go on foot. Vidyasagar learned English numbers by following the mile-stones on his way to Kolkata. He was admitted to a primary school in Burrobazar. After a few months, being seriously ill, he returned to his village. He went back to Kolkata and was admitted on 1 June 1829 to Sanskrit College in grammar Class III.

This was a turning point in his life and a giant leap in the history of Bengal. He started living in Bhagabat Charan's house in Burrobazar, where his father had already been staying for some years. Bhagabat's youngest daughter Raimoni's motherly and affectionate feelings towards

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Ishwar touched him deeply and had a strong influence on his later revolutionary work towards the upliftment of women's status in India.

His quest for knowledge was so intense that he used to study in street light since it was not possible for him to afford a gas lamp at home. He stood first in the examination held in March 1831 and received a monthly scholarship of Rs. 5. Due to poverty he had to do household works like cooking, washing of utensils, grind spices for cooking, etc. before going to college. At the age of 15 he entered in Alankar class. Often he studied as he cooked or walked to school. He stood first in Sanskrit prose and poetry competitions in the college competing with the students of higher classes. He cleared all the examinations with excellence in quick succession. He was rewarded with a number of scholarships for his brilliant academic performance.

In 1839 he successfully passed the Hindu Law examination conducted by the Hindu Law Committee and became eligible for a job of 'Judge-Pundit'. Only at the age of 21 he passed the final examination of Sanskrit For his all-round education at College. Sanskrit College and considerable knowledge in grammar, literature and mastery in a number of shastras like kavya (poetry), alankar (rhetorics), vedanta (vedic literature and anthology), smriti (philosophy of law), nyaya (logic, science and jurisprudence), and juotish (astronomy) he was awarded the title Vidyasagar (in Sanskrit vidya means knowledge and sagar means ocean, i.e., Ocean of Knowledge) from the Sanskrit College on 4 December 1891.

### Career

Mr. G. T. Marshall, the then Secretary of Fort William College (FWC), was thoroughly impressed by Vidyasagar's scholastic achievements and invited him join the

post of 'Head Pundit' at Fort William College. On 29 December 1841, at the age of 21, Vidyasagar joined the college at a salary of Rs. 50/-.

During those days British civil servants who came to India had to study Bengali and Hindi at FWC and to pass an examination. Those who could not succeed had to go back to England. Vidyasagar was their examiner. Many of them were not serious enough to learn the vernaculars and as a result failed in the examinations and had to go back. Mr. Marshall requested Vidyasagar to be lenient in evaluating the answer scripts because the higher authorities would be displeased if so many Englishmen had to go back home. Vidyasagar refused and said he would rather resign. Such was his boldness. Throughout his life he did not make any compromise.

At that time Vidyasagar did not know English and Hindi well. So he started learning these languages. He learned Hindi within 2/3 months from a Hindustani Pundit. For learning English literature he went to Anandakrishna Basu at Sovabazar Rajbati. There he made acquaintance with another legendary figure Akshyay Kumar Datta. At his request Vidyasagar started translating the *Mahabharata*. The translation was published successively in the magazine *Tatwabodhini*. However, Vidyasagar did not complete the translation.

In April 1946, Vidyasagar left FWC and joined Sanskrit College as Assistant Secretary. There was hardly any discipline in the college. He restored discipline. In the first year of service, he prepared a report outlining and recommending a number of changes to the curricula and the existing education system in the college. He requested Rasomoy Dutta, the Secretary of Sanskrit College, to forward it to the Education Council. This report caused a serious altercation between Vidyasagar and



Iswar Chandra Vidyasagar (26 September 1820 – 29 July 1891)

Rasomoy Dutta. Mr. Dutta forwarded only portion of the report to the Education Council. Vidyasagar felt that he would not be able to implement his plan for development of the Sanskrit College. He resigned his post in July 1847. His well-wishers tried to prevent him saying "What will you How will you survive?" His reply do? was "I will sell vegetables, open a grocery shop; I will find something to survive on. But I am not ready to work where I will be dishonoured." After leaving the job he set up a printing press with his friend Madanmohon Tarkalankar by taking some loan.

At the request of Marshall he again joined FWC as a Head-writer and Cashier at a monthly salary of Rs.80. In 1950 when a post of Professor of Sanskrit literature fell vacant, at the request of F.J. Mouat, Secretary of Education Council, Vidyasagar joined the post on 5 December 1850 at a monthly salary of Rs.90 on the condition

# **General Article**

that he would be allowed to work freely. Rasomoy Dutta resigned his post as Secretary, Sanskrit College, and on 5 January 1851, Vidyasagar was temporarily given the post. After a few days, on 22 January 1851, he was appointed Principal of the College.

As Principal he brought about a number of significant changes. At that time only students of upper castes Hindu families were admitted to the college. Vidyasagar opened its door to all, overcoming strong opposition from the orthodox Hindu society. According to religious customs, the college remained closed on Pratipad and Ekadashi. Vidyasagar was of the opinion that secular practices and not religious customs should be followed in a college. He changed the weekly holiday to Sunday (We see the opposite today: The present Central government is trying to introduce religious practices such as Saraswati vandana in schools).

He revised the syllabus radically. At that time there was no pass-fail system at Sanskrit College. The students were promoted to higher classes at the end of each academic year. Vidyasagar felt that a proper evaluation of teaching and learning is necessary and introduced passfail system in the college. It is an irony that for more than a decade the pass-fail system has been abolished in our country and that has resulted in drastic fall in the learning level of students, particularly in the government schools.

Instead of teaching grammar and mathematics through Sanskrit, as was the practice at that time, he began teaching these subjects through Bengali and English. He also made English a compulsory subject in view of the contemporary reality and strengthened the English Department. He stressed on teaching languages, mathematics, science and western materialistic philosophy. Opposing the report on San-

skrit College prepared by Dr. Ballantyne, Principal of Benaras Sanskrit College, he wrote to F.J Mouat, Secretary of Council of Education, "For certain reasons... we are obliged to continue the teaching of Vedanta and Sankhya in the Sanskrit college. That the Vedanta and Sankhya are false system of philosophy are no longer a matter of dispute."<sup>3,4</sup> In another letter he wrote to F.J Mouat, "Whilst teaching in the Sanskrit course, we should oppose them by sound philosophy in the English course to counteract these influences."<sup>3,4</sup> So he wanted to include Bacon's philosophy, J S Mill's logic, Geography, History, Arithmetic, Geometry, Biography, Political Economy, Physiology, etc., in the syllabus at Sanskrit College so that the students can examine European and Indian concepts and practices side by side and can apply their own judgement in discovering the truth for themselves. In contrast to this, presently the Central government is introducing unscientific and obscurantist ideas in the curricula.

In May 1855, in addition to his responsibilities as the Principal of Sanskrit College, he was given, the responsibility of the Assistant Inspector of Schools. He immediately started opening Bengali-medium schools in four districts of Nadia, Bardhaman, Hooghly and Medinipur; and, within a couple of years, set up twenty schools. He observed that there was dearth of qualified teachers and Bengali text books. He wanted teachers who know both the Bengali and the English language, and at the same time to be free from religious prejudices. He established a training school at Sanskrit College for training of teachers for these schools. He founded a school in his own village almost entirely with his own money.

He also started writing text books for school students. Various superstitions, apartheid, restrictions on women, child marriage, polygamy etc. prevailed in the society at that time. Vidyasagar was a secular humanist and had a logical mind. He felt that in order to eradicate these from the society the people should be educated with modern knowledge so that they acquire logical mind and be able to judge themselves which are harmful for the society. So he wanted spread of modern education.

Alongside establishing Bengali schools he also established 35 girls' schools in four districts. Though female education started at that time, it faced strong opposition from the conservative society. Vidyasagar tried hard to enroll girl students. He went door to door to convince the parents for admitting their daughters to schools. At the same time he fought against the conservatives with quotations from the Sanskrit scriptures which clearly prescribed care and education of the daughters. He did not receive any grants from the government for running the schools and managed to run the schools mostly out of his own pocket.

At a certain time differences emerged between Vidyasagar and the Director of Public Instructions. He realized that he would not be able to continue his work of spreading education freely as a government employee. So in 1858 he resigned his post. Lieutenant Governor of Bengal F. J. Halliday requested him to withdraw the resignation letter. But he refused saying that he was not ready to work where he would not be able to work freely with honour. Such was his selfrespect.

In 1864 he took the charge of Calcutta Training school and it was renamed Metropolitan Institution. With the approval of Calcutta University, it started preparing candidates for Entrance Examination and showed instant success. In early 1872, it was recognized by the University as an intermediate college, and in 1879 as a degree college.

In 1850 Vidyasagar became the Secretary of Bethune School which was founded by Norman Bethune in 1849. On 24 January 1854 a Board of Examiners was formed in place of the Fort William College for holding examinations for the Civilians. Vidyasagar was selected as a member of the Board. On 26 January 1855 Government of India formed a University Committee for founding universities in Calcutta, Bombay and Madras. Vidyasagar was selected as a member of the committee. In 1857 he was nominated a member of the Arts Faculty of Calcutta University.

His most important contribution to education was the textbooks he wrote. He felt the need for simple primary books for learning Bengali. Those books were necessary for mass education which was essential for emancipation of the country from the darkness of the medieval ignorance. In 1855 he wrote Varna Parichay, a primer for learning Bengali. The quality of this book was so good that it is prescribed for the beginners in primary schools even today. He wrote many other books, such as Kathamala, Bodhoday, Charitabali, Jiban Charit etc.. Through these books he tried not only to teach the students the skill of reading and writing but also inculcate liberal outlook and sense of moral values, like sense of duty and responsibility, sincerity, truthfulness, etc., in students and children of different ages.

These books reveal the dynamism of his progressive mind. For example, in *Charitmala* he did not write biographical sketches of ancient and medieval saints of India, but wrote about sixteen great men of Europe. In *Jibancharit* he wrote short biographies of scientists like Copernicus, Galileo, Newton etc. In *Nitibodh* he wrote not on institutionalized religions or rituals, but on the virtues that every human being should acquire. In *Kathamala*, he com-

piled fables that contained a moral; and in the three volumes of *Akhyanmanjari* he compiled popular stories from Europe and America, and four from Arabia and Persia. He also felt the need for new books which would make the learning of Sanskrit easy, and wrote *Upakramanika* and *Vyakaran Koumudi*, books of Sanskrit grammar.

Apart from writing text books he wrote many other books, like *Betal panchavinsati*, *Sitar Banavas, Bhrantivilas*. Before him Bengali prose was not lucid, and had no punctuation marks (other than full-stops and double full-stops). Vidyasagar's compositions are better organized. He used punctuation marks and made the prose lucid. Rabindranath said, Vidyasagar was the first real artist of the Bengali language<sup>2</sup>. In fact Vidyasagar is recognized as the father of modern Bengali prose.

Vidyasagar's efforts were not limited to educational reforms only. He was very much concerned with social reforms and his contribution was great. The miseries of widows were inducing him to rebel against the whole system. He started to search the scriptures and after hard labour found that under certain circumstances remarriage of a widow was permitted. In 1855 he wrote a book about the desirability of remarriage of widows. He adopted the democratic method of collecting signatures in support of widow remarriage. In spite of virulent opposition of the Hindu fundamentalists, and even threat to his life, he could collect a large number of signatures. Finally the Hindu Widows' remarriage Act was passed in 1856. He then arranged remarriage of widows out of his own pocket.

Vidyasagar tried to abolish polygamy. He wrote a book explaining why polygamy should be prohibited. His efforts again created stir in the society and he was the target of vilification by the fundamentalists. In reply he wrote two satirical books *Ati* 

Alpa Haila and Abar Ati Alpa Haila. Observing the helpless condition of women and their children when the bread-winner of the family died, he set up a Hindu Family Annuity Fund to provide them financial help.

His kindness knew no bounds. He could not bear the suffering of others and did not hesitate to incur debt to help them. He used to spend on the treatment and nursing of poor people and never bothered about their religion, caste, creed or status. Many a time he nursed people with his own hands. In times of famine and epidemic, in addition to financial assistance, he engaged himself in relief work.

# **Personal life**

Vidyasagar was a typical Bengali in his dress. He was completely secular in his personal life. He considered worship of God unnecessary. He did not follow any religious practices, never worshiped and never went to any religious place. His life shows that it is possible to acquire high morality and to live a socially useful life without believing in any religion.

He was a man of high integrity. He was very happy when his son Narayanchandra volunteered to marry a widow, but disinherited him when he misbehaved with his wife. Vidyasagar removed his son-inlaw Surya Kumar Adhikari from the post of Principal, Metropolitan College when he misappropriated funds of the college.

Towards the end of his life, being pained and disgusted by the deceit and hypocrisy of many people whom he helped and served, he went to Karmatar, a tribal area in today's Jharkhand state, to spend his life with the santals. There he served them till he was seriously ill.

There are many instances which show his profound self-respect and boldness of character. Let us cite one. Once Vidyasagar went to meet Principal Kerr of the Hindu College. Kerr sat with his booted legs on the table. He continued to be in that position even when Vidyasagar entered his room and did not ask him to sit even. A few days later Kerr came to visit Vidyasagar. He placed his legs with slippers on the table and did not ask him to sit. Kerr felt insulted and complained to the Secretary of Council of Education against Vidyasagar. When he was asked to explain his conduct he replied that he thought that this is the British manner of receiving people as Kerr had received him in that way. If he was guilty Mr. Kerr is responsible. The Secretary, Education Council asked Kerr to compromise with Vidyasagar. He had no slavish mentality or inferiority complex and he interacted with the British as equals.

On 4 July 1864 he was selected as a member of Royal Asiatic Society of England. On 1 January 1880 he was honoured by the Government with the title of C.I.E. He passed away on 29 July 1891 at the age of 70 years.  $\Box$ 

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# **Organizational Report**

# Astrology programme at IISc Bangalore cancelled after protest spearheaded by BSS

On 26th October 2017, we came across an announcement of a two-day Workshop titled 'Astrology as a Scientific Tool for Individual Progress' to be held at the campus of the prestigious Indian Institute of Science, Bangalore, on 25 and 26 November, 2017. The programme was to be organized by the Indian Institute of Science Alumni Association (IIScAA).

The activists of BSS immediately sprung into action and contacted the alumni of IISc, most of whom were unaware of this programme. Most of them found it 'incredible' that a programme on a pseudoscientific topic can be held in a scientific institution. They started a signature campaign among the IISc alumni, and wrote to the Director of IISc urging him to cancel the programme. The *Breakthrough Science Society* issued a statement in support of the protest by the rational minded alumni of the IISc Bangalore.

Following these concerted moves and outburst of protest over social media, the programme was cancelled.

To justify our action, we reproduce below a statement by 186 leading scientists including 18 Nobel Laureates, issued in 1975.

### **Objections to Astrology**

Scientists in a variety of fields have become concerned about the increased acceptance of astrology in many parts of the world. We, the undersigned — astronomers, astrophysicists, and scientists in other fields wish to caution the public against the unquestioning acceptance of the predictions and advice given privately and publicly by astrologers. Those who wish to believe in astrology should realize that there is no scientific foundation for its tenets.

In ancient times people believed in the predictions and advice of astrologers because astrology was part and parcel of their magical world view. They looked upon celestial objects as abodes or omens of the gods and, thus, intimately connected with events here on earth; they had no concept of the vast distances from the earth to the planets and stars. Now that these distances can and have been calculated, we can see how infinitesimally small are the gravitational and other effects produced by the distant planets and the far more distant stars. It is simply a mistake to imagine that the forces exerted by stars and planets at the moment of birth can in any way shape our futures. Neither is it true that the position of distant heavenly bodies make certain days or periods more favorable to particular kinds of action, or that the sign under which one was born determines one's compatibility or incompatibility with other people.

Why do people believe in astrology? In these uncertain times many long for the comfort of having guidance in making decisions. They would like to believe in a destiny predetermined by astral forces beyond their control. However, we must all face the world, and we must realize that

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our futures lie in ourselves, and not in the West Bengal stars.

One would imagine, in this day of widespread enlightenment and education, that it would be unnecessary to debunk beliefs based on magic and superstition. Yet, acceptance of astrology pervades modern society. We are especially disturbed by the continued uncritical dissemination of astrological charts, forecasts, and horoscopes by the media and by otherwise reputable newspapers, magazines, and book publishers. This can only contribute to the growth of irrationalism and obscurantism. We believe that the time has come to challenge directly, and forcefully, the pretentious claims of astrological charlatans.

It should be apparent that those individuals who continue to have faith in astrology do so in spite of the fact that there is no verified scientific basis for their beliefs, and indeed that there is strong evidence to the contrary.

> (From The Humanist, September/October 1975.)

Convention in Kolkata following the **India March for Science** 

India March for Science Kolkata Organising Committee organized a Convention on 6 September, 2017 at Rajabazar Science College (Calcutta University) on "Problems of Science and Scientists in India". Prof. Palash Baran Pal of the Saha Institute of Nuclear Physics, Dr. Ayan Banerjee of the IISER Kolkata, Prof. Soumitro Banerjee of IISER Kolkata and General Secretary of BSS, and Mr. Arghya Das, Joint Convenor, Democratic Research Scholars' Organization spoke on the occasion. Prof. Dhruba Mukhopadhyay, President of BSS, presided over the Convention. More than two hundred people including scientists, research scholars and students participated.

### 150th Birth Anniversary of Madame Curie observed

Kolkata: A district level science workshop was organized at Maharani Kasiswari College (Maharaja Manindra College) on 25 June, 2017. More than 250 students from



A view of the audience of the Convention in Kolkata



Eminent scientist and popular science writer Prof. Palash Baran Pal addressing the Convention in Kolkata

different institutions attended the program. Sri Subrata Gouri and Professor Nilesh Maiti addressed the delegates. A new district committee was elected from among the participants of the workshop.

**Dinajpur (South):** A science workshop was organized at Balurghat on 26 June by Chetana Bigyan Sanstha. More than two hundred students attended the workshop. Sri Biswajit Roy was the main speaker.

Midnapore (East): District level science

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workshop was organized at Panskura on 30 July, 2017 at Rabindra Nazrul Sadan. More than six hundred students participated in different events. Professor Soumitro Banerjee was the main speaker. Professor Debasish Aich also spoke on the occasion.

**South 24 Parganas:** In the district, subdivision-wise science workshops were organized with the objective of acquainting the local students with the struggling spirit of the great scientist Madame Curie. The programs organized were as follows:

23 July at Pathar Pratima (Dakshin Mahendrapur S B High School)

23 July at Jaynagar-Mazilpur (Mazilpur J M Training School)

20 August at Jamtala, Kultali (Jamtala Bhagavan Chandra High School (HS))

19 September at Mathurapur (Krishnachandrapur High School (HS))

More than a thousand students participated in these programs.

**Midnapore (West):** A district level science workshop was organized at Sabang on 27 August at Anath Bandhu Smrirti Auditorium Hall. More than seven hun-



A flood relief camp in North Bengal organized by Breakthrough Science Society

# **Organizational News**

dred students participated. At the end of the workshop, a district body was elected from among the participants. Professor Damodar Maity inaugurated the workshop and Sri Subrata Gouri was the main speaker.

**Bankura:** A science workshop was organized on 17 September at Bankura Zilla School. Professor Nilesh Maiti was the main speaker.

**Purulia:** A district level workshop was organized on 24 September at Belguma Vivekananda Vidyapitha (Purulia town). More than two hundred students took part. Sri Chanchal Ghosh was the main speaker. Dr Subal Chandra Dey (Sidoo Kanoo BiwasVidyalaya), Dr Sanat Mahato and Dr Dilip Sau also addressed the delegates.

### Flood Relief Camp

A flood relief camp was organized at Daspur No 2 block of Ghatal Subdivision by the *Breakthrough Science Society* IIT Kharagpur Chapter on 26 August. Volunteers of Panskura Science Centre accompanied the team to the effected area. Professor Damodar Maity led the team of 10 BSS members of IIT Kharagpur Chapter. Relief materials worth fifty thousand rupees were distributed in this camp.

Other units of BSS also embarked on a fund collection drive which was used for relief works in the affected areas of North Bengal.

On 9 September near Budiadpur of South Dinajpur district a relief camp was organized. Sri Dinesh Mohanto, Sri Chandran Santra Sri Biswajit Roy and members of Bigyan Chetana Sanstha organized the camp.

Another camp was organized on 11 September near Gazole in Malda district of North Bengal. Sri Chandan Santra and Sri Biswajit Roy led the team to distribute the relief materials to the affected families.

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Send by ordinary post (not speed-post or registered post that have to be received personally). Mailing address : Breakthrough, 8A Creek Lane, P.O. Taltala, Kolkata-700014, W.B. Relief materials worth Rs 2 lakhs were distributed by the BSS West Bengal Chapter during the relief activities.

# Andhra and Telengana

**226th Birth Anniversary of Michael Faraday:** The Hyderabad chapter of BSS organized a program to commemorate the 226th birth anniversary of Michael Faraday at the Methodist Engineering College and Technology on 22 September 2017. R.Gangadhar, state convener of BSS was the main speaker. Around 70 students along with staff members Sri Ramesh and Smt. Saketha actively participated in the program. R. Pujith Raj (Joint Secretary BSS Hyderabad) presided.

# Kerala

# Kottayam District:

Aug 14: Hiroshima-Nagasaki Exhibition at Kendriya Vidylaya Kottayam. Hundreds of students visited the exhibition. Principal Dr. Joy Joseph and Prof.P.N.Thankachan and P.G.Sasikumar of BSS spoke.

Sept 26: Iswar Chandra Vidyasagar birth anniversary observation at Baker Vidyapeed Kottayam. A portrait of Vidyasagar was handed over to the school. Prof. Joseph Thomas, Principal and Prof. P.N.Thankachan (BSS) spoke.

**Ernakulam District:** Sept. 26: Iswar Chandra Vidyasagar birth anniversary observation at SNGM Central School Thuravoor. A portrait of Vidyasagar was handed over to the school. Principal Sri L.Chitrangathan. Mr Francis Kalathungal (BSS) spoke on Vidyasagar.

**Alappuzha District:** Sept. 21: Ozone day observation at Sri Ayyappa College Eramallikkara. Quiz and debate competitions were conducted. K Sivankutty, Prof P N Thankachan, Venugopal and Roy of BSS conducted the program.