

NEWS

SEMINAR ON THE HISTORY OF SCIENCE AND TECHNOLOGY IN 20TH CENTURY INDIA— A REPORT*

One day seminar on 'History of Science and Technology in 20th Century India' was organized by the Indian National Science Academy (Delhi) in collaboration with Centre for Contemporary Studies at the CCS, Indian Institute of Science, Bangalore on 15 October 2011. The purpose of the seminar was to critically analyse the features and development of science and technology in the period.

It was a well-attended Seminar in which the Director, IISc, Bangalore, a few faculty members including students were present. Prof. R Gadagkar, the Chairman, Research Council for History of Science, in his welcome address outlined the diverse cultural and scientific facets of India on the calendar system, prediction of eclipses, concepts of time, knowledge of metals and metallurgical processes, concepts of weights & measures etc. and emphasised that it is all the more important to study, document and analyse systematically the 19th and 20th century science and technological progress in India where events have unfolded very fast.

Dr. Krishan Lal, the President INSA and Chairman, National Commission for History of Science in his opening remarks gave an international perspective of the 20th century achievements in science and technology starting with discovery of Atomic Model (Niels Bohr), General theory of Relativity (Albert Einstein), Diffraction of X-ray (Max von Laue) including Raman Experiment on Spectroscopy known as Raman Scattering or the Raman Effect, Bose-Einstein Statistics leading to mathematical derivation, Planck's constant, Indian achievements and other path breaking events. The establishment of Council of Scientific and Industrial Research (1946) including National Physical Laboratory (1947) for maintaining national standards of measurement and other institutes for specific activities in his opinion are no small achievements. He also lauded India's contributions in the field of minerals and metallurgy such as Diamond processing and other areas of technology.

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During the day-long seminar following papers were presented:

Science and Society in the Twentieth Century; Critical Reflections (Chair: P. Balaram, IISc, Bangalore)

Deepak Kumar in his lecture presented a broad canvas of 20th century science and by science it includes technology, medicine and also the environmental concerns. He described it as a century of enormous material progress, unprecedented innovations, equally unprecedented consumption, violence and a gradual dip in moral values. Science may or may not be at the heart of all this; but, it definitely played a significant role in bringing about the change. At the beginning of the 20th century, India found itself in torpor of two kinds— one was, of course, the growing resentment against an oppressive foreign rule and the other was how to deal with the new ideas and tools which had entered India as part of the colonial baggage. First one was political, the other cultural though both were crucial.

The amount of theoretical work done during the pre-independence period was truly remarkable, in the realm of physics and medicine path-breaking works were being done, so was the process of institutionalization of science. The establishment of the Indian Institute of Science (1909), the initiation of the Indian Science Congress (1935) and the gradual proliferation of the scientific bodies and societies were to integrate science firmly into the Indian society and polity.

But as regards scientific temper, improvement of science education to the desirable extent, impact of scientific researches on Indian society and economy, for example, in terms of agriculture and health, on science to be used for national reconstruction, politicians, scientists, laureates, reformers, all participated and contributed to this outstanding debate to draw a blue-print. The nation, however, might have faltered in implementation and this becomes even more glaring in the post-independence period. Though there was no lack of clarity or vision in intentions, Indian science seems to be at cross-roads again at the end of the century. Some of the above-mentioned questions were, examined for plausible explanations.

Clinical Medicine and Medical Research; A Story of unequal Growth in History (Chair: Obaid Siddiqi, NCBS, Bangalore)

MS Valiathan traced foundation and development of clinical medicine and medical research in India. Traditional medicine of Āyurveda and Unani were more prevalent in Nineteenth century. But surgery was not performed by Āyurvedic doctors but

by special class of people (caste) and this became one of the reasons for its decline. East-West encounter in medicine began with the Portuguese presence in Goa (15010) and it grew substantially after the establishment of the first Medical College in Kolkata by the British in the later part of the nineteenth century. In area of midwifery, British government started training of *Dai(s)* in 1866. In the year 1946 as against a demand of one lakh there were only five thousand trained *Dai(s)* in colonial India. Florence Nightingale, having close knowledge of Indian conditions was interested in the nursing service for the civilian population, though her first interest was the welfare of the army in India. In 1865, she drew up some detailed suggestions on a system of nursing for hospitals in India. Graduates were sent out from the Nightingale School of Nurses at St. Thomas Hospital, England to start similar schools in our country. St Stephens Hospital at Delhi was the first one to begin training the Indian girls as nurses in 1867. Hospitals offering modern medicine were initially set up to serve British troops, officers and families but soon expanded to serve the natives who welcomed them. While the hospitals and medical colleges continued to expand rapidly in the first two or three decades of the twentieth century (Madras Medical College 1935), the British also set up laboratories for medical research in several parts of India – some preceding the MRC of Britain. The growth trajectories of hospitals and research institutions during the twentieth centuries were however very different. While the hospital system grew explosively, medical research remained a stunted sibling. The reason for this divergence is still to be worked out.

Biotechnology in India: Milestones Behind, Miles Ahead (Chair: D. N. Rao, IISc, Bangalore)

S. Natesh gave an account of central government agencies before ‘biotechnology’ became a buzzword, to provide new impetus to the field of modern biology and biotechnology including early phase of Department of Biotechnology (DBT), established in 1986 which concentrated on creating capacity for research in the country by investing in public sector research institutions. Main initiatives were taken in creating trained human resource to carry out ‘modern’ biology, institutional infrastructure and a strong research base in areas relating to agriculture, human health, animal productivity, forestry, environmental safety and industrial production. DBT also set up sound regulatory structures for products developed through recombinant technologies and framed the Recombinant DNA Safety Guidelines (1990), with a three-tier mechanism to assess biosafety. Many of the early initiatives

were expanded during the 90s and early 2000. R&D support was extended to newer areas and several new institutions were established.

Meanwhile, the private sector, with several homegrown companies did well in leveraging strengths in services and manufacturing, the consequence of which has been on promoting low-cost vaccines and other novel health care products and forcing price reductions on bio-products of MNCs. The sector grew spectacularly at 25-30% annually. There has been however, a dearth of effective platforms that could trigger accelerated technology access, validation and commercialization through partnerships between the public and private sectors. The biotechnology sector needs to have several stakeholders for consistent success, which requires a long time perspective as well as predictable and transparent fiscal, regulatory and policy support. DBT has now recognized that engagement of public and private sectors in individual components of technology generation, without paying attention to all the segments of the mind-to-market value chain as a whole, which may create problems for affordable and sustainable solutions to India's challenges in agriculture, health, energy and environment.

Science and the creation of an “elsewhere”: Scientific internationalism and the Institute that Bhabha built (Chair: K.Vijay Raghavan, NCBS, Bangalore)

Indira Chowdhury traced the history of Tata Institute of Fundamental Research and the role of Dr. Homi Bhabha in its establishment. Long before India became independent, it was clear that as a newly emerging nation it had to make place for science, given the imperatives of education, industry, infrastructure and defence. But as to the question of how to imagine science, how to design the institution that would house it, Homi Bhabha hit upon the solutions when he started the Tata Institute of Fundamental Research in 1945. It had many surprising features, some of which still shape science in India. But one of its most interesting features brought by speaker was a robust internationalism and mapping out colonial structures and institutional history of the Tata Institute of Fundamental Research based on her recent publication *A Masterful Spirit: Homi Bhabha 1909-1966* (Penguin, 2010) and forthcoming book, *Growing the Tree of Science: Homi Bhabha and the creation of TIFR*. Both of these publications used the resources of the TIFR Archives and the extensive series of Oral History interviews with the scientists conducted during 2002 – 2006.

Controlling Nature and the Triumph of Technology; Is the Idea of Progress Sustainable (Chair: R Sukumar, IISc, Bangalore)

Rohan D'Souza tried to analyze river embankment as tool to control flood and to define progress and development in eastern India during the colonial period. These ingredients for progress were peculiarly marked by the European enlightenment tradition of pursuing the conquest and control of nature leading to triumph of human reason and freedom. It argued for the comprehensive domination of the natural world in order to unfold its secrets, mysteries and properties for the benefit of human possibilities. In the process large river embankments and irrigation canals were constructed during the British period in eastern India. The large projects were carried out by the British engineers who had very little knowledge of local terrain and policies were implemented uniformly. The large projects, however, were unable to provide a sustainable developmental solution and by 1970s, the world over rhetoric about harnessing nature for unending developmental projects began to lose its sheen. The planet increasingly appeared fragile: more spaceship earth rather than as a container of vast untapped resources. A planet under siege by modern technology and unquantifiable human desire resulted in emergence of dominant environmentalism. The quest to control nature has given way to the ideals for human restraint towards the vagaries of nature, appropriate community based technology and sustainable livelihoods. The idea of progress has gone through a perceptive change by reconsidering the social and political dimension.

History of Psychoanalysis: Between the Windscreen and the Rearview Mirror (Chair: R Sukumar, IISc, Bangalore)

Anup Dhar attempted to present a history of psychoanalysis in India. His presentation focused on the works and life-history of the first Indian psychoanalyst, Girindrasekhar Bose, who also practiced psychiatry, taught psychology and wrote (psychoanalytically singed) commentaries on the *Bhagvad Gītā*, the *Yoga Sūtras*, *Purāṇas* and proposed in lieu of psychoanalysis, *A New Theory of Mental Life*. Dr. Dhar presented the pioneering works done by Girindrasekhar Bose in the field of psychiatry and psychoanalysis in India and how he differed from Freudian concept. Principle of pleasure was central to Freud's thinking of man while principle of unity was the guiding factor in Girindrasekhar Bose's behavioral analysis. The reason for this might lie in Bose's grounding in Indian metaphysical texts. The differences in their perception are vividly expressed in their correspondences. Bose during process of recuperating patient negotiated

between the windscreen view (i.e. the direct vision of the way ahead [or what is to come]) and the rearview mirror (i.e. the reflected vision of what has been left behind). In other words he negotiated between insights coming from a vanishing present and a vanishing past. His psychoanalytic theory was marked by insights drawn from what gets reflected in the rearview mirror, namely insights from the *Yoga Sūtra*, the *Purāṇas* and the *Bhagvad Gītā*. In the process he established first mental hospital in 1939 and founded Indian psychoanalytic society in 1922. He also started two psychoanalysis journals namely *Chitto* (Bengali) and *Samiksha* and wrote children's novel *Lāl- kālō* (1930) in Bengali.

CORRIGENDUM

Gondhalekar, P, Possible Chronological Markers in the Vedic Texts, *IJHS*, 46. 1 (2011) 1-22.

The first half of Fig. 5 was inadvertently slipped out. The complete figure is reproduced here.

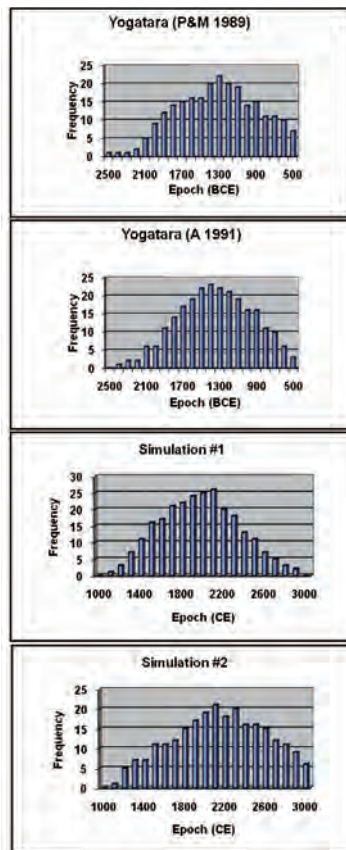


Fig. 5. The cross-correlation of *yogatārās* and *nakṣatra*-sectors. The frequency distribution obtained with the coordinates of *yogatārās* given by Pingree and Morrissey (1989) is shown in the top panel and in the lower panel is shown the frequency distribution obtained with the coordinates given by Abhyankar (1991). The results with pseudo-*yogatārās* selected at epoch 2000 AD are shown in the bottom two panels. The frequency distribution for pseudo-*yogatārās* around the position of the full moon in a *yuga* are shown in Simulation #1. The frequency distribution for pseudo-*yogatārās* around the position of the moon for twenty-seven nights of a month, starting from the night after the new moon, is shown in Simulation #2. See text for detail.

BOOKS RECEIVED FOR REVIEW 2010-11

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Adhikari, Swapan Kumar, *Mesopotamian Astrology: The Mother of Modern Astronomy*, Dipali Publications, West Bengal, 2009, Pages 56, Price Rs.200/USD 10/

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Palit, Chittabrata, Das, Anhinandan, Asutosh Mookerjee: *Mathesis of Mathematics*, The Hallmark, Kolkata 2010, Pages 288, Price Rs.400/.

Anderson, Robert S, *Nucleus and Nation – Scientists, International Networks and Power in India*, The University of Chicago Press, Chicago, 2010, Pages 683.

Jain, L C, *Systemic Sciences in the Karma Antiquity Vol. I*, Gulabrani Karma Science Musuem and Shri Brahmi Sundari Prasthashram Samiti, Jabalpur, 2010, Pages 456.

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Reddy, R Dhanalakshmi Sarva Jagannadha, *Pi of the Circle*, Tirupati, 2010, Pages 297.

Phadke, Vijay Sadashiv, *Saavan Time Count*, Sangli, 2010, Pages 142.

Kharakwal, J S, *Indian Zinc Technology in a Global Perspective*, Pentagon Press, New Delhi, 2011, Pages 340, Price Rs.1500/.

Singh, Harkishan, *Pharmaceutical History of India*, Vallabh Prakashan, Delhi, 2011, Pages 322, Price Rs.450/.

Hussain, Meher Fatima, *Syed Zahoor Qasim, The Man, Missions and Milestones*, Manak Publications Pvt. Ltd., Delhi, 2011, Pages 110, Price Rs. 550/.

Chattopadhyay, Pranab K, Sengupta, Gautam, *History of Metals in Eastern India and Bangladesh*, Pentagon Press, New Delhi, 2011, Pages 193, Price Rs.1350/.

Jagadish, KS, Modi, Pankaj, *Domes and Vaults of South India*, Indian National Academy of Engineering, New Delhi, 2011, Pages 87.