

## The 25<sup>th</sup> International Congress of History of Science and Technology (IUPHS/DHST): A Report

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The 25<sup>th</sup> International Congress of History of Science and Technology was held from 23 to 29 July 2017 under the aegis of the International Union of History and Philosophy of Science and Technology/ Division of History of Science and Technology, in Rio de Janeiro, the historic port city of majestic beaches in Brazil. IUHPST, one of the members of International Council of Science, and Division of History of Science and Technology is an international non-governmental organisation devoted to international cooperation in the field of history and philosophy of science. It was the largest international gathering of historians of science, technology and medicine in South America and the Southern hemisphere where scholars and researchers of more than 60 countries gathered from every continent for the first time, enjoying the rich natural landscape and scenic beauty of the host country.

The event was hosted by the Federal University of Rio de Janeiro, or University of Brazil (Portuguese: *Universidade Federal do Rio de Janeiro*, UFRJ or *Universidade do Brasil*), a public university in the state of Rio de Janeiro. It is a fairly large university in the country and one of the Brazilian centres of excellence in teaching and research. The historical Praia Vermelha (Red Beach) campus, one of the most beautiful locations of the city happened to be the venue of the conference. The city of Rio de Janeiro is also home to a number of important teaching and research institutions concerned with the History of Science, Technology and Medicine, a

field of study which has developed significantly in Brazil in the last 30 years, and of which the Brazilian Society for the History of Science (Sociedade Brasileira de Historia da Ciencia SBHC) is the main representative. The Museum of Astronomy and Related Sciences (Museu de Astronomia e Ciências Afins - MAST), in Rio De Janeiro is the other such important institution founded in 1985. It is the former base of the National Observatory (Observatório Nacional - ON), at present a research unit linked to the Ministry of Science, Technology, and Innovation (Ministério da Ciência, Tecnologia e Inovação - MCTI) which has the mission of expanding the access of society to scientific and technological knowledge through research, the preservation of archives, and the dissemination of the history of science and technology in Brazil.

The Congress opened with the keynote address on the theme “Trajectories and Challenges of History of Science in Latin America,” delivered by the Peruvian historian Marcos Cueto, with Ronald L. Numbers, the Hildale Professor of the History of Science and Medicine at the University of Wisconsin-Madison, USA, seated in chair. Marcos Cueto, the scientific editor of reputed journal *História, Ciências, Saúde-Manguinhos*, is Professor of the Postgraduate Program in History of Sciences and Health at the Casa de Oswaldo Cruz (COC/Fiocruz Brazil). Founded in 1986, this is the largest institution in the history of science in Brazil, devoted to the study of Brazilian medicine and related subjects. Prof. Cueto, along

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with the Canadian historian Steven Palmer, is the winner of the award of best book (Medicine and Public Health in Latin America, Cambridge University Press, 2014) on health, science and technology from the Latin American Studies Association.

The Congress consisted of scientific sessions in the form of proposed thematic symposia organised by various DHST Commissions, individual papers presented in the regular sessions categorised as stand-alone sessions, and joint symposia organized by IUHPST Inter-division Commissions and Inter-union Commissions. The general theme of the Congress, “Science, Technology, and Medicine between the global and the local,” reflected the broad nature of the Congress which drew scholars from diverse disciplines in the domain of science and technology from across the world. Moreover, as the history of science in Europe and North America, in particular, remains dominated by the study of science from 1800 onward, the Congress provided an important chronological and geographic balance.

The symposium “Local, regional, and trans-regional perspectives on ancient and medieval astronomy,” organized by Alexander Jones, (Institute for the Study of the Ancient World, New York University, USA) and Josep Casulleras, (University of Barcelona, Spain), under the auspices of the Commission on the History of Ancient and Medieval Astronomy (CHAMA), sought to highlight how pre-modern astronomy as an entity was constantly in flux from contrary tendencies towards uniformity and local diversity. Another symposium on “Science and Orthodox Christianity around the World: The History of Science and Religion,” highlighted the complex relations between orthodox Christianity and science which is a developing field of the general history of science-religion relations. Another symposium entitled “Science and Literature: Global and Local Perspectives”,

organized by the Commission for Science and Literature examined the role of science in poetry and fiction as well as in other forms of literature in different periods.

Another important symposium on “Science in Islamic Societies, globally and locally”, as part of Islamic Civilization Commission, was jointly organized by Robert Morrison (Bowdoin College, USA), J. Lennart Berggren (Simon Fraser University, Canada) and Miquel Forcada, (University of Barcelona, Spain). It had papers on astronomy, mathematics and medicine, both theoretical and mathematical. The symposium aimed to situate science in their cultural context in Islamic societies with special attention to the local specifics and the global connections of that science. In the same symposium, Gulfishan Khan (Department of History, Aligarh Muslim University, India) presented an academic profile of Maulānā Farid al-Dīn ibn Hāfiz Ibrāhīm Dehlawī, the royal astronomer of the Mughal Emperor Shāh Jahān and his scientist brother and astrolabe maker Mullā Shaikh Ṭayyab. She argued that though having little concern for planetary theory, Indian astronomers continued to make advances in observational astronomy culminating in the building of what today is popularly known as the Jantar Mantar (New Delhi). Moreover, the Mughal scientist Mu‘tamad Khān Rustam bin Diyānat Khān Qubād Harīsī Badakhshī’s (d.1705) visit to Europe/Portugal, where he learnt Latin and translated Jesuit astronomer Clavius’s *Eight Books of Gnomics* into Arabic was a continuation of similar imperial endeavours. An analysis of *Sirāj al-Istikhraj*, “The Lamp of Astronomical Observations” (Bodleian Library, Oxford, Persian Manuscript, Fraser, 180) a hand-book for the professional astronomers compiled by Mullā Farīd shows that with his diverse functions, the astronomer-astrologer remained extremely influential in Mughal court-culture and aristocratic society. She concluded that the Mughal court

continued to promote multiple astronomical traditions for time-keeping as well as for devising calendars and almanacs for what was predominantly an agrarian society.

Perhaps here it is highly imperative to discuss the significance of Mullā Farīd's another work known as *Zīj-i-Shāhjahānī*, the Astronomical Tables of the Reign of Shāh Jahān which was based upon the *Zīj* of Ulugh Beg, the ruler of Samarqand. It was rendered into Sanskrit with the title *Siddhāntasindhu* by yet another court astronomer Nityānandā who was residing in Delhi. The same Nityānandā, the court astronomer of Shāh Jahān, was subject of two other papers: One paper was presented by Anuj Misra (of TAMAS, PSL-Observatoire de Paris) titled "The computational challenges in reconstructing the astronomical tables of *Amṛtalaharī* of Nityānandā". The *Amṛtalaharī* (or perhaps, the *Khemakṛti*) of Nityānandā is an undated Sanskrit manuscript found in the collection of the University of Tokyo discovered by the late Professor Pingree. This work, along with the *Siddhāntasindhu* and the *Sarvasiddhāntarāja*, a siddhāntic text, represents the three works known to have been authored by Nityānandā. Another scholar, Prof. K. Ramasubramanian, from the Indian Institute of Technology, Bombay presented a paper on "Computation of Sines by Nityānandā in his *Sarvasiddhāntarāja*". He argued that the *Sarvasiddhāntarāja* (1639 CE) of Nityānandā is a monumental treatise that provides a comprehensive treatment of various aspects of astronomy. As is the case with much of the *Sarvasiddhāntarāja*, Nityānandā introduces certain novel features which are not found in prior treatments, of this topic in the Indian tradition. Some of these features are his own insights, whereas others seem to have been inspired by Arabic [and Persian] sources. In the view of Pingree, Nityānandā rephrased Islamic astronomy in a language which the adherents of Hindu astronomy could understand. He also points out

that some of the new vocabulary in the *Sarvasiddhāntarāja* was nevertheless used in other translations made at Delhi a few years later, during the reign of emperor Muḥammad Shah. For example in the Sanskrit prose version of the *Tabulae Astronomical of Phillippe de la Hire* (1640-1718). Perhaps unintentionally, these papers together shed light on a neglected aspect of the interface between Islamic astronomy as developed during the seventeenth century and Siddhāntic astronomy.

The presentation by Ramasubramanian was followed by another paper dealing with Indian astronomy, in particular, bringing to fore the contribution made by the Kerala School. A young Ph.D. scholar from IIT Bombay presented a paper on "Determination of the Ascendant in the Kerala School of Indian Astronomy", that highlighted the interesting and novel contributions made by Mādhava in his hitherto unpublished work *Lagnāprākāraṇa*. The other paper by Miquel Forcada, (University of Barcelona) in the same symposium sought to trace the development of didactic poetry about science in late al-Andalus and the Maghrib. He explored its diffusion in the learned circles of Western Islam. The author highlighted the role the didactical poetry in the transmission of scientific knowledge from the 13<sup>th</sup> century onwards and the intellectual locales in which this genre flourished. The didactic poetry became a widespread tool for scientific education as the genre begins to flourish from the 12<sup>th</sup> century onwards. One of the factors that explains this phenomenon, or what seems to have stirred the scholar's interest is the reception of Ibn Sīnā's *Urjūzafī l-ṭibb* in the mid-12<sup>th</sup> century. In much the same way as in other Islamic regions of the Dār al-Islam, the flourishing of the *urjūza* and other forms of didactical poetry in al-Andalus and the Maghrib coincided with the establishment of the *madrasa*.

Yet another presentation discussed Al-Bīrūnī's Methods of Mappings of the Earth and

the Heavens. Alberuni's treatment of these topics was based on his treatises *Projections of the Constellations and Making Spheres Plane* and his *Istī'āb al-wujūh al-mumkinafiṣan'at al-ašturlāb*. J. Lennart Berggren's talk was devoted to an exposition of some of his remarkable discoveries in this area, their context among his contemporaries and earlier writers, and something of the subsequent history of these mappings. Kaveh Niazi's paper on "Knowledge of the Cosmos," explored Qaṭṭān al-Marwazī's (1072/1073 – 1153 CE) Persian text *Kayhān Shinākht* ("Knowledge of the Cosmos") on astronomy, and its significance with respect to the tradition of astronomical writing in the Persianate lands of the eastern Islam. Al-Marwazī was a prominent scholar of the Islamic world who is known to have written prolifically on literature, medicine, engineering, and astronomy. The author highlighted his configurations of the heavens, and the layout and dimensions of the various climes of the Earth. Marwazī also included other material such as a list of religious festivals, and atmospheric phenomena as well. The work is divided into three sections: On the Heavens (in nine chapters), On the Earth (in three chapters), and On the Calendar and the Passage of Time (in three chapters). In the same symposium in her paper "Geographical Coordinates in the western Indian Ocean: Transmission of Knowledge from Antiquity to the Late Middle Ages" Marina Tolmacheva, of Washington State University analyzed a selection of coordinates pertaining to the East African coast of the Indian Ocean as transmitted from the Greek to the early Arabic astronomic geographical works such as al-Idrisī's maps to Ibn Sa'id and Abu'l-Fida', comparing their narrative and cartographical data. Nathan Sidoli's paper entitled Thābit ibn Qurra's *Restoration* of Euclid's *Data* (*KitābUqlīdisfi al-Muṭayyāt*) the first treatise in most of manuscript sources for the collection of works that circulated in the medieval period under the title of *The Middle Books* (*al-Mutawassiṭāt*). Despite the fact that this work had originally been

composed as a treatise in pure geometry for facilitating geometrical analysis, it had been repurposed by scholars like Heron and Ptolemy as a foundation for numerical computation. Hence, by the time it was translated into Arabic in 9th century Baghdad, it was being read as a foundation for these two, sometimes conflicting, mathematical practices. He pointed out the differences between the Greek text and Thābit's *Restoration*, with particular attention to translation choices and how they reflected the ways that the Baghdadi scholars were appropriating and modifying Greek mathematical concepts and practices.

Robert G. Morrison in his paper "Scientific Exchange at the Early Ottoman Court in Istanbul and Connections with the Veneto" presented the career and oeuvre of Moses Galeano/Mūsā Jālīnūs (d. after 1542) as a window on to the fascinating intellectual world of the Ottoman elite. The Ottoman court following the conquest of Constantinople saw the confluence of a number of scientific traditions. The author showed that Moses Galeano might have been affected intellectually by his time in the Veneto and by his acquaintance with texts written in Latin. Two of his writings, a medical text in Ottoman Turkish and a Hebrew text entitled *Puzzles of Wisdom* (*Ta'alumot Hokma*), indicated some familiarity with European texts that were not available in Hebrew and/or in Islamic languages. Perhaps Galeano was operating in a Renaissance context. It is worth mentioning here that there was a separate Symposium on "Non-Muslim Physicians and Scholars and Their Contributions to Ottoman Science" which highlighted the role of Christians and Jews in the multi-ethnic and multi-religious Ottoman Empire (1299-1923) organized by the well-known Turkish scholar Ekmeleddin Ihsanoglu, of Turkish Society for History of Science.

A paper on "Medical Concerns under National and International Pressures: India during

the Inter-War Years,” was presented by the historian of science Deepak Kumar, (Jawaharlal Nehru University) in the Symposium on “Science, Technology, and Medicine in Local, Regional, Transnational, and Global Context”. He argued that during the first half of the twentieth century, in the context of British India, medical knowledge and practices underwent remarkable changes, so did the ways of governance in different colonies. These changes gathered pace during the inter-war years and the author showed the dynamics of why and how this change occurred and with what consequences. It was the period when national movement was on the upswing and demands were made for the Indianisation of the medical services and for more space to the indigenous medical practices. Despite certain advances in modern medicine, epidemics had become virtually endemic. Concerns were raised on national and international forums; quarantine alone was not enough. Even private philanthropy like the Rockefeller Foundation tried to intervene. The author sought to capture the contours and quality of the debates and examine its reflections and consequences in terms of public health, medical institutions, and setting the agenda for the future.

Sir Syed Ahmad Khān (1817-1898), the nineteenth century Indo-Muslim intellectual and political leader, in the bicentenary year, also found a place among the luminaries who contributed in the spread of new scientific ideas and knowledge. Sarah Qidwai from the University of Toronto in a paper entitled “Islam’s Complexity: Sir Syed Ahmad Khan on the Relationship Between Science and Religion in 19<sup>th</sup> Century India” presented in a noteworthy symposium on “Science and Religion: Exploring the Complexity Thesis” said that the great reformer, saw no contradiction between science and religion. Rather the great thinker proposed a compatible, but complex relationship of science and Islam in the late nineteenth century. She cited a pamphlet of the author written in 1892 in which he outlined his

principles of Qur’anic exegesis, wherein he argued that the work of God and the word of God could not be inconsistent with each other. However, the progenitors of all such works remains Christian W. Troll’s study *Sayyid Ahmad Khān, A Reinterpretation of Muslim Theology*, Delhi, 1978.

Kapil Raj an India-born historian of science, teaching at the École des Hautes Études en Sciences Sociales (EHESS, Paris) in his interesting paper on “How Locality Affects the Contents of Knowledge: The Asiatic Society of Bengal, 1784-1794”, presented under the symposium on “Circulation of Knowledge and Scientific Institutions: the Americas, Western Europe, South Asia (1750s-1914)” highlighted the role of the Asiatic Society of Bengal which aimed to study all the knowledge of Asia, from its ancient history, geography and religions to its ethnography, metrology, astronomy, mathematics and other sciences. Through an analysis of the annual discourses of Sir William Jones (1746-1794), he sought to bring out the central role that the periphery played in the making of knowledge within this institution of Asia and the world. He argued that Jones’s theories differed from those of his predecessors, being the unique result of the encounter between European and Asian linguistic, theological, political and imperial traditions in the learned and imperial-administrative institutions of Calcutta. He also brought out the role of knowledge institutions in controlling the circulation of heterogeneous knowledge practices and rendering possible their sustained encounter.

A number of scholars from India also participated in the congress and contributed in the significant academic event. Nishat Manzar, (Department of History & Culture, Jamia Millia Islamia), contributed a paper on “Indian Sciences and Colonial Concerns: Sir William Jones’ (1746-1794) and James Forbes’ (1749-1819) Impressions of Brahmanical Knowledge”, Kamlesh Mohan (Punjab University, Chandigarh) read a paper, “On Modernising Maternities and Motherhood:

The Missionary Intervention”, in the symposium on “Science and Empire: New localities - New Circulations” and Padmaja Venugopal from Bangalore presented a paper on “Eclipses - Inscriptional and Literary References”.

Also, Achintya Kumar Dutta (University of Burdwan) presented a paper on “Combating Kala-azar: Indian Experience and Experiments” in the symposium on the “History of Tropical and Neglected Diseases from the 19<sup>th</sup> to the 21<sup>st</sup> Centuries”. Two more scholars from the University of Burdwan, Binata Sarkar, read a paper on “Relocating Popular Response: Burdwan Fever in Lower Bengal (1860–1943)” and Aparajita Dhar, read on the “New Reproductive Technologies and Women’s Health in post-colonial India”. John Mathew (Indian Institute of Science Education and Research, IISER, Pune) read a paper on “Epidemics and Natural History in the Colonial Encounters of South and South-East Asia”, Roland Wittje (Indian Institute of Technology, Madras) contributed a paper on “Instruments of Development: German Teaching Apparatus and Practices at IIT Madras”, and K Mahesh (Indian Institute of Technology, Bombay) presented a paper on “Two elegant derivations of the Surface Area of a Sphere by Bhāskarācārya”.

A few Panels such as “The ICHST and the Future of HSTM Studies in the Global South: A Conversation” and a Plenary talk on “Scientific Exchanges Between the US and Brazil in the Twentieth Century: Cultural Diplomacy and Transnational Movements,” delivered by Olival Freire Junior of Federal University of Bahia, Brazil, also focused on the host nation’s state of scientific knowledge and technical know-how. There were panels, plenary talks and individual sessions on the theme of science and technology and attitude and role of colonial governments: such

as the “Science and Medicine in Colonial India”, “Science and Technology in Colonial Latin America”. Specific panels focussing on China’s contribution such as “Science and Technology in China from Ancient to Early Modern Period” and another on the broad theme of “Chinese, Indian and Islamic Classical Medical Traditions,” and further on a wide-ranging topic, “Ancient and Indigenous Astronomy: India China and America” were also organised.

There were other symposia which focused on issues related to diseases, medicine, medical practices and knowledge. There were sessions which sought to explore the well-known themes such as the Scientific Revolution, History of Cartography, Catholicism and Science, and finally Science, Religion and Ideology. Other subjects like Mathematics, Physics, Chemistry and Pharmacy had separate panels and sessions which highlighted the history of the gradual development of these subjects as distinct disciplines. The Jesuits, who played a vital role in bringing science, and Catholic vision of Christianity to the Latin America had separate symposium devoted to their extraordinary contribution. The historical monuments secular as well as sacred such as the University buildings, royal palaces, magnificent cathedrals and splendid Churches which dotted the beautiful historic landscape of a fine country bear undeniable imprints of European civilisation and culture especially that of the Portuguese venture and mission across the Atlantic. Overall, it was a splendid experience, and Luiz Carlos SOARES, (Federal University of Rio de Janeiro, Chair) the event’s dedicated organizer and his team should be congratulated for successfully organizing an international event at the local and global scale.