NEWS

2000 AD —A LEAP YEAR

Gregorian calendar is really the modified Indian Calendar that was named after the famous Roman Emperor Julius Caesar who introduced a new calendar in 46 BC. Julius Caesar discarded the prevalent complicated lunar calendar which was then in use, and in its place adopted a simple solar calendar whose length of the year was fixed as 365.25 days. In this calendar, a four year cycle system was followed in which the first three years comprised of 365 days and the fourth year of 366 days, and this longer year was known as leap year. In the Julius calendar, the year coinciding with 45 BC (or - 44 AD) was counted as leap year. When Christian era was introduced later, the occurrence of leap in continuous sequence did not get disturbed.

The drawback of the Indian calendar was that its length of the year of 365.25 days was slightly longer than the correct length of the tropical year which is 365.2422 days. This resulted in counting three extra days in a period of 400 years.

During early centuries of the Christian era, many diverse practices were followed by Churches of different countries in fixing the date for celebrating Easter. It is a movable festival linked with vernal equinox day and full moon day. In 325 AD, General Council of Nicaea decided that Easter should occur on Sunday following the ecclesiastical full moon that falls on or next after 21 March which was then taken to be the vernal equinox day. But due to longer length of the year of the Julius Calendar, vernal equinox day progressively occurred earlier than 21 March since 325 AD and in 1582 AD, at the time of pope Gregory XIII, it was found to occur on 11 March.

Pope Gregory took steps to correct this long accumulated error of 10 days by naming the day following 4th October 1582 as 15 October 1582 AD, and thus restoring the day 21 March as the vernal equinox day which was mentioned by the General Council of Nicae in connection with the fixing the date of Easter.

Pope Gregory further ordained that leap years will not occur in century years unless it was divisible by 400. In other words, he omitted counting of three leap years in a cycle of 400 years. This modified Julius Calendar came to be known as Gregorian Calendar, and the length of the year of this calendar became 365.2425 days which is very nearly equal to the correct length of the tropical year which is 365.2422 days.

It is in excess from the correct length of the tropical year by only 0.00031 day, and this error will accumulate to one day in 3226 years. The Gregorian reform to the Indian calendar was brought about in October, 1582 AD, and hence taking this year as the initial year of the Gregorian calendar, this excess error in counting the length of the year will need consideration for correction many many years later, conveniently in the

century year 4800 AD when a leap year will become due, the year being divisible by 400. The Calendric astronomers at that time, presuming that the Gregorian calendar remains in use till that distant future, will probably treat 4800 AD as an ordinary year, and thus effect the correction to the accumulated error of excess of one day.

In accordance with the aforementioned rule the year 2000 AD, which incidentally is the last year of this twentieth century, will be a leap year as it is divisible by 400, and as such February of that year will have 29 days. Similarly February of 2400 AD will have 29 days, but not that of 2100, 2200 and 2300 AD.

S.K. CHATERJEE

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DOCTORATE AWARDED IN HISTORY OF MATHEMATICS

Dr. Vinod Mishra, Department of Mathematics, Sant Longowal Institute of Engineering and Technology, Longowal 148106, Dist. Sangrur (Punjab) was awarded the Ph.D. degree by Gurukula Kangri Vishwavidyalaya, Haridwar on 18th April, 1998 for his thesis *A Study in Vedic Geometry and its Relevance to Science and Technology*.

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NINTH INTERNATIONAL SEMINAR ON INDO-PORTUGUESE HISTORY: SCIENCE, TECHNOLOGY AND CULTURE 15TH TO 18TH CENTURY, 7-11 DECEMBER, 1998—A REPORT

The Ninth International Seminar on Indo-Portuguese History: Science, Technology and Culture - 15th to 18th Century was held at theAcademy from December 7 to 11, 1998 under the auspices of the Indian National Commission for History of Science. The Inaugural Session commenced with the welcome address by Dr. S. Varadarajan, President of the Academy who emphasized the importance of such a seminar with available experts from different countries and publication of its proceedings for better understanding. Dr. M. V. S. Valiathan, Vice Chairman of the National Commission, in his introduction to the Seminar, pointed out that the region of Indian Ocean witnessed major activities during the period when the Chinese, Arab, Dutch, Portuguese, Indian and other traders and navigators were involved. Much interactions had taken place and these had enriched the perceptions in science, technology and cultural activites. The Seminar, through its multifaceted dimensions would help throw more light on the pattern of exchange of knowledge resulting from these interactions. Dr. S. Sriramachari, the Convenor of the Organising Committee and Dr. Rosa Maria Perez, the leader of the Portuguese delegation, described the scope and wide canvas of the varieties of interactions and stressed the impact of these on the existing knowledge systems, cartography, ship building, navigation, identification of new crop and medicinal plants and manifold other cultural practices inclusive of food habits.

The *Rahamani* of M. P. Kunhikinhi Malmi, a traditional Malayalam sailing manual of Lakshadweep, comprising the Malayalam text in the facsimile along with an English translation, accompanied by notes and appendices was also released on the occasion. Three exhibitions on Plant Introductions, History of Cartography, and Portuguese Writtings covering the period 15th to 18th Century were also arranged in colaboration with Instituto Camões—Portuguese Cultural Centre, and National Science Centre, Delhi. A selected Book Exhibition dealing with science, technology and culture was also arranged.

There were five paper reading sessions where papers were presented. These concentrated on the areas of early interactions, crop introductions and interactions in medicines, physical geography and cartography, navigation and instrumentation, calendrical systems and cultural interactions of the period. The session on crop

introductions was held in Jamia Hamdard University, Delhi under the auspices of Hakim Abdul Hameed, the Chancellor, and Prof. Allauddin Ahmad, the Vice Chancellor of the University.

Seventy participants attended the Seminar of which three were from France, one from Denmark, one from Damascus, eighteen from Portugal while the remaining members were from India. Copies of papers were circulated before presentation. Three video films were also shown. These were: Charting the Heaven, Building of the Rabello—A Traditional Portuguese Boat, and Frigate D. Fernando II e Gloria (1843), its Last Voyage to the East. Details of presentation in each session along with names of contributors are listed below. This provides some idea of the overall presentation and scope of the Seminar:

SESSION A : EARLY INTERACTIONS

Artur Teodoro de Matos (Portugal)	:	The Diary of Viceroy Count of Serzedas in Goa.
Rosa Maria Perez (Portugal)	:	Feeding Status: Food and Social Stratification in Goa.
Maria de Jesus dos Martires Lopes (Portugal)	:	Education in Goa during the 18th Century: Influences, Agents and Results.
Joao Paulo Oliveira e. Costa (Portugal)	:	Cultural Interaction dealing on Jesuit Documents of the 16-17 Centuries.
Charles J. Borges (Goa)	:	Catholic Missionaries in the Estado da India and their Insight into Indian Culture, Science, Medicine, Life and Manners.
Antonio Manuel Hepanha (Portugal)	:	Law and European Colonial Dominance.
Pratima Kamat (Goa)	:	Konkan Conquered for Christ by Priests of the Society of Jesus: Some Socio-cultural Expressions.

SESSION B : CROP INTRODUCTIONS AND INTERACTIONS IN MEDICINE

Luis Filipe Thomaz (Portugal)	:	Iberian Expansion and the Diffusion of Indian Plants in the New World.
Jaweed Ashraf (Delhi)	:	Portuguese Sources on Plant Introductions in India.

S.K. Jain (Lucknow)	:	Indo-Portuguese Connection: Some Botanical Aspects.
Zillur Rehman (Aligarh)	:	De Silva Family and its Contribution to Medicine.
Aloka Parasher-Sen (Hyderabad)	:	Differences and Interactions: 15-16 Century Portuguese Contact with Indian Medicine.
Srabani Sen (Calcutta)	:	*Firanga Roga*: A Portuguese Influence on Indian Medicine.

SESSION C : PHYSICAL GEOGRAPHY AND CARTOGRAPHY

K.S. Behera (Bhubaneswar)	:	Portuguese and Coastal Orissa : Impact and Interactions.
Christer Westerdahl (Denmark)	:	From River to Sea, Catching the Monsoon - Concepts of Maritime Cultural Landscape
Inacio Guerreiro (Portugal)	:	Physical Geography and Cartography
P.P. Gogate (Mumbai)	:	A Maratha Map of South India.
Aparajito Basu (Calcutta)	:	Physical Geography of Bengal in 16th Century as Perceived through Portuguese Writings.
J. Malhao Pereira (Portugual)	:	Sailings from Malindi to Malabar—Problems and Solutions.
C.S. Murty and M.P. Tapaswi (Goa)	:	Physics of the Sea for the Seafarers.

SESSIONS C (CONTINUED) : NAVIGATION AND INSTRUMENTATION

A.K. Bag (Delhi)	:	Astronomical Heritage vis-a-vis Navigational Tradition in India.
Michel Nieto (Syrian Arab Republic)	:	The Arab Nautical Tradition.
Lotika Varadarajan (Delhi)	:	Indian Rutters - the Indigenous Tradition.
C.K. Raju (Delhi)	:	*Kamal* or *Rapalagai*.

S.R. Sarma (Aligarh)	:	Instrumentation for Astronomy and Navigation in India at the Advent of the Portuguese.
B. Arunachalam (Mumbai)	:	The Chola Mode of Navigation in North Indian Ocean.
Job Kozhamthadam (Pune)	:	The Jesuit Response to Copernicanism and its Influence on the Portuguese Contribution to Science in India.

SESSION C (CONTINUED) : CALENDRICAL SYSTEMS AND SHIP BUILDING

Francois Bellec (France)	:	Early Pilots on the Indian Ocean.
Rowena Robinson (Mumbai)	:	Ritual Calendars of Goa.
E.P. Attakoya Thangal (Kavaratti)	:	Thangal Calendar in Lakshadweep.
Francisco J.S. Alves (Portugal)	:	Iberian Ship Building - Living Traditions.
Ernestine Carreira (France)	:	Development/Decline of Ship Building Activity in Daman in XVIII and XIXth Centuries.
K.S. Mathew (Pondicherry)	:	Naval Architecture in Portuguese India

SESSION D : CULTURAL INTERACTION

Manuel Lobato (Portugal)	:	European Perceptions of Nature and Culture of Maluku Islands (Indonesia) in Early Modern Periods.
S.M.R. Ansari (Aligarh)	:	Scientific Activities of the Christian Missionaries : the Transfer of European Science to India up to 18th Century.
Tarapada Santra and Gautam Sengupta (Calcutta)	:	Portuguese Elements in Bengal : A Note Defining the Scope and Problems.
Jan Brouwer (Mysore)	:	Indigenous Knowledge and Cultural Interaction.

Graca Goncalves Lima (Portugal)	:	From Rice to Potato, Oranges and Capricorn.
G.V. Soumitri (Delhi)	:	Food of the Aiyangars of Tamil Nadu : Prescription and Practice.
Ena Desai (Delhi)	:	Gastronomy of Bengal.
Lakshmi Subramanian (Calcutta)	:	Aspects of Maritime Jurisdiction in Portuguese India and the Construction of Piracy.
Angelo Costa Silveira (Portugal)	:	Domestic Architecture in Goa: Intervention Methodologies.
Jean Deloche (Pondicherry)	:	Hill Forts of South India.
Francisco Sousa Lobo (Portugal)	:	Indo-Portuguese Fortification.
R.J. Vasavada (Ahmedabad)	:	Indo-Portuguese Architecture.

SESSION E : CONCLUDING SESSION

The deliberations of the Seminar were largely based on documentary evidence from Portuguese sources, Arab astronomical material and available indigenous information in India. It exemplifies, in clear perspective, the scope and pattern of dissemination of knowledge accrued during the crucial period of one of the earliest European interactions with South East Asia. Dr. S. Sriramachari, the convenor of the Organizing Committee, who conducted the concluding session, complimented all the participants in the multidisciplinary seminar for their excellent presentations and equally keen discussions. It was felt that there was a great need to pursue in depth the wealth of information generated on the status of traditional knowledge prior to and subsequent to the Portuguese discoveries towards the end of the 15th century in quest of new routes to India and South East Asia. The concluding session emphasized on the importance of establishing a database of all relevant sources of information which would lead to a critical assessment of cognitive or meaningful patterns underlying the scientific, technological and cultural developments that had emanated from Indo-Portuguese interactions. As a stimulus for further studies, the INSA is desirous of publishing the Proceedings of the Seminar. Hence, all the participants were specially

requested to sent at the earliest, and not later then 28th February the revised of final manuscripts so that none are missed out.

As a token of appreciation, a set of INSA publication on History of Science were presented to the leader of the Portuguese delegation.

In response to an open invitation from the Chair, several participants from within the country and abroad, presented their considered views, and offered constructive suggestions for future lines of research, such as the activities of Jesuit scientists in India, early publication for current Indian studies on navigation, interaction of Indian, Persian and European Medicine, temple architecture in Goa, economic dimensions of early European influences, unexplored areas like participation / involvement of Eastern Indian coast- line and trans -cultural impact and influence as reflected in vernacular writings, etc.,. Special mention needs to be made to the suggestions of exploiting the scope to access information through the internent and follow -up action on the exchange of Research Scientists between the two countries to cement the personal bonds established during the Seminar. All the delegates echoed their wholesome appreciation of the untiring efforts of Dr. Mrs. Lotika Varadarajan, Dr. A.K. Bag and all his staff in the INSA.

Dr. Lotika Varadarajan welcomed many of the suggestions and the flood of new ideas. Recalling that this was the Year of the Sea, she thought it appropriate that the Seminar should pass a Resolution entitled. "The New Delhi Declaration" which was duly seconded and passed unanimously.