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WHERE SCIENCE & EMPIRE MET:

*Observatories in Asia in the
Late 19th to Mid-20th Centuries*

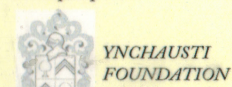
27 February 2020
CSSP Audio Visual
Room (PH 207)

*University of the
Philippines Diliman*

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The College of Social
Sciences and Philosophy & The UP Department
of History

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Conference Overview

Major developments in science took place in colonial Asia in the latter half of the nineteenth century, the period historians consider an era of instrumentation. European inventions and instruments flooded major economic and academic centers in Asia, solidifying the role of science as a primary epistemological framework for achieving progress.¹ As Adas argues, the introduction of key instruments such as the steamship, the telephone, the telegraph, and several laboratory instruments like the aneroid barometer, made it possible for Europeans to imagine and explore the natural world of their colonial territories. Advancements in the sciences and mathematics also heightened the colonial valuation of their political and economic endeavors in terms of better grounded, more accurate estimates. Colonizers, too, applied scientific knowledge to production, communications and military technology in their respective colonial turfs in Asia.²

A fine example of a scientific institution that developed in the era of instrumentation was the observatory. In colonial Asia, meteorological observatories became centers of the numerically calculated approach to understanding the weather, in the process producing valuable scientific information. As MacKeown notes, the

the historical importance of all observatories in that part of the world lies most entirely in the advances achieved by their pioneering staff in understanding such meteorological phenomena, and in weather forecasting.³

MacKeown also observes that the “role of observatories in [the] colonial expansion of Western powers in Asia is not a simple linear history.”⁴ Here it is worth noting that meteorological studies



offered the additional benefit of supporting mercantile shipping and trade, which were crucial to the success of the colonial project in Asia. The genesis of meteorology is in fact traceable to the need of developing colonies to adapt to the vast and, at the time, largely unforeseeable challenges of sea trade.

The pioneers of meteorological institutions were a mix of religious and secular officials. The Jesuit missionaries, for instance, stand out in the Philippines and China, where their pioneering efforts led to the establishment of observatories in Manila and Shanghai. Secular officials such as the British meteorologist, Sir Robert Hart, then the Inspector General of the Chinese Imperial Maritime Customs, initiated a project in which he organized the meteorological observation system of the bureau in 1869.⁵ Observatories were also set up in Hong Kong (Hongkong Observatory, 1882), British Malaya (Meteorological Division of the Malayan Survey Department, 1927), Thailand (Royal Thai Meteorological Service in Bangkok, 1923), Java (Observatory of Batavia, 1866 and Bosscha Observatory in Lembang, 1923), and Japan (Dutch Meteorological Observation Base in Dejima Island, late 18th century, and Central Meteorological Observatory in Tokyo, 1875). Some of these observatories, such as the Observatorio Meteorológico de Manila (1865) in the Philippines and the Zikawei Observatory in China (1872), became so popular and well-developed that governments eventually absorbed them, turning the observatories into official state agencies.

This conference seeks to:

(1) examine the role of observatories as scientific institutions—as pioneers in the use of scientific instruments and as production sites of valuable and necessary scientific data and knowledge, and/or as agencies in the administration of Asian colonies, including trade and shipping;

(2) compare the histories and experiences (scientific, bureaucratic, and knowledge politics) of meteorological observatories in Asia during this period, in various aspects such as funding, sustainability, management, hiring and training personnel, the issues colonial administrators faced in running the observatories, as well as the crucial connection with other important scientific inventions and innovations like telegraphy, and;

(3) discuss regional and global developments in the first half of the 20th century, such as the emergence of a transcolonial meteorological community enabled in part by international scientific congresses on meteorology, the standardization of practices in observatories, and closer cooperation among colonial governments in the understanding of weather and climate.

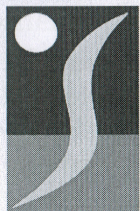
¹Alvin Camba, "Diskurso ng Siyensiya: Kolonyal na Diskurso sa mga Sakuna mula sa Panahon ng Instrumentasyon tungo sa Panahon ng mga Amerikano," *Daluyan: Jurnal sa Wikang Filipino* 16 (2010): 120.

²Michael Adas, *Machines as Measure of Men: Science, Technology, and the Ideologies of Western Dominance* (New York: Cornell University Press, 1989), pp. 263, 268.

³P. Kevin MacKeown, *Early China Coast Meteorology: The Role of Hong Kong* (Hong Kong: Hong Kong University Press, 2011), p. 11.

⁴*Ibid.*, p. 9.

⁵Marlon Zhu, "Typhoons, Meteorological Intelligence, and the Inter-port Mercantile Community in Nineteenth Century China," PhD dissertation, Graduate School of Binghamton University, State University of New York, 2012, p. 20.



The SEASREP Foundation

SEASREP (Southeast Asian Studies Regional Exchange Program) began in 1994 with a meeting of four historians—Taufik Abdullah, Charnvit Kasetseri, Shaharil Talib, and Maria Serena I. Diokno—who shared the goal of advancing Southeast Asian studies in Southeast Asia by Southeast Asians. Registered in the Philippines in 1997 as a non-profit, non-stock organization, the SEASREP Foundation obtained accreditation from the ASEAN ten years later as an affiliated civil society organization. In pursuit of its objectives, SEASREP established grants programs for language training, postgraduate study in the region, and collaborative research in the humanities and social sciences. The grants, which were supported by the Toyota Foundation and the Japan Foundation, were designed for young Southeast Asianists. SEASREP also organized training seminars and workshops and traveling classrooms for undergraduate Southeast Asian students, and participated in international conferences in and outside the region.

When the grants program ended in 2015, SEASREP placed greater focus on knowledge dissemination through capacity-building seminars and workshops, participation in conferences, and research collaboration. In 2016, SEASREP launched the RJSEAS (Regional Journal of Southeast Asian Studies), a peer reviewed, bi-annual, online, open access journal that features papers by emerging Southeast Asian scholars.

Over the years SEASREP has been able to build a network of some 2,000 Southeast Asian scholars who have taken part in SEASREP activities or availed of its grants. A significant number of SEASREP 'alumni' hold academic positions in universities throughout the region. In the course of its work, SEASREP also established institutional partnerships with Southeast Asian universities and non-profit organizations such as Sephis (then based in The Netherlands), Korean Institute of Southeast Asian Studies (KISEAS), International Convention of Asian Scholars (ICAS), Rockefeller Foundation, Sasakawa Health Foundation, and the Luce Foundation. This project on Observatories in Asia is the product of a collaboration with the Ynchausti Foundation.



The Ynchausti Foundation

The Ynchausti Foundation was re-established by Mr. Antonio M. de Ynchausti to act as the organizing umbrella for the Ynchausti family's various philanthropic, developmental, and social justice oriented efforts in the Philippines. Today, the projects of the Foundation are primarily focused on two areas: heritage and historical investigation; and livelihood and development.

The roots of the Foundation originate in the 19th century, when Mr. Ynchausti's great grandfather (Jo-se Joaquin de Ynchausti), grandfather (Joaquin Jose de Ynchausti), and father (Manuel de Ynchausti) established secular- and religious-based social programs in the Philippines.

Notably, in the 1920s, Mr. Manuel de Ynchausti voluntarily gave away thousands of hectares of personal land in Bicol and Negros to the farmers, tillers, and the Church. Later he and his wife, Mrs. Ana Belen de Ynchausti, founded a free medical clinic for the indigent in Manila. During the tumultuous decades of the 1930s and 1940s, Mr. Manuel de Ynchausti established programs and foundations in Europe focused on aiding and rescuing Basque refugees fleeing the oppressive regimes of Ferdinand Franco and, later, the Nazis during World War II.

Under Mr. Antonio M. de Ynchausti, the Ynchausti Foundation continued its efforts in livelihood and development, health and well-being, while continuing to promote further research into Basque history in the Philippines, as well as more general historical inquiries into the Philippines in the 19th century.



CONFERENCE PROGRAM



27 February 2020, Thursday,
CSSP Audio Visual Room (PH 207)

8:20 AM - *Registration*

8:50 AM - *National Anthem of the Philippines*

Opening Remarks

Maria Bernadette L. Abrera
Dean, College of Social Sciences and Philosophy

Nikolas Ynchausti
Ynchausti Foundation

Maria Serena I. Diokno
UP Professor of History (retired)
Executive Director, SEASREP Foundation

Group Photograph
CSSP Information Office

9:15 AM - *Panel 1*

Moderator:

Jely A. Galang, UP Department of History

“Between Three Empires: The Manila Observatory, 1865-1945”
Kerby C. Alvarez, UP Department of History

“Fathers to Be Blamed: Media and the Public Accountability of
Zikawai’s Typhoon Warnings in Treaty-Port Shanghai”
Marlon Zhu, Institute of Modern History, Academia Sinica, Taiwan

Reactor:

Ma. Florina Orillos-Juan, DLSU Department of History

10:30 AM - *Break*

10:45 AM - *Panel 2*

Moderator:

Jely A. Galang, UP Department of History

“Centres of Calculation’?: Colonial Meteorology in
Nineteenth Century Japan”

Takuya Miyagawa, Faculty of Human Environmental Studies,
Hiroshima Shudo University

“Batavia and Lembang Observatories: Creation and
Circulation of Science in Colonial Indonesia”

Uji Nugroho, Department of History, Universitas Gadjah Madah

Reactor:

Ruel V. Pagunsan, UP Department of History

12:00 NN - *Lunch*

1:30 PM - *Panel 3*

Moderator:

Rhodilyn C. Wani-Obias, UP Department of History

“An Ocean Apart: Meteorology and the
Elusive Observatories in British Malaya”

Fiona Williamson, School of Social Sciences,
Singapore Management University

“The Role of Temporary Western Observatories in the
Development of Professional Astronomy in Thailand”

Wayne Orchiston and **Darunee Lingling Orchiston**,
National Astronomical Research Institute of Thailand,
Chiang Mai

Reactor:

Ma. Luisa DL. Bolinao, UP Department of History

2:45 PM - *Break*

3:00 PM - *Panel 4*

Moderator:

Rhodilyn C. Wani-Obias, UP Department of History

“Servicing Colonial Exploitation:
The French Establishment and Management
of Phù Lien Observatory, 1899-1945”

Hoang Anh Tuan and **Nguyen Thi Hoai Phuong**,
University of Social Sciences and Humanities
Vietnam National University, Hanoi

“Astronomical Observatories in India in the British Period”

Rajesh Kochhar, Panjab University Chandigarh

Reactor:

Benjamin M. Vallejo, Jr., Institute of Environmental Science
and Meteorology, UP College of Science

4:15 PM - *Closing Remarks*

Neil Martial R. Santillan
Chair, UP Department of History

ABSTRACTS



PANEL 1

“Between Three Empires: The Manila Observatory, 1865-1945”

Kerby C. Alvarez,
UP Department of History

> The nineteenth-century world witnessed significant developments in science; metropolises and colonial territories acquired scientific knowledge and technologies from different countries in Europe, mainly from France and Germany. The second half of the nineteenth century saw a new mentality in science, particularly on the use and essence of scientific instruments.

The scientific endeavors of the *Observatorio Meteorológico de Manila/Manila Observatory* contributed to the advancement of modern, instrumental science in the Philippines. The observatory under the Jesuits was a pioneer on “modern” reading and study of weather, climate, and natural hazards through the use of instruments and apparatuses, some of which the Jesuits Fathers themselves invented and promoted. It was a source and repository of modern scientific knowledge and instruments. The height of their scientific prominence ushered in the transition of science confined in the laboratories to the public sphere, as different sectors of the Filipino society take impart in the broader scientific projects of different colonial regimes.

This paper will discuss the role of the Manila Observatory in the colonial empire building, from the last decades of the 19th century until the end of the Pacific War in 1945. The paper has three parts: (1) the observatory as an institution for empire building, (2) as a pioneer scientific institution for the advancement of instrumental sciences – meteorology, seismology, and astronomy, and (3) as a “laboratory” for Filipino meteorologists and weather observers.

"Fathers to Be Blamed: Media and the Public Accountability of Zikawei's Typhoon Warnings in Treaty-Port Shanghai"

Marlon Zhu,

Institute of Modern History,
Academia Sinica, Taiwan

> This paper examines the public "auditing," through media, on the incipient civil weather service in Shanghai in the nineteenth century. Jesuit fathers' Zikawei Observatory became, since the 1880s, a *de facto* head observatory of weather information in China. To Shanghai's mercantile community, which was dominated by shipping and marine insurance interests, Zikawei's typhoon warnings had been of prime importance. This article introduces and argues that, the commercial English-language newspapers, which published in Shanghai and circulated among other port cities along the typhoon-inflicted China coasts, had constituted an inter-port forum for these mercantile "users" of the weather service to judge the "efficiency" of Zikawei. "Who's to blame" questions in the commercial newspapers closely connected to the shipping trade had framed what's to be meteorological fact in the Jesuits and mariners' everyday life in treaty-port Shanghai.

PANEL 2

"Centres of Calculation?": Colonial Meteorology in Nineteenth Century Japan"

Takuya Miyagawa,

Faculty of Human Environmental Studies,
Hiroshima Shudo University

> It is generally said that Japan made successful modernization in the latter half of nineteenth century, especially since Meiji restoration in 1868. Meiji government promoted scientific, technological, and industrial renovation quite rapidly through the aggressive import policy from the Western powers that targeted all fields of science and technology. Meteorology, of course, was one of them. Tokyo observatory, established in 1875, started storm warning and weather forecast since 1882 led by Erwin Knipping, a German navigator before coming to Japan. Tokyo consolidated the domestic meteorological network through 1880s to 90s, and then, the network was maintained only by Japanese meteorologists by 1890. Since the last decade of the century, Japanese observational network made further expansion to entire East Asia following the imperial expansion, including Taiwan, Korea, Sakhalin, and Japanese meteorologists produced various works in the modern meteorological manner to catch up the Western academia.

Behind this 'success story' Japanese historians have shown, however, the nineteenth century Japan was a field of colonial science by European and American visitors; some of whom were employed by Meiji government as science teachers, others were sent out with missions to acquire information on Japan from the geopolitical perspectives, or both of them. This article explores 'colonial meteorology' in Japan conducted by various actors from Europe and the US from 1850s to 1890s. As broadly known, Japan is one of a few Asian nations who did not experience colonial rule by Western powers until World War II. Yet, in field sciences, the Japan archipelago was targeted as the newly discovered

'frontier' and, therefore, the Western navigators, naturalists, and science teachers sought and collected information on geography, hydrography, climate, flora and fauna, ethnicity, and so forth as undertaken in Qing China earlier. How did the foreign visitors collect weather information and produce meteorological/ climatological knowledge in modernizing Japan? What did the meteorological works produced in Japan by foreign scholars mean and how did they influence upon Japanese meteorologists?

In most cases, the foreign scholars observed daily weather and compiled climatological data during their stay, researched weather phenomena assumed to be unique to Japan like typhoon, and then, reported the results to their home country, scientific journals in Europe, or foreigners' communities in Japan, but those activities were not to share the information with the indigenous. For instance, Philipp Von Siebold, a German doctor who was quite influential to development of Rangaku, made daily observation during his six year stay in Nagasaki and reported to the journal published by Dutch East India Company in Batavia. In another example, Knipping, employed by Meiji government in 1882 to make typhoon alarming and weather forecast in Japan, investigated East Asian typhoon based on data from Japanese local observatories, and reported to German journal of hydrography. British empire also approached Japanese weather data by sending a survey ship, the *Sylvia*, who asked Meiji government to permit ocean investigation around Hokkaido in 1868. Robert Hart, the Inspector General of the Chinese Imperial Maritime Customs who planned to construct East and Southeast Asian typhoon network for the safety of British commercial benefit, urged Japanese navy to exchange observational data with the British network in Qing China. They were obviously linked with the British imperial intelligence strategy in East Asia.

These data collecting activities led to the climatographical works of Japan by Western scholars such as Knipping and Johannes Justus Rein. Knipping described climate of Japan in 1885, written in English first and later translated into Japanese in 1887, which was the first climatographical work published in Japanese tongue. Rein, a Prussian geographer, traveled around Japan in 1874 to collect information on natural history as an agent of the Prussian government. He wrote a series of articles about Japanese climate and published a travel book in German around 1880, and its English translation (*Japan: Travel*

and Researches) was broadly read in Europe because of its voluminous information. His description on Japanese climate relied on observations by missionaries, merchants, teachers at open ports like Yokohama, Kobe, and so on, and it partly helped Julius von Hann, an Austrian climatologist, complete world climatology through his textbook (*Handbuch der Klimatologie*) in 1883. Hann's ambitious work covered global climate, dividing three climatic zone: the Tropics, the Temperate, and the Frigid, Japan was categorized as non-tropical East Asia as well as China. These climatological studies served as a model for Kiyoo Nakamura, third director of Tokyo observatory, who published *Climate of Japan* in 1893 that was the first achievement by Japanese meteorologist. Indeed, its narrative and methodology had close similarity to Knipping, Rein, and Hann in describing the characteristics of Japanese climate, only deference was his patriotic description that highly praised the beauty of Japan as "the Paradise on the whole globe" thanks to its climatological condition. Although Nakamura's work should be revised again and again by Japanese scholars based on the accumulation of observational data following the expansion of the network, the element of his description on Japanese climate would survive longer. It is partly because there were few Japanese who investigated on climate in the process of establishing the observation system because modern weather science was totally new activity for the Japanese, therefore, they had to imitate how to survey in the field, record data, and describe climate. Eventually, this form of knowledge production, including ignoring the indigenous, was duplicated when Japanese meteorologists surveyed East Asian climate in the expansive imperial territory.

“Batavia and Lembang Observatories: Creation and Circulation of Science in Colonial Indonesia”

Uji Nugroho,

Department of History,
Universitas Gadjah Madah

> Colonial period charted important transmissions of sciences which mostly had developed in Europe to be introduced in the colony, especially in the second passage of the nineteenth century. Although Mauritz Mohr had introduced an observatory built at his mansion in the eighteenth century, the regular and trustworthy climate and meteorological observation in the Netherlands Indie just began in 1866 with the foundation of Observatory in Batavia. To follow, as well as, to spur up this effort, *Nederlandsch-Indische Sterrenkundige Vereeniging* (the colonial astronomer association) was established and then successfully built another observatory in Lembang in the second decade of the twentieth century. Regardless those developments, meteorology as a science was still less popular, and the knowledge only revolved within a particular circle. Whereas some of sciences introduced in the colonial time were considered to have a close connection to the empire making project for utilizing the government with knowledge over its colony, the role of those observatories is still less observed.

This study aims to chronicle the life of two pioneer observatories in Java: Batavia and Bosscha in Lembang especially in colonial time, to gauge a better understanding on the creation and circulation of knowledge in the colonial Indonesia. This research focuses its lens on the creation as well as the idea behind the creation of those observatories; its roles on the making of tropical knowledge; and the extents of its influences—whether it was purely scientific or it had also economic or political dimensions. In doing so, this project make fuller use of document including series of periodical published by *Koninklijk Magnetisch en Meteorologisch* in Batavia, archives, and newspapers.

PANEL 3

“An Ocean Apart: Meteorology and the Elusive Observatories in British Malaya”

Fiona Williamson,

School of Social Sciences,
Singapore Management University

> Across the late nineteenth century, the British established observatories and meteorological stations across the nations and outposts of their burgeoning empire including Canada, Australia, India and Hong Kong. These observatories and the network of meteorological posts and registering stations were part of a global endeavour to map and understand the weather by collating vast quantities of data from which to infer weather patterns and behaviours. In Asia, these observatories became centres of research into typhoon and monsoon systems. In the British Straits Settlements and Federated Malay States however, observatories came and went. Establishments were short lived and small, the system relying instead on the dedication of doctors and occasional plantation owners for the collection and study of weather information. This lack is surprising given the investment in meteorology in other parts of Asia.

This paper explores the erratic and often elusive meteorological provision across nineteenth and early twentieth century Malaya. It argues that contemporary perceptions of the local climate as stable all year round combined with conflict and occasional incredulity over the potentiality of anthropogenic climate change. This fed into bureaucratic disinterest in investing in the science, despite its centrality to agricultural and industrial productivity.

"The Role of Temporary Western Observatories in the Development of Professional Astronomy in Thailand"

Wayne Orchiston and Darunee Lingling Orchiston,
National Astronomical Research Institute of Thailand,
Chiang Mai

> During the nineteenth century Siam (present-day Thailand) was entrapped between British colonies to the west (Burma) and south (the Straits Settlements) and a French colony to the east (Cochin China), yet managed to retain its independence—the only Southeast Asian nation that succeeded in doing so.

One consequent downside was that Siam did not feel the need to develop astronomical observatories, which were a conspicuous element of British colonialism (as witnessed, for example, in Australia, India and South Africa). Despite their designations as 'astronomical observatories', the primary function of these institutions was to provide a regulated local time service and meteorological data, and some also were involved in tidal studies, geomagnetic research, seismology, trigonometrical surveys and astronomical research. In Siam/Thailand, these non-astronomical functions were pursued by different Government departments.

Instead Siam witnessed its first 'modern' astronomical observatories when European expeditions accepted invitations to come to Siam to observe the total solar eclipses of 1868, 1875 and 1929. These expeditions led to the emergence of academic astronomy in Thailand and the establishment of the nation's first permanent astronomical research observatory.

In this paper we will examine the 1868, 1875 and 1929 European eclipse expeditions, and the subsequent development of professional astronomy in Siam. This culminated in the establishment of the National Astronomical Research Institute of Thailand in 2009 and the phenomenal growth of astronomy during the following decade, primarily under strong Royal patronage.

PANEL 4

"Servicing Colonial Exploitation: The French Establishment and Management of Phù Lien Observatory, 1899-1945"

Hoang Anh Tuan and Nguyen Thi Hoai Phuong,
University of Social Sciences and Humanities
Vietnam National University, Hanoi

> By the dawn of the 1890s, the French have basically pacified Tonkin (northern Vietnam) and began the process of colonial exploitation. In the eyes of the French colonialists, the prospect of both natural resources and maritime transportation offered by the north-eastern region of Vietnam grew rapidly visible. Thus, already in the late 1880s, having carefully surveyed the northeastern coastal area, the French built Hai Phong Harbor (1885) and then established Hai Phong City (1888) in order to turn this place into a international seaport, connecting Tonkin with the other international trading places in Northeast and Southeast Asia.

It was obvious to the French that, for the successful operation of Hai Phong seaport, understanding the weather of this region was of extreme importance. By that time, the strangeness of the Tonkinese weather, tide, currents etc. had been randomly described in the Western records and travelogues since the seventeenth century, causing a great concern to the French people. Additionally, since their arrival in Vietnam in the middle of the 1800s, the French must have been fully aware of a number of observatories established by various Western powers in East Asian countries, including the stations in the Philippines (Manila, 1865), in Java (Batavia, 1866), in Japan (Tokyo, 1875), in China (Shanghai, 1872 and Hong Kong, 1882)... On the basis of these developments, in 1898, the French colonial government began to consider the establishment of meteorological observatories in northern Vietnam. Not long afterward, in 1899, the Indochina Supreme Council passed the plan to survey

Phù Lien area, around ten kilometers north of Hai Phòng City, for a possible establishment of the first-ever Central Meteorological Station in Indochina. In April of the following year, the Governor General of Indochina, Paul Doumer, signed Resolution No. 421 to construct the main building for Indochina Meteorological Department in Phù Lien. The building, as well as the overall planning of Phù Lien Station, was designed by the French architectur, M. Lichtenfelder, and was said to have strongly been influenced by the design of the Zikawei Meteorological Station in Shanghai which had also been designed and constructed by the French several decades earlier. In 1902, the Central Station of Meteorology and Magnetism was officially established and was given the following major functions: implementing scientific activities relating to meteorology, magnetism, earthquake...; collecting updated information from the other meteorological stations in Indochina to analyze and forecast the upcoming typhoons and storms in the region in order to serve the maritime transportation; and so forth.

In the following decades until the end of the Second World War and the declaration of national independence by President Ho Chi Minh in September 1945, Phù Lien Observatory had undergone through a relatively fruitful period of operation in which a good number of researches and activities did contribute to the progression of meteorological study as well as the daily activities. A number of Vietnamese scholars, most notably Nguyen Xien, was also trained and later on involved in the management of Phù Lien Station. On the basis of newly-extracted archival data and the fieldtrip information, this research aims to highlight the history of establishment, operation, and contribution of Phù Lien Observatory in the context of French colonial exploitation as well as the politico-economic transformation in East Asian region during the period from late nineteenth to mid- twentieth centuries.

“Astronomical Observatories in India in the British Period”

Rajesh Kochhar,
Panjab University Chandigarh

> Modern astronomy came to India in tow with the Europeans. Three celestial events and observational programmes are associated with major institutionalization initiatives. The transits of Venus of 1761 and 1769 were incorporated into the ongoing geo-political rivalry between England and France. For the latter of the two transits, a number of clocks and instruments were sent out to India where they were stored. Institutionalization of (modern) astronomy began in India in 1787 with the establishment of Madras Observatory on the east coast. It was the first astronomical observatory outside the Western world. India would have been happier without the distinction. The Observatory provided the reference point for coastal survey deemed necessary for avoiding shipwrecks. It repaired shipping instruments and provided time signals. Its most significant contribution during more than 100 years of existence was the 11000 strong Madras Star Catalogue published in 1844 by the erstwhile Greenwich assistant, T.G. Taylor.

With the advent of solar photography and spectroscopy, British and continental astronomers showed renewed interest in British India thanks to its abundant supply of sunshine. Solar eclipses of 1868, 1871 and 1872, that came in quick succession and were all visible from India gave a great fillip to solar instrumentation the world over. Then came the 1874 Transit of Venus which eventually led, in 1899, to Kodaikanal Solar Observatory in South India, under the Imperial government. It found a place on the world science map with the discovery of Evershed effect in 1908. Kodaikanal has the unique distinction of possessing an unbroken series of white-light solar pictures from the same instrument, since 1912.

The night-time astronomy slot vacated by the Madras Observatory was filled by the Nizamiah Observatory, Hyderabad, named after the King (Nizam). It was privately established in 1901, taken over by the government in 1908. It was made part of the Osmania University

when the latter was set up in 1919. The same year it was inducted into the international *carte du ciel* and astrographic catalogue programme where its active participation lasted from 1914 till 1946.

Some other observatories were established during the 19th century, by the kings or wealthy individuals. They however were either short-lived or converted into magnetic or meteorological observatories.

NOTES