Workshop 3: Historic Observatory Networks
Royal Observatory Edinburgh, 28-29 June 2022

Tuesday 28th June

Royal Observatory Edinburgh (ROE)

09:45 Welcome and introductions

10:00-11:30 **Session 1: Colonial networks**

Chair: Ileana Chinnici (Italy)

Katharina Bick (Germany)

- General Assembly in Guelma: Expeditionary Travel and Astronomical Networks

Oyndrila Sarkar (India) (online speaker)

- A Weather in the Empire's Cap: Henry Francis Blanford & the Indian Meteorological Observatories 1875-1890

Toner Stevenson (Australia) (online speaker)

- Stars on glass cross the sea from Perth to Royal Observatory Edinburgh

11:30-12:00 Coffee break

12:00-13:00 **Session 2: Local networks and observatory locales**

Chair: Omar Nasim (Germany)

Keynote speaker: David Aubin (France)

- Local Observatory Networks: The Case of Paris, 17th-19th centuries

13:00-14:00 Lunch

14:00-15:30 **Session 3: Observatories across hemispheres**

Chair: Lee Macdonald (UK)

Barbara Silva (Chile)

- Northern Astronomy in Chile: Connected Experiences in the 20th century

Osase Omoruyi (USA)

- The Extractive Gaze: The Influence of Race and Capitalism on the Development of American Astronomical Stations in South Africa

15:30-16:00 Coffee break

16:00-17:30 **Session 4: Tours of the ROE site (in-person event)**

Weds 29th June

10:00-12:00 **Session 5: Observatory locations in Edinburgh (in-person event)**

- Tours of City Observatory and the Nelson Monument on Calton Hill
- Taxi transfer to the ROE

12:00-13:00 **Session 6: Contested networks, past and present**

Chair: Louise Devoy (UK)

Keynote speaker: Saul Dubow (UK)

- Southern Skies Astronomy in South Africa: A 250 Year Survey

13:00-14:00 Lunch at ROE

14:00-15:30 **Session 7: Observatories within international networks**

Chair: Daniel Belteki (UK)

Eun-Joo Ahn (USA)

- Investing through networking: the rise to prominence of Mount Wilson Observatory in the early twentieth century

Lee Macdonald (UK)

- The Royal Observatory, Greenwich and international science in the early twentieth century

David DeVorkin (USA) (online speaker)

- Charles Greeley Abbot's Global Quest for the Solar Constant

15:30-16:00 **Session 8: Closing remarks and discussion**

Chair: Rebekah Higgitt (UK)

Advisory Group and Project Team

End of workshop*

Abstracts

Session 1: Colonial networks

General Assembly in Guelma: Expeditionary Travel and Astronomical Networks

Katharina Bick, University of Regensburg (Germany)

On 31 August 1905, three astronomers from Hamburg Observatory travelled the 70 km from Souk Ahras to Guelma (both in Algeria), to visit no less than seven astronomical expedition parties stationed there. They all had come there to observe a solar eclipse. The astronomers from Hamburg were not the only ones to do such visits. Astronomical expeditions, for the observation of Venus transits or solar eclipses, were regularly used as opportunities for inspecting the instruments of other parties in the area or for dropping by permanent observatories that were usually out of reach.

Based on the documentation of the German transit of Venus expeditions 1874 and 1882, and solar eclipse expeditions mounted by German observatories in the early 20th century, I will reconstruct this visiting business. Additionally, I will detail how the expeditions made recourse to existing connections for procuring information beforehand and organising practical help on site. In this way, I will show that astronomical expeditions were an important factor in building and maintaining astronomical networks and in exchanging practical knowledge about instruments and techniques.

A Weather in the Empire's Cap: Henry Francis Blanford & the Indian Meteorological Observatories 1875-1890

Oyndrila Sarkar, Department of History, Presidency University, Kolkata (India) (online)

Henry Francis Blanford was a British geologist working on India's coal deposits in 1855. Within a decade, when unprecedented cyclones destroyed the eastern coast of India, Blanford was appointed chief meteorological reporter, and he took an active role in creating a network of meteorological observatories all over the Indian subcontinent.

Building on existing scientific principles applied in observatories throughout the British empire, Blanford sought to replicate the same in the 'natural laboratory' of India by collaborating with diverse institutions like the Trigonometrical and the Geological Surveys. Monitoring and cataloguing Indian weather were unsystematic and unorganized. Aided by a short-staffed department and no standardized patterns of observations or instruments to rely on, Blanford managed to direct a coordinated system of recording temperature, pressure, and rainfall in meticulous detail. This created a comprehensive record of meteorological service across these observatory sites, their objectives, and their practical application to weather knowledge, the usage and maintenance of instruments by trained workers, as is evident in the existing meteorological archive.

This paper examines the nature of networks created by Blanford's meteorological observatories, furthered by his instructional handbooks to understand the formative years of meteorology as a practical science in the nineteenth century.

Stars on glass cross the sea from Perth to Royal Observatory Edinburgh
Toner Stevenson, Honorary Affiliate, History Department, The University of Sydney (Australia) (online speaker)

When Observatories in Australia undertook to complete a section of the Astrographic Catalogue and Carte du Ciel (AC/CdC) in 1887, and 1900, this was an opportunity to strengthen networks in astronomy within Australia. Fundamental to the success of the state observatories was also the strength of their relationships with leading astronomers in Britain, who held enormous sway with the state and commonwealth government representatives.

In this presentation the focus is on the Perth zone of the Astrographic catalogue and the involvement with Royal Observatory Edinburgh. The challenges and opportunities presented by this relationship, will be set within the context of Australia's overall participation in the AC/CdC. In conclusion I will reflect on why, historically, Australia's participation in the Astrographic Catalogue and Carte du Ciel were viewed as detrimental to the development of astrophysics in Australia, and how a different lens has altered that interpretation.

Session 2: Local networks and observatory locales

Local Observatory Networks: The Case of Paris, 17th-19th centuries
David Aubin, Sorbonne Université, Paris, France

The first plans for erecting the Observatory in Paris in the 1660s was innovative in at least two important respects: permanence and unicity. The building and its surrounding gardens were indeed intended to be the permanent and unique location where all astronomical observations by members of the Academy of Sciences (and indeed most of their experimental and observational practice) was supposed to take place. However, even then, many other observation spots existed in the capital which remained active for decades afterwards. In fact, at any time during the 18th and 19th centuries, at least half a dozen observatories and sometimes more were in operations in the city and its surroundings. They served a wide range of purposes: official duties, research in various (sub) disciplines, education or training for various trades, popularization, amateur observation, representation, etc. We provide a first attempt at analyzing such local dynamics between different kinds of observatories in a given place.

Session 3: Observatories across hemispheres

Northern Astronomy in Chile: Connected Experiences in the 20th century
Barbara Kirsi Silva, History Department & Center for Studies in Science, Technology and Society, Universidad Alberto Hurtado (Chile)

In the 1960s, astronomers from the United States and Europe arrived in Chile with the plan of building astronomical observatories. This was a milestone for the development of astronomy in the southern country, which had scarce experience in the field. Nevertheless, these initiatives connected to a previous enterprise in the early 20th century, when astronomers from the Lick Observatory (California, US) sent an expedition to Chile, with the purpose of establishing parallel and combined observations both in the northern and southern hemisphere. Initially, the Lick expedition was planned for 2 to 3 years, but they stayed for 26 years. During that time, connections between northern astronomers and the southern station multiplied. This applied to instruments (designed and constructed in several places across the US and Paris) but also to scientists.

This early experience seemed to have been forgotten when choosing Chile as the place for modern astronomy in the 1960s. However, when taking a closer look to this southern station,

it becomes clear it was a relevant reference in the circulation of astronomical ideas both in Europe and the US. These connections were to be fundamental to understand the further development of northern astronomy in the southern country from the 1960s onwards, now a 'global center' for international astronomy.

The Extractive Gaze: The Influence of Race and Capitalism on the Development of American Astronomical Stations in South Africa
Osase Omoruyi, Harvard University (USA)

At the first 1983 National Forum meeting, Neville Alexander used the term "racial capitalism" to describe the productive relationship among ethnicity, class, and nation, emphasizing that the true struggle for South Africans lay against the class of white capitalists who perpetrated the system which denied Black people political rights, limited their freedom of movement, and constricted their access to land, preparing "them for life in a subordinate society." Operating within this racial capitalist system, which would eventually express itself as apartheid, were American astronomers who ventured from Yale and Harvard University and contracted Black laborers to build Southern stations for their observatories.

To trace this history through the early 1900s, I critically analyze observatory archival records, personal accounts, correspondence letters, and histories of the developing Black labor union movement to unsheathe the struggle for liberation and fight against land dispossession at play in the construction and maintenance of these Southern stations. Grappling with this history will allow us to situate the role of Eurocentric astronomy in the advancement of global racial capitalism and exploitation, recognize the implications of any transgressions (both committed in the past and ongoing), and finally, envision what must be done to put an end to this continued violence.

Sessions 4 and 5 – in person events, no abstracts required

Session 6: Contested networks, past and present

Southern Skies Astronomy in South Africa: A 250 Year Survey
Saul Dubow, Smuts Professor of Commonwealth History, University of Cambridge (UK)

South Africa has gained a great deal of attention in world astronomy since the launch of Meerkat, forerunner of the soon to be inaugurated Square Kilometre Array. Both signal the country's re-emergence within global science after years of isolation and pariah status during the high apartheid years. These prestige projects are exemplars of national pride and scientific achievement, yet their potential as drivers of social development are increasingly contested.

My contribution casts the story of the SKA in the context of a longer history of imperialism and colonialism. There were several distinct phases to this process. I begin with the work of La Caille and Herschel in the 18th and early 19th centuries; consider the institutionalisation of astronomy (Royal Observatory, Radcliffe Observatory, multiple telescopes operated on behalf of northern hemisphere scientific centres); and examine how these diverse projects came to be centralised in the (optically-based) South African Astronomical Observatory and the dual purpose radio astronomy facility at Hartebeesthoek during the 1970s - the era of high apartheid. My talk casts these developments in the context of South African history and politics. It reflects, too, on debates about the role of the SKA in the region of the Karoo, a region marked by conquest and settlement – and where paleontological and astronomical 'deep time' happen to coincide.

Session 7: Observatories within international networks

Investing through networking: the rise to prominence of Mount Wilson Observatory in the early twentieth century

Eun-Joo Ahn, Department of History, University of California Santa Barbara

Scholars have regarded collaborations and the sharing of scientific resources between scientists as ways to enhance their professional networks. Examining the collaboration between the astronomers at Mount Wilson Observatory (MWO) and European astronomers from 1906 to the late 1910s, I consider professional networking as investments astronomers made to expand their scientific enterprise. MWO director George Ellery Hale proposed cooperation with Dutch astronomer Jacobus Cornelius Kapteyn: he offered to carry out Kapteyn's research proposal with the newly commissioned 60-inch reflector telescope and share scientific resources such as photographic plates by inviting Kapteyn and his colleagues to Mount Wilson. Such collaborations strengthened and expanded the professional network of these astronomers.

I argue that these cooperations were driven by the principles of accumulation that concentrated knowledge and resources at MWO rather than redistributing them to other places. Hale formulated a robust observation program that justified further financial investment into the observatory and drew even more astronomers to Mount Wilson, enriching the observatory's scientific prestige. Through this process, MWO became one of the prominent centres of astronomical research during the early twentieth century.

The Royal Observatory, Greenwich and international science in the early twentieth century

Lee T. Macdonald, Royal Museums Greenwich (UK)

From the late nineteenth century, the Royal Observatory at Greenwich became part of several international astronomical projects and networks, facilitated by technologies such as the railway, the steamship and the electric telegraph. The most famous of these collaborations was the *Carte du Ciel*, a project to photograph and catalogue the entire sky using standardized telescopes across the world. Greenwich also became a member of the 'Centralstelle', an international clearing house based at Kiel, Germany, for telegrams announcing astronomical discoveries. When war broke out in 1914 and communications with enemy countries were cut off, these networks were altered but nevertheless remained active, with Greenwich fully participating.

In this paper, I describe how the Royal Observatory helped set up these networks and functioned within them. I then show how the observatory worked around the restrictions caused by the First World War and became part of an international scientific communications system that excluded German and Austrian scientists. This formed the basis on which the International Astronomical Union was formed in 1919. However, I also show how during the war the observatory's director, Astronomer Royal Frank Dyson, remained committed to a scientific internationalism that did not necessarily exclude Germany in the long term.

Charles Greeley Abbot's Global Quest for the Solar Constant

David H. DeVorkin, Senior Curator, Emeritus
National Air and Space Museum, Smithsonian Institution (USA)

In the spirit of the 19th Century "magnetic crusade," to establish world-wide networks for collecting magnetic data about the earth, in 1904 George Ellery Hale established the International Union for Cooperation in Solar Research. Among his goals was to build a worldwide program of monitoring ever-changing solar activity. Hale knew this was in line with

the goals of the Astrophysical Observatory of the Smithsonian Institution, based in Washington, D.C. Over the next four decades, the APO's second director, Charles Greeley Abbot, fostered a worldwide network of observing stations to monitor solar activity, designing, building, and supplying standardized instrumentation to scores of observatories to spread the Smithsonian's program and its technical expertise to any country desiring it. In the 1920s, Abbot's efforts also aligned with a passionate mission by John C. Merriam of the Carnegie Institution to explore "cycles" in Nature. Due to Abbot's claim that this work promised commercial crop predictions, it remained well-funded even during the Depression.

Here we present how Abbot established the network, and how it persevered in the face of growing criticism of his claimed results that the Sun's energy output varied in a set of some two dozen interlocking cycles that could influence climate on Earth.

End of abstracts