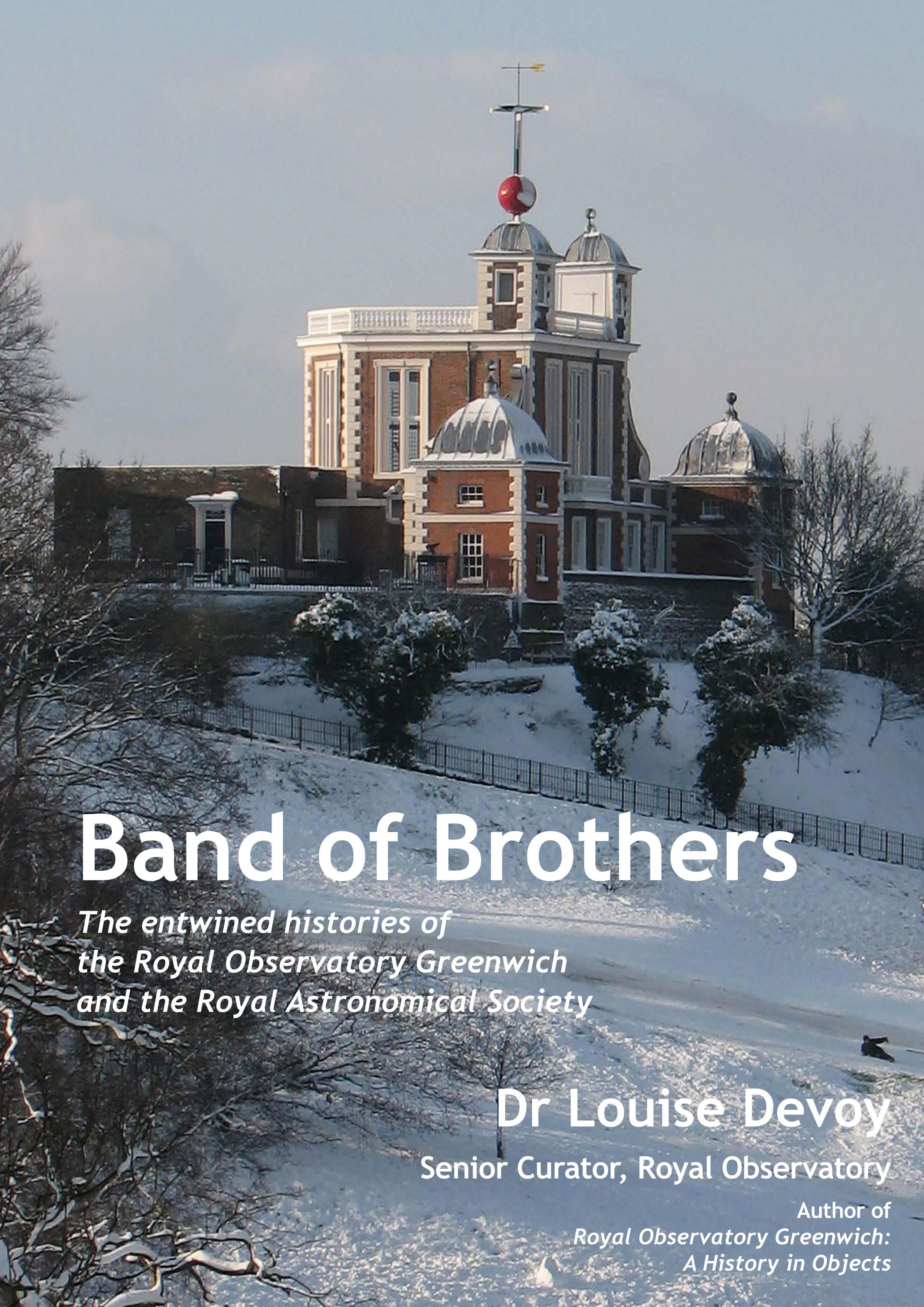


Band of Brothers

The entwined histories of the Royal Observatory Greenwich and the Royal Astronomical Society

Dr Louise Devoy

Senior Curator, Royal Observatory

Author of
Royal Observatory Greenwich: A History in Objects

Contents

Typesetting: The Royal Astronomical Society

First published as an online special issue in
Monthly Notices of the Royal Astronomical Society
https://academic.oup.com/mnras/pages/royal-observatory-greenwich

Introduction

On 4 March 1675, King Charles II signed a Royal Warrant appointing John Flamsteed as 'astronomical observator', followed by another Warrant in June appointing Christopher Wren as the architect of Britain's first state-funded scientific institution. Charged with 'perfecting the art of navigation' to improve global trade, the Observatory was well established by the time of the Royal Astronomical Society's (RAS's) founding in 1820. Since then, eight Astronomers Royal across its 350-year history have served as the Society's President, usually more than once, along with numerous other astronomers who have worked at Greenwich at some point during their career. From 1831, the RAS President was also a nominated postholder within the Observatory's Board of Visitors, the governing group who assembled at the Annual Visitation to oversee and direct the institution's work and instrumentation. Unsurprisingly, there were exemptions in place for the years when the Astronomer Royal and President were one and the same!

On a less formal basis, the RAS was an important forum for Greenwich astronomers to share their work with the wider astronomical community and to absorb new ideas from a range of topics beyond their core remit of positional astronomy. Founding RAS Fellows with a strong interest in history, such as Francis Baily and later Stephen Rigaud, also championed the preservation and transcription of original Observatory manuscripts, creating a legacy that we continue to appreciate today.

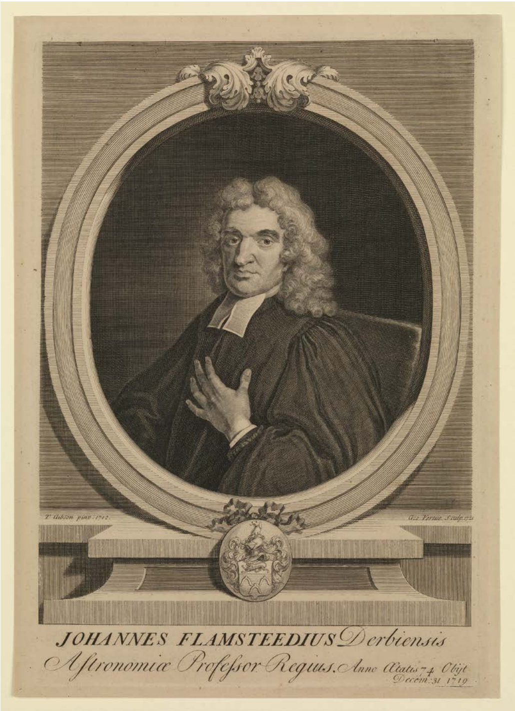
This selection of articles from the *Monthly Notices of the Royal Astronomical Society* (*MNRAS*), *Quarterly Journal of the Royal Astronomical Society* (*QJRAS*) and *Astronomy & Geophysics* (*A&G*) illustrates the evolving relationship between Greenwich and the RAS from the 1820s until the Observatory's relocation to Herstmonceux in 1948. For the continuation of the Observatory's subsequent history, please see this excellent summary by Graham Dolan (Dolan, G., 2025).

The first section of this review is arranged chronologically by the first ten Astronomers Royal who lived and worked at Greenwich while the second section turns the spotlight onto five themes: The Sun, Instrumentation, Longitude, Time, and the Planets. Links to relevant objects held within the collections of Royal Museums Greenwich are included for additional context in the Interactive PDF version of this booklet.

John Flamsteed (1646-1719)

First Astronomer Royal, 1675-1719

Our detailed knowledge of Flamsteed's life and work stems from the efforts of Francis Baily, a stockbroker by profession and four-time President of the Society whose interest in the history of astronomy set the foundations of the RAS's extensive library and archive. Having discovered a hitherto unknown collection of correspondence between Flamsteed and his assistants Abraham Sharp and Joseph Crosthwait, Baily set about assembling Flamsteed's biography and correspondence. In particular, the material covered the crucial last two decades of Flamsteed's life, when the Astronomer Royal was trying to publish his work but was hampered by interference from various factors, including influential figures such as Newton and Halley. Baily felt that Flamsteed had been unfairly blamed for the delayed publication of the *Historia Coelestis Britannica* (1725) and sought to set the record straight in this paper published in 1833 (Baily, F., 1833). First, he introduced the newly discovered collection and outlined his revised interpretation of events, commenting on how 'science is no protection against the infirmities of human nature'. This was followed by another account two years later (Baily, F., 1835), which became an important turning point in the restoration of Flamsteed's reputation as a productive astronomer. But Baily was not afraid to criticise his hero, as shown by *On the non-existence of the star 42 Virginis* (Baily, F., 1837), in which he laments transcription errors that led to Flamsteed's erroneous plotting of this object and the subsequent endeavours by other astronomers to locate it.



John Flamsteed. Image courtesy of the National Maritime Museum, Greenwich, London.

Edmond Halley (1656-1742)

Second Astronomer Royal, 1720-1742

Despite his fame and association with comets, Halley's presence in the Observatory's archives and collections is rather sparse. The London astronomer arrived at Greenwich in 1720 to find Flamsteed's Sextant and Quadrant House subsiding and the buildings devoid of instruments, thanks to Margaret Flamsteed's determination to extract all remnants of her husband's property. Baily's summary of Halley's papers (Baily, F., 1834) is a transcription of the original documents that were 'rather confusedly written'. Baily explains how Halley initially focused on transit observations and later switched to recording the motion of the Moon and planets, although he criticises Halley's poor record keeping with respect to the clocks that rendered 'it extremely difficult to deduce any very accurate results'.

In a similar vein, the historian and astronomer Professor Stephen Rigaud summarised Halley's programme of new instrumentation in 1836 (Rigaud, S., 1836). Several key instruments remain in the Museum's collections today, such as Halley's transit telescope and the mural quadrant by George Graham, along with one of the clockmaker's regulators used in the 1720s. Like Baily, Rigaud was keen to reinstate Halley's significance and defended the lacklustre results of the astronomer's twilight years, commenting that 'it is only wonderful that he could still apply himself to any active employment.'

James Bradley (1692-1762)

Third Astronomer Royal, 1742-1762

Famous for his discovery of the aberration of starlight (1727) and the Earth's nutation (1748), Bradley continued to be appreciated as a highly skilled and competent observer long after his death in 1762. Over sixty years later, the Society published its Catalogue of 2,881 stars (referenced in the awarding of the Gold Medal to Francis Baily), which was assembled from previous catalogues made by Bradley and other notable figures such as Flamsteed, Lacaille, Mayer, Piazzi and Zach. In his 1827 paper (Baily, F., 1827), Baily described how he was struck by the different values for the right ascension of γ Cassiopeiae between the *Catalogue* and the positions of 100 stars given by Bradley's successor John Pond in the *Nautical Almanac* for 1829. The historian subsequently reassessed the observations and reductions of γ Cassiopeiae made by Bradley, Pond and Piazzi, to try to identify the source of the discrepancy but was unable to make a firm conclusion. A few years later, Pond himself also reassessed Bradley's work to calculate a revised latitude of Greenwich in 1831 (Pond, J., 1831).

Nathaniel Bliss (1700-1764)

Fourth Astronomer Royal, 1762-1764

Following in the footsteps of his Oxford colleagues Halley and Bradley, Bliss was appointed as Savilian Professor of Geometry in February 1742. He continued to correspond with Bradley for the next 20 years and sometimes travelled to Greenwich to observe, especially as Bradley's health began to deteriorate around 1760. Bliss also gained practical observing experience thanks to the excellent library and instruments assembled by George Parker, second Earl of Macclesfield, at Shirburn Castle Observatory, just south of Oxford. Bradley died in July 1762 and within a month, Bliss was appointed as his successor. But his own tenure was short-lived as he died suddenly just two years later, leaving his work and observations to languish in obscurity until they were included as an appendix to Bradley's *Astronomical Observations*, published by Thomas Hornsby in 1805.

We can find no direct mention of Bliss in the RAS Journals, apart from a brief mention in 2000 (Bowler, S., 2000) when the IAU decided to name a lunar crater in his honour, having realised that Bliss was the only Astronomer Royal with no named feature.

Nevil Maskelyne (1732-1811)

Fifth Astronomer Royal, 1765-1811

Famous for his involvement with the Board of Longitude and the story of John Harrison's marine timekeepers, Maskelyne is one of the better-known Astronomers Royal who has been portrayed several times on screen and stage. RAS articles by Philip Laurie (Laurie, P. S., 1966) and Paul Edwards (Edwards, P., 2015) provide a comprehensive summary of Maskelyne's career and achievements including his creation of the *Nautical Almanac*, his reform of Observatory practices and publications, and his pioneering experiment on the Scottish mountain of Schiehallion in 1774. By observing the deflection of a plumb bob on a zenith sector when measuring star positions from either side of the mountain, Maskelyne was able to deduce the density of the Earth (Davies, R. D., 1985), for which he was awarded the Royal Society's Copley Medal, preserved today at Greenwich. By the 1790s, he was also involved with the ordering and testing of highly accurate pendulum clocks (regulators) for the newly-formed Armagh Observatory, as explained by John Butler (Butler, J., 2016).

John Pond (1767-1836)

Sixth Astronomer Royal, 1811-1835

With no known portrait and few surviving personal effects, Pond is one of the Observatory's most elusive and mysterious figures. Our most tangible contact with his work is the 6-foot mural circle made by Troughton in 1810, which remains on display today. The instrument had been commissioned by his predecessor Maskelyne who sadly died before its completion. The Circle was eventually installed in 1812 and was later accompanied by a second version made by Thomas Jones in 1824. Pond became an accomplished mural circle observer and continued to write about the instrument during his remaining tenure, including this paper from 1830 (Pond, J., 1830).

The Mural Circle. Image courtesy of the National Maritime Museum, Greenwich, London.

After two decades of service, Pond was in poor health and he reluctantly left the Observatory in the summer of 1835, the first Astronomer Royal to resign rather than die in post. At the same time, the British Association for the Advancement of Science asked the Irish astronomer Thomas Romney Robinson at Armagh Observatory to use Pond's work to reassess the value of the constant of lunar nutation, which varied between British and Continental astronomers. In his 1838 paper, Robinson compared the Greenwich values to those obtained at Seeburg and Dunsink Observatories (Robinson, T. R., 1838). By carefully considering the limiting factors of Pond's instrument and observations, Robinson arrived at a more satisfactory value of 9·23913". It was a useful result that validated Pond's legacy as a skilled practical observer.

George Biddell Airy (1801-1892)

Seventh Astronomer Royal, 1835-1881

RAS President 1835-1837, 1849-1851, 1853-1855, 1863-1864

Spanning 46 years, Airy's tenure at Greenwich was characterised by a growing hierarchy of assistants and human 'computers', innovative telescopes, and the adoption of new technologies such as photography and spectroscopy. Airy's 18-page obituary in the *MNRAS*, written by Chief Assistant Herbert Hall Turner, is a testament to the breadth of Airy's interests and achievements both at Greenwich and within the wider scientific community (Turner, H. H., 1892). With a keen sense of order, Airy instigated the systematic reduction and publication of historic observational data, along with the compilation of the Observatory's *Annual Report*. More broadly, Airy also became a *de facto* government scientist who was called upon to advise on matters such as creating national standards for weights and measures and investigating the effect of iron-clad ships on magnetic compasses. As Turner comments, Airy also directed his attention to wider scientific endeavours such as organising underground pendulum experiments at Harton Colliery in the 1850s and coordinating expeditions to witness the Transits of Venus in 1874 and 1882.

But all these activities came at a price, namely Airy's own research interests. In the 1870s he returned to his work on theories of the Moon's complex and erratic orbit, a task that had befuddled mathematicians and astronomers for generations. In his 1874 paper, Airy traced the history of lunar theory from Newton's *Principia* (1687) to the mathematical contributions of Clairaut, Laplace, Damoiseau and Delaunay, commenting that 'the mental labour in these operations is fearfully great' (Airy, G. B., 1874). Now in his seventies, Airy recognised the enormity of the intellectual task ahead of him, stating, 'It is sufficiently possible that I may not be able to complete it, but I desire to leave it in such a state that a successor may be able to take it up successfully'. He published his final version in 1886 but was dissatisfied with the result, leaving us with a rather sad ending for such a distinguished and productive scientist.

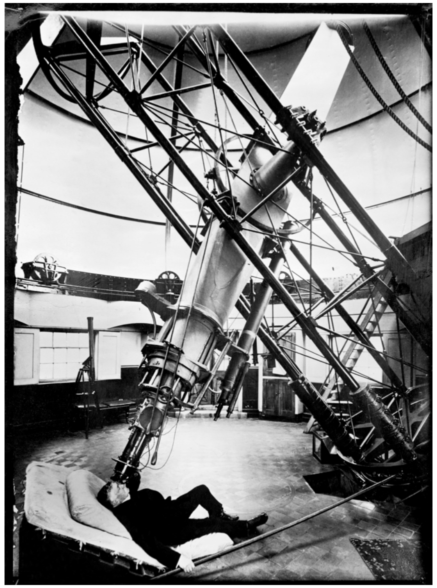
Box containing the British Standard Yard No. 5 and British Standard Pound No. 3. Image courtesy of the National Maritime Museum, Greenwich, London.

William Christie (1845-1922)

Eighth Astronomer Royal, 1881-1910

RAS President 1888-1890

Christie initially joined the Observatory as Chief Assistant in 1870 at just 24 years old. He was interested in new technologies such as photography and spectroscopy and this would become a defining feature of his own tenure as Astronomer Royal. By April 1887, Christie was one of around 20 observatory directors who assembled in Paris to instigate an ambitious global endeavour known as the International Astrographic Catalogue (Jones, D., 2000). Each institution was required to purchase a 13-inch astrographic refractor and to systematically photograph an assigned portion of the sky. The goal was to produce two publications: i) a catalogue of star positions down to 11th magnitude and ii) a photographic atlas ('Carte du Ciel') of the celestial sphere down to 14th magnitude. At first glance, Christie's paper, *On the Relation between Diameter of Image, Duration of Exposure, and Brightness of Objects in Photographs of Stars taken at the Royal Observatory, Greenwich* (Christie, W. H. M., 1892), provides us with an insight into the meticulous process of measuring the star positions using a special machine known as the plate micrometer (Christie, W. H. M., 1893). But if we look more closely, we can also see the names of some of the 'lady computers' who were employed as additional staff members to progress this labour-intensive project, the first women to be employed as professional astronomers at Greenwich.



The 28 inch reflector with Frank Dyson at the eyepiece. Image courtesy of the National Maritime Museum, Greenwich, London.

Another legacy from Christie's tenure was the installation of the Great Equatorial Telescope by Grubb in 1893. Originally intended for astrophotography, the telescope's unwieldy 28-inch (71 cm) diameter lens made it difficult to use and it was quickly usurped by the installation of the Thompson Equatorial Telescopes in 1896. Christie decided to reassign the Great Equatorial Telescope to the measurement of the separation and orbital period of double stars. In the summer of 1900, a team of six assistants diligently recorded the rapid binary star Capella, sometimes making their observations during the daytime to minimise glare from the star's brightness, as explained in this paper (Christie, W. H. M., 1900).

Frank Dyson (1868-1939)

Ninth Astronomer Royal, 1910-1933

RAS President 1911-1913

Dyson was recruited by Christie as Chief Assistant in 1894 and in this paper (Christie, W. H. M., and Dyson, F. W., 1896) we see Dyson taking over the reins in leading Greenwich's contribution to the International Astrographic Catalogue. Originally scheduled to last just a few years, the Catalogue dominated Dyson's work for the next decade and even continued during his time as Astronomer Royal for Scotland at the Royal Observatory Edinburgh, followed by his return to Greenwich as Astronomer Royal in 1910. Over a century later, some of the photographic plates captured by Greenwich astronomers in 1893 have recently been scanned as part of the NAROO programme and will be used for astrometric comparison with GAIA data.

Having sustained the Observatory during the challenging conditions of the First World War, Dyson directed his energies towards a range of topics, perhaps most famously spearheading the 1919 eclipse expeditions to Principe and Sobral that proved Einstein's Theory of General Relativity. As Chair of the Joint Permanent Eclipse Committee (JPEC), Dyson was able to draw upon the decades-long experience of both the Royal Society and RAS in organising expeditions.

In the following decade he kept the Observatory at the forefront of horological technology with the installation of the Shortt free pendulum system whose accuracy enabled astronomers to confirm their long-held suspicions about irregularities in the Earth's rotation. He also upgraded the Observatory's role in time dissemination with the commencement of the BBC six pips time signal in 1924, followed by long-wave radio time signals via the Rugby transmitter from December 1927.

Two years later, Dyson directed his attention towards the accurate plotting of planetary orbits, as shown by his 1929 paper (Dyson, F. W., and Cullen, R. T., 1929). Written in conjunction with R. T. Cullen, an experienced meridian observer with the Airy Transit Circle, Dyson highlighted the 'peculiar variations from year to year' and tabulated the variations between observed and calculated positions. This work later informed the development of Ephemeris Time by Dyson's successor in 1939.

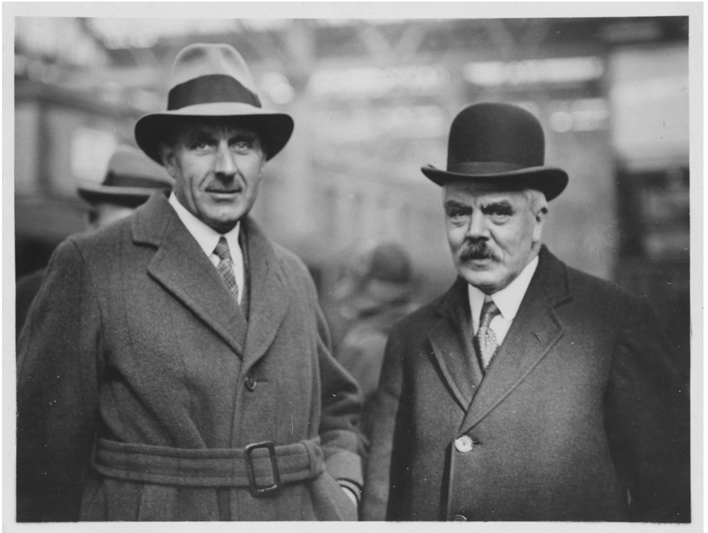
Harold Spencer Jones (1890-1960)

Tenth Astronomer Royal, 1933-1955

RAS President 1937-1939

Similar to Dyson, Spencer Jones began his career at Greenwich before taking leadership of one of the other Royal Observatories and then returning to London as Astronomer Royal. Written while he was HM Astronomer at the Royal Observatory at the Cape, this paper on *Discussion of the Greenwich Observations of the Sun, 1836-1923* (Spencer Jones, H., 1926) is ostensibly about making corrections between the predicted and observed positions of the Sun. But Spencer Jones' references to numerous other catalogues and mathematical techniques used by observatories elsewhere is indicative of the inter-war period and the emergence of the International Astronomical Union (IAU) that signalled a new era of global, collaborative astronomy.

By contrast, the second paper, *The Tidal Effect on the Variation of Latitude at Greenwich* (Spencer Jones, H., 1939) is much more parochial with a discussion on the effect of the twice daily tides at Greenwich on measurements of the site's latitude. Using long-term data collected from 1911 to 1936 with the Cookson Floating Zenith Telescope (now held within the collections of the Science Museum, London), Spencer Jones concluded that 'The difference between the observed and theoretical values is not of great significance'.



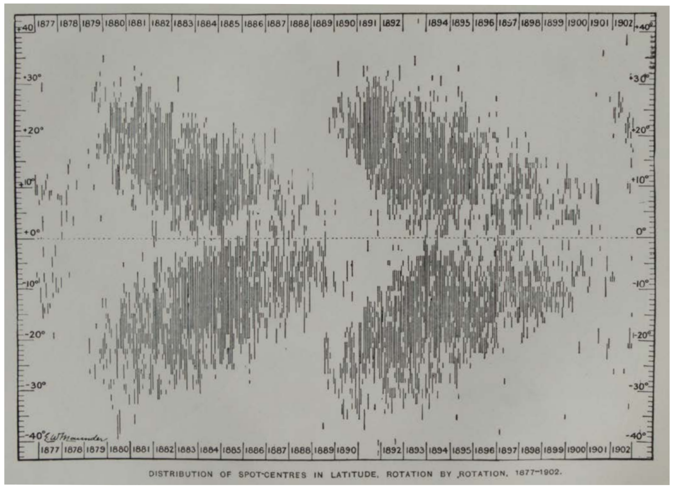
Left to right: Harold Spencer Jones and Frank Dyson.
Image courtesy of the National Maritime Museum, Greenwich, London.

Topic 1 - The Sun

Daily observations of the Sun commenced at Greenwich in June 1873 in preparation for the forthcoming Transit of Venus expeditions planned for the following year. Astronomer Royal Airy ordered five photoheliographs – telescopes designed for photographing the Sun - and his new assistant E. Walter Maunder began the daily capture of solar images. In the wake of the transit expeditions, the photoheliographs were dispersed among colonial observatories located in Mauritius, India and South Africa. Copies of the photographs taken in these sunny locations were sent to Greenwich to fill in the gaps caused by cloudy weather.

By 1904, Maunder had accumulated several decades of data and could identify a number of trends. For example, his paper of January 1904 describes the correlation between periods of magnetic disturbance, as recorded by instruments in the Magnet House, and the appearance of large sunspot groups on the solar meridian (Maunder, E. W., 1904a). A year later, he published another paper on the use of sunspots to measure solar rotation, co-authored with his wife Annie (née Scott Dill Russell) (Maunder, E. W. and Maunder, A. S. D., 1905). Annie had originally been recruited as one of Christie's 'lady computers' in September 1891 but was later transferred to the Heliographic Department and worked alongside Maunder. When the couple decided to marry in 1895, Annie was required to resign, as per the social and working conventions of the time. Undeterred, she continued to contribute as an amateur astronomer on cataloguing sunspots and making innovative photographs of total solar eclipses. She also worked with Walter on plotting the famous 'Butterfly diagram' that illustrated the progressive appearance of sunspots at different solar latitudes over an 11-year cycle (Maunder, E. W., 1904b).

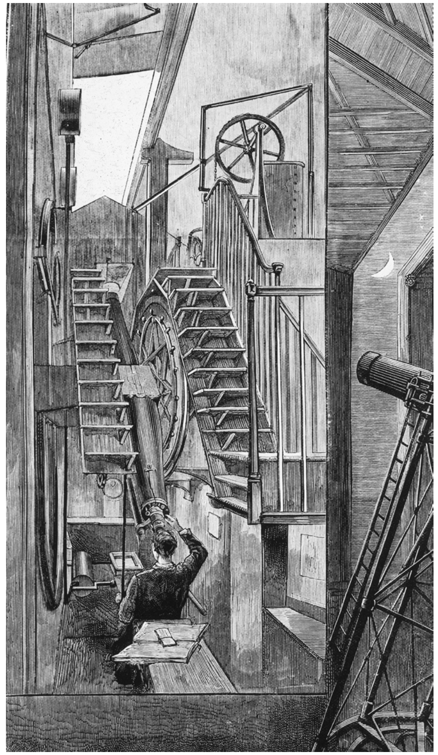
After forty years' service, Walter retired in November 1913 but subsequently returned to sustain the Observatory's daily solar record during the First World War, when many of the Assistants signed up for military service. Annie joined him as a Volunteer and continued to observe until 1921.



The Butterfly Diagram, as reproduced in The Heavens and Their Story (London: Robert Culley, [1908]) by A. S. D. Maunder and E. W. Maunder.

Topic 2 - Instrumentation

Designed by the seventh Astronomer Royal himself, the Airy Transit Circle (ATC) served as the principal instrument of the Observatory for over 70 years and was used to make over 650,000 observations. In October 1884, it was selected by international delegates as the defining instrument of the Prime Meridian of the World — 0° longitude — and the origin of the Universal Day. Only the most experienced and trusted assistants were permitted to use it and their observations underpinned the determination of Greenwich Mean Time (GMT) and the essential parameters of the Sun and Moon, as exemplified by William Garrett Thackeray's paper from 1893 (Thackeray, W. G., 1893).



The Airy Transit Circle being used to observe the Sun. Image courtesy of the National Maritime Museum, Greenwich, London.

But by 1930, it was coming to the end of its useful life, especially as the dry summers of the 1920s had caused the stone piers to settle at different heights. The new Reversible Transit Circle (RTC) made by Cooke, Troughton and Simms was based on a similar design installed at the Cape Observatory and came into use in 1936, with the preliminary results summarised by Spencer Jones in 1944 (Spencer Jones, H., and Cullen, R. T., 1944). Unlike its predecessor, the RTC could be used in four different configurations, offering greater accuracy through averaged results. Another difference was the lack of interference from surrounding buildings: while the ATC was situated within the working heart of the Observatory, the RTC was installed in a copper-clad pavilion situated in the Christie Enclosure, about 320 metres away in the park. Its closest neighbour was the Yapp 36-inch Reflector Telescope, a gift from the cigarette manufacturer William Johnstone Yapp in honour of Dyson's retirement. The Yapp Telescope was fitted with a slitless spectrograph to continue the spectroscopic colour observations that had commenced in 1925, but with worsening atmospheric conditions, the telescope's useful life was limited (Greaves, W. M. H., et al, 1934). A few years later it was mothballed during the Second World War and was subsequently transferred to Herstmonceux where it can be seen today.

Topic 3 - Longitude

The Observatory's founding story and its crucial involvement with the quest to measure longitude at sea is well known. While most accounts conclude with the successful trials of John Harrison's fourth marine timekeeper, 'H4' in the early 1760s, this paper by clockmaker Edward Dent in 1838 reminds us that Harrison's achievement was only the beginning of a much longer scientific endeavour to accurately measure longitudes between observatories (Dent, E. J., 1838). In the decades after Harrison's triumph, clockmakers across Europe developed his ideas into a more affordable design known as the marine chronometer that became an essential navigational aid for the next 150 years. With its accurate clocks regulated by observations of the Sun and stars, the Royal Observatory was the obvious location for the testing of British chronometers in preparation for use on Admiralty ships.

The clock face from an eight-day astronomical regulator signed 'E. Dent & Co 61, Strand London 2009'. Image courtesy of the National Maritime Museum, Greenwich, London.

Despite his antagonism towards the time-consuming and labour-intensive process of rating chronometers at the Observatory, seventh Astronomer Royal Airy also recognised their prospective scientific value. By exchanging chronometers and comparing similar observations made at Greenwich and Paris observatories, he hoped to measure their respective meridians more accurately. As Dent describes, twelve chronometers were despatched by stagecoach and boat to Paris, safely cradled in wooden boxes packed with horsehair. The results were a success and were repeated every few decades, initially with the physical transfer of chronometers but later adapted for the exchange of time signals by telegraph networks and radio transmissions.

Topic 4 - Time

Measuring time by the Sun and stars was a fundamental part of the Observatory's purpose from its foundation in 1675 and it remained at the forefront of horological innovation throughout its working life. These three papers reflect the revolutionary changes that occurred during the first few decades of the twentieth century. The first paper is by William Bowyer, Head of the Time Department from 1917 to 1936, in which he outlines the Observatory's use of radio time signals broadcast from locations such as Paris (Eiffel Tower) and Annapolis (US Naval Academy) (Bowyer, W., 1920). A lengthy wire aerial was suspended across the site from the New Physical Observatory to Flamsteed House and the signals were referenced against local mean solar time for the comparison of longitudes.

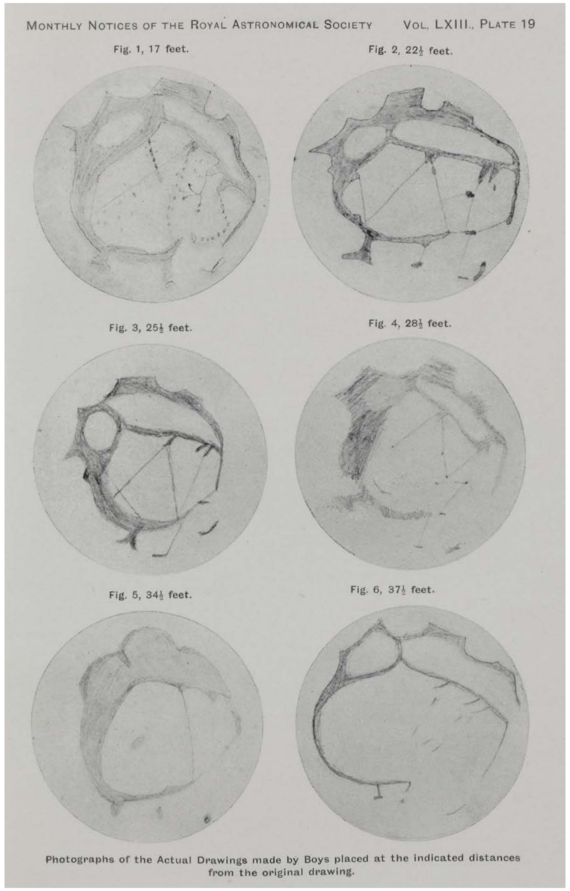
The second paper by Jackson and Bowyer chronicles the installation and successful trials of the new Shortt free pendulum system in the 1920s, an innovative design that was exceptionally accurate and allowed astronomers to measure their long-held suspicions about variations in the Earth's rate of rotation, previously assumed to be constant (Jackson, J., and Bowyer, B., 1928). It was the culmination of accurate pendulum technology and the beginning of the transition away from relying on the Earth's rotation as our timekeeping standard. The third paper, written by Humphrey Smith in 1952, continues the technological transition from observatories to laboratories in a useful summary of the Observatory's adoption of quartz timekeepers from 1939, made in conjunction with the National Physical Laboratory and the Post Office (Smith, H. M., 1953).

Shortt free-pendulum clocks. Image courtesy of the National Maritime Museum, Greenwich, London.

Topic 5 – Planets

Planetary observations at Greenwich were relatively patchy during the first two centuries as they were not regarded as part of the Observatory's fundamental work on timekeeping and navigation, apart from predicting the eclipses of Jupiter's moons for longitude and providing data on planetary orbits. When the eighth planet Neptune was discovered by French and German astronomers in 1846, the Astronomer Royal was one of several eminent scientists blamed for this British oversight.

Half a century later, however, two announcements in the *MNRAS* put Greenwich back in the spotlight of planetary studies. The first was E. Walter Maunder's pioneering experiment in 1903 to disprove the idea of 'canals' on Mars by using local teenage boys to sketch a drawing of Mars as seen from increasing distances within a school hall (Evans, J. E. and Maunder, E. W., 1903) (illustrated left). Maunder used this innovative approach to persuade his peers that the linear features were 'purely subjective' and the result of visual perception.



The sketches drawn by local teenage boys from the 1903 paper. This image courtesy of the National Maritime Museum, Greenwich, London, reproduced from MNRAS.

The second paper of note is the announcement of the discovery of the eighth moon of Jupiter by Charles Davidson and Philibert Melotte using the 30-inch Thompson Photographic Reflector in 1908 (Christie, W. H. M., 1908). Later named 'Pasiphae', this moon is believed to be a fragment of a captured asteroid.

References

Airy, G. B., 1874, *On a proposed New Method of Treating the Lunar Theory*, MNRAS, Vol 34 Issue 3 pp 89-98
https://academic.oup.com/mnras/article/34/3/89/1034609

Baily, F., 1827, *On the right ascension of γ Cassiopeæ*, MNRAS, Vol 1 Issue 6 pp 37-40
https://academic.oup.com/mnras/article/1/6/37/954115

Baily, F., 1833, *Some particulars relative to the Life and Writings of the late Mr. Flamsteed, never yet published,* MNRAS, Vol 3 Issue 1 pp 4-10
https://academic.oup.com/mnras/article/3/1/4/1106058

Baily, F., 1834, *Some account of the astronomical observations made by Dr. Edmund Halley, at the Royal Observatory at Greenwich,* MNRAS, Vol 3 Issue 9 pp 63-65
https://academic.oup.com/mnras/article/3/9/63/1005145

Baily, F., 1835, *An account of the Revd. John Flamsteed, the first Astronomer-Royal: compiled from his own manuscripts, and other authentic documents, never before published. To which is added his British catalogue of stars, corrected and enlarged*, London
https://catalog.hathitrust.org/Record/011592762

Baily, F., 1837, *On the non-existence of the star 42 Virginis*, MNRAS, Vol 4 Issue 8 pp 85-37
https://academic.oup.com/mnras/article/4/8/85/964581

Bowler, S., 2000, *Famous and tempestuous names*, A&G, Vol 41 Issue 5 p 5.5
https://academic.oup.com/astrogeo/article/41/5/5.5/213038

Bowyer, W., 1920, *Reception of W/T Time Signals at the Royal Observatory, Greenwich*, MNRAS, Vol 80 Issue 7 pp 648-656
https://academic.oup.com/mnras/article/80/7/648/1023129

Butler, J., 2016, *Armagh Observatory's meridian marks*, A&G, Vol 57 Issue 2 pp 2.27-2.31
https://academic.oup.com/astrogeo/article/57/2/2.27/2468648

Christie, W. H. M., 1892, *On the Relation Between Diameter of Image, Duration of Exposure, and Brightness of Objects in Photographs of Stars Taken at the Royal Observatory, Greenwich*, MNRAS, Vol 52 Issue 3 pp 125-146
https://academic.oup.com/mnras/article/52/3/125/979129

Christie, W. H. M., 1893, *A Micrometer for measuring the Plates of the Astrophotographic Chart*, MNRAS, Vol 53 Issue 5 pp 326-329
https://academic.oup.com/mnras/article/53/5/326/1004403

Christie, W. H. M., and Dyson, F. W., 1896, *On the Determination of Positions of Stars for the Astrographic Catalogue at the Royal Observatory, Greenwich*, MNRAS, Vol 56 Issue 3 pp 114-135
https://academic.oup.com/mnras/article/56/3/114/1067283

Christie, W. H. M., 1900, *Observations of Capella as a Double Star made at the Royal Observatory, Greenwich*, MNRAS, Vol 60 Issue 9 pp 595-597
https://academic.oup.com/mnras/article/60/9/595/1034952

Christie, W. H. M., 1908, *Note on the newly discovered Eighth Satellite of Jupiter, photographed at the Royal Observatory, Greenwich*, MNRAS, Vol 68 Issue 6 pp 456-457
https://academic.oup.com/mnras/article/68/6/456/1102636

Davies, R. D., 1985, *A Commemoration of Maskelyne at Schiehallion*, QJRAS, Vol 26 pp 289-294
https://articles.adsabs.harvard.edu/pdf/1985QJRAS..26..289D

Dent, E. J., 1838, *On the difference of Longitude between the Greenwich and Paris Observatories*, MNRAS, Vol 4 Issue 11 pp 101-102
https://academic.oup.com/mnras/article/4/11/101/994936

Dolan, G., 2025, *The Herstmonceux years ...1948–1990*, The Royal Observatory Greenwich
https://www.royalobservatorygreenwich.org/articles.php?article=5

Dyson, F. W., and Cullen, R. T., 1929, *Greenwich Observations of the Sun and the Four Outer Planets from 1901–1928*, MNRAS, Vol 89 Issue 3 pp 256-264
https://academic.oup.com/mnras/article/89/3/256/980414

Edwards, P., 2015, *Innovation and intrigue: Nevil Maskelyne's rise*, A&G, Vol 56 Issue 6 p 6.33-6.36
https://academic.oup.com/astrogeo/article/56/6/6.33/241325

Evans, J. E. and Maunder, E. W., 1903, *Experiments as to the Actuality of the "Canals" observed on Mars*, MNRAS, Vol 63 Issue 8 pp 488-499
https://academic.oup.com/mnras/article/63/8/488/1009049

Greaves, W. M. H., Davidson, C., Martin, E., Spencer Jones, H., 1934, *The Zero Point of the Greenwich Colour Temperature System*, MNRAS, Vol 94 Issue 6 pp 488-507
https://academic.oup.com/mnras/article/94/6/488/1066631

Jackson, J., and Bowyer, B., 1928, *The Shortt Clocks at the Royal Observatory, Greenwich*, MNRAS, Vol 88 Issue 5 pp 465-481
https://academic.oup.com/mnras/article/88/5/465/1023108

Jones, D., 2000, *The scientific value of the Carte du Ciel*, A&G, Vol 41 Issue 5, pp 5.16-5.20
https://academic.oup.com/astrogeo/article/41/5/5.16/212569

Laurie, P. S., 1966, *The Board of Visitors of the Royal Observatory-I: 1710-1830*, QJRAS, Vol 7 p 169
https://ui.adsabs.harvard.edu/abs/1966QJRAS...7..169L/abstract

Maunder, E. W., 1904a, *The "Great" Magnetic Storms, 1875 to 1903, and their association with Sun-spots, as recorded at the Royal Observatory, Greenwich*, MNRAS, Vol 64 Issue 3 pp 205-222
https://academic.oup.com/mnras/article/64/3/205/1025669

Maunder, E. W., 1904b, *Note on the Distribution of Sun-spots in Heliographic Latitude, 1874 to 1902*, MNRAS, Vol 64 Issue 8 pp 747-761
https://academic.oup.com/mnras/article/64/8/747/1074013

Maunder, E. W. and Maunder, A. S. D., 1905, *The Solar Rotation Period from Greenwich Sun-spot Measures, 1879–1901*, MNRAS, Vol 65 Issue 8 pp 813-825
https://academic.oup.com/mnras/article/65/8/813/1079020

Pond, J., 1830, *On a Method of determining the Declinations of Stars with one Mural Circle*, MNRAS, Vol 1 Issue 31 pp 195-200
https://academic.oup.com/mnras/article/1/31/195/980401

Pond, J., 1831, *A communication from the Astronomer Royal, containing the results of all the observations, which have been made at the Royal Observatory at Greenwich, of the sun's zenith distance, at or near the solstices, from the time of Bradley to the present time*, MNRAS, Vol 2 Issue 4 pp 29-30
https://academic.oup.com/mnras/article/2/4/29/1331857

Rigaud, S., 1836, *Some particulars respecting the principal instruments at Greenwich in the time of Dr. Halley,* MNRAS, Vol 3 Issue 23 pp 193-194
https://academic.oup.com/mnras/article/3/23/193/991235

Robinson, T. R., 1838, *On the Constant of Lunar Nutation, as given by the Circle Observations of Mr. Pond, from 1812 to 1835*, MNRAS, Vol 4 Issue 15 pp 133-139
https://academic.oup.com/mnras/article/4/15/133/1025142

Smith, H. M., 1953, *Quartz Clocks of the Greenwich Time Service*, MNRAS, Vol 113 Issue 1 pp 67-80
https://academic.oup.com/mnras/article/113/1/67/2602009

Spencer Jones, H., 1926, *Discussion of the Greenwich Observations of the Sun, 1836–1923*, MNRAS, Vol 86 Issue 6 pp 426-439
https://academic.oup.com/mnras/article/86/6/426/1036175

Spencer Jones, H., 1939, *The Tidal Effect on the Variation of Latitude at Greenwich*, MNRAS, Vol 99 Issue 3 pp 196-198
https://academic.oup.com/mnras/article/99/3/196/1059922

Spencer Jones, H., and Cullen, R. T., 1944, *Preliminary Results of Tests of and Observations with the Reversible Transit Circle of the Royal Observatory, Greenwich*, MNRAS, Vol 104 Issue 3 pp 146-162
https://academic.oup.com/mnras/article/104/3/146/2603301

Thackeray, W. G., 1893, *Latitude Variation and Greenwich Observations, 1851–91*, MNRAS, Vol 53 Issue 3 pp 120-123
https://academic.oup.com/mnras/article/53/3/120/1051972

Turner, H. H., 1892, *George Biddell Airy*, MNRAS, Vol 52 Issue 4 pp 212-229
https://academic.oup.com/mnras/article/52/4/212/1074828

About the Author

Dr Louise Devoy
Senior Curator: Royal Observatory Greenwich

Louise has a background in astrophysics and the history of science and has worked at various museums in the UK and abroad. She has contributed to exhibitions such as *Cosmos and Culture* (Science Museum, 2009), *Observatory Life* (Royal Observatory Greenwich, 2016) and *The Moon* (National Maritime Museum, 2019). Her research interests encompass astronomical instruments, women in astronomy and networks of knowledge exchange between historical observatories.

Over the past five years Louise has delved into the archives and museum stores to choose 100 objects and their stories for her book *Royal Observatory Greenwich: A History in Objects*, published to celebrate the observatory's 350th anniversary in 2025.

Find the papers featured in this booklet here:
https://academic.oup.com/mnras/pages/royal-observatory-greenwich