

Reviews

Yerkes Observatory, 1892-1950, The Birth, Near Death, and Resurrection of a Scientific Research Institution, by Donald E Osterbrock (University of Chicago Press, Chicago, 1997), 394 pp., ISBN: 0-226-63945-2, US \$40; UK £31.95, hardback, 235 × 160 mm.

This is a story of the people and events surrounding one of the most important observatories for optical astronomy in the USA. It is a story of the people, the decisions and the events leading to the creation of Yerkes Observatory and subsequently to the plethora of discoveries coming out of the Observatory.

From the first steps in the creation of the Observatory in 1892 as "... America's second big-science establishment", through its years of decline between 1904 – 1932, to the "... golden years" of the Observatory in the 1930's and 1940's – this is the story of many of the people who have shaped modern astrophysics.

One could say that Yerkes Observatory was created and supported through those critical years when astronomers increasingly moved away from position astronomy as their chief occupation into the emerging and far more scientifically fruitful work of astrophysics. Today's astronomers and astrophysicists were trained in developing many of the scientific ideas that came out of Yerkes Observatory.

This is an interesting and well-researched book which looks in detail at the interactions of the people involved in the Observatory and its discoveries. The book is very easy to read and the style of writing flows smoothly throughout the story to the end page.

It is a book for those interested in the history of astronomy or on the developmental stages of astrophysics. Astronomers and others interested in the way the politics of science works will also find this a fascinating book. It is not a book that investigates in detail the ideas behind the physics or science that evolved in the period under discussion. It is also not a book that would engender excitement in a student of the science of astronomy in their formative years.

With my own background in astrophysics, and from 30 years as a practising astronomer, I found the book absorbing, so I completed the book in a single reading; others may likewise be unable to put the book down.

If you are interested in the history-and-philosophy-of-science aspects of astronomical discovery then this is a book for you.

From the inception of the observatory through private funding from Charles T Yerkes to the struggles that three of the directors of the Observatory had in obtaining continuing funding from the University of Chicago, other private benefactors, and/or foundations supporting science – this is the story of the interactions between many famous 'names' in physics, astronomy, and astrophysics of the nineteenth and twentieth century. From George Ellery Hale who built Yerkes Observatory, through Edwin B Frost who let it run down, to Otto Struve who revived it again ... all played critical parts in the life of Yerkes Observatory and this, as much as anything else, is their story.

It is also the story of the events over which they presided: the start of one of the most important journals to modern astrophysics – the *Astrophysical Journal*; the founding of the American Astronomical Society (the AAS); the important involvement of the Carnegie Institution in funding processes during the early years of astrophysics; and the building of the Mount Wilson Observatory – all under the leadership of George Hale. Then followed the 'wilderness' years when lack of dynamic leadership led to a serious decline in the status and work of the Yerkes Observatory. However, with the arrival of Otto Struve the quality of leadership revived and again Yerkes Observatory became a centre to be admired, with many enthusiastic and highly-intelligent, young astrophysicists working within its walls.

No less important in this history are the programmes for training the new generation of astronomers at Yerkes – the students who went on to other positions and made an enormous

impact on the field of astrophysics. Even graduates out of the less-dynamic Frost-years made very important contributions to astrophysics. Names like Edwin Hubble, Otto Struve, Nicholas T Bobrovnikoff, William W Morgan, Philip C Keenan, and Christian T Elvey feature.

But perhaps Otto Struve's most important decision was to bring in three brilliant young researchers from overseas: Gerard P Kuiper from the Netherlands, Bengt Stromgren from Denmark and Subrahmanyan Chandrasekhar from India, and to appoint as post-doctoral fellows Jesse L Greenstein and Bart J Bok. Many of these younger appointees were to go on to become directors including Bart Bok at the Mount Stromlo and Siding Spring Observatories in Australia.

Donald E Osterbrock, himself an astronomer with a high reputation, has woven this book with charm and some amount of 'dry' wit. He has not held back from detailing the mistakes and manipulations undertaken by the Yerkes directors to get their own way in running the Observatory. I was left though, at the end of the book, with the feeling that some of the characters of the book had not come 'alive' for me. Perhaps Donald Osterbrock, in being meticulous with the details of the history of Yerkes Observatory, tends to overcome the reader with the sheer volume of facts. The reader is left with a feeling that the people, as astronomers fascinated in their science, are somewhat put to one side in the telling of the history.

I recommend the book as an important tribute to the work of the Yerkes Observatory and suggest it to the student of the history of the early years of astrophysics.

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Instrument Makers to the World. A History of Cooke, Troughton & Simms, by A. McConnell (William Sessions, York, 1992), xii + 116 pp., ISBN 1-85072-096-7, paperback, 210 × 200 mm.

In recent years, those of us interested in historic telescopes have been particularly fortunate with the appearance (or in one case, re-appearance) of books about Alvan Clark and Sons, Thomas and Howard Grubb, Simms and Cooke instruments. My own institution, Carter Observatory in New Zealand, is home to the ex-Crossley 23-cm Cooke refractor of 1860s vintage (see Orchiston 1996), so McConnell's book about Cooke, Troughton, and Simms was of special interest.

Dr Anita McConnell is well known for her work on historic scientific instruments, and has done a thorough job in taking us through the involved evolution of the company, from its early days under John Troughton to the Vickers Instrument Company of today. Along the way, the astronomical activities were sold off to Grubb, Parsons & Co. (in 1938), which subsequently closed. The five chapters on the Troughton and the Simms families provide a valuable exposé on their various astronomical activities before joining up with T Cooke & Sons Ltd. in 1922.

One of the things which quickly emerges in these early chapters is that Troughton and Simms were involved in manufacturing a wide range of astronomical instruments – and not just telescopes. Discussed are quadrants, transit circles, mural circles, transit telescopes, repeating circles, and even a small orrery. Also included are the surveying instruments which were widely used by professional astronomers during the nineteenth century for trigonometrical surveys. Amongst the many illustrations (on page 30) is one of my all-time favourites: the dismantled remains of Sir James South's 29.8-cm Troughton refractor scattered over the lawn outside his observatory in 1839.

The second half of the book deals with the Cookes. During the nineteenth century, Thomas Cooke and his sons Charles Frederick and Thomas (junior) were at the vanguard of telescope-making. From 1855, they exhibited regularly at exhibitions in England and abroad, and secured contracts from major amateur and professional observatories throughout the world (but mostly in the British Empire). In 1871 they completed a 63.5-cm refractor for the wealthy British amateur astronomer, R S Newall, and for two years this instrument was the largest refractor in the world. At around the same time, the 1874 and 1882 transits of Venus had a profound impact on their order-books.

In addition to their fine telescopes, Cooke also became known for their domes, including the famous Onion Dome at Greenwich. But their focus extended far beyond astronomy, and they too were particularly well-known for their surveying instruments. Towards the end of the nineteenth century 'optical munitions' became important.

Early in the 1880s, the firm acquired "A brilliant and inventive young man ... " named Dennis Taylor (1861-1943), who was to assemble some 50 patents for a variety of optical instruments. One of these was the photovisual objective, and the Carter Observatory telescope was furnished with an early example of this. In 1891, Taylor's book, *The Adjusting and Testing of Telescope Objectives*, was published, and this quickly became the standard work in this field. For many years, Taylor was a Cooke stalwart, and he made an important contribution to astronomical optics. McConnell tells us that he counted "... gardening, astronomy, photography and natural history among his hobbies ..." (page 71).

From these dizzy heights, it is remarkable to reflect on how quickly the fortunes of the company changed. In 1922 it was reconstituted as Cooke, Troughton & Simms, and despite their long and successful collective track records as manufacturers of astronomical equipment of all kinds, it took just two years before the new business was up for sale. They were bought out by Vickers, who after the depths of the Great Depression transferred the astronomical side of the business to Grubb, Parsons Ltd. in 1938. After precisely 100 years the Cooke telescope, a respected British institution, was no more.

For those of us with a love of old refractors, Cooke or otherwise, McConnell's book tells a tantalizing tale, and it will find a place in many a bookcase. I thoroughly recommend it.

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Vultus Uraniae, by Laura Peperoni and Marina Zuccoli (Biblioteca Universitaria di Bologna, 1996), 32 pp. paperback, A4.

Ex libris stellarum, edited by Remo Palmirani and Marina Zuccoli (Editrice Lo Scarabeo, Bologna, 1998), 38 pp., paperback, B5.

It is not very often that there is the offer of two charming little books just for the price of a letter requesting same from the University. *The Countenance of Urania* is written in both Italian and English in adjoining columns and was made available originally at the time of an exhibition of volumes from the library of the Department of Astronomy of the University of Bologna and the University Center for Museums and Archives.

The reader is given a brief introduction to the mythology of the Muse Urania and her sisters. This is followed by a description of some literary and astronomical works which mention Urania in their titles. The first illustration is not of the 'vultus Uraniae', but of Sextans Uraniae in Hevelius' *Star Atlas* of 1690; however, the frontispiece his earlier work *Selenographia* shows Urania between the Moon and the Sun seated upon an eagle. For this and most of the other engravings depicting Urania there are notes on the artists who did the engravings.

For those interested in books and particularly astronomical books, there is a wealth of information to be culled from this delightful little book. To whet your appetite, the frontispiece from La Caille's *Ephemerides des mouvemens célestes, pour dix années, depuis 1765 jusqu'en 1775, et pour le meridiem de la ville de Paris, 1763* is reproduced on the inside backcover; the engraving is signed by Simon Challe and François Antoine Aveline.

It is pleasing to see that the delightful practice of personalizing your books with your very own book-plate has not gone the way of many other traditions. I remember designing and printing one whilst a student which depicted the three branches of science in which I was

employed. The book-plates described and depicted in *Ex libris stellarum* are divided into seven categories, with illustrations in all sections; thirty-five of the sixty-five book-plates are illustrated.

Book-plates have been used since the end of the eighteenth century, and we are usually greeted with the heraldic shield or just the coat of arms for those found in old books. Later, they were designed to show the particular interest(s) of the proud owner of the book in which they had been placed. The categories into which *Ex libris stellarum* is divided are those which you would expect, especially by an older reader, except section six, L'esplorazione spaziale, here one of the two illustrated examples shows Jurij Gagarin, the other Neil Armstrong.

The time spanned is from 1864 to 1998 with the vast majority being from the last thirty years. Two are reproduced here with the owner's name clearly visible; however, if you wish to know who designed them, then read the booklet. As can be seen, Urania also appears in one of them.



Both these items are available from: Department of Astronomy, Attention M. Zuccoli, University of Bologna, via Zamboni 33, I-40126 Bologna, ITALY.

John Perdrix

Nautical astronomy in New Zealand, the voyages of James Cook, by Wayne Orchiston (Carter Observatory Board, Wellington, 1998), 131 pp., ISBN 0-473-05303-9, NZ\$29.95 + postage and packing, paperback, A4.

As stated in Patrick Moore's foreword, "... this monograph represents a very clear, informative and readable account of the New Zealand component of the Cook voyages ...", but it contains much more not indicated by the title with which I had difficulty towards the end of the volume. Although explained in the introduction, I failed to see what "... summarise international developments in research astronomy during the eighteenth and nineteenth centuries, and trace the evolution of New Zealand astronomy through to the end of the nineteenth century." has to do with the voyages of James Cook.

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Cook made three voyages to the Pacific and had the services of five astronomers, including himself, to carry out the tasks set out in the orders given to Cook on sailing. There were some fourteen others who helped with observations, amongst whom were the legendary William Bligh, and Joseph Gilbert and John Elliott after whom a group of Pacific Ocean islands is named. Orchiston paints a succinct pen picture of the astronomers of whom Cook and Green died during a voyage.

Following the short biographies of the observers, the author progresses to detail and list the astronomical instruments and equipment used during the three voyages to the Pacific with a number of excellent illustrations supplied by the National Maritime Museum, London. Although the observation of the transit of Venus was the prime reason for Cook's first voyage, the constant determining of latitude and longitude, either on board ship or on land were mundane observations for which Cook and his team were renown.

One innovation used on all of the voyages was the 'tent observatory' designed by Smeaton and constructed under the direction of Maskelyne and Cook. There is an illustration of one on page 59 taken from Wales and Bayly's 1777 publication *The Original Astronomical Observations, Made in the Course of a Voyage Towards the South Pole, and Round the World ...* So it was that "New Zealand gained its first genuine astronomical observatories in 1773 when tent observatories were erected at Dusky Sound and Queen Charlotte Sound".

In logical progression, the author deals with the observational data obtained on and around the coast of both New Zealand's main islands. As a bonus, Cook and Green observed the 1769 November 9 transit of Mercury from Mercury Bay (North Island), the first of three sites used by Cook for astronomical observations. The other two were at opposite ends of the South Island, Queen Charlotte Sound in the north and Dusky Sound at the south-west corner. Queen Charlotte Sound was the only site from which observations were made in each of the three voyages, and so there was a refining in the measurements of its latitude and longitude. The easier determined latitude varied by some twenty seconds over seven years with the mean of $41^{\circ} 05' 46''.77$ compared to the currently-accepted value of $41^{\circ} 05' 43''$ S. The observed longitude determinations varied by over half a degree and were all in excess of the modern value by six minutes or more.

Chapter 5 is concerned with Maori astronomy and New Zealand amateur and professional astronomers of the nineteenth century. This is very interesting, but nothing to do with the title of the book.

With his usual meticulous striving for detail, Orchiston list over two hundred references in the bibliography which will be most useful to those wishing to pursue certain aspects of this fascinating part of astronomical history in the Pacific Ocean region. The addition of an index would enhance the book; however, at its very modest price for a signed copy of an edition limited to 750 it is a good buy and is recommended.

John Perdrix

