

Rajesh Kochhar who have extensively documented the period in a systematic, objective and scholarly manner (e.g. see Kochhar, 1985a; 1985b; 1989; 1991a; 1991b; 1991c; 1993; 2002) finds no mention in the book. Similarly, the seminal research of British astronomers who worked to document Indian astronomical practices of the period (e.g. Kaye, 1998) also does not find an important place in the book.

In summary, the book would have been far more potent if it had discussed in detail issues such as the dramatic impact of the arrival of European astronomers in India, and the cultural conflict that followed the arrival of telescopes (a point that is mentioned more in passing). The language and content of the book are more focused on bringing out the contents of individual communications rather than the exciting impact of these developments on Indian science. The book therefore provides valuable insights into the exact dynamics of the evolution of telescopic astronomy in the subcontinent, but it does not document its impact in India, which was very significant. However, within the limited focus of documenting the debates and discussions in Britain about supporting astronomy in India the book does provide valuable research material.

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***Wolf Telescopes: A Collection of Historical Telescopes*, by Edward D. Wolf. (Trumansburg NY, printed for the author, 2016). Pp. 365. ISBN 978-0-9980037-1-9 (hard-back), 222 × 287 mm, US\$125 (plus shipping). Place orders through www.wolftelescopes.com.**

Historic astronomical telescopes can be found in long-established observatories, because that is where they were used, and in public museums. An example is the National Museum of Scotland in Edinburgh, which holds dozens of instruments with Scottish connections and earlier this year held an exhibition “Reflecting Telescopes” highlighting the work of James Gregory and James Short. But private individuals also collect telescopes, often in conjunction with other scientific instruments, or books. Charles Frank and his son Arthur in Glasgow come to mind, as do Robert B. Ariail in the United States and Peter Louwman in The Netherlands.

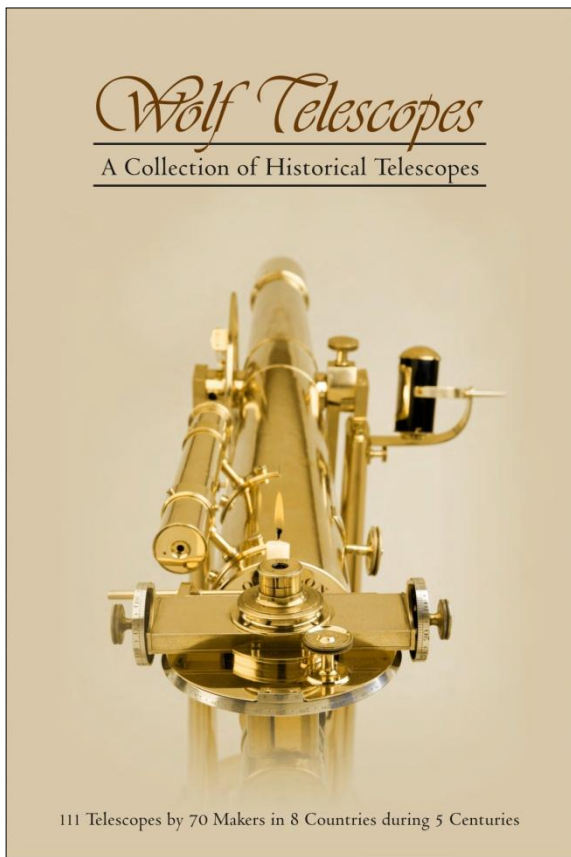
To this list must be added the name of Edward D. Wolf, Emeritus Professor at Cornell, who after a doctorate in physical chemistry followed a career in industry and academia. Since the beginning of the millennium, he has amassed a collection of 111 telescopes, or an average of a new one every six weeks. Most of them are astronomical, though some are terrestrial or marine, and there is a handful of binoculars and surveying instruments.

The principal feature of the collection is its rich variety. It boasts telescopes from many of the famous French, American, English and German makers, such as Adams, Bardou, Alvan Clark, Dollond, Grubb Parsons, Lemaire, Lerebours & Secretan and successors, Mailhat, Merz, Nairne, Negretti & Zambra, Passemant, Plössl, Ramsden, Short, Steinheil, Troughton & Simms, Utzschneider & Fraunhofer, and Zeiss. In total, some seventy makers from eight countries are represented, including instruments from five different centuries if you accept that one beautiful Japanese spyglass might just date from as early as 1690. Most, however, date from the eighteenth and nineteenth centuries.

In choosing telescopes, Wolf favoured those that retained their associated accessories, such as multiple eyepieces, filters, micrometers, dust caps, storage boxes, tripods, etc. This is valuable, because over time accessories have often been lost, or in the case of boxes, discarded. Many instruments are rare. As an example, I would cite Foucault-Secretan silvered-glass reflecting telescopes. Only a few hundred would appear to have been made, yet the Wolf collection includes three, and they were of great service in my recent study of these instruments (Tobin, 2016). As a practical matter, the coll-

ection is limited to portable instruments—there are no pedestal-mounted telescopes. Nor are there specialist instruments, such as transit telescopes.

The question of what to do with one's collection must haunt every collector. Is the collection permanent, or just a temporary grouping? The dice were rolled for the Frank Collection, which was dispersed at auction in 1986, thereby feeding, amongst others, the National Museum of Scotland, the Science Museum in London and, via intermediaries, the Wolf Collection. Ariail gave his collection to the South Carolina State Museum. Louwman's Collection is exhibited as part of his family's motor-car museum in a



suburb of The Hague. The good news for the Wolf Collection is that it will not be dispersed. It has just been sold to the Beijing Planetarium with the expectation that it will be exhibited at the fifteenth-century Beijing Ancient Observatory, which is now run as an affiliate museum of the Planetarium.

Dispersed or not, every collection is treasure for those interested in telescope history and heritage, and a catalogue is an essential adjunct. For the Frank Collection, the sale catalogue and an earlier exhibition catalogue are the primary resources (Nuttall, 1973; Sotheby's, 1986). The Ariail Collection can be accessed on-line (Ariail, 2016). Louwman has published a magnificently-illustrated compendium of some of

his telescopes (Louwman and Zuidervaart, 2013). And now Wolf follows suit with *Wolf Telescopes*, the even-more-magnificent catalogue of his 111 instruments.

Wolf Telescopes is a joint work between Wolf, his wife, daughter, a granddaughter, and a photographer, Gary L. Hodges. The catalogue does not claim to be a scholarly work. Indeed, no information is given as to how dates were ascribed to individual telescopes (privately, Wolf indicates he used Clifton (1995) extensively for telescopes of British origin). Provenance information is sparse, and there are a few confusions, such as 'Wentworth' with 'Whitworth' and 'Marc Secretan' with 'Auguste Secretan'. But these are minor. The great and unparalleled strength of the catalogue is its 1,500 crystal-clear photographs, which, as Wolf notes, were often technically challenging, requiring a large depth of field for objects composed of parts with very different reflectivities. The multiplicity of images means each instrument is thoroughly documented, and many are seen disassembled. This is invaluable for researchers who want to make detailed comparisons without travelling to China! For example, in *Wolf Telescopes* we can study the great variety of spring designs that different eighteenth-century makers used to support the speculum-metal primary mirrors of their Gregorian telescopes, and the different focus-adjustment mechanisms for the secondaries. The Collection contains two Secretan telescopes numbered 236, one a reflector and the other a refractor, which confirms the suspicion that the two types were numbered separately. And rather subtle differences, well-presented in the photographs, may permit the assignment of unsigned instruments to one maker or another, as I have shown with prism supports in Secretan and Bardou reflectors (Tobin, 2016).

The catalogue begins with a Foreword by Robert B. Ariail and other introductory and summary text. This is interspersed with full- or half-page photographs of some of the choicest items in the Wolf Collection, such as a very pretty shagreen-covered 1-inch reflector *c.*1750, a Dollond 12-foot (long) refractor *c.*1762 with rope-and-pole mount, the aforementioned 19th-century silvered-glass reflectors, a 92-mm Secretan refractor *c.*1915–1920, and an Alvan Clark 106-mm refractor dated 1867, which prior to sale to the Beijing Planetarium was believed to be the earliest Clark telescope in a private collection. There then follows a series of 'galleries' presenting the whole collection. Six galleries permute refractors and reflectors with different mountings—hand-held, table or tripod. Final galleries present binocular telescopes, surveying instruments and some historical telescope books. After that, sections present the evolution of makers' signatures, mounts and tripods, oc-

ular focusers, and comparisons with related instruments in other collections. As necessary, Wolf cleaned, repaired and restored his telescopes. This is described and photo-documented in the final hundred pages of the catalogue, along with a page of restoration 'Do's and Don'ts'. ("In general, don't restore!" is Wolf's wise advice.) Since information on any given instrument is often spread throughout the catalogue, it is to be regretted that there is no comprehensive index to hasten finding. It should be noted that for the next year or two, much of the material in *Wolf Telescopes* will remain available via the website www.wolftelescopes.com.

To summarize: The Wolf Collection is important and extensive. Because of its numerous excellent photographs *Wolf Telescopes* sets a new and exacting standard. It is a comprehensive record of the Collection and an unparalleled tool for the study of both the Collection itself and historic telescopes elsewhere. Dealers, all museums with telescope collections, and everyone passionate about telescope heritage should acquire a copy.

A final comment. The investigation of the optics of the Wolf Collection and other Secretan reflectors that Ed Wolf and I undertook in Tobin (2016) was very simple. China has an extensive optics industry and in metropolitan Beijing (population 22 million) numerous students will be studying practical optics. I hope that their professors ally with the Beijing Planetarium to devise student projects that study the Wolf telescopes. Accurate evaluation of the form of the optical surfaces and the performance of the instruments can but yield valuable insights into the development of the optician's art across the centuries.

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Chintamani Ragoonatha Charry and Contemporary Indian Astronomy, by B.S. Shylaja. (Bangalore, Bangalore Association for Science Education and Navakarnataka Publications Private Limited, 2012). Pp. 96. ISBN 978-81-8467-283-1, 142 x 215 mm, Rs 75.

The transits of Venus in 2004 and 2012 evoked great public interest all over the world, spurring educators, historians, scientists and numerous others to write papers and books and produce other material for the occasion. The book under review is one such. Published in 2012, it is about transits, the life of Ragoonatha Charry (1828–1880), the First Assistant to Norman Pogson, Astronomer at Madras Observatory, and a 38-page pamphlet that he brought out about the 8 December 1874 transit while preparations were under way for its observation by astronomers spread across India (and elsewhere).

Ragoonatha Charry came from a family of almanac makers and when around eighteen years of age joined Madras Observatory in 1847 during T.G. Taylor's time as Director (Rao et al., 2009). Although steeped in traditional astronomy, once there he learnt about modern European astronomy. He was so devoted to astronomy that he even maintained a private observatory at his home, and he contributed many observations. A science enthusiast, he took a keen interest in communicating information on forthcoming astronomical events to the general public in their own languages. Pogson (1861) has spoken highly of him. About the life and works of Ragoonatha Charry, one should look up his obituary in the *Monthly Notices of the Royal Astronomical Society* (Obituary, 1881), and refer to the papers by Rao et al. (2009) and Shylaja (2009).

Ragoonatha Charry's pamphlet, titled 'Transit of Venus', was brought out early in 1874 in English and a few Indian languages. Charry states in the Preface:

Having been accustomed for many years to discuss astronomical facts and methods verbally with Hindu professors of the art, my present sketch has naturally, as it were, taken the form of a dialogue; but in the Sanscrit, Canavese, Malayalum, and Maharathi versions I have found it convenient to vary the arrangement. The sketch was first drafted in Tamil, and then translated into English and the other languages ...

Through several figures, the pamphlet, as Charry called it, beautifully explains the transit to the lay public. The English version was presented in the form of dialogue between a Pandit and a Sidhanti, an expert familiar with modern European astronomy wherein the former, a traditionalist requests the latter to explain the forthcoming transit of Venus, a subject not treated in