

*Karl Friedrich Zöllner and the Historical Dimension of Astronomical Photometry. A Collection of Papers on the History of Photometry*, edited by Christiaan Sterken, and Klaus Staubermann (VUB Press, Brussels, 2000), 188 pp., ISBN 90 5487 254 3, paperback, US\$30:00, 240 × 155 mm.

The application of spectroscopy, photometry, and photography to astronomy during the second half of the nineteenth century was to have a major impact and lead to the emergence of astrophysics. While Hearnshaw (1986, 1993) has done an excellent job summarizing major nineteenth century developments in astronomical spectroscopy and photometry, it has been left to others to provide more detail on some of the notable contributors.

One of these was Karl Friedrich Zöllner (1834-1882), a German physicist who introduced a new type of photometer in 1858, and this book reports the presentations and discussions that took place at a one-day workshop that was held at the Archenhold Observatory, Berlin-Treptow, on 1997 April 4. This was the first in a new series of workshops dedicated to documenting historical aspects of observational astrophysics in the nineteenth and early twentieth centuries.

The editors of this volume combine an interesting range of expertise and talent: Chris Sterken is a well-known variable star researcher, with a strong interest in historical aspects of astrophysics, while Klaus Staubermann is an historian who has built a working replica of Zöllner's famous 1858 photometer.

This book is divided into four parts. Part I deals with "Instruments of Zöllner's Era", and begins with an excellent review of nineteenth century visual photometers by Hearnshaw, followed by two chapters by Geyer on Zöllner's revision spectrometer and Schwerd's double-beam photometer. Batha provides a listing of Zöllner-type photometers in Hungarian institutions, and Staubermann ends Part I with two chapters relating to his replication of Zöllner's original photometer. The first of these has fourteen co-authors (one of whom is Sterken), and begins with details of Zöllner's original photometer, which is preserved in the Deutsches Museum in Munich.

There are three chapters in Part II, on "Zöllner's Photometric Data", the first two by Sterken and the last by Sterken and Staubermann. Sterken begins with a frustratingly short chapter on the applications of what he terms 'archo-photometry', where he shows that ancient photometric catalogues can provide extremely useful data. For example,

... the historic light curve of  $\zeta^2$  Sco ... shows that two centuries ago the star was about 2 magnitudes brighter than today, while a millenium ago it was only 1 magnitude brighter than now, an indication that  $\zeta^2$  Sco should be regarded as a candidate Luminous Blue Variable." (page 79).

Sterken follows this chapter with a much longer one on the data contents of Zöllner's catalogue of 2216 photometric measures of 26 stars between magnitudes 1 and 6, which was published in 1861. In discussing Zöllner's derived magnitudes, he finds they are "... a consistent set ... [and Figure 8.7] shows that not a single of these stars deviates by more than one magnitude from their values of today and that thus none of these stars exhibits strong irregular variability." (pages 90-91). In another interesting analysis, Sterken compares Zöllner's photometric data for  $\beta$  Lyrae with visual magnitudes provided by other observers. In the third and final chapter in Part II, Sterken and Staubermann reproduce an edited version of Zöllner's catalogue of magnitude estimates, adding a sequence number,  $V$  magnitudes (drawn from the *Bright Star Catalogue*) and JDs.

Part III is about "Zöllner's Personality", and in three short chapters Dick and Münzel provide an interesting insight into Zöllner's contacts with other astronomers through surviving listings of his personal papers, and through letters that he wrote to his Berlin Observatory colleague and friend, Wilhelm Foerster. Some of these letters contain "... irreconcilable attacks on colleagues ... [indicating] an emotionally wounded person." (page 129), and Dick and Münzel conclude that "Many of Zöllner's reactions indeed manifest a narcissism ... which made him especially sensitive for insults. It would surely be helpful, if a psychologist or a psychiatrist with an interest in history could take care of Zöllner's biography ..." (ibid.). Further evidence of this instability comes through in Münzel's chapter on Zöllner's relations with staff at the Leipzig

University Observatory between 1862 and his death in 1882, although his political activism and emerging interest in spiritualism from 1877 may also have been factors in his growing unpopularity. At any rate, the University chose not to appoint a new Professor of Astrophysics following his death.

The final section of this book, "Studies on K.-F. Zöllner", contains just two chapters. The first is by that master astronomical historian and Zöllner expert, Dieter B. Herrmann, who over the years has published a succession of studies on this pioneering astronomer. Herrmann believes that "... Karl Friedrich Zöllner was one of the central figures in the early history of astrophysics in Germany. Without his work the genesis of the new scientific discipline of astrophysics cannot be understood." This is high praise indeed, but sums up Zöllner's vital role in the international development of astrophysics. Finally, Hamel brings this fascinating book to a close with a list of Zöllner's 87 publications, plus key biographical works about Zöllner.

Sterken and Staubermann are to be congratulated on producing a readable volume about one of the key figures in nineteenth century German astronomy – even if he is sometimes misunderstood, and I particularly recommend this book to anyone interested in the history of astrophysics.

Wayne Orchiston

## References

- Hearnshaw, J., 1986. *The Analysis of Starlight. One Hundred and Fifty Years of Astronomical Spectroscopy*. Cambridge University Press, Cambridge.
- Hearnshaw, J., 1993. *The Measurement of Starlight. Two Centuries of Astronomical Photometry*. Cambridge University Press, Cambridge.

*Queen of Science, Personal Recollections of Mary Somerville*. edited and introduced by Dorothy McMillan. (Edinburgh: Canongate Classics 2001), xlii + 434 pp., 195 × 125 mm, £8.99 softback,.

Mary Somerville (1780-1872), mathematician, theoretical astronomer, and writer, is among the most celebrated women in the history of science. The daughter of an admiral in the Royal Navy, Somerville was brought up in a small seaport in Scotland. She received little formal education in her youth; yet she longed to learn and, mainly through her own persistence, became her own principal tutor. Later, with the help of sympathetic Edinburgh academics she mastered the calculus and was introduced to the works of the great continental mathematicians. She was married and widowed young, but in her second husband and first cousin William Somerville, an Army doctor, she acquired a partner who shared her enthusiasm for science and encouraged her studies. The Somervilles began their married life in Edinburgh among that city's liberal intelligentsia, but soon moved to London which was their home for over twenty years. Their English circle included a galaxy of scientists, most influential among whom was John Herschel who became a lifelong personal friend and adviser. Others were William Wollaston, the first to discover dark lines in the Sun's spectrum, and Charles Babbage of calculating machine fame. Early in her career Mary Somerville gained the friendship of the distinguished Paris school of scientists including the great Marquis de Laplace. When Mary was 58, her reputation well established, the family moved to Italy for the sake of her husband's health. There she was to live out the rest of her long life. She died in Naples at the age of 92 and is buried there. Mary Somerville first shot to fame with a theoretical treatise, *The Mechanism of the Heavens* (1831), a rendering in English of Laplace's monumental *Mécanique Céleste*. Two books addressed to a wider educated readership, *The Connection of the Physical Sciences* (1834) and *Physical Geography* (1848), were best sellers that went into several editions. In her old age she tackled a new field (biology) with *On Molecular and Microscopic Science* (1869) published in her ninetieth year. Towards the end of her life she also wrote her Personal Recollections, annotated and published after her death by her daughter Martha. It is from these Recollections that most of our knowledge of Mary Somerville's remarkable life is based. The original edition (1873) is now rare, and a new one is therefore to be warmly welcomed. The present re-issue, with the title *Queen of Science* (a sobriquet given by an obituarist), published in the Canongate Classics series of Scottish writing, is edited and introduced by Dorothy McMillan, head of English and