

idea of this book and seeing it through to publication. It will surely appeal to anyone with an interest in the Moon or astronomical photography.

References

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Starlight Detectives: How Astronomers, Inventors and Eccentrics, Discovered the Modern Universe, by Alan Hirshfeld. (New York, Bellevue Literary Press, 2014). Pp. 397. ISBN 978-1-934137-78-0 (paperback), 150 × 228 mm, US\$19.95.

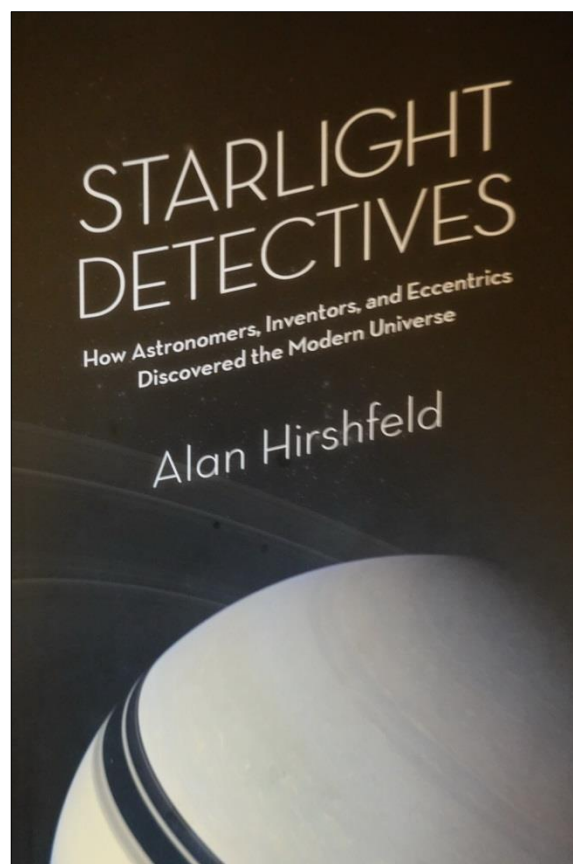
The development of astrophotography in the nineteenth century, to its employment by Hubble in the 1920s and 1930s that revealed a Universe of galaxies, is the subject of this book. The author is current President of the History of Astronomy Division of the American Astronomical Society, and Professor of Physics at the University of Massachusetts, in Dartmouth.

One hesitates to pronounce any book definitive, but this work by Hirshfeld has set a standard that will not soon be equalled, much less surpassed in just a single volume. In addition to fleshing out the details which are broadly known, he rescues from oblivion several, eccentrics who contributed mightily to astrophotography.

The first astronomical image was taken by New York University chemistry professor John W. Draper in 1840. It was a 20-minute exposure of the Moon, since lost in a fire of 1866. Draper used the only method available, a daguerrotype, invented by Louis Daguerre and inspired by his friend Joseph Niépce, who took the first photograph from nature in 1826. By 1841 there was a second way to take images—the calotype—developed in England by William Henry Fox Talbot, but he patented the process, hindering its widespread use:

Neither the daguerreotype nor the calotype were [*sic*] astronomy-friendly. In fact, they were downright hostile ... Until exposure times were shortened and telescope drives improved, astronomers would remain hostage to every flutter of the air and lurch of the drive gear. (p. 69).

One of the eccentrics Hirshfeld mentions is Richard Leach Maddox (1816–1902), who engaged in a “... noxious hobby of wet-collodion photomicroscopy. This he pursued in an unventilated closet in his home.” His use of gelatin, “... a true chemical advance over collodion ...”, was the key breakthrough in the development of dry plates: “The hoary thirty-minute daguerrotype had evolved into the dry-plate snapshot.” (pp. 113–114). That was in 1871, but it was not until the 1890s that photography proved its value:



It was pictures of the controversial spiral nebulae that were to cement the acceptance of photography by professional astronomers. (p. 143).

The second part of the book focuses on the rise of spectroscopy, pioneered by Robert Bunsen “... the amiable lord of the laboratory ...” (p. 156) and Gustav Kirchhoff, who was plagued into adulthood by ‘neurotic demons’ that had their root in angst about his slight stature. Bunsen, by contrast, was a bearish man. Hirshfeld dubs them “... the odd couple.” (p. 155). Going from the laboratory to the instrumental perspective, the author describes

how Joseph Fraunhofer developed a spectroscopic device that enabled him to identify 574 spectral lines in the light from the Sun.

The delicacy of this work is emphasised in an anecdote about John Herschel, who invited Charles Babbage to his home to view the Fraunhofer lines. Herschel warned Babbage that even though he would look for the lines, he would not find them. “I will instruct you how to see them,” Herschel said, “and you shall see them ... [in such a way that] you shall find it impossible to look at a spectrum without seeing them.” Babbage writes:

On looking as I was directed, notwithstanding the previous warning, I did not see them; and after some time I inquired how they might be seen, when the prediction of Mr. Herschel was completely fulfilled. (p. 169)

As these snippets from the book attest, the author weaves a tale of personality with that of laboratory and instrumental discovery, making the story of astrophotography accessible to a wide audience.

I found only one passage to contest. The assertion (p. 137) that the Astrographic Conference of 1887 in Paris was “... the first-ever international conference of astronomers ...” is incorrect. That honour goes to Baron Franz von Zach, who held the first such conference in Gotha in 1798.

The book concludes with 65 pages of references, a time line, glossary of names, bibliography and index. Some nineteenth-century aspects of Hirshfeld’s text, such as Herschel and the Fraunhofer lines, overlaps with Steven Case’s book, *Making Stars Physical*, which is also reviewed in this issue of the *JAHH*. Both books form valuable companions to Stefan Hughes’ massive 2013 two-volume tome *Catchers of the Light ...* (that also has been reviewed in *JAHH*).

Starlight Detectives: How Astronomers, Inventors and Eccentrics Discovered the Modern Universe is not only immensely informative but written in fine prose that few history of astronomy books attain.

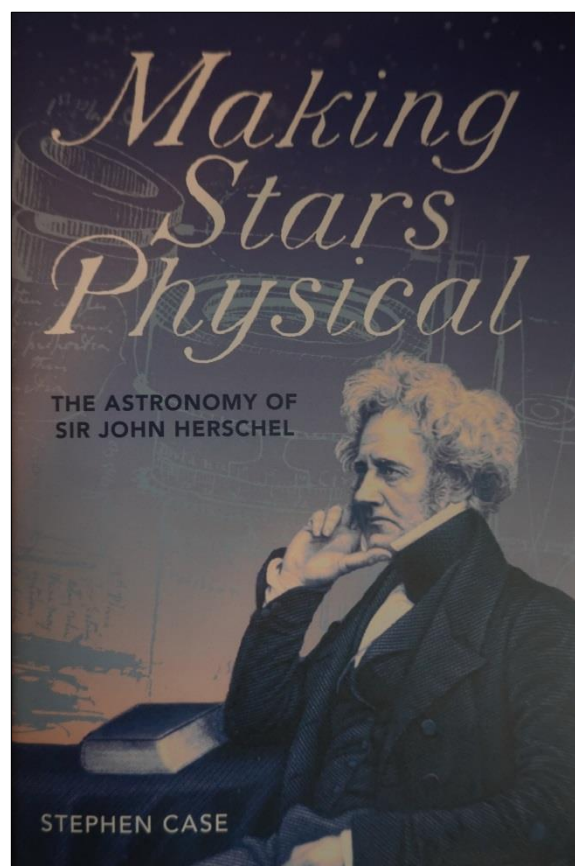
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Hughes, S., 2013. *Catchers of the Light. The Forgotten Lives of the Men and Women who First Photographed the Heavens: Their True Tales of Adventure, Adversity & Triumph*. Paphos, ArtDeCiel Publishing.

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Making Stars Physical: The Astronomy of Sir John Herschel, by Stephen Case. (Pittsburgh, University of Pittsburgh Press, 2018). Pp. viii + 319. ISBN 978-0-8229-4530-7 (hardcover), 155 × 235 mm, US\$39.95.

Sir John Herschel (1792–1871) remains an enigmatic figure in the history of astronomy, amazingly famous in his lifetime but rarely referenced today. John’s popular-level book *Outlines in Astronomy* was published in 1849, “... just prior to spectroscopic analysis.” (p. 209). While his text “Offered the first avenue ...” by which a “... new understanding of stars was presented to an English reading public ...”, it ultimately suffered the same fate as books about spacecraft published before 1957.



“Herschel’s goal was to make stars physical ...” (p. 126), but “It was spectroscopy, and not the double stars with their calculated masses or velocities ...” that Herschel spent much of his life studying, “... that most firmly and definitively established the physical nature of the stars.” (p. 224). By a cruel twist of fate, he “... remained unconvinced by the new chemical insights into the nature of stars that spectroscopy purported to provide.” (p. 186). While Herschel saw lines in the solar spectrum (a delight he shared with his friend Charles Babbage), he apparently never saw them in stellar spectra. Thus, Herschel rejected the very scientific advance that made his goal possible.