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BOOK REVIEW

Vera Rubin – A Life

Jacqueline Mitton & Simon Mitton

Belknap, Harvard University Press. 2021, 320 p. ISBN 9780674919198, 27.00 EUR, 29.95 USD

This book draws the story of Vera Rubin’s life in astronomy from age eleven till the end of her lifetime. Rubin (née Cooper) was one of the most influential female astronomers of her generation.

At age 18, Vera Rubin had been awarded a scholarship to study at Vassar College, a women’s liberal arts college about 75 miles north of New York City, where she studied under outstanding teachers. In her first year she enrolled for all the astronomy courses she could, and preferred for mathematics instead of physics. She graduated from Vassar in 1948, and she got married while applying for graduate school. In those days, women were typically expected to marry as soon as they came out of college, and for most of them that meant the end of any career ambitions. Not for Vera: she joined the Graduate School at Cornell, and after graduating she enlisted for a PhD at Georgetown University Observatory (Washington).

Vera was a hectic and highly competent observer: Mt Wilson, Lowell, Kitt Peak, Cerro Tololo and Mt Palomar, where she made history as the first woman permitted to observe at the 5.1-meter Hale Telescope (1965). She never left observing to her graduate students, and she reminded her postdocs that “*Observational astronomy is still an art, the art of making as few mistakes as possible*”. She also was at the forefront in using new technologies, such as the image tube (1967) in the days when the IBM mainframe computers came with a 1 Mb hard disk and 32k of magnetic core memory and without any graphic output. The long-term character and the clear-cut objectives of her observational program led to stunning discoveries in her studies of spiral galaxies. Her approach was a real boost for data-driven astronomy, *i.e.*, gaining knowledge through observation. Vera moreover had a talent for extracting answers from very limited datasets, for example she established the observational basis for the existence of a great deal of mass in the disk of the Andromeda Galaxy: dark non-luminous gravitating matter with a mass distribution totally at odds with the distribution of stars.

She was first and foremost an observational astronomer, yet she kept insisting that she was an astronomer with a basis in mathematics and astronomy, rather than an astrophysicist with a basis in physics. Her entire career was carried by her qualities of curiosity, resilience of character, imagination and courage. But she was never comfortable with competitive aspects in her field, and found it personally distasteful that competing colleagues would call her asking what she had observed, and that was not the way she wanted to do astronomy.

The authors of this work developed a multi-faceted approach: the variety of different features includes her research in astronomy – explained in simple but straightforward language, and a lot of facts on the history of astronomy in the United States. The book deals with aspects such as feminism and emancipation, diversity in the male-dominated scientific culture, and the way science worked in her times – including the petty sides of the profession. Family life with the ever present staunch support by her parents and her husband is depicted all through the book, as well as social conventions in the astronomy world of the times.

The penultimate Chapter “*Speaking out for women*” is really enlightening. Vera campaigned for the equality of women and men in astronomy until the end of her life. She challenged inequity, pointed out gender imbalance wherever she found it in her professional encounters, and attacked extreme masculine etiquette. For example, she explained in strong terms her views that plural pronouns such as *they* and *their* are to be used as alternatives to *he* and *his* that were commonly applied in male-oriented language when referring to authors and referees (who in those days were mostly male). She simply dreamt of a future in which female scientists would be able to fulfill their potential on an equal footing with men.

The language in this wonderful book is clear and direct, and the volume is extremely well documented and includes 40 pages of notes arranged by chapter, and a nine-page long combined name and subject index. Many good-quality black-and-white photographs and diagrams illustrate this biography.

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