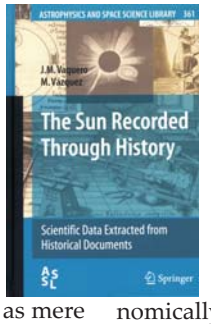
The Sun Recorded Through History

Scientific Data Extracted from Historical Documents

J. M. Vaquero and M. Vázquez
Springer, New York, 2009. $179.00 (382 pp.). ISBN 978-0-387-92789-3

The historical and contemporary influence of the Sun on climate change remains a topic mired in controversy. Space-borne solar observations of the past three decades have shown that the variations in solar radiative output over that period are by themselves far too small to significantly impact Earth's climate. But ample evidence shows that recent solar-activity-cycle fluctuation patterns are markedly different from what has been observed in earlier centuries. For some, the smoking gun that proved the Sun's impact on climate change is the temporal overlap of the 17th century's Little Ice Age and the Maunder Minimum—a period of markedly reduced solar activity—which others dismiss as mere coincidence. Surely, both of those positions are extreme, but the question remains: How scientifically reliable are historical solar observations?



José Manuel Vaquero and Manuel Vázquez tackle that question in *The Sun Recorded Through History: Scientific Data Extracted from Historical Documents*. Their goal is ambitious: They set out to cover solar observations from the dawn of recorded history up to the beginning of photographic monitoring in the mid-19th century. They delve at length into naked-eye and telescopic sunspot observations and also discuss historical observations of eclipses, flares, solar surface features such as faculae and granulation, solar diameter measurements, and even auroras. It is no small achievement that they managed to collect, present, and cogently discuss such a vast body of data, much of it already published but widely scattered in assorted astronomical and historical journals or observatory annals.

Packed with many hundreds of references to both past and contemporary astronomical and historical literature, the book is a must for historians of science and professional astronomers and solar physicists interested in the historical reconstructions of solar activity. It carries a hefty price tag, but interested readers should find their money's worth. I am not aware of anything else currently in print resembling it. Douglas Hoyt and Kenneth Schatten's *The Role of the Sun in Climate Change* (Oxford University Press, 1997) is an English-language book that covers similar ground, but its discussion of historical source material is nowhere as extensive. Its primary focus is to critically discuss possible correlations of solar activity with Earth's climate.

The Sun Recorded Through History is definitely not a coffee-table book on the history of science. Readers expecting a leisurely grand tour of the history of solar physics, interspersed with amusing anecdotes on the life and times of some of its great practitioners, will instead be confronted by discussion of point-spread functions of early telescopes, diffraction effects in camera obscuras, and the influence of sociopolitical factors on the frequency of naked-eye sunspot observations by imperial court astrologers. The authors do devote their first chapter to astronomical and instrumental concepts and terminology, but even that at times may prove arduous reading for the nonastronomically trained.

Fans of historical scientific illustrations will discover some true gems in Vaquero and Vázquez's copiously illustrated book. One of my favorites is Johannes Kepler's drawing of his 1607 observation of a sunspot that he mistook as Mercury in transit. Another is the wonderful 1128 drawing taken from *The Chronicles of John of Worcester* of two giant sunspots, exquisitely reproduced in full color.

The book does contain a few minor irritants that unfortunately survived the proofreading stage. For example, a quote from 17th century French astronomer Pierre Gassendi actually manages to pack three transcription errors in just four lines of printed text. More surprising in a history of science volume of this overall high quality is that some figure captions give incorrect sources, the most glaring instance being two well-known 1801 sunspot drawings by William Herschel that the book appears to attribute to a 1774 paper by Alexander Wilson.

It is a sad coincidence that this book should appear in print within a month of the passing of John Eddy, arguably the foremost modern scholar and advocate of historical research into past solar-activity patterns. That such a book can now be written—and find a mainstream publisher—is in many ways a testimony to the collective awakening triggered by Eddy's landmark 1976 paper in *Science* on the Maunder Minimum.

In *The Sun Recorded Through History*, long-gone solar astronomers tell us what they saw. Whether that history holds the key to unravelling the complexities of solar-activity patterns and solar–terrestrial influences remains to be seen. But their observations, echoing from the beyond, do have scientific value and stand as an outstanding example of the collective nature of the scientific enterprise, branching out inexorably across time and space.

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General Relativity and the Einstein Equations

Yvonne Choquet-Bruhat
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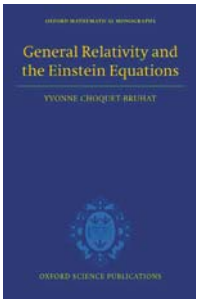
I am old enough to remember the days when general relativity was considered by many to be an obscure and unimportant branch of mathematical physics. How things have changed! Nowadays, any decent galaxy is supposed to have a massive black hole at its center, and cosmology, for which general relativity is an essential tool, currently offers some of the most puzzling and important problems in all of physical science. General relativity's growing importance has corresponded with an increase in the number of monographs on the subject. But most of them offer only a casual glance at what is perhaps the most beautiful theory ever constructed.



Yvonne Choquet-Bruhat's *General Relativity and the Einstein Equations* stands out from the crowd. The author has made many seminal contributions over the past 50 years to global aspects of the subject, which led to her election as the first woman in the French Academy of Sciences. In addition to the author, the following experts contribute to the book and expand the discussion: Robert Bartnik, Piotr Chruściel, Thibault Damour, James Isenberg, Vincent Moncrief, and Tommaso Ruggeri.

The book's first five chapters could form the text for a first course in general