

REVIEW

THE PASSION AND POLITICS OF SCIENCE

Clark, Stuart, *The Sun Kings: The Unexpected Tragedy of Richard Carrington and the Tale of How Modern Astronomy Began*. Princeton, New Jersey: Princeton University Press, 2007.
Pp. xii + 211. US\$24.95 HB.

By Naomi Pasachoff

When *The Sun Kings* came to my attention, what caught my eye was not the title but the back cover's four enthusiastic endorsements, each by an acquaintance I greatly admire. How could I not want to read "a fast-paced, beautifully crafted story" (Dava Sobel), "the most gripping and brilliant popular-science history account that I have ever read" (Owen Gingerich), "the tale of intrepid astronomers, across time and cultures" (Neil Tyson), the "illumina[ti]on of] the dawn of astrophysics" through biographical sketches of scientists who "blend a passion for their work with the more worldly passions of pride, jealousy, greed, and lust" (Bob Kirshner)? Without these blurbs, I might not have picked up Clark's book. Having read it, I am pleased to add my less illustrious name to the recommenders' list.

The heart and, for me, best part of *Sun Kings* is the interwoven stories of the lives of scientific contributors to our still-developing understanding of solar-terrestrial relations, from William Herschel (1738–1822) to currently active researchers unknown outside their fields. The book sheds light on how the vagaries of individual lives, including personal enmities, institutional politics, and other non-scientific issues, affect the course of scientific discovery. Less gripping for me was Clark's eight-page prologue describing SOHO – the European Space Agency's Solar and Heliospheric Observatory, launched on 2 December, 1995 – and the most disruptive solar storm of recent times, which, having taken place in autumn 2003, is called the 'Halloween storm'.

SOHO monitors magnetic activity on the Sun. Areas of heightened magnetic activity are marked by sunspots – dark blotches on the Sun’s surface that appear in greater or lesser number over an eleven-year cycle. The greater the number of sunspots, the likelier a major solar storm will occur. When vast explosions on the Sun bombard Earth with energetic particles and highly charged matter, our planet’s ionosphere and geomagnetic field are affected. Solar storms have their aesthetic side – the auroras that illuminate the night with colourful curtains of light. But they also have their pernicious side – disruptions of power grids, radio communications, GPS readings, and Earth-orbiting satellites. Solar storms may cause air-traffic delays and expose astronauts, airline crews, and passengers to unsafe levels of radiation.

Having begun with eight pages rooted in a twenty-first-century event, *Sun Kings* ends with twenty-one pages taking us from SOHO’s detection of the 2003 Halloween storm to predictions of massive solar storms in 2008. Clark’s reason for framing his book, which focuses on Victorian England, with twenty-first-century events, becomes apparent at the prologue’s end. In the Halloween storm’s aftermath, ‘many wondered what would have happened if such a massive solar storm had directed its full force at Earth. The answers lie buried in the historical records of around 150 years ago’. The *segué* is to the events of September 1859, when what remains the greatest solar storm in recorded history occurred, and to the efforts of Richard Carrington (1826–1875), the English astronomer who strove to understand how what happens on the Sun affects the Earth.

From his private observatory in Surrey, Carrington not only observed and rendered drawings of a huge sunspot group on 1 September, 1859, but was also the first in history to describe a solar flare. In the succeeding hours and days, auroras were visible around the world, and telegraph communications were severely affected. Carrington came to understand that the Sun’s magnetism directly influences the Earth, a realisation ridiculed by some scientists and advanced by others. As Clark puts it, Carrington’s flare was ‘a tipping point in astronomy. The sudden demonstration of the Sun’s ability to disrupt life on Earth catapulted astronomers into a head-long race to understand the nature of the Sun. Previously, such investigations had been a backwater of astronomy with the main science concentrating on charting the stars to help navigation’.

In other words, Carrington helped spur the transition from astronomy to astrophysics.

In the course of *Sun Kings*, what we learn about Carrington and other scientists illuminates how contributions to knowledge may be impeded or impelled by the drama called life. Carrington, who read mathematics at Trinity College, Cambridge, encountered several obstacles in his professional path, and then died – the book doesn't quite make clear whether as a suicide or of natural causes – before he turned fifty. Family responsibilities upon his father's death and problems securing an appropriate position were among the more mundane impediments standing in Carrington's way. In 1868, in his late forties, Carrington, still a bachelor, fell in love with an uneducated woman he encountered on London's Regent Street. Although on his second proposal Rosa Rodway agreed to marry him, she claimed she could not live with Carrington 'until she had obtained sufficient education to fulfill her role as the wife of a gentleman'. For nearly two years Carrington paid for her to live in London with a man purporting to be her brother, but who was in fact a former circus employee, twice her age, who had been cohabiting with her for several years. In August 1871 William Rodway came to the Carrington house and stabbed Rosa repeatedly, though not fatally. With Rodway sentenced to penal servitude for twenty years, Carrington hoped for domestic tranquility. In autumn 1875, however, Rosa died of an overdose of the sedative prescribed after the earlier traumatic events. Shortly thereafter, Carrington, whom the coroner had chided for failing to provide satisfactory medical supervision for Rosa, was found dead inside the house.

If Clark's bombshell revelations about Carrington underscore how the unwished for can undermine the most insightful of scientific researchers, his brief profile of Jack Eddy (b. 1932) demonstrates how it may also advance research. While at the High Altitude Observatory (HAO) in the 1970s, Eddy became interested in the Maunder Minimum, the period from 1645 to 1715, which Eddy named in honour of the solar astronomer Edward Walter Maunder – Carrington's heir, according to Clark – whose archival studies revealed the dearth of sunspots at the time. Upon first learning of Maunder's assertion that solar activity might affect weather patterns, Eddy – as skeptical as the general solar physics community – resolved to prove that the Maunder Minimum had not occurred. Once he began his research, however, his disbelief

waned. When a budget crisis at HAO led to the loss of his position, Eddy had to drop the Maunder Minimum research to find a new job. A temporary position at NASA, preparing an official history of the space station Skylab, happily enabled him to combine his library visits for NASA research with further research into the Maunder Minimum. The records he assembled convinced him that 'a genuine drop in the Sun's activity levels was the only explanation for the lack of observations between 1645 and 1715'. After confirming the archival work with carbon-14 analysis of tree rings, Eddy convincingly argued in a 1976 *Science* article that solar activity affected the Earth's climate, an idea William Herschel had first put forward (to great derision) in the early 1800s.

Near the conclusion of *Sun Kings* (a *double-entendre* of a title touched on in Clark's profile of Eddy, referring both to the pioneers of solar physics and to Louis XIV, the Sun King, whose reign, Eddy realised, coincided with the Little Ice Age in Europe), Clark confronts the larger contemporary implications of his story. Noting that 'climate investigations are often politically charged', Clark explains that some industry lobbyists and governments take advantage of 'any hint of natural warming as a means of avoiding pollution control', while environmental groups 'can sometimes be philosophically opposed to admitting even a small solar effect on climate'.

The book's conclusion brings us even more up to date, to the giant flare given off on 27 December, 2004, by a 'magnetar' – a celestial object distinguished by the most powerful magnetic fields known to exist. Astronomers of Carrington's day had to accept that an object as distant as the Sun could dramatically affect Earth. Now the 2004 magnetar eruption, which released into space more energy in a fraction of a second than the Sun emits in 100,000 years, left astronomers 'dumbfounded' by the 'realisation that such a distant object could deluge Earth with so much radiation'. Because of this magnetar-related epilogue, I would amend Neil Tyson's blurb slightly: by the time one concludes *Sun Kings*, one realises 'that the story's main protagonist – the one with all the personality', is neither any of the scientists nor the Sun, but rather the Universe itself.

Among the book's minor irritants the most substantive is that Clark provides so few dates; I found myself regularly looking them up in Google. The majority of the text doesn't focus on Carrington,

and I would have used a different sub-title. The index isn't perfect, partly because of typos in the text. And while I was happy to read about Annie Russell, the mathematically gifted second wife of the widowed Maunder, Clark might have noted that after her marriage she had to resign from her computational position at the Royal Greenwich Observatory. Such quibbles aside, I enjoyed *Sun Kings* greatly.

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