

Royal revolutionaries of Victorian astronomy

The Sun Kings The Unexpected Tragedy of Richard Carrington and the Tale of How Modern Astronomy Began

Stuart Clark
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Reviewed by Richard C. Canfield

Stuart Clark's *The Sun Kings: The Unexpected Tragedy of Richard Carrington and the Tale of How Modern Astronomy Began* is a lively, informative discourse on the research that led to a discovery that in Victorian times was revolutionary: a cause-and-effect relationship between events on the Sun and Earth. Although the book is biographical, the science is

not secondary: The characters and their research are skillfully interwoven in the narrative. The inclusion of the discoveries and personas of so many of the pioneers of Victorian astrophysics will make Clark's

book an enjoyable and meaningful read for anyone, professional physicist and layperson alike, who has an interest in the roots of physics and astronomy.

Before the age of the "Sun Kings"—the Victorian astronomers who are the focus of the book—solar astronomy was strictly an intellectual pursuit. Nowadays, that field's liveliest branch is arguably the study of what contemporary geophysicists call space weather, the physics and phenomena of storms in interplanetary space and in Earth's magnetosphere, ionosphere, and outermost atmosphere that are caused by solar flares and coronal mass ejections. The practical relevance of space weather accrues from its threat to both spaceborne and ground-based technological

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systems and from the danger it poses to humans in space.

In setting the stage for his biography of the founders of Victorian solar astronomy, Clark, a writer for the European Space Agency who has a PhD in astrophysics, introduces the phenomena of space weather with a blow-by-blow account of the ferocious solar storms that took place around late October and early November 2003. He starts by discussing the radiation effects of those storms on astronauts aboard the International Space Station, passengers on airplanes flying polar routes, and instrumentation aboard scientific and weather satellites. This rhetorical device works well; it gives the reader a framework and motivation for understanding the final outcome of the convoluted and intensely personal research path taken by the pioneers of solar astronomy.

The author traces the development of the comprehension of the Sun–Earth connection from the 17th through 19th centuries, beginning with the telescopic observations of sunspots by Galileo in 1610. Key players in the 19th century included mathematician and Astronomer Royal George Biddell Airy and natural scientist Alexander von Humboldt. During the time that 18th-century astronomer William Herschel, the discoverer of the planet Uranus, was making his observations, it was well accepted that sunspots were indeed located on the surface of the Sun. But, interestingly, notions such as Herschel's that living creatures inhabited the Sun were not rejected out of hand.

The event that had the most impact on the solar astronomy that Clark chronicles was Carrington's telescopic observation in 1859 of a white-light solar flare. The sighting temporally coincided with an impulsive change in the direction of compass needles at a nearby magnetic observatory followed by an auroral display of extraordinary intensity, and with electrical arcs and the smell of scorched paint at telegraph stations. Although Carrington was famously conservative, cautioning that "one swallow does not make a summer," Clark rightly notes that the events were a tipping point for astronomy.

Clark is writing for a popular-science audience who will enjoy his lively and eminently readable account of the lives and scientific careers of those whose work furthered the understanding of the Sun–Earth connection. Moreover, all readers, professional physicists and interested laypersons alike, will appreciate that *The Sun Kings* is no dry, biographical tome. Clark's skillful writing weaves into his protagonists' research the aspects of their non-professional lives that so strongly influenced their work. That fact is captured in the book's rather embellished subtitle. Clark successfully presents the way a major subfield of modern astronomy began while introducing readers to one of its key players. Carrington led a hard life, punctuated by failed, turbulent relationships, professional and personal. Contemporary physicists will recognize that irrational and counterproductive rivalries, petty jealousies, and affairs of the heart were every bit as pervasive in the scientific life of the Victorian era as they are today.

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**Phillip Kaye,
Raymond Laflamme,
and Michele Mosca**
Oxford U. Press, New York, 2007.
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ISBN 978-0-19-857000-4,
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Vlatko Vedral
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There was a time when computer and information science appeared to be a discipline of pure logical reasoning, divorced from physics. Questions of