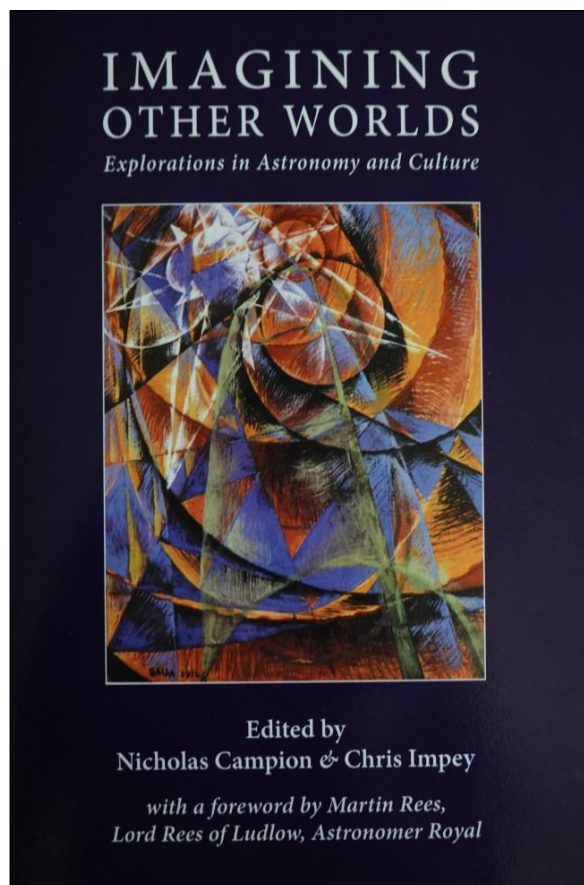


It was, she writes, to align the building with the vernal equinox according to the old Julian calendar, "... implying perhaps an opposition to the new calendar." (p. 272).

A chapter by Gary Wells on the transit of Mercury paintings by Giacomo Balla, inspired by his view of the 1914 transit, is a fine example of art historical analysis (and one of the paintings is on the book's cover). Wells puts these works "... at the end of his initial Futurist exploration of movement and dynamic forces." (p. 319). Since Mercury is just a very tiny black dot in Balla's paintings and drawings (which are held by Philadelphia, Yale, New York's Museum of Modern Art and the Guggenheim in Venice), the Sun takes prominence. Here it is shown as



... the modernist sun, and it represents a set of ideas and observations about nature and humanity infused by the enthusiasms of the early twentieth century. (p. 326).

Artistic inspiration of another sort inspired the depiction of Orion and Ursa Major on a 2D glass sphere held in the hand of Christ, part of a mosaic in Saint Isaac's Cathedral in St Petersburg, Russia. Authors Michael Mendillo and Ethan Pollock compare this large depiction of the Salvator Mundi motif with various paintings, showing that the Cathedral version (likely late nineteenth century) is unique in depicting actual constellations, the others just being dotted with random star images.

In the non-artistic realm, editor Nicholas Campion gives a 17-page chapter on how astronomy can provide a foundation for human rights and sustainability, and his co-editor Chris Impey pens an essay ranging from the Copernican Revolution to the exoplanet era we live in. Clive Davenhall shows us that spiritualism in the late nineteenth and early twentieth centuries co-opted the planet Mars into its mystical embrace. In a specific séance held in 1894, messages from the spirit world were being delivered by two people "... explicitly located as resident on Mars." This conveniently took place just five days after the opposition of Mars!

There is a fascinating chapter by Duane Hamacher and co-authors about the link between astronomy and music in the Torres Strait of northeastern Australia, complete with illustrations of an eclipse mask and astronomical dance machines. The astronomical paintings of a contemporary native American artist are examined in a chapter by Annette S. Lee that focuses on the time-sensitive effort aimed at "... reclaiming the native star knowledge." (p. 204).

There are a few minor typos in the book. For example, on page 148, the word 'with' is missing: "... sea rights (with) the Australian government." Generally the Index is excellent, although the entry for monarchs is a little confusing: the entry King Charles II is duplicated, and King Friedrich Wilhelm IV of Prussia is listed under both King and Wilhelm. A few names are missing from the index, such as Farie Mac-George and Sir William Peck, both on page 118.

Imagining Other Worlds has the imprimatur of the Astronomer Royal, Lord Rees of Ludlow, whose public lecture (ranging from alien life to cosmology) and subsequent panel discussion opens the volume. This is a valuable book in its own right, but combined with the proceedings of previous conferences extending back to 1994 (with only the 2nd conference, in 1999, unpublished) the series represents a significant source of information on historical and cultural astronomy.

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The Great Canoes in the Sky: Starlore and Astronomy of the South Pacific, by Stephen Robert Chadwick and Martin Paviour-Smith (Cham (Switzerland), Springer, 2017). Pp. xviii + 233. ISBN 978-3-319-22622-4 (hardcover), 220 × 286 mm, €32:99.

As someone who was born and bred in the South Pacific and with an innate curiosity about the indigenous cultures and astronomical syst-

ems of Australia, New Zealand and the other islands of Polynesia, this had every promise of being a wonderful book for me to review.

Its nine chapters began with the Solar System, and then progressed to the astronomy of our Galaxy; the Magellanic Clouds and the constellation of Centaurus; constellations, the oceans and voyaging; navigation in the Pacific; stellar astronomy and birds in the night sky; star clusters and notable asterisms (including the ever-popular Pleiades); indigenous cosmologies; and finally “Observing the Universe in the Modern Age”. Then followed maps of the South Pacific, Australia and New Zealand, a 7-page Bibliography, and the Index. The title of the book derives from a sub-section within Chapter 4, “The Sky is an Ocean”.

I found that each chapter provided a mix of Western scientific information, and indigenous knowledge presented in the form of case studies, usually a succession of short myths or legends. Thus, in “Star Lore of the Magellanic Clouds” we are introduced to a number of narratives from Australia, one account from Tonga, and another from Atuna (a Polynesian outlier in Melanesia). Other chapters include legends from New Guinea and other Melanesian islands and even from the islands of Micronesia.

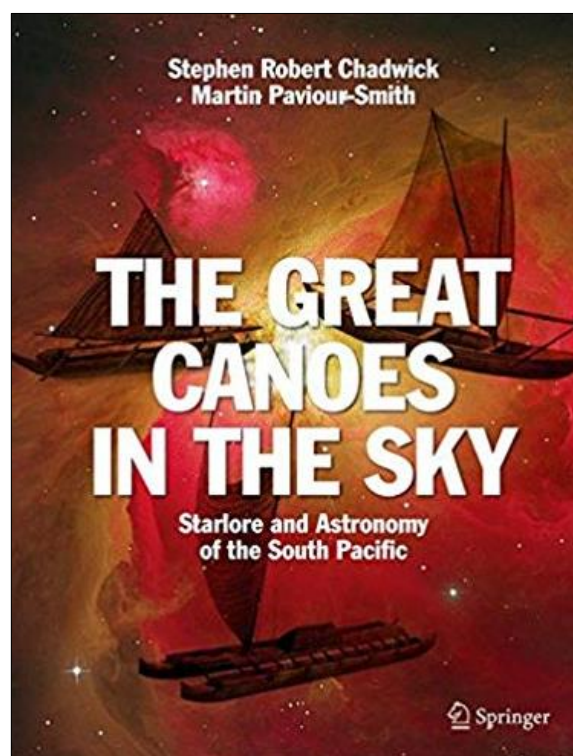
Most of these case studies are interesting—indeed some are utterly titillating—but there is a problem in that Aboriginal Australian, Melanesian, Micronesian and Polynesian astronomy are all very different (see Orchiston, 1997), reflecting the different settlement dates and cultural evolutionary paths experienced in these four disparate regions of the Pacific. To lump them all together is confusing.

From the start, we also needed to know something about these cultures before embarking on a ‘tour’ of their astronomical systems. For example, in the case of Polynesia, recent data derived from prehistory, linguistics, genetics and palaeoclimatology have totally revolutionised our understanding of the dates and processes involved in the initial settlement of Polynesia, and especially Hawaii, the Marquesas Islands, Easter Island and New Zealand (e.g. see Anderson, 2017; Goodwin et al., 2014; Wilmshurst et al., 2011). We now have mtDNA information about the genetic relationships between different South Pacific populations, and even the approximate size of the group of ancestral Polynesians that first settled Aotearoa/New Zealand (Penny et al., 2002; Whyte et al., 2005).

But there is an even more fundamental problem with this book that relates to the fact that neither author has a research background in ethnoastronomy (as is quickly revealed by their biodata entries and a review of the 7-page

Bibliography near the end of the book. Chadwick is an accomplished astrophotographer (and we applaud his beautiful images that adorn this book) while Paviour-Smith is primarily a linguist. So to assemble this book they had to rely entirely on the research of others, and judiciously select from the the corpus of existing publications.

Therein lay another problem given that the authors had no personal research involvement in this field: which papers (and books) should they use for their book? Their unfamiliarity with the relevant literature is very apparent. In the case of Aboriginal Australian astronomy they made extensive use of the publications of my friend and Associate Editor of this journal, Associate-Professor Duane Hamacher, and his graduate students, but Dr Phillip Clarke also has



an impressive list of Australian ethnoastronomy papers, yet only one of these is listed by Chadwick and Paviour-Smith. Other papers of his that at very least warranted examination were Clarke (1997; 2009a; 2009b; 2014; 2015).

As might be expected given the authors' New Zealand domicile, there is less of a problem with references on Māori astronomy, yet I still noted that a number of key works were missing from the Bibliography (e.g. Hamacher and Britton, 2014; Harris et al., 2013; Kingsley-Smith, 1967; Orchiston, 2000).

Their unfamiliarity with the literature is also apparent from time to time when Chadwick and Paviour-Smith discuss Pacific astronomical history. Thus, on pages 101–102 they describe Cook's voyage to the Pacific to observe the

June 1769 transit of Venus, but seem unaware of the most comprehensive recent analysis of this hallmark event (Orchiston, 2005; which subsequently was superseded by Orchard, 2015) or of the wide-ranging astronomical observations made during Cook's three voyages to the Pacific (Orchiston, 1998a) and especially during the various stop-overs in New Zealand between 1769 and 1777 (see Orchard, 1998b; 2016: 107–203).

Again relating to Cook, on page 116 Chadwick and Paviour-Smith discuss the observations that Cook and Green made of the transit of Mercury from Mercury Bay, New Zealand, on 9 November 1769. Mimicking Keir (2010), Chadwick and Paviour-Smith query whether the transit timings were used to determine the longitude of Mercury Bay. This enigma has to do with the disappearance of *all* of the official astronomical records from Cook's First Voyage, plus two full sets of copies that were made, and is the subject of on-going research (see Orchard, 2015).

Chapter 7, "The Heavenly Sisters", is about star clusters, and we soon encounter an old favourite, the Pleiades (or *Matariki* in Māori). On pages 176–180 Chadwick and Paviour-Smith discuss the critical role of *Matariki* in marking the start of the Māori New Year, and in the planting and harvesting of *kumara* (the indigenous New Zealand sweet potato). It is important to realise, however, that *Matariki* did not always have this agricultural association. When the ancestral Polynesians settled Aotearoa/New Zealand around AD 1250, the dietary staples they brought with them from the Cook Islands-Society Islands area were taro and yams. But both failed to thrive in the harsh temperature climate of this new land, and it took considerable experimentation before the *kumara* could be successfully grown (and stored over winter). Therefore, the intimate association of *Matariki* and *kumara* cultivation only dates from about the fourteenth century. This interesting topic is discussed in Orchard and Orchard (2017), and reminds us that astronomical systems are part of culture, which is dynamic and evolving not static and stagnating. When we conduct ethnoastronomical fieldwork we merely end up sampling one cultural segment drawn from a long time-continuum. Part of our charter as ethnoastronomers must be to try and identify and reconstruct major earlier changes that occurred in present-day indigenous astronomical systems.

Chapter 8 on indigenous cosmologies is the last of the ethnoastronomical chapters in this book, before the final chapter introduces the telescope and photography and discusses—albeit briefly—how technology (and particularly

colour photography) has introduced a new aesthetic element and completely altered the way we go about 'doing astronomy'.

In this final chapter—as throughout the book—Stephen Chadwick's beautiful astrophotographs are an added bonus, especially when viewed alongside the many paintings, bark-paintings, drawings, and photographs that grace the pages of this book.

As an ethnoastronomer, and someone trained in anthropology and prehistory I found this book both entertaining and frustrating. In general, I did not feel that mixing Aboriginal Australian, Melanesian, Micronesian and Polynesian case studies worked, and I am dismayed that Springer did not ask an expert to review the MS of this book prior to publication, given that neither author is an ethnoastronomer. Had that occurred, then many of the shortcomings mentioned above could have been avoided.

That said, *The Great Canoes of the Sky ...* is nicely produced and on fine-quality paper. The text is an easy read, and generally is entertaining. Typos, fortunately, are rare, although I note that Ragbir Bhatlal's 2009 paper on "Pre-contact astronomy" published in the *Journal and Proceedings of the Royal Society of New South Wales* starts on page 25 and ends on page 23. The thought of a –3-page research paper is interesting!

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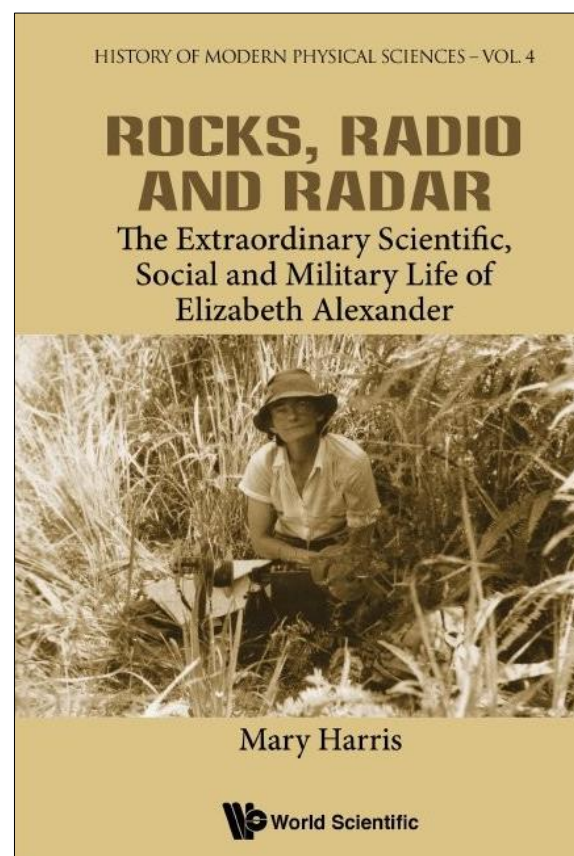
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Rocks, Radio and Radar: The Extraordinary Scientific, Social and Military Life of Elizabeth Alexander, by Mary Harris. (New Jersey, World Scientific, 2019). Pp. xiv + 587, ISBN 978-1-78634-6640-3 (hardback), 155 × 230 mm, US\$88:00.

To say that this is a remarkable book about a remarkable woman is a gross understatement. This is the story of Dr Elizabeth Alexander, a Cambridge-trained geologist who unwittingly became the world's first female radio astronomer. But it is much more than this. It is also about life in England, in Singapore, in New Zealand and in Nigeria. It is also a love story that began when Elizabeth was a young British Geology graduate student at Cambridge and he a New Zealander there to complete his PhD in Physics. It is about WWII, about academia in the British Empire, and about expatriate children—the so-called *colonial orphans*—who were sent 'home' to England to endure a lonely parentless existence while their parents enjoyed life in the colonies. All this, and more ...



Francis Elizabeth Somerville Caldwell was born in England on 'Black Friday', or to be precise, Friday 13 December 1908 (Chapter 1). Her father, Dr Kenneth Caldwell, was in India working for the Colonial Education Service as Professor of Chemistry at Patna College, and