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Historical Records of Australian Science

Reviews

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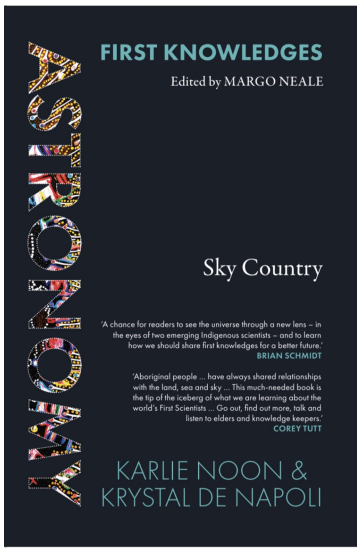
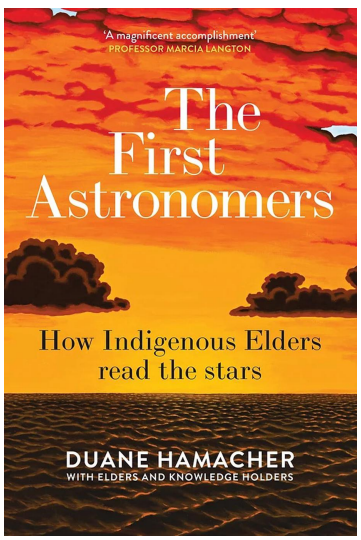


Karlie Noon and Krystal De Napoli (2022) *Astronomy: Sky Country* (series editor Margo Neale), Thames & Hudson, in conjunction with the National Museum of Australia and supported by the Australia Council for the Arts, Melbourne. 195 pp., illustrated. ISBN: 978176076216 (PB), $24.99, e-book available.



Duane Hamacher with elders and knowledge holders (2021) *The First Astronomers: How Indigenous Elders Read the Stars*, Allen & Unwin, Sydney, 2021. 304 pp., illustrated. ISBN: 9781761063800 (PB), $34.99, audiobook and e-book available.

We are in a period of awakening to First Nations knowledge in many areas including astronomy. A part of that awakening is respect and cultural competence in the nature of Indigenous knowledge. These are fundamental to achieving an Australian society that is respectful and inclusive of First Nations peoples. Both of these books will contribute enormously to empowering Indigenous Australians and developing those cultural competencies for non-Indigenous Australians.

Astronomy: Sky Country is centred on the connection Indigenous peoples in Australia and the Torres Strait Islands have to the sky as part of one all-encompassing and comprehensive knowledge system. The impact of colonisation on the land and sea, and, more recently, the sky, on Indigenous people's culture, heritage and existence is well-argued and extended to include how decisions are being made that will impact everyone and everything. The authors offer hope for the future if we, as a society, are pro-active about understanding and communicating what is at stake.

This is the first book of First Nations astrophysicists Karlie Noon and Krystal de Napoli, emerging scientific researchers in their early careers who have already well-established reputations in scientific communication. Karlie Noon is a Eureka Prize finalist who wrote for the book while 'astronomer in residence' at Sydney Observatory where she gave numerous engaging public on-line stargazing talks. Krystal De Napoli also has numerous outreach activities to her name and has published research that brings together Indigenous science and astronomy with a particular focus on STEM education being inclusive of Indigenous science.

Astronomy: Sky Country is the fourth book in the *First Knowledges* series, edited by Adjunct Professor Margo Neale and supported by the National Museum of Australia. The first three volumes are about Aboriginal songlines, farming technology and designing structures within, informed by and as part of country. In this book we look up, and like the other volumes, learn and appreciate why sky country must be protected.

It is a compelling read for many reasons. Although the authors are astrophysicists, for the curious reader expertise in astronomy is not required as all the explanations of astronomical phenomena are very clear. For those with little knowledge of the Dreaming, it is also a wonderful introduction to the connection between land, sea and sky and how

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Indigenous knowledge is different to contemporary Western science because of this connectivity.

The book begins with personal stories about the authors' struggles to stay in the education system and achieve. The extreme disadvantage and racism still faced by Indigenous Australians may be a surprise for some readers. De Napoli exposes the problems in our social systems for support of children but also how individual teachers, mentors and support groups, and university programs providing pathways for First Nations students enabled her success in tangible ways. Noon articulates how low expectations of her abilities, gender prejudice and family issues disrupted her education, but not her passion for learning which led her to university. Noon also acknowledges the positive experiences and support from Indigenous departments at the University of Newcastle as fundamental to her successful completion of a double degree in maths and science. De Napoli and Noon's personal journeys are important in framing their perspectives as we learn in the following chapters.

In chapter 2, titled 'Indigenous ways of knowing', the authors begin their explanation about the connection between the sky, land, sea, rivers and everything natural with the shape many Indigenous Peoples see as a Dark Emu in the night sky formed by dark patches seen in the Milky Way galaxy. The path of the celestial emu, and its shape, connects with the behaviour of emus on the ground, indicating such things as the time when eggs are laid and waterholes sought. There are many other fascinating and lesser-known examples. This connection is continued in chapter 3 where Noon and De Napoli describe examples of First Nations observations of meteorological phenomena like Moon halos and Sun dogs, using Western scientific terms and Indigenous methodologies to demonstrate that the two align.

The following chapter, 'Dark skies', shifts focus to Indigenous perspectives on the widespread illumination of our planet. The authors convincingly argue that this is negatively impacting the survival of species, human health and the ability for all humans to see the stars and planets. The book offers hope in the final two chapters that change is happening in how Indigenous knowledge is respected. An example of this is the renaming of stars, asteroids and astronomical instruments after Aboriginal and Torres Strait Islander words or people, and the progress made in integrating Indigenous astronomy into education curricula at all levels. Noon and De Napoli leave us with an inspiring vision for the future, including a proposed centre for First Nations science.

The First Astronomers, by Duane Hamacher, leads the reader on a journey full of wonderment, surprise and appreciation regarding ancient knowledges. It focuses on the detailed knowledge about astronomy of Indigenous peoples and how that has manifested over millennia. Duane Hamacher provides the evidence of why First Nations effective knowledge of astronomy, accumulated over tens of thousands of years, is scientific observation. The cover artwork—a vast and dramatic seascape with a red sunrise—is an immediate indication that this book will have an impact.

The fundamental thesis of *The First Astronomers* is that an oral tradition and other forms of intangible heritage are valid scientific observations and records of natural phenomena that are explained and recorded by different cultures in different forms constitute Indigenous science. As anthropologist and Indigenous rights activist Professor Marcia Langton articulates in the foreword, this book marks the time when Aboriginal peoples' art, dance and storytelling are recognised as evidence of scientific observation and the accumulation of knowledge.

Hamacher, who grew up in Missouri, has a background in both astrophysics and cultural astronomy. Over the past decade, he has produced an array of publications based on highly collaborative and ethical research practices, and this book reflects that. The cover artwork described above was made by Torres Strait Islander artist, Segar Passi. Six Aboriginal and Torres Strait Islander elders are listed as co-authors of the book and their voices are heard in conversation throughout. In particular, Hamacher acknowledges Professor Michael Nakata as guiding the methodology for this work. In their book, Noon and De Napoli acknowledge and refer to many of the stories in *The First Astronomers*, and have high regard and appreciation for the contribution Hamacher and the Indigenous elders have made in documenting the stories of Indigenous astronomy.

In chapter 2 our journey begins as we look out to the horizon on the island of Mer, where we learn about our closest star, the Sun, from Uncle Segar Passi. In the following chapter we learn about the Moon; lunar cycles, what a halo around the Moon can mean, tides and lunar eclipses. Hamacher draws on Indigenous knowledge and languages from different groups across Australia.

We are reminded of the difference between the sky seen by those living in a city and the stars you can see in remote dark sky locations in chapter 4 as we learn of stories that explain five 'wandering stars' that are the brightest planets in our solar system. Greek, Roman, Arabic and many other cultural knowledges are woven into the story and this is a purposeful comparison. How Indigenous peoples 'read' the stars as part of a total system of land, sea and sky, and use this holistic knowledge to survive, and guide their lives is beautifully explained through the words of elders, and at this point we can better understand the title of the book.

Chapters 5–9 each explain a specific type of star-like object in the sky; twinkling stars; seasonal stars; variable stars; cataclysmic stars and navigational stars. Having navigated on board a small ship at night in French Polynesia I appreciate the 'tools for navigation' section which provides useful and illustrated methods of navigating using the stars should GPS positioning satellites misfunction. Hamacher

humorously describes a treacherous situation where his lack of navigating skills in the Australian desert almost led to disaster. This story highlights that most of us have lost the scientific skills that were essential for First Nations peoples' survival. The final chapter 'The falling stars' is about meteorites and comets and the deep spiritual meaning they have for many First Nations peoples. The impact extra-terrestrial objects have had on creating landforms are marked in different cultural forms which are now recognised as significant historical records. At the end of this chapter we are left inspired to be attentive because there is much more to learn.

Like Noon and de Napoli, Hamacher explains phenomena so that a reader with no or very little knowledge of astronomy is not disadvantaged. There is an excellent glossary of astronomical terms and many places in Australia and the Torres Strait Islands referred to are shown on a map. A unique aspect of this work is that all royalties will be used to support First Nations' astronomy and their dissemination of knowledge.

These two important works, with differing but compatible approaches to the topic of Indigenous Australian astronomy are important contributions. I hope that both books will be present on the shelves of homes and schools as resources for many years to come.

The author declares no conflicts of interest.

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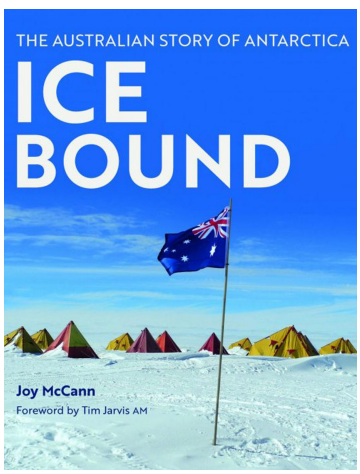
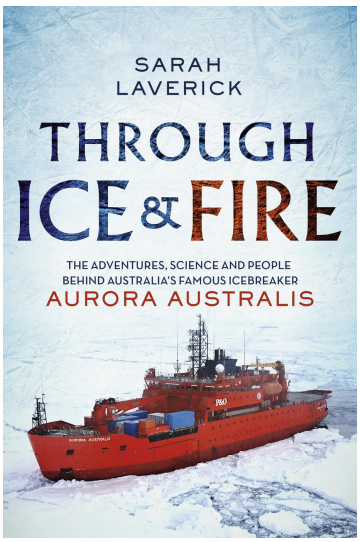


Joy McCann (2022) *Ice Bound: the Australian Story of Antarctica*, NLA Publishing, Canberra. 320 pp., illus. ISBN: 9781922507334 (HB), A$49.99.



Sarah Laverick (2019) *Through Ice & Fire: the Adventures, Science and People behind Australia's Famous Icebreaker Aurora Australis*, Macmillan Australia, Sydney, 2019. 368 pp., illus. ISBN: 9781760554798 (PB), A$34.99, e-book available.

These two publications, linked by the ice, tell different aspects of the history of Australian engagement with Antarctica in very different ways.

Joy McCann's *Ice Bound* is published by the National Library of Australia and is clearly intended to be a definitive work. It is thematically organised with each chapter devoted to a separate aspect of Antarctica, including 'Ice', 'Station', 'Island' (Macquarie) and 'Environment', amongst others. Given McCann's background as an environmental historian who has written previously about the Southern Ocean, 'Ocean' is particularly strong, but all chapters succeed in giving a detailed treatment of their selected topics in a way that is essentially stand-alone—the book could be read in almost any sequence. Inevitably this choice does also come with some costs—the chronological sequence jumps around and the constant parade of characters that are introduced can be dizzying.

The subject matter, like the continent itself, is vast, and so, despite this comprehensive treatment, *Ice Bound* could not cover every aspect of Australia Antarctic history. Nonetheless, I find some of the omissions surprising. Most prominent is the lack of sustained attention given to Antarctic policy. McCann outlines the different arrangements that Australia has had for its Antarctic missions, from the age of the 'individual adventurer scientist championed by Douglas Mawson and Phillip Law'—Law would surely have hated that comparison—through to the contemporary Antarctic Division, but what are the implications of these different institutional structures? The major international treaties regarding Antarctica are described, but what have been Australian policy goals in Antarctica? How well have we met them? The field of science diplomacy studies is only just developing in Australia and there is certainly scope for further work here.

As might be expected from a book published by a collecting institution, the images and artefacts illustrated within this work are a highlight. Indeed, it is hard to imagine a stronger set of pictures relating to Australian Antarctic history than those included here by the author. This alone would make the volume worth getting, but the virtues of *Ice Bound* go

well beyond imagery. The writing is strong and McCann does an excellent job of including multiple perspectives on Antarctica including scientific, literary, historical and environmental. We meet both the old 'heroes' like Carsten Borchgrevink as well as contemporary scientists like ornithologist Dr Jamie Cleland. The documentation is impeccable.

Appropriate to the apparent intent, the book takes, for the most part, a rather detached tone of an objective observer. When the lone first-person 'I' pops up in chapter 10 'Ocean' it surprised me. But the intent is realised; this will be an authoritative work for some time.

The authorial voice in *Through Ice & Fire*, by Sarah Laverick could not be more different. This book describes the history of the Australian icebreaker ship *Aurora Australis*, from its construction in Newcastle to the eve of its final voyage in 2020. Laverick is a marine biologist who undertook several expeditions in *Aurora Australis*, and is also part of the family that owned Carrington Slipways, the shipbuilding company that constructed the icebreaker. As a result, Laverick has quite a personal relationship with *Aurora Australis*, and this shines through in the writing.

The book takes an episodic, rather than comprehensive approach to the history of the ship, as the author herself notes in the preface, within an overall chronological sequence.

The subtitle for the book is the *Adventures, Science and People* behind the ship, but there is no question that it is the first of these that receives the most attention. The shipboard disasters, including several fires and a grounding at Horseshoe Harbour in Antarctica while resupplying Mawson station are prominent examples. This makes for exciting reading—and Laverick conveys this drama well—but leads to a slightly distorted view of the history. With few accounts of normal expeditions, one might come away with the impression that *Aurora Australia* hardly did any scientific work at all.

Indeed, it is the second topic of the subtitle, the science, that fares most poorly in this book. Throughout, Laverick lists the various scientific missions on the expeditions but only in a few places do these get discussed in more detail. Some of the krill fishery experiments are nicely described but from the perspective of the history of Antarctic science it would have been appropriate to learn more about the operation of other experimental programs in a similar vein.

Like *Ice Bound*, there is a constant parade of characters in the book coming and going. We get a sense of knowing a few of these people, but many more just flit by. This is perhaps inevitable for an overview history of a ship that had a constantly rotating crew, but it does make the reading a little more challenging. Surprisingly, given the personal tone of the book, Laverick does not give prominence to her own expeditions and I wonder if this was a missed opportunity to help in this regard.

There are a few technical flaws that detract somewhat. There is a slight tendency to use Antarctic jargon, and while there is a comprehensive glossary of abbreviations given, these are not always spelled out when first encountered in the text. Break-out boxes are used extensively but, in some instances, they contain material that is central to the main narrative rather than being stand-alone elements. These minor issues do not detract from the overall enjoyment of the text.

Through Ice & Fire is clearly *not* intended to be a definitive history but it is informative and a thoroughly entertaining read. It will be of great value to people interested in Australian Antarctic history, in maritime expeditions and certainly to anyone with a connection to *Aurora Australis*.

The different approaches taken by McCann and Laverick each suit the story they are intending to tell. The range of content between them also shows that many more books could be written about Australia and Antarctica. *Ice Bound* and *Through Ice & Fire* are two valuable contributions to this literature.

The author declares no conflicts of interest.

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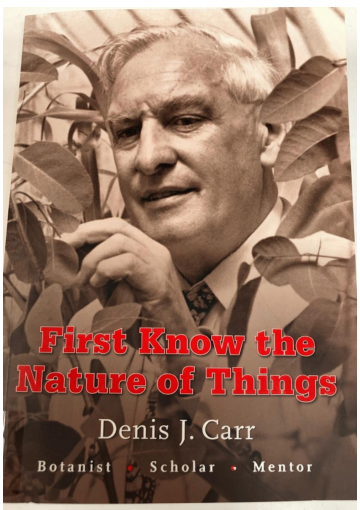

Brian Gunning, Roland Jahnke, Marion Manifold, and Bruce Wellington (2021) *First Know the Nature of Things: Celebrating the Life and Work of Denis John Carr (1915–2008): Botanist, Scholar, Mentor*, Phytoglyph Press, Canberra. 390 pp., illus. ISBN: 9780646840642.

First Know the Nature of Things is a remarkable book dedicated to Denis Carr, who was a foundation professor in the Department of Developmental Biology, Research School of Biological Sciences, at the Australian National University. It is remarkable for the hitherto unpublished series of partial autobiographies that Carr wrote, for the skill of the compiling editors at weaving in their own pertinent comments, and for the vignettes of others who admired Carr and knew him well. Carr is always referred to by others in this volume using his first name Denis, giving the book a warmth, which is a tribute to the affection in which he was held by his colleagues. There are also strong hints of others who knew him well but who found his frequently intrusive nature to be disturbing. Lead author Brian Gunning remarked that Carr entered a new job 'not so much as a new broom but as a whirlwind', and that he aimed for 'creative tension' with his students, most of whom responded creatively, but others found it 'too intrusive for comfort'.

Carr's autobiographies vividly cover his childhood and early twenties, his time in the air force as a fitter, and then

as a commando in southern Italy during World War 2. Thereafter he entered academia with fervour, having regretted what he thought of as his wasted years during the war. He was determined to catch up. He enrolled as an undergraduate at the University of Manchester, and graduated, in botany, with first class honours and several notable prizes and then completed a PhD, also at Manchester. His thesis was outstandingly novel at that time. Titled 'Photoperiodic behaviour of short-day plants', it dealt with plants that flower only if the daylength is shorter than twelve hours.

During his time as a postgraduate student, he spent some time in Germany, where he learnt to speak German fluently. He became well-versed in German botanical science and often introduced examples of that into his lectures.

Post-war Australia was eager to appoint plant physiologists to provide a scientific background that could foster increases in agricultural production. John Stewart Turner, Professor of Botany and Plant Physiology at the University of Melbourne, invited Denis to accept a position as a senior lecturer for second year students, which he took up. He focused his lectures at Melbourne on aspects of plant physiology that underpinned agricultural production.

I had the good fortune of being in his second-year class in 1957. Carr was phenomenally knowledgeable in plant physiology, and, though he brought with him many sets of notes, he rarely made use of them. On the contrary, his eyes were turned up towards the steep botany lecture theatre so that he could watch the reactions of the students. He was abundantly clear in his lecturing but writing one's own notes at his speed was a challenge.

Carr's marriage to Maisie Fawcett in 1955 turned his life around. She was an expert taxonomist, who educated him in her field. Their combined efforts on the taxonomy of eucalypts, including their novel use of floral structure, resulted in intense debates which the book summarises, though does not mention some strident disagreements with other taxonomists who were also intensely interested in eucalypts.

Denis and Maisie were made for each other and loved each other deeply. I recall, as a naive young graduate student in 1960, watching in wonderment, from the laboratory I worked in at the School of Agriculture in the University of Melbourne, as these two 'old' people (who were about 45 at the time) walked around the botany department's beautiful system garden at lunchtime, hand in hand.

While he was rapidly promoted to a readership at Melbourne, Denis was, in 1960, attracted to applying for the Chair of Botany at Queen's University of Belfast. The Board of Curators, impressed by the extraordinary breadth of his qualifications in botany, including mastery of plant physiology, developmental biology, anatomy, taxonomy, and bryophytes, offered him the job and he accepted it. The Department of Botany had become rundown, but within seven years Carr had built it up to one of the best in the United Kingdom. His immense energy and ability to garner modern instruments stimulated his students, with most of whom he had daily contact.

In 1968, David Catcheside, the Foundation Director of the Research School of Biological Sciences at ANU, succeeded in attracting Carr back to Australia. However, there were disagreements. Catcheside viewed biology as having no real boundaries, while both Carr and Ralph Slatyer, another foundation professor, strenuously fought against this idea. Carr and Slatyer eventually won, and separate departments of Developmental Biology and Environmental Biology were formed with both flourishing. Carr retired in 1980, at 65, to enthusiastic acclaim at his farewell.

The book ends with an appendix containing an essay by Carr entitled 'First know the nature of things'. This essay meant a lot to Carr. It is the printed version of his 1979 J. G. Wood Memorial Lecture. Although previous Wood lectures had been published, this one was rejected for publication. Carr was, understandably, deeply distressed by this and chose to publish the lecture privately.

Why was it rejected? That is not known, but it could have been because of the somewhat philosophical nature of the essay. The essay also gives the impression that universities should foster the attainment of new basic knowledge with little encouragement of any potential utility of that knowledge. That may have been the case 40 years ago. Certainly, Carr followed that line with his remarkable intensity. Today, however, there is a reasonable balance between basic and applied research.

This book will be appreciated by readers interested in the lives of talented academics. It will be of especial interest to the many who knew Carr as colleague, teacher, mentor or friend, and also to subsequent generations of students to whom Carr values have been passed down.

The author declares no conflicts of interest.

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