

## Mabberley's *Botanical Revelation*: The future

Robert E Marks

Emeritus Professor, Economics, UNSW Sydney

Robert.marks@gmail.com

This paper is drawn from Chapter 7 of David Mabberley's *Botanical Revelation* (2019, pp. 330–332), The future of botanical revelation. The text is reprinted with permission.

### Introduction

By “botanical revelation” David Mabberley means the way European botanical knowledge of Australia and its extraordinary native flora emerged. His book, Mabberley (2019), is an exhaustive exploration of this process, from the first plant record, in 1606, to Charles Darwin's time, using as a vehicle to document and illustrate these plants a very significant private library (the Peter Crossing Collection). The author was very pleased when David Mabberley sought permission from his publisher (NewSouth, Sydney) for this extract to be republished here. In the event, permission was granted and the author was able to source five images of botanical illustrations, as included. David Mabberley insisted that Marks be listed as sole author. The text is Mabberley's.

### How many plants are there?

The practical necessity of classifying plants according to their uses is at the root of plant systematics, which is therefore one of the oldest of all sciences, being evident in the historical records of all major civilisations. Despite this longevity and an enormous literature, both printed and online, the fact remains that it is still impossible to state accurately how many plant species there are in the world. Each year around 2000 new species are described globally (in Australia some 130 or so), and it is unknown how many undescribed species are undiscovered in the field or lie fallow as preserved specimens in museum collections.<sup>1</sup>

### Some extinctions

Following Allan Cunningham's concerns about possible local extinctions in the

Sydney area, the scale of land clearing in the “neo-Europes,” the territories now with Europeanised agricultural systems, led Joseph Hooker to write, “Many of the small, local genera of Australia, New Zealand, and South Africa, will ultimately disappear, owing to the usurping tendencies of the emigrant plants of the northern hemisphere, energetically supported as they are by the artificial aids that the northern races of man afford them.”<sup>2</sup>

Charles Darwin arrived in New South Wales just before Queen Victoria ascended the throne; by 1900, almost at the end of her reign, around 35% of New South Wales had been cleared, or partly so, while 75% of the nation's rainforest had already gone. By the 1990s some 300,000 tree ferns and grass trees (*Xanthorrhoea* species) were taken annually from the wild by the landscaping industry.<sup>3</sup>

1 Mabberley (2017) pp. vii–viii; Anna Monroe, pers. comm. with David Mabberley, 19 March 2019

2 Quoted in Crosby (1986), p.165.

3 Good (1993) pp. K-1.

In 2018 over 1000 Australian plant species were listed as vulnerable, and around 70 seed plants were already extinct. However, contrary to Hooker's forebodings, the only genus to have been lost was *Streblorrhiza* from Norfolk Island in the nineteenth century,<sup>4</sup> and neither New Zealand or South Africa has lost any.<sup>5</sup>

### Plant illustrators have been crucial

An important element in the botanical revelation charted in Mabberley (2019) has been the fundamental value of illustration in documenting the diversity of Australia's plants, and they were the subjects of some of the greatest botanical artists — namely, Pierre-Joseph Redoué<sup>6</sup> and Ferdinand Bauer.<sup>7</sup>

At the start of the 21<sup>st</sup> century, Australia's artists were internationally recognised as among the most accomplished in the world. A renaissance in this art form was perhaps led by Margaret Stones (1920–2018)<sup>8</sup> and Celia Rosser.<sup>9</sup>

Another remarkable exponent was Paul Jones (1921–1997), with his *Flora superba* (1971), in the startling style of Robert Thornton's *Temple of flowers* (1799–1807). There have been many others, for example the striking image by Susannah Blaxill, on the back cover of Mabberley (2019).<sup>10</sup>



Figure 1: *Hardenbergia violacea* by P-J Redoué, in Ventenat (1803). Australian Library of Art, State Library of Qld.

The best Australian artists, including Blaxill, were represented at the start of the century in perhaps the finest private collection of contemporary botanical illustration: that of Shirley Sherwood, often shown in the Shirley Sherwood Gallery of Botanical Art at the Royal Botanical Gardens, Kew.<sup>11</sup>

4 See Coyne (2023).

5 Gideon Smith, pers. comm. with David Mabberley, November 2015; Mark Large, pers. comm. with David Mabberley, November 2015.

6 Josephine Bonaparte commissioned P.-J. Redoué to illustrate *Hardenbergia violacea*, then known as *Josephinia imperatricis* in her honour. Figure 1.

7 See his coloured engraving of the Gynea Lily (*Doryanthes excelsa*) on the cover of Mabberley (2019), Figure 2.

8 See the cover of Stones & Curtis (1967–1978). Figure 3.

9 See the covers of Rosser (2001a, 2001b), Figures 4 and 5, and her gallery, at <https://www.celiarossergallery.com.au>.

10 See <https://blaxill.com>, Morrison (2012)

11 See <https://shirleysherwood.com>.

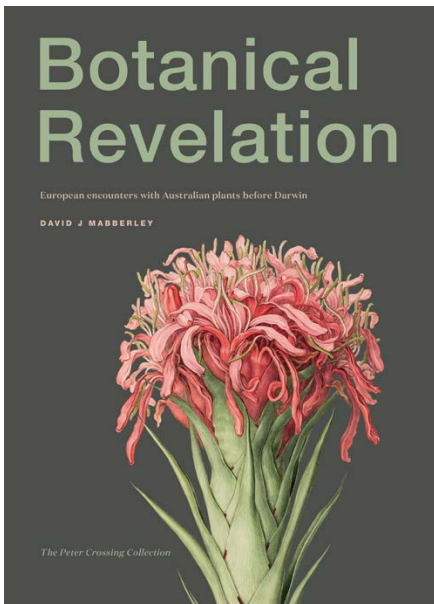


Figure 2: Cover of Mabberley (2019) *Doryanthes excelsa* by Ferdinand Bauer

### The unique genetics of Australian plants

In further botanical revelation, such excellence was mirrored in Australian expertise through the investigation of genetic characteristics of some of Australia's crop wild relatives.

In the 1960s there were 10.4 million people in Australia and just over 3 billion in the world; in 2019 there were over 25 million people in Australia, in a population growing faster than the average global rate; by 2050 there will be well over 9 billion worldwide. In 2019 the equivalent of two worlds' sustainable production was being consumed. To keep all these people going, the Earth will of course need to produce more food. Between the 1950s and the 2010s agricultural efficiency improved so that yields per unit area doubled. This had the effect

of saving from tillage millions of hectares, but there are limits to improving efficiency, and awareness of degradation of soils, pollution and the hazards of pesticides and herbicides has increased. Internationally, an understandably urgent call was made to conserve and investigate crop wild relatives to alleviate these pressures.

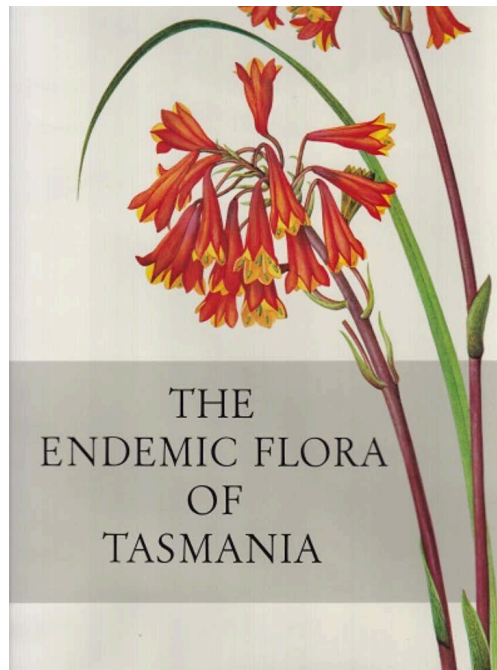


Figure 3: Cover of Stones & Willis (1967) *Blandfordia punicea* by Stones

In Australia in 2010, examination was underway of grasses with gluten-free grains like curly Mitchell grass (*Astrelba lappacea*) and pepper grass (*Panicum laevinode*), once collected by Thomas Livingstone Mitchell, and dryland legumes like Cooper's clover (*Trigonella suavissima*), which Mitchell recorded.<sup>12</sup>

12 Bell et al. (2010).

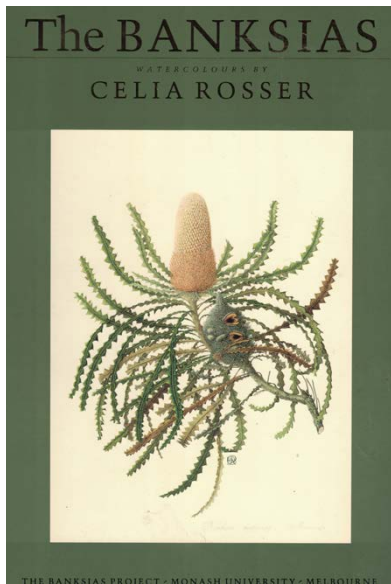


Figure 4: Cover of Rosser (2001a), *Banksia victoriae* by Rosser

Particularly important was the discovery in the early 21<sup>st</sup> century at Macquarie University in Sydney of heat-tolerant proteins in Australian rice, *Oryza australiensis*,<sup>13</sup> a perennial cultivated and harvested by Aboriginal people in northern Australia (Pascoe, 2018). Such proteins continue to be sought in wild Australian relatives of cotton and tobacco. In a warming climate, the advantages of using genetic engineering with the genes coding for these proteins in their allied commercial crops, and even in wheat, are obvious, making this area of botanical revelation crucial.

### The impacts of Australian plants

As Europeans gained knowledge of Australian native plants, they took them throughout the world via their horticultural and botanical networks, transforming landscapes with Australian trees and bringing the continent's

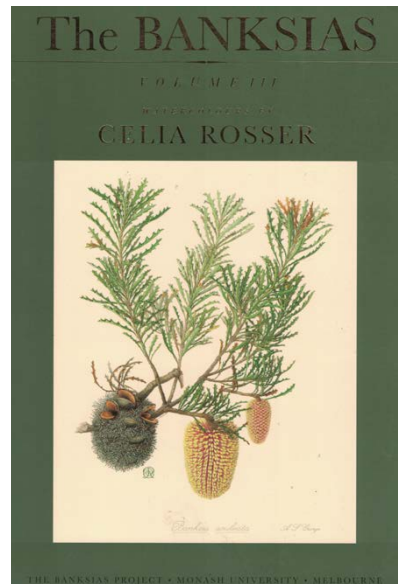


Figure 5: Cover of Rosser (2001b), *Banksia aculeata* by Rosser

more striking ornamentals into cultivation, as well as depicting the flora in inspiring art of the highest calibre. Australians early in the 21<sup>st</sup> century continued to do all these things, and, with their ingenuity, are poised to contribute even more to human wellbeing.

### Bibliography

- Bell LW, Bennett RG, Ryan MH, et al. (2010) The potential of herbaceous native Australian legumes as grain crops: A review. *Renewable Agriculture & Food Systems* 26: 72–91.
- Coyne P (2023) Ferals — some remote Australian island experiences. *Journal & Proceedings of the Royal Society of New South Wales* 156: 221–242.
- Crosby AW (1986) *Ecological Imperialism: The Biological Expansion of Europe 900–1900*. Cambridge University Press.
- Good R (1993) The impact of human activities on the Australian flora. In: Association of Societies for Growing Australian Plants (ed.)

<sup>13</sup> Scafaro et al. (2016).

- Seminar papers: 17<sup>th</sup> biennial seminar, Robert Menzies College, Sydney 27 September to 1 October 1993.*
- Jones P (1971) *Flora superba*. London: The Tyron Gallery.
- Mabblerley RJ (2017) *Mabblerley's Plant Book: A Portable Dictionary of Plants, Their Classification and Uses*. 4<sup>th</sup> ed. Cambridge University Press.
- Mabblerley RJ (2019) *Botanical Revelation: European Encounters With Australian Plants Before Darwin*. Sydney: NewSouth.
- Morrison G (2012) Decline and rebirth: Botanical art in Australia from 1900 to the present day. In: Freud P (ed.) *Capturing Flora: 300 Years of Australian Botanical Art*, pp. 223–269. Ballarat: Art Gallery of Ballarat.
- Pascoe B (2018) *Dark emu: Aboriginal Australia and the Birth of Agriculture*. Broome, WA: Megabala Books.
- Rosser C (2001a) *The Banksias: Watercolours*. Melbourne: Nokomis Pub.
- Rosser C (2001b) *The Banksias, Vol. 3: Watercolours*. Melbourne: Nokomis Pub.
- Scafaro AP, Gallé A, Van Rie J, et al. (2016) Heat tolerance in a wild *Oryza* species is attributed to maintenance of Rubisco activation by a thermally stable Rubisco activase ortholog. *New Phytologist* 211(3): 899–911.
- Stones M and Curtis W (1967–1978) *The Endemic Flora of Tasmania*. London: Ariel, in six volumes.
- Thornton RJ (1807) *The Temple of Flowers*. London: The author.
- Ventenat EP (1803) *Jardin de la Malmaison*. Paris: Imprimerie de Crapelet.

