# GARDNER'S WORLD

**by Rob Buehrig and Kate Hooper**

The quest to relocate some of Western Australia's rare plants is frequently fraught with problems. Poor records, kept by the legendary and sometimes colourful characters who originally discovered the plants, only help to make them more ellusive. This is the story of one such early collector.

Western Australia has an array of plants that rivals those of the species-rich tropical regions of the world. It is estimated that there are about 9 000 species in the area from Shark Bay to Israelite Bay alone.

Pioneering botanists such as James Drummond, Ludwig Preiss and Charles Gardner contributed much to our knowledge of the flora of Western Australia, but the State covers such a vast area and encompasses such a rich variety of plants that much botanical exploration remains to be done. It may come as a shock to some to realise that some of the estimated 12 000 plant species thought to grow in Western Australia have only been collected and documented once or twice, some as long ago as the 1840s, and have never been rediscovered since. Having a plant specimen without knowing where to find the plant is somewhat academic, we are continually looking for ways to retrace the steps of the early collectors.

Charles Gardner was one of the most influential figures in the rich history of botanical study in Western Australia, and also one of its great personalities. As Government Botanist, Gardner is credited with having collected 10 000 to 12 000 plant specimens, and he named a large number of the plant species in WA.

## A DEVOTION TO PLANTS

Gardner was an enigmatic figure, remembered by many Western Australian botanists for his idiosyncrasies as well as his prodigious knowledge of plants. Plants were his life. His fascination with them led him to roam the entire State over a period of 50 years, collecting, naming and characterising its plants. He described eight new genera and some 200 new species.

Charles Austin Gardner was born in England in 1896, into a Lancastrian farming family. He developed an interest in botany at an early age, starting his first herbarium (collection of dried plant specimens) when he was about 11 years old. When Charles was 13, the Gardners sold their farm and emigrated to Western Australia, arriving in Albany in November 1909. They settled on a property near Yorkrakine in the central Wheatbelt, where the abundant wildflowers must have spurred young Charles' burgeoning interest in plants.

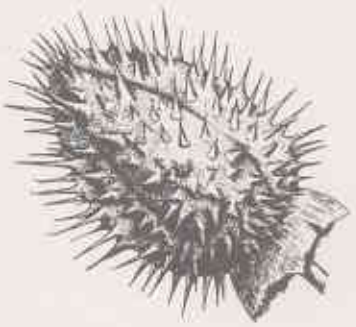
Throughout his teens and early twenties, while working as a bank clerk, Charles Gardner extended his knowledge of the local flora; collecting and identifying plants around Yorkrakine, and lovingly producing drawings of them. He made a name for himself among amateur botanists and, most importantly, impressed D.A. Herbert, then Economic Botanist and Plant Pathologist with the Department of Agriculture. As a result he was appointed Forests Department Collector in 1920, an opportunity that turned his obsession with plants into a career.

As luck would have it, one of his earliest commissions was to accompany an expedition sent by the Surveyor-General's office to survey the northern Kimberley in 1921. It must have been overwhelming to enter a region hardly touched by settlers; indeed, the expedition came into contact with Aborigines who had never seen Europeans before. Gardner must have been overawed by the plants he encountered, many of which had never been described and were unlike any he had seen before. The collections he made on that expedition launched his professional career: he described 20 new species and added a new family to the known flora of Western Australia.

In 1924 Gardner transferred to the Department of Agriculture, and in 1929 at the age of 33 he was appointed Government Botanist and Curator of the WA Herbarium, a post he held until the age of 65.

Gardner had a photographic memory, and an astonishing ability to identify local plants on the spot. He could even identify exotic plants that he had never seen before, simply by remembering their descriptions. His intimate knowledge of soils, aspects, climate and flowering times gave him the ability to examine a set of specimens and say exactly where they had been collected. When collectors brought plant specimens to the Herbarium, he took delight in saying something like, 'Don't tell me, let me examine them. You have been to Wongan Hills, Dalwallinu and Moora'. And he was invariably right.

With the help of his friend Father William Gimenez of the Benedictine Monastery at New Norcia, he became



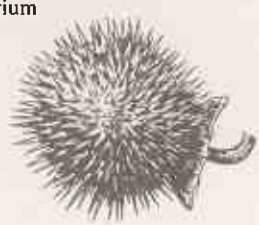
*Previous page*
Rapier feather flower (*Verticordia mitchelliana*).
Photo - Jiri Lochman
Illustrations by Charles Gardner

*Above*: Phalanx grevillea (*Grevillea candelabroides*) is just one of many striking species documented by Gardner.
Photo - Charles Gardner

*Left*: *Verticordia etheliana* was named in 1941 after the wife of Dr W.E. Blackall, an eminent amateur botanist who produced illustrated keys to the flora of south-western Australia.
Photo - M&I Morcombe

*Below left*: Charles Gardner.
Photo - WA Herbarium

*Below right*: This 'plant with no name' was collected by Gardner, but he gave no details of the species or its location.
Photo - WA Herbarium



fluent in Latin, the language of botany. He often wrote his collecting notebooks and labels in Latin, a habit that has made the task of unravelling his notes rather more difficult!

Gardner's collecting trips were prolific. He documented many of the State's most striking species, such as the phalanx grevillea (*Grevillea candelabroides*) and the rapier featherflower (*Verticordia mitchelliana*), which has a pendulous woolly flower with a sharp rapier-like protruberance. Gardner would collect and press enormous numbers of plants, his besetting sin being that he was often so eager to move on to the next plant that he would neglect to label the specimens. His collecting notebooks were often written up much later, and despite his prodigious memory, errors must have occurred.

Of course, even when he knew exactly where he had found a plant, it was not always easy to provide a specific location. Modern botanists record plant locations using geopositioning systems, giving latitude and longitude, but in Gardner's day such precise methods were not available.

He would probably have taken the train to somewhere like Dalwallinu, then hired a horse and cart, or later a motor car, from a local farmer and rambled around the area. A specimen labelled 'Dalwallinu' might have been found anywhere within a 30-40 kilometre radius of the town.

## SHARING THE KNOWLEDGE

There is an intriguing plant specimen in the WA Herbarium, mounted on one of Gardner's herbarium sheets, which is otherwise left blank.

The 'plant with no name' is a fascinating-looking plant, probably a new genus, perhaps related to the feather flowers (verticordias) or to the darwinias. Could he not remember where he had found it? Or was he so keen to keep the finding to himself that he did not record details of its locality? Botanists at the Herbarium have since tried, without success, to find out from where it came. The secret of this mysterious plant may have died with Gardner.

The 'plant with no name' reveals another facet of Gardner's character: he

*Above left*: A specimen of (*Melaleuca arenaria*), recently rediscovered by Rob Buehrig more than 70 years after Gardner first discovered it.
Photo - CALM

*Above: Eucalyptus jucunda*, one of the many plants described by Gardner.
Photo - Steve Hopper

was often reluctant to share his knowledge with other scientists. With his vast knowledge of plants and their relationships, his great ambition was to write a complete *Flora* of Western Australia. But, like many a gifted perfectionist, he was reluctant to share the huge task of classifying the plants he had discovered.

Charles Gardner made an outstanding contribution to the study of the State's flora. However, the irony is that instead of being a catalyst for research into the plants he loved, he may have hampered research by his determination to encompass the whole of the local botany himself. He could have used the skills of the many informed amateur plant collectors in the State, but instead he tended to freeze them out. The tragedy is that although he made copious notes, he never completed the comprehensive *Flora* of WA that he was so uniquely positioned to write. The first volume of this *magnum opus* (*Flora of Western Australia Vol.1 No.1, Gramineae*, published in 1952) was the only part he completed. Many of his observations were never published, and have been lost.

Paradoxically, in some respects he was generous in sharing his knowledge of plants. His *Wildflowers of Western Australia*, first published in 1959, is now in its eighteenth edition, and is still considered an inspired work on the subject. He was a gifted speaker, with the ability to inform and enthuse his audience, and was much in demand. In his day his lectures on wildflowers packed Perth's Town Hall. He gave numerous radio talks and acted as a botanical guide. He also lectured on systematic botany at the University of Western Australia for nearly 40 years.

Charles Gardner never married; his great love in life was plants. Even after his retirement he continued to collect and record plants, but ill-health overtook him before he could complete his ambitious systematic *Flora*. He died in 1970.

## CONSERVING THE LEGACY

Charles Gardner's legacy lies in the many plant specimens he collected, and in some of our nature reserves and national parks. He had a strong commitment to conservation, and the vision to realise that on a world scale, some areas of the State were extraordinarily rich in plant species. He used his gift for expression to extol their virtues and to urge the government to set aside large reserves such as Cape Arid and Fitzgerald River, which now protect many rare and endangered species.

Although national parks and reserves have a vital role in conserving our flora, they do not contain all our rare species. Unfortunately, our knowledge of some rare and endangered plants is sketchy. For some specimens in the Herbarium, it is not known whether the species still grows at the site at which it was originally collected, let alone elsewhere.

The Department of Conservation and Land Management (CALM) has initiated a series of Wildlife Management Programs, to provide information on the appearance, distribution, habitat and conservation status of the wildlife and Declared Rare (and Priority) Flora in particular Districts and Regions. This information will allow the Department more effectively to conserve and manage our rich flora and fauna.

When the original collector's notes on a plant species provide information on location, soil type, landform, aspect and association with other plants, it is possible to design the survey so as to increase the chance of rediscovering the plant.

Normally, a survey of the plant life of an area begins with a search of the Herbarium records, to produce a list of all the plants known to have been collected in that area previously and their locations.

This may not prove as simple as it sounds: part of the difficulty in rediscovering rare species lies in the lack of information given by some collectors. Charles Gardner was by no means the only botanist to provide imprecise information on the locations of plant specimens; the nineteenth

century collector James Drummond was notoriously vague about locations. One of Drummond's most infamous specimens is simply labelled 'New Holland', and another 'Swan River Colony'. For this reason, tracking down rare plants can involve some detective work.

## RETRACING THE STEPS

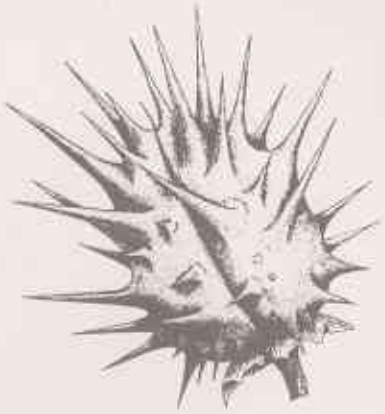
In the case of rare plants for which there is little information, we can sometimes do little more than familiarise ourselves with the specimens available and hope eventually to find the plants during the course of other survey work. On other occasions there are clues that give direction to the search.

Even though Gardner's locations are often imprecise, he prided himself on correctly describing the plant's habitat. His soil descriptions were very accurate. As soils often faithfully reflect the underlying bedrock, one key to unlocking Gardner's locations, and to rediscovering some of our rare and endangered plants, could be geology.

By making educated guesses as to the rock-type preferences of particular species, one can use geology to inform the search for them. The reverse technique, using vegetation to map minerals, is not new. For example, particular plants are known to favour copper-rich soils, and prospectors will take their occurrence as an indication of the nature of the bedrock. Here, we use geology to prospect for the plants.

A benefit of this method is that, by noting the rock types found in reserves and parks, it is possible to forecast which rare species one might expect to find there. In looking for a book on a crowded bookshelf, it helps to have a mental image of the cover. In the same way, if one surveys an area with a rough idea of what rare plants one might expect to find there, one is more likely to pick them out. In this way, new populations of endangered species may be found (see 'From Buckshot to Breakaways', *LANDSCOPE*, Spring 1993).

This approach is simple, cheap and has great potential for locating rare and endangered plants. It may save time in the field by focusing our search. It may also resolve some of the mystery surrounding a great botanist, Charles Gardner.



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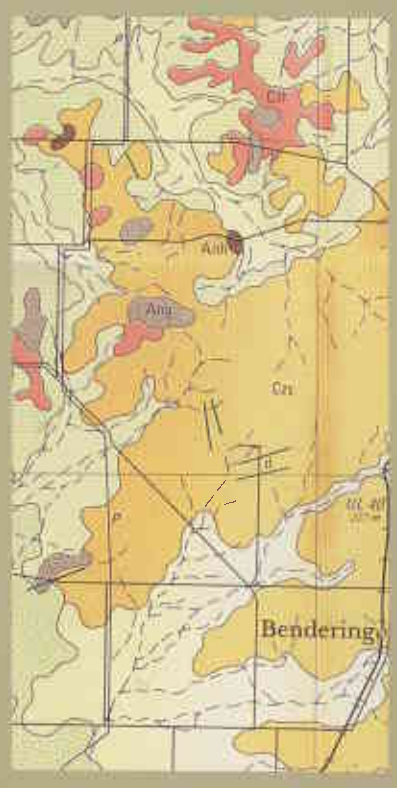


## GEOLOGY AS A TOOL

How does one go about using geology to find rare and endangered plants? The first step is to pinpoint all of the original sites of collection, as closely as possible, on geology maps. If a plant species has been collected more than once, we can look for geological features that are common to the different locations. In this way, it is often possible to define a species in terms of the geological formations that it favours.

Of course, in some instances the collector gives helpful clues. The species *Melaleuca arenaria* had been collected only once, in 1922, near Bendering by Charles Gardner. It had never been found since, and was described as: 'Presumed extinct and unknown in cultivation. There seems little hope that this species will be rediscovered'. But Gardner described the habitat of *Melaleuca arenaria* as '...yellow sandy gravelly soil...'. He also named the plant *arenaria* meaning 'pertaining to, or growing in, sand'. Interestingly, the geological map of the Bendering area includes a formation described in the key as 'Reworked Cainozoic sandplain: yellow and white sand containing locally abundant limonite pebbles'. This formation may be the basis of the soil that Gardner described, and it is something to work on. Looking at the geological map around the place that I estimate Gardner must have collected *M. arenaria*, I found this type of sand formation in a large nature reserve nearby. Thus, without stepping from the office, a strategy was laid.

In the case of this plant, the strategy paid off. The next time field work took me near that nature reserve I was able to follow up the hunch. As I stepped from the car I was surrounded by *Melaleuca arenaria*, growing in abundance more than 70 years after Gardner first discovered it.

Rob Buehrig

**The geological survey map of Corrigin used to help find the *Melaleuca arenaria*. Map - Courtesy of the Geological Survey of Western Australia**

The galah is just one of the many bird species that visit our urban and suburban gardens. 'Birds in the Garden' shows us how we can attract more.

In spring, the Wongan Hills are ablaze with wildflowers, but this 'island' sanctuary is also a home to a wide variety of animals. See page 21.

# LANDSCOPE

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*Yanchep National Park is having a facelift. Our story on page 28 examines the history and rebirth of one of Perth's closest and most visited national parks.*

Banksia gardneri *var.* brevidentata *is one of a number of plants named in honour of Charles Gardner. See 'Gardner's World' on page 41.*

*The Pinnacles is one of several destinations for licensed tours operating in WA's national parks. See 'Travel Companions'.*

## FEATURES

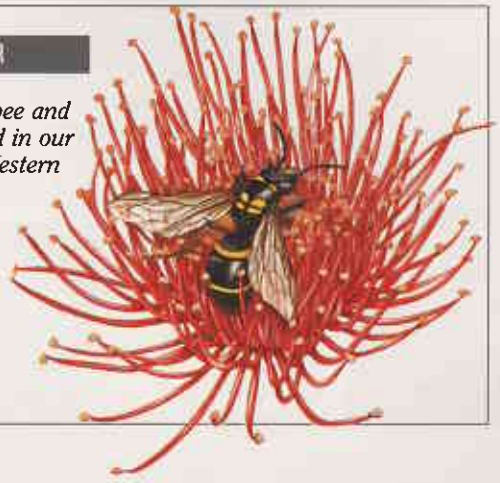


## REGULARS



## COVER

Hyleoides zonalis *is a solitary bee and one of the native bees described in our story about the 'real' bees of Western Australia on page 17.*
*The illustration is by Philippa Nikulinsky.*



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