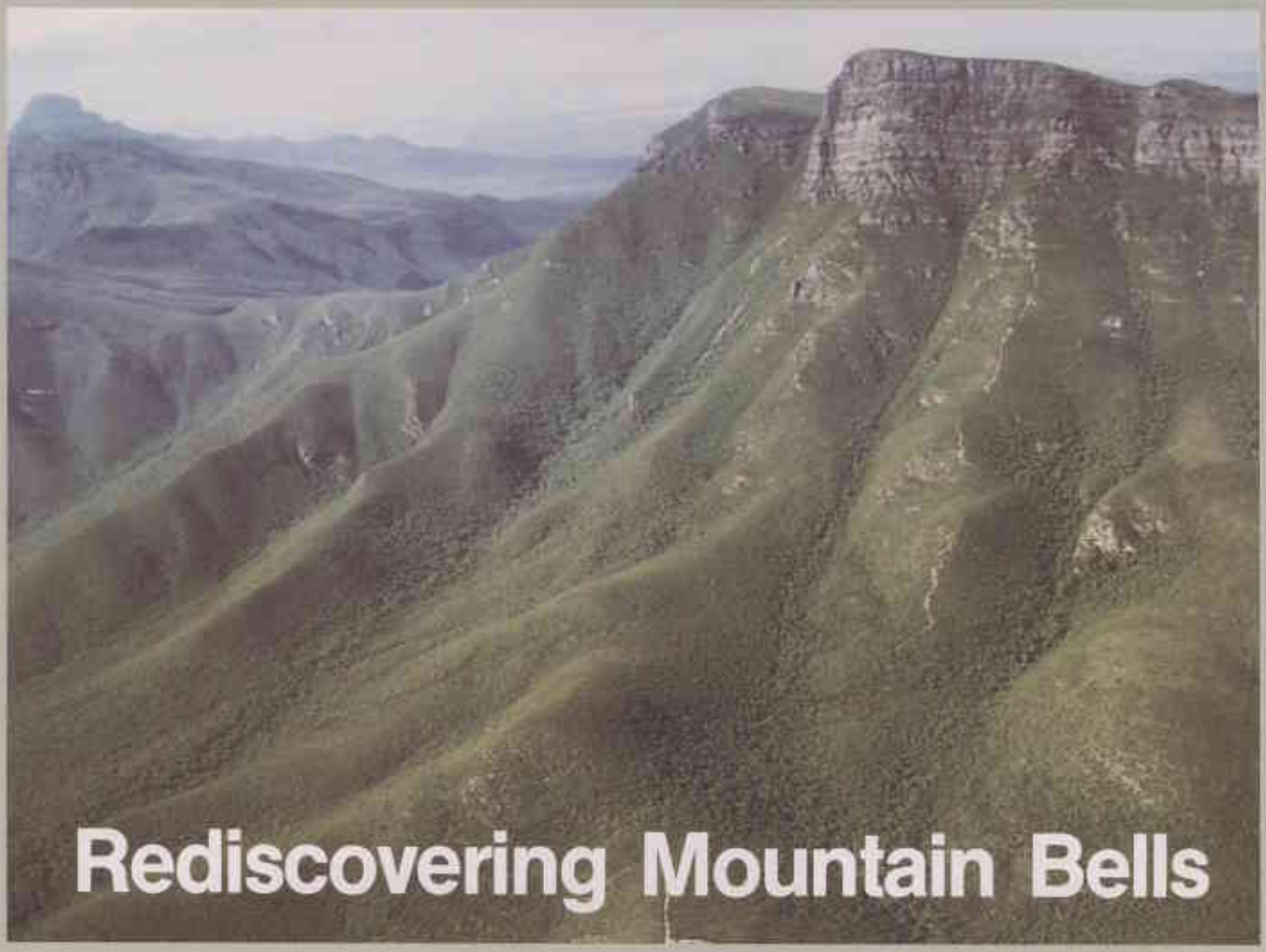


Cliff Winfield

Rediscovering Mountain Bells

Bluff Knoll, the highest point of the Stirling Range and home of *Darwinia squarrosa* and *Darwinia collina.*

by
Botanist
Greg Keighery

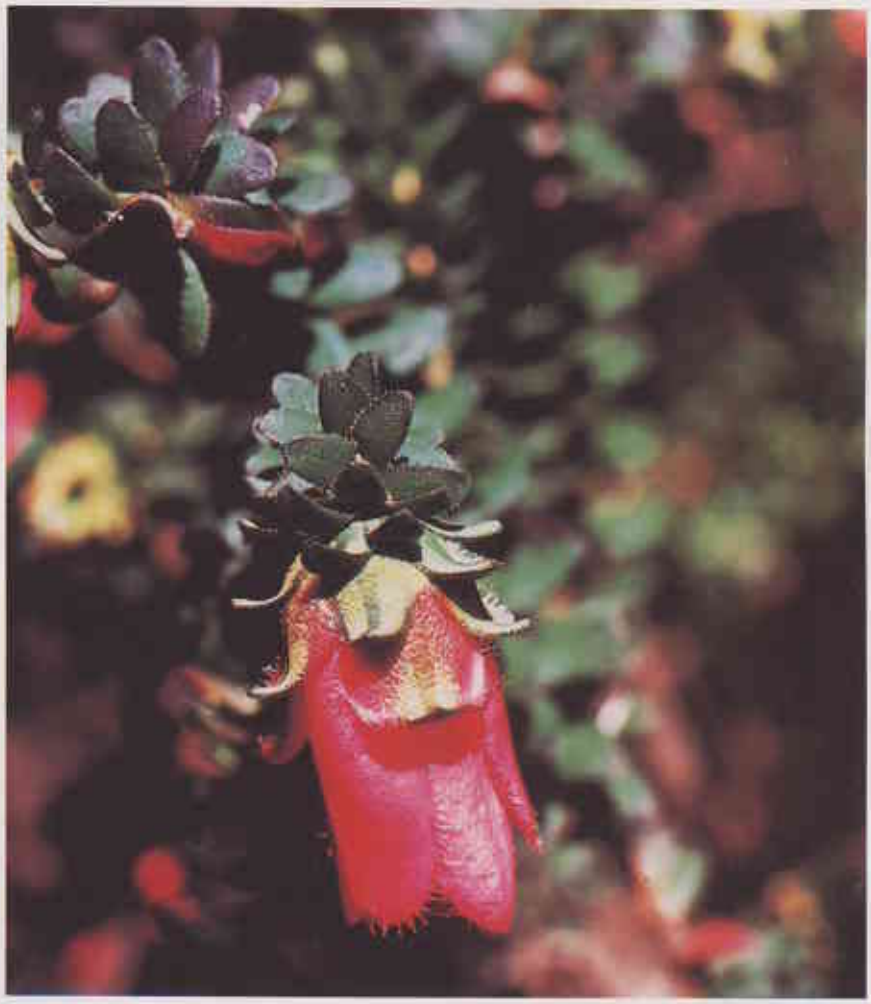
It was one of the more rewarding moments of my many visits to the Stirling Range when in September 1981 after a long, hard, wet climb I first saw, in full flower on Mt Success, a previously unknown species of mountain bell.

The Stirling Range, rising to a height of over 1,000 metres, is the nearest approximation to a mountain range that the subdued topography of Western Australia has produced. Now enclosed in a magnificent National Park, the range is home to almost 1,000 species of flowering plants, including 60 that occur nowhere else.

As a scientist I have been associated with the range since 1977 when I first became interested in the lovely and varied plants, mountain bells (*Darwinia* species). At this time their names were confused, so work began to obtain more information about the total flora of the range, with special attention being paid to the mountain bells. The results of seven years' work are now to hand, revealing a fascinating history and description of the *Darwinias* in this region.

Greg Keighery

This unnamed *Darwinia* species differs from *Darwinia squarrosa* (opposite) in that the bracts are slightly more red in colour, and the flowers protrude. This is the only bell confined to a single peak.



Greg Keighery

The false bell, *Muiriantha hassellii* mimics the *Darwinia* form. However the bell is actually a single flower, unlike the bell of the *Darwinia* which is composed of flower-like leaves called bracts.

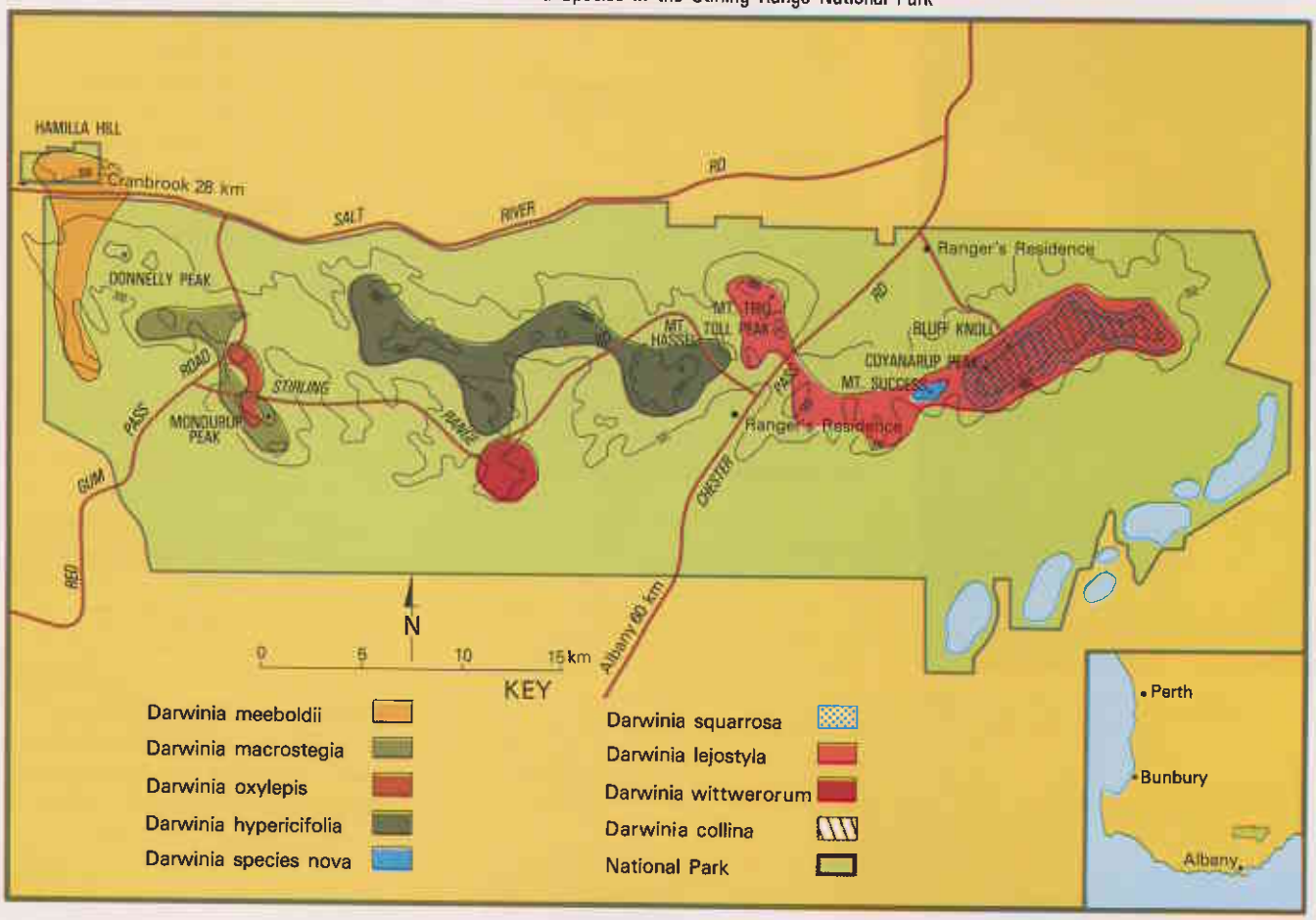
All of the mountain bells belong to the genus *Darwinia* (named after Erasmus Darwin, grandfather of Charles Darwin). The genus is a member of the family Myrtaceae, and is closely related to the Geraldton waxes *(Chamelaucium)*, Albany swamp daisy *(Actinodium)* and the feather flowers *(Verticordia)*. The genus *Darwinia* in Western Australia is comprised of approximately 60 species (about 15-20 are unnamed), and can be divided into several very discreet sections. One of these sections contains the mountain bells and the very rare *Darwinia carnea*, the only member of the group found outside the Stirling Ranges.

Close-up

The bell of the *Darwinia* is in fact a cluster of flowers that hang down and are enclosed by colourful petal-like leaves referred to as bracts. One plant frequently mistaken as a *Darwinia* is *Muiriantha hassellii*. This genus, a member of the Rutaceae family, has pale yellow, slender bells and is endemic to the range. It can be distinguished from *Darwinias* in having a solitary flower per bell, and in flowering in autumn and early winter, not spring and early summer. All species of *Darwinia* attract birds who feed on the nectar produced by the plant and who pollinate the flowers. *Muiriantha* is also pollinated by honey-eating birds and has probably mimicked the shape of the *Darwinias* in order to attract pollinaters.

The distribution of each species of mountain bell is shown in the accompanying map. One popular misconception is that the bells are confined to particular peaks. This is not generally true, although most occur within well defined regions, either upon several peaks or in the valleys between them. Always they occur above the 300 metre contour level, and on acid sandy clay soil.

Figure 1 Distribution of Darwinia Species in the Stirling Range National Park



The simplest way to consider each species is to discuss them in a geographical sequence from the driest area (Cranbrook) to the wettest (Bluff Knoll — East). The first bell encountered is the Cranbrook bell *(Darwinia meeboldii)* which is the emblem of the Cranbrook Shire and occurs on the Hamilla Hills and the far western margin of the range. Originally this species was thought to be confined to Donnelly Peak, but our subsequent searches have failed to locate it on this peak. There are two distinct colour forms, the yellowish Hamilla Hills form and the paler Western Stirlings form. It is important that both forms be preserved, as the Hamilla Hills form is the Cranbrook emblem and is characteristic of this group of mountain bells.

The second species is Gillham's bell, *(Darwinia oxylepis)*, long considered a form of *Darwinia lejostyla*, but always considered distinct by longtime Cranbrook resident Alf Gillham. Our studies show it to be deserving of separate species status, and we then discovered that James Drummond had collected it on his visit to the range in 1848. His material had been described as a species of *Genetyllis* by Russian botanist Turczaninow in 1852, and subsequently ignored by English and Australian botantists. However, the original name has now been resurrected as this species is considered to be closely related to *Darwinia meeboldii*, not *D. lejostyla*. It is confined to lowland regions rather than the peaks of the Stirlings.

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Left:
Darwinia meeboldii is the emblem of the Cranbrook Shire and shows the characteristic bell shape of the species.

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The third species encountered is the tulip darwinia or the Mondurup bell *(Darwinia macrostegia)*, a plant with an untidy straggling habit, but with large bells showing red veins that may vary from almost white to nearly pure red. In Europe during the nineteenth century this species was widely cultivated from seeds sent back by James Drummond, but it is rarely grown now. *Darwinia macrostegia* prefers high wet slopes of the larger western peaks.

Left:
Darwinia wittwerorum was named after Ernst and Magda Wittwer in 1981. Note that the bell structure is rounder than most other mountain bells.

In the central part of the range grows the lowland species, *Darwinia wittwerorum*, named after Ernst and the late Magda Wittwer. This is a small erect shrub, which occurs on only a few sites in the central Stirlings, and can be easily distinguished by its small almost closed bells, tinged red at the base. It too was previously placed in *Darwinia lejostyla*.

On all larger peaks of the central Stirlings, one finds the widespread *Darwinia hypericifolia*. Closely related to *Darwinia macrostegia*, it shares the same scrambling habit, but differs in having narrow few-flowered heads covered by pure red bracts.

Finally, just before the high eastern peaks, *Darwinia lejostyla* (note: *lejostyla* not *leiostyla*) can be found, west of Chester Pass on Mt Trio and Tolls Peak. This is the second widespread species,

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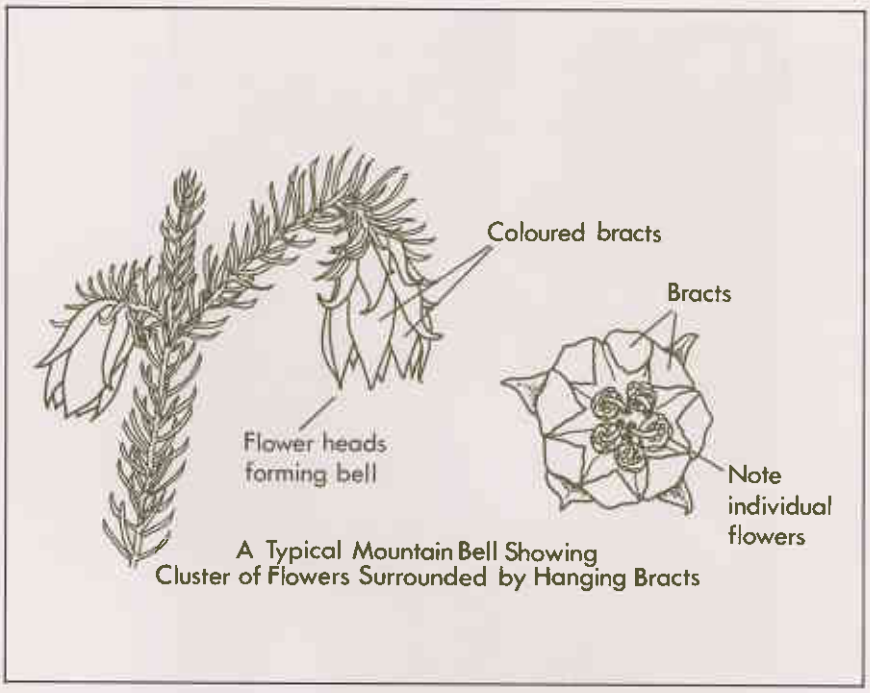
Left:
The Mondurup bell, *Darwinia macrostegia*. This bell was most frequently grown in nineteenth-century Europe from seeds sent to London by James Drummond in 1850. It gained the name tulip bell because of the resemblance of the bracts to a variegated tulip flower.

Below:
Darwinia oxylepis growing beautifully on the slopes near the eastern end of the Stirling Range National Park.

Cliff Winfield

and the only one that crosses Chester Pass. *Darwinia lejostyla* has two distinct forms, a montane form with long, bright pink bracts, and a valley form, with upturned light pink spreading bracts (known only to occur in the valleys below Bluff Knoll). Our studies indicate that these two forms should be recognized as separate sub-species of *Darwinia lejostyla*. James Drummond found the valley form during his visit to the range, then climbing higher he found *Darwinia squarrosa*. However, since he normally found only one bell per peak on the western hills he did not climb further. Hence he never saw the montane form of *Darwinia lejostyla*, nor *Darwinia collina*, which was not named until the late 1920s.

Figure 2



A Typical Mountain Bell Showing Cluster of Flowers Surrounded by Hanging Bracts

Right and Below:
Darwinia hyperificolia occurs on Mt Hassell and other peaks in the central part of the Stirling Range National Park.

Greg Keighery

Greg Keighery

The valley form of *Darwinia lejostyla* was once confused with members of the genus *Genetyllis* but has now been confirmed as a *Darwinia*. Note the beautiful pink colour of the bracts.

The other mountain bells are all confined to the high, wet eastern peaks. *Darwinia squarrosa* occurs generally at lower levels than *Darwinia collina* which is confined to the high plateau. The two species do not normally occur together. *Darwinia squarrosa* descends the wetter valleys and, for example, occurs in a very localized position just above the waterfall on Bluff Knoll. This species with its fringed leaves and pink bracts is very distinctive. *Darwinia collina* (aptly named in Latin as "dweller on hills") is the most spectacular species of all the bells. In places where the soils are very shallow it grows as a dense shrub covered in large lemon-lime bells (they are often tinged with red on Bluff Knoll and Coyanerup Peak).

The final species, discovered on Mt Success in 1981 and currently unnamed, is probably the rarest mountain bell. It is

Below

The mountain form of *Darwinia lejostyla*. This bell is probably the most commonly encountered by tourists who climb the peaks around Chester Pass (especially Bluff Knoll).

Greg Keighery

closely related to *Darwinia squarrosa* but differs in having a smaller bell, short red bracts and a scrambling habit (see photo on page 4).

New Discoveries

One final point of interest to note in the mountain bells is the presence of interspecific hybrids. As can be seen from the distribution map and notes on each species, the bells rarely occur together, being separated either geographically or altitudinally. In cases where two species do meet, hybrids can be found. So far, two hybridizing populations are known, *Darwinia collina* x *Darwinia lejostyla*, and the unnamed species hybridizing with *Darwinia lejostyla*. The latter hybrid is a very attractive plant, and the population is one of the largest naturally hybridizing populations of wildflower known in Western Australia.

Greg Keighery

Darwinia collina occurs high in the range, in the vicinity of Ellens Peak and Coyanerup. Its almost translucent colour and profusion make this one of the most spectacular of the mountain bells.

Below:

Ranger Martin Loyd shows one of the *Darwinia witterorum* plants growing in the Stirling Range National Park.

Cliff Winfield

Greg Keighery

This phantom hybrid was found on Tolls Peak. It is a cross between *Darwinia lejostyla* and *Darwinia hypericifolia.*

Below

This lovely hybrid is a cross between the unnamed species and *Darwinia lejostyla.* It is currently being cultivated and should prove a very good garden plant. Being a hybrid, this plant grows easily from cuttings.

Greg Keighery

The delight of working in the range, apart from the scenery and the flowers, is that one is able to make new and exciting discoveries even on well trodden territory. As an example, while climbing Tolls Peak to check flowering of the only bell recorded on this peak for a visit by a group of overseas botanists in 1984, we discovered three hybrids between *Darwinia lejostyla* and *Darwinia hypericifolia.* These phantom hybrids, in a large population of normal *Darwinia lejostyla,* were found on or near a track on a deep valley opposite Mt Hassell (where *Darwinia hypericifolia* grows). Apparently birds visit *Darwinia hypericifolia* on Mt Hassell, then fly across the intervening valley floor, up the gully and into the *Darwinia lejostyla* population to feed. Along the track edges the hybrids can grow and survive. This sort of hybrid has only been documented in the genus *Darwinia* in this area in Western Australia. Who knows what other unusual and exciting discoveries await us with the mountain bells of the Stirling Range?

I would like to acknowledge that the work undertaken in the Stirling Range National Park was, for a number of years, a co-operative effort between myself and Dr Neville Marchant from the Western Australian Herbarium.

Landscope Volume 1 June 1985

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Front Cover

Wildlife is a term that applies to both fauna and flora in their native environments, and includes the smallest insect, the largest mammal, the daintiest flower and the tallest tree. Co-ordinated land management will keep our wildlife everlasting, like these everlastings *Helipterum craspedioides and Helichrysum davenportii* which, every spring, carpet the semi-arid regions of Western Australia in profuse colour. Photo: Cliff Winfield

Minister's Message

Western Australia's land is among the most ancient in the world, and because of our isolation and climate, much of our flora and fauna is unique — evidenced by the 8000 plant species that are indigenous to this State.

The Western Australian Government has a responsibility to protect our unique landscape for our current use and, in particular, for the use of future generations.

To help us achieve our objective the Government has amalgamated the Forests Department, the National Parks Authority and the Wildlife Branch of the Department of Fisheries and Wildlife to form the Department of Conservation and Land Management.

The new Department will co-ordinate the functions of its predecessors and will utilize the combined resources at its disposal to encourage effective and lasting land management practices in Western Australia.

To operate effectively the Department of Conservation and Land Management will encourage public participation in its operations and at the same time will keep the public informed of its practices.

The publication of this magazine — Landscope — will play an important role in keeping the public and staff informed about the valuable scientific work being carried out in Western Australia by the Department.

The publication of this, the first issue of Landscope, indicates the success that can be achieved through the combined efforts of people who were previously employed by the amalgamated Departments.

I commend them on the success of this magazine and I look forward to reading future editions.

Ron Davies
Minister for Conservation and Land Management
Western Australia