



Kosciusko's alpine flora

Travel up to Mt Kosciusko, Australia's highest peak, at the end of January. Usually you will be rewarded with one of the most magnificent wildflower displays in the world.

Alpine flower displays are magnificent anywhere — best known are those of the Swiss Alps, or the Rocky Mountains. That of the 250-sq-km alpine area of the Snowy Mountains is no exception.

Studying these wildflowers and the other alpine vegetation of Kosciusko has been the life's work of ecologist Dr Alec Costin, formerly of the CSIRO Division of Plant Industry.

Dr Costin has now teamed up with three other colleagues within the Division to produce a detailed book of around 400 pages about the high-country flora of the area. Called 'Kosciusko Alpine Flora', this book is very much a labour of love. It will be published early next year by CSIRO.

'Kosciusko Alpine Flora' has two aims. The authors have tried to present the beauty of the area as well as give scientific information. Thus they hope that other people 'will learn to under-

stand and appreciate this unique and wonderful flora and, in doing so, become committed to conserving it'.

Dr Costin wrote the text. He and Mr Dane Wimbush, who has been living in the Kosciusko National Park for the last 20 years, were mainly responsible for the ecological information.

The book will also contain a large amount of taxonomic information and keys for identifying the plants. Mr Max Gray contributed these. Wildflower photographer Colin Totterdell took the large number of beautiful colour plates and black and white photographs that illustrate the work.

The book is divided into five parts. An introductory section outlines the area's general features, and its geological and climatic history. Then comes a summary of human history and use, followed by a consideration of the general characteristics of the flora — where it came from and how it's related to other alpine floras. After this come keys to the species, and finally each species is described with the aid of colour plates, together with notes on

the habitat and other points of special interest.

There are some 200 alpine species in the Kosciusko area, many of which were originally described by the great Ferdinand von Mueller, who traversed the area and collected very thoroughly during the 1850s. Nevertheless, some of the most common plants still aren't properly named — especially those with close relatives in Tasmania and New Zealand. Twenty species occur only in the park.

What in fact is alpine vegetation? One definition states that it includes all the vegetation above the treeline. The Snowy treeline occurs at about 1830 metres.

However, some authorities have questioned whether the vegetation above this elevation is truly alpine. They argue that at similar latitudes elsewhere in the world the treeline is often several hundred metres higher, and that Australia's is kept low by peculiar local features like shallow or poorly drained soils. The treeline of the Colorado Rockies, for example, is at about 3000 metres. So it can be argued that, since Australia's highest peak reaches only 2228 metres, none of the vegetation is truly alpine.

Dr Costin disagrees. He points out that regardless of where treelines are — be they on high mountains in either the Northern or Southern Hemisphere or in the Arctic or Antarctic regions — they all have one feature in common: the mean annual temperature of the warmest month is always about 10°C. Kosciusko is no exception.

The treeline seems to depend on the amount of energy that the trees can obtain from the sun. Where the average mid-summer temperature is less than about 10° there just isn't enough energy available for the tree to keep on respiring, renewing its leaves, and developing its

stem and root system. So shrubs and herbaceous plants become the dominant vegetation.

Of the six main plant communities listed for the alpine zone, tall alpine herbfield dominated by the spectacular snow daisies, billy buttons, and sod tussock grass cover more than half. Heaths make up another quarter of the area, fens and bogs 6%, and short alpine herbfield and feldmark communities less than 1%.

'Feldmark' in the Australian alpine zone is applied to the dwarf prostrate plants that inhabit the most difficult environments. It is applied elsewhere to similar communities in alpine and polar regions.

As in the Northern Hemisphere, Australia has had its ice ages. Whether these coincided with similar events north of the equator is not certain. Australian areas covered with ice included only the high-country areas of the Snowy, Victoria, and Tasmania. The cirques, lakes, moraines, and polished pavements of Mt Kosciusko bear witness.

During the ice ages — the last major one ended 10–15 000 years ago — the average temperature of the area was 9–10°C colder than it is today. However a 'little ice age', when mean temperatures seem to have been at least 3° cooler than today, ended as recently as 1500 years ago.

European Man has left his impact on the alpine vegetation and soils. Cattle and sheep grazed Kosciusko's highest reaches between the 1830s and 1944. Stockmen also burnt the vegetation from time to time to keep back encroaching shrubs. The Snowy Mountains scheme left its scars too.

By contrast, the Aborigines seem to have had very little effect at all. They visited the area to be sure, but apparently

only fleetingly in summer to feast on the bogong moths that migrate there in huge numbers at that time. There's no evidence that they burnt the vegetation — indeed they had no reason to, since there never was much game in the area. So 150 years ago the

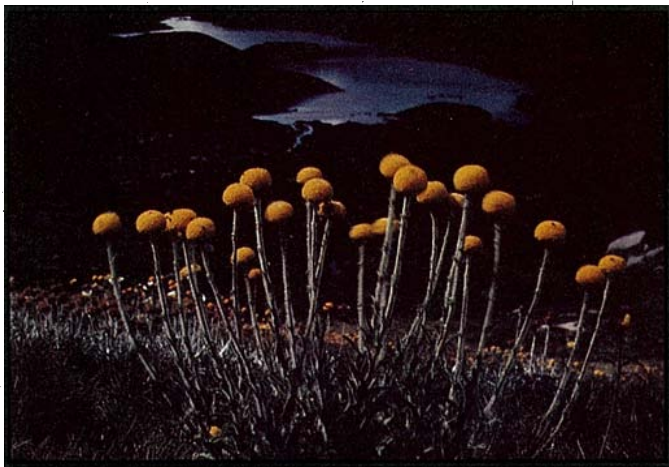


Snow daisy.

alpine region still remained pristine.

The fact that the Kosciusko alpine vegetation had received little burning or grazing meant that it was little equipped to cope with European pastoral practices. A number of plants in the most favoured grazing areas — and particularly the beautiful anemone buttercup, the mountain celery, and the slow-growing *Chionochloa* grass — all but disappeared. Erosion became a problem, and cattle and sheep were destroying many of the bogs and fens by walking through them.

Official recognition of the damage being done by grazing and burning came before World War II. Mr B. U. Byles reported it to the Commonwealth Forestry Bureau in 1932, and the Soil Conservation Service of New South Wales came to the same con-



Billy buttons at Lake Albina.



Inhabitant of the feldmark—*Caltha introloba*.

clusion in 1938. Private individuals and societies increased the pressure for protecting the area and this pressure finally led to the passing of the *Kosciusko State Park Act* of 1944.

This *Act* proclaimed an area of about 5000 sq km as a park under the control of a specially appointed trust. The Kosciusko alpine area was withdrawn from grazing at the same time to minimize further damage. Grazing continued in the rest of the Park until 1958, when it was decided to progressively withdraw the remaining snow leases.

The *Act* contained provisions for a primitive area, although none was designated at the time. In fact it was not until 1963 that the Kosciusko State Park Trust, yielding to strong pressure from scientific and public opinion, declared the 100-sq-km alpine area around Mt Kosciusko and the steep western slopes as a

Primitive Area. Under the recent management plan for the Kosciusko National Park, the Primitive Area has received the new classification of Outstanding Natural Area.

Thus, much of the alpine zone is now well protected. However, the very attractiveness of the area has brought some problems. Tourists flock to Kosciusko's summit in summer, and the facilities they need — like footpaths, car parks, and roads — bring their own peculiar difficulties.

Happily, several near-extinct plants such as the anemone buttercup have made a remarkable come-back since the alpine region received protection. Also, many species not previously known in the area have been discovered since that time.

'Kosciusko Alpine Flora.'
Alec Costin, Max Gray,
Colin Totterdell, and
Dane Wimbush. (CSIRO:
Melbourne 1977 (in press).)