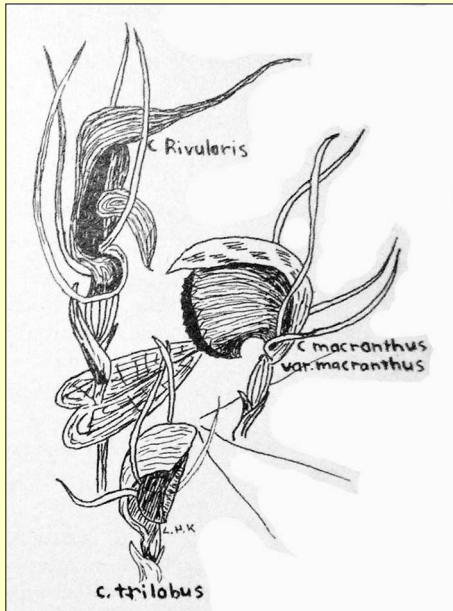


Leicester Kyle
The Orchids
of New Zealand



Compiled by Ian St George

Cover: “Typical rain forest orchids of New Zealand” line drawing by Leicester Kyle, from *New Zealand Gardener* 1956: October, p.115. Shown are *Nematoceras acuminatum* (then mistakenly known as *Corybas rivularis*), *N. macranthum* and *N. trilobum*.

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Leicester Hugo Kyle 1937–2006

These notes are significant for two reasons.

The first is that they are the only lengthy appraisal of the New Zealand orchids between Hatch's papers and Moore's work published in *Flora II*. The nomenclature pretty much follows Hatch, but there is much that is original too, especially the observations from the West Coast. It is written in lay terms, as advice to growers.

The second reason is that they were written by the late Leicester Kyle—at one time a member of our NZ Native Orchid Group, and a contributor to our journal—now recognised as an important environmentalist, poet, historian, scientist and priest.

Here, from the Leicester Kyle website (<http://leicesterkyle.blogspot.co.nz/>), is a chronology of his life and published work.

1937 – (30 October) Leicester Hugo Kyle born in Christchurch.

c.1975 – Leicester publishes *The Abbot and the Rock*, a set of short stories (32 pp.)

c.1975 – Leicester publishes *I Got Me Flowers: Letters to a Psychiatrist*, a novella (54 pp.)

c.1975 – Leicester publishes *Deosa Bay: A Pastoral*, a novella (47 pp.)

c.1975 – Leicester publishes *The Visitation; An Account of the Last Diocesan Visitation of John Mowbray, Bishop of Calcutta; Largely Compiled from His Journal and His Letters*, a novella (68 pp.)

1995 – Leicester takes early retirement from the Anglican church, and moves with his wife Miriel to Flat 8/1 Ruapehu St., Mt. Eden, Auckland.

1996 – (August) Leicester finishes compiling his first (unpublished) book of Poems *Message from a Lightboard*, with editorial help from Miriel Kyle and Catherine Mair. It consists of 44 poems and sequences, selected from the 200-odd written by him up to May 1996.

1996 – (November) Leicester publishes the first three sections of *Options*, a long poem with drawings by Jeffrey Harris.

1997 – (June) Leicester publishes the long autobiographical poem *State Houses*.

1997 – (July) Leicester adds "Dancing Maria" to *Options*, reissuing the book in a revised edition.

1997 – (July-April 1998) Four Sections of *Koroneho*, Leicester's long Zukofskyan poem about William Colenso, appears in Alan Loney's journal *A Brief Description of the Whole World* 6 (1997): 10–19 / 7 (1997): 35–40 / 8 (1997): 62–67 / 9 (1998): 49–54.

- 1997 – (November) Leicester edits *Spin* 29.
- 1997 – Leicester publishes *A Voyage to New Zealand: the Log of Joseph Sowry, Translated and Made Better*, a poem based on a real immigrant journal, with "translations" and marginalia.
- 1998 – (29 March) Death of Miriel Kyle from melanoma.
- 1998 – Leicester publishes *Heteropholis*, the last major piece of work from his sojourn in Auckland, a symbolic account of his relations with the Christian Church.
- 1998 – (June) Leicester leaves Auckland for Millerton, on the West Coast of the South Island, having bought a house there (sight unseen).
- 1998 – (November) Leicester, now managing editor of *Spin*, edits issue 32 in Millerton.
- 1999 – (1 January) Leicester starts the first of eight surviving volumes of diaries, one for each year from 1999 to 2006.
- 1999 – (January) Leicester publishes *A Machinery for Pain*, his first book to be written in Millerton.
- 1999 – (November) Leicester edits *Spin* 35.
- 2000 – Leicester publishes *A Safe House for a Man*, which includes "Threnos", a moving account of Miriel's last days.
- 2000 – (21 July) Jack Ross launches *A Safe House for a Man*, published by Calum Gilmour of Polygraphia Press in a trade edition, at Takapuna Public Library.
- 2000 – Leicester publishes *Five Anzac Liturgies*, a poem based on his experiences as a parish priest in the Canterbury Plains.
- 2000 – (November) Leicester resigns as managing editor of *Spin*, after editing issue 38.
- 2000 – (December) Leicester publishes *A Christmas Book*, a small pamphlet of poems written during the year.
- 2001 – (July) The Millerton and Plateaux Protection Society [MAPPS] publishes *The Great Buller Coal Plateaux: A Sequence of Poems: an ecological manifesto*.
- 2002 – (May) Leicester publishes *King of Bliss*, a poem about psychoanalysis.
- 2002 – (July) Leicester publishes *A Wedding in Tintown*, a blow-by-blow account of an actual wedding ceremony held in Millerton.
- 2002 – (October) Leicester publishes *Things to Do with Kerosene*, based on the household hints of Depression-era NZ Radio star Aunt Daisy.
- 2002 – (November) Leicester circulates *Dun Huang Aesthetic Dance*, a poem about religion.
- 2003 – Calum Gilmour of Polygraphia Press republishes *Five Anzac Liturgies* in a trade edition, with drawings by Philip Trusttum.

- 2003 – Leicester publishes *8 Great O's*, a set of stories in verse.
- 2003 – (December) Leicester publishes *Panic Poems*, another Christmas book.
- 2004 – (December) Leicester publishes *Living at a Bad Address*, a Christmas book of short poems.
- 2004 – Leicester finalises the text of *Miller Creek*, with coloured sketches by Joel Bolton.
- 2005 – (May) Leicester publishes "Peninsula Days: A Memoir of Joanna Paul," in *brief* 32 (2005): 61–64 (edited by Jack Ross).
- 2005 – (August) Leicester publishes *Anogramma*, an account of his first job as an horticultural apprentice at the Christchurch Botanical Gardens.
- 2005 – (September) Leicester publishes *Breaker: A Progress of the Sea*, a book of "Homeric" character sketches, with illustrations by John Crawford.
- 2005 – (23 October) Leicester marries his second wife Carol.
- 2005 – (Christmas) Leicester publishes *Red Dog / Brown*, with cover Illustrations by Jim Conolly & Jocelyn Maughan, the last of his Christmas pamphlets.
- 2006 – (March) Leicester publishes "A Letter from Buller," in *brief* 33 (2006): 44–45 (edited by Scott Hamilton).
- 2006 – (4 July) Leicester dies of cancer in Christchurch hospital.
- 2011 – (4 July) Launch of Leicester Kyle website [<http://leicesterkyle.blogspot.co.nz/>]
- 2011 – (3 November) First posthumous book publication: *Koroneho: Joyful News Out Of The New Found World*, edited with an Introduction by Jack Ross and a preface by Ian St George.

I am grateful to Dr Jack Ross and David Howard of the Leicester Kyle Literary Estate for permission to publish material from their website, and to Nick Miller for sending copy of the articles from *New Zealand Gardener*.

Ian St George
November 2012

The Orchids of New Zealand

1. Epiphytic Species

L. H. Kyle

IT is most unfortunate that at present the only complete index available of the flora of New Zealand is Cheeseman's 'Manual', which, though very accurate, is also very much out of date. Consequently, the position as regards the lesser known families of New Zealand plants is very confused and indefinite, and will continue so until much work is done upon them. Most people are completely ignorant of some sections of our flora, and though many have a tolerable knowledge of native shrubs and alpiners, they will express great surprise if asked if they have ever seen a native orchid. Eighty per cent will query if there are any. There are no books available which will greatly enlighten those who have an enquiring mind towards our native orchids, and, unless he has time to spend upon a great deal of research, he will have to remain ignorant.

If one goes solely by Cheeseman's 'Manual of New Zealand Flora', there are 64 species of orchids in this country, yet Colenso adds on another 35 to bring the total to approximately 100. All of these 35 are completely refuted by Cheeseman, but there is some doubt now as to whether at least six of these should have been so irrevocably condemned. Since the last edition of the 'Manual' new discoveries have brought the full total, including definite and indefinite species, to 114, but a careful, scientific elimination brings the number down to approximately 85.

We will assume, then, that there are 85 species of orchids in New Zealand. All these can be roughly divided into four natural groups:



Growth habits of some epiphytic orchids

Epiphytic, Terrestrial, Saprophytic, and Parasitic orchids. That is, tree-dwelling orchids, ground-dwelling orchids, orchids which feed upon dead and rotting organic matter, thus having no need for chlorophyll, and orchids which attach themselves to the roots of other plants and feed from them. However, it will be simpler to divide all the species into an artificial system of grouping. First divide them into Epiphytic and Terrestrial orchids, then class the terrestrial species into those which grow in wet bush, dry bush, tussock country, and in the sub-alpine herbfields.

There are present in New Zealand four genera of epiphytic orchids, which give seven species. The genera are: *Dendrobium*, *Earina*, *Bulbo-*

phyllum, and *Sarcochilus*. The first three of these are well worthy of investigation and hybridisation in the field of horticulture, and at least one New Zealand nursery is selling plants of *Dendrobium* and *Earina*, for they can be grown easily in a cool glass-house or even inside.

In their natural state these four genera can commonly be found in moist bush throughout the North Island, and on the west and south coasts of the South Island. They grow most luxuriantly upon mossy branches and tree trunks, at a height of about 1,000ft. above sea-level, but also grow very well from sea-level to 2,000ft., for they can resist up to seven degrees of frost. Any heavier frost burns the tip of the leaf-shoots.

Dendrobium cunninghamii is a robust, finely-leaved orchid which grows steadily into quite a large, bushy shrub. Tree trunks, large branches, or shaded, mossy rocks, provide an ideal habitat for it. The very long, thin, and cane-like branches have enough resilience to stand almost any weather conditions, except extreme dryness.

The flowers, two or three together, are $\frac{3}{4}$ in. across, and coloured white (often with a delicate flush of pink) and have a deep pink or purple throat. The whole flower is very open and spreading, and has a large, broadly triangular lip.

The hammer-shaped buds are born in great profusion, and open in late January in most districts. The whole shrub, sometimes as much as a yard in diameter, is a pretty picture to discover in the bush. As a rule the branches droop strongly, but, if grown in an exposed situation, are sometimes erect and very short.

Earina autumnalis is perhaps the most attractive of the epiphytes, and grows in a great variety of forms. It also is a shrub—either erect or pendulous, and grows in much the

same area as *Dendrobium cunninghamii*, but with a single exception—it is often found on the eastern coasts of both islands, growing upon shaded cliffs (always near bush) in an erect form. The stems are cane-like, the leaves are much bigger and broader than *Dendrobium*, and, when growing upon trees, it covers a larger area but forms a sparser shrub.

Its usual form is a semi-pendulous state, with each branch about 1½ft. long and almost horizontal at the tip. There is a second form, which is almost completely pendulous—the branches being even more than three feet long—and has its terminal raceme suddenly curving and ascending directly upwards for two-thirds of its length, which is about three inches. This state forms long curtains from horizontal branches, and the larger foliage and flowers make it a highly desirable plant, yet, in spite of its apparent robustness, it is the most delicate of all the forms.

There is yet another completely pendulous variety which is similar to the last-mentioned, but only half its length. I have seen in the Buller Gorge all, bar the erect variety, growing upon the same tree, yet never hybridising into intermediate forms; however, the flowers of each form are similar. They are about one-third of an inch in diameter, and the minute petals and sepals formed into the shape of the popular conception of an orchid flower, the little lip even having frilled edges. The colour is cream or white, with two orange spots at the base of the lip, and each flower is very highly scented.

Ten to 40 flowers are born in a bottle-brush at the end of each branch, and the scent is sometimes overpowering. The branches never divide, as do those of *Dendrobium cunninghamii*, but always remain single.

Earina mucronata is finer leaved and finer stemmed than *E. autumnalis*, and is usually completely pendulous,

though rather rigid. One variety has almost filiform stems, and leaves that are not $\frac{3}{8}$ in. across, though the leaf of the normal state is $\frac{1}{2}$ in. broad and 6 in. long. Each branch is between 1 ft. and 3 ft. long, and the flower-heads are branched.

Usually the flowers are greenish-yellow, with a darker, three-lobed lip. However, there is a very rare red variety which flowers in great profusion, but unfortunately I have not yet been lucky enough to see this extremely beautiful type.

The flowers are scented, though not so very strongly, and the foliage is very beautiful and useful for flower arrangements.

Bulbophyllum tuberculatum is a beautiful little orchid which forms mats of greenery upon tree trunks. It grows chiefly in coastal bush north of Picton and Westport. Each leaf has a small pseudobulb at its base, the pseudobulbs growing from a twisted, creeping rhizome. The flowers are borne upon a stalk which grows from the base of a pseudobulb, and there are two to four flowers to a stalk.

Each flower is like a miniature of *D. cunninghamii*, and is only about $\frac{1}{8}$ in. long, and has a bright orange lip, while the rest of the blossom is waxy white. It is so small that it is frequently overlooked, but it does make a charming little plant when in full bloom and luxuriant growth.

Sarcochilus adversus is a low-growing, creeping epiphytic orchid, which bears numerous tiny green flowers in late spring. It is chiefly noticeable for its peculiar foliage, otherwise it is usually overlooked.

Each crisp leaf is 1 in. to $1\frac{3}{4}$ in. long, broad, and coloured dark green patched with purple. This creates an impression that it is a tropical orchid bound to have weird and beautiful

flowers. The observer, however, will be greatly disappointed if he has not met this orchid before.

It can be seen that New Zealand has a small number of epiphytic orchids of considerable beauty. However, it must be emphasised, so that the reader does not form an exaggerated opinion, that these cannot compare favourably with the flamboyance and luxuriance of many tropical and sub-tropical species.

However, we have another type of orchid which is well represented in our country. In these there lies a beauty which can easily be ignored, but reveals itself to those who seek it. These are the ground orchids, and many will be examined and discussed in a following article.

Orchids of New Zealand

2. Terrestrial Species (Part One)

L. H. Kyle

IN all the countries in which orchids grow, terrestrial orchids make up a large percentage of the total number of species. Australia has over 600 species, of which ninety per cent. are terrestrial, and in that country there are some of the most amazing and delightful terrestrial species. New Zealand has about eighty-five species, of which seventy-eight are terrestrial. England is famous for its ground orchids (having no epiphytic orchids at all), these having reached a high degree of beauty and imagery, and are often protected, or even cultivated, in the gardens and parks of many stately country mansions.

In the temperate countries of the Northern Hemisphere, there is a prevalence of the "hyacinth" ground orchid, as it is commonly called, in which many large and brightly-coloured flowers are arranged in a raceme very similar to the hyacinth. This arrangement is comparatively uncommon in the southern temperate countries; here the greater number of species have either one or a few flowers to each stem, and, in New Zealand at any rate, the colours are rarely bright enough to bring them, unaided, to the layman's eye.

As with so many of our native plants, colouring in our orchids, with a few very notable exceptions, is very dull. The colourful ground-orchids of all temperate countries are generally sun-loving flowers, which grow in open heaths or upon grassy hillsides, but very rarely in thick forest. New Zealand was, until very recently, a very heavily forested country, with comparatively few open heaths, and

it is a significant fact that the few areas in New Zealand that were first cleared of land are now most plentiful in sun-loving orchids. These areas include the North Auckland gumfields, which have many orchids found nowhere else in this country; the Taranaki pastures and the Marlborough Sounds, where many orchids are fast becoming wayside flowers, and some parts of the West Coast, particularly areas around Greymouth and Westport, in which several orchids grow which are solely confined to these parts.

In several places in New Zealand, as has already happened in Australia, South Africa, and over much of the Northern Hemisphere, ground-orchids are steadily becoming flowers of the wayside and the hedges. This is happening to some extent over the whole country, but particularly in the moister, warmer districts, such as North Auckland, Taranaki, Rotorua, Nelson, and the Marlborough Sounds, and the West Coast. Already orchids can be frequently found in road-cuttings, neglected verges, and beside water-races, and often epiphytic orchids, particularly Earinas, are found growing in old orchards. I have seen some fine bushes of Earina Autumnalis upon an old cherry tree in Westport.

Even in such dry and wind-swept places as the Canterbury Plains some orchids are accustoming themselves to civilisation. One little orchid, *Prasophyllum conlensoi*, is not uncommon in the roadside verges throughout the city of Christchurch. Another robust orchid, *Microtis uni-*



Calochilus, a curious species of New Zealand orchid, showing the typical flowers with heavy beard.

folia, forms large colonies beside water-races throughout the province. Indeed, water-races provide an ideal hunting ground for many unexpected

species. However, orchids of the rain forest are never likely to move towards civilisation. They have over-adapted themselves to their environment, and the only new recruits that can be expected to adapt themselves to pasturelands are orchids from tussock lands, light scrub, and sub-alpine herbfields. Almost any ground orchid from the open country can grow from sea level to 3,500 ft.

In this article I shall begin to discuss the ground orchids of the rain forests. There are many orchids which specialise themselves to a certain environment, and others, which are almost universal, but I cannot recall to mind any ground orchid which grows both in rain forest and upon heathland.

Some genera are almost wholly confined to rain forest. These are: *Calochilus*, *Caleana*, *Chiloglottis*, *Corybas*, and *Cyrtostylis*, but some species of *Corybas* can occasionally be found in moist places in somewhat dryer bush.

ORCHIDS OF THE RAIN FORESTS

Calochilus is a genus of dark dripping bush, from Western Nelson to North Auckland, and is fairly rare. It contains three species, all of which are found in New Zealand and Australia. All three species frequent bush, but one, *C. campestris*, is also found in fairly open sphagnum swamps.

All three species are much alike. They have a stout stem, up to 18 ins. high, and with one rather long and very narrow leaf, often tinged purple. The large, open flowers are quite handsome, and coloured greenish-purple, or, occasionally, yellowish-green. There are two to three on the stem, with the oblong sepals and petals rounded at the tips, and a large, rather long lip, which is bearded heavily, and is yellowish-green at the base.

The beard is the most noticeable part of the flower. It is up to $\frac{3}{4}$ in.

long, and composed of reddish-purple threads which, in certain lights, reflects metallic flickers of red, blue and almost black.

All three species—*C. campestris*, *paludosus*, and *robertsonianii*, are fairly easily grown in a completely enclosed shade house, as long as they are preserved in the soil from which they were originally taken. This applies to almost all our indigenous orchids—a slight change of climate affects them very little, but they greatly resent any change of soil. Clay, made porous with fine, crushed shingle and dead grass roots, can be obtained from most hillsides, and will prove ideal for all, other than bush orchids, particularly if sprinkled with charcoal once a year.

Unfortunately, there seems to be no soil mixture common to all bush orchids, and the safest way is to keep them in their original soil, though small amounts of charcoal are very beneficial to them, darkening the leaf and the colours of the flower, which cultivation tends to pale. It is most unwise to try any artificial or manufactured fertilisers, unless as a planned and methodical experiment, and insecticides should never be administered when the plant is in flower.

Caleana Minor is a slender, wiry plant, with the leaf and stem often tinged with red. The stem is 2-8 ins. high, and the leaf is very narrow and about half as high as the stem. However, it is the flower which is the most interesting part of the plant. Each is about $\frac{1}{3}$ in. long, coloured green tinged with red, and twisted upside down, so that the lip is uppermost. The sepals and petals are almost thread-like, but the lip is most remarkably shaped. The lower part is joined to the base of the column, is claw-like, and the upper part is expanded into a broad plate which is covered with numerous red lumps.

This lip serves greatly as an aid in the pollination of the plant, for when an insect alights on it, it overbalances, and shuts it up against the column of the flower, which holds the pollinia.

Like so many of the more remarkable of our orchids, this is an exceedingly local intruder from Australia, found so far, only in dense wet bush in a few places in the North Island. It is quite probable that it could also be found upon the West Coast of the South Island, and in North-west Nelson, if sought for.

This could be said of the whole of the orchidaceae in New Zealand. Their history may parallel the orchid history of the Phillipines. In this huge collection of islands there were, at the turn of the century, four hundred species of orchids, and now, after a systematic survey, there are almost one thousand. Not, of course, that this country will ever have a third as many species as the Phillipines, but I think that if a few responsible botanists really set out on a systematic survey, the number of species might be almost doubled upon the present total. Mr. E. Hatch, of Auckland, is doing excellent work in this field, and is keeping the nomenclature of our species in conformity with other countries, particularly Australia.

In a following article I will describe the Genera *Chiloglottis*, *Corybas*, and *Cyrtostylis*, all these being peculiar moisture-loving and bush-dwelling orchids.

Orchids of New Zealand

Rain Forest Terrestrial Species

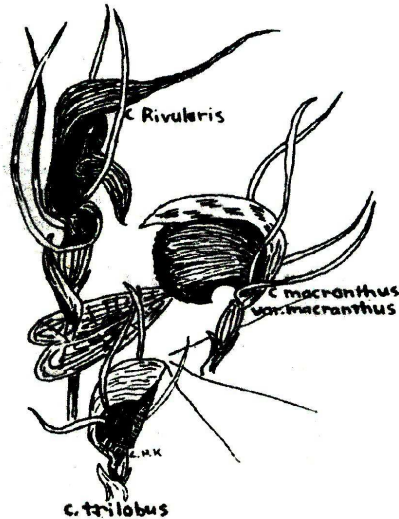
L. H. Kyle

AS our native orchids are not well known, only a few have popular, or common names, and those that have are frequently confused. Fairly easily identified, however, are the Green Spiders and the Purple Spiders, or the genera of *Chiloglottis* and *Corybas*—both have flowers that are roughly alike in general appearance, but the leaves are quite different, and so is the habit of each.

Chiloglottis cornuta is not, strictly speaking, a typical species of the rain-forests. It is found through all but the driest bush, up to about 4,500 ft., but is most prolific, and grows more luxuriantly, in rain-forest in mossy places.

It usually grows in small colonies, and the whole plant hugs the ground, so that it is very easily overlooked. Each plant has two leaves, the lower one the larger, while the leaf is shaped broadly oval, and is never more than three inches long by one inch wide. The flower is borne upon a very short stalk, and sometimes stands almost vertically upon it. The colour is green or spotted with purple, and is about one inch long and $\frac{1}{2}$ in. across. The lip hangs down and is studded with large glands, while the short wisps of lateral petals and sepals are very rigid and almost transparent—these are the "spiders' legs", and the "body" is the dorsal sepal, which forms an egg-shaped hood.

There is another species, *C. formicifera*, which has much narrower leaves, and is very rare indeed, being found only near Kaitaia and through New South Wales. Generally, how-



Typical rain forest orchids of New Zealand.

ever, the eight species in this genus are small and insignificant, and the two representatives in New Zealand are rarely collected.

A much more interesting group is the genus *Corybas*, or *Corysanthes*, as it was formerly called. There are seven species in New Zealand; three are confined to moist bush, three to mixed forests or scrub in drier areas, and one to swamp. These are the Purple Spiders, a quite well known and widespread genus, found from Malaya, to Australia and New Zealand, Polynesia and Indonesia. The

flowers are often weirdly shaped and lurid purple, with the lateral sepals and petals far outflung, like the legs of a huge spider, ready to pounce.

Corybas macranthus is a typical member of the genus, and is also one of the largest. The flower is beautiful—in a rather dark and mysterious way—and is usually coloured a lurid purple. The blossom is $\frac{1}{2}$ -1 in. long, and rather narrow, with the petals and sepals flung upwards and outwards in long tails. These tails are up to 2 in. long and very narrow, but in some of the other species are quite lacking. The dorsal sepal is very narrow and arched over the lip, which is large and has margins that are so greatly inrolled that they almost turn the lip into a tube, up which the insects must go to reach the nectar at the base of the column, pollinating the plant as they do so.

A heart-shaped leaf almost cups the flower, and is about two inches across; round the margins of the leaf is a ring of purple dots, and the whole plant keeps close to the ground, spreading into large colonies by means of a creeping underground rhizome. This sends up abundant buds in the early spring. In Stewart Island a large pink-flowering form is found, but I do not think that this extends to the mainland.

In any shady place, protected from birds, slugs, and extremes of weather, this species will grow well and multiply very rapidly, soon forming a loose carpet of green heart-shaped leaves.

There are two varieties, or jordanons, that form the species; *C. macranthus* var., *macranthus*, which is described above, and *C. macranthus* var. *longipetalus*; the latter, which is rather rare in both islands, can be distinguished by its smaller size, almost horizontal petals and sepals, a lobed lip, and an incurved tip to the dorsal sepal. It prefers higher altitudes than the former variety, often being found near the bushline.

Corybas rivularis is another not uncommon species, found through the whole country in damp bush, preferring, as its name suggests, to grow along the banks of streams and rivers. It is, however, often found away from these localities.

It is a rather higher plant than *C. macranthus*, with a delicate leaf shaped like a spear head, though the margins are often undulating. The flower is somewhat smaller than the previously described species, and is almost vertical, but the petals and sepals are comparatively longer, and the dorsal sepal is tailed.

C. trilobus has a leaf which is divided, at the tip, into three lobes, but is generally heart-shaped. The flower is short and high, with rather short tails, and the dorsal sepal is very blunt.

C. oblongus is another quite common species, the flower of which is almost a miniature of *C. macranthus* var. *longipetalus*. It is distinguished by a longer, narrower flower, with the margins at the tip of the lip being ribbed in a rather unusual way. The leaf is usually roughly oval, but, as with most other species of *Corybas*, is also rather variable.

Three other species of *Corybas* occur in drier bush, or scrub, but these will be dealt with in their place, yet there is one other species which I will describe here. Its name is *Corybas cryptanthus*, and it has the distinction of being the only underground orchid that has so far been found in this country. Messrs. Irwin and Gibson first discovered the species near Wellsford, where it was growing in old manuka scrub, and has since been found in an old heap of compost at Greymouth, so it probably has a fairly wide range. Almost certainly, however, it will only grow in wet districts.

The only part of the plant which appears above ground level is the

seed stalk, which always, in the genera *Corybas* and *Chiloglottis*, elongates considerably after the seed has set. It is flecked with red, and bears the small capsule upon it. The leaf is practically rudimentary, growing just beneath the flower, which is small, loose, and open, and never more than half an inch long. The tails are about the same length, and the lip rather flaccid and broad, with frilled margins, and is horizontally placed. Like other members of the genus *Corybas*, it has a creeping rhizome, which moves through the soil, branching out in front and rotting behind, so that it forms an unstable, moving colony. Naturally, the plant is easily overlooked and very rarely collected, and is certainly never collected for ornamentation, as the seed-heads are hardly ornamental.

Underground orchids are always a subject for interesting discussion, though hardly during a drawing-room conversation. Quite understandably, many are almost incredulous when told that there are such things as orchids that live and flower under the ground. "What use are such plants?" they ask—a question that can only be answered by a philosopher. There must be some insects that prey upon *Corybas cryptanthus*, but otherwise it serves no evident use. It almost certainly pollinates itself, and serves as no ornament—just a pallid, red-flecked, almost shapeless blossom, that could hardly be recognised as such. It has no chlorophyll, and is strongly linked in association with an almost microscopic fungus, which lives in the rhizome and rootlets, giving the plant many needed minerals in solution.

Though there are rumours that another underground orchid exists in the rain-forests of South Westland, *C. cryptanthus* is the only established underground orchid in this country. Several species exist in Australia, one was discovered by a farmer, who ploughed it up from his paddock, and

there are, no doubt, others yet to be discovered.

One other species has yet to be mentioned—*Cyrtostylis oblonga*, which has lately been renamed as *Acianthus reniformis* var. *oblongus*, rather too much of a mouthful. It is a small plant, and its oblong or spreading leaf is born close to the ground. The flower-stalk is up to four inches high, with a few delicate green or purple flowers near the top. The flowers are small and open, with thin, spreading petals and sepals, and a narrow, pendulous lip. The plant is not uncommon in forests throughout the country, growing more frequently at low altitudes in small colonies.

There are several other species which are also found in rain-forests, but which would be more suitably discussed elsewhere. Some species of the Greenhoods, or *Pterostylis*, occur on the edges of forest in clearings, but the whole of this interesting genus will be discussed later. Some species of *Corybas* grow both in dry and wet bush, as does *Acianthus fornicatus*, the saprophytic orchid *Gastrodia*, and many other species. All these will be described in the following article, when I will discuss the orchids of the dryer bush and scrub.

Orchids of New Zealand

Species from Drier Bush and Scrub

L. H. Kyle

GROUND orchids have adapted themselves to suit a great variety of environments, and can be found in almost all areas except those which are too dry or cold to support any green plants. Beautiful little orchids can be found in the perma-frost regions of Alaska, where the ground only melts to a depth of a few inches, even in midsummer. The edges of everlasting snows water species in the Aleutian Islands, the near-rainless canyons of Mexico shelter several gems, while the hollows between sand dunes enable some British species, far exceeding ours in delicacy of beauty, to grow to perfection.

New Zealand has several such species which show remarkable adaptability to unusual environments. The underground *Corybas* has already been described. Some others are found only in several localities hundreds of miles apart, while others are confined to the Auckland Province, or to a particular combination of trees or shrubs, such as kauri or manuka. Some are beautiful, others are not, and some have large flowers, while others have tiny green flowers, such as our representatives of the genus *Acianthus*.

Acianthus fornicatus is a tiny orchid (as a rule), favouring, for its habitat, mixed bush and a very well drained place. Small, slightly overgrown clearings, such as old bush tracks, are ideal. It is very rarely over three inches high; the leaf is shaped like a spear-head, and the flowers are borne on the upper half of the stem, with from three to twelve



NEW ZEALAND ORCHIDS. A. *Caleana minor*; B, *Caleana carnea* var. *minor*; C, *Gastrodia minor*; D. *Corybas unguiculatus*.

in number. Each is coloured green or brown, $\frac{1}{4}$ in. long and $\frac{1}{8}$ in. wide, with a tiny upper helmet and a red-edged lip that is often twisted sideways out of the flower. The leaves are comparatively large, and the stems are lined with red, so that the plant has an appeal which is more attractive to those who are inclined to curio collecting. If they don't collect native orchids, they are bound to collect stamps, lily or primula species, rare china or old records. Many of

our orchids are only botanical curios, but this rather adds to their desirability instead of lessening it.

The full name of this little species is *Acianthus fornicatus var. sinclairii*, a terrible tongue twister that cannot be quoted whenever the species is mentioned.

Throughout the world the early botanical explorers discovered many species that were so rare as to vanish back into obscurity, never to be found again, or to be confined to such a very small area that they came to be regarded as delicate freaks, better left alone. Such is the following genus.

Petalochilus is a genus of two very delicate, though rather hairy species: *P. calyciformis* and *P. saccatus*. *P. calyciformis* is the smaller species, with a greenish flower, while *P. saccatus* is large and has a pink flower. Both species are endemic, and grow only in the manuka bush of Kaitaia. The genus is closely allied to the *Caladenias*, but the lip, a distinguishing feature of orchids in general, is so modified that it can hardly be told apart from the other sepals and petals. Both species are about three inches high, with a long, narrow leaf, and one comparatively large flower, which has very thin sepals and petals.

Almost half of our orchids are also found in Australia—35 species, to be exact. There are the Greenhoods, the Sun Orchids, and the graceful Pink Fairies, that have the pleasant Latin name of *Caladenia*. Unfortunately, our native *Caladenias* are not so pretty as the Australian species, which have become so well known as to find their way into carpet and cloth patterns.

Caladenia carnea has no fewer than twelve jordanons, or forms, as they must now be called, to make up the species, and so becomes an exceedingly complicated one indeed. It

occurs over all but Western Australia, and extends to Java and New Zealand. In this country there are three main varieties:—

C. carnea var. minor, which is itself divided into two forms. **Form one** is found all through the country in semi-open, well drained places in bush. It has a single, rather hairy leaf, and a long, hairy stem, which bears one or two small and delicate pink flowers. The flower has a small pink hood, and a very pretty lip, which is studded with little yellow glands. The plant is from three to six inches high, and so delicate as to often pass unnoticed. **Form two** is similar, but has a green flower, dusted with red, and with a chocolate lip. Both forms grow in clumps of two or three, and do well inside in a three-inch pot.

C. carnea var. exiguis, rather similar to *var. minor*, but is smaller, with wider sepals and petals.

C. carnea var. exigua is a rather remarkable variety. It is hardly hairy at all, and the whole plant is a purple-green, with the flower coloured a dark glazed mauve, except for the glands on the lip, the pollinia, and the mid-lobe of the lip, which are all bright yellow. It is confined to the Auckland Province, as is *var. exigua*, though this is also found in Tasmania and New South Wales. There are quite a few species found in the North Island that do not occur in the South, and many of these are confined to the Auckland Province.

Caleana minor is a peculiar little orchid that is found in the North Island, and even there it is very rare, being found in scrub or light bush, particularly in the Rotorua district. It is fairly tall—6 to 8 in. high, with one long and leathery leaf, and one to four flowers at the top of the stem. The flowers are hardly orchid-like, for the petals and sepals are very short and thin, while the lip,

held horizontally, is enlarged into a broad and lumpy plate, that makes the flower resemble a flying insect.

In Australia, where orchids are so widely recognised that they are officially protected, this plant is called "The Flying Duck Orchid", and so it should be named here.

Some species of *Corybas* have already been described—those that grow in the rain forests; there are three other species that grow in more open areas, and though these are not so singular in appearance as those previously described, they are still interesting. There are *C. carsei*, *C. unguiculatus*, and *C. aconitiflorus*, and all have one common distinguishing feature—the lateral sepals and petals are never elongated into tails. They are usually very short, curled, and often non-existent.

Corybas carsei is a very small plant with a flower about $\frac{1}{2}$ in. long, and its tiny heart-shaped leaf barely struggles through the ground. A dip in the middle of the flower, and a spur to the lower tip of the lip, distinguish it.

Corybas aconitiflorus has a much larger flower. The lateral sepals and petals are often absent, but the dorsal sepal is large and concave, and the lip is also large, and has an expanded mouth. The leaf is heart-shaped and very small.

Corybas unguiculatus is slightly larger than *C. carsei*, though rather similar. The flower is thicker and shorter, and the lip has frilled margins without a spur. *C. unguiculatus* and *aconitiflorus* are found in well-drained, partly-open areas in scrub, the former found only in the Auckland province, and the latter found from Nelson north. *C. carsei* is rather rare, and grows mainly in North Island swamps, in association with a species of sedge and lycopodium.

Many families of plants have a few parasitic members, and the orchidaceae are no exception. In New Zealand we have three representatives of a genus that is known to have some parasitic species. This is the genus *Gastrodia*, and its three native species are often parasitic upon the roots of grasses and other plants. For this reason the plants would be very difficult to transplant, but might just be grown from seed at a great expense of time, and probably money. All the species of *Gastrodia* are brown, leafless herbs, saprophytic if not parasitic.

G. cunninghamii is the largest of the three. It is one to three feet high, is coloured brown, striped with purple and fawn, and has many large, brown, drooping flowers at the top of the stem. The lower ones open first. The parts of the flower are arranged in a tube, that is greatly swollen, particularly at the base, and has a slightly expanded mouth.

G. minor, a smaller plant, is only eight to fifteen inches high, and very slender, and is shaded a complete umber-brown. The flower is only $\frac{1}{2}$ in. long and drooping, with a tinge of white at the tips.

G. sesamoides is variable, from one to two feet in height, and is stout or slender, and coloured a mottled grey, except for the flowers, which are brownish-white. *G. cunninghamii* prefers darker bush or long grass on bush margins, while *G. minor* and *G. sesamoides* grow in small colonies in grass or scrub, the former being more common in the South Island, and the latter more common in the North Island. *G. cunninghamii* is not uncommon through all the country.

Next month I will discuss a genus that is well known to all interested in native plants, and admired by all who are interested in botany. It is the genus *Pterostylis* (the Greenhoods), that well deserves a chapter to itself.

Orchids of New Zealand

The Greenhoods, the Largest Genus

L. H. Kyle

THE Greenhoods, or the genus *Pterostylis*, is the largest orchid genus in this country, and also the most interesting. Some of the species hybridise so extensively that classifying them is like looking for a needle in a haystack; strangely enough, there seem to be several centres where hybridisation occurs to a far greater degree than elsewhere. The Waimakariri River basin is the most important centre, and here hybridisation occurs to an exceedingly great degree, and there are even several species that do not occur elsewhere. One (*Pt. cynocephala*) was discovered a few years ago, and another (*Pt. areolata*) was rediscovered at about the same time.

The genus is distributed fairly evenly through all the country, though perhaps there is a slight predominance of species in the North Island. They are definitely more common in inland areas, particularly upon upland country over one thousand feet and under three thousand feet. Some species grow in tussock country, others in scrub (particularly manuka) or in thin bush, and often on the edges of bush. Representatives of the genus are only absent from the bleakest and most barren areas, for they cannot stand dryness or strong winds.

At least twenty-two species and varieties grow in New Zealand. Most of these also grow in Australia, for the genus is Australian by origin, and it will be possible to describe only the most important ones here.



1. *PTEROSTYLIS AREOLATA*;
2. *P. BARBATA*.

Apart from six odd ones, all the species are divided into three main groups. Firstly, there is the *Australis* group, which is confined to New Zealand, and hybridises extensively within itself.

Pterostylis banksii is the commonest native greenhood, growing in scrub, light bush, and bush edges through the whole country. It is a compound species, containing at least two forms.

Pterostylis banksii var. *banksii* is a very handsome and well-known variety, up to 21 inches high, and in the past it has been greatly confused with other varieties and species. It has a stout, straight stem, with up to eight leaves arranged up it. Each leaf is narrow, pointed, up to seven and a half inches long, and wider at the base. The flower is large and usually solitary, up to 3¼ inches high, including the long, slightly curling tails to the helmet and lateral sepals. Var. *patens* is similar generally, but has shorter and broader leaves, but the tail of the dorsal sepal is very greatly incurved, while those of the side-sepals are very greatly recurved, meeting behind and just below the flower. It presents a most peculiar appearance.

Both varieties are endemic, while the latter is found at a generally higher altitude, and both have a variable amount of red in the flower, particularly in the upper sepal.

Pterostylis australis has many forms close to *P. banksii*, but the type has much wider and shorter leaves, with a slightly silvery tinge. The flower is looser, and has coarse streaks of green and white, while the tails are much shorter, with the lateral ones being very sharply recurved within a few days of opening.

In the two main islands it is rather local, growing up to 4,500 feet, but in Chatham and Stewart Islands it is quite common. Generally it inhabits light bush or tussock.

Pterostylis graminea cannot easily be distinguished from other allied species, but the whole plant is very slender and almost grassy. The flower is small with rather short tails, but the stem rarely reaches the height of *P. banksii*. It is not uncommon in scrub or upon the forest floor.

Pterostylis montana is a compound species of two forms which were formerly included in *P. graminea*.

Pterostylis montana var. *montana* is up to seven inches high with five spreading leaves, and a solitary flower, which is usual in this group. The flower is up to one inch high, with the top and side sepals pointed and not tailed. It is a fairly common species, growing upon the forest floor. Var. *rubricaulis*, apart from the flower, which has tailed side-sepals, the whole plant, to a greater or lesser degree, is suffused with red.

It is obvious that many species of the *Australis* group could only be told apart by a fairly experienced person, as crosses are more frequent than true species. The scientist classifies the Greenhoods and most other orchids by the structure of the flower, particularly the column and the lip. Otherwise there is much difficulty in telling which species is which. In the "Transactions of the New Zealand Institute", Vol. 77, pages 234-246, there is an article by Mr. E. D. Hatch giving detailed descriptions of nearly all the *Pterostylids*. These descriptions are very authoritative and complete, for Mr. Hatch has done a great deal of work upon our orchids. Also, the writer of this article is quite prepared to answer any questions that are put by interested persons.

The *Falcata* group has just one New Zealand member; it is *Pterostylis furcata*, which is a compound species of two forms, one of which is confined to New Zealand and the other is found in both Australia and this country.

Pterostylis furcata var. *micromega* has up to eight leaves and is up to seven inches tall, with the lower leaves loosely arranged just above the ground. Each leaf is 1¾ inches long by ½ inch broad and is sharply pointed. The flower is very pale, solitary, about 1½ inches high, with long tails to the lateral sepals. Var. *linearis* differs in having fewer leaves and a much smaller flower, which

has shorter tails. It is abundant in the central plateau of the North Island in bogs, while *var. micromega* is found locally through the North Island and the Chatham Islands. The juvenile stage of *P. furcata* is a plant with two to five broad, oval leaves.

The third group is the *Obtusa* group, which is essentially an Australian group, with four species found in this country.

Pterostylis trullifolia is a compound species of three forms, all of which are delicate, beautiful and rather rare.

Pterostylis trullifolia var. rubella is erect and slender, three to four inches high, with two to three leaves at the base of the stem, each leaf being about one inch long. The flower is solitary, large, fat and up to 1¾ inches long. The helmet is sharply pointed, while the lateral sepals have tails which are about 2 inches long. The plant is often tinged with red. *Var. gracilis* is taller, with leaves up most of the stem. The side-sepals are not tailed, and there is there is usually no red in the plant. *Var. alobula* has darker green flowers than *var. rubella*, which it otherwise resembles.

Hybrids between *var. rubella* and *gracilis* are not uncommon. *Var. rubella* is not uncommon in the North Island, *var. alobula* is found in North Auckland and about Wanganui. Until recently *var. gracilis* was also supposed to be confined to the North Island, but it has since been found along the western edge of the Hammer Plains. All these forms grow in tussock land.

Pterostylis Xirsoniana is the only other species of this group that I will describe; it is, perhaps, the most symmetrical species of all our Greenhoods. The plant is up to eight inches high, with one to six very long, narrow and spreading leaves, which overtop the flower. This is solitary, up to one inch high, and is con-

spicuous by the very fine, regular green striping upon the outside of the flower, and the equally fine red etching upon the inside of the lateral petals. The lateral sepals have tails up to one inch long, and these are curved back rather sharply.

The species is found, locally abundant, through much of the North Island and the west of the South Island.

Other species which I have not described are:—

P. barbata, which has a golden beard hanging from the mouth of the flower.

P. mutica, which is a tiny species, bearing several flowers at the top of the stem.

P. cynocephala, which is like *P. mutica*, only much larger. It is found only near Springfield and Cass in Canterbury.

P. nutans, which has a nodding flower.

There are also several other species which are distinguished by differences that are too complex to mention here.

Next month I will describe a group of orchids that contain many beautiful and easily-grown species—those that grow in tussock country.

Orchids of New Zealand

Species From Tussock Lands

L. H. Kyle

THE tussock lands of New Zealand cover a great area, from the gum fields of North Auckland to the arid hills of Central Otago. They cover mountains, plains, and downs, offering a great area of specialised habitats for many orchids, including many of our most beautiful and brightly-coloured species. The tussock country seems to many to be a rather dull and uniform plant association, with the same plants growing throughout, but that is rarely so.

In the Auckland Province the peculiar formation of the gumfields, with their bogs and hillocks, contain many rare or local plants, including some of the most brightly coloured orchids to be found in our country, many of which are confined to the province. In the typical swamps found at the base of the mountains in Canterbury there grow several species of greenhoods that are confined to such habitats. Many other species grow in the cool shelter of the tussocks themselves.

Caladenia lyallii is such a species. It is found through the whole country in tussock or scrub, from sea level to 4,000 ft., and is usually more common in upland districts, where it grows in large colonies. As is the rule with *Caladenias*, the leaf is solitary, and is also very narrow and several inches long. On the other hand, the flower is large, pink, and very beautifully scented in strong sunlight. It is up to $\frac{3}{4}$ in. wide, with the dorsal sepal formed into an egg-shaped hood, while the lip is strap-like, inrolled at the tip, and with several rows of brilliant yellow glands upon it. This



A, *Caladenia lyallii*; B, *Prasophyllum colensoi*; C, *Thelymitra venosa*, var. *cedricsmithii*.

orchid can be grown in crumbling soil and sheltered sunlight, but it is much subject to rot in wet weather.

New Zealand has several species of orchids which grow nearly everywhere but in dense bush. These several species are from the genera *Microtis*, *Prasophyllum* and *Thelymitra*, and grow in scrub, light bush, tussock, bog, or alpine meadows.

Microtis unifolia is a conspicuous orchid that is easily identified. In height it is very variable, being from six inches to three feet high, with a long, tubular onion-like leaf. Many

small green flowers are arranged on the stem in a thick cone, and these are highly scented. The plant grows in large clumps or colonies in a great variety of habitats, but it seems to grow best beside streams.

Prasophyllum is a genus that is closely related and superficially similar to *Microtis*, with a shorter, stouter, tubular leaf and usually fewer flowers at the top of the stem. In addition, the small flowers are reversed, with the lip on the top and the dorsal sepal below. In actual fact, this is the "right way up", and it is nearly all other orchids that have their flowers reversed.

There are five species of *Prasophyllum* in this country, only two of which are very common: *P. colensoi*, which is rarely more than six inches high, and has a few yellowish-green flowers upon the stem, and *P. nudum*, which has a loose, dark-red spike of flowers. The latter species does not extend south of Marlborough, while *P. colensoi* extends throughout, particularly in alpine meadows. Roadsides are becoming increasingly popular with our native orchids, and a rich and colourful harvest can be reaped from roadsides and cuttings in moister districts.

Orthoceras strictum gives a weird and unusual touch to hillsides and roadsides north of Marlborough and Nelson, and in some districts is very common. It grows in colonies or scattered groups into quite a tall plant—up to 18 in. high. There are several strap-like leaves at the base of the stem, which is reddish-green, and bears many very strange flowers.

These are arranged spirally up the stem and are quite large—up to one inch long. They are shaped more or less tubular, but with a very open mouth. From out of the base of this hangs the frilly, barely two-lobed lip, and at each side of the flower there arises an upright tail. The colouring is unusual, for the lip is dark, near-

black, while the rest of the flower is purplish, brownish, or green, so that it resembles nothing but some prehistoric insect whose fossil has not been found yet.

In New Zealand there is represented an orchid genus that is found over almost the whole of the temperate and tropical world. It is the genus *Spiranthes*, known in England as the Ladies' Tress, a different species from the New Zealand *Spiranthes lancea*, which was previously listed as *Spiranthes australis* and *Spiranthes sinensis*. The flowers range in colour from pink to white and whitish-green; they are small but delicately formed, and arranged spirally in large numbers at the top half of the flower stem. Rather short but fairly wide leaves sheath the lower half of the stem, and by these it is easily recognised when not in flower. There are many species of *Spiranthes* scattered throughout the world, but the New Zealand plant is, I think, endemic. It is rather local, growing in swampy regions, particularly coastal pakihi.

It has been said that whatever our native orchids lose in colour they gain in scent, but there is at least one orchid genus which gains in colour whatever it loses in scent. This is the large genus of *Thelymitra*, which has more than sixty species, mostly Australian, but also distributed through Tasmania, Timor, Java, New Guinea, New Caledonia, and New Zealand, which has seventeen species. These species are mostly large, robust, and beautifully flowered, and most of them make excellent pot plants. Most orchids make good, if curious decorative plants, and our natives, especially the epiphytes, are no exception.

In New Zealand the genus is particularly concentrated in the gumfields of the Auckland Province, in the volcanic plateau, and on the West Coast of the South Island. These are the notably higher-rainfall districts, and the orchids are found

where the bush has been cleared and the ground has reverted to a mixed pakihi and native heath—manuka, Epacris, Coprosmas, Olearias, Dianella, etc.

Many species greatly favour the banks of roadside cuttings, particularly the overhang of moss and grass that often forms at the top of these banks. The colours of these native species range through almost the whole scale—from white, cream, and pink to red, sky-blue, and lilac. As a rule, the flowers are quite large, mostly over $\frac{1}{2}$ in. in diameter, and up to $1\frac{1}{2}$ in. in several species. A few species have solitary flowers, but most bear the blooms upon a tall spike, which makes them quite conspicuous.

Thelymitra longifolia is our most common species of this genus, and is the only one which I will describe at any length. All our species are comparatively hard to distinguish, many being so closely interrelated. *Th. longifolia* itself is a very complex species divided into three varieties. *Th. var. longifolia* is again divided into two forms: Form 1, which has a leaf up to three feet long by $2\frac{1}{2}$ in. broad, and a flower-stem up to two feet high. Upon the flower stem are

one to twenty-four blooms, coloured white, pink, pale blue or maroon, and these are usually about one inch wide. As with all the *Thelymitras*, the flower is fairly flat, showy and simple (something like an ixia), and the lip can hardly be distinguished from the other perianth segments. Form 2 is rather similar to Form 1, but the flowers are rather small and always white, while the whole plant is pale green.

Both forms are abundant, and grow in scattered groups or large colonies up to the summer snowline. They will have just finished flowering now.

Th. var. stenopetala has a technical difference in the sex-column, but is otherwise much similar to *Ph. var. longifolia*, with brightly coloured flowers. It is found only in the Auckland Islands.

The genus *Thelymitra* is very much a lowland and sun-loving group, plants of the heaths and swamps of this country. The upland heaths, or alpine herb-gardens, have their own group of orchids, some of which are rare and as puzzling as modern political diplomacy. These will be described in the next and final article of this series.

Orchids of New Zealand

Gems From the Alpine Meadows

L. H. Kyle

THE alpine herb-gardens of both islands—but especially of the South—are well known to trampers and wanderers for the wealth of wild-flowers found in them. Many have become well known for their simple loveliness: *Ranunculus lyallii* in the South Island, the *Celmisias* of both Islands, the *Helchrysums*, and the *Gentians*; all of these are mostly white, but there are also plenty of yellows—the *Senecios*, *Chrysobactron*, and other species of *Ranunculus*. Unfortunately, there are very few wild flowers coloured other than yellow or white. In such a case as this we could expect to fall back upon whatever orchids are found growing in these localities to provide us with a little more interest and colour, but this is not the case.

The mountains of Marlborough, Canterbury and Otago often look so dry, barren, and uninviting as to frighten many would-be tourists off to the West Coast. Indeed, in a hot, dry summer, when the streams dry up and the tussock goes a shining brown, these mountains very nearly become a dust-bowl. Like oases in the Sahara, however, there are numerous well-watered glades lying at the heads of valleys and streams, dotted with symmetrical beech trees, and frowned upon by grey, sombre, and crumbling crags. In such sheltered places can be found the relatively few alpine orchids.

Caladenia lyallii was mentioned last month. It is a lovely thing, and when above the bush-line usually grows on sunny clay banks that are

nearly devoid of grass. Its predominant colour is white, and one variety has a lovely scent.

Prasophyllum colensoi is another very abundant orchid, often growing in very large, thick colonies, from sea-level to 4,500 ft., and was described in a previous article. It has a wide colour range in the yellow-green-brown series, and some forms are of a very rich cocoa colour. It is a pity that it is so rarely tall.

Adenochilus gracilis is an ambiguous species, growing in deep dark rain forest or open highland tussock. Its two dissimilar forms correspond to the conditions it grows in. When in rain forest it is a delicate, slender plant up to ten inches high, with a leaf shaped like an arrow head. The leaf lies near the base of the stem, and is a dark, polished green. The flower is small and dainty—rarely more than $\frac{1}{4}$ in. wide, coloured mostly white, and is clearly related to the *Caladenias*. A little colour is present on the lip, and though this is sharply recurved at the tip, it is held so erect that it is impossible to see the column without forcing the lip down. Purple streaks are present on the underside of the lip, and two rows of golden glands on the upper side. The highland form is usually shorter, slightly downy, with dull green leaves.

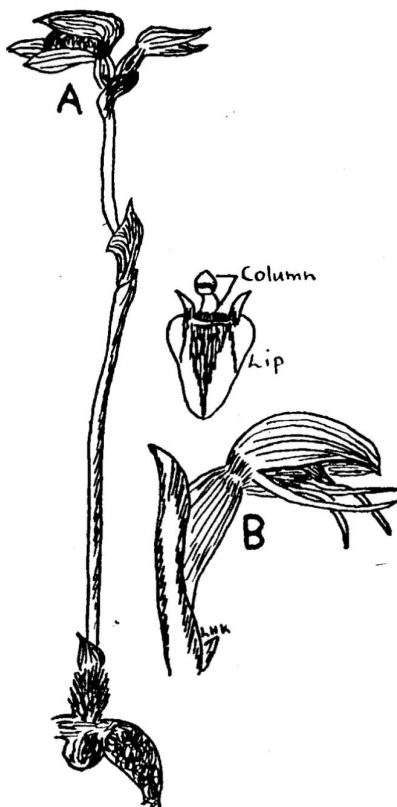
Aporostylis bifolia is an orchid that is very easily confused with the above species. It also grows in moist bush or alpine meadows, but is more common in the highlands where it is sometimes found in great abundance, particularly about the western half

of the Southern Alps. One great distinguishing factor is the invariable two leaves of flowering specimens; both leaves are low to the ground, and the lower one is the larger. Their shape varies from a form similar to *Adenochilus gracilis* to a much longer, narrower shape, and they are often netted with purple. The whole plant is sometimes downy. In suitable situations the flower can be as much as an inch across when fully expanded, and is usually tinged with pink. All the lateral sepals and petals are narrow, and like *Adenochilus gracilis*, the flower is protected by a small hood. The lip is nearly round and spreading, with two rows of yellow glands near the base.

Lyperanthus antarcticus, commonly called the Southern Dullflower, is an uncommon species, not often seen. It is up to eight inches high, with two to three leathery, sword-shaped leaves, and up to three small and rather untidy flowers coloured greenish. The lateral sepals and petals are narrow, while the dorsal sepal forms a broad hood over the flower. The lip is roughly oval and horizontal, with five or six longitudinal ridges upon it. This species is found in the upper forest margins, or in alpine meadows, flowering in summer.

The subject of orchid distribution is a very exhausting but difficult one. Little is known about it, but what does make it more intriguing is that our orchids display a closer relationship with the Australian flora than any other family of New Zealand plants. The orchids now are the largest family of flowering plants in the world, outnumbering even the Composites, so that the matter of their distribution becomes quite an important one, and facts realised may help to solve other problems.

Messrs. Rupp and Hatch have suggested a theory based upon conclusions reached by Cockayne and Marshall, that an antarctic continent in early Cretaceous time linked up (or



NEW ZEALAND ORCHIDS: (a) *Townsonia viridis*; (b) *Lyperanthus antarcticus*.

was linked to) Australia and New Zealand. Upon this continent there originated many of our orchid genera — *Thelymitra*, *Aporostylis*, *Chiloglottis*, *Lyperanthus*, *Townsonia*, *Caladenia*, *Pterostylis*. There are only two of these genera which are not found up the Australian continent: *Aporostylis* and *Townsonia*.

Aporostylis is a monotypic genus, that is, it is made up of only one species—*Aporostylis bifolia*. This species probably originated as a cross

between *Chiloglottis cornuta* and *Caladenia lyallii*, and for some unknown reason it never reached the Australian mainland.

Townsonia viridis hails from the rough, half-explored wildernesses of the Western Southern Alps, though it can also be found on Stewart Island and Mount Ruapehu. In height it may reach up to 6 ft., and is very slender, with a small roughly heart-shaped leaf. With flowering specimens the leaf, often much reduced in size, is placed well up the stem, but if the specimen has not reached the flowering stage, it is upon a thin leaf-stalk growing from the slender, creeping rhizome. The flowers are very small, rarely above $\frac{1}{4}$ in. long, and coloured greenish, and are born horizontally. The upper sepal forms a hood, crouching down over the flower. A small, undivided, and heart-shaped lip distinguishes it, while the lateral petals are very minute, with much larger and horizontal sepals. Its habitat is sub-alpine scrub or the edge of alpine herb fields, descending to lower levels further south.

Its distribution is very interesting, for the genus is only found in Tasmania and New Zealand. Theoretically it is supposed that its progress northwards into Australia was arrested by the formation of Bass Strait. The same species has obviously been isolated in Tasmania for some time, for it differs in many minor points from the New Zealand form.

Another important factor in the distribution of our orchids is the great trade wind-stream that sweeps across the Tasman, passing over Tasmania, South Australia, and Victoria. Orchid seeds are as light as dust, and could easily be borne over the Tasman Sea by the great nor'-westers of the South Island, extending often to the North Island. This explanation could account for many of our species that have otherwise no right to be here.

It is evident that this means of dispersal is still effective. *Pterostylis cynocephala* is one example. This species has only been found recently, growing in only one comparatively small river valley near Springfield. Here it is found in great abundance within a mile of the main road, and is found nowhere else but in the south-east part of Australia.

New arrivals may still come, but these will be few and far between. New species will be found, perhaps rather more frequently. Our orchid population is quite large and is growing—New Zealand is a growing country; it is also attracting a fast-growing number of admiring collectors. Though these can help in many ways, they might also be quite dangerous. Some of our orchids are exceedingly rare, while others are found very locally in some places. It would therefore be much better if students either only removed the flower, or studied the plant *in situ*.

In Australia the Government has realised that a delicate plant like an orchid must have a delicate constitution, and has legally protected indigenous orchids. New Zealand could well do the same, for orchids are delicate, and do need some protection. Never mind he who says, "Orchids are everyman's hobby". They're not.

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