



# Journal

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## Photo competition

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G.M. Thomson's *Introductory*  
*Class-book of Botany for use in New*  
*Zealand Schools*, 1891

We are indebted to Gordon Watson of Invercargill for the time and effort he has put into organising a photographic competition for the Group. The entry form is included as a tear-out centre page in this issue of the Journal. We hope to be embarrassed by the huge number of entries - we know there are some superb photographers (Hit there, so said in your work.

There will be film prizes, and the overall grand prizewinner will receive a copy of David Jones's Australian orchids.

The rules are as follows:

¶ Entries will be accepted only from financial members of the Group,

¶ Entries must have been exposed by the entrant,

¶ Each entrant may enter two photos in each class except class I,

¶ Slides - must be on 2" x 2" mounts, should be spotted correctly, and should carry the entrant's name cm the reverse,

¶ Prints - may be up to 6" x 4" and should carry the title and entrant's name on the reverse,

- ¶ NZNOG reserves the right to use any photo for any future occasion, such as publicity or archives,
- ¶ Results may be published in the NZNOG Journal soon after judging and entries will then be returned,
- ¶ The judges' decision is final, but comments on future competitions would be appreciated,
- ¶ There is an entry fee of \$5 per section, cheques to be written to NZNOG and posted with entry,

- ¶ Packaging is your responsibility - please do it thoroughly. We will take all care at this end,
- ¶ Please fill in the return address label,
- ¶ AGFA have generously sponsored the prizes, so when you are thinking of buying film - THINK AGFA,
- ¶ Judges - two qualified judges from the Southland Photographic Society will be assisted by a highly regarded orchidologist

These rules are repeated on the reverse of the entry form.

## Editorial

### The curious "exploded" *Pterostylis* of Upper Morrison's Creek, Dunedin

by Ian St George, Wellington

There is a host of *Pterostylis* on the clay bank beside the Upper Morrison's Creek track, Leith Valley, Dunedin: among them a lot of different shapes of plants having affinities with *P. montana*, many of them similar to the *P. "aff. montana"* common around Dunedin (St George 1988).

In December 1990 I saw a colony of about a metre across of a curious *Pterostylis*, its flowers open, appearing almost as if they had been exploded. I took a note of it, assumed it represented some local habitat effect (though it is in a water catchment area, and weedicides are never used on the tracksides), and decided to go back the next season.

It was there again this year. About fifty plants, the 3 to 5 leaves upright, pale

yellow-green like the local *P. "aff. montana"*, but the flowers different: the tips of the lateral sepals were flat (not tubular), and rolled forward, the petals on most flowers quite separate from the dorsal sepal, the whole effect open so that the labellum and column were clearly visible from the side (Figure 1a).

The labellum and column were those of *P. "aff. montana"*, with the long, flat stigma (Figure 1b) suggesting insect pollination.

Indeed, some tiny creature had been chewing at several of the flowers, and small insect parts were stuck to the stigmas of some, but the pollinia of most were undisturbed: small wonder, for although

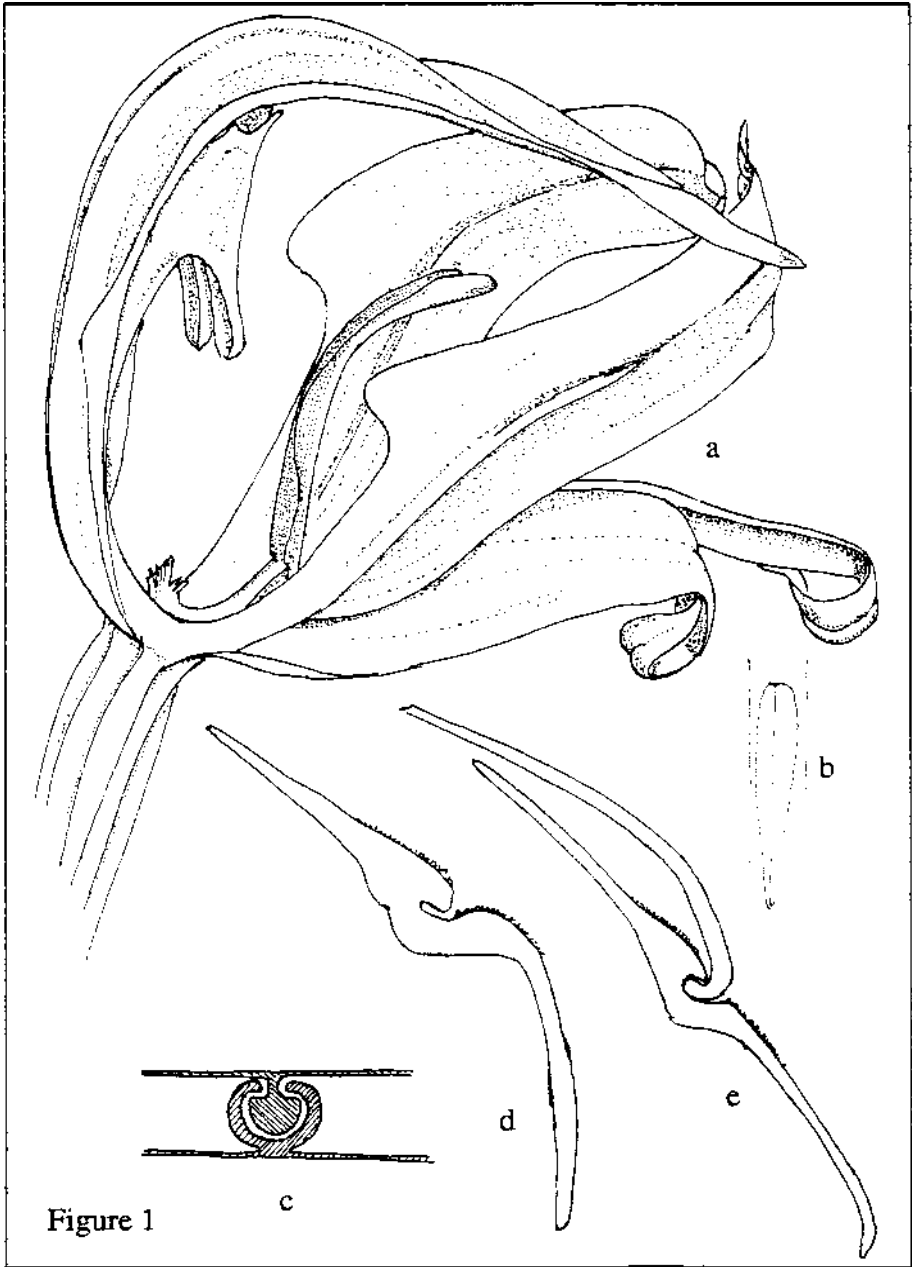


Figure 1

the labellum was irritable it could no longer form a tube when triggered, for the petals (which with the dorsal sepal normally form the postero-lateral walls of the lower part of the tube) were not joined to the dorsal sepal. In other words, an insect alighting on the labellum would be flung back onto the stigma, but would not have to crawl up behind the column- wings and past the pollinia and anther to escape.

Why the non-union of petals and dorsal sepal?

If one pulls the petals away from the dorsal sepal on a *Pterostylis*, it is like "unzipping" a plastic self-sealing freezer bag.

Indeed, if one examines a cross-section of the joined petal and dorsal sepal under a microscope one can see that the mechanism is remarkably similar to that of a plastic "zipper" (figure 1c): the dorsal sepal has a rolled- over and thickened edge that fits into a groove on the petal (see figure 1d).

In these "exploded" flowers, the rolled, thickened edge of the dorsal sepal

was present, as were the grooves on the petals. But the grooves were narrower than those of *P. "aff. montana"* flowers nearby, too narrow to accommodate the edge of the dorsal sepal (figure 1e).

This may have been a secondary effect, a result of the groove having remained empty; but it may equally have been the cause for non-union.

Conclusion? A local mutation of *P. "aff. montana"* has caused the ends of the lateral sepals to remain flat. It has also caused narrowing of the grooves on the petals and thus non-union of the dorsal sepal with the petals. The non-union has rendered the plant effectively sterile, in that the usual structures that help ensure successful insect pollination have been dislocated. The plants are thus confined to vegetative local spread.

### Reference

1. St George IM 1988. Will the real *Pterostylis montana* please stand up? *NZNOG Newsletter* 25: 12-14.

## Notes

The Hobart Mercury (2 October 1991) gleefully reported its version of the NZ Herald story printed in the December Journal's Notes: "New Zealand botanists who spent years searching for an orchid thought to be extinct sat on it during a lunch break. The tiny native *Corybas carsei* was not harmed and 14 more were found nearby."

¶ Pat Enright summed up the lateness and inclemency of the season with a report (1 February) of a trip to the Borland Lodge, "The weather was no good for any higher altitude botanising as it was misty with rain on Saturday and snowing on Sunday. However a five hour stroll through die beech forest along the Borland River yielded the following orchids: *Thelymitra cyanea* (in flower on an open bank),

*Thelymitra* sp. (in seed on a well lit clay bank below limestone cliffs. This plant was 32 inches high with a single strap leaf 15 inches long and 1 inch wide at the base. It must have been really something in flower), *Corybas trilobus*, *Caladenia catenata*, *Pterostylis ?graminea*, *Chiloglottis cornuta*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Microtis unifolia*, *Prasophyllum colensoi*."

¶ Ian Rutherford phoned all the NZNOG members listed in Taranaki to "stroll around the tracks" of north Mt Taranaki and the eight in his party found *Pterostylis humilis*, *P. venosa*, *P. patens*, *P. irsoniana*, *Chiloglottis cornuta*, *Thelymitra longifolia*, *Corybas macranthus*, *C. trilobus*. He also recently found *Prasophyllum colensoi* at Bell Block, in the same swamp as *Microtis unifolia* and *T. longifolia*; and *Gastrodia* sp., possibly *G. sesamoides*, at Pukekura Park.

¶ Bruce Irwin continues his reflections on the nature of *Corybas* (see also Newsletter 1989; 32: 14; Journal 1990; 35: 17-18):  
 "20-24 September I went on my annual *Corybas* crawl. No spectacular finds were made and for every small item of information towards an understanding of *Corybas*, some contradictory evidence would appear. I had hoped to convince myself that two colonies of *Corybas* growing within 400 metres of each other at Koru near New Plymouth were two distinct species. Two years ago I had looked at one of these colonies and it then seemed to be identical to forms growing in north Taranaki. This season I was less sure and I noticed that some plants on one side of the colony seemed even more different from the Mt Messenger type.

"Thinking about this later I began to suspect that some plants at least were hybrids. There has to be some explanation as to why *C. rivularis* in the vicinity of New Plymouth varies remarkably.

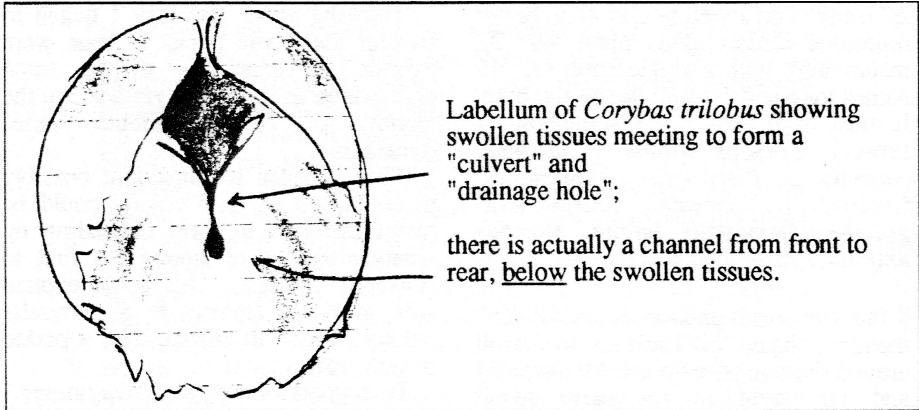
"Then I began to think that possibly plants flowering in a colony could be rather different in form depending on whether they were among the first to flower or the last. That could explain why at Koru, flowers in a particular colony seemed to change over a period of two years....

"In support of my wild imaginings I have drawings made this year of *Corybas* flowers from a particular colony in the Northern Kaimais. The drawings show a *Corybas* which is very nearly *Corybas macranthus*, though flowering four to six weeks too soon for true *macranthus* in the same region. Now here is an interesting point. Two years ago I collected flowers from the same colony and they were very nearly *Corybas trilobus*. Unfortunately I didn't draw them.

"All these flowers showed characteristics of both *C. trilobus* and *C. macranthus* and must be of hybrid origin. Since *Corybas* spreads readily vegetatively, daughters of the original hybrid crossing are likely to persist for many years. Sibling crosses and back crosses to either parent have probably occurred also, to confuse the issue.

"I presume that plants with predominantly *trilobus* 'blood' will tend to flower early (about the same time as *C. trilobus*) and plants with strong *macranthus* 'blood' will tend to flower later. Obviously I must record the changing flower patterns from early to late flowering next season.

"I was surprised to note that the very nearly *C. macranthus* all had a feature



Labellum of *Corybas trilobus* showing swollen tissues meeting to form a "culvert" and "drainage hole";

there is actually a channel from front to rear, below the swollen tissues.

I consider to be characteristic of *C. trilobus*. It was not as prominent as on *trilobus* but it was very definitely there.

"I was just finishing drawings of very nearly *C. macranthus* when I received flowers of *Corybas trilobus* ?? from NOG member John Dodunski of New Plymouth. These flowers lacked the culvert and drainage hole I have come to expect on *C. trilobus*. During my weekend in Taranaki John showed me his weird *C. trilobus* colony and we found other rather similar forms at several locations. Are these also hybrids? If so, with what?"

"In Taranaki this year I received the usual enthusiastic help of local NOG members. On Sunday 22 September eight of us explored an area at Omoana, far inland from Eltham. Two years ago we had found *Corybas* 'short tepals' there, on roadsides bordering the Menzies property. Since then Margaret Menzies has taken every opportunity to study the many orchids present.

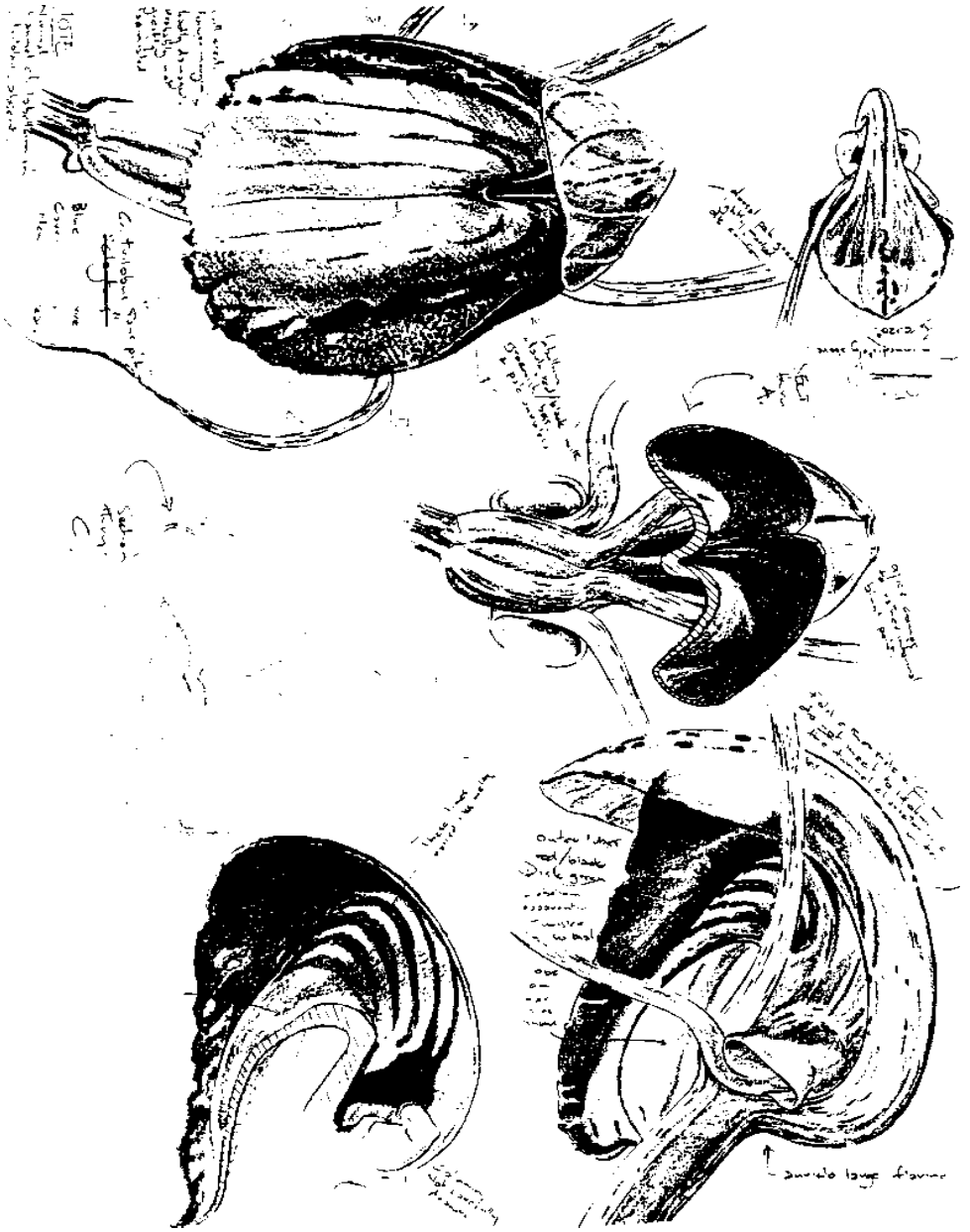
"Two of her finds have been *Pterostylis cardiostigma* and *Corybas rivularis* s.s. Margaret was able to point out the most interesting orchids to us, and in return the eight pairs of

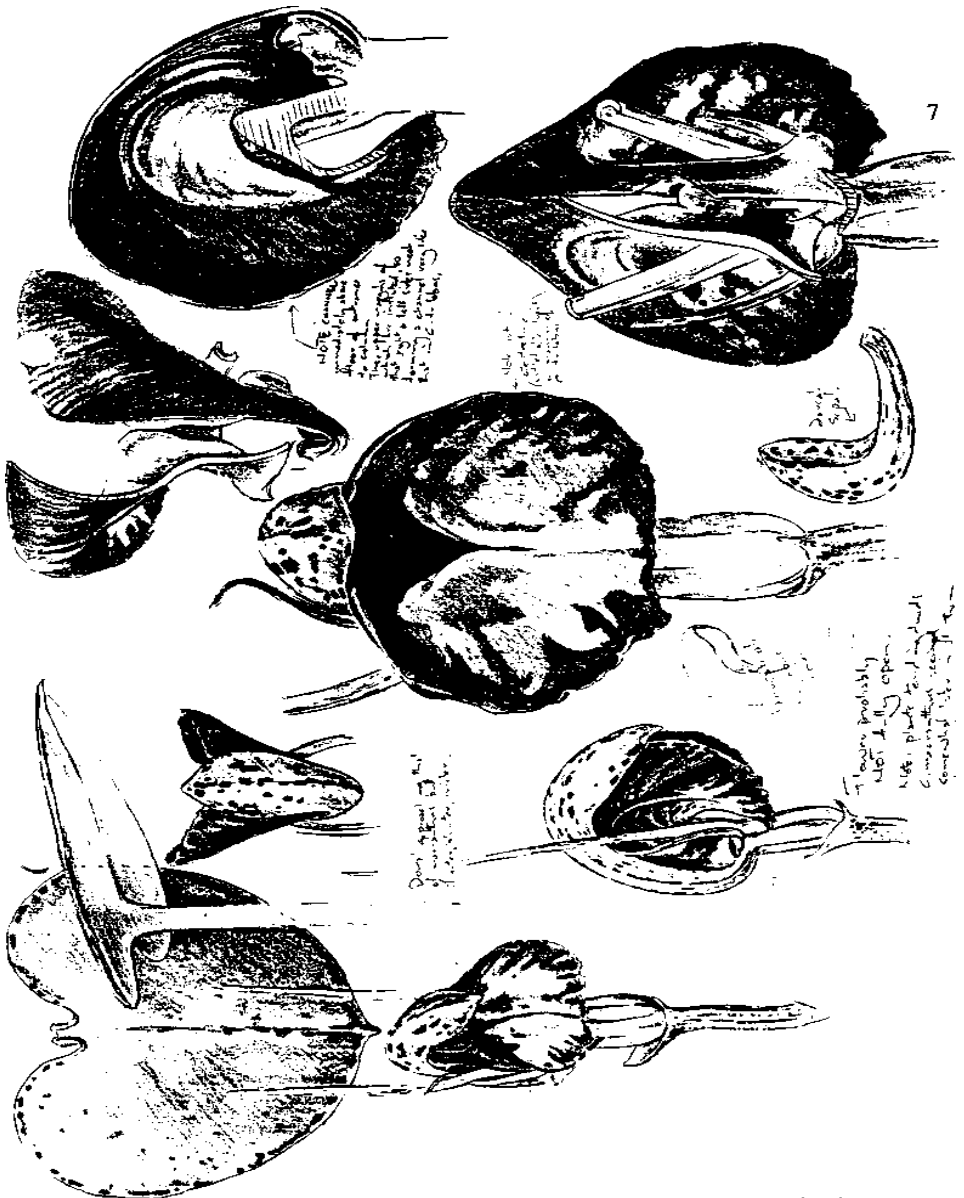
eyes added two further species to the local records - *Pterostylis alobula* and *Corybas cheesemani*.

"I spent a further two days mapping *Corybas* species before reaching home. "One flower of *Corybas* 'A' measured precisely 2cm across the labellum. Unfortunately I could not locate any *Corybas* plants at Waitangi Stream, Waiouru - the type locality of Dan Hatch's *Corybas macranthus* var *longipetalus*. Both Dan and I expect that *Corybas* 'A' will be proved to be synonymous."

¶ Maureen Young writes, "On 6 December 1991 Frank Hudson and I found *Yoania australis* growing in McElroy's Scenic Reserve (124.6ha) on the western shore of Mahurangi Harbour. Thirteen flower spikes were found scattered over a couple of hundred metres, under a taraire/nikau canopy.

"We have now seen this orchid on four sites on the narrow strip of land between the Kaipara Harbour and Kawau Bay. The type locality, Mt Auckland, is also in this area." On 20 January I could find only one spike of *Yoania* at a site near Collingwood - Ed.





Probable hybrid, *Corybas trilobus* x *macranthus*, Northern Kaimais.



## The NZNOG's Mapping Scheme's final year

*The New Zealand Native Orchid Group's Mapping Scheme is supported by Lottery Science, which has granted a further \$500 this year.*

Next December marks the end of the twenty years of the Mapping Scheme. In one final 1992 effort to get reports from under-reported Regions, a copy of the maps is enclosed, with a printout hereunder of the most up-to-date list of species by Region. Please do give this your earnest attention this year. All that is needed is your list by Ecological Regions of orchids which you have seen since 1972, and which are not on our list.

We hope to obtain funding for publication of distribution maps in 1993.

Thanks to Pat Enright who recently sent a P.N.A. survey listing botanical species from the Eyre Mountains, updating orchid records from Ecological Region 73. Such surveys may be available (perhaps from local DOC offices) for other under-reported Regions, and if members know of such, please send them, or write to the Editor.

Thanks, too, to Delphine Cox, whose report of *Microtis unifolia* from the foothills of Mt Percy is the first report we have had of orchids in the Eastern Wairarapa Ecological Region (35). She writes, "In December 1991... some showed signs of having been eaten, perhaps by stock, as at times there are both cows and sheep in the area." - *I have sometimes wondered if the remarkable profusion of Microtis unifolia in farmland might result from unpalatability to stock because of its*

*bitter taste: try chewing one - Ed.*

Other contributors to the Mapping Scheme have included those who sent reports in the early years of the Group, before a formal Scheme was begun, and the following, who have sent reports of the different Ecological Regions (if I have missed you, I apologise - please do let me know): Nancy Adye, Sarah Beadel, Ella Campbell, D Catchpole, LP Chrystall, Noeleen Clements, Ida Collett, Peter de Lange, Max Gibbs, Bob & Beryl Goodger, Dan Hatch, Margaret Hopkins, Bruce Irwin, Jean Jenks, Sandra Jones, Brian Killen, WF Liddy, Doug McCrae, Barbara McGann, David McNaughton, Pauline Mayhill, Mark Moorhouse, Manfred Peterek, Kevin Ross, Stella & John Rowe, Betty Seddon, Philip Simpson, Val Smith, TA Smith, Gordon Sylvester, U Tweedy, Gordon Watson, Morley West, AE Wright, Wilbur Wright, Lyn Young.

### Orchid species by Ecological Region

- 1 Kermadec:
- 2 Three Kings: *Drymoanthus adversus*, *Microtis unifolia*, *Thelymitra longifolia*
- 3 Te Pahi: *Acanthus sinclairii*, *Bulbophyllum pygmaeum*, *Caladenia alata*, *C. minor*, *C. "green column"*, *Calochilus herbaceus*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. cheesemani*, *C. cryptanthus*, *C. oblongus*, *C. trilobus*, *C. rotundifolius*, *Cyrtostylis oblonga*, *C. reniformis*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia sesamoides*, *Genoplesium pumilum*, *Microtis parviflora*, *M. unifolia*, *Ortkoceras novae-zeelandiae*, *P. "all. patens"*, *Pterostylis alobula*, *P. nana*, *P. plmtosa*, *P. trullifolia*, *P. "rubricaulis"*, *Spiranthes sinensis*, *Thelymitra aemula*, *T. cornea*, *T. longifolia*, *T. matthewsii*, *T. pauciflora*, *T. pulchella*, *T. tholiformis*, *T. "aff. ixioides"*, *T. "darkie"*, *T. "rough leaf"*.
- 4 Aupouri: *Acianthus sinclairii*, *Caladenia alata*, *C. minor*, *C. "green column"*, *Calochilus herbaceus*, *Corybas oblongus*, *C. trilobus*, *C. rotundifolius*, *Corybas "A"*, *Cryptostylis subulata*.

- Cyrtostylis oblonga*, *C. reniformis*, *Earina mucronata*, *Genoplesium pumilum*, *Microtis parviflora*, *M. unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis plumosa*, *P. trullifolia*, *Spiranthes sinensis*, *Thelymitra aemula*, *T. cornea*, *T. longifolia*, *T. malvina*, *T. pauciflora*, *T. pulchella*, *T. "aff. ixioides"*, *T. "Ahipara"*, *T. "darkie"*, *T. "rough leaf"*.
- 5 Hokianga: *Acanthus sinclairii*, *Bulbophyllum pygmaeum*, *B. tuberculatum*, *Caladenia a iota*, *C. minor*, *C. "green column"*, *Calochilus herbaceus*, *C. paludosus*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. cheesemanii*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *C. rotundifolius*, *Cyrtostylis oblonga*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina aestivalis*, *E. autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *Genoplesium pumilum*, *Microtis parviflora*, *Microtis unifoliata*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis alobula*, *P. banksii*, *P. brumalis*, *P. trullifolia*, *P. "rubricaulis"*, *Spiranthes sinensis*, *Thelymitra aemula*, *T. cornea*, *T. cyanea*, *T. longifolia*, *T. malvina*, *T. pauciflora*, *T. pulchella*, *T. tholiformis*, *T. "all. ixioides"*, *T. "darkie"*, *T. "rough leaf"*.
- 6 Eastern Northland: *Acanthus sinclairii*, *Bulbophyllum pygmaeum*, *B. tuberculatum*, *Calochilus paludosus*, *Corybas acuminatus*, *C. rotundifolius*, *C. cheesemanii*, *C. oblongus*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Farina autumnalis*, *E. mucronata*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Pterostylis alobula*, *P. banksii*, *P. brumalis*, *P. graminea*, *P. "rubricaulis"*, *P. trullifolia*, *Thelymitra aemula*, *T. cornea*, *T. longifolia*, *T. pauciflora*, *T. pulchella*.
- 7 Poor Knights: *Acanthus sinclairii*, *Caladenia catenata*, *Dendrobium cunninghamii*, *Earina autumnalis*, *E. mucronata*, *Microtis unifolia*, *Pterostylis alobula*, *P. banksii*, *Thelymitra longifolia*.
- 8 Kaipara: *Acanthus sinclairii*, *Caladenia catenata*, *C. minor*, *C. "green column"*, *Chiloglottis cornuta*, *C. acuminatus*, *C. oblongus*, *C. trilobus*, *Cyrtostylis oblonga*, *Earina mucronata*, *Microtis parviflora*, *M. unifolia*, *Orthoceras novae-zeelandiae*, *Pterostylis banksii*, *P. "rubricaulis"*, *Thelymitra aemula*, *T. longifolia*, *T. pauciflora*, *T. "aff. ixioides"*, *Yuania australis*.
- 9 Auckland: *Acanthus sinclairii*, *Bulbophyllum pygmaeum*, *B. tuberculatum*, *Caladenia catenata*, *C. iridescens*, *C. minor*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. cheesemanii*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Cyrtostylis oblonga*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia minor*, *Genoplesium pumilum*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Pterostylis alobula*, *P. banksii*, *P. brumalis*, *P. cardiostigma*, *P. graminea*, *P. plumosa*, *P. trullifolia*, *P. "rubricaulis"*, *Thelymitra aemula*, *T. cornea*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. pulchella*, *T. "intermedia"*, *Yuania australis*.
- 10 Coromandel: *Acanthus sinclairii*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia iridescens*, *C. minor*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. cheesemanii*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Cyrtostylis oblonga*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. minor*, *G. sesamoides*, *Genoplesium nudum*, *G. pumilum*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *P. puberula*, *P. Haft. passes*, *Pterostylis alobula*, *P. banksii*, *P. brumalis*, *P. graminea*, *P. patens*, *P. trullifolia*, *P. "rubricaulis"*, *Thelymitra aemula*, *T. cornea*, *T. formosa*, *T. ixioides*, *T. longifolia*, *T. pauciflora*, *T. pulchella*, *T. "aff. ixioides"*, *Yuania australis*.
- 11 Waikato: *Acanthus sinclairii*, *Bulbophyllum pygmaeum*, *Calochilus paludosus*, *C. robertsonii*, *Chiloglottis cornuta*, *Corybas carsei*, *C. cheesemanii*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Pterostylis alobula*, *P. banksii*, *P. furcata*, *P. graminea*, *P. linearis*, *P. trullifolia*, *Spiranthes sinensis*.
- 12 Tainui: *Acanthus sinclairii*, *Bulbophyllum tuberculatum*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. trilobus*, *Corybas "short Sepals"*, *Earina autumnalis*, *E. mucronata*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Orthoceras novae-zeelandiae forma viride*, *Pterostylis banksii*, *Thelymitra longifolia*.
- 13 Northern Volcanic Plateau: *Acanthus sinclairii*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia alata*, *C. catenata*, *C. iridescens*, *Calanea minor*, *Calochilus paludosus*, *C. robertsonii*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. cheesemanii*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. minor*, *G. sesamoides*, *Microtis oligantha*, *M. parviflora*, *M. unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis alobula*, *P. banksii*, *P. cardiostigma*, *P. graminea*, *P. trullifolia*, *P. "rubricaulis"*, *P. "aff. montana"*, *Spiranthes sinensis*, *Thelymitra aemula*, *T. cornea*, *T. decora*, *T. formosa*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. "aff. ixioides"*.
- 14 Whakatane: *Acanthus sinclairii*, *Bulbophyllum pygmaeum*, *B. tuberculatum*, *Caladenia catenata*, *Chiloglottis cornuta*, *Corybas trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Pterostylis alobula*, *P. banksii*, *P. graminea*, *P. trullifolia*, *Thelymitra longifolia*.
- 15 Western Volcanic Plateau: *Corybas trilobus*, *Dendrobium cunninghamii*, *Earina autumnalis*, *E. mucronata*, *Gastrodia minor*, *Prasophyllum "aff. patens"*.
- 16 Central Volcanic Plateau: *Acanthus sinclairii*, *caladenia catenata*, *Calochilus robertsonii*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. cheesemanii*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. minor*, *G. sesamoides*, *Genoplesium pumilum*, *Microtis oligantha*, *M. parviflora*, *M. unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis alobula*, *P. banksii*, *P. trullifolia*, *Spiranthes sinensis*, *Thelymitra cyanea*, *T. cornea*, *T. decora*, *T. longifolia*, *T. pauciflora*.
- 17 Eastern Volcanic Plateau: *Adenochilus gracilis*, *Aporostylis bifolia*, *Caladenia catenata*, *C. iridescens*, *C. lyallii*, *Calochilus robertsonii*, *Chiloglottis cornuta*, *Chiloglottis gunnii*, *Corybas acuminatus*, *C. cheesemanii*, *C. macranthus*, *C. oblongus*, *C. trilobus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. minor*, *G. sesamoides*, *Genoplesium nudum*, *Microtis oligantha* (?), *M. parviflora*, *M. unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis alobula*, *P. banksii*, *P. cardiostigma*, *P. graminea*, *P. patens*, *Pterostylis "aff. montana"*, *Spiranthes sinensis*, *Thelymitra cyanea*, *T. decora*, *T. formosa*, *T. longifolia*, *T. pauciflora*.
- 18 Tongariro: *Acanthus viridis*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Caladenia catenata*, *Caladenia iridescens*, *C. lyallii*, *Corybas "A"*, *Earina mucronata*, *Gastrodia cunninghamii*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *P. "aff. patens"*, *Pterostylis banksii*, *P. cardiostigma*, *P. graminea*, *P. micromega*, *P. patens*, *Spiranthes sinensis*, *Thelymitra cyanea*, *T. decora*, *T. formosa*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. pulchella*, *T. "aff. ixioides"*.
- 19 Raukumara: *Acanthus sinclairii*, *Bulbophyllum tuberculatum*, *Corybas oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Microtis parviflora*, *M. unifolia*, *Orthoceras novae-zeelandiae*, *Pterostylis banksii*, *P. graminea*, *Thelymitra longifolia*.
- 20 East Cape: *Acanthus sinclairii*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Cyrtostylis reniformis*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *E. aestivalis*, *Genoplesium nudum*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis alobula*, *P. banksii*, *P. patens*, *P. trullifolia*, *Thelymitra decora*, *T. hatchii*, *T. longifolia*, *T. pauciflora*.

- 21 Urewera: *Acianthus sinclairii*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *Chiloglottis commata*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *Genoplesium nudum*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis banksii*, *P. cardiostigma*, *P. graminea*, *P. patens*, *P. trullifolia*, *Thelymitra cyanea*, *T. hatchii*, *T. longifolia*, *T. pauciflora*.
- 22 Wairoa: *Acianthus sinclairii*, *Caladenia catenata*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. trilobus*, *Cyrtostylis reniformis*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *Genoplesium nudum*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Pterostylis albula*, *P. banksii*, *P. cardiostigma*, *P. patens*, *P. trullifolia*, *Thelymitra cornea*, *T. longifolia*.
- 23 King Country: *C. macranthus*, *Corybas "A"*.
- 24 Taranaki: *Acianthus sinclairii*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *C. "short Sepals"*, *Corybas "A"*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Genoplesium nudum*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Pterostylis albula*, *P. banksii*, *P. cardiostigma*, *P. montana*, *P. trullifolia*, *P. "aff. montana"*, *Thelymitra hatchii*, *T. longifolia*, *T. pauciflora*.
- 25 Egmont: *Adenochilus gracilis*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *C. lyallii*, *Chiloglottis commata*, *Corybas acuminatus*, *C. cheesemaniae*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis banksii*, *P. cardiostigma*, *P. graminea*, *P. humilis*, *P. irsoniana*, *P. montana*, *P. patens*, *P. venosa*, *P. "aff. montana"*, *Spiranthes sinensis*, *Thelymitra hatchii*, *T. longifolia*, *T. pauciflora*.
- 26 Maowhango:
- 27 Kaimanawa: *Caladenia catenata*, *Chiloglottis commata*, *Corybas trilobus*, *Earina mucronata*, *Prasophyllum colensoi*, *Pterostylis banksii*, *P. patens*, *Thelymitra cyanea*, *T. longifolia*.
- 28 Ruahine: *Caladenia iridescens*, *Chiloglottis commata*, *Corybas trilobus*, *Dendrobium cunninghamii*, *Earina mucronata*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis australis*, *P. banksii*, *P. patens*, *P. venosa*, *Thelymitra longifolia*, *T. pauciflora*.
- 29 Hawke's Bay: *Acianthus sinclairii*, *Chiloglottis cornuta*, *Corybas macranthus*, *C. trilobus*, *Cyrtostylis reniformis*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis albula*, *P. banksii*, *P. graminea*, *P. montana*, *P. trullifolia*, *Thelymitra cyanea*, *T. decora*, *T. formosa*, *T. hatchii*, *T. longifolia*.
- 30 Rangitikei: *Chiloglottis commata*, *Corybas macranthus*, *C. trilobus*, *Corybas "A"*, *Corybas "abort Sepals"*, *Prasophyllum colensoi*, *Pterostylis australis*, *P. banksii*, *P. aff. montana*, *Thelymitra longifolia*.
- 31 Manawatu: *Chiloglottis commata*, *Corybas trilobus*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. minor*, *G. sesamoides*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Pterostylis graminea*, *Thelymitra longifolia*.
- 32 Manawatu Gorge:
- 33 Pahiatua: *Dendrobium cunninghamii*, *Earina autumnalis*, *E. mucronata*, *Thelymitra longifolia*.
- 34 Eastern Hawke's Bay: *Pterostylis trullifolia*
- 35 Eastern Wairarapa: *Microtis unifolia*
- 36 Wairarapa: *Acianthus sinclairii*, *Corybas macranthus*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Microtis unifolia*, *Pterostylis banksii*, *P. graminea*, *Thelymitra longifolia*.
- 37 Aorangi:
- 38 Taranaki: *Acianthus sinclairii*, *A. viridis*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *C. iridescens*, *C. lyallii*, *Chiloglottis commata*, *Corybas acuminatus*, *C. cheesemaniae*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Cyrtostylis oblonga*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. sesamoides*, *Lyperanthus antarcticus*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis albula*, *P. australis*, *P. banksii*, *P. cardiostigma*, *P. foliata*, *P. graminea*, *P. montana*, *P. plumosa*, *P. trullifolia*, *Thelymitra cyanea*, *T. decora*, *T. formosa*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. pulchella*, *T. "aff. ixioides"*.
- 39 Sounds Wellington: *Acianthus sinclairii*, *A. viridis*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *C. iridescens*, *Chiloglottis commata*, *Corybas acuminatus*, *C. cheesemaniae*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. sesamoides*, *Genoplesium nudum*, *G. pumilum*, *Microtis parviflora*, *M. unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis albula*, *P. banksii*, *P. cardiostigma*, *P. foliata*, *P. graminea*, *P. plumosa*, *P. trullifolia*, *Thelymitra cyanea*, *T. decora*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. pulchella*.
- 40 Richmond: *Acianthus sinclairii*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *C. iridescens*, *C. lyallii*, *Chiloglottis cornuta*, *Corybas oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia minor*, *G. sesamoides*, *Genoplesium pumilum*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis albula*, *P. australis*, *P. banksii*, *P. foliata*, *P. graminea*, *P. montana*, *P. trullifolia*, *Thelymitra cornea*, *T. decora*, *T. hatchii*, *T. longifolia*, *T. pauciflora*.
- 41 Wairoa: *Corybas rivularis*, *Dendrobium cunninghamii*, *Earina autumnalis*, *E. mucronata*, *Gastrodia sesamoides*, *Orthoceras novae-zeelandiae*.
- 42 Inland Marlborough:
- 43 Molesworth: *Earina mucronata*,
- 44 Clarence:
- 45 Kaikoura: *Drymoanthus adversus*
- 46 Northwest Nelson: *Acianthus sinclairii*, *A. viridis*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *C. iridescens*, *C. lyallii*, *Calochilus paludosus*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. cheesemaniae*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. minor*, *Genoplesium pumilum*, *Lyperanthus antarcticus*, *Microtis oligantha*, *M. parviflora*, *M. unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis albula*, *P. australis*, *P. banksii*, *P. foliata*, *P. graminea*, *P. humilis*, *P. irsoniana*, *P. micromega*, *P. montana*, *P. oliveri*, *P. plumosa*, *P. trullifolia*, *P. venosa*, *thelymitra cornea*, *T. cyanea*, *T. decora*, *T. formosa*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. pulchella*, *T. "aff. ixioides"*, *Yoaia australis*.
- 47 Nelson: *Acianthus sinclairii*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Caladenia catenata*, *C. iridescens*, *C. lyallii*, *Calochilus paludosus*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. cryptanthus*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. minor*, *Genoplesium nudum*, *G. pumilum*, *Microtis unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis albula*, *P. areolata*, *P. australis*, *P. banksii*, *P. foliata*, *P. graminea*, *P. humilis*, *P. irsoniana*, *P. montana*, *P. nana*, *P. oliveri*, *P. trullifolia*, *Thelymitra cornea*, *T. cyanea*, *T. decora*, *T. formosa*, *T. hatchii*, *T. longifolia*, *T. pauciflora*.
- 48 North Westland: *Adenochilus gracilis*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *C. lyallii*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. cryptanthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *Genoplesium nudum*, *Microtis parviflora*, *M. unifolia*, *Orthoceras novae-zeelandiae*, *Prasophyllum colensoi*, *Pterostylis banksii*, *P. cardiostigma*, *P. graminea*, *P. irsoniana*, *P. montana*, *Thelymitra cornea*, *T. cyanea*, *T. dentata*, *T. longifolia*, *T. pauciflora*, *T. pulchella*.

- 49 Spenser: *Acianthus viridis*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Caladenia catenata*, *C. lyallii*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. minor*, *Genoplesium nudum*, *Microtis unifolia*, *Prasophyllum colensoi*, *Pterostylis australis*, *P. banksii*, *P. graminea*, *P. irsoniana*, *P. oliveri*, *Thelymitra cornea*, *T. cyanea*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. pulchella*.
- 50 Whataroa: *Adenochilus gracilis*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. trilobus*, *D. cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *Genoplesium nudum*, *Lyperanthus antarcticus*, *Microtis oligantha*, *M. unifolia*, *Prasophyllum colensoi*, *Pterostylis australis*, *P. banksii*, *P. graminea*, *P. irsoniana*, *P. montana*, *Spiranthes sinensis*, *Thelymitra cyanea*, *T. longifolia*.
- 51 Aspiring: *Adenochilus gracilis*, *Aporostylis bifolia*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Gastrodia cunninghamii*, *G. minor*, *Lyperanthus antarcticus*, *Microtis oligantha*, *Prasophyllum colensoi*, *Pterostylis australis*, *P. banksii*, *P. montana*, *P. venosa*, *Thelymitra cyanea*, *T. formosa*, *T. longifolia*, *T. pulchella*.
- 52 Lowry: *Chiloglottis cornuta*, *Chiloglottis gunni*.
- 53 Hawdon: *Acianthus viridis*, *Aporostylis bifolia*, *Caladenia lyallii*, *Chiloglottis cornuta*, *Corybas rivularis*, *C. trilobus*, *Lyperanthus antarcticus*, *Pterostylis graminea*, *P. montana*, *P. oliveri*, *Thelymitra hatchii*.
- 54 Puketaraki: *Chiloglottis cornuta*, *Corybas trilobus*, *Pterostylis oliveri*.
- 55 Canterbury Foothills: *Caladenia catenata*, *C. lyallii*, *Chiloglottis comma*, *Corybas cryptanthus*, *C. macranthus*, *C. rivularis*, *C. trilobus*, *Gastrodia cunninghamii*, *G. minor*(?), *Microtis unifolia*, *Prasophyllum colensoi*, *Pterostylis areolata*, *P. banksii*, *P. irsoniana*, *P. montana*, *P. tristis*, *P. "aff. cynocephala"*, *Thelymitra cyanea*, *T. formosa*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. pulchella*.
- 56 Canterbury Plains: *Pterostylis tristis*, *P. "aff. cynocephala"*, *Thelymitra hatchii*, *T. longifolia*, *T. pauciflora*.
- 57 Banks: *Gastrodia cunninghamii*.
- 58 D'Archaie: *Caladenia lyallii*, *Corybas rivularis*, *Gastrodia cunninghamii*, *Prasophyllum colensoi*, *Pterostylis "aff. montana"*, *Thelymitra hatchii*, *T. longifolia*.
- 59 Heron:
- 60 Tasman: *Caladenia lyallii*.
- 61 Pareora:
- 62 Wainomo:
- 63 MacKenzie: *Prasophyllum colensoi*.
- 64 Waitaki:
- 65 Kakanui: *Aporostylis bifolia*, *Caladenia lyallii*, *Chiloglottis comma*, *Corybas macranthus*, *C. trilobus*, *Gastrodia cunninghamii*, *G. minor*, *Microtis oligantha*, *M. unifolia*, *Prasophyllum colensoi*, *Pterostylis banksii*, *P. aff. cynocephala*, *P. foliate*, *P. graminea*, *P. montana*, *P. "aff. montana"*, *Thelymitra cyanea*, *T. decora*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. pulchella*.
- 66 Lakes: *Adenochilus gracilis*, *Aporostylis bifolia*, *Caladenia catenata*, *Chiloglottis comma*, *Corybas macranthus*, *C. rivularis*, *C. trilobus*, *C. "shot tepals"*, *Earina mucronata*, *Gastrodia cunninghamii*, *G. minor*, *G. "long column"*, *Lyperanthus antarcticus*, *Microtis oligantha*, *M. unifolia*, *Prasophyllum colensoi*, *Pterostylis australis*, *P. banksii*, *P. venosa*, *P. "aff. cynocephala"*, *Thelymitra cyanea*, *T. formosa*, *T. longifolia*, *T. pauciflora*, *T. pulchella*.
- 67 Central Otago: *Corybas macranthus*, *Lyperanthus antarcticus*, *Prasophyllum colensoi*, *Pterostylis "aff. cynocephala"*, *Thelymitra longifolia*.
- 68 Lammerlaw: *Adenochilus gracilis*, *Aporostylis bifolia*, *Caladenia lyallii*, *Chiloglottis cornuta*, *Corybas macranthus*, *C. rivularis*, *C. trilobus*, *Gastrodia minor*, *Prasophyllum colensoi*, *Thelymitra pauciflora*.
- 69 Otago Coast: *Adenochilus gracilis*, *Aporostylis bifolia*, *Caladenia catenata*, *C. lyallii*, *Chiloglottis comma*, *Corybas macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus "spotted leaf"*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *M. unifolia*, *Prasophyllum colensoi*, *Pterostylis oligantha*, *P. australis*, *P. banksii*, *P. graminea*, *P. venosa*, *P. "aff. cynocephala"*, *P. "aff. montana"*, *Thelymitra cyanea*, *T. formosa*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. pulchella*.
- 70 Catlins: *Adenochilus gracilis*, *Aporostylis bifolia*, *Caladenia lyallii*, *C. minor*, *Chiloglottis cornuta*, *Corybas macranthus*, *C. oblongus*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus "spotted leaf"*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *Lyperanthus antarcticus*, *Microtis unifolia*, *Prasophyllum colensoi*, *Pterostylis australis*, *P. banksii*, *P. graminea*, *P. montana*, *P. venosa*, *P. "aff. cynocephala"*, *P. "aff. montana"*, *Thelymitra cyanea*, *T. formosa*, *T. hatchii*, *T. longifolia*, *T. pauciflora*, *T. pulchella*.
- 71 Otago: *Corybas acuminatus*, *Pterostylis australis*, *Spiranthes sinensis*, *Thelymitra longifolia*.
- 72 Fiord: *Adenochilus gracilis*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *C. minor*, *C. lyallii*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Lyperanthus antarcticus*, *Microtis unifolia*, *Prasophyllum colensoi*, *Pterostylis australis*, *P. banksii*, *P. graminea*, *P. venosa*, *T. longifolia*.
- 73 Mavora: *Acianthus viridis*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Caladenia lyallii*, *C. minor*, *Chiloglottis cornuta*, *Corybas macranthus*, *C. rivularis*, *C. trilobus*, *Gastrodia cunninghamii*, *G. minor*, *G. "long column"*, *Microtis oligantha*, *M. unifolia*, *Prasophyllum colensoi*, *Pterostylis areolata*, *P. australis*, *P. banksii*, *P. montana*, *Thelymitra hatchii*, *T. longifolia*, *T. pulchella*.
- 74 Waikato:
- 75 Gore:
- 76 Southland Hills: *Corybas trilobus*, *Thelymitra pauciflora*.
- 77 Te Wae Wae: *Acianthus viridis*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia lyallii*, *C. minor*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *Dendrobium cunninghamii*, *Drymoanthus "spotted leaf"*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *Lyperanthus antarcticus*, *Microtis unifolia*, *Prasophyllum colensoi*, *Pterostylis banksii*, *P. venosa*, *Thelymitra cyanea*, *T. hatchii*, *T. longifolia*, *T. pulchella*.
- 78 Makarewa: *Chiloglottis cornuta*, *Corybas oblongus*, *Drymoanthus "spotted leaf"*, *Gastrodia minor*, *G. "long column"*, *Microtis oligantha*, *M. unifolia*, *Pterostylis australis*, *P. banksii*, *P. graminea*, *P. montana*, *P. venosa*, *Thelymitra cyanea*, *T. hatchii*, *T. longifolia*, *T. pulchella*.
- 79 Rakiura: *Acianthus sinclairii*, *Acianthus viridis*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Bulbophyllum pygmaeum*, *Caladenia catenata*, *Caladenia lyallii*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. rivularis*, *C. trilobus*, *C. "short tepals"*, *Dendrobium cunninghamii*, *Drymoanthus "spoiled leaf"*, *Earina autumnalis*, *E. mucronata*, *Gastrodia cunninghamii*, *G. minor*, *G. "long column"*, *Lyperanthus antarcticus*, *Microtis oligantha*, *M. unifolia*, *Prasophyllum colensoi*, *Pterostylis banksii*, *P. graminea*, *P. irsoniana*, *P. montana*, *P. venosa*, *Thelymitra cyanea*, *T. hatchii*, *T. longifolia*, *T. pulchella*.
- 80 Chatham: *Acianthus sinclairii*, *Adenochilus gracilis*, *Aporostylis bifolia*, *Caladenia catenata*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. macranthus*, *C. oblongus*, *C. trilobus*, *Drymoanthus adversus*, *Earina autumnalis*, *E. mucronata*, *Microtis unifolia*, *Prasophyllum colensoi*, *Pterostylis australis*, *P. banksii*, *P. micromega*, *Thelymitra cyanea*, *T. longifolia*, *T. pulchella*.
- 81 Bounty:
- 82 Antipodes:
- 83 Auckland Is.: *Acianthus viridis*, *Aporostylis bifolia*, *Caladenia 'catenata*, *Chiloglottis cornuta*, *Corybas acuminatus*, *C. oblongus*, *C. rivularis*, *Lyperanthus antarcticus*, *Thelymitra longifolia*.
- 84 Campbell: *Aporostylis bifolia*, *Chiloglottis cornuta*, *Corybas trilobus*, *Lyperanthus antarcticus*
- 85 Macquarie: *Corybas macranthus*

## Australian notes

¶ Reg. Angus writes (*Wollongong Native Orchid Bulletin*), "...the (question of) the resetting of the labellum of *Caleana major* is still outstanding.... All sources in the field of plant biology that I have approached have been unable to provide answers on the chemo/mechanics involved.

Theories by one party regarding turgid cells which fill with liquid to stiffen or straighten the "strap" are not accepted by another. David Jones states that while he is not a chemist the cell structure with small cells to the outside of the "strap" and large cells down the centre have something to do with it but just what, is out of the field of his expertise and he knows of no-one who has successfully investigated this."

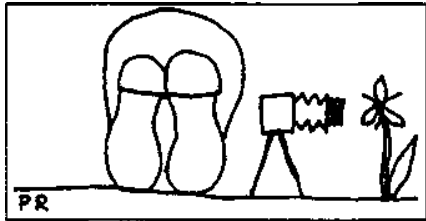
¶ A new ANOS group has been formed in North Tasmania.

¶ The next ANOS Autumn Show is to be hosted by the Warringah Group and will be held in the East Roseville Community Hall, Babbage Rd, East Roseville on 5 April 1992.

¶ RJ Markwick writes on photographing native orchids (*ANOS Victorian Group Bulletin* December 1991, p11): "... Since our orchids are generally quite small, the problem is to concentrate sufficient light on them.

"Lighting for orchid photographs should be soft if true colours and textures are to be shown. Direct sunlight is not good because it tends to produce excessive contrast which can 'bum out' textural details. Furthermore, problems with reflected ultraviolet light

can cause blues to be rendered as shades of violet. (The use of a skylight filter is helpful in these circumstances). The natural light of an overcast day is, however, ideal for outdoor shots, and a subject in shade can be better lit by reflecting light from a white card or some other reflective substance. Different kinds of reflectors produce different effects. Side lighting or back lighting can be used to enhance textural details. Orchids can look very effective photographed against the light as many are translucent.

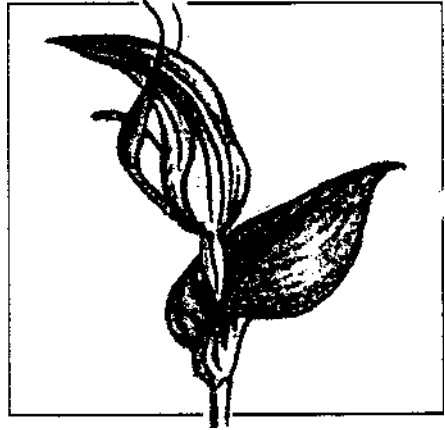


"It may not be generally realised by natural light photographers, but it is a fact that the colour of the sunlight varies during the day. As a result blue, green and purple flowers are best photographed in the mornings, while reds, yellows and oranges are best reserved for late afternoons.. If you abide by these guidelines the colour saturation of your orchid photographs will be greatly enhanced. Remember to avoid direct sunlight. If possible, use the softly diffused and natural lighting of a cloudy day, where colour saturation is at its peak.

"To maintain realism, I prefer to photograph orchids in their natural

environment. However, movement caused by wind, and increased exposure times, can combine to prevent the more extreme close-ups unless flash lighting is used, and this opens up a whole new ball-game. Some purist photographers even advise against using flash for flower portraiture, because, depending on the surface reflectivity of the plant, the instantaneous burst of intense light will sometimes cause glare which results in undesirable, unnatural white spots." *(And the black background inevitable in flashlit shots, while at first sight attractive, does not show habitat and becomes tedious after a while - Ed.)*

¶Bob Bates writes (NOSSA Journal, 1991; 15 [11]: 111) on a visit to rugged Onkaparinga Gorge in S. Australia, "... the rare *Pterostylis foliata* is well conserved in this area."



*(But the illustration is not what we would recognise as P. foliata, is it? - Ed)*

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## Historical reprint

"If scientific work is to take place in our schools which modern views seem to demand, then it must in the first place be thorough and practical, and a sufficiency of time must be devoted to it. Two hours a week for a period of three or four years is not too much to demand for this branch of science; but no provision has hitherto been made in the way of providing text-books for such a thorough study

of the subject. This must be my excuse for adding one more to the many works which profess to teach the science of Botany," wrote G.M. Thomson in the preface to his *Introductory Class-book of Botany, for use in New Zealand Schools*, published in 1891. The section on orchids (pp 93-98) is reproduced here - much of it still apt, some of it dated, all of it interesting.

Several genera of orchidaceous plants are common in New Zealand, but they are usually so different in appearance from one another that it becomes a somewhat difficult matter to select typical species. In no group of plants are there so many interesting and varied contrivances to bring about cross- fertilisation, and therefore to the student who has studied the types we have already described orchids will repay close examination. While it is impossible in a short space to go into details of many of the forms, it will be advisable to describe one or two somewhat fully.

*Dendrobium cunninghamii* is a species to be found in many parts of both Islands, particularly near the sea-coast. It is a true epiphyte\*, growing in large tufts on tree-trunks or rocks, and having only aerial roots, which rot away if buried in the soil. Its branching stems are thin, wiry, and polished, and bear numerous narrow striated 3-nerved leaves, arranged in two rows (*distichous*). In December or January its pretty white or pinkish flowers are produced, on



slender pedicels, in 2- or more-flowered racemes, which spring from the axils of



Fig. 181. Ovary of *Dendrobium*.  
trans. section (mag.).



Fig. 182. Flower of *Dendrobium*.  
long. section.

Fig. 180. Flowering branch of  
*Dendrobium cunninghamii*.

the upper leaves. Note first the inferior ovary, which is 1-celled, and contains an immense number of minute ovules on 3 parietal placentae. Above this is the perianth, made up of 6 leaves, while the centre of the flower is occupied by a column shaped somewhat like the letter J. Of the three outer perianth-leaves, or *sepals*, one stands up behind the upright part of the column, while the other two are lateral

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Gr. epi, upon; phyton, a plant.

and have their bases adnate to its produced part. Of the three inner leaves, or petals, two are lateral, while the third faces the upright part of the column. This petal is nearly always remarkably formed in orchids, and is called the **labellum**, or lip. In the present species it is 3-lobed, the small lateral lobes being usually of a bright-crimson colour, while on the central lobe is a longitudinal series of 5 yellow plate-like ridges. The labellum is jointed on to the tip of the produced part of the column, and is easily bent back - e.g., by the weight of an insect; but it is sufficiently elastic to spring up again when the pressure is removed. When all the perianth-leaves have been removed only the column is left, standing on the summit of the ovary. The produced portion of this, on which the labellum stands, ends in a green glandular swelling, at the base of which a drop of nectar is excreted. The upright portion of the column ends in a single *anther*. The pollen, instead of lying in two or more cells or cavities as dust, is united into masses called **pollinia** in all orchids. In this species there are 4 pollinia in the anther ;

each is in the form of an oblong flatfish plate, and these unite in pairs to form

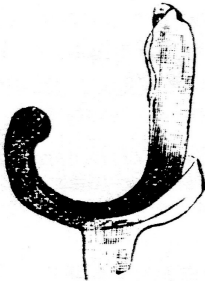


Fig. 183. Column of *Dendrobium*, seen from the side (mag.).



Fig. 184. Column of *Dendrobium*, front view (mag.).



Fig. 185. Pollinia of *Dendrobium*, withdrawn on a needle (mag.).

a strap-shaped caudicle, or thong, by which they are joined in front to a viscid gland on the rostellum. This **rostellum** is the beak, or point, of the column, which projects out in front of the anther. Below it, and forming a nearly square viscid depression or pit in the front of the column, facing the labellum, is the stigma, which is imperfectly 2-lobed. The sides of the column near the top are slightly inflated in a wing-like manner.

The flowers usually hang in such a manner that the labellum is on the lower side, so that if an insect alight on it it hangs down and exposes the nectar-gland. As the insect moves forward to sip the nectar, the elasticity of the labellum tends to press it against the column. In moving back out of



the flower it brushes the viscid rostellum with the top or bade of its head, and in this way removes usually all four of the pollinia, which, however, by the mode in which they are withdrawn from the anther, are pulled forward a little on the insect's head. In visiting the next flower these pollinia are in such a position by this depressing action that, as the insect advances its head, they miss the rostellum, but are thrust below it into the stigmatic cavity. It will be easily seen that self-fertilisation of these flowers is absolutely impossible in a state of nature.

The ovary matures into a capsule, which dehisces by 3 placentiferous valves; these separate away above and below, leaving the midribs of the carpels standing. The seeds are very minute and light, in appearance like very fine sawdust, and are readily dispersed by the wind. Owing to their size, their structure is only made out with great difficulty. They have a very loose, reticulated testa, enclosing a solid, apparently structureless embryo.

Another common epiphyte is *Earina*, two species of which occur in the bush: the flowers are small, wax-like, and fragrant.



Fig. 186. Part of panicle of *Earina mucronata*.

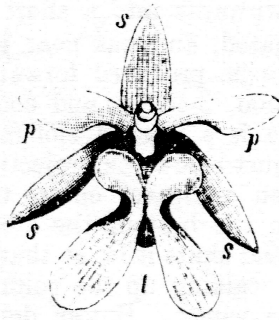


Fig. 187. Flower of *Earina*, front view (mag.). *s*, sepals; *p*, petals; *l*, labelum.



Fig. 188. Columu of *Earina*, side view (mag.). *an*, anther; *r*, rostellum; *st*, stigmatic cavity.

(a.) A singular form of flowers prevails in the genus *Pterostylis* (so named from the winged column). The plants are terrestrial herbs, bearing grass-like sheathing - leaves, springing from underground tubers, which are annually produced. In most of our species each plant bears only one rather large green flower. In this, the upper sepal and lateral



**Fig. 189. Flower of *Pterostylis banksii* in long. section.**

petals are more or less bent or united together to form a boat-shaped hood, -while the two lateral sepals are



**Fig. 190.**  
Labellum of  
*Pterostylis*



**Fig. 191.** Column of  
*Pterostylis*, side view,  
*an*, anther;  
*st*, stigma

united in front. The labellum is rather small and narrow, and is nearly all enclosed by the other leaves of the whorl, only its apex projecting. It is fastened by a small claw to the basal projection of the column, while its lower end is produced downwards into, a short curved appendage. The column is elongated, and has near its upper extremity two quadrangular wings, produced forwards at right angles. The anther is terminal, 2-celled, and contains four granular pollinia. The stigma is a 2-lobed elongated surface on the face of the column, just below the projection of the wings. When an insect enters the flower and crawls to the bottom, the labellum moves forward and shuts it in, so that it can only escape by walking up the column and out between the wings. But in doing so it has first to pass the stigma, and then the rostellum, in touching which it will carry away with it one or more of the pollinia. If it visits a second flower the same process will be repeated, but this time the stigma will be smeared with the pollen brought from the first-visited flower."\*



**Fig. 192.** Column of  
*Pterostylis* front view.  
*an*, anther; *r*, rostellum;  
*st*, stigma.

\*The structure and development of this group of flowering plants is fully treated of in Darwin's "Fertilisation of Orchids." Papers on the fertilisation of New Zealand species, by Mr. T. Cheeseman and the present writer, will be found in the "Transactions of the N.Z. Institute," Vol. v., p. 352; vii., p. 349; ix., p. 542; x., p. 353; xi., p. 418; and xiii., p. 291,

(b.) The structure of orchid-flowers is apparently so different from that of the two types previously examined that it is not easy at first sight to see any relationship between them. In both iridaceous and liliaceous- plants trimerous symmetry prevails in all the parts, there being 6 perianth-leaves, 3 or 6 stamens, and usually a 3-celled ovary. In orchids we also find the 6-leaved perianth and 3 placentae in the ovary ; but the staminal whorl appears to be defective. At the same time one of the perianth-leaves—viz., the labellum—is always different in appearance from the others, while, further, there are in most orchids peculiar outgrowths, both of the labellum and column, which are not explicable by superficial examination.

But by careful dissection it has been shown pretty conclusively that the flower consists theoretically of 5 whorls of 3 parts each—viz., 3 sepals, 3 petals, 6 stamens, and 3 carpels. By tracing out the 15 groups of spiral vessels which pass up into flower, Darwin (whose diagram is reproduced here) came to the following conclusions: Of the

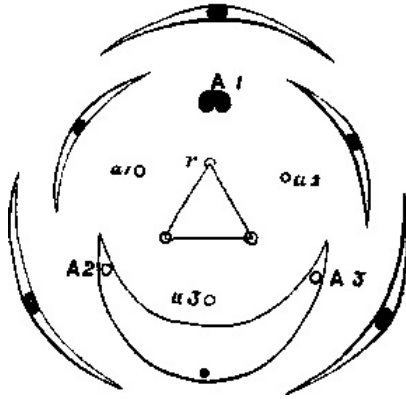


Fig. 193. Theoretical floral diagram of the Orchid flower (after Darwin).

6 staminal organs originally present, one ( $A_1$ ) of the outer whorl is represented by the fully-developed terminal anther of the flower, the other two ( $A_2$  and  $A_3$ ) of the same whorl combine with the lower petal to form the labellum. Of the inner staminal whorl, ( $a_1$  and  $a_2$  pass up the sides of the column, sometimes appearing as outgrowths or staminodia, as in *Thelymitra*, a common New Zealand genus of orchids, in which the flowers are nearly regular. (In Ladies' Slipper — *Cypripedium* — a genus not uncommonly found in cultivation,  $A_1$  is represented by a shield-like expansion on the top of the column, while  $a_1$  and  $a_2$  form fully-developed stamens.) The third stamen of the inner whorl is quite undeveloped, the spiral vessel passing up the front of the column. Of the innermost whorl of three spiral vessels, two can be traced to the stigmatic faces, while the third,  $r$ , ends in the rostellum. Although this view is only theoretical, yet it is so inherently probable, and affords such an insight into the modifications which take place in the development of floral organs for definite purposes, that it is

well worth studying. We should judge from it that the pro-genitors of all orchids had regular flowers with perfectly trimerous symmetry, but that their mode of fertilisation became more and more specialised, until at last they became dependent on certain kinds of insects to perform this necessary work for them. In course of time species of some genera, such as *Thelymitra*, *Microtis*, and *Prasophyllum*, appear to have retrograded in development so far as to become self-fertile once more; but the majority of orchid-flowers are

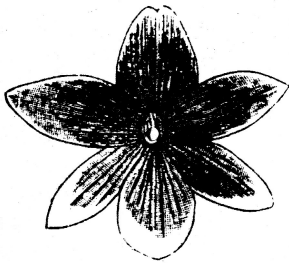


Fig. 194. Flower of *Thelymitra pulchella*, front view.



Fig. 195. Column of *Thelymitra*, side view (mag).

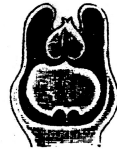


Fig. 196. Column of *Thelymitra*, front view (mag).

quite incapable of self-fertilisation. In the first-named genus the flowers tend to revert to regularity of form as far as the perianth is concerned, but in other respects retain the typical orchid-structure.

*The Proceedings*  
of

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