



Journal

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Editor: Ian St George, 22 Orchard St,
Wadestown, Wellington
Conservation: Doug McCrae,
15 Glendon Ave, Avondale, Auckland.
ANOS liaison: Brian Molloy, DSIR Land
Resources, Private Bag Christchurch

Please note the Editor's new address

Contents

1. Editorial
The specific names

Original papers

2. Attempts at cultivating
Pterostylis banksii. Tim Funnell
4. Identification of *Thelymitra*
flowers. Bruce Irwin and Beryl
Goodger
8. *Australian Orchid Research*
Volume 2 - a New Zealand
perspective. Brian Molloy

10. Notes

- Errors. Ken Wilson on *Corybas
cheesemanii* (and pantyhose).
Orchids in the iron curtain.
The "viscarium". Wilbur Wright
on *Acianthus viridis*.
R.D. FitzGerald's Australian
Orchids at the National Museum.
Bruce Irwin on Norfolk Island
*Dendrobium*s. Gordon Sylvester.
Kapiti Island trip.
Has *Chiloglottis formicifera*
reappeared in New Zealand?
Photographic competition.
15. Australian notes *Thelymitra
pulchella* in Victoria. The
Australian Botanic Gardens.
When *Thelymitra*s open.
A.N.O.S. news
 17. *Historical note* Robert Desmond
FitzGerald.

Editorial

The specific names

Botanical names are double - the first is the name of the genus (generic), the second that of the species (specific). Some of the specific names of our orchids honour great men; others, such as the following, draw attention to special characteristics of the species.

acuminatus: pointed (hood)
adversus: opposite (leaves)
aestivalis: summer (flowering)
alata: winged
alobula: without lobes
antarcticus: southern
areolata: divided into small areas (by
the leaf veins?)
australis: southern
autumnalis: autumn (flowering)
bifolia: two-leaved
brumalis: winter (flowering)
cardiostigma: heart-shaped stigma
carnea: flesh (coloured)
catenata: intertwined
cornuta: horned
cryptanthus: hidden-flowered
cyanea: blue
cycnocephala: like a swan's head
decora: decorative dentata: toothed
foliata: leafy

formicifera: ant-bearing
formosa: beautiful
gracilis: slender
graminea: grasslike
herbaceus: grassy
humilis: humble
iridescens: iridescent
irsoniana: after Irwin and Gibson
ixioides: like an Ixia
longifolia: long-leaved
macranthus: large-flowered
malvina: mauve (cilia)
micromega: small (plant) large (flower)
minor: smaller
montana: montane
mucronata: pointed
nana: dwarf
nudum: naked
nutans: nodding
oblongus: oblong
oligantha: few-flowered
paludosus: swamp-growing
parviflora: small-flowered

patens: open, expanded (sepals)
pauciflora: poor-flowered
plumosa: feathery
pulchella: beautiful
pumilum: very small
pygmaeum: very small
reniformis: kidney-shaped
rivularis: (growing in) a stream
rotundifolius: round-leaved
rubricaulis: red-stemmed
sesamoides: like Sesamum
sinensis: Chinese
subulata: thin and pointed like an awl
tholiformis: dome-shaped
trilobus: three-lobed (leaves)
tristis: sad ("dingy-looking": Colenso)
trullifolia: trowel-leaved
tuberculatum: tuberculate, warty
unifolia: single-leaved
valida: strong
venosa: veined
viridis: green.

Original papers

Attempts at cultivating *Pterostylis banksii*

by Tim Funnell, Hastings

A single tuber with stem and flower was planted up in the 1987 growing season in a 125mm pot, with a divot of soil it was originally growing in. In time the flower finished its cycle, although it did not set any seed. During the dormant part of the season I kept the soil a little on the damp side, I not allowing the pot to dry out. At this point I was groping in the dark with regard to cultivation, didn't

know which books to read, nor even who to turn to. My main concern was not losing the tuber from dehydration. I must have got something right for I was rewarded with three tubers, all of which flowered, in 1988.

It was about this time I joined NZNOG, and found and read John Johns and Brian Molloy's book *Native orchids of New Zealand*. During the 1989 flowering season I

was rewarded with eight individual plants and flowers. *P. banksii* obviously clumps up well. The pot of plants was sitting at the bottom of my very small shade house among *Cymbidium* plants; the roof of the shade house is covered with 80% shade cloth during the summer, and replaced with plastic material of 12% to 20% shading in the winter.

At the end of the 1989 flowering season I made my first big mistake. After the flowers had dried off, I repotted these eight plants into a bigger pot of fresh medium. I used equal parts of a commercial potting mix, Hauraki peat moss and a commercial compost. I have since learned that one should retain at least half the old mix so that the mycorrhizal fungi can establish quicker in the pot, giving the orchid a better chance of survival. I am sorry to say that some time during the 1990 flowering season I lost some of the tubers and I had about eight left, when I should have had at least sixteen. This loss could have been caused by a number of things. Lack of mycorrhizal fungi in the medium could be one reason; overwatering could have been another; the pot, although bigger, was also shallower and may not have been very free-draining; sitting among the "cymbids" would not have helped; the compost I used may have been another factor.

Some time during 1988-89 I read *Wild orchids of Britain and Europe* by P. and J. Davies and A. Huxley. I learned that by removing the new tuber from the old, it is possible to get the old tuber to form a replacement tuber for the coming season. Unless I am mistaken, there was no mention of

when during the flowering season this should be done. So with this little bit of information, I took one of the eight plants I was repotting, and with a clean knife-blade I removed the new tuber, and potted both tubers up in a separate pot from the others and labelled and dated both tubers (November 1989).

The following season I was rewarded with not two but three plants which flowered. My conclusions are that the old tuber formed a new tuber which flowered the next year. This is what was supposed to happen, although I was a little surprised to see it flower. The interesting thing was that the separated tuber also produced a tuber of its own before becoming dormant.

These two tubers also flowered the following year. From what I have recently read, tuber removal should be done during flowering. I did the above experiment at the end of the season after the flower had wilted, and count myself lucky that the old tuber had enough energy to produce another tuber before the end of its life.

One thing I did find was that these three plants were not as big as the other *P. banksii* that flowered in 1990. This is probably because of tuber separation and I am hoping that in a year or two succeeding tubers from these three plants will resume normal vigour, and produce normal sized plants and blooms.

It should be noted that the method of cultivating *P. banksii* as mentioned above is not by any means correct. I did not have a lot of information at the time, so I went blindly ahead. It was by good luck rather than good management that these plants survived and flowered.

Identification of *Thelymitra* flowers

by Bruce Irwin (and Beryl Goodger), Tauranga

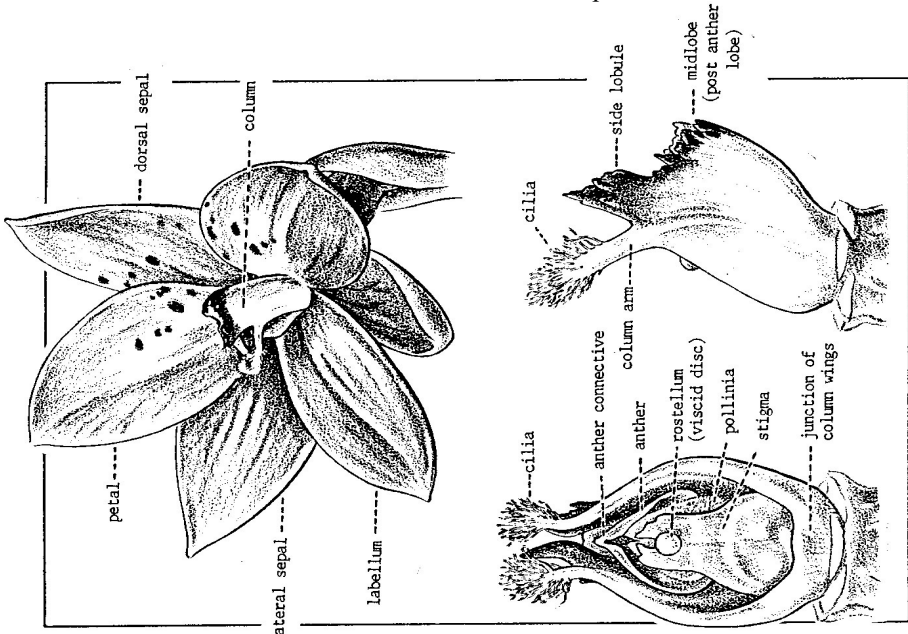
Flowers of *Thelymitra* generally open only in warm sunny conditions - sometimes not at all. Sepals and petals (including the labellum) are usually much alike in shape and size. Flower colour often varies within a species and species normally spotted or striped may carry plain coloured flowers so identification is based largely on structure and ornamentation of the column.

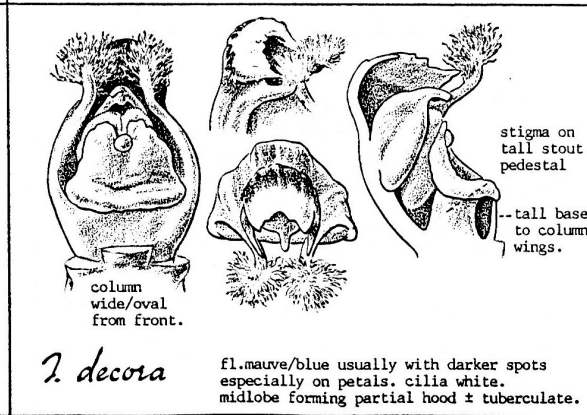
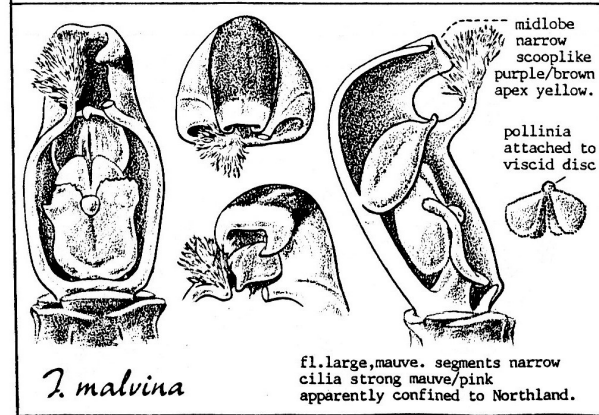
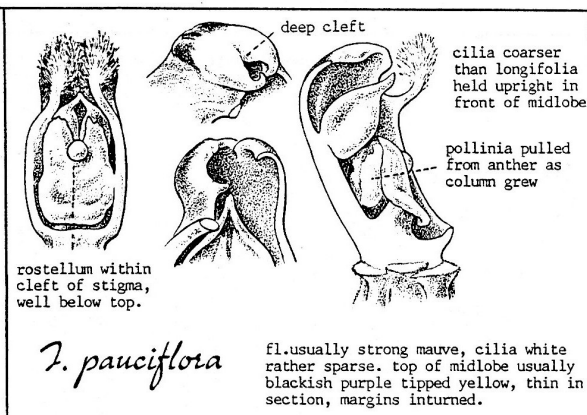
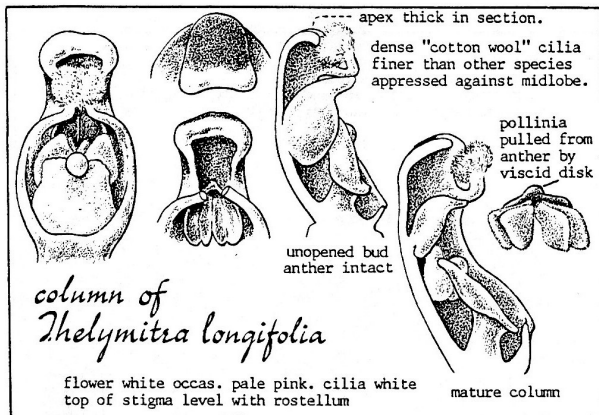
The column itself can show much variation. In several species the basal junction of column wings is occasionally developed into a triangular extra lobe partially obscuring anther and stigma. Incomplete development of the column wings or component parts are other rather common abnormalities. It

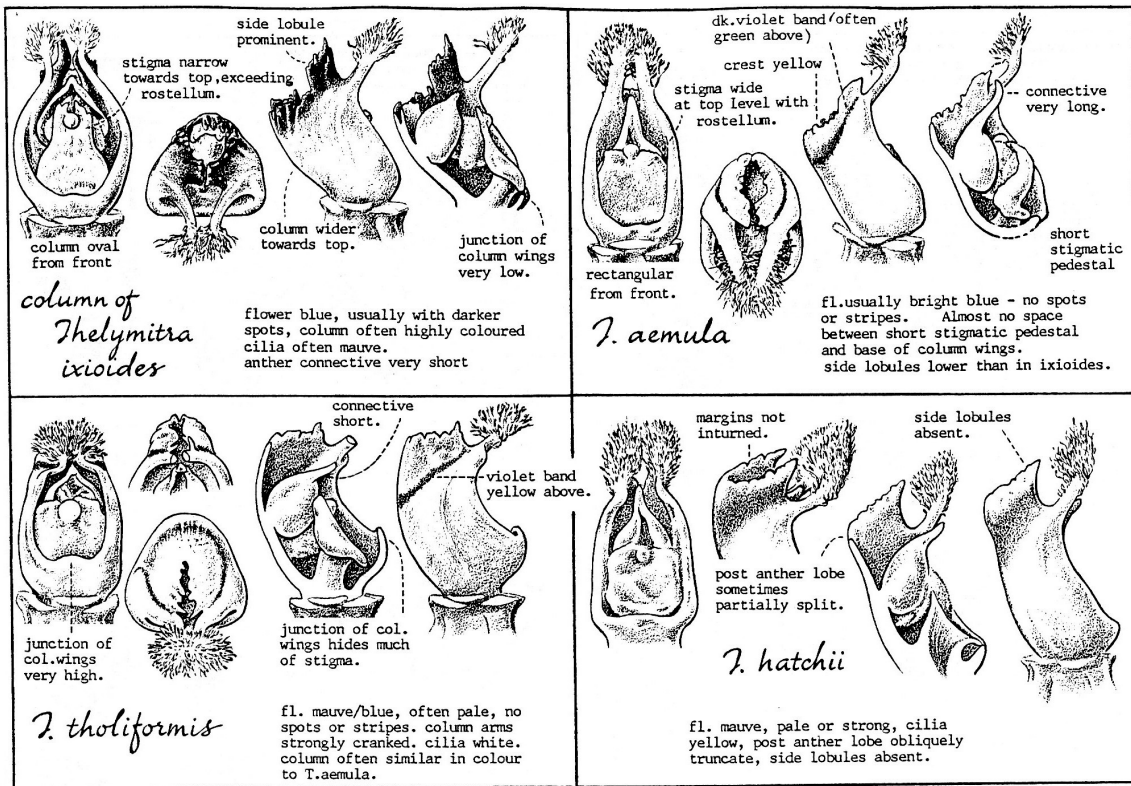
should be noted that in unopened buds, column structures have not attained final form and can be misleading.

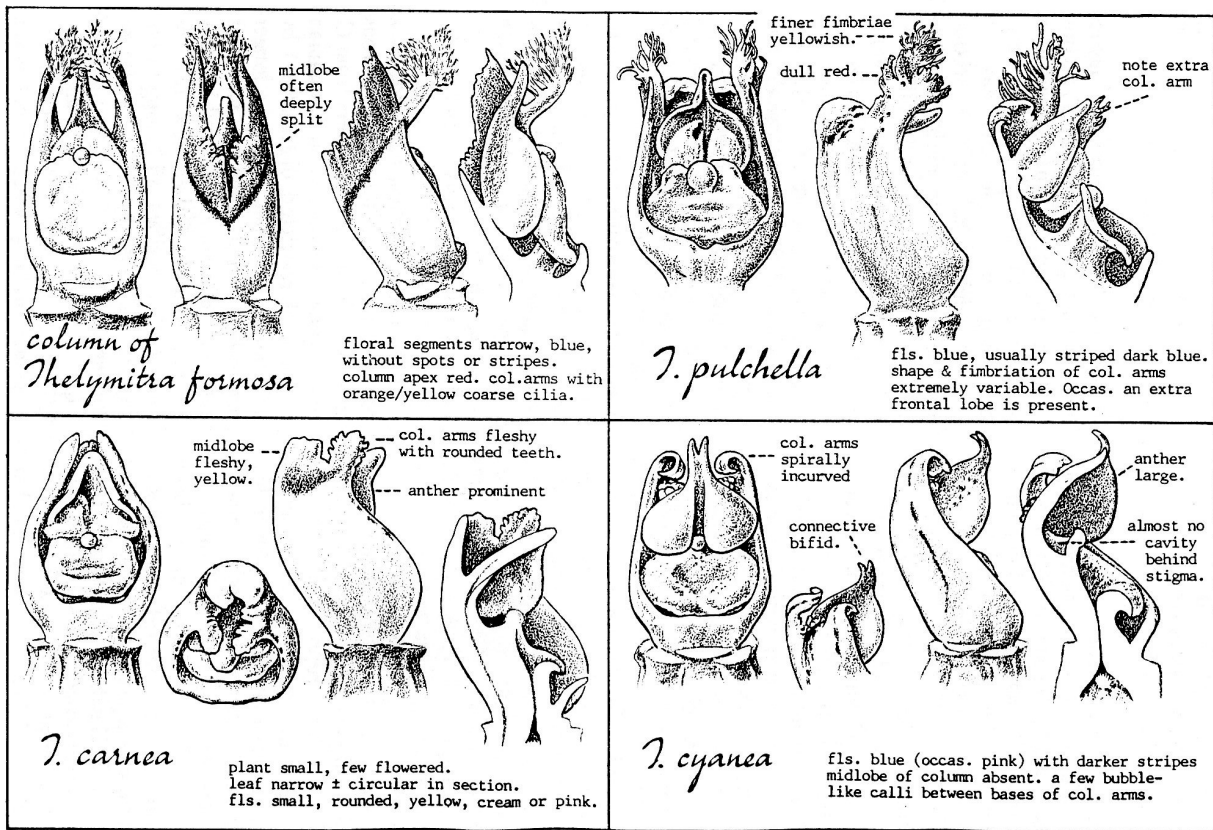
The following twelve illustrations show column structures of all formally recognised species except *T. matthewsii* which is easily identified by the leaf which spirals around the flower stem. Several additional *Thelymitras*, mainly from the far north, are recognised as distinct but await formal description.

Despite the aberrations mentioned above, most *Thelymitra* flowers should clearly relate to the species illustrated. If they do not, please send in your observations for publication in our *Journal*. You may have found a new species.









Australian Orchid Research Volume 2 - a New Zealand perspective

by Brian Molloy, DSIR Land Resources, Lincoln

Recently I reviewed an advance copy of *Australian Orchid Research Volume 2*, courtesy of Gerald McCraith of the Australian Orchid Foundation. Published by the Foundation in cooperation with Reed Books on 5 April 1991, Volume 2 is devoted entirely to "New taxa of Australian Orchidaceae". David Jones of the Australian National Botanic Gardens, Canberra, is the sole author. In all, Volume 2 contains descriptions of 108 new species and two natural hybrids in the genera *Acianthus* (five spp.), *Arthrochilus* (six spp.), *Caladenia* (31 spp.), *Chiloglottis* (eleven spp.), *Corybas* (five spp., one hybrid), *Dipodium* (four spp.), *Diuris* (fifteen spp., one hybrid), *Gastrodia* (five spp.), *Genoplesium* (fifteen spp.) and *Prasophyllum* (eleven spp.). The volume consists of 84 pages of text, mainly descriptions of new taxa, sixteen pages of colour plates illustrating 64 new taxa, and 105 pages of line drawings depicting all the taxa described.¹

David Jones is a prolific author of books and papers on Australian plants, and this volume represents the results of ten years' intensive study and a lifelong association with Australian orchids. As the author notes, some of the new taxa have been well known for years, while others have been overlooked or "lumped" into species complexes - a situation not unlike that in New Zealand, though clearly on a much larger scale. The descriptions of new taxa follow David Jones' now-familiar,

standardised and informative layout that includes a useful "notes" section and an estimate of the conservation status of each taxon. His line drawings are clean, diagnostic and easy to follow, while the colour section provides a further dimension and aid to the recognition of many of the taxa.

As far as I can judge at this stage, only one New Zealand orchid is affected by this treatment, namely the recent migrant discovered at Hanmer, the Richmond Range and Iwitahi, and previously assigned to *Chiloglottis gunnii* Lindley^{2,3,4}. It is now clear that this name has been applied to several related but distinct taxa. Four of these are described as new - *C. chlorantha* D. Jones, *C. pluricallata* D. Jones, *C. turfosa* D. Jones and *C. valida* D. Jones. The last-named, *C. valida*, is confirmed by comparison of specimens and type material as the taxon occurring in New Zealand and formerly referred to as *C. gunnii*. (D. Jones *pers. comm.* 1991).

As its name implies, *C. valida* is a robust orchid and "the most vigorous species in the genus". It differs from *C. gunnii* (now considered a Tasmanian endemic of restricted distribution) by its more robust habit, longer peduncles, larger flowers, narrower and sparser laminar calli, and broader column wings. Other new taxa of *Chiloglottis* described all belong to the ant-like *C. reflexa*/*C. formicifera* complex. Of the 31 new species of *Caladenia*, 23 belong to the large-flowered group, or spider orchids, which do

not occur in New Zealand, and eight belong to the small-flowered group that do; all eight being part of the *C. carnea* complex.

Four out of the five new species of *Acianthus* are closely related to *A. formicatus* R. Br. which is now regarded by David Jones as a species distinct from *A. sinclairii* J.D. Hook, of New Zealand.

Australian species of *Corybas*, or helmet orchids, are noted for the absence of long filiform appendages found in many New Zealand species. Five of these and one natural hybrid are described as new, including one, *C. abditus* D. Jones, which closely resembles *C. unguiculatus* (R. Br.) H.B. Reichb.

Four out of the five new taxa of *Gastrodia* are related to *G. sesamoides* R. Br. and each "can be discerned by subtle yet recurrent differences in floral morphology, growth habit and habitat preference". None of these new taxa are known to occur in New Zealand.

Fifteen new species are assigned to *Genoplesium*, a segregate genus of *Prasophyllum* recently reinstated and circumscribed by David Jones and Mark Clements (1989).⁵ This genus includes two taxa shared by New Zealand and Australia, *G. nudum* (J.D. Hook.) D. Jones et M. Clements, and *G. pumilum* (J.D. Hook.) D. Jones et M. Clements. None of the new taxa described are closely related to these two.

In another genus represented in New Zealand, *Prasophyllum*, eleven new species are described, all related to other known Australian taxa. Three other genera treated, *Arthrochilus*, *Dipodium* and *Diuris*, are not represented in New Zealand.

Volume 2, authored by David Jones, is a logical outcome of *Volume 1*, a "Catalogue of Australian Orchidaceae" in which Mark Clements (1989) brought together under one cover the type specimens of most Australian orchids.⁶ Clements' important and monumental work is basic to current and much-needed taxonomic reappraisal of orchid genera in Australia. It has important implications for New Zealand too in determining the correct application of several orchid names (see St George 1990).⁷

Volume 2, together with other publications emerging on the taxonomy of Australian orchids, signals a revival of research interest in these plants, more particularly in preparation for the treatment of the family in volume 47 of the *Flora of Australia*, scheduled for publication in 1994. While it has little direct bearing on the taxonomy and names of New Zealand orchid taxa, *Volume 2* should nevertheless be required reading for all orchid enthusiasts in this country. The introductory passages especially carry several important messages such as the necessity of studying fresh material and the importance of in situ field studies. For working taxonomists, the great advantage of having a network of volunteer associates throughout the country is amply demonstrated in Jones' work by the large number of new species collected by regional people. The descriptions, line drawings and colour illustrations of the various taxa are a mine of information and an object lesson in identifying and highlighting characteristics of diagnostic value. Some of the terms are new and coined

by the author out of necessity. I am confident that all orchid enthusiasts will benefit from David Jones' timely treatment and his extraordinary insight into the makeup and lifestyle of orchids.

Australian Orchid Research Volume 2 is reasonably priced at Aus\$24.50 plus postage, and copies are available from the Australian Orchid Foundation, 107 Roberts St, Essendon 3040, Victoria, Australia.

References

1. Jones D.L. New taxa of Australian Orchidaceae. *Australian Orchid Research* 2, 1991:1-207.
2. Johns J. and Molloy B. *Native orchids of New Zealand*. Reed, Wellington, 1983: 124 pp.
3. Molloy B. and Johns J. *Chiloglottis gunnii* Lindley, a new orchid record for New Zealand. *The Orchadian* 7 (9). 1983: 210-214.
4. Gibbs M. Iwitahi: a native orchid reserve in exotic pine forest, New Zealand. *The Orchadian* 9 (3). 1988: 49-51.
5. Jones D.L. and Clements MA. Reinterpretation of the genus *Genoplesium* R. Br. (Orchidaceae: Prasophyllinae). *Lindleyana* 4 (5). 1989: 139-145.
6. Clements MA. Catalogue of Australian Orchidaceae. *Australian Orchid Research* 1. 1989: 1-160.
7. St George I.M. Questions about some New Zealand orchids after the recent publication of the Catalogue of Australian Orchidaceae. *New Zealand Native Orchid Group Journal* 34. 1990: 1-4.

Notes

¶ Errors: Bruce Irwin points out that in *Journal* 38, p8, under *Pterostylis graminea*, "base of dorsal inflated from behind" should read "NOT inflated". On p9, under *montana*, 4th box down, "inflated" should read "recessed".

¶ Ken Wilson writes (20 June): "The colony of the white form of *Corybas cheesemanii* in the Waitakeres is under observation again, and we noted that the leaves are smaller this year, and that in many places rhizomes are exposed on the soil surface. Also other plants in the vicinity are definitely paler in colour

this year, where last year they were of normal colouring. It goes on.

"Some growers will know that pantyhose are excellent for fixing epiphytes to host trees, and therefore a careful study to find the best available brand is essential... right, Max Gibbs?" - *and I innocently thought that the only use for pantyhose was as a spare fanbelt for the car - Ed.*

¶ Dr Thomas Patkai writes in *Kew's Orchid Research Newsletter* (January 1991), "...recent changes galloping in East Europe brought at least two undesirable side-effects that the

international orchid community should be aware of.

"The first concerns the status of the zone east of that just demolished, infamous fence, the Iron Curtain. In Hungary, the strictly controlled border zone at the Austrian-Hungarian border was no less than 260km long: the depth varied between about 10km up to more than 30km. Which means that the overall area amounts to several thousand square kilometres. The zone was so thoroughly controlled that even birds were hardly allowed to fly over it... Needless to say, strolling about in that zone was out of the question and to attempt something even vaguely similar was asking for trouble no person in full control of his senses dared bargain for. Nobody liked this situation - but it did work miracles for the flora and fauna.

"In the 40 years or so of sensu strictissimo protection, just about the best orchid populations of Hungary developed there....

"On 12 May... we ran through the place - at times wading in orchids, knee deep. There are 28 species in an area one can visit in a matter of an hour or so, plus lots of natural hybrids. Among them unique individuals, like a gigantic specimen of *Orchis militaris* x *O. purpurea* with variegated leaves. The plants were in *floribus*, breathtaking sights everywhere.

"That is the good news. The bad news is that the prospects of saving them are rather dim.... there are no personnel to guard the place.

"The most famous colony (of *Cypripedium calceolus*) I photographed in '71 (when the area was under strict military control)

gone with the winds of freedom. It was picked/dug up, period. This year I photographed a *Cypripedium* habitat where lumberjacks - who cares? - neatly packed the logs to the very top of these orchids!"

¶ In the same issue Robert Dressier and Gerardo Salazar propose the new term "viscarium" for the glue and glue-producing area of the rostellum in those orchids that do not have a distinct (removable) viscidium or viscid disk.

¶ Wilbur Wright reports *Acianthus viridis* from the Greenstone and Routeburn Tracks (Ecological Region 73) in flower in the first week of March, a new record for the Region, and an extension of the flowering time of this species.

¶ Patrick Brownsey, Curator of Botany at the National Art Gallery and Museum, Wellington, writes to inform members that the National Museum has recently acquired a complete copy of R.D. FitzGerald's *Australian orchids*, which will shortly be available for study in the Library. (*Auckland Museum has a set, but as far as I know there are no other copies accessible to the public in New Zealand - see the "Historical Note" in this issue - Ed*).

¶ It was good to see Bruce Irwin's paper on "The peloric *Dendrobium*s of Norfolk Island" in the Winter issue of the *Orchadian* (Vol 10, No.4, pp100-103) accompanied by examples of that extraordinary artistry which we tend to take a little for granted here.



Spiranthes sinensis

am not sure whether I told you about the *Spiranthes sinensis* colony located on the airport at Paraparaumu earlier this year.

"And a red-centred *Earina mucronata* flowering in December at Wainuiomata. Species of *Caladenia* thought to be *C. catenata* but not so: instead we have *C.* "green column" and a "red stem" variety that may be another species located on the Puffer Track when Brain Molloy, Phil de Jong and I were looking for *Thelymitra* "dentata"; we also located *T. aemula*....

"In Taranaki last weekend at the CONZED Conference; when orchiding in the wet saw epiphytes.- *B. pygmaeum*, *Drymoanthus adversus*, *Earina mucronata* /*autumnalis*, all in the Hautoki Domain courtesy of Ian Rutherford."

KAPITI ISLAND

The Wellington Orchid Society is running a trip on 30 November. Cost is \$26: limited to 45 persons.

Contact Gordon Sylvester,
22 Pencarrow Cres, Wainuiomata,
Lower Hutt.

¶ Has *Chiloglottis formicifera* returned to the wild in New Zealand? Rhoda and Allan Wallis of Masterton have a plant in cultivation, and though they cannot recall where it came from, they think tubers may have been acquired among "some fernery bought either in Tauranga or on the West Coast of the South Island". If so, there is the exciting prospect for Bay of Plenty and West Coast members of a treasure hunt - a colony to be located in one of

their areas.

Clue: "growing with ferns". Hint: find out where the ferns came from.

PHOTOGRAPHIC
COMPETITION

■ Gordon Watson of Invercargill has agreed to organise a photographic competition for NZNOG members.

■ There will be two sections - prints and slides.

■ Class A: a set of she different species.

Class B: single photograph of a *Thelymitra*.

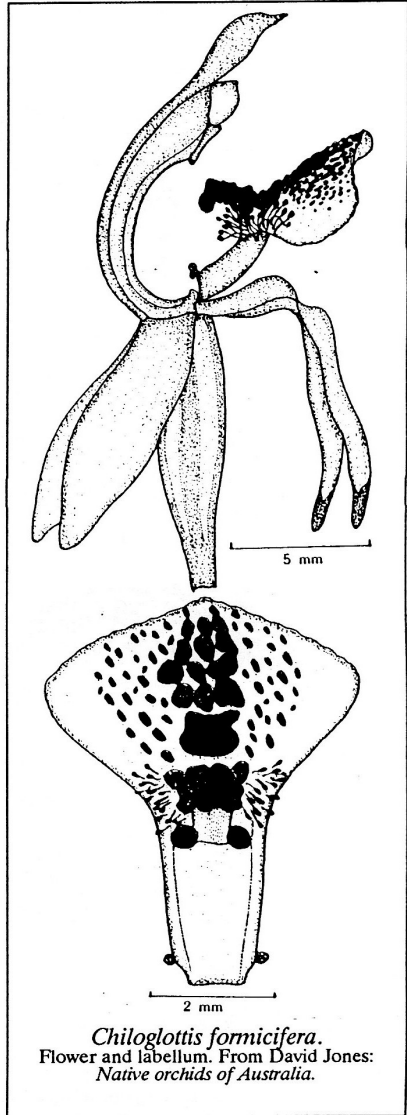
Class C: single photograph of a *Pterostylis*.

Class D: single photograph of a *Corybas*.

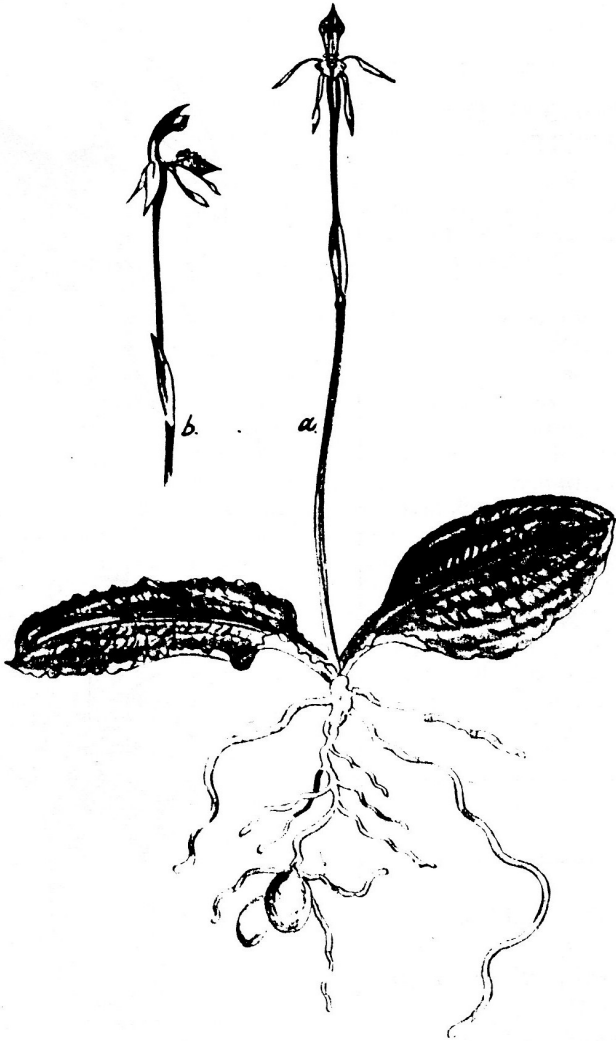
■ Entry forms will be available later. Entries will close on 2 May 1992.

■ Soon to be published

■ *The southernmost orchids in the World:
wild orchids in Otago,
Southland and Stewart Island*



Chiloglottis formicifera.
Flower and labellum. From David Jones:
Native orchids of Australia.



Chiloglottis formicifera - from a watercolour by W.H. Nicholls, 1969. *Orchids of Australia*. Melbourne, Thomas Nelson.

The New Zealand orchids:

■
a loose-leaf folder for members of
the NZNOG

■
Illustrations (drawings and
photographs) of species in the
following genera are needed now
for the first chapters of this
NZNOG publication:

■
*Acianthus, Adenochilus, Aporostylis,
Corybas, Dendrobium, Drymoanthus,
Lyperanthus, Pterostylis, Spiranthes*

**14th World Orchid
Conference**

■
Glasgow
24 April - 4 May 1993

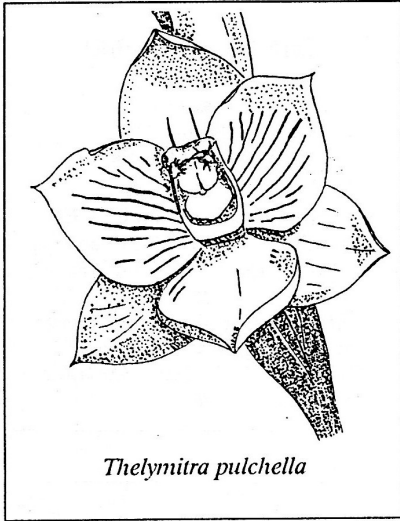
■
Write for information to, CEP
Consultants Ltd, 26-28 Albany St,
Edinburgh EH1 3QH, UK.

■
ANOS is organising a tour - write
to Barry Collins, 245 Avoca St,
Randwick, NSW 2031, Australia

Notes

¶ The Orchadian [1991, 10 (3, Autumn): 83-4] contains an account of the recently recognised occurrence in Victoria of *Thelymitra pulchella*: "...there appear to be two distinct forms of this orchid, one from subalpine meadows of the eastern highlands, and the other from lowland swamps and grasstree plains, mainly in East Gippsland.... The former have intense blue or purple flowers with prominent darker veins, while the latter are uniformly pale blue in colour. Morphologically they are very similar with some variation in the amount of toothing or lobing on the column arms, a feature also displayed by this species in New Zealand. In Tasmania, the two forms are sometimes found growing together and

flowering at the same time. In Victoria, the sub-alpine plants flower mainly from late December through January, whilst those from the lowlands flower from October to November. The pale blue lowland form has been identified as an undescribed species based on collections from the Croajingalong National Park. The highland form in recent years was thought to be a natural hybrid. *T. pulchella* appears to be quite rare in Victoria, but fortunately both forms occur within national parks and are probably secure at present. Over-grazing, draining of swamps and weed invasion may constitute some future threats to this most attractive Sun Orchid."



¶ The Australian Botanic Gardens *Review of Activities 1989-90* reports (among its major activities):

"considerable progress in clarifying the taxonomy of the orchid genera *Diuris*, *Pterostylis* and *Chiloglottis* for the *Flora of Australia* project, including descriptions of several new taxa.... "Electrophoretic techniques for the isoenzyme analysis of orchid taxa using leaf material (rather than the conventional pollen) were developed..."

Among the collaborative research projects listed was a "Catalogue of the New Zealand Orchidaceae" - Brian Molloy, Mark Clements and David Jones - and a "Pollination biology of orchids database".

Among the publications by the Gardens staff was the report of a new species of *Calochilus* from north-eastern Queensland (*Proc. R. Soc. Qld* 100: 101-103).

¶ Bob Bates writes (Warringah Group of A.N.O.S. Monthly Bulletin, June 1991, p5), that it is a fallacy that sun orchids only open up in bright sunshine.

"The conditions required for the flowers to open are different from species to species. There are many species which stay open all night even when it is raining, i.e. *T. venosa*, *T. antennifera*. One species, *T. cyanea*, opens only in warm humid mornings ^ and actually closes its flowers in the afternoon even on a blazing hot day!

Of course the warmth of the sunshine does help many flowers to open but on cold dry days, bright sunshine has no effect! For most species it is a combination of humidity, warmth and light which 'persuades' the flowers to open. As species such as *T. pauciflora* open best just before a thunderstorm, falling atmospheric pressure may also have an influence."

Many have pondered the opening of Thelymitra flowers. I read the above and was reminded of a warm, black, threatening morning at Shag Point two years ago when the air was alive with flying insects and the ground was alive with the vivid blue flowers of T. cyanea. Brian Molloy wrote that T. cyanea is predominantly self-pollinating a derived condition¹, and indeed some of the characters typical of insect-pollinated species persist. Does the orchid still open in conditions that favoured the hatch of its ancestor's pollinator? - Ed.

1. Molloy B.P.J. Pollination systems of New Zealand native orchids. In St George I. and McCrae D. (eds). *The New Zealand orchids: natural history and cultivation*. NZNOG, Dunedin, 1990. p 52

¶The A.N.O.S. Conservation Subcommittee (Graeme Bradburn, 10 Jaylang Place, Figtree, NSW 2525) reports,

"The NSW Tuberoïd Bank was again a success with the number and variety of species increasing. It is again approaching the time when growers should be considering what excess could be donated this year. Tuberoïd banks now operate in NSW, Vic and SA, with WA establishing theirs this year. *A NZ tuberoïd bank was among the pleas from our members - is anyone prepared to take this on?* - Ed. "The 1989 A.N.O.S. Conservation Badge is now 'a high-priced collectors item', but the 1990 one is still available, and the 1991 badge depicts *Thelymitra epipactioides* (A\$5 + A\$1.50 p&p from ANOS, POB C106, Clarence St, Sydney, NSW 2000, Australia).

"*Pterostylis gibbosa* has been a concern of the Wollongong Group for a number of years. This year a management committee made up of two Elcom officials, the Wollongong Group Conservation Officer, a Wollongong University representative plus two local environment researchers (has been formed). This committee oversees the area of Elcom land where *Pterostylis gibbosa* is found and has the task of making management decisions to protect the orchid... It is hoped a management regime can be set up to allow a stable population to be maintained." - this is the sort of arrangement that has worked well in Britain, and could be emulated here when local colonies of rare species are threatened - Ed.

Historical note

Robert Desmond FitzGerald

FitzGerald was an Irishman who arrived in Sydney in 1856. He was a surveyor, but a dedicated naturalist who successfully bridged the gap between amateur and professional botanist, a man whose hobby attained scientific standard and recognition.¹

In Sydney, within a radius of a mile, he found sixty-two orchid species. He described many orchids in scientific journals, and even described one in the Sydney Morning Herald. Two orchids

are named in his honour.

His great work was his Australian orchids, published between 1875 and 1894 in seven folio parts with 118 plates in all. The lithographic plates are exquisite, and include enlargements of his dissections, the drawings by FitzGerald himself, lithographed by the author and his friend Arthur J Stopps, and coloured by various artists. J.D. Hooker considered it "a work which would be

an honour to any country and to any Botanist". Full editions are now very rare, but the Auckland Museum Library has one, and (see above) the National Museum and Art Gallery in Wellington has recently acquired a copy. Many of the orchids are of course shared with New Zealand.

FitzGerald dedicated the first volume to Charles Darwin. In his introduction he made some elegantly argued points on self-fertilisation, apt for New Zealand, where self-pollination is the rule rather than the exception - "Mr. Darwin's proposition regarding 'the contrivances by which Orchids are fertilized' is, that they 'have for their main objects the fertilization of each flower by the pollen of another flower.' As far as I could investigate the subject in Australia, I have not been able altogether to verify this proposition; for though the great majority appear to be frequently impregnated by pollen brought from other flowers, I believe they are also frequently fertilized by their own.... Certain parts of plants and animals being wonderfully designed (or adapted) for certain ends to the palpable benefit of such plant or animal, it is argued that their life or existence being dependant on such design, they must have been so created. But what, except inheritance, can account for the extension of similar parts to others where they are evidently useless? The flowers of *Thelymitra ixioides* are of a beautiful blue colour, and are borne in attractive spikes. In the centre of each flower is placed the stigma or female part of the flower; it resembles a shield, covered with viscid matter. At the top of it is inserted, in a notch, a little boss or button called the rostellum, connected with which, and

behind the stigma, are the pollen masses, and on either side arms stretch out, supposed to attract and guide to the rostellum. Touch this rostellum, which is covered, as it were, with glue, with the point of a pin, and then withdraw it, and the pollen masses are at once withdrawn from behind the stigma. Return the pollen masses, now firmly attached to the point of the pin, again into the flower, and the greater part of them adhere to the viscid surface of the stigma, and the flower is fertilised. Such is the process, and the only one, by which it can be impregnated; but in nature the proboscis, or some part of an insect, acts as the pin has done in the experiment. Left to themselves, in a bell-glass, not one flower of *Thelymitra ixioides* will produce seed.

"Can there be a more perfect example of predetermined design? The bright colour to attract the insect - the arms to guide it - the projecting rostellum for it to touch - the viscid matter on the rostellum to adhere to the visitor - and the expanded shield-like stigma, covered in its turn with gum to lay hold of the pollen, when the insect either returns its head in search of honey or visits another flower, perhaps on the same spike.

What — trace is there of development? It is a well-adapted whole: a whole adapted to one end.

"Now examine another species of the same genus, *Thelymitra carnea*. The flowers are of a bright pink. Here are the extended arms - the shield-like stigma - the sticky rostellum and the pollen masses behind the glutinous stigma; but there is a slight modification; the pollen masses are not only behind but over the stigma,

and crumble upon it whilst yet in bud, thereby fertilizing the flower, which seldom opens, and never until after fertilization. What has become of the picture of design? For what is the colour in the flowers, seeing that they so rarely open, and then to no purpose? For what are the arms? What use is the rostellum? Without their aid, *Thelymitra carnea* is far more fertile than *T. ixioides* in fact, every flower produces seed. Why are all those parts, so necessary in *T. ixioides*, present in *T. carnea* can they be accounted for by any other explanation than relationship through inheritance?"²

*The New Zealand orchids are to a quite remarkable extent self-pollinated.*³

References

1. Nairn B., Serle G., Ward R. (eds). *Australian Dictionary of biography*. Vol 4 1851-1890. pp 178-9.
2. FitzGerald R.D. *Australian Orchids*. Sydney, Charles Potter, 1876-1894.
3. Molloy, B.P.J. Pollination systems of New Zealand native orchids. In St George I.M. and McCrae D. (eds) *The New Zealand orchids: natural history and cultivation*. N.Z.N.O.G., Dunedin, 1990.

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