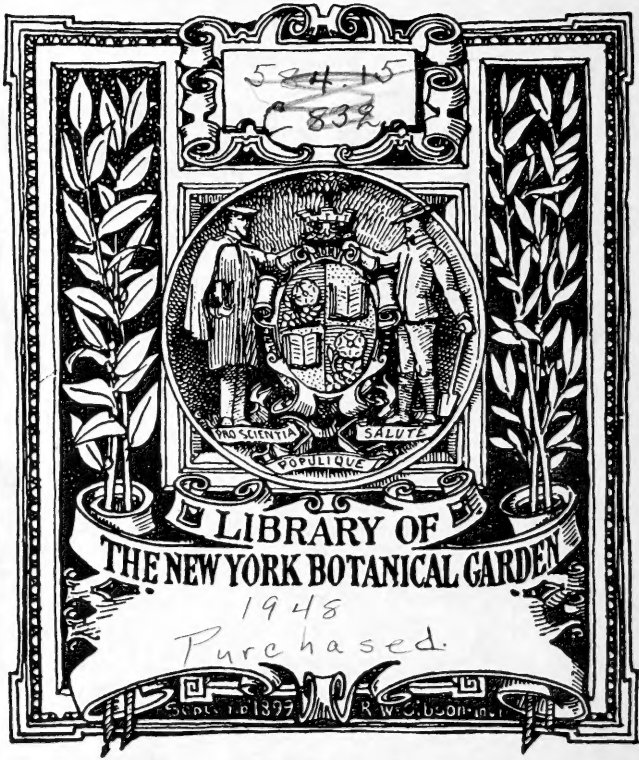
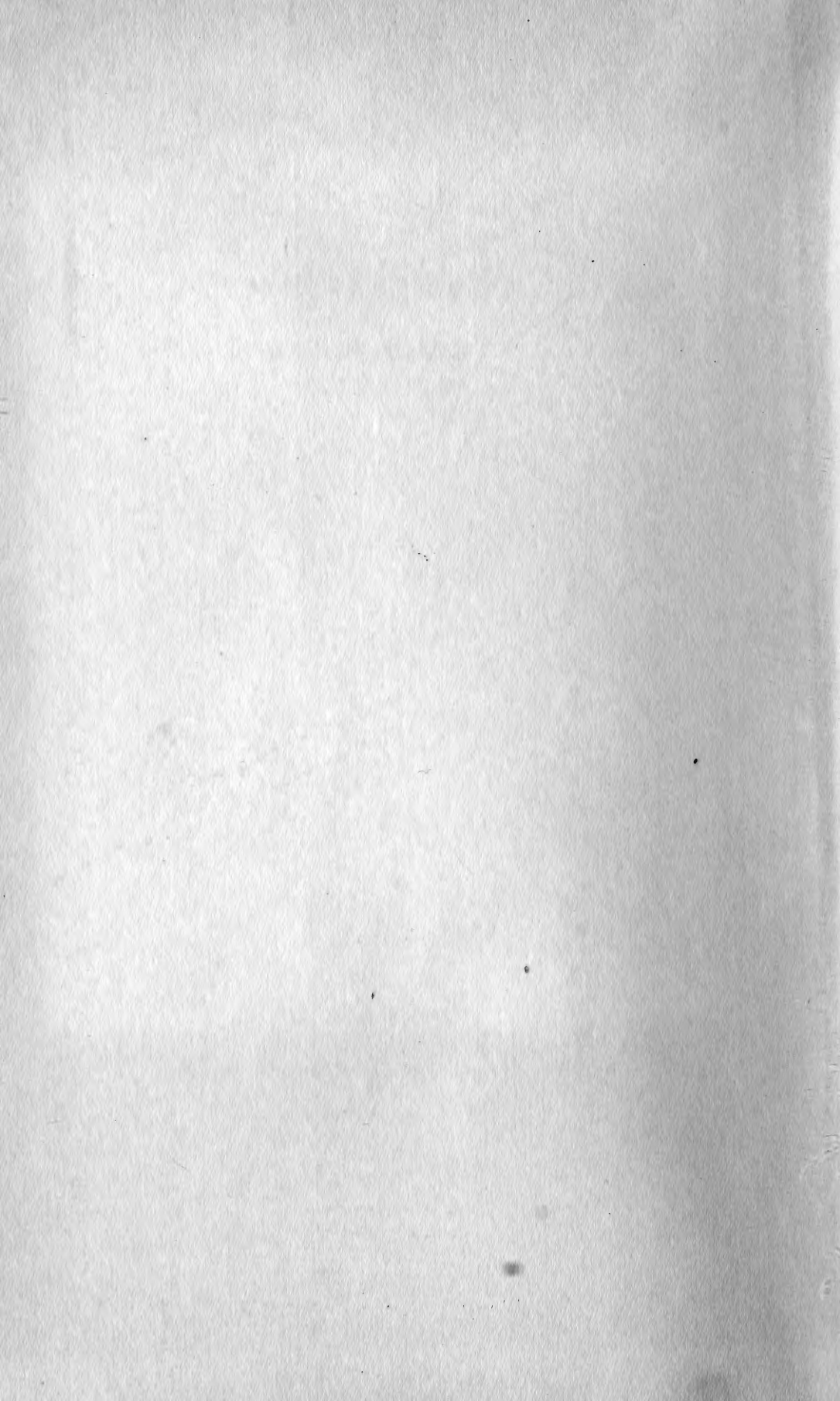


A CULTURAL TABLE
OF
ORCHIDACEOUS
PLANTS

J. MURRAY COX

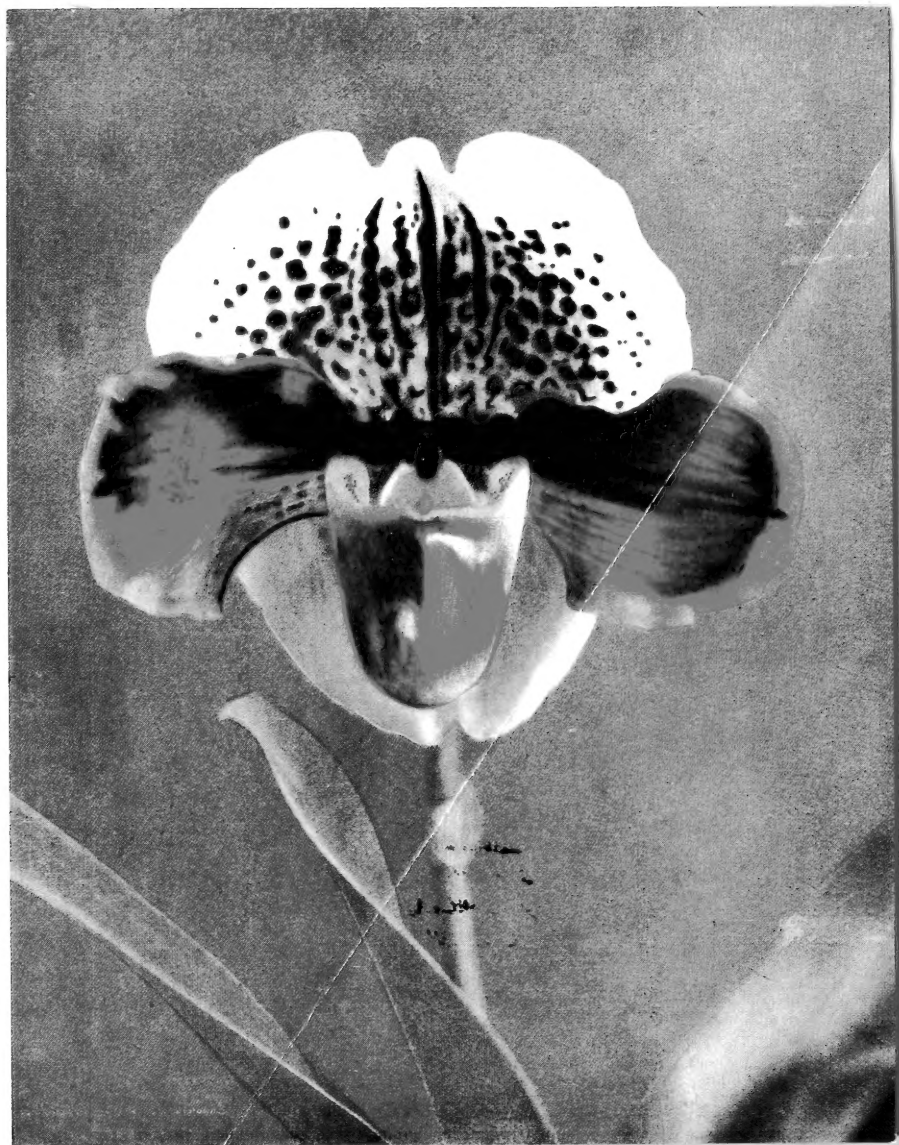




A CULTURAL TABLE
OF
ORCHIDACEOUS
PLANTS

1st EDITION—JUNE, 1946

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CYPRIPEDIUM. x. GRAND MONARCH.

Awarded First Class Certificate and
Silver Medal at The Orchid Society of New South Wales Show, 1945.

Exhibited by W. Fahey.

A CULTURAL TABLE
OF
ORCHIDACEOUS
PLANTS

By *J. M.* MURRAY COX

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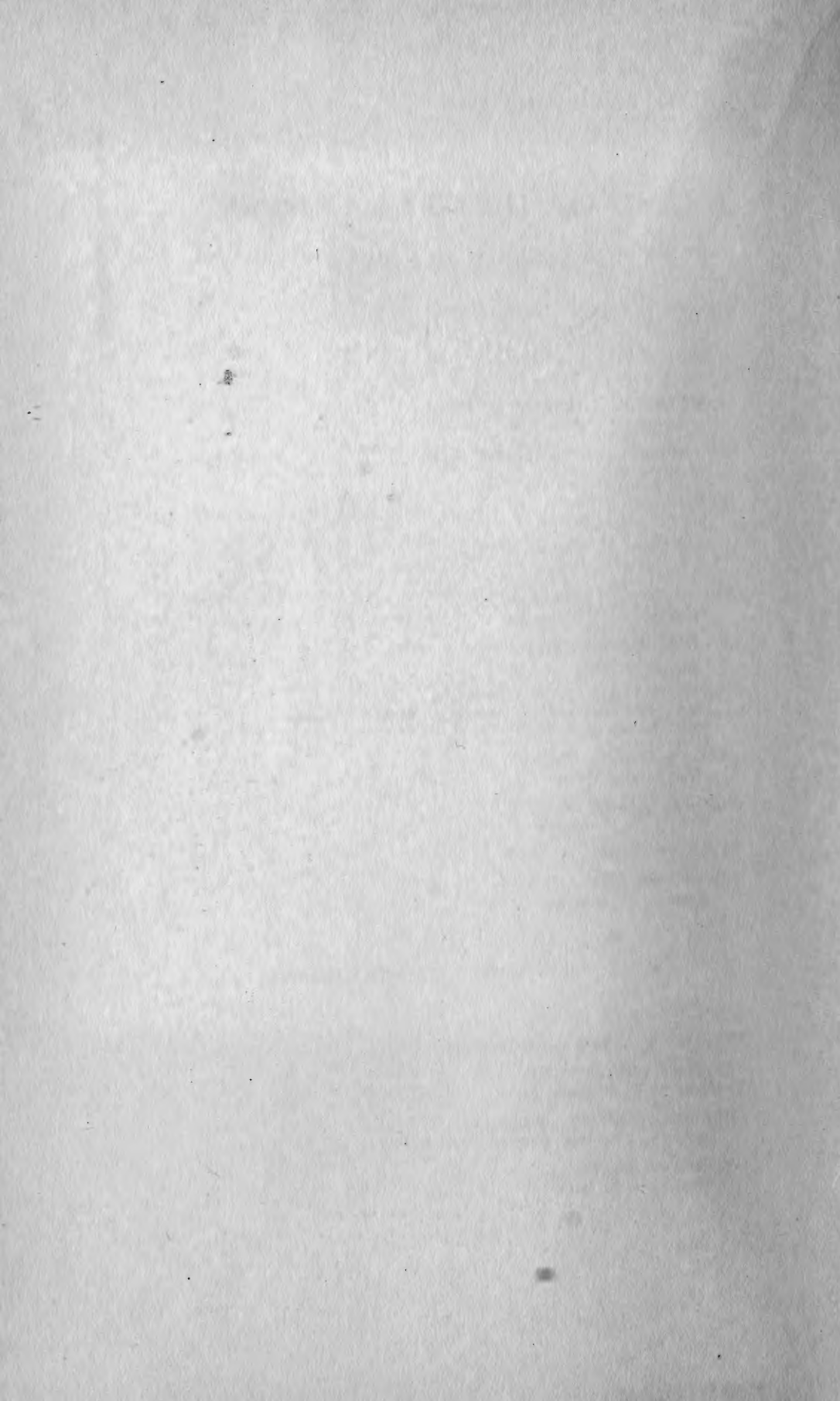
SPECIAL ACKNOWLEDGMENT.

The author desires to express his especial thanks and appreciation of the careful editing by Mr. P. A. Gilbert. When the work was commenced it was intended merely for circulation among the enthusiastic members of The Queensland Orchid Society, many of whom had no particular interest in the actual scientific classification and nomenclature of their plants. I therefore referred to to several species by the names by which they are generally known to orchid growers. For the wider purposes of this edition it was desirable that a more accurate classification be made, and I am deeply grateful to Mr. Gilbert for his valuable assistance in this and also for revising the notes on the distribution of Australian orchids.

J. M. COX.

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<i>Wardii</i> - - - -	285	<i>Lindeni</i> - - - -	111	VUYLSTEKEARA - - - -	305
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THELYMITRA		<i>Arbuthnotiana</i> - - - -	293	<i>cyanea</i> - - - -	306
<i>antennifera</i> - - - -	286	<i>Batemanii</i> - - - -	294	<i>tricolor</i> - - - -	306
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<i>azurea</i> - - - -	286	<i>Boxallii</i> - - - -	294	<i>Walesiana</i> - - - -	308
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<i>urnatis</i> - - - -	287	<i>Lowii</i> - - - -	303	<i>grandiflorum</i> - - - -	310
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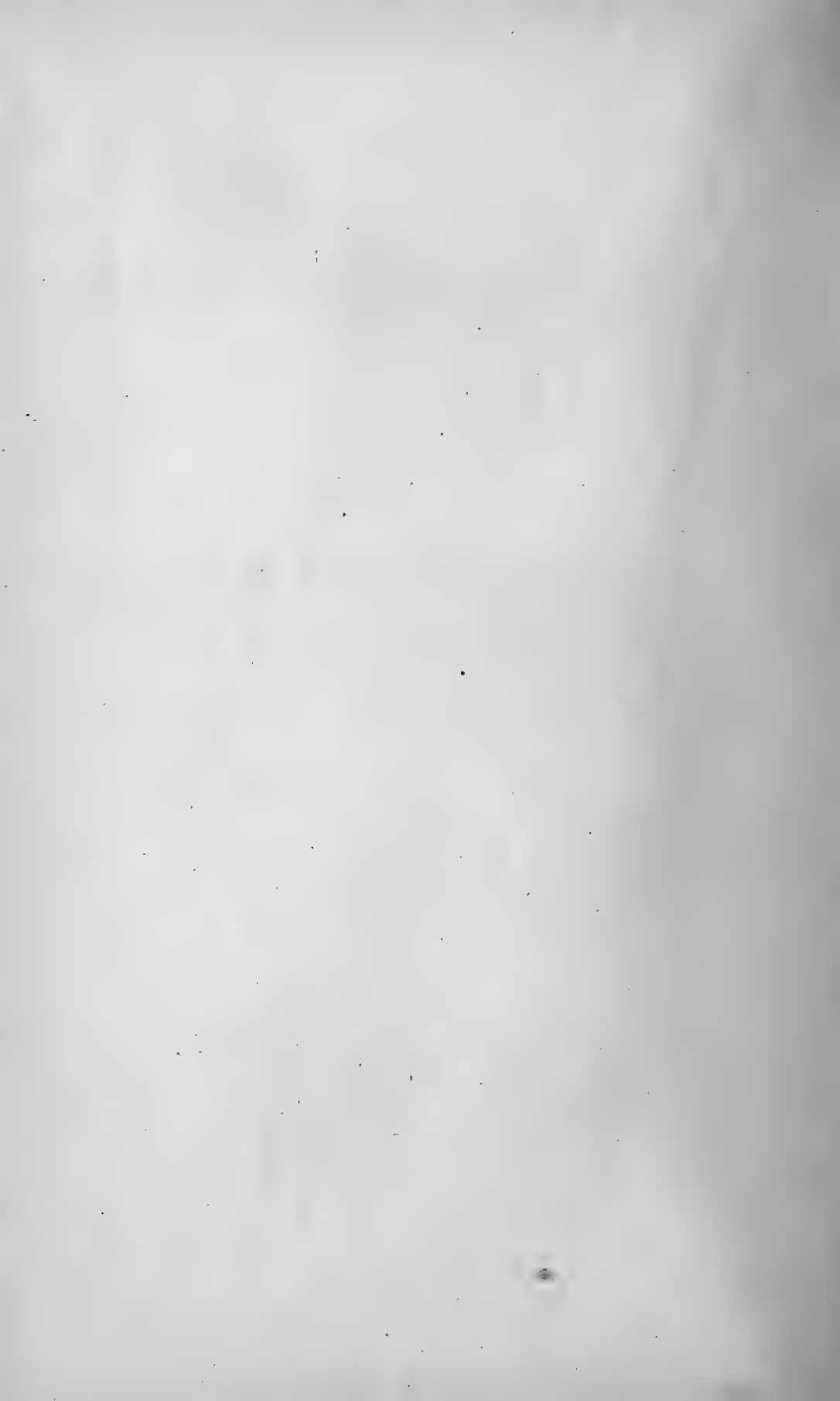


FOREWORD

THE constantly increasing interest in the cultivation of Orchids in Australia, and my knowledge of the difficulty most beginners have in obtaining reliable information as to the natural conditions in their native haunts of the plants they endeavour to grow, have persuaded me to commence the very ambitious task of tabulating, as far as possible, the data available relating to these plants, and to deduce from this data suggested cultural treatment for most of those species generally grown by Orchid lovers. The aim of every grower should be to give his plants as nearly as possible the conditions naturally ideal for their welfare. It must be remembered, however, that it is practically impossible to reproduce natural conditions in their entirety, and therefore each grower must strive to add by artificial means the factors which his available conditions otherwise lack.

For instance, while most epiphytes can be broadly described as "air-plants" the fact is that, in their native state, their food supplies are provided by nature through the agency of the sun, rain, dew, air, and by the nature of the bark of the tree which harbours them, and, what is often most important, by the insects and birds which frequent these trees. Many epiphytes are treated by us as semi- (or even absolute) terrestrials for the purpose of cultivation so as to provide that extra nourishment which nature gives through the agencies mentioned.

I have found it profitable to give additional nourishment to practically every genus by means of judicious applications of liquid manure. Personally I use a preparation named "Floraphos," but I



know other growers have used various patent mixtures with success. Of course, this extra tonic should only be applied when seasonal growth has well commenced, and not in any circumstances to a sickly plant.

I purpose commencing with *Aerides* and, working right through to *Zygopetalum*, dealing only with those species of each genus that are cultivated by us or which I think are worth trying.

I believe the information I give will assist considerably, but I would emphasise that no one can set out an arbitrary code of rules for the culture of any Orchid. The best that can be done is to give a general outline based on the plants' natural requirements, and each grower must then modify this to meet the peculiarities of his own conditions.

It is inevitable that some growers with greater experience than my own will disagree with some of my suggestions—but it is one of the charms of Orchid culture that one may disagree with one's colleague's opinions without enmity on either side.

At least, I hope the contents of these pages will prove interesting and useful to those who may read them.

J. M. COX.

THINGS OF BEAUTY

“A thing of beauty is a joy forever—its loveliness increaseth,” sang the poet Keats, and therein spoke truly, for the remembrance of the beauty of Nature’s glories lingers long in our minds, and with memory the loveliness increases always as a comparison with the more drab associations of our daily life.

We, whose particular joy lies in the production of glorious blooms, are sometimes rather prone to overlook the peculiar charm of our native Orchids in our enthusiasm for rare exotic blooms. But while we must freely admit that the Orchids of South Queensland have not the magnificence of their foreign brethren from a horticultural point of view, we can honestly claim that they are possessed of great charm when discovered growing in their natural surroundings; and some of that charm lingers when they are transferred to grace a tree in a garden, or to fill a space in the bushhouse of an Orchid lover.

Probably the happiest hunting grounds for the Orchid lover who wishes to study the native genera in their own haunts are the Main Range and its spurs. There are many places on the range where the vandal’s foot has never trodden, and here our native Orchids grow in riotous profusion. It is to a few such haunts that I wish to take you in thought, and of which I will endeavour to paint a few word pictures that may convey to your minds something of the memories of loveliness that I carry in mine.

Dendrobium monophyllum is a dainty little flower with its golden-yellow spray of bell-like blossoms, but on account of its small manner of growth we are apt to treat it with little regard. Picture, however, a great rock higher than the wall of a room, and about 15 feet long, standing a few feet from a precipice, with the whole of its eastern face densely covered with myriads of these golden hued blossoms gleaming in the morning sun which has just peeped over the eastern hills. The dawn rays seem to gain in refulgence as they light upon the blossoms, and the air is filled with a delicate fragrance. It is a memory that lingers in my mind always—which will remain long after the memories of many of our wonderful shows of exotic blossoms have faded into the mistiness of yesterdays.

I remember another sunrise when I wandered round a corner of a narrow ledge on one of the spurs of the Main Range, and saw on the face of the cliff just round the bend a great mass of *Sarcochilus Hartmannii* in full and glorious blossom. In the cool crystalline air of a mountain morning they too were a sight to cause a catch in one’s throat, and they too are a memory whose loveliness ever increaseth.

Cunningham's Gap is a passage way through the Dividing Range, making a direct route between Brisbane and Warwick. On the south side of the Gap is pyramid-shaped Mt. Mitchell, and on the northern side is Mt. Cordeaux towering 4,000 feet skywards. The lower slopes of these mountains are covered with a dense scrub through which great trees push their way sunwards. Almost every tree has its upper portion shrouded with great clumps of *Dendrobium speciosum*. At the time of my visit (September) these were all in flower, and the long sprays of cream coloured blossoms with here and there one of the rarer white variety (*Hillii*) made a charming sight upon which one's eyes never tired of feasting. On the trunks of the box trees, and occasionally on the pines and oaks, were clumps of dainty *Dendrobium aemulum*. Further up the slopes were clumps of the snow white *Sarcochilus falcatus* which gleamed when the furtive rays of the sun stole through the leafy mantle and kissed their white petals. But right on the rocky cliffs at the head of the mount was the crowning glory of all. Great masses of *Dendrobium Kingianum* there were, with numberless blooms running the whole gamut of colour from pale lilac to a deep purple which would have mocked the robes of an Emperor, and with a fragrance like the incense from an old Cathedral. One almost listened to hear a voice proclaim "Put off thy shoes from off thy feet, for the place whereon thou standest is holy ground."

I remember, too, a ramble I made a few months ago to a part of the Lamington Plateau down beyond Tambourine. A small party of us descended to the bottom of what is known as the Black Gorge—a fascinating place which would not fail to touch the imagination of anyone with a trace of the romantic in his make-up. In little grottos here and there in the course of the descent were rills and tiny waterfalls dropping a few feet in gradual descent before they took their final plunge over the edge of the gorge to the black depths many hundreds of feet beneath. Most of these grottos were quite damp, although the sun shone into them, and in nearly all of them were clumps of *Sarcochilus Fitzgeraldii* in bloom. But it was when we reached the bottom of the gorge itself that I had my greatest thrill. A tree had fallen athwart the stream which rushes down through the gorge to swell the Albert River. By chance the place that it spanned was one of the few places in the depths of the gorge that the sun's light could reach. The log was covered with the finest specimens of *Fitzgeraldii* that I have ever seen. The growths were up to eighteen inches high and mostly had long sprays of flowers. I measured one or two of the individual blooms and found them to be very nearly an inch and a half in diameter. I may say that it took a supreme effort on my part to refrain from breaking my promise not to remove plants from the National Park area!

Another Orchid which is little esteemed by us is that rather odorous flower *Liparis reflexa*, but I remember seeing a cliff face near the top of Wilson's Peak down on the New South Wales border which was simply a mass of the honey coloured blooms. Coming suddenly upon the vision it was quite a charming sight, worthy of being treasured in the memory gallery of things of beauty.

On another occasion after breaking through a belt of thick undergrowth into more open forest country, I became aware of a sweet perfume; looking round

for its origin I was delighted to find a fine specimen of *Galeola* in full flower. This strange Orchid grows from a tuberous root deep down in the earth. It has no leaves but sends out a long brown stem up to half or three-quarters of an inch in thickness which, fastening on to a large tree trunk by means of clusters of adventitious roots, ascends forty to fifty feet. It sends out numerous panicles about 18 inches or two feet long densely covered by yellowy brown flowers each of which is about two inches across. The labellum is pink and white with a crinkled edge. A beautiful thing but alas! of no value to the horticulturist, as it will not bear transplanting—but suddenly to come across one in full bloom is to add another treasure to your store of beautiful memories.

The Orchids I have mentioned so far have all been of the epiphytic type, and most of them, in individual cases at any rate, are well enough known to most Queensland Orchid lovers. But we have in this State many terrestrial or ground Orchids which in their own way are beautiful.

In my young days I remember the joy we had in getting great bunches of the little purple ground Orchid *Glossodia minor*, which we used to call Spring Stars. I have seen the ground in certain coastal districts turned into a rich purple carpet by the multitude of these little flowers. They were a lovely thing, and now in my graver years I have twinges of conscience at the memory of the many thousands of these I plucked as a youth. But young though I was at the time, I still cherish memories of those royal carpets in the clearings amid the gum trees near Scott's Point.

Recently a member of the Queensland Orchid Society showed a little clump of *Corybas aconitiflorus* (or Helmet Orchid) at a monthly show. Some of those present were inclined to be facetious at the expense of this tiny flower as compared with the striking blooms of *Cypripediums*, staged near it. But I have seen that same little flower growing in a massed formation under natural conditions. I can assure you that the sight of some hundreds of these blood-red flowers backed by the deep green of their foliage is one of my treasured memories.

I have always recommended any beginner in Orchid culture to start off with a few local Orchids, and to use these as a means of building up his technique in potting and general culture. But I do not by any means suggest that our South Queensland Orchids are only suitable for the inept handling of the neophyte. On the contrary, I consider that every Orchid grower should have in his collection a representative selection of the local Orchids. If we treat these plants as Orchids and not as something between a freak and a weed, we will find ourselves amply recompensed in the resultant growth. Take little *Dendrobium aemulum* for example. I recently saw a large-sized pan completely filled with this plant in full bloom, and a lovelier sight it would be hard to find.

In my opinion a plant or so of each of the following Orchids will add interest and beauty to any collection:—*Dendrobium speciosum* with its variety *Hillii*, *D. Kingianum*, *D. falcorostrum*, *D. gracilicaule* and its hybrid *gracillimum*, *D. tetragonum*—a specimen plant of which is a beautiful sight when in full bloom, *D. aemulum* and *D. monophyllum* already referred to, *D. linguiforme*—a dainty

and very prolific blossomer which is always a joy in the early spring, *D. cucumerinum*, which, while distinctly curious in its manner of growth, flowers very frequently—my specimen seeming to flower on and off throughout the year. *Cymbidiums iridifolium*, *suave*, and *canaliculatum* are all worthy of a place in your collection, *Sarcochilus Hartmannii*, *S. Fitzgeraldii*, *S. falcatus*, *S. Cecilæ* and *S. divitiflorus* have charm and interest, the two first named of this group being sought after by overseas growers.

As to our terrestrial Orchids, the beauty of our *Phaius grandifolius* is famous and, with *Calantbe veratrifolia*, is worthy to be in any collection of Orchids for floricultural value alone. But in addition to these, many of our host of small ground Orchids under proper treatment will repay the care taken of them and reward the grower with beautiful blooms.

By reason of the fact that their natural growing places are so handy, thus enabling us to get a thorough knowledge of their requirements, the cultivation of our native species presents very little difficulty even to the beginner.

The *Dendrobiums* generally are sun lovers, and will do well grown out in the open attached to a tree trunk, or a post, or properly potted up in a basket, pot or raft. If potted, good care should be taken of the drainage, for long periods of damp feet mean death to an Orchid just as they may do to you or me. The best potting material is staghorn or elkhorn peat, and care must be taken that the Orchid is planted on the compost and not in it. Those *Dendrobiums* that grow on the open forest trees, such as *tetragonum*, *teretifolium*, *gracilicaule*, etc., need less water than the rain forest or scrub Orchids, such as *speciosum* and *aemulum*. But no variety of *Dendrobium* needs too much water, and in the winter months practically none need be given.

The native *Cymbidiums* do well in basket or pot in a peaty compost, though a mixture of sand, old dung, leaf-mould and fibre or peat suits them equally well. They like a reasonable amount of water during the summer months, but are very adaptable to almost any surroundings. I find they do best out in the open hung from a tree where they can get the morning sun, but where the fierce noon-tide rays are broken by overhead foliage.

Sarcochilus Hartmannii grows on the cliffs of the mountain ranges exposed to full morning sunshine. It grows well for me in a compost of sand, leaf-mould and charcoal which approximates very closely its natural living conditions. It does not require very much water.

Sarcochilus Fitzgeraldii, however, grows in the cool moist gorges. I grow it in a tray of sand and leaf-mould in a cool, damp part of the bushhouse, where it does quite well. I once saw a whole mass of this plant growing gaily among the damp charcoal screenings under and around the shelves of a bushhouse.

Sarcochilus falcatus seems to do best if it is left to grow on a branch of a tree, particularly a piece of crow's ash or she-oak. It likes a cool location where it gets plenty of light but not too much of the direct rays.

Sarcochilus divitiflorus does nicely potted in peat and given fair sunlight.

Of the principal terrestrials, *Phaius* should be planted in a compost of loam, sand, leaf-mould and dung—a little bonemeal seems to be appreciated. Growing naturally as it does in marshy country, it likes plenty of water, particularly in the summer time. In the cool period less water is necessary, but I never let the plant get very dry.

Calanthe veratrifolia will grow in the same compost, but does not require quite so much water, although, like our Orchids generally, it is very adaptable to circumstances.

With regard to the other ground Orchids, so long as you approximate to the conditions under which they grow naturally, no great difficulty should be experienced in growing and flowering them.



NUTRITION

WHEN James Branch Cabell created and gave to the world that very improper, but most amusing character, "Jurgen," he placed in the mouth of his hero, the saying, "I will try anything once!" This phrase has since become incorporated in our popular idioms, for it expresses admirably the impulse of the human instinct ever to seek some new sensation. It is a motto which can well be adopted by Orchid growers, for only by constant experiment, the trying of anything once, can they ascertain the way to get the best out of their plants. It was with this phrase running through my mind that I commenced to experiment with the use of liquid manures for my Orchids. My first efforts were simply an extension of a practice I have always followed in the growing of flowers—the giving of manure in liquid form to accelerate the growth of the plant, and to improve the quality and quantity of blooms. Naturally, my early experiments with Orchids were tempered with diffidence and discretion.

The first results were somewhat puzzling. Two plants of *Cypripedium hirsutissimum* growing under similar conditions—that is, in the same bushhouse and alongside one another—were selected for my first effort. They were about equal in size, and both were strong and healthy. After four or five weekly applications of a rather weak manure (made by soaking matured cow-dung in water for a fortnight) I found that one plant, "A," was increasing in vigour, while plant "B" was evidently going back, the leaves having become rather limp with a tendency to turn yellow. It was obvious that while "A" was benefiting by the extra nutriment, "B" was adversely affected. Referring to my records, I found that "A" had been potted nearly two years before, while "B" had been repotted only three months before the first application of the liquid manure was made. During the period which had elapsed I had altered my compost for *C. hirsutissimum* to some extent. When "A" was potted the compost was comprised of equal parts of silver sand, leaf-mould, finely chopped sphagnum moss, osmunda, and staghorn peat, with an admixture of powdered charcoal and crushed brick. Plant "B" was in almost pure staghorn peat fibre, with a little dried cow-dung, and a topping of sphagnum moss. I decided to make a study of composts and manures, before I took any more chances with my plants. In the meantime copious applications of tank water soon restored plant "B" to health.

Now, although this first attempt at giving added nutrition to Orchid plants ended rather unsatisfactorily, it was really beneficial, for it caused me to investigate, as thoroughly as I could, the factors underlying the growth of plants. As a result of these studies, and my experiments over a period of five years, I am quite convinced that most Orchids will benefit by a carefully arranged plan of liquid manuring.

When we pot an Orchid, if we are wise, we use only clean new materials, and we remove all traces of the old compost (if any) in which the plant grew. This ensures that the newly potted plant has untouched and uncontaminated stores of food to utilise for its needs. Hence, we usually find that a newly potted plant puts forth strong, healthy new growths. This fact is modified to some extent by the state of the plant at the time of potting. In the case of a plant which has gone back through disease, malnutrition, or the attacks of parasites, the first new growth will probably be below average strength, but the general health of the plant will show improvement. Subsequent growths will increase in size and substance, until the food value of the compost has been considerably weakened. Again, if at the time of the repotting, the development of a forward growth is advanced, the influence of the new compost will be less evident than when the transfer is made just as the new growth is starting.

If the compost is chosen with due regard to the requirements of the plant, a newly potted Orchid should require no additional feeding for some time.

I refer you to a table below listing the essential elements of plant food and analysing the materials most commonly used in Orchid composts. You will note that each of the materials has a very large percentage of its bulk made up of organic matter. It is the gradual modification of this organic matter which creates "humus," a kind of concentrated plant food containing the salts necessary for the nutrition of plants:—

ANALYSES OF COMMON ORCHID COMPOSTS

(Supplied by L. C. Home, Brisbane)

	Staghorn Peat	Polypodium Fibre	Todea Barbara Fibre	Osmunda Fibre
Organic Matter and Moisture	97.85	97.96	96.89	96.75
Calcium .....	.98	.44	.17	.15
Magnesium .....	.07	.03	.12	.11
Potash .....	.09	.16	.89	.14
Phosphorous .....	.02	.08	.12	.16
Iron and Aluminium	1.20	.29	.44	.88
Nitrogen	1.59	1.13	.91	.74
Silica	—	1.64	.45	1.20
Sulphur	—	—	—	—
Chlorine	—	—	—	—
	pH value			pH value
Staghorn peat	4.99	Cow-dung		6.51
Polypodium fibre	3.77	Horse-dung		7.27
Osmunda fibre	4.26	Fowl-manure		6.67

In the Orchid's natural state this humus is supplied by nature from the conglomeration of detritus which collects about the plant's roots in its harbourage of a tree-trunk or branch. The decay and crumbling of the bark, the depositing of dust, the droppings of birds and arboreal animals, the decaying bodies of dead beetles, ants and insects, and the growth and decay of various mosses and

fungi, all contribute their quota of food for epiphytes. Although Orchids generally are considered to be non-parasitical, I am inclined to think that certain species may obtain at least part of their nutrition from the bark or sap of their host. This appears to be the case with those species which invariably are found growing on a particular species of tree. *Dendrobium Tofftii*, one of our finest native species, almost invariably is found growing upon certain species of mangrove, although other trees quite generally suited to them, are growing in contiguity. This may, of course, be quite coincidental, but I am inclined to think that probably *D. Tofftii* gets some of its nutriment either from the sap of the mangrove, or from some element of its bark, or possibly from some particular fungus growing upon it.

The great bulk of the genera and species of Orchids cultivated by us originate in the tropical band encircling the earth and covering the area of its surface between latitudes 20 degrees north and 20 degrees south. In this band, nearly 3,000 miles wide, the climate naturally varies somewhat, due to different factors such as elevation, surface conformation, contiguity to the ocean, and so on, but in most of the areas where our Orchids grow, the climates come under Koppens classifications, Af., Am., and Aw. These are all much alike, the main difference being in the amount of average rainfall during the dry period of the year. The essential features of these climates are that they have a heavy rainfall for at least nine months of the year, so that even in the winter, or during a dry period, the ground is damp, causing constant atmospheric moisture by evaporation; warm conditions, which vary little between winter and summer; and strong sunlight for the greater part of the year. We naturally try to give the plants in our care something of the same conditions. This means that for the greater part of the year we are applying considerable quantities of water to our plants, so that all through the warm period the compost in which they grow is kept uniformly moist.

Now, Orchids absorb the necessary elements of their nutriment from the water of their compost. This water, by the process of *osmosis*, has attracted the molecules of nitrogen, potassium, and other chemicals from the humic compost; and the plant selects from the water such of these elements as it requires at the moment. When first potted in suitable compost there are ample supplies of food available. Naturally only a little of the water is absorbed at a time. This means that right throughout the warmer period of the year (nearly 9 months in Brisbane) a tremendous quantity of water is passing through the compost and collecting, in its passage, minute particles of plant food. Most of this water is lost by drainage or by evaporation, so that quite a large proportion of the plant food is simply carried away unused. Therefore, after some months the compost has had its stores of food elements considerably depleted, and this depletion continues to increase in ratio to the disintegration of the compost material.

If we could repot our Orchids every few months, or even every year, and give them a new compost to work upon, this wastage of food would not matter. Of course this is physically impossible for most of us—we haven't the time to

attend to it. Moreover, it is not in the interests of the plants that they should be subjected to the shock of frequent uprootings. It is better, therefore, to replace the food loss by supplementing the supplies still obtainable from the compost with extra food in an easily assimilable form.

I do not propose to weary you with details of all the experiments I have made with liquid manures, but will set out, briefly, what I have found to be the best treatment for the principal genera of Orchids we grow.

Aerides.—This genus requires very little artificial feeding. If it is potted only in charcoal, with a topping of sphagnum moss, the application, once a fortnight, from about the beginning of August to the end of March, of a liquid manure, will improve the growth and quantity and quality of the flowers. This manure is made by steeping 2 pounds of dry cow-dung and about 4 ounces of fowl droppings in four gallons of water and letting it stand for 3 weeks. Before using, the fluid should be well stirred and then diluted with an equal quantity of tank water. About 4 ounces of this dilute fertilizer should be applied to the thoroughly wetted compost.

If the compost used contains dried dung and fibre, no liquid manuring is necessary for at least six months after repotting. Then applications of the above manure once every two or three weeks is sufficient.

Calanthes.—These are terrestrial Orchids and are heavy feeders. They should be potted in a rich compost of about equal parts of loam, leaf-mould and well matured dung. I usually abstain from additional manuring the first year after potting; but in the second year I give weekly applications of the liquid manure already referred to, from the time the seasonal growths have reached a height of four inches.

Cattleyas (including the usually associated bi- and tri-generic hybrids).—

(1) Compost of osmunda fibre only.

No liquid manure for from 4 to 5 months, but at the end of three months I usually give the repotted plant about 8 ounces of lime water, made by air-slaking a piece of rock lime the size of my fist, and steeping the resultant powder in 2 gallons of water. This helps to neutralise undue acidity from oxalic acid in the compost, and also assists in replacing and liberating potash. If you will consult the table of analyses provided earlier, you will see that osmunda fibre contains comparatively little lime. When the new growths are well developed and approaching the time when the sheath should appear, I give applications of two different manures at intervals of a fortnight between each. The first of these is a preparation sold under the name of Floraphos, said to contain as active agents 15.6 per cent. nitrogen and 31.2 per cent. phosphoric acid. A dessertspoonful of this is dissolved in 4 gallons of water and about a breakfast cup of the solution is applied about the roots of the plant. A fortnight later I give about the same quantity of the liquid cow-manure as prescribed for *Aerides*.

(2) Compost of todea-barbara and osmunda in equal parts. Lime water as previously recommended. Instead of the cow-dung—fowl-manure liquid, I give a manure of steeped cow-dung only, once in six weeks, and the Floraphos solution three weeks later.

(3) Compost of equal parts of osmunda and polypodium.

Polypodium contains an appreciable quantity of lime. I therefore dispense with the lime wash. The nitrogen content is high, therefore liquid manure of any kind is unnecessary until they have been potted for some considerable time. Usually I commence after growth has well started at the beginning of the next growing period; that is, if a *Cattleya* is repotted in this compost at the beginning of spring this year, no added nutriment will be given until spring next year. Then I give the fortnightly applications as recommended for plants in osmunda only, but of about half the strength. The next year full strength applications are given if the plant has not been repotted in the meantime.

(4) Potted in polypodium fibre only.

No lime water. In twelve months' time fortnightly applications of manure at $\frac{1}{3}$ of the normal strength. After two years a shade under full strength.

Cymbidiums.—I have found that these plants respond to liquid manuring more readily than any other genus of Orchid. Grown in a good, light, and airy place out of doors, the direct rays of the sun broken by the foliage of a tree, and given ample water all through the summer, they are perhaps the most satisfactory of all the Orchids to grow in Brisbane. I am of the opinion that polypodium fibre, not too tightly packed, makes the best potting medium. They are greedy feeders and after they have been potted three months (and providing growth has started) I give them fortnightly applications of liquid manures, in the same alternatives and strength as for *Cattleyas* potted in osmunda fibre. This is maintained throughout the year until the beginning of winter when the applications are made monthly. My experience is that *Cymbidiums* have little or no resting period, and make new growths practically all the year through. In winter, when the flower spikes are maturing, this is less obvious, but it is quite an ordinary occurrence to find new growths and flower spikes developing simultaneously. When dried cow-dung and leaf-mould are included in the compost, half strength solutions of manure should be given.

Cypripediums.—Here again the nature of the compost has a bearing on the strength and frequency of the applied nutriment. Observation has proved to me that the best all-round compost for this group is the dust and powder from polypodium fibre, mixed with about one fourth of its bulk of cow-manure, with a little crushed brick or crocks. Using this compost, no extra feeding will be required for a year, or until the sheaths begin to form. Then alternate applications of the manure and Floraphos solutions, diluted to half strength, may be applied.

For those potted in osmunda only, or osmunda and sphagnum moss, a lime wash after 4 or 5 months is beneficial. After two months, half strength of the manures can be applied, the strengths being gradually increased until after twelve months have elapsed since repotting, when full strength applications can be made.

When mixtures of loam, leaf-mould, dung and fibre are used, the lime wash can be used after six months, but liquid manuring should not be required until the following spring. When lime has been included in the mixture (as in the case of *bellatulum*, *niveum*, etc.), the lime wash should be omitted.

Dendrobiums.—Most *Dendrobiums* are potted in straight-out staghorn peat, which is comparatively rich in nitrogenous matter and lime. I have not experimented with liquid manure for *Dendrobiums* to anything like the same extent as for the other genera, but I have found it satisfactory when applied to plants growing in osmunda fibre. I have given weak solutions of Floraphos to *D. formosum*, var. *giganteum*, and *D. superbum*, var. *giganteum*, and have noted increased vigour in their growth. *D. superbiens* and *D. atrovioleaceum* also respond well to the application of the cow-fowl manure solution.

Other Genera.—I have used both forms of liquid manure for *Lycaste*, *Stanbopea*, *Zygopetalum*, *Phalaenopsis*, *Epidendrum*, and *Vanda* species. All of these reacted favourably to the additional feeding.

It may be of interest to set out the average contents of various forms of animal manure, so that you can see where their value lies. These figures are averaged only, and, of course, will vary in different samples of the various manures.

Horse-dung—contains about 75 per cent. water, 21 per cent. organic matter, .44 per cent. nitrogen, .35 per cent. phosphoric acid, and .035 per cent. potash.

Cow-dung—contains 83 per cent. water, 10 per cent. organic matter, .3 per cent. nitrogen, .1 per cent. phosphoric acid and .05 per cent. potash.

Sheep-dung—contains 51 per cent. water, 45 per cent. organic matter, .62 per cent. nitrogen, .3 per cent. phosphoric acid and .4 per cent. potash.

Pig-dung—contains about 80 per cent. water, 13.8 per cent. organic matter, .44 per cent. nitrogen, .3 per cent. phosphoric acid and .35 per cent. potash.

Fowl-manure—contains about 60 per cent. water, 29 per cent. organic matter, 1.25 per cent. nitrogen, 1 per cent. phosphoric acid and .8 per cent. potash.

It will be seen from these tables that while horse-dung contains on the average a little more nitrogen than cow-dung, its acid content is $3\frac{1}{2}$ times as great. If it is used in place of cow-manure the solution should be diluted to about half strength. That is, instead of adding an equal quantity of tank water to the liquid manure, twice the quantity should be added. Both sheep- and pig-dung can be used as substitutes for cow-dung, but they too should be diluted as for horse-manure. Fowl droppings are particularly rich in plant food, and must therefore be used most sparingly. It should not be used in conjunction with horse-, sheep- or pig-manure, but a little (4 ounces) incorporated with 2 pounds of cow-dung makes a well balanced liquid food.

Like most other things, liquid manure should be used but not abused. Its application must be reserved for healthy plants in full growth. It must not be applied too often, or in too great a strength. It is better to start off with a very weak solution and gradually increase the strength, than to apply it at the maximum strength from the start. Again, as the growing season approaches its end, the frequency and strength of the nutriment should be gradually reduced, and not suddenly stopped. Another thing, always see that the compost is thoroughly soaked before applying liquid manure. Rain water is preferable both in mixing the manure, and for soaking the compost.

Now I want to make one point clear. This information regarding the liquid manuring of Orchids has been acquired from my own experiments, and is given on the results obtained by me. I am not recommending, or even suggesting, that

you use liquid manure for your plants. That is entirely a matter for your own judgment. I can only say that I am fully satisfied with the results that I have obtained from its use.

Although Orchids, like other plants, obtain a large portion of their nourishment from the salts absorbed from their compost, they also obtain some very essential elements directly from the atmosphere which surrounds them. Their respiratory processes have much in common with those of animals. Both animals and plants breathe air and both have internal cells or cavities into which the air may enter and be modified. In the case of the animal, however, its lungs extract oxygen from the air, and expel the carbon-dioxide; in plants the oxygen is thrown off and the carbon-dioxide is retained to supply the carbohydrates that are used to build up plant tissues and to help supply the sugars, starches, etc., which it needs. If you examine the leaf of an Orchid under a very powerful glass you will find that its whole surface is covered with tiny pores, and through these the air enters into the internal air chambers. Packed closely round these air chambers are myriads of tiny cells which contain the green chlorophyll grains giving the leaf its typical colour. These chlorophyll cells absorb sunshine, and use it to break down the carbon-dioxide, and extract from it the carbon for the use of the plant. The chlorophyll cells can work only in comparatively bright light, and, during the night or under cloudy or dark conditions, the guard cells, which nature has provided about the breathing pores, change their form, and by shutting out the atmosphere and shutting in the water of the plant, prevent useless evaporation.

You will remember that I mentioned, in regard to the equatorial band in which Orchids grow naturally, that one of the characteristics of the climates there, was strong sunlight for the greater part of the year. This implies a very high activity on the part of the respiratory organs of the plant, and, having regard to the pithy, firm nature of the stems or pseudobulbs of the great majority of our epiphytical Orchids, we know that this must be the case. It follows from this that in order that our plants may be able to obtain a sufficiency of carbon to build up strong, vigorous, floribundant pseudobulbs or stems, we must give them ample air and light. Orchids grown under dark, stuffy conditions will be puny and weak, and will lack strength to resist the attacks of disease and parasites, or to produce flowers in the quantity and quality characteristic of the species. In many cases, I believe that light is of greater importance than temperature for the successful growing of a plant.

I have endeavoured to give you some idea of the natural laws underlying the nutrition of plants, and to show you how to use these laws to improve your Orchids. I know that quite a number of Orchid growers are rather sceptical as to the advantages of the application of science to their hobby. But if they will compare the results obtained from present-day methods with those of older days, I am sure that they will find out that the passing years have brought a greater understanding of the needs of Orchids, with the result that losses have been reduced to a fraction of what they were, and that the plants of to-day are, for the most part, stronger and healthier, and flower more regularly than ever before.

The study of plant physics is still in its swaddling clothes, but in many parts of the world research work is in progress, which, when completed, may revolutionise many of our present ideas and methods. Every grower can contribute his share to this quest for knowledge by making careful experiments and recording the results. Even if an experiment fails in its object, it may yet reveal some important factor hitherto unrecognised.

LIGHT

I suppose we have all, at some time or other, seen the gradual break of day—how, through that deep darkness which precedes the dawn, comes a wavering finger which seems to wipe away a little of the blackness from the eastern horizon, and how this little clearing grows from green to rose, purple and gold; and, as the light grows stronger, objects on the skyline turn from vague masses into grotesque arabesques, then to silhouettes, and finally into their every-day forms. Then the sun appears above the horizon and brings to life all that complex melange of vice and virtue, hypocrisy and honesty, peace and conflict, which makes up life.

It is little wonder that the sun held a high place in the religious beliefs of the ancients. Among the primal people it was thought that it was something like a glorified electric light (though, of course, they had no conception of an electric light as such) which was switched on at dawn and off at dusk, with the sole function of giving light to the world. With the development of speech and the establishment of the written word, first by hieroglyphic symbols or pictures, and then by letters which had a constant value, the thinkers of the early civilisations began to ponder on the causes of things. They realised that there was some form of law or influence that controlled the development of earthly things, and, not understanding the why and the wherefore thereof, they ascribed this unknown power to various supernatural beings which, for the sake of clarity, we call Gods. It was realised that the sun was something more than a lighting apparatus, and that it had some mysterious control over the development of the plants and animals of the world. Hence, in most of the primitive religions the Sun (under various names) was looked upon as the chief of the Gods. This belief was spread over practically the whole of the world, for the legends of the peoples of Scandinavia, and many other parts of Europe, Egypt, America, and Asia, give evidence of a sun-god who, in most cases, was regarded as the creator and propagator of life. In the light of modern knowledge there was more than a scintilla of truth in those old beliefs.

With the growth of this belief in a sun-god, there arose the doctrine of appeasement or sacrifice, and it was a normal part of their ritual that on certain days of the year, usually at the equinoxes, the longest day of the year, and the shortest day, human sacrifices were made to this great god of fruitfulness. These sacrifices were generally festivals during which a good time was had by all—except, of course, the star performers at the party, who always came to a sticky and, generally, a painful end. There may be some analogy between those ancient sun-worshippers and those of our day in which thousands of individuals voluntarily submit themselves to the torture of sunburn as part of the ritual of a form of

sun-worship when lying unclothed upon highly reflective beaches.

A cynic has said that language was invented by man to conceal his thoughts, but the development of the avenues of communication has led to the advancement of knowledge.

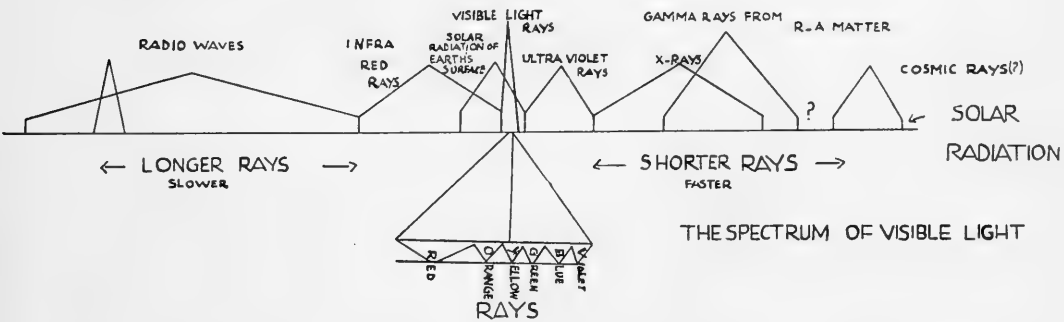
So, as communication between the wise men grew, knowledge was gradually dispersed among the old civilizations and, with the growth of new ideas so born, the old empires fell and gave place to new. Hence the old Chaldean, Persian and Egyptian Empires were succeeded by the Greek, the Carthaginian, and the Roman Empires, and during these new eras philosophy was born and grew, and logical consideration of the physical facts of the universe began to be recorded. It was soon realised, that while the sun had much to do with the growth of plants and the ripening of crops, its influence was not of a supernatural nature, but was physical or chemical in its action.

The early Christian era preceded and followed the fall of the Roman Empire. In this stage of the development of civilisation most of the ancient knowledge was repudiated and forbidden. Right up to medieval times the Church had practically the sole control of education and thought, and any attempts to pry into the unknown were regarded as dealings with "the devil," and were suppressed by the invocation of curses, with all the dread ritual of bell, book and candle, and by the infliction of physical torture and death. But while the Church was refusing any adventure into the unknown, it was sowing the seeds of the growths which later would strangle its power, for it was imparting the rudiments of reading, writing and numbering to the children of its adherents, and, when the fruit of the Tree of Knowledge is eaten, its seeds fall to the earth and germinate and grow. With the Renaissance there came a fresh growth of speculation and investigation into the phenomena of the earth, and, although most of these early researches were abortive, some of them survived to form the basis of modern science.

Among the many phenomena to which thought was given in those early times was that of "Light." Many theories were evolved regarding the nature of the sun's rays, but the first man to give any practical pronouncement was the great English Scientist and Mathematician, Sir Isaac Newton, of whom all that most of us know is the legend that an apple struck his head, and, as he couldn't find anyone who threw it, he propounded the Law of Gravity to explain the event. Newton made many experiments with lenses and prisms, and he demonstrated that white light—the light which we see and which we know comes from the sun—was not an intangible essence but something which has physical attributes, and which could be divided into various constituent parts—and from the further investigations which have followed upon Newton's work right down the centuries to the present day, we know that the sun's rays can be weighed and analysed and controlled, like all the other phenomena which make up our wonderful universe.

As a result of these investigations, we now know that visible light is but a fraction of the constant radiation from the sun—how small this fraction is can be seen from the diagram opposite. This gives some idea of the composition of the rays as they leave the sun. This radiation is made up of a number of different

waves of varying length and intensity or speed. Not all the rays which make up the sun's radiation reach the earth. If they did happen to do so, even for so short a time as one second, it is likely that every living organism on the earth would be destroyed, and possibly our planet itself would be burned to ashes. Fortunately (or having regard to the mess into which humanity has got itself, perhaps unfortunately), most of these rays are absorbed first by the comparatively narrow belt of ozone which lies like a blanket round our atmosphere, second, by the atmosphere itself, and, third, by the clouds, dust, vapour and other impurities which, though unseen, crowd the air about us. As the result of these barriers only a very limited number of rays outside the visible rays succeed in penetrating through to the earth's surface—and these invisible rays are a fraction of the infra-red rays, and a fraction of the ultra-violet rays—modifications of each of which are represented by the red and violet rays which comprise the two ends of the spectrum or visible light rays as shown in the enlarged section at the bottom of the diagram.



VISIBLE LIGHT RAYS REACHING THE EARTH AT THE RATE OF 392 TO 727 BILLIONS PER SECOND

We know that the solar energy received by the earth is not constant, in so far as it varies in different parts of the world, and at different times of the year, not only in its duration, but in its intensity and its quality. Thus at the equator we have days which are divided almost equally into darkness and light, while in the distant latitudes we find that in summer the days have light for anything up to 24 hours and in winter they are in darkness for the same time. Then, again, the intensity of the sun's rays is affected by the angle at which they reach the earth—if the sun is directly overhead the rays have a much greater intensity than if they are striking obliquely at the earth's surface, for the simple reason that in the latter case they have a greater depth of atmosphere, etc., to penetrate, and so more of their force is absorbed. Therefore, the intensity of the sun's rays is greatest in mid-summer from the annual aspect, and at noon during the diurnal period. The exact difference of intensity at different periods and times have been calculated and demonstrated, but they do not concern us in this paper.

In the paper on the "Nutrition of Plants" which appears elsewhere in this volume, we see, by a process called photo-synthesis, how the leaves of our

plants manufacture certain sugars from the carbon dioxide of the atmosphere and the water within their stems, through action of light upon their chlorophyll cells and that, by processes not yet completely understood, these sugars are converted into starch or mucilage and other carbohydrates, and into proteins, organic acids, fats, and so on. It is obvious, therefore, that light of some sort is essential to the growth of every plant. For some years this relationship between light and plant life has been the subject of scientific investigation.

Experiments have been made in specially constructed chambers in which heat and moisture were controlled, and which were so screened that certain rays could be blocked while others were permitted to enter the chamber. These experiments were not only conducted with sunlight, but with various forms of artificial light such as mercury arc and tungsten lamps. The compilation of the results from the data obtained has not been completed, but it would appear that the red rays are the most promotive of growth, the blue rays next best, while the green and yellow rays are useful—but the infra-red and the ultra-violet rays contribute nothing to the growth of the plant.

Investigations into the relationship between light and the flowering of plants have been carried on for some years, particularly by Dr. Garner and Dr. Allard, of the United States Department of Agriculture, and, as a result of these inquiries, it has been demonstrated that the production of flowers in many types of plants may be increased or reduced by the regulation of the daylight available to them. A number of plants are not noticeably affected, but the majority fall into one of two groups: (1) "long-day" plants, and (2) "short-day" plants.

In the case of the long-day plants, it was shown that, in order that they produce flowers at all, they must have a certain minimum daily exposure to sunlight. If this critical light period was increased, the flowering stage was reached more rapidly, and the quantity of flowers produced was increased—and this improvement was continued by increasing the period of light up to a maximum, after which no further improvement was noted. In fact, a tendency to deteriorate was noted in some instances, and in others an increase of foliage growth at the expense of the flowers.

When the light periods were reduced below the critical period there was a cessation of flowering and a retardation of growth.

In the case of short-day plants, the results were practically reversed. An increase of light over the critical period tends to reduce or prevent flowering, while a reduction of the light period increases the quantity of flowers and hastens the flowering period. Experiments with artificial lights had similar results.

Now, as far as I can ascertain, no experiments have been carried out under research conditions with Orchids as their subject. Just before the war broke out I made certain arrangements for the supply from America of certain lamps which emit various rays—red, yellow, blue, etc.—with the intention of conducting experiments with Orchids along the lines mentioned, but unfortunately, as a result of the hostilities, I was not able to obtain them. However, when happier times return, I hope to be able to go ahead with my plan. I am quite confident that

“light” has a big bearing on the difficulty which we find in flowering certain Orchids.

Whether a plant is a long-day or a short-day plant depends almost entirely upon the physical conditions of its native habitat. Thus of two plants growing naturally on the same parallel of latitude one may be a short-day plant and the other a long-day plant, because the first may grow in a deep gulch into which the sunlight may penetrate only for an hour or two each day, while the other may live high on a tree, or a cliff, exposed to the sun’s rays for many hours each day. It is desirable, therefore, that we ascertain as nearly as we can, how each of our Orchids grow, naturally, particularly in the case of species. Thus, if we know that *Vanda suavis* grows in Java on trees in the shade of other trees, and that *Vanda tricolor* also grows in Java, but grows upon stunted trees which allow the full light of the sun to play upon it for the greater part of the day, it will require no great amount of intelligence to decide that *Vanda suavis* must be grown in a somewhat more shaded position than *Vanda tricolor*. But if we are having difficulty in flowering either or both *tricolor* and *suavis*, it may puzzle us to know the reason. Assuming that our attention to temperature, moisture and nutrition has been in accordance with the known requirements of the plants, we will be justified in looking into the matter of the lighting conditions in which they grow.

Java, of course, lies in the equatorial zone, and hence has days which are divided practically equally into darkness and light all the year round. Here in Brisbane we are right outside the tropics and, therefore, our days are considerably longer in summer time than in the winter. The winter period is the time when these *Vandas* are getting ready for their spring and summer flowering. From their manner of growing on trees in the tropical belt, we know that they are both probably “long-day” plants, and that in their natural haunts, under the influence of the warm long tropical sunlight, their chemical functions are working at high pressure right through the winter. Therefore, it will probably assist the plants to flower in the next spring if we move them so that they get the maximum amount of sunlight during the winter months—always remembering that *suavis* can do with a little less sunlight than *tricolor*. I have chosen these two *Vandas* for this example because, as a general rule, they are very easy to flower in Brisbane, our climatic conditions meeting their requirements reasonably well—and yet from time to time we hear growers say: “I can’t flower *suavis*,” or “my *tricolors* never do as well as so-and-so’s,” and so on. The failure is most probably due to a deficiency of light during the winter period.

Cattleya Warscewiczii or, as it is usually called, *gigas*, is notoriously hard to flower. This *Cattleya* grows high up on the Andes, principally in the Republic of Colombia which, again, is right in the centre of the equatorial belt. Here it grows upon the sparsely-leaved trees, and even on the high, almost inaccessible cliffs nearly 8,000 feet above sea level, where it is exposed to the four winds of heaven, and to the full force of the tropical sun. Under these conditions it flowers regularly and abundantly every spring. Yet, transferred to our sub-tropical climate, and given all the refinements of Orchid culture, it often refuses to show a sheath, although it grows rapidly. I am confident that this is largely

due to the difference in light hours and that—if we could find a means of increasing our hours of light during the winter—*gigas* would present no more difficulty than any other *Cattleya*, particularly in the cooler climate of Sydney.

Again, the terete species, *Vanda teres*, *V. Kimballiana* and *V. Hookeriana*, and the hybrid, *V. Agnes Joachim* are often shy bloomers here, whereas in their habitats, they flower prolifically. Here again, the secret lies in this matter of light. As far as I can ascertain, all those who have flowered these plants have either grown them out in the full sunshine or the plants have bloomed only when they have grown up through the roof of the bushhouse.

So, if we have any Orchids which we find exceptional difficulty in flowering, it will pay us to consider closely how we are treating them in this matter of sunlight. If they are already growing in the sunniest part of the bushhouse, and have made good growth, it is possible that they are getting too much light in summer, and it will probably pay to shift them into a more shaded part of the greenhouse during the long days of that season. If, on the other hand, they are in a shaded part of the house, then the obvious thing is to move them to a sunnier place—making this move during the autumn or winter.

In any case, we should always increase the light available to our plants in the winter time, if possible, by removing battens or by otherwise decreasing the overhead covering.

Another important feature of light is its relation to colour. It has been well authenticated that plants which flower in the high altitudes produce more brilliantly-coloured flowers than those of similar species which grow nearer to sea-level. This is attributed to the fact that in the high altitudes there is a greater amount of the ultra-violet rays in the light. I have had an experience with *Vanda coerulea* which, no doubt, has occurred to other Orchid growers. This plant grows on low shrubs and trees with plenty of sunlight, at altitudes ranging from 3,000 to 5,000 feet. Certain plants of this species flowered very shortly after arrival from India, the flowers being a deep blue in colour. Next year the flowers were still blue, but much paler in shade, while the third year they were almost white. Now, it seems that the so-called "dark" variety is found only at the highest part of the plant's altitude range, whereas the paler hued types are found at the lower elevations. This seems to me to indicate that there is no such thing as an inherently dark-flowered or light-flowered variety of *Vanda coerulea*, and that the differences in colouring in the various plants are merely coincidental with the elevation and light conditions of their habitats. It seems to me, too, that much of the difficulty associated with the growing of this plant lies in the fact that we try to grow at an altitude of 15 to 20 feet a plant which is accustomed to the lighting and atmospheric conditions of 3,000 to 5,000 feet.

Another experience of the changing of colour happened to me with a plant of *Dendrobium Kingianum*. The plant came from near the top of Mt. Cordeaux (about 4,000 feet), near Cunningham's Gap, where I found it growing in a great mass upon basaltic rock. The blooms were a very deep crimson purple, definitely the deepest shade I have seen in the species. When it first flowered for me it was still a good, deep colour, but appreciably lighter in shade. Now, after five years,

its blooms are the typical pale pinkish lilac—no different from those found in the low-lying scrubs near Brookfield. This change of colour can surely be due only to one of two causes: (1) change of altitude and consequent variation in light value; (2) absence of some agent in its food—such as iron, manganese, etc., which may affect the colouring in the same way that hydrangeas and other flowers are said to be affected by the addition or removal of some element to or from their soil. But I am inclined to think that it is the lessening of the ultra-violet rays in the sunlight of Brisbane that is responsible.

The principal factors in the growing of Orchids are nutrition, temperature, moisture and light, and we must remember always that the importance of any one of these factors is relative to the other factors. We cannot say that the feeding of Orchids is the most important element in their cultivation, nor are temperature, moisture or light, paramount in importance. We should strive to provide a nicely judged scale of treatment for each plant according to its needs and according to the conditions available to us. If we restrict our efforts at Orchid-growing to those plants whose requirements most nearly meet what we can give them, we shall have a vastly higher percentage of success than if we try to grow a large range of species without giving consideration to their requirements. The fact that we grow Orchids is an indication that we are plant lovers, and it is a poor plant lover who will subject a beautiful Orchid to a miserable existence and a lingering and painful death just for the sake of including it in his collection.

There are scores, even hundreds, of Orchids which thrive under quite ordinary conditions in bushhouses and glasshouses, and, if we restrict our efforts to these, we can build up large and interesting collections which will give us worthwhile results all the year round. We can then leave to those who can provide the extra requirements the plants that require specialized treatment. By doing this we will save our purses and our self-esteem from some nasty shocks.

We know that *Dendrobiums* and *Epidendrums* are almost all lovers of sunlight, and in their natural state grow under conditions where they have the direct rays of the sun beating upon them for some hours each day. *Cymbidiums*, too, are light lovers, but they grow either upon the trunk of the host tree, or on branches close to the trunk, so that they get ample light, but this is diffused or broken by the foliage above them. *Cypripediums* are mostly terrestrials and tend to grow in the jungles of the tropics where their sunlight is broken by the overhead growth. There are exceptions, of course. *Cypripedium Lowii*, for example, grows high up on trees like a *Dendrobium*, while *C. Spicerianum* is often found growing upon rock faces exposed to morning sunlight. *Cattleyas*, which come from the Andes, require greater sunlight than those which originate in the Amazonian jungles—and so on. Hybrids tend to inherit the characteristics of their parents, not only in regard to physical features, but also with regard to cultivation needs. These hereditary traits, however, are modified by the artificial conditions in which they are raised. But whether your plants are species or hybrids, they must be kept clean. If the leaves are coated with a film of dust or soot or scale, this film will act as a screen which will prevent the light rays from reaching the

leaves, so that the intricate apparatus by means of which the plant manufactures its foods will work imperfectly. Instead of a virile healthy plant, you will find you have a weedy, sickly specimen which will be unable to resist the attacks of disease and pests, certainly never flowering satisfactorily, and almost certainly a total loss. Keep the leaves and stems of your plants fresh and clean by frequently spraying or hosing them, give them plenty of fresh air and reasonable light, and you will find they will amply repay your trouble.

It all boils down to this—to grow Orchids successfully you must use your brains. The road to success is steep and rutted, and there are many traps for the unwary along it, but if you make the grade and avoid the traps, and keep out of the ruts, you will have a satisfaction such as nothing else can give you.



LAFLIO-CATTLEYA x. BLANCHETTE.



CYPRIPEDIUM. x. DONALD AYRES



DENDROBIUM. x. OWENIANUM.



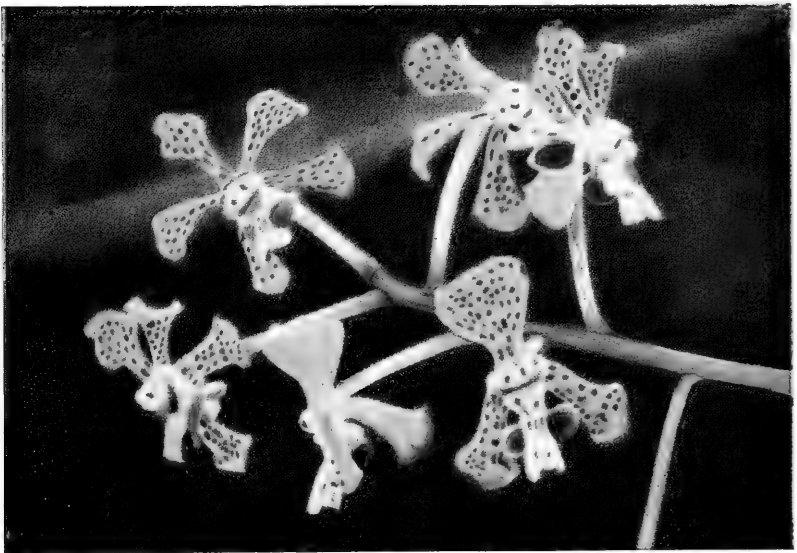
DENDROBIUM WARDIANUM.



DENDROBIUM NOBILE.



EUANTHE SANDERIANA.



VANDA TRICOLOR, *var. suavis*.



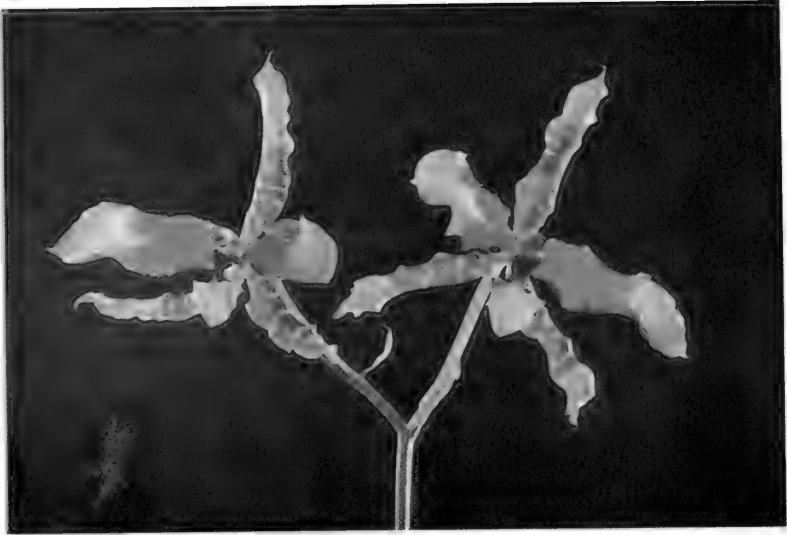
BRASSO-CATTLEYA. x. CLIFTONVILLE.



BRASSO-CATTLEYA. x. FABIA.



TRICHOPILIA SUAVIS. X. PANZ.



ODONTOGLOSSUM GRANDE.



ODONTOGLOSSUM. x. AURIGA.

AERIDES

This genus, one of the most charming, is indigenous generally to the eastern tropical countries of the Northern Hemisphere, although one or two varieties are sometimes found on the southern side of the Equator. Although found in tropical countries, they are dwellers in the higher altitudes, and this factor must be kept in mind when their cultivation is undertaken. All the species are epiphytes and are typical air plants. It is recorded that a plant of *Aerides odoratum* lived and flowered for years when suspended from the ceiling of a house in Cochin-China, although it was given no form of nourishment—not even water—during that period. It is obvious, therefore, that any potting compost used should be so open that an ample circulation of air is available to the roots at all times. Dr. A. L. Waddell, in one of his interesting books on Sikkim and Nepal, refers to *Aerides* growing upon “the dripping bark of tall Oaks, Ilex and Magnolias” at an elevation of from 6000 to 8000 feet above sea level. The month was October, which is the end of the rainy season in Sikkim.

The standard compost for the growing of *Aerides* is a mixture of large pieces of charcoal and corks up to about 1½ inches from the top of the pot or basket, the stem of the plant being firmly seated therein. The surface of the pot is then topped with a layer of sphagnum moss. The addition of peat or fibre and also of large pieces of well dried cow-dung are satisfactory variations. There is no reason why *Aerides* should not be grown on blocks or rafts. This method of treatment would allow of abundant watering at the right seasons without risk of damage—in any case, the drainage of any container must be free. As will be seen in the underlying tables of rainfall, some of these species get up to 100 inches of rain per month at certain times of the year in their native habitat. To give a potted plant this quantity of water would be to court disaster, but probably a blocked or rafted plant could stand it, providing air circulation was satisfactory. The species of *Aerides* most generally cultivated are:—

AERIDES CRASSIFOLIUM.

This is a virile species with a thick, upright stem, the leaves being extremely coriaceous, deep green in colour and about eight inches long. The flowers, which are numerous, are borne on long, drooping racemes. Sepals and petals rosy purple—lip deep purple. Sweetly scented. This species is fairly widespread, having been reported from Nepal, Sikkim, Bhutan, Assam and Upper Burma. Its requirements are very similar to those of *multiflorum*, but it needs rather less moisture in the Summer. It will stand bushhouse treatment all the year round in Brisbane, providing it is protected from cold draughts and frosts in the Winter months. As far south as Sydney, bushhouse treatment in the warmer months with removal to the glasshouse as soon as the cold weather commences in the Autumn. In places north of Brisbane it requires cool treatment all the year round. Watering must be reduced to a minimum in the Winter months, but providing free drainage is given it, unlimited water can be applied in the middle of Summer.

AERIDES CRISPUM.

A robust, fine flowering type of erect habit. Leaves flat and broad and about 8 inches long. Flowers about $1\frac{1}{4}$ inches in diameter. It is a native of Bombay District, India, being found on the Western Ghats at about 4000 feet and upwards.

The rainfall ranges as follows:—

January	$\frac{1}{4}$ inch	May	1 inch	September	11 inches.
February	$\frac{1}{4}$ „	June	$18\frac{1}{2}$ inches	October	$2\frac{1}{2}$ „
March	$\frac{1}{4}$ „	July	25 „	November	$\frac{1}{2}$ inch
April	$\frac{1}{4}$ „	August	14 „	December	$\frac{1}{4}$ „

Temperatures range—

January	40 to 71°	May	63 to 79°	September	57 to 72°
February	45 to 75°	June	58 to 80°	October	58 to 80°
March	52 to 76°	July	60 to 75°	November	56 to 80°
April	60 to 79°	August	58 to 73°	December	47 to 73°

It will be noted that the climatic conditions resemble those relating to *multiflorum*, but the resting or "limited moisture" period is longer and that not nearly so much water is desirable, even in the heat of Summer. This plant should do quite well in an ordinary bushhouse in Brisbane northwards throughout the year, providing that it is protected from dampness and frost. In the warmer regions of the North care must be taken to keep this plant in a cool position. In the South bushhouse treatment in the Summer, with a transfer to the glasshouse or to a warm corner in the Winter months.

AERIDES FALCATUM.

This hardy species was first reported from Coonoor in the Nilgiri Hills in Southern India. Its leaves are a peculiarly greenish blue colour and are about twelve inches long. Flowers on drooping racemes, sepals and petals white with crimson blotches at the apex. Lip has white sides with a rosy crimson centre, the front lobe being ciliated. Usually found at from 4000 to 6000 feet above sea level, growing upon tall trees, protected by foliage from noonday sun, but usually subject to early morning or late afternoon rays.

Rainfall.

January	3 inches	May	6 inches	September	$7\frac{1}{2}$ inches
February	2 „	June	8 „	October	10 „
March	2 „	July	5 „	November	8 „
April	$4\frac{1}{2}$ „	August	7 „	December	$4\frac{1}{2}$ „

Temperatures.

January	51° to 77°	May	61° to 85°	September	59° to 80°
February	53° to 78°	June	60° to 83°	October	58° to 79°
March	54° to 83°	July	59° to 80°	November	57° to 76°
April	59° to 82°	August	59° to 78°	December	52° to 77°

For Australian conditions the culture recommended for *Aerides crispum* should

be satisfactory. By conning the tables given, it will be seen that, from the beginning of Winter until the Spring, little water is necessary—an occasional wetting on sunny Winter mornings being sufficient to prevent wilting or shrivelling of the stems and leaves. In Spring and Summer the amount of water should be progressively increased, the quantity being reduced in Autumn. At all times *falcatum* needs much less water than *multiflorum*, *crassifolium* or *crispum*, but, so long as there is a free circulation of fresh air, excess watering will not do any damage. Flowers in middle of Summer.

AERIDES FIELDINGII

This is one of the finest species of the genus. Plant grows to about two feet in height with dark green leaves about 8 to 10 inches long and thick and fleshy in texture. Flower racemes (which are occasionally branched) grow to a length of two feet or over and carry numerous large flowers with sepals and petals white and mottled with bright rose, the lip being rose coloured. The flowers are delicately fragrant. The plant is a native of the hills of Assam, Sikkim and Upper Burma, growing at a height of from 6000 feet to 8000 feet above the sea level, generally on tall oak trees.

The treatment required is largely that suggested for *multiflorum* and *crassifolium*, but this species can stand a somewhat greater degree of cold, providing it is kept dry during the Winter months. Sufficient water must be given to prevent shrivelling and it is desirable that, when watering is necessary during the cold weather, this be done early or on bright mornings. In the Summer months almost unlimited water may be applied.

Rainfall and Temperature.—Statistics are so close to those given for the species above referred to that it is not necessary to recapitulate them. Flowers during middle and late Summer.

AERIDES HUTTONII. *Native of Celebes and Borneo.*

A compact species with typical stems and light green leaves about 6 inches long. Flowers produced on axillary racemes a foot in length. Sepals and petals rose-pink. Lip white. Flowers in Autumn and lasts three weeks.

AERIDES LAWRENCEAE

A rarely met with species which may be called a gigantic form of *odoratum*, which it greatly resembles in shape and colour. Treatment as recommended for *odoratum* is suitable for this species, which blooms in late Summer and Autumn.

AERIDES LINDLEYANUM

A variety of *crispum*—which see.

AERIDES MULTIFLORUM

Which is synonymous with *Aerides affine* and *Aerides roseum*. This is a rather small growing plant, its leaves being about 12 inches long, pale green in colour and leathery in texture. The racemes, which are erect and often branched, carry numerous flowers which range in shade from about white to pink and rose,

with rose coloured spots. The spur is short and is generally more deeply coloured than the sepals and petals. It is a native of the mountains of Sylhet and Nepal in Northern India and grows at an elevation above sea level ranging from about 4000 to 7000 feet.

The rainfall per annum is as follows:—

January $\frac{3}{4}$ inch	May 45- 50 inches	September 35-40 inches
February $2\frac{3}{4}$ inches	June 95-100 „	October 17-22 „
March 8- 9 „	July 100-105 „	November 2- 5 „
April 25-30 „	August 80- 85 „	December about $\frac{1}{2}$ inch

The temperature range is as follows, the figures given being the lowest mean and the maximum registrations for the particular months:—

Jan. (Winter) 41-67°	May 54-80°	Sept. (Autumn) 64-77°
February 44-71°	June (Summer) 63-77°	October 57-76°
March (Spring) 47-75°	July 63-82°	Nov. (Winter) 46-70°
April 50-81°	August 63-78°	December 43-70°

The plants grow high up on tall trees and they receive shade from the foliage of their harbouring tree during the greater part of the day, but in the early morning they often have the direct rays of the sun.

It is apparent, therefore, that in Brisbane and places further north, cool bushhouse treatment is necessary, particularly in the Summer months. In those parts of Brisbane where the Winter temperature falls below about 40 degrees it will be desirable to get it under cover of glass for the midwinter period, and, in places south of Brisbane, for probably the whole of the Winter months. If attempts are made to grow it in North Queensland the coolest possible part of the bushhouse must be used for it, except, of course, on the higher tablelands.

Watering should be practically eliminated during the Winter, should commence gradually with Spring, be profuse in Summer, and then slacken off in the Autumn until the circle is complete. Even in Winter time, however, sufficient water should be given to prevent the shrivelling of the leaves.

AERIDES ODORATUM

This is probably the best known and most generally grown species of the genus. It is of a wide distribution, being found in India, Sikkim, Assam, Siam, Burma, China and Cochin-China. It is a hardy species with leaves about seven to nine inches long, strap-shaped, recurved and dark green in colour. The racemes are long and pendulous. The flowers are numerous and of good size. Sepals and petals creamy white, deepening in colour with age, tipped with purple. The lip is three-lobed and somewhat richer in colour. The spur is conical and incurved.

As will be realised from its wide range of distribution, it is a very adaptable species and will thrive under very varying conditions. It is amenable to ordinary bushhouse treatment in Brisbane and northwards, but requires slightly warmer treatment in the South. Little water is desirable in the colder months, but during the Summer plentiful supplies can be given.

AERIDES QUINQUEVULNERUM

This species has proved somewhat of a difficult subject in the past, as after a year or two it loses its leaves and dies. Plant somewhat like *odoratum* in appearance, but is distinguishable by the habit of its leaves in clasping the stem of the plant. Flowers also resemble those of *odoratum* but are distinguishable by five reddish-crimson blotches on the sepals and petals, from which it gets its name. Lip is funnel-shaped, and the spur is green in colour and conical in shape. The flowers are sweetly perfumed, their scent resembling that of "Lily-of-the-Valley."

It is a native of Mindanao (Philippine Islands), Sumatra, Borneo and Timor, in all of which islands it grows upon tall trees on the interior ranges at a height above sea level ranging from 4000 feet to 6000 feet. The climatic conditions in each of these islands are somewhat similar, i.e., on the coastline the temperature never falls below 69° to 70° nor rises above 90° to 95°. At the elevation at which their native growth takes place the mean average range of temperature would be from approximately 57° to 78°.

The rainfall varies considerably. In Timor it reaches fourteen inches in February, and falls to about half-an-inch in Midsummer; in Mindanao the rainfall is not so diverse, as the minimum average rainfall for any month is August 2 inches, while the maximum falls occur in October and November, when about 8 inches are averaged. In Borneo again the rainfall is fairly heavy throughout the year, the lowest average rainfall being in April, when 5 inches is the mean, in May, June and July, the dry season, about 7 inches is the average, while from September to February the rainfall ranges from 11 to 20 inches.

It would seem that the best treatment for this species is to grow it in a glass-house close to the roof—preferably suspended over a fish pond where the evaporation will keep the plant moist. In the South hothouse conditions will be necessary, particularly in the Winter months.

AERIDES ROSEUM

See *multiflorum*.

AERIDES VANDARUM

This species resembles *Vanda teres* in appearance of the plant, but is slenderer in form. It bears two to three large blooms on short spikes. Sepals and petals pure white. Lip three-lobed with erect sides. The spur is long and straight. This plant grows well on a board or raft or in a shallow basket. It is a native of Coimbatore in the Nilgiri Hills, Southern India, where it grows on the trees in the humid and shady forests on the mountain slopes.

Throughout the year the temperature never falls below 70° and rises throughout the Summer months to 90° to 92°, while in Winter the maximum temperature is generally about 84° to 86°. Rainfall is fairly constant throughout the year, though in Winter time it is not so copious, as it falls to about two to three inches per month, whereas the Summer rainfall ranges from six to nine inches.

It is obvious that this plant will require warm, shaded and moist treatment.

Probably the best method is to attach it to a block of tree fern or a raft, and hang it in the moistest part of a glasshouse—an umbrella-like shade over the plant may help to reproduce its natural conditions somewhat.

AERIDES VIRENS (a form of *A. odoratum*).

A Javanese species with long strap-shaped, channelled and recurved leaves. Racemes long and drooping. Flowers numerous and fragrant. Sepals and petals peach-coloured with purple tips. Lip large, white, dotted with crimson, side lobes toothed. Flowers late Spring and Summer. (var. *Dayanum*. Flowers larger and brighter in colour).

Temperature 60° minimum to 80° maximum. Being so close to the Equator the temperature of Java is one of great evenness, the total variation between Summer and Winter being not more than four degrees, both in minimum and maximum. Rainfall is fairly copious throughout the year, in some parts the minimum average being about three inches in the driest month. On the north-eastern point of the island, however, there is somewhat less rain than on the southern and western coasts, the inland highlands being responsible for this. *Aerides virens* is found on the jungle clad slopes of the hills, usually on tallish trees, which protect it from the midday sun.

The species will grow well under bushhouse conditions in places north of Brisbane and even in the warmer parts of that city. In the colder parts and in places south of Brisbane, glasshouse and hothouse treatment is desirable. Copious watering is desirable during the warm months, and the plant should not be allowed to become quite dry, even in Winter, although a minimum of water is necessary at that period.

ANGRAECUM and ALLIED GENERA

This genus comprises some of the most interesting and remarkable orchids known. Most of the species are natives of the east coast of Africa and Madagascar. They are epiphytes and all the species have an extensive root system necessitating ample pot room.

The usual compost is made up of large pieces of broken crocks and charcoal and a topping of sphagnum moss. The addition of osmunda, todea or cocoanut fibre and large pieces of dried dung will be found advantageous.

All the species grow naturally in a humid atmosphere. Generally speaking, only *eburneum* and *sesquipedale* are grown here, but all the species dealt with herein are worth growing if they can be had. Unfortunately, the members of this genus are not good travellers, so that although the plants are plentiful in their native regions, they are not easy to obtain in Australia.

ANGRAECUM EBURNEUM

One of the varieties usually grown by orchid cultivators in Australia. A large robust species which grows to a height of three feet or more. It has long, thick, coriaceous leaves of a lightish green shade. The flower spikes are produced in Spring and early Summer from the lateral nodes and grow perpendicularly. They are rigid and produce a large number of good-sized blooms, the sepals and petals of which are rather narrow and of a green shade, the lip being heart-shaped and pure white in colour. The flowers last for about eight weeks in perfection and they retain their fragrance throughout this period. It is a bad traveller, but once established gives no trouble.

This species can stand a somewhat larger variation of temperature than *L. caudatum*. In its native condition the temperature range is between 56° F. and 95° F. In suitable locations in Brisbane and northwards, bushhouse treatment will serve, but in the colder parts it should be transferred to a glasshouse during the Winter months. South of Brisbane glasshouse treatment is necessary all the year with heat in Winter. The usual water conditions apply. In Winter the amount of water given should be just sufficient to prevent wasting of the plant—in Spring commence to water regularly, making a gradual increase until midsummer, when the amount of water applied should be copious; gradually decrease during the Autumn to the completion of the circle. The necessary quantity must be determined by the conditions in each case—if your orchid house is naturally moist, less water need be given—if dry, more must be given.

ANGRAECUM SCOTTIANUM. *A native of the Comoro Islands, between the African Mainland and Madagascar.*

A small plant with twelve leaves about four inches long and deep green in colour. Flowers in pairs on short spikes. Sepals and petals white, lip large and pointed. Spur six inches long and yellow. Flowers are about two inches across and bloom in midsummer. The Comoro Islands are low-lying, not exceeding 600 feet above sea level at the highest part.

The temperature range is as follows:—

	temperature	rainfall		temperature	rainfall
January	70° to 99°	12 inches	July	50° to 86°	2 inches
February	72° to 97°	12 „	August	52° to 88°	2 „
March	64° to 95°	8 „	September	55° to 97°	2 „
April	64° to 91°	3 „	October	61° to 97°	3 „
May	60° to 91°	2 „	November	63° to 99°	5 „
June	52° to 90°	2 „	December	68° to 99°	12 „

The climate of these islands is humid and this *Angraecum* should be given a place in a glasshouse in a moist position. Heat is desirable. It should be hung as near to the glass as is possible without scorching the foliage. *Scottianum* should be a good subject for growing on a block of tree fern suspended over a fish pond.

ANGRAECUM SESQUIPEDALE

This is undoubtedly the finest of the genus. It is a tall, stout plant growing to

four feet—the leaves are deep green, keeled and clasp the stem. They are about one foot in length and are bilobed at the apex. The flower spikes grow from the axils of the leaves and usually carry up to four flowers to the spike. They are a waxy ivory-white in appearance, and are approximately six inches across. The lip is large and heart-shaped, and the spur is as thick as a lead pencil, and up to eighteen inches long. Flowers appear in the Winter or early Spring. A native of Madagascar, it grows under conditions identical with those of *eburneum*, and the directions and data given for that species apply in all respects to *sesquipedale*.

In the December 1937 issue of "The Australian Orchid Review" is an interesting article contributed by Mr. E. P. Firth, of Kenya, Equatorial Africa. The writer states that *Angraecums* are found there at elevations of from 4000 to 8000 feet, growing in dense shade. Apparently the *Angraecums*, like many other orchid genera, have adapted themselves over a wide range of climatic conditions. The Madagascan varieties all grow on the lower elevations in well lighted conditions. This variation of natural conditions is common to many genera, particularly *Dendrobiums*, *Cypripediums*, *Cymbidium*s, *Cattleyas*, and *Vandas*. An important point to be remembered is that mere elevation does not necessarily mean cool conditions. A valley or glen at 8000 feet may be much hotter and more humid than a plain or hill of only a few feet elevation in the same latitude. It is, therefore, desirable to know where all plants cultivated actually come from and under what conditions they and their forebears have lived.

AERANGIS ELLISII (syn: *Angraecum Ellisii*).

This is one of the prettiest of the smaller species. A native of Madagascar, it grows to a height of about twelve inches and carries five to six pairs of leaves each about ten inches in length, being broad and tongue-shaped, bilobed at the apex, and a bright green in colour. The flower spikes are about eighteen inches long and are arched. They carry a number of pure white flowers each about two and a half inches across. They have a white spur about six inches long. The flowers appear in the Autumn and are very sweetly scented. Like other members of the family, they grow on sparsely foliated trees on the edge of the forests of the coastal areas, and are rarely found at an elevation above 1000 feet from the sea level. The cultural directions set out for *eburneum* apply in all respects to this species.

LEPTOCENTRUM CAUDATUM (syn: *Angraecum caudatum*). A Native of Sierra Leone.

Plant grows about a foot high—leaves strap-shaped and recurved, and about 10 inches long. Flower spikes have blossoms arranged in two parallel rows. Sepals and petals vary from deep yellow to dark brown. Lip large and pure white with a long, projecting point. Spur about nine inches long and coloured brown. Flowers in late Summer and Autumn. Temperature:—

January	67° to 92°	May	69° to 91°	September	69° to 87°
February	68° to 91°	June	69° to 89°	October	68° to 88°
March	71° to 92°	July	70° to 89°	November	68° to 90°
April	71° to 93°	August	69° to 86°	December	68° to 90°

It will be seen by this table that the plant is accustomed to warmth all through the year, with a temperature falling very little below 70° at any time. In the Summer months the Brisbane climate would allow the species to be grown in a bushhouse, but in the Winter—at least glasshouse, and preferably hothouse, treatment is desirable. In Sydney, glasshouse in the Summer, and hothouse in the Winter are essential.

Rainfall.—Sierra Leone is much drier than Brisbane in the Winter and much wetter in the Summer. For the four midwinter months very little applied water should be given, but, commencing with the Spring, the quantity can be quickly increased until in Summer it can literally be poured on the compost.

The *Angraecums*—unlike the *Aerides*—do not grow upon the higher elevations. They are found generally on straggling trees on the edge of the coastal forests. They enjoy plenty of sunlight. Ellis reports that during his visits to Madagascar and Sierra Leone he saw many *Angraecums* growing in the thick leaf-mould at the foot of trees. These plants looked healthier and better than those growing on their parent trees, but he adds that he never saw one of the plants which grew in the leaf-mould either in flower or showing signs of having flowered—whereas the straggling plants on the trees were laden with blooms or old flower stems.

ANGULO A

This genus, related in form to the *Lycastes* and the *Odontoglossoms*, is a terrestrial orchid found in the forest glades of Central America, and parts of northern South America. From the shape of the flower they are often called “The Tulip Orchid” and they resemble tulips also in their bright colourings, which are mostly the primaries, Red and Yellow in various tones. They are not grown in Australia to any extent, but as our natural conditions in Queensland are not greatly different from those of their natural homes, there appears to be no reason why they should not be represented in our collections, apart from the fact that they are poor travellers except in an established condition. Therefore, it would be well for intending importers to arrange to have the plants well established in pots before shipment is made from American ports. If shipment is made during the months from November to January—the plants’ natural resting period—they will be travelling while dormant and should have time to become acclimatised before our own Winter commences. After this additional rest they should flower during the ensuing Spring and Summer seasons.

They will grow in a compost of charcoal and crocks, but a more suitable medium

is a mixture of turfy loam, peat and dried dung—say, one fifth dung and the other components in equal parts of the balance.

The temperatures to which they are accustomed range from 60° to 86° in the middle of Winter and from 67° to 93° in the middle of Summer.

They should be kept damp throughout the year. In Winter, however, care should be taken to prevent water from lodging in the undeveloped growths as this may lead to damping off. In Summer they can stand ample water, both overhead and applied to the compost. In their native haunts the atmosphere is sultry during the Summer months. They like plenty of light, but should be protected from too direct sun rays. In the warmer parts of Brisbane—and particularly north of that city—they will grow in an ordinary bushhouse, but in the colder parts glasshouse treatment is desirable, especially in the Winter months.

The species best suited for cultivation are *Clowesii* (Yellow), *Ruckeri* (red), and *uniflora* (Cream). *Clowesii* is the hardiest and most popular, but *Ruckeri* is very fine.

Anguloa Clowesii has been crossed with *Lycaste Lawrenceana* and the resultant plant is listed as *Angulocaste vesta*.

ANSELLIA

This is an African orchid which grows like a *Dendrobium* and has flowers like a *Cymbidium*. The best species is *Ansellia Africana*, which has pseudobulbs growing to a height of four feet. The leaves are about twelve inches long and have prominent ribs. It has long branching panicles, each producing fifty or more flowers, which last, in perfection, for about six weeks. The flowers are pale yellow with brownish or red spots.

It is a native of Sierra Leone, on the west coast of Africa. Being close to the Equator, Sierra Leone has a very even climate, there being little difference between the Summer and Winter temperatures. *Ansellia* would require glasshouse treatment in Brisbane and south, with heat desirable in the Winter, but from Rockhampton north it should do well enough under bushhouse conditions.

The average monthly rainfall in Sierra Leone is:—

January	½ inch	May	11½ inches	September	28 inches
February	½ „	June	20½ „	October	13 „
March	1½ inches	July	36 „	November	5 „
April	4½ „	August	37 „	December	1½ „

It will be seen from this that little water should be applied in the Winter months, but, as soon as Spring commences, watering should increase rapidly, until in the Summer very copious quantities can be given the plant. As the weather cools the quantity will gradually diminish again.

Compost as for *Dendrobium*s. A little good leaf-mould and moss make a satisfactory addition. Pot high, firmly, and stake securely. Provide ample drainage. Use well shredded peat, osmunda fibre, todea fibre or cocoanut fibre, either singly or mixed.

ARACHNIS

A small but very interesting genus of epiphytical plants found in the Moluccas—particularly Java and Borneo. They are closely allied to the *Renantheras* and the *Vandas*, with which genera some of the species have been included from time to time. The type species is *flos-aeris*, whose spider-like flowers gave the genus its name. They are found in the tropical jungles generally growing upon the lower branches of the trees, but sometimes on rocks and cliffs.

They are usually regarded as rather difficult subjects for cultivation, probably due to wrong treatment. The principal species are:—

ARACHNIS FLOS-AERIS (Syn.: *Arachnanthe moschifera*).

The type species. Growth similar to *Hookerae*. Flowers are large and of a yellowish white to lemon colour, spotted with purple, spider-like in form. They have a strong musk-like scent and last for seven to ten weeks in perfection. Cultural conditions are similar to those presented for *Arachnis Hookerae*.

ARACHNIS HOOKERAE.

This plant is something like an *Epidendrum Boundii* in appearance, but the stem is much thicker and the leaves longer and more leathery in texture. It grows to a height of from eight to ten feet and throws flower spikes from the upper nodes. These spikes are long and loose and usually carry up to fifteen or twenty flowers 2½ to 3 inches across, somewhat spider-like in form, coloured orange with reddish to purple spots. It has a lavender-like scent. A native of Java and Borneo, it requires consistently warm treatment. The variations of temperature and rainfall are:—

	temperature	rainfall		temperature	rainfall
January	73° to 91°	13 inches	July	70° to 89°	3 inches
February	73° to 91°	13 „	August	71° to 89°	2 „
March	73° to 91°	8 „	September	71° to 92°	3 „
April	72° to 91°	5½ „	October	72° to 92°	4 „
May	72° to 91°	4 „	November	73° to 92°	6 „
June	71° to 90°	4 „	December	72° to 91°	9 „

It will be seen from this table that to have any chance of success this species must be grown in a glasshouse in Brisbane, with heat in the Winter months. In

Sydney it will require heat for most of the year. In North Queensland, on the hot coastal belt, it should do well enough in an ordinary bushhouse or even in the open on a suitable tree. It likes light, but should be protected from the too direct rays of the sun. It must never be allowed to become dry and in Summer will appreciate copious watering. Actually it needs a warm moist atmosphere. Like most epiphytes, it absorbs most of its nourishment through the numerous aerial roots it sends out; therefore its pot is merely a convenient harbourage.

The plant may be set in a compost of charcoal and crocks, with a cleaned old bone or two. A layer of peat or fibre topped with sphagnum moss will help to conserve moisture. A tall, broad hardwood stake firmly fixed in the centre of the pot will provide a suitable support around which it will wrap its roots. If these directions are carried out growers should have a reasonable chance of succeeding with the species.

ARUNDINA

This is a small genus of grass-like terrestrial orchids, only two of the known species of which are very suitable for orchicultural purposes. These two species are well worthy of growing by those who can give them something approaching their natural requirements. Unfortunately, the difficulty of transporting them from their native habitats sufficiently quickly to enable them to be started before they have perished has been one of the greatest barriers against them. With the speeding up of aerial transport between Northern India, Borneo and Java, where they originate, this barrier may be overcome. The plants require a compost as follows:—

Two parts good fibrous turf, two parts good leaf-mould, one part clean sand, and two parts well dried cow-dung. Mix well and plant in pot with plenty of good drainage and mix in a few pieces of clean wood charcoal to prevent souring of the compost.

Keep the compost damp even in the resting period, and give copious water during the growing period. The species best suited for culture are:—

ARUNDINA DENSA. *Native of Singapore, Borneo, Java, etc.*

Stems three feet high or taller. Leaves narrower and more pointed than those of *graminifolia*. Flower heads more compact than in that species. Flowers have violet sepals and petals, and labellum has a deep crimson border. Very sweet scented. Compost and growing conditions similar to those suggested for *graminifolia*.

In North Queensland both species of this genus could be grown without any difficulty in the bushhouse or even outside in a shady place. In Brisbane, bushhouse treatment would do in the warmer areas throughout the year, providing the plant is sheltered from draughts and chills in the Winter months. In the cooler parts of the City it would be desirable to get it under glass for the mid-winter months. In Sydney, glasshouse treatment would be desirable for the greater part of the year, as the variations in temperature are greater there than is the case in Queensland.

ARUNDINA GRAMINIFOLIA (syn: *Arundina bambusifolia*). A Native of Northern India, Nepal, Burma, the Moluccas, and occasionally met with in the Celebes.

Stems reed-like, from three to five feet high, with sword-like (ensiform) light green leaves, the appearance of the plant resembling that of a bamboo. The flowers issue from the apex of the stems in a short spike and are like a small variety of *Cattleya*, both in shape and in colouring. Sepals and petals approximately vieux-rose in colour, the lip being a deeper shade lined with orange and generally with a white throat. Although spread over a wide range in their natural state, in each country where they are found they frequent the same type of place—a glen where the atmosphere is moist and hot and where, although they have plenty of light, the direct rays of the sun are broken before they reach the plant. There seems to be no reason why this plant should not become acclimatised and later be grown in the herbaceous border of our Queensland gardens just as the *Epidendrums* we grow here are sometimes treated.

BLETILLA

Another terrestrial genus of the *Epidendrum* tribe, akin to the *Calanthes*, *Phaius* and *Arundinas*, and related to the *Brassavolas*. Although there are many species of wide distribution only two of them are worth cultivating, the others being primarily of academic botanic interest.

They are very hardy and are easily acclimatised. Some years ago quite a patch of them was to be seen growing like a native plant at French's Forest, outside Sydney. How they were started there is not known, but they flourished exceedingly until the vandals got to work and rooted them up. Now there is no sign of them. However, this shows that they can be adapted for ordinary garden culture in Australia.

For pot culture they like a reasonably rich compost and the one recommended for *Arundinas* should suit them admirably. Ordinary bushhouse culture will suit them right from Sydney to Brisbane and a little further North. In the

far North it will be necessary to provide cool treatment, though they soon accustom themselves to changed conditions. The two species worth growing are:—

BLETILLA STRIATA (syn: *Bletia byacintbina*). Native of China and Japan. A fine plant somewhat resembling *Calanthe veratrifolia* in appearance, but deciduous. Flower scapes about a foot long, each carrying a number of blooms. Sepals and petals rose-purple. Lip purple with white and red bands and a broad edge of deep crimson.

BLETILLA STRIATA, var. *alba* (syn: *Bletia byacintbina albo-striata*). Similar in all respects to the above except that the nerves are white, creating a rather lovely striped effect. Both species flower freely and two or three of each of these plants placed together make a fine show of colour when in full bloom.

BRASSAVOLA

A genus of epiphytcal plants allied to the *Cattleyas*. Although a number of the species are quite beautiful, only two of them are grown to any extent in Australian collections, and of these one (*Glauca*) is only very rarely seen.

This species, and more particularly species *Digbyana*, have been used to make the well known *Brasso-Cattleya* hybrids.

In Brisbane (and certainly in North Queensland) they will do well enough in a bushhouse, but the extra warmth given by a glasshouse tends to quicken development. They need plenty of light and so should be suspended as near to the roof as possible. In Sydney it may be desirable to transfer to glass for the Winter. Like all the *Cattleya* group, a defined resting period is needed for their well-being. The growing period commences in Spring and, so soon as the new growth has commenced to show its roots, water should be applied, increasing in quantity throughout the growing period. When the pseudobulb has reached full growth, a sheath will appear at the top (in well grown plants) from which a single large flower should spring. Watering may continue copiously until the flower has opened, but care should be taken to see that water does not lodge in the sheath in badly ventilated houses, as there is then a possibility of "damping off." When the air circulation is good there is little risk of this.

The plants of this genus grow well either in a pot, a basket, or on blocks of hardwood or tree fern. When potted see that ample drainage is given, with the crocks placed on edge to allow of free passage of excess water. For compost, either osmunda, todea or polypodium fibre (or a mixture of two or all of these), rammed firmly into the container, makes a suitable growing medium. The plant should be potted firmly and a topping of sphagnum moss will help to conserve moisture. Care should be taken to see that all dead or diseased or broken roots are removed. The fibre may be chopped finely and mixed with fine cut sphagnum moss; or it

may be placed in the pot in lumps or rolls and rammed into a compact mass. High potting is advantageous.

BRASSAVOLA DIGBYANA. *Native of Honduras.*

Short, stout pseudobulbs, each carrying one thick, fleshy, grey-green leaf about six inches long. Sepals and petals pale green, lip variable, but generally creamy-white with a well fimbriated lip. This fringe is an outstanding characteristic of the flower and its influence is generally plainly seen in the hybrids bred from it. Another character generally noted in the *Brassavola-Cattleya* cross is the livid green throat the resultant flowers show. The climate of Honduras does not differ greatly from that of Brisbane, though it never becomes quite so cold there as it does in our midwinter months. The rainfall is much greater during the Summer than in Brisbane, however, as the following table will show.

	Brisbane			Honduras		
January	656	points av.	Summer	28	points av.	Winter
February	656	” ”	”	28	” ”	”
March	588	” ”	Autumn	52	” ”	”
April	384	” ”	”	232	” ”	Spring
May	284	” ”	Winter	692	” ”	”
June	284	” ”	”	1320	” ”	Summer
July	224	” ”	”	1192	” ”	”
August	204	” ”	Spring	1228	” ”	”
September	204	” ”	”	1172	” ”	Autumn
October	254	” ”	”	1068	” ”	”
November	380	” ”	Summer	152	” ”	Winter
December	496	” ”	”	52	” ”	”

BRASSAVOLA GLAUCA. *Native of Mexico and Guatemala.*

Pseudobulbs like *Digbyana*, but leaves much longer. Flowers from sheath. Sepals and petals pale green, lip pure white, with pink streaks in throat. Cultural conditions similar to those for *B. Digbyana*—but can bear a greater degree of coolness and also needs less water in the Summer months.

BRASSIA

An interesting genus of the *Oncidium* group, having large spidery flowers. They are natives of the tropical forests of Brazil, Ecuador, the West Indian Islands, and the Guianas. Although there are many species, they are not much grown here, but American growers and many English and Continental orchid lovers have representatives of the genus in their collections. They have not the same

beauty of form as their cousins, the *Oncidiums* and *Odontoglossums*, nor do their flowers have the same vividness as the plants of the allied genera. They have a fairly wide range of distribution over varying climatic conditions. Some species come from the mountain ranges at elevations ranging from 4000 feet to 7000 feet, while others come from the tropical jungles where there is always a humid moistness in the Summer, and very little diminution of the heat in Winter. It is therefore essential to ascertain from what particular class of country your plants have been procured. It happens, however, that the more popular species are those of warm origins, so that, generally speaking, in Brisbane, glasshouse conditions would be satisfactory, and even a warm corner of a bushhouse in the Summer months. In the North (except on the tablelands) bushhouse treatment all the year round would serve. In places south of Brisbane glasshouse treatment will be necessary, with heat in the Winter months. They need regular and plentiful supplies of water right through the growing period, but during the resting period only sufficient water to keep the compost from drying out should be applied. The usual compost is peat fibre topped with sphagnum moss.

The best species are:—

BRASSIA GIREOUDIANA. *A native of Costa Rica.*

A vigorous grower, lending itself to relatively easy cultivation. Pseudobulbs are thick, more or less rectangular, fining towards the sides. Leaves light green, wedge-shaped at base and pointed at the apex. Flower spikes long and branched, bearing many blooms, each about two to two and a half inches across, and of a bright yellow spotted with red. Costa Rica has a temperature range in its coastal area (up to 2000 feet above sea level) of 50 degrees, as the Winter mean, to 99 degrees the midsummer maximum average. Rainfall is scanty throughout the colder months, but is abundant in the Spring and Summer, about thirteen inches being the average rainfall in June, the midsummer month.

BRASSIA GUTTATA (variety of *B. maculata*, which see). *Native of Guatemala.*

Plant resembles *Gireoudiana*. Flower spikes about three feet long. Sepals and petals yellowish green with brown markings. Lip bright yellow with brown spots. The lip is broad and spoon-shaped. The climatic and rainfall conditions of Guatemala are so close to those of Costa Rica, given above, that it is not necessary to detail them here.

BRASSIA LAWRENCEANA. *A Native of Brazil.*

From the humid forests around the Rio Negro. A fine species with bright yellow flowers, the sepals and petals being tinged with green at the base with prominent red and brown spots, sweet scented. This species requires warmer conditions than those previously mentioned. It also likes rather more water during Autumn, but, as is typical of the genus, the Winter watering should be restricted to a bare sufficiency to avoid withering of the pseudobulbs.

BRASSIA MACULATA. *A Native of Jamaica.*

The type species. Spiderlike in form, its flowers are produced in quantity on racemes from 18 inches to two feet in length. They are of good size, the sepals and petals being creamy yellow with Indian-red spots, the labellum being white with a purplish tint at the throat, rounded in shape with a hard stiff point at the apex.

This species requires similar treatment to that of *Gireoudiana*, but needs much less water throughout the year.

BRASSIA VERRUCOSA. *A Native of Guatemala.*

This (and particularly its variety *grandiflora*) is the finest of the *Brassias*. The flowers, which are numerous and borne on long scapes, have sepals and petals of green and white in varying quantities, with blotches of deep purple verging on black. The lip is white and is covered with small green "warts." Treatment as prescribed for *B. Gireoudiana*.

BULBOPHYLLUM

A large genus, but the flowers are more valuable from a botanical than a horticultural standpoint. There are many Australian species, but with the possible exception of *B. Wienthali* (which is very rare), they are not usually included in growers' collections. For those who like to include one or two specimens I would suggest that the best method of growing them is by attaching them to blocks of wood with a little moss or peat, and suspending them in a bushhouse where they will obtain reasonably warm conditions and plenty of moisture. Those from tropical areas will naturally require more heat than those from the southern latitudes.

CALANTHE

A large genus of, generally, terrestrial orchids which are easily grown and flowered. Their range is from Northern India, through Burma, Siam and Malaya, to the Celebes and Australia, with a few varieties in China, Japan and America. They are of two types—deciduous and evergreen.

The deciduous type produces its flower racemes from the pseudobulbs after they have reached full development and have shed their leaves. After flowering they should then be given about four months rest before they are again started into growth. The best way to do this is to lay the pot on its side in a dry corner of the house so that no water can reach the plants. Usually early in Spring a new

growth or two will be seen at the base of the old bulb. When this is about $\frac{1}{2}$ to 1 inch long watering can be recommenced. By reason of their vigorous root growth they are best suited by a rich compost consisting of loam, leaf-mould, and well rotted dung in about equal quantities. Good drainage is necessary, and ample room should be provided for root growth. Many growers repot annually. If a plant has flowered, I believe in repotting the next Spring. But where for any reason no bloom has been produced I prefer to leave the plants undisturbed for two successive years. Frequently the richness of the compost, and perhaps a slight variation from normal weather conditions, cause the plant to expend all of its effort in the development of strong bulbs. If these are left undisturbed they almost invariably flower the following Summer or Autumn, whereas, if they are repotted in a further rich compost, they again make an extraordinarily large bulb at the expense of flowers.

The evergreen species do not require so defined a resting period, and, if water is applied just sufficiently to prevent the compost from becoming dry, they will carry over quite well. They do not require repotting as often as the deciduous type and, providing they are planted in a reasonably large pot or pan in good compost, they will go for three years without repotting, particularly if weak liquid cow manure is applied, say fortnightly, after seasonal growth has got well under way. This genus has had the attention of skilled hybridisers and as a result some of the hybrids are better known and are more often grown than many of the species.

CALANTHE FURCATA. *Native of Java, Borneo and the Philippines.*

One of the evergreen type. A large plant with long ovate leaves with deep fan-like folds. Flower spikes long (about 2ft. 6ins. to 3ft.), bearing numerous flowers, creamy white in colour. Very like our native *veratrifolia* in shape, but having larger lateral lobes in the labellum. Requires moist, warm conditions with ample water in Summer. Flowers in Summer and early Autumn. Should grow in bushhouse in North Queensland, but prefers glasshouse treatment in Brisbane and hothouse in the South.

CALANTHE MASUCA. *Native of Nepal, Sikkim, and Southern India.*

A beautiful species of the evergreen type. Although found in Nepal and Sikkim, it inhabits the deep gorges where the temperature is humid and moist. Flower spike about half-a-yard or more in length. Blooms plentiful. Sepals and petals deep violet in shade, becoming lighter to a lilac tone with age; lip rich purple. Blooms in midsummer. Same treatment as prescribed for *furcata*.

CALANTHE ROSEA. (Syn. *Limatodes rosea*). *Native of Moulmein (Lower Burma).*

This plant is really a member of the small genus *Limatodes*, but as it is usually referred to as *Calantbe rosea* I have included it here. A deciduous species, the flower spikes being developed plentifully from the base of the matured pseudobulbs after the leaves have been shed at the approach of Winter. The flowers are

variable in colour from white with a pink blush to a dark rose. The pseudobulbs are somewhat spindle-shaped and are about 5 or 6 inches in length. The leaves are broad, pointed, heavily ribbed and veined, and of a deep green colour. These plants are indigenous to the comparatively low jungle country between the coast and the mountain range which runs through Burma to the Malay Peninsula. The climate is humid and warm through the greater part of the year. Even in mid-winter the minimum temperature rarely drops below 63 degrees Fahr., and in the Summer the temperature range is from 72° to 100°. Obviously, therefore, it will require glasshouse treatment at least in Brisbane and a hothouse will be essential southwards. In Townsville and other northern warm areas it should do well enough in the warmer part of a bushhouse. During the Winter months no water should be applied, but during the growing period (Summer) it can absorb unlimited quantities.

CALANTHE SIEBOLDI. *Native of Japan.*

Evergreen type, of small growth. Leaves broad, plaited and dark green. Spikes short and erect. Flowers on racemes from spike. Sepals and petals bright yellow and sometimes of a brownish shade. Lip cream to golden. This species is found at from 1200 to 3000 feet above sea level near Kyoto in the Island of Honshu (Japan). It is probably found in other parts of the island, but the only authoritative statement I have been able to obtain is as above. The Japanese climate is one of a wide range of temperatures. At Kyoto the temperature range and average monthly rainfall are as follows—

	Temperature		Rainfall		Temperature		Rainfall
	from	to	Inches		from	to	Inches
January	22°	60°	2½	July	60°	93°	8
February	22°	57°	2½	August	60°	92°	6
March	25°	72°	4½	September ...	50°	92°	8
April	31°	83°	6½	October	41°	80°	5
May	39°	85°	6	November ...	40°	75°	3
June	50°	89°	9½	December ...	24°	60°	2

It is obvious, therefore, that this species will require very cool treatment. In North Queensland it is doubtful if it could be grown at all. In Brisbane we might succeed with it in the cooler parts if it is kept in a cool bushhouse. In Sydney it should do well enough in a bushhouse. It will require to be kept reasonably damp in the Winter time and have moderate applied water in the Spring and Autumn, with good soakings at frequent intervals in the Summer.

CALANTHE VERATRIFOLIA. *Native of Ceylon, India, Java, Australia, etc.*

Naturally the plants of this species grown by the majority of Australian orchid culturists are of Australian origin. A hardy evergreen plant with long, broad, plaited leaves. Flowers borne on long spikes, sepals and petals white, turning black with age. The flowers are delicate in texture, and if handled are apt to

develop blue-black marks. In Australia it is found over such a wide range of climatic conditions that it would appear to grow anywhere. It does quite well planted in an ordinary garden border. If potted it requires much less leaf-mould and dung than the exotic species—in fact, too rich a compost encourages vigorous growth at the expense of flowers. Ordinary bushhouse treatment is all that it needs and it does not require a great deal of water at any time, though, like most other orchids, it needs more in the Summer than in Winter.

CALANTHE VESTITA. *A Native of Moulmein.*

Probably the finest species generally grown. The pseudobulbs are large and silvery, and apple-shaped. The leaves are large, lanceolate, bright green and much plaited. The flowers are creamy white, generally with a yellow blotch in the throat. They are much larger than *veratrifolia*. The varieties *Fournierii* (shades of pink and rose), *luteo-oculata* (yellow blotch on lip), *rubro-oculata* (crimson blotch in throat), *Regnieri* (with rosy blush all over) are all fine variations from the type.

They require exactly the same treatment as prescribed for *Calantbe rosea* (above).

CATASETUM

This genus of epiphytes has a very large number of species, but very few of them are considered worthy of cultivation.

Natives of Central and South America, they grow in the forests on the lower branches of trees, generally where they can get plenty of light. They need ample heat and water during the growing period. In the resting season a lower temperature and practically no water should be provided. They can be grown on blocks, but it is preferable to pot them in baskets or pots in a compost consisting of three parts crocks and charcoal and one part fibrous peat or todea or osmunda or well teased cocoanut fibre. The following are the most popular species:—

CATASETUM MACROCARPUM. *Native of Colombia, Ecuador and Brazil.*

Similar in growth to *pileatum*. Flowers yellow-green spotted with brownish purple, lip rich orange. About 4 inches across. Cultural requirements as for *pileatum*.

CATASETUM PILEATUM (syn: *Catastetum Bungerotbii*). *Native of Ecuador.*

One of the most notable species. Pseudobulbs stout and fusiform and about 9 inches long. Leaves broad at base, fining to a point at the apex, prominently veined and deep green in colour. Usually three to four leaves remain on the stem at one time. Flower scapes grow from the base of stems, each stem producing

two or more flowers. Flowers are about four inches in width. The sepals and the two smaller petals are narrow and pointed and stand out above the broad lip. This is one of the very few pure white flowers known, there being no suggestion of any other colour in any part of it. This purity and the size of the flowers make it a desirable addition to any collection.

The climate of Ecuador is naturally equatorial (as the name implies), Summer and Winter are practically unknown, the temperature range being only 3 to 5 degrees lower in midwinter than in midsummer. The minimum temperature is 68° and the maximum average 96° Fahr. They can be grown in an ordinary bushhouse in Brisbane during the midsummer months, but should be moved under glass as soon as Winter approaches. In the South they need glasshouse treatment in Summer and hothouse conditions in Winter. In North Queensland (in the warm parts) they could be expected to do well under bushhouse treatment.

As regards water. They should never be allowed to become dry. In the Winter sufficient applied and overhead water to keep the compost damp and the bulbs and leaves unshrivelled may be given them, and in the Summer the water can be fully applied. They require plenty of light and will not flower under shaded conditions.

CATTLEYA

One of the most important genera, and certainly the most beautiful of all the orchid family. All the species are of Central or South American origin and range over very diversified conditions as to elevation, temperature and rainfall. Some are found 10,000 to 12,000 feet high on the Andes, where the temperature falls below freezing point in the Winter, while others again flourish in the dense jungles which fringe the banks of the Amazon, Rio Negro, Parana, and other northern South American rivers. They generally grow on the lower branches of trees on the mountains (or even on rocks or cliffs) and thrive, with their roots swathed in ever soaked moss. Hence they are exposed to the full force of the sunlight through the rarefied air, and to all the winds that blow. In the tropical jungles, however, they are usually found high up on the trees where they can get the light which is so essential to their welfare.

The *Cattleyas* have been the subject of much attention on the part of the expert hybridisers in the great orchid houses, and to-day there are many thousands of wonderfully beautiful hybrid plants whose parentage in many cases goes back through numerous generations of hybrids. Nowadays the hybrids are more easily acquired and therefore more usually grown than the natural species. Although this intensive hybridisation (not only between species of *Cattleyas* alone, but also with the allied genera, *Laelias*, *Brassavolas*, *Epidendrums*, *Bletillae*, *Calanthes*,

Phaius, etc), has led to the production of tremendous flowers (some of ten and eleven inches in width, and even larger, have been exhibited in Brisbane), and of wonderful colour variations, it has, in my opinion, tended somewhat to reduce the substance of the blooms. Most of the natural species have flowers of good firm texture of sepal and petal, but some of the later hybrids, particularly the tri-generic and quatrogenic hybrids, show a tendency towards flimsiness of texture and a sloppiness of form which detracts from their appearance. However, you can't have everything, and it is certainly a source of joy to produce a *Cattleya* hybrid a foot, or thereabouts, across.

Although the hybrids are more generally grown, many of the natural species are equal to any of their aristocratic relations, and when the opportunity offers every orchid grower should add to his collection one or more plants of the species I have set out hereunder.

Most beginners at orchid growing have the idea that the *Cattleya* type are difficult orchids to grow. Actually they can be numbered among the easiest of the orchid genera to cultivate. The hybrids, having been raised under artificial conditions, are more easily grown than some of the species, but the latter when once established grow remarkably well. So long as attention is given to the four essentials, they should not present any difficulty. These essentials are—

Light

Temperature

Water

Protection from pests

Of these, the first is, in my opinion, the most important. No *Cattleya* will grow sturdily and bloom satisfactorily unless it is grown in a place where it has good light at all times. If you grow them under glass (and this is not by any means essential—even so far south as Sydney), you should hang them so that they are as close to the glass as you can get them without scorching the leaves—and even a little mild sunburn does not seem to do the plants any lasting harm, and, moreover, it appears to encourage them to flower. Personally, (though I know a number of growers will disagree with me), I like a *Cattleya* house to have semi-transparent walls as well as roof. I have experimented with a glass roof and sides of a patent substance known as windolite, and have been entirely satisfied with the results. This material allows abundant light to enter and at the same time keeps out the dangerous infra-red rays (or, at least, that is claimed for it). But whatever form of house you have for your *Cattleyas*, if you see that it is light and airy you will not go far wrong.

As regards water. Reams of paper and gallons of ink must have been expended on this subject. The mistake that most commentators make is that they try to set out arbitrary rules for application in all circumstances. This is obviously impracticable. The amount of water to be applied to the plants in a *Cattleya* house must vary—(1) According to the nature of the house itself, (2) According to the atmospheric conditions prevailing in the house and in the open air outside, (3) According to the origin and condition of the particular plants themselves, (4) According to the type of potting compost and its container, (5) According to the season.

Frankly, I believe more damage is done to *Cattleyas* by underwatering and ill-timed watering than by excess watering. But this is not to be interpreted to mean that I think overabundant watering to be harmless.

NATURE OF HOUSE.

The ideal method of growing orchids would be to have a large series of houses, giving a different set of conditions suitable for all the shades of variation desirable for the perfect treatment of different types of orchidaceous plants. In England and America, where the cultivation of orchids is mostly confined to persons of wealth, something of this nature is often carried out; but where, as in Australia, a very large number of people with quite small incomes undertake the growing of these plants, most growers find it beyond their means to provide such gradations of their growing conditions, and, indeed, in the wonderful climate of Queensland, it is by no means necessary to do so. An ordinary bushhouse without any glass whatsoever is all that is required for many genera of outstanding beauty, and, further, quite a number of orchid plants do exceedingly well without any house at all. I have seen quite a large, healthy, *Cattleya* species growing on blocks nailed to a tree in Brisbane itself, and these plants have been grown in this way for years, and flower in due season.

However, it is desirable for orchid cultivators to have at least two houses—one an ordinary open roofed bushhouse, and the other a glass-roofed house. A heated house is an additional advantage, which is essential for growing certain members of the orchid family, and is a great help in the growing of other members. In Brisbane and the North a heated house is not necessary for the growing of *Cattleyas*. Several of the best species are actually cool loving plants. The houses provided for their *Cattleyas* by orchid growers vary very considerably, and on this variation depends the amount and frequency of watering necessary. As a general rule a *Cattleya* needs a resting period, when water is applied only in sufficient quantities to maintain the plant in health, and a growing period, when it needs frequent and copious waterings. If a *Cattleya* house is so built and furnished that the atmosphere remains in a reasonably moist condition, it is obvious that the extra water applied must be less than when the house is of a dry nature. Probably the best means of promoting a moist atmosphere is to have a fish pond in the centre, and have a thick covering of ashes on the floor and on the benches, and keep these ashes in a wet condition; or have a fine spray or fountain which can be turned on whenever necessary. Where these conditions cannot be given, resort must be had to applied water.

An open bushhouse in which there is a constant circulation of fresh air dries out quickly, and consequently in the Summer season plants grown in such a bushhouse can be safely watered thoroughly every morning. When the bushhouse is closely covered and boarded at the sides, however, there will not be the same rapid evaporation, and therefore watering must be done less frequently. Heavy watering in a stale, lightless bushhouse will be fatal.

A completely closed-in glasshouse with a cinder floor and benches will conserve moisture much longer than a house with concrete or asphalt or wooden floors and bare benches.

Each grower should therefore strive to so water his plants that they will be uniformly damp throughout the growing season, and right up to the time the flower is ready to burst. After flowering they must be kept comparatively dry, only being given enough moisture from time to time to prevent their bulbs from shrivelling. Tank water is preferable to reservoir water, but I have not had any reason to object to the latter. I usually spray *Cattleya* plants and their house with the hose each morning in Summer and immerse the plants in tank water once a week.

ATMOSPHERE CONDITIONS.

The state of the air about the plants is a large factor in deciding when and how much to water them. When dry, hot winds are prevalent, frequent and copious waterings will be necessary. On dull days or days when moisture laden winds affect the air, little or no water should be given. On clear, bright sunny days, again, you will need to give your *Cattleyas* a good drenching early in the morning. When it is raining outside the house there is no need for water inside—even if the glass keeps out the actual rain, the air will carry water, which will be absorbed by the plants.

ORIGIN OF THE PLANTS.

Some species come from localities where more rain is precipitated than in the habitats of other species. A knowledge of the natural climatic conditions to which your plant is accustomed will help you to place it in a position so that it will obtain, as nearly as you can give it, these conditions.

COMPOST AND CONTAINER.

Again, the nature of the compost in which a plant is set modifies the amount of water it needs. A *Cattleya* planted in a compost of osmunda fibre only will need much more applied water than one which is potted in a mixture of osmunda and sphagnum moss. *Todea barbara* fibre, again, holds the water longer than osmunda, so it will need less water than osmunda potting. *Polypodium* fibre and staghorn peat hold the water a little longer than *todea*, so that here again slightly less frequent watering will be necessary.

A plant on a block or raft can stand practically unlimited water, as the surplus runs off or evaporates very quickly. Baskets also allow very quick drainage, and so can stand liberal water. Pots tend to retain the water, so that a potted plant needs less frequent watering than a basketed one. If a pot has its drainage properly arranged so as to allow free exit of surplus water, the plant in it can stand more frequent watering than when the drainage is placed flat in the pot covering the drainage hole.

SEASONAL CHANGES.

The watering necessarily varies with the seasons as a general rule. *Cattleyas* usually commence their new growth with the first warm days of Spring. The buds at the base of last year's growth commence to swell. As soon as this growth is definitely shown, regular watering can be commenced. At first the increase must

be slight, but as the new growths lengthen out and commence to send forth their roots the quantity can be steadily increased. Should cold conditions return for a day or two occasionally, the watering must be stopped at once, only sufficient being given to keep the plant from going back. When the Summer has fully arrived the new bulbs will be well developed, and watering can then be done daily and in copious quantities. When the growth is complete (or nearly so in some cases) the flower sheath should make an appearance from the top of the pseudo-bulb. Watering can be continued in quantity until the buds come up through the sheath and swell to bursting point. After flowering, the plant should be rested for a while. A healthy, vigorous plant will sometimes make two new growths from each of one or more growing points in one year. The main thing is to watch the plant. If, after flowering and resting for a few weeks, it commences to make a new growth, the watering can be increased again—but unless I can see a good chance of the bulb being matured and flowered before at least early in the ensuing Winter, I am disinclined to push the growth too much. It is better to have a strong growth and a good flower in Spring than a weedy growth and a poor flower in Winter. Hybrids, through their complex mixture of parentage, occasionally vary from the usual rules. Some of these seem to grow throughout the year. While I do not do anything to hinder this tendency—I do not encourage it, but endeavour to provide some sort of a resting period by keeping the plant absolutely dry for a while after it has flowered, even though it has shown its wish to make a new bulb.

In the Winter a damping once a fortnight, with perhaps a light spray occasionally when dry winds blow, is all that they require.

I commend these remarks on watering to the consideration of all growers contemplating the cultivation of *Cattleyas* and their associated types. The information given should enable them to decide for themselves just what to do in the conditions in which they will be growing their plants.

TEMPERATURE.

The ideal temperature range for *Cattleyas* is from about 50 degrees Fhr. minimum in the Winter to approximately 75° in the Summer. Slight variations one way or the other do not matter—in fact, with species such as *Warscewiczii*, *Mendelii*, *Morganiae* and others from the high spurs of the Andes, an occasional lower minimum than 50° does them no harm, and actually may do them good. The Sydney, and particularly the Brisbane, climatic conditions are very suitable for the cultivation of these orchids in ordinary bushhouses—and in the far North nothing but cool bushhouse treatment should be needed. A glasshouse is an advantage in so far as it enables the temperature to be maintained somewhat constant by minimising the effect of sudden rises and falls, moreover it provides a protection against winds and draughts. In arranging *Cattleyas* in a house, an effort should be made to give the plants which like warmth the warmest position and to reserve the cooler spots for those which come from the higher altitudes. Usually growers, especially the less experienced ones, do not consider this point and just deposit a fresh plant in any old place which may be vacant. Certain species are

proverbially hard to flower. This is almost certainly due to the fact that the temperature in which they are grown does not suit them. I would certainly recommend any grower who has had a plant of *Warscewiczii* for a period of two or three years and has not succeeded in flowering it to move it into the coolest (not the shadiest) part of his glasshouse or bushhouse. I will endeavour, in the list of species following, to set out the plants which require warmth and those which like coolness in their surroundings.

PROTECTION FROM PESTS.

Cattleyas are subject to attack by scale, thrips, red-spider, slugs, orchid-beetle, cockroach and other pests. They should be carefully watched and prompt measures should be taken should any of the abovementioned pests appear. A careful washing with an emulsion of soap and nicotine sulphate from time to time will act as a deterrent to scale, thrips and red-spider. For slugs and orchid-beetle direct action is necessary. I have also noticed occasionally that the large black locust is not averse to nibbling a *Cattleya* leaf, and on three occasions I have captured the black orange-bug on these plants, but whether the last named visitors sought a meal or not, I did not wait to ascertain, but dealt very firmly with them without delay—in fact, I never wait to examine the credentials of any beetle, insect, moth or grub that I find among orchids.

Everyone who has grown orchids has noticed the fascination exercised by these plants over ants. This strange alliance is not confined to plants grown in private collections, but is usual with orchids growing in their natural state. It has been remarked again and again in the journals of orchid collectors that almost invariably associated with a clump of epiphytical orchids is an ant's nest.

Particularly is this the case with *Cattleyas*, *Oncidiums*, *Catasetums*, and *Coryanthes*. The reason for this is generally ascribed to the fact that cockroaches are very partial to orchid roots and to the young growths, as an appetising food, and the ants are very partial to cockroaches for the same reason. The orchid, by providing a harbourage for the ants in its wide-spreading root system, thus protects itself against its inveterate enemy, the cockroach. I do not worry too much at the prevalence of ants in my plants, as I know that they will assist in keeping other pests away. The only annoyance they give is that they have a habit of carrying a small black and white scale which they deposit on the stems and leaves of orchids for some purpose of their own. This particular scale does not do much harm to plants, and in any case is easily removed either by a touch of the finger, or by applying a camel hair brush, dipped in Methylated Spirits. If the ants become too thick a few traps will reduce their numbers by a million or so very quickly. The immersion of the pots and baskets in water for some minutes will also destroy large numbers of them.

There are about 90 distinct species of the genus *Cattleya*, and these have about 400 defined and accepted varieties. I do not purpose listing all these, but will confine my attentions to the better known and more usually grown species and to those which most generally have been used as the parents of the hybrids most of us grow.

CATTLEYA ACLANDIAE. *A Native of Brazil.*

A small growing, but very striking, species. Stems about 5 or 6 inches long. Leaves in pairs, usually 3 inches long and dark green and leathery in texture. Flowers are about 4 inches across and are variable in colouring, being sometimes of an olive green base blotched with purple and with darker veins and column, and sometimes with a chocolate brown base barred with cross bands of yellow—lip is large and wide, and ranges from a magenta to a deep purple shade. It is indigenous to the forests along the upper Amazon and its tributaries where it grows in the tops of the tall trees. It must have plenty of light, and thrives under the warmest conditions. It makes two and sometimes three flowering growths in succession in a season under suitable conditions. It needs moist conditions all through the growing period and needs but very short resting periods after flowering is completed. It is not often seen in Australia, but is worthy of inclusion in any Queensland collection. It is very suitable for growing under North Queensland conditions.

CATTLEYA AMABILIS. *Native of Brazil.*

A very rare plant, but one which has been used in breeding some of our finest hybrids. Tall and free growing, it is a fine type of *Cattleya*. Sepals and petals delicate pink and lip deep crimson. Usually makes two growths annually, which characteristic is noticeable in its hybrids. It is found on the banks of the Amazon and loves light and fairly warm conditions. Var. *alba* has white sepals and petals.

CATTLEYA AMETHYSTOGLOSSA. *Native of Brazil.*

A tall growing species with long thin stems about two feet high, crowned with two leaves. Flower stems usually carry seven or more blooms, each about 5 inches in diameter. Sepals and petals rosy-lilac, beautifully spotted with magenta-purple—lip a deep amethyst. This species shows wide variety in the colour of its flowers, but the above is the usual type. It requires greater warmth and light when growing than most of the other *Cattleyas*; also likes unlimited water in Summer.

Variety *sulphurea*. Sepals and petals bright yellow with purple spots and blotches. Lip rich cream.

CATTLEYA AURANTIACA. *Native of Central America.*

One of the *Epidendrum*-like types. The stems are about a foot high, club-shaped topped with a pair of oblong, leathery, notched, dark green leaves. Flowers are produced from a sheath at the top of the stem on a somewhat drooping raceme. The sepals and petals are lanceolate and bright cinnabar-red in colour. The rather hood-shaped lip is the same colour, striped with crimson and with three elevated lines on the disk. Flowers in Spring—lasts for about 5 weeks. Some varieties open very imperfectly—others remain nearly closed—but a good type is a desirable plant.

Syn. *Epidendrum aurantiacum*.

CATTLEYA BICOLOR. *Native of Brazil.*

Growing along the upper Amazon and tributaries in large clumps high up on the

tallest trees. Stems from 18 inches to 3 feet in length, very slender, prominently jointed, and with two leaves at top. Bears from three to five flowers in the Autumn months. Sepals and petals greenish-brown, lip long and narrow, without side lobes, and crimson purple in colour. Likes warmth and light and plenty of moisture in growing period, with good rest after flowering.

There are several varieties differing more or less from the type.

CATTLEYA BOWRINGIANA. *Native of Belize (Br. Honduras).* (Illustrated.)

An attractive species of the *Skinneri* type. Stems about 12 to 18 inches high and rather slender. Flowers are produced in a scape usually from five to ten blooms at a time, each flower being about three inches across. Petals are double the width of the sepals. The lip funnel-shaped. The colour is a rosy purple, paling slightly towards the edge. Throat either white or with white markings. The climate of British Honduras has a temperature range of from about 52 degrees minimum to a maximum recording of 99 degrees, so that it somewhat resembles our Brisbane climate. The rainfall, however, is much greater than here, and for nine months of the year the average precipitation is very high, ranging from 9 to 13 inches. *Bowringiana* is found on trees and cliffs overhanging the streams and often close to waterfalls. Hence it requires ample water at all times and should not be allowed to become dry at any time, though the quantity of water should be reduced considerably after it has flowered (usually in the late Autumn or early Winter). This species is particularly suitable for ordinary bushhouse cultivation in Brisbane, and definitely in a cool part of the house in the warmer climate of the North.

CATTLEYA CHOCOENSIS. *Native of Colombia.*

A beautiful species closely related to the *Trianae* group. Stems oblong and thickening towards the top, from which a single oblong, somewhat wedge-shaped leaf appears. The flowers are large, but do not open so widely as most *Cattleya* blooms, but remain somewhat bell-like in form. Colourings vary somewhat, but the general type has white sepals and petals with a fringed margin. The lip is yellow with rich magenta-purple tinting towards the front. The flowers are very fragrant. It is one of the cool growing species, being found high up on the Western Cordilleras, where the climate is extremely wet. The plants are usually found on the lower branches of straggling trees, but frequently also on the cliffs edging the precipices of the mountains. They should be grown in a cool, light position, and should receive ample water at all times; through the resting period the supply should be considerably reduced. Like *Bowringiana*, however, they should never be allowed to become quite dry. This feature is usually carried on to its descendants by hybridisation, so that growers having hybrids with *chocoensis* as one of the parents or grandparents should grow them under cool conditions and with plenty of water.

CATTLEYA CITRINA. *A Native of Mexico.*

A small growing plant with small, stout and round pseudobulbs from which grow

two grey-green, powdery, long and pointed leaves. The flowers, which are generally single, but occasionally in pairs, are on long peduncles which come from the apex of the bulb. They invariably hang downwards. The sepals and petals and lip are a bright and pleasing shade of yellow, the latter having a wavy white margin. It grows under the branches of trees in the Tierra Fria, at an elevation of from 6000 to 7000 feet. It is best grown attached to a block of tree fern or a piece of hardwood with a little sphagnum moss and a small piece of fibre beneath it. The leaves should hang downwards. It should be grown in a warm but shady corner of a bushhouse where it can get plenty of light, but is protected from the direct sun rays. Ordinary bushhouse conditions should suit this plant from Sydney right to the far North. It requires rather less applied water than most of the species, but likes the atmosphere to be on the moist side. This plant was one of the first *Cattleyas* used for hybridisation, it having been crossed with *Cattleya intermedia*. Since then it has often been used, particularly in the creation of certain types of yellow hybrids.

CATTLEYA DOWIANA. *Native of Costa Rica.*

An outstanding species, both in beauty of form and in colouring and fragrance. It has strong stems about a foot in height thickening towards the top from which a single oblong, rounded leaf is produced. Flower scape grows through a sheath at the end of the bulb. There are usually two flowers, but in strong plants the number of blooms on the one spike may be as many as seven. These flowers are of good size, being usually about seven inches or more across, and having sepals and petals of a rich, Nankin yellow shade, with a purple or rosy blush underneath. Lip large and broad, of a deep crimson-purple, often shaded with a rosy bloom and streaked with varying quantities of gold. Its flowering season is towards the end of Summer. Costa Rica, the natural habitat of this plant, is a low-lying republic on the northern end of the Isthmus of Darien. In no part of it does the terrain rise above 3000 feet, and being close to the equator its climate is uniformly warm, rarely falling below 60° and averaging 70° all through the year. There is heavy rainfall for nine months of the year, the Summer falls being round about 10 inches per month. In the Winter the rainfall is approximately 2-4 inches per month. From this it will be seen that *Dowiana* needs warm conditions with copious moisture throughout the Spring and Summer seasons, but with much less during the Autumn and Winter periods. This plant also revels in plenty of light, so that for best results it should be suspended as close to the glass as possible in the warmest corner of a glasshouse.

Variety *AUREA* (Syn. *Cattleya aurea*).

Sepals and petals rich primrose yellow. Lip rich purple crimson with streaks of golden yellow, flowering period late Autumn. Treatment as for type.

CATTLEYA GASKELLIANA. *Native of Venezuela.*

A fine species of the *labiata* group. Pseudobulbs are short, stout, thickest in the middle, deeply furrowed and bear one shining, leathery, dark green leaf. The

flowers, which open fully, are large, with sepals and petals of pale purple suffused with white. The lip is similar in colour to the petals in the upper lobes, but the lower lobe is a pale mauve shade with a large blotch of yellow. The front of the lip often bears white and purple blotches also. This plant grows upon tall trees in the forests of the tableland along the banks of the upper Orinoco River at a height of from 4000 to 6000 feet above the sea level. The temperature ranges from a minimum of 48° Fahr. to a maximum of 81°. The rainfall is moderate and ranges as follows:—

RAINFALL

January	1 inch	July	4½ inches
February	½ „	August	4½ „
March	½ „	September	4 „
April	2 „	October	4 „
May	3 „	November	3½ „
June	4 „	December	2 „

This species should be grown in a cool position in a glasshouse or bushhouse. It should do quite well, from Sydney northwards, in an ordinary bushhouse, but probably it would be desirable to get it under glass for the Winter months in the cooler parts of Brisbane and south thereof. It requires less water than the majority of the *Cattleyas* and in the resting period should be kept practically dry.

CATTLEYA GIGAS (Syn. *C. Warscewiczii*. Q.V.)

CATTLEYA GUTTATA. *Native of Brazil.*

This species (of which there are eight or nine distinct varieties) is found in the Provinces of Para, Bahia, Minas Geraes, and San Paulo. It is generally found in the jungles which line the banks of the numerous rivers of that part of Brazil, and like the other jungle orchids it makes its home high up near the tops of the tallest trees. It is a tall growing plant with somewhat slender stems from 18 inches to 2 feet in length and tapering from the base. It carries two dark green and fleshy leaves. Its flowers are borne on a long raceme which carries up to nine or ten blooms with sepals and petals of a yellowish green (sometimes lemon coloured) spotted with numerous dots of crimson. The lip is white with a rose-purple tinging. It flowers in the late Autumn. All the *guttata* varieties need warm treatment with a minimum Winter temperature of 55°. They need ample water in the Summer months and even in the resting period should be given enough water to prevent their stems from shrivelling. The best varieties are:—

Leopoldii — brown sepals and petals spotted crimson — lip rich, velvety purple (bearing up to 30 flowers on one scape).

Prinzii, which resembles *Catt. amethystoglossa* somewhat.

CATTLEYA HARDYANA. *Native of Colombia.*

One of the finest and probably a natural hybrid between *Warscewiczii* and *Dowiana aurea*. Plant has stout, short and spindle-shaped stems with one leaf. Flowers are borne on a scape carrying three to five blooms and are large (about 8 inches

across) with petals and sepals from magenta to rosy purple in shade—lip, very broad and fringed, is magenta crimson, the throat and rear portion of the labellum being lined with golden yellow. The yellow blotches on the side lobes, typical of *Warscewiczii*, are present. It requires the same cultural treatment as *Warscewiczii*.

CATTLEYA INTERMEDIA. *Native of Lower Brazil.*

A fine species with slender stems one to two feet high (according to variety), with two leaves to each stem, each about 6 inches long. Vigorous growing and free bloomer, making as many as nine on one stem (but usually from three to five), each bloom being about four inches across. Sepals and petals rosy pink with purple shading; lip paler with deep purple blotches at the front. Flowers in midsummer. Requires treatment as suggested for *guttata*.

Variety *alba* is reputed to be the whitest of all the *Cattleyas*.

CATTLEYA LABIATA. *Native of Brazil.* (Illustrated.)

One of the best known species, and very popular with growers. It is a strong growing plant with pseudobulbs up to about 10 inches in length, thicker at the top than at the base, and prominently furrowed. Has a single leaf at the top of each stem, this being dark green in colour, of stout texture and broad. The flower spikes carry from two to four large blooms (about 6 inches across). The sepals and petals are a rich rose colour, the petals being gracefully waved—the lip is of good size and curled—the front being a brilliant and rich crimson, bordered with lilac and with one or more large yellow blotches at the back. It flowers in late Autumn. It is found far up on the Rio Negro and its tributaries. It likes plenty of light—average warmth and copious water during the Summer time with just enough moisture to keep the bulbs filled out in the Winter time.

There are nearly a score of recognised varieties, some of which are rare, but all are beautiful. Natural *labiata* (often referred to as *labiata vera*, to distinguish it from some closely allied *Cattleyas* which have sometimes been labelled *labiata*) and its varieties have been much used by the hybridisers in evolving many of the fine modern hybrids.

CATTLEYA LAWRENCEANA. *Native of British Guiana.*

A valuable and easily grown species. Stems vary in length, those of some varieties being only six inches tall, while others are as long as 15 inches. These are usually a brownish colour and are generally rather flattened and furrowed. They have one leaf which is about nine inches long. Flower scapes grow from apex of the bulbs through a brownish purple sheath, and carry numerous flowers. These are between 4 to 5 inches and have lilac sepals and petals, the latter being twice the width of the former. Lip tube-like, with spreading front coloured rosy-purple with white throat. *Lawrenceana* grows on the slopes of Roraima Mt., the highest peak in British Guiana, at an elevation from 6000 feet to 8000 feet above the sea. The plant lives upon the high trees in the forests that clothe the mountain. The climate is wet throughout the year, the precipitation being:—

January	4 inches	July	8 inches
February	3 „	August	8 „
March	2 „	September	5 „
April	3 „	October	4 „
May	5 „	November	3½ „
June	8 „	December	4½ „

While the temperature at the top of the mountain ranges from a minimum of 41° to a maximum of 68°, the actual jungle temperatures are rather higher, ranging from 65° minimum to 83° in midsummer. It will, therefore, require to be grown in the warmest and moistest part of the glasshouse or bushhouse and will need plenty of water in the Summer and enough to keep the bulbs healthy in the resting period. This is a useful species and makes a fine show in the late Spring. It is similar in form to *Skinneri* and *Bouringiana*.

CATTLEYA LODDIGESII. *Native of Lower Brazil and the Argentine.*

Stems about 12 to 15 inches in height, tapering towards apex with two oval shaped leaves. Flowers usually two or three on scape—about four inches across. Sepals and petals lilac; lip pale amethyst purple, with a yellow blotch on the disk and having a broad rounded front crinkled at the edge. An easily grown and pretty variety which will thrive under ordinary bushhouse conditions in Queensland. General culture as for *Cattleya bicolor*.

CATTLEYA LUEDDEMANNIANA. *Native of Venezuela.*

A fine *Cattleya* of the *labiata Mossiae* group—and used in making some of the finest crosses. Flowers are large (about 8 inches across) and are produced two to four on a scape. Petals are much broader than sepals. Lip large and well shaped. Colour purplish rose all over except the front of the lip which is deep amethyst-purple with two yellow or cream blotches in the throat where there are also narrow bright magenta stripes.

Culture.—This plant should be grown in the warmer part of the glasshouse and requires the same attention as regards water as most other *Cattleyas*. It should be noted that this *Cattleya* needs plenty of fresh air and light. Syn. *C. Mossiae autumnalis* and *C. speciosissima Lowii*.

CATTLEYA MENDELII. *Native of Colombia.*

Pseudobulbs short and club-like, bearing a single leaf. Flowers large and handsome. Sepals and petals large and broad and in the type are white or very pale pink. The lip is the same colour as the sepals and petals, but the spreading portion, which is very broad and has a crinkled and wavy edge, is a rich crimson-purple with a blotch of golden yellow in the throat.

Treatment same as for *Warscewiczii*.

CATTLEYA MOSSIAE. *Native of Venezuela.*

A very popular species, of great variety and extremely beautiful. Stems, oblong

and furrowed, a foot or more in length—topped by a single, leathery, dark green leaf—rather glossy. Scapes carry from two to five flowers which range from 6 inches to 8½ inches in width. Colour varies considerably, but usually sepals and petals range from light pink to deep rose. Labellum beautifully fringed and crinkled at the edge, large and spreading, the basic colour being the same as the petals, but suffused with rich violet, with purple veins, bordered with lilac and with a rich orange stain at the base.

Bushhouse treatment will suit this species, particularly in the warmer parts of Brisbane and the North. A well defined resting period is necessary for the production of flowers and light airy conditions are desirable.

CATTLEYA PERCIVALIANA. *Native of Venezuela.*

This very beautiful species is found near Merida on the slopes of the Merida range at an altitude of from 4000 to 6000 feet (and occasionally higher up the range). It is usually found on the taller forest trees and occasionally on exposed rocks and cliffs. The stems are from 7 to 15 inches in length, prominently furrowed, and usually slightly thicker in the middle than at either end. Flowers smaller than those of *Mossiae* which they resemble in shape, but are richer in colour tones—the lip being particularly striking, with a well fringed margin of rose pink in contrast with the rich magenta-crimson of the front lobe. The throat is a beautiful, rich yellow lined with maroon and purple. It flowers in midwinter, which adds to its value in a collection. In its natural place of growth it has a temperature range from 49° mean minimum in midwinter to a maximum of 88° in midsummer. It is therefore particularly suited for bushhouse treatment in Brisbane (so far as temperature is concerned) and in North Queensland. It likes plenty of light and good air circulation, but requires less water throughout the year than almost any other species of *Cattleya*. The rainfall data as recorded for Merida is:—

January	88 points	July	436 points
February	36 „	August	432 „
March	60 „	September	412 „
April	160 „	October	388 „
May	284 „	November	340 „
June	412 „	December	180 „

The plant flowers during December and January (in Venezuela) and then rests until the beginning of April when the commencement of the seasonal rains starts it into growth again. The rainfall averages from Brisbane are considerably higher than is the case at Merida. Thus, if the Winter is wet it will be desirable to move the plant under shelter so that its period of rest may be uninterrupted. Hybrids carrying a large amount of *Percivaliana* strain will probably benefit by similar treatment.

CATTLEYA SKINNERI. *Native of Guatemala.*

Found in the dense, tropical rain forests high up in the trees. This species requires rather warmer and moister atmospheric conditions than most of the *Cattleya*

group. Pseudobulbs up to about 12 inches tall—tapering to the apex which is surmounted by a pair of dark green leaves, about 6 inches long and oval in shape. From between these leaves appears the flower scape which is erect and long and bears (in strong plants) up to 12 flowers, from $4\frac{1}{2}$ to 5 inches in width, with sepals and petals of rose-purple. The lip is white with a violet border. Flowers in late Autumn. In Sydney this species should be grown in the glasshouse and will probably appreciate a minimum temperature of 55° in the Winter time. In Brisbane it can be grown in the bushhouse in the warmer parts—a transfer to a glasshouse in the Winter being desirable. In North Queensland bushhouse treatment will serve throughout the year. Give plenty of water during the Summer with a reasonable amount in the cooler months up to the time of flowering—slackening the quantity immediately the buds have swollen. After flowering, give short resting period, during which water is to be most sparingly applied—but do not allow the pseudobulbs to shrivel.

Var. *alba*. Pure white flowers with sulphur coloured blotch on the lip.

CATTLEYA SUPERBA. *Native of British Guiana and Brazil.*

This very beautiful species is found growing on the trunks of trees along the banks of the rivers in the hot and humid jungles. It requires heat and moisture at all times and for this reason should only be grown in a heated house in Sydney and the cooler parts of Brisbane. A warmly situated glasshouse may serve in the other localities of Brisbane and in the North. The plant is slow growing at all times and, unlike the other *Cattleyas*, it requires no definite resting period. In fact, it is desirable to keep it growing at all times. It is one of the loveliest of the genus. The sepals and petals are a violet rosy-purple with a kind of misty white suffusion; the lip is folded over the column at the base, but in front is spreading and kidney shaped, crimson-purple in colour, blotched with yellow and white.

The stems grow to about 9 inches—are grooved and brownish-purple in colour. They bear two leaves about five inches long. Flowers from two to five, each about 5 inches across.

It is better to grow this species in baskets or even on blocks of tree fern than in pots. This method will allow of the provision of ample water without the risk of soaked and sodden compost.

Var. *alba*. Pure white throughout.

CATTLEYA TRIANAE. (Syn. *C. quadricolor*). *Native of Bolivar (Colombia).*

This popular species (which has many known varieties) is very like *Mossiae* (to which it is allied) in manner of growth, but the pseudobulbs are a little thinner and longer. In strong, healthy plants it carries three to five large blooms on each scape. Sepals and petals vary in colour from lilac to deep rose. Lip stained with yellow at the base, the front being a rich purplish-violet.

Treatment as for *Mossiae*.

CATTLEYA WARSCEWICZII. *Native of Colombia.*

One of the largest and finest species, with shortish, stout, fusiform pseudobulbs

topped with a single large, oblong, leathery leaf. The flowers, which are large and of good texture, are produced on a peduncle in clusters of from two to eight blossoms. The sepals and petals are a pale rosy pink, and the lip, which is large and broad, is a rich purple in front with yellow blotches on each side of the throat. It grows naturally on the trees and on the cliffs adjacent to Rivers Magdalena and Meta beyond Bogoto, 8000 feet up in the Cordilleras spurs of the Andes. Here, in spite of the altitude, the days are warm in Summer, the temperature reaching as high as 76° at noon. The nights are cool, always falling to as low as 40° even in Summer time, while in Winter the thermometer frequently falls below freezing point.

Of all the *Cattleya* species none requires a definite resting period more than *Warscewiczii*—in fact, one might coin an aphorism and say “No rest—no flowers,” and unless the plant is kept quite dry in Winter (except for a very occasional spray) it will not rest.

It is a lover of light, and when grown in a glasshouse should be suspended as near to the glass as possible without scorching the leaves. Actually this species should do excellently in an ordinary bushhouse in Sydney and northwards. I have seen a plant of *Warscewiczii* growing on a raft in an open bushhouse in one of the suburbs of Sydney. It was a massive plant with about 40 stems, and flowered freely every year. It received no special attention of any sort—it was the only orchid its owner possessed and he treated it as just a greenhouse plant! I believe the difficulty some growers find in flowering *Warscewiczii* is due to the fact that it is kept too warm, too shaded, and too moist in the Winter time. Syn.: *Cattleya gigas*.

There are many other species and varieties but the above represent the most important.

CHYSIS

This genus of epiphytical orchids is not generally grown here, but one or two of its members would be an interesting addition to any collection of orchids. Most of them require considerable warmth while growing, and only growers who can give them this should undertake the culture of these particular species.

They can be grown on blocks, but do better in baskets or pots. Use good sized pots to allow ample room for root development and pot in fibrous peat and sphagnum moss. They must have copious water during growing period. After growth is complete remove them to a slightly cooler position and keep dry until growth recommences. They are deciduous (i.e., they shed their leaves when resting).

CHYSIS AUREA. *Native of Colombia and Western Venezuela.*

A cool growing species suitable for bushhouse culture in Brisbane and the North. Cool glasshouse will serve in Sydney. Spindle-shaped pseudobulbs up to about 9 inches in length. Flowers, which are broad and cup-shaped and have thick fleshy sepals and petals, are borne on short racemes and are brownish-yellow in colour, the lip being marked with crimson on the inside. This species usually flowers twice a year; the flower scapes are short and usually carry five or more blooms. They are produced laterally with the young growth.

CHYSIS BRACDESCENS. *Native of Mexico.*

A large growing species, its pseudobulbs being about a foot long. Leaves long and broad with prominent ribs—acutely pointed and somewhat plicate (plaited). Flowers in early Winter from short spikes, each flower being up to three inches in diameter. Sepals and petals waxy white—lip white outside—bright yellow inside—front being marked with crimson lines and having thick tooth-like projections. This species grows in the thick rain forests of Yucatan, Campeche and Chiapas. It requires to be kept to a minimum temperature of 65 degrees throughout the year so is not suited for bushhouse treatment. A warm glasshouse may serve in the warmer parts of Brisbane and the north—otherwise heat. Apply ample water throughout the period of growth and keep dry and cooler after growth complete.

CHYSIS LAEVIS. *Native of Mexico.*

Stems are fifteen inches long and pendant. Flowers from the young growths in midsummer. Racemes pendulous and longer than those of *bractescens* and flowers more numerous. Upper sepals and petals orange, the lower part being yellow. Lip yellow marked with crimson blotches, front lobe frilled. Same treatment and conditions as for *bractescens*.

CIRRHOPE TALUM

This is a genus of evergreen epiphytical orchids of a quaint beauty which makes a few of them interesting novelties in an orchid collection. Many of the species are of botanical interest rather than of horticultural value, and this applies to our North Queensland species, *clavigerum*. There are, however, some half-a-dozen species, which are worth while growing for their beauty and quaintness. The derivation of the name is "Cirrhos," a tendril, and "Petalon," a petal or flower leaf, and this gives quite a good idea of the nature of the flower—as the two lateral sepals are extended in a long and sinuous "tail" tapering away to a fine point. They

NOTE.—There is some doubt as to the correctness of the derivation of the name *Cirrhopetalum*. Some authorities hold that the correct derivation is from the Greek "Kirrhos" meaning yellowish or tawny (referring to the colour of the petals). Mr. P. A. Gilbert takes this view. On the other hand an American catalogue just received gives the same derivation as used in the text. Which ever is correct, both are appropriate, and I am prepared to accept either of them.—J. M. Cox, 26-11-1945.

usually grow in the jungles at a comparatively low elevation, attached to the trunks of trees. They like a warm, moist atmosphere when growing, but it is an advantage to remove them to a cooler and airier place after growth is completed and when they are in flower.

They are best grown in baskets, but will grow in pots or attached to a block of wood with a little sphagnum moss or fibre between the plant and the wood. If potted, ample and free drainage should be provided, and the addition of a few pieces of clean wood-charcoal will assist in preventing sourness of the compost. This can be of fibrous peat, or osmunda or polypodium or todea, with a little live sphagnum moss mixed in. They appreciate plenty of light and plenty of air.

CIRRHOPETALUM AMESIANUM. *Native of Malaya, Sumatra, Borneo, etc.*

Small, thick pseudobulbs, topped with broad oblong and obtuse leaves prominently veined. The flower spikes proceed from the base of the new bulbs after they have matured. Flowers are produced in umbels of about 9 flowers (which is characteristic of all the genus). Dorsal sepal and petals bright yellow with a reddish brown fringe; the lateral sepals are a rosy purple, the base being creamy white and the sides sometimes the same colour. These are more or less joined together to a greater or lesser degree from the base to the beginning of the terminal tails. The lip is a dull reddish brown. This species is found in the jungles of the Moluccas and the Malayan Islands. In Sydney it will be necessary to grow it in a warm glasshouse as close to the light as possible, but in Brisbane (in the warmer parts) the hottest part of the bushhouse will do, and in the North this is all that will be needed. Copious water right through the growing period. As soon as growth is completed move to a cooler place and reduce the water supply, but do not dry off even in the Winter time. Once the plants of this genus commence to wither, there is very little hope of restoring them to vigour.

CIRRHOPETALUM MEDUSAE. *A Native of Singapore.* (Illustrated.)

One of the strangest orchid flowers in an order in which remarkable flowers are the rule rather than the exception. Plant dwarf-growing with stout, rather square, angular pseudobulbs. Leaves (one on each new growth) are thick and fleshy. The flowers are very numerous. Sepals and petals pale yellow with pink or lilac spots, and are drawn out into long drooping threads so that the umbel of flowers resembles a head with the hair hanging down—hence the name.

The cultural treatment required is the same as that for *Cirrhopetalum Amesianum*.

CIRRHOPETALUM ORNATISSIMUM. *Native of Sikkim, Nepal, Bkutan, etc.*

A small growing species—pseudobulbs about one inch in height, squarish, crowned by a single dark green leaf about 5 inches long and 2 inches wide. Flower spike (from about 6 to 9 inches in length) produced from base of bulbs, and carries an umbel of four to nine flowers, sepals and petals a pale purplish-brown in colour with veinings of bright violet. The tips of the petals have a series of dark brown to purple or black hairs, and the dorsal sepal is edged with a similar growth. This species, although a native of the cooler regions of Northern India, is found in the

valleys where the climatic conditions are hot and moist for the greater part of the year. It does not require the same heat as does *Amesianum* or *Medusae*, and can readily be grown in a fairly warm bushhouse both in Brisbane and the North. In Sydney it will probably be desirable to grow it in a glasshouse, particularly in the Winter months. The general cultural treatment is as already prescribed for other members of the genus.

CIRRHOPETALUM ROBUSTUM. *Native of New Guinea.*

A large growing species found in the valleys of Central Papua and New Guinea. Pseudobulbs large and rectangular—leaves thick and leathery, about a foot long and 3½ to 5 inches wide. Flower scape thick, bearing a head or umbel of 7 to 13 flowers. Sepals and petals—yellowish, tinged with purple—lip deep reddish purple. This plant needs warm, moist conditions and will require glasshouse treatment in Sydney and Brisbane (with heat desirable in the Winter), but in North Queensland should do well enough in the warmest and moistest part of the bushhouse. Copious watering is necessary in the Summer, and even in Winter it should not be permitted to dry right out.

There are a number of other species, but the only ones worth cultivating are rare and unlikely to be met with, so I have not included them in this table.

COCHLIODA

A genus of interesting and beautiful epiphytical orchids allied to the *Odontoglossums* and to the *Oncidium*s. They are not frequently grown in Australia, but a number of growers have one or two of the bi-generic hybrids between *Cochlioda* and *Odontoglossum* known as *Odontiodas*.

The *Cochliodas* are natives of the Andes of Peru at an elevation of about 8000 feet, and they therefore require cool treatment at all times. This feature militates against their being easily imported, except in the form of well established plants properly dried off for shipment. It is desirable also that shipment be made at such times as will allow their travelling to be done during the coolest months of the year. They can be set in pots, but are better suited by hanging teak baskets. A compost of polypodium fibre or todea with a little sphagnum moss is suitable, but a good alternative compost is one composed of two parts chopped osmunda fibre, one part chopped sphagnum and one part good leaf-mould—not fine powder, but rather coarse—with a little sharp sand—the compound to be well mixed and pressed firmly about the plant.

Cochliodas should be grown in the coolest part of the bushhouse. They like plenty of light, but our Queensland sun's rays are rather too fierce to allow them to come into direct contact with the plant. They therefore require shaded conditions. The climatic conditions of Peru are rather varied. The low lying lands between the Andes and the coast (Pacific) are arid. The eastern slopes of the Andes have

a very wet climate and consequently are covered with a humid, tropical rain forest. On the inland slopes of the Andes the climate is that classified by meteorologists as Cwb. That is, the Summers are moderately warm and wet, and the Winter months dry and cold. *Cochliodas* come from this section of Peru and they will therefore require reasonable watering in Summer, but absolute dryness in the Winter; only sufficient water being given in the cold months to keep the plant healthy. The following are the best varieties:—

COCHLIODA NOEZLIANA. *Native of Cajamarca (Peru) and Ecuador.*

Pseudobulbs $1\frac{1}{2}$ to 2 inches long, somewhat flattened and corrugated, and bearing a single leaf from 4 to 6 inches in length and sharply pointed. Flower scapes proceed from base of matured pseudobulb and are arched and carry up to 25 or 30 flowers. These are about one inch in width and have sepals and petals of orange-scarlet, the lateral sepals being longer and narrower than the dorsal sepal and the petals. The lip is three-lobed, and is the same colour as the sepals and petals with a yellow disk, the column being a vivid purple. This species is the one most often utilised for hybridising with the *Odontoglossums*. It is a hardy and free growing plant once established, and would make an interesting and attractive addition to any collection. Under suitable conditions the flowers last from three to four weeks. Cool bushhouse treatment at all times.

COCHLIODA ROSEA. *Native of Otuxco (Peru).*

Pseudobulbs $1\frac{1}{2}$ to 2 inches high—thinner at the sides than in the middle, rather egg-shaped and dark green with violet markings. They carry one leaf, strap-shaped and blunted. Flowers appear on long drooping racemes from 15 to 25 blooms at a time. Sepals and petals rosy-pink—lip three-lobed, and of a slightly darker shade of pink, wedge-shaped at base. The column is pink with a white tip. Lasts from 6 to 8 weeks. It needs cool treatment at all times. Ample water in the summer time; care should be taken to avoid water lodging in the new growths as they are susceptible to damping off. In the winter, just sufficient water to keep plant from shrivelling, but on no account wet the foliage or the flower scape.

COCHLIODA SANGUINEA. *Native of Cajamarca and Ecuador.*

Pseudobulbs oval and flattened, deep green in colour with mottled brown bands. They carry two strap-shaped leaves six to eight inches in length. Flowers from base of matured bulbs on slender drooping racemes bearing 12 to 20 flowers about $1\frac{1}{2}$ to 2 inches across. Sepals and petals bright waxy rose-pink. Column pink and white. The flowers appear in late Summer and early Autumn and last about 4 weeks. Conditions and culture as for *rosea*.

COCHLIODA VULCANICA. *Native of Huanuco, Peru.*

Pseudobulbs ovoid, thin at edges and flattened, bearing one (sometimes two) leaves three to five inches long, blunted at the end and oblong in shape. Flower scape is long and erect and bears from 15 to 20 large, deep rose-pink flowers each about 2 inches across. This species requires rather more water than the others. Flowers remain in good condition for three to four weeks.

Var. *grandiflora* has larger and more numerous flowers of a reddish colour.

COELOGYNE

A large genus of evergreen epiphytical orchids, quite a number of the species being valued items in an orchid collection. They are found over a wide range of country and under varying climatic conditions which will be dealt with under the respective species-headings below.

Best results are usually had from growing *Coelogynes* in shallow wooden baskets which allow the drooping racemes to hang over the sides; but they do well enough in pots. It is well to over-pot the members of this genus, thus giving them some years without disturbance, as they are rather slow at re-starting growth after having been repotted. For potting compost a good fibrous peat topped with sphagnum moss is ideal, but *osmunda*, *todea*, *polypodium* or other fibrous material may be used. I have seen *cristata* growing in a basket with no other potting material than sphagnum moss and the growth made was excellent. Then again I have seen a large plant of *cristata* growing over a piece of sandstone in a damp bushhouse, and it, too, was a fine healthy plant. But whatever compost is used, it is essential that ample drainage be provided, as a soggy, sour compost has a more quickly fatal effect on *Coelogynes* than on almost any other orchid I know.

COELOGYNE ASPERATA. *Native of Borneo.*

A large growing and attractive species which is usually found a little difficult to cultivate satisfactorily. The pseudobulbs are very large, often growing to a length of from 10 to 12 inches. They are thick and fleshy, oblong in shape, but stretching out at the apex which is surmounted by two long, broad, lance-shaped leaves, dull green in colour. The racemes are from twelve to fourteen inches long and proceed from the base of the matured pseudobulbs. They are pendulous and carry up to a dozen (or even more) large blooms of which the sepals and petals are a pleasing deep cream or yellow colour. The lip has the same basic colour, but has a bright orange ridge from which run reddish brown or chocolate veins. This species must be well over-potted, as it requires ample root room. Its natural habitat is on trees growing in or close to swamps and marshes in the forest country in the main coastal areas of Borneo. It has also been reported as growing on the mangroves on the coastal mud flats of the island. Borneo is situated right on the equator so that there is practically no difference between Summer and Winter, and the rainfall is heavy through the year as the following table shows:—

Month	Temperature		Rainfall	Month	Temperature		Rainfall
	Lowest	Highest			Lowest	Highest	
Jan.	73°	to 92°	11½ inches	July	71°	to 93°	6½ inches
Feb.	74	„ 93	8½ „	Aug.	73	„ 95	9 „
March	73	„ 95	10 „	Sept.	73	„ 94	9 „
April	73	„ 94	11½ „	Oct.	74	„ 94	15 „
May	74	„ 94	11¼ „	Nov.	74	„ 93	16 „
June	72	„ 94	9 „	Dec.	74	„ 90	14 „

It is obvious, therefore, that if this plant is to be grown satisfactorily, it will

have to be placed in an extremely warm, moist position. In Sydney it will require a heated house. In the warmer parts of Brisbane it may do in a warm glasshouse, particularly if suspended over a fish pond, thus providing for a constantly moist atmosphere. In the cooler parts of Brisbane and other cool localities, a glasshouse may serve in the Summer time, providing the temperature rarely falls below, say, 60 degrees, but it will be necessary to give it heat in the cooler months. On the higher elevations a heated glasshouse will be essential. In Townsville and other warm, moist climates it should live and grow under warm bushhouse conditions in the Summer, but a glasshouse will be desirable in the Winter time. It will require plenty of moisture at all times, but those who are endeavouring to grow it under conditions which will not allow of a fair warmth (say 60 to 65 degrees) during the Winter, should reduce the water considerably during the cold months, just giving the plant sufficient to sustain a little growth, for it is one of those orchids which should not be allowed to cease growing. Although it is an attractive plant, growers would be better advised to omit it from their collections unless they can give it something approaching the conditions it needs.

COELOGYNE BARBATA. *Native of Nepal, Bbutan, and Assam.*

A beautiful species suitable for cool treatment and quite capable of cultivation under most growers' conditions. (If *crinata* can be grown, *barbata* will do as well). The pseudobulbs are egg-shaped and light green in colour and are topped by two leaves about a foot long and two inches across at the widest part then diminishing to a point, and thick and coriaceous in substance. Flower scape erect and what the botanists term flexuose—that is, it bends a little further forward with each joint so that as the buds develop it has an arched appearance. The flowers are produced in a cluster, the bottom ones opening first. Sepals and petals and lip are white, but the latter has a ciliated margin—that is, along the edges of the lip there is a hairy fringe light brown in colour, while the centre ridge of the lip is crested with another hairy line of darker brown. It flowers towards the end of Winter and the blooms last 4 to 5 weeks. Found as it is on the higher altitudes, this plant needs cool treatment, and should be grown under bushhouse conditions right from Sydney northwards. It likes plenty of water, especially during the growing period, but even in Winter should never be allowed to dry out.

COELOGYNE CORYMBOSA. *Native of Assam.*

This species is one of the handsomest of the genus. It is found about half way up the Khasi Hills at an elevation of from 3,000 to 6,000 feet. The pseudobulbs, about 2 inches long and about half as thick, carry a pair of broad pointed leaves up to a foot in length. The raceme is thrown up with the new growth, and bears a rounded cluster of blooms, the sepals and petals being a creamy white, the lip having two large, orange yellow spots, with brown margins and a yellow and brown throat. It flowers in Summer time, and if kept cool the blooms last from three to four weeks. Ordinary bushhouse treatment will serve for this plant. Plenty of water should be given throughout the growing period, reducing the quantity considerably in the Winter months.

COELOGYNE CRISTATA. *Northern India, Sikkim, etc.* (Illustrated.)

The most popular species of *Coelogyne* grown, and one which amply repays the trouble taken to grow it. Actually it is a native of the Himalayan passes, and in the streets of Darjeeling the native hawkers frequently offer for sale baskets of this lovely plant plucked from its harbouring trees in the forests of the mountain slopes. It used to be considered that this plant would not thrive unless after every two years' absence it was returned to its native fastnesses. However, it has now been proved that *cristata* will in time flower quite well in Australia once it has become well acclimatised, and providing it gets reasonably cool treatment. The pseudobulbs are from 2 inches to 3 inches in length, and in a healthy state are spheroid and smooth and shiny; when the plant is in poor condition the pseudobulbs crinkle and shrink. Two leaves are produced from each pseudobulb, and are narrow, pointed, leathery, about six inches long and dark green in colour. The flower raceme springs from the bottom of the fully grown pseudobulbs and bears five or more large white flowers with a brilliant yellow crest on the lip. These flowers last from five to six weeks, and are fragrant. It should be grown in the coolest part of the bushhouse and should have copious water right through the growing period. After growth has been completed it may advantageously be transferred to a rather warmer position and the quantity of water considerably diminished. Growers must not expect quick results from this orchid. It takes a long time to become fully acclimatised and it hates being repotted. Once it has found itself in satisfactory surroundings, however, it grows quite rapidly, and when it has once commenced to flower it will bloom regularly every year, and with an increasing quantity of blossom. For the patient grower it is a species well worth having.

Varieties. There are several variations from the type, the best being: *Coelogyne cristata alba*—pure white all over, *Coelogyne cristata citrina*, lip pale yellow; and *Coelogyne cristata major*, very large flowers and somewhat more robust.

COELOGYNE DAYANA. *Native of Borneo.*

A striking species having long pear-shaped pseudobulbs from which spring two stalked, oval, pointed leaves. The flower scapes are long and pendulous and carry from twenty to thirty flowers each about 2 inches in diameter, the sepals and petals being light yellow, the lip having broad, dark brown stripes at the sides with a brown semi-circle on the middle lobe, opening toward the base. It flowers in midsummer, the blooms lasting from three weeks to a month, if kept protected from water. The cultural remarks made concerning *Coelogyne asperata* apply to this species also, as it is found in similar surroundings to those set out for *asperata*.

COELOGYNE ELATA. *Native of Northern India, Sikkim, etc.*

This species has a superficial resemblance to *Coelogyne cristata*, and hence is sometimes sent from India as *cristata*. The pseudobulbs are larger and more angular than those of *cristata*, and the leaves are larger and broader and are striated (covered with a net work of fine lines). The flowers are not unlike those of *cristata*,

but are rather more drooping in appearance, and not quite so large. Sepals and petals white, lip white with a formed yellow band in the centre, and two orange striped crests in the disk.

This plant comes from the same district as *cristata*, and the cultural suggestions given for that orchid apply to *elata*.

COELOGYNE FLACCIDA. *Native of Nepal.*

A well known and easily cultivated species with oblong light green and somewhat corrugated pseudobulbs five to six inches tall, topped with a pair of stiffish, dark green leaves. It flowers in late Winter or early Spring on long pendulous racemes carrying up to twelve blooms with pointed petals, white or cream in colour, the lip being stained with yellow in front, and with three crimson streaks in the throat.

This plant is found on the trees in the forests of the lower Alpine slopes at an elevation of from 3000 feet to about 4700 feet. It grows quite easily in an ordinary bushhouse from Sydney northwards. Staghorn peat is as good a compost as any for it. Plenty of water should be given it right through the summer months, and the compost should be kept slightly damp even in the Winter. Care must be taken to avoid water entering the new growths, as they have a tendency to dampen off. Like most of the *Coelogynes*, it is rather slow at starting to flower, but once it commences to do so it blooms regularly every year under appropriate conditions. It is subject to mildew, and should, therefore, be placed in a light and airy position. Flowers last from four to five weeks.

COELOGYNE FUSCESCENS. *Native of Burma.*

Originally found on the Dawna Range on the western border of Moulmein (lower Burma), it has since been reported from Kachins (upper Burma), and also from the lower Himalayan slopes in Northern India. It is a fine, strong growing species with tapering pseudobulbs 4 to 5 inches high with two broad plaited leaves about nine inches long. Racemes grow from the bottoms of matured pseudobulbs and, slightly arched, carry about half-a-dozen blooms roughly three inches across. The colour of the flowers varies somewhat, the Moulmein variety having sepals and petals of brownish green, the lip being marked with four cinnamon spots with three brownish yellow lines running back to the throat. In the northern variety the sepals and petals are yellowish red with a touch of white on the tips, the lip being edged with white and having two cinnamon spots and three orange lines. The Moulmein variety flowers in the late Autumn and the northern one in the Winter months. The flowers remain beautiful for five to six weeks. This species will grow well under bushhouse treatment in Brisbane, but in Sydney should be moved under glass during the Winter months—and probably this would be advisable in the colder parts of Brisbane. In places from Rockhampton north, a cool part of the bushhouse is desirable. Copious watering is necessary in the Summer months, slackening off when growth is completed until practically all watering is eliminated in the Winter.

COELOGYNE LENTIGINOSA. *Native of Burma.*

Pseudobulbs about 3 to 4 inches long, stout and rectangular. Leaves in pairs 6 to 8 inches long, broad and diminishing to a sharp point. Flower spikes, from base of bulb, carry up to half-a-dozen bright yellow blooms from an inch to an inch and a half across. The lip has three lobes, the side ones being white with a chocolate border and sometimes spotted with light brown, the middle lobe yellow, with a large patch of yellowish brown in the centre with a white margin. An attractive species, very popular with the Burmese, who are frequently seen wearing a spray of the blooms in their hair during late Spring and early Summer, its flowering season.

Coelogyne lentiginosa is found in the hilly country beyond Mandalay. The climate in this part of Burma differs greatly from that round Rangoon and Moulmein. Instead of the humid wet conditions of lower Burma they have a hot, drier climate, and even in the rainy season the average monthly rainfall does not exceed six inches. In Winter the nights are quite cold, the temperature falling to as low as 40 degrees at a height of 4000 feet, at which elevation this *Coelogyne* is found. The following is the table of temperature and rainfall:—

Month	Temperature		Rainfall	Month	Temperature		Rainfall
	from	to			from	to	
Jan.	40°	to 74°	negligible	July	63°	to 82°	3 inches
Feb.	46	„ 84	„	Aug.	63	„ 84	5 „
March	48	„ 92	1 inch	Sept.	64	„ 84	6 „
April	58	„ 93	6 inches	Oct.	53	„ 82	5 „
May	61	„ 92	6 „	Nov.	45	„ 80	1½ „
June	63	„ 88	3½ „	Dec.	43	„ 77	½ „

It will be observed from this that the Winter period is not unlike that of our Brisbane Winter with its cool nights and pleasant dry days. The Summer range, too, is much like Brisbane, and the rainfall average is also like our average Summer season, though their Winter is much drier than ours is on the average. *Coelogyne lentiginosa* should, therefore, be given bushhouse treatment in Brisbane and the North—but should the Winter be a wet one it should be moved into a cool, dry part of a glasshouse. In Sydney, it will probably be desirable to move it into a glasshouse during the colder weather, and probably this policy will be wise in the colder parts of Queensland. It is worthy of note here that much of the difficulty found in growing Burmese orchids in Queensland is due to the fact that the origins of the plants have been so loosely stated.

Burma has an area of 263,000 square miles, and its climate ranges from the frost bound regions of the Himalayan slopes to the wet, moist heat of tropical rain forest country with all the variations possible in between. It is, therefore, almost impossible for anyone, not knowing the location from which a Burmese orchid has come, to pick the right conditions for it. I hope that the information I give from time to time in the course of these notes will help growers to overcome this difficulty.

COELOGYNE MASSANGEANA. *Native of Assam.*

Pseudobulbs three to four inches high and pyriform in shape. Leaves are produced in pairs and are long, broad and pointed. Flower spikes long and pendent, and carry up to 20 or 30 flowers, each about 2 inches in width. Sepals and petals pale yellow, lip reddish-brown, marked with yellow streaks, tipped with white, disk brown, with three crests of light yellow. This is another of the many orchids found in the Khasi Hills. It grows on the upper parts of tall trees and needs plenty of light at all times. Bushhouse or glasshouse treatment will suit it in Brisbane—a glasshouse being preferable in the colder parts and in the South. In North Queensland a cool part of the greenhouse will serve excellently. Give it copious water right through the Summer and Autumn. It has the rather unusual but pleasing habit of flowering twice a year—in Spring and Autumn. As soon as the Autumn flowering is over let it have a dry resting period until the first Spring day—then commence watering again. Like most of the *Coelogynes*, it dislikes having its roots disturbed, and is rather slow at establishing itself, and for this reason has not proved a very satisfactory subject in the past. It is desirable to pot this species in a good sized basket to give it plenty of growing room.

COELOGYNE MOOREANA. *Native of Annam.*

A small growing and rather rarely met with species, from the slopes of Pu Atwat in French Indo-China. The pseudobulbs are short (about an inch to 1½ inches high) yellowish, and very corrugated. They are surmounted by a pair of narrow, pointed, green leaves. The flower racemes come from the base of the matured bulbs and carry five to six flowers, creamy white in shade and rather like *Coelogyne flaccida* in form. It likes a fairly dry atmosphere for the greater part of the year, but in late Summer and Autumn it needs copious water. Bushhouse treatment is best for it in Brisbane and the North, but in the South it will need the protection of glass in the Winter.

COELOGYNE NERVOSA. *Native of Northern India, and also reported from the Nilgiri Hills.*

Another cool growing species somewhat resembling *cristata* in its manner of growth. The pseudobulbs are egg-shaped, but very much corrugated and are surmounted by a pair of fleshy, broad leaves about 6 inches in length. Flower spikes erect but short, carrying from three to five blooms each about 2½ inches across. Sepals and petals pure white. Lip is white underneath, but the inside is a rich sulphur yellow with orange stripes. Treatment as for *barbata*. Flowers in Winter and blooms last 4 or 5 weeks.

COELOGYNE ODORATISSIMA. *Native of Southern India.*

A small growing species which bears large numbers of smallish, white, sweetly scented flowers on slender drooping racemes. The pseudobulbs are spheroidal in shape and about an inch tall, and are surmounted by a pair of pale green, pointed leaves about 4 inches long. The flowers are about 1¾ inches across and are pure white, the lip having a slight yellow stain in its centre.

It grows on the top of the Nilgiri Hills, where it is found growing upon the stones amid the wet moss.

It requires cool treatment at all times and should be in a bushhouse in Sydney and the cooler parts of Brisbane, where it can have a temperature range from about 40° to 76°. It likes ample water in Summer, and rather less in the Winter, but should never be allowed to become dry even in the coldest weather.

COELOGYNE PANDURATA. *Native of Borneo, Malaya, etc.*

This outstanding species has large, flattish, oval pseudobulbs, which are rather widely spaced on a thick, creeping raceme, topped by a pair of striking, broad, stout, leathery and plaited leaves, bright green in colour, and about 15 inches long. The raceme is upright in the early stages, but, as the numerous buds develop, it becomes arched and finally somewhat pendulous. The flowers are up to 3 inches across, and have sepals and petals of a light pale green colour, the lip being a greenish yellow with broad, black stripes running lengthwise, and terminating in a black blotch towards the front, which is curiously warted, and the disk has two warted crests converging in a patch of warts.

Coelogyne pandurata, like *asperata*, grows on the trees in the coastal swamps of Borneo and Malaya. It requires the same cultural treatment as does *Coelogyne asperata* (which see). It should be grown in a long shallow basket to allow plenty of room for growth.

COELOGYNE PELTASTES. *Native of Borneo.*

This interesting species has pseudobulbs shaped like a half-moon, one side of which is concave, and this concave side grows against the host tree, and thus forms a sort of reservoir which collects water for the use of the plant. The leaves are about 4 inches long and are narrow and pointed. The flowers are about 2 inches in width, and have green sepals and petals, and a broad and recurved white lip marked with yellowish brown stripes and blotches. Cultural treatment as for *Coelogyne asperata* (q.v.).

COELOGYNE SANDERIANA. *Native of Timor and other Islands of the Sunda Group.*

This lovely orchid has flowers which are something like those of *Coelogyne cristata*, but the appearance of the plant itself is very different. It has oval, wrinkled pseudobulbs about 2 inches long, each of which carries a pair of stalked leaves about a foot in length, 2¼ inches in width, prominently veined and dark green in colour. The flower spikes proceed from the young growths, are pendulous and carry five or six white flowers, 2½ to 3 inches across, with narrow, pointed sepals, the petals being half as broad again. The three-lobed lip has its centre lobe blotched with deep yellow, whilst the side lobes have a number of reddish brown stripes. The Sunda Islands are close to the equator, and there is very little difference between Summer and Winter. The climate is warm and moist, and there is copious precipitation for six months of the year. *Coelogyne Sanderiana* will require warm treatment (never less than 60°) always, and in the Summer months

must be kept saturated. In the Winter months much less water is required, but the plant should never become dry. Like most *Coelogynes*, it is slow at starting growth and flowering, but, once established, grows vigorously and flowers regularly. Flowers produced in late Summer, and last for 3 or 4 weeks.

COELOGYNE SPECIOSA. *Native of Java, Borneo, and Malaya.*

A vigorous species, with tall oblong pseudobulbs bearing a long, thin, pointed, dark green leaf. Flowers 3 to 4 inches across and produced either singly or in pairs from a short stalk. Sepals and petals (which latter are longer and narrower than the sepals) olive green, the lip is a brilliant yellow veined with crimson, the base being a dark brown colour, and pure white and fringed. The lateral lobes are small and pointed. Two hairy crests run down the centre of the middle lobe. This species flowers very freely and sends out a succession of blooms—well developed plants having been known to flower from Spring right through to late Autumn. The individual flowers last well. Although a native of tropical countries, it actually needs comparatively cool treatment, for it is found high up on the mountains at an elevation of from 6000 to 8000 feet. Bushhouse treatment will serve this plant from Sydney northwards in the Summer time, but in the cooler climates it will be desirable to move it into the glasshouse during the cold months. Copious water must be given it during the Spring, Summer and Autumn, but in Winter only enough to keep the plant from going back will be needed. There are many other species of *Coelogyne*, but those given are the best of the genus.

COMPARETTIA

A small genus of epiphytcal evergreen orchids allied to the *Oncidium*s. They grow on the lower slopes of the Andes, and will do well enough in a warm bushhouse or glasshouse. They must never be allowed to become dry, and this fact makes it difficult to import them. Possibly the institution of a trans-Pacific air service may overcome this disability and enable them to be added to our collections in Australia, for they are a distinctive and beautiful genus.

They will grow well, if fastened to a block of tree fern or hardwood and suspended in a shaded part of the bush or glasshouse—alternatively, basket culture is satisfactory, and pot growing moderately so. A compost of two parts of sphagnum moss to one of peat or fibre is most suitable. Ample water must be given at all times.

Any of the following species are desirable:

COMPARETTIA COCCINEA. *Native of Mexico, Brazil, etc.*

Small growing. Flowers (usually 7 to 9) on scapes from apex of young bulbs.

Brilliant scarlet and orange sepals and petals, and broad, flat lip. Spur long. Flowers last 5 to 6 weeks. Midwinter.

COMPARETTIA FALCATA. *Native of Peru—Pacific Slopes of the Andes.*

Small growing. Single leaf. Flowers—crimson purple. Lip broad and heart-shaped. Very suitable for bushhouse cultivation. Blooms last 6 to 8 weeks. Spring.

COMPARETTIA MACROPLECTRUM. *Native of Colombia.*

Small growing. Two—sometimes three leaves. Usually five or six flowers on scape from base of bulbs. Sepals and petals rose coloured, spotted purple. Lip very large, magenta with purple spots. Spurs about 2 inches long. Flowers in Spring. Blooms last 4 to 5 weeks.

CORYANTHES

A remarkable genus of evergreen epiphytical orchids, some half-dozen species of which make interesting and attractive novelties worthy of inclusion in any collection where suitable conditions can be afforded them. They grow in the moist, hot jungles of northern South America, growing out on the ends of the branches of the great trees where they get the full benefit of the sunlight.

There are probably no more remarkable orchids than the species of the genus *Coryanthes*. It is impossible to give an intelligible description of the flower, the most notable feature of which is the helmet-shaped lip—which is attached to (or detached from) the rest of the flower by a stout headed stem. This stem has, near its base, a gland which secretes a sweet watery fluid which during the maturity of the flower drips into the helmet-shaped lip or pouch, attracting the bees necessary for the fertilisation of the flower.

All the plants of this genus require warmth and light at all times, and during the growing period need copious water. Even in Winter the compost should not be allowed to become so dry as to allow any shrivelling of the pseudobulbs. As in all other cases where heavy watering is required, it is essential that the drainage of the pots shall be perfect. Basket culture is the most satisfactory method of growing them, but pots suspended close to the roof of a glasshouse will serve.

The best compost is a good fibrous peat topped with live sphagnum moss—but the substitution of *osmunda* or *todea* fibre for the peat is a satisfactory alternative.

It is characteristic of the genus that the blooms, though large and brilliant, are short-lived, like those of their close relations, the *Stanhopeas*, rarely retaining their form more than three or four days. The following are the chief species:—

CORYANTHES BUNGEROTHII. *Native of Venezuela.*

Pseudobulbs ovoid in shape and about 2½ inches long, the leaves, produced singly from each bulb, are up to 15 inches long, narrow and acutely pointed. The flowers are produced on a long stem from the base of the matured pseudobulbs—one bloom being produced on the stem. The flowers are large (specimens a foot across having been reported). The sepals are a greenish white—the petals being whiter, and are covered with purple spots, those on the petals being larger and more numerous than those on the sepals. The large, strange lip is yellow at the base, gradually deepening in colour to a brownish yellow, and the characteristic hood being a brilliant orange inside and spotted with reddish brown.

It flowers in early summer.

This species is found in the coastal jungles of Venezuela, where the temperature range is as follows:—

January	61°	to	87°	July	66°	to	90°
February	61	„	89	August	68	„	93
March	61	„	94	September	67	„	93
April	66	„	95	October	65	„	94
May	68	„	98	November	67	„	90
June	68	„	94	December	61	„	89

It will be seen from this table that there is very little difference between Summer and Winter. The rainfall averages from 4 to 5 inches per month from the middle of Spring until the beginning of Winter, when it falls away to an inch, or less.

It can be grown in a bushhouse in the Summer time in the warmer parts of Brisbane and the North, but should be moved under glass as soon as the temperature commences to cool off. Although not essential, a heated glasshouse is desirable during midwinter (in Sydney this definitely will be necessary) as the temperature should not be allowed to fall much below 55° at any time. Water freely during the growing period, but slacken off in the cold weather to enable the plant to rest, but do not let the plant get so dry as to allow shrivelling to commence. When the flowers open the plant can be moved to a cooler and drier situation, thus prolonging for a few hours the life of the blooms.

CORYANTHES MACRANTHA. *Native of Venezuela.*

Flowers 6 or 7 inches across. Sepals and petals brilliant yellow, spotted irregularly with purple-red dots, the pouch is 2 inches across and is brownish-yellow, the hood is the same colour and is supported by a purplish coloured stem. The flowers, which are usually borne three on each scape, are powerfully but agreeably scented and last three or four days. It requires the same cultural treatment as *Bungerothii*.

CORYANTHES MACULATA. *Native of British Guiana.*

A beautiful species from the jungles of Demerara. Pseudobulbs 5 to 6 inches long and tapering. Leaves, which are produced in pairs, are broad and pointed and rather

fibrous. Flowers are borne on a long scape from base of matured bulbs, and are generally in clusters of from 6 to 12. Sepals and petals pale brownish yellow, the lip tinged and spotted with purple.

This species requires warmer and moister treatment than those previously mentioned, and the temperature of its house should not be less than 67°-70° at any time, so that even in Brisbane a heated glasshouse will be necessary in winter. In the far North an ordinary glasshouse will probably serve. It also requires more water than the Venezuelan species, and even in winter should be kept damp, as it does not need so pronounced a resting period.

CORYANTHES MACULATA PUNCTATA. *Native of British Guiana.*

A finer variety of *C. maculata*. Sepals and petals palish lemon-yellow, thickly spotted with burgundy red—hood and pouch a warmer yellow, richly spotted and blotched with purple—the back of the pouch being almost covered with the purple. Strongly scented. Flowers in late Autumn. Same treatment as for *maculata*.

CORYANTHES SPECIOSA. *Native of Northern Brazil and British Guiana.*

Pseudobulbs about 5 inches high. Leaves in pairs—broad, pointed and membranous. Flowers about three inches across. Usually three flowers on a scape. Dull pink in colour, more or less closely spotted with dark brown dots and blotches. Powerfully scented with a rather disagreeable odour. Same treatment as for *C. maculata*.

C O R Y B A S (Corysanthes)

Australia has its Helmet orchids also, but our genus is little suited for horticultural purposes, the flowers of the largest species being little over an inch across, even in the largest specimens. However, they have a quaint beauty of their own, and for those growers who specialise in Australian native orchids, several of the Corysanthes make an attractive show when grown "en masse."

CORYBAS ACONITIFLORUS

Somewhat smaller than *C. fimbriatus*, is found in the coastal areas from Far North Queensland down into New South Wales. There are two varieties—a reddish purple flowered one, and a greyish one. A charming little plant. The same method of cultivation as suggested for the following species will suit, but it likes rather warmer conditions.

CORYBAS FIMBRIATUS. (Illustrated.)

Is the largest species and is found in New South Wales, Victoria and Tasmania. It is usually found growing in open forest glades and in many of the moist gullies

throughout the coastal areas from about Sydney south, though it has also been occasionally reported north of that City. It is a dwarf growing plant with what are called obicular-cordate leaves—that is they are roundly heart-shaped, the stems being 2 to 3 inches high and the flowers solitary. The dorsal sepal is greatly incurved to form a quaint helmet-like cap, under which the labellum tube is incurved and partly concealed. The flower is beautifully fringed, and the hood is veined and marked in an attractive manner. The plant springs from small underground tubers and care must be taken to avoid any damage to these when transplanting. They are best grown in a fairly deep tray in a compost of three parts loam, one part each dried dung and leaf-mould and one part sharp sand. Keep in an airy position and maintain cool, damp surroundings. In Winter less water is necessary. They flower between May and August under natural conditions, and with care a good clump will maintain a succession of blooms over a long period. There are several other species, but the two mentioned are the best of them.

CYCNOCHES

This is another interesting South American genus which is worthy of being added to our collection. It is related to the *Stanhopeas* and its species are easily grown (with a little care) and flower freely. A definite resting period is essential, and while at rest they should be given cool, dry conditions. They should be potted in a compost of fibrous peat, or fibre, with a little sphagnum. The addition of a little well dried dung to the compost is a satisfactory variant from the standard potting. Perfect drainage is essential, for the slightest suggestion of a sour or soggy compost is enough to kill them. The following are the best species.

CYCNOCHES AUREUM. *Native of Honduras, Nicaragua, etc.*

Pseudobulbs thick and fleshy and from 6 inches to a foot in height, with four large, plicate, heavily veined leaves which wither and fall off as soon as the bulb has finished growing. The flowers are produced on long racemes which droop from the axils of the leaves and bear up to 20 (or even more) large flowers, having narrow, pointed sepals and petals of a rich, golden yellow colour, dotted with purple. The tips of the petals are incurved. The lip is small and grows from a short stalk. It has a rounded disk, the edge of which is much divided into a series of pointed segments. This plant grows on the lower slopes of the ranges in Honduras and Nicaragua, and in parts of Guatemala at an elevation of from 3000 to 4000 feet. During the growing period it will require a minimum temperature of about 56 degrees, but when growth is completed, somewhat cooler conditions are desirable to ensure rest. The rainfall in the natural habitat of the plant is profuse in the Summer and Autumn, but the Winters are almost rainless. It is desirable, therefore, that the plant be kept almost dry throughout the resting period.

CYCNOCHES CHLOROCHILON. *Native of British Guiana.*

This orchid is sometimes referred to as "The Swan Orchid," from the fancied resemblance to a swan's neck and head in the long slender column—in fact, the genus gets its name from this fact. The pseudobulbs are long (about 12 inches) and fleshy, and carry some four broad and prominently ribbed leaves about 10 to 12 inches in length. The flowers are produced on rather short curving scapes, and are about five inches across. There is considerable variation in the colour of these, but a shade of yellowish-green is usual, and the lip ivory white with a dark olive green shiny blotch in the centre. The column is long and curved and swollen into a prominent round knob at the apex. The number of flowers varies from three to about ten on each scape. They last for some three weeks in midsummer.

Cycnoches chlorochilon is found in the thick jungles on the slopes of the Roraima Mountain, near the borders of British Guiana, Brazil and Venezuela. This species requires warmer treatment than does *aureum*, and also rather more water in the growing period. A warm bushhouse will serve in the warmer parts of Brisbane, but, in the cooler parts and southwards, glasshouse treatment will be desirable, particularly in the Winter months when the plant must be kept as dry as possible, without allowing the pseudobulbs to shrivel. Given suitable conditions this is the easiest species to grow and it is a very free bloomer.

CYCNOCHES LODDIGESII. *Native of Dutch Guiana.*

Pseudobulbs short and spindle-shaped, sheathed by the bases of the leaves which appear in two parallel rows and are broad and pointed. The racemes come from the top of the stem and usually carry from six to eight large, fragrant flowers about 4 inches in width. The flower has sepals and petals of a deep brownish green, the sepals with chocolate spots. The lip is trowel-shaped, and is white (sometimes with a pale pink flush) spotted with blood-red dots. This species occasionally produces two very distinct racemes of flowers from the one pseudobulb at the same time. The flowers appear in early Autumn—last for about three weeks if kept cool and dry.

Treatment as for *C. chlorochilon*.

CYCNOCHES VENTRICOSUM. *Native of Guatemala.*

An interesting species which occasionally astounds its growers by producing two totally different types of flowers—so diverse that one can hardly believe they are produced by the same plant. Pseudobulbs tall and fleshy, and sheathed with the bases of the membranous, broad pointed leaves. Usually two racemes are produced at a time, these proceeding from the axils of the top leaves on the latest matured stems. As a rule, each spike carries five flowers, having broad pointed sepals of pale green, the petals being the same colour but about twice as broad with a downward curve. The lip is white and has a black callosity on the claw that connects it with the column. It blooms in midsummer and early Autumn, and the flowers last about three weeks. Occasionally instead of, and sometimes concurrent with, the usual flowers, it sends forth a long drooping raceme carrying

a large number of small black flowers, with narrow sepals and petals folded back, a disk-like labellum, with a horn in the middle and with fringelike projections around the edge.

The treatment recommended for *C. aureum* is suitable for this species.

CYCNOCHES WARSCEWICZII. *Native of Guatemala.*

Another freakish species. It bears two distinct types of flowers at the same time, one type being female and the other male flowers. The general nature of the plant is similar to that of *C. ventricosum* (of which it is sometimes classed as a variety). The female flowers are the larger and are produced three or four at a time on a short raceme from the axils of the upper leaves. They have broad sepals and petals and a broad, undivided lip, the colour of the flower being a delicate green. The column is short and club-shaped. The male flowers, much smaller, grow on a long pendulous raceme, and usually number twelve to eighteen. Sepals and petals pale green, and the lip is bright yellow, divided into many segments. The column is long and curved.

Treatment as for *C. aureum*.

The above are the best species of an interesting genus, but there are several others well worth growing, and growers who have an opportunity of adding one or more of the species to their collections should not fail to take advantage of the chance.

CYMBIDIUM

This genus may be looked upon as the Cinderella of the orchid family. Although the number of species is fairly large, very few of them were considered to be of more than botanical interest, probably because their colourings are less vivid than the *Dendrobiums*, *Cattleyas*, etc. But the fairy prince has now found Cinderella out, and by the use of his magic hybridising wand he has made of the *Cymbidiums* one of the most attractive genera that grace an orchid collection. I do not propose to deal with the hybrids in this table; they are too numerous now, and the crosses have become so complex that they are quite outside the scope of my present work. I shall, therefore, confine my attention to the natural species best known and most suitable for the collection of the amateur orchid collector.

The majority of these come from the higher altitudes where they grow in the upper branches of tall trees, exposed to the sunlight and to all winds that blow.

Although epiphytes, we have, for cultural purposes turned them into terrestrials, or nearly so. In Sydney I saw growing in the ordinary beds of a border garden great plants of *Cymbidium* which have flourished for many years in that position, while the same and other species are growing in outdoor rockeries in at least two other places in Sydney.

My own experience has been, that, in Brisbane, *Cymbidium* species (and hybrids, too) grow excellently, well out in the open where they get some little shade from the heat of the midday sun—preferably from the foliage of a tree. The only species which has failed to respond to that method of cultivation for me has been that notorious breaker of orchid-growers' hearts, *Cymbidium Huttonii*. Even it seemed to improve for a while after I got it out into the open, and I am inclined to believe that its ultimate demise was more due to its cussedness than to any particular dissatisfaction with its situation.

Being a hardy epiphyte, the *Cymbidium* can be grown on a block or raft, in baskets, or in pots or wooden tubs. For small plants, pots are the most suitable, and for very large plants wooden tubs are excellent. Their root system is extensive, so that they require ample room, but the best results are obtained from under-potting rather than over-potting. The ideal is to have a pot which will comfortably accommodate the roots and allow of a reasonable thickness of compost below and around the plant. Opinions vary considerably as to the best compost to use for these plants. I have experimented with the following:

- (1) Equal parts leaf-mould, sand and turfy-loam.
- (2) Similar to (1), with the addition of a liberal seasoning of bone-meal.
- (3) Similar to (1), with the addition of about 25% dry cow-dung.
- (4) One part staghorn peat chopped and shredded, one part osmunda fibre, one part leaf-mould, one part sand, and one part dried dung, with a little powdered brick and charcoal mixed in, together with a little chopped sphagnum.
- (5) One part each peat, osmunda, todea, loam and dung and leaf-mould.
- (6) Polypodium fibre with good drainage of charcoal and crocks.

Frankly, I can see little, if any, difference in the results obtainable from these composts, and I have come to the conclusion that any or all of them will serve. It is fair to say that the two plants potted in compost (6) have only been so potted a comparatively short time and they have made exceptionally vigorous growth.

I am of the considered opinion that you cannot overwater a well drained and healthy *Cymbidium* during the warmer months. A thorough soaking each morning from the first warm days of Spring right up to the first cold days of Autumn will produce a healthy and vigorous plant. If you then slacken off the water until the winter comes and keep the plants comparatively dry throughout the cold weather the growths will mature and you should have a wealth of blossom in due season. Only from well grown vigorous healthy plants can you expect to get perfect flowers.

The following species are either in general cultivation or are worthy of it for one reason or another:—

CYMBIDIUM AFFINE. *Native of Sbillong and Assam.*

Pseudobulbs spherical, about three inches in height with long strap-shaped leaves in parallel rows. Flowers borne two or three at a time on short, erect scapes.

Sepals and petals white, lip white with blotch of purple at rear with two golden yellow crests; and a crimson purple patch in the throat. About two to two and a half inches across and delicately scented. Blooms late Winter and early Spring. Outdoor treatment will suit this plant in Sydney and Brisbane, but it is desirable that it be placed where it gets some protection from the midday sun. Watering should be profuse during the Summer, but very much less is needed in the Winter months.

CYMBIDIUM IRIDIFOLIUM. *Native of Australia.*

One of our native orchids found on the gum and ironbark trees on the forests of the coastal areas from the far north of Queensland down into New South Wales. The plants are handsome with three pseudobulbs 6 to 12 inches tall, topped with long and graceful leaves. The racemes are up to two feet in length and carry numerous golden-brown to brownish-green flowers which last for a long time. They are sweetly scented. Although there is nothing particularly striking about the flower, the plant is worth including in collections for comparison with the exotic varieties and also for the purpose of gaining experience in the growing of orchids by beginners. No difficulty is experienced in cultivating it, but the best way is to place it firmly in a wire basket well packed with staghorn peat; hang the basket to a branch of a tree and the plant will do the rest. (Syn. *Cymbidium albuciflorum.*)

CYMBIDIUM ALOIFOLIUM. *Native of Burma.*

Pseudobulbs spheroidal and about 2 inches tall. Leaves strap-like and fleshy, dark green in colour, and up to about 18 inches long. Flower scapes short and pendent, carrying up to ten flowers, each about $1\frac{1}{4}$ inches across. Sepals and petals dull yellow, lip yellow marked with brown. They last for some weeks. Flowering period late Winter and early Spring. This plant is rather slow growing, and is a shy bloomer until it has become well established. It is a native of the mountain ranges in Kachins, one of the northern provinces of Burma, where it grows at an elevation of 8000 feet. Here the Summer is soakingly wet, it being looked upon as worthy of remark should there be seven or eight days in succession on which rain does not fall between daylight and dark, quite apart from the almost invariable downpour after dusk each evening. The Winters are comparatively dry. The Summer temperature ranges from a minimum of about 53° to a maximum of 87° , while the Winter range is about 40° to 67° . The plant, therefore, should be grown in the coolest position possible. A cool, shady place in the open air will suit it well enough—failing this, the coolest part of a well-lighted, airy bushhouse. This species is not likely to grow in the North.

CYMBIDIUM BICOLOR. *Native of Ceylon and Southern India.*

This pretty *Cymbidium* has short, stout pseudobulbs crowned with fleshy strap-shaped leaves up to 30 inches in length and about an inch across. The flower spikes are pendent and bear up to 30 beautiful flowers with creamy sepals and petals striped with rosy purple. The crest of the lip is tinged with yellow. The

flowers are smallish, being about 1 to 1½ inches across. They are slightly perfumed with a suggestion of narcissus. Treatment as for *Cymbidiums* in general but rather less water than usual is required. Because of their pendent flower spikes they are well adapted for growing in hanging baskets. They dislike being disturbed and once established should not be repotted except when absolutely necessary.

CYMBIDIUM CANALICULATUM. *Native of Australia.*

This interesting and extremely variable species is found over a wide range of territory, variations of it being found from the coastal rain forests of North Queensland to the forest areas about Newcastle in New South Wales. Unlike most of the other epiphytical orchids it is not confined to the coastal areas, where ample rainfall is the rule, but extends out to about Moree, in New South Wales, and to Chinchilla (and perhaps further West) in Queensland. It is also found in the Northern Territory, and North-West Australia. The manner of growth differs little (if at all) throughout this wide area of distribution, but there is a considerable variation in the colouring of the flowers. Some of the areas in which it is found are notoriously dry, and in those places the plants are invariably found on hollow stumps, dead trees, or living trees with hollows in trunk or branches. The roots penetrate through any interstices down to the moist centre of their host, which is usually a sort of natural reservoir, enabling the plants to live through the frequent droughty periods. Instances have been noted where the roots of this orchid have travelled to a distance of forty feet to reach this water supply. The coastal growing varieties do not have to send their roots on such voyages of discovery, but, like most other epiphytes, use them to extract their food requirements from the atmosphere, and also to maintain a firm grip on their host tree. *C. canaliculatum* flowers very freely once it is established, and is quite an attractive plant, although the individual flowers are not very large.

Rev. H. M. R. Rupp, a noted authority on Australian orchids, has classified *canaliculatum* as follows:—

C. canaliculatum—type form—

- (1) *Forma inconstans*. The commonly found type ranging from about Newcastle (N.S.W.) to Broad Sound (Q.). Sepals and petals—outside, brown or green; inside, dull to light green, with heavy brown blotches or flakes. Labellum white, dotted purple.
- (2) *Forma aureolum*. Found chiefly west of the Dividing Range in northern New South Wales and Southern Queensland. Sepals and petals outside, almost bronze; inside, golden yellowish-green with red blotches or spots. Labellum very white with red dots. The varieties found in North-West Australia appear to belong to this form.

C. canaliculatum—variety *marginatum*.

- (1) *Forma fuscum*. From Cape York to Mt. Garnet and perhaps more widely spread. Sepals and petals outside, brown or greyish; inside, uniformly brown with a narrow pale-green margin. Labellum greenish-white, dotted red.

(2) *Forma purpurescens*. From the head of the Brisbane River to Proserpine. Sepals and petals outside as last, inside, uniformly magenta or cerise, with a narrow pale-green margin. Labellum white—spotted.

C. canaliculatum—variety *Sparkesii*. Found at Mareeba and other North Queensland areas, and also the Northern Territory. Sepals and petals uniformly intensely deep maroon, appear jet black except when viewed by transmitted light. Labellum pink with deep red suffusions or spots.

The treatment necessary for *canaliculatum* will, of course, vary according to the districts from which the individual plants are obtained. Thus variety *Sparkesii* from the rain forests of North Queensland will require rather more water and warmth than the common species from Central and South Queensland, while the form from the dry Western areas will require drier conditions than either of the others. The wide distribution of the species is evidence of good powers of adaptability, and fairly average conditions will probably suit almost any variety. I grow *Sparkesii* under glass, and keep it fairly moist in the Summer period. Variety *aureolum*, I have in a small pot hanging from the branch of a tree. It is never watered, and depends upon rain and dew for its moisture.

CYMBIDIUM DAYANUM. *Native of Assam.*

One of the *eburneum* group. Pseudobulbs about 3 inches tall. Leaves very long, about three-quarters of an inch in width, and fairly thick. Racemes drooping and carrying from up to 15, or more, yellowish white flowers, the sepals and petals having reddish streaks in the centre, while the lip has a border and numerous streaks of the same colour. It comes from the Khasi Hills at an elevation of between 5,000 and 6,000 feet. Treatment as suggested for *C. affine* will suit.

CYMBIDIUM DEVONIANUM. *Native of Northern India.*

Different in appearance from most other *Cymbidiums*. Pseudobulbs egg-shaped, about 2½ to 3 inches tall. Leaves something like those of an arum, but more leathery in texture. Racemes are drooping and carry up to two dozen or more flowers of about 1½ to 2 inches in width. Sepals and petals pale yellowish-brown, with reddish-purple markings, the lip having a white base, closely lined and blotched with crimson-purple, the back portion having a large blackish-purple blotch on either side. It flowers in the Winter. Cool bushhouse treatment is satisfactory. Plenty of water during the Summer, but slacken off with the Autumn, keeping the compost just sufficiently damp in the Winter time to allow of a resting period without withering of the pseudobulbs. (Not very suitable for growing in North Queensland, as it comes from the Vindhya Ranges, at an elevation of about 8000 feet. However, if cool conditions are available, it is an unusual and interesting variety to have in a collection).

CYMBIDIUM EBURNEUM. *Native of Assam and North Burma.* (Illustrated.)

A very lovely species, but one which is something of a shy flowerer. In well grown plants the pseudobulbs (which form in the growths as they mature) are

from 2½ to 4 inches in height and oblong in shape. The leaves are sword-shaped, pale green in colour, about 2 feet in length, and ¾ inch in width. Flower spikes are erect and about 9 inches long, and carry two or three large, ivory white, sweet-scented flowers. The lip is white, like the petals, broadly banded with yellow and with a yellow crest. Flowers in Spring, and blossoms last 5 to 6 weeks under suitable conditions.

Shaded open air treatment or a cool, airy bushhouse will serve.

Crossed with *Cymbidium Lowianum*, this species gives the very popular hybrid *eburneo-Lowianum*.

CYMBIDIUM ELEGANS. *Native of Nepal.*

This orchid is now classed botanically in a small separate genus known as *Cyperorchis*; but as the species comprising it are known to orchid growers as *Cymbidiums*, and as they resemble *Cymbidiums* in manner of growth and in their cultural requirements I am dealing with them here.

C. elegans has long, narrow, sword-like leaves and smallish, compact pseudobulbs, and produces its numerous flowers upon short, densely sheathed scapes from which a large number (up to 40 or 50) of cylindrical flowers appear. These are about 1½ inches long and closely overlap each other on the scape. They are a tawny yellow in shade (as a rule, though there is a white variety as well). They do not open fully, but make a graceful "plume." The lip is spotted with red.

They flower in the Autumn, and last well. The same general treatment as previously prescribed will suit them.

(Syn. *Cyperorchis elegans*).

CYMBIDIUM GIGANTEUM. *Native of Nepal.* (Illustrated.)

One of the best known and most frequently grown species. It is vigorous growing, and flowers freely in Queensland, and although its colouring is rather dingy its large flowers and prominent bright lip make it an attractive item in a collection, while its easy culture makes it a suitable subject for the experiments of the beginner. The pseudobulbs are large and fleshy, and are swathed with the broad, sheathing bases of the long and plentiful ensiform (sword-like) leaves. The flower scape comes from the roots at the base of the pseudobulbs, and is stout, long (reaching a length of three feet at times), and erect, but becomes bowed as the buds develop and the flowers open. As many as 25 large flowers (though usually somewhat less) may be produced from each scape. They are between four and five inches across and have dull greenish-brown (sometimes yellowish) sepals and petals, streaked and dotted with flat reddish or purplish marks. The lip is prominent and large, and is yellow, sometimes densely spotted with bright crimson—and sometimes only spotted in the margin. It flowers during the Winter (sometimes early Spring), and the flowers last up to 6 weeks if kept reasonably dry.

Outside treatment serves this species excellently in Sydney and Brisbane. Being particularly hardy it may grow in North Queensland if placed in a cool position,

and kept well watered during the Summer. There is no reason why it should not grow well on the Atherton Tableland, and other high parts of the North.

CYMBIDIUM GRANDIFLORUM. *Native of Sikkim.*

Often called *Hookerianum*. A large and handsome species, albeit rather a difficult subject to grow and flower in Brisbane. Very similar to *giganteum* in form and manner, but distinguishable from that species by the yellow markings at the bases of the leaves. The scapes are tall and erect, but arched with the weight of the flowers. These are between 5 and 6 inches across with sepals and petals yellowish-green (sometimes olive-green) marked with brown, the lip, which is large, broad and handsome, being a bright light yellow with two erect side lobes, all blotched with bright crimson, the middle lobe being ciliate, with two tooth-like plates at the rear.

I am growing this plant outside with other *Cymbidium* species, but am inclined to think that a little warmer treatment is desirable, although it is making good growth.

This species should do well enough in North Queensland, grown in the shade of a tree in the garden.

Culture generally as already prescribed.

CYMBIDIUM HUTTONII. (Syn. *Grammangis Huttonii. q.v.*)

CYMBIDIUM INSIGNE. *Native of Annam.*

The finest species of the genus and the source of many of the fine hybrids now available for collection. Pseudobulbs four or five inches tall, fleshy and sheathed with the bases of the long (2½ feet) narrow (about ½ inch) leaves. The flower scapes are thirty to forty inches in height, erect (but somewhat bowed when the flower buds swell) and carry up to twenty or more beautiful blooms each four inches in width, and with petals and sepals varying from white with a delicate pink flush to a light rose pink (sometimes even deeper), with red dots on the lower sepals and petals. The lip is rounded with a pale pink base flushed with white and a delicate yellow with a few purple dots, the throat being barred with reddish-purple. Flowers in late Autumn or early Spring. The blooms last about four weeks in perfection.

This beautiful species grows on the teak trees that clothe the high ranges forming the inland of Annam in French Indo-China, particularly the slope of Pu Atwat, at an elevation of about 6000 feet.

The temperature range and the rainfall is:—

	Temperature		Rain		Temperature		Rain
	from	to			from	to	
January	49	66	264	July	55	81	192
February	49	69	112	August	56	79	176
March	50	70	248	September	55	74	712
April	54	72	76	October	49	71	1384
May	56	74	204	November	49	70	1652
June	55	78	192	December	49	68	872

It will be seen from this table that the greatest amount of rainfall is precipitated during the Autumn months, whereas the Summer is comparatively dry, though it is never arid. Bushhouse treatment or out of door cultivation as previously advised for *Cymbidium*s will serve, but watering should be maintained right up to mid-winter, slackening as the flower buds swell, and the plant kept just reasonably damp during the Spring and early Summer. This plant likes rather warmer conditions than most exotic *Cymbidium*s. It will hardly stand out of door treatment in Sydney, except perhaps in the warmer part of the Summer. In Brisbane it should stand out of door culture, and, unlike most of the *Cymbidium*s, is worth trying, under cool conditions, in North Queensland.

CYMBIDIUM LOWIANUM. *Native of Northern Burma.*

A very popular and free growing species which is worthy of being included in any collection where it can be given reasonably cool conditions. The pseudobulbs are large and vigorous and are sheathed by the bases of the long, narrow, sword-like leaves. The flower scapes are stout and from two to four feet long, arching gracefully under the weight of the twenty or more large graceful flowers. Sepals and petals are a delicate yellowish-green, faintly marked with brown lines. The lip, scoop-shaped, has large, erect, yellow side lobes; the centre lobe is cream with the front coloured deep maroon or a brownish red, and the back part of the mouth of the throat blotched with maroon, edged with yellow. It flowers in the Winter, and the blooms last as long as two months in suitable surroundings.

The general culture previously recommended for *Cymbidium*s will be suitable.

CYMBIDIUM MASTERSII. *Native of Assam.*

It is similar to *Cymbidium eburneum* in manner of growth, except that the leaves do not sheath the pseudobulbs with their bases. The flower spike is erect and about 9 to 12 inches tall, and bears from seven to ten somewhat drooping blossoms. Sepals and petals ivory white. The lip is white, with purple spots on the front lobe. The throat is yellow. The flowers are strongly scented with an almond-like aroma, and are produced in Winter. Like many other orchids it is found in the Khasi Hills. Treatment as already recommended for *Cymbidium*s will be suitable.

CYMBIDIUM PENDULUM. *Native of Sylhet.*

This handsome plant is of vigorous growth and under suitable treatment grows quickly to great size. Pseudobulbs are stout and large, and leaves are distichous (i.e. growing in two parallel rows), 2 and 3 feet long, leathery, sword-shaped, and deeply furrowed. The racemes are long and pendulous, and carry numerous flowers, each about 2-2½ inches across, with sepals and petals of a yellowish base tinged with olive-green. The lip is three-lobed, the side lobes being a rosy-red, and the centre lobe clear white in the rear portion crowned with two yellow crests, the tip of the lip being red. Flowers in early Autumn and lasts about two months. The treatment already prescribed for *Cym. eburneum* will be satisfactory.

CYMBIDIUM PENDULUM ATROPURPUREUM. *Native of Borneo, etc., and Northern India.*

A striking orchid. Growth similar to the type form (*supra*), but leaves rather thicker and slightly more erect. Racemes very long and pendulous. Flowers very numerous and heavier in substance than those of most *Cymbidiums*. Sepals and petals yellowish green on the outside, and a deep rich purple on the inside. Lip white, blotched with crimson. Flowers in early Summer or late Spring. Flowers last for two months.

This orchid requires rather warmer treatment than most of the species, and should be grown under glass in Sydney and the colder parts of Brisbane—in fact, it will be well to move it in to the glasshouse with the first cold nights of Autumn, for it should not be subjected to a minimum temperature of less than about 46 to 48°. Give ample water right through the warm months, and do not let the plant become dry, even during the Winter.

CYMBIDIUM SUAVE. *Native of Australia.*

A dainty little *Cymbidium*, particularly the bright green variety. Unlike most of the other *Cymbidiums*, this species does not form swollen pseudobulbs, the stem being slender and about a foot high. The leaves, produced in parallel rows, are narrow, somewhat grass-like, and dark green. The racemes are long, and carry a large number of smallish flowers. The sepals and petals vary from an old-gold shade through a brownish green to a delicate bright green. This latter type is found on the iron-barks of south-eastern Queensland, particularly along the ridges of Lamington National Park. The brown and yellowish varieties are most often met with on the lower forest stretches right down to Sydney in New South Wales. All varieties have an aromatic fragrance somewhat reminiscent of pimento.

By reason of its lacking swollen pseudobulbs, and, therefore, being without reserves of nourishment, it is rather a difficult plant to establish unless it is obtained growing in part of its host tree, with its roots uninjured. It has a habit of selecting a branch with a knot-hole or other opening through which it sends a number of roots. If these roots are damaged the plant invariably dies. Unless it can be removed without injury, therefore, it is better to leave it to grow in its natural surroundings.

General treatment as recommended for *iridifolium*.

CYMBIDIUM TIGRINUM. *Native of Tenasserim.*

A small-growing species having small pseudobulbs about the size of and something of the shape of walnuts, much furrowed and wrinkled. These each have four strap-shaped, leathery, somewhat twisted leaves from four to six inches in length. Two of these appear from the base of the pseudobulbs, and two from the top. The flower scape is erect and comes from the bottom of the matured bulbs. It carries two or three flowers, each being about 3 inches across. The sepals and petals are green with a brownish or yellowish tinge and spotted with brown. The lip is large and three-lobed, the side lobes being erect and the front spreading—

colours—white or cream, with cross-bars of reddish-purple. Flowers appear in the early Autumn, and last for 6 to 7 weeks.

This orchid is found between 5500 feet and 6800 feet on the Tenasserim Mountains, in the far South of Burma, in the Isthmus of Kra. This area has a tropical monsoonal climate with an exceptionally heavy annual rainfall, the heaviest part of which falls in the Autumn. Even in the driest months of the year (the end of the Winter) rainfall does not fall below 3 inches, while the coastal temperatures are high and humid throughout the year, seldom falling as low as 60° on the coldest night of midwinter. The range at the elevation at which *Cymbidium tigrinum* grows is comparatively cool, ranging between 42° minimum and 77° maximum.

This orchid will stand ordinary bushhouse treatment in Brisbane, and can be grown out of doors in a sheltered position. Where the temperature falls below 40° it should be moved under glass as the Winter approaches. Water must be applied copiously throughout the Summer, and the compost must be kept reasonably damp even in the Winter.

CYMBIDIUM TRACEYANUM. *Burma.*

A very handsome species resembling *grandiflorum* in manner of growth. The flowers are up to six inches in width. The sepals and petals vary from yellowish-green to brownish-green with lines of dots and streaks of crimson or red running lengthwise, the petals being narrower than the sepals. The lip is prominent, and has three lobes, the side lobes being broad, fringed at the edge, crisped and reflexed. It is creamy coloured, richly marked with reddish bars and dots. The column is greenish, and it also has reddish spots.

The treatment suggested for *giganteum*, etc., will serve this fine species well.

CYMBIDIUM ZALESKIANUM. *Native of Sikkim.*

A natural hybrid between *giganteum* and *grandiflorum* which combines the best features of both parents. Variety *Kalawensis* is particularly fine, though rare. The habit of the plant resembles that of both parents—strong, large pseudobulbs and long, tough, sword-shaped leaves. The flowers are about six inches across, with yellow sepals and petals with a large sulphur-yellow lip, covered with fine golden hairs, brilliantly marked with crimson and with two toothy crimson plates on the disk.

It is said to be rather a difficult subject, but I am growing it under the shade of a tree in my yard, and it is making steady growth, although it has not yet flowered.

CYPRIPEDIUM and ALLIED GENERA

This is one of the most important of the orchid genera, and one of the most popular among orchid growers, though of late years the *Cattleya* group has ousted the "slippers" somewhat from the pride of place. This is quite understandable for *Cattleyas* are actually among the easiest of the orchids to cultivate, whereas the *Cypripediums* present certain difficulties which cause quite a lot of disappointments to Australian growers. Some of these difficulties are due to a failure to realise that the *Cypripedium* takes some time to become acclimatised, and that it is actually rather a slow grower under the best conditions. Hence a grower may have a *Cypripedium* for two or three years without it showing any sign of flowering, even though it has apparently made good growth during that period. This delayed flowering has caused many growers to lose interest in the genus. Besides this inherent slowness of maturing and flowering, there are few orchids more susceptible to unsuitable conditions than the *Cypripediums*, and as too few of us are able to provide suitably varied houses for the many varieties of orchids we grow, it often happens that our *Cypripediums* are simply fitted in wherever there is a space—sometimes with the *Cattleyas*—at others with the *Dendrobiums*, in fact, any old where at all. Again the species of the genus come from widely differing natural habitats, and unless their source of origin has been ascertained, together with some idea of the climatic conditions of those areas, growers are hard put to decide exactly how to treat their respective plants. In these notes I hope to remove this disability, at least to some extent.

The species of the genus are numerous and vary very considerably in the form and colouring of their blooms as well as in the manner of their growth. They differ widely in structure from all other forms of orchids, and botanically they are looked upon as the most primitive of all the orchid family. For systematic classification botanists have divided the *Cypripediums* into several sub-tribes such as *Paphiopedilums*, *Phragmopedilums*, etc., but, for the purpose of this table, such classifications will be disregarded. Many of the species are so rare that they are unlikely to be met with in Australia or obtained from abroad. Others again are not considered worthy of inclusion in orchid collections. All such species will be omitted, but I will endeavour to deal fully with all the better species and their varieties, the conditions under which they grow naturally, and the best means, in my opinion, of cultivating them successfully. I would again emphasise that no arbitrary rules can be set out for growing any orchid—only suggestions as to their ideal requirements based upon their natural conditions can be made, and growers must adapt these suggestions to their own available conditions in the best way possible. If you find that you are successfully growing a plant, and my suggestions differ from your method, you should, of course, adhere to your own treatment until, if ever, you find that your plant has ceased to make progress, or after it has failed to flower in spite of some years of careful attention. If, on the other hand, your *Cypripediums*, or any of them, are not making the progress they should, I am sure that the suggestions I offer will assist you.

As I said before, the genus is wide spread, being found in England, America, Siberia, Japan, China, Tibet, India, Malaya, Cochinchina, the Malay Archipelago, including the Philippines, and New Guinea. To date no true species of *Cypripedium* has been found in Australia, but one species of an allied genus of the same tribe (*Cypripedileae*) has been reported from North Queensland (*Apostasia stylioides*). I have always had the belief that when a thorough botanical exploration is made of the great tract of tropical jungle country high up in the Cape York Peninsula, there is a strong possibility that an Australian species of *Cypripedium* will be found. I may say here that I have on several occasions heard of *Cypripediums* being found in the scrubs of Southern Queensland, but upon investigation every such story has, of course, been proved a fabrication.

CULTURE.

For purpose of cultivation it is desirable that *Cypripediums* be divided into three groups. The first group requires a temperature minimum of not less than 60 degrees. This includes most of the mottled leaved species, such as *Lawrenceanum*, *barbatum*, and *callosum*, and also all those from the tropical areas, such as *Stonei*, *Rothschildianum*, *Sanderianum*, *Philippinense*, *Parishii*, *Lowii*, etc. The second group requires a minimum temperature of about 50 degrees. This includes *bellatulum*, *Charlesworthii*, *niveum*, *concolor*, *exul*, *hirsutissimum*, and *Spicerianum*. The third group is the cool growing class, and its minimum temperature should be about 48 degrees, but in some few cases a temperature of 40 degrees as a minimum will not matter. This group includes (among others) *insigne* (and its varieties), *villosum*, *Boxallii*, *nitens*, etc.

In the warmer parts of Brisbane, practically all the *Cypripediums* will grow in an ordinary bushhouse, though those included in group one and some of those in group two do better in a glasshouse. In the cooler parts of Brisbane, and in Sydney, all the *Cypripediums* will be best served by glasshouse treatment, those of the first group being the better for hothouse treatment in the Winter months. The beginner is advised to restrict his early efforts to those *Cypripediums* which belong to the third group—and these actually include some of the finest species. As his collection grows and he becomes more accustomed to handling plants requiring special treatment he can venture on the second group and, later still, when he has the necessary accommodation he can undertake those of the first group with every confidence of succeeding with them.

COMPOST

Many varied composts have been used and recommended for growing *Cypripediums*—in fact, almost every grower has his own formula. My own experience is that the *Cypripediums* in the different groups, set out above, each do best in a particular compost of their own. Those in the first group seem to do best in a fibrous compost and a mixture of two parts chopped osmunda with one part of sphagnum moss. The drainage must be perfect, and a little charcoal mixed with the compost will help to prevent sourness. Over potting should be avoided, but reasonable root room is advisable. With this compost, tank water is preferable,

as reservoir water tends to spoil the sphagnum moss. Watering must be copious all through the summer months, but in the winter the supply should be restricted to keeping the compost reasonably damp.

Those of the second group do well in a compost of two parts chopped fibre, one part sphagnum moss, one part of fibrous loam with a little good leaf-mould, and a small quantity of well dried cow dung. The *bellatulum* and *niveum* group requires a little limestone or slaked lime mixed in the compost. This group likes rather more light than the plants of the first group. Watering as for the first group.

The compost for the third group is similar to that of the second group with the addition of a little clean sand, charcoal, or powdered crocks.

These three suggested composts must not be looked upon as essential factors for the growing of *Cypripediums*. Local conditions, climatic and structural, will affect the value of any compost used. Thus, in parts where the atmosphere is usually charged with great moisture, or where long rainy seasons are normal, the inclusion of sand, leaf-mould, or loam is apt to lead to a soggy, water laden compost—so that under such circumstances none of these ingredients should be included. The best medium in wet conditions is a good fibrous peat, or a mixture of this and osmunda in about equal proportions. In several instances I have found *Cypripediums*, which had failed to respond to any of the standard composts, have thrived when potted in straight out fibrous staghorn peat. Where heat is used, extra care must be taken to see that the drainage is efficient, and watering must be most carefully controlled as peat has a tendency to hold water longer than almost any other medium.

When a *Cypripedium* has been potted in an unsatisfactory compost and has gone back, and upon examination it is found that its roots have perished or become diseased, the plant can often be saved and restored to vigorous growth by planting it in sphagnum moss, keeping it reasonably damp. As soon as growth is established again, the plant should be repotted in a suitable permanent compost.

Cypripediums generally prefer shaded conditions, and with a few exceptions should not be exposed to direct sun-rays for any length of time—in fact, the shadiest part of the bush or glasshouse is the best place for them.

In the tables of species hereunder I do not propose to differentiate between *Cypripediums* and *Selenipediums*, or the *Uropediums*, as the difference between the various groups is one of botanical interest only. It is a remarkable thing that considering the ease with which so many varying species and genera of orchids have been crossed, and the multitude of bi- tri- and multi-generic hybrids that have been produced, that no successful cross has yet been made between the *Cypripediums* and the *Selenipediums*, although they are so closely akin. On several occasions seed pods have been set and the seeds planted, but in every case where the seeds have germinated and the seedlings have been raised, either the resultant plants have never flowered, or, if they have, have proved to be only a straight *Cypripedium* or *Selenipedium* similar to the pod-bearing parent. Possibly the reason for this lies in the difference in the pollen of the two plants, that of the *Cypripedium* being moist and waxy, while that of the *Selenipedium* is dry and powdery.

The following includes the best and most interesting species of *Cypripediums* and *Pbragmopedilums*. (*Selenipediums* and *Uropediums*).

CYPRIPEDIUM ARGUS. *Native of Philippine Islands.*

A striking species belonging to the second group. Leaves up to 8 inches long and one inch in width. Dark green in colour, beautifully variegated with yellowish green. The flower scape grows from the centre of the growth and attains a height of from 1 to 2 feet, and bears a large and showy flower. The dorsal sepal is large and is white with green stripes and generally a few purple lines at the base. Petals are about 3 inches in length, with wavy edges, whitish in colour, with green stripes towards the base, and rosy at the tips, the surface being covered with purple eyes. They bend downwards. The pouch is broad and brownish purple; greenish underneath.

This plant is found in the island of Luzon, on the slopes of the highlands at an altitude of about 4000 to 5000 feet, this elevation reducing somewhat the tropical monsoonal warmth of the lower levels of the Island. The plant requires comparatively warm treatment and ample moisture right through the Summer and Autumn. The compost should be kept damp, even in the Winter months. In Sydney, and the colder parts of Brisbane and Southern Queensland, glasshouse treatment will be desirable. In the warmer parts a bushhouse giving a minimum temperature of 50 degrees will be satisfactory.

Varieties *Moonsii* and *nigrescens* are fine variations of the type, the former being more densely spotted than the type; while in the latter variety the spots run so much together that they appear like large black blotches (hence the name).

CYPRIPEDIUM BARBATUM. *Native of Malaya.*

A popular and very variable species belonging to the first group. Leaves are about 6 inches long, pointed and channelled. They are light green in colour, beautifully mottled and blotched with dark green. Scapes are from twelve to fifteen inches in height, downy, and purplish. Flowers are borne singly. Dorsal sepal large and broad, the upper half being pure white, while the bottom is pale green, striped with purple. The petals are narrow with a fringed edge, green and white more or less, stained with purple, and with tufts of black hairs protruding from a row of purplish-black warts near the upper edges. The pouch is large and purplish black in colour. It flowers in early Summer and lasts up to 10 weeks. There are many recognised varieties of this species all like the type, but differing in various degrees of colouring and spotting—also in size.

Varieties *nigrum* (larger than the type) and *superbum* (more richly coloured) are the best of these, while variety *biflorum*, though smaller than the type, is interesting in that its scapes are usually two-flowered.

This species will need heated glasshouse treatment in Sydney and the colder parts of Brisbane and South Queensland. In the warmer parts a glasshouse or bushhouse providing a minimum Winter temperature of 65 degrees, will satisfy its requirements. It is found on the lower slopes of Mt. Ophir, in Sumatra, and also

has been reported from Malay Peninsula. The rainfall is ample throughout the year, even the driest month averaging 10 inches. It should never be allowed to become dry—even when in flower it is well to see that the compost is damp.

CYPRIPEDIUM BELLATULUM. *Native of Moulmein.*

A charming and popular species of the second group. Leaves grow to about 10 inches, and from 1½ to 2 inches across. Dark green in colour, prettily marked with grey-green, the underneath being a rich reddish-purple. The scapes are short (up to about 4 inches) and bear single flowers about 3 inches in width. The colouring varies—sometimes white, sometimes cream, and (more rarely) sometimes flushed with pale pink—but invariably profusely spotted with purplish black. The dorsal sepal is round and concave, curving over to form a cap. The petals are almost as broad as long, and the purple spots are usually somewhat larger than those of the sepals. The pouch is small but daintily shaped, and is white with small purple spots. It flowers in the late Summer, and the blooms last several weeks.

This species is very partial to limestone in its compost. I had a very large plant which had outgrown its pot. On dividing it I planted one portion in the general compost recommended above for the second group of orchids with a little lime mixed in—the other I potted in polypodium fibre (see *Cymbidiums*) with some pieces of limestone. Both plants are growing well, but the one in the latter compost is making the more vigorous growth—whether this is due to the fibre or to the extra amount of lime I do not know.

Cypripedium bellatulum grows well in an ordinary bushhouse in the warmer parts of Brisbane, but in Sydney and other cool locations, a glasshouse is desirable, particularly in the Winter months when the temperature of its atmosphere should not be allowed to fall much below 50 degrees at any time. Ample water is necessary throughout the warmer months, and even in the Winter the compost should be kept damp enough to prevent any deterioration of the plant. This species resents disturbance, and should be so potted that it will go for years without repotting.

There are several varieties, including variety *alba*, which is pure white throughout, and is a very beautiful thing, but, unfortunately, hard to come by.

CYPRIPEDIUM BOXALLII—a variety of *C. villosum*. *Native of Burma.*

One of the third or cool-growing group. Leaves green, strap-shaped, about a foot long and fairly broad. The flower scapes are long and bear usually one, but occasionally two, large flowers which have a highly glazed appearance like those of *C. villosum*. The dorsal sepal is broad, and is green with a wide, white margin, heavily spotted with purple. Petals greenish-yellow veined with brownish-purple. Pouch yellow tinged with dull purple. It flowers in late Winter.

This species is found in the forests of upper Burma, in the mountainous country between Myadaung and Wuntho at an elevation of 6,000 feet. Rainfall is moderate during the Summer and Autumn, scanty in the Winter and in Spring. The temperature range is from about 37 degrees in midwinter to a maximum of 83

degrees in midsummer. Cool bushhouse treatment will suit this species admirably from Sydney northwards. Water moderately during the Summer and Autumn, but barely dampen the compost during the Winter and early Spring.

CYPRIPEDIUM CALLOSUM. *Native of Siam and Cochin China.*

A very attractive species of the first group. Leaves up to 8 or 9 inches long, and 1½ to 2 inches broad, bright green, beautifully tessellated with dark green. Scape about 15 inches tall, proceeding from centre of growth—usually one flower—sometimes two. Blooms are large, dorsal sepal up to 3 inches across, somewhat heart-shaped, white with alternate streaks of long and short veins, green at base, becoming purple as they approach the apex. Petals inclined to bend downwards, pale green in colour, tinted with pale purple towards the tips. The edges are hairy, with a few warts on the upper side. Pouch dark brownish-purple, shading to green. The species is found in the low-lying country on the western borders of Siam and the eastern borders of Cambodia. The climate is what is known as a tropical rainy climate—with a temperature that seldom falls below 64 degrees. Rainfall is heavy throughout the year, but is considerably less in the Winter time, although the climate is never arid. The species, therefore, requires warm treatment, and in Sydney and the colder parts of Queensland needs heat in the Winter time. In the warm parts of Brisbane a glasshouse will serve, providing the minimum temperature does not fall below, say, 60 degrees. Give the plant ample water throughout Spring, Summer, and Autumn, and do not allow it to dry out even in Winter.

Variety *Sanderæ* is greenish yellow and white throughout.

CYPRIPEDIUM CHAMBERLAINIANUM. *Native of New Guinea.*

A rarely-met-with member of the second group, mentioned here because, being a native of New Guinea, there is always a possibility that one of my readers may be so fortunate as to obtain possession of a plant of it. It is found (though rarely) in the little known country between the Victor Emanuel and Muller Ranges, near the boundaries of New Guinea and Papua. It is a particularly robust growing plant—the leathery, strap-shaped leaves, which are a bright green, attaining a length of 18 inches to two feet. The flower scapes are long and stout, and are reported to bear more than twenty flowers on each scape, each flower being backed by a large boat-shaped bract. Dorsal petal cream, marked with thin red lines on each side of the mid-rib, the base being richly spotted with purple. The sepals are very pubescent at the back. Petals are long, very twisted, with a crinkled edge—cream in colour, with crimson spots, the margin having a fringe of white hairs. The pouch is large and white, densely spotted with rose-coloured spots at the bottom.

Glasshouse treatment is necessary in Sydney and the cooler parts of Brisbane, but in the warmer parts a fairly warm bushhouse will be sufficient. Give ample water throughout the Summer, but no more than is necessary to keep the compost slightly damp during the Winter months.

CYPRIPEDIUM CHARLESWORTHII. *Borneo, also Eastern Burma.*

A charming species which can be included in either the second or third groups, though preferably the second. It is rather a shy flowerer in Brisbane, but when it starts to bloom it does so each year with great regularity. The leaves grow to about 9 inches in length and are about $\frac{3}{4}$ of an inch in width. Like those of *Spicerianum*, they are prettily spotted underneath with minute purple spots—in some cases only at the base of the leaves and in others practically the whole length. The dorsal sepal is broad and flattish, white in colour, with veins of green and purple. The petals are about $1\frac{1}{2}$ inches in length, yellowish brown in colour. The pouch is yellowish brown also, sometimes spotted closely with darker brown. *Cyp. Charlesworthii* will do quite well in an ordinary bushhouse in all the warmer parts of Queensland, but in Sydney and the cooler places a glasshouse is preferable, particularly in the Winter months. Ample water is essential during the warm months, but just enough to keep the compost damp is all that is necessary in the cooler season.

CYPRIPEDIUM CILIOLARE. *Native of Mindanao.*

A distinct species of the first group. Leaves are long and pointed with a dark green base, prettily marked with lighter green. Flowers are about 4 inches across. Dorsal sepal white in the upper half, and suffused with purple in the lower part, greenish veins running longitudinally from the base to the top. The petals are green at the base, and the tips light purple, the edges lightly fringed with dark-coloured hairs. They are closely spotted with blackish-purple warts for two-thirds of their length. The lip is purplish-brown, shaded green towards the base.

Treatment as recommended for *Cyp. Argus* (q.v.).

CYPRIPEDIUM CONCOLOR. *Native of Siam, Cochín China, etc.*

A small growing species of the second group. Leaves about four inches long, blunt, fleshy, and strap-shaped, marbled with grey on the upper side, reddish-purple underneath. Flower scape is erect, short, usually carrying one flower, but sometimes two. Blooms 2-2 $\frac{1}{2}$ inches in width. The sepals and petals are oval, concave, and similarly shaped. The pouch is small and shapely. Colour throughout a rich cream yellow, with numerous small spots of cinnamon-red. They appear in the Autumn and last for 4 to 5 weeks.

Cyp. concolor grows upon the limestone rocks on the Bow Hills on the borders of Siam and Laos (Annam), and, as with *C. bellatulum*, the addition of limestone to the compost makes for better growth and healthier plants.

Concolor is one of the slowest moving of all the *Cypripediums*, and extreme patience must be exercised with it. In Sydney and the colder parts of Brisbane, it will need a heated house in the Winter months, but in the warmer places a glasshouse will suit it—but the temperature of its surroundings should not be less than 58 degrees at any time. It likes plenty of light and must have copious water right up to the beginning of the Winter—and even during that season the compost must be kept moist. Drainage must be particularly good. When it is

being grown under colder conditions than are prescribed, it will be desirable to reduce the Winter watering to a minimum sufficient to keep the compost just damp.

Var. *Regneri* is more robust growing, and bears from three to five flowers on each scape.

CYPRIPEDIUM CURTISII. *Native of Sumatra.*

A very striking species of the first group—deservedly popular with experienced growers. Leaves 8 to 9 inches long, mottled dark green on a light green base. Flower scape is about 10 inches to a foot in height, dull purple in colour and covered with a light down. Flowers are borne singly, and are large and attractive. Dorsal sepal is broad, short, and acutely pointed. It is green with a white margin, with purple and green veinings. Petals are narrow and pointed, curving back at the apex, and pendulous. Top half green, lower half white. Veined and spotted with reddish-purple, and with hairy edges. The pouch is large and shaped like an inverted policeman's helmet. It is a dull, reddish-purple, with dark purplish veinings.

It flowers in Winter and lasts 6 to 7 weeks. This species does best in a heated house in Sydney and colder parts of Brisbane. In warmer places where a minimum temperature of about 60 degrees can be given it, an ordinary glasshouse will do nicely.

Copious water must be applied throughout the Spring, Summer, and Autumn, with a diminution in Winter. But the plant must not be allowed to become parched at any time.

CYPRIPEDIUM DAYANUM. *Native of Borneo.*

Another of the handsomely foliaged species of the first group. Leaves about 5 or 6 inches long by 1½ inches across, yellowish-green marked with olive green. The flower scape is a foot to fourteen inches tall and is stout and dark coloured. The flowers, borne singly, are of good size. The dorsal sepal is large and broad, and is white, lined with green. The narrow petals are deep purple in colour, with a dull greenish shading and a fringe of dense black hairs. The pouch is a dull purple with a few greenish veins. Flowers in Winter, and the blooms last up to 8 weeks under suitable conditions.

Cultural treatment as for *Cyp. Curtisii*.

CYPRIPEDIUM DRURYI. *Native of Southern India.*

A small growing variety of the first group. Leaves are long, stout, somewhat rigid and green in colour. Scape 7 to 9 inches, stout, erect and hairy, brownish in colour and bearing one flower. Dorsal sepal broad and pointed, bent forwards, greenish-yellow in colour, with a broad purplish stripe down the centre. The outside is hairy. The petals are broad and, like the dorsal sepal, greenish-yellow with a broad dark stripe down the middle, and with a few dark, wart-like spots near the base. They are inclined to bend downwards a little. The lip is a very pale yellow, channelled at the base and with a number of brown spots at the bottom and

inside the lip. Flowers in late Autumn, the blooms lasting four to five weeks. It is a slow developing plant, and a shy flowerer.

This species is found in the gorges of the Cardamom Mountains and other ranges of Travancore, in Southern India. The climate is of the class known as tropical monsoonal, there being little difference in the temperature in Summer and Winter; the minimum average temperature being 65 degrees. Rainfall is heavy for ten months of the year, but even during the two dry months the monthly precipitation is seldom less than two inches, so that in its natural state *Cyp. Druryi* is accustomed to a constantly moist heat. Those who secure a plant will, therefore, need to reproduce these conditions if they hope to overcome its diffidence at growing and flowering under cultivation. I doubt if it can be grown satisfactorily in Sydney or Southern Queensland without a heated glasshouse. In North Queensland a glasshouse may serve. Ample moisture at all times is essential.

CYPRIPEDIUM EXUL. *Native of Siam.*

One of the third group. The leaves somewhat resemble those of the well known species *insigne*, i.e., they are about 9-12 inches long and $\frac{3}{4}$ of an inch wide and green in colour, but they are much stouter than those of *insigne*, and generally a little longer. The scapes are about a foot high, and carry a single flower. The dorsal petal is broad, and is white with a yellow base with a number of purple spots and blotches. Petals are long, rounded at the apex and moderately broad, greenish in colour, tinged with brown. Pouch large and greenish brown.

Cyp. exul is a very shy bloomer, though it grows vigorously enough in an ordinary bushhouse. It is a native of the high ranges which cross Siam, and grows at a height of 8000 feet, at which the usual tropical climate of Siam is much tempered. Plenty of water should be given for the greater part of the year, but in the colder months it should be kept comparatively dry, though not to the extent that the leaves commence to wither. It should be given a position where it gets plenty of light, but should be shaded against the direct rays of the sun.

CYPRIPEDIUM FAIRIEANUM. *Native of Assam.* (Illustrated.)

Possibly the most charming of all the *Cypripediums*. It can be treated as either group one or group two, though I prefer the latter. When first found this orchid was quoted at £5,000, but nowadays it can be secured for a few shillings. It is a small growing species, the leaves being about 6 inches long, and about an inch across, bright green in colour, and channelled. The scape is about 6 inches tall, pale green in colour. Flowers are usually single, but very occasionally one scape will produce two blooms in slow succession. The flowers are large and distinctive. The dorsal sepal is large and spreading, and is white tinted yellowish-green from the base, and strikingly veined with brownish-purple. The petals are white, striped with green, and with a purplish margin. They are bent downwards, and curl outwards and upwards at the pointed tips. The edges are studded with tufts of black hairs. The pouch is a peculiar purplish shade, tinged with brown, and veined with green. The flower has a large purple ovary.

Cyp. Fairieanum develops rather slowly, and is a long time reaching the flowering stage. For a considerable time it was thought that the species was extinct naturally, but a few years ago further supplies were found in a secluded part of the Khasi Hills, and a larger species from the ranges of Northern Burma. These discoveries made it possible for orchid growers to obtain the species at a reasonable price. In the colder places it is well to grow *Cyp. Fairieanum* in a heated house. But in the warmer parts of Brisbane it grows quite well in an ordinary glasshouse, and in the warmer parts of North Queensland an ordinary bushhouse may serve. Give it plenty of light at all times, but protect it from direct sunlight. Ample water during the greater part of the year, but keep it fairly dry during the Winter months, especially after flowering. It blooms in Autumn, and the flowers last for 5 or 6 weeks.

CYPRIPEDIUM GLANDULIFERUM. *Native of New Guinea.*

Another New Guinea variety belonging to the first group. Leaves about 12 to 15 inches long, very leathery, broadly rounded at the ends, and green in colour. The flower scape is two feet or more in length, and hairy and branching. It bears numerous flowers of large size, specimens of 9 and 10 inches across having been reported. The dorsal sepal, 2 inches long by 1½ inches, is bent forward over the flower, and is a creamy white striped with brownish-purple. The petals, up to about 5 inches in length, and slightly drooping, are twisted spirally, and are a goldish-tinted green in colour with a stripe of deep brown down the middle, having on the edge near the base a series of black spots. The pouch is about 2 inches long, and is a glossy, greenish-yellow, lined and blotched with reddish-brown.

This species is found principally in the hot, moist tropical gorges in Dutch New Guinea, and in parts of Papua, principally among the mountain ranges which run through the island from North to South, and particularly near Mounts Idenburg and Wilhelmina. It requires the same treatment as suggested for *Cyp. Chamberlainianum*. It flowers in the Summer, and the blooms last about a month.

CYPRIPEDIUM GODEFROYAE. *Native of Cochín China.*

One of the *bellatulum* type belonging to the first group. A small growing species of great charm. The leaves are from 4 to 8 inches long; purple underneath, and mottled green and grey on top. Flower scapes short and purple spotted, from which the blooms are produced singly. Dorsal petal short, pointed, and roundish. Sepals broad, ovate and blunted, somewhat pendulous. Sepals and petals white, densely spotted with deep chocolate-purple. The lip is small but shapely, spotted all over with purple spots—bright in front and duller at the bottom and the rear.

Same treatment as for *Cyp. concolor*.

CYPRIPEDIUM HAYNALDIANUM. *Native of Luzon Island.*

A handsome species of the first group, but somewhat of a difficult subject to grow. Leaves are about a foot in length, broad and leathery, and dark green in colour. Flower scapes, up to two feet tall, green and hairy, bearing up to six flowers. The dorsal sepal is oval in shape, pale green with a yellowish tinge, blotched with brown at the base, and pinkish at the apex. The petals are about three inches

in length, moderately broad and pointed. They are greenish-yellow, the upper edge being rose-pink and the lower twisted and blotched with brown. The pouch is green suffused with purple.

This species requires a minimum temperature of 65 degrees, and in Sydney and the cooler parts of Brisbane and Queensland will need a heated house. In the warmer localities a glasshouse may serve. It needs a hot, moist atmosphere, with copious water right through the Summer. It is essential that the drainage be perfect, as the slightest sign of sourness in the compost is likely to cause root rot, with fatal results. It flowers in Autumn.

CYPRIPEDIUM HIRSUTISSIMUM. *Native of Bhutan, Assam.*

A popular species belonging to the second group. Leaves are about 9 to 12 inches long, rather narrow and keeled. Flower scapes are about ten inches high, green and hairy, and produce one flower. Flowers are large (up to six inches or more across). The dorsal sepal is large, heart-shaped, dark purplish, with a green margin. Petals are large and undulated, blunted and fringed with black hairs. The base is dark green, dotted with purple, while the fore part is entirely purple. The pouch is large, helmet-shaped, deep green, tinged with purple. The whole of the back of the sepals is thickly covered with hairs.

Cyp. hirsutissimum will do best in a glasshouse in Sydney and other cool localities, but in warmer parts does quite well in an ordinary bushhouse. Plenty of water is desirable during the Summer. In Winter the compost should be just kept sufficiently damp to avoid withering. Flowers in late Winter or early Spring. Flowers last 6 or 7 weeks. An easily grown plant, suitable for beginners at orchid culture, and one of the most attractive species.

CYPRIPEDIUM HOOKERAE. *Native of Borneo.*

Another of the variegated foliage type belonging to the first group. Leaves are six inches long, broad and blunted. They are of the deepest green in colour, beautifully mottled, and blotched with creamy yellow. The scapes are long, and bear a single flower. Dorsal sepal yellow with a greenish centre. Petals yellowish-brown, rosy-purple at the tips. They are horizontal, and spreading and pointed. Pouch small, dark green, tinged with chocolate.

Flowers in the Summer, and lasts about a month or five weeks.

This species requires heated glasshouse treatment in all localities where the minimum temperature falls below 62 degrees. In the warmer parts a glasshouse will do.

Water copiously during the greater part of the year, and even in Winter, keep the compost quite damp.

Although the flowers are comparatively small, the brightness of their colouring, and the beauty of the foliage makes this species worth while.

CYPRIPEDIUM INSIGNE. *Native of Sylhet, Nepal, Assam, etc.*

This is one of the third group, and is probably the most popular of all the *Cypripediums*. There are many varieties, some of which rank among the finest of all

the genus. In the type species the leaves are about 9 inches long, and bright green in colour. The scapes about the same height, purple, and rather downy. Flowers are produced singly. The dorsal sepal is large, oval in shape, the apex being bent forward. It is apple-green with dark purplish spots below, and has a varying white margin, the apex of the sepal being pure white. The petals are broad, undulate and spreading—pale-green in colour, tinged with brown to a varying degree, and with purple longitudinal lines. The pouch is green and brown, being paler near the mouth. It flowers in Autumn and early Winter, the flowers lasting up to a month or five weeks. There are nearly fifty named varieties which differ from the type in varying degrees. The best of these are:—

Var. *insigne albo-marginatum*. Flowers yellowish—dorsal petal with white margin all round and without the spots found in the type.

Insigne Chantini. (Syn.: *insigne punctato violaceum*). Dorsal sepal pure white on the upper half and spotted with rich purple; petals have light yellow veins. Pouch is reddish-brown.

Insigne Harefield Hall. Very large flowers, the characteristic spots being much larger than in the type.

Insigne Sanderae. Flowers are a bright yellow, tinged with light green at the bases of the sepals and petals, and with a white margin at the apex of the dorsal sepal with a few brown dots.

Most of the varieties are little different from the type. *Insigne* (and most of its varieties) grows freely in an ordinary bushhouse right from Sydney northwards. One of the loveliest things I remember was a visit to the bushhouse at the Sydney Botanical Gardens, when I saw some hundreds of *Cypripedium insigne* growing in the ground in masses here and there and covered with blossoms.

The same conditions as to watering as already given here to other species apply equally to the *insigne* group—ample in the warmer weather—mere keeping of the compost slightly damp in Winter.

CYPRIPEDIUM JAVANICUM. *Native of Java.*

A mottle-leaved variety of the second group. Leaves about six inches long by about 1½ inches wide, pointed, dark green, mottled with greyish-green. Scape 6 to 8 inches tall, carrying a single bloom. Blooms smallish but pretty. Dorsal sepal broad and short, pale green with the apex white, and generally a white margin. Petals green, tipped with dark purple, and with a number of small, black warts. Pouch green, tinged with brown and veined darker green.

This species will grow in a glasshouse in Sydney and the colder localities. In Brisbane it does very well under ordinary greenhouse conditions. It likes plenty of water for ten months of the year, but in the coldest part of the Winter the compost should be kept only sufficiently damp to prevent deterioration. Flowers in Winter, and the blooms last five or six weeks.

CYPRIPEDIUM LAWRENCEANUM. *Native of Borneo.*

A very handsome species belonging to the first group. Leaves 9 to 11 inches long

by about 2 inches broad, dark green, handsomely tessellated with a yellowish green. Scapes up to fifteen inches tall, purplish, hairy, and carrying a single large flower. The dorsal sepal is very large and spreading, white with broad parallel lines of brown purple. The petals, wide-spread, $2\frac{1}{2}$ inches long by about $\frac{1}{2}$ an inch wide, green with a purplish tip, and reddish at the base, the edges are hairy and have a few blackish warts here and there. The pouch is large, cylindrical, purplish-brown in colour, and yellowish at the base. Flowers are produced in the Summer time and last a month or more.

Cypripedium Lawrenceanum grows in the gorges of the Kapuas, Schwaner, and Muller ranges where the climate is hot and moist throughout the year.

It will, therefore, be necessary for it to be grown in a heated house in Sydney, and in all the cooler climates. In Brisbane an ordinary glasshouse will serve, providing it does not allow the temperature of the atmosphere to fall below about 64 degrees. Profuse water should be applied throughout the year and the drainage must be kept open so that no sourness of the compost occurs.

Variety *Hye anum* has the dorsal sepal white with pale green lines; petals are yellowish-green and covered with short, dark hairs—the pouch being yellowish-green with darker veins.

CYPRIPEDIUM LOWII. *Native of Borneo.*

An outstanding species which seems to do best when treated as a member of the second group. The leaves grow to thirteen inches in length, and are about two inches in width, with a small notch in the apex, a palish green in colour. The flower scapes grow to a length of three feet and are many flowered, though in cultivation they rarely produce more than two flowers on a spike. The dorsal sepal is pointed and rather oval in shape, narrowing towards the base, and is pale green in colour, tinged with purple (sometimes with yellow). The petals are long, with a single twist, broadening out at the apex and fringed with a row of hairs. They are green with purple spots at the base, and the broad end is all purple of varying shades of richness. The pouch is purple, tinged with green. The flowers are about four inches across, and appear in late Spring and early Summer. If the plant is moved into a cool position when in bloom, the flowers will live for 7 to 8 weeks.

The majority of the *Cypripediums* are terrestrial growing by nature, but *Cypripedium Lowii* grows high up on the giant ironwood trees in the thick jungles of Sarawak and the northern section of Dutch Borneo. This *Cypripedium* does best in a fibrous compost packed very firmly into the pot, i.e., very similar potting to that used for *Cattleyas*.

Cyp. Lowii likes plenty of light, but not direct sun rays. Copious water throughout the warmer weather is desirable, and the compost should be kept moist in the Winter. Glasshouse culture in the cooler climates (with artificial heat when glasshouse temperature falls below 56 degrees).

It is altogether an interesting and beautiful species.

CYPRIPEDIUM NIVEUM. *Malayan Archipelago*. (Illustrated.)

A beautiful species of the first group. Dwarf-growing with small, oblong, pointed leaves, dark green, mottled with grey on the upper side, and dull red underneath. The flower scapes are short, rarely being six inches in height. The flowers are usually produced singly, but occasionally in pairs. The dorsal sepal is shaped like a flattened sphere. It is pure white, save for a few bright red streaks on the back. The roundish petals are white also, except for a number of minute cinnamon red spots. The pouch is tiny and egg-shaped, and is pure white.

Like other species of the *concolor* and *bellatulum* group, it appreciates limestone in the compost. It flowers in late Spring and early Summer, and the flowers last four or five weeks.

Culture as suggested for *Cyp. concolor*.

CYPRIPEDIUM PARDINUM. (See under *C. venustum*).

CYPRIPEDIUM PARISHII. *Native of Burma*.

A handsome and robust species of the first group. Leaves are long, thick, and leathery, the apex obliquely rounded, the upper part being a darker green than underneath. Flower scape grows to 2 feet in height, and is thick, hairy and occasionally branched. It bears generally two, but sometimes, in particularly strong specimens, as many as six flowers. Dorsal sepal broad and bent forward, a rich lemon colour veined with pale green. The petals are up to five inches long, wavy, twisted and pendulous, coloured green at the base, and a reddish-purple at the apex, the edges being studded with purple, hairy warts. The pouch is large and long, and is a deep green, tinged with purple. Flowers appear in Autumn and last up to six weeks.

Culture as already recommended for heat-loving *Cypripediums* of the first group.

CYPRIPEDIUM PHILIPPINENSE. *Native of Mindanao*.

This is a rather rare species of the first group. Leaves are about a foot long, strap-shaped, fleshy, bright glossy green. Scape about eighteen inches high, hairy and carrying up to four flowers. Flowers large with a tall, broad dorsal petal bending forward. It is white with purple stripes. The lower sepal has green stripes—both are hairy on the outside. The petals are about 6 inches in length, narrow, much twisted, and pendulous. They are yellow at the base, green in the middle, and white at the apex. The middle part is thickly blotched with chocolate. The pouch is small, and is greenish yellow in colour. It flowers in Spring and lasts 4 to 5 weeks.

Cyp. Philippinense is found in the tropical jungles of the Philippine Islands, particularly in the island of Mindanao. The treatment suggested for *Cyp. glanduliferum* is satisfactory.

Syn. *Cyp. laevigatum*.

CYPRIPEDIUM PRAESTANS. Synonymous with *C. glanduliferum*, q.v.

CYPRIPEDIUM PURPURATUM. *Native of China.*

Another of the tessellated leaved species belonging to the first group. Leaves, 5-6 inches long, pale green in colour, mottled with dark green. The flower spike is about 6 inches tall, carrying a single flower. Dorsal sepal large and broad, lower part green striped with purple—the upper half white. The edges are curled back. The petals are broad, undulated, hairy on the edges. They are brownish-purple in colour, studded with black warts.

This species originally came from Hong Kong, but has since been found in various parts of the East Indies.

It flowers in the Winter time, the blooms lasting for 5-6 weeks.

Cultural treatment as recommended for *Cyp. barbatum* (which it closely resembles) will be found satisfactory.

CYPRIPEDIUM ROTHSCILDIANUM. *Native of New Guinea.*

Another of the New Guinea species, belonging to the first group, and, like the other species from that country, of great beauty. The leaves are very long (over 2 feet), by about 2½ inches wide. They are green and very shining. The flower scape is strong, red in colour, about a foot high, and carries two or three large flowers. Dorsal sepal long, and wedge-shaped pointed at the apex. It is pale yellow in shade, with purplish-black stripes, and a white margin. The petals are narrow, undulated at the lower end, yellowish-green with dark brown lines running lengthways, and blotched here and there. The pouch is large and of thick texture, cinnamon-brown in colour, the mouth being red. Column curved, and curiously shaped.

Treatment as already suggested for the other New Guinea species.

CYPRIPEDIUM SANDERIANUM. *Native of Malay.*

A fine species of the first group. The fleshy leaves are strap-shaped, shining and green, and about 12 inches long. Flower scapes a foot high, stout and downy, and dark purple in colour. The dorsal sepal is triangular in shape and concave, the back being ciliated. It is pale green, magnificently striped with brownish-crimson. The petals curl backwards at the base and then hang downwards, gracefully spiralled. They are up to 2 feet in length. They are crimson and white in the upper half, changing to a brownish-crimson at the base. The pouch is small and narrow, and is dark brown in colour. Flowers in Autumn, and the blooms last six weeks.

Culture as already suggested for members of the first group.

CYPRIPEDIUM SPICERIANUM. *Native of Assam.*

A popular and pretty species of easy culture which may be classed in either the second or third groups. Leaves are about 8 inches in length and about an inch across, and green in colour, spotted rich purple near the base, underneath. Scape is about 9 inches long, hairy and purple. The flowers are produced singly as a rule, though pairs are occasionally seen. They are from 2 to 2½ inches across.

The dorsal sepal is broad and pointed at the apex. The basal part is green, the balance being a snowy white with a distinct purple stripe running from the apex to the bottom. The petals are about 2 inches long, horizontal, wavy on the edges, pale green in colour, striped and spotted with purple. The pouch is large and a dull purple. The mouth is wide. *Cyp. Spicerianum* grows well in an ordinary bushhouse in the warmer parts of Brisbane, but in Sydney and the cooler areas glasshouse treatment is desirable. In fact, a plant I have growing under glass in Brisbane is making better progress than another plant growing in a bushhouse, but the flowers last longer under bushhouse treatment. Give plenty of water during the warmer weather, but in the Winter time just keep the compost damp. This is one of the easiest of the *Cypripediums* to grow, and is quite a desirable item in any collection.

CYPRIPEDIUM STONEI. *Native of Sarawak, Borneo.*

Another fine species belonging to the first group. Leaves a foot long, thick and leathery in texture, and blunted at the ends. Flower scape up to 2 feet in length, and bearing up to three large flowers. Sepals are large and broad, white, tinged with greenish-yellow, and streaked with thin lines of reddish-purple; the underside of the sepals is tinted with purple. The petals are 5 or 6 inches in length, and are pendulous. They are greenish-yellow at the base and up to about half their length. The apical half is whitish, streaked with purple, with a purple end, the lower part being spotted with brownish-purple markings. The lip is large, reddish-purple, marked with dark veins.

Variety *platytaenium* has very broad petals, on the inside white blotched with purple, on the outside, white blotched with yellow and with purple tips.

There are several other varieties differing more or less from the type species.

The cultural treatment required is similar to that prescribed for *Cyp. glanduliferum*.

CYPRIPEDIUM SUPERBIENS. *Native of Java.*

Another fine species of the *C. barbatum* class, belonging to the first group. Leaves six to seven inches in length and about two inches wide—rounded at the apex and beautifully mottled with dark and yellowish-green shades. Scape up to 12 inches tall, and single flowered. Dorsal sepal large and broad, and gracefully pointed. It is hairy at the edges, white, streaked with brownish-purple and green. Petals are three inches long and about an inch across. They are white, tinted with green at the base, the edges being suffused with purple. The margins are fringed with a row of hairs, the upper edge having a number of blackish warts. The pouch is large, and a rich purplish-brown in colour, netted on the front portion. Flowers in the Summer, the blooms lasting for about 6 weeks.

Treatment as suggested for *Cyp. barbatum* (supra). Syn. *Cyp. Veitchianum* and *Cyp. barbatum Veitchii*.

CYPRIPEDIUM TONSUM. *Native of Sumatra.*

Another tessellated species belonging to the first group, but which may with care

be cultivated as a member of the second group. It is a free-growing species with leaves up to 10 inches in length by about $1\frac{1}{2}$ inches across, mottled dark green on a light green base, the underside of the leaves being tinged with purple. Scape a foot high, bearing a single flower. Dorsal petal broad and somewhat heart-shaped. White in colour, veined with green and with a brown blotch on each inside border, and a greenish disk on the outside. Petals greenish, tinged with light brown with dark brown spots. The lip is green, the upper part suffused with light brown. It flowers in the Autumn, and the blooms last 5-6 weeks. Treatment as suggested for *Cyp. Javanicum* is generally successful.

CYPRIPEDIUM VENUSTUM. *Native of Sylhet and Nepal.*

A fine species which may be included in the third group. The leaves are about six inches in length, and a little over half an inch in width. They are a bluish-green colour, mottled with grey-green on the upper surface, while on the underneath they are mottled with purple. Scape is about 7 inches high, and bears a single flower. The dorsal sepal is short and broad and greenish-white (sometimes flushed with pink), striped with green (occasionally purple). Sepals greenish-white, fringed, with purplish warts and streaked with green (sometimes purple). Pouch yellowish-green flushed with brownish-purple and veined with dull green. It flowers in late Summer and the blooms last up to 8 weeks.

Variety *paradinum* is more robust in growth, and the flowers are rather brighter in colour, the flowers sometimes being produced in pairs.

Treatment as already suggested for cool growing species—such as *insigne*, etc.

CYPRIPEDIUM VILLOSUM. *Native of Lower Burma.*

A very handsome species belonging to the third group. Leaves long and leathery, bright green on top, lighter underneath and spotted purple near the base. Scapes about a foot in height, very hairy, and producing a solitary flower. The dorsal sepal is upright, oval in shape and curling back at the base, and with a hairy fringe. It is pale green in colour, fading to white at the apex. The petals are tongue-shaped, narrowed to a short stalk at the base and about an inch across at the widest part. They are a reddish-orange in shade, with a purplish streak down the middle and touches of pale green in the veins. The pouch is large and open mouthed, and reddish-orange like the petals. The whole flower is beautifully glossy. It is one of the most pleasing of the cool-growing *Cypripediums*, and should be in every collection.

There are a number of varieties, none of which exceed the beauty of the type, although some of them are as fine.

Cyp. villosum grows well under ordinary bushhouse treatment as already prescribed for the cooler species.

There are many other species of *Cypripediums*, but I believe that those treated above will comprise all the species and varieties likely to be grown by Australian orchid growers.

CYPRIPEDIUM HYBRIDS

For many years the *Cypripediums* have received much attention at the hands of the hybridisers, and as a result there are now thousands of hybrids available to growers of orchids. Many of these hybrids are of great beauty, both of form and colouring, but most of them are of less interest than the original species from which they were raised. Many of these hybrids are so similar that it may be said that they differ from each other only in name.

From a cultural point of view, most of the hybrids are easier to cultivate successfully than are the native species. This can be understood when it is realised that the hybrid plants purchased have often been under cultivation through several generations; whereas, as a general rule, the species are plucked from their native resting place and shipped overseas to us where we endeavour to establish them under conditions which often differ in every essential from those prevailing in the land of their origin.

It is outside the scope of this work to give any list of the hybrids grown or offered. I would suggest, however, that before any hybrid is acquired, its pedigree be traced through that very fine work, "Sanders Orchid Hybrids." By doing this, growers will be able to ascertain to some extent whether the conditions they have available are suited to the particular hybrid proposed to be purchased. Generally speaking, hybrid *Cypripediums* do best in an ordinary glasshouse in Sydney and in the cooler parts of Queensland. In the warmer parts, however, ordinary bushhouse treatment will serve.

All hybrids tend to preserve the characteristics of their forebears. Hence a cross between two species belonging to the first group will definitely need the warmest treatment—while a cross between two of the third group will probably thrive under bushhouse conditions. Where the hybrid is a product of a cross between species of different groups, it is safer to give it glasshouse treatment. When the plant is the product of several generations of hybridisation, it will probably have lost most of its original requirements and have become inured to the artificial conditions pertaining to orchid cultivation, and will, therefore, be best served by glasshouse treatment.

PHRAGMOPEDILUM BOISSIERIANUM. *Native of Peru.*

One of the most wonderful of the genus. The leaves are very long, narrow and grass-like, curved backwards, and a bright shining green. The scape is long (up to about 2 feet), often branching, and carrying several flowers which open in slow succession. The dorsal sepal is narrow, and curves forward over the body of the flowers; the petals are up to 5 inches long, narrow and twisted, and with undulating edges standing out horizontally. Sepals and petals are pale green or yellowish-green, netted closely with veins of darker green. The pouch is round and smooth, with curious cuts about the mouth. It is brownish-green, much spotted with darker brown in the upper parts. Each flower rests in a large boat-shaped bract of bright yellow, margined with white.

This species grows in the tropical rain forests of north-eastern Peru. It requires

heated glasshouse treatment in Sydney and the cooler parts of Queensland, but an ordinary glasshouse giving a minimum temperature of about 60 degrees will serve in other parts. Ample moisture is required at all times, and even in mid-winter the plant must be kept moist. Flowers in mid to late Summer, and stays in bloom for an extended period with its long succession of blooms. Synonymous with *Selenipedium Boissierianum*.

PHRAGMOPEDILUM CARICINUM. *Native of Peru.*

Leaves grass-like, growing in clumps from a thick, creeping rhizome, rigid, pointed, green in colour, and about a foot high. Flower spike up to 18 inches or two feet tall. It carries up to six moderate-sized flowers, sepals and petals pale green, margined with white, and tipped with deep brown, the petals being narrow, twisted, and pendent. The pouch is bright green, with a row of black blotches on the inside rim.

Unlike most of the *Selenipedium* class this species is best suited by cool treatment, and will do well in an ordinary bushhouse from Sydney northward. Give plenty of water during the summer, but just keep the compost slightly damp during the cold weather.

Syn. *Selenipedium Caricinum*.

PHRAGMOPEDILUM CAUDATUM. *Native of Ecuador.*

Another, and perhaps the most charming, of the genus. Leaves are stiff, curved, bright green, about a foot in length, and 2 to 3 inches wide. Flower scapes grow from the centre of the matured growth, and are about 18 inches in height and carry 3 to 4 blooms. The dorsal and lower sepals are long and narrow, and curve forwards. The petals, very narrow, hang down like long ribbons, often reaching a length of two feet or over. Sepals and petals are yellow at the base, gradually changing first to brown and then purple. Pouch, about 2 inches long, is yellow, with red spots at the base, changing to reddish-brown. It flowers in late Summer or early Autumn, and the blooms last about a month.

P. caudatum will need hothouse treatment in Sydney and the colder parts of Queensland, but in warmer areas a glasshouse, providing a minimum of about 50°-55°, will suit it admirably. This plant must have plenty of water at all times—the compost being kept moist even in Winter. Drainage must be absolutely perfect, and care must be taken to keep the compost free from any trace of sourness, as the roots are particularly sensitive to this.

Syn.: *Selenipedium caudatum* or *Uropedium caudatum*.

Var. *Lindeni* has a ribbon-shaped lip instead of a pouch, and is paler in colour.

Syn.: *Uropedium Lindeni*.

Var. *Wallisii* has sepals light green, marked with darker green. Petals white, veined with green, long and finely pointed, tipped with brown. Lip white, marked with crimson with a yellow edge round the mouth.

PHRAGMOPEDILUM LINDLEYANUM. *British Guiana.*

One of the *Selenipediums* belonging to the first group. A very strong type with

long, broad, leathery leaves, dark green in colour with a narrow margin of yellowish or light green. The scape is about two feet in height, green, and hairy, and carries a number of blooms which open in succession. Each of these flowers is semi-sheathed with a large light-green, boat-shaped bract. The sepals and petals are pale green, veined with red on the outside and rather hairy—the edges are crinkled and the dorsal sepal bends forward at the apex. The petals are about 2½ inches long, narrow, and sickle-shaped with the edges curled inwards, and hairy. The lip is a yellowish olive-green, with brownish veins, and densely spotted with crimson or brown dots on the side lobes.

This very striking species is found in the vicinity of the Kaieteur Falls, in the upper reaches of the River Guyuni, in the depths of British Guiana. The climate here is hot and moist throughout the year, the minimum temperature being 62 degrees. There is very little difference between Summer and Winter temperatures, and the rain precipitation is heavy for ten months of the year. There is a short dry period, but the annual rainfall is so heavy that even in the dry months the ground is so wet that the atmosphere remains moist. *P. Lindleyanum* will therefore, need warm treatment, and in the South and the cool areas in Queensland a heated glasshouse will be necessary. In the warmer parts a glasshouse which preserves a minimum temperature of about 60 degrees will serve. Copious watering is necessary for the greater part of the year, and the compost must be kept moist at all times.

Syn. *Selenipedium Lindleyanum* and *Selenipedium Kaieteurum*.

PHRAGMOPEDILUM LONGIFOLIUM. *Native of Panama.*

A free growing and handsome plant of the *Selenipedium* class, belonging to the first (or tropical) group. The leaves are long, keeled, strap-shaped, shining, and dark green. The scape is long (up to 3 feet) and somewhat downy, and carries from six to ten flowers, opening one after the other, keeping the plant in flower often for many months at a time, though usually only one bloom is fully expanded at once. The dorsal sepal is narrow and pointed, and very wavy, and is a pale yellowish-green, with a number of rather indistinct reddish streaks. The lower sepal is large and concave. The petals are narrow, up to six inches in length, and much twisted. They are green with deep pink and white margins. The pouch is large with a wide mouth, and is a shiny purplish-brown, tinged with green. It does best in a heated glasshouse in the cooler climates, but will grow easily enough in an ordinary glasshouse in Brisbane, and even a bushhouse will serve in the warmer parts. Copious water is desirable throughout the warmer weather, and the compost should be kept damp in the Winter months.

Like most of the *Selenipedium* group, *P. longifolium* is very tardy in commencing to flower. It should be disturbed as little as possible, and for this reason should be overpotted so that it will not be necessary to repot it for some years. Hence the drainage must be free, so that the compost can be preserved as long as possible. Syn. *Selenipedium longifolium*.

PHRAGMOPEDILUM SCHLIMII. *Native of Columbia.*

A species which belongs to the second group. Leaves 6-7 inches in length, thin,

narrow and pointed—light green in colour. The flower scape hairy and about 10 inches in length, branched and bearing up to 8 flowers, each about 2 inches across. These differ from most of the other *Cypripediums* in having the dorsal sepal and the petals identical in shape and colouring. They are snowy white with green tips and mottled with rosy purple. The pouch is round and contracted at the mouth. It is white, blotched in front with deep rose.

It flowers generally in Spring, but is not consistent in this respect. The flowers last well.

The species is found in the swamps on the plateaux of the Andes round about 4000 feet above sea level. It is best grown in a compost of peat, sphagnum and sand. The drainage must be perfect at all times. Give copious water throughout the year. This species grows best in a glasshouse in Sydney and Brisbane, preferably hung over a fish-pond, and it should have plenty of light. It is rather a difficult subject to grow, and is not a suitable plant for beginners to experiment with.

Syn. Selenipedium Schlimii.

DENDROBIUM and ALLIED GENERA

Probably there is no genus of orchids which is more widely cultivated than the *Dendrobiums*—generally one or more of its species are the first plants in a beginner's collection. And there is no doubt that this genus is most beautiful and varied in its forms. Upwards of 850 species are listed, but of these the majority are of botanical interest rather than horticultural. There are, however, nearly two hundred species that are well worth including in any collection of orchidaceous plants.

The *Dendrobiums* are extremely widely distributed, being found in various parts of India, Ceylon, Nepal, Sylhet, Assam, Burma, Siam, the Moluccas, the Philippines, New Guinea, Australia (from the farthest North down to Tasmania), New Zealand, the South Sea Islands, China and Japan. Obviously this wide distribution necessitates that there is a wide divergence in the conditions they experience in a state of nature and equally obviously it is impossible to lay down a method of culture to serve all species. One thing is common to all the species—they must have a well defined resting period during which the recently formed stems or pseudobulbs mature and become ready for the production of flowers—but even in this common feature the species vary considerably in their requirements.

Another factor that must be kept in mind for the satisfactory growing of plants of this genus is that all the *Dendrobiums* are sun lovers. In their natural state they grow on the trunks and branches of tall trees, or on exposed rocks, where they are subject to the full strength of the sun's rays. Growers who place their

Dendrobiums in dark, gloomy, sunless, overshadowed houses can never hope to grow fine, healthy plants, producing the mass of rich coloured blossom natural to most of the *Dendrobium* species.

For the purposes of brevity and clarity, I intend to classify the genus into sections according to—

- | | |
|-------------------------------|----------------------------|
| (a) Nature of the plant. | (d) Light. |
| (b) Temperature requirements. | (e) Potting and Compost. |
| (c) Water. | (f) Quality of the flower. |

(A) NATURE OF THE PLANT.

The *Dendrobiums* vary more in the form of their plant species than any other of the orchid genera—and so great are these divergences that the genus has been divided into various sub-genera which have again been divided into sections, and occasionally into sub-sections, etc. For our purposes, however, it will not be necessary to follow this very careful classification other than to distinguish by a common symbol those species which are best treated in a particular manner. For cultural purposes we can divide the genus into the following classes:—

- (1) Those with stout, erect stems or pseudobulbs of strong vigorous growth. In the table, this class will be referred to as A.1.
- (2) Those with fine, erect stems of rather delicate growth—referred to as A.2.
- (3) Those of stout, drooping, or pendulous stems—referred to as A.3.
- (4) Those of slender, drooping, or pendulous stems—referred to as A.4.
- (5) Those of the Strongyle, Rhizobium, and Monophyllaeae groups, having creeping rhizomes, elongated, branched, and generally slender stems—referred to as A.5.

(B). TEMPERATURE REQUIREMENTS.

From the very wide dispersal of the *Dendrobium* naturally, it can be understood quite easily that the species grow under very different climatic conditions. The custom of placing all *Dendrobiums*, irrespective of species, in a house where the conditions are practically similar for every plant can never yield satisfactory results—must, in fact, end disastrously for many species.

Some of the *Dendrobiums* require great heat, others quite cool conditions, while many do best in a mild, warm temperature.

Those plants which require a temperature which never falls below 60 degrees in the coldest night will be designated with the symbol B.1. This class will require to be grown in a heated glasshouse in Sydney, the cooler parts of Brisbane and the higher elevations, such as Toowoomba, Maleny, etc.

The species which thrive best under warm conditions (i.e. a temperature range of not less than 50 degrees to 60 degrees in Winter) will do well enough in a glasshouse in the cooler parts of Sydney, Brisbane, and the elevated regions. In the warmer parts a suitable bushhouse will serve, but care should be taken to prevent cold draughts from striking the plants. In frosty weather it will be

good policy to protect the plants from the unusual chilliness by covering them with paper blankets—ordinary news sheets will do quite well. This class will be referred to as B.2.

The cool growing species will thrive in an ordinary bushhouse in Sydney northwards, and will be referred to herein as B.3.

(C). WATER REQUIREMENTS.

As the temperature requirements for different species of orchids vary extensively, so do their water needs. In the class C.1. water must be literally poured on throughout the Summer season right up to the time when the season's growths have reached full development; with the coming of Autumn the quantity of water should be appreciably diminished, but the plants of this group should not be allowed to dry out, and even in midwinter watering should be continued by giving the compost a good soaking once a fortnight—choosing a bright, clear morning for the purpose.

Class C.2. Will require heavy watering until well into the Autumn, the plants then being allowed to dry out for the Winter, except for a soaking about once in four to six weeks.

Class C.3. Will need heavy watering from the commencement of Summer until the first chill spell of Autumn, when watering should practically cease until the new shoots appear in Spring.

In all the above classes it is desirable that the atmosphere in the house be kept moist throughout the growing period—i.e. from the time the first shoots of Spring show themselves until the last pseudobulb in Summer has grown to its maximum.

As to *Class C.4.*, however, although its plants like plenty of applied water in the Summer, they do best in a dry atmosphere.

Class C.5. likes much less water in Summer than the other species, but likes it applied right up to the beginning of Winter—then water once in three weeks.

This classification is intended to assist growers in the important factor of watering, but it is not intended as a hard and fast rule—the actual weather conditions prevailing at the time will necessitate an intelligent modification of the suggestions made. The ideal to be aimed at is to give the plants the necessary resting and maturing period without allowing the stems to wither or lose condition. Generally speaking, the deciduous species can stand a much longer period of drought than can the evergreen or persistent leaved species.

(D). REQUIREMENTS AS TO LIGHT.

As a class the *Dendrobiums* are lovers of light and sun, but as in other things some species need more sun and light than others. I have classified them as follows:—

D.1. Those that do best in full sunshine—right in the open in the case of the hardier species—close to the glass where glasshouse treatment is required.

D.2. Those that like plenty of light, but cannot stand the full noonday rays of

the sun. These usually do best when placed so that they can get the early morning sun, but are shaded from about 10 a.m. onwards in the Summer time. In the Winter they can usually stand the sun's rays up to 11.30 a.m.

D.3. Those that like plenty of light but not direct sun's rays, except in the early morning.

D.4. Those that prefer shaded (not dark) conditions.

(E). POTTING AND COMPOST.

The most essential feature of the satisfactory culture of *Dendrobiums* (as with all orchids, indeed) is firmness of potting whether the container be pot, pan, basket, raft or block. A little thought will show the reason for this. A plant which is loosely set in its pot will wobble or shake about whenever the pot is moved or touched, or when a vagrant breeze stirs its leaves. Each such movement of the plant imposes a strain upon its roots; and if these strains are frequent, the roots become sickly and unable to carry out their natural functions of (1) Securing the plant. (2) Assimilating the necessary life-giving food. Therefore the plant sickens and dies, and another loss must be recorded upon the Profit and Loss Account of its grower's venture into orchid culture. When potting (and this term includes any form of planting an orchid) it is therefore a profitable insurance to see that your plant is firmly fixed in its container and compost.

Drainage is another important factor. During the growing period *Dendrobiums* require the application of copious supplies of water. As the application is made the orchid roots absorb the maximum amount of water they require, and the potting compost also takes in its maximum absorption quantity. To enable both these media to obtain a sufficiency, a surplus amount of liquid must be applied. If this surplus cannot find a ready exit from the container it will be trapped, and by the chemical action of the air will set up a fermentation and sourness in the compost that will, in most cases, cause the plant roots to become diseased. The best way to obtain a perfect drainage system in a pot or pan, is to place the drainage crocks on edge, thus allowing a free exit of all excess water as it comes through the compost. The addition of pieces of wood-charcoal, broken brick, etc., in the compost will help to keep the drainage free and the compost sweet.

The most satisfactory way of cultivating this genus varies with the nature of the species. Some plants (particularly the strong, erect, stemmed type of Dendrobe) do best in earthenware pots. Others are better set in wooden baskets. A further section can be grown in shallow pans, a fourth thrives on a raft, and others again when fastened to blocks of hardwood, palm trees or tree fern. These will be shown in the table as follows:—

Pots	E.1.	Rafts	E.4.
Baskets	E.2.	Blocks	E.5.
Pans	E.3.		

POTTING E.1.

When potting *Dendrobiums* first see that all diseased and perished stems are

removed. Cut off all dead and injured roots. Then take a clean pot (preferably new), soak it for 10-15 minutes in clean water, and allow to dry out. Select a quantity of clean crocks and place these on their edges in the bottom of the pot. Select a suitable stake—of rounded hardwood, if possible—and wedge it firmly between the crocks, so that it stands rigidly in position. Take a quantity of clean wood-charcoal in pieces about the size of a walnut and place these on top of the crocks. Next, thoroughly clean a quantity of the potting material (whatever it may be), break or cut it into pieces of suitable size and ram it down into the pot—gradually building up a tight mound round the stake. When the summit of this mound is above or on a level with the top of the pot, place the *Dendrobium* upon it and tie it firmly to the stake in such a way as to allow the roots to spread as nicely as possible over the mound. If the roots are long enough to reach to the side of the pot, roll a few pieces of fibre into tight rolls and ram these down on top of the ends of the roots, thus helping to hold the plant in position until it has gripped the compost with new roots. If the roots are not long enough for this you can tie a few pieces of clean jute twine, or raffia, to the bases of the stems and cover them in the same way as suggested for the root ends. Take particular care with *Dendrobiums* that the plant is set on and not in the compost—if the little eyes at the base of each pseudobulb are covered they will probably die and you will thus lose all hope of making a new bulb from that stem. After potting, dip the plant into a bucket of tank water deep enough to submerge the whole of the compost—allow the pot to drain thoroughly. Then keep in a cool, shady place for a few days before placing it in its growing position. Do not overpot. Use the smallest pot that will accommodate your plant.

BASKETS. E.2.

These are made of wood, usually beech, but sometimes of Australian hardwood, which is quite as satisfactory. They are easily made, and are comparatively inexpensive to buy. See that the fastenings are made of copper wire, which will not rust, and which is not as harmful to the orchid roots as is tinned iron wire. As the bottoms of these wooden baskets are open (consisting of a few well-spaced bars), drainage is not an important factor, but I usually line the bottom with a few large pieces of wood-charcoal, which helps to provide aeration, and counteracts any tendency of the compost to ferment. The procedure is otherwise similar to the potting method—the compost being built into a tight mound, and the *Dendrobe* planted upon it. The pseudobulbs can be tied, where necessary, to the hanging wires, thus ensuring stability. Baskets are particularly suitable for those species which require maximum moisture and light, for it is easy to suspend them in a position which will furnish both these requirements.

PANS E.3, RAFTS E.4, AND BLOCKS E.5.

These media are suited to awkward specimens of all species, but are particularly convenient for those *Dendrobes* belonging to Group A.5. For pans the compost should be built up into a mound as recommended for pots, the plant being pinned thereon with copper wire. Rafts (E.4) are formed by nailing (with copper nails)

a number of short lengths of beech or hardwood horizontally across a similar number of perpendicular pieces to form a sort of lattice or grating. The raft is covered with fibre or peat with a little green sphagnum moss, the orchid being fastened thereon with copper wire. Blocks (E.5) are pieces of hardwood of suitable length and width (usually about 12 inches by 5 inches is satisfactory), or of palmwood or tree fern trunk, to which the plant is bound with copper wire. When hardwood is used, a little fibre should be fastened to the surface to make it easy for the young roots to obtain a grip. Where tree fern is used, the basal part of the trunk, which is covered with thick, fibrous growth, should be used. Where the roots of the orchid are scanty or weak, a little sphagnum between the plant and the block will encourage quick root growth. Where the roots are plentiful and vigorous, however, this is not necessary.

COMPOST.

Almost any vegetable fibrous substance will serve as a compost for *Dendrobium*s, but the best media are staghorn peat, polypodium fibre, todea fibre, osmunda fibre and cocoanut fibre. For the hardy types, peat seems to be most suitable, but for orchids which need extra heavy watering I find osmunda more satisfactory. The delicate types of *Dendrobium*s seem to do best in a compound made by chopping up finely two parts of osmunda, two parts of peat or todea, and one part of good fresh sphagnum moss, and mixing these items thoroughly. Even fresh cocoanut fibre (not the dried out fibre used in upholstering), is an excellent substitute for both todea and peat, and I have also found polypodium fibre quite a good potting medium for delicate *Dendrobium*s. For the guidance of readers I will suggest a compost for each *Dendrobium* dealt with in the table, and will indicate it as follows:—

- | | |
|---------------------|---------------------------------------|
| (ea) Staghorn peat. | (ec) Todea. |
| (eb) Osmunda fibre. | (ed) Mixed compost, as set out above. |

Before leaving the subject of potting and compost I would like to mention a method used by Mr. W. H. R. Burnett, of Maleny (Q'ld.), and others, which has much to recommend it. Mr. Burnett uses baskets for his *Dendrobium*s, and in the centre of each of them he erects a stout length of green beech with the bark attached. This stake is about 1½ to 2 inches in diameter, and is fixed to the bottom of the basket with a two inch screw. The bottom of the basket is then lined with a layer of wood-charcoal on top of which a compost of fibre and moss is firmly packed and the surface of the compost covered with a layer of green moss. The *Dendrobium* is then secured to the beech-stake with rattan. The compost is kept damp at all times. This is an excellent combination of the block and basket methods. The plant soon sends out its new roots which grip the thick bark of the stake (this bark will remain about five years on the wood). The constant damping of the compost results in ample moisture-laden air circulating about the plant's roots, some of which will grow down the stake into the compost. While beech is admirably suited for this method, probably tea-tree or any other thick barked tree which holds its bark for a lengthy period, would suit as well where beech is not available.

NATURE OF FLOWER.

I intend in this classification to show as nearly as possible those *Dendrobiums* best suited for horticultural purposes. This naturally depends upon the size and beauty of the blooms and upon the length of time they last in condition. Flowers of large size and attractive appearance with a lasting quality of three weeks will be marked F.1. Those of equal size and beauty, but which keep for two weeks and less than three weeks will be marked F.2. Those of the same size and beauty, but which bloom for less than two weeks will be marked F.3.

The second group will consist of average size and beauty, and will be marked F.4, F.5, and F.6, according to their lasting qualities.

The third group will be those orchids of good colouring, but of small size, and according to their lasting qualities will be marked F.7, F.8, and F.9.

The fourth group will consist of orchids which grow in drooping clusters, such as *Dendrobium thyrsiflorum*, and those will be marked F.10, F.11, and F.12 on the same scale.

The fifth group will be those grown for their quaintness of form, either of plant or flower, or from the point of view of local interest, and these will be marked F.13.

In certain cases where the flowers of a species would, by their size or longevity, be classed in one of the above groups, but are of a dingy or unattractive colour, the symbol Z will be added to their flower quality symbol, thus F4Z.

As an illustration of this method of classifying the *Dendrobiums*, let us take *Dendrobium formosum*. This will appear in the table, thus:—

DENDROBIUM FORMOSUM.

General description of the plant and flowers:—

A1. B1. C1. D1. E2. (eb) F1. By which it will be seen that it is a stout, erect growing plant, requiring warm treatment, with copious water in the Summer, and should be kept damp even in the Winter time, that it likes plenty of light, is best planted in a pot with osmunda fibre, and that it has large flowers which last well.

The use of this method will save much valuable space, and will allow the more expeditious treatment of the genus in this table. After a little acquaintance readers should be able to interpret the symbols with ease.

As I stated at the beginning of this article, the genus consists of more than 850 known species. It is not within the scope of this table to deal with those species which are not of horticultural value. I am making an exception in the case of the Australian species, as a number of growers are interested in specialising in our native orchids, and a description of as many of these as possible may be helpful to such growers.

The following are the principal species of *Dendrobiums*:—

DENDROBIUM ADAE. *Native of Queensland.*

A slender growing species of little horticultural value. Pseudobulbs slender, 9 to

10 inches long, usually topped with three lanceolate or oblong lanceolate leaves. It bears one or two short racemes from the apex of each matured growth, each raceme having a few (seldom more than 4) small whitish, fragrant flowers in late Summer. A2. B2. C1. D1. E1. (or E5.) (ea) F13.

DENDROBIUM ADUNCUM. *Native of Himalayas, Upper Burma, etc.*

An evergreen orchid with slender, pendulous stems about 20 inches long, and somewhat untidy in growth. Leaves narrow and pointed. Flowers small, white suffused with pink. They are borne on short racemes which grow from the joints of the older stems, there being from 3 to 6 flowers on each spike. Flowering period midsummer to early Autumn. A4. B3. C2. D3. E1. (or E4.) (ea) F8.

DENDROBIUM AEMULUM. *Native of Eastern Australia.*

A charming little evergreen native, worth growing in masses, when it makes an attractive show in the Spring time. The stems are slender and up to about 9 inches in length, though generally shorter. Leaves are ovate, fleshy and dark green. The racemes, which appear from the axils of the leaves, are pendulous, and carry a few (though as many as 15 have been noted) white flowers (about 1½ inches across when spread), the lower part of the sepals and petals being often tinted pale pink. They are sweetly scented. Although moderately sized when spread, the habit of the flower is to droop its petals and sepals, and when grown in a mass this has a graceful effect. A2. B3. C3. D1. E1. (or 3, 4 or 5.) (ea) F13.

DENDROBIUM AGGREGATUM. *Native of Northern India and Southern China.*

A desirable dwarf-growing species with short (3 to 4 inches) stout, furrowed pseudobulbs, crowned with a single fleshy, oblong, green leaf. The drooping racemes spring from the sides of the pseudobulbs and carry from 6 to 10 clear yellow blooms in a cluster. The lip is hairy, and is rather darker in colour than the sepals and petals, and has an orange stain at the base. Flowers in late Spring or early Summer. A1, B1, C3, D3, E1. (or 4 or 5) (ea) F11.

DENDROBIUM AGROSTOPHYLLUM. *North Queensland.*

A rare but rather insignificant Dendrobe of botanical interest. Stems 10 inches to a foot in height with grass-like leaves from about the middle of the stems. The short racemes grow from the axils of the leaves and carry a few yellow flowers. Lateral sepals narrow and pointed, dorsal sepal oblong and about a third of an inch in length. Petals ovate and a little longer. The labellum nearly square, about half an inch long and wide. Interesting from its rarity. A2. B2. C2. D1. E1. (ea) F13.

DENDROBIUM ALBO-SANGUINEUM. *Native of Moulmein.*

A fine species with short, stout stems about a foot in height, and ½ to ¾ inch through. The leaves are about 6 inches long, broad and pointed, and of good texture. The flowers grow two or three together on a short scape which issues from the upper joints of the stems. They are about four inches across, sepals and petals are creamy white, the petals being about twice as broad as the sepals

and having a few blood-red streaks at the base. The labellum is large, square and flat, creamy white in colour, with two large blotches of reddish-crimson towards the base. They appear in midsummer. A1. B1. C1. D1. E2. (or 4 or 5) (eb) F1.

DENDROBIUM ALBUM. *Native of Nilgiri Hills.*

Pseudobulbs about 20 inches long and pendulous, fairly slender. Leaves remain on the newly matured stems until after flowering. Flowers are produced, generally, in pairs, sometimes in threes, on short racemes. The flowers are about $1\frac{1}{2}$ inches across, the labellum being rather shorter than the sepals and petals. Sepals and petals creamy white, with a greenish tinge, the labellum being white with a yellow disk. They appear in early Autumn. (Syn. *Dend. aquem*). A4. B2. C3. D2. E1 or 2 (ea) F5.

DENDROBIUM AMBOINENSE. *Native of Amboina.*

A Moluccan species with large spider-like blooms very like the native *Dend. tetragomum* in form, but larger and brighter in colour. Pseudobulbs about 10 inches tall, generally erect, but sometimes pendulous, usually round, but tetragonal in some varieties. Leaves about three inches long and one inch wide, oblong, but sharply pointed. Racemes are short and usually two flowered. Sepals and petals three inches in length, and about $\frac{1}{3}$ of an inch in width. They are whitish in colour. The labellum is about $\frac{3}{4}$ of an inch in length, and is three-lobed, the middle lobe being acutely pointed, and the side lobes curving inwards. It is golden in colour, the edges being purple, and there are two purple blotches at the base of the middle lobe. A2. B1. C1. D1. E1 or 5. (ea) F3.

DENDROBIUM AMETHYSTOGLOSSUM. *Native of Philippine Islands.*

A dainty species with long, erect stems 20 to 30 inches in height, cylindrical in shape, and about $\frac{3}{4}$ of an inch in thickness when matured. It is deciduous, the flowers appearing after the leaves have fallen. It has pendulous racemes 5 to 6 inches in length, carrying a number of flowers, the dorsal sepal and the petals being about $\frac{3}{4}$ of an inch in length, and about $\frac{3}{8}$ of an inch in width; the dorsal sepal being about $1\frac{1}{4}$ inches long. The labellum is larger than the petals by about $\frac{1}{2}$ of an inch in width. The sepals and petals are snowy white, the labellum being purple at the tip. The flowers appear in early Spring. A1. B1. C1. D2. E1. (eb) F4.

DENDROBIUM AMOENUM. *Native of Sikkim.*

A cool growing species from 5000 feet up the lower slopes of the Himalayas. The stems are slender, up to about 20 inches in length, and pendulous. The leaves are about $3\frac{1}{2}$ inches long, narrow, sharply pointed, and somewhat wavy. The plant is deciduous, the short racemes appearing from the upper nodes after the leaves have fallen. Sometimes one, but often two, and occasionally three blooms are borne on each raceme. The sepals and petals are about $\frac{3}{4}$ inch in length, the dorsal being slightly longer. The labellum is large and trumpet-shaped. The sepals and petals are pure white, tipped with purple. The labellum is amethyst, coloured at the front with a white margin and a yellow blotch, the throat is

hairy and yellowish green. The flowers are very fragrant with a scent like that of parma violets. They flower in Summer and last about a fortnight. A3. B3. C3. D2. E2. (ea) F5.

DENDROBIUM ANOSUM. *Native of Philippine Islands.*

A large flowered species with long, stout, pendulous stems; leaves glossy green; ovate-oblong in shape. The flowers appear after the leaves begin to fall, and spring from the nodes, usually in pairs. Sepals and petals magenta-lilac, the labellum having a large dark purple spot at the throat. Altogether it resembles *D. superbum* very closely, but the flowers are a more pleasing shape. It has not the strong, rather unpleasant odour of *superbum*. A3. B1. C1. D1. E2. (eb) F2.

DENDROBIUM APHRODITE. *Native of Moulmein.*

A shy blooming species with slender stems about a foot in length, the nodes being prominently swollen. Leaves about 3 inches in length, oblong and rounded at the ends, deciduous, the flowers appearing from the nodes after the leaves have fallen, the stems flowering for several years in succession once the plant has commenced to bloom. Flowers appear singly as a rule, and are from $2\frac{1}{4}$ to $2\frac{3}{4}$ inches across. Sepals and petals are white. The labellum is large and spreading, the front lobe being golden yellow with a white disk on the claw, and white margins, the sides curl inwards, and there is a deep blood-red spot at the base. Flowers in Spring. A2. B2. C2. D2. E1. (ea) F2.

DENDROBIUM ARACHNITES. *Native of Tenasserim.*

A rare species of unusual colouring. The stems are short and slender, the leaves being narrow and pointed, about $2\frac{1}{2}$ inches long. The racemes are short, and usually two or three to each stem and they generally have two or three flowers on each raceme. The sepals and petals are uniform in shape and size, the labellum being broader. In colour they are a coppery red and are about $1\frac{1}{2}$ inches across when fully expanded. Flowers appear in late Spring. A2. B1. C1. D2. E1. (ed) F8.

DENDROBIUM AUREUM (See *D. heterocarpum*).

DENDROBIUM ATROVIOLACEUM. *Native of New Guinea and Pacific Islands.*

An unusual species with fusiform club-shaped pseudobulbs topped with two or three leathery, green leaves up to about 4 inches in length by about $1\frac{1}{2}$ inches in width. The leaves are oblong-ovate, the apices being bilobed. Flower scapes proceed from the apex of the pseudobulb and carry 5-6 good sized flowers. The sepals and petals are creamy-white (sometimes tinged with pale green), closely spotted with intense violet. The lip is fine of texture, is three-lobed, the lateral lobes curving inwards. It is rich violet-purple on the inside and green on the outside. The flowers appear in Spring and last a good time. Their somewhat

decumbent habit detracts from the showiness of the plant, but it is altogether a striking and desirable species. A1. B1. C3. D2. E1. (ea) F4.

DENDROBIUM AUGUSTAE-VICTORIAE. *Native of New Guinea.*

A tall growing species, the stems being upwards of 6 feet in height when fully developed and about $\frac{3}{4}$ inch in thickness. The leaves are about 4 inches long and about $1\frac{1}{2}$ inches wide. The racemes are usually produced two or three at a time from the upper nodes of the stems, and are up to 18 inches in height and fairly closely covered with white flowers with a purple tinted labellum, each bloom being about 2 inches across. Flowers in late Spring. A1. B2. C2. D2. E1. (ea) F11.

DENDROBIUM BAILEYI. *Native of North Queensland.*

Named after Mr. F. M. Bailey. Of botanical interest only. Has slender, leafy stems about $\frac{1}{10}$ inch thick. The leaves are grass-like, and up to 3 inches in length. The flowers are borne on short lateral racemes, and on the plants so far reported only one flower on each has been noted. A2. B1. C1. D1. E1. (ea) F13.

DENDROBIUM BAIRDIANUM. *Native of North Queensland.*

Another small North Queensland Dendrobe of interest only to those who specialise in Australian orchids. Pseudobulbs 3-7 inches high, club-shaped and about $\frac{1}{2}$ inch thick, somewhat grooved and noded, with a few narrow, pointed leaves each about two inches long by $\frac{1}{2}$ an inch wide. Racemes are about 2 inches long and bear a few small flowers with yellowish green sepals and petals. The labellum is shorter than the petals and is paler in colour, the side lobes being veined with deep purple. A1. B1. C1. D1. E1. (ea) F13.

DENDROBIUM BARBATULO-CHLOROPS. *Western India.*

A natural hybrid between *D. barbatulum* and *D. chlorops*. Stems slender, about 18 inches long, and somewhat pendulous. The leaves are long and narrow and acutely pointed, and last only while the young stem is growing, falling as the stem approaches maturity. The racemes grow from the nodes of the stem and are drooping and crowded with a number of large flowers—white sepals and petals (sometimes flushed with pale pink and sometimes faintly tinged with green). The trilobed labellum is white, the side lobes being green. A4. B2. C3. D2. E4. or E2 (ed) F8.

DENDROBIUM BARBATULUM. *Native of Western India.*

A somewhat delicate species with slender, semi-drooping stems. The foliage, as in the foregoing species is of a transient nature, the narrow pointed leaves falling as the slender flower racemes appear at their axils. The racemes are crowded with smallish white flowers, each with a green spur. The sepals are broad and pointed, the petals being about half as wide. The lip is large and spreading. A4. B2. C3. D2. E4. or E2. (ed) F8.

DENDROBIUM BECKLERI. *Native of Queensland and New South Wales.*

One of the pencil orchids. Stems long and pendulous and very branching. Leaves terete and somewhat quadrangular and about 6 inches long when fully grown. In the Spring the plant is covered with its scented blooms. Sepals and petals creamy-white—sometimes tinted with green, with pink or reddish-brown longitudinal lines. Lateral sepals about an inch in length, dorsal sepal and the petals a little less. The labellum is about as long as the petals and its front lobe is rounded, recurved, and gracefully undulated. Sometimes confused with *Dend. Mortii* which resembles it, but has smaller flowers. A5. B3. C4. D2. E5. F13.

DENDROBIUM BENSONIAE. *Native of Moulmein and Siam.*

A popular species with long, slender pseudobulbs, semi-erect as a rule, but with a tendency to hang down. Foliage deciduous, the leaves being about two inches long and about $\frac{3}{4}$ inch in width. Flowers are produced in late Spring or early Summer, according to climatic variations, and appear in twos or threes from the nodes on the upper part of the stem. Sepals and petals are white or cream, the former being narrow and pointed, the latter broad and rounded. Lip has a prominent orange yellow centre and two dark blotches at the base. Like a number of *Dendrobiums*, it does not live very long under cultivation. A2. B1. C4. D2. E1 or 2 (ea) F5.

DENDROBIUM BICAUDATUM. *Native of Java.*

An attractive species with long, slender, drooping stems. The leaves grow in pairs in parallel rows right along the length of the stem and are ovate, acutely pointed and fleshy. They are about 3 inches long and 1 inch across. Racemes grow from the upper part of the stem and bear from 2 to 5 flowers. Lateral sepals $\frac{3}{4}$ inch long, petals $\frac{1}{2}$ inch long, with dorsal sepal and labellum about the same length. The general colour is white suffused with pale green lined with purple. The petals have a line of fleshy warts from about the middle to the apex, something like those of *Cypripedium venustum*. A4. B1. C1. D2. E2. (ed) F5.

DENDROBIUM BIGIBBUM. *Native of Queensland.*

A beautiful species of varied form which includes the lovely *Dend. Phalaenopsis*. (For the purpose of this table *D. Phalaenopsis* and its variations will be treated as separate species.) Stems up to about 18 inches in height and about $\frac{1}{2}$ inch in thickness. The petals are broad and generally somewhat recurved. The sepals are narrower. In colour it ranges from white to a deep carmine purple. The labellum is deeper in shade than the petals and sepals, veined with richer purple. The throat has usually a white crested ridge—(rarely, this is yellow). The blooms vary in size from about $\frac{3}{4}$ inch to $1\frac{1}{2}$ inches in diameter. They have a waxy appearance and are noted for the double spur formed at the base of the column. Variety *albo-marginatum*.—Similar in shape to the type species, but brighter coloured with the tips of the sepals white and with a more or less distinct white margin in both sepals and petals.

Variety *superbum*.—Similar to the type but double spur less prominent. Grows well out of doors in Brisbane and northwards. Otherwise glasshouse. A1. B1. C1. D1. E1. or E5. (ea) F4.

DENDROBIUM BOWMANII. *Native of Queensland.*

See *Dend. Mortii*.

DENDROBIUM BRANDTIAE. *Native of New Guinea.*

Plant and flowers very like *Dend. Phalaenopsis*, but smaller. Sepals and petals a beautiful violet-purple with a paler margin—the base of the petals on the exterior being white. The base and lateral lobes of the labellum are white with a purple suffusion, the front lobe being the same colour as the sepals and petals. A1. B1. C1. D1. E1. (eb) F4.

DENDROBIUM BRONCKARTII. *Native of Annam.*

A species closely resembling *D. densiflorum*, with long, stout stems, somewhat fusiform in shape, and deeply grooved. Leaves about 4 inches in length, diminishing in size as they appear at the top of the stems. Racemes are long and pendulous, covered with many handsome blooms, pale rose suffused with light yellow, the labellum being deep yellow with a rose-pink margin. Flowers are each about an inch across. A1. B2. C2. D2. E1 or 2. (ea) F12.

DENDROBIUM BRYMERIANUM. *Native of Upper Burma.*

A striking species which is often found rather difficult to cultivate satisfactorily, as it has a habit of suddenly going back without apparent reason, generally after it has made quite vigorous growth. Also it is sometimes a very shy flowerer. The stems are a foot or a little more in length, and are yellow. They are swollen in the middle and about $\frac{1}{3}$ inch in diameter at bottom and top. The leaves are distichous, that is they appear in two parallel rows. They are lanceolate and pointed, and remain on the bulbs for a considerable period. The racemes emerge at or near the tops of the bulbs. The blooms (1-3 on each raceme) are about 3 inches across and are strongly and pleasantly scented. The petals are broader than the sepals, but all are the same rich, golden yellow colour. The lip is large and remarkably beautiful, reaching a size (sometimes) of as much as 3 inches in length by about half that breadth. The lateral lobes are short and broad and deep yellow in colour with a short, yellow, lacy fringe. The middle lobe is yellow with a slight greenish tinge, and is somewhat heart-shaped and downy. It is surrounded by a deep, beard-like fringe of branching, interlacing threads of the same, deep orange yellow of the sepals and petals. It is a glorious species and well worth persevering with. It is my opinion that more success will be had with this orchid if care is taken in watering it. It requires ample applied water, but cannot stand up to a waterlogged atmosphere. Flowering period Spring. A1. B2. C4. D2. E2. (ed) F2.

Variety *histrionicum*. Smaller both in habit and size of bloom. Rarely opens fully. Flowering period Autumn.

DENDROBIUM CANALICULATUM. *Native of North Queensland.*

A small flowered but rather interesting species from North Queensland. The stems are short, being swollen at the base into a pseudobulb, and are topped with from three to five rigid, fleshy, sharply pointed and deeply channelled leaves. The racemes are produced from the axils of the leaves on the young bulbs and from the side nodes on the upper part of the stems on the older bulbs, the same bulbs flowering for some years in succession. The scapes are produced two or more from each stem, giving the plant a handsome appearance when in full bloom. The scapes grow to about a maximum of a foot in length and are occasionally branched. They carry numerous smallish and attractive but not very spectacular flowers. The sepals and petals are narrow and pointed and about $\frac{1}{2}$ inch long. They are whitish (sometimes cream) tipped with yellow (sometimes brown). The labellum is cuneiform and purplish-brown in colour, with white margins and three prominent veins running lengthwise towards the apex. Flowers in late Spring. Seems to do best in open sunshine in warmer parts—otherwise glasshouse. A1. B1. C1. D1. E4 or 5, 3 or 1 (ea) F7.

DENDROBIUM CAPILLIPES. *Native of Burma.*

A small growing variety with stout, erect, and somewhat knobby stems up to about 6 inches in height, crowned with 3 or 4 broad and rather stiff leaves. The racemes are short and carry from 2-4 round, bright golden yellow flowers about $1\frac{1}{2}$ to 2 inches in width. A1. B1. C1. D1. E4, 5 or 1 (ed) F4.

DENDROBIUM CARRI. *Native of North Queensland.*

A recently discovered species, interesting as being located by and named after Mr. T. Carr, of Julatten, North Queensland, one of the members of the Queensland Orchid Society. Growing from a creeping rhizome, the stems are conical in shape, about an inch in height, much grooved, and tipped by a single oblong leaf slightly notched at the apex and about $3\frac{1}{2}$ -4 inches long by $\frac{3}{4}$ inch in width. The scapes grow from the apex of the newly developed bulbs, and carry 5 or 6 small white flowers, the sepals and petals being lanceolate and acute, and somewhat connivent. Actually it may be described as a white species of *Dend. monophyllum*. The stems are rather more widely spaced along the rhizome than is the case with *D. monophyllum*. Whereas the latter is quite fragrant, I was unable to detect any scent from the only plant of *D. Carri* I have seen. A5. B2. C2. D1. E3 (ea) F13.

DENDROBIUM CARINIFERUM. *Native of Burma.*

A pretty species of a hardy nature. Stems 8-12 inches tall, or sometimes rather longer, terete and slightly grooved. Leaves are persistent, about $2\frac{1}{2}$ inches by $\frac{3}{4}$ inch wide, dark green, glossy and notched, and rather leathery in texture. Flowers are produced in bunches of from two to four from the year-old and older bulbs—appearing sometimes from the axils of the leaves at the apex of the stem, and sometimes from the nodes of the older stems. Sepals and petals white

(in some varieties creamy or even yellowish). Labellum white crested with coppery red. Flowers in late Spring. A1. B2. C2. D3. E1. (ea) F4.

DENDROBIUM CHLOROPS. *Native of Western India.*

An orchid rarely seen in Australia. Stems slender and semi-pendulous—up to about 15 inches long. Leaves are lanceolate and pointed. They fall before the flowers are produced in short sprays from the top and upper nodes of the stems. They are about 1½ inches across and have sepals and petals of very pale yellow, the labellum being yellowish green at the base. Flowers in Spring. A2. B1. C2. D2. E2. (ea) F4.

DENDROBIUM CHRYSANTHUM. *Native of Nepal.*

A long stemmed species. Stems up to over five feet in length, pendulous, and generally contorted. Leaves, which fall as the stems mature, are about 4 inches long by about 1¾ inches wide—lanceolate-ovate and pointed. Flowers usually appear on the younger pseudobulbs from the leaf axils, but occasionally from the nodes of the older stems. Racemes vary and carry from 2 to 6 flowers of a bright orange-yellow colour with waxy surface. The labellum is rounded and fringed, the same colour as the sepals and petals with a large irregular blotch of reddish-purple in the centre. Flowers in Autumn. A3. B1. C2. D1. E2. (eb) F6.

DENDROBIUM CARYSOTIS (Syn. *D. Hookerianum*. q.v.)

DENDROBIUM CHRYSOTOXUM. *Native of Burma.*

A vigorous and hardy species of considerable popularity both because of the loveliness of its flowers and its easiness of culture. It has stout pseudobulbs which are generally spindle-shaped (i.e. narrow at bottom and top and swollen in the middle), but sometimes clavate (i.e., slender at the base and thickened at the top—like a club), and always prominently ribbed. Each stem has a few (generally four) oblong-acute, dark green, leathery leaves at the top—these being 4-5 inches long by about 1½ inches wide. The long, drooping racemes come from the tops of the newly developed pseudobulbs and occasionally from the lateral nodes of older stems. They bear from 12-15 flowers with sepals and petals about equal in size and a rich golden-yellow in colour. The lip is the same colour as the sepals and petals with a deeper shade in the front and an arch of deep orange at the throat. The surface of the lip is downy and the edges are beautifully fringed and ciliated. I find this orchid does remarkably well hung under a lemon tree where it gets full morning sunlight up to about 10 a.m. in Summer. A1. B2. C2. D2. E1 or 2. (ea) F4.

DENDROBIUM CILIATUM. *Native of Burma.*

A small but interesting species with stems from 4 to 18 inches in length, somewhat slender and tapering towards the top, and growing in a tufted formation. Leaves are persistent, about 3 inches long by an inch wide, oblong with rounded, slightly notched tip. The short racemes grow from the top of the newly matured bulbs and carry from 6 to 18 (or even more in big plants) blooms each about an inch in diameter. The sepals and petals are about equal in size, and are a

greenish-yellow, the labellum being deeper in colour and marked longitudinally with a number of reddish-brown stripes, the edges having a row of dark brown hairs (from which fact it gets its name). This plant should be grown under glass in Sydney and in the cooler parts of Brisbane (preferably with heat in Winter). A2. B1. C2. D1. E1. (ea) F7.

Syn.: *D. rupicola*.

DENDROBIUM CLAVATUM. *Native of Assam.*

One of the seldom met with species worthy of inclusion in any collection if opportunity offers. The stems are long and pendulous, reaching a length of three feet. Leaves are long, narrow and pointed, and the plant is evergreen. The flower scapes are produced laterally from the nodes of the leafy stems, and each produces 4-6 blooms with rounded, brilliant yellow-orange sepals and petals. The downy labellum is slightly darker in colour and has a large double-blotch of chocolate in its centre and a row of golden-brown hairs along the edges. A4. B2. C1. D2. E1 or 2. (ea) F4.

DENDROBIUM COELOGYNE. *Native of Burma.*

A distinctive species not often seen. Pseudobulbs are very short (rarely exceeding two inches) and square, exceptionally stout, sometimes as thick as they are long, and are topped by two or three long, very thick and leathery, elliptically shaped leaves. Racemes grow from the tops of the pseudobulbs and carry 1 or 2 very large flowers, the sepals being longer (up to $2\frac{3}{4}$ inches) and pointed, and the petals about as long, but narrower, both being greenish or yellow, mottled with dark red. The labellum is dark purple with narrow side lobes and a broad trapezoidal centre lobe. A5. B1. C1. D2. E2. or E4. (eb) F1Z.

DENDROBIUM CRASSINODE. *Native of Lower Burma.*

A difficult species with strange knobbly stems up to about 24 inches in length. The leaves are about 4 inches long, narrow and pointed. Flowers are produced usually in pairs, but often in threes, from the upper nodes of the recently matured stems after the leaves have fallen. They are from $2\frac{1}{2}$ to 3 inches across and have equal sized, oblong, pointed sepals and petals, white, with amethyst to purple tips and a kidney-shaped, spreading, velvety lip, white, marked with yellow and amethyst at the tip. Flowers in early Spring. Like a number of the other *Dendrobiums* this species does not seem to flourish for more than about three years under cultivation. It has a tendency to mould and damping off. A1. B1. C4. D1. E2. (ea) F1.

Var. *albiflorum*.—Sepals, petals and labellum are pure white. Yellow blotch at throat.

Var. *Barberianum*.—Plant more vigorous in habit and bloom—flowers last longer and are more richly coloured—throat and middle of labellum blotched with deep orange.

DENDROBIUM CREPIDATUM. *Native of Assam (Illustrated.)*

A desirable species. Pseudobulbs (semi-pendulous) 12 to 15 inches in length,

and about $\frac{1}{2}$ an inch through—with one or two whitish stripes. Leaves deciduous—about 3 inches long—oblong and pointed. Flowers spring from the nodes of the recently matured stems after the leaves have fallen—usually in pairs, sometimes singly and sometimes in threes. Stalks purplish. Sepals and petals (the latter being the broader) are white, flushed with pink. The lip is heart-shaped and downy, the base being pursed—in colour white, tinted pink in front and yellow in the throat. Flowers in late Spring or early Summer. A1. B2. C1. D2. E2. (ed) F4.

DENDROBIUM CRETACEUM. *Native of Assam and Khasi.*

A species with long lasting flowers. Stems 12 to 14 inches long, pendulous and somewhat curved leaves with greyish streaks are about $3\frac{1}{2}$ inches long, narrow, rounded and notched at the apex. After the leaves fall the flowers are produced singly from the nodes. The sepals and petals are narrow and pointed, rather heavy, dull white in colour. The labellum is roundish and hoodlike, downy, and fringed with yellowish hairs, white edged with a yellow centre marked with crimson lines. A3. B2. C1. D2. E2. (ed) F1.

DENDROBIUM CRUMENATUM. *Native of Malaya.*

A beautiful species with long, slender, erect stems with black-haired membranous sheaths between the nodes. Leaves long, narrow and pointed. Blooms produced (usually in pairs) from the nodes on the two-year old leafless stems. Sepals and petals large and broad, yellowish green in colour, netted with darker green. The lip is also yellowish green with scarlet margins, crests and fringes. Flowers in late Summer and Autumn. A2. B1. C1. D2. E1. (eb) F1.

DENDROBIUM CRYSTALLINUM. *Native of Burma.*

A free flowering species of delicate beauty. Stems terete, striped, pendulous, rather slender and about a foot in length. Leaves are about 4 inches long, narrow and acutely pointed. Flowers grow (in twos and threes) from the apex and nodes of the young matured stems. They are of delicate texture with white sepals and petals, brightly tipped with amethyst purple. The labellum is roundish, yellow, margin white, front lobe blotched with purple. Flowers late Spring and early Summer. A2. B1. C4. D2. E1. (ea) F6.

DENDROBIUM CUCUMERINUM. *Eastern Australia.*

A quaint species whose leaves resemble (in shape) the small gherkins often seen in delicatessen stores. They grow from a branching, creeping rhizome and are about 2 inches in length. The short racemes spring from the rhizome at the base of the leaves and are about an inch across. Sepals and petals narrow and pointed, yellowish to creamy white in colour, marked with light reddish-brown lines. The labellum is short and curved, the margins of the side lobes being denticulated. The flowers are fragrant and often appear in Autumn and Spring, and occasionally in Summer. This interesting species is now comparatively rarely met with in a natural state. A5. B3. C3. D1. E4. or 5. F13.

DENDROBIUM CYMBIDIoidES. *Native of Java.*

A showy species rarely met with. Pseudobulbs thick, oval and angular, topped with two long, narrow pointed, leathery leaves. Racemes produced erectly from the top of the pseudobulbs. They bear from 5-7 fair sized flowers with spreading oblong sepals and petals, pale greenish yellow in colour. The lip is short and heart-shaped and is white in colour, blotched with purple at the base, the disk having 2 or 3 lines of small lumps or tubercles. The sides lobes are incurved. A1. B1. C1. D1. E1. (eb) F5.

DENDROBIUM D'ALBERTISII. *Native of New Guinea.*

A very striking species with rather short, squarish, tapering stems. Leaves about 3 inches long, elliptic and stout of texture. Racemes are produced from the top of the stems, and laterally from the upper nodes of the recently matured stems and occasionally from the older wood. They are long, and sometimes branched, and carry numerous quaintly shaped flowers, having two anther-like greenish petals (somewhat curled, but not to the same extent as the similar petals of *Dend. stratiotes*). The sepals are white, as is the shapely three-lobed lip, but the latter is attractively striped with bright purple. The flowers are very fragrant. A1. B1. C2. D2. E1. (ea) F1.

DENDROBIUM DEAREI. *Native of the Philippine Islands.*

A most desirable species which is rather difficult to obtain. Stems up to 3 feet in length, stout at the base and tapering at the top. The leaves are persistent and are about 2½ inches in length, oblong and notched. The racemes spring from the tops of the newly matured stems, and also from the lateral nodes of the older ones. Each raceme carries from 5 to 7 large white flowers which retain their beauty for a long time. The sepals are narrow and pointed, while the petals are broadly oval. The lip is broad and somewhat heart-shaped. Like the petals it is white, with a tinge of pale green (sometimes yellowish) in the throat. The flower is about 2¼ inches across. A1. B1. C1. D1. E2. (ed) F1.

DENDROBIUM DENSIFLORUM. *Native of Nepal.*

A lovely species with large drooping clusters of blossom. Stems stout, up to 15 inches tall, somewhat thicker at the top than at the base, four-angled and topped with a number of broad, oblong shining leaves, 4-5 inches in length. The racemes are long and drooping, and are produced from the upper nodes of the two-year-old (and sometimes older) stems. Flowers are up to 2 inches across, the sepals and petals being a bright orange-yellow in colour, spreading, and rounded in shape. The labellum is somewhat deeper in shade, rhomboidal in shape, the edges being minutely serrated and densely clothed with short, soft, golden hairs. A1. B3. C3. D3. E1. (or 2.) (ea) F12.

Var. *Dend. Schroderi*. Racemes longer, flowers further apart and larger. Sepals and petals white—lip deep orange. Syn. *D. densiflorum album*.

DENDROBIUM DEVONIANUM. *Native of Assam.*

A beautiful species, but, of all the *Dendrobiums*, one of the most difficult to cultivate successfully. The stems are very long and slender, tapering to the tips and pendulous. Leaves are deciduous, about 3 inches long, narrow and pointed. They fall before the flowers are produced from the nodes along the apical half of the stem. They are about 2 inches in width, sepals and petals being creamy-white, with a faint rosy blush, the petals being tipped with bright purple. Lip is cordate (heart-shaped), large, white with a purple margin, the base having a large blotch of bright orange. It is delightfully bordered with a lacy frill. Flowers in early Summer. A4. B3. C1. D4. E2. (ed) F5.

N.B.—This species seems to attract thrips, red spider and orchid beetles, and a close watch should be kept upon it to prevent the onslaught of these pests. Keep it saturated right through the growing season. It needs very little rest, and actually should not be allowed to dry out at any time.

DENDROBIUM DELICATUM. *S.E. Queensland.*

A very rare species usually classed as a variety of *Dend. speciosum*. The plant and florescence more closely resemble the well known *Dend. Kingianum*. The stems are up to 9 inches to a foot in height, swollen at the base, but tapering to slenderness at the top which is crowned with 2 to 4 evergreen, oval, obtuse leaves about 5 inches in length, and 1½ inches in width. Racemes carrying 8-9 flowers grow from the upper nodes of the recently developed stems, and occasionally from the two-year-old stems. Flowers ½ to ¾ inch across, the sepals and petals being somewhat incurved. The labellum is about ⅓ the length of the sepals and petals. In colour the sepals and petals are often a milky white, but are sometimes delicately tinted with lilac or rose. The short lip is white, with violet stripes. Flowers in the Spring. A2. B3. C3. D1. E1. (ea) F3.

DENDROBIUM DIXANTHUM. *Native of Lower Burma.*

A free flowering species with slender tapering stems which grow to a length of from a foot to eighteen inches. It is deciduous, and the linear, pointed leaves fall from the stems before the flowers appear. The racemes are short and grow from the lateral nodes of the two-year-old and sometimes the still older stems. From 2 to 6 flowers of medium size are carried on each stem. The sepals are narrow and pointed, while the petals are oblong and rounded. Both are a light yellow in colour. The lip is broad and squarish, the margins being edged with a series of tiny serrations. It is about the same colour as the segments, with a deeper yellow patch in the middle. It flowers in late Spring. A2. B2. C2. D2. E1. (ea) F5.

DENDROBIUM DRACONIS. *Eastern Asia.*

A well known species with evergreen erect stems, somewhat fusiform in shape, about a foot in height, and clothed with short, black hairs. The leaves are about 3 inches long, lance-shaped, and fairly leathery in texture. They remain on the stems for about 2 years. The flowers are produced in close heads from

the upper joints of both old and new growths. The sepals and petals are pure white and are rather narrow and pointed. The lip is spatulate (tongue-like), and is white, marked at the base with a number of coppery-red stripes. Flowers in early Summer. (Syn. *Dend. eburneum*). A1. B3. C3. D2. E1. (ea) F4.

DENDROBIUM ERIAEOIDES. *Johnstone River, North Queensland.*

A species of botanical interest only, but interesting to those specialising in Queensland species. Stems grow in thick masses from a creeping rhizome. They are tapering, finger-shaped, erect, with a few pointed and twisted leaves at the apex. Racemes short with a few small, dirty brown flowers, with some whitish spots in the sepals and petals. A5. B2. C2. D1. E1. (ea) F13Z.

DENDROBIUM ERYTHOPOGON. *Native of Borneo.*

Another black-haired species with erect, stout, twelve inch stems, topped with a number of dark green, oval, oblong leaves. Racemes are produced from the lateral joints on the upper part of the stems and bear five or more rather dingy yellowish flowers, each about 2 inches across. The trilobed lip has seven crimson ridges on the disk of the middle lobe, the two external ones being furnished with fringes of crimson hairs. The base of the lip between the ridges is tinted crimson, also. A1. B1. C1. D1. E1. (ea) F4.

DENDROBIUM EXIMIUM. *Native of Kaiser Wilhelmsland, New Guinea.*

An attractive but rare species, with fusiform extended stems, growing from a short rhizome, up to about 2 feet in length, deeply grooved in the upper parts, and bearing a few oblong, pointed, leathery leaves at the apex. The racemes are short and carry two or three large flowers with long, pale yellow sepals (the dorsal being lanceolate and pointed, and the laterals oval and somewhat triangular), and white tongue-shaped petals. The labellum is short and trilobed, the laterals being erect, the front lobe being wedge-shaped and rounded with a slight depression in the front, white with violet spots and blotches. Flowers in Autumn. This plant grows in the steamy gorges of the Torricelli Ranges. A2. B1. C2. D4. E1. (eb) F2.

DENDROBIUM FALCONERI. *Native of Assam.*

A beautiful species, but usually found difficult to cultivate. The stems are very long, slender and branching, with prominent nodes. Leaves are scanty, narrow and pointed. The flowers are large, and are produced solitarily from the nodes, mostly along the older stems. Flowers are from 4 to 5 inches across, with sepals and petals white with deep purple tips. Sepals are oblong and pointed, and the petals are oval-shaped with acute points. The labellum is trilobed, the lateral lobes being small and the central lobe heart-shaped and acutely pointed. It is white, the front deeply purple with a broad orange disk—marked with a purple blotch. This plant must be grown under cool conditions, with plenty of diffused light. It needs copious watering during the summer and a long resting period. It is desirable to keep the compost from drying right out during the winter months. A4. B3. C3. (modified), D3. E2. (ed) (or E5.) F3.

DENDROBIUM FALCOROSTUM. *Native of Coastal Areas of South Eastern Queensland and Northern New South Wales.* (Illustrated.)

A lovely species with grooved stems about a foot in length, topped with 4 or 5 oblong, obtuse, leathery leaves 4 to 5 inches in length and about 1½ inches in width. Racemes spring from the axils of the leaves at the top of the stem, grow to about 10 inches long and carry up to 20 white or creamy fragrant blossoms with oblong, rather obtuse sepals and lanceolate petals, the latter being a little the shorter. The labellum is short and incurved, the side lobes curling inwards, giving the lip something of the appearance of a falcon's beak (from which fact the species gets its name). The lip is the same creamy white as the sepals and petals, but is prettily marked with red or purple spots and blotches, the throat being yellow. It flowers in the late Spring, and during the warmer parts of the day is very sweetly scented. A1. B3. C3. D2. E1. (ea) or E5. F5.

DENDROBIUM FARMERI. *Native of Sikkim, Nepal and North Burma.*

A distinctive species, having square stems, slender at the base and from 6 to 12 inches in height. Each stem has two or three fleshy, ovate or lanceolate pointed leaves, usually from 3 to 4 inches in length, but sometimes as long as 7 inches, and from 1½ to 2 inches in width. Drooping flower scapes come from the tops of the stems and carry a number of two-inch flowers with creamy-pink flushed sepals and petals. The downy labellum is yellowish, with a richer yellow centre, the front being somewhat serrated. Flowers in late Spring. A1. B3. C2. D2. E1. (ea) F5.

Var. *albiflorum*. Sepals and petals whiter, and lip orange.

Var. *aureo-flavum*. Less robust in habit. Sepals and petals deep yellow—labellum saffron yellow.

DENDROBIUM FELLONSII.

Syn. *D. gracilicaule* (q.v.).

DENDROBIUM FIMBRIATUM. *Native of Nepal.*

A handsome and vigorous species with tall, stout, erect stems, sometimes reaching a length of nearly five feet. Leaves are oblong, lanceolate and pointed, from 3 to 6 inches long by ¾ to one inch in width and evergreen. Flowers are produced on drooping racemes from the top of the year-old and older stems, and carry up to a dozen lovely blossoms from 2½ to 3 inches in diameter. They are delicate in texture and a deep rich yellow in colour, the labellum being edged with a golden mossy fringe. A1. B3. C2. D3. E1. (ea) F3.

Variety *oculatum*. Sepals and petals a deeper orange—yellow with a deep maroon-purple blotch in the centre of the lip.

DENDROBIUM FINDLAYANUM. *Native of Burma and Siam.*

A species with swollen nodes along curving, rather slender stems, which grow to a length of 18 inches or less, and produce a pair of lanceolate, acutely pointed deciduous leaves from their top. The flowers are produced (in twos or threes) on longish pedicels at or near the top of the recently ripened stems. Flowers are

about 3 inches across and have white lilac tinted sepals and petals, and the broad heart-shaped labellum is deep yellow in the centre with pale yellow or white margins. Flowers in late Summer. A2. B1. C1. D1. E1. (ea) F2.

DENDROBIUM FITZGERALDII.

(Syn. *D. superbiens* (q.v.).)

DENDROBIUM FORMOSUM. *Native of Nepal and Sylhet, etc., etc.*

A magnificent species with stout, erect, hirsute stems with large broad-ovate leathery leaves. The flowers are produced in groups of from 3 to 5 from the tops of the recently matured stems. Sepals and petals pure white. Labellum very large, tongue-shaped, white with a bright yellow groove down the middle. Flowers from 3½ to 4 inches across. Flowers in Autumn. Variety *giganteum* has blooms 5 inches across, and the central groove of the lip is broader and deeper in colour. Flowers are of good texture and last 5 to 6 weeks. This plant requires ample water at all times and should be given the maximum of warmth and light. A1. B1. C1. D1. E2. (eb) F1.

DENDROBIUM FOXII. *Native of Perak River, Malay States.*

A quaint species with long slender reddish stems about 3 feet in length with a number of lanceolate pointed leaves, about 4 inches long and one inch wide. Racemes grow from the upper nodes of the matured stems and are slender and pendulous, and pink coloured. They carry from 7-10 flowers with white rosy flushed sepals about ½ an inch long, ovate in shape and pointed, and white petals nearly an inch in length, and twice as wide as the sepals. The lip is pink flushed and about the same length as the sepals. The front portion is rounded, and the edges are fringed. Flowers in Spring. A2. B1. C2. D3. E1. (eb) F5.

DENDROBIUM FROSTII. *Native of North Queensland.*

A variety of *D. bigibbum* and probably synonymous with *D. bigibbum alba*. Sepals and petals pure white. Throat tinged with green.

DENDROBIUM FUSCUM. *North Australia.*

A rarely seen species with long (up to 6 feet) somewhat fusiform stems clothed at the top with a number of ovate, sometimes elliptical, thick fleshy leaves up to 4 inches in length with incurved edges. The racemes (about 8 inches long) come from the lateral nodes on the upper part of the stems and bear up to about 12 flowers, sepals and petals are brown in colour, the petals being darker and both having a paler margin. The lateral sepals and the petals are about ¾ of an inch in length, the dorsal sepal being shorter. The petals are undulated. The labellum is short with incurved side lobes and a short, pointed middle lobe. Flowers in late Spring. A1. B1. C1. D1. E1. (ea) F4Z.

DENDROBIUM FUSIFORME. *Native of Queensland.* (Illustrated).

A species with (often) long, stout fusiform stems frequently purplish in colour with two or three large, fleshy, leathery leaves, similar to those of the *speciosum*.

Racemes are produced from near the apex of the stems, and are long and crowded with white or creamy yellow flowers, which, if spread out, would be about 2 inches across. The sepals and petals are acutely lanceolate and are much incurved. The flowers are fragrant. A1. B2. C3. D1. E1. (ea) F5.

DENDROBIUM FYTCHIANUM. *Native of Burma and Malaya, etc.*

A small habited species with erect, slender, round stems up to a foot high with a few oblong-lanceolate and acute leaves which fall before the flowers appear. Racemes from the tops and from the upper nodes of the stems. These carry eight or ten snowy white flowers with a three-lobed lip, the lateral lobes curled inwards and rosy pink, the middle lobe heart-shaped and pointed at the front, usually white in colour, but sometimes more or less suffused with pink. The rear portion is lightly bearded with yellow silky hairs. A2. B2. C2. D2. E1. (ea) F9.

Variety *roseum*. Similar in type to the above, but the flowers are entirely of a bright rosy pink colour.

DENDROBIUM GIBSONII. *Native of Sikkim, Assam, Burma, Java and Yunnan.*

A colourful species with long, round, slender stems whose oblong pointed leaves are persistent and parchment-like in substance. The racemes are long and drooping and spring from the axils of the leaves at the top of the two-year-old stems (and occasionally from the older stems). Flowers (up to about 15 of which are borne on each raceme) are deep yellow in colour, the labellum being rather deeper in shade, downy and ornamented with a double maroon blotch towards the back of the middle lobe. It is slightly fringed on the curling sides. It has a strong, rather musty, scent. A1. B.1 C2. D3. E1. (ea) F6.

Syn. *Dendrobium fuscatum*.

DENDROBIUM GOLDFINCHII. *Native of Solomon Islands.*

An interesting species with massed compressed stems, oblong in shape, from 3 inches to a foot in height, and about an inch or more in width. The leaves are oblong lanceolate and acutely pointed, their papyrus-like bases sheathing the stems. The racemes appear at the apex of the stems, are about 2 inches in length and are branched. About 4 to 5 flowers are produced on 1 inch pedicels. The most striking feature of the blooms is the long conical spur which comprises $\frac{2}{3}$ the total length of the flower. Sepals and petals are oblong and pointed. The labellum is wedge-shaped at the base, and spreading in front, the whole flower being rounded into a kind of cornucopia. The sepals are milky in colour, sometimes tinted pale yellow, the petals are white, while the labellum is creamy with a number of small green dots in the middle of the disk. Flowers in early Summer, and blooms are delicately scented. A1. B1. C1. D2. E1. (ed) F7.

DENDROBIUM GOLDIEI. *Native of North Queensland.* (Illustrated.)

A beautiful species often confounded with *D. superbiens*, but differing from that species in its richer colouring, broader petals without a white margin, and in

the labellum, which is longer, narrower and more pointed than is the case with *D. superbiens*. It is hypothesized, that is, *D. Goldiei* is a natural hybrid between *D. bigibbum* and *D. undulatum*, while *D. superbiens* is a natural hybrid between *D. Phalaenopsis* and *D. undulatum*. The results of artificial cross fertilisation between the above species seem to confirm the theory. Stems erect and up to about 3 feet in height, and cylindrical in form. The leaves are lanceolate and rich reddish purple in colour, often netted with darker veins. The petals are wider than the sepals, oblong in shape, and uniform in colour. Labellum shortish with semi-rounded side lobes. Front lobe pointed. Same colour as petals. Flowers Spring, Summer, or early Winter. A1. B1. C1. D1. E1. (eb) F1.

DENDROBIUM GRACILICAULE. *Native of South Queensland and N.S.W.*

A very common species round Brisbane, and found in most of the low hilly forest country along the coastal areas of Queensland. It is of little value from the horticultural point of view, the flowers being small and often very dingy in appearance, but when grown in masses it is quite charming. Being so easily obtained it is particularly useful to beginners in orchid culture as a medium for their experiments in potting, etc. The stems are slender and greyish, and attain a length of about 2 feet. They carry 3 or 4 lanceolate leaves up to about 3 inches in length and nearly an inch across at the widest part. The racemes are short and are produced from the apex of the stem, two or three racemes often being produced at the same time. Flowers, usually from 6-8 on a stem, are small (about $\frac{1}{2}$ an inch across) and have pale to deep yellow petals and sepals spotted with reddish-brown. The labellum is lighter than the other segments, and is generally free from spots. Flowers are rather sweetly scented and appear in late Spring. A2. B3. C3. D1. E1. or E5. (ea) F13.

Syn. *Dend. Brisbaneense*, *Dend. elongatum*.

DENDROBIUM GRACILLIMUM. *Native of South Queensland and N.S.W.*

Usually regarded as a natural cross between *D. speciosum* and *D. gracilicaule*. Stems and foliage somewhat like those of *gracilicaule*, but longer and stouter. Flowers produced on 8 inch racemes from tops of stems and sometimes laterally from the upper nodes. They are nearly twice the size of those of *gracilicaule*, and are wholly deep cream in colour. They are strongly scented. A1. B3. C3. D1. E1. (ea) F7.

DENDROBIUM GRATIOSISSIMUM. *Native of Burma.*

A very pretty species with slender, rather drooping stems which reach a length of from 12 to 36 inches. The leaves are deciduous and sheath the stems with their bases. They are somewhat reddish in colour and broadly lanceolate in shape. Flowers are produced in twos or three in a cluster, each flower being on a pedicel about $1\frac{1}{2}$ inches long. They grow from the lateral nodes towards the end of the stems. Flowers are $2\frac{1}{2}$ to 3 inches in diameter, the sepals being lanceolate and very acutely pointed, while the petals are oblong and less acute at the apex. The labellum is broad and somewhat heart-shaped, and slightly pointed at the tip.

Sepals and petals and labellum are white, the tips being tinted pink, while the disk is ornamented with a large golden spot sometimes lined with deep purple. A4. B2. C2. D2. E2. (eb) F2.

Syn. *D. Boxallii*.

DENDROBIUM GRATIOSISSIMUM. var. *Boxallii*. Native of Lower Burma.

A pretty species with variable stems. Sometimes these are long and pendulous, at others moderately stout and semi-erect. Leaves are about 4 inches long, bilobed at the apex and fall before the racemes appear from the upper nodes. Racemes a rich reddish purple. The labellum white tipped with purple and with a large rich orange disk. A4. B2. C3. D2. E2 or 1. (ea) F4.

DENDROBIUM GRIFFITHIANUM. Native of Chappedong.

A magnificent species with robust, erect, club-shaped stems, the upper parts being somewhat four-sided, growing to a height of from 12 to 18 inches, bearing at the top 2 or 3 leathery, oblong acute leaves about $3\frac{1}{2}$ inches in length by $1\frac{1}{4}$ inches wide. The racemes are long and drooping, and bear from a few to a great many flowers in the manner of *D. densiflorum*. The sepals are oblong and pointed, the petals being about twice their width, and rounded at the tips. The labellum is spreading and heart-shaped, the back part of the side lobes being curled inwards to form a funnel. The individual flowers are about $\frac{1}{2}$ inch in diameter, and are a very rich golden yellow in colour, the petals being ciliated, while the labellum is covered with a fine yellow down, the edges being finely toothed. Flowers in Spring. A1. B2. C4. D2. E1. (ea) F11.

Variety *Guibertii*. Stems stouter and rather shorter than the type. Leaves smaller. Flowers larger and more brilliant.

DENDROBIUM HAMATUM. Native of Cochinchina.

A delicate species with long, very slender stems 3 feet or more in length, with leaves four inches in length, oblong-lanceolate and acute, and about $\frac{3}{4}$ inch wide. The racemes are pendulous, and carry a few small but distinctive flowers about $1\frac{1}{2}$ inches across, yellow in colour, and freely spotted with purple dots. A4. B1. C1. D1. E4, or E2. (eb) F7.

DENDROBIUM HARVEYANUM. Native of Burma.

Another attractive yellow-flowered species with short fusiform stems, somewhat furrowed, with a few oblong-ovate and pointed leaves. The racemes are produced laterally from the axils of the leaves. They carry 4 or 5 flowers each about $1\frac{1}{4}$ inches across with lanceolate sepals and oblong, fringed edged petals. Labellum is round, concave, the edge being fringed—the surface is covered with short, soft down. The colour of the flowers is dense yellow, the labellum having two deep orange blotches. Flowers in Spring. A1. B1. C4. D2. E1. (eb) F5.

DENDROBIUM HEDYOSUM. (Syn. *D. scabrilingue* (q.v.).)

DENDROBIUM HENSHALLII.

(Synonymous with *Dend. transparens*—q.v.)

DENDROBIUM HETEROCARPUM. *Native of India, Nepal, Assam, Malaya, Java, etc.*

A widely spread and variable species of considerable charm. Pseudobulbs up to 18 inches in height and fusiform, the upper part being about $\frac{1}{2}$ inch in width—yellowish in colour. The leaves are about 4 inches in length, oblong and sharply pointed. Flowers are produced in pairs (sometimes threes) from the nodes of the previous year's bulbs. They are about 2 inches in width and (in the type variety) are a creamy yellow colour in the sepals and petals, the labellum being prominent, reflexed, grooved, in colour buff-yellow with reddish streaks. Flowers appear at end of winter and grow deeper in colour with age. They are very fragrant. (Syn. *D. aureum*.)

Var. *Henshallii*.—Stems longer and more slender than the type, the sepals and petals being lighter in shade, and the lip white and spotted and blotched with yellow and red.

Var. *pallidum*.—Similar to *Henshallii*, but flowers, smaller and paler.

Var. *Philippinense*.—Stems up to 3 feet or more in length, and inclined to be pendulous—flowers paler than the type (not scented). A1. (sometimes A3.) B2. C2. D2. E2. (ea) or (ec) F4.

DENDROBIUM HILDERBRANDTII. *Native of Siam and the Celebes.*

A variable but pleasing species, the stems of which are inclined to be pendulous, up to 20 inches in length, slender at the base, but thickening in the upper part, which is clothed with ample foliage. The bases of the leaves sheath the stem. Leaves oblong-lanceolate, bilobed at the apex, and obtuse. Racemes are short and usually three-flowered, the flowers being on inch-long pedicels. Sepals obtusely oblong, the apex being twisted. The petals are broad, oblong-ovate and obtuse. The labellum is broad and ovate, the rear part of the lateral lobes forming a tube. The margins and the disk are covered with hairs. In colour it is rather variable, the petals and sepals being sometimes greenish-white, sometimes yellowish-greenish white, and, again, occasionally white. The labellum is pale yellow, with two dark brown spots. The flowers are about 3 inches across, and appear in early Summer. A3. B1. C4. D2. E1. (eb) F1.

DENDROBIUM HILLII.

A variety of *Dend. speciosum* (q.v.).

DENDROBIUM HISPIDUM. Syn. of *Cadetia hispida*. q.v.

DENDROBIUM HODGKINSONII. *Native of New Guinea.*

An interesting species with fusiform stems up to 10 inches high, up to about $\frac{3}{4}$ inch thick in the middle, grooved and topped at the apex with two or three lanceolate acute leaves from 4 to 7 inches in length and up to $1\frac{1}{2}$ inches in width and

finely textured. The racemes, which are shorter or about as long as the leaves, come from the apex or laterally from the upper nodes and carry two or three flowers on $1\frac{1}{2}$ inch pedicels. Flowers are fair sized, but bell-shaped and nodding. Sepals and petals up to $1\frac{1}{2}$ inches long. The labellum is a little longer than the sepals and petals, trilobed, the lateral lobes being erect and the middle lobe ovate-cordate and pointed at the apex. The sepals and petals are pale yellowish-green, the labellum white with purple veins. Flowers in Spring. A1. B1. C1. D1. E1. (eb) F5.

DENDROBIUM HOHLIANUM. *Native of Fiji.*

The best of the Fijian orchids. The stems are slender, erect and about 20 inches tall. The leaves are sheathed, black-spotted, ovate-lanceolate, and about $3\frac{1}{2}$ inches long. Racemes come from the upper nodes and carry a few closely congested flowers, each about $1\frac{1}{2}$ inches across. They are a beautiful shade of rose-purple and appear in late Winter. A2. B2. C1. D2. E1 (ea) F4.

DENDROBIUM HOOKERIANUM. *Native of Assam.*

Stems up to 5 feet or more in length and comparatively slender but swollen at the bases. The leaves are lanceolate and acutely pointed, and about 5 inches long. They fall as the stems mature. The flowers are borne on long racemes produced from the axils or nodes on the upper parts of the matured stems. Each raceme bears from 6 to a dozen large golden-yellow flowers. The sepals and petals are acutely oblong and equal in size. The labellum is large and spreading with a fringe round the edges, velvety on the top, deep yellow in colour and with two dark red blotches in the throat. Altogether the plant greatly resembles the better known *D. fimbriatum* var. *oculatum* both in form and flower. A2. B2. D2. E1. or E2. (ea) F1. (Syn. *D. chrysothis*.)

DENDROBIUM HORNEI. *Native of Fiji.*

A species rarely if ever seen here. Stems about 16 inches in length, thick at the base, but attenuated at the apex (sometimes fusiform). Leaves (2) are about 3 inches long by $\frac{3}{4}$ inches wide, oblong and obtuse, thick and leathery. Racemes from apex 8 inches or longer. Dorsal sepals lanceolate, oblong. Petals similar to the dorsal sepal, lateral sepals circular. Labellum short and oblong ovate, the lateral lobes insignificant, middle lobe broadly ovate with an undulated edge. Flower about 2 inches across. Sepals and petals a rather dusty white with a purple veined labellum. A1. B2. C1. D2. E1. (ea) F4.

DENDROBIUM IMPERATRIX. *Native of New Guinea.*

A lusty species with clustered stems growing to a length of 6 feet and more, and about an inch in thickness, many jointed and well leaved. The sheathed leaves are greyish green, with oblong obtuse blades bilobed at the apex and about 6 inches long by over two inches in width. The long racemes grow from below the terminal of the stem and carry a number of flowers each on a pedicel about 2 inches in length. The dorsal sepal is long, pointed and undulating, with the lateral

sepals narrow and curved; the petals being shorter than the sepals, slightly twisted and spreading at the tips. The labellum is three-lobed, the lateral lobes being rounded with toothed edges, and the middle lobe broad and rounded with three raised lines on the disk. The sepals and petals are white, while the labellum is rose-pink with purple veins. It flowers in Autumn. A1. B1. C2. D2. E1 (eb). F4.

DENDROBIUM INFUNDIBULUM. *Native of Burma.* (Illustrated.)

A handsome species with long (up to 2 feet) rather slender stems which are more or less thickly coated with short black hairs. The ovate-lanceolate leaves are about $3\frac{1}{2}$ inches long, and have hairy sheaths which envelop the stems. The large white flowers are produced on pedicels from the apex of the recently matured stems. The sepals are acutely ovate, while the petals are somewhat longer and rounded. The lip is large, spreading and wedge-shaped, and has a brilliant yellow or golden streak towards the throat. A2. B1. C2. D2. E1. (ea) F1.

Variety *Jamesianum*. Very similar to the type, but the marking on the labellum is cinnabar red.

Variety *ornatissimum* has larger flowers than type.

Variety *carneopticum* has the labellum suffused with flesh-pink while the middle line is narrower than in the type.

DENDROBIUM INVOLUTUM. *Native of Samoa.*

An interesting species with long (over 4 feet) terete, pendulous stems, brownish yellow in colour and clothed with numerous, greyish green leaves, obtusely ovate lanceolate in shape, and about 3 inches long. The racemes appear from the stems on the opposite side from the leaves, and carry two medium-sized flowers with lanceolate dorsal sepals and triangular lateral sepals, while the petals are narrow and pointed. The sepals and petals are incurved and twisted. The labellum is short and rhomboidal in form. Generally the colour is yellowish, but often salmon coloured. A4. B2. C2. D2. E1 (ea) F7.

DENDROBIUM JAMESIANUM.

A variety of *D. infundibulum* (q.v.).

DENDROBIUM JAPONICUM.

(Syn. *D. monile* q.v.)

DENDROBIUM JOHANNIS. *Native of Cape York Peninsula.*

A pretty species, but shy of flowering in cultivation outside its habitual latitude. The fusiform stems grow in clumps and attain a length of a foot or more and are roughly $\frac{2}{5}$ of an inch in diameter in the middle. The few leaves they bear at the terminals are lanceolate, pointed and slightly notched at the apex. The racemes come from the axils of the leaves on the recently matured stems and occasionally from the lateral nodes of the older stems. They carry a dozen or

more attractive flowers. The sepals and petals are brown, and occasionally the apex of these is yellow. The labellum is yellow, the side lobes being purple striped. It flowers in Spring. A1. B1. C1. D1. E1. (ea) F4.

Variety *semifuscum*. This differs from the type in having the petals a paler brown than the sepals.

DENDROBIUM JOHNSONIAE. *Native of New Guinea.*

A very beautiful species. Stems, clustered, fusiform, but elongated up to about 10 inches in height and $\frac{3}{8}$ inch in diameter, and somewhat furrowed. Foliage is scanty and deciduous. Leaves lanceolate-oblong and obtuse, with the apex lobed. About 6 inches long and $1\frac{1}{4}$ inches wide. Racemes lateral from the axillary nodes of the upper part of the stems. They grow to 16 inches in length and carry a number of large flowers. The sepals are ovate-lanceolate and sharply pointed, the tip being more or less reflexed. The petals are much larger than the sepals and are rhomboidal in shape, the apex pointed and the edges slightly undulate. The flowers are large (in some cases nearly five inches across) and are snowy-white, the lateral lobes of the labellum being edged with purple-violet. Flowers in early Summer. A1. B1. C1. D1. E1. (eb) F1.

Synonyms: *Dendrobium MacFarlanei* and *Dendrobium niveum*.

DENDROBIUM KINGIANUM. *Native of Coastal S.E. Australia.*

A small, but charming, sun-loving species found growing on the rocks on the Dividing Range and the Glass House Mountains and other eminences. Stems grow in clusters and attain a height of from 6 to 9 inches. They are swollen at the base but attenuated towards the apex. The three to five leaves which clothe the upper part are oblong, bilobed, and leathery. Racemes grow to about $4\frac{1}{2}$ inches in length and carry a few smallish sweet scented flowers. The sepals and petals are slightly incurved. In colour it varies from pale rose or lilac to a rich royal purple, the whitish labellum being densely spotted with rosy lilac or purple. Flowers in late Spring. (I find this species does best out of doors in full sunlight.) A2. B3. C3. D1. E1. (ea) or E4. or E5. F8.

Variety *album*. Stems longer than the type, racemes carrying more flowers all pure white.

Variety *Aldersonae*. Flowers white, petals and labellum spotted with pale purple, and with a yellowish disk.

Variety *pallidum*. Stems weaker than the type, the flowers being pale lilac.

Variety *Silcockii*. Flowers larger and fleshier than the type and pure white in colour.

DENDROBIUM LAMELLATUM. *Native of Lower Burma, Malaya, Java and Borneo.*

A curious species with pseudobulbs growing from a long, creeping rhizome. They are something like a prickly-pear leaf in shape and form, being narrow at the base and broad and rounded at the top and very compressed (flat). The leaves appear at the top of the stems and are ovate and fleshy. The flowers are produced from

near the terminal and bear 3 or 4 smallish (about an inch across) creamy or yellowish flowers with a deeper yellow throat. A5. B1. C1. D1. E3. (ed) F7. or F13.

Syn. *Dend. compressum* and *Onychium lamellatum*.

DENDROBIUM LASIOGLOSSUM. *Native of Burma.*

An interesting species with slender, drooping, terete and sometimes branching stems with a few lanceolate acute persistent leaves. Racemes grow from the nodes opposite the leaves and produce two or three small medium sized flowers with white sepals and petals (the lateral sepals being longer than the dorsal or the petals) and a white squarish labellum with a hairy golden disk and red striped lateral lobes. Flowers in late Spring. A4. B2. C4. D2. E2. (ed) F5.

DENDROBIUM LEEANUM. *Native of New Guinea.*

A beautiful species with stems 3 feet or more in length, and slightly flattened. The leaves, which are few, are lanceolate-oblong, and pointed. Racemes are produced from the upper parts of the stems and each of these carries several large flowers. The sepals are ovate and pointed, tipped in the lower part with rose pink. The petals are lanceolate, narrow and slightly twisted. They are carmine in colour. The labellum is tubular at the base, but expansive and open in front, the apex being rounded. The throat is green, decorated with radiating lines of rose pink. The edge and the lower part is the same carmine colour as the petals. Flowers, about 3 inches across, appear in late Spring and Summer. A1. B1. C2. D2. E1. (eb) F1.

DENDROBIUM LEUCOLOPHOTUM. *Native of Sunda Isles.*

An attractive species with cylindrical, many leaved stems about 20 inches in length and inclined to be pendulous. Leaves are ligulate, pointed and thin, but stiff in texture. The foot-long racemes which bend under the weight of the blossoms spring from the nodes in the upper part of the stems and carry a number of flowers about an inch in diameter. The sepals and petals are pointed. The labellum has triangular side lobes while the centre lobe is ovate, comparatively large and pointed. Flowers are white, the side lobes of the lip being greenish tinted. A1. B1. C1. D2. E1 (eb) F7.

DENDROBIUM LINAWIANUM. *Native of China.*

A handsome species with stout, club-shaped, prominently noded and deeply grooved stems reaching a length of 10 inches or more. Leaves are oblong and bilobed and up to 4 inches in length. The short racemes are produced from the lateral joints of the two-year old stems and carry two blooms. Flowers about 2½ inches across. The sepals and petals are oblong acute, the petals being half as wide again as the sepals. The labellum is shorter than the other segments, and is roundish, reflexed and has the margins toothed. Sepals and petals are white at the base, and deep rose pink in the upper part, the apex being almost purple. The lip is white with a purplish apex and margins and a crimson spot on each side of the disk. Flowers late Autumn. A1. B3. C4. D4. E1. (ea) F2.

DENDROBIUM LINGUIFORME. *Native of Queensland and New South Wales.*

A quaint and dainty species generally found on tea-trees and rocks. It grows in the form of a creeping rhizome or stem, which is frequently branched and rooted from the nodes. The leaves are sessile (that is, they grow from the stem without a petiole or stalk), oblong and rounded and generally have three grooves running lengthways down the leaf. They usually lie flat on the surface of the tree or rock upon which they grow. In the Spring the plant sends out numerous short (up to about 6 inches) racemes, each of which carries a number of dainty white blossoms with narrow, pointed and incurved sepals and petals. The lip is very short and recurved. It is usually white with a creamy tinge. Flowers are fragrant. A5. B3. C3. D2. E5. F8.

DENDROBIUM LITUIFLORUM. *Native of Lower Burma and Assam.*

A fine species with swollen-based stems up to about 2 feet, slender, terete and many-jointed. They are clothed with the greyish sheaths of the linear-lanceolate leaves (up to 4 inches long and about $\frac{3}{4}$ inch wide) which, being deciduous, fall as the stems mature. The racemes are short and carry from 2 to 5 fair sized flowers. The sepals are oblong and pointed, while the petals are broadly elliptic in shape. They vary in colour, but are usually a deep amethyst. The labellum is tubular at the base, but the front lobe is curved upwards at the tip, concave and broad. It is deep amethyst at the base with a yellow band round the disk, this being edged with purple. Flowers in Autumn. A2. B2. C3. D3. E1. (ea) F2. Syn. *Dend. Hanburyanum*.

Variety *candidum*. Sepals and petals white, otherwise similar to the type.

Variety *Freemanni*. Stems shorter and thicker than the type. Sepals and petals deep purple, the band round the disk being sulphur coloured.

Variety *robustus*—a very rare variety, the flowers being up to $3\frac{1}{2}$ inches across—otherwise similar to the type.

DENDROBIUM LODDIGESII. *Native of China.*

A pretty species with short greyish-green stems about 6 inches long and slender. Leaves about 2 inches long and oblong lanceolate in shape. Flowers are produced singly from the stems among the leaves near the top. They are about $1\frac{3}{4}$ inches across. Sepals and petals are rosy pink (or white with a rose suffusion) at the base, deepening to intense purple at the tips. The labellum is short, concave and roundish, the margins being fimbriated. It is yellow from centre to the throat with a rosy tone spreading to the edges and the apex. Flowers are fragrant. Blooms in Spring. A2. B3. C1. D3. E1. (eb) F5.

DENDROBIUM LONGICORNU. *Native of Sikkim, Nepal, etc.*

A charming species with erect, terete, slender, bristly and slightly furrowed stems a foot or more in height. The deciduous, linear-lanceolate, acuminate leaves are about $1\frac{3}{4}$ to 5 inches in length. The short terminal racemes carry from one to three large flowers. The lateral sepals are up to 2 inches long, while the dorsal sepal and the petals are about $\frac{3}{4}$ inch long, all being narrow and pointed. The

labellum is rounded and toothed with semi-obovate lateral lobes. The sepals and petals are white, the lip having a yellow centre. A2. B2. C1. D1. E1. (ed) F4. Variety *majus*. Sepals and petals a more milky white — flower more regularly shaped, labellum more deeply coloured—flower lasts better and is larger in size.

DENDROBIUM LOWII. *Native of Borneo.*

A species which somewhat resembles *Dend. draconis* in habit and form. Stems up to about 16 inches in height, erect, the upper part of the stem having a number of ovate-oblong leaves with an obliquely-bilobed apex in length about $3\frac{1}{2}$ inches by about $\frac{3}{4}$ inch in width. The bases of these leaves sheath the stems, and are covered with short black hairs. The racemes come from near the top of the stems, and carry from 4 to 6 pale buff-yellow flowers which are somewhat funnel-shaped. The petals are rather longer and half as wide again as the sepals. The labellum is pale yellow in colour and has six raised purplish lines furnished with brown hairs down the centre. It is longer than the petals, the middle lobe being spatulate (tongue-shaped) while the side lobes are oblong and somewhat ligulate. Fragrant in middle of day. A1. B1. C1. D1. E2. (ed) F4.

DENDROBIUM LUTEOLUM. *Native of Lower Burma.*

A pretty species with slender, extended, fusiform stems up to about 2 feet in height, the upper parts of which are furnished with ovate-oblong, obtuse, bilobed leaves about 4 inches long and $1\frac{1}{4}$ inches wide. The short racemes come from the upper part of the newly matured stems and carry 2-4 flowers. Sepals and petals primrose-yellow, the labellum being the same but marked and lined with reddish-purple lines. A2. B2. C2. D2. E1. (ea) F4.

Variety *chlorocentrum*. Sepals and petals pale yellowish green—disk ornamented with green hairs. Flowers rather firmer in texture and slightly larger than the type.

DENDROBIUM LYPERANTHIFLORUM. *Native of New Guinea.*

A distinctive species with slender, firm, 20-inch stems, evergreen, and with short inter-nodes. Leaves are ovate and about 2 inches long. The racemes are short, and grow from the lateral nodes on the upper part of the stems. The dorsal sepal is hooded, while the lateral sepals are broadly triangular and falcate. The petals are narrow, pointed and falcate, the points being deflexed. The labellum is trilobed, but the lateral lobes are minute while the middle lobe is oblong-rhomboidal in shape, the margins having three or four prominent teeth while the apex is triangular pointed and sharply deflexed. In colour the flower is white or cream with yellow stripes. Flowers in December. A2. B2. C1. D2. E1. (eb) F4.

DENDROBIUM MACCARTHIAE. *Native of Ceylon, etc.*

A magnificent species, but unfortunately difficult to obtain, its exportation from Ceylon being prohibited. It has long, pendulous stems, bulbous at the base, terete, and with the nodes purplish or crimson spotted. The leaves are scanty and are narrow and pointed and about 4 inches in length. The racemes are short and

appear on the stems opposite the leaves, and carry 4 or 5 large and beautiful but drooping flowers. Sepals and petals are rosy-mauve, the petals being nearly twice as wide as the sepals. The flowers, being flattened, give the appearance of being only partly opened. The labellum is nearly $2\frac{1}{2}$ inches long, tongue-shaped, pale lavender (sometimes almost white) striped and spotted with intense purple with a blotch of deep maroon in the centre. A3. B1. C3. D1. E2. (ed) F1.

DENDROBIUM MACFARLANEI.

A Synonym of *Dend. Johnsoniae*.

DENDROBIUM MACGREGORI. *Native of Louisiade Islands.*

A distinctive species with very numerous thick roots and stems growing from a twisting rhizome. These stems are slightly swollen at the base and are then fusiform, the upper part being terete. They grow to a height of 8 or 9 inches, and have a few oblong-lanceolate bilobed leaves. Racemes come from the top of the stems and carry 2-4 good-sized flowers (about 2 inches across).

The sepals are white, spotted with purple, while the petals are white, spotted with pale gold. The labellum, which has large, erect, triangular, lateral lobes and a kidney-shaped middle lobe, has the latter bright yellow ornamented with violet lines while the laterals are white, spotted with violet. A2. B2. C1. D2. E1. (ea) F4.

DENDROBIUM MACRANTHUM. *Native of Queen Charlotte Island, New Hebrides, and Samoa.*

This species (which should not be confused with *Dend. superbum*, which has as one of its synonyms *D. macranthum* (Hook)) has smooth stems about 2 feet high, terete and articulated, clothed with elliptic leaves, slightly bilobed at the apex, about $1\frac{1}{2}$ inches. Racemes about a foot in length, carrying from 6 to 9 flowers. These have erect dorsal sepal and petals, narrow and pointed, and somewhat twisted, the lateral sepals being falcate, deflexed, pointed and semi-twisted. The labellum has semi-ovate lateral lobes, the middle lobe being oblong-lanceolate with an undulated margin, and having three elevated lines on the disk. The flowers are true white, and nearly three inches across. A1. B2. C1. D1. E1. (ea) F1.

DENDROBIUM MACROPHYLLUM. *Native of New Guinea, Java, Timor, etc.*

A curious species with club-shaped, rather slender, jointed and deeply furrowed and somewhat flattened stems, about 12 inches high and carrying at the top a few oblong, acute, irregularly bilobed, thick, fleshy leaves up to about 15 inches in length and $2\frac{1}{2}$ inches across. These stay on the stems for 2 or 3 years. Racemes about 8 to 12 inches in length, grow from the apex and carry a number of quaint, but hardly beautiful flowers which are somewhat inclined to nod. Sepals are greenish yellow, while the petals are whitish. The labellum has somewhat kidney-shaped lateral lobes, the front lobe being dilated and spreading. It is greenish in colour, the side lobes being lined and blotched with purple. The undersides of the sepals are somewhat hirsute. A1. B1. C1. D2. E1. (eb) F4Z.

(Syn. *D. Sarcostoma*).

Variety *Dayanum*—rather larger and more attractive than the type.

Variety *stenopterum*—has smaller flowers and the lateral lobes of the labellum triangular, the sepals and petals being ochre-yellow, spotted with purple and the lip yellow spotted with brown, the laterals being lined and spotted with brown. This variety resembles *D. atrovioleaceum* rather more than the type.

DENDROBIUM MALEOLENS. *Native of the Celebes.*

A species named from its unpleasant odour. Stems terete, drooping and branched, up to 3 feet in length. The leaves vary greatly in shape, and oblong, ovate-oblong and linear leaves (all obtuse) have been noted on the same stem. Racemes come from the nodes of the upper parts of the stems and carry a few white pink-flushed, rather evil-smelling flowers, the dorsal sepal and the petals being violet-veined. The flowers are about 2½ inches across when expanded. Flowers in July. A4. B1. C1. D3. E2. (ed) F4.

DENDROBIUM MARMORATUM. *Native of Burma.*

A delightful species with round, smooth, greyish-black stems about a foot high, with linear lanceolate leaves. The flowers are white with purple tips, the labellum being purplish with a ciliated margin and very like *D. transparens* in shape. A1. B3. C2. D3. E1. (ea) F2.

DENDROBIUM MASTERSIANUM. *Native of New Guinea.*

A showy species with fairly stout, erect, slightly noded stems. The beautiful flowers are white, the labellum being spotted and lined with purple. Flowers are 3 inches across and appear in late Spring. A1. B2. C1. D1. E1. (ea) F1.

DENDROBIUM MONILE. *Native of North Japan.*

A cool-growing species with cylindrical, slightly fusiform stems, which grow to a height of about a foot. Each stem carries about 6 leaves which are ligulate, or occasionally linear-lanceolate, the apex being acute. The flowers grow in ones or twos from the nodes on the upper part of the stem. They are white, the back and throat of the labellum greenish spotted with purple. The flowers are delicately fragrant and appear in midsummer. A1. B3. C1. D4. E1. (ea) F4.

Syn. *Dend. moniliforme* (wrongly), *Dend. Japonicum*, *Onychium Japonicum*.

DENDROBIUM MONOPHYLLUM. *Native of Eastern Australia.*

A small but dainty Australian native which has conical furrowed stems growing from a creeping rhizome and which reach a height of from 1 to 4 inches, and bear usually a single (but very rarely two) oblong, flat, or broadly linear green leaf about 4 inches long unequally bilobed at the apex. The racemes are as long as or slightly longer than the leaves and come from near the apex of the newly matured pseudobulbs. They carry up to about 15 bright yellow, faintly fragrant flowers somewhat connivent in form, but quite pretty when grown in a mass. It grows excellently out in the open attached to a piece of peat or a hardwood slab. In its natural state it grows in large masses and often covers large sandstone boulders or trunks of trees. A5. B3. C3. D1. E4. or E5. F13.

DENDROBIUM MONTIS-YULEI. *Native of Mount Yule, New Guinea.*

Another of the attractive New Guinea *Dendrobiums* with thick, even, woody stems, carrying two or three broadly oblong, obtuse, thick, fleshy leaves. The racemes come from the top of the stems and bear about 7 flowers with a narrow pointed dorsal sepal and petals and oblong pointed lateral sepals. The labellum is somewhat excavated at the back and is pointed in front, the side lobes being rounded. The flowers are yellow, the disk having three raised lines. A1. B2. C1. D2. E1 (eb) F4.

DENDROBIUM MOOREI. *Native of Lord Howe Island.*

A small but beautiful species growing in clumps with short (up to about 9 inches) cylindrical, glossy, green, grooved stems topped with usually five oblong lanceolate leaves about 5 or 6 inches long. The racemes are produced from the axils of the leaves near the apex of the stem and carry a number of smallish, graceful, pure white frosted-looking flowers about $\frac{3}{4}$ inch across. A2. B3. C3. D1. E1. (ea) F8.

DENDROBIUM MORTII. *Native of South Queensland and New South Wales.*

One of the terete leaved species having long, slender, branched and pendulous stems. The leaves are solitary, four-angled and up to 6 inches long and very slender. Flowers are borne on short pedicels from the articulations at the base of the leaves and appear either solitary or in pairs. The petals and sepals are about $\frac{1}{2}$ an inch in length, the latter being slightly the longer. They are white, with longitudinal brown stripes. A5. B3. C3. D1. E4. F12.

DENDROBIUM MOSCHATUM. *Native of Assam, Khasi, Burma, etc.*

One of the finest species, with stout cylindrical stems up to more than 6 feet in length with persistent oblong, lanceolate, pointed, leathery leaves from 4 to 6 inches long. The racemes come from the axils of the leaves on the top part of the two-year-old stems, and grow to about 10 inches long, pendulous and bearing 10-15 large spreading flowers up to $3\frac{1}{2}$ inches across, yellowish-buff in colour, with a rosy flush. The lip is pouch shaped, covered densely with short, fine golden hairs and ornamented with a large blotch of deep maroon-purple on each side at the base. Musk scented. A1. B2. C2. D2. E1 (ea) F3.

Variety *calceolaria*—similar to type, but rather pinker in toning.

Variety *cupreum*—flowers somewhat smaller than the type, sepals and petals apricot-yellow, lip golden yellow—blotches orange. (Syn. *Dend. calceolus*.)

DENDROBIUM MUTABILE. *Native of Java.*

A small but pretty species with long, slender, extended fusiform stems up to about 40 inches in height. Leaves oblong obtuse and minutely bilobed, about 3 inches long and 1 inch wide. Racemes from near apex of stems carry 8 to 12 flowers. These are about an inch across the sepals and petals, being rose coloured, with the lower portions deeper in tone. The labellum is white, the back portion

being rose-pink, the disk having three raised yellow crests. Flowers in late Spring. A2. B2. C2. D2. E1. (ea) F8.

Syn. *Dend. rigidum*, *Onychium mutabile*, *Onychium rigidum*.

DENDROBIUM NOBILE. *Native of Northern India, Tibet and China.*

Probably the most popular of all the *Dendrobium* species, some of its forms being magnificent. It is one of the easiest of all the *Dendrobiums* to cultivate, doing well under bushhouse conditions provided it is given a definite resting period during the winter months. The stems are aggregate (i.e., grow in clusters), are slightly flattened, erect, thickening upwards and up to about 20 inches in height. It is evergreen, the leaves being ovate-lanceolate, the apex being bicuspidate and usually obtuse. The flowers are produced in groups of 2 or 3 from the ripened stems. The two inch pedicels are somewhat curved at the top so that the flowers are inclined to nod. The sepals are acute oblong-lanceolate, while the petals are obovate-oblong, being much wider than the sepals. The lip is tubular at the base, but open and rounded in front. The flowers are of good texture, the sepals and petals being whitish, tipped with rose-purple, the labellum, which is velvety, is creamy with rosy tip and deep purple throat. They are about 3½ inches across, and appear in Spring. A1. B3. C3. D3. E1. or E2. (ea) F1.

There are many varieties from the type, the principal being:—

Var. *alba*. — Rare. Sepals and petals pure white, lip deeper cream with deep purple blotch in throat.

Var. *Ballianum*. Sepals and petals waxy-white, slightly flushed with pink, the tips of the sepals and petals being more deeply shaded. Labellum pale pink, pale yellow in front, with a lilac apex. The usual purple blotch in the throat is yellow in this variety.

Var. *Cooksonianum*. Differs from the type in having the petals coloured like the labellum; they are concave, and the margin is undulated—in fact, the petals are a form of quasi-labellum. The colouring is finer than in the type.

Variety *nobilius*. Flowers larger than in the type. The sepals and petals are intense purple, except at the white bases; the labellum is larger, the margin at the rear portion being deep rose pink, while the throat is deep purple.

Var. *Sanderianum*. Related to the preceding variety, but the sepals and petals are broader and shorter, the colour being richer in tone and the white area larger. The middle nerve is green. The lip has a large dark purple blotch surrounded by crimson purple.

Variety *Amesiae*. Flowers white, the middle disk of the labellum being dark purple.

Variety *abliflorum*. Same as var. *Amesiae*, but with small flowers.

Var. *Schneiderianum*. Labellum suffused with yellow and densely spotted with purple in the throat.

Var. *Asbworthianum*. Snowy white all over with the exception of the throat which is green.

Variety *formosanum*. Stems longer than the type and inclined to be pendulous. The pedicels are long and white, the apex of the petals and the labellum purple, while the throat is green.

Var. *purpureum*. Similar to variety *nobilis*, but the flowers are smaller.

Var. *Schroederianum*. Similar to variety *albiflorum*, but larger, faintly flushed with pink, the apex of the labellum being purple.

Var. *intermedium*. Sepals and petals white. The lip is white, with a violet spot in the disk.

Var. *Wallichianum*. Longer stems—foliage deeper green. Flowers rather more brilliantly hued than the type.

DENDROBIUM OCHREATUM. *Native of Assam.*

A beautiful species with fairly stout pendulous stems, furrowed, and reddish striped, with prominent nodes. They grow to about a foot in length. The leaves are ovate lanceolate and pointed, and are deciduous. The short racemes grow from the upper part of the youngest stems at the same time as the leaves, and carry from 1 to 3 flowers. The flowers are nearly three inches across and are a bright golden orange, the labellum having a large blood-red blotch in the centre. Flowers in late Spring. A3. B3. C2. D1. E2. (ed) F2.

DENDROBIUM OCHROLEUCUM. *Native of Mt. Salak, Java.*

An island variety of *Dend. heterocarpum*.

DENDROBIUM ODIOSUM. *Native of Mong-tse, China.*

A rare but attractive white species with short, fusiform, furrowed stems about 8 inches long which divide at the top into long thin branches which are clothed with linear-lanceolate pointed leaves about 3 inches long. The short racemes carry one or two flowers and grow from the axils of the leaves. Flowers are about 1½ inches across, are strongly scented and pure white. They appear in Spring. A1. B3. C3. D1. E1. (ea) F7.

DENDROBIUM OPHIOGLOSSUM. *Native of Cape York. (Illustrated.)*

A variety of *Dendrobium Smilliae*, from which it differs mainly in having yellow flowers; the other differences are of botanical interest only. See *Dendrobium Smilliae*.

DENDROBIUM PALPEBRAE. *Native of Siam and China.*

A species very like *Dend. densiflorum* in form. Stems club-shaped, somewhat quadrangular, yellowish and shining. Leaves usually 3-5, oblong-lanceolate, acute and leathery, about 6 inches long. Racemes, mostly rather sparsely flowered, from the top of the matured stems. Flowers about 2 inches across. Sepals and petals white, the labellum having a middle lobe bright yellow. A1. B3. C1. D2. E1. (ea) F12.

DENDROBIUM PANDURIFERUM. *Native of Rangoon.*

An interesting species with long (about 2 feet), erect, and rather cylindrical

and greenish stems. Leaves deciduous, lanceolate and pointed. Racemes short, carrying a few greenish yellow flowers more or less intensely striped with purple. A1. B2. C4. D2. E1. (ea) F4.

DENDROBIUM PARISHII. *Native of Tenasserim, Burma.*

A lovely species with pendulous, sometimes prostrate stems about 12-18 inches long, and up to $\frac{3}{4}$ inch in thickness. Leaves oblong-lanceolate, obtuse, and leathery, with grey sheaths. The flowers grow in twos or threes from the nodes of the two-year-old stems in the Spring. They are about 3 inches across, and a beautiful dark rose, the labellum being white down the middle, and having a deep purple blotch on each side of the throat. It is velvety in appearance. A3. B1. C2. D2. E1. (ea) F2.

DENDROBIUM PARTHENIUM. *Native of Borneo.*

A charming species with long, angular, furrowed stems. The leaves are $1\frac{1}{2}$ inches long, $\frac{1}{2}$ an inch wide, thick, sinewy, obtusely bilobed. Flowers produced in pairs from the nodes of the stems. They are white, the claw being tipped with green, and the base of the lip marked with purple. They are about $2\frac{1}{2}$ inches across. A2. B1. C1. D1. E1. (ed) F2.

DENDROBIUM PENDULUM.

Syn. of *Dend. crassinode*. (q.v.).

DENDROBIUM PHALAENOPSIS. *Native of North Queensland, New Guinea, Timor Laut, etc. (Illustrated.)*

One of the grandest species, with long, somewhat fusiform stems, moderately stout, and bearing 8 or 9 lanceolate, acute, leathery leaves up to about 6 inches in length. The racemes grow from the terminals of the young stems and from the nodes of the older stems, the same stem often flowering some years in succession. The flowers are large, in some instances up to 4 inches across, but in the type from $2\frac{1}{2}$ to 3 inches in diameter. In colour they are variable, but the general type is beautiful magenta-purple, while the lip is darker purple, veined with intense purple. Sometimes the shade is pale pink, and at others so dark a purple as to be almost black. Flowers appear in Autumn and Winter. A1. B1. C1. D1. E1. (ea) or (eb) F1.

DENDROBIUM PHALAENOPSIS.—Variety *compactum*.

A compact growing type. Pseudobulbs short, rarely exceeding 6 inches in length, up to $\frac{3}{4}$ inch in thickness and topped with 3 or 4 leaves up to 4 inches in length and nearly an inch wide. The flowers are reddish purple and about the size of *Dend. bigibbum*, but the labellum is shorter and broader at the apex.

Variety *hololeucum*. Pure white. Rare. (Syn. *P. album*).

Variety *Rothschildianum*. Flowers large (up to 4 inches across), white, rose tinted, labellum rose-pink veined with purple, sepals narrower than in the type.

Variety *Schroederianum*. Sepals white, petals intense violet—sometimes almost entirely white.

Variety *Statterianum*. Flowers very intense violet coloured—labellum smaller than the type.

DENDROBIUM PIERARDII. *Native of Sylhet, Sikkim, etc.*

A very attractive and free flowering species, with long, slender, pendulous stems up to 3 feet long. The ovate-lanceolate pointed leaves are about 4 inches long, and are deciduous. The flowers grow in little clusters of 2, or sometimes 3, from practically all the nodes of the stems, the same stems flowering for two or more successive years. The flowers are in dainty pastel shades, the sepals and petals are very pale rose-pink, or white with a rosy blush. The labellum is short, stalked, roundish, and is pale primrose, with faint purple stripes in the throat and claw. They are about 2 inches across. Flowers appear in early Summer. A3. B3. C2. D3. E1. or E2. (ea) F4.

Syn. *Dend. cucullatum*.

Variety *lantinifolium*. Stems wider and darker in colour—flowers finer in texture.

DENDROBIUM PRIMULINUM. *Native of Sikkim.* (Illustrated.)

Another dainty species, akin to *D. crepidatum*, Stems cylindrical, erect (sometimes more or less prostrate), up to about 18 inches tall. Leaves lanceolate, to 4 inches in length, the apex being irregularly bilobed. Flowers are produced usually singly, but occasionally in pairs, from the lateral nodes—generally lining each side of the stem. Sepals and petals oblong-obtuse, are white (sometimes faintly flushed), tipped with delicate pink. The lip is orbicular in front, the back portion being more or less convolute. It is pale yellow, often pink flushed, and striped with pale violet at the base. A1. B2. C2. D3. E2. (ed) F6.

Variety *giganteum*. Flowers larger and more brilliantly tinted. More pendulous in manner of growth than the type.

DENDROBIUM PUGIONIFORME. *Native of S.E. Queensland and New South Wales.*

Of botanical and local interest only. Stems long, slender, branched and creeping, rooting from the nodes. The leaves are articulate, ovate, lanceolate and sharply pointed, the tip being hard and sticky. In Spring it produces short racemes, with a few tiny whitish flowers. A5. B3. C3. D2. E5. F13.

DENDROBIUM PULCHELLUM. *Native of Northern India.* (Illustrated.)

One of the finest of the *Dendrobiums*. Stems very long and stout, tapering towards the apex, dark red in colour, and evergreen. The leaves are 3 to 4 inches long and nearly an inch wide, linear, pointed (not acutely), green and glossy. Flowers are produced laterally from the upper nodes of the older stems. They droop under the weight of the half dozen or more large flowers produced on each. These flowers are up to 5 inches in width, with ovate sepals and petals (the latter much the larger) of a pleasing biscuit-yellow, the edges being pinkish. The lip is oblong, narrow at the base and curved inwards at the front lobe. It is a pale yellow in colour with two shining, large, reddish purple blotches at the rear. The back edges are fringed, and the whole lip is downy. In

Brisbane this plant will grow in a warm, sunny place out of doors—particularly during the Summer months. (Syn. *Dend. Dalbousieanum.*) A1. B2. C2. D1. E1 or 2. (ed) F1.

Var. *luteum*. Flowers a brighter yellow, and of heavier substance.

DENDROBIUM PULCHELLUM (LODDIGES).

Synonym of *Dend. Loddigesii*.

DENDROBIUM QUINARIUM. *Native of New Guinea.*

Pretty species with fusiform pseudobulbs, slender at the base and tetragonal in the middle, up to about 8 inches wide, being topped with a pair of oblong-lanceolate acute leaves. Racemes form the terminal of the stems, short and two-flowered. These are about 2½ inches across when expanded. Flowers pale yellow, the labellum being lightly striped with brownish red. The flower is very similar to our *Dend. tetragonum*. A2. B1. C2. D1. E1. (ea) F13.

DENDROBIUM RADIANS. *Native of Borneo.*

An interesting species, with short terete stems, with a few short, oblong, acutely pointed, and somewhat downy leaves. Racemes short and carrying a few flowers about 2½ inches across. Sepals and petals milky white, the labellum, which is unguiculate (stalked), is green, the lateral lobes and disk striped and spotted with reddish-brown. A2. B1. C2. D1. E1. (ea) F4.

DENDROBIUM REVOLUTUM. *Native of Burma and Singapore.*

An interesting species, though rather of botanical than horticultural interest, listed here because it is occasionally included in shipments from Burma and the Malay States. The stems are long, woody, but somewhat slender, with numerous nodes—making them look something like thin canes. The leaves are evergreen, numerous, in two parallel lines—linear-oblong, bilobed, and obtuse. The flowers grow from the nodes along the upper part of the matured stems, and usually appear singly. The flowers are on the small side, being barely an inch in diameter. The petals and sepals are whitish, the labellum being yellow striped with deep brown. The latter is tubular in shape, and appears large in comparison with the total size of the flower. A2. B2. C4. D2. E1. (ea) F8. (F13).

DENDROBIUM RHODOPTERYGIUM. *Native of Moulmein.*

A fine species, closely related to *Dend. Parishii*. The stems are erect, cylindrical (not quite as stout as *Parishii*), and up to about 20 inches in length. The linear-lanceolate leaves are from 2½ to 4 inches in length. The beautiful flowers are produced usually singly, but occasionally in pairs. They are nearly 3 inches across, and have rosy-pink petals, sepals and labellum, the latter having a white band, and being striped with deep purple in the throat. A1. B2. C2. D2. E1. (ea) F1.

Variety *Emerica*. (Native of Burma.) Differs from the type in not having the white band on the labellum, and having the labellum spotted with yellowish warts in the disk.

DENDROBIUM RHODOSTICTUM. *Native of New Guinea.*

An attractive species, growing in clusters, the stems being rather globular at the base and slenderly fusiform above (the fusiform part somewhat flattened), the total length being about 12 inches. They are usually topped with three leaves, oblong and acute in shape, paper-like but fairly firm in texture. The racemes come from the upper part of the stem (usually from near the apex), and are slightly drooping. They carry 3 or 4 fair sized snowy white flowers, the lower parts being suffused with green, the margins and rear part of the lateral lobes of the labellum being beautifully marked with purple, as is the throat. A1. B2. C2. D3. E1. (ea) F4.

DENDROBIUM RUMPHIANUM.

(A synonym of *D. minax* and *D. stratiotes* q.v.).

DENDROBIUM RUPICOLA.

(A Synonym of *D. ciliatum* q.v.)

DENDROBIUM SALACCENSE. *Native of Java.*

An interesting species with bamboo-like stems of about 3 feet 6 inches in length, with linear-lanceolate, acutely pointed leaves up to 6 inches long, and about $\frac{1}{2}$ an inch wide. The flowers grow (usually in pairs) on short pedicels from the upper nodes of the stems. These flowers are about $1\frac{1}{2}$ inches across, and vary from crimson to bright yellow in colour. The labellum is narrow at the base, but dilated and rounded in the front. Flowers in Spring and early Summer. A1. B1. C1. D1. E1. (ea) F7.

DENDROBIUM SANDERIANUM. *Native of Borneo.*

A pretty species with rather black-haired, erect stems, with parallel rows of leaves which are oblong-ovate, unequally toothed at the apex and about $1\frac{1}{2}$ inches long, and 1 inch wide. The flowers appear in bunches of 2 or 3 from the axils of the leaves. These are about $2\frac{1}{2}$ inches across—sepals and petals white. The labellum, which has small obtuse lateral lobes, the middle lobe being heart-shaped and scalloped, is white with pale rosy spots, Flowers in Spring. A1. B1. C1. D1. E1. (ea) F4.

DENDROBIUM SANGUINOLENTUM. *Native of Penang.*

A lovely species with long, pendulous, grooved stems and elliptical (sometimes lanceolate) acute leaves up to about $3\frac{1}{2}$ inches in length. The racemes grow from the apexes of the well matured stems which flower for some years in succession, and they carry from 2 to 5 flowers, which grow in a cluster. The flowers are about 2 inches across. They are pale yellow, the tips of the petals and sepals being touched with purple. The labellum is creamy white, the back being marked with purple and the disk ornamented with two large golden spots. A1. B2. C2. D2. E1. or E2. (ed) F5.

Variety *superbum* is rather larger and more brilliantly coloured.

DENDROBIUM SARCOSTOMA.

(A synonym of *Dend. macrophyllum* q.v.)

DENDROBIUM SCABRILINGUE. *Native of Moulmein.*

A charming species with club-shaped, erect, 8-inch, black-haired stems, with a few oblong-linear leaves—obtuse and bilobed at the apex. The flowers appear usually in pairs from the nodes of the stems. They are about $1\frac{1}{2}$ inches across. The sepals and petals are white (sometimes tinted pale green), the labellum has white lateral lobes marked with purplish-brown, the middle lobe which is long and recurved with crenulated edges is a bright golden yellow, the disk being furrowed with yellow grooves and marked with purple stripes. This orchid is strongly scented. A1. B2. C3. D2. E1. (ea) F7.

Synonymous with *Dend. Hedyosum*.

DENDROBIUM SCHMIDTIANUM. *Native of Siam.*

A species closely allied to the popular Cingalese *Dend. crumenatum*. It has slender, closely clustered, curved stems which are fusiform in the lower part and attenuated above, and of a total length of 8 inches. The upper part of the stem has a few acute oblong-lanceolate leaves, the base of which sheath the stems, and are about 4 inches long in the blade. The flowers which are fairly large open in succession along the stems. They are diaphanous in texture, and snowy white in colour. Flowers usually after the Autumn rains. A2. B2. C3. D3. E1. (ea) F3.

DENDROBIUM SCHNEIDERAE. *Native of Northern New South Wales to North Queensland.*

A minute species of botanical interest only. The pseudobulbs grow in dense masses on the rocks of the Darlington Ranges. They are very short (about $\frac{1}{2}$ an inch tall), conical in shape and grow close together on a creeping rhizome. Each pseudobulb has two oblong-linear leaves about an inch in length. The racemes, grown from the terminals, are about $3\frac{1}{2}$ inches long and carry about 10 tiny flowers. They are greenish-yellow in colour, marked with red. The labellum is the same colour, the pointed lateral lobes being tipped with brown. A2. B2. C1. D1. E5. F13.

DENDROBIUM SMILLIAE. *Native of North Queensland.*

Commonly called the Bottle-Brush orchid from the manner of floescence. The stems are in small fascicles and are cylindrical, furrowed, attenuated at the apex, and about 2 feet or more in length. The leaves are ovate-lanceolate and pointed, the apex being slightly twisted; they are paper-like in texture, and from 2 to 4 inches in length and $\frac{3}{4}$ inch in width. The racemes come from the upper nodes of the two-year-old stems, and are about as long as the leaves. They are densely crowded with numerous small flowers, each of a total length of $\frac{3}{4}$ inch, and are crimson tipped with green and have a spur which is longer than the sepals. It flowers in Summer, but is rather shy in

captivity. It needs warmth, light and moisture. A1. B1. C1. D1. E1. (eb) F10. (Treated as a cluster though erect).

Var. *ophioglossum*. Similar to type in manner of growth, but flowers smaller and yellow.

DENDROBIUM SPECIOSUM. *Native of Eastern Australia.* (Illustrated.)

A very handsome species, which if it were an exotic would be more highly regarded than it is in its native land. Stems are stout and a foot or more in length. Each is topped with 3 to 4 (rarely 5) stout, rigid, ovate-oblong leaves. Racemes grow from the nodes near the top of the stems, up to about 16 inches in length, densely clad with many creamy white scented flowers with lanceolate acute somewhat incurved sepals and petals. The flower racemes come from both the current and the older stems and when a large plant is in full bloom it is a magnificent sight. I once saw a plant with over 130 spikes of blossom. This species is most easy of culture, and grows equally well in a bushhouse or outside in the open sunshine. It would make an excellent centre piece for a large rock garden. Flowers in Spring. A1. B3. C3. D1. E1. E2. E4. or E5. (ea) F12. (treated as a cluster.)

Variety *Hillii*. Plants larger and stouter. Flowers white.

Variety *curvicaule*. Stems curved — flowers more fleshy and smaller than the type—milky white.

Variety *nitidum*. Stems long and slender. Flowers smaller than in the type, the lateral lobes being purple striped.

Variety *fusiforme*. Stems fusiform in shape and somewhat purple in colour. Flowers white and prolific.

DENDROBIUM SPECTABILE. *South West New Guinea.*

A remarkable *Dendrobium*, strangely reminiscent of some of the fantastic idols made by the New Guinea savages. The stems grow from a creeping rhizome. They are small at the base, then become semi-globular, the upper portion being attenuated and lightly flattened and furrowed—reaching a total length of about 16 inches. The leaves are oblong obtuse, and have a double apex. They grow to about 6 inches and about 2 inches in width. They are thick and fleshy and grow in twos or threes at the top of the stems. The racemes are more than twice as long as the leaves, are upright and carry a number of large flowers. Sepals are triangular and extended to a long narrow peak irregularly undulated. The petals are somewhat shorter and narrower, less undulated but curved downwards. They are pale yellow in colour, irregularly striped with purple. The lip is about 2 inches long and is similar to the sepals in appearance, but more strikingly triangular and pointed. It is white, veined with bright purple, the side lobes being erect and hoodlike. A1. B1. C1. D1. E1. (ea) F1.

DENDROBIUM STRATIOTES. *A Native of Sunda Islands.* (Illustrated.)

A curious species with elongated fusiform stems up to two feet and more in length. Leaves oblong, obtuse and leathery, about $3\frac{1}{4}$ inches long and $\frac{3}{4}$ inch

wide. The raceme is about 6 inches long, and is flattened and proceeds from near the apex of the stems. It bears from 3-5 large flowers. The sepals are long (the laterals being slightly more so than the dorsal), twisted, and with the apex reflexed. The petals are twice as long as the sepals, have two twists, and are pointed. The labellum is large, the front lobe being rounded and pointed in front. The sepals and petals are white, more or less suffused with pale green. The labellum is white, with rose-pink veins and spots, the throat being tinged with greenish-yellow. The chin is coral. Flowers late Spring. A1. B2. C1. D2. E1. (eb) F2.

DENDROBIUM STRIOLATUM. *Native of New South Wales to Tasmania.*

One of the terete-leaved species with long branching stems. Leaves straight and thick (occasionally curved slightly) up to about 4 inches in length. Flowers usually in pairs from nodes of the branches. Sepals and petals white with a few brownish stripes from the base. Labellum about half as long as the sepals and recurved. Flowers in late Spring. A5. B3. C3. D3. E4. or E5. (ea) F13.

DENDROBIUM STUARTII. *Native of Herberton, North Queensland.*

A small species included herein for those who specialise in Queensland orchids. It has slender, prominently ribbed stems from 6 to 18 inches high, having a number of lanceolate pointed leaves, about 1 inch long, with purple-suffused sheaths. The racemes come from the apex of the stems and usually carry three flowers. Sepals and petals yellow with red stripes. The labellum (which is about $\frac{1}{2}$ an inch in length, oblong and obtuse, the margins being slightly undulated and ciliated), is yellow with red radiating veins. The flower is fragrant and about 1 inch in width. A2. B2. C3. D2. E1. (ea) F8.

DENDROBIUM SUAVISSIMUM. *Native of Burma.*

A variety of *Dend. chrysotoxum* (q.v.) differing from the type in being shorter and thicker in habit, the flowers being slightly larger, while the blotch on the labellum is purple. It is very strongly scented.

DENDROBIUM SULCATUM. *Native of Khasi, Sikkim.*

A fine species with woody fusiform stems slightly flattened in the upper part and very deeply furrowed, growing to a length of between 4 to 12 inches, and having a few leaves at the apex. These are broadly oblong, acutely pointed and parchment-like in texture. Racemes grow from tops of two-year-old stems and are drooping and carry a number of 2 inch flowers with golden yellow sepals and petals. The labellum is egg-shaped and concave, the margins turned inwards and minutely fimbriated, the disk and the middle of the lip being densely covered with fine hairs. It is orange in colour with radiating purple lines at the base. It flowers in Summer. A1. B2. C1. D3. E1. (ea) F5.

DENDROBIUM SUMNERII. *Native of North Queensland.*

A variety of *Dend. bigibbum* (q.v.), very similar to the type, but the double spur is less prominent.

DENDROBIUM SUPERBIENS. *Native of Cape York (Q.). (Illustrated.)*

Probably the finest of the Australian *Dendrobiums*, generally considered to be a natural hybrid between *D. Phalaenopsis* and *Dend. undulatum*. The stems are stout and tall, often reaching a height of 3 feet. They are woody, cylindrical, sometimes fusiform, often furrowed and generally striped with red—and are topped by a few lanceolate oblong, acute leaves whose long sheaths clothe the stems. The racemes grow from the apex of the new growths, and also from the upper nodes of the older stems, the same stems often flowering for several years in succession. They carry a number (up to 15 or 20) beautiful flowers which last some weeks. Sepals and petals are reflexed and semi-twisted, the latter being rather broader than the former. They are a rich, dark reddish purple in colour, the sepals having a white edge. The labellum is a beautiful shade of purple with 3 to 5 keels on the disk. I find this plant does quite well in Brisbane, grown outside in a sunny place—it needs ample water all through the year. Under these conditions it flowers freely always in late Summer and Autumn, and often again in early Spring. A1. B1. C1. D1. E1. (ea) F1.

DENDROBIUM SUPERBUM. *Native of Philippine Islands and Borneo, etc.*

A very splendid species with terete, drooping stems up to about 3 feet in length. It is deciduous, the oblong-lanceolate leaves falling before the flower buds form. The large flowers grow usually in singles (though sometimes in pairs) along each side of the stems. They are large, being up to 4 inches across. They are bluish-purple in colour, the lip having a couple of large reddish spots at the base. They are powerfully scented (to my mind unpleasantly) with an odour alleged to be similar to that of "Rhei barbari" (rhubarb). A1. B1. C1. D1. (eb) F2.

Var. *anosum*. Flowers smaller, sepals and petals narrower, not strongly scented.

Var. *giganteum*. Flowers larger—often up to 5 inches across.

Var. *purpureo-marginatum*. Sepals and petals white, the lip being purple with a white margin.

(Syn. *Dend. Huttonii*).

Var. *Burkei*. Flowers white, the lip being yellowish-white with two pale rose spots in the throat. Strongly scented as the type.

DENDROBIUM TAURINUM. *Native of Philippine Islands.*

A curious species with very long, erect, cylindrical, stout stems with broad oblong, somewhat elliptical, fleshy, coriaceous leaves about 6 inches long and 2½ inches wide. The racemes grow from the axils of the leaves on the upper part of the stem and sometimes attain a length of 18 inches—they carry a good number of large, strangely shaped flowers, allegedly resembling the head of a bull (hence the name). The sepals are greenish yellow or white, with a greenish suffusion. The petals, which are long and erect, are twisted. They vary in colour—some varieties having them pale rose-pink—while in others they are light or dark purple. The lip also varies in the same way but in all varieties it has three deep coloured lines down the middle. Flowers in Summer. A1. B1. C1. D2. E1. (ea) F1.

DENDROBIUM TERETIFOLIUM. *Native of Eastern Australia.*

A distinctive species with long, pendulous, much branched stems, having solitary, terete, tapering, hard cylindrical, fleshy leaf from 4 to 10 inches in length. The flowers grow usually singly but sometimes in pairs, on short racemes which spring from the branches of the stem. They have sepals and petals about 1 inch in length. The labellum is shorter and recurved. The flower is white or creamy, the disk being dotted with reddish brown and having a few raised lines. A5. B3. C3. D3. E4. or E5. (ea) F13.

Var. *Fairfaxii*. Flowers larger—red spots on petals and sepals.

DENDROBIUM TETRAGONUM. *Native of Queensland and New South Wales.*

A strange species with squarish fusiform stems which grow in a cluster from a short creeping rhizome. The stems are very slender at the base (particularly the Northern variety), and reach a height of 12 inches or more. They are topped with two or three oblong, acute persistent leaves. Flowers grow from the top of the stems on a raceme bearing 2 or 3 large but delicate and somewhat drab flowers. The segments are narrow, long and acutely pointed. They are pale yellow, the sepals being marked with a few red lines. The lip is yellow, striped with red. The northern variety is slightly more brightly coloured. Flowers are faintly fragrant at mid-day. Blooms in late Spring. A2. B3. C3. D2. E1. (ea) or E5. F13.

DENDROBIUM THYRSIFLORUM. *Native of Burma. (Illustrated.)*

A beautiful and easily grown species of great popularity. The stems are stout and tall and club-shaped. Leaves grow at top of stems, usually 3-4, lanceolate-acute. Racemes pendulous from the axils of the leaves of the matured stems, and occasionally from the older stems. They carry a large number of beautiful flowers about 2½ inches across, the sepals and petals being white and the lip a beautiful rich golden yellow. Flowers in late Spring. (Syn. *Dendrobium densiflorum* var. *albo-lutea*.) A1. B3. C3. D2. E1. or E2. (ea) F12.

Var. *Walkerianum*. Plant very robust—racemes up to 2 feet in length—carrying in up to 50 blooms. Individual blooms larger than in the type.

DENDROBIUM TOFFTII. *Native of Queensland.*

A rare and rather difficult but lovely species with tall, stout, fusiform stems, somewhat compressed, furrowed, and with purplish ribs. Leaves broadly ovate with an obtuse, notched apex. The racemes proceed from the upper part of the stems and reach a length of about 16 inches. They carry several large flowers, something of the nature of *Dendrobium stratiotes* (the Antelope orchid), the sepals being ligulate and obtuse, while the petals are linear and narrow, generally, but not always, twisted. The labellum is large and spreading. Sepals and petals are white, the labellum being sometimes white with radiating and branching purple lines and sometimes purple with radiating and branching mauve lines, in all cases the disk is decorated with violet stripes. This plant is very rarely grown successfully out of its natural surroundings, but recently Mr. J. Gordon Smith

exhibited a plant which he had cultivated for some years and which had rewarded him with a fine display of bloom. After many experiments Mr. Smith found that, in Brisbane at least, the best method is to grow the plant out in the full sunshine and give it ample water throughout the year. Growing as it does on the mangroves in the vicinity of Johnstone River, North Queensland, it lives in one of the warmest and moistest parts of Queensland. It will be necessary, therefore, to select a spot where cold winds are blocked, and where the maximum of sunlight will strike the plant. Water throughout the year, but in Winter time select fine, clear, sunny mornings for the purpose. A1. B1. C1. D1. E1. (ea or eb) F1.

Note. Possibly shredded mangrove bark would serve as an acceptable compost for this species. I intended trying this experiment with a very sick specimen given me by a disappointed grower—but the plant was dead before I succeeded in getting the bark. (I'll try anything once!)

DENDROBIUM TOKAI. *Native of Fiji, etc.*

A hardy species with tall (about 3 feet), erect, terete, yellow stems clothed with deciduous oblong-obtuse leaves from 3 to 6 inches long, and from 1 to 1½ inches wide. The racemes are from 8 to 12 inches long and carry numerous large flowers fairly densely placed on pedicels of varying lengths in a series of rings round the scapes. They are about 3 inches across (when expanded), but the sepals are only ¼ inch in width, with the petals narrower. They are straw coloured. The labellum is an inch in length, and 2 inches wide in the front of the middle lobe. The margins are slightly undulated. In colour it is a dirty white, veined with purple. A1. B1. C1. D2. E1 (ea) F2.

Var. *crassinerve*. Differs from the type in having shorter and wider leaves. The middle lobe is narrow and acute with thick fleshy elevated lines in the disk—the sepals and petals being yellow.

DENDROBIUM TOMOHONENSE. *Native of Tomohon—Celebes.*

An interesting species, somewhat akin to *Dendrobiums macrophyllum* and *atroviolaceum*. Stems in clusters, rather slender, somewhat fusiform, yellow and smooth. They are topped with two broadly oblong, slightly pointed, leathery leaves from 3½ to 6 inches long and 1½ to 2½ inches wide. Racemes from the top of the stem carrying a few fair sized flowers with a large graceful labellum. The scented flowers have yellowish-brown sepals and petals, the labellum being pale green, striped with purple. Flowers in Summer. A2. B1. C2. D2. E1. (ea) F2.

DENDROBIUM TORTILE (LINDLEY). *Native of Malaya, Burma, etc.*

A pretty species with clustered fusiform stems, somewhat flattened in the upper part. They are rather twisted and are clothed at the top with a number of narrow, oblong, deciduous leaves about 3 inches long. The racemes are short and grow from the nodes on the upper part of the leafless stems. They carry two large and handsome flowers not unlike those of *Dend. primulinum*. The sepals and

petals are of very pale rosy-lilac, while the labellum is pale lemon-yellow with a lilac flush and a few purplish streaks in the throat. It is ciliated at the margin while the disk is downy. Sepals and petals are more or less spirally twisted. Flowers in Summer.

Variety *Dartoisianum*. Differs from the type in having the sepals and petals tinged with yellow.

Variety *roseum*—has sepals and petals rose-pink and shaded with yellow. A1. B2. C2. D2. E1. (ea) F1.

DENDROBIUM TRANSPARENS. *Native of Assam.*

A dainty species with slender, erect, terete stems up to about 16 inches in length, with deciduous linear-lanceolate leaves. The flowers grow in pairs along the matured stems. The sepals are narrow and pointed, and like the broader sepals are white or pale pinkish lilac, the tips being more intensely coloured. The lip is the same as the petals, with a reddish blotch from which a few stripes run to the edges. Flowers in Summer.

Var. *album*—a rare species which is spotless white all over. A2. B3. C3. D3. E1. (ea) F4.

DENDROBIUM TREACHERIANUM. *Native of Borneo.*

A small growing species of great beauty, with short angular, oblong, pseudobulb-like stems, growing from a creeping rhizome, and topped with a pair of small oblong, lanceolate leaves up to about 3 inches in length. Flowers are produced from top of the bulbs, the racemes carrying 3-5 flowers. Sepals and petals deep reddish purple, the sepals being the broader, the labellum being the same colour at the base but paling towards the apex. Flowers in early Spring. Strongly aromatic. The species is now usually included in the allied genus *Sarcopodium*. A5. B1. C1. D2. E1. (ed) F1.

DENDROBIUM TREUBII. *Native of Amboina.*

A handsome species with terete stems slender at the base and swollen and flattened in the upper parts, and growing to a length of about 18 inches. The deciduous leaves are about 2 inches long and are oblong, undulated and soft in texture. The racemes grow from the upper nodes of the stems and carry 5 to 6 flowers $2\frac{1}{2}$ to 3 inches in diameter. Sepals a glossy, creamy white (the dorsal being broader than the laterals), the petals white, and the large labellum purple with elevated more intense lines radiating from the disk. The lateral lobes are white, more or less marked with purple in the inside. The flowers appear in Autumn and last a long time. A1. B1. C1. D1. E1. (eb) F1.

DENDROBIUM UNDULATUM. *Native of Queensland.* (Illustrated).

A fine hardy species with long, stout, fusiform and sometimes furrowed stems growing to a length of 6 or 8 feet. The leaves are persistent and grow in parallel rows on both sides of the stems. They are oblong, obtuse, notched at the tip, up to 5 inches in length and about 2 inches across. Racemes grow from the

tops of the stems and also from the nodes in the upper parts and reach a length of about 12 inches. On these a number of fair-sized flowers are carried. The sepals and petals are obtuse, linear-oblong in shape, often very twisted and with margins undulated. In colour the sepals and petals are bronze-brown, the margins being suffused with yellow. Flowers in Spring. A1. B1. C1. D1. E1. (ea) F1. (This plant does well out of doors in a sunny position in Brisbane and northwards. It grows with great freedom when attached to a citrus or other soft barked tree).

Var. *fimbrilabium*—rather smaller in manner of growth. Sepals ochre yellow—petals same colour, but veined and spotted with brown. Labellum pale sulphur-yellow, the lateral lobes being fimbriated.

Var. *Broomfieldii*. Flowers yellow, the middle lobe of the labellum being green. Racemes longer and more pendulous than the type.

DENDROBIUM VIRGINEUM. *Native of Burma.*

A beautiful species with cylindrical black-haired stems clothed with oblong-ligulate bilobed leaves. Racemes grow from the top of the stems and carry a number of fair sized white flowers one third less in size than *D. infundibulum*, which it resembles. The labellum has two club-like reddish lines along the middle lobe, while there is a tinge of the same colour in the throat. A1. B2. C4. D2. E1. (ea) F4.

DENDROBIUM WARDIANUM. *Native of Assam and Burma.*

One of the finest species, with stout, terete, noded stems which are somewhat pendulous by nature and are up to three feet in length. The deciduous leaves are lanceolate-oblong. The flowers grow in clusters of twos and threes on opposite sides of the greater part of the stem. These flowers are from 3 to 3½ inches across. Sepals and petals are broad, thick, and waxy, and blunt at the tips. They are white, and the tips are a bright rich magenta purple. The lip is large, white in front with a blotch of purple on the apex, the throat being rich orange with two deep spots of amethyst-purple. Flowers in late Spring. A3. B3. C3. D3. E1. (ea) F1.

Var. *Assamicum*. Stems shorter and slenderer, leaves narrower, flowers smaller but intensely coloured.

Var. *candidum*. Flowers white—the spots in the throat being brown.

Var. *giganteum*. Flowers up to 4½ inches in width—otherwise as type.

Var. *pictum*. Sepals and petals amethyst, with white margins, apex deep purple.

DENDROBIUM WILLIAMSIANUM. *Native of New Guinea.*

An outstanding species with stout terete stems growing to about 18 inches and with oblong obtuse, notched, persistent leaves 2 to 2½ inches in length. Racemes from the upper part of the stems carry a few good sized flowers with white sepals and petals, lightly flushed with pale mauve—the labellum is large and prominent, “scoop-shaped” in front. It is deep mauve purple, paling at the edges. Flowers late Summer. A1. B1. C2. D2. E1. (ea) F1.

DENDROBIUM WILLIAMSONII. *Native of Assam.*

A pretty species with clustered, erect, elongate-fusiform, black-haired stems growing to about 10 inches high and somewhat curved. Leaves are linear-oblong and blunted. Racemes come from the top of the stems and carry two flowers. These have sepals and petals of creamy white on the inside and pale ochre yellow on the underside; the labellum having a large three-lobed blotch of golden red (sometimes cinnamon red) on the disk. Flowers in late Spring. A2. B2. C3. D3. E1. (ea) F1.

DENDROBIUM XANTHOPHLEBIUM. *Native of Tenasserim.*

Another interesting species with erect, cylindrical, terete stems with a few linear-lanceolate bilobed leaves. The flowers grow, sometimes singly, but usually in pairs, from the nodes in the upper part of the two-year-old stems. Sepals and petals are white. The three-lobed labellum has erect, white side lobes veined with deep orange, the downy front lobe being a brilliant golden yellow with a white edge, the margins being beautifully waved. A2. B1. C1. D1. E1. (ea) F4.

CADETIA HISPIDA. *Native of North Queensland.*

A small species of botanical interest. Grows in clumps on trees. Stems slender and terete, about $1\frac{1}{4}$ inches high, bearing a single oblong, obtuse, bilobed leaf up to 3 inches in length and keeled underneath. Pedicels, about $1\frac{1}{2}$ inches long, spring from the base of the leaf and carry one small white blossom with a few red spots. A5. B1. C3. E1. (ea) F13.

CADETIA TAYLORI. *Native of North Queensland.*

Differs very slightly from the above, the main differences being of botanical interest, the principal one being that the lip is rather larger and more heart-shaped. A5. B1. C3. E1. (ea) F13.

This completes the *Dendrobiums* treated in this table. Some hundreds have been omitted—for which fact you will, no doubt, be duly thankful.

DENDROCHILUM

A small genus of tropical, epiphytical orchids which produce long, pendulous spikes crowded with small but pretty flowers. There are about a dozen known species, but few of these are cultivated. Plants of the genus are rarely seen in cultivation, but if the opportunity offers, one or two plants of certain species are well worth inclusion in any collection. For compost, polypodium fibre, osmunda or peat will serve, and a topping of sphagnum moss will help to keep the compost in a suitably damp state during the warmer months. They must have ample water from the time growth commences in the Spring until the flower spikes have fully developed. In North Queensland ordinary bushhouse conditions will be suitable; in Brisbane a warm bushhouse or glasshouse will do. In the South added heat will be desirable during the Winter. The following are attractive species—

DENDROCHILUM COBBIANUM. *Native of Philippines.*

Pseudobulbs small and oval, growing in clusters, and surmounted by a pair of narrow, pointed, lanceolate leaves about 6 inches long. Flower spikes are produced from apex of the pseudobulbs and droop gracefully. Flowers, small, with pale yellow sepals and petals, lip orange coloured, with bristly side lobes. Flowers in late Summer and Autumn and lasts three to four weeks.

DENDROCHILUM FILIFORME. *Native of Philippine Islands.*

Growth similar to *D. Cobbianum*. Flowers, delightfully fragrant, yellowish-green in colour. Blooms in Summer.

DENDROCHILUM GLUMACEUM. *Native of Mindanao—Philippine Islands.*

Growth as before. Flowers white tinged with green, delicately scented. Blooms in Spring.

DENDROCHILUM UNCATUM. *Native of Malay.*

Similar to the others in growth. Flowers slightly larger and pale green in colour, scented.

DENDROPHYLAX

A small genus of West Indian orchids whose leaves are rudimentary or entirely missing. I have not seen any of the species personally, but as there is always the possibility that a few specimens will be landed by growers with friends in Cuba

or Jamaica or some other of the West Indies, I have decided to deal briefly with them here.

They consist of dense clusters of roots from which spring racemes of varying lengths. The best method of growing them is to affix them to a block or raft or shallow basket with a quantity of sphagnum moss packed in between and about the roots. They require a moist position and must not become dry. The species usually grown are:—

DENDROPHYLAX FAWCETTII.

Simply a tuft of longish green roots springing from a tiny stem or centre. Racemes which vary from 2 inches to 2 feet spring from the roots, carrying a few flowers about 2 inches across with pointed lanceolate sepals and petals of a greenish white colour, and a broad white lip with a seven inch spur after the nature of the *Angraecums*. Flowers in Summer, the blooms lasting about 6 weeks.

POLYRRHIZA FUNALIS.

Plant similar in manner of growth to the previously mentioned species. Flowers are small and greenish white with a broad lip with a short white spur. Blooms in Summer, and lasts 8 weeks.

DIPODIUM

A small genus of terrestrial orchids. There are two Queensland species, and occasionally they are cultivated by orchid growers. Only one exotic species is in cultivation, and that but rarely. They should do well enough grown as an ordinary border garden plant in a moderately sandy soil with a little leaf-mould and well dried dung.

DIPODIUM PUNCTATUM. *Native of Australia (except W.A.) (Illustrated.)*

Found in many parts of the country, generally in the coastal areas. Plant consists of a leafless, horizontal, creeping rhizome from which scapes grow to a height of from 1 to 2 feet—the upper part being occupied by a number of fair-sized brownish-purple flowers.

Variety *Hamiltonianum*. (Found on Stradbroke and other Moreton Bay Islands, and occasionally, I understand, on the foreshores of Moreton Bay.) Thick, creeping, leafless rhizome. Stems grow up to about 3 feet with a number of overlapping scales covering the base. The flowers are of fair size, and up to 30 on the stem. Sepals and petals are oblong, yellow, spotted with red, the large lip having a pink middle lobe with two elevated lines on the disk. Flowers in Spring.

DIPODIUM ENSIFOLIUM. *Native of North Queensland.*

This species has leafy stems about a foot high. The leaves (which are about 6 inches long) grow in pairs up the stem and are linear-lanceolate, channelled, acutely pointed, strongly ruled and prominently ribbed. The racemes (which usually come in pairs on the one stem) carry a number of bright pink flowers with purplish spots, up to about 1½ inches across.

DIPODIUM PALUDOSUM. *Native of Borneo, Cochinchina, etc.*

Erect, leafy stems, with pointed linear-lanceolate leaves of a bluish-green colour. The scapes come from the axils of the leaves and carry up to a dozen creamy-white flowers, prettily spotted with pinkish-purple. Flowers about 1½ inches wide.

DISA

A large genus of terrestrial orchids, some of the species of which are extremely beautiful and well worth experimenting with if the opportunity offers. Considerable difficulty has been experienced in growing them in Europe, but, as the majority of the desirable species are natives of South Africa, the climatic conditions of Queensland should be quite suitable for their culture either in a sunny bushhouse or in the garden beds. They like a compost of fibrous peat, well rotted dung, leaf-mould and a little sand. Drainage must be good, and plenty of sunlight is desirable. Growth commences at the end of winter at which time the tubers start to show new roots. The compost must be kept moist from this period until flowering is finished. Daily spraying is desirable right through the growing period. After flowering watering should be diminished, as the plants need a distinct rest, but they should never be allowed to dry right out as they are difficult to restore to vigour once they go back.

The flowers appear on spikes from the tip of a tall, well-leaved stem; the leaves whose sheaths clasp the stem are lanceolate. Most species are brilliantly coloured, and some are of good size. The best are:—

DISA BARELLI. *Variety of D. uniflora.*

Flowers brilliant orange-scarlet, the lip lighter and veined with crimson.

DISA CERNUA.

Green and yellow.

DISA CRASSICORNIS.

White, spotted deep purple.

DISA DRACONIS.

White and dark blue.

DISA GRAMINIFOLIA.

Bright blue, the lip being striped with alternate narrow bands of white and mauve.

DISA UNIFLORA.

Lateral sepals crimson, dorsal sepal bright pink outside and bluish inside, with crimson veins, the petals brilliant scarlet as is also the lip. (Syn. *D. grandiflora*.)
Var. *Superba*. Flowers very large and much the same colour as the type, but the crimson sepals are tinged with orange.

DISA RACEMOSA.

Sepals rose pink with deeper pink veins, petals and lip scarlet and yellow.

DISA TRIPETALOIDES.

Flowers smallish. Pinkish white, dotted with rose-purple.

The flowers of the species are attractive in form, the dorsal sepal usually being hooded or helmet-like in shape—the lateral sepals being broad and spreading, while the petals and lip are much smaller, the latter being narrow, acute, and projecting forward.

DIURIS

A genus of small, terrestrial orchids found in the coastal districts of South Eastern Australia. They are attractive in form and colouring, but are not suitable for general culture in orchid collections. The plants are usually slender and from several inches to 2 feet in height with a few narrow and comparatively long leaves. The flowers can generally be identified by the two long, narrow, downward lateral sepals which give them their popular name of "two-tails." They grow from a small underground tuber which is sometimes quite a distance below the surface of the soil—and, moreover, they seem to delight in getting under a rock which makes it particularly difficult to remove them without injury. I managed to flower two or three species by planting them in their native soil and growing them in a shallow pan in a sunny place—giving them ample water from the time the first shoots appeared. There are about 30 varieties of which the following are best known:—

DIURIS ABBREVIATA.

Small pale yellow flowers, dorsal sepals spotted. (Queensland and N.S. Wales.)

DIURIS ALBA. (S.Q., N.S.W., Vic.).

Ranging from pure white to mauve.

DIURIS AUREA. (S.Q., N.S.W., and Vic.). (*Illustrated.*)

Yellow marked with brown.

DIURIS CUNEATA (N.S.W.).

Pale lilac with purple veins.

DIURIS DENDROBIODES. (N.S.W.).

Large reddish brown flowers.

DIURIS LONGIFOLIA. (N.S.W., Vic., etc.).

Yellow marked with brown.

DIURIS MACULATA. (*Australia, all States except W.A.*).

Yellow blotched with brown—sometimes white marked with grey—sometimes pale yellow.

DIURIS PALLENS. (Q., N.S.W.).

Pale yellow—lower sepals green.

DIURIS PEDUNCULATA. (*Australia, all States except W.A.*).

Orange yellow.

DIURIS PUNCTATA. (Q., N.S.W., Vic., S. Aust.).

Fragrant—from pale mauve to deep purple.

DIURIS SECUNDIFLORA. (Q.).

Pale yellow—brown stalks.

DIURIS SULPHUREA. (*Australia, all States except W.A.*). (*Illustrated.*)

Sulphur yellow—the dorsal marked with red-brown.

Etc., etc.

EPIDENDRUM and ALLIED GENERA

This is a very extensive genus of orchids, something approaching 500 different species having been listed. The greater part of these are of botanical interest only—and indeed in Australia very few members of this genus are grown. Possibly better communicational services with Central and Southern America will enable a greater variety of species to be made available to Australian growers. There are three types of plant, one with long reedy stems clothed with ever-green leaves (as seen in the hybrids, *E. Boundii* and *E. O'Brienianum* so extensively grown in Queensland), another with short round pseudobulbs topped with two or three long narrow leaves (as exemplified in *E. atropurpurea*, often seen here), while the third type is after the manner of the *Cattleyas* with upright stems having two or three stout oval leaves at the top (*E. bicornutum* is one of this type, and has occasionally been sold as a *Cattleya* either in ignorance of its true nature, or with intent to deceive).

The Queensland climate from Brisbane northwards is well suited to their requirements, and practically all the varieties will do well enough in a sunny bushhouse throughout the State. In the South glasshouse conditions are necessary, some species needing artificial heating in the colder months. Most of the reedy type can be treated as garden plants, provided they are planted in a warm, sunny place, and attention is given to their water requirements.

The reed-like species generally like cool treatment, and are suitable subjects for bushhouse or out-door cultivation. The pseudobulbous type generally prefer slightly warmer conditions and, though they will grow well enough in a bushhouse in the warmer parts of Brisbane and elsewhere, will develop more quickly and flower more freely in a glasshouse. An exception is *Epidendrum vitellinum*, a very beautiful orchid which requires very cool moist conditions.

The *Cattleya*-like type requires still warmer treatment, and glasshouse culture is desirable for it, with heat in the colder localities.

All species like a maximum of light and the reedy types revel in sunlight. The other types prefer less direct sun, particularly in the warmer part of the day, but a little early morning sun will not hurt them.

The reedy type is not very particular as to compost, but a mixture of peat with a few lumps of well dried dung and a little leaf-mould or fibrous loam gives good results. The other types do well in osmunda fibre or good fibrous peat.

The water requirements are somewhat similar to those for the *Cattleyas*—ample water through the Summer season, slackening through the Autumn, and with a defined dry resting period in the Winter. *E. vitellinum* is an exception again, as it needs moist conditions throughout the year. The following are the best species, and worthy of inclusion in any collection.

EPIDENDRUM ATROPURPUREA. *Native of Central America, Colombia, and Venezuela.*

One of the finest of the species and worthy of inclusion in any collection.

Pseudobulbs are ovate (sometimes pear-shaped), with a pair of dark green, narrow, leathery leaves. The long spike grows from the top of the pseudobulb and bears a number of large flowers. Sepals and petals are oblong and spreading, greenish at the base and dark brown to the top. Lip is large, spreading and three-lobed, pure white in colour with a leathery-like blotch of reddish-purple at the base. Flowers in late Spring and early Summer, the blooms lasting for about five weeks. Variety *roseum*—has purplish sepals and petals, and a dark rosy-pink labellum.

EPIDENDRUM CATILLUS. *Native of Colombia.*

One of the reedy type of long leafy stems, the leaves being fleshy, oblong, and acute. The flowers are produced in terminal racemes and appear in many flowered cymes, the pedicels and ovaries being scarlet. The sepals and petals, which are narrow, lanceolate and pointed, are deep reddish-gold in colour, the sepals being glossy. The lip is vermilion, the middle lobe being bifid, and the ends toothed. In general it resembles the form of *E. Boundii*. Flowers in Winter and early Spring. Flowers last a month.

EPIDENDRUM CILIARE. *Native of Tropical America.*

A fragrant species of the *Cattleya* type, the stems of which closely resemble those of *Cattleya Mossiae*, in mistake for which it is sometimes sold. Leaves appear in pairs at the top of the stems and are oblong and rounded in shape and leathery in texture. Flower scapes, about six inches long, grow from the apex between the leaves, and carry from three to six large flowers (about 5 inches across). These vary considerably in colour from a creamy white through various tones to a greenish tinged yellow. The white lip is three-lobed, the middle one being long and pointed, while the laterals are deeply fringed. Flowers in Winter, and lasts about 6 weeks. The blooms are delightfully fragrant.

Variety *crispidatum*. Flowers larger and brighter yellow in colour, while the middle lobe is only slightly longer than the lateral lobes.

EPIDENDRUM CINNABARINUM. *Native of Brazil.*

One of the reed-like stemmed species, the leafy stems reaching a height of more than four feet, clothed for the greater part with oblong slightly veined leaves in pairs. The racemes spring from the apex and carry a large number of brilliant scarlet flowers with a handsome orange-yellow, red-spotted trilobed lip. This species is found in the sandy thickets near the coast at Bahia, in Brazil, and on sandstone rocks near Villa Rico in the Rio Grande. It will do quite well grown under the same conditions as the hybrids *Boundii* and *O'Brienianum* (which it resembles). Flowers in the Winter time, the corymbiform sprays of bloom making a brilliant show with their succession of opening flowers for two or three months.

EPIDENDRUM COCHLEATUM. *Central America and West Indies, etc.*

A very interesting species with flattened oval, deep green pseudobulbs topped with two broad, oblong, acute, deep green leaves with slightly undulated edges.

The flower spike grows from the top of the stem and carries a number of nicely sized flowers which in good varieties are very attractive. The greenish-yellow sepals and petals are narrow and pointed and somewhat tortile (twisted). The lip, which is uppermost, is alleged to resemble the under part of a cockle shell (hence the name). It is deep purple outside, the underside being even darker, prettily veined with yellowy-green veins. This species, although plentiful in its native haunts, is rather hard to obtain, as it does not carry well. Once established, however, it grows vigorously and flowers for the greater part of the year. It likes warm, moist conditions.

EPIDENDRUM COOPERIANUM. *Native of Rio De Janiero, Brazil.*

A beautiful and hardy species with stiff, erect and rather stout stems up to 3 feet 6 inches in height with numerous fleshy, stiff, acutely pointed leaves on the top half. It produces several drooping racemes densely covered with stout-textured flowers whose sepals and petals range from pale brownish green to an attractive golden-brown. The trilobed lip is a brilliant rosy pink, the middle lobe being kidney-shaped, notched in front, while the laterals are rounded and large. Flowers in Autumn and early Winter, the blooms lasting about 8 weeks. Should grow in warm bushhouse in Brisbane and, generally speaking, under similar conditions to those prescribed for *Cattleyas*.

EPIDENDRUM ETECTUM. *Native of Colombia.*

One of the parents of the well known hybrid, *E. O'Brienianum*. Stems tall and reedlike up to about 5 feet in height, somewhat swollen at the base and clothed almost from the base upwards with leathery, oblong-lanceolate, bright green leaves notched at the tip. The flowers appear in globose heads on long racemes from the top of the stems. Pedicels are long and pale red, while the sepals and petals are deep magenta in colour. The lip is similar in shape to that of *O'Brienianum*, but it is of the same colour as the sepals and petals. Flowers in Winter and stays in bloom for a very long period. Will grow under the same conditions as *E. Boundii* and *E. O'Brienianum*.

EPIDENDRUM FALCATUM. *Native of Guatemala.*

A rare and rather difficult species, which differs from all other species of *Epidendrums* in having long, creeping and branching stems from which grow widely spaced, thick, fleshy, falcate drooping leaves, about a foot in length and tapering to a peculiarly twisted point. Flowers are produced in pairs and are 5 or 6 inches in width. Sepals and petals are narrow, pointed and spreading, and are light brownish-green in colour. The lip is dark yellow, the lateral lobes being rounded, while the middle lobe is narrow and pointed. Flowers in early Summer, the blooms lasting some eight weeks. It should be grown in a basket or on a tree fern block. It likes plenty of light, and ordinary bushhouse treatment will serve in places where the temperature does not fall below 48 degrees—otherwise glasshouse. Ample moisture in the Summer time, but only enough to keep the stems unshrivelled during the Winter.

EPIDENDRUM FRAGRANS. *Native of West Indies.*

A sweet-scented species with flattened fusiform pseudobulbs which carry a solitary lanceolate, recurved leaf, dark green and persistent. The flower scapes grow from the apex, are short and carry a few fair sized flowers, creamy white in colour, the lip being streaked with red. This species is particularly strongly scented. Flowers in Summer and Autumn and lasts about 7 weeks. Needs a minimum temperature of about 54 degrees, with ample moisture in the Summer, and should not be allowed to become dried out in the Winter.

EPIDENDRUM IBAGUENSE. *Native of Peru.*

Similar to *E. evectum* in manner of growth, but flowers are orange scarlet.

EPIDENDRUM MEDUSAE. *Native of Ecuador.* (Illustrated.)

One of the strangest of orchids. It has clustered, pendent stems, about a foot long, completely sheathed with the bases of the leaves. These are arranged in two opposite rows and are linear-oblong in shape, fleshy in texture, from 2 to 4 inches in length, notched at the tips and a pale, shining green in colour. Flowers (about 2½ to 3 inches across) appear from the axils of the terminal leaves either singly or in groups of two or three. They are leathery in texture, the narrow, oblong sepals and petals are yellowish-green with a faint border of purplish-brown. The lip is very large and striking, spherical in shape, notched at the apex and heart-shaped at the base. The margin is divided into numerous long and pointed segments which are extended to form a striking looking fringe all round it. In colour it is a rich, maroon purple, the disk having a greenish tint. It requires very cool, moist conditions, and should grow well enough in a cool bushhouse, either on a tree fern slab or in a shallow basket in a compost of finely chopped osmunda fibre and sphagnum moss. The plant should be kept saturated in the Summer time and quite moist throughout the Winter. Flowers in late Summer and Autumn, the blooms lasting about 6 weeks.

Syn. *Nanodes medusae*.

EPIDENDRUM PRISMATOCARPUM. *Native of Central America.*

A handsome species, with robust, flask-like, wrinkled pseudobulbs up to about a foot high, dark green in colour, topped with a pair of strap-shaped, dark green leaves 12 inches or more in length. The scape proceeds from the apex and bears a raceme of a dozen or more beautiful and fragrant flowers. The lanceolate sepals and petals are creamy-yellow, spotted and blotched with dark purple. The lip is smallish, and is rose pink with a pale yellow margin. Flowers in Summer and lasts for about 5 weeks. This plant grows in the dense jungles about Chiriqui in Panama where there is little seasonal variation, and so will require warm, moist conditions, and should only be grown by those who can give it conditions which do not fall below 55° Fahr. at any time. Heated glasshouse treatment, with a moist atmosphere, is necessary.

EPIDENDRUM RADICANS. *Native of Guatemala.*

This is one of the parents of the hybrid *E. Boundii*, so popular as a garden plant in Brisbane. Stems very long and thin, reaching a height of over ten feet, using its long, white, adventitious roots to hold it to a tree or other convenient support. Leaves are in two opposite rows along the stem. They are from 3 to 5 inches long and about $\frac{3}{4}$ inch wide, fleshy in texture and shining green in colour. Flowers are produced in large terminal panicles. Sepals and petals bright orange-scarlet, lip cross-shaped, deep yellow edged with scarlet. It likes warm, moist, sunny conditions. Flowers in Spring and Summer, the individual blooms being produced in succession, the plant making a brave show for 8 or 9 weeks.

Syn. *E. rhizophorum*.

EPIDENDRUM STAMFORDIANUM. *Native of Brazil.*

A beautiful species, with stout, long pseudobulbs tapering at top and bottom, having three or four stout, thick, leathery leaves at the apex, each 5 or 6 inches long and $1\frac{1}{2}$ to 2 inches broad. The flower spikes spring from the base of the pseudobulbs and carry a large number of good-sized flowers, greenish-yellow in colour, spotted and blotched with pink. The flowers are fragrant.

Treat as for *Cattleyas*. Water moderately at all times, and sparingly in the Winter. A position where it will get the morning sun is particularly suitable.

EPIDENDRUM VITELLINUM. *Native of Mexico.*

A brilliant species with short, egg-shaped, glossy green pseudobulbs, topped with two (sometimes three) glossy green, oblong, acute leaves. The racemes, which are erect and many flowered, reach a length of about 18 inches, and carry a number of large, fleshy flowers with sepals and petals orange-scarlet, the pointed lip being bright yellow. Flowers in Summer and lasts 8 weeks. It likes sunlight and cool conditions.

Variety *majus*. Much larger than the type.

(Occasionally this plant is imported and sold as *Zygopetalum Mackayi*—Var. *majus*, although it bears very little resemblance to the *Zygopetalums*.)

EPIDENDRUM WALLISII. *Native of Colombia.*

A lovely species, with tall leafy stems up to about 4 feet high, having raised spots of brownish-purple, and clothed with two rows of fleshy, green, four-inch leaves. Flowers are produced from the apex and from the axils of the leaves in the upper part of the stems, and are borne on drooping racemes. The blossoms are numerous and up to 2 inches across. Sepals and petals are strap-shaped, yellow spotted with crimson. The fan-shaped lip is large, white with feathery crimson lines. Flowers are musk scented. Blooms in Autumn and lasts for some months. Likes warm, moist, sunny conditions with plenty of water all through the year.

There are many hybrids, the two best known to us being *Boundii* and *O'Brianianum*. Another excellent hybrid is *E. Endresio-Wallisii*.

Epidendrums have also been crossed with *Cattleyas*, *Laelias*, *Sophronitis*, *Calanthes* and *Zygopetalums*.

BARKERIA ELEGANS. *Native of Mexico.*

A small growing but charming species with slender pseudobulbs surmounted with a few lanceolate leaves. The racemes are erect and stout and carry a few flowers each about 2 inches across. The sepals and petals are broad, spreading and slightly twisted. They are rosy-lilac in colour. The lip is large and spoon-shaped, and is white dotted with crimson and with a large blotch of maroon-crimson in the front. The column is broad and winged, yellowish in colour with crimson spots. Blooms in the Spring. Flowers last about 4 weeks. Ordinary bushhouse treatment in the warmer parts and glasshouse culture in cool regions.

Syn. *Epidendrum elegans*.

DIACRIUM BICORNUTUM. *Native of British Guiana and Trinidad.*

One of the finest of the *Cattleya* type. The stems are about a foot in height—are fusiform in shape and furrowed and hollow in the centre. The leaves are oblong, pointed, leathery, and dark green. The flower stems grow from the summits of the matured stems and carry up to about 12 large pure white flowers, the centre of the lip being sparsely spotted with crimson. It has two hollow horns between the lateral lobes—the middle lobe being lanceolate. Flowers in early Summer, the blooms lasting about a fortnight. Requires warm, moist conditions.

(Syn. *Epidendrum bicornutum*).

ENCYCLIA ALATA. *Native of Mexico.*

A fragrant and very variable species with small ovate pseudobulbs with two sword-shaped leaves. Flower spikes spring from the top of the pseudobulb and carry a cluster of good-sized flowers with narrow sepals and petals, which are green in the lower part and reddish-purple thence to the apex. The lip is broad and blunt, the middle lobe waved. It is straw-coloured, striped and spotted with carmine. Flowers in Summer and lasts for about 6 weeks.

(Syn. *Epidendrum alatum*.)

ENCYCLIA DICHROMA. *Native of Brazil.*

An outstanding species with clustered ovate pseudobulbs up to 6 inches in height, on which grow two or three dark green, rigid, leathery leaves from 6 inches to a foot or more in length and rounded at the apex. The flower scape grows from between the leaves at the apex of the pseudobulb, and reaches a length of from 1½ feet to 2 feet and carries a considerable number of flowers from 2 inches to 3 inches across. In the type species the narrow sepals and broad petals are pure white; the trilobed lip is a bright rose pink with a white margin tinged with yellow at the base, the middle lobe being rounded in front, while the laterals curl over the column. In the variety known as *amabile* the sepals and petals are rosy pink, while the lip is purple.

Variety *striatum* has white sepals and petals veined with deep purple. Flowers at various times of the year. It requires warm, moist treatment.

(Syn. *Epidendrum dichromum*.)

ENCYCLIA MEMORALIS. *Native of Mexico.*

A very fine species, with ovate or conical, stout pseudobulbs about 4 inches high and supporting a pair of leathery, strap-shaped, bright green leaves up to a foot in length. The drooping panicles grow from the apex between the leaves, and reach a length of from 2 to 3 feet. They are covered with wart-like protuberances and bear numerous large flowers up to 4 inches across. They are delicate in texture, the narrow, pointed sepals and petals varying from soft rose pink to pale mauve. The trilobed lip has a scalloped margin, and is white, lined with red, bordered with dark rose. Cultural treatment as for *Cattleyas*, but rather less warmth is necessary.

Var. *majus*. More robust than the type—panicles longer and often branched—flowers more delicately coloured.

Syn. *Epidendrum verrucosum*.

EPISTEPHIUM

A small genus of terrestrial orchids belonging to the sub-tribe *Vanilleae*; the majority of the species being rather of botanical than horticultural interest. One species, however, is very beautiful and worthy of being included in any orchid collection.

EPISTEPHIUM WILLIAMSII. *Native of Brazil.*

A beautiful species, with erect stems, up to about 18 inches high, sheathed with the bases of the shining, dark green, elliptical leaves, those on the upper part of the stem being considerably larger than those nearer the base. The flower spike grows from the top of the stem and carries a number of large and beautiful flowers with mauve coloured sepals and petals, both of which are oval in shape, the petals being twice as broad as the sepals. The labellum is large and prominent, the front portion being mauve, the base white with a band of deep carmine, while the disk has a crest of yellow hairs.

By reason of its nature this plant is very difficult to import, except in an established condition. It has a tuft of fleshy, underground, fibrous roots from which the stem springs. It should be planted in a roomy pot in a compost of loam, leaf-mould, sand and well decayed dung. Drainage must be perfect. It requires copious water throughout the Summer time, and the compost should not be allowed to become dry, even in midwinter. It should do well enough in a warm bushhouse in the warmer parts of Brisbane and the North, but in colder parts and in the South glasshouse treatment will be desirable—with heat in the Winter an advantage, particularly where the temperature falls below a minimum of 50-52 degrees.

ERIA

A small genus of epiphytical orchids more quaint than beautiful, and mostly of botanical interest only. They like plenty of light and ample moisture and warmth. In Brisbane and the South, glasshouse treatment is necessary, but in the North an ordinary warm bushhouse will serve, particularly for the native species.

The best known native species is *Eria Fitzalani* which is found on trees in the tropical scrubs near Buddabadoo (N.Q.). It has short, ovate pseudobulbous stems terminated by a single narrow lanceolate leaf. The peduncle comes from the base of the bulb and bears a hairy, many-flowered raceme carrying numerous small creamy-white flowers with narrow, glossy petals and rather broader sepals, the lateral ones being extended into a short spur. The labellum is three-lobed and hoodlike, and has a thick crested disk.

Other native species which differ more or less from the above are *E. Australiensis* (Johnstone River), and *E. eriaoides* from the Fox, this latter being distinguished by the scaly appearance of the pseudobulb.

The best of the exotic species are:—

Eria convallarioides—large, creamy white, tipped red.

Eria coronaria—Golden yellow, flecked faint lilac.

Eria vittata—Fleshy pink, large flowers.

These are all natives of Northern Burma.

ERIOPSIS

A small evergreen epiphytical genus from British Guiana and Colombia, only two of the species of which are cultivated.

ERIOPSIS BILOBA. *Native of Colombia and British Guiana.*

Pseudobulbs about $2\frac{1}{2}$ to $3\frac{1}{2}$ inches high, ovate and terete in form, with a pair (sometimes three) of broad, lanceolate, plaited, dark green leaves at the apex. Peduncle springs from the base of the matured pseudobulbs, and bears an erect raceme up to 18 inches long, carrying a number of bright flowers each about 1 to $1\frac{1}{4}$ inches across. The short, oblong, blunt sepals and petals are bright yellow, the edges deepening to orange-red. The concave lip is trilobed and somewhat heart-shaped, the front lobe being contracted and rather depressed. It is yellow in colour, densely covered with minute brown spots. The disk is crested with a number of triangular, scaly plates.

ERIOPSIS RUTIDOBULBON. *Native of Colombia.*

The finer species. It has wrinkled, ovate-oblong, terete pseudobulbs, deep purplish-black in colour, with a pair (or occasionally three) broad, dark green, prominently veined leaves. Flower scapes, from the bottom of the pseudobulbs, carry a long, drooping raceme, bearing up to 24 attractive blooms, each about 2 inches in diameter. The spreading, oblong, obtuse sepals and petals are deep orange yellow edged with maroon. The lip is three-lobed; the lateral lobes, curling inwards, are orange-red, while the roundish, slightly notched, front lobe is smaller and is white spotted with deep purple.

Both these species grow at an elevation of from 4,000 to 6,000 feet on palm tree stems where they are exposed to the full light of the sun. They should, therefore, be grown in a cool position, but plenty of sunlight must be available. Much water is necessary, particularly in the warmer months, but even in Winter the compost should be kept damp. Staghorn peat is a suitable compost, providing the drainage is absolutely free. They should do well enough in Brisbane suspended from a tree or from the top of an open bushhouse. It is doubtful if they could be grown in the North except on the tablelands. Maleny should suit them excellently.

ESMERALDA

A genus of evergreen, epiphytcal plants closely related to *Vanda* and *Arachnis*, to which genera most of the species have been assigned. They require warm, moist conditions, and, therefore, a glasshouse is desirable for their cultivation in Brisbane and even in the greater parts of the North, while artificial heat will be essential in the South and in the cooler parts of Queensland.

They will grow in a pot or basket with wood-charcoal topped with sphagnum moss, but the addition of an old clean bone, a few large pieces of well dried dung and a little fibre makes for vigorous and healthy growth.

ESMERALDA BELLA. *Native of the hot gulches in Himalayan Sikkim.*

Stems erect and shortish, clothed with a double row of shining, bilobed leaves about 5 inches long and 1 inch wide. Blooms are produced on short, four-flowered racemes from the axils of the leaves on the upper part of the stem, and are about 2½ inches across. The straight and oblong, somewhat wedge-shaped sepals and petals are light ochre-yellow, banded with cinnamon. The labellum has its white lateral lobes striped with purplish brown, while the broad swollen middle lobe has a brown border.

Syn. *Arachnanthe bella*.

ESMERALDA CATHCARTII. *Native of Sikkim.*

The finest of the genus and, indeed, one of the finest of all the Vandaceous type of orchids. The tall, terete, rather stout stems have two rows of pale green, narrowly-oblong, somewhat drooping leaves, unevenly lobed at the apex and about 6 inches long. Flowers are produced on thick racemes from the axils of the upper leaves and usually four to five blooms appear on each raceme. The flowers are from 3 to 4 inches across, and have broadly-oblong overlapping sepals and petals. These are pale yellow, densely banded with reddish-brown. The lip is white, the small lateral lobes being streaked with red at the base. The middle lobe has a beautifully scalloped, incurved edge, toned bright yellow.

This species is rather difficult to import and establish, and most attempts to grow it in the past have ended in disappointment. However, it is so beautiful a flower that it is worthy of further efforts. It grows naturally on the trees and rocks close to the waterfalls in the steamy gorges of the Sikkim Himalayas. Therefore a warm, moist glasshouse is desirable, and, if the plant can be suspended over a fish-pond or a fountain, it should obtain something of its natural conditions.

Syn. *Arachnanthe Cathcartii*. *Vanda Cathcartii*.

ESMERALDA CLARKEI. *Native of Sikkim.*

This species is somewhat similar to *E. Cathcartii* in manner of growth. Sepals and petals dark tobacco brown, banded with yellow-ochre. Lip creamy white, streaked with brown in the lateral lobes. This species grows high up in the Himalayas and needs less heat than the others. Probably bushhouse treatment will serve during the Summer months, moving it into the glasshouse for the Winter.

Syn. *Arachnanthe Clarkei*. *Vanda Clarkei*.

ESMERALDA SANDERIANA. See *Euanthe Sanderiana*.

E U A N T H E

EUANTHE SANDERIANA. *Native of Philippine Islands.*

A magnificent species with an erect woody stem and handsome, recurved, leathery, strap-shaped leaves more than a foot in length. About a dozen beautiful flowers are produced upon the raceme, each flower being up to 5 inches in diameter. The dorsal sepal and the somewhat smaller petals are broadly oval, pale rosy-lilac tinged with yellow and dotted with crimson at the base. Lower sepals are larger (sometimes 2 inches in diameter), yellow on the outside, fawn tinted inside and netted with brownish-crimson. Lip small, the front portion flat, the sides curled upwards, dull crimson in front and greenish-yellow at the base. It is a really beautiful and remarkable flower. Of all the *Vanda* group, *E. Sanderiana* is the

most difficult to keep. It requires very warm, moist conditions, and both in Brisbane and the South a heated glasshouse is essential. It is best potted in a basket and suspended over a fish-pond close to the glass. Flowers in late Summer and lasts four to five weeks, if, when the flowers open, it is moved into a cooler house. Syn. *Vanda Sanderiana*. *Esmeralda Sanderiana*.

EULOPHIA

Eulophia is a large genus of terrestrial orchids, most of the species of which are beautiful, though few of them are cultivated in orchid collections. There are two distinct forms, one having leafy stems sometimes thickened into pseudobulbs, usually producing three flowers from a leafless scape growing from the base of the stem and, more rarely, sometimes from the apex of the stem; the other type, which is that of the three known Australian species, grows from a thick, fleshy, tuber-like, underground root, from which spring leafless stems terminating in a raceme.

They will grow well enough in a compost of fibrous loam, leaf-mould, a little dried dung, and a few pieces of charcoal and broken crock. All the species come from tropical rain forest areas and therefore require rather warm conditions. The three Australian species are quite worth growing if they can be had, but by reason of the peculiar method of growing they are rather difficult to obtain.

The native species are:—

EULOPHIA CARRI. *Native of North Queensland.*

This species was discovered by and named after Mr. Thomas Carr of Julatten, North Queensland, a member of the Queensland Orchid Society. It has a thick, fleshy tuberous root from which spring a few brownish stems up to about 18 inches with numerous sheathing bracts and terminating in a many flowered raceme. The flowers are nearly an inch across, and are a pleasing cinnamon brown in shade, prettily flecked with lavender. Flowers last about a month when they can be persuaded to open. I have grown this plant under glass and have succeeded in producing flower scapes on two occasions, but unfortunately on each occasion the stems damped off before the flowers opened. I am, therefore, of the opinion that when the flower spikes begin to develop it would be desirable to move the plant into the open air. As an experiment I have recently planted a tuber in the garden border and I am watching with interest for developments.

EULOPHIA FITZALANI. *Native of Mt. Dryander, N.Q.*

Same manner of growth as the previous species, the stems being about a foot long. Flowers are creamy white with brown veins.

EULOPHIA VENOSA. *Native of Rockingham Bay and Brown Bay, N.Q.*

Same manner of growth. Flowers white with deep red veins—the labellum being much broader than long.

The chief exotic species are:—

EULOPHIA DREGEANA. *Native of South Africa.*

Thick, fleshy rhizomes, having short, stout, erect stems with sword-like, pointed leaves from the middle of which spring erect scapes with racemes carrying numerous quaint flowers which have chocolate sepals and petals and white oblong lip.

EULOPHIA GUINEENSIS. *Native of Tropical West Africa.*

Broad, pyriform, short pseudobulbs, topped with a pair of thick plicate, elliptic-lanceolate leaves. The three-foot scape is produced from the base of the pseudobulb, its terminal raceme carrying up to a dozen good sized flowers each about 2½ inches across. The sepals and petals are lanceolate and purplish-green in colour, while the large lip is white, striped with crimson at the base. Flowers in Spring. Variety *purpurata*. Sepals and petals rosy-purple—lip magenta veined with crimson.

EULOPHIDIUM MACULATUM. *Native of Congo.*

Pseudobulbs ovate and flattened, terminating in a solitary leathery, elliptic-ovate leaf, green with several rows of silvery spots across it. Scape from the base of the pseudobulbs, the terminal raceme carrying numerous flowers with hooded, dorsal sepal which, with the sharply pointed laterals, is reddish-brown, while the lanceolate petals are white and the broad heart-shaped lip white with two red triangles at the base.

GALEOLA

A small genus with about ten exotic and three native species. These latter are among the most fragrant of all the native orchids, but unfortunately their manner of growth makes them unsuitable for cultivation. They grow from fleshy, tuberous roots, usually deep down below the surface, sending up fairly stout, leafless stems which climb upon a convenient tree, by means of clusters of fleshy roots from the nodes, to a great height; specimens 50 feet tall having been mentioned. The native species are:—

GALEOLA CASSYTHOIDES. *Native of South Queensland and New South Wales.*

Leafless stems up to about 15 feet in length, dark, stout and vine-like. Flowers

produced in long, branching panicles which carry a large number of brownish-yellow or golden-yellow, somewhat connivent flowers, the sepals and petals being acutely lanceolate, the dorsal sepal curving inwards. The broad labellum has undulated, lateral lobes, the front lobe being round with silky down on the disk, which has two raised longitudinal lines. Flowers in the springtime, its strange perfume filling the surrounding scrub with fragrance.

GALEOLA FOLIATA. *Native of Coastal Scrubs and North and Central Queensland.*

Rather more robust than the last, the panicles being larger and spreading, while the individual blooms are nearly three inches across. The flowers are golden yellow, while the labellum is glossy between the two typical raised lines, while the margins are marked with two diverging fringes of small yellow hairs. Very fragrant.

GALEOLA LEDGERIANA. *Native of South East Queensland and Northern New South Wales. (A synonym of the above.)*

A very tall growing species, which reaches a height of over 45 feet, more slender than either of the previous species. Flowers produced prolifically on long branching scapes. They are brilliant yellow marked with purple at the bases of the sepals and petals, the wavy fringed labellum having blotches and spots of purple. Sweetly scented with a honey-like perfume.

GALEANDRA

A small genus of which some species are epiphytical and others terrestrial. They are not usually found in cultivation, but a few of the species are worthy of inclusion in a collection if opportunity offers—particularly by those who can give them warmth during the growing period.

They can be grown in pots or baskets with peat or fibre topped with sphagnum moss. When the spring growth starts they should be placed in the warmest part of the glasshouse, suspended close to the glass, and should then be kept saturated until growth has been completed—after which they can be moved to a cooler position and the moisture reduced to just sufficient to prevent shrivelling of the stems. Care should be taken to guard against insect pests, such as thrips and red spider to which they are very subject.

The following are the best species:—

GALEANDRA BAUERI. *Guiana.*

A small growing epiphytical species with slender, leafy stems up to a foot high

which swell as they mature into an ovate, pointed pseudobulb. Racemes spring from the top of the stems in a drooping cluster, each flower being about 2 inches in width. The sepals and petals are narrow, oblong and pointed, brownish-green in colour, the petals a little darker. The large lip is funnel-shaped, broad in front and extended into a spur at the rear, the sides curling inwards over the column. The front edge is waved and notched. The front part is brilliant purple, the outside being white. Flowers in Summer—blooms last about 7 weeks. Var. *lutea*. Flowers deep yellow, front lip marked with blood-red lines.

GALEANDRA DEVONIANA. *Native of Brazil.*

The finest species of the genus. Stems round and erect, reaching, under natural conditions, to a height of 6 feet, but rarely growing taller than 2 feet under cultivation. The younger stems are clothed with numerous narrow, pointed leaves and from their apex develops a pendent flower scape which carries 8 or 9 large and beautiful flowers, each attaining a diameter of from 3 to 4 inches. The sepals and petals are lanceolate and erect, and are deep purple in colour with a green edge. The lip is large and handsome. It is waxy white, the front portion beautifully striped with purple. Flowers variously from Spring to Autumn, the blooms lasting for 8 weeks or more.

GEODORUM

A small terrestrial genus of little horticultural value. The native species *Geodorum pictum* is widely distributed throughout the coastal districts of New South Wales, Queensland, and the Northern Territory. It has a short, leafy stem, swelling into a pseudobulb at the base. The lanceolate-ovate leaves are from 6 to 9 inches long, prominently ribbed. The flower scapes are produced from the base of the stems and bear a short curved raceme carrying a number of dingy pink flowers, whose oval lips are dark veined. It is not an interesting or beautiful species, but collectors of Australian orchids may like to include a plant or so in their collections. They grow easily enough in a compost of sandy loam and a little dried dung and leaf-mould. Keep fairly moist in the Summer but dry in the Winter.

The best of the exotic species are:—

GEODORUM CANDIDUM.

Pale green sepals and petals, lip white veined purple.

GEODORUM DILATATUM.

Pale pink sepals and petals, lip pink with yellow blotch.

Both these species are natives of the East Indies and require warmer and moister conditions than the local species.

GLOSSODIA

A very beautiful genus of small terrestrial orchids found in the open spaces among the coastal green forests. It grows in thick patches, carpeting the ground with brilliant purple-mauve. Plants grow from small underground tubers usually some inches below the surface, and are rather hard to transplant, but, if they can be moved without hurting the tubers and planted in a quiet place in the garden, they will grow up and flower each Spring time. There are two species:—

GLOSSODIA MAJOR. *Australia, all States (except W.A.).*

Plant grows from 4 to 12 inches in height, covered with short hairs, with one (occasionally two) short, oblong-lanceolate leaf at the base and topped with 1 or 2 flowers from 1½ to 2 inches across. These vary in colour from a bluish-purple through mauve, mauve-pink, pink to white.

GLOSSODIA MINOR. *Queensland, New South Wales, and Victoria.*

Plant similar in habit to *G. major*. Flowers smaller than *major* and a rich purple-mauve in colour. They last for some weeks in beauty.

GONGORA

A large and interesting genus of epiphytical orchids, few of the species of which are looked upon as of cultural interest. They are curiously shaped, and usually rather dingily coloured, but most of them are delicately fragrant, while a few are attractive in appearance. They grow in compact clusters of usually deeply ribbed, oblong or ovate cylindrical pseudobulbs each topped with a pair of stalked, broad, lanceolate pointed, plicate leaves. The flowers are produced on long pendulous scapes growing from the base of the latest matured pseudobulbs.

They do best in baskets suspended from the roof in a fairly open compost of fibre and sphagnum moss, though pots will serve. Occasionally the flower spike grows downwards from the base of the pseudobulb as is the habit with *Stanbopeas* and, in such cases, of course, growing in pots is fatal to the flowers. They like comparatively cool culture, and the advice given in respect of *Cattleyas* will apply to the *Gongoras*. As is the case with *Cattleyas*, the *Gongoras* need copious water during the Summer period, but in Winter only sufficient to preserve the pseudobulbs from withering.

In the warmer parts of Brisbane and northwards an ordinary bushhouse or cool glasshouse will suit them admirably, but in the colder parts and southwards a glasshouse is desirable. As long as the temperature does not often fall below 50

degrees, they will thrive well. The following are brief descriptions of the better species:—

GONGORA ARMENIACA. *Native of Nicaragua.*

Spikes a foot long and bearing a dozen or more apricot-yellow flowers in the Summer. These last about 6 weeks in perfection.

GONGORA ATROPURPUREA. *Native of Trinidad.*

Racemes over two feet in length, carrying numerous large, dark purple-brown flowers in succession. The sepals are lanceolate, the dorsal being smaller than the others. The petals are small and inward. The lip stands out at right angles from the flower, its base being developed into a cylindrical claw above which are placed two rounded and two sharply pointed horns. The pedicels are purple. Lasts some weeks.

GONGORA CHARLESWORTHII. *Native of Guiana.*

Scape 18 inches long and carrying up to 20 flowers. Whitish, barred with light brownish-purple on the sepals. Flowers in Summer.

GONGORA GALEATA. *Native of Mexico.*

Flowers in Summer. Racemes short, carrying a few large fragrant, incurved, light brown flowers.

GONGORA GRATULABUNDA. *Native of Colombia.*

Flowers in Summer. Racemes long, loose, pendent and many flowered. Flowers yellow, much dotted with dull red. Tips of sepals twisted, dorsal erect, laterals reflexed.

GONGORA QUINQUENERVIS. *Central and Northern South America.*

Racemes a foot or more in length, carrying 8 or 9 good sized flowers of graceful shape, clear yellow in colour, barred and spotted with red-brown.

Var. *alba*. Flowers white, lip having a few spots of light pink.

GONGORA ODORATISSIMA. *Native of Venezuela.*

Has long, drooping, many-flowered racemes of large flowers of brilliant yellow, heavily blotched with bright brick-red, these blotches being deeper in colour at the points and edges. Pedicels green. Lip clawed at the base. Flowers late Summer, the blooms lasting 6 weeks. Very fragrant.

GONGORA PORTENTOSA. *Native of Colombia.*

Racemes long and drooping. Flowers yellowish-buff spotted with light purple. Texture of flower rather more fleshy than other species. Pedicels greenish.

GONGORA TRICOLOR. *Native of Panama.*

Racemes stout and long. Flowers large. Dorsal sepal lanceolate, lateral sepals triangular, all deep bright yellow, richly spotted and blotched with deep brown. Petals small and narrow, pale yellow, lightly spotted brown. The under part of the labellum is white, while the upper part is stained with cinnamon brown at the sides. Pedicels purple. Flowers late Spring and lasts for over two months.

GONGORA TRUNCATA. *Native of Mexico.*

Flowers straw coloured, marked with a few brownish purple flecks and bars. Lip glossy yellow. Pedicels are mottled purple.

GOODYERA

A genus of terrestrial orchids somewhat resembling the *Anoectochilidae* in having handsome, velvety, dark-green leaves, often beautifully marked or veined with silver and gold lines. They are of wide distribution, being found in Europe, Madeira, America, Asia, New Caledonia and Australia. Generally speaking, they are found in the tropical regions, but some species are found in the temperate latitudes. They are more easily grown than *Anoectochilus* and do not require the constant moist heat necessary to plants of that genus. A reasonably warm, moist glasshouse will suit them in the warmer parts of Brisbane, but artificial heat will be necessary in those places where the minimum temperature falls below 55 degrees Fhr. with any degree of frequency. Compost as recommended for *Anoectochilus*. The following are the best known species:—

GOODYERA MACRANTHA. *Native of Japan.*

Leaves dark green, centre band pale green, the whole of the upper surface being netted with pale green, the under surface also pale green. Flowers grow on terminal rose-pink spikes. Petals rose pink, sepals and lips white.

Variety *luteo-marginata*. Same leaves as type but with a creamy-yellow margin.

GOODYERA POLYGONOIDES. *Native of Rockingham Bay, N.Q.*

Grows from a creeping rhizome from which grow stems up to 8 inches high, clothed and sheathed with the bases of a number of leaves. These are green, not variegated as the exotic species.

GOODYERA PUBESCENS. *Native of North America.*

Leaves dark green with a silvery white mid-rib, reticulated with pale green veins. Flowers on 8 to 10 inch spikes thickly covered with small white flowers.

GOODYERA RODIGASIANA. *Native of New Guinea.*

Leaves thick and fleshy. Pale green with a broad white stripe in the centre.

GOODYERA ROLLISSONII. *Native country not known.*

A beautiful, strong-growing species having large, heart-shaped leaves, rich dark green in colour, with margins, stripes and blotches of pale yellow on the upper side and beautifully purple on the under side. The only plants of this species which can be obtained are the artificially raised descendants from the original plant which was imported into England from an unknown source late last century.

GOODYERA RUBROVENIA. *Native of Brazil.*

A small growing plant, leaves bronzy-green with three coppery red bands.

GOODYERA TESSELLATA. *Native of North America.*

A dwarf species with ovate stalked leaves, dark green in colour, reticulated with pale green and white. The small white flowers are produced on slender erect spikes.

GOODYERA VELUTINA. *Native of Japan.*

Leaves purplish tinted on bottle-green marked with a central bar of silvery white, purple underneath. Flowers on short spikes, rose pink in colour.

GOODYERA VIRIDIFLORA. *Native of Rockingham Bay, N.Q.*

Stems from 6 to 12 inches high. Leaves on long pedicels green in colour. Flowers green.

GRAMMANGIS

I would suggest that the best way to grow the species in Sydney and Brisbane is in a heated glasshouse with a fish-pond in the centre, the plant being set in a pot or basket and suspended from the roof immediately over the fish-pond.

Give copious water through the Summer months, reducing the quantity as the weather cools, but always keeping the atmosphere moist and the compost damp. (I have tried almost every other method without success. I believe that the above method has a reasonable chance of succeeding—but I still wonder whether the plant is worth the care involved—except as a curious novelty).

In North Queensland (particularly in the lower altitudes and the coastal areas) the species should not offer so much difficulty, for it should be easier to give it something approaching natural conditions.

GRAMMANGIS HUTTONII. (Syn. *Cymbidium Huttonii*.) Native of Java.

This rather uncommon species has proved a very difficult subject for Queensland growers, and, frankly, I doubt if it is worth the trouble. Probably the reason for past failures has been a lack of knowledge regarding its natural conditions, and therefore doubts as to how to grow it.

The plant itself is attractive enough with its long, ovoid, fleshy pseudobulbs topped with two broad rounded leaves, thick and leathery in texture. Its flower scapes are drooping and radical (i.e. springing from the stem just above the roots) and carry usually ten flowers, each about an inch and a half in width—sepals and petals being equal, the sepals yellow, closely banded with chocolate lines, and the petals wholly deep chocolate brown. The lip, three-lobed, is greenish-yellow, closely dotted with chocolate. The underneath of the flower is uniformly olive—or brownish-green. The flowers last two or three weeks.

The species grows in the trees (usually on the branches overhanging the streams) in the rain forests surrounding the upper sources of the rivers (sic) of Java. Here the climate is equatorial, and varies little between Summer and Winter—the rainfall being heavy all through the year, though the Summer precipitation is considerably greater than the Winter falls.

	Temperature		Rainfall		Temperature		Rainfall
	from	to			from	to	
January	72°	91°	13¼ inches	July	70°	89°	2½ inches
March	73	91	8 „	September ...	71	92	3 „
April	72	91	5¼ „	October	72	92	4½ „
May	72	91	4 „	November...	73	92	5½ „
June	71	90	4 „	December ...	72	91	8¼ „

GRAMMATOPHYLLUM

A small genus related to the *Vandas*. They grow to great size, Veitch mentioning one plant of *G. speciosum* as being over 15 feet in diameter. The name comes from the peculiar markings on the leaves which are said to resemble the character of Sanskrit writings. They are all natives of the tropics and require warm treatment throughout their growing season. They would probably grow well enough in a warm glasshouse in the warmer parts of Brisbane, but in the South and in the higher altitudes of Queensland they would require a heated house. For compost a mixture of peat or osmunda, mixed with large pieces of charcoal and broken crocks, with a few lumps of well matured cow dung will be satisfactory. A topping of green sphagnum moss will assist in conserving moisture. They dislike being disturbed and, therefore, should be potted to provide some years of growth. They must at all times have plenty of light. In Summer copious water must be given direct to the roots and through the surrounding atmosphere. In Winter

rather less water is necessary, but they should not be allowed to remain dry for any length of time. The best species are:—

GRAMMATOPHYLLUM SCRIPTUM. *Native of Amboina.*

Pseudobulbs 4 to 6 inches long with two opposite rows of oblong, lanceolate, rather stout leaves each a foot to eighteen inches in length. Flower scapes up to 4 feet in length produced in clusters, each flower over two inches in diameter. Sepals and petals are a light greenish-yellow, prettily spotted with brown. The petals are narrower than the sepals and are somewhat reflexed. Lip yellow, diagonally striped with brown, the centre lobe curled back and having a white channelled plate between the side lobes.

Temperature range, minimum 71°, maximum 92°. Maximum variation of minimum temperature 3°, maximum variation of maximum temperature 3°.

Rainfall.—Average in driest month, 4½ inches.

„ „ wettest „ 15 „

Altitude under natural conditions, 100-150 feet above sea-level.

GRAMMATOPHYLLUM RUMPHIANUM. (Var. of *G. scriptum*.) *Native of Moluccas.*

Pseudobulbs 6 to 9 inches long. Flowers very similar to those of *scriptum*, but the middle lobe of the lip is white with a few purple lines on the inside. Treatment as for the firstnamed.

GRAMMATOPHYLLUM SPECIOSUM. *Native of East Indies, Malacca, Malay, Sumatra and Cochín China.*

Probably the largest orchid plant in existence. The stems grow to a length of 10 feet or more and the flower scapes exceed that length, while the seed pods are up to 7½ inches in length. Stems erect and compressed terete, growing in a cluster, and sheathed with the bases of the long (up to 2 feet) strap-shaped leaves which clothe the stems in two parallel rows. Flower scapes grow from the bottom of the stems and are about an inch in thickness. They bear a cluster of many blooms, each being up to 5½ inches in diameter. They are deep yellow, densely spotted with brownish-red, sepals and petals broad-oblong and rounded at the tip. The lip is comparatively small and is bright yellow with symmetrical stripes of red, with some hairy bristles; the furrowed disk has three raised plates. Flowers Spring and Summer and occasionally in Autumn. Flowers last for 2 to 3 months if protected from water. Treatment as already suggested. With such a tremendous plant it seems ludicrous to suggest hanging it over a fishpond, but actually this treatment should suit it admirably. Only growers with ample space available should undertake the cultivation of this plant, but it is such a wonderful orchid that I doubt if any of us would balk at it if the opportunity of growing it were given us.

HABENARIA and ALLIED GENERA

A large genus of terrestrial orchids of extremely wide distribution, species being found in America, Europe, Asia, Africa and Australia. Very few of them are grown in orchid collections although, as a family, they are interesting and often showy. They grow from tuberous roots, the plants dying down with the coming of Winter. There are five or six species native to North Queensland, but they are of botanical interest only, the individual flowers being very small.

The local species are:—

HABENARIA ELONGATA. *Rockhampton.*

The best local species, with stems about a foot high and oblong leaves up to about 4 inches in length. Flowers are produced densely on a terminal spike, the individual blooms being about half an inch across. The middle lobe of the labellum is half-an-inch long with a spur an inch or more in length.

HABENARIA GRAMINEA. *Rockingham Bay.*

Slender stems up to a foot high with a few linear, sharply pointed leaves at the base. Terminal spike slender with a number of small greenish yellow flowers.

HABENARIA XANTHANTHA. *Rockingham Bay.*

Similar in form to *graminea*. Flowers in a dense spike, slightly smaller than *graminea*, and yellowish in colour.

The best of the exotic species are:—

HABENARIA CARNEA. *Native of Penang.*

A handsome species with small, dark green leaves much spotted with white. Flowers 3 to 5 on stem, upper portion pink, balance white. Spur 1½ inches long.

HABENARIA CRINIFERA. *Native of Ceylon and Southern India.*

Small flowers, pale yellow in colour. Stem about a foot high. Leaves ovate.

This plant grows in the lower levels in the open fields. It has a short stem up to, but rarely exceeding, three inches in height, clothed with a whorl of bright green, oblong, rather lanceolate leaves four inches by about an inch or more in width. It flowers in Spring or Autumn, the scape rising from the centre of the plant and bearing a cluster of white flowers. The sepals and petals are about half an inch long, and the long narrow lip is three times that length. The whole appearance of the flower has given it the colloquial name of "Dancing Lady."

HABENARIA PUSILLA. *Native of Cochinchina.*

The finest species, with an erect stem up to 2 feet in height, furnished with six bluish-green, lanceolate leaves. The dorsal sepal and petals form a sort of helmet, the lateral sepals being reflexed and twisted. Sepals and petals are deep green in

colour and contrast pleasantly with the handsome spreading lip, the middle lobe of which is bifid, the colour of the whole organ being scarlet. Flowers in Autumn. Syn. *Hab. militaris*.

PLATANThERA SUSANNAE. *Native of Indo-China.*

The largest species. Flowers up to 2 inches across, the spur being up to 4 inches in length. Flowers are pure white, the front lobe of the lip being beautifully fringed.

Habenarias should be potted in the smallest possible containers. Drainage should be perfect and the crocks should form a pyramid which will raise the top of the tuber to within about half an inch of the rim. The pot is then filled with a well mixed compost of peat, loam, dried dung and powdered crocks, the top of the tuber being just covered. Water sparingly until growth has well begun, but do not allow the compost to become dry. When in full growth give copious supplies of water. If necessary, transfer to a slightly larger pot without disturbing the roots, the best way of doing this being to crack the original pot with a sharp blow and transfer it bodily to the larger pot. The plants should be placed in a well lighted position, but they should be protected from the direct rays of the midday sun. During the Winter keep the tubers fairly dry, but not so much as to cause them to wither.

In the North this genus will do well in a bushhouse, and probably this will serve in the warmer parts of Brisbane. In cooler areas a glasshouse will be necessary. Minimum temperature should not fall below 50 degrees for any length of time.

HOULETTIA

A genus of epiphytcal orchids closely allied to the *Stanbopeas*, the nature of the plants being very similar. Only half-a-dozen species are known, and none of these is grown to any extent in Australia, although the flowers are of good size, form, and colour.

They grow naturally on the mountain side of Central and South America, usually from 4000 to 7000 feet above sea-level. They thrive under cool conditions and should do well in Sydney—Brisbane under ordinary bushhouse conditions. They like light, but not the too direct rays of the sun. During the warmer months copious water must be given, but during the Winter only such moisture as will suffice to prevent their pseudobulbs from shrivelling is necessary. For compost that prescribed for *Cattleyas* will suit. The best species are:—

HOULETTIA BROCKLEHURSTIANA. *Native of Brazil.*

One of the finest of the genus. Pseudobulbs about 3 inches high, stout, ovate and deeply furrowed, tapering upwards, and each surmounted by a single broad, lanceolate, plaited, pale green leaf. Scapes grow from the base of the matured bulbs

and are erect and about 2 feet long, each carrying up to a dozen fragrant flowers about 3 inches across. The colours vary considerably, the usual type having oblong, concave sepals and petals of a rich red-brown shade, thickly spotted with dark purplish dots. The lip is striking in form, the middle lobe triangular in shape and purple in colour. The base is yellowish, finely spotted with purple, and is finished with two pointed, recurving horns at the sides. Other varieties are much darker in colouring, and in others again the basic colour of the lip is white or cream, striped and spotted with purple. They flower in Autumn, the flowers lasting from 7 to 10 days.

HOULLETIA CHRYSANTHA. *Native of Colombia.*

A distinct and lovely species with long ovate, furrowed pseudobulbs bearing a solitary long, ovate-lanceolate, plaited leaf. Scape is erect and shortish, and red in colour, and carries 6 or 7 medium sized concave flowers. Sepals and petals yellow outside, golden inside, spotted thickly with chocolate. Lip deep yellow, flecked with crimson. Flowers in Autumn.

HOULLETIA LANDSBERGII. *Native of Costa Rica.*

Pseudobulbs about an inch long, solitary leaf a foot long and about 4 inches across. Flowers about 3 inches, and fleshy in texture. Sepals and petals orange with red spots. Lip narrow, white with a suffusion of purple. Flowers early Winter and lasts about a fortnight.

HOULLETIA ODORATISSIMA. *Native of Colombia.*

A worthwhile species with ovate, ribbed pseudobulbs topped with solitary light green, lanceolate, ribbed leaf. Flower spikes erect and about 15 inches high, carrying up to half-a-dozen three-inch flowers. Lip white with two reddish horns at the base. Fragrant with a strong smell of violets. Flowers in Autumn. Lasts 10 days.

Var. *antroquensis*. Sepals and petals broader than the type and rich crimson on the inside, the exterior being brown.

Var. *xanthina*. Sepals and petals orange-yellow—lip white, tipped with yellow.

HOULLETIA PICTA.

A delightful species with narrow conical furrowed pseudobulbs about 3 inches tall and an inch wide at the base tapering towards the top which bears a broad lanceolate leaf about 18 inches long. Flowers on a basal, erect, eighteen-inch stem, up to ten blooms being produced per stem. Each is about 3½ inches across and has narrow oblong rounded sepals and petals which contract considerably at the base, cinnamon brown in colour, the lower parts being mottled with yellow. The spear-shaped middle lobe of the lip has a recurved channelled apex, the front part being yellow barred with reddish-purple and having at its sides two ascending spurs. Flowers in Autumn and lasts about a week.

I P S E A

IPSEA SPECIOSA. *Native of Ceylon and India.*

One of the loveliest of the ground orchids, *Ipsea speciosa* belongs to the sub-tribe *Phajaeae*. It grows on the tablelands and mountain slopes, between the elevations of 3,000 and 6,000 feet, from a fleshy, tuberous-rooted rhizome about half an inch to an inch in diameter, from which in late Summer spring one or two—and sometimes three—narrow, lanceolate, prominently plaited leaves, which look something like those of a young date palm. They grow from 10 to 16 inches in length and about $\frac{3}{4}$ inch in width. The flower spike springs from an underground tuber, usually in the Autumn or late Spring. It bears from one to three large, fragrant flowers from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches across. The sepals and petals are bright yellow, the edges of the large, three-lobed lip being tipped with scarlet. I have found that it takes three years to acclimatise this orchid. The best compost I found to be a good, sandy, creek-bank soil mixed with broken crocks, crumpled cow-dung with a liberal mixing of "bulb fibre." Plants, grown in this compost and left undisturbed, have become more vigorous each year, and flowered the third year after planting. Plant in a good large pot and do not disturb. Fresh compost can be added to the top each Spring. Water sparingly at all times, and keep practically dry during the Winter months. In Brisbane I grow them out in the open under a tree, which breaks the noon sun. In Sydney they would also do outside in a sheltered spot, but in Melbourne and Adelaide glasshouse treatment is necessary.

L A E L I A

The *Laelias* are a genus of beautiful epiphytcal orchids closely allied to the *Cattleyas*, from which genus they differ but slightly—such difference being merely the botanical fact that the *Laelias* have four pairs of pollen-masses, whereas the *Cattleyas* have but two.

Although the genus has numerous species, very few of these are grown locally, most growers confining their attention to one or more varieties of *Laelia anceps*. The idea is held that *Laelias* are more difficult to cultivate than the *Cattleyas*, but there is no good reason for holding this view, as, actually, almost any species of *Laelia* should thrive in an ordinary Brisbane bushhouse except in those areas subject to frosts.

For purposes of general cultural notes the genus may be divided into two groups, the first consisting of the Mexican and Guatemalan species, and the second those that grow in Brazil and other parts of tropical South America. For the second group the general treatment prescribed for *Cattleyas* will serve quite well. For the first group, however, some variation of those methods is desirable.

The amount of compost used should be reduced to the barest possible minimum; they should be planted in smaller pots or baskets and hung where they will get ample light and a warm, moist atmosphere. They can be watered copiously right through the growing period, a good soaking twice a day in the middle of Summer being not too much for them. This treatment may be continued until the flowers have opened. After flowering the watering must be diminished and in the Winter they can be kept quite dry except for an occasional spray on a bright morning to save wastage of the stems.

The following are the best species:—

LAELIA ALBIDA. *Native of Mexico.*

A graceful species of the first group with pyriform or oblong, more or less furrowed pseudobulbs, topped with one or more, often two, strap-shaped, pointed, leathery leaves about 6 inches long. The eighteen-inch scape carries half-a-dozen fragrant and graceful flowers up to 3 inches across. Sepals and petals white, delicately flushed with rose. Lip white to pale pink, marked with three yellow lines in the centre, the middle lobe being recurved. Flowers in late Autumn, the blooms lasting 3 to 4 weeks.

This species will do best in a shallow basket or on a raft or block.

Variety *bella*. Flowers flushed with rose, lip bright rose.

Variety *Mariana*. Sepals and petals flesh to salmon pink. Lip mauve, striped with biscuit.

Variety *Stobertiana*. Tips of sepals, petals and lip deep purple.

Variety *sulphurea*. Flowers pale sulphur-yellow.

LAELIA AMANDA. *Native of Brazil.*

One of the first group. Pseudobulbs are thin and fusiform, light green and about 7 inches tall, and are topped with a pair of wedge-shaped, leathery leaves about 8 inches long and red beneath in the earlier stages. Flowers, on short stems and usually produced in pairs, are up to 6 inches in width. Sepals and petals light rosy pink, the lip being deep rose, veined with purple. Flowers in Autumn and lasts about a month.

Syn. *Cattleya Rothschildiana*.

LAELIA ANCEPS. *Native of Mexico.*

Probably the most popular species and certainly the most varied of all the *Laelias*. Pseudobulbs up to about 5 inches in length, ovate and rather flattened, and surmounted by a solitary (occasionally two) broadly lanceolate, shining green leaf. Scapes, up to three feet tall, are flattened and jointed, and bear from 2 to 6 lovely flowers each about 4 inches across. In the type form the nearly equal sepals and petals are lanceolate, purplish-rose or rosy-lilac and funnel shaped, spatulate fronted lip is deep purple flushed with rose, the throat being yellow, streaked with purple. The fragrant flowers are produced in late Autumn to early Winter and last

a long time in beauty, providing the flowers are kept protected from water, fog, etc.

Variety *alba*. Pure white except for a few tinges of pale yellow in the throat.

Variety *Amesiana*. Sepals and petals white at the rear, gradually deepening into purple at the tips. Front lobe of lip reddish-purple. Petals much broader than the sepals.

Variety *Amesiana Crawsbayana*. More deeply coloured than the last—probably the best and rarest variety.

Variety *Asbworthiana*. Sepals and petals white and shapely, lip pure white at front, the throat and tube being spotted and lined with slate-grey.

Variety *Barkeriana*. Very deep purple-rose. Lip short and magenta-purple with a yellow disk.

Variety *blanda*. Sepals and petals pale rose, lip deep amethyst purple.

Variety *Chamberlainiana*. Very large shapely flowers. Rosy purple, lip deep purple.

Variety *Dawsoni*. Pure white with crimson blotch on front lobe, side lobes sometimes spotted with pink and the throat lined with rose.

Variety *delicata*. Sepals and petals white, stained with rose-purple. Lip white, suffused with reddish-purple, tinged with violet, throat orange-yellow.

Variety *Hilliana*. Sepals and petals rather narrow, pure white. Lip pale pink rear and side lobes.

Variety *Hollidayana*. Sepals and petals white. Anterior lobe of lip blotched with crimson. Tube lined with crimson.

Variety *Leeana*. Pure white, with anterior and side lobes faintly flushed with rose.

Variety *Percivaliana*. Sepals and petals very pale rose-pink with white bases, lip tipped in all lobes with bright purple, disk white.

Variety *Sanderiana*. Sepals and petals pure white. Lip blotched and lined with crimson.

Variety *Schroederiana*.—Pure white except for crimson lines in the tube. Front lobe very large and overlapping the side lobes.

Variety *Stella*.—Similar to *Sanderiana* but without the crimson blotch.

Variety *Veitchiana*.—Sepals and petals white, sometimes tinged with lilac. Front lobe slate-blue, the tube being similarly lined.

Variety *Williamsiana*.—Pure white with exception of the deep brown (almost black) lines in the tube.

LAELIA AUTUMNALIS. *Native of Mexico.*

A beautiful species of the first group. Pseudobulbs ovate, tapering towards the top and prominently ribbed. They are about 6 inches long and carry two (occasionally three) lanceolate, bright green leaves about 6 inches in length. Flower

scape 2 feet tall, carrying up to six flowers, each about 4 inches across. Sepals and petals are oblong and pointed with wavy edges, and rose-purple in colour. Lip white flushed with rose with a purple tip and a yellow centre. The flowers are fragrant and appear in late Autumn or early Winter. They last well.

Variety *alba*.—Flowers pure white.

Variety *atrorubens*.—Flowers larger than the type. Deep crimson shading to deep pink in the centre.

LAELIA CINNABARINA. *Native of Brazil.*

A handsome and distinctive species with pseudobulbs (sheathed with protective scales) which are swollen at the base but taper to a narrow stem at the top. They grow to about 10 inches tall and bear usually one (though sometimes two) erect, dark green, pointed, leathery leaf. The erect scape grows to 15 or 20 inches high and bears anything up to six or seven flowers, each about 2½ inches across, with narrow pointed petals and a funnel-shaped lip with wavy edges. The whole flower is reddish-orange in colour. Flowers in Winter and lasts five or six weeks in perfection. Treatment as for second group.

LAELIA CRISPA. *Native of Brazil.*

Another handsome species of the second group with stout, club-shaped, flattened, furrowed pseudobulbs up to 10 inches in length, bearing a solitary stout, green leaf about a foot long and rounded at the top. Scape carries up to half-a-dozen large flowers, each about 5 inches in width. The narrow, pointed sepals are white, as also are the petals whose edges are wavy and crinkled. The side lobes of the lip curl over the centre, while the front lobe is oblong, wavy and pointed. The side lobes are white on the outside and yellow and purple on the inside, while the front lobe is amethyst veined with purple. The throat has a blotch of purple. Flowers in Autumn, the blooms lasting up to a month under favourable conditions. Syn. *Cattleya crispa*.

LAELIA DIGBYANA. (See *Brassavola Digbyana* with which it is synonymous.)

LAELIA DORMANIANA. *Native of Brazil.*

A small growing species of the second group, with flowers of strange colouring. The stems are slightly swollen at the base, but are rarely more than a third of an inch in thickness and very much furrowed. They carry from one to three wedge-shaped, oblong leaves, each about 4 inches in length. Flower spikes from the top of the stems carry three or four flowers each between 3 and 4 inches in width. The rather narrow sepals and petals are olive-brown, veined with purple, the petals having thin margins spotted with blotches of port-wine colour. The front lobe of the lip is deep purple, while the side lobes are lighter in shade, and the whole lip is veined with purplish-crimson. Flowers in Autumn and Winter and lasts well.

LAELIA FLAVA. *Native of Brazil.*

A pretty species with plants of a similar growth to those of *L. cinnabarina*. Scapes

grow to about 18 inches and carry up to nine golden-yellow flowers with narrow, lanceolate and somewhat falcate sepals and petals, while the narrow veined lip is recurved and crinkled at the margin. The throat has four crimson ridges. Flowers in late Autumn and lasts about three weeks.

LAELIA FURFURACEA. *Native of Mexico.*

A striking species of the first group, with ovate furrowed pseudobulbs topped with one or two narrow, oblong, erect, pointed, leathery, light green leaves. Scapes upright, and carry from one to three flowers, each about 5 inches in width, and sepals and petals (the latter being broader) of pale purple. The lip is bright purple with rounded side lobes and oblong front lobe. Flowers in Autumn. Rather a delicate species.

LAELIA GRANDIS. *Native of Brazil.*

A species of unusual colouring, with long, club-shaped, furrowed stems, bearing a solitary stiff, oblong pointed, dark green leaf. Scapes are erect and carry up to five flowers each 4 inches across. Petals broader than the sepals, which are a kind of fawn colour and are waved at the edges. The lip is tube-shaped at the base, the front lobe being rounded. It is white, well veined with purple. Flowers in Summer, the blooms lasting up to six weeks if kept dry.

LAELIA HARPOPHYLLA. *Native of Brazil.*

A slender growing species of the second group, having thin, erect, tufted stems about a foot tall bearing a single narrow pointed leaf about 7 inches long. Scape carries up to seven flowers each about 3 inches wide. Sepals and petals are narrow and pointed, and spread out like a star. Like the small veined lip, they are a bright cinnabar-red in colour, the crinkled edge of the lip being white. Flowers late Autumn.

LAELIA JONGHEANA. *Native of Brazil.*

Another small growing species of the second group, having single-leaved, shining, flattened, egg-shaped pseudobulbs, each about 2 inches long. The leaves are about 4 inches long, erect, dark green, blunt edged and sometimes notched at the apex. Flowers are usually borne in pairs, though often singly, the scapes being short. Flowers are 4½ to 5 inches across. Sepals are narrow and pointed, the petals being broader and oblong. Both are rose-purple. The lip is small but beautifully coloured, the front lobe being creamy-white, its delicate, toothed edge being violet, while the convolute side lobes are yellow inside, the throat being yellow also, but decorated with seven raised, undulating, dark orange ridges. Flowers in Spring and the blooms last up to six weeks under suitable conditions.

LAELIA LOBATA. *Native of Brazil.*

A stout growing species of the second group with flattened fusiform pseudobulbs about 6 inches high, each surmounted with a single leathery leaf from 8 to 10 inches in length. The scapes carry from two to five flowers, each about 5 inches

across, with narrow sepals whose edges curve back, and broad petals with a wavy margin. Sepals and petals are rosy-lilac, while the lip, whose side lobes curl inwards and whose front lobe is spreading and wavy-edged, is a rich reddish-purple veined with lilac. It flowers in Winter, the blooms lasting three to four weeks. This species must have ample sunlight all the year round. It grows naturally upon the high, rocky, sea washed cliffs round Rio de Janiero, and is exposed to the full rays of the sun all the year round.

Syn. *L. Boothiana* and *Cattleya lobata*.

LAELIA MONOPHYLLA. *Native of Jamaica.*

The pigmy of the *Laelias*, with pseudobulbs about as thick as a dance pencil and from 3 to 5 inches tall. They are greyish-green, spotted with red. Leaves are solitary, leathery, deep green in colour, and narrow and blunted in shape. Flowers appear singly on a short scape, and are up to 2 inches in width. They are a vivid orange-scarlet in colour, the tip of the column being purple and eye-like over the short, yellow lip whose base sheaths the column. Flowers in late Spring. Treatment as for the second group.

LAELIA PERRINII. *Native of Brazil.*

Another species of the second group. The flattened pseudobulbs are stout and grow from 6 inches to 9 inches, topped with a single dark green leaf up to 9 inches in length. The erect scapes carry two to five flowers, each about 5 inches in width, and somewhat flattened in appearance. Sepals and petals are rosy-purple tipped with magenta. Lip has small, pale purple side lobes, front lobe pointed and reflexed, a rich purple in colour, the throat being blotched with yellow. Flowers in Autumn, blooms lasting about a fortnight.

Var. *alba*.—Pure white.

Var. *irrorata*.—Sepals and petals pale rose, lip white tipped with lilac, the disk pale yellow.

Var. *nivea*.—White, slightly tinged with yellow on the disk.

LAELIA PRAESTANS.

One of the varieties of *L. pumila* (q.v.).

LAELIA PUMILA. *Native of Brazil.*

A variable and dwarf growing species of the second group with thin, round pseudobulbs 3 to 5 inches long topped with a single oblong, green leaf about as long as the stems. Flowers are produced singly and are about 4 inches across. The lanceolate sepals and ovate inch-wide petals are rose-purple. The side lobes of the lip fold over, while the front lobe is spreading. The lip is rose-purple, the tip of the front lobe being maroon, while the throat is decorated with a number of parallel ridges. Flowers in Autumn. Lasts about a fortnight.

Var. *Dayana*.—Has purple border and dark veins.

Var. *praestans*.—Larger and brighter coloured.

Var. *praestans alba*.—Sepals and petals pure white, front of lip rich purple, disk yellow.

LAELIA PUMILA—Var. *Dayana*. *Native of Brazil*.

A lovely species of the second group with short, clustered, oblong, and somewhat club-shaped stems bearing a single oblong-elliptic, fleshy, dark green leaf. The scape carries a solitary 4-inch flower with rose-pink sepals and petals and a purple-magenta lip. The throat is creamy and has a number of purple ridges. Flowers in Autumn or Winter and lasts about three weeks.

Variety *alba*.—Sepals and petals white, lip white veined with dark purple.

LAELIA PURPURATA. *Native of Brazil*.

A fine species of the second group with large, stout, spindle-shaped pseudobulbs, somewhat compressed, and bearing a broad, leathery, dark green leaf about a foot long. Scape erect and carries from two to five flowers which reach a width of 8 inches. Sepals and petals narrow at the base and broad in the upper half. They are white tinged and streaked with reddish purple. The large lip has a broad spreading front lobe with a crinkly edge. It is rich purple veined with darker purple. The throat is yellow lined with purple. Flowers late Spring and early Summer and lasts about three weeks.

Var. *Brysiانا*.—Sepals and petals tinted with rose-lilac, lip deep purple.

Var. *Russelliana*.—Sepals and petals white tinged with lilac. Lip rose-lilac veined with purple.

Var. *Schroederi*.—Sepals and petals white, front of lip mauve bordered with white.

LAELIA RUBESCENS. *Native of South Mexico and Guatemala*.

A small growing species with flattened ovoid pseudobulbs rarely more than 2 inches tall, topped with a solitary oblong, leathery leaf about 4 inches in length. The slender, jointed scape grows from a sheath at the top of the bulb and is about a foot long, bearing from 4 to 7 flowers each about 2½ inches across. In the type species the nearly equal sepals and petals are white or pale lilac, while the lip which is short with a large front lobe is deep lilac blotched with purple in the throat. The pure beauty of this flower caused it to be named "Flor de Jesu" (Flower of Jesus) by the missionaries who followed the Spaniards in the conquest of Mexico. Flowers in Winter.

Variety *alba*. Has white flowers with a yellow blotch on the lip.

Variety *rosea*. Has mauve flowers with a maroon blotch on the lip.

This species and its varieties belong to the first group.

Syn. *L. acuminata* and *L. peduncularis*.

LAELIA SPECIOSA. *Native of Mexico*.

One of the first group and possibly the loveliest of all the *Laelias*. Pseudobulbs are clustered, egg-shaped, light green in colour, wrinkling with age. They carry a

solitary 6-inch leaf, leathery in substance and oblong in shape. Flowers are large (up to 7 inches across) and are produced either singly or in pairs. Sepals lanceolate, the petals being two and a half times as broad. Both are a soft rose-pink in colour. The lip is large and graceful, rose-lilac in colour, symmetrically lined and spotted with purple. Blooms late Spring or early Summer, the flowers coming from the young growths. The cultural procedure prescribed for the first group will suit, care being taken to give copious water in the Summer and keep almost dry in the Winter. Ample light is necessary at all times.

LAELIA SUPERBIENS. *Native of Guatemala.*

A strong-growing species of the first group, with tall, stout pseudobulbs carrying a pair of thick, leathery, light green leaves a foot or more in length. Flower spikes average about 5 feet long, but have been reported as tall as 12 feet, and carry from 10 to 20 large flowers from 6 to 7 inches across. Sepals and petals rich rose with a flush of lilac. Lip deep crimson-purple striped with yellow. Flowers in the Winter, and lasts as long as eight weeks under suitable conditions.

LAELIA TENEBROSA. *Native of Brazil.*

A species of the second group closely allied to *L. grandis*, of which it is often classified as a variety. Same mode of growth as *grandis*. Sepals and petals coppery-bronze. Lip purple, lighter at margins, darker at throat, and with a dark blotch on each side of the disk. Flowers in Spring.

LAELIA XANTHINA. *Native of Brazil.*

A pleasing species of the second group, with club-shaped pseudobulbs up to a foot tall. Leaves solitary, oblong and bluntish. Flower spikes carry up to six blooms, each 3½ inches wide. The oblong sepals and petals are undulated with the sides curled back. They are yellow with an olive-green flush. The lip is yellow with a deep border of white, the disk being veined with purple. Flowers in Summer and lasts three weeks.

LAELIO-CATTLEYA

The beauty of the *Laelias* and their affinity with the *Cattleyas* caused them to be one of the earliest subjects for experiments in hybridisation. The fact that a number of natural hybrids between the two genera were known encouraged the early experimenters to try their hands at the cross-fertilising of many *Cattleyas* with *Laelias*. This has resulted in the creation of many brilliant orchids whose form and colour surpasses both their parent species. Each year finds a further variety available for the orchid grower, and some of the latest hybrids have five or six generations of careful hybridisation on each side of their parentage.

The fact that these hybrids have been raised for generations under cultural conditions has resulted in their being particularly adapted for cultivation, and they are, therefore, much more easily grown and flowered than native species recently wrenched from their natural dwelling places and carried thousands of miles overseas, there to live under conditions far removed from those to which they have been accustomed for centuries past.

The *Cattleya* hybrids can safely be looked upon as among the easiest of all orchids to grow satisfactorily, and, as their flowers surpass in size and colouring almost all other flowers, any grower of orchids can be recommended to include in his collection a few plants at least of hybrid *Cattleyas*, *Laelio-Cattleyas* and *Brasso-Laelio-Cattleyas*.

Their cultural requirements are practically those recommended for *Cattleyas* species, but owing to their having been raised under hot-house conditions, glass-house treatment is more satisfactory for them than ordinary bushhouse culture, although they will do well enough in an open bushhouse in the warmer parts of Brisbane and particularly in the North.

For growers who sell flowers it is well to note that there is a constant demand for good blooms of the *Cattleya* type and they command good prices.

LIPARIS

This is a fairly large genus of orchids widely distributed throughout the globe. Most of them are epiphytes and a few are terrestrials. Very few are worth growing from a horticultural standpoint, and I have not seen any of the exotic species cultivated in Australia.

There are a few native species which I will mention briefly for the benefit of growers specialising in our indigenous orchids.

I have found *Liparis* does not greatly esteem cultivation but does best when grown after the manner of *Cymbidium*s.

LIPARIS BERNAYSII. *Native of North Queensland.*

Green stems up to 6 inches high. Leaves large and broad and pointed. Bears a long terminal spike densely clothed with pale creamy-yellow flowers.

LIPARIS COELOGYNOIDES. *Native of North Queensland.*

Stout stems swollen at the base into a pseudobulb and growing from a creeping rhizome. Leaves rigid. Slender terminal flower spikes bearing numerous small, whitish flowers about half an inch in width.

LIPARIS CUNEILABRIS. *Native of North Queensland.*

Stems grow from a rhizome, pseudobulbous in form, clothed with a few acute,

tapering leaves, the lower ones being more or less like sheathing scales. Flowers grow on loose racemes from the apex of the bulb. They are about an inch and a half across, bright yellow and scented.

LIPARIS HABENARINA. *Native of Northern New South Wales and North Queensland.*

Stems swollen into pseudobulbs and growing from a rhizome. Leaves tapering at both ends about 9 inches long and 1 inch wide in middle. Racemes erect, rigid and long, clothed with numerous small yellowish flowers.

LIPARIS REFLEXA. *Native of New South Wales and South Queensland.*

The best known species. Stems grow from a creeping rhizome, are swollen at the base, with long, somewhat flaccid, channelled leaves. The erect stems grow from the apex and carry from ten to twenty flowers which vary in colour from creamy-white to a greenish-yellow. When first open, the sepals and petals are spreading, but soon become reflexed. They are strongly scented with a rather sickly odour. When seen growing in a mass on a cliff face at Wilson's Peak they made a pleasing picture from a distance.

L U I S I A

A small genus of orchids belonging to the *Vanda* tribe, few of the species being of other than botanical interest. They are small plants with erect terete leaves of the type of *Vanda teres*. One Queensland species is found in Goode and Hammond Islands, and possibly other Torres Strait islands. They are best grown on blocks of tree fern with a pad of sphagnum moss under the roots. They like plenty of sunlight and ample water in the Summer time and a modicum in Winter. The best species are:—

LUISIA AMESIANA. *Native of Northern India.*

Flowers about an inch across, produced in a cluster in a terminal raceme. Sepals and petals pale yellow marked with purplish-brown spots and streaks externally. The heart-shaped lip is creamy with reddish-purple spots. Flowers in Summer.

LUISIA PSYCHE. *Native of Burma.*

Flowers green, with tongue-like petals. Lip roundish and covered with deep purple spots. They are produced in pairs.

LUISIA TERETIFOLIA. *Native of Torres Strait Islands.*

Short upright terete stems with cylindrical leaves. Raceme short, carrying a few flowers closely clustered together. Sepals oval-oblong. Petals longer, narrow-oblong. Dark green marked with purple. Flowers late Spring and Summer.

LUISIA VOLUCHRIS. *Native of Assam.*

Flowers produced singly from the bottom of the leaves. Sepals and petals cream coloured. The lip, which is said to resemble a chrysalis, is dark purplish brown. The flowers are described as resembling flying birds.

LYCASTE and ALLIED GENERA

A large and beautiful genus of epiphytcal type, some of whose species are numbered amongst the loveliest of orchids. They are easily cultivated for the most part, and should thrive well enough under ordinary open bushhouse treatment in Brisbane. One or two plants of *Lycaste Skinneri* should be included in every collection of orchids.

For compost a mixture of osmunda and sphagnum with a little good leaf-mould and one or two pieces of dry cow-dung suits them admirably. They can take all the water you like to give them during the Summer months and should never be allowed to dry out even in the Winter time. Weekly applications of weak liquid cow-manure during the Summer will result in increased vigour and greater florescence. Do not keep them too shaded as they like plenty of sunshine.

The following are the best species:—

LYCASTE AROMATICA. *Native of Mexico.*

Pseudobulbs 2 inches high, somewhat flattened and bearing two to four broad, lanceolate, plaited leaves. Flower spikes are produced in numbers from the bases of the bulbs and are about 4 inches long, erect and slender, and bear a single flower about 3 inches in width. Sepals and petals golden yellow, tinged with green on the outside. The lip is cylindrical, the front lobe being serrated at the tip. It is spotted on the inside with deep orange. Flowers in midsummer and lasts for about a month. This species is pleasantly but strongly scented.

LYCASTE DEPPEI. *Native of Mexico.*

Manner of growth very similar to the preceding species. Flowers about 4 inches across. Sepals green marked with horizontal bands of purplish-brown spots. Petals pure white and smaller than the sepals. Lip hood-shaped and yellow, marked with crimson dots. Flowers Spring and Summer and lasts five or six weeks.

LYCASTE MACROPHYLLA. *Native of Bolivia.*

A robust species with large, corrugated pseudobulbs and pointed, oval, plaited leaves. Flowers $3\frac{1}{2}$ inches across. Sepals oblong and madder-red in colour. The smaller petals are recurved at the tip and are pure white with a crimson blotch. The very small lip is white, spotted with pinkish crimson. Flowers in Winter.

LYCASTE SKINNERI. *Native of Guatemala.* (Illustrated).

A species that is one of the finest of the genus and at the same time is one of the loveliest of all orchids. It is a species of great variety, some varieties being much more attractive than others. It has another advantage in being one of the easiest of all orchids to cultivate.

It has oblong, flattened pseudobulbs from 3 to 5 inches high which bear two (sometimes three) broadly lanceolate, dark green, plaited leaves. The single-

flowered scapes spring from the base of the pseudobulbs. In the type species the large, oblong pointed sepals are bluish-white. In other forms they range from pale pink to deep mauve. The petals, which are much smaller, enfold the column, and are a deep rose-pink. The lip is white spotted with crimson. Flowers from Winter through to late Spring, the blooms lasting six to seven weeks.

Variety *alba*.—Pure white, the centre of the lip being tinged with yellow.

LYCASTE TRICOLOR. *Native of Guatemala.*

Pseudobulbs, compressed and ovate and about 2 inches high, bear two or three deep green, lanceolate leaves. Flower scapes grow from the bases of the pseudobulbs and bear a single flower about 3 inches across. Sepals are oblong and spreading, light brown in colour, and somewhat recurved. Petals, smaller and broader towards the tips, are rosy-pink. The lip is smaller still, and is deep pink with a toothed margin. Flowers in late Summer and Autumn and lasts five weeks.

BIFRENARIA TETRAGONA. *Native of Brazil.*

The pear-shaped, tetragonal pseudobulbs each bear a single large, oblong-lanceolate, plaited leaf. The short scapes carry two or three flowers with broadly-ovate, pointed, green sepals and petals lined and blotched with brown. The lip is hollow and fleshy, white blotched with crimson near the tip on the underneath, and purple inside. Flowers appear in Summer and last for two months. They are very sweetly scented.

MASDEVALLIA

This charming and interesting genus of terrestrial orchids has been rather neglected in Queensland, and in Australia generally. Probably the reasons are that the majority of our local growers are comparatively recent beginners at orchid culture and naturally have concentrated on building up their collections from the more generally known and grown genera. Moreover, in Australia the South American orchids are not so easily obtainable as the native species from the Eastern tropical countries. Even in the case of *Cattleyas* and *Laelias* it is very rarely that plants of the less known species are offered for sale. Again, shipping transport between South America and this land is somewhat unreliable and tardy, so that the risk of loss in transport of South American orchids is relatively high. However, quite a number of the big range of species of *Masdevallia* are well worth owning, and as they grow very freely and flower well under suitable conditions, any opportunity of obtaining a few plants should not be missed.

The plants grow in tufts and have bright green leaves which are strap-shaped in some species and spoon-shaped in others. The flowers are notable because the

three petals are inconspicuous and often hidden in a tube formed by the curling of the bases of the sepals. They are divided into three groups:—

The first, the dog-fish type, represented by *M. Chimaera*, is fantastic in the shape of the flowers; the second group, represented by *M. coccinea*, etc., is simple in form but brilliant in colouring; while the third group, which produces tiny jewel-like flowers, is remarkable both for beauty of form and for the colour of its blooms.

They grow naturally in the cooler parts of tropical Colombia and Peru, half-way up the rocky ranges which form the Andes. They are particularly suited for cool bushhouse cultivation in Australia, but in places where the temperature falls below about 50 degrees it is well to get them under glass in the colder seasons of the year. In fact, a temperature of 55 degrees throughout the year is ideal for them. In the warmer parts of Brisbane a bushhouse will probably suit them admirably throughout the year, but in the frosty parts they will need to be removed to the shelter of glass in the Winter. For compost a mixture of good fibrous peat, a little loam, leaf-mould, and well matured cow-dung, with some green sphagnum moss as a topping, will be productive of good results. They must never be allowed to dry out completely at the roots, and, although they should have considerably less water in the Winter than in the Summer, their roots must always be kept damp. On the other hand, they are very susceptible to black-spot, which is due to an over-abundance of water during the dull, cold days of Winter.

They are also much affected by thrips and red spider, so that a constant watch must be kept over them and regular sprayings of nicotine sulphate emulsion applied. They like plenty of light, but should be protected from the direct rays of the sun. As is the case with most orchids, and particularly those which like copious watering during the Summer, the drainage should be as perfect as possible, as stagnant water trapped in the pots will rot their roots.

Repotting should be done at the beginning of Spring (where necessary) in the case of the *Chimaera* and the small-flowering types, while the second group is best treated at the beginning of Autumn.

The following are the better known and more desirable species:—

MASDEVALLIA AMABILIS. *Native of Peru.*

A charming species of the second group which grows in dense tufts with erect, fleshy, green leaves on tapering, channelled stalks. The leaves are about 5 inches long and nearly an inch wide, the apex being recurved and pointed. The scape, which grows to about 9 inches, is erect and carries a single flower. The tube is about an inch long, a brilliant carmine on the top, and pink underneath. The dorsal sepal is erect, $\frac{1}{4}$ inch wide at the base, narrowing to a long pointed tail. The two lower sepals are about $1\frac{1}{2}$ inches long, joined together for about a third of their length, then tapering to tails. In colour the sepals are a bright, rosy carmine. It flowers in late Spring or early Summer, the blooms lasting about a fortnight.

Var. *lineata*.—Similar in form to the type, but the throat and the upper sepal are

orange-yellow, the upper sepal being marked with three narrow purple lines, while the lower sepals are streaked with three broad, curved lines of purple.

MASDEVALLIA BELLA. *Native of Colombia.*

A striking species of the dog-fish group. It grows in dense tufts, the leaves being about 8 inches long, wedge-shaped and channelled, narrowing at the base, which is sheathed with short bracts. The flower scapes are pendent, about 6 inches long, thin, wiry and twisted, and carry a single large, fantastic flower which is claimed to resemble an enormous spider. The three sepals are large, united at the bases by their edges, thus making an irregular triangle some two inches across. The apices taper away to tails about 4 inches in length, that of the upper one bending backwards, while the two lower ones bend forwards and cross. The lip is kidney-shaped and nearly an inch across, while the small petals are attached like ears to the column. In colour the sepals are ochre-yellow densely spotted with purplish-brown, while the tails are deep purplish-brown. The lip and the petals are white. On the underside the flower is a uniform, dull, deep purple. Flowers in Autumn, the blooms lasting up to three weeks.

MASDEVALLIA CARDERI. *Native of Colombia.*

One of the small species with flowers of bell-like shape and of rich yellow colour. The thin leaves are about 5 inches in length and less than an inch in breadth and are very slightly narrowed at the base. The scapes, pendent from the base of the stems, are about 3 inches long, and carry a single flower. The sepals are united practically their full length, and form a bell about an inch across and half an inch deep. They are yellow at their broadened base, then have a band of purple, then a space of white, after which they spread into one-inch bright yellow tails. The inside of the sepalic bell is hairy, the petals and the lip small and white. They flower in midsummer and last a couple of weeks in perfection.

MASDEVALLIA CAUDATA. *Native of Central America.*

One of the loveliest of the smaller varieties. Its ovate leaves rarely exceed 4 inches in length and an inch in width, the bases being narrowed into a stalk. The flower scape reaches a height of five inches, and bears a solitary bloom which is about an inch and a half in width without counting the 2½-inch tails which terminate the sepals. As is usual with the genus the petals and lip are insignificant. The sepals are united at the base, forming a sort of saucer. They then spread, the upper one being the largest, and finish with the long tails referred to above. The upper sepal is yellowish-red freely dotted with deep red spots and lined with red nerves. The lower petals are a deep rose-pink dotted plentifully with red. The tails are green at the base and topped with yellow. The brilliance of its colouring makes this species one of the most popular of the genus, and it is well worth including in any collection. Flowers in Spring, the blooms lasting from two to five weeks, according to weather conditions.

Syn. *M. Shuttleworthii.*

MASDEVALLIA CHESTERTONII. *Native of New Granada.*

One of the finest of the first type, with tufted leaves, about 6 inches long by an inch in width, broad in the middle, pointed at the tip, channelled, dull green in colour, and with only a suggestion of a stalk. The sheathed scapes are pendulous. Each bears a single singular flower which is about $2\frac{1}{2}$ inches in width with spreading ovate sepals about an inch long terminating in a curved tail of the same length. They are yellowish-green in colour, spotted and streaked with purple. The club-shaped petals are small and are yellow tipped with black. The reniform, concave lip is $\frac{3}{4}$ inch in width, and is a palish-red veined with a deeper shade. Flowers Spring and Summer, the blooms lasting for about three weeks.

MASDEVALLIA CHIMAERA. *Native of Colombia.*

A most striking and probably one of the most fantastic of all orchids—which has given it its name of “The Dogfish Orchid.” “Chimaera” in Greek mythology was the son of Typhon and Echidna, and had the body of a goat, the head of a lion and the tail of a dragon. The plant has leaves up to a foot long, an inch and a half in width, dull green in colour, very slightly channelled, and terminating in inch-long stalks. The solitary flowered scape is up to 9 inches in length. The flowers have three triangular sepals joined at the bases, forming a shallow cup. They narrow into long, thin, straight tails about $4\frac{1}{2}$ inches in length. The inner surface is creamy yellow covered with large spots and blotches of purple-brown. It is thickly covered with soft, light brown hairs. Petals small. Lip small and pouch-like, slightly dentated at the edges and creamy-white in colour. Flowers late Spring and lasts three to five weeks. Occasionally this species produces a succession of flowers from the one scape.

Var. *Backhouseana*.—Darker in colour.

Var. *Wallisii*.—Tails shorter, colour lighter.

MASDEVALLIA COCCINEA. *Native of Colombia.*

This little plant of the second group grows in the Province of Pamplona on the western slopes of the Andes. It grows in tufts with leathery, strap-shaped leaves about 5 inches in length, round at the apex, and tapering to a stalk at the base. The scapes are about a foot in length and are topped with a single bright scarlet flower with a short, curved tube, which, like the upper sepals, is a bright rosy pink. Flowers in Spring, the blooms lasting some weeks in perfection. There are many varieties of this species, and all those varieties once classed as *M. Harryana* are now treated as varieties of *M. coccinea*. The principal of these are:—

- (1) *Coccinea* var. *alba maculata*.—Flowers white tipped with pink, the apices of the sepals being spotted, and the mouth of the throat marked with four short magenta stripes. (Syn. *Harryana alba maculata*.)
- (2) *Coccinea* var. *Armeniaca*.—Flowers larger, deep apricot, marked with a yellow eye. (Syn. *Harryana Armeniaca*.)
- (3) *Coccinea* var. *atrosanguinea*.—Flowers large, crimson tinted and magenta.

- (4) Var. *coerulescens*.—The largest flowered species, magenta-crimson flushed with azure.
- (5) Var. *Denisoniana*.—A very fine variety with large blood-red flowers, the sepals being tinted with magenta.
- (6) Var. *miniata*.—Vermilion flushed with scarlet.
- (7) Var. *sanguinea*.—Flowers crimson flushed with orange.
- (8) Var. *splendens*.—Flowers deep mauve veined with crimson.

MASDEVALLIA DAVISII. *Native of Peru.*

Another brilliantly coloured species of the second group. Grows in tufts with thick leathery leaves about 8 inches long, $\frac{3}{4}$ of an inch wide, blunted at the end and tapering to a stalk-like base. The erect scapes grow to a foot in length, and bear a single flower of a bright, canary-yellow colour. The sepals are united at the base, forming a tube, the upper one decreasing to a narrow, pointed tail. The lower sepals are about $2\frac{1}{2}$ inches long, and join together from about the middle to the base, and are tipped with $\frac{1}{4}$ inch tails. Flowers in Summer and lasts for about five weeks.

MASDEVALLIA EPHIPIUM. *Native of Colombia.*

A fantastic species of the first group, found on the Andes in the district of Antioquia. Grows in a tuft of erect, fleshy, shining green leaves from 6 to 9 inches in length, an inch and a half wide, curved inwards at the top and narrowing to a stalk 2 inches long. The solitary flowered scape is about a foot high, stout and angular. The flower is about 4 inches in width and up to 9 inches in length, including the tails. The upper sepal is small, concave and round, yellow and brown in colour, and terminated with a long, reflexed, yellow tail. The lower sepals are united, reddish-brown in colour, and ending in long, curving tails. Flowers in Spring and lasts well.

MASDEVALLIA HARRYANA. See *M. coccinea*.

MASDEVALLIA MACRURA. *Native of Colombia.*

A stout growing species of the first group. Leaves thick, fleshy, shining green, up to a foot in length and a couple of inches wide, tapering to a stalk-like base about 2 inches long. The solitary-flowered scape is a foot tall. Flowers up to 2 inches long. The sepals are united at the base forming a cup, then spreading vertically, the upper sepal being about 5 inches long, gradually narrowing to a point. The lower ones up to 6 inches long, terminating in tails. They are tawny-yellow in colour spotted with purple; the cup is purplish outside, paler inside. Flowers in Winter and lasts nearly two months under satisfactory conditions.

MASDEVALLIA MILITARIS. *Native of Colombia.*

Probably the most popular species. It belongs to the brilliant flowered second group. Leaves about 6 inches long, base stalked, rounded at top, about $1\frac{1}{2}$ inches

wide and dark green in colour. Scapes up to a foot long, bearing a solitary flower. The sepals form a short tube, the upper one being about $1\frac{1}{2}$ inches long and tailed. The lower ones are joined about halfway down, are sharp pointed and broadly ovate in shape. They are fleshy in substance, and orange-red in colour, decorated with five or six broad crimson lines. Flowers in Spring and lasts about six weeks. This is a very variable species, the chief varieties being:—

- (1) *Aurantica*.—Flowers orange-yellow.
- (2) *Boddaertii*.—Rose-tinted, yellow underneath.
- (3) *Eckhautii*.—Rich crimson.
- (4) *Marshalliana*.—Yellow.
- (5) *Stobartiana*.—Mauve tinted.

MASDEVALLIA MOOREANA. *Native of Venezuela.*

This species is also a robust one much akin to *M. macrura*. The stalked bases of the leaves are noded and broaden into thick, fleshy, dark green leaves up to about 8 inches long and $1\frac{1}{2}$ inches wide, the bottom half being spotted with purple, while the base is sheathed. The erect, purplish scapes are only 4 inches long and carry a single flower which lies horizontally across the top. The flowers are cup-shaped in the centre, the sepals being continued into tails. In colour they are a flat white, the tube being flecked with purple and the lower sepals blotched with magenta, the tails being a lighter shade of the same colour. The small petals are white, while the lip is dark purple and hairy. Flowers in Winter and lasts well.

MASDEVALLIA RACEMOSA. *Native of Colombia.*

A very attractive and distinctive species. It grows from long, creeping stems. The leaves, rising on slender stems, are spoon-shaped, about 4 inches long by $\frac{3}{4}$ inch wide, and are fleshy in substance and dark green in colour. The flowers are borne on long, branching racemes which carry up to twenty blooms. The flowers are about an inch across and are a brilliant orange lined with dark red. This species requires cool treatment at all times, and does best in a basket. Flowers in early Spring and lasts for about four weeks.

MASDEVALLIA ROSEA. *Native of Peru.*

A pretty, free-flowering species. Leaves are semi-erect and are carried on slender 2-inch stems. The leaf is spoon-shaped and dark green in colour. The flowers are borne singly on slender scapes. They are a brilliant pink tinged with purple. They have a short, narrow tube formed by the bases of the sepals which are extended into short tails. Although small growing, it flowers prolifically when properly established. It requires rather warmer treatment than most of the *Masdevallias*, and should be grown in a glasshouse. Flowers in Winter, the blooms lasting for six or seven weeks.

MASDEVALLIA TOVARENSIS. *Native of Colombia.*

An attractive species with erect, brittle leaves, fleshy in substance and glossy

green in colour, and about 5 inches long and $\frac{3}{4}$ inch wide, growing upon 2-inch stalks. Sheathed in green. The erect scape is about 5 inches long and carries from one to four pure white, sweetly scented blooms, typically tailed. Flowers in Winter and lasts for about two months. This plant also requires warm treatment.

MASDEVALLIA VEITCHIANA. *Native of Peru.*

One of the most brilliant species, and belonging to the second group. Leaves 6 to 8 inches long and about an inch in width. The apex is sharp pointed, but the leaves are broadest towards the top and narrow to a stalklike base which is partly sheathed. The solitary flowers are borne on an erect scape about a foot tall. The united sepals form a shallow cup, their extremities being continued into short tails. They are a bright cinnabar-red, blotched with bright violet-purple on the inner surface of the lower sepals. Flowers in Autumn (occasionally in Spring), the blooms lasting many weeks.

Var. *grandiflora*.—Flowers much larger and more brilliantly coloured.

There are many more species of this genus well worth cultivating, but those described above are the best of them. There are also quite a number of hybrids available, some of which are exquisitely beautiful.

MAXILLARIA

This is a genus of epiphytcal orchids closely allied to the *Lycastes*, many species of which were formerly called *Maxillarias*.

They are easily grown and, in places where the minimum Winter temperature does not fall much below fifty degrees, they will grow quite well in an ordinary bushhouse—otherwise glasshouse treatment is necessary in the Winter months. They do best when grown in pots in a compost of four parts fibrous peat, two parts polypodium fibre, one part well-chopped sphagnum moss, and one part dried cow-dung, the whole of the ingredients being well mixed. During the growing period they need liberal supplies of water, but when growth has been completed the supply of moisture should be diminished considerably, though they should never be allowed to become completely dry. Daily waterings in Summer and once a week in Winter on clear, bright, sunny mornings should suit. They like plenty of light and fresh air, but should be protected from bright sunshine and draughts. Most species flower freely when established, and the blooms are attractive in form and colouring. There are many species, but a large number of these are of botanical rather than horticultural interest. The species quoted here are the best of the genus.

MAXILLARIA GRANDIFLORA. *Native of Peru.*

This handsome species has ovate, flattened pseudobulbs which bear a single broad,

strap-shaped, curving leaf up to about a foot in length. The radical scapes are about 6 inches high and carry a single, fragrant, milk-white flower, whose ovate, spreading sepals are about half as long again as the petals. The three-lobed lip has its front lobe pouched and is yellow in colour, the lateral lobes being tinged with red along the edges. Flowers in late Autumn and early Winter and lasts about five weeks.

MAXILLARIA LUTEO-ALBA. *Native of Colombia.*

A robust growing, free flowering species with ovate, compressed pseudobulbs about 2½ inches long and having one leaf. Leaves broad and blunted, up to 18 inches long, dark green in colour, the base tapering into a stalk. Scapes radical, sheathed with bracts, and about 6 inches long. They carry a single flower about 6 inches wide. Sepals about 3 inches long, brown underneath, creamy-white at the base on the inside, the rest being tawny-yellow. The upper sepal is erect, the two lower ones drooping. The petals are erect and slope outwards. They are about half the length of the sepals, and are white at the base, then brown and tipped with yellow. The middle lobe of the lip is recurved and covered with fine hairs, and is yellow with a white margin. The side lobes are yellow, striped with purple. Flowers Winter and Spring, lasting a month in perfection.

MAXILLARIA NIGRESCENS. *Native of Colombia.*

A species with strikingly coloured flowers. Pseudobulbs oval, greenish-black and flattened. Leaves single, strap-shaped, pointed at apex, from 12 to 16 inches long and 1½ inches wide. Flower scapes, about 4 inches long, grow from the bases of the pseudobulbs and carry a solitary flower about 2 inches across. In form the flowers resemble those of *M. grandiflora*, but are the colour of port-wine, with a flush of dull purple on the upper portion of the segments. Flowers in Winter and lasts well.

MAXILLARIA PICTA. *Native of Brazil.*

A very free flowering species with typical pseudobulbs, bearing one (occasionally two) strap-shaped, pointed leaves up to a foot in length. Flowers produced singly on basal scapes, a number of which appear at the same time from each pseudobulb. They are about 2 inches across. Sepals and petals creamy-yellow on the outside, and deep orange on the inside, streaked and spotted with purple or dark brown. Petals curl inwards. Lip white, spotted purple, the column being entirely purple. Flowers in the Winter time and lasts well. Likes rather warmer treatment than the other species.

MAXILLARIA SANDERIANA. *Native of Peru.*

This species is probably the best of all the *Maxillarias*. Its ovate, compressed pseudobulbs are surmounted by one (occasionally two) oblong, pointed, bright green leaves about 9 inches long. The flower scape is drooping and bears a single flower about 5 inches in width. The ovate sepals are about 2 inches broad, and are spreading, the upper one being concave. The petals are two-thirds the length

of the sepals. The middle lobe of the lip is concave, the side lobes erect. Flowers white, the bases of the lip and segments being deep crimson, and the petals spotted with the same colour. Flowers late Winter and early Spring. Lasts about a month.

MAXILLARIA VENUSTA. Native of Colombia.

A robust growing species with typical pseudobulbs, each with one broad-oblong, recurved and sharply pointed leaf a foot or more in length and glossy, light green in colour. Scapes basal, curving upwards, clothed with reddish bracts and bearing a single flower which is somewhat inclined to nod. These flowers are large, about 6 inches across, and their sepals are broad at the base and tapering to a point. The upper one is concave, while the lower ones are undulated and slightly curved. Petals somewhat shorter than the sepals. The middle lobe of the lip is triangular, recurved, yellow with two crimson spots, while the erect side lobes are red along the edges. The sepals and petals are pure, shining white. Flowers in Winter and Spring. Blossoms last from three to five weeks.

MICROSTYLIS

A fairly numerous genus of terrestrial orchids, some few of whose species are worthy of cultivation for the beauty of their foliage, their flowers being insignificant. The fleshy pseudobulbs die away within a year of maturing and new growths spring from their bases as soon as they have flowered or developed fully. Like *Physureae* they require moist, warm conditions at all times, so that a glasshouse is essential and heat desirable in the Winter months. A compost of peat broken into small pieces with a little chopped sphagnum moss and osmunda fibre with some leaf-mould and powdered brick will suit them. They should be grown in the smallest pots compatible with the size of the plant. The compost and the atmosphere about them must be kept moist at all times. The following are the best of these:—

MICROSTYLIS CALOPHYLIA. Native of Malaya.

A prettily variegated species. Leaves ovate, narrowed to a point at the tip, pale, yellowish-green with a patch of deep brown in the centre, with numerous lines of the brown crossing the yellow part. Flowers, borne on an erect spike, are tiny and yellow.

MICROSTYLIS CHLOROPHRYS. Native of Borneo.

A handsome species with leaves 4 inches long and two inches wide narrowed to a point, the edges being waved. Lower part and stems purple. Middle of leaf

glossy sepia-brown with a marginal band of greyish-green. Flowers purple and very small.

MICROSTYLIS DISCOLOR. *Native of Ceylon.*

A lovely species with clustered stems about 2 inches long, which are enclosed in the bases of the leaves. Leaves about 4 inches long, ovate, plaited and deep, glossy crimson-purple in colour with a wavy pale green margin. The small flowers are yellow and shining, and contrast well with the leaf colouring.

MICROSTYLIS METALLICA. *Native of Borneo.*

A beautiful little species with a cylindrical bulb bearing half-a-dozen oblong, pointed leaves about 2 inches long and 1 inch wide. These are rosy-crimson underneath and a metallic blackish-purple above. Flowers small and purple.

MILTONIA

A genus of beautiful epiphytical orchids, all the species of which can be numbered amongst the choicest of orchids. In Australia the species are rarely met (with one or two exceptions) and the plants most often seen here are the result of the hybridists' work. Even the hybrids present considerable difficulty to growers in Queensland, and most of the plants imported from time to time have died. However, we occasionally see a plant of *M. Bleuana* (*vexillaria x Roezlii*) which has survived our Summer, and its beauty inspires a desire to see more of them. In the South a few species are seen, particularly in Melbourne and Adelaide. These are generally *M. vexillaria*, *M. Clowesii*, and occasionally *M. Warscewiczii*. Possibly in the near future we may be able to obtain supplies of the species from South America, and so enable us to make further efforts to grow plants of this lovely genus.

Miltonias either grow from stout creeping rhizomes, in which case the pseudobulbs grow about an inch apart, or in clusters. Each pseudobulb has from four to eight narrow, strap-shaped, keeled leaves, of which two grow from the apex of the pseudobulb, while the rest spring from the bottom, their bases sheathing the pseudobulb in its early stages.

The plants grow naturally on the slopes and the high peaks of the Andes in Colombia, where they have been found as high up as 16,000 feet above sea level, on the mountains of Costa Rica at an elevation of 8,000 feet, and on the higher parts of the Organ Mountains, the Sierra de Mar, and the Sierra Tabatinga in Brazil, and again on the Andes in Peru. With such variations in the latitude, longitude and altitude of their natural haunts, it is obvious that they will need somewhat varying conditions under cultural treatment. This will be dealt with as each species is referred to later on.

The best potting medium is osmunda fibre, but a reasonably open compost of todea, peat, or polypodium will serve. The drainage must be good to allow the exit of surplus moisture from the copious waterings necessary. During the growing period liberal supplies of water must be applied to the roots, but care must be exercised to see that no moisture gets into the young growths, as they are prone to damping off. Once rot has started in a plant it is very difficult to save its life, as the disease spreads from bulb to bulb with great rapidity. Only ruthless use of the knife will be of avail. *Miltonias* will not flower unless the recently grown pseudobulbs have ripened thoroughly, and, to enable them to do this, water must be reduced considerably as soon as maturity is reached. On the other hand the pseudobulbs must not be allowed to shrivel or lose condition, or again it will be found hard to restore the plant to health. It will be seen, therefore, that the successful cultivation of this genus requires constant vigilance and thought. But so beautiful are the flowers that the extra care necessary to grow them is well worth while. One point that should be remembered is that in their natural state the leaves lose their original, light green colour as they mature, and acquire a rather yellowish appearance. Therefore, if your plants' leaves suddenly show a tendency in this way, it is not necessarily a sign of ill-health, but rather that the plant is following its natural course.

Hybrid *Miltonias*, of which there are numerous varieties now, having been brought up under artificial conditions, are rather easier to grow than the species, newly imported, which have not only to be acclimatised but accustomed to artificial nutrition and conditions. But, when species are properly established, they are usually hardier and more prolific flowerers than the hybrids—for it is the tendency of all mixed breeds to produce and often increase the weaknesses of the parents as well as to produce their good qualities.

Miltonias like plenty of light, but cannot sustain much exposure to direct sun rays. The following are the best species:—

MILTONIA CANDIDA. *Native of Brazil.*

One of the hardiest species, with clustered, ovate, slightly compressed pseudobulbs narrowing towards the apex with two long leaves at the top, each about a foot long and an inch and a half wide. The leaves at the base are shorter and have broad sheaths. The scape, which grows from inside the sheath of one of the basal leaves, is 12 inches or longer, and carries up to eight flowers each about 2½ inches wide. The spreading sepals and petals are reddish-brown and lightly barred and spotted with yellow. The lip is scoop-shaped and has a wavy margin. It varies from white to cream at different stages of development. Flowers in Autumn, the blooms lasting about a month. This plant can be grown in a cool bushhouse throughout the Summer, but should be moved under glass in Winter. Grows best in a pot.

MILTONIA CLOWESII. *Native of Brazil.*

Another strong growing species rather similar to *M. candida*. Pseudobulbs and leaves similar to those of the previously mentioned species. The erect scapes carry

many flowers, each being up to 3 inches across. Sepals and petals chestnut brown blotched with yellow. The heart-shaped lip is constricted in the middle and pointed at the apex. It is reddish-purple in the lower part and white in front. Flowers in late Autumn or Winter. Treatment as for *candida*.

MILTONIA CUNEATA. *Native of Brazil.*

A free flowering species, one of the largest of the *Miltonias*. Pseudobulbs clustered, ovate, slightly compressed and about 4 inches high. The leaves are dark green in colour (unusual with *Miltonias*), and are strap-shaped, stout and about a foot long and 1½ inches wide. Scape erect and carries four to eight flowers, which are from 3 to 4 inches wide. The sepals and petals are undulated and narrow from the middle to a sharp reflexed point. They are chocolate-brown in colour, with a few bars of yellowish-green and tipped with the same tonings. Lip 1½ inches long and 1 inch wide, creamy-white, with a crest of two parallel lines spotted with rose-purple. Flowers in late Summer or early Autumn and lasts about a month. Does best in a pot. Give ample light and moisture. Likes rather warmer conditions than most of the *Miltonias*.

MILTONIA PHALAENOPSIS. *Native of Colombia.*

A beautiful but delicate species with small, clustered, ovate, slightly compressed pseudobulbs, each about an inch in height. Leaves pale green, narrow and grass-like, from 8 to 12 inches in length. Scapes erect, about a foot tall and bearing from two to four flattish flowers. Sepals oblong, pointed, and an inch long. Petals broader and longer. Lip, large and flat, about an inch wide at the base and nearly two inches across at the apex. Sepals and petals white. Lip white, blotched and sheathed with crimson. Flowers in Spring and remains in good order for a month.

This species requires glasshouse treatment throughout the year and should be hung close to the glass. Ample water is necessary in Summer, and even in Winter it should be kept moist. Thrips and red spider are partial to this species.

MILTONIA REGNELLII. *Native of Brazil.*

A lovely species with narrow flat pseudobulbs with apical leaves a foot long and 1½ inches across, the basal sheathing leaves being much shorter. The scape bears a number of flowers each about 2 inches wide; the spreading sepals and petals are recurved at the tips and are white in colour. The lip is rosy-purple, darkly veined, and has a prominent crest of three yellow ridges. Flowers in Spring and lasts about a month. Treatment as for *M. cuneata*.

MILTONIA ROEZZII. *Native of Colombia.*

One of the finest of all the *Miltonias*, with clustered, rather compressed, ovate pseudobulbs between 1 and 2 inches high and sheathed in the bases of the side leaves. The apex carries a single leaf about a foot high, and less than an inch across, sharply pointed, thin of texture and pale green in colour. Scapes carry

two to four flat flowers, each about 3 inches wide. The sepals and petals are oblong and pointed, pure white blotched with purple at the base. The lip is two-lobed, 2 inches across at the apex, pure white in colour with a tinge of purple and yellow at the crest. This species is one of the most difficult to grow satisfactorily, it having a tendency to damp off upon the slightest provocation, and yet it needs copious watering at all times. It is also a favourite item on the menu of thrips and red spider, for which a constant watch must be kept. It requires plenty of light and fresh air, but not direct sunshine. When in good condition it often flowers twice in the year, in Winter and Spring, and the flowers last up to five weeks.

Var. *album*.—No purple.

Var. *rubrum*.—Has more purple than the type.

Syn. *Odontoglossum Roezlii*.

MILTONIA SCHROEDERIANA. *Native of Costa Rica.*

This species is both fragrant and beautiful and has ovoid-oblong pseudobulbs with a pair of narrow 6-inch leaves at the apex. Racemes bear six to nine flowers nearly 2½ inches across, with chestnut-brown sepals and petals tipped and marked with yellow and with curling edges. Lip is rosy-purple at the base and white in front. Flowers in Spring and lasts about a month. Cultural treatment as for *M. cuneata*.

MILTONIA SPECTABILIS. *Native of Brazil.* (Illustrated.)

A very variable species, most of the varieties being of outstanding beauty. The pseudobulbs grow an inch apart on a stout rhizome. They are oblong in shape, very much flattened and from 1 to 3 inches tall, yellowish in colour, and bear a pair of apical leaves which vary from 4 to 12 inches in length and are apple-green in colour. Scapes are erect and sheathed, and carry a single flower about 4 inches across. The pure white sepals and petals are about 2 inches long and nearly an inch across—they develop a creamy tinge as they mature. The lip, as long as the segments, is purplish-crimson with dark veins, the crest being ridged. Flowers in Autumn and lasts about a month. Treatment as for var. *Moreliana*.

Var. *bicolor*.—Flowers white and rosy-purple.

Var. *radious*.—Lip white with radiating purple lines from the crest.

Var. *rosea*.—Pseudobulbs narrower and longer than the type, sepals and petals rose tinted with rosy bands on the lip.

Var. *virginalis*.—Scapes longer, flowers larger, lip rich crimson.

MILTONIA SPECTABILIS var. MORELIANA. *Native of Brazil.*

A fine variety of *M. spectabilis* (q.v.). Pseudobulbs ovate and much compressed, 2 to 3 inches long, apple-green in colour when young, turning bright yellow with age. Apical leaves about 6 inches long and strap-shaped, the basal ones being shorter. The pseudobulbs grow from a stout, creeping rhizome and are about 1½ inches apart. The flower scape is some 6 inches high and carries a single flower from 2 inches to 4½ inches across. Sepals and petals deep wine-purple.

Lip, nearly square, light purple veined with deep purple. Flowers in early Summer and lasts from six to seven weeks under good conditions.

This species does best in a shallow basket. A little, rich leaf-mould may be added to the compost. In planting use only a thin layer of compost, which should be pressed firmly about the roots. Give them plenty of light and copious water in the growing season. They will do well enough in a bushhouse during the Summer, but require more warmth in Winter, when glasshouse treatment will be desirable.

MILTONIA VEXILLARIA. *Native of Colombia.*

The most popular of all the *Miltonia* species and indeed one of the most beautiful of orchids. It is a bad traveller, hence it is difficult to obtain healthy specimens. Once established, however, it is the easiest of the *Miltonias* to grow, providing care is taken to keep it free of thrips. Pseudobulbs, oblong and rather narrow, and about 2 inches tall, bear a pair of narrow, pointed, pale green leaves, each about 10 inches long. Scapes erect and carry from two to seven large flowers 4 inches or more across. Sepals and petals are smallish, but a beautiful bright rose in colour. The crowning glory of the flower is the labellum, which is very large and flat, bilobed in front, rich rose, shading to white at the base, and streaked with yellow and red. Flowers in late Spring and early Summer. This plant will grow in an ordinary bushhouse all the year round in the warmer parts of Brisbane and the North. In cooler parts it will be desirable to transfer it to the glasshouse during the winter. Plenty of water while growth is vigorous, but discretion must be used in the resting period.

Syn. *Odontoglossum vexillaria*.

Var. *Hilliiana*.—Lip spotted with purple and margined with rose.

Var. *leucoglossa*.—Lip white.

Var. *rubilla*.—Pseudobulbs and leaves smaller, the flowers also being smaller and bright pink, and produced in Autumn.

Var. *superba*.—Darker in colour than the type, lip crimson with three broad, radiating lines of white.

MILTONIA WARSCEWICZII. *Native of Peru.*

A very distinctive and handsome species with clustered pseudobulbs, 5 inches tall and 1 inch across, very compressed and green, with a single apical leaf and about six basal leaves. The strap-shaped leaves are from 6 to 9 inches long and 1½ inches across, and bright green in colour. The scape is long, wiry, arching and branching, and carries as many as 40 flowers, each about 2 inches in width. The sepals and petals have their margins recurved near the base, are wavy and reddish-brown with yellow tips. The lip is nearly round, bilobed in front. It is rose-purple, blotched in the centre with yellowish-brown, with a broad band of white round the edges. Flowers in Summer and Autumn, the blooms lasting three weeks or more. Treatment as for *M. candida*.

Var. *Weltoni*.—Flowers smaller. Purple of the lip cut off sharply half-way to the apex, the rest being white. Blotch olive-brown.

Var. *xanthini*.—Sepals and petals yellow. Lip light yellow with white border.

MORMODES

A small genus of epiphytcal plants, only about two of whose species are considered to be worth cultivating. They are bulky plants with long, curving leaves of a handsome, dark green colour. They are rarely seen, but as there is always a possibility that a grower may land a specimen or two in a shipment of orchids from Mexico, I am including them in this table.

They should be potted in a fibrous material such as staghorn peat, osmunda or polypodium with the addition of a few lumps of well dried cow-dung. The pots should be two-thirds filled with broken crocks and wood-charcoal, as drainage must be perfect to cope with the large supplies of water which must be given them *after growth has well commenced*. In the early stages of growth the matured pseudobulbs supply the young shoots with all the moisture and nourishment they require. They demand warm conditions and the temperature of their surroundings should not be allowed to fall below 55 degrees even in the ripening period. After flowering the plants should be placed in a dry part of the house and given only sufficient water to prevent shrivelling. The following species are worth growing if the opportunity presents itself.

MORMODES LUXATUM. *Native of Mexico.*

Pseudobulbs 4 to 6 inches high, thick and rounded at the base, tapering towards the top. Leaves, four to six in number, 1 to 2 feet long, lance-shaped and plaited, and bluish-green in colour. Flowers are produced on long, arching racemes which grow from the nodes of the pseudobulbs. Flowers, which are numerous, are each about three inches in diameter and are lemon-yellow, the lip being a deeper yellow with a brown streak down the middle. The flowers have the labellum uppermost.

Var. *eburneum*.—Flowers up to 4 inches across, creamy-white in colour and very fragrant.

Var. *punctata*.—Flowers white, sepals and petals spotted thickly with red on the inside.

MORMODES PARDINUM. *Native of Mexico.*

Pseudobulbs 4 to 7 inches long. Leaves dark green, lanceolate and membraneous. Scapes up to 18 inches long, crowned with large flowers with ovate, pointed sepals and petals whose tips converge upwards. Lip three-lobed, the side lobes being small and curved. Bright yellow in colour, richly spotted with brownish-red spots. Flowers in Summer and lasts about three weeks.

There are about a dozen other species.

NANODES

All the species of this genus are now included under *Epidendrum*. The most remarkable species is *medusae*, described under the heading *Epidendrum medusae* (q.v.).

OBERONIA

A small genus of epiphytical orchids of botanical interest only, included in this table merely for the reason that a couple of species are found in Queensland and may therefore be of some interest to those collectors who specialise in local genera. These are:—

OBERONIA IRIDIFOLIA. *Native of Northern New South Wales and Queensland.*

This is the largest of the local species and is found in the coastal districts of Queensland and Northern New South Wales. As the name would imply, the plant somewhat resembles in leaf-form the ordinary garden or flag iris. The leaves are from 3 to 9 inches in length and pale green in colour, sometimes inclined to be yellowish. Racemes about as long or a little longer than the leaves and crowded with small, pale green flowers. The labellum is fringed. Flowers in Spring.

OBERONIA PALMICOLA. *Native of Australia.*

A very small plant similar in form and habit to the first, the leaves rarely exceeding 2 inches in length. The scapes are comparatively long and very slender. Flowers numerous, greenish tinged with brown. Flowers in Summer. This plant has the same range as *O. iridifolia*, but is more commonly (but not only) found on palm trees.

OBERONIA TITANIA. *Native of Northern New South Wales.*

Named by Lindley but probably identical with *O. palmicola*, which was named by F. von Muller. Small and apparently similar in all respects to *O. palmicola*. Flowers (pale green) appear in Autumn.

Ordinary bushhouse treatment will serve for these plants when potted in staghorn peat. They like plenty of sunlight and plenty of water in the summer, but very little in the Winter period. The ideal way to grow them is to remove a slab of the trunk or branch of the tree upon which they are growing and hang it in a sunny place. Unless the grower is particularly interested in Queensland orchids it is better to leave them in their natural dwelling place.

ODONTIODA

The hybridists have evolved a beautiful new genus by crossing species of *Cochlioda* with those of *Odontoglossum* and plants derived from these crosses are called *Odontiodas*. The *Cochlioda* species most used are *C. Noezliana*, *C. Vuylstekae* and *C. vulcanica*, while *Odontoglossums* *Cooksoniae*, *Harryman*, *crispum* and *eximium* have been most favoured.

Treatment as prescribed for *Odontoglossums* will suit them, but the *Odontiodas* are regarded as being more amenable to cultural conditions than the natural species. There are now hybrids of three or four generations available.

ODONTOGLOSSUM

Practically every species in the genus of epiphytical orchids known as *Odontoglossum* is a thing of beauty. Unfortunately the cultivation of plants of this genus has presented much difficulty in Australia, and the problem of how to grow them satisfactorily has not yet been solved. From time to time shipments of species and hybrids have been imported by or for growers. Occasionally a plant lives for a year or two and sometimes even delights its owner by flowering. Almost invariably, however, the plants either fail to grow or else gradually go back and finally perish. Experiments made comparatively recently at growing these plants out of doors in and near Sydney have given some signs of possible success, but it is really too soon to say more than that growing *Odontoglossums* out of doors offers the best chance of satisfactory results.

The *Odontoglossums* grow naturally in elevations which range between 5,000 feet and 12,000 feet above sea-level, and are all found in that stretch of America from Southern Mexico down to Bolivia, roughly between the latitudes of 20° N. and 15° S. This distribution covers a distance of about 2,000 miles along a comparatively narrow strip of country on the Pacific side of the American continent. Throughout the whole of this area the climate belongs to the class Aw in Koppens classification of climates. Lands with this climate are of tropical temperature with very little difference between Winter and Summer thermometer registrations—that is, they are lands of perpetual Summer. Their particular distinction from other tropical lands is that in the Winter their average rainfall is less than 2.4 inches for at least one month—but their Summer rainfall is so great that even though they have this dry spell in the Winter months, the ground remains damp throughout the year, so that the atmosphere always contains a high percentage of moisture.

Although the latitudes in which *Odontoglossums* grow are all under the tropical

belt their elevations remove them from the hot and sultry climate conditions common to tropical lowlands. An instance of this may be seen in a comparison between two Mexican centres at which meteorological records have been kept; Merida at an elevation of 70 feet and Tulancingo at a height of 7,088 feet above sea-level.

Month	MERIDA			TULANCINGO		
	Temperature from	to	Rainfall Ave. per Mth.	Temperature from	to	Rainfall Ave. per Mth.
Jan.	55°	87°	96 pts.	31°	77°	60 pts.
Feb.	58°	92°	80 "	32°	80°	44 "
Mar.	60°	97°	128 "	34°	85°	92 "
Apl.	64°	98°	88 "	38°	86°	140 "
May	65°	98°	284 "	38°	96°	204 "
June	74°	103°	664 "	42°	86½°	384 "
July	72°	95°	432 "	45°	82°	372 "
Aug.	72°	94°	572 "	45°	82°	200 "
Sept.	74°	95°	584 "	46°	80°	432 "
Oct.	69°	93°	360 "	40°	79°	252 "
Nov.	62°	90°	172 "	36°	83°	60 "
Dec.	58°	90°	124 "	33°	80°	44 "

We see from this table that during their Winter period the rainfall is particularly low—for five months in succession the rainfall in the higher altitudes is less than one inch per month. It will also be noted that the maximum temperature never rises to 100° F., and that for seven months of the year it falls below 40°. These are the conditions under which *Odontoglossums* grow naturally, though in the case of the Colombian, Bolivian and Guatemalan species the Summer and Winter rainfalls are higher. It is obvious from this that a hot steamy atmosphere will not suit them. They must, therefore, be given a cool situation with constant moisture. I am, therefore, inclined to believe that a shady spot under a tree which protects them from the too direct rays of the sun, but which nevertheless allows them plenty of light, will suit them best.

Under natural conditions they grow upon the trunks of tall trees or in the mossy forks of the branches where the thick moss so common to mountain trees grows. This moss remains damp at all times. In cultivation a mixture of osmunda and polypodium will give best results, about 50/50 of each being ideal. This compost will allow of the retention of reasonable moisture at all times, and will also allow the free circulation of air about the roots.

Care must be taken in watering them for they are very liable to damp-off, particularly if water lodges in the young growth. The best way of watering them is to apply water to the compost by watering-can, and keep the surroundings wet at all times but avoid actually wetting the plant itself. Watering twice a day in Summer will be desirable, while about twice a week in the cooler period will suffice.

It is better to under-pot rather than to over-pot this genus. The best procedure will be to repot annually, in the Autumn, with fresh compost, changing into a

pot a size larger, if the growth made warrants it. This annual repotting will prevent souring of the compost which is detrimental to the plant. The following are the best species:—

ODONTOGLOSSUM APERTUM. *Native of Mexico.*

A strong growing species with large pseudobulbs, carrying two green leaves each 9 inches long by an inch in width. Flower-scape stout and about a foot in length, carrying from three to seven good sized blooms, each about 3 inches across. Sepals and petals white, spotted at the base with reddish-brown. Syn. *O. nebulosum*.

ODONTOGLOSSUM BICTONIENSE. *Native of Guatemala.*

A robust species with ovoid, compressed pseudobulbs clothed with two or three sword-shaped, somewhat undulated leaves about a foot long, with prominent nerves, and bright green in colour. The scape is upright and grows from the matured bulbs, reaches to a length of two feet and carries a number of beautiful flowers each about 1½ inches across. In the type form they are yellowish-green with a brownish-purple blotch. Lip is lilac and undulated. Flowers in Autumn and lasts a long time in perfection.

Var. *album*.—Sepals and petals chestnut-brown, lip white.

Var. *splendens*.—Green and brown sepals and petals, lip pink.

Var. *superbum*.—Sepals and petals chocolate, lip large and purplish-mauve marked with darker lines.

ODONTOGLOSSUM BLANDUM. *Native of Colombia.*

A small species with small pseudobulbs rarely more than an inch in height. The two leaves are about 9 inches long, narrow and pale green. Spike is about 10 inches long and bears anything up to a dozen charming flowers with sepals and petals equal and tapering to a point. They are white spotted and blotched with reddish-purple. Lip has brown, triangular blade, sharply pointed at the apex, same colouring as the segments with a yellow crest and two erect narrow teeth. Requires rather warmer treatment than most of the Odontoglossums, but should do well enough out of doors in Brisbane during the Summer if it is moved to a glass-house in the cooler months.

Var. *albo-cupreum*.—Segments pale yellow with coppery bars and bands. Labellum pure white with yellow crest.

Var. *Rossianum*.—Sepals and petals white spotted with brown. Lip yellow, the base spotted red and the front spotted and barred with lavender.

ODONTOGLOSSUM CARINIFERUM. *Native of Honduras.*

A charming species with oblong, compressed, two-leaved pseudobulbs up to 4 inches tall. The leathery leaves are oblong and about a foot long. The flower spikes are stout and branching, and carry a number of handsome flowers, each about 2 inches in diameter. The sepals and petals are pointed and prominently

keeled at the back, olive-brown with tips and edges of yellow. The lip is narrow at the base, but expands into a reniform blade. It is white or cream, turning brown with age, and has a narrow crest. Flowers in late Autumn and lasts well. It requires treatment as for *O. blandum*.

ODONTOGLOSSUM CERVANTESII. *Native of Mexico.*

A lovely species of small growing habit. Pseudobulbs, flattened and 1½ inches long, bear one oblong leaf. Scape carries two or three (rarely more) flowers each 2 inches in width. Sepals and petals white, suffused with palest pink, and barred at the base with broken bands of brownish-crimson. Lip somewhat heart-shaped, pointed in front. Very fragrant. Flowers in Spring. Lasts well.

Var. *decorum*.—Large flowers with broader segments, the bands being purple.

Var. *punctatissimum*.—Spotted all over with rose.

ODONTOGLOSSUM CIRRHOSUM. *Native of Ecuador.*

A very fine species with oblong, tapering, flattened pseudobulbs with one leaf at the apex, and two others whose bases sheath the pseudobulbs. The long scapes grow from the base of the pseudobulbs, inside one of the basal leaves, and carry a large number of starry flowers which are often up to 5 inches in diameter. Sepals narrow, acutely pointed and somewhat undulated. Petals shorter and rather broader at the base. In colour they are white, thickly blotched with chocolate-purple. Lip smaller and shorter, but tipped with a very long, fine point, its base cordate. It is yellow with deep crimson veins. Flowers in Spring and lasts well.

Var. *Hrubyanum*.—Sepals and petals pure white with a blotch of orange, the base of the lip having a few red lines.

Var. *Klabochorum*.—Flowers larger than the type, white spotted with chocolate the tips of the sepals and petals being extended into longer tails.

ODONTOGLOSSUM CITROSMUM. *Native of Mexico.*

An attractive species with smooth, shining, light green, rounded and flattened pseudobulbs which bear two leaves each a foot long, oblong, thick, and dark green. Flowers produced on long, pendulous racemes, which carry up to 30 fragrant flowers each about 3 inches across. Flowers white suffused with pink. Lip has long claw and expands into a reniform blade. Scapes grow from new bulb, this being the only *Odontoglossum* which has this habit. Flowers in Summer—lasting three to four weeks.

Var. *album*.—Flowers pure white with yellow crest on base of lip.

Var. *punctatum*.—Flowers rosy, dotted with purple.

Var. *roseum*.—Lip deep rose-coloured.

ODONTOGLOSSUM CONSTRICTUM. *Native of Venezuela.*

A pretty species with ovoid, compressed, dark green pseudobulbs with a pair of narrow, pointed leaves about a foot in length. The slender scape is up to 18 inches long, and has a drooping, loose panicle at the top. This carries a number of

flowers each $1\frac{1}{2}$ to 2 inches across. Sepals and petals lanceolate, bright yellow blotched and barred with orange-brown. Lip fiddle-shaped, white, tipped with yellow, with two rose coloured spots near the centre. Flowers in Spring and Summer.

Var. *castaneum*.—Sepals and petals cinnamon lined at base with greenish-white.

Var. *pallens*.—Sepals and petals sulphur yellow. Lip whitish.

Var. *Sanderianum*. (Native of Colombia).—Sepals and petals yellow blotched with brown. Lip white, sometimes light yellow, with large purple blotch in front.

ODONTOGLOSSUM CORDATUM. *Native of Guatemala and Mexico.*

A striking species with ovoid, flattened, glossy green pseudobulbs topped with a single leaf about 8-9 inches in length. The scape is erect, sometimes branched, and carries a number of attractive flowers, with sepals and petals yellow, blotched and barred with chocolate, being elongated into wavy tails, the sepals having a keel underneath. The lip is very large and cordate, the apex being long and acutely pointed. It is white with blotches of light lavender and magenta and in some varieties with lemon and crimson. Flowers in late Spring and Summer. Lasts about three weeks in perfection.

Var. *sulphureum*.—Sepals and petals the colour of sulphur, with a white lip tipped and blotched with yellow.

ODONTOGLOSSUM CORONARIUM. *Native of Colombia.*

A very charming species but difficult to import and to grow. Its ovoid pseudobulbs grow from a long, creeping rhizome from which they develop at a distance of about $1\frac{3}{4}$ inches from each other. They bear a single leathery leaf at the apex, this being from 7 to 11 inches in length and 2 inches across. The flower spikes are a foot, or thereabouts, in length and carry up to a dozen (in some cases more) delightful flowers, each about 2 inches across, these being of good shape with rounded sepals and petals, crinkly edged, and in colour reddish-brown with a yellow border, extremely glossy in appearance. The lip is narrow at the base but broadens towards the point. It is bright yellow and has a white crest. Flowers in Summer and lasts well. This species requires ample light at all times.

Var. *chiriquense*.—Flowers larger and paler in colour.

Var. *miniatum*.—Pseudobulbs grow close together. Flowers smaller and more numerous.

ODONTOGLOSSUM CRISPUM. *Native of Colombia.*

This species, which is the finest of the Odontoglots, and has, indeed, been called "The Queen of the Orchids," is very variable, and is looked upon as one of the least difficult to grow. It is found high up on the Andes at a height of nearly 12,000 feet above sea-level, and requires cool conditions and light throughout the year. It has compressed, ovoid pseudobulbs about 3 inches in height, each carrying a solitary strap-shaped leaf up to a foot in length. The flower scapes are long and arched (sometimes branched), and carry a number (up to 30) of outstandingly beautiful flowers, each between 2 and 3 inches in width. In the

type species the ovate (often lanceolate) petals and sepals are white, petals greatly undulated and generally fringed. Lip oblong and tapering to a point, yellow, spotted and blotched in the front with red or brown, crisped at the edges, with a crest at the base. Flowers at various times during the year, most frequently in Spring and Autumn. Flowers last three to four weeks. There are many varieties, the best of which are:—

Var. *apiatum*.—Flowers larger than the type, pure white segments prominently toothed and crested, and blotched with chocolate.

Var. *Ashworthianum*.—Good shaped flowers, sepals and petals rose-purple with white margins. Lip white with yellow crest, with purplish blotches in front of the crest.

Var. *Aureum*.—Sepals, petals and lip flushed with lemon-yellow.

Var. *Baroness Schroeder*.—Symmetrical flowers. Sepals and petals flushed with reddish-purple with a white patch at the bases and along the edges of the segments. Lip white at the margins, centre blotched red-brown, disk yellow.

Var. *Confetti*.—Sepals and petals white, flushed pink on the outside, the inside being thickly spotted with brownish-purple dots. Lip white, yellow crested and spotted brown.

Var. *Cooksonianum*.—Sepals and petals white, much spotted and blotched with brownish-crimson. Lip white with a large blotch in the centre and smaller spottings on the yellow crest.

Var. *Franz Mazreel*.—Sepals white tinged with rose-pink and, like the petals, blotched with purple in the centre, and spotted at the base. Lip white spotted with brown in the centre and having a yellow crest.

Var. *heliotropium*.—Segments heliotrope spotted with small brown dots.

Var. *King Edward VII*.—Sepals and petals white, with very pale pink suffusion spotted with bright brown. Lip white, spotted brown and yellow crest.

Var. *Luciani*.—A well-shaped flower, rose tinted and blotched with brown-purple, crested with yellow.

Var. *Mundayanum*.—Flowers of good substance. Sepals and petals white, blotched with purple-brown. Lip white, spotted red-brown, crest yellow.

Var. *purpurescens*.—Flowers white, very delicately tinted with rose, spotted bright brown-purple.

Var. *Rex*.—Sepals and petals rose flushed, each having a single large irregular magenta blotch in the centre, with a few small ones at the edges. Lip white with brown blotch in middle.

Var. *Sanderae*.—Sepals and petals and lip rosy white, heavily blotched with crimson-chocolate. Lip crested deep yellow. Flowers roundish.

Var. *Starlight*.—Segments rose-tinted densely spotted with tiny red-brown dots.

Var. *Sultan*.—Sepals and petals practically covered with reddish-chocolate blotches, the remainder white suffused with rose. Lip crested yellow.

Var. *Veitchianum*.—White marked with brownish-crimson. Lip has a yellow disk and is spotted brown in front.

Var. *Victoria Regina*.—Sepals and petals rosy-purple on the outside, white with a purplish flush on the inside which has a few spots of reddish-brown. Lip white with spots in centre.

Var. *xanthotes*.—Pure white with three bright yellow spots on the lip.

ODONTOGLOSSUM CRISTATUM. *Native of Ecuador.*

A delicately scented species with small, oval, shiny, light green pseudobulbs, topped with a couple of narrow, fine-textured leaves. Flowers creamy-yellow, banded and spotted with dark brown. Lip, which varies from white to bright yellow, spotted sparingly with brown, is prominently crested. Flowers in Summer and lasts three weeks.

ODONTOGLOSSUM EDWARDI. *Native of Ecuador.*

An unusually coloured species, with ovoid pseudobulbs up to 4½ inches tall and having two strap-shaped leaves each a foot in length. The flower spike is very stout and is erect and branched, carrying up to 40 or 50 flowers each about an inch in diameter. The sepals, petals and lip are all waved at the edges and puce-coloured, the lip having a yellow crest. Flowers in Spring and lasts a long time in perfection. This species requires very cool treatment and very moist conditions.

ODONTOGLOSSUM GRANDE. *Native of Guatemala.*

One of the hardiest of the species, with pseudobulbs up to 4 inches high, topped with two leaves about 9 inches long, dull green in colour and leathery in texture. Scapes about a foot tall and carrying up to seven flowers. They spring from the newly matured bulb. Flowers are very large, some reaching a diameter of 7 inches. Sepals bright yellow, barred with dark brown. Petals deep brown at the base, the upper portions being bright yellow. Lip short, ranging from white to light yellow in colour, spotted with brown, particularly near the base. Flowers in Autumn and lasts three weeks. This species likes warmer conditions than the usual forms of *Odontoglossum*, and likes drier conditions after the completion of growth.

Var. *Williamsianum*.—Petals shorter and broader than the type.

ODONTOGLOSSUM HALLII. *Native of Peru, Ecuador and Bolivia.*

A good species with long, thin, narrow, sharp-edged, somewhat furrowed pseudobulbs with two green 12-inch leaves. The arching, branched scape grows up to 5 feet in length and bears numerous flowers between 3 and 4 inches across, with pale yellow sepals and petals, with deep brown patches and spots. The sepals and petals are both extended into long points. Lip white, fringed, spotted and blotched with red, and tinged with yellow at the base. Flowers in Autumn and lasts well. Coolest treatment is necessary.

ODONTOGLOSSUM HARRYANUM. *Native of Colombia.*

An outstanding species much used in the breeding of hybrids. It has oblong and

rather oval, flattened pseudobulbs which become furrowed when mature, and reach a length of about 3 inches. The leathery leaves grow to about a foot. Flower spikes erect and carry four or five flowers about three inches across. The oblong sepals are pointed and undulate, and are chocolate-brown with broad streaks of yellow. The petals are broad at the base, pointed at the apex, white with broad lines of purple. Lip large and triangular, white with numerous streaks of purple from the base, the apex being pure white. Crest yellow. Flowers in Autumn.

ODONTOGLOSSUM HASTILABIUM. *Native of Colombia.*

This beautiful orchid grows at a much lower elevation than most *Odontoglossum*, being found between 2,500 and 4,000 feet on the Andes below Bogota. It, therefore, requires rather warmer treatment than any other of the genus, and in the cooler parts should be grown under glass most of the year. If it is placed with the *Cattleya* hybrids it should do well enough. Its pseudobulbs are large and a glossy, light green in colour, and the broad, well-textured leaves are about a foot in length. The very much branched flower spike grows to a great length, some as long as 6 feet having been noted on particularly good plants. The flowers are numerous and very sweetly scented. Sepals and petals cream with transverse lines of purple-brown. Lip is white with dark rose at the base. Flowers in Spring and lasts nearly a month.

ODONTOGLOSSUM HUNNEWELLIANUM. *Native of Colombia.*

A small growing but desirable species with roundish, flattened pseudobulbs rarely taller than 2 inches. Leaves from 6 to 9 inches long, middle green in colour. Scape grows to 18 inches and carries a number of roundish flowers with sepals and petals which vary in shade from cream to light yellow, spotted with dark brown, the petals being lighter coloured at the base. Lip cream, spotted with light brown and crinkled at the margins. Crest prominently toothed. Flowers at various times, generally Spring or Autumn.

ODONTOGLOSSUM INSLEAYI. *Native of Mexico.*

A brilliantly flowered species, similar in growth to *Odontoglossum grande*. The flowers vary greatly in size, good plants producing blooms up to 4 inches in width. The wavy sepals and petals are oblong and a rich yellow banded with dull red-brown. Lip, rather oval in shape, is bright yellow with light brown dots around the edges. Blooms at various times, chiefly in the Autumn months. Treatment as for *Odontoglossum grande*.

Var. *leopardinum*.—Sepals and petals deeper yellow banded with crimson. Lip yellow, bordered all round with dots of dark crimson.

Var. *splendens*.—Very large flowers ochre yellow in colour, the lip having a number of red blotches.

ODONTOGLOSSUM KEGELJANI. *Native of Ecuador.*

A robust type with pseudobulbs long, thin, narrow and sharpened at the edges

with well textured leaves about a foot in length. Flower scape about 2 feet long, arched and branching. Flowers numerous, each about 3 inches wide. Sepals and petals broad at the base and pointed at the apex, lemon-yellow in colour, blotched with reddish-brown. Lip oblong, the edge finely waved, reddish-brown bordered with yellow. Flowers vigorously in Summer.

Syn. *O. polyxanthum*.

ODONTOGLOSSUM KRAMERI. *Native of Costa Rica.*

A small growing species with short, almost round, somewhat compressed pseudobulbs which carry a single 8-inch leaf. The flower spike is short and carries three to five smallish flowers which rarely exceed $1\frac{1}{2}$ inches across. Sepals and petals similar in shape and pale violet in the centre, shading to white at the edges. Lip bilobed at apex, purple in colour, streaked with white and brown at the base. Flowers in Autumn. Warmer conditions than most types.

ODONTOGLOSSUM LAEVE. *Native of Mexico.*

A very fragrant and robust species with long, stout flower scapes carrying many blooms, each about 2 inches across. They are light brown barred with dull yellow. Lip is broad, the apex extended into a tail, lilac and white. Flowers in Spring.

ODONTOGLOSSUM LUTEO-PURPUREUM. *Native of Colombia, Ecuador, etc.*

A robust species with very variable flowers. Pseudobulbs 3 to 4 inches long, stout, compressed and ovoid in shape, carrying a pair of strap-shaped, leathery leaves about a foot in length. The scape is arched and branching and carries a number of flowers which in good quality plants are as much as 4 inches in diameter. In the type the sepals and petals are rich brown with white or yellow bands and bordered with gold—sometimes the basic colour is purplish. The lip is minutely fringed, and is white with a brown base. Flowers in Spring and lasts three to four weeks.

Var. *sceptium*.—Smaller flowers, deep brown markings on a golden-brown base. Lip has a horse-shoe shaped blotch in front. Margins heavily fringed.

Var. *Vuylstekianum*.—Flowers smaller than type. Sulphur yellow blotches with bright yellow.

ODONTOGLOSSUM MACULATUM. *Native of Mexico.*

Similar in habit and growth to *Odontoglossum cordatum*. Sepals and petals shorter and broader, and lip rounder. Sepals and petals yellow, blotched and barred with chocolate-brown. Lip yellow spotted with brown. Flowers in late Autumn and lasts well.

ODONTOGLOSSUM MAXILLARE. *Native of Mexico.*

A pretty species with narrow, thin pseudobulbs topped with two leaves about 10 inches long. Scape, as long as the leaves, carries up to a dozen fragrant flowers,

each between 2 and 3 inches wide. Sepals and petals, keeled at back and lanceolate, white with a purplish base. Lip shorter, narrow and yellow at the base, broadening into a somewhat blunted, triangular shape in the blade, which is white. Flowers during the Autumn and early Winter. Should be removed to the glass-house during the colder part of the year.

ODONTOGLOSSUM NAEVIUM. *Native of Colombia.*

A beautiful species with oblong, flattened, deep green pseudobulbs, and a pair of oblong, narrow, dark green leaves. The erect, arching scape bears a panicle of star-shaped flowers up to 4 inches in diameter. Sepals and petals white and densely spotted with rosy-purple and crimson dots. They are beautifully waved. Flowers in Spring and lasts well.

Var. *majus*.—Larger than the type.

ODONTOGLOSSUM NOBILE. *Native of Colombia.*

A lovely and variable species which resembles *Odontoglossum crispum* in form and habit, but its pseudobulbs are rather smaller. Flower spikes are very long and carry a great number of 3-inch flowers, up to 100 having been counted on a single scape. In the type the sepals and petals are snow-white, but occasionally are very faintly flushed with rose. The lip is reniform, white with crimson and yellow blotchings at the base. Flowers at various times but generally in early Summer, the blooms lasting a long time. Treatment as for *Odontoglossum crispum*.

Var. *Lindenii*.—Very symmetrical. Sepals, petals and lip blotched with rich, dark reddish-purple.

Var. *Veitchianum*.—Flowers larger than the type, irregularly blotched with magenta.

Syn. *O. Pescatorei*.

ODONTOGLOSSUM ODORATUM. *Native of Colombia.*

In habit this species resembles *O. crispum*. Its scapes grow to about 2 feet and are often branched. Flowers fragrant. Sepals and petals rather narrow, yellow spotted with chestnut-brown. Lip large, yellow blotched with brown in front of the prominently toothed crest. Flowers in Summer and lasts well.

ODONTOGLOSSUM OERSTEDII. *Native of Costa Rica.*

A small growing species with roundish, compressed pseudobulbs topped by a single leaf which is only 4 inches long, oblong and pointed. Flower spikes are short and erect and produce one or two (rarely more) charming flowers each about 1½ inches across. They are pure white, except for a yellow spot on the base of the lip. It is very sweetly scented. Flowers in Summer, the blossoms lasting well.

Var. *majus*.—Flowers larger and of better substances than those of the type.

ODONTOGLOSSUM PULCHELLUM. *Native of Guatemala.*

Another small growing species with fragrant flowers and long, narrow, thin

pseudobulbs with two narrow, grassy, stiff leaves from 9 to 12 inches long. Scapes are erect and short, and carry a few white flowers with a yellow blotch spotted with crimson on the crest. They are $1\frac{1}{2}$ inches in diameter. Flowers in Spring, blooms lasting five to six weeks. This species has the peculiarity of flowering with the lip uppermost, the flowers seeming to be upside down.

Var. *Dormanianum*.—Plant more robust and flowers much larger than the type.

Var. *majus*.—Flowers larger and more numerous than the type and much more strongly scented. Plant has pseudobulbs much larger than the type.

ODONTOGLOSSUM RAMOSISSIMUM. *Native of Colombia.*

An attractive plant with oblong, flattened pseudobulbs bearing a single sword-shaped leaf about a foot long. Scapes very long and branched, and bearing a large number of 2-inch flowers. Sepals and petals narrow and wavy, the lip being narrow and reflexed. In colour the flower is pure white spotted with pale purple. Blooms in Spring and lasts well.

ODONTOGLOSSUM ROSSII. *Native of Mexico.*

A small growing species which is included amongst the best of the Odontogloss. Pseudobulbs are small and ovate, and grow in tufts. They have single leaves which are oblong-lanceolate in form. The scapes are about 6 inches long, each about 3 inches across. The sepals, which are narrow and pointed, are keeled at the back. They are greenish-yellow, barred and spotted with brown. The petals are oblong and blunted, and are white with brownish-purple spots at the base. The lip is roundish and somewhat heart-shaped, very large, pure white (sometimes flushed with pink). Flowers in Winter and remains in beauty for a long time. There are many varieties of this species, the best being:—

Var. *albans*.—Sepals white banded with soft green, lip having yellow crest.

Var. *Amesianum*.—Sepals greenish-white, spotted with brown. Petals white with a chestnut blotch.

Var. *majus*.—Petals white with crimson blotches at base. Sepals white, barred with crimson.

ODONTOGLOSSUM SCHLIEPERIANUM. *Native of Costa Rica.*

This species is similar to *O. grande* in nature of plant and manner of growth. Flowers are borne on erect, stout scapes and are pale yellow, blotched and barred with deep yellow or brown. Flowers in late Summer and like all the Odontogloss the blooms last well.

ODONTOGLOSSUM TRIPUDIANS. *Native of Colombia.*

An interesting species with ovoid, flattened, oblong pseudobulbs with two narrow, pointed leaves and arching, many-flowered scapes which grow to a length of three feet or more. Flowers between 2 and 3 inches in diameter. Sepals and petals yellow with blotches of chestnut. The lip is white with an irregularly waved edge, blotched with rose-pink. Flowers in Autumn.

ODONTOGLOSSUM TRIUMPHANS. *Native of Colombia.*

A popular and striking species with large, ovate-elliptic, compressed pseudobulbs bearing two bright green leaves from 12 to 18 inches long, and dark green in colour. The scape is arching and often branching, and from 2 to 3 feet long. It carries a large number of flowers, each between 3 and 4 inches across. Sepals and petals brilliant yellow with blotches of deep brownish-crimson. Lip oblong, the apex extended into a narrow tail-like tip, the edges being toothed. The front part is light brown, the back portion white with a yellow centre. The white crest has two long teeth. Flowers in early Summer.

Var. *aureum*.—Sepals and petals soft yellow blotched with deeper yellow. Lip white with large yellow blotches. Crest yellow and toothed.

ODONTOGLOSSUM URO-SKINNERI. *Native of Guatemala.*

A large growing species with stout, ovate, compressed, glossy, purple-spotted pseudobulbs growing from a creeping rhizome. The scape grows erectly from the base of the matured pseudobulbs, reaching a height of between 2 and 3 feet, and bearing a number of fine flowers, each nearly 3 inches in diameter. Sepals and petals chestnut brown mottled with green. The roundly cordate heart is mauve-purple mottled with white, the disk having two white crests. Flowers in Autumn.

ODONTOGLOSSUM WALLISII. *Native of Colombia.*

A slender species with ovoid pseudobulbs and narrow pointed leaves. The scape is slender and carries a few 2½-inch flowers. Sepals brown with yellow margins. Petals yellow spotted with brown. Lip white with a rosy blotch in the centre of the blade. Flowers in Spring and lasts well.

The above are the principal species of *Odontoglossums*. There are many more of them, but those not mentioned are of rare occurrence even in their native regions, so are very unlikely to be met with in Australia.

There are many hybrids (both natural and man-made) available for cultivation, and the beauty of all the members of this genus is great enough to encourage growers to further efforts to establish them, even though first attempts have proved unhappy.

The hybrids usually sold have, of course, been raised in artificial surroundings, and should, therefore, be more adaptable to our cultural conditions than species which have been torn from their harbourage on tree or rock and shipped overseas, but in most cases the hybrids will need rather warmer conditions than the species. I would recommend that all hybrid plants imported from England be moved under glass for the Winter months.

ONCIDIODA

This is another artificially formed genus, being the result of crossing *Oncidium* species and hybrids with *Cochlioda* species. *Cochliodas Noezliana* and *vulcanica* and *Oncidiums Schlimii*, *tigrinum* and *varicosum* have figured in most of these crosses to date. But, as the new genus attains wider popularity, probably many more crosses of interest and beauty will be made.

Treatment as for *Oncidiums*. The *Oncidiogas* like rather warmer conditions than the natural species, and are more adaptable to cultural conditions.

ONCIDIUM and ALLIED GENERA

This large genus of epiphytical orchids is allied to the *Miltonias*, and to the *Odontoglossums*, but for the most part the plants of the various species present much less difficulty in cultivation than either the *Miltonias* or the *Odontoglots*. They are found naturally over a wide range of country and their natural conditions vary so considerably that I feel it will be better to give cultural directions for each of the species as they are dealt with, rather than give general directions here.

For compost any fibrous material will serve, and I have had good results with osmunda, polypodium and cocoanut fibre. However, I think that a mixture of equal parts of osmunda and polypodium fibres gives best results. Ample drainage is essential. The following are the best species, any of which will make a handsome and satisfying addition to an orchid collection.

ONCIDIUM AMPLIATUM. Found from Honduras to Colombia.

A grand species with large spheroid, flattened pseudobulbs which are bright green with a few purple spots when young and turning purplish-black with age. Leaves are a foot long and 4 inches wide, very glossy and leathery in substance, and green in colour. Flower scape which is long, branched, and, in good plants, many flowered, springs from the base of the last matured pseudobulb. Sepals and petals small, but the lip is about 1½ inches across at the widest part. It is kidney-shaped, narrow at the base with two small, lateral lobes, and has a prominent two-lobed crest. The sepals are yellow spotted with red, the petals bright yellow with a few red spots at the base, the lip also being yellow with red markings at the base. The underneath of the flowers is paler than the front. This species requires warm treatment at all times. In the warmer parts of Brisbane a glass-house will serve, but in the cooler parts artificial heat will be necessary in Winter, as the temperature should not be allowed to fall below 55 degrees. It requires

copious water in Summer, and should not be allowed to become dry at any time. Plenty of light is desirable, the plant doing best when grown close to the glass. Flowers in Summer and lasts about three weeks.

Var. *majus*.—Has larger flower than the type.

ONCIDIUM BARBATUM. *Native of Brazil.*

An attractive species with roundish, compressed, ovoid pseudobulbs with a single narrow, oblong leaf about 2 or 3 inches long. The flower spike is slender and arching, and carries several flowers, each from 1½ to 2 inches across. Sepals narrow and pointed with wavy edges, pale yellow with bars of chestnut-brown, the laterals being joined at the base. Petals oblong, waved at the edges, golden-yellow with bright red streaks at the base. Base of lip triangular, yellow, the disk fimbriated and spotted with brown. Side lobes bright golden-yellow, the front lobe diamond-shaped and bright yellow. Flowers in Autumn. Treatment as for *O. ampliatum*.

ONCIDIUM CHEIROPHORUM. *Native of Colombia.*

This small growing species is a little gem. The pseudobulbs are about an inch long, elliptoid in shape, very compressed, smooth, shiny and pale green. The leaves are up to 5 inches long, narrow, grassy and light green. The very slender scape grows to 9 inches long and is erect and branched, and grows from the matured bulbs (most frequently two-year-old). It bears a large number of small yellow flowers about half-an-inch in diameter. Sepals and petals round, reflexed and concave. Lip three-lobed and larger than the segments. In colour the flower is a uniform bright yellow. It is very fragrant, a single spike of the flowers being sufficient to fill a large room with perfume. As I write a small plant of this species is in the room and the air is filled with its sweetness. There are many more striking *Oncidiums*, but none more charming than *cheirophorum*. Flowers in Winter and lasts about five weeks in perfection. It is a very free growing species, and I find it does best in a sunny bushhouse, with copious moisture throughout the Summer but much less in Winter, though, except when in bloom, it should not be allowed to become dry.

ONCIDIUM CONCOLOR. *Native of Brazil.*

An attractive species with oval, flattened, furrowed pseudobulbs, sheathed at the base and bearing two strap-shaped leaves, pointed at the apex bright green in colour, and from 6 to 9 inches long. Flower scape arched or pendent, many-flowered, each being 1¾ inches wide. Sepals and petals pure yellow. The large lip is flat and is yellow with two raised ridges at the base. Cool treatment as for *O. ampliatum*. Flowers in late Spring or early Summer.

ONCIDIUM CORNIGERUM. *Native of Brazil.*

An easily grown species with furrowed, oblong pseudobulbs about 3 inches tall and having a single leaf. This is broad and ovate, about 4 inches long, and thick and fleshy in substance. Flower spike thin, up to 18 inches long, branched and

bearing many flowers. The flowers are small, the incurved sepals and petals being less than half an inch long. The lip is about twice as long, reniform with long, narrow side lobes, with two horns at the base. The whole flower is bright yellow banded with red-brown. It flowers in early Summer. This plant should be grown in a basket so that the spikes hang over the sides. The compost should be in a thin layer about the roots, any great depth having a tendency to rot the roots. Ample water in Summer with plenty of light. In Winter much less moisture is required, but the plant should not be allowed to become dry. Rather warmer treatment required than the general run of *Oncidium*s, a glasshouse in the warmer parts and artificial heat in Winter in the colder areas.

ONCIDIUM CRISPUM. *Native of Brazil.*

A very beautiful species which presents some difficulty in cultivating. Pseudobulbs are broad, ovate, rough-skinned and prominently furrowed, and grow from a stout, creeping rhizome. The leathery leaves which are deep green in colour, are about 9 inches in length and an inch and a half in width, and grow in pairs from the apex of the bulb. The flower spike is long, arched, branched and stout, and bears up to fifty flowers, which, in some species, are as small as 1½ inches across, while, in others, they exceed 3 inches in diameter. The sepals and petals are large, oblong, narrow at the base, and rounded at the apex, with crinkled and wavy edges. The lip is almost circular in front, stalked at the base, has two horn-like side lobes and a three-lobed yellow crest prominently warted. In colour the flower is a glossy deep brown with a few yellow and red marks at the bases of the segments. Flowers at various times, chiefly Spring, and lasts a month. Treatment as suggested for *O. cornigerum*.

Var. *grandiflorum*.—Flowers over 4 inches across, the sepals and petals being edged with bright yellow.

ONCIDIUM CUCULLATUM. *Native of Colombia.*

Another small growing species of considerable variety, all of whose members are distinctly lovely. The oval pseudobulbs are under two inches in length, smooth when young, but sulcate when mature, and bear a single stiff, pointed, dark green leaf about 6 inches in length and nearly an inch in width. It produces from the last-matured bulb a wiry, erect, flower-scape up to a foot in length which bears from six to a dozen smallish flowers rarely exceeding 1½ inches in diameter. The oval petals and sepals are concave and a beautiful rosy-purple in colour. The lip is large and wide, two-lobed in front, but with firm unbroken edges. It varies from white to rose-pink, is spotted with dark purple, and has a small fleshy crest. This species requires the coolest of treatment at all times, and must have copious water throughout the year. It grows high up on the Andes at an elevation reaching nearly to 14,000 feet, where it gets ample light and fresh air at all times. Outdoor treatment in a cool, light but shady place will suit it, and it will probably do better in the South than in Queensland, except at Maleny and similar elevations. Flowers in Spring, the blooms remaining in good condition for six weeks or more.

Var. *Cbestertoni*.—Sepals and petals narrow, lip has prominent side lobes and a long narrow waist. Colour paler than the type.

Var. *flavidum*.—Sepals and petals bright yellow blotched with brown. Lip purple with white edges.

Var. *macrochilum*.—Larger than the type. Sepals and petals plum-coloured, lip being mauve spotted with violet.

Var. *nubigenum*.—Sepals and petals as type. Lip white with purple blotch on the crest.

Var. *Phalaenopsis*. Flowers twice as large as the type, pure white with purple blotches. (Syn. *O. Phalaenopsis*.)

ONCIDIUM CURTUM. *Native of Brazil.*

A very ornamental species in manner of growth, similar to that of *O. crispum*. Flowers from an erect, branching panicle which is literally crowded with flowers up to 2 inches across. The rather oval, blunted sepals and petals are yellow with bright red blotches and bars. The bilobed lip is about an inch across at the widest part, is bright yellow with a band of brown round the gracefully waved edges, the yellow portion being spotted with tiny red dots. The crest is lobed and warty. Flowers in Spring and lasts about a month in beauty. Treatment as for *O. cornigerum*.

ONCIDIUM DASYTYLE. *Native of Brazil.*

A dainty little species with small, oval, flattened pseudobulbs which are smooth when growing, but become creased with age. They have two bright green leaves about 5 inches long and nearly an inch in width, prominently keeled. Scape, very slender, rises from base of matured pseudobulb and carries from half to a dozen flowers, each about 1½ inches wide. Sepals and petals pale yellow, blotched with purplish-brown; lip, reniform, stalked, spreading and with undulating edges. It is pale yellow and has a glossy, purple, two-lobed crest. Flowers in early Summer. Treatment as for *O. ampliatum*.

ONCIDIUM DIVARICATUM. *Native of Brazil.*

A small but prolific flowering species with round, flattened pseudobulbs each carrying a pair of long, broad, leathery leaves. Flower scapes are very long, slender and branching, and carry a great number of flowers each about one inch across. Sepals and petals light brown, tipped with golden-yellow. Lip yellow with a brown blotch in the centre; side lobes yellow spotted with brown. Flowers in Summer. Treatment as for *O. ampliatum*.

ONCIDIUM EXCAVATUM. *Native of Peru.*

A strong growing species with ovate-oblong, compressed, shining green pseudobulbs up to 5 inches tall, topped with a pair of long, broad, leathery, shining leaves, there being also two or three leaves sheathing the base of the bulb. Scapes are stout, long and branching, and are crowded with brilliant flowers each an inch

and a half wide. Sepals are a little smaller than the petals, the three-lobed lip being large and spreading. The whole of the flower is bright golden-yellow with a few dark brown spots on each segment. Flowers in Summer. Treatment as for *O. ampliatum*.

ONCIDIUM FLEXUOSUM. *Native of Brazil.*

A hardy and variable species with oval, flattened and sulcate pseudobulbs, 2 inches long with a pair of oblong, strap-shaped, bright green leaves, each about 6 inches long. Flower spike large, branching and many flowered. Blooms rarely more than three-quarters of an inch in diameter, with small, narrow, recurved sepals and petals, yellow, barred with lightish brown. Lip yellow flecked with red, the front lobe being kidney-shaped, the base narrowed and the crest warty and prominent. Flowers principally in Spring. Treatment as for *O. cornigerum*.

ONCIDIUM FORBESII. *Native of Brazil.*

A very striking species with typical oval, flattened, sulcate pseudobulbs with brown sheaths and leathery, strap-shaped leaves about 9 inches long and dark green in colour. Scape about 12 inches in length, carrying nine or ten flowers each 2 inches in diameter. Sepals ovate, petals twice as long as the sepals, spathulate, waved and stalked at the base. The whole flower is a glossy red-brown, margined with bright yellow, the crest being spotted with red. Flowers in Autumn and lasts well. Culture as recommended for *O. cornigerum*.

ONCIDIUM HAEMATOCHILUM. *Native of Trinidad.*

This species differs from most of the other *Oncidiums* in that the pseudobulbs are absent, the oblong, flat, thick, stiff leaves grow from a stout, creeping rhizome. The leaves are from 6 to 9 inches long and about 2 inches wide, dark green in colour with a few brown spots. The flower spike, erect and up to about 2 feet tall, carries from ten to thirty flowers each about 1½ inches across with wavy, tongue-shaped sepals and petals, yellowish-green in colour, spotted with deep reddish-brown. Lip is narrow at the base with two ear-like side lobes, the front being broadly oval and undulated, with a small raised, lumpy crest. It is bright crimson in colour with darker spots in the margins. Flowers in late Autumn and lasts well. This plant, by reason of its manner of growth, is a bad traveller and is, therefore, difficult to obtain. It requires very warm, moist treatment throughout the Summer and should be kept in a heated glasshouse, preferably suspended over a fish-pond. After growth has been completed it should be transferred to a cooler, drier situation.

ONCIDIUM INCURVUM. *Native of Mexico.*

Another small flowered species with ovate, compressed pseudobulbs, somewhat furrowed, about 2 inches long and topped with a couple of sword-shaped, pointed, dark green leaves about 9 inches long. Flower spikes long and considerably branched, and gracefully arched and covered with attractive blooms, each about 1½ inches across. Sepals and petals are narrow, wavy and free, and are white with

bands of magenta. The three-lobed lip is narrowed to the middle and then broadens into a roundish, concaved front lobe. It is pure white. The crest is fleshy and is marked with fine teeth. Flowers in Autumn, the blooms lasting a month. Cool treatment as for *Palumbina candida*.

Var. *alba*.—Is all white, except for a yellow disk at the base of the lip.

ONCIDIUM JONESIANUM. *Native of Paraguay.*

A beautiful and unusual species with tiny pseudobulbs formed in dense clusters, topped with fleshy, rather slender, tapering, deep green leaves, channelled on the upper surface. These vary in length from 3 inches to a foot, and in the longer types they tend to droop or even hang downwards. Flower spikes come from the base of the last matured bulb, and grow up to about 2 feet in length, arched or drooping. They bear up to a dozen flowers, 2 inches across. Sepals and petals are waved at the margins, oblong and pointed (sometimes rather obovate), and vary from creamy-white to a pale greenish-yellow, having large spots of dark brown which sometimes merge into blotches. The lip is large, broad and flat, with small yellow side lobes, the blade being pure white, with a few crimson spots at the base, and a crest of yellow teeth. Flowers in Autumn and Winter and lasts a month in perfection. Treatment as for *O. cornigerum*.

ONCIDIUM KRAMERIANUM. *Native of Ecuador.*

This lovely species, which is really a variety of *O. papilio* is a very popular one by reason of its brilliant and rather fantastically shaped flowers. Pseudobulbs are roundish, compressed, wrinkled, rough to the touch and grow in clusters so crowded that they overlap each other. The solitary leaves, each up to about 8 inches long and 2 inches wide, are pointed. They are tough and leathery, a mottled deep green in colour, often purplish at the back. The flower scape grows from the base of the bulbs, and is tall, jointed and wiry. The flowers are produced one at a time, but in a succession that keeps the plant in bloom for many consecutive weeks, a new flower opening as its predecessor dies. The dorsal sepals and petals are narrow and linear, and turn inwards, yellow at the bottom and dark reddish-brown at the top. The lateral sepals are deflexed, acutely pointed, pale yellow heavily spotted with reddish-brown. The beautifully undulated lip is spreading and somewhat cordate, pale yellow with brown spots at the edge. Requires warm treatment with plenty of light and moisture at all times.

Syn. *Oncidium papilio* var. *Kramerianum*.

ONCIDIUM LAMELLIGERUM. *Native of Ecuador.*

A fine species with large, ovoid pseudobulbs with pointed, dark green leaves. The flower scapes are several feet long, twining, branching and many-flowered. The dorsal sepal kidney-shaped, wavy, stalked, deep brown with a border of bright yellow. Lower sepals long and oblong. Petals are triangular, undulated, light yellow spotted with brown. The lip is small and triangular, white with dark purplish-brown side lobes. Blooms in Spring and lasts a long time. Treatment as for *Palumbina candida*.

ONCIDIUM LANCEANUM. *Native of Dutch Guiana.*

This species is of the same habit and form as *O. haematochilum*, and has the same disabilities. Leaves, without pseudobulbs, spring from a stout rhizome. They are a foot or more in length, 3 inches wide, thick, leathery and green spotted with brown. The many-flowered spike is erect, branched and stout, the flowers being between 2 and 3 inches wide. Sepals and petals ovate, fleshy, yellow, barred and blotched with chocolate. Lip $1\frac{1}{2}$ inches long, narrowed in the middle, spreading and flat at the apex, pinkish at the base and violet in front. Flowers in Summer and lasts a month. Treatment as for *O. haematochilum*.

ONCIDIUM LEUCHOCHILUM. *Native of Mexico.*

A variable but beautiful species with ovate, flattened pseudobulbs, slightly furrowed, and bearing one or more pointed recurved leaves, each about 9 inches long and 1 inch wide. Flower spikes are very long (instances where they have extended to 10 feet having been recorded), branched and paniced. They bear a great number of flowers each about 2 inches wide, with equal oblong sepals and petals which are yellowish-green blotched with dark brown. Lip reniform with a red stalk-like base, the two-lobed blade is white, turning yellow with age, with two small, white side lobes. Flowers at various times during the year, the blooms lasting five or six weeks. Treatment as for *P. candida*.

ONCIDIUM LONGIPES. (Var. *Croesus*). *Native of Brazil.*

A dwarf species with tufted, narrow, furrowed pseudobulbs about an inch tall, tapering into a neck at the top, and bearing two strap-shaped leaves about 4 inches long and light green in colour. Flower spike, inclined outwards, is short, and bears up to half-a-dozen pansy-like flowers, each about $1\frac{1}{2}$ inches wide. Sepals and petals oblong and spreading and with recurved margins. They are reddish-brown in colour. Lip is three-lobed, the lateral lobes being almost circular, the front one large and kidney-shaped and nearly an inch across. It is rich golden-yellow in colour, and has a large blotch of black-purple around the toothed crest. Warm treatment as suggested for *O. cornigerum*. Flowers in late Summer.

ONCIDIUM LURIDUM. *Native of Trinidad.*

This species grows at low altitudes, generally on tall trees, but often on the ground in the heavy humus of the tropical forests where it has been blown by a passing storm. It is a robust growing plant with fleshy, pegriform pseudobulbs topped with broad, fleshy leaves about $2\frac{1}{2}$ inches wide and up to 18 inches long. The panicles spring from the base of the newly matured pseudobulbs. They are very long and slender, and the flowers are borne on short, lateral branches at intervals along the stem, usually from four to eight blooms appearing on each branch. The flowers are yellow with fringed margins, the column being white marked with black and pink. This plant requires plenty of moisture and sunlight. In Brisbane it will do passing well in a basket suspended from a tree. In Sydney glasshouse treatment will be needed; while in Melbourne and Adelaide heat is essential. Flowers in Summer, the blooms remaining perfect for three or four weeks.

ONCIDIUM MACRANTHUM. *Native of Colombia.*

A very handsome species with stout, ovoid, compressed, furrowed (and in old age somewhat wrinkled) pseudobulbs. They bear two leathery, strap-shaped leaves about a foot long and 2 inches in width, sharply pointed and dark green in colour. Flower scape is very long (up to 12 feet), twining and branching. It carries up to 75 flowers, each between 3 and 4 inches across. Sepals and petals are narrow at the base then broadly ovate, crisped and wavy, the petals being rather broader than the sepals. Both are fleshy and thick. They are bright yellowish-brown, the petals being rather more yellow or golden. Lip is comparatively small and roughly triangular. It is white and has two purplish-brown side lobes. Blooms in Spring and early Summer and lasts for many weeks in beauty. Treatment as for *O. cornigerum*.

ONCIDIUM MARSHALLIANUM. *Native of Brazil.*

A striking and beautiful species with oblong, compressed pseudobulbs bearing two leathery, oblong-lanceolate leaves up to about 8 inches long by 2 inches broad, bright green on top and pale green underneath. The stout flower spikes grow up to a couple of feet long, branched, with numerous flowers each between 2 and 3 inches across. Sepals are short, ovate and concave, yellow prominently barred with purple. Petals, twice as long, reniform, wavy and bilobed, golden yellow with large blotches of chocolate in a row along the middle. The spreading lip is nearly 2 inches across, notched, contracting at the base with two small side lobes. It is bright yellow spotted with orange-red at the base and is crested with a number of fleshy tubercles. Flowers in Summer and lasts well. Treatment as for *O. cucullatum*.

ONCIDIUM ORNITHORHYNCHUM. *Native of Mexico and Guatemala.*

A dwarf species with smooth, ovate, compressed pseudobulbs, each with two sword-shaped and pointed leaves. Flower scapes, up to 18 inches long, incline to droop, and are crowded with pretty flowers up to an inch in width, and rosy-purple in colour. Flowers in Autumn and Winter and lasts some weeks in beauty and fragrance. Cool growing and shade loving, it likes plenty of moisture at all times.

Var. *albiflorum*.—White flowers crested with yellow. Likes rather warmer conditions than the type.

ONCIDIUM PAPILIO. *Native of Trinidad.*

A brilliant species of the same manner and growth as *O. Kramerianum* which latter is indeed generally treated as a variety of *O. papilio*. Flowers as described for *O. Kramerianum* but a brighter yellow with red marks and not quite so large. Flowers in succession, one blooming and falling as its successor opens. Treatment as for *O. Kramerianum*.

Var. *Eckbaudtii*.—Flowers large, lip yellow with an orange-red border.

ONCIDIUM PHALAENOPSIS. *Native of Ecuador.*

A variety of *O. cucullatum*, which see.

ONCIDIUM ROGERSII.

A variety of *O. varicosum* (q.v).

ONCIDIUM SARCODES. *Native of Brazil.*

A showy species with long tapering pseudobulbs, each about 5 inches tall, dark green in colour with a pair of leathery, shining green leaves up to 9 inches long by 2 inches broad. The flower spike is from 2 to 5 feet long, branched and many-flowered, with blossoms up to 2 inches in diameter. Upper sepal roundish, yellow with dull brown cross-bars, the lateral ones lance-shaped and dull brown coloured. Petals tongue-shaped and pointed, two-thirds from the base, bright brown sparingly lined with yellow, top portion yellow. Broad undulated lip, clear yellow except for a few red spots at the base. Flowers in Spring and lasts very well. Treatment as for *O. cornigerum*.

ONCIDIUM SERRATUM. *Native of Peru.*

A good species with large, oval pseudobulbs bearing long, broad, leathery, bright green leaves. Flower scapes up to 12 feet long, twining and branched, and carrying many good-sized flowers, often exceeding 3 inches in width, with wavy edged sepals and petals. The upper sepal is fiddle-shaped, while the laterals are oblong and curving. Petals oblong and curved in towards the column. They are bright chocolate brown, the edges being bright yellow. Lip, small and spear-shaped, is bright yellow and has a prominently ridged crest. Flowers in Winter and lasts a long time. Culture as for *O. cornigerum*.

ONCIDIUM SPACELATUM. *Native of Mexico and Guatemala.*

A popular and hardy species. Pseudobulbs elongate, ovate, flattened, two-edged, with long, sword-shaped leaves. Flower spikes up to 5 or 6 feet long and branched, crowded with attractive flowers, in the variety *majus*, about $1\frac{1}{4}$ inches across, and in *minus*, about $\frac{3}{4}$ inch in width. Sepals and petals bright yellow barred with deep chestnut brown. The lip is roundish in front and narrowed at the base. It is yellow, the contracted part being barred with brown. Flowers in early Summer and lasts three to four weeks. I find that this species grows well in Brisbane suspended from the branch of a tree which protects it from the too-direct rays of the sun. Copious water in Summer and less in Winter, but the compost never allowed to become dry. Ordinary bushhouse treatment will serve it quite well from Sydney northwards, though in the south it is well to get it under glass in the coldest weeks of the Winter.

ONCIDIUM SPLENDIDUM. *Native of Guatemala.*

One of the finest species with roundish, compressed pseudobulbs with a single thick, leathery, oblong-ovate leaf about 8 inches long and $2\frac{1}{2}$ inches wide. The

erect, branched flower scape is about 30 inches tall and is crowded with large attractive flowers about 3 inches wide. Sepals and petals are oblong, lanceolate and recurved, yellowish green with heavy bars of deep brown. The lip is large, rounded, flat and spreading, and clear bright yellow with a long, white crest. Flowers in Spring. Blooms last four weeks. Treatment as for *O. cornigerum*.

ONCIDIUM SUPERBIENS. *Native of Colombia.*

A very striking species with ovate, compressed, flattened pseudobulbs about 4 inches long, with leaves about a foot in length, 1½ inches wide, leathery, sharp pointed and keeled. Scape, twining, from 2 to 5 feet long, branched, and carrying many flowers, each about 2½ inches in diameter. The sepals are stalked, broad, curled and wavy, reddish-brown with a yellow margin. Petals shorter than the sepals, stalked, recurved, very wavy, bright yellow with bands of reddish-brown. Lip small, purple, pointed and recurved, crested with a large blunt, yellow tooth. Flowers in Winter and lasts four to five weeks. Treatment as for *O. macranthum*.

ONCIDIUM TIGRINUM. *Native of Mexico.*

A beautiful and fragrant species of fair-sized, broad, ovate, compressed pseudobulbs about 3 inches tall and bearing a pair of stout, leathery, bright green leaves about a foot long and two inches wide. Flower scape erect, stout and branched. Blooms numerous, each about 2½ inches in diameter. Sepals and petals about an inch long, wavy, recurved and pointed, red-brown barred and blotched with dull yellow. Lip broad and rounded in front, narrowed at the base, with a pair of ear-like side lobes, brilliant yellow in colour, slightly tinged with green. Flowers late Autumn and Winter, lasting a month. Very sweetly fragrant. Cool treatment as for *P. candida*.

ONCIDIUM VARICOSUM. *Native of Brazil.*

A very attractive species with ovate, angular, furrowed pseudobulbs to 4 inches in height, with a pair of firm, strap-shaped leaves, dark green and 9 inches long. Flower scapes strong, arching and branched, up to about 3 feet in length and crowded with small flowers about an inch in width. Sepals and petals small, greenish blotched with brown. Lip large, reniform, spreading into two ovate, lateral lobes, then narrowing to the base. It is bright yellow. Crest fleshy and toothed. Flowers in Winter and early Spring. Treatment as for *O. cornigerum*.
Var. *Rogersii*.—Lip 2 inches across, golden-yellow barred with red at base.

ONCIDIUM ZEBRINUM. *Native of Venezuela.*

A handsome species which is similar to *O. macranthum* in appearance and habit. The flower spike is long and twining, many-branched and many-flowered. Flowers 2 inches or more in diameter. Sepals and petals narrowed to a stalk at the base, ½ inch broad in the middle and acutely pointed at the apex. Edges very wavy. White, banded with reddish-purple towards the base. Lip small, bent sideways, fleshy, yellow spotted with red. Crest thick, warty and toothed. Flowers in

Autumn and lasts about a month. Treatment as for *O. macranthum*.

There are upwards of 250 species of *Oncidium* and, while each has a beauty and charm of its own, those listed above are the finest of them all. There are also a dozen or so natural hybrids as well as a considerable number of artificially crossed plants.

PALUMBINA CANDIDA. *Native of Mexico.*

A very distinct, small growing plant with compressed, oblong, smooth, one-leaved pseudobulbs, each about 2 inches in height, the leaf being sword-shaped, up to 9 inches long and half an inch wide, acute and keeled. The spikes spring from the new growths and are erect and nervy, and bear up to half-a-dozen flowers each about 1½ inches long. The lip is triangular in shape and white with a purplish-rose flush in colour. This plant flowers in Spring and lasts about three weeks in bloom. Cool treatment is necessary, a bushhouse being suitable almost anywhere, though in the South and the cooler parts of Brisbane it will be advisable to put it under glass in the Winter. It needs much drier treatment than the *Oncidiums* and should never have a great deal of water at the roots, though a daily leaf spray in Summer is desirable. In Winter keep practically dry, but give enough moisture when needed to prevent shrivelling.

(Syn. *Oncidium candidum*.)

ORNITHOCHILUS

A small genus of epiphytes closely allied to *Sarcobilus*. They are of botanical interest only. There is one local species listed, *Ornithochilus Hillii*, sometimes found in the coastal districts of Queensland. It has a short, rigid stem clothed with parallel lines of leaves, each being from 3 to 6 inches long and about an inch wide. They produce a number of slender racemes from the axils of the leaves. Each carries a number of tiny, drab white or creamy flowers, of interest only to botanists and those who specialise in Queensland orchids.

There are a few Himalayan and Burmese species, but, like our local plant, they have very small flowers and are not of particular account. Treatment as for *Aerides*.

PERISTERIA

A small genus of epiphytical orchids usually treated as terrestrials for cultural purposes. Although all the species are attractive, the only one usually grown in Australia is *P. elata*, the "dove orchid," from which the genus was named, the reason being that its column has something of the appearance of a white dove. They are rather difficult to obtain, as they are notoriously bad carriers, only a small percentage of any shipment surviving the journey. However, once landed safely, they are easy to cultivate and make vigorous growth.

They do best when treated as a terrestrial and given a rich compost of about equal parts of fibrous loam, leaf-mould and old cow-dung, with a little coarse sand or powdered brick. From the time growth starts in the Spring until the Summer is over they require copious water, but from the time growth is complete the supply must be diminished until, in the resting period, they must be kept practically dry. When the flower spikes appear, fortnightly applications of liquid manure are beneficial, particularly if they have been left undisturbed for more than one year. There are eight species recorded, of which the following are the best.

PERISTERIA CERINA. *Native of Mexico.*

An attractive species with furrowed, dark green, egg-shaped pseudobulbs each about 3 inches long. They bear a number of stout, lanceolate, plaited, dark green leaves over a foot long. The short flower spike is stout and pendulous, and grows from the base of the bulbs. For this reason it should be grown in an open bottomed basket in the same way as *Stanhopeas*. The flowers, which usually number between six and twelve, are cup-shaped, fleshy, generally yellow, in some varieties dotted with purple or violet. Bushhouse treatment will serve in the warmer parts, but where the temperature falls below 50 degrees a glasshouse is desirable in the Winter time.

PERISTERIA ELATA. *Native of Panama.*

A fine species of great beauty, not only of the flowers but the plant itself. Pseudobulbs up to 5 inches tall, broadly ovate, slightly wrinkled when mature, and bearing three or more prominently nerved leaves about 6 inches wide and as much as 3 feet long, tapering at both ends. Flower stems erect and up to 5 feet long, bearing a large number of good sized, white, sweet-scented flowers each about 2 inches in width. Sepals and petals are somewhat concave, giving the flower a rather cup-like form. The dove-shaped column is united with the thick fleshy lip. The flower is usually pure white all over, but in some varieties the lip and the lobes of the column are purple spotted. This species does best in a large pot, and should be housed in a glasshouse when the temperature falls below 55°. Flowers in Summer or Autumn, the flowers appearing in succession over a period of two months.

PERISTERIA PENDULA. *Native of British Guiana.*

Another handsome species, having oblong-ovate, somewhat sulcate pseudobulbs which bear a number of lanceolate, prominently streaked leaves. Its flower scape is pendulous, up to 18 inches long, and carries up to a score of globular, fragrant flowers, each about 1½ inches across. They are pale yellow tinged with pink and dotted with purple on the inside. Lip thick and substantial, creamy in colour, and having a fleshy, elevated crest. It should be planted in a basket and suspended in a glasshouse. (In the colder parts added heat will be required in Winter.) Flowers in Summer and lasts in perfection for some weeks.

PHAI O - CALANTHE

The work of the hybridist has found scope in crossing various species of *Phaius* and *Calanthe*. Most of these hybrids have more of the characteristics of the *Phaius* parent than the *Calanthe*. These hybrids are very attractive. Treatment as for *Phaius*.

PHAIUS

A handsome genus of terrestrial orchids of wide distribution, being found in Asia, Africa, Madagascar and Australia. They are generally easily grown and flower freely in most species, the blooms being attractive and long lasting. They do well when potted in a compost of fibrous loam, leaf-mould, sand and well-rotted cow-dung, two parts each of the loam and leaf-mould, and one part each of the sand and dung. They require ample water in the Summer months, but should be kept comparatively dry in the resting period. A sunny bushhouse or open air will suit them in the warmer parts, with glasshouse protection in the Winter in colder areas.

PHAIUS BICOLOR, a variety of *P. Wallichii*. *Native of Ceylon.*

This attractive species has large round, ringed, dark green pseudobulbs with plaited, sharp-pointed leaves about 18 inches long, the bases of which have a number of greenish scales. The flower spikes are sturdy and erect, and grow up to 5 feet in length, but are usually between 2 and 3 feet. Flowers are numerous and about 4 inches across. Sepals and petals bright red-brown in colour, spreading, linear-lanceolate and pointed. Lip three-lobed, the side lobes rosy pink and

folded into a funnel round the column. The front lobe is broad, undulated at the edge, creamy-yellow flushed with rose, the colour deeping at the apex. Flowers in Summer and lasts some weeks in beauty.

PHAIUS BLUMEI, a variety of *P. Tankervilleae*. *Native of Java.*

This handsome plant is very similar in habit to *P. Tankervilleae*, so well known to us. The pseudobulbs, short and roundish, are produced from a creeping rhizome. Leaves lanceolate and plaited, about 2 feet long. Flower scapes grow from base of pseudobulbs and reach a height of from 2 to 4 feet. They are terminated in a raceme of numerous flowers, each about 4 inches across, with narrow, pointed sepals and petals olive-brown in colour. Side lobes of the lip yellow and curled over the column, while the front lobe is large and spreading and is crimson with a yellow edge. Flowers in Autumn and lasts well.

Var. *Assamicus*.—A variable variety, its sepals and petals ranging from light yellow to red-brown, and the lip from pale yellow edged with white to orange bordered with purple.

Var. *Sanderianus*.—Sepals and petals bronze, lip larger than the type, bronze with a wide band of white round the edge, and a large, dark pink blotch.

PHAIUS HUMBLIOTII. *Native of Madagascar.*

One of the loveliest of the genus, with stout pseudobulbs and typical, plaited leaves. The erect flower spike carries a number of large, handsome flowers with rosy-pink sepals and petals, blotched with white and red. The brown lip is large, the side lobes curled inwards and projecting forward, the middle lobe being spreading and emarginate, with a fleshy callus on the crest terminating in front in a small keel. Flowers in Summer and lasts well.

Var. *albiflora*.—Sepals and petals pure white with a purple lip.

PHAIUS MACULATUS, a variety of *P. flavus*. *Native of Northern India and Japan.*

A handsome species with ovate, furrowed pseudobulbs each about 2 inches high. Leaves long, comparatively narrow, pointed and prettily variegated with large, round, yellow spots on a dark green base. The flower stems grow to a height of 2 feet and carry a cluster of about a dozen flowers, each from 2 to 3 inches across, with sepals and petals oblong and clear yellow. Lip yellow, the edges of the middle lobe being streaked with reddish brown. Flowers in Spring and lasts some weeks. (Syn. *Bletia Woodfordii*.)

PHAIUS SIMULANS. *Native of Madagascar.*

A distinct species with small, slender pseudobulbs growing from a rhizome. Leaves from 6 to 9 inches long, plaited and pointed. Flower spikes erect, carrying a few handsome flowers each about 2½ inches wide, with pure white sepals and petals, the latter being slightly broader than the sepals and overlapping them. The lip is three-lobed, lateral lobes yellow, thickly dotted with brownish-crimson,

and forming a tube about the column. Central lobe, smaller than the laterals, is roundish and divided in front, the edges being gracefully waved. In colour it is white spotted with magenta. It flowers in Summer. Much warmer treatment is required than for the other species, and it should be grown in a glasshouse in Brisbane where it can have a shady but moist position. It should be potted with only a very thin layer of osmunda and a little sphagnum moss.

PHAIUS TANKERVILLIAE var. *Bernaysii*. Native of Queensland.

This native species was originally considered by Mr. F. M. Bailey to be a variety of *P. Tankervilliae*, with which it is often found growing, but Reichenbach, the younger, classified it as a variety of *P. Blumei*, and it is generally listed as such. In growth it resembles *P. Blumei*. The sepals and petals are lanceolate and sharply pointed, white on the outside and a light yellow inside. Side lobes of the lip are deep yellow, the middle lobe white with a yellow centre. The flower has a conical, curved, greenish spur. Flowers at various times but generally in Summer and Autumn.

(Syn. *P. Bernaysii*.)

PHAIUS TANKERVILLIAE. Native of China and Australia.

This species is well known to most Australian orchid growers. Unfortunately the spread of cultivation has destroyed most of the natural stands of this plant, so that it is now comparatively rarely met with. In fact, quite often when someone stumbles across a patch it is thought to be a new orchid. However, a good number of plants of this and *P. Bernaysii* are growing on Moreton and Stradbroke Islands, where they are strictly protected under the Native Plants Act. Pseudobulbs are large and round, prominently marked with circular scars. Leaves large, oblong, lanceolate and pointed, prominently nerved and dark green in colour. Flower spikes spring from the base of the pseudobulbs and bear a large number of 4-inch flowers, with oblong lanceolate sepals and petals, white outside and chocolate-brown inside. The lip is tubular, whitish, spreading at the apex, with a yellow throat and disk. The sides are flushed with crimson. Flowers in Winter and Spring and lasts well. This plant will grow quite well when planted in a sunny place in the garden or in pots in an airy bushhouse. In its native state it is usually found on the margins of swamps where the water reaches and sometimes covers the bases of the plants in Summer and dries away in Winter.

Var. *Rowanae*.—Sepals and petals mottled pink.

Var. *superbum*.—Inside of the sepals and petals bright yellow, the lip being reddish-purple fringed with rose-pink.

(Syn. *P. grandifolius*.)

PHAIUS TUBERCULOSUS. Native of Madagascar.

A fine species which grows in tufts with stems springing from a rhizome. The leaves are similar to those of *P. simulans*. Flower spikes spring with the new leaves and carry about half-a-dozen 2½-inch flowers, which resemble those of *P. simulans*

in form and colouring, but the disk has three deep yellow keels, the middle one channelled, and a purple disk with four rows of white hairs at the base. Treatment as for *P. simulans*.

PHAIUS WALLICHII. *Native of Northern India.*

A very beautiful species with large, ovate pseudobulbs bearing a number of large, oblong-lanceolate, plaited leaves which sometimes grow from 3 to 4 feet in length. The erect spikes are tall, occasionally reaching a height of 5 feet. These carry a large number of 4-inch flowers with lance-shaped sepals and petals, white outside and orange-yellow flushed with reddish-purple on the inside. The lip is yellow with a brownish-purple throat, pointed at the apex and crisped at the margin. Flowers in Autumn and lasts about six weeks.

Var. *Mannii*.—Flowers larger and deeper in colour.

There are many hybrids now available, all of which are interesting and most of them beautiful. Among the most attractive are:—

- | | | | |
|------------------|--------------------------|----------|-----------------------|
| <i>Cooksonae</i> | — <i>P. grandifolius</i> | <i>x</i> | <i>Humblotii</i> . |
| <i>Cooksoni</i> | — <i>P. Wallichii</i> | <i>x</i> | <i>simulans</i> . |
| <i>Gravesii</i> | — <i>P. Wallichii</i> | <i>x</i> | <i>grandifolius</i> . |
| <i>Hybrinus</i> | — <i>P. grandifolius</i> | <i>x</i> | <i>Wallichii</i> . |
| <i>Ruby</i> | — <i>P. Cooksonae</i> | <i>x</i> | <i>Humblotii</i> . |

PHALAENOPSIS

This rather large genus of epiphytical orchids includes in its number some of the loveliest of orchids; in fact, *P. Schilleriana* is, in my opinion, the most beautiful of all the treasures of the world of flowers. The long lasting quality of the blooms is an added attraction. The plants themselves are attractive in appearance and, given reasonably good conditions, are not difficult to maintain in good health.

Many growers are reluctant to commence growing plants of this genus because they have the impression that *Phalaenopses* are difficult to cultivate. Actually, providing a reasonably airy, warm, sunny position is available, they present no problem. I am firmly convinced that heated houses are not only unnecessary in the warmer parts of Brisbane and the North, but are actually detrimental to the plants. Where the position of the grower is subject to frosts or frequent fallings of the temperature below 40° a heated house is necessary. Ordinarily, a glasshouse is desirable, but I have seen some very well-grown and floriferous plants growing in an ordinary open bushhouse in Brisbane.

The usual potting medium is clean wood-charcoal with a topping of sphagnum moss, and this usually gives quite good results. Personally I am not very keen on sphagnum moss. It is adversely affected by tap water, and moreover it is too

often the hiding place of slug spawn, which hatches in due course, the resultant gastropods often playing havoc with root, leaves and flower spikes. Experiments made with the hardier species, such as *amabilis* and its varieties, have shown me that a thin layer of osmunda fibre on top of the charcoal gives very satisfactory results. Certainly it does not hold the water like the moss, but this disadvantage can be minimised by more frequent sprayings. One point in potting these plants is essential—they must be so potted that the base of the stem is above the level of the container. I find the best way to achieve this is to wire or tie the plant on to a piece of 1in. x 1in. hardwood just long enough to be wedged firmly in the top of the pot. Broken crocks, inserted edgewise, are put in for drainage, and the pot then filled to about an inch from the top with good sized pieces of charcoal. The plant on its length of hardwood is then wedged into place and the layer of osmunda fibre spread over the charcoal and about the plant. An empty coconut makes a remarkably good container for plants of this genus, the roots appearing to appreciate the rough fibrous nature of the coconut shell.

Although all the *Phalaenopsis* are natives of tropical countries, they are generally found growing upon highlands and usually upon the branch of a tree, but sometimes in masses on the face of a cliff. In all cases they are exposed to the direct rays of the morning sun, and always they are in locations where there is a copious rainfall throughout the Summer months and comparatively little in the Winter months, though always sufficient to keep the plants from becoming too dry. Treatment approaching these conditions is therefore desirable when they are in cultivation. In the Summer frequent soakings are essential, and their surroundings should be sprayed two or three times a day. In Winter a wetting once a week is ample, but care should be taken that this is not done on a dull, bleak day. In fact, the watering of any orchids during the Winter months should be reserved for clear, bright, sunny mornings. In Winter particular care should be taken to avoid drips from the roof of the glasshouse falling into the centre of the plant, as this is almost certain to cause rot or damping off.

Slugs, beetles, thrips, red spider and Java scale seem to have a particular fancy for *Phalaenopsis* and growers should exercise constant vigilance so that they can be dealt with before damage is done to the roots or leaves.

There are about 30 species recorded, of which the following are the choicest:—

PHALAENOPSIS AMABILIS. *Native of Java, Borneo and the Philippine Islands.*
(Illustrated.)

A magnificent species of hardy growth, making it one of the best for beginners to cultivate. It grows from a stout, fleshy stem clothed with oblong, thick, leathery, light green leaves, and furnished with numerous thick, fleshy, firm roots. The flower racemes are produced from the axils of the leaves, and are stout, long and arching, and usually purplish in colour. Flowers 4 to 5 inches in diameter. Petals considerably broader than the sepals, which they overlap. Both pure white. Lip three-lobed, white with a yellow tinge in the side lobes on the forward edges. Middle lobe pyriform and emarginate, the apex separating into two curling filaments, yellow in colour and twisting upwards. This species flowers at various

seasons from Spring to late Autumn, and occasionally in the Winter. Flowers last for many weeks in perfection.

Syn. *P. grandiflora*.

Var. *Rimestadiana*.—Flowers larger than the type, with deeper colouring on the side lobes of the lip.

Var. *Rosenstromii*.—Flowers very similar to *P. amabilis*. Flowers $2\frac{1}{2}$ to 3 inches in diameter, slightly more delicate in substance. (Native of North Queensland.)

PHALAEENOPSIS APHRODITE. *Native of Java and the Philippine Islands.*

This species is akin to *P. amabilis*, but the flowers are smaller. Actually Lindley recorded *Aphrodite* as being synonymous with *P. amabilis*, whereas his *P. grandiflora* is synonymous with *P. amabilis* (Blume) as we know it. *P. Aphrodite* has thick, brownish-green, rather elliptical leaves with a prominent midrib. Flowers are borne on long, usually pendent (and occasionally branching) racemes. They are about 3 inches in diameter, white, the inside of the lip being spotted and streaked with rose-pink and yellow. Sepals broad and ovate, petals broader and rhomboidal in shape. The apex of the lip is divided into two fine, twisted filaments. Flowers in Spring and Summer.

Var. *gloriosa*.—Rather larger than the type and more brilliantly marked.

PHALAEENOPSIS CORNU-CERVI. *Native of Burma.*

A striking species with leathery, oblong leaves, bright green in colour. Spikes are erect, thickening at the top, and flattened at the apex, and bearing about a dozen smallish flowers in succession. Dorsal sepal narrow and pointed, the lateral ones somewhat falcate. Dorsal sepal greenish-yellow barred with red-brown and blotched at the base. The laterals are barred on the apex only. Petals smaller, coloured like the dorsal sepal. Lip white or cream, incurved, trilobed, side lobes oblong, middle lobe crescent-shaped. Flowers in Summer.

PHALAEENOPSIS ESMERALDA. *Native of Burma and Cochin China.*

A pretty species with thick, fleshy, grey-green leaves with a few dull brown spots, rarely exceeding 3 inches in length. The flower spike is erect, and from 6 inches to 18 inches tall, and bears up to a dozen flowers about $\frac{3}{4}$ -inch in width. Sepals and petals almost similar, and a light rosy-purple in colour. Lip a deep purple, lateral lobes yellow with two slender appendages at the base. Flowers in Spring and Summer.

Var. *antennifera*.—Flowers darker in colour.

PHALAEENOPSIS GRANDIFLORA. (A synonym of *P. amabilis* q.v.).

PHALAEENOPSIS INTERMEDIA. *Native of the Philippine Islands.*

A pretty species generally regarded as a natural hybrid between *P. amabilis* and *P. rosea*. General form of the plant similar to *P. Aphrodite*. Flower spike erect and arched, brownish-purple. Flowers, about $2\frac{1}{2}$ inches across, are white, the

petals being speckled with pink. The lip is three-lobed, the side lobes erect and cuneiform, violet dotted with crimson. The middle lobe is ovate, deep crimson, the point being separated into two fine tendrils. Crest of the disk deep yellow dotted with crimson. Flowers in Spring, Summer and Autumn. Lasts for weeks.

PHALAEOPSIS LEUCORRHODA. *Native of Philippine Islands.*

A handsome species apparently a natural hybrid between *P. Schilleriana* and *P. amabilis*. The fleshy roots are flat, and the oblong leaves are green with mottlings like those of *P. Schilleriana*. Flowers about 3 inches wide, sepals and petals white, the lateral sepals having a few purple dots at the base, while the petals are tinged with rose-pink at the base. The lip is white, the lateral lobes large and round and striped with purple on the lower parts. Crest yellowish. Callus, fleshy, orange spotted with purple. Blooms in Autumn and Winter and lasts for two months.

PHALAEOPSIS LOWII. *Native of Burma, Borneo, etc.*

A small flowered but very beautiful species. The pointed leaves are tufted, about 4 inches in length and $1\frac{1}{2}$ inches wide, deep green tinged with purple. The flower spike is slender, purplish, and, in particularly healthy plants, carries up to 20 blooms, but usually the number is from five to nine. These are up to $1\frac{3}{4}$ inches across, and have oblong sepals and broader roundish petals, both white with a violet flush. Lip trilobed, middle lobe rich purple, side lobes violet. Flowers in Summer and lasts six weeks.

PHALAEOPSIS LUEDDEMANNIANA. *Native of Philippine Islands.*

A rather strong growing plant with very thick, oblong leaves from 6 to 8 inches in length and a bright, shining green in colour. Flower spike up to a foot in length, erect and bearing a few flowers averaging $2\frac{1}{2}$ inches wide. The oblong pointed sepals and petals, white with cross lines of violet-purple at the base and brown at the tops. Middle lobe of lip is oblong, and deep violet in colour, the side lobes being a paler shade of the same colour. Flowers in Spring and Summer, the blooms lasting over eight weeks in beauty.

PHALAEOPSIS SANDERIANA. A variety of *P. Aphrodite*. *Native of Philippine Islands.*

A very handsome species which closely rivals *P. Schilleriana* for pride of place as the loveliest of the genus. Leaves elliptical and 9 to 12 inches in length. The upper surface irregularly mottled with grey, on the underside, purple. The flower spikes are very long and branching, and are usually well laden with graceful flowers from 3 to 4 inches across. Sepals ovate and broad, the petals larger. In colour, they are a soft rose-pink with a suggestion of a purplish tinge. Lip three-lobed, side lobes roundish, white, spotted with purple low down. Middle lobe white, tinged on the edges with yellow. The apex is divided into two long curling filaments. Flowers at various times, but most frequently in late Spring and early Summer.

PHALAEENOPSIS SCHILLERIANA. *Native of Philippine Islands.* (Illustrated).

The finest of all orchids. Leaves as described for *P. Sanderiana*, but growing to greater size, specimens with leaves nearly 2 feet long having been reported. Flower scapes grow to as long as 3 feet, are well branched and crowded with flowers $2\frac{1}{2}$ to 3 inches across. Sepals and the larger and rounder petals are light mauve, sometimes deep rose, whitish at the edges. Lip three-lobed, the side lobes rounded, the central one oval and divided into spreading, curved horns. It is the same colour as the sepals, but has a few darker patches. The disk has a four-cornered callus, yellow spotted with red-brown. Flowers in Summer, the blooms lasting seven to eight weeks.

Var. *purpurea*.—Flowers deeper coloured, in some plants bluish purple.

Var. *vestalis*.—Flowers pure white, except for a little yellow on the base of the lip, which has a few brownish-yellow spots. As there is only one known specimen of this plant, and, as the value runs into four figures, any grower who manages to fluke a plant should be very happy about it!

PHALAEENOPSIS SPECIOSA. *Native of Andaman Islands.*

Leaves large, yellowish-green, oblong, wedge-shaped. Racemes long and branching. Flowers purple marked with white on the lip and at the base of the petals. About $2\frac{1}{2}$ inches across. Fragrant. Flowers in Summer and lasts six weeks. This species likes plenty of light at all times.

PHALAEENOPSIS STUARTIANA. *Native of Mindanao—Philippine Islands.*

A popular species with oblong, obliquely notched leaves up to about a foot in length, marbled on the upper surface when immature, the mottlings mostly fading to a greyish-green with age, though occasionally the mottled appearance is persistent. Racemes, very long and branching, carry a large number of attractive flowers, each about 2 inches across. The rhomboidal petals are twice as wide as the oblong sepals. Petals and upper sepal pure white. Lateral sepals pale yellow spotted with reddish-brown at the base, and white on the upper part. Lip white, the side lobes and the centre of the front lobe well spotted with red. Apex of the lip divided into two curling filaments, sometimes extended considerably. Flowers in late Winter and early Spring. Lasts nearly two months in beauty.

Var. *bella*.—Side lobes of lip lined with red, middle lobe prominently blotched with purplish-brown.

Var. *Hrubyana*.—Sepals and petals purple at back, the petals having a broad white margin, the sepals a narrow white margin.

Var. *nobilis*.—Flowers are larger than the type, the spots on the lip and sepals being fewer in number but larger.

Var. *punctatissima*.—Sepals and petals thickly spotted with purplish red.

PHALAEENOPSIS SUMATRANA. *Native of Sumatra.*

A striking species with three or four oblong, rather oval, fleshy, bright green leaves. Flower spikes shortish and bearing five to ten flowers about $2\frac{1}{4}$ inches

in width. Sepals and petals cream, barred with reddish-brown. Lip narrow, side lobes ending in a short tooth. Middle lobe oblong with four purple, raised lines with a dense tuft of hairs down the centre to the apex. Flowers in Spring and Summer, and lasts five to six weeks.

Var. *Kimballiana*.—Sepals and petals yellow barred with red. Lip deep greenish yellow, side lobes orange.

PHALAENOPSIS TETRASPIS. *Native of Andaman Islands.*

Another beautiful species with a few dark green, fleshy, somewhat wedge-shaped leaves, and long drooping and branched panicles which carry large numbers of 2½-inch flowers. These are a glossy white (occasionally pale cream), the side lobes of the lip having a yellowish blotch. The central lobe has a cushion of hairs at the apex. Flowers in Summer and lasts four to six weeks.

PHALAENOPSIS VIOLACEA. *Native of Malaya.*

A fragrant species with tongue-shaped, glossy, light green leaves up to about a foot in length. Flower spike short, only two or, at the most, three flowers opening at a time. These are up to 2½ inches across with broadly lanceolate sepals and petals, which are violet-rose at the base, becoming yellow towards the tips. Lip deep magenta with a yellow crest. Blooms in Summer, the flowers lasting in succession for a very long time.

Var. *Bowringiana*.—Flowers light yellow, striped and spotted with purple.

Var. *Schroederiana*.—Sepals and petals white with a rose-purple suffusion at the base.

There are many other species. There are also a number of hybrids available.

PHOLIDOTA

An epiphytcal genus whose species are of botanical interest rather than horticultural. There is one native species which is sometimes seen in collections. This is:

PHOLIDOTA IMBRICATA. *Native of Malay, New Guinea and N. Queensland.*

This species has small, roundish pseudobulbs with a few sheathing scales and lanceolate, pointed leaves, up to about 18 inches long, and prominently ribbed. The flower scapes spring from the base of the pseudobulbs, and bear a large number of tiny flowers, with narrow, creamy sepals and petals, in two parallel rows. Although the individual flowers are small, the long spikes are interesting and attractive. It grows quite well when potted in a shallow, well-drained pot with a thin layer of peat or fibre. A sunny place in a bushhouse or in the open will suit this species, which flowers in Spring and lasts well.

PHREATIA

Another small genus of no horticultural value. The native species is *P. limenophylax*, which grows on trees in the vicinity of Rockingham Bay (North Queensland). It has short, slender stems, sheathed by the bases of the short, dark green, caniculate, linear leaves, which are 1 to 2 inches long and about a quarter of an inch wide. The short stems carry a few minute, yellow flowers. It grows quite easily, potted in peat in a sunny place.

PHYSUREAE or JEWEL ORCHIDS

The so-called "Jewel" or "Gem" Orchids. This group is cultivated for the surpassing beauty of its leaves, which are undoubtedly the loveliest of all the plant world. The flowers are insignificant and, indeed, should be removed from the plant as soon as they appear, to conserve its strength.

In Brisbane, and more particularly in places south of that city, no one should go in for the cultivation of this group unless he can provide hothouse treatment. An odd plant or two might be grown in an unheated glasshouse by way of experiment and in certain parts of Brisbane would probably do well enough. In the North, glasshouse treatment should suit them excellently.

They grow naturally in the hot, moist glens in the jungles of Assam, Java, Borneo, Malaya, India and Ceylon. In Summer the temperature about them must not fall below 70° nor exceed 80°, and in the Winter the range should be between 60° and 70°. They should be planted in a compost of turfy peat (in lumps about the size of a sixpenny piece), a little chopped up sphagnum moss and osmunda fibre, a sprinkling of good leaf-mould mixed with some powdered brick, and they should be grown only in the smallest of pots. These pots should stand on a layer of cinders, which should be kept in a saturated condition. The atmosphere must be moist at all times. Where only two or three plants are grown bell glasses are helpful, one being placed over each plant. Where a number are grown it is desirable to have a special glass frame to conserve the heat and moisture they need.

The following is a brief description of the best species:—

ANOECTOCHILUS CONCINNUM. Native of Assam.

Leaves olive green, striped and netted with coppery-red veins and markings.

ANOECTOCHILUS INTERMEDIUM. Native of Ceylon.

Leaves bronze-green with a silk-like sheen, mid-rib banded grey at base, striped and veined with bright gold.

ANOECTOCHILUS REINWARDTII. *Native of Java.*

Leaves dark bronze green, with good sheen, thickly interlaced with deep gold lines. They are about $1\frac{1}{4}$ inches long. This is a delicate type and difficult to land in Queensland by reason of its bad travelling capacity, although it is very plentiful in Java. However, with the improvement of aeroplane mails this disability should be removed.

ANOECTOCHILUS SETACEUS. *Native of India, Ceylon and Malaya.*

In its best forms this is probably the loveliest species, but it varies tremendously. Leaves are a soft velvet brown richly spangled with shining gold.

ANOECTOCHILUS WORTHINGII. *Native of Malaya.*

Leaves deep bronze and green, with a broad band of silvery grey along the mid-rib and bright red veins.

ANOECTOCHILUS XANTHOPYLLUM. *Native of Ceylon.*

Leaves very dark velvety green, with intersecting lines of pale green and yellow and bands of gold across the middle.

DOSSINIA MARMORATA (syn: *Anoectochilus Lowii*) *Native of Borneo.*

Leaves a dark velvety green, spotted brown, lined and veined with pale gold. Under surface pale yellow tinged with rose. A large species—the leaves being about four inches long by three inches across.

MACODES JAVANICA (syn: *Anoectochilus Javanicum*). *Native of Java.*

Leaves, about 4 inches long by $2\frac{1}{2}$ inches broad, narrow suddenly at the ends. They are apple-green in colour brightly veined with silver-grey, the under part being rosy.

MACODES PETOLA (syn: *Anoectochilus petola*). *Native of Java.*

Stems about 6 inches long clothed with a number of oval leaves about 3 inches by 2 inches and fleshy in texture. They are a soft, shining green veined with pale gold.

PILUMNA

Synonymous with *Trichopilia*, which see.

PLEIONE

A genus of small growing, deciduous orchids which are best treated as terrestrials. They are closely related to the *Coelogynes*, which they resemble in form of plant. They shed their leaves as soon as the pseudobulbs reach maturity and before the flower spikes are produced. The flowers are brilliantly coloured and of attractive form. For compost a mixture of good fibrous loam, leaf-mould, peat, dried dung and a little crushed brick or sand, with ample drainage of crocks and charcoal, will give good results. As soon as growth commences, watering should begin and progress should not be allowed to slacken until the new pseudobulbs have formed and the leaves commence to fall. At this stage water should be restricted to just enough to prevent the bulbs from shrivelling. Then, when the flower spikes begin to appear from the base of the pseudobulbs, watering may be commenced again, and a weekly or fortnightly application of liquid cow-manure will assist towards better and more numerous flowers. After the flowers fade the plants should be repotted in preparation for the next series of growth. Any of the following species are worth having:—

PLEIONE BIRMANICA. *Native of Burma.*

A beautiful species with roundish pseudobulbs, blue-purple with white bands, raised shoulder and depressed conical apex, crowned with a dark green, lanceolate, pointed leaf. After leaves fall, flower scapes are produced from the base of the bulbs, and are one- or two-flowered, each bloom about 3 inches across and shaped something like *Phaius Tankervilleae*, but with a more graceful lip. Flower is light purple in colour, the disk having three white, toothed keels, blotched with brown. The front of the lip is finely dentate, instead of frilled as in most of the species. Winter flowering.

Syn. *Coelogyne birmanica*.

PLEIONE CONCOLOR. *Native of India.*

A pretty species with the habit of the last-quoted species, the pseudobulbs, however, being mottled brownish-purple with a network of veins. Flowers about 3½ inches across. Sepals and petals dark pink. Lip pink with yellow blotches in which are some reddish-brown spots. Crests yellow. Front of lip fringed. Flowers in Winter.

Syn. *Coelogyne concolor*.

PLEIONE HOOKERIANA. *Native of Sikkim.*

A distinct species which differs from most of the *Pleiones* by producing leaves and flowers together. Pseudobulbs small (about an inch tall) and ovoid, smooth and green. They carry a single ovate-lanceolate, green leaf which is pointed and prominently veined. Stems are 4 to 5 inches high and bear a solitary flower up to 3 inches in width. Sepals and petals bright rose. Lip funnel-shaped at base and

spreading in front, in colour white with about half-a-dozen pale, brownish-purple spots towards the front, the throat being light yellow. Flowers in late Spring or early Summer.

Syn. *Coelogyne Hookeriana*.

PLEIONE HUMILIS. *Native of Northern India.* (Illustrated.)

A small growing species with little, flask-shaped, dark green pseudobulbs, clothed with fibrous scales, and crowned with a pointed, lanceolate, dark green leaf. The single-flowered spike grows from the base of the matured bulbs. The blooms are up to 4 inches in width, the sepals and petals, linear-lanceolate in shape, bluish white, and the trumpet-shaped lip the same colour, with half-a-dozen parallel fringed veins, with alternating stripes of rich purplish-crimson. Front of the lip is fringed. Flowers in Winter and lasts about three weeks.

Syn. *Coelogyne humilis* and *Epidendrum humile*.

Var. *albata*.—Sepals, petals and lip pure white, the latter having pale purple radiating lines with a bright yellow spot on each side of the lip towards the front.

Var. *tricolor*.—Sepals and petals pale pink. Lip very large and beautifully frilled. Pale yellow with brownish streaks in the centre. Flowers in early Autumn.

PLEIONE LAGENARIA. *Native of Himalayas.*

A brilliant species with clustered, wrinkled, broadly flask-shaped pseudobulbs, somewhat flattened near the apex and light green spotted with brown. Leaves solitary, lanceolate. Flower scapes short and single flowered. The bloom is about 2 inches wide. Sepals and petals rosy-lilac. Lip white, sometimes with a pale lilac tinge, the middle part having a large patch of yellow which is traversed by four to six bearded ridges, margin crinkled, white barred and blotched with deep magenta. Flowers in late Winter and lasts a month or more.

Syn. *Coelogyne lagenaria*.

PLEIONE MACULATA. *Native of Khasi Hills, Assam.*

A most variable species, the best varieties being very beautiful. Pseudobulbs roundish and somewhat flattened, glossy dark green in colour, with brown imbricated scales. Lanceolate leaves are plaited, one being carried by each young pseudobulb. Scapes short and solitary-flowered. Blossoms about 2 inches across. Sepals and petals white. The oblong lip is white marked with oblique purple lines. The front lobe is ovate and wavy, somewhat retuse. The disk is yellow with five to six elevated fringed veins lined with purple. The margins are wavy and barred with crimson-purple. Flowers in early Winter and lasts up to a month.

Syn. *Coelogyne maculata*.

PLEIONE PRAECOX. *Native of Northern India, etc.*

A very beautiful species of small habit, the pseudobulbs being top-shaped and pale mottled brownish-purple covered with a veined network. Leaf solitary, broadly lanceolate, membranous and plicate. Scape short and solitary-flowered. Bloom

3 inches wide. Sepals and smaller petals deep pink. Lip prominent, bluish-white, disk yellow, with five dentate crests which stretch almost to the apex, and a few yellow and pale pink spots. Front part beautifully fringed. Flowers in Winter, lasts two to three weeks.

Var. *Wallichiana*.—Sepals, petals, and lip deep magenta-purple, the latter having a broad, yellow streak in the disk, crossed by five ridges of white tubercles and with a few crimson stains in the throat, the apex being dentate. Flowers larger than the type.

PLEIONE SCHILLERIANA. *Native of Burma.*

A handsome species which, like *P. Hookeriana*, retains its leaves during the flowering period. Pseudobulbs very small, somewhat pear-shaped and clustered, pale green and pitted. Scapes short, bearing two leaves and a solitary flower. The oblong, acute dorsal sepal is erect, while the lateral sepals are somewhat falcate and incline downwards. Petals are very narrow and also tend to point downwards. Sepals and petals brownish-yellow. The lip is broad and trilobed. Lateral lobes erect, semi-ovate, white or cream with a deep, orange-red margin. Middle lobe, constricted at the base and spreading in front, convex and dentate on the margins. In colour it is the same tawny-yellow, blotched and spotted with orange-red. Disk has three elevated crests barred with orange-red lines.

Syn. *Coelogyne Schilleriana*.

POGONIA

A genus of terrestrial orchids of botanical interest only. There are a few native species, found chiefly in the coastal districts of North Queensland. They grow from small underground tubers from which spring leafless scapes with sheathing scales. After the flowers have fallen leaves are developed. The flowers are small, with more or less connivent sepals and petals, so that they do not expand widely. A compost of sand, leaf-mould and dried dung will serve. The following are the local species:—

POGONIA DALLACHYANA. *Native of North Queensland.*

Stems up to 6 inches high, with a few sheathing scales. Flowers are usually two or three on each stem, and are about an inch long.

POGONIA HOLOCHILA. *Native of North Queensland.*

Stems up to 10 inches high with a few scales. Up to half-a-dozen tiny flowers over half an inch long. The labellum is three-lobed, the disk having a bearded line running from it to the centre of the middle lobe.

POGONIA PACHYSTOMOIDES. *Native of Queensland.*

Stems 9 inches high and slender, with a few minute flowers, the labellum thin and translucent.

POGONIA UNIFLORA. *Native of North Queensland.*

Like the other species, this has very slender stems about 6 inches tall with a few sheathing scales. Flowers half an inch long. The three-lobed lip has its middle lobe contracted at the base, and the disk has a fleshy line at the base.

PLEUROTHALLIS

A large genus of epiphytical orchids, few of whose species are of horticultural value, though some of them are beautiful and have flowers of fair size. Like so many of the South American orchids, they do not travel well. However, one occasionally sees a plant or so of *Pleurothallis* in Australia, and only a year or so ago a few plants were available in Sydney. They do best in teak baskets in a compost of peat or polypodium fibre, with a little leaf-mould, dried cow-dung and pulverised brick added. In the warmer parts of Brisbane an open bushhouse will serve, particularly in the Summer months. But, where the Winter temperature falls below 50° for any length of time, they should be moved under glass for that season. Plenty of water must be applied during the warmer part of the year, but during Winter the plants must be kept comparatively dry. The best species are:—

PLEUROTHALLIS ORNATA. *Native of Colombia.*

A small growing orchid which grows in clusters of short stems springing from a stout rhizome. They are crowned with a small oval, fleshy leaf about an inch long. Flowers solitary and about half an inch in diameter. Sepals and petals pale purplish-brown, the sepals having a prominent fringe of white tendrils which wave at the slightest stir of the plant or the air about it. Flowers late Spring and lasts three to four weeks.

PLEUROTHALLIS PUNCTULATA. *Native of Colombia.*

The most attractive species, with 2-inch stems topped with stiff, leathery, lanceolate-oblong leaves, 3 inches to 3½ inches in length. Sepals and petals honey-coloured, dotted with purplish-brown. Top sepal rhomboidal, pointed and erect. Lateral sepals spreading, united at the base. Lip a beautiful deep maroon, the top being papillose (*i.e.*, furnished with a number of nipple-like protuberances). Flowers Summer, lasts three weeks.

PLEUROTHALLIS ROEZLII. *Native of Colombia.*

A handsome species with short stems, sheathed and crowned with a solitary, oblong, lanceolate leaf up to 7 or 8 inches in length. Flowers borne on a terminal raceme up to 10 inches long and bearing from six to nine good-sized flowers which hang like a series of bells. They are deep blood purple in colour and are about 1½ inches long—the petals shorter than the sepals. Lip spatulate. Flowers in Spring and lasts well.

PTEROSTYLIS

A genus of terrestrial orchids (commonly called the "greenhoods") most of the species of which are indigenous to Australia or New Zealand. These pretty little orchids grow quite well when planted in a shady part of a garden border in ordinary garden soil. Care must be taken in gathering them, for the tiny underground tubers are easily damaged. They will grow well enough in shallow pots or pans in a compost of loam and leaf-mould, but as most species have the habit of dying down after flowering they are apt to be discarded or forgotten and so perish. Although the flowers are quite pretty and interesting in their form, they are not usually included in horticultural collections, but they are mentioned herein for the benefit of those specialising in our native species.

PTEROSTYLIS ACUMINATA. *Native of Queensland, New South Wales, Victoria, Tasmania and New Caledonia.*

A slender plant from 6 to 10 inches high, growing in marshes near the coast. Height about 15 inches. Leaves in a flat rosette at the base. Solitary flowers produced in Winter and Springtime. Green with brown lines and tips. Typical greenhood shape.

PTEROSTYLIS BAPTISTII. *Native of Queensland and New South Wales.*

The largest native species. Grows up to a height of 2 feet with a basal rosette of oblong, light green leaves. The flowers are solitary, white, banded with green and marked with light brown. The hood is up to 3 inches in length. Flowers in Spring.

PTEROSTYLIS COCCINEA. *Native of New South Wales.*

A slender growing species with a few small, pointed leaves on the stem. Flower solitary. Hood much decurved, the segments being continued into long, hairlike tails. Colour red or greenish-red with dark bands. Flowers in Summer.

PTEROSTYLIS CONCINNA. *Native of Queensland, New South Wales, Victoria, Tasmania and South Australia.*

Generally found in the coastal Melaleuca swamps. Grows from a small rosette of

broadly oblong leaves about an inch long on a petiole of about the same length. Flower solitary, nearly an inch long, green marked with brown. The lip has a V notch at the apex. Flowers in Winter and Spring.

PTEROSTYLIS CUCULLATA. *Native of Victoria, South Australia and Tasmania.*

Grows among the scrubs along the sea coast in the sand of Victoria and South Australia. It has rather large oblong leaves, very glossy underneath. Stem from 2 inches to a foot tall, much sheathed with the bases of large bracts, the topmost of which forms a cowl over the bottom of the flower. Flower solitary. Light green with bold green and brown bands. Flowers in Spring.

PTEROSTYLIS CURTA. *Native of Queensland, New South Wales, Victoria, Tasmania and New Caledonia.*

One of the most commonly met with species. It grows from a rosette of elliptical leaves, the stem being from 4 to 12 inches tall. Flower greenish-white. Sepals very short, giving the flower a curtailed appearance. Tongue twisted. Flowers in Spring and Summer.

PTEROSTYLIS CYCNOCEPHALA. *Native of New South Wales, Victoria, South Australia, Tasmania and Queensland.*

A rather robust species, usually found in plain or open forest country in the south-east portion of Australia. Grows from a small rosette of leaves, the lower part of the stem being clothed with long sheathing bracts. Up to about a dozen small, rich green flowers are produced. The tongue resembles a swan's head. Flowers in Spring or early Summer.

PTEROSTYLIS DAINTREANA. *Native of New South Wales.*

A very slender species growing from a small rosette. Stem 2 to 6 inches tall. Bears up to half-a-dozen tiny flowers, greenish-white finely lined with dark green. Tongue pointed and dark brown. Flowers in Autumn and Winter.

PTEROSTYLIS DECURVA. *Native of New South Wales, Victoria and Tasmania.*

A small species with two or three broadly oval stem leaves. Stem 2 to 6 inches high with a single flower which is greenish-white with dark brown or green markings. Tongue protrudes through the lip. The segments are continued into long hair-like tails, that of the hood-sepal being much decurved. Flowers late Spring or Summer.

PTEROSTYLIS FALCATA. *Native of New South Wales, Victoria and Tasmania.*

This species has good sized flowers which are green and white, marked with brown. All the segments are falcate. Leaves basal, sometimes ascending the stem. Tongue narrow and very long. The extensions of the sepals sometimes forked. Flowers in Summer.

PTEROSTYLIS FOLIATA. *Native of Victoria, Tasmania and New Zealand.*

This is a very slender plant which gets its name from the fact that the leaves, which are comparatively large, grow up the stem, giving it a much leafier appearance than most of the species. Flower small, green, the tip of the hood dark brown. The extended tips of the sepals erect. Tongue large, oblong, the tip being blunted and recurved. Flowers Winter and Spring.

PTEROSTYLIS FURCILLATA. *Native of New South Wales.*

Similar to *P. decurva*, but with basal leaves (usually only two). Tongue slightly notched. Flowers in Autumn.

PTEROSTYLIS GRANDIFLORA. *Native of Queensland, New South Wales and Victoria.*

One of the handsomest species. Stem from 6 to 12 inches long, furnished with a number of long, narrow, pointed leaves. Flowers solitary, in colour rich green marked with rich red brown. Tips of the petals widely dilated. Tips of the sepals erect, extended into tails gracefully curved. Tongue long, the tip club-shaped. Grows in mountain gullies. Flowers in Winter and Spring.

PTEROSTYLIS LONGIFOLIA. *Native of Queensland, New South Wales, Victoria, South Australia, and Tasmania.*

A tall slender plant, the stems being a foot high or more. These are clothed with a number of long, linear, lanceolate, pointed leaves, up to 2 inches long, the middle leaves being longer than those at the top and the base. Flowers, from three to seven on the stem, small, green tipped with yellow and red. Lower sepal pendent. Tongue thick and glandular, and very sensitive. Flowers in Winter and Spring.

PTEROSTYLIS MITCHELLII. *Native of Queensland, New South Wales, Victoria, South Australia, and Tasmania.*

A slender, multiflowered species growing from a small rosette and reaching from 3 to 10 inches in height. Up to eight flowers are borne on the spike. These are green or greenish-white flecked or lined with red-brown. The fine tails of the lower sepals are divergent. Tongue narrow and slipper-shaped, and clothed with a few hairs. Flowers in Winter and Spring.

PTEROSTYLIS MUTICA. *Native of Queensland, New South Wales, Victoria, South Australia, Tasmania and New Zealand.*

A variable species which is most often short and robust in form, but is sometimes tall and slender and, rarely, short and slender. It grows from a basal rosette of leaves which usually are in the process of decay by the time the flowers are opened. The spike bears up to 15 small green flowers readily identifiable by the tongue which points inwards. Flowers in Winter and Spring.

PTEROSTYLIS NANA. *Native of New South Wales, Victoria, Tasmania, South Australia, Western Australia, and New Zealand.*

A small but dainty species which ranges between 2 and 12 inches in height with a single (or sometimes two) green flower. Leaves clustered at the base of the stem. Identifiable by the small green tooth in the fork of the lower lip. Grows in colonies under trees and shrubs and occasionally on the trunks of trees. Flowers in Winter and Spring.

PTEROSTYLIS NUTANS. *Native of Queensland, New South Wales, Victoria, South Australia, Tasmania and New Zealand. (Illustrated.)*

This species grows in well sheltered situations in open forest country and occasionally in the coastal scrubs. It is variable in size, ranging from tiny plants an inch high to giants of 15 inches. Leaves from a typical rosette at the base of the stem, which is sheathed by four to five bracts. Flower solitary. Green with a number of fine brown or red lines. The whole flower bent forward or nodding, hence the specific name. Flowers in Winter and Spring.

PTEROSTYLIS OBTUSA. *Native of Queensland, New South Wales, Victoria, and South Australia. (Illustrated.)*

A rather graceful species, the stem having a few pointed and undulated green leaves, topped, usually, by a solitary flower, though, occasionally, two flowers are produced. These are small, green, marked with brown or green lines. Sometimes wholly green. The tongue is blunted at the tip. Flowers in Autumn.

PTEROSTYLIS OPHIOGLOSSA. *Native of Queensland, New South Wales, and New Caledonia.*

A small herb-like species, with a stem that ranges between 5 and 10 inches in height, and is clothed with a few cordate, pointed leaves. The flowers are solitary (rarely two) and are greenish-white with brown and green lines. The distinguishing feature is the forked tongue, which is more or less like that of a snake—hence the name. Flowers in Autumn.

PTEROSTYLIS PARVIFLORA. *Native of Queensland, New South Wales, Victoria, South Australia, and Tasmania.*

A very variable species. That found on the coast and in the dry ranges grows from a rosette, is slender and rarely more than 7 inches in height. In this type the flowers are about three or four in number and honey coloured. Another form, found in the open forests, is of deeper colouring, with prominent dark green lines, marked with yellowish-brown or red markings. This form grows up to 2 feet in height, and has up to 13 flowers. Another type (var. *aphylla*), found on the higher hills, is stouter in form and carries one or two flowers. This form is practically leafless. Flowers at various times throughout the year.

PTEROSTYLIS PEDOGLOSSA. *Native of New South Wales, Victoria, and Tasmania.*

A very slender species which rarely exceeds 6 inches in height. Grows from a small rosette. Flower solitary, green in colour, sometimes tipped with brown. The hair-like extensions of the sepals are long and erect, while the tongue is stalked and sensitive. Flowers in Autumn.

PTEROSTYLIS PEDUNCULATA. *Native of New South Wales, Victoria, and Tasmania.*

An extremely slender species which grows from a rosette of small oval leaves and bears a single flower. This is small, green at the base, the upper parts being dark brown, red or light brown. Tongue oval and blunted. Flowers in Spring and Summer.

PTEROSTYLIS PULCHELLA. *Native of New South Wales.*

A tiny species similar to *P. grandiflora* in shape and colouring, but the flowers are much smaller and the tongue is cleft at the apex.

PTEROSTYLIS PUSILLA. *Native of New South Wales, Victoria, Tasmania, South Australia, and Western Australia.*

Another slender, small flowered species, generally about 8 inches tall, but occasionally found growing up to 20 inches in height. The slender stem bears five or six green flowers flecked with brown, grey or palish red-brown. Tips of the sepals are blunted. Tongue oval with a straight tip and a row of small hairs round the edges. It is very sensitive.

Var. *prominens*.—Flowers deep red on long stalks. Flowers in Spring and Summer.

PTEROSTYLIS REFLEXA. *Native of Queensland and New South Wales.*

A small but graceful plant from 4 to 8 inches high, with small bract-like leaves on the stem. Flowers small and solitary, greenish-white, marked with greenish-brown lines. The sepals and petals extended into long reflexed tails. Flowers in Autumn.

PTEROSTYLIS REVOLUTA. *Native of New South Wales and Victoria.*

A graceful species with a slender stem up to twelve inches high, bearing a single fair sized flower, white attractively striped with green and marked with brown. Leaves few at the base of the stem. Flowers in Autumn.

PTEROSTYLIS ROBUSTA. *Native of Victoria, South Australia, and Western Australia.*

A large flowered species with stems ranging from 2 to 14 inches in height, and furnished with a few narrow, lanceolate, green leaves. Flower solitary, white striped with green or brown. Tongue short and lanceolate. Flowers in Spring and Autumn.

PTEROSTYLIS RUFA. *Native of Queensland, New South Wales, South Australia, Western Australia, and Tasmania.*

Grows in a basal rosette which is usually withered by the time the flowers open. Stem, up to about 10 inches tall, bears three or four flowers of good size, which are usually green marked with red-brown, but sometimes greenish-white lined with red-brown. Tongue very sensitive, tip turned upwards, the edges fringed with short hairs, while two long erect hairs rise from the base. Tips of the lower sepals extended into long hair-like tails which vary in length. Flowers in Summer.

PTEROSTYLIS VITTATA. *Native of Tasmania, Victoria, South Australia, and Western Australia.*

An attractive species something like *P. grandiflora* in appearance, but much stouter in growth, the basal and stem leaves being broader. Stem grows up to 15 inches in height, and bears up to eight somewhat nutant flowers of good size. These are variously reddish-brown, grey-green or green with brown bands. Tongue sensitive with a spike at the base. The Western Australian varieties are particularly attractive. Flowers in Autumn and Winter.

PTEROSTYLIS WOOLLSII. *Native of New South Wales and Victoria.*

Grows from a rosette, the slender, bracted stem bearing three to five (or more) smallish flowers, usually green marked with yellowish-brown, or wholly red-brown in colour. The striking feature of these is that the sepals are terminated with very long, wavy tails up to $3\frac{1}{2}$ or 4 inches long. Flowers in Spring and Summer.

There are a few other species, but they are rarely seen.

RENANTHERA

A small genus of epiphytical evergreen orchids having brilliantly coloured flowers. The species best known to Australian growers are *Imschootiana* and *Storiei*, neither of which presents much difficulty in culture. The finest species is *R. coccinea*, but unfortunately it is a difficult subject to grow, and a very shy bloomer under cultivation.

The *Renantheras* thrive best under warm, moist conditions, but *R. Imschootiana* and *Storiei* do well enough in an open, sunny bushhouse in the warmer parts of Brisbane.

For compost a little fibrous peat or osmunda with which is mixed a few lumps of well dried dung will suit them. Ample drainage of crocks and charcoal must be provided. Plenty of light is essential, and a little direct sunshine will not harm them. In the Summer time copious water is necessary, but in Winter they must

be allowed to rest, and during this period only sufficient water to keep them from shrinking should be provided.

RENANTHERA COCCINEA. *Native of Cochin China.*

This species grows on long, climbing stems which cling to their host tree by means of the numerous white, fleshy roots which spring from the sides. Leaves are arranged in two parallel rows, and are four to five inches long, strap-shaped, notched at the apex, and dark green in colour. The flowers are produced on long racemes, branched, and many flowered. The individual flowers are between 2 and 3 inches across. The upper sepal and the two petals are strap-shaped, deep red blotched with orange. The two lower sepals are very large, oblong, widened at the apex, and have undulated edges. They are deep crimson, barred transversely with lighter lines. Labellum small, deep crimson, throat white. Spur conical and pointed. Flowers in Autumn, the blooms lasting a month or more.

By reason of its climbing habit this plant does best when grown on a tree fern trunk or a slab from one. It loves sunlight and should be placed in the warmest, sunniest, and moistest part of a glasshouse. In the colder parts of Brisbane and the South it will be desirable to give it artificial heat in the Winter.

RENANTHERA COCCINEA (var. *alba*). *A Native of Malaya.*

This attractive species grows to a great height in the forests of its native land, specimens up to, and even exceeding, 20 feet in height having been found. Under cultivation it rarely exceeds 4 or 5 feet. The terete stems are woody and clothed with leathery, oblong leaves notched at the apex, about 6 inches long and 1½ inches wide. They appear alternatively on opposite sides of the stem, their bases forming a sheath round it. From the nodes opposite the leaves the long slender flower stems grow, each bearing five or six good sized ivory-white flowers with linear oblong sepals and petals, the latter incurved at the apex. The lip is small and incurved and is prettily mottled with yellow blotches.

This species demands warm treatment, and will require glasshouse treatment in Brisbane, and in the south must have heat. It requires copious water throughout the Spring and Summer, and even during the Winter must not be allowed to become dry. Plenty of light is necessary, but in the Summer the plant should be shaded from the direct rays of the sun.

Synonyms: *Arachnis alba*, *Renanthera alba* and *Arachnanthe alba*.

RENANTHERA IMSCHOOTIANA. *Native of Assam.*

This very popular species grows on a slender, erect stem about 18 inches or more high, clothed with two rows of dark green, strap-shaped leaves about 3 to 4 inches long and notched at the apex. Flowers on a branching raceme. Upper sepals and petals small, oblong, reddish-vermilion or orange in colour, the lower sepals larger and broader and of the same colour. Flowers in Spring and Summer and lasts a month to six weeks.

RENANTHERIA LOWII. A synonym of *Vandopsis Lowii*.

RENANTHERA MATUTINA. *Native of Sunda Islands.*

A small growing species with rather stout and mottled stems with fleshy roots. The leaves are dark green, obtuse and unequally bilobed, and are arranged in two rows along the stem. Flowers grow on racemes from the axils of the leaves. They are about $2\frac{1}{2}$ inches from top to bottom and shaped like those of *Imschootiana*. In colour they are orange, with darker blotches. Lip minute, white with a red central spot. Flowers Spring and Summer and lasts well.

RENANTHERA STORIEI. *Native of the Philippines, etc.*

Similar in habit to *R. Imschootiana*. Flowers about 2 inches across. Sepals and petals dark orange, lower sepals broad and brilliant velvety crimson, with lighter crimson patches. Lip small, deep crimson, barred with yellow, and with a white centre. Flowers in Spring and Summer and lasts a month or five weeks.

RHYNCHOSTYLIS

A small genus of epiphytcal orchids which derives its name from the waxlike form of the column or style. They are closely related to the *Saccolabiums*, and in fact the best-known species, *R. retusa* var. *praemorsa*, is generally regarded as being synonymous with *Saccolabium Blumei*. They are easily cultivated, and will grow quite well under open bushhouse conditions in Brisbane and the North, and in a cool glasshouse in Sydney. For compost a mixture of polypodium or staghorn peat with a little matured cow-dung suits them admirably. A topping of green sphagnum moss may be given to preserve moist conditions. Copious water is necessary all through the growing period. In Winter less applied water is required, but enough should be provided to prevent any tendency to wither. During the growing season the application of a weak liquid manure will make for vigorous growth and better blooming. The two species generally grown are:—

RHYNCHOSTYLIS COELESTIS. *Native of Siam.*

A handsome, compact plant with evergreen stems up to a foot in height, clothed with fleshy, praemorse, deflexed, light green, channelled leaves. (Note.—Praemorse means bitten off—that is, ending abruptly.) These are from 4 to 6 inches in length. Flower scapes grow from the axils of the leaves. They are from 3 to 4 inches long, and are crowded with flowers, each about $\frac{3}{4}$ -inch in width, and on a white or pale blue pedicel. Sepals and petals are oblong-cuneate, white tipped with indigo-blue. The lip is saccate, white at the base and indigo-blue at the apex. Flowers in Spring and Summer, the scapes lasting two to four weeks in perfection according to the weather conditions.

Syn. *Saccolabium Coeleste*.

RHYNCHOSTYLIS RETUSA. *Native of Java, South Burma, Malabar and India.* (Illustrated.)

A variable species, all the varieties being attractive. The variety *praemorsum* is

synonymous with *Saccolabium Blumei* (q.v.). Stems stout and robust, and sheathed with the bases of the long, fleshy, channelled, dark green leaves, which grow to a foot or more in length and $1\frac{1}{2}$ inches in width. Spikes are produced from the axils of the leaves and reach a length of from 10 inches to 20 or even 24 inches. They are thickly crowded with flowers each from $\frac{1}{2}$ to $\frac{3}{4}$ -inch in width. These are white, beautifully spotted with deep pink, the labellum being almost entirely coloured. Said to be fragrant, but I have never been able to detect this feature. Flowers in early Summer and lasts from three to four weeks.

Syn. *Saccolabium retusum*.

Var. *praemorsum*.—Syn. of *Sac. Blumei*, q.v.

SACCOLABIUM and ALLIED GENERA

A genus of evergreen, tropical, epiphytcal orchids, many of the species of which are extremely attractive. The name comes from the sack-like lip. They all need warm treatment, and for most species the application of artificial heat will be necessary in Sydney and other centres where the temperature range is lower than 60-80 degrees. In the warmer parts of Brisbane and the North, glasshouses without artificial heat will serve. I have known them grow in ordinary, open bush-houses, but under these circumstances they are rather shy in flowering. Where they are grown under cool conditions, care must be taken to keep them as dry as possible during the Winter months. They require very moist conditions throughout the Summer. This applies both to the compost and to the atmosphere about them. A compost of polypodium or osmunda with a little matured cow-dung and a topping of sphagnum moss will be most satisfactory. They like plenty of light, and direct sunrays will do them no harm, provided they are protected from the midday sun, which is liable to burn the leaves.

SACCOLABIUM BLUMEI, a variety of *Rhynchostylis retusa*. Native of India and Java.

A very fine species with erect, leafy stems reaching a height of up to 18 or 20 inches, and sheathed with the bases of the strap-shaped, bright green, channelled, praemorse or truncate leaves, which grow in two rows along the stem. These are not so broad nor so arched as those of *Rhynchostylis retusa*. The flowers grow on pendulous, axillary racemes, and are crowded with good sized blooms having white sepals and petals with a faint rosy blush and a few spots of reddish purple or magenta. The lip is saccate and deep rose-pink. It flowers in early Summer and lasts up to three weeks.

Syn. *Rhynchostylis retusa praemorsa*, *Sac. Rheedii*, *Aerides praemorsum*.

Var. *majus*.—Flowers larger and less profusely spotted. Plant more robust in growth. Blooms appear in early Spring.

Var. *Russellianum*.—A particularly beautiful variety with very large, crowded blooms, well spotted, and the spikes longer than those of other varieties.

SACCOLABIUM COELESTE. A syn. of *Rhynchosstylis Coelestis* (q.v.).

SACCOLABIUM CURVIFOLIUM. *Native of Nepal, Burma and Java.*

A compact growing, dwarfed plant with erect stems from 6 inches to a foot in height, with narrow, praemorse, deflexed, channelled, light green leaves. Racemes erect and about 6 inches tall, crowded with bright orange-scarlet flowers about an inch across. Flowers in midsummer and lasts about three weeks.

Var. *luteum*.—Has bright yellow flowers.

SACCOLABIUM FURCATUM. *Native of Java.*

A slow growing but robust species with the typical stem and stout, truncate leaves about 8 inches long. It is something after the nature of *S. Blumei*, but the flowers are more loosely set on the spike. Colour, white spotted with rose. Blooms late in the Summer and lasts about three weeks.

SACCOLABIUM GUTTATUM. *Native of India, Java, etc.*

This is really a variety of *Rhynchosstylis retusa*. The flowers are white spotted with deep purple. Lip purple.

SACCOLABIUM HENDERSONIANUM. *Native of Borneo.*

A pretty, dwarf species with a short stem and strap-shaped, leathery, bright green leaves. Racemes about 6 inches long, upright and crowded with flowers, each nearly $\frac{3}{4}$ -inch in depth. Sepals and petals bright rosy-red. Lip is a somewhat flattened, conical spur, with three teeth at the mouth. It is white. Flowers in Summer and lasts three weeks.

SACCOLABIUM PRAEMORSUM.—Syn. with *Sac. Blumei*, *Rhynchosstylis retusa praemorsa*.

SACCOLABIUM RETUSUM.—Syn. with *Rhynchosstylis retusa*.

ANOTA GIGANTEUM. *Native of Burma.*

A grand species with stout, erect stems sheathed with the bases of the long, strap-shaped, stout, dark green leaves which are streaked on the surface with lighter green and are obliquely notched at the apex. Racemes are pendulous and are produced from the axils of the leaves. They are about a foot in length and carry a large number of closely packed, fragrant flowers usually more than an inch across. Sepals and petals white or creamy, spotted with amethyst, the wedge-shaped lip being a darker shade of the same colour. Flowers in Winter, Spring or early Summer, and lasts four to five weeks.

Var. *illustre* (Native of Cochin China).—A superior type of more robust growth with longer racemes and larger flowers, which are more richly spotted and coloured. Flowers in midwinter.

ANOTA VIOLACEA. *Native of Philippine Islands.*

A very fine species with erect, stout stems clothed and sheathed with recurved, deep green leaves a foot or more in length and two inches in width, and striped with darker green lines. Racemes grow from the axils of the leaves, and reach a length of 15 inches, carrying numerous flowers of a diameter of about an inch. Sepals and petals white spotted with pale mauve. Lip dark mauve with about half-a-dozen lines of a darker shade. Flowers in late Winter and lasts five to six weeks.

(Syn. *Vanda violacea*, *Rhynchostylis violacea*, *Saccolabium violaceum*.)

Var. *Harrisonianum*. (Native of Pulo Copang).—Slightly stouter in habit, the leaves being a little broader than *Anota violaceum*, and keeled underneath, and a lighter green in colour. Flowers ivory-white and fragrant.

ASCOCENTRUM AMPULLACEUM. *Native of Northern India.*

A rather dwarfed species with erect stems from 6 to 10 inches high, thickly clothed with two opposite rows of short, strap-shaped, channelled, deep green leaves, from 3 to 4 inches long, truncate and toothed at the end. Racemes are axillary, and are erect, about 6 inches long and densely clothed with $\frac{1}{4}$ -inch flowers, deep magenta-rose in colour, the lip having a cylindrical spur. Flowers in Summer and lasts three weeks. This species requires warmth and heat, and should be grown close to the glass.

Var. *Moulmeinense*.—Leaves spotted with purplish-brown. Flower spike longer, flower larger.

ASCOCENTRUM MINIATUM. *Native of Borneo.*

A dwarf species with stems about 4 to 6 inches tall with strap-shaped, channelled, stiff, fleshy leaves 3 to 4 inches in length and obliquely notched at the apex. The racemes are erect or spreading and are crowded with small, bright, orange-red flowers. These appear in early Summer and last two to three weeks.

Var. *citrinum* (Native of Philippine Islands).—Flowers lemon-yellow, darkening almost to orange in the centre.

GASTROCHILUS BELLINUS. *Native of Burma.*

A pretty, large-flowered but dwarf growing plant with short, erect stems furnished with pale green, notched leaves 6 to 8 inches long, and 1 inch wide. Racemes carry from three to seven flowers, each $1\frac{1}{2}$ inches across. These are variable in colour, the type variety having sepals and petals of olive green blotched plentifully with rich brown. The lip is cup-shaped at the base, with a horizontal ledge-like margin prettily fringed and pure white with a patch of yellow in the

centre; the cup is white dotted with mauve. Another variety has sepals and petals of greenish-yellow blotched with dark brown. Flowers in late Winter and lasts four weeks.

SARCANTHUS and ALLIED GENERA

These genera of orchids are of little value from the orchid grower's point of view. There are between 40 and 50 species recorded. A couple of species are found in Queensland or northern New South Wales, and these are sometimes grown by collectors who specialise in Australian orchids. Occasionally a few plants of *Staurochilus Dawsonianus* arrive in Australia wrongly labelled *Renanthera Imshoo-tiana*, although the resemblance between the plants is superficial.

The native species are:—

SARCANTHUS BECKLERI.

Habitat—northern New South Wales. Small growing species, generally found on the smaller branches of trees in the coastal scrubs. Flowers small, green-brown and sweetly scented.

SARCANTHUS TRIDENTATUS.

Habitat—throughout the coastal districts from North Queensland to Victoria. Grows in masses in the scrub trees usually in close proximity to running creeks, etc. Flowers are small and green with deep red markings. The lip is three-pronged or trident-like (hence the name) and very large in comparison with the rest of the flower. It is a very fragrant orchid—in fact overpoweringly so at certain hours.

The best method of growing these orchids is to attach them to a block of wood—and hang them in the moistest part of a bushhouse. Ample water is essential always, though in the Winter they manage with much less than in the Summer. They will also grow planted in shallow baskets or pans with a compost consisting principally of crocks, charcoal and a little staghorn peat or todea.

Trixsperrnum album, *Camarotis Keffordii*, *Saccolabium brevilabre*, *Sarcanthus MacPhersonii* and *Saccolabium orbiculare* are all Northern species and varieties differing more or less from the type. They require warmer conditions than the Southern species.

The exotic species best suited for cultivation are:—

CLEISOSTOMA RINGENS. *Native of Philippine Islands.*

Small growing species up to about a foot in height with oblong leaves 3 to 4 inches long. Flowers produced from short raceme from axils of leaves—generally 4 to 6 flowers at a time. Blooms are small and range from cream to a dingy yellow, the labellum being marked with purple and orange spots. The spur is comparatively large and broad. The climate of the Philippines is equatorial and there is very little difference between Summer and Winter—while the rainfall is comparatively high throughout the year. The low mean temperature at Mindanao is 70°, while the maximum average per month is round about 90° throughout the year. It will be seen from this that it will be necessary to grow this plant in a warm, moist glass-house in Brisbane, with heat desirable in Winter—while a heated glasshouse is essential for its well-being in the South. In North Queensland, in the warm areas, a warm bushhouse may serve, but it is probable that glasshouse conditions will be desirable even here during the Winter months. Copious water is needed except in Winter—but even during this season it must be kept damp.

STAUROCHILUS DAWSONIANUS. *Native of Moulmein, Assam, etc.*

This species grows on the trunks and branches of tall trees in the jungles around Rangoon. It resembles *Vanda Roxburghii* in appearance with its thick green recurved leaves. The flowers, which are about eau-de-nil in colour, with a pink labellum, are about an inch in diameter, and are produced from a drooping panicle from the axils of the leaves. They are sweetly scented.

Culture. The *Staurochilus* are typical air-plants and hence require an open compost similar to that prescribed for *Aerides*. They also do quite well on blocks of wood. The species should be grown in a warm, moist atmosphere and during the Summer time should have copious water applied to the roots. In Winter much less is necessary—in fact all that is required is enough to keep the plant from shrivelling.

SARCOCHILUS

This is a genus of epiphytical, evergreen orchids, most of which are of botanical interest only, being on the small side, but many of them are quite beautiful. There are about a dozen native species which are of interest to those who specialise in Australian or Queensland orchids. Strangely enough these Queensland orchids are rather difficult to grow in cultivation, and most growers find that after a year or two their plants have died or gone back so much that their end seems inevitable. The rather rare and beautiful *Sarcochilus Hartmannii* is an exception, and it seems to respond quite well to cultivation when treated as a terrestrial. Recommendations for treatment will be made when dealing with the species.

In the Australian Orchid Review, March 1939, there was published an interesting article on Blister Culture by Mr. Joseph Shaw (reprinted at foot of page). It seems to me that this method should be particularly suited to *Sarcochilus*.

SARCOCHILUS ARMITII. *Native of North Queensland (Burdekin River).*

A small growing species with lanceolate leaves $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long and from $\frac{1}{4}$ to $\frac{1}{2}$ -inch in width. Spikes $1\frac{1}{2}$ to 3 inches long, bearing a few tiny flowers with oblong sepals and rounded petals. Lip short, with ovate side lobes and rounded middle lobe. In colour, white or creamy. Flowers in Spring. This tiny plant requires warm, moist conditions. It will require glasshouse treatment in Brisbane, with heat in the South. Ample water throughout the Summer, with only enough to avoid shrivelling in Winter. Wiring them on a good, fibrous slab of tree fern stem is as good a means of growing them as any other. For those who wish to pot them, a thin layer of staghorn peat over a good quantity of crocks and charcoal will serve.

SARCOCHILUS AUSTRALIS. *Native of Queensland, New South Wales, Victoria, and Tasmania.*

An attractive species with slender stems which are clothed with a considerable number of oblong, sometimes falcate leaves about 4 inches in length and deep green in colour. Racemes slender, longer than the leaves and bearing four or five fragrant flowers each about $\frac{3}{4}$ -inch across. Sepals and petals vary from olive-brown to straw colour, the lip being marked with brown, red or purplish lines. Flowers in Spring and lasts two to three weeks. Treatment as for *S. falcatus*.

SARCOCHILUS BERKLEYI. *Native of Malaya.*

One of the exotic species with short stems clothed with strap-shaped, obtuse, dark green leaves, keeled on the underside. The drooping racemes bear a number of small flowers, the sepals and petals white, dorsal sepal bent forward into a somewhat hooded form, the typical, fleshy, saccate lip being stained with mauve, the middle lobe having two small horns. The short column has another which somewhat resembles the head and neck of a bird. Flowers in Spring and lasts two

Blister Culture, by Joseph Shaw—The title suggests something synthetic; in actual fact, "Blisters" are the reverse. They are natural rafts of wood.

We know of rafts, blocks, teak baskets, etc., but nothing, to my mind, can come up to these quaint containers. They are, in short, log blisters, tree blisters, hollow protuberances, knurls, lumps, pimples, cancers—call them what you will—they are the wounds of a broken limb which have healed over from some growing tree damaged by wind or bump. They are to be seen commonly in forest country. They are mostly found on wind-swept ridges where flooded Gum, Box, Blackbutt, Yellow Stringybark and Bloodwood, etc., grow. But almost any uncleaned paddock will yield a few. I have obtained eight and nine off one log, but this is an exception.

I should mention that I have a fair knowledge of timbers and forest country, but this is not at all necessary to procure these; a little enthusiasm, plus the energy, and any grower who has the opportunity of getting into a forest paddock can procure a few. In fact, many can be found by the roadside on country roads.

to three weeks. This species requires warm, moist conditions at all times. Copious moisture all through the growing period, with only a slight diminution in the Winter. In the South and in the cooler parts of Brisbane a heated house is essential. In the warmer parts a closed glasshouse may serve.

SARCOCHILUS BREVILABRIS. *Native of North Queensland.*

A rare species with elongated stems furnished with green leaves, 2 to 3 inches long and from $\frac{1}{2}$ to 1 inch wide, and striped with lines of darker green. Raceme 3 to 4 inches in length, and bearing up to half-a-dozen small flowers with lanceolate sepals and ovate petals, white with a few lilac flecks, lip very short, white with purplish or brown markings. Flowers in Spring and lasts two to four weeks. Treatment as for *S. Armitii*.

SARCOCHILUS CECILIAE. *Native of Eastern Australia.*

A dainty, little species widely distributed through the coastal districts from the far North to Southern New South Wales. It has rather fragile stems, usually from 3 to 6 inches in length, sheathed in the bases of the linear pointed, sometimes falcate, brownish-green leaves, which are fleshy and from 2 to 3 inches long. The very slender stems are erect and bear a number of tiny, pink (sometimes white), bell-shaped flowers with sepals and petals about $\frac{1}{4}$ -inch in length. The lip is short and fleshy, the middle lobe having a woolly surface. Flowers in Spring. This species is usually found growing on the trunks or branches of dead gum trees where it gets the full force of the morning sun. If gathered in the grower's locality open-air treatment will be best. This species is particularly suited for experiments with tree blisters.

SARCOCHILUS DIVITIFLORUS. *Native of South-east Queensland and New South Wales.*

This distinctive and interesting species has short, flattened stems with very flat, rough, dark coloured roots. The leaves, whose bases sheathe the stems, are oblong, falcate, very hard and coarse, dark green in colour, and rather sandpappy to the touch. They are up to 6 inches long and about $1\frac{1}{2}$ inches wide. The slender racemes are usually about 7 inches long, but in good specimens often reach from

My wife and I often go on a blister hunt, and derive great enjoyment. Our best tally so far was 32 in two and a half hours, but we struck a real patch that afternoon. These blisters are practically without exception hollow, or semi-hollow, according to the way the white ants have done their work inside, and a few well directed blows with the axe will sever them from the trunk of the log. If they are too tough to cut away they will be too tough to clean out, so leave them. A little experience will soon determine on sight which are the ones to tackle.

Dump the good ones in the back of the car and take them home and clean them out with mallet and chisel—not too drastically; the rougher they are inside the better. Bore a few holes with an inch bit and you have to hand the finest Orchid containers, to my mind, that it is possible to produce. If you are lucky and energetic enough to get a selection (no two are alike), you will find a pot to suit any Orchid you have—deep ones for *Vandas*, small ones for *Cypripediums*, large ones for *Cymbidium*s, and mediums for *Dendrobium*s and *Cattleya*s. I find that every blister has its Orchid and every Orchid has its blister—they go together. I have over a hundred hanging

9 to 12 inches. They are crowded with large, spider-like flowers, often exceeding 3 inches in width. The narrow, pointed sepals and petals vary from a greenish-gold to dark yellow, blotched with reddish-brown; lip small and white. The flowers are delicately fragrant, but unfortunately are very short-lived, seldom lasting more than a day or two. Flowers in Spring. Treatment as for *S. Ceciliae*.

SARCOCHILUS ERIOCHILUS. *Native of New South Wales.*

I have not seen this small species, which is recorded by R. D. Fitzgerald. It is described as having small, white flowers, the mid-lobe of the tongue having two inturred cups which are very woolly.

SARCOCHILUS FALCATUS. *Native of South-east Queensland, New South Wales, and Victoria.*

A very charming species, but one which is rather difficult to keep in cultivation. Stems 2 to 3 inches long, sheathed with the bases of the oblong, falcate, green leaves, which are about 4 inches long. Racemes, 3 to 4 inches long, bear up to six (though rarely more than four) white or creamy flowers with oblong sepals and petals each about half an inch in length. The short, thick lip has rather large side lobes, while the disk has a two-lobed scale between the lateral lobes. The labellum is white with vari-coloured markings. Flowers late Spring and lasts a couple of weeks or more.

Var. *montanus*.—Has purplish markings on the lip and segments. Leaves shorter than in the type. This species grows upon the mossy bark of trees in moist gullies or on the lower slopes of the mountains and the dividing range. It requires cool, shady conditions with plenty of moisture in the Summer, but very little in the Winter period. In its natural state the roots seem barely to touch the host tree's bark, and seem rather to depend upon the moss for support. Therefore they are not suitable subjects for potting, and it is better to attach them lightly to a piece of tree fern bark or a piece of a branch from a forest tree. Possibly the blister method will suit them.

SARCOCHILUS FITZGERALDII. *Native of Queensland and New South Wales.*

This is probably the most charming of the native species of *Sarcocbilus*. Its short rather slender stems are fully furnished with linear, pointed, dark green leaves

in my bush-house, also many on which I have mounted legs, either nailed on the outside or driven as pegs through holes, after the old 3-legged milking stool fashion. I have given many away and have about fifty on hand ready to plant.

You may think I possess opportunities enjoyed by few to procure these, but many others should also be able to get some.

They are a natural affinity, warmer in winter than pots, kinder to roots, and practically indestructible; the root growth of some *Dendrobiums* forms a network all over the blister; *Cattileyas* also thrive in them.

Method of Potting.—First select the blister required and in the case of *Dendrobiums* fill at least a third with crocks and charcoal; I also use chopped lumps of old bone; then cut with knife or old saw a cone-shaped piece of tough fibred staghorn peat slightly larger round than the diameter of blister and flat on the bottom, rising sharply to a central peak. Wedge this down

from 4 to 8 inches long, and from $\frac{3}{8}$ to $\frac{1}{2}$ -inch in width. Flower scapes, slender and about 9 inches long, carry up to nine or ten graceful flowers about an inch across and with ovoid-ovate sepals and petals of pure white with a large number of small bright reddish-purple spots at their bases, forming a ring round the short orange lip. It grows mostly upon rocks in the deep ravines of our coastal ranges, usually in a very moist and fairly shaded position. Like *S. falcatus* it has a very slender hold upon its host rock or tree. It will often grow quite well under the benches of a cool bushhouse among *Adiantums*. It can also be grown in a shallow pan with a compost of leaf-mould, crocks and moss. Another method is to wire a few pieces through the meshes of a wire basket lined with moss or fibre, and suspend it in a cool part of the bushhouse. It requires copious water at all times. Flowers in Spring and lasts about three weeks.

There is a pure white variety which is not uncommon.

SARCOCHILUS HARTMANNII. *Native of Queensland and New South Wales.*

Another handsome species with short, stout, oval stems clothed with stiff, fleshy leaves 6 to 8 inches long and about $\frac{3}{4}$ -inch in width. The flowers are similar in shape to those of *S. Fitzgeraldii*, and resemble it in colouration, but those of *S. Hartmannii* are of heavier texture and rather more waxy. The general appearance of the plant is that of a grosser variety of *S. Fitzgeraldii*. It is found on the cliff faces of the Great Dividing Range, where it is exposed to the full glare of the sun. A compost of leaf-mould, sand, a little dried dung and a small amount of peat suits it. A moderate amount of water in the Summer and very little in the Winter time is necessary. It must have plenty of light, and direct sunlight is beneficial to it. Flowers in Spring and lasts two to three weeks. There is also a white variety of this species, but it is uncommon. I have seen only three plants of it.

SARCOCHILUS HILLII. *Native of Queensland and New South Wales.*

This species is found along the coastal mountain districts of Queensland from the tropics to well down into New South Wales. It has very short stems with three or four narrow linear, brownish-green leaves, and short, slender racemes which bear a few small, white or pinkish flowers with expanded oval sepals and petals

into crocks so that top of cone is level with top of blister. Sit plant on top and spread out roots down sides of cone; long roots will come up and out of pot—let them. Secure all roots by hairpin-shaped pieces of stiff copper wire stabbed into peat.

Then intersperse a few more crocks and a few of the cone shapings on the roots, wedging them firmly against the sides of the blister, and cover all with a liberal coating of sphagnum moss, leaving, of course, the crown of the plant exposed. A tall growing variety may need staking. In the case of *Cymbidiums* I use a mixture of wood chippings, dry and rotting refuse from the inside of blisters, including a lot of the wet, red, almost puggy clay which the white ants leave, and intersperse with small lumps of peat. I find they are doing very well.

Another idea which may be of use is a swivel for hanging. They are made of two pieces of galvanised wire, No. 8 gauge, each $7\frac{1}{2}$ inches long. They are quite simple to make with a hammer, pliers, and vice. They are invaluable in growing even baskets; a slight twist and they will stay wherever put. I equip all my pots and hanging baskets with them. (See illustration).

which are about one-sixth of an inch across. The tongue is short, very hirsute on the inside, and has prominent yellow glands. Treatment as for *S. Ceciliae*. Flowers in Spring and lasts two to three weeks.

SARCOCHILUS OLIVACEUS. *Native of Queensland and New South Wales.*

A pretty species which resembles *S. falcatus* in habit and form, the leaves being a little broader and darker in colour than those of that species. Racemes are short and bear three to five fragrant flowers about $\frac{1}{4}$ -inch in width. Sepals and petals are brownish-green, lip white streaked with red. Treatment as for *S. falcatus*. Flowers in Spring and lasts two to three weeks.

SARCOCHILUS SPATHULATUS. *Native of Queensland and New South Wales.*

A very small species found on Mt. Tambourine, the form and habit of which resemble those of *S. Hillii*. The racemes are short and very slender and carry one to three tiny flowers with oblong-ovate sepals and petals, and a large trilobed lip, the side lobes being erect and large and the front lobe spathulate. They are creamy or yellowish in colour. Flowers in Spring and lasts two to three weeks. Treatment as for *S. falcatus*.

SARCOCHILUS UNGUICULATUS. *Native of Burma, Malaya and Philippine Islands.*

Probably the finest of the genus, has short, thick stems and broad green leaves somewhat typical of *Phalaenopsis*. Flower spikes hang from the lower part of the stem and carry a number of pure white flowers about $1\frac{1}{2}$ inches across and of thick texture. The lip is fleshy and white, the side lobes being striped with red and the front lobe spotted with the same colour. Lip clawed. Flowers in Summer and lasts three or four weeks. Treatment as for *S. Berkleyi*.

SATYRIUM

A genus of terrestrial orchids chiefly from South Africa. They are not generally grown, but a few of the species are attractive and brilliant. They grow from a stout, tuberous root and have broad, handsome, fleshy leaves at the base of the stem. These are deciduous and perish as soon as the flowers have faded. Personally, I grow them out of doors under a tree, potted in a compost of leaf-mould, soil and dried cow-dung, with a little polypodium fibre mixed in. There is no reason why, in Brisbane and the North, they should not be treated as an ordinary bedding plant for a shady part of the garden. After flowering and when the leaves have died, it is prudent to remove the tubers from the compost and keep

them until towards the end of Winter, when they can be repotted for the next cycle of growth. They require little water at the commencement of growth, but as the leaves begin to spread a generous amount may be given them, together with a little weak liquid manure.

The spikes are terminal and tall, and are crowded with a mass of good-sized blooms which look something like babies' bonnets. The best species are:—

SATYRIUM CARNEUM.—Flowers pink flushed with crimson.

SATYRIUM CORIIFOLIUM.—Flowers deep orange flushed with crimson. They flower in late Summer or Autumn and last some weeks in perfection.

SCHLIMIA

A small genus of epiphytical orchids which closely resemble the *Stanhopeas* in the form of their plants, the leaves being rather broader. Treatment as for the cooler growing *Cattleyas* will serve them best. The best species is:—

SCHLIMIA TRIFIDA. *Native of Colombia.*

Pseudobulbs clustered, elongate-ovate in shape and topped by a solitary, oblong, acute, plaited, dark green leaf which tapers to a stem-like base. Flowers produced from an arching raceme which grows from the base of the matured pseudobulb. This bears four helmet-shaped, waxy white flowers whose sepals are curled outwards. There are a few purple spots on the inside. Lip short, white marked with orange. The flower is very fragrant. Blooms in Spring and lasts two to three weeks.

SCHOMBURGKIA

A small epiphytical genus from tropical America. They have something of the habit of the *Cattleya* group, having stout, erect pseudobulbs topped with two or three leathery leaves. They are not often grown in cultivation as they are notoriously slow at coming into bloom under artificial conditions. In their native state they grow in the upper branches of tall trees, fully exposed to the sun, and, as their natural haunts are in the equatorial belt, this means that they have long days of hot sun with copious rainfall throughout the Summer and a moist, mild

atmosphere even in the middle of Winter. I would, therefore, suggest that in North Queensland these orchids could be grown outside all the year round, and that, in Brisbane and even in Sydney, suspending them outside in the full glare of the sun from the beginning of Summer to the commencement of Autumn and then transferring them to a place near the roof of a glasshouse or hothouse, and keeping them soaking in the Summer time and damp in the Winter time, should be as near an approach to their natural conditions as is possible to give them. For compost a mixture of osmunda and polypodium should be suitable. Ample drainage (*i.e.*, about two-thirds of the pot) is essential.

There are about a dozen distinct species, of which the following are the best:—

SCHOMBURGKIA LYONSII. *Native of Jamaica.*

A handsome species with foot-high, stout, fusiform stems with two or three linear-oblong, leathery leaves at the top. The raceme grows uprightly from the apex of the last matured pseudobulb and bears from 12 to 25 flowers, each about 2 inches across. The sepals and petals are lanceolate in shape, white with several rows of purple dots and dashes. The lip is smaller than the sepals, recurved at the apex, white with a deep yellow margin, the disk having several purple-spotted, elevated, longitudinal lines. Flowers in Autumn and lasts about three weeks.

SCHOMBURGKIA THOMSONIANA. *Native of West Indies.*

A beautiful species with short, tapering pseudobulbs having two or three oblong leathery leaves at the top. The flower spike grows to a height of four feet or more, and bears numerous handsome flowers each about 2 inches in diameter. Sepals and petals strap-shaped and undulated, the sepals light yellow, the petals sulphur-yellow streaked and lined with purple on the outside. Lip three-lobed, the side lobes being triangular, the middle lobe strap-shaped, notched at the apex and crisped at the margins. The front portion is white, the middle blackish-purple, with some yellow on the disk which has a few blackish-purple keels. Flowers in Summer and lasts two to three weeks.

SCHOMBURGKIA TIBICINIS. *Native of Honduras.*

The finest species. It has long, stout, tapering, hollow pseudobulbs a foot or 18 inches tall; after the leaves have fallen they resemble cows' horns. They have two or three oblong, leathery leaves on the upper part. The apical raceme grows from 4 to 8 feet in height, its top having numerous flowers each about 2 inches in diameter. Sepals and petals oblong, obtuse and undulated, the sepals being broader than the petals. They are pale purple on the outside and deep pink inside, tinged and spotted with reddish-brown towards the tips. The lip is white with erect, rosy-pink side lobes. Flowers in Summer and lasts four to six weeks.

Var. *grandiflora*.—Habit as the type. Flowers larger (up to 3½ inches across), petals and sepals undulated, light purple underneath, crimson-purple tinged with reddish-brown near the apex on the inside. Lip three-lobed, the lateral lobes being large and a rich orange streaked with purple edged with white; middle lobe

small, white tinged with yellow and bordered with purple. Disk white. Flowers in Summer and lasts up to six weeks in beauty.

SCUTICARIA

Another small genus of epiphytical orchids rarely if ever grown in Australia, but intensely interesting in their form and handsome in their flowers. From their nature they are rather difficult to transport, but an opportunity may arise by which we may have an opportunity of getting a few established plants from South America. In their native state the *Scuticarias* grow upon trees exposed to the sunlight in the intense heat of the tropics. They do best when grown upon blocks of hardwood or tree fern or upon rafts, suspended in full sunlight. The treatment recommended for *Schomburgkias* will suit them in all respects. The best species are:—

SCUTICARIA HADWENII. *Native of tropical Brazil.*

This species grows from a short, knotty rhizome, having a swollen base from which a cluster of terete, acute leaves about 18 inches long usually hangs (but occasionally stands erect). Flowers are produced singly (rarely in pairs) from a short, erect scape. They are up to or over 4 inches across. Sepals and petals oblong, pointed, yellowish-green, prominently blotched with red-brown. Lip three-lobed, about $1\frac{1}{2}$ inches broad across the obovate front lobe; the lateral lobes being particularly well marked. Flowers at various times of the year and lasts six or seven weeks in beauty.

Var. *bella*.—Sepals and petals yellowish outside and bright crimson spotted and blotched with sulphur-yellow inside. Lip white, spotted with light brown on the disk and side lobes, and with mauve on the front lobe.

SCUTICARIA STEELII. *Native of British Guiana.*

The invariably pendent, terete leaves are about as thick as an ordinary lead pencil, very flexible, channelled on one side, and reaching a length of over 4 feet. Flowers, about 4 inches wide, are produced on a short scape, from one to three blooms being developed at a time, though usually they are solitary. Sepals and petals broadly oblong and overlapping, pale yellow with numerous blotches of chocolate. Lip creamy-white striped with brownish-purple, with three orange teeth in the front of the oblong crest. Flowers at various seasons and lasts for a long time.

SELENIPEDIUM

(PHRAGMOPEDILUM)

This genus has been included with the *Cypripediums*, from which it differs only on the formation of its ovary. For information regarding culture and species see under *Cypripedium*.

SOBRALIA

A genus of terrestrial orchids of some thirty species, some of which produce handsome and graceful flowers but which, because of the short life of the blooms, is but little cultivated. They grow in clusters of slender reed-like stems, which bear a few plaited, somewhat leathery, lanceolate leaves. They are heavy feeders, and should be planted in pots which give them ample root room with a compost of loam, leaf-mould, a little fibre (either polypodium, osmunda, stag-horn or cocoanut) and some dried cow-dung. The addition of a little bone-meal will improve the growth and flowering of the plant. Drainage must be perfect, as copious water must be applied throughout the growing period, and even in Winter the compost should be kept damp. They will do in a glasshouse in Brisbane, but in the colder parts hothouse treatment is preferable. In the far North open bushhouse or even outdoor cultivation will be possible. The best species are:—

SOBRALIA LEUCOXANTHA. *Native of Costa Rica.*

Stems slender, 18 inches to 2 feet high. Flowers produced singly at intervals. Sepals and petals 3 inches long by 1 inch wide, tips veined, white. Lip white outside, inside golden-yellow at the throat, gradually paling to white at the frilled edge. Apex spreading, base curled into a tube. Flowers in succession at intervals during the Summer. Individual blooms last one to two days only.

SOBRALIA LOWII. *Native of Colombia.*

Stems slender, 1 to 1½ feet high, and purple. Sepals and petals and lip bright purple.

SOBRALIA LUCASIANA. *Native of Honduras and Mexico.*

Stems slender, 3 to 5 feet high. Flowers large. Sepals and petals white, tinged with rosy-pink. Lip rosy-purple with a yellow blotch at the throat.

SOBRALIA MACRANTHA. *Native of Guatemala and Mexico.*

The best species. Stems slender and reed-like, occasionally reaching a height of

7 feet. Flowers very large, sometimes 7 inches across. Sepals oblong, petals somewhat broader. Whole flower rich purple with a yellow spot at the base of the lip. Flowers more or less continuously for two to three months, although the individual blossoms last little more than a single day. Summer flowering.

Var. *Kienastiana*.—Pure white with a small greenish-yellow mark at the base of the lip.

Var. *nana*.—Dwarf growing. Flowers deep purple and crimson.

Var. *pallida*.—Sepals and petals rose-pink, lip white with a tinge of rose.

SOBRALIA SESSILIS. *Native of British Guiana.*

Stems slender and reedy, from 12 to 24 inches tall. Sepals and petals oblong and spreading and pure white, the petals being a little longer and broader. Lip cream to light yellow, tinged with rose pink, the front lobe being undulated at the edges. Flowers are about 2 inches across. Blooms in succession for a long time.

SOBRALIA XANTHOLEUCA. *Native of Mexico and Honduras.*

Similar in habit to *S. macrantha*, but does not grow to so great a height. Sepals and petals narrowly oblong. Pale lemon yellow. Lip a deeper yellow. Large flowers with the same characteristics as other species.

SOPHRONITIS

A genus of dwarf growing, epiphytcal orchids of which only three species are known. They have been used in the creation of hybrid genera with both *Laelias* and *Cattleyas*. They like reasonably cool conditions, and can be grown in an ordinary bushhouse in the warmer parts of Brisbane and the North, while cool glasshouse treatment will be preferable in the cooler parts. A compost of osmunda fibre, or osmunda and polypodium in a 50/50 mixture, lightly covering ample drainage, will suit. Ample moisture is necessary while growth is in progress and even in Winter they should be kept damp.

SOPHRONITIS CERNUA. *Native of Brazil.*

A very small species with little two-edged, stem-like pseudobulbs about half an inch long, growing from a creeping rhizome and topped with a single broadly-ovate, dark green leaf about 1 inch long. The flowers are produced on a short peduncle which bears from 4 to 8 small, scarlet flowers, each about 1 to 1½ inches across, with a short, narrow, pointed, yellow lip. Flowers in Winter and lasts some weeks.

SOPHRONITIS COCCINEA. *Native of Brazil.*

The finest species and indeed one of the most brilliant of the whole orchid species. Pseudobulbs are sometimes terete but usually oval, about 1 inch long. Leaves solitary, oblong, 2 to 3 inches in length, leathery and deep green in colour. Flowers produced from the apex of the bulb, one flower only on the short, erect scape. They are of good texture, the sepals being oblong-lanceolate and the petals roundish elliptic. These are cinnabar-edged or bright orange-scarlet. The lip is trilobed, the side lobes incurved and the middle lobe flat and acutely pointed. It is a brilliant orange-red streaked with scarlet. They flower in Winter and last many weeks in perfection.

(Syn. *S. grandiflora.*)

Var. *purpurea* is smaller in habit and bears flowers of bright carmine-purple.

SOPHRONITIS VIOLACEA. *Native of Brazil.*

A very small species with 1-inch, fluted pseudobulbs tapering at both ends and narrow, pointed, dark green leaves about 2 inches in length. Scape very short and bears a single flower about 1 inch across, violet-magenta in colour, the bases of the petals and sepals being lighter in toning. Flowers in Winter and lasts a month or six weeks in perfection.

SOPHRONITIS HYBRIDS

The beautiful *Sophronitis coccinea* has been extensively used by those enterprising gentlemen who create new genera and species by cross-fertilisation or hybridisation. As a result we have *Sopbro-Laelias*, *Sopbro-Cattleyas*, *Sopbro-Laelio-Cattleyas* and *Sopbro-Brasso-Laelio-Cattleyas*, this latter group having been given the generic name of *Potinara*, after the French orchid grower, Julien Potin. The *Sophronitis* strain in these hybrids generally results in the flowers being rather smaller than the usual *Cattleya* type hybrids, but this is more than compensated for by the superior texture, the more symmetrical shape, and the exceedingly brilliant colouring of the flowers. Moreover, *Sophronitis* hybrids are better lasting and are less affected by cold weather than the *Laelio-* and *Brasso-Cattleyas*. Altogether a few *Sophronitis* hybrids make a desirable and interesting addition to any collection of *Cattleya* type orchids.

The smaller flowered *Sophronitis* hybrids are also much more suited for dress wear than some of the very large, rather flaccid *Cattleya* hybrids now produced.

SPATHOGLOTTIS

A genus of terrestrial orchids of which a dozen or more species are known, two of them natives of North Queensland. They are not much grown in cultivation, but, as most of the species have graceful and rather colourful flowers, they deserve more attention from growers. Their culture presents no particular difficulty. They like warmish conditions generally, one or two species doing best under tropical treatment. For compost a mixture of loam, fibre, leaf-mould and dried dung, with ample drainage, will be found suitable. I have seen the native species growing in a garden border in a damp and somewhat shady spot, and they made a very colourful spot indeed when in flower, while their handsome, plaited leaves made them attractive when not in bloom. They like copious water in the growing period, but should be kept almost dry during the resting stage.

SPATHOGLOTTIS AUREA. *Native of Malaya, etc.*

A handsome species with small, ovoid pseudobulbs with narrow, plaited, lanceolate pointed leaves 3 feet long by $1\frac{1}{2}$ inches broad. The flower spike is about a foot high, bearing a number of flowers each about 3 inches across with oval-oblong sepals and petals, bright yellow in colour, the sepals being marked with a few brown lines and dots. Lip small, and yellow spotted with purple-brown. Side lobes erect and rounded, the front lobe variously narrow and acute, broad and rounded, or three-toothed, with a triangular secondary lobe on each side near the base. This species requires warm, moist conditions during the Summer, but dry treatment in the Winter. Flowers in Autumn and lasts a long time in beauty.

SPATHOGLOTTIS FORTUNEI. *Native of Hong Kong.*

A pretty species with flat, tuber-like pseudobulbs topped with three or four narrow, lanceolate, thin, pale green leaves about a foot in length. Flower scapes erect, one foot tall and somewhat downy. They carry six to eight flowers, each about $1\frac{1}{2}$ inches across, with ovate sepals and petals, the latter somewhat the broader, bright yellow in colour. The lip is trilobed, yellow, with lateral side lobes erect and tipped with chocolate, the front lobe cuneate and notched at the apex. This species likes rather cooler treatment than the other species and may be grown in an ordinary bushhouse in Brisbane and the North. Glasshouse treatment will serve better in the South. Flowers in late Summer and Autumn.

SPATHOGLOTTIS PAULINAE. *Native of N. Queensland.*

This pretty species has small, tuberous pseudobulbs with lanceolate, plaited leaves 2 to 3 feet long and tapering at the base into a petiole. Scapes, 3 to 4 feet high, carry seven or eight deep purple flowers $1\frac{1}{4}$ inches wide, the lip being lighter in colour and trilobed, the laterals incurved and the middle lobe being clawed. Flowers in Summer and Autumn and lasts well. This species is often confused with *S. plicata*, which it somewhat resembles in colour. It can be grown out of doors in the warmer parts of Queensland, but will require glasshouse treatment in the South.

SPATHOGLOTTIS PLICATA. *Native of Penang, Straits Settlements, and the Pacific Islands.*

Pseudobulbs conical-ovoid and ringed, furnished with three or four lanceolate, acute, prominently veined leaves on stalk-like stems. Scape erect, about 2 feet high, bears eight to ten purple flowers with elliptic sepals and ovate petals. The lip is small and trifid, white spotted with purple and has an incurved column. Disk has a saddle-shaped bifid callus. Flowers in September. Treatment as for *S. Paulinae*.

SPATHOGLOTTIS SOUTTERIANA. *Native of North Queensland.*

A charming, native species with rounded pseudobulbs 1 to 1½ inches high, topped with six or seven green, plicate leaves from 18 inches to 2 feet in length, and up to ¾-inch wide. The scape is slender and terminates in a short raceme which bears eight or nine flowers about an inch in diameter, the sepals and petals being slightly longer than the trilobed lip. Lateral lobes spatulate and incurved over the column. Middle lobe extended into a claw with densely woolly margins. The disk has two large, thick, erect, rather spreading, glabrous calli between the lateral lobes. Column incurved, presenting a hooded appearance. In colour the flower is light purple. Flowers in Summer. Treatment as for *S. Paulinae*.

SPATHOGLOTTIS VIELLARDI. *Native of Pacific Islands.*

The largest species, having ovoid pseudobulbs with handsome acuminate, plaited leaves 2 feet long by 2 to 3 inches wide. Scape, about 3 feet tall, bears a very large number of flowers, of which eight to ten flowers are open at a time, the others developing in succession. Each flower is about 2 inches in diameter. Sepals and petals, broadly ovate, are white and pale lilac. Lip trilobed, side lobes small, erect, orange-brown with two large orange-coloured protruberances on the disk, front lobe heart-shaped, deep lilac in colour and stalked. Flowers in late Summer or Autumn. Treatment as for *S. aurea*.

STANHOPEA

This genus of epiphytical, evergreen orchids has about a score of known species, all of which are interesting and beautiful, and include in their number some of the most remarkable blooms of the whole realm of flowers. They are easily grown, and the plants, even when not in bloom, are attractive with their broad, plaited, dark green leaves, which closely resemble those of the *Aspidistras* so popular with our grandmothers. They have certain slight disadvantages in so far as the flower scapes grow from the bases of the pseudobulbs and are invariably perpendicularly pendulous. The flowers are short-lived, rarely lasting more than a few days in beauty, and their perfume is overpoweringly sweet.

By reason of their flowering habit they should be grown in open bottomed baskets without drainage in an open compost of osmunda fibre or peat so that the descending spikes can find easy exit. They like rather warm conditions, but during the Summer our climatic conditions in a sunny bushhouse are quite suitable for the plants. In the cooler months, particularly in those parts of Brisbane where the temperature average in Winter falls below 48°, it is desirable to move them under glass. In Summer abundant water must be applied to leaves and compost; in the hottest period watering at least once a day is necessary. In the Winter time a decent soaking once a week is all that is necessary; in fact, if they are grown in a moist atmosphere, no added water is necessary. In the South glasshouse cultivation is necessary all the year through, while in the North, bushhouse treatment will suffice. They need light conditions, but must be sheltered from the direct rays of the sun at noon. The most suitable of the species are:—

STANHOPEA DEVONIENSIS. *Native of Peru.*

A striking species with pyriform, furrowed pseudobulbs topped with plaited, stout leaves up to a foot in length and from 4 to 6 inches in width, and pointed at the apex. Scape bears two or three flowers, each about 5 inches across. Sepals broad and spreading, orange in colour, blotched prominently with reddish-brown. Petals narrow and wavy, of a similar colouring. Lip very fleshy, the lateral lobes being curved inwards and extended into long, pointed horns. The apex is three-toothed. In colour, white with purplish stains. Column white and purple.

STANHOPEA EBURNEA. *Native of British Guiana, Brazil, etc.*

A noble species with conical pseudobulbs. Leaves typical. Scapes bear three flowers each about 5 inches in width. Sepals and petals both reflexed, the former being broad and the latter narrow. In colour, shining waxy white. Lip 3 inches long, fleshy, the base being caved and furnished with a pair of horns over the mouth. Apex of the lip is cordate, white with a few purple blotches. Column 3 inches tall, winged near the top.

STANHOPEA ECORNUTA. *Native of Mexico.*

A distinctive species with large, conical pseudobulbs and the usual broad, plicate leaves. Scape short and carrying two flowers. Sepals erect, concave, fleshy, creamy-white in colour and about 2 inches long by an inch wide. Petals smaller, but otherwise similar. The lip is simply a fleshy sac, 1½ inches long by 1 inch wide, the narrow mouth being nearly covered by the short, fleshy column. In colour it is bright yellow at the apex, deepening to dark orange at the base. The column is similarly coloured.

STANHOPEA FLORIDA. *Native of Mexico.*

A quaint species of typical habit. Flower spike long and stout, bearing up to seven flowers, each 5 inches across. Sepals, twice as long as broad, are white with small purple dots. Petals smaller than the sepals and similarly coloured. Lip fleshy

with a sac-like base, whitish, thickly spotted with purple, with a large blotch on each side of the base.

STANHOPEA GRANDIFLORA. *Native of Mexico, Peru, etc.*

A handsome species with fleshy, oval, dark green pseudobulbs which grow in clustered formation on a stout, creeping rhizome, and which become ridged and wrinkled with age. Each pseudobulb has a broadly lanceolate, dark green leaf on a narrow stem, the blade of the leaf being about 8 to 9 inches long by 4 inches wide. The flower spike is pendulous and about 8 inches long, and carries four to six flowers, each about 4 inches across. Sepals and petals are reflexed, the sepals being broad, while the petals are narrow and have undulated margins. In colour they are a rich brownish-yellow marked with large crimson blotches. The column is 2 inches long, and is green and white with purple spots. The lip, similar in colouring to the other segments, has a curved, boat-shaped cavity, two curved horns, and a clawed apex to the broad, fleshy mid-lobe. Very fragrant. Flowers in Autumn usually, but, as is the case with all the *Stanbopeas*, is variable in this respect.

Syn. *S. bucephalus*.

STANHOPEA INSIGNIS. *Native of Brazil.*

A handsome species with ovate, ribbed pseudobulbs and stout, leathery leaves on short stems, the blade being about a foot long by 4 inches wide. Scape up to a foot in length, generally carrying four flowers, which are about 5 inches across. The broad, spreading, concave sepals and the narrow, wavy petals are dull yellow, spotted with purple. The lip is short and globose at the base, thick and waxy in appearance, with a broad margin. It is dull white, spotted with purple, the inner part of the cavity being wholly purple. It is furnished with two horns which curve forwards; the front lobe is heart-shaped, channelled and pointed.

Var. *flava*.—White tinged with yellow. Flowers much larger than the type.

STANHOPEA MACULOSA.—Syn. of *S. Devoniensis*.

STANHOPEA MARTIANA. *Native of Mexico.*

Martiana is similar in general form to the other species. Flowers about 4½ inches across. Sepals and petals broad, concave and spreading. Sepals creamy-white with a few purple spots at the base, petals clear white, blotched with purplish-crimson. Lip white and provided with a short, chin-like base with a pair of broad, tapering horns, the middle lobe being long and clawed at the tip. Column clavate, white spotted with red.

Var. *bicolor*.—Sepals pure white, spotted at base.

STANHOPEA OCVLATA. *Native of Mexico.*

Pseudobulbs oval and furrowed, and 2 inches long. Leaves of the usual type.

Flower spike, a foot long, bears up to half-a-dozen 5-inch flowers. Sepals reflexed, pale yellow thickly dotted with purple. Petals half the size, with fewer and larger spots. Lip long, narrow and fleshy, with a cavity near the base where it is white with crimson blotches; front lobe is spatulate with horn-like lobes on each side, this part being white with purple dots. Column green dotted with purple.

STANHOPEA PLATYCERAS. *Native of Colombia.*

A stout-growing and remarkable species. The pseudobulbs are stout, dark green, ringed and somewhat wrinkled as they age, leaves dark green and stalked, about 9 by 4 inches and of firm texture. Scape short, generally one-flowered, but occasionally with two blooms. Flowers about 7 inches across, with spreading, pale yellow sepals, blotched and spotted with rose-purple, and about $3\frac{1}{2}$ inches long and $2\frac{1}{2}$ inches broad. Petals narrower and shorter, similarly coloured. Base of the lip (hypochil) boat-shaped, deep magenta inside, paler on the outside with darker spots. Horns 1 inch long, broad and curling forwards parallel with the spatulate front lobe, which is coloured like the sepals. The column is winged near the top, and is pale green spotted with red.

STANHOPEA TIGRINA. *Native of Mexico.* (Illustrated.)

A very striking species with broad, dark green, petioled leaves on short, oval, dark green pseudobulbs. Scapes are long and bear from four to six flowers, each of which is 6 inches in width. Sepals nearly as broad as long, and concave; petals much narrower and wavy. Both are a murky yellow with very large blotches of dull purple. The base of the lip has a broad, short cavity and two short horns bent forward at right-angles. Middle lobe, an inch wide, divided at the apex into three fleshy teeth. Column 3 inches long, about an inch wide at the top and narrowed at the base. The lip and the column are pale, dull yellow spotted with purple. The whole flower is extremely waxy in appearance.

STANHOPEA WARDII. *Native of Guatemala.*

Pseudobulbs 2 inches long and oval. Leaves large, broad and leathery. Scape, about 9 inches long, carries from four to nine flowers, each about 4 inches across. These closely resemble *S. oculata* in shape, but are much brighter in colour, varying from bright yellow to deep golden orange, spotted with crimson. The basal cavity is deep velvety purple with a satiny sheen.

THELYMITRA

This is a genus of herb-like terrestrial orchids spread through the Malay Archipelago, Australia and New Zealand. Although they are rarely cultivated, they are mostly quite beautiful; in fact, some of the species are outstandingly so.

More than twenty species are known, but I propose only to tabulate the best of the Australian varieties here. If care is taken to preserve their tuberous roots from injury they will grow quite well in an ordinary garden, and/or in a pot with a compost of loam, leaf-mould and a little dried dung. Plentiful water should be given them while growing, but after the flowers have fallen very little is necessary. After flowering, the plant dies down, and water should then be withheld until the fresh growth appears. If potted they should be placed in a sunny part of the bushhouse or out of doors where they will have ample sun and air.

THELYMITRA ANTENNIFERA. *All States except Queensland and New South Wales.*

Yellow inside, striped red-brown externally.

THELYMITRA ARISTATA. *All States except Queensland.*
Variable from blue to pale mauve.

THELYMITRA AZUREA. *South Australia and Victoria.*
Azure blue.

THELYMITRA CARNEA. *New South Wales and Victoria.*
Deep flesh pink.

THELYMITRA CHASMOGAMA. *South Australia.*
Pink, with yellow hairs on the column. (Purple to white.)

THELYMITRA CIRCUMSEPTA. *New South Wales.*
Colour variable, entrance to column blocked by additional lobe.

THELYMITRA D'ALTONII. *Victoria.*
Leaf spiral. Flowers violet-mauve.

THELYMITRA EPIPAETOIDES. *South Australia and Victoria.*
Robust plant. Flowers large, mixed colours like shot silk.

THELYMITRA FLEXUOSA. *Western Australia, South Australia, Victoria, and Tasmania.*

Small species with small yellow flowers.

THELYMITRA FUSCO-LUTEA. *Victoria, South Australia, Western Australia.*
Leaf large and leathery. Yellow with brown blotches.

THELYMITRA GRANDIFLORA. *Victoria and South Australia.*

The finest species, and the one usually seen in cultivation. Strong growing, with a large, pointed, prominently veined leaf, and large leaf-like stem bracts. Spike very long, bearing numerous large purplish-blue flowers.

THELYMITRA HOLMESII. *Victoria.*

Leaf long and narrow. Flower violet-blue.

THELYMITRA IXIOIDES. *All States of Australia and New Zealand.*

Twelve to 18 inches high with pointed, narrow leaves and bracts, and from two to nine flowers which are variously blue, purple, lavender or white, the upper part usually spotted. Looks like an ixia. Flowers in Spring or Summer.

THELYMITRA LUTEO-CILIATA.

Very slender purplish-red plant. Pale pink flowers.

THELYMITRA MACMILLANII. *Victoria and South Australia.*

Flowers fragrant. Salmon-pink to dark rose, with yellowish markings on margins. Side lobes of lip dark red or yellow.

THELYMITRA MEDIA. *New South Wales, Victoria and South Australia.*

Robust species with large, leathery leaf. Flowers large, variable from purple to white. Column has dark collar-like band round the top.

THELYMITRA MERRANAE. *Victoria.*

Similar to *T. ixioides*, but column has large middle lobe. Flowers are small.

THELYMITRA MURDOCHAE. *Victoria.*

Leaves narrow and pointed. Flowers purplish-red.

THELYMITRA NUDA. *New South Wales, Victoria, and Tasmania.*

Leaf long and channelled. Flowers moderate size, pale blue with a purplish-blue column.

THELYMITRA PAUCIFLORA. *All States of Australia and New Zealand.*

Twelve to 18 inches in height, one to nine small flowers, pale blue, cream or whitish in colour.

THELYMITRA SAPROPHYTICUS. *Victoria.*

Large flowers, pale saffron marked with red and purple.

THELYMITRA TRUNCATA. *South Australia and Victoria.*

Slender plant with two to six small dark blue or mauve flowers with upper segments spotted.

THELYMITRA URNATIS. *South Australia.*

Small plant with long, narrow leaf and one or two small, yellow-brown flowers.

THELYMITRA VENOSA. *New South Wales, Victoria, South Australia, Tasmania, New Zealand.*

Very tall (up to 3 feet), leaf narrow and thick. Flowers pale blue, prominently veined.

THUNIA

A very attractive genus of epiphytical orchids closely allied to *Phaius*, with which they are often included. They grow very easily, but sometimes are shy at flowering, probably due to incorrect treatment during the period when the plant is preparing to rest. Though really epiphytes they do best when treated as terrestrials and potted in a compost of loam, leaf-mould, dried cow-dung, and fibrous peat. The addition of a little bone-meal to the compost leads to quicker and more robust growth. Once growth is evident watering should be commenced, the quantity increasing with the progress of the growth until at maturity the compost is always thoroughly moist. Light, airy conditions are necessary for the successful growing of *Thunias*, and in Brisbane they do best when grown out in the open exposed to the full light of the sun. The flowers appear on short, terminal racemes as soon as the season's growths are complete. After flowering (or oftentimes without flowering) the leaves commence to turn brown and fall. From this time the water should be reduced, and by the beginning of the Winter period it should have ceased altogether. While the leaves are decaying the plants must have all the light and air available, as on this depends the quality of the new season's growth, and the probability of flowering them. After the leaves have all fallen the plant may be moved to a place where it will be protected from water for the resting period—but don't forget it is there when Spring comes around again.

THUNIA ALBA. *Native of Northern India, Burma, etc.*

A free growing species with terete, tapering stems from 2 to 3 feet high, furnished with narrow, oblong, pointed, pale green leaves about 6 inches in length, with a fine, bluish-green bloom underneath. Flowers are produced in a dense, pendulous cluster from the apex of the stem, about a dozen (or more) at a time. These are about 3 to 4 inches across when open, but owing to the large boat-shaped bract it often happens that they do not open fully. Sepals and petals oblong-lanceolate and pure white. Sides of lip curl over the column, the front part being expanded with wavy margins. White tinged with pale purple.

THUNIA ALBA var. *NIVALIS*. *Native of Sylhet.*

Stems shorter but otherwise similar to those of the other species. Racemes produce five or six pure white flowers about 4 to 5 inches across. Flowers in Summer.

THUNIA BENSONIAE. *Native of Burma.*

A beautiful series of same habit as *T. alba*. Drooping racemes carry up to 18 flowers between 4 and 5 inches across. Sepals and petals narrowly oblong and spreading. In colour they are bright red-purple, becoming paler at the base. Trilobed lip is large and spreading in front, the side lobes being curled over the column. Rich magenta-purple in front, the frilled margin being deeper, the base white with yellow keels on the disk. Flowers in midsummer.

THUNIA BRYMERIANA. *Native of Burma.*

Similar in form to *T. Marshalliana*. Stems about 2 feet high. Sepals and petals white. Lip is yellow with radiating crimson lines.

THUNIA MARSHALLIANA. *Native of Burma.* (Illustrated.)

Probably the finest species, with reed-like stems 2 to 3 feet high and typical foliage. Flowers produced in the usual terminal raceme. They are about 5 inches across with lanceolate-oblong, acute, spreading sepals and petals. They are pure white except the front part of the large lip, which is rich golden-yellow veined with orange-red. Disk has five yellow, raised veins and five shorter ones on each side. This plant flowers in midsummer and it is almost axiomatic that, if the flower scape is not in appearance by the first week in December, it will not flower that year.

TRICHOCESTRUM

A genus of dwarf epiphytes with tiny, ovoid, single-leaved pseudobulbs which send out short scapes from the bases of the pseudobulbs. These bear one or two small flowers. Most species are of botanical interest only, but one or two are worthy of inclusion in collections if the opportunity offers. They do best in a shallow basket in a compost of osmunda or polypodium fibre. They need plentiful water during the growing period, but only sufficient in Winter to prevent the plants from losing condition. They require rather warm conditions, but in the North ordinary bushhouse treatment will serve, while in Brisbane a glasshouse, and in the South artificial heat, will be necessary in the Winter.

TRICHOCESTRUM ALBO-PURPUREUM. *Native of North Brazil.*

A pretty species with very small pseudobulbs and oblong, acute, shining green leaves 4 to 6 inches long. Flower spikes bear a single flower about an inch across at the widest part. Sepals and petals bright cinnamon-brown inside, tawny-yellow outside. Lip large, projected forwards, fiddle-shaped, broad and bilobed in front, white with two large purple spots near the base. Crest marked with four rosy-purple keels. Flowers Autumn.

TRICHOCESTRUM ORTHOPLECTRON. *Native of Argentine.*

Flowers comparatively large. Sepals and petals light cinnamon-brown, tipped with yellow. Lip large, white with a crimson lake blotch each side of the base, with five keels of the same colour between them. Disk yellow. Flowers Autumn.

TRICHOCESTRUM TIGRINUM. *Native of Ecuador.*

A desirable species with oblong leaves dotted with deep red. Peduncles one- or

two-flowered. Sepals and petals strap-shaped and lanceolate, greenish-yellow, barred and spotted with purplish-brown. Lip, very large (1½ inches long and 2 inches wide at the apex), is broadly wedge-shaped, deeply bilobed, pure white with a yellow crest on the disk and on each side at the base a wedge-shaped blotch of purple. Flowers in Autumn and Winter.

TRICHOGLOTTIS

Another small genus of epiphytcal orchids with long, leafy stems which produce axillary racemes bearing a single (or few) rather striking flower. Potted in a compost of osmunda, polypodium or peat, with a few chunks of dried dung, and ample drainage, and given moderately warm treatment, they should thrive well.

Trichoglottis is related to *Sarcochilus*, but has not the typical fleshy lip of the latter. Copious water in Summer is necessary, but little in Winter. Only two of the known species are worth cultivation.

TRICHOGLOTTIS COCHLEARIS. *Native of Sumatra.*

A rather rare species with a stem about 9 inches tall with thick, channelled, unequally bilobed leaves. Scapes are four-flowered, each about 1½ inches across. Sepals and petals oblong-lanceolate, recurved at the tips, white with heavy transverse bars of purple. Lip scoop-shaped, white blotched with purple. Flowers in Spring and lasts three weeks.

TRICHOGLOTTIS FASCIATA. *Native of Cochinchina.*

A showy species with stout stems which grow to about 2 feet and are clothed with distichous, oblong-obtuse, notched leaves about three inches long, their bases sheathing the stem. Spikes bear three or four large, leathery flowers. Sepals and petals wedge-shaped, oblong and acute, the lateral sepals being falcate, white on the outside. On the inside they are pale greenish-yellow, closely banded with cinnamon-brown bars. Lip whitish, side lobes yellow at the tip, and the keel having a few purple spots underneath. Flowers in Spring and lasts three weeks.

TRICHOPILIA

A small genus of epiphytcal orchids from Central America. I have not seen them in cultivation in Australia, but they are attractive enough to be included

in any collection. Possibly an opportunity will be afforded Australian growers to obtain one or more species of the genus. They should thrive under bushhouse conditions in Brisbane and further North, but in Sydney a glasshouse will be desirable. A compost of peat, osmunda or polypodium fibre with plenty of drainage, wood-charcoal and a few lumps of well dried dung will suit their needs. The best species are:—

TRICHOPILIA FRAGRANS. *Native of Colombia.*

This species has oblong, somewhat compressed pseudobulbs topped with a single broad, oblong-lanceolate leaf. The flower scapes grow from the bases of the pseudobulbs, and bear three or four fragrant flowers with sepals and petals about $2\frac{3}{4}$ inches long, wavy, somewhat twisted and pointed; they are a pale greenish-yellow. The prominent oblong lip is pure white with an orange spot at the base. Flowers in Winter and lasts about three weeks.

Var. *Lebmannii*.—Sepals and petals white.

TRICHOPILIA LAXA. *Native of Colombia.*

Another sweetly scented species, similar in habit to *T. fragrans*. Scapes carry up to nine flowers with sepals of pale, dull rose-pink, with a greenish tinge. Lip broad and white in colour. Flowers in late Winter and lasts three weeks.

TRICHOPILIA NOBILIS. *Native of Colombia, Ecuador and Peru.*

The finest species. Pseudobulbs elongate, oblong and flattened. Leaves solitary, broadly oblong acute. Flower scapes, erect, carry four or five somewhat nutant, sweet-scented blooms, much larger than those of *T. fragrans*. Sepals and petals white. Lip constricted near the base, the front part being $1\frac{1}{4}$ inches wide. It is snow white with a double orange blotch at the base. Flowers in Winter and lasts nearly a month.

TRICHOSMA

A genus of epiphytical orchids of which only one species has been recorded to date. This is *Trichosma suavis*. It is closely allied to *Coelogyne*, the chief difference being in its erect tufted stems. It is a hardy type and will grow well in a cool, moist atmosphere in a compost of any fibrous vegetable material such as osmunda, polypodium, todea, staghorn peat or cocoanut fibre. A topping of green sphagnum moss will help to maintain the moisture of the compost, for although the amount of applied water should be lessened in the Winter time, the roots should not be allowed to become dry. The plant has slender tapering stems up to 8 inches high, furnished with two apical, bright green leaves, oblong in shape, between which the terminal raceme is produced. From four to eight fragrant

flowers are produced, with creamy-white, lanceolate sepals and petals, and a three-lobed lip whose side lobes are white with brownish-crimson stripes, and the crested middle one yellow with crimson edges. It flowers in Autumn or early Winter, and lasts for some weeks. Ordinary bushhouse treatment in Brisbane and the North, and the cool part of the glasshouse in the South.

V A N D A

The genus *Vanda* rivals the *Dendrobiums* as the most popular of the orchid order amongst Australian growers, and there are very few collections from which at least plants of *V. tricolor* or *V. coerulea* are absent. This esteem is well justified, for, taken by and large, as the sailors say, the *Vandas* are the least troublesome of all the orchid genera to grow, and their flowers are just as beautiful and better lasting than most of the *Dendrobiums*. The *Vandas*, too, are evergreen, and their plants are, for the most part, of pleasing appearance, even when not in flower, although some object to their habit of sending forth the long, aerial, adventitious roots that seek from sun and air the carbons necessary to build up their stout, erect stems. They are widely distributed in longitude, latitude and elevation, so that in a state of nature the various species grow under widely differing conditions. The orchid family in general has the quality of adaptability very strongly incorporated in its make-up, and, of all its orders, that of *Vanda* is not surpassed in this respect. Naturally it is desirable that each species be given as nearly as possible the conditions under which it grows naturally, but, if patience and care be exercised, something very remote from these natural conditions will eventually see *Vandas* growing well and flowering in due season. Despite this faculty of adaptability, however, it is better for growers to confine their selection of *Vandas* to those for which the conditions they can offer are reasonably suitable. For instance, it is courting failure (and expensive failure, too) for a grower living in a cold situation to try and grow *Euanthe* (*Vanda*) *Sanderiana* in a cold, damp bushhouse. On the other hand, some growers have a tendency to over-heat their *Vandas*. It is just as likely to be fatal to grow a *V. coerulea* in a hot glasshouse as it is to grow *Euanthe* (*V.*) *Sanderiana* in the cold bushhouse to which I have just referred.

The old technique was to pot *Vandas* in a compost consisting entirely of crocks, charcoal, and a topping of sphagnum moss. The amount of nutriment in such a compost is just about nil, so that the plant was entirely dependent upon the carbons and such salts as it could extract from the atmosphere and the water given it. It is no wonder that *Vandas* lost popularity because of the high percentage of mortality among their growers' plants. In more modern times, however, the compost for this genus has been considerably modified, and now growers are obtaining excellent results from a compost of good fibrous peat and good-sized

lumps of mature cow-dung. Some growers add an old bone or two. I have done this, but, on subsequent removal of the plant, there has been no evidence that it has made any attempt to obtain nourishment from these. I have found a coarse bone-meal a better addition, as the nitrates and phosphates are more easily assimilable. All the *Vandas* require copious water throughout the warm growing period, and even in Winter, as a general rule, they should not be allowed to become dried out. Certain species require more water in the Winter period than others, while one or two are benefited by a definite period of drought.

The plants of practically every species have pithy or woody stems. To build these it is essential that they have plenty of light—and here again many growers are apt to err in their treatment of these plants. The majority of *Vandas* cannot be given too much light, and nearly all of them revel in sunshine. This point will be dealt with in the Table as each species is described.

VANDA AMESIANA. *Native of Burma, India.*

A very beautiful species with rather short, stout, fleshy stems, the tallest specimen I have seen having a stem about fifteen inches high, but the majority of the plants are much shorter. The leaves are stiff and fleshy, with a broad channel on the upper side, about an inch broad at the base and tapering to a fine point. The flowers are produced on erect scapes from the axils of the leaves and bear from a few to a great number of exquisitely fragrant blooms from 1½ to 2 inches across. Sepals and petals nearly equal, flat and spreading. They are white with a soft, pink flush. The lip is a rich rose-pink with paler edges. *Vanda Amesiana* is found growing high up on the frosty mountains of Eastern Burma and on the Himalayas. It usually selects the face of rocky cliffs, where it is exposed to sun and wind. It, therefore, requires cool, light conditions. An open bushhouse is quite the best place for it in Brisbane, and it should be so placed as to receive the benefit of the morning sunrays. In Sydney open house cultivation should also be sufficient, but probably it will do well in a cool glasshouse, grown in a basket and suspended close to the glass. Copious water must be given it right from the beginning of Spring until Autumn has turned chill. From then on sufficient moisture must be applied to prevent dryness at the roots. Flowers in early Spring, the blooms lasting three weeks in perfection.

Var. *alba*.—Has pure white flowers.

VANDA ARBUTHNOTIANA. *Native of the Western Ghats, India.*

An attractive species with stems from 1 to 2 feet high, the narrow, recurved, bilobed leaves from 6 to 8 inches long. Flowers produced on racemes from the axils of the leaves, usually from six to eight (sometimes more) on each raceme. They are about 2½ inches from the top of the dorsal to the lip, and about 1½ inches across. Sepals and petals are oblong-obovate, and are a rich golden-yellow with transverse stripes of purple. The middle lobe of the lip is fiddle-shaped, and is usually cream with a few purple lines. Flowers are fragrant. This species will grow in a bushhouse in Brisbane and the North, with glasshouse treatment in the

South. It likes rather warmer treatment than *Amesiana*, and, like it, requires plenty of light. Flowers in midsummer and lasts three to four weeks.

VANDA BATEMANII.

(A synonym of *Vandopsis lissocbiloides*, q.v.)

VANDA BENSONI. *Native of Northern Burma.*

A handsome species with strap-shaped, channelled, leathery leaves, unevenly bilobed at the apex, and from 6 to 8 inches long. Racemes are up to 18 inches long and bear from 10 to 15 flowers with obovate, rounded sepals and petals which are white on the underside, and yellowish-green on the inside dotted freely with reddish-brown. The reniform apex of the lip is a soft violet, the ovate, central part rose-pink, and the small side lobes and spur white. Treatment as for *V. Arbutnotiana*. Flowers in Spring and lasts four to five weeks.

VANDA BOXALLII. (See *V. lamellata*.)

VANDA BRUNNEA. *Native of Nepal.*

A rare species with stout, fleshy stems and crested, green, fleshy leaves, 6 to 7 inches long, grooved on the upper surface and unevenly bilobed. Flower spikes 8 or 9 inches long bearing six to eight flowers, each 1 to 1½ inches across. Sepals and petals wedge-shaped, elongate and obtuse, deep-greenish brown on the inside and yellowish on the under parts. Lip cream or pale yellow, the long conical spur the same colour. Flowers in Summer and lasts three to four weeks. Treatment as for *V. Arbutnotiana*.

VANDA CATHCARTII.—See *Esmeralda Cathcartii*.

VANDA CLARKEI.—See *Esmeralda Clarkei*.

VANDA COERULEA (Sometimes CAERULEA). *Native of Northern India and Burma.* (Illustrated).

This is a very lovely and probably the most popular species. It has stout, erect stems from 1 foot to 3 feet high with dark green, rigid, leathery, channelled leaves, about 6 to 8 inches long and unevenly bilobed at the apex. Scapes are from 1 to 2 feet (even longer in fine specimens) in length and erect, and carry from 10 to 20 good sized flowers which are from 4 to 5 inches across. The sepals and petals are flat, oblong and rounded. In good varieties the sepals and petals overlap at the base, making a particularly symmetrical and handsome flower. They are of a beautiful pale blue in colour, often tessellated with darker blue to a varying extent, so that in particularly fine plants the flowers appear to be almost cobalt in shade. (I have noticed that often the darker coloured flowers grow on plants with slightly broader leaves—this may be coincidence only.) The lip is small, narrow and oblong, the apex divided into two divergent lobes. The front portion is deep blue, the base and the lateral lobes being the same colour as the segments.

This species is found high up on the mountains and requires cool, sunny conditions. In Brisbane an ordinary bushhouse, where the morning sun can reach the plant and where there is plenty of fresh air, will do. In Sydney a cool glasshouse will be suitable. In the North, except on cool highlands, a bushhouse where the fierce rays of the sun are broken will be best. Abundance of water during the growing period, but very little from the beginning of Winter. The normal flowering period is Autumn or early Winter, but it is somewhat variable in this respect, fine specimens often being seen in Spring or even Summer. In the cooler seasons the blooms last about a month, but in Summer rather less.

VANDA COERULESCENS. *Native of Northern Burma.*

A rather slender species of great charm, the stems being from 6 to 12 inches or a little higher, with leathery, channelled leaves about 6 inches long, dark green in colour and with the usual apical notch. Scapes are slender, erect and about 15 inches high, and bear from 10 to 20 flowers, each from 1 to 1½ inches across, with ovate, spreading, somewhat incurved sepals and petals of pale mauve-blue, and a small rich violet-blue lip whose front lobe stands at almost right angles to the base, which is furnished with a green-tipped, conical spur. Treatment as for *V. Arbutnotiana*. Flowers in Spring and lasts six weeks.

Var. *Boxallii*.—Sepals and petals white tinged with lilac.

VANDA CONCOLOR. *Native of China.*

An interesting species which has stems from a foot to 5 or 6 feet high, with somewhat drooping, fleshy leaves obliquely three-pointed at the apex. Racemes are long and carry a considerable number of widely spaced flowers each from about 1¼ to 2 inches across. Sepals and petals are oblong-ovate, slightly undulated, white underneath and cinnamon-brown on the inside. The base of the lip is white and downy, the side lobes having a few pinkish dots. The front lip is cinnamon-brown and is bilobed at the tip. Sweetly fragrant. This species should be treated as prescribed for *V. Arbutnotiana*, but a slightly warmer situation is desirable. Flowers in early Summer and lasts three to four weeks.

(Syn. *Vanda furva* and *Vanda stella*.)

VANDA CRISTATA. *Native of Himalaya Mountains.*

A rather unsatisfactory and not very attractive species, having shortish, erect stems with the usual leathery, strap-like, notched leaves which are 3 to 5 inches long. Flower spikes short, erect and bearing from three to six fair-sized flowers with oblong, obtuse, incurved sepals and somewhat narrower petals of pale yellowish-green. The lip is oblong and convex, the apex being divided into three divergent lobes. On the inside this is brownish-yellow marked with red-purple stripes lengthwise, the side lobes being almost wholly of this reddish-purple. The under part of the lip is similar in colour to the sepals. Flowers in Spring and Summer, and lasts six weeks or more. Treatment as for *V. Amesiana*.

VANDA DENISONIANA. *Native of Burma.*

A very lovely, small growing species, with typical stems and very much decurved leaves, about 6 to 10 inches long. Racemes are short and stout, and carry about five to six flowers, each about 2 inches across. The upper sepals and the petals are broadly tongue-like, and the lower sepals are ovate, narrowed at the base. All these segments are white, delicately tinged with green, the lip being the same colour. The apex is divided into two broad, divergent lobes, the base having two erect side lobes. Treatment as for *V. Arbutnotiana*. Flowers in Summer and lasts well.

Var. *Hebraica*.—Petals and sepals sulphur-yellow, curiously barred and spotted with deeper yellow, these marks being, allegedly, like Hebrew characters. The front part of the blade of the lip is olive green.

VANDA DENSIFLORA.—Syn. of *Anota giganteum*, which see under *Saccolabium*.

VANDA HASTIFERA. *Native of Dutch East Indies.*

A very rare species with tall, rather slender, erect stems with recurved leaves of typical *Vanda* type. Racemes, long and rather drooping, bear 14 to 20 flowers about 2 inches across. Sepals and petals spatulate and undulate, light yellow blotched with red. The lip is triangular in front, and has two erect, triangular side lobes at the base. White marked with brown and purple, the crest hairy. Column white spotted with brown. Flowers in Summer. Treatment as for *V. concolor*.

VANDA HELVOLA. *Native of Java.*

This species is probably a variety of *Vanda tricolor*, being similar to that species in habit, but the flowers are smaller. Sepals and petals are pale yellow marked with reddish-brown. The lip is violet purple. Flowers in Summer and lasts about a month. Treatment as for *Vanda tricolor*.

VANDA HINDSII. *Native of Arnheim Land, North Australia.*

The only Australian species, and, from the description, probably more or less synonymous with *Vanda tricolor*. I have not seen this plant. Lindley's description is, in effect:—Stems of moderate length, much linear, canaliculate leaves 1 foot or more long. Racemes 6 inches to 1 foot in length, with from three to ten large flowers, the spreading pedicels 2 to 3 inches long, including the ovary. Sepals and petals nearly 1 inch long, broadly ovate with sinuate margins constricted into a claw of a pale yellowish white outside, white inside with purple spots, slightly stained with yellow at the base and with pink towards the margins. Labellum at least as long as the sepals, convex, rather thick and fleshy, generally purple but with more or less of white towards the base and darker streaks on the disk; the lateral lobes broad and short, the middle lobe much longer, obovate, white.

Lindley (Hook. Lond. Journal 11 237—Bentham Flora Australiensis).

VANDA HOOKERIANA. *Native of Borneo, Perak, Cochin China.*

A very shy flowering species having slender, elongate, terete stems with nearly erect, terete, pointed leaves of a paler green than the more commonly known *V. teres*, which is also of more robust growth than *V. Hookeriana*. Racemes are produced from the upper part of the stem and bear two or three (rarely more) beautiful flowers each about $2\frac{1}{2}$ inches across, with the undulated, broad, spatulate petals and the smaller sepals white spotted with magenta. The lip, which is striking and handsome and about $1\frac{1}{2}$ inches wide, is white, the side lobes having transverse lines of magenta-purple, while the middle lobe is lined longitudinally with the same colour. On each side of the column is a triangular appendage of a rich, deep purple. This orchid has always been difficult to obtain, as, although it is plentiful in its native haunts, it carries very badly, and in most cases whole consignments have opened up black or moribund. However, the improved aerial communications will probably lead to supplies being had more readily.

Vanda Hookeriana grows upon trees and shrubs in the marshy lowlands of Borneo, etc. To grow it successfully requires exposure to the warmth of the sun throughout the year. In Brisbane and the North it will be served best by being grown right out in the open, where the sun will shine upon it for the maximum time each day. From the beginning of Spring until the first chill of Winter copious supplies of water must be given it. In Winter it can be left comparatively dry, a spraying and soaking once a week being all that is necessary. In Sydney a sunny corner of the glasshouse is required. Flowers in late Summer and lasts about three weeks.

VANDA INSIGNIS. *Native of Timor.*

A very handsome species. The erect stems are clothed with stiff, strap-shaped, recurving, keeled leaves, denticulate at the tip and up to about 10 inches in length. Racemes, 9 to 10 inches long, produce six to ten flowers each about $2\frac{1}{2}$ inches in width. Sepals and petals, obovate, obtuse and fleshy, are light yellowish-brown, blotched with red-brown; on the underside creamy-white. The lip is large and pandurate, side lobes white, middle lobe white at the base and the expanding front portion light purplish-rose, the disk having two low, transverse ridges. Flowers in midsummer and lasts three to four weeks. Treatment as for *V. Arbutnotiana*.

Var. *Schroderiana*.—Sepals and petals light yellow. Lip pure white. Flowers in Autumn.

VANDA KIMBALLIANA. *Native of Burma.*

A slender growing species with short, slight stems rarely exceeding a foot or fifteen inches in height, and furnished with a number of narrow, tapering, pointed leaves which have a narrow furrow along the upper side. Flower scapes up to 18 inches across, drooping and bearing a dozen or more flowers each between 2 and 3 inches in width. Sepals and petals white, sometimes tinted with rose. Lip three-lobed; mid-lobe large, heart-shaped, deep rose-purple; side lobes small,

yellow dotted with brown. Flowers in late Summer or Autumn and lasts two to four weeks. Treatment as for *Vanda Amesiana*.

VANDA LAMELLATA. *Native of Philippine Islands.*

A small growing variety with slender, erect stems and long, narrow, strap-shaped, channelled, recurved leaves, with the typical notched tip. Flower spikes long and slender with up to a score of 2-inch flowers. Dorsal sepal and petals, bent backwards, are creamy-white in colour. Lateral sepals divided longitudinally in halves, the outside halves white, the inner being reddish-brown with a purplish tinge. Lip somewhat fiddle-shaped in front, rich rosy-magenta in colour, side lobes creamy-white; disk marked with six reddish-purple stripes. Flowers in mid-winter and lasts four to six weeks. Treatment as for *Vanda Arbutnotiana*.

VANDA LIMBATA. *Native of Java.*

A comparativeley rare species, with stout stems and long, thick, white roots and leathery, channelled leaves from 8 to 10 inches long and about an inch across. Racemes are erect, somewhat arching, and carry a dozen or more flowers each about 2 inches wide. Sepals and petals tongue-shaped, cinnamon-brown, blotched and mottled with reddish-brown and margined with yellow. The lip is squarish and somewhat pandurate. It is rosy-pink with a white margin, the disk having five to seven parallel grooves. Flowers in midsummer and lasts a month. Treatment as for *V. Arbutnotiana*.

VANDA LINDENI. *Native of New Guinea.*

A rare plant which I have not seen. It is similar in habit and form to *Vanda hastifera*. Sepals and petals oblong-cuneate with undulated edges, yellow spotted with red. Lip three-lobed and fleshy, lateral lobes erect, middle lobe triangular.

VANDA LUZONICA. *Native of Philippine Islands.*

A charming species, but very shy of blooming. Stems 18 inches to 2 feet tall, half an inch in thickness, rather woody, furnished with light green, arching leaves about 15 inches long. Racemes long with nine or ten flowers each about 2½ inches across. Sepals and petals white tinged at the apex with magenta, the petals having a number of bars and dots of purple at the base. Lip white at the base, middle lobe magenta. Flowers in Autumn. This species requires warm, moist conditions and needs hothouse treatment in the South and a warm glasshouse in Brisbane.

VANDA PARVIFLORA (syn: *Aerides Wightianum*).

This species is mentioned as being worthy of attention by Australian growers. It is a very distinct, small growing variety from Southern India and Ceylon. Leaves are bilobed with a point between the two lobes. Racemes erect and fairly long. Flowers (5 to 9) rich yellow flushed with pink. Lip white and violet, spotted with lilac and having a crested disk. Sweetly scented with a honey-like fragrance. Flowers in midsummer.

Climate.—The plant is found at from 6000 to 8000 feet on the highlands of Travancore and Ceylon. The temperature range is from a minimum of 43 degrees to a maximum of 74 degrees. It should therefore do well enough under bushhouse conditions in Queensland—and under glass in Sydney in the Winter time. Like most of the genus, it can take almost unlimited water in the Summer, with just sufficient in the Winter time to prevent withering.

VANDA PUMILA. *Native of Northern India.*

A small growing variety, similar in form and habit to *V. Denisoniana*. Flowers about 3 inches across. The sepals and petals whitish spotted with red towards the base. Lip blood-crimson with white stripes. Flowers in Spring and lasts three to four weeks. Treatment as for *V. Arbutnotiana*.

VANDA SPATHULATA. *Native of India.*

I have not seen this variety. It has tall, stout stems with fleshy, recurved, tridentate leaves. Flower scapes erect and bear a dozen two-inch flowers which are wholly golden-yellow. Flowers in late Spring and early Summer.

Syn. *Renanthera spathulata*.

VANDA STANGEANA. *Native of Assam.*

A fragrant species very similar to *Vanda tessellata*. Flower spikes erect and bear 5 or 6 flowers each 1½ to 2 inches across. Sepals and petals greenish or ochre coloured, tessellated with dark reddish-brown. Lip trilobed, the centre lobe rather heart-shaped and triangular, bilobed at the apex, white marked with mauve, sometimes wholly mauve. The auricles of the lip are blunt, white with yellow sparsely spotted with mauve. Flowers in late Spring and early Summer. Lasts five to six weeks. Treatment as for *V. Arbutnotiana*.

VANDA SUAVIS—Variety of *V. tricolor*. *Native of Java.*

A noble and popular species which should be in every collection. It has tall, erect spikes, sometimes reaching a height of over 6 feet, clothed with strap-shaped, rather flaccid, dark green leaves, unevenly bilobed at the apex, and up to 16 inches long by 1½ inches across. Racemes are long and bear a dozen or more handsome and sweet-scented flowers from 2 to nearly 5 inches across. Sepals and petals broadly spathulate and waved, white on the outside and freely spotted and barred with reddish-purple. In the type species the petals are often twisted so as almost to bring their backs to the front. In others the flower has the petals facing frontwise. The lip is three-lobed, the front lobe narrow and bilobed, pale rosy-purple in colour, lateral lobes ovate, flat and a deeper shade of purple. Flowers in late Spring and Summer. Lasts five to six weeks. This species likes slightly shadier conditions than most of the *Vandas*. It does well in an open bushhouse in Brisbane and the North, but glasshouse treatment would be necessary in the South.

Var. *Charlesworthii*.—More richly spotted and streaked. Lip rosy-purple flecked with darker dots, side lobes violet purple with white edges.

Var. *flava*.—Ground colour of sepals and petals yellow instead of white, marked with broad oblong brown spots, lip paler in colour.

Var. *Gottschalckei*.—Stouter growing. Sepals and petals more densely spotted, the pedicels tinged with rose-pink. Lip bright rose-purple, tipped with white.

Var. *rubra*.—Sepals and petals suffused with orange instead of marked with red dots and dashes. Lip red.

VANDA TERES. *Native of India, Burma, etc.*

A climbing species with a long, slender, cylindrical, terete stem, dark green in colour and furnished with numerous lateral aerial roots and erect, cylindrical, terete, pointed leaves. Racemes are erect and bear from two to six large and beautiful flowers about 3 inches across. Sepals are oblong and are white tinged with rose. Petals larger and rounder than the sepals, which they overlap. Deep rose in colour. The lip is large and bifid, deep rose-pink in front with yellow veins, the crest is orange lined and spotted with crimson. Spur conical. Flowers in Summer and Autumn, and lasts about a month. Treatment as recommended for *V. Hookeriana*.

Var. *teres alba*.—Flowers white. Throat yellow striped with red. (Syn. *teres candida*.)

Var. *teres Andersoni*.—Flowers more brilliantly coloured.

Var. *teres aurora*.—Sepals white, petals white tinted with rose, throat light yellow. Lateral lobes pink with two rows of small purple dots.

VANDA TESSELLATA. *Native of India.*

A handsome species with fairly stout, erect stems up to 2 feet high and narrow, leathery, recurved, channelled leaves up to about 8 inches long. Flower spike, erect, bears from six to twelve flowers each about 2 inches across. These are white on the outside, the inside of the sepals and petals being yellowish-green much mottled with olive-brown. The three-lobed lip has a violet-purple middle lobe with white laterals, the spur being rose-pink. The flowers are strongly scented. Flowers in early Summer and lasts up to six weeks. Treatment as for *V. Arbutnotiana*.

(Syn. *Vanda Roxburghii*.)

VANDA TRICOLOR. *Native of Java.*

One of the most popular species among orchid growers in Australia. It has stout, tall, erect stems amply clothed with two rows of strap-shaped, channelled, bilobed, recurved leaves somewhat lighter in shade than those of *V. suavis*. The racemes are shorter than those of *V. suavis*, but carry up to a dozen (sometimes more) attractive flowers from 2 to 3 inches in width. These fragrant flowers have oblong-obovate, obtuse, fleshy sepals and petals which are white on the outside and, on the inside, cream or pale yellow spotted with brownish-red. The three-lobed lip has a convex, deeply bilobed middle lobe of bright rosy-purple, usually paler at the tip, and with five or six white lines in the disk. The lateral lobes

are roundish and white, the spur white and compressed. Flowers in Spring and early Summer, the blooms lasting a long time in perfection. I find that in Brisbane *Vanda tricolor* grows excellently, well out in the open where it gets ample sunshine and fresh air. If it can be placed where the midday rays of the sun are partially broken the leaves are less likely to become yellowish. The effect of the strong light is to make for stronger, firmer plants and better flowers. Bushhouse treatment will suit them also, but there must be ample light. They grow naturally on shrubs and trees exposed to the full glare of the tropical Java sun, and buffeted by every breeze that blows. In the South a sunny place in a glasshouse will serve, but in the very cold parts artificial heat in the coldest part of the Winter is desirable. It is a very variable plant, some of the best varieties being:—

Var. *Conningii*.—Foliage rather broader and darker coloured. Flowers large. Sepals and petals rich yellow spotted and streaked with deep crimson, the margins being rosy-purple. Lip dark reddish purple, the base pink.

Var. *Dodgeonii*.—Flowers large and numerous. Sepals and petals light amber, streaked and blotched with reddish-brown with violet margins. Lip large, purplish-violet, with a few white blotches near the base. Highly fragrant.

Var. *formosa*.—Sepals and petals bright yellow covered with oblong red-brown spots arranged in rows, sometimes the spots flowing together into large blotches.

Var. *insignis*.—Sepals and petals light yellow spotted with crimson. Lip pale rosy-lilac. A very free flowering species which blooms twice or even thrice a year.

Var. *Patersonii*.—Flowers smallish (about 2 inches). Sepals and petals creamy-white, very thickly spotted with cinnamon-brown, the lip bright magenta.

Var. *planilabris*.—Flowers very large. Sepals and petals very broad. Citron yellow densely marked with brown spots. Lip large and flat, rose-pink with a purplish margin, the disk being striped with deep brownish-purple.

Var. *Wallichii*.—Spots on petals reddish-brown, with a rose border. Lip rose-lilac lined at the base with deep magenta.

Var. *Warneri*.—Leaves narrower and prominently ribbed. Sepals and petals have a deep rose margin. Lip wholly deep rose-purple.

VANDA VIOLACEA.—Syn. *Anota violacea*, which see under *Saccolabium*.

VANDA VITELLINA. *Native of India.*

A small growing species with stems from 6 to 12 inches tall, with leathery, channelled leaves unequally bilobed at the apex. Scapes, slender and erect, carry from 10 to 20 flowers, rarely an inch in diameter, and a deep golden-yellow in colour. Flowers in Spring and lasts four to five weeks. Treatment as for *V. Arbutnotiana*.

VANDA WATSONI. *Native of Annam and Lower Burma.*

A slender species with short, slight stems up to a foot or 15 inches tall, with

narrow, tapering, pointed leaves very similar to those of *V. Kimballiana*. Flower scapes long and slender and bearing up to 9 or 10 good sized flowers. Sepals, petals and lip pure white, the latter ending in a short sac instead of the usual conical spur. Flowers in late Summer. Treatment as for *Vanda Amesiana*.

VANDOPSIS

A small genus of large, epiphytical orchids, of which only a few species are cultivated, and one of these is very rarely seen. They grow to considerable height and rarely flower until they are of good size. Plants potted in crocks and charcoal with a topping of sphagnum moss will grow quite well, but more accelerated development is shown when a few lumps of matured cow-dung are mixed with the charcoal, and a layer of peat or osmunda substituted for the sphagnum moss. They like warmish conditions, but are not adversely affected by bushhouse treatment. In Brisbane ordinary bushhouse conditions will be satisfactory during the Summer period, but, particularly in the cooler parts, it will be desirable to shift them under glass in the Winter. In the South glasshouse treatment will be necessary all the year round. In the North the bushhouse will do. Like most of the Vandaceous type of orchids, which seem to derive a considerable part of their nourishment through their prolific aerial roots, they require ample light, and direct sunlight will do them no harm, providing the intense midday rays are broken. Copious water is necessary during the growing period, but in the Winter very little is required other than to keep the plants from shrivelling as they rest.

VANDOPSIS GIGANTEA. *Native of Burma.* (Illustrated).

A strong growing plant with stout, erect stems clothed with two parallel rows of broad, leathery, deep green leaves up to 18 inches long, prominently bilobed at the apex. The flower spikes grow from the axils of the leaves, are pendent, and bear from 10 to 15 flowers, each about 3 inches across. Sepals and petals deep golden-yellow blotched with cinnamon-brown. Lip is small, thick and fleshy, and is white, as also is the column. Flowers in Summer, the blooms lasting some weeks in perfection.

VANDOPSIS LISSOCHILOIDES. *Native of the Moluccas.*

This is the best known species. It has a stout, erect stem which reaches a height of from 4 to 5 feet when fully grown, the stem being about an inch in diameter. The roots are particularly thick. Leaves extremely thick and rigid, deeply channelled, green and bilobed at the apex. In large plants they reach a length of 2 feet. The tall, erect, axillary flower spike bears from 20 to 30 waxy flowers, about 2½ inches wide, somewhat cruciform in appearance, with golden-yellow sepals

and petals freely spotted with brownish-red, the outside of the flower being purplish, while the small lip is purplish crimson. It flowers during the Summer months, and a period of two to three months elapses from the time the first flower opens till the last one falls.

Syn. *Vanda Batemannii*, as which it is often quoted in catalogues.

VANDOPSIS LOWII. (Often referred to as *Arachnanthe Lowii*, *Vanda Lowii* or *Renanthera Lowii*.) *A Native of Java, Sumatra and Borneo.*

The finest and most interesting species. As a general rule it grows upon the lower branches of trees in the hot and steamy jungles; but Professor A. R. Wallace, in his book, "The Malay Archipelago," says that he saw it growing in profusion hanging over the hot springs at the foot of Peninjuah Mountain, in Borneo. The stems grow to a height of from two feet to four feet and are stout and vigorous. It bears long, green, strap-shaped leaves of firm texture reaching a length of about 18 inches. It sends out long, thick aerial roots, which absorb moisture from the atmosphere, and also serve to anchor the plant to its host tree or rock.

It issues long flower spikes from the leaf nodes, these spikes often being from six to eight feet long and producing from thirty to fifty large flowers. A peculiarity of the plant is that the basal pair of flowers differs in form and shape from all the others on the spike. This basal pair are approximately of the shade called "tango," dotted with crimson, and the sepals and petals are lanceolate but blunted at the point. The other flowers are larger and are of a pale green shade with a yellow tinge, and are marked with irregular blotches of reddish brown. The lip is shorter than the sepals and petals.

This species requires warmth and moisture. It should do quite well in North Queensland when potted in a basket in a compost of charcoal, crocks and fibre or peat with sphagnum moss in a thick layer on the top. In Brisbane in the warmer areas it will do nicely in an ordinary glasshouse, providing it is given plenty of water in the heat of the Summer, and provided that the atmosphere surrounding it is kept moist and warm. In the colder parts a moist hothouse is desirable. I have had a plant for about three years and have grown it in a glass protected house. It made slow growth at first and I then carefully removed some of the charcoal and crocks and substituted large-sized lumps of cow-dung. Since then the plant has made excellent growth and has practically filled a fifteen inch pot with healthy roots.

Like many other equatorially grown orchids, this plant should never be allowed to become dry. Water should be applied generously throughout the warmer months, but should be reduced to a suitable minimum in Winter.

VANDOPSIS PARISHII. *Native of Burma.*

A dwarf and slow growing variety with a short, stout stem and thick, fleshy, oblong leaves, bright green in colour and notched at the apex. The raceme is erect and carries as many as ten flowers up to 2 inches in width, with firmly

textured sepals and petals, the latter being slightly the broader. They are greenish-yellow freely spotted with bright reddish-brown. Lip has a white base striped with orange at the base; the front lobe pale magenta with a white margin. It is strongly scented. Flowers in Summer and lasts well. This species does best in a basket. It must have ample light. Treatment as for *Vanda Arbutnotiana*.

Var. *Marriottiana*.—Sepals and petals glossy brown, with a magenta tint. Lip white at base and a magenta front lobe. No scent.

VANILLA

A small genus of climbing, epiphytcal orchids of little horticultural value, although at least a few species have rather large, showy blooms. Plants are difficult to obtain, but they make an interesting addition to a collection if the grower can give them the space and the conditions they require. They are all inhabitants of sweltering tropical jungles where the ground is always damp and the encircling air always humid. At the conclusion of the Great War I came ashore with the usual sailor's idea of a peaceful farm. I had seen *Vanilla planifolia* growing in Fiji, where some people with whom I became acquainted were making at least a decent living out of Vanilla beans, the commercial chemist not having by then completely turned the fruit flavouring business into a matter of synthetic chemicals. I managed to land a few plants which I planted in sawn-off hollow logs at Redcliffe. For compost I used a mixture of leaf-mould and manure. In spite of the prognostications of a botanist friend the plants grew quite vigorously. Unfortunately, they were assailed by caterpillars, locusts and opossums before they had a chance to flower. So they died miserably, and with them my hopes of a fortune from true Vanilla essence! Although the plants seemed likely to flourish in the open air, I doubt if they would have flowered. They require hot, moist conditions at all times, and to have any success with them a heated house will be necessary in Brisbane and the South. In the tropical North, however, there is no reason why they should not grow well enough out in the open. A compost of good fibrous peat with a little leaf-mould and manure will suit them well. They must have a frame upon which to climb, and this is best provided by a stout post with clinging bark to which the numerous roots sent out from the stems can attach themselves. Ample water at all times must be given them. The following are the best species:—

VANILLA LUTESCENS. *Native of Venezuela, etc.*

A rather attractive species, with flowers about 6 inches across, usually borne in pairs on axillary racemes. Sepals and petals sulphur yellow. Lip bright yellow.

VANILLA PHALAENOPSIS. *Native of Madagascar.*

Quite a showy species with long, terete, leafless, channelled stems. Flowers, 2½ to 3½ inches across, are produced in clusters at the end of branches from the

main stem, there being usually up to six or seven flowers in each cluster. Sepals and petals white with a faint tinge of pink. Lip funnel-shaped, the front portion being recurved. It is white with a pink tinge on the outside, and brownish-orange inside.

VANILLA PLANIFOLIA. *Native of West Indies.*

The Vanilla of commerce. Flowers about 2 inches across and pale, rather dingy greenish-white in colour.

VANILLA WALKERIAE. *Native of India.*

A leafless species. Sepals and petals pure white inside, the outside having a brownish tinge with a green streak down the centre. Petals with the same green streak, narrower than the sepals and translucent in appearance. The lip has the same semi-transparent appearance, and is bearded near the base. All the species flower in Spring and Summer. The blooms are rather short-lived, a week to ten days being about their average span.

V U Y L S T E K E A R A

A trigeneric, artificially created genus consisting of hybrids of *Miltonia*, *Cochlioda* and *Odontoglossum*. They are remarkable for their symmetry and brilliant colouring. Treatment as for *Odontoglossums* will serve, but they like rather warmer conditions.

W A R R E A

A small genus of terrestrial orchids closely related to the *Maxillarias* and also to the *Zygopetalums*. They are all natives of South America and are very rarely seen in cultivation in Australia. They will do well in a compost of loam, leaf-mould, some fibrous peat and a little matured cow-dung. They need copious water during the growing season, but only sufficient to keep the compost reasonably damp during the Winter months. They relish good light and a rather warm

temperature, but in the warmer parts of Brisbane and the North bushhouse conditions would serve. In the South a sunny glasshouse will be necessary, though there is no need for artificial heat.

WARREA CYANEA. *Native of Colombia.*

This species grows in a tuft of broadly lanceolate leaves produced directly from the roots. The raceme is short and slender and grows from the roots. It bears several small flowers with ovate, pointed, white sepals and petals. The lip is wedge-shaped, rounded and undulated at the tip, its crest having four to six elevated lines. It is pale blue in colour. Flowers in Summer and lasts six to seven weeks.

Var. *alba*.—The whole flower is white.

WARREA TRICOLOR. *Native of Brazil.*

The finest species. Pseudobulbs oblong, terete, attenuated and jointed, with lanceolate, plicate leaves, tapered at the base into a long stem. The flower-scape is about two feet long and purple, and bears a raceme of eight or ten rather large globose, drooping flowers. Sepals and petals concave, roundish and creamy-white. Lip obovate and cup-shaped, white at the edges, but beautifully dotted and blotched with yellow and purple inside. The disk has three to five fleshy ridges. Flowers in Summer and lasts well.

WARSCIEWICZELLA

A genus of epiphytes closely allied to *Zygopetalum*, from which it differs in being without pseudobulbs, the evergreen leaves springing from a root crown, as also do the single-flowered scapes. They like moderately warm conditions, and, in fact, grow excellently under the same cultural conditions as *Cattleyas*. Care should be taken to preserve them from too much heat, so that a cool place in a glasshouse, or even a warm place in an ordinary bushhouse, will serve them in Brisbane. In the North bushhouse treatment will suffice. In Sydney glasshouse treatment with a little warmth in the coldest part of the Winter is called for. A mixture of osmunda and polypodium fibres in equal quantities is as good a compost as can be had, although peat and coconut fibre will serve. Copious watering through the growing period, but only sufficient in Winter to keep the roots from drying out. Good drainage is essential.

WARSCIEWICZELLA AMAZONICA. *Native of Central America and Venezuela.*

A beautiful species with large, pure white flowers, 4 inches in width, the only colouring being a few raised purple lines at the base of the broad, spreading lip. Flowers late Summer and lasts a fortnight or more.

(Syn. *Zyg. Lindeni*.)

WARSCIEWICZELLA AROMATICA. *Native of Central America.*

One of the rarest species, with oblong, acute leaves springing from the root crown. Scape about 6 inches long, bearing a solitary flower between 3 and 4 inches across. Sepals and petals acutely lanceolate, and snow-white in colour. Lip large and deeply notched at the apex, the margins somewhat crisped. It is azure blue at the front, darkening to purple at the base, with a white border. Between the erect side lobes is a large, many-furrowed callus. Flowers in late Summer, the strongly fragrant blooms lasting many weeks.

(Syn. *Zygopetalum aromaticum*.)

WARSCIEWICZELLA CANDIDA. *Native of Brazil.*

A small growing species, with tufted, oblong, strap-shaped leaves about 8 or 9 inches long. Flowers about 2½ inches across. Sepals and the broader reflexed petals white. Lip squarish or roughly triangular, rosy-purple in the centre, the broad margin having a bluish tint. Disk has a triangular, white callus marked with five blue-purple bars and five tooth-like protuberances. Flowers in Autumn and lasts four to five weeks.

(Syn. *Warrea candida*, *Huntleya candida*, etc.)

WARSCIEWICZELLA FLABELLIFORMIS. *Native of Brazil and Trinidad.*

This species has broadly oblanceolate leaves growing in a tuft from a root crown. The scape is radical and one-flowered, the fragrant bloom being about 2½ inches across with waxy white sepals and petals, the dorsal sepal and the petals being narrowly oblong and acute, while the lateral sepals are broader, ovate, oblong, and have a blotch of greenish-yellow at the tips. The sub-quadrate lip is concave at the base and reflexed at the apex. It is white with broad, close-set, violet-purple lines. Flowers in Autumn and lasts well.

(Syn. *Zygopetalum cocbleare*.)

WARSCIEWICZELLA MARGINATA. *Native of Colombia.*

A charming species with oblong, strap-shaped, pointed leaves up to a foot tall. Dorsal sepal and petals, oblong, broadly ovate lateral sepals, narrower and spreading upwards, are yellowish-white. Lip broad and flat, yellowish-white with a crimson margin, the disk having numerous radiating purple-crimson bars. At the base of the disk is a callus consisting of five to seven tooth-like protuberances arranged in a semi-circle. Flowers in Autumn and lasts three weeks.

(Syn. *W. velata*, *Zyg. velatum*, etc.)

WARSCIEWICZELLA WAILESIANA. *Native of Brazil.*

A small species with typical leaves, but of a darker shade and about 3 to 4 inches in length from crown to apex. Flowers about 3 inches across with white or cream coloured sepals and petals, and a round concave lip which is white with an irregular light purple stain down the centre. The crest has five radiating bars joined at

their bases. Very fragrant. Blooms in late Summer or Autumn, and lasts for some weeks.

(Syn. *Warrea Wailesiana* and *Zygopetalum Wailesianum*.)

WARSCIEWICZELLA WENDLANDII. *Native of Costa Rica.*

One of the best species, with tufted, oblong, strap-shaped leaves. Flower spikes carry a single flower between 4 and 5 inches across, in good specimens. Sepals and petals lanceolate, twisted and white. Lip rather heart-shaped with a recurved apex, white with a violet-purple blotch marked with numerous dark purple lines lengthwise. Flowers in early Autumn and lasts two weeks or more.

Var. *discolor*.—Very fragrant. Sepals and petals yellowish-green. Lip much crisped at the margins, white with a violet blotch in the centre.

ZYGOPETALUM and ALLIED GENERA

An epiphytical genus of orchids of a score or more species whose flowers are extremely attractive but which has been somewhat neglected by Australian growers. However, quite a number of growers have plants of various species, generally *Zyg. Mackayi* and its varieties, or *Zyg. intermedium*, and it is probable that from time to time opportunity will be afforded of increasing their holdings. I have noticed in regard to this genus that the plants take some time before they become acclimatised. They usually go back very considerably for the first year or two after their acquisition, but when they have become established they make rapid growth. They are all natives of tropical Central and South America, but grow at considerable altitude, so that they do not flourish easily in a hot, humid atmosphere, preferring the warm but rather rarefied air of tropical highlands. The temperature range in Brisbane quite closely approximates that of their natural habitats, but our air is rather "heavy" for them. Nevertheless under bushhouse treatment in Brisbane and northwards they will eventually grow. In Sydney a cool glasshouse is most suitable for them. Worried by their failure to commence growth quickly, I tried many varieties of compost for them, but have come to the conclusion that the potting material is of secondary importance. I find that a mixture of half and half osmunda and polypodium fibres is as satisfactory as can be had; but staghorn peat or todea can be substituted for the polypodium without detriment. Copious water is essential during the growing period, but care must be taken to prevent any moisture lying in the young growths, as they are particularly susceptible to "damping off." In the resting period a minimum of applied water is necessary, but the plants should not be allowed to "dry out," sufficient liquid being given them to keep the compost about the roots slightly damp. The *Zygopetalums* like a reasonable amount of light, but should be kept

from the direct rays of the sun, though the early morning sunbeams appear to be rather beneficial.

ZYGOPETALUM BRACHYPETALUM. *Native of Brazil.*

A handsome species with sword-like, lanceolate leaves, from three to five in number, which grow from the top of the oval, light green pseudobulbs (2 to 2½ inches high). Scape grows from the base of the pseudobulb and carries from two to five flowers, each from 2½ to 3 inches in width, with stiff, oblong-obtuse sepals and petals, brown somewhat marbled with green, and a broad, roundish, notched lip which is white with blue-violet. At the base of the lip is a frill-like crest closely striped with blue. Flowers in midwinter and lasts some weeks.

ZYGOPETALUM BURKEI. *Native of British Guiana.*

A striking species with clustered, narrowly oblong, compressed pseudobulbs which become furrowed with age, and a pair of linear, lanceolate, acute leaves 9 to 12 inches long. Radical flower scapes carry four or five flowers each 2½ inches across, with oval-oblong sepals and petals whose margins are slightly reflexed. They are green with seven to nine longitudinal, chocolate bars sometimes broken into dots. Lip white with numerous crimson grooves and ridges. This species grows at an elevation of 6,000 feet on rocks in swamps on the side of the Roraima Mountains in British Guiana. It requires rather more warmth than most species and more moist conditions. Flowers in Winter and lasts three to five weeks.

ZYGOPETALUM CRINITUM. *Native of Brazil.*

A fine species often classified as a variety of *Z. Mackayi*. It has ovoid green pseudobulbs, wrinkled when old, which bear three lanceolate, strap-shaped, somewhat plaited leaves. Flower scapes bear five to seven flowers each about 3 inches across. Sepals and petals are green barred with brown, the broad lip being creamy-white with hairy purple coloured veins. The disk has a small yellow semi-circular callus. Flowers in Autumn and lasts well.

(Syn. *Zyg. Mackayi crinitum*.)

ZYGOPETALUM DAYANUM. *Native of Colombia.*

A species without pseudobulbs and growing in a tuft of oblanceolate, pointed, narrow leaves 10 to 15 inches long. Bloom is solitary, about 3 inches across. The fleshy sepals and petals are creamy-white tipped with pale green, the petals being smaller than the sepals and often without the green tips. Lip is white with crimson streaks and furnished with a semi-circular frilly crest of deep crimson. Flowers in late Autumn. Native of the Andes at a height of 6,000 feet.

Var. *candidulum*.—Sepals and petals pure white. Lip tinted with remote-crimson.

Var. *rhodacrum*.—White sepals and petals tipped with purplish-rose. Lip white, suffused with crimson.

Var. *splendens*.—Tips of sepals and petals dark violet, lip deep violet.

ZYGOPETALUM GAUTIERI. *Native of Brazil.*

A robust species, with ovate-oblong, somewhat compressed pseudobulbs from 3 to 4½ inches tall, topped with a pair of lanceolate, prominently veined leaves and about 15 to 18 inches long. Erect, basal scapes carry five to seven flowers nearly 4 inches across in good specimens. Sepals and petals are green with blotches of dark brown. The lip is deep purple-blue, often spotted and streaked with a deeper shade. The crest is lined with the same deep shade. Flowers in Winter and lasts five to six weeks.

(Syn. *Z. maxillare*. var. *Gautieri*.)

ZYGOPETALUM GRAMINIFOLIUM. *Native of Southern Brazil.*

This species has inch-high, roundish pseudobulbs which grow from a slender rhizome, each pseudobulb having from three to five linear, lanceolate, pointed leaves 8 to 12 inches long. The basal scapes carry five to seven flowers each about 2 inches in width. The pointed, spatulate sepals and petals are a bronzy-blackish brown with dark green spots and markings. Lip broadly obcordate, emarginate and convex, violet blue with white streaks. Crest large, semi-circular and deep violet blue. This species grows on the tree ferns on the ranges at from 4,000 feet. Flowers in Autumn.

ZYGOPETALUM GRANDIFLORUM. *Native of Guiana.*

A fine species with ovoid, furrowed pseudobulbs 2 to 3 inches long, each having two broadly lanceolate, pointed leaves over 12 inches long. Scapes carry three to five flowers each about 3 inches across. Sepals and petals broadly lanceolate, extended into long, fine points. Light green with five to seven brown longitudinal bands. Lip broadly ovate, pointed; side lobes roundish-oblong and erect, white; front lobe has reflexed, dentate margin, white with ten to twelve longitudinal, raised purple lines. Semi-circular crest, orange-yellow with red edges and toothed in front. Flowers late Summer.

ZYGOPETALUM INTERMEDIUM. *Native of Brazil.*

This species closely resembles *Z. Mackayi*, for which it is often mistaken. It differs from that species in having a more or less hairy lip with veins of purplish-blue. Pseudobulbs, large and oval, are furnished with two or three sword-shaped, bright green leaves up to 18 inches long and 1½ inches wide. Scape, erect, bears five to seven flowers each about 2¾ inches across. Sepals and petals oblong and acute, the tips being incurved. In colour they are green with large, merging patches of brown. Lip 1½ inches across, narrow at the base, bluish-white with radiating broken lines of purplish-blue. The fleshy disk is white. Flowers in Summer and lasts up to eight weeks.

(Syn. *Z. Mackayi* var. *intermedium* and *Z. velutinum*.)

ZYGOPETALUM JUGOSUM. *Native of Brazil.*

Pseudobulbs smooth and oval, about 2 inches long, surmounted by a pair of dark

green leaves 6 to 7 inches long, lanceolate and tapering to a point. The flower spike rises from the base of the bulbs, and bears two or three flowers each about 2 inches across. Sepals and petals creamy white on the outside, but the petals are banded and mottled with royal-purple stripes on the inside. Lip three-lobed, velvety white, ridged, the side lobes being spotted and lined with purple; the middle lobe, semi-circular in shape, is striped and veined with deep purple. Flowers in midsummer and blooms last 4 to 5 weeks in good condition.

Zygopetalum jugosum is found on the forest trees along the banks of the Rio Negro, Northern Brazil. It should be grown in pots in a compost of good fibre (todea, osmunda, or good peat) with a topping of live sphagnum moss. The climate in which it grows is warm and moist for the greater part of the year. *Zygopetalum jugosum*, therefore, needs to be grown in a glasshouse in Sydney and in the colder parts of Brisbane, and places in the cooler altitudes; and it will be desirable to give it heat in the Winter months. In the North, and in other warm places, bushhouse treatment will serve, providing the Winter temperature does not fall below about 48° to 50°—when a glasshouse will be desirable. Water must be plentifully supplied during the warm months, but very little should be given during the resting period. See that the drainage is perfect. Syn: *Colax jugosus*.

ZYGOPETALUM MACKAYI. *Native of Brazil.*

Probably the most popular of all the *Zygopetalums*. It has large, ovate, scarred pseudobulbs 2 to 3 inches high and wrinkled when old. They carry three to five lanceolate leaves 18 inches in length and about 1½ inches wide. Flower scape carries five to seven flowers, similar in colouring to those of *Z. intermedium*, but with a smaller, hairless, glossy lip. The flowers themselves are smaller but more brightly coloured than *Z. intermedium*. Flowers in Winter and lasts eight to nine weeks.

ZYGOPETALUM MAXILLARE. *Native of Brazil.*

This handsome species has ovate-oblong pseudobulbs 2 to 3 inches long and slightly compressed, topped with a pair of narrow, lanceolate, prominently veined leaves about a foot long and an inch in width, but narrower at the base. The scapes, which grow from the bottom of the matured pseudobulbs, bear up to eight handsome flowers from 1½ to 2½ inches across, with sepals and narrower petals green with large blotches of brown. Lip is roundish in front, narrowed at the base, over an inch wide at the broadest part, and a purplish-blue in colour, the large, frilled, semi-circular crest being a darker shade. Flowers in Winter and lasts well. This species grows on the trunks of tree ferns on the slopes of the Organ Mountains in Brazil at an elevation of from 4,000 to 5,000 feet.

Var. *Gautieri*.—Syn. *Zyg. Gautieri* (q.v.).

ZYGOPETALUM ROSTRATUM. *Native of Guiana.*

This species grows from a creeping rhizome from which spring ovate-oblong, flattened pseudobulbs 2 inches long and with one or two leaves at the top, about

5 inches long, 1½ inches wide at the base, and pointed at the tip. Scapes grow with the new pseudobulbs and are 4 inches long, with from one to three large flowers, each being from 4 to 6 inches in width. Sepals and petals are narrow and spreading, and are white. Lip broad and heart-shaped, about 3 inches long, white, with a crest of rose-purple from which there are radiating lines of the same shade. Flowers in Summer. This species requires warmer and moister treatment than any of the others, and a glasshouse is necessary in Brisbane, with added heat in the South and cool localities.

ZYGOPETALUM HYBRIDS

Those enterprising gentlemen who like to show Mother Nature that her youngest son knows as much as she does about the creation of new species and genera have exercised their art upon the *Zygopetalums* as they have with so many of the other genera. As a result we have hybrid *Zygopetalums* such as *Z. Clayi* (*Z. crinitum* x *Z. maxillare*), sometimes labelled "*crinito-maxillare*"; *leucochilum* (*Mackayi* x *Burkei*); *Sedenii* (*Mackayi* x *maxillare*); and others. They have also been crossed with the genus *Colax*, giving the bigeneric *Zygo-colax*, of which *Z.C. Amesiana* (*Z. brachypetalum* x *jugosus*) and *Veitchii* (*Z. crinitum* x *C. jugosus*) are the best known.

Crosses between *Zygopetalum* and *Batemannia* and between *Zygopetalum* and *Vanda* species have also been made, and there is also a record of a cross between *Z. crinitum* and *Sarochilus unguiculatus*. Treatment generally as for *Zygopetalum* should suit if any of these come into the possession of our growers.

BOLLEA COELESTIS. *Native of Colombia.*

A distinct species without pseudobulbs having a cluster of from six to ten oblong-lanceolate pointed leaves, 6 to 12 inches long and 1½ to 2 inches broad. Scapes bear a single flower each 3 or 4 inches across. Sepals and petals violet-blue, the margins and bases being paler, the tips yellowish. Lip has a large, semi-circular, buff-yellow crest. This species is found at a place named Salado, some 6,000 feet up the Andes, where the temperature range is from a minimum of 46° to a maximum of 72°. Flowers in Summer and lasts three to four weeks or more. (Syn. *Zygopetalum coeleste*.)

BOLLEA LALINDEI. *Native of Colombia.*

A fine species, somewhat like *P. Klambochorum* in form and habit. Single flowered up to 4 inches wide. Sepals and petals oblong and wavy. They are rosy-coloured, the under part of the lateral sepals being a deeper shade. Lip short and yellow. Flowers in Autumn.

(Syn. *Bollea Patinii*, *Zygopetalum Lalindei*.)

HUNTLEYA MELEAGRIS. *Native of Brazil.*

A rather rare species, without pseudobulbs but having a number of broadly lanceolate leaves growing from the root-crown. Scapes bear a single flower between 3 and 4 inches in width. Sepals and petals are broad at the base, and lanceolate,

pale yellow in the lower part, and purplish-brown in the upper. Lip smallish, white at the base and purplish-brown in front, with a semi-circular fringe of stiff, yellow hairs in the front. Flowers in Summer and lasts some weeks.

(Syn. *Zygopetalum Meleagris* and *Batemannia Meleagris*.)

KEFFERSTEINIA GRAMINEA. *Native of Brazil.*

This species, lacking pseudobulbs, grows in a fan-shaped tuft of leaves from the root-crown. These are lanceolate, channelled, bright green, about 6 inches in length, and united to each other for about 1 inch at the base. Stems are about 2 inches long and grow in clusters at the base of the leaves, each bearing one flower. These are about 1½ inches across and have ovate, spreading sepals and petals, greenish-yellow and lightly spotted with rich, deep brown. Lip oval with a crisped margin—yellow with a rosy suffusion and blotched with crimson-brown. Flowers in Autumn.

(Syn. *Zygopetalum gramineum*.)

PESCATOREA KLABOCHORUM. *Native of Colombia and Ecuador.*

A lovely species without pseudobulbs and with tufted, strap-shaped, dark green leaves about 1 foot in length. Flowers, solitary, 3 to 3½ inches wide. Sepals, oblong and blunted, petals pointed, are white with chocolate-purple points; lip trowel-shaped, creamy-yellow covered in front with purple-topped hairs; disk has a sulphur-coloured callus with brown keels. Flowers in Autumn and lasts several weeks.

(Syn. *Zygopetalum Klabochorum*.)

PESCATOREA LEHMANNII. *Native of Ecuador.*

A very beautiful species, without pseudobulbs and with lanceolate, pointed leaves up to 18 inches long by 1 inch wide. Flowers solitary and from 3 to 3½ inches across. Sepals and petals broadly ovate, white with close, reddish-purple, parallel lines. Lip small, deep mauve-purple, narrow at the base. Side lobes folded over the column. Middle lobe clothed with coarse, purple hairs. The callus consists of a dozen longitudinal, chestnut-brown ridges. Flowers in Autumn and Winter and lasts four to five weeks.

(Syn. *Zygopetalum Lehmannii*.)

PROMENAEA ROLLINSONII. *Native of Brazil.*

A small but brilliant species, with small, round, compressed, green pseudobulbs about an inch long, topped with a pair of short, broadly lanceolate leaves, recurved at the tips. Flowers are solitary, on slender, drooping scapes which spring from the base of newly matured pseudobulbs. They are about 2 inches across and have oblong, acute and spreading sepals and petals of a bright, pale, clear yellow. The three-lobed lip is bright yellow, the erect side lobes spotted and barred with purple. Flowers in Summer and lasts three to four weeks.

(Syn. *Zygopetalum Rollinsonii*.)

PROMENAEA STAPELOIDES. *Native of Brazil.*

Another small growing species, with small, compressed pseudobulbs which have a prominent rib in the centre of each flattened side, and are topped with two or three broadly lanceolate, acute, glossy-green, striated leaves from 3 to 4 inches in length and somewhat grassy in texture. The short scape grows more or less horizontally from the base of the matured pseudobulb, and is generally one-flowered, but occasionally has two flowers, each about 1½ inches across, with ovate, spreading sepals and petals, greenish-yellow with crosswise purple-brown bands. Lip, three-lobed, has an ovate middle lobe, so deeply purple as to seem almost black, paling slightly towards the margin, and streaked with yellowish-green. Lateral lobes are greenish-yellow. Flowers in Summer and lasts well.

(Syn. *Zygopetalum stapeloides*.)

PROMENAEA XANTHINA. *Native of Brazil.*

A pretty, small growing species, with ovoid, compressed pseudobulbs, acutely edged, about an inch in height and furnished with from one to three oval, oblong leaves, 2 to 3½ inches long. The scape bears one flower (sometimes two), about 2 inches across, with oblong, spreading, rather acute sepals and petals of bright citron-yellow, the three-lobed lip being yellow with bright red spots. Column also yellow, spotted with red.

(Syn. *Zygopetalum xanthinum*.)

ERRATA.

Page	Line(s)	
i	26	Read <i>Trichopilia suavis</i> only (delete x. Paxt.).
vii	index	Under genus <i>Oncidium</i> , for <i>spacelatum</i> read <i>sphacelatum</i> .
29	caption	Delete x. Paxt.
85	8 to 20	<i>Cymbidium iridifolium</i> should follow <i>Cymbidium insigne</i> , on page 89.
127	19	For <i>carysotis</i> read <i>chrysotis</i> .
133	1	For <i>falcorostum</i> read <i>falcorostrum</i> .
148	39	For <i>abliflorum</i> read <i>albiflorum</i> .
164	24 to 34	<i>Dipodium punctatum</i> should follow <i>Dipodium paludosum</i> on page 165.
166	5 to 9	<i>Disa uniflora</i> should follow <i>Disa tripetaloides</i> on same page.
167	7	For <i>dendrobiodes</i> read <i>dendrobioides</i> .
238	24	For <i>spacelatum</i> read <i>sphacelatum</i> .
263	41	For <i>Renantheria</i> read <i>Renanthera</i> .

THE ORCHIDS of NORTH QUEENSLAND

In the happy days of peace the scrubs and forests of North Queensland provided a happy hunting ground for the orchid collector, but in these times of war, with their stresses and strains, few have the time and none have the means at their disposal to pursue an orchid hunt. During the last eighteen months, the greater part of my time has been spent in North Queensland in a series of hectic visits, and on none of these occasions have I found time even to visit the collections of orchid cultivators or to spend an hour in the quest of plants, although I have on many occasions passed through the known habitats of some of our grandest species.

But although the war has robbed many of us of much of our time usually devoted to the growing of orchids, I am of the opinion that, as is so often the case, out of the evil of war will come good. The virile, fertile, tropical jungles and forests of Cape York Peninsula have never been efficiently and completely prospected for the discovery of new orchids. For one reason, transport has been exceptionally difficult, and the greater part of the Peninsula has been possible of traverse only by means of pack-horse, and, even then, only in certain of the more sparsely timbered areas. The exigencies of war, however, have made necessary the construction of roads through the densest jungles, and, although the hungry jungle will creep over these tracks again, it will always be possible to find a pathway through them. These Peninsular jungles hold much hope of the discovery of hitherto unknown orchid treasures and, if, in the grand new world, finance is available for the quest of such unmercenary things as orchids, I venture my reputation as a prophet to forecast that many new species of the order will be found.

New Guinea is rich in orchids and as scientists of various kinds have drawn analogies between the flora and fauna of the two places and, from the evidence available, have argued that Australia and New Guinea were once joined together, it is more than probable that an intensive search of the Peninsular jungles will disclose species closely akin to those of the Papuan jungles.

One genus which I have always felt would be found in North Queensland is the *Cyripedium*. Papua is rich in slipper orchids, and I feel certain that somewhere in Cape York Peninsula there will be found some native species. We have one member of the tribe already reported, *Apostasia stylidoides* (Reichenbach), a humble, grasslike plant, found in the Rockingham Bay area.

But whatever the future may hold for us we have some known orchids in North Queensland which can hold their own in any collection. Indeed, I would say that a person could form quite a satisfactory collection of plants of horticultural value consisting of North Queensland orchids alone.

In this paper I propose dealing only with those orchids which lend themselves to culture from a horticultural viewpoint and will not touch upon the vast

collection of species of more purely botanical interest—although many of these are very beautiful in their small way.

The outstanding genus in North Queensland is the *Dendrobium*, and some of the species are as fine as any to be found elsewhere in the world. One of the best known is *Dendrobium bigibbum* (Lindley), which is found right through the Peninsula and in the islands of Torres Strait. It has stems about a foot long (rarely more than 15 inches) with a few lanceolate leaves at the top. Racemes bearing a number of symmetrical flowers grow from the upper nodes of the matured stems—the same stem often producing flowers for two or three years in succession. The blooms have a wide range of colour from a pure white to a very deep lilac-purple. Typical of the flower is the white or yellow crest on the disk of the labellum. Closely akin to *D. bigibbum* is *D. Phalaenopsis* (sometimes regarded as a variety of *D. bigibbum*). In this species the stems are longer and often stouter, and the flowers are generally somewhat larger than those of the first-mentioned species. They range in shade from white to so deep a purple as to seem almost black in certain lights. These flowers last well, and are a useful orchid for table decoration or for wear. Its range is from north of Cairns right through the Peninsula. *Dendrobium superbiens* is another fine *Dendrobium*, usually regarded as a natural hybrid between *D. Phalaenopsis* and *D. undulatum*.

This beautiful orchid has much the same range of colour as *D. Phalaenopsis* (though I have not seen or heard of a white variety of *superbiens*). Its sepals and petals are narrower than those of *D. Phalaenopsis*, and are somewhat undulated and retroverted. The labellum is rather short and pointed. *Dendrobium Goldiei* is somewhat similar to *superbiens*, and the colour is a richer shade of purplish-red, while the lip is broader and rounded at the tip. Both *superbiens* and *Goldiei* are found in the coastal scrubs from Cooktown north and through the Islands of the Straits.

Dendrobium undulatum is found along the coast right from Lady Elliott Island in the south up to Cape York. It is a very variable orchid and ranges from a dark brown through a rich gold to a bright yellow, according to the variety. It is particularly notable for its twisted and contorted segments. The flowers are of good size and are borne prolifically on long racemes. It is a hardy orchid and grows well in a warm, sunny position. The bright yellow variety, *Broomfieldii*, is particularly attractive. Closely akin to *D. undulatum* are *D. Johannis*, with its smaller flowers with dark brown sepals and petals and yellow tip, and *D. fuscum*, a rather drab-coloured orchid found on Magnetic Island. *D. Johannis* is found north of Cooktown to Cape York.

Perhaps the grandest of North Queensland *Dendrobiums* is *D. Tofftii*. This splendid orchid is found in the far northern coastal scrubs chiefly in the Daintree River country. It has tall, stout pseudobulbs, dark brown in colour and prominently ribbed. Flowers are large, and are of the "Antelope" type of orchid. The sepals and petals are white, and the labellum a deep, rich purple, the side lobes and the throat being striated. Unfortunately, as well as being difficult to obtain, it is even more difficult to cultivate, and rarely flowers in "captivity." *Dendrobium*

canaliculatum is plentiful from about Mackay to Cooktown. Known as the "onion" orchid, this rather attractive plant grows chiefly upon tea-trees. The sweetly scented flowers are white, yellow and dark purplish-brown. *Dendrobium speciosum* grows throughout the coastal scrubs and all the varieties are found. *D. fusiforme*, with its spindle-shaped stems, is also quite common in the rain-forest country and, when in bloom, its silvery-white sprays of flowers are a handsome sight. *D. Smilliae* grows plentifully throughout the Far North from about Ingham onwards. The plant has stout, furrowed stems up to about 26 inches high, crowned with half-a-dozen oblong, lanceolate leaves up to 6 inches long and about half that in width at the widest part. The racemes spring from the upper nodes of the newly matured stem and carry a cluster of numerous small flowers varying in colour from pink to crimson tipped with green, and with a spur longer than the sepals. A variety *D. Smilliae* var. *ophioglossum* has been reported from Gordonvale, near Cairns. This plant has yellow flowers. *D. Smilliae* is known as the "bottle-brush" orchid from the shape of the flower spikes.

These are only a few of the *Dendrobiums* of North Queensland. The plants mentioned are the most important of the genus from a horticultural point of view, but many of the others are worth while growing, although space does not permit of their inclusion in this paper.

Cymbidiums, though the number of species is not great, grow plentifully throughout North Queensland, the species most frequently met with being *C. canaliculatum*, of which four varieties have been noted, including the attractive variety *Sparkesii*, which is found on the Atherton Tablelands and on the ironbark trees of the Ranges. It is a really attractive plant and grows quite well under cultivation. *C. Hillii* and *C. iridifolium* are plentiful and, although their individual blossoms are small, each has its own charm.

An outstanding orchid is a variety of *Phalaenopsis amabilis*, recorded as var. *Rosenstromii*. This lovely plant has been reported from Mount Spec, Bambaroo, and other places near Ingham, and also from Mt. Bartle Frere and the Mossman River further north. The flowers are closely similar to the type species *P. amabilis*, and, in good plants, often approach in size those of var. *Rimestadiana*. It is rather difficult to grow, and has a tendency to die off after two or three years.

Terrestrial orchids are numerous, but most of them are not considered suitable for an orchid collection, and in any case the North Queensland species are much the same as those in the Southern latitudes. *Calanthe veratrifolia* is found in many places north in the coastal areas and in the open forest country at the back of the Dividing Range. *Phaius Tankervilleae* and a variety found by Mrs. Ellis Rowan, and named "*Rowanae*" after its finder (by the late J. F. Bailey) are found in swampy ground near the Murray River in the Tully area. The variety *Rowanae* is rather more brilliantly toned than the type.

Another attractive ground orchid which grows quite well in the herbaceous border is *Spathoglottis Paulinae*, which is found near Cardwell in the Rockingham Bay district. Its deep purple flowers, often borne on a long scape, last well, and the

plant is quite an acquisition in the garden. The plant itself is attractive, with its long, lanceolate, prominently ribbed, green leaves tapering to a long petiole and springing from a small tuber. We have, too, a couple of species of *Goodyera* *viridiflora* and *G. polygonoides*, both of them handsome, but difficult to transport and grow. There is also a native *Anoectobilus* reported from two places on the Atherton Tableland (Kuranda and Ravenshoe), but as (so far as I know) there is only one plant in cultivation at the present time, it is not worth wasting time looking for specimens just now.

There are hundreds of other orchids in North Queensland and I have no doubt that many others will be found when the world returns to sanity; and it is one of my hopes that I may be able to search these unexamined jungles in the Far North and round the Gulf of Carpentaria in the quest for new species and perhaps new genera.

at Townsville.

J. MURRAY COX.



PLEIONE HUMILIS, *Don.*



AN ANOECTOCHILUS SPECIES



CATTLEYA BOWRINGIANA, *Vitch.*



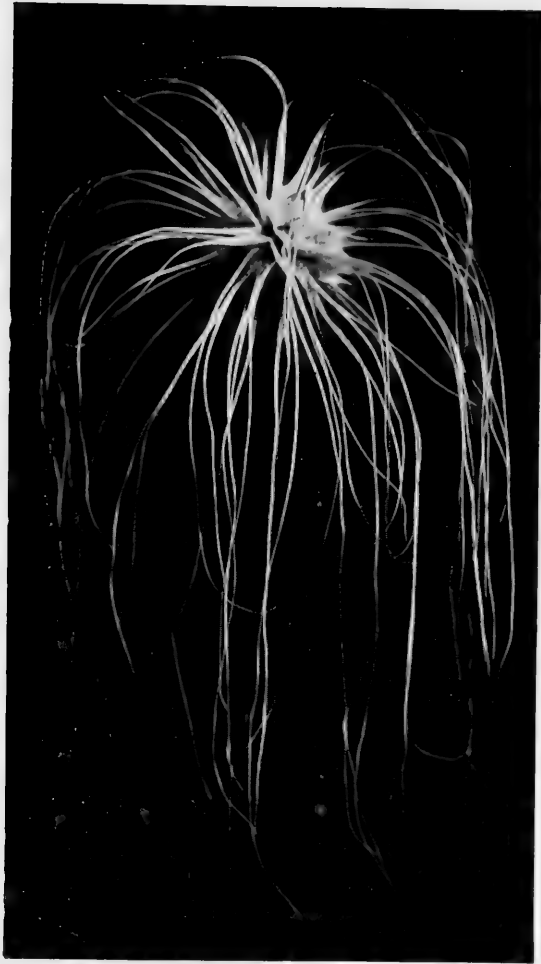
CATTLEYA LABIATA, *Lindl.*



CATTLEYA. x. CELIA, *var. Rivermont.*



SOPHRO-LAELIO-CATTLEYA. x. ISACOL.



CIRRHOPETALUM MEDUSAE, *Lindl.*



COELOGYNE CRISTATA, *Lindl.*



CORYBAS FIMBRIATUS, (R.Br.) Reicbb. f.



EPIDENDRUM MEDUSAE, Benth.



CRYPTANTHEMIS SLATERI, *Rupp.*



CRYPTANTHEMIS SLATERI, Rupp.

This remarkable Orchid, discovered at Bullahdelah, N.S.W., has not so far been recorded elsewhere. This is not surprising, for the whole plant is *subterranean*. It was found "accidentally" by Mr. E. W. Slater in 1931. Botanical circles had been stirred two years earlier by the astonishing discovery at Corrigin, in Western Australia, of an Orchid also of subterranean habit. Though clearly belonging to the Orchidaceous sub-tribe which Dr. Rogers had to create for *Rhizantbella*, the Bullahdelah plant would not fit into that genus, and the Rev. H. M. R. Rupp gave it the name *Cryptanthemis Slateri*.



CYMBIDIUM. x. CASSANDRA, *var. Snow Queen.*



CYMBIDIUM. x. DORCHESTER.



CYMBIDIUM GIGANTEUM, *Wall.*



CYMBIDIUM EBURNEUM. *Lindl.*



CYMBIDIUM x MADELEINE.



CYMBIDIUM. *x* CHARM.



CYMBIDIUM. (*Alexanderi*. var. *Westonbirt*, *x* C. *Toucan*).



CYPRIPEDIUM. s. WENDOVER.

CYPRIPEDIUM. s. MEMPHIS.



CYPRIPEDIUM FAIRIEANUM, *Lindl.*



CYPRIPEDIUM NIVEUM, *Reichb. f.*



DENDROBIUM. x. ZANTHOCENTRUM.



DENDROBIUM CREPIDATUM, Lindl.



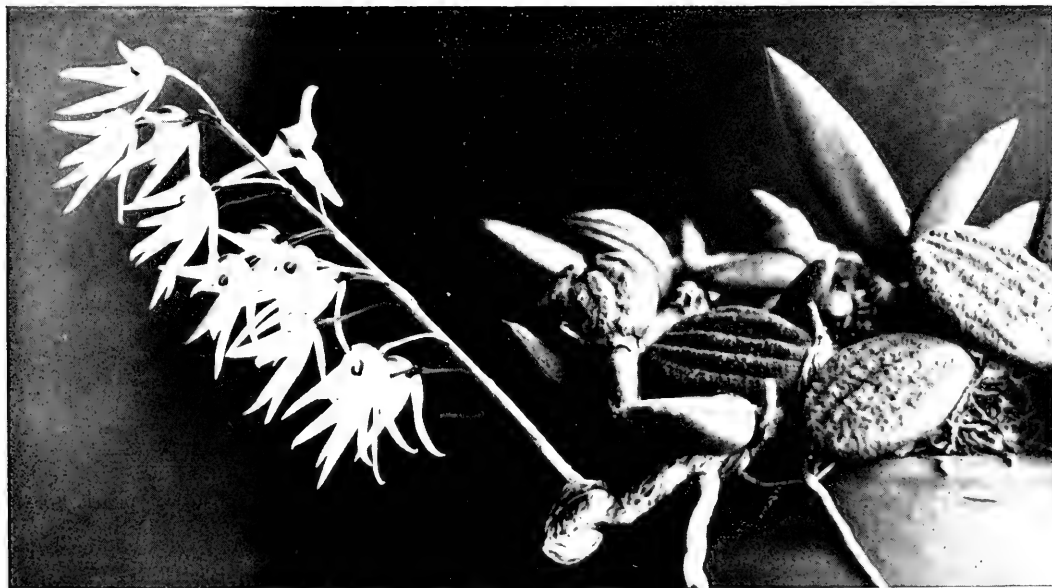
DENDROBIUM FALCOROSTRUM, *Fitzg.*



DENDROBIUM PHALAENOPSIS, *Fitzg.*, var. *Schroederianum*.



DENDROBIUM FUSIFORME, *Bail.*



DENDROBIUM LINGUIFORME, *Sw.—var. Nugentii.*



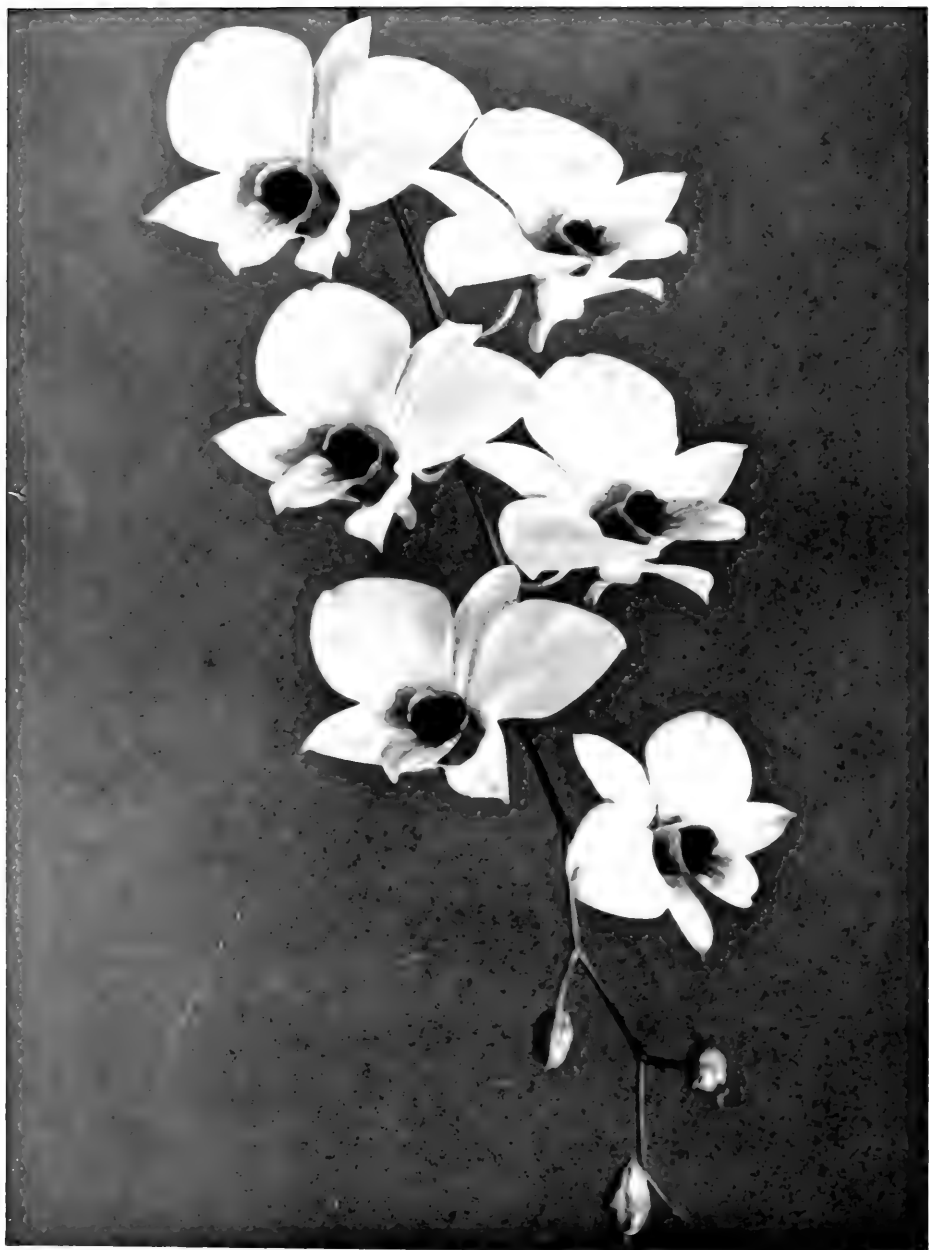
DENDROBIUM INFUNDIBULUM, *Lindl.*



DENDROBIUM PRIMULINUM, *Lindl.*



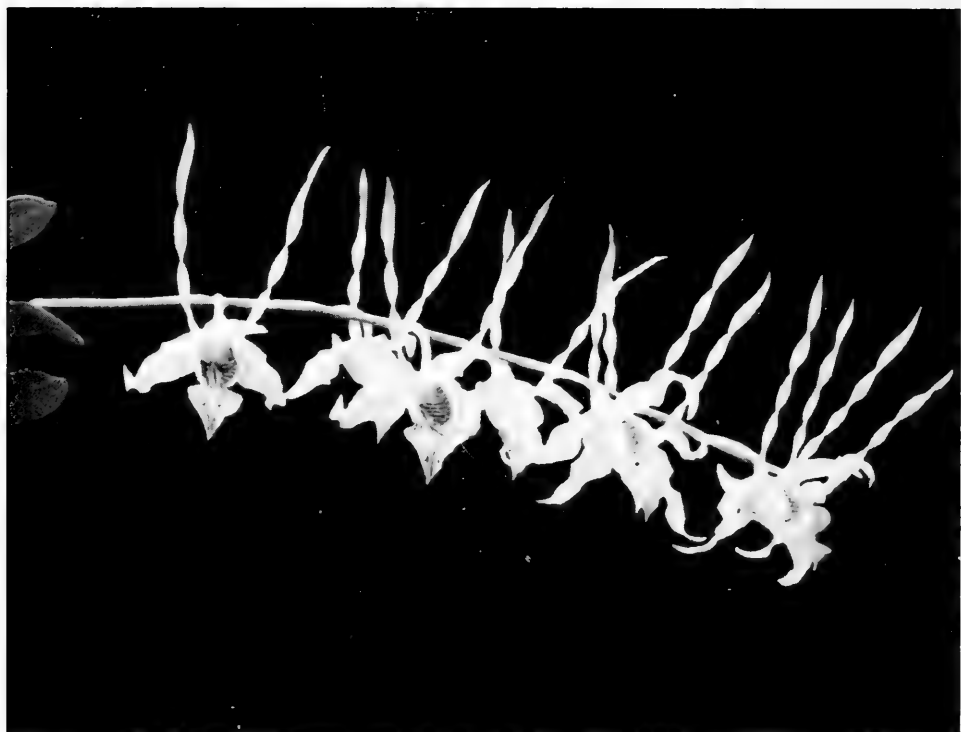
DENDROBIUM OPHIOGLOSSUM, *Reichb.*



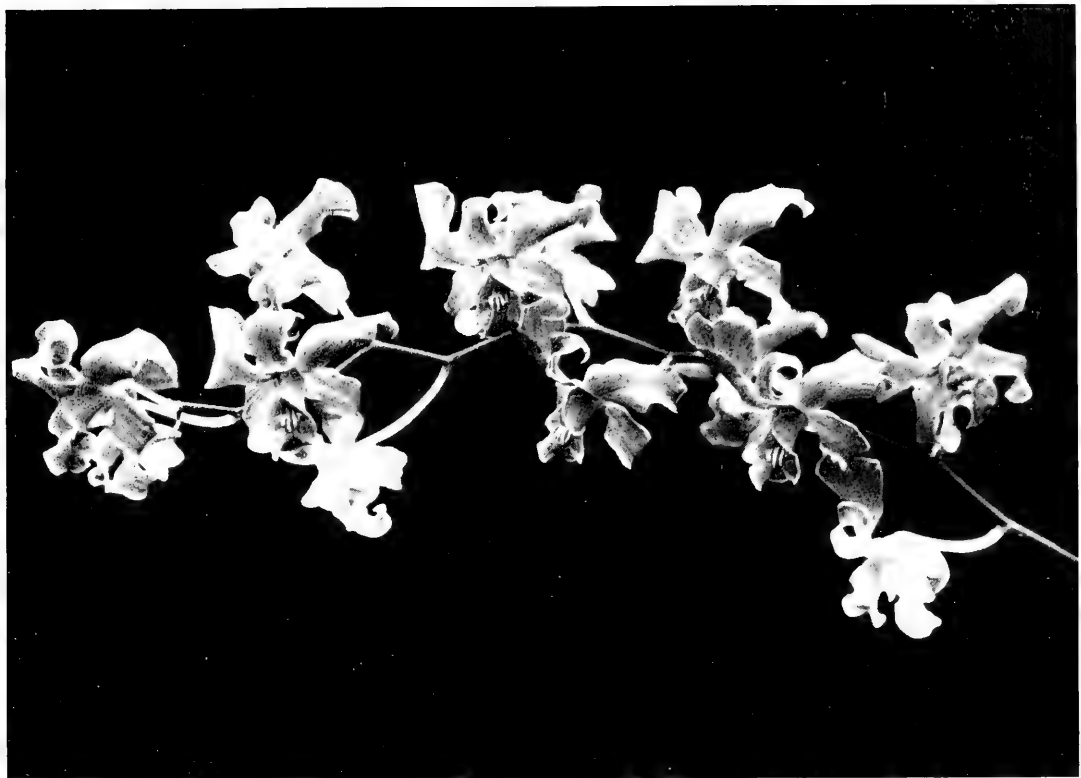
DENDROBIUM PHALAEOPSIS, *Fitzg.*



DENDROBIUM PULCHELLUM. *Roxb.*



DENDROBIUM STRATIOTES, *Reichb. f.*



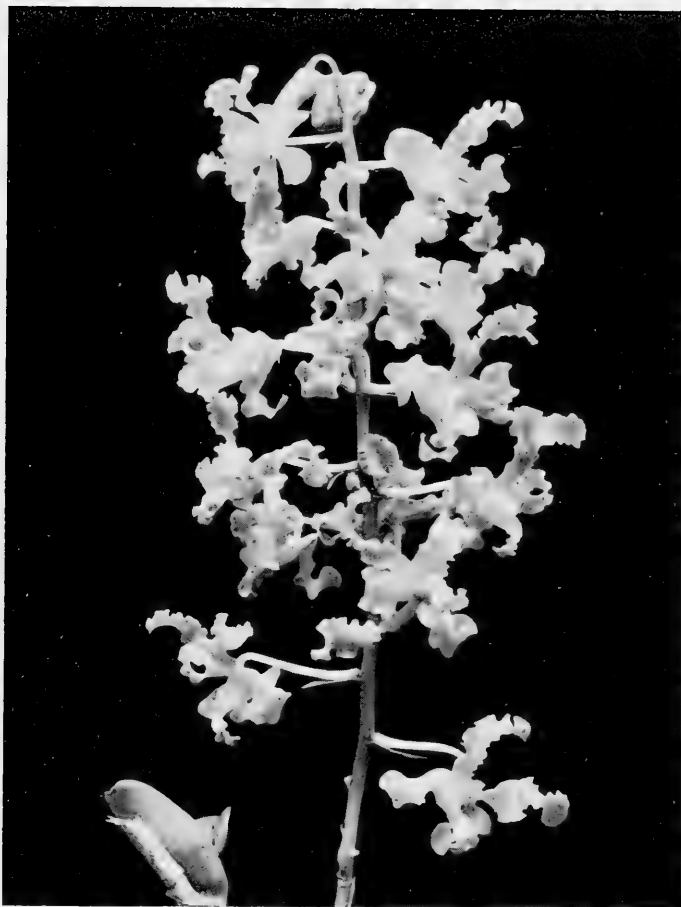
DENDROBIUM GOLDIEI, *Reichb. f.*



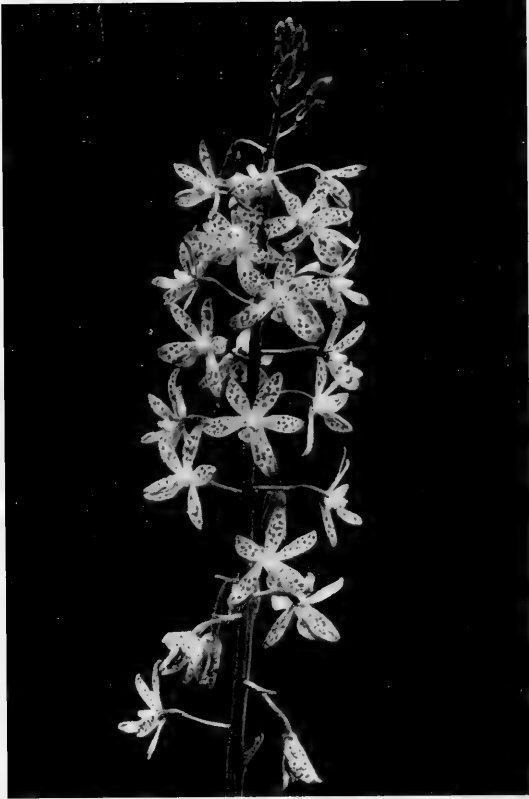
DENDROBIUM SPECIOSUM, *Sm.*



DENDROBIUM THYSIFLORUM, *Reichb. f.*



DENDROBIUM UNDULATUM R. Br. var. *Broomfieldii*, Fitzg.



DIPODIUM PUNCTATUM, *R. Br.*



DIURIS SULPHUREA, *R. Br.*



DIURIS AUREA, *Sm.*



LAELIA ANCEPS, *Lindl.*



LYCASTE SKINNERI, *Lindl.*



MILTONIA SPECTABILIS, *Lindl.*



MILTONIA. x. NADIA.



MILTONIA. x. LYOTH.



PHALAENOPSIS AMABILIS, *Bl. var. Rosenstromii*.



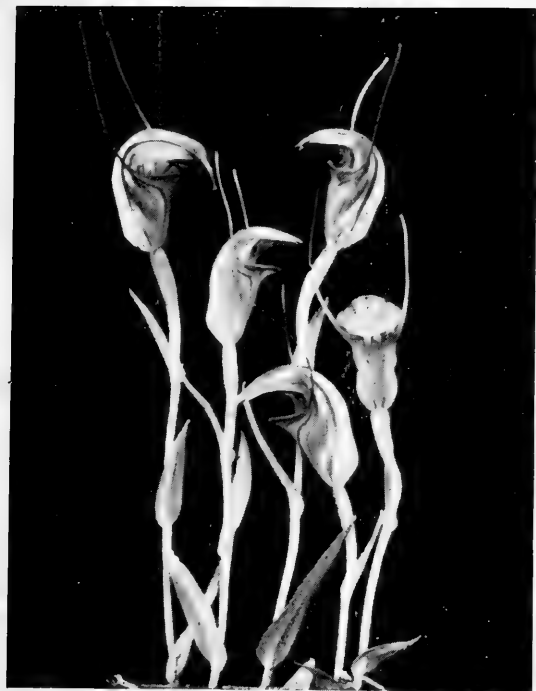
PHALAENOPSIS SCHILLERIANA, *Reichb. f.*



PHALAENOPSIS SCHILLERIANA, *Reichb. f.*



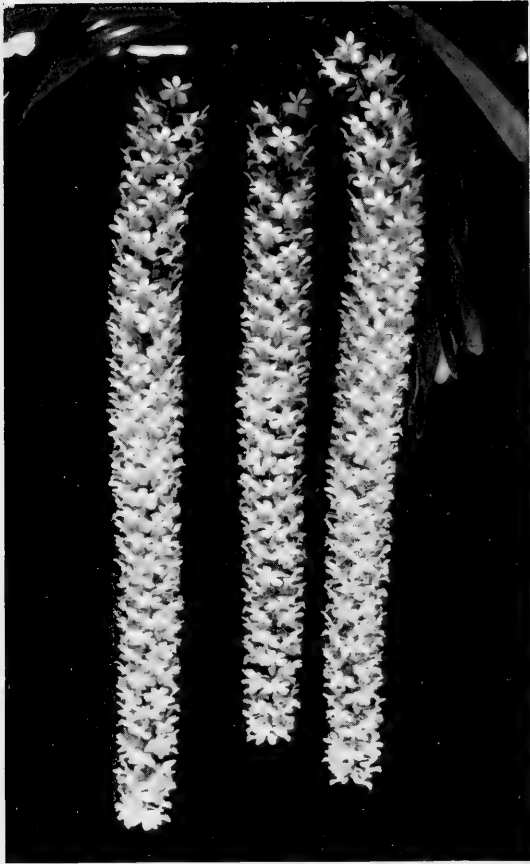
PHALAENOPSIS AMABILIS, *Bl.*



PTEROSTYLIS OBTUSA, R. Br.



PTEROSTYLIS NUTANS, R. Br.



RHYNCHOSTYLIS RETUSA, Bl.



STANHOPEA TIGRINA, *Batem.*



THUNIA MARSHALLIANA, *Reichb. f.*



CYMBIDIUM DEVONIANUM.



VANDA. x. LA COQUETTE.



VANDA COERULEA, *Griff.*



VANDA. x. MARGUERITE MARON.



VANDA. x. BURGEFFII.



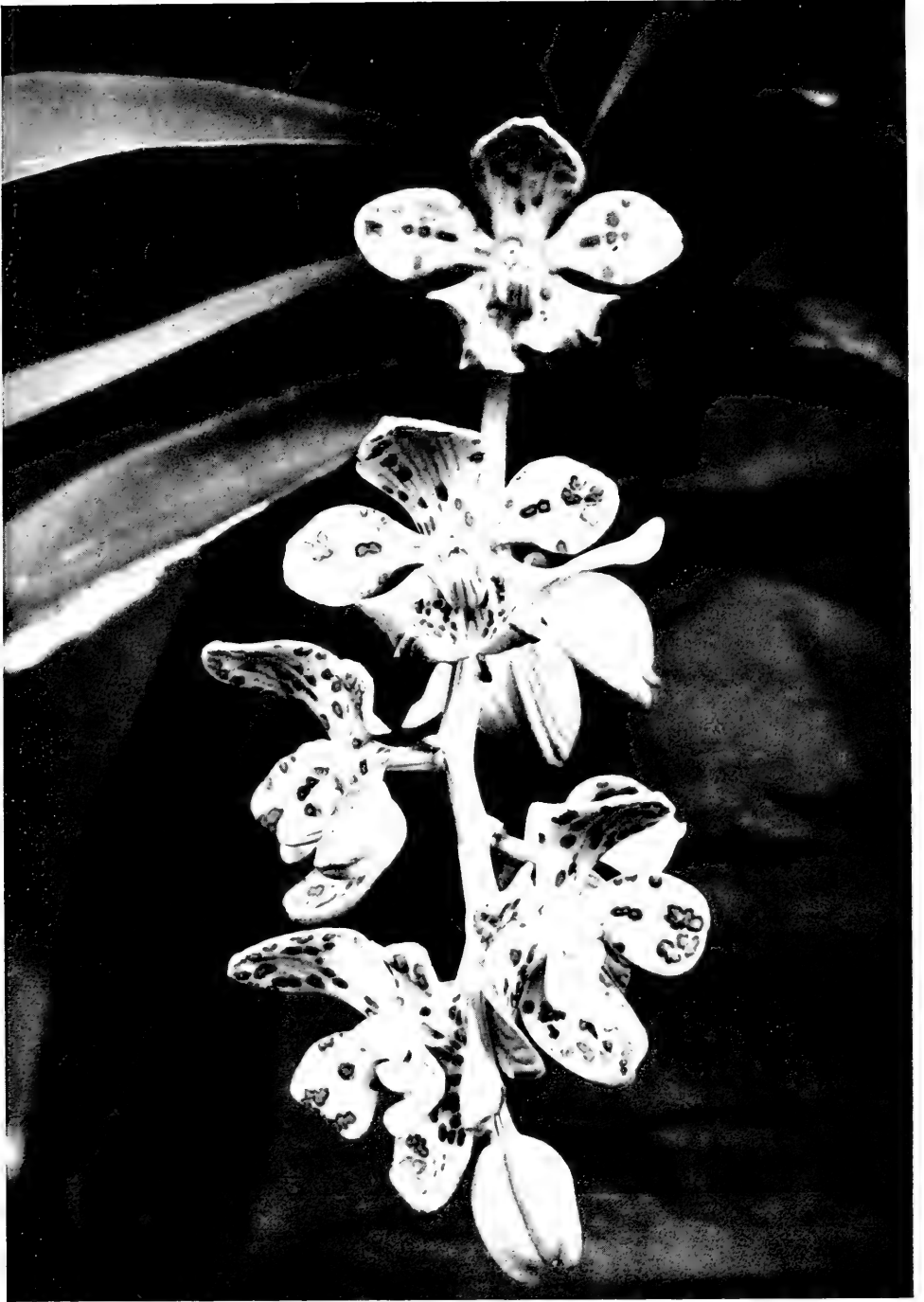
EUANTHE SANDERIANA.



DENDROBIUM CHRYSOTOXUM.

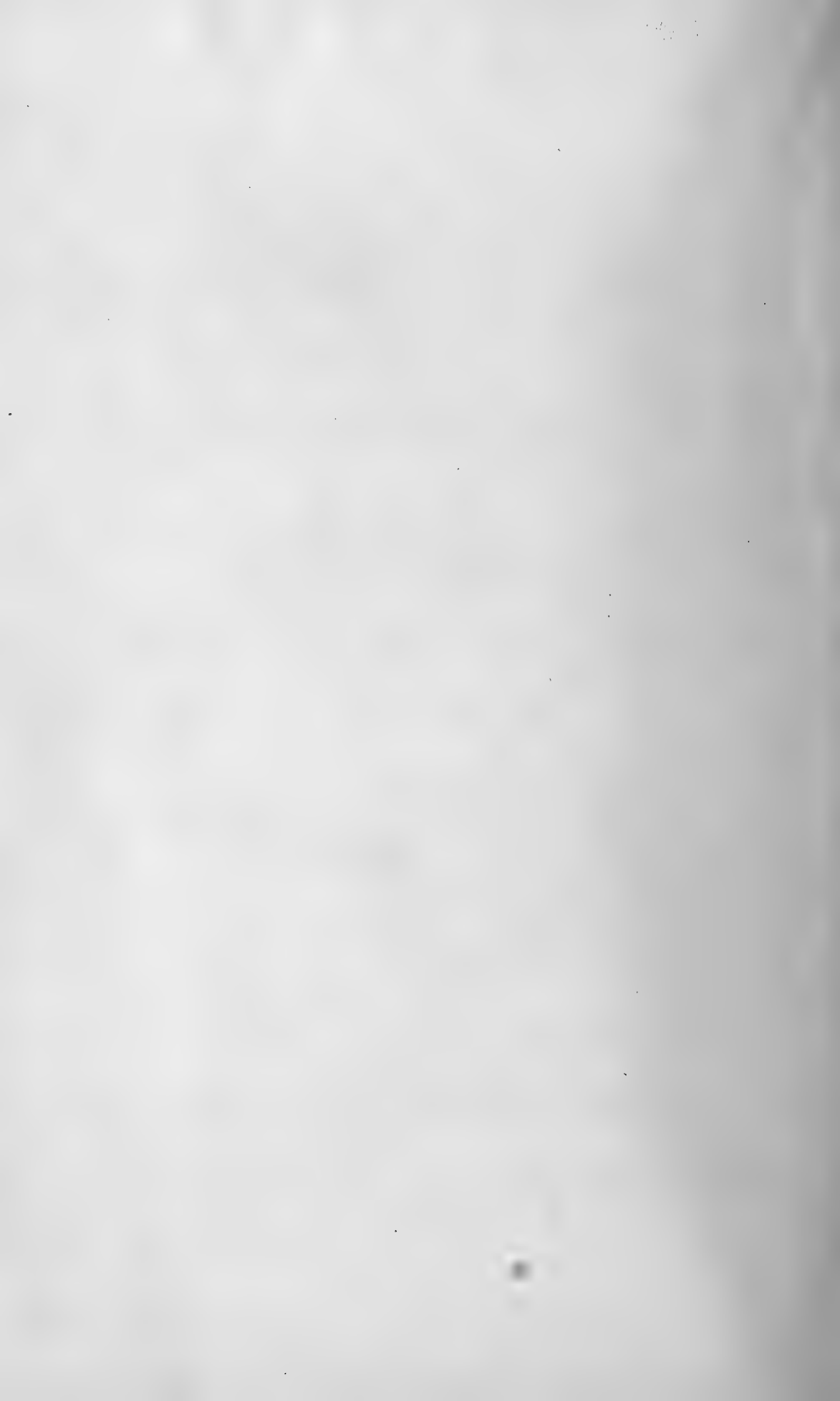


DENDROBIUM AEMULUM
as a subject for "Blister" culture.
(See article Page 270).



VANDOPSIS GIGANTEA, *Pfitz.*

WE wish to thank the growers of orchids who supplied photographs from which the foregoing illustrations are reproduced; Mr. F. Moulen, in particular, for lending the colour blocks from which we reproduced the painting by A. J. Sherman.



IT is finished. For some three or four years I have worked night after night in the chill of Winter and the sultry heat of Summer accumulating data, consulting and comparing authorities, and setting down my conclusions as to the best means of growing the various genera and species of orchidaceous plants in Australia. I can only hope that the result of this labour and care is of benefit to some of those who, like myself, find pleasure and relaxation in the cultivation of orchids. In the preparation of this work I had recourse to many books. Books on travel and administration in remote tropical countries, authoritative works on climate and meteorology, reports from Government Botanists in many lands, the works of the world-renowned authorities on orchids and plants generally. It is right that I make acknowledgment of my indebtedness to these. I must also mention, particularly, the following works from which I have gained information, great or small, incorporated in my Table:—

- “New Guinea” by L. M. D’Albertis.
- “Unbeaten Tracks in Japan” by Isabella M. Bird.
- “Three Thousand Miles through Brazil” by J. W. Wells.
- “Adventures of an Orchid Hunter” by A. Millican.
- “Twenty-five Years in British Guiana” by Henry Kirke.
- “Asia” by A. H. Keane.
- “Among Swamps and Giants in Equatorial Africa” by H. W. Austin.
- “In the Wilds of South America” by L. E. Miller.
- “Two Years among the New Guinea Cannibals” by A. E. Pratt.
- “Across Papua” by K. Mackay.
- “Through Southern Mexico” by Hans Gadow.
- “Argentina” by W. A. Hirst.
- “The Highest Andes” by E. A. Fitzgerald.
- “Through the Brazilian Wilderness” by Theodore Roosevelt.
- “Among the Wild Tribes of the Amazons” by C. W. Domville-Fife.
- “Upper Reaches of the Amazon” by Joseph Woodroffe.
- “Odyssey of an Orchid Hunter” by W. Burnett.
- “Burma—A Handbook” by Sir George Scott.
- “Madagascar” by Wm. Ellis.
- “The Malay Archipelago” by A. R. Wallace.
- “Malayan India” by John Cameron.
- “British Burmah” by C. J. F. S. Forbes.
- “Dutch Guiana” by W. G. Palgrave.
- “Travels in the Philippines” by F. Jagor.
- “The Philippine Islands” by Sir John Bowring.
- “In the Guiana Forest” by James Rodway.
- “The Wanderings of Plants and Animals from their First Home,” by Victor Hehn.

and many other such works the names of which I cannot readily recall at the moment.

I have also consulted frequently:—

“Orchids” by Watson & Bean.

“Orchids” by Jas. O’Brien.

“Orchids” by Watson & Chapman.

“Orchid Growers’ Manual” by Williams.

“Orchideae” by Lindley.

“Dendrobiae Monandrae” by Kraenzlin.

“Manual of Orchidaceous Plants” by Veitch.

“Queensland Flora” by F. Manson Bailey.

“Encyclopaedia of Plants” by J. Loudin.

“Flora Australiensis” by G. Bentham and F. Mueller.

Also many articles in the Australian Orchid Review, *Orchidologia Zeylanica*, the Orchid Review, etc.

The information on climatic conditions has been garnered from reports by meteorological officers in many parts of the world. I have also had recourse to “An Introduction to the Study of Climate” by Trewortha, “World Weather” by Clayton, “A Study of Climates” by Koppen, and “Reseau Mondial,” a compilation of weather data and statistics from all observation stations in the world. I should also like to express here my thanks to Mr. C. T. White, Queensland Government Botanist, Mr. W. D. Francis, Acting Government Botanist, and Mr. A. S. Richards, the Commonwealth Meteorologist, for their assistance and advice.

I should also be lacking in courtesy and gratitude if I omitted to record my thanks to Miss Alice Hart, who has so carefully typed out the manuscript for this work, this being a particularly onerous task in view, not only of the unfamiliar botanical names and terms, but also because of the almost indecipherable character of my writing. Thanks are due, also, to Miss R. W. Barr, who has done much valuable work in proof-reading and checking manuscript on the book.

J. M. COX.

NOSTALGIA

THE COMPLAINT OF A CATTLEYA

I

Torn incontinently from my harbourage
High on a tree which through the centuries
Has raised a noble head 'midst its primeval brethren—
Thrown, numbed and bruised, in a fuggy box—
Thence in a dark and noisome hold,
Transported o'er the uncertain waves
Until I came at last to rest, fatigued, half-starved and "all-alone,"
'Midst some four hundred and four score
Sad exiled plants—who stood in serried ranks
On benches in a heated house;
Or hung, like felons, from a beam
Athwart the glassy roof.

.

And here for five long years I've dwelt.

II

Our lord and master is a gentle soul
Who loves and tends his slaves with learned care—
Whose greatest joy it is to find
Buds on a plant that ne'er has bloomed before—
Whose love is catholic, nor scorns the meanest flower
Which graces for a while the confines of his bower.
Each plant is scanned with careful eye
Lest pest or pestilence assail;
Or lest as peradventure may behap
The unwonted routine of the gaol
May cause its soul to flag or strength to fail.

III

In durance there's a regimen that numbs
The lifespring of the captive—be he man or animal or plant:
Though 'tis designed, by minds that do not understand,
To keep together tortured frame and soul
Which, for their eternal peace, fain would be separate.

IV

In such a case live we, sad captive plants that erstwhile lived afree—
'Tis all meant for the best. In wise way 'tis decreed
That we shall have such warmth at noon, and such at midnight's hour;
The living sun no longer is the arbiter but some cold thermostat
That works upon a formula of Fahrenheit or Centigrade.

V

The very water that we crave is measured out
 In rigid fractions of an inch—
 So much at five, so much at twelve
 And then again at three—if so permits
 Barometer, hygrometer or such.

VI

Our food is rationed in accord with scientific lore—
 So much of nitrogen and this—
 So much of that and of those other things
 Essential to the nutriment of plants:—
 Potash, lime and humus, and all the various vitamins
 Pale sickly chemists have devised
 To kill romance in appetites of man and plant.
 The very light we need to stir our organs into action
 Is regulated nicely, with paint and blind and screen.
 They fear the kindly sun will burn us—
 We who have lived for centuries
 In strait communion with the Lord of Light!

VII

Our lord and master, kindly soul, oft frets
 To find that I, who seem to grow in native vigour,
 Yet show no sign of sheath or spike—
 He's done, he feels, the whole appointed catalogue of things
 That makes an orchid blossom!
 But how *can* I, pent prisoner in a humid cell
 Deprived of sun and breeze and all the high adventure
 That Mother Nature wills shall be
 The inspiration and the goad to my fruition?
 Can the wild bird, enclosed in an iron cage
 Pour out its full sweet ecstasy of song?
 Can the raped beauty, torn unwilling from her father's home
 To be just one more houri in a jaded sultan's bed,
 Give to her aged diseased lord the gift of Love?
 Or can the glittering streamlet, rushing down the glade,
 Ripple and sing when some dull farmer's oaf
 Has thrown a dam of mud and branch across her course?

VIII

Up on Parima's heights there is a tree
 That stands Titanic 'midst its brother giants.
 Its high branched stem is clothed
 With firm and fibrous bark

That gives fit anchorage for orchid roots.
 'Twas here some century or more agone
 I first saw light. Perchance some vagrant wind
 Tossed on the living tree a tiny seed,
 Or else some errant bird or climbing beast
 Or yet perchance an ant or some such humble thing
 Left with that forest host the germ
 That brought me into being.
 Howe'er it may be, on that tree I grew
 And flowered and shed about
 The seeds that presaged further life
 To carry on my work of adding beauty to a sombre world.

IX

Close by, the Orinoco's stream raced through its tortile banks
 From the high hills down to Paria where lies the isle of Trinidad
 And romantic Port-o-Spain.
 About me and below there lay the leafy gloom
 Of forest primeval; from whose shady fastnesses
 Rose the mixed scent of flowers and stench of foetid tropic.
 The quiet of the night was broken oft
 By the snarl of spotted jaguar or the cry
 Of some blood-hungry puma on the trail
 Of his predestined prey.
 And sometimes through the sleepy night would come
 The dulcet song of some lone Indian on his way
 In bark canoe to secret trysting place—
 Or else the shrill screech of warriors
 Casting defiance to the foes who lurked with poised dart
 Amidst the shrubs that limned the river bank.

X

And with the dawn, the sun, all glorious, shed
 Its virile fructifying beams about—
 And brought to wakefulness the forest folk.
 Then was the air with fragrance filled—
 A thousand different scents from twenty thousand flowers.
 The bees and beetles in their swarms
 Fulfilled their part in Nature's wondrous plan,
 While humming birds in glowing colours clad
 Hovered and sped about me and around;
 And, when the mild and balmy trades brought on their breath
 A passing thunder-shower, took shelter 'neath my leaves and flowers.
 Beneath the haven of my roots and stems
 There dwelt a tribe of ants, fierce warriors

(Not like these stingless stinking things
That climb about me here and spread
Aphis and scale and filth around)
But gallant soldiers who, in thanks for harbourage,
Sallied in angry force 'gainst any foe
Who might approach to do me injury.

XI

Such was my home—thus Nature willed that I should live—
Not in a glassy sepulchre that shuts out
The sunlight and the wind and rain;
Not in a grimly regulated cell
Where every breath and every sup
Is measured by the rule of some abstruse machine.

XII

I may not die—the routine of the gaol
Can warp the spirit and yet build the frame—
But all their care and all their erudition
Can never in my being strike the spark
That lights the flame of fierce desire
To urge me to my life's fruition.

XIII

Give me the sunlight and the breeze,
The tickling of the wind about my leaves,
The soothing patter of the rain that comes
By Nature's bounty to revive the thirsty earth.
Give me the life that every living thing is heir to
The right to strive and struggle—to succeed or die!

XIV

Give me just these and in return
In humble gratitude and joyous love
I'll bear for thee such flowers
As you in your most secret heart
Have never dared to hope for—
Such beauty and such fragrance as shall make
Your heart stand still a beat—and bate your breath—
Like unto one who stands within a Holy Place
And sees transfigured Truth—
And knows at last that God is Beauty
And Beauty—Love transmuted.

GLOSSARY OF BOTANICAL TERMS

Note.—When writing the Cultural Notes, I avoided as far as possible the use of technical and botanical terms, and endeavoured to express my meaning in simple English words. However, the use of some such terms was inevitable. I have, therefore, arranged this Glossary of commoner botanical terms which may assist readers, not only in the use of this book, but also in reading other and more technical works on plants.—*The Author.*

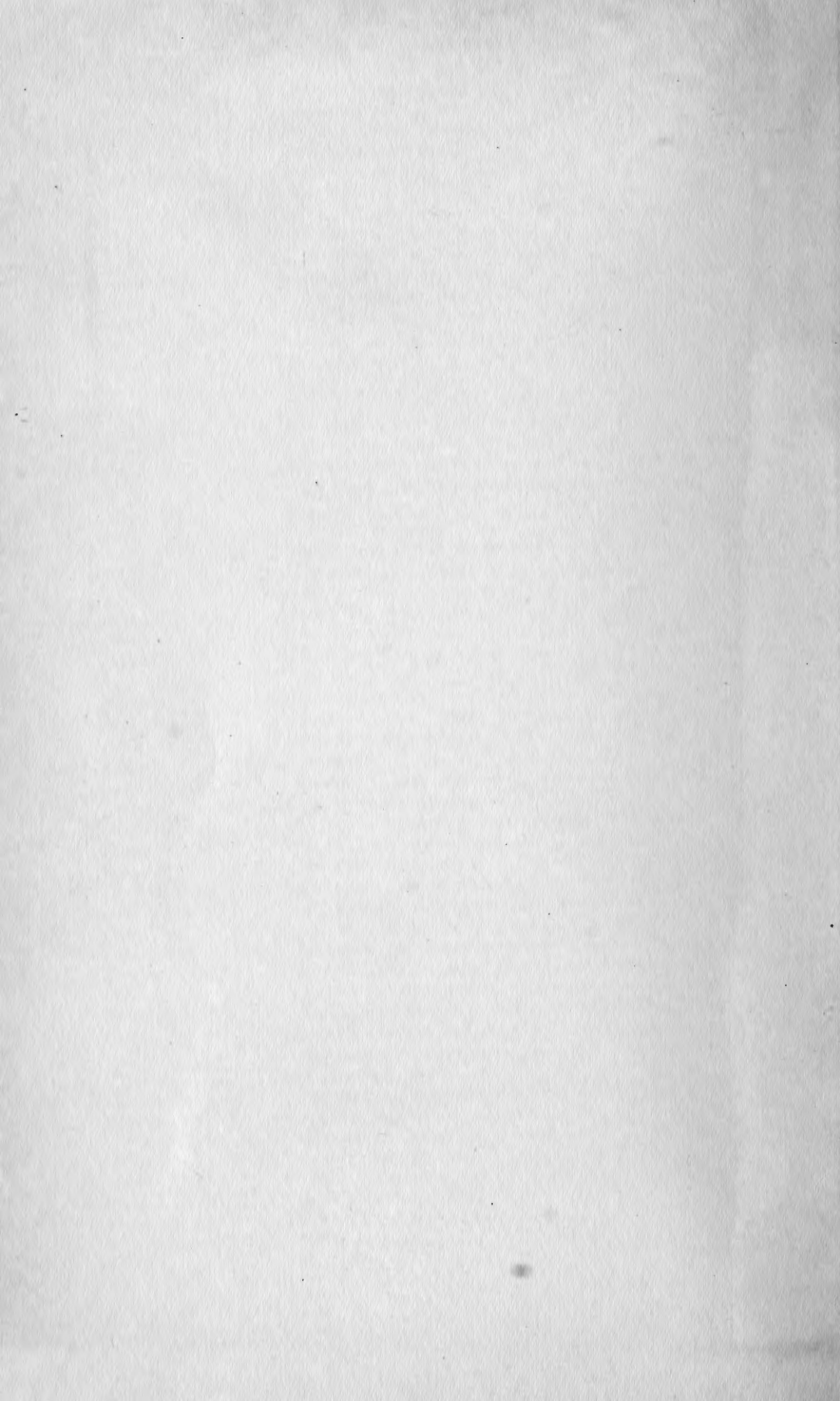
Acerose.	Narrow and slender with a sharp claw.
Acinaciform.	Shaped like a scimitar.
Acropetal.	Developing from the apex outwards; said of the order in which the parts of a plant develop.
Acuminate.	Tapering to a sharp point.
Acute.	Sharp-pointed.
Aduncus.	Crooked or hooked.
Adventitious.	Applied to a bud appearing elsewhere than in the axil of a leaf, or to roots appearing on stems or leaves.
Allotamy.	Cross fertilization of plants.
Alternate.	The arrangement of leaves on a stem, first one side, then the other.
Anceps.	Two-edged.
Anterior.	Part of a flower whorl nearest the pedicel.
Anther.	Pollen sac at the top of the stamen.
Ascending.	Applied to stems which lie prostrate on the ground, and then rise perpendicularly.
Axil.	The angle between a leaf and the stem.
Axillary.	Growing in an axil.
Basket.	A wooden container for plants, preferably made of teak wired with copper.
Beaked	Having a sharp point.
Bicornous.	Having two horn-like processes.
Bidentate.	Having two teeth.
Bifid.	Of a leaf or petal indented to the middle.
Bracts.	Modified leaves generally situated on a peduncle near the flower.
Caespitose.	Growing in tufts.
Calceolate.	Slipper-shaped.
Callus.	A hardened part.
Calyx.	The outer whorl of a flower or sepals.
Canaliculate.	Channelled or grooved.
Capreolate.	Having tendrils.
Cernuous.	Nodding or pendulous.
Ciliated.	Fringed with very fine hairs.
Cirrhus.	A tendril.
Claw.	The base of a petal.
Compost.	A mixture of soil and/or other substances in which plants are potted.
Compressed.	Flattened laterally—lengthwise.
Connate.	So closely united that cannot be separated without cutting or tearing.
Connivent.	Nearer together at the top than at the base.
Contorted.	Twisted.
Cordate.	Heart-shaped.
Coriaceous.	Having the consistency of leather.
Corymb.	An inflorescence in which the upper flowers are sessile, and the lower ones stalked so that the flowers are all at the same level.
Crenate.	Scalloped at the edge.
Cristate.	Crested.

Cucullate.	Hooded.
Cuniform.	Wedge-shaped.
Cuspidate.	Having the medial vein ending in a free point.
Cyme.	Irregularly-branched inflorescence in which the terminal flower opens first.
Cymose.	Bearing cymes.
Deciduous.	Soon falling off.
Dentate.	Toothed.
Depressed.	Flattened from above downwards.
Disk.	The central part of a flower. It is a circular enlargement of the receptacle, usually in the form of a cup, flat disk, or a cushion. It may be lobed, toothed or crested, and in orchids is frequently highly coloured.
Divergent.	Further apart at the summit than at the base.
Dorsal Sepal.	The topmost of the three sepals of an orchid bloom.
Emarginate.	Notched.
Ensiform.	Sword-shaped.
Erose.	Irregularly toothed; gnawed or bitten.
Exserted.	Protruded beyond the other parts.
Falcate.	} Bent like a sickle.
Falciform.	
Fasicled.	Growing in a dense tuft.
Fibre.	An important potting agent. The fibres most commonly used are roots of osmunda, polypodium, <i>Todea Barbara</i> , staghorn, and elkhorn, while cocoanut fibre from the husk of the cocoanut and shredded ti-tree and mangrove bark also have been used successfully.
Fimbriated.	Fringed.
Flexuous.	Bent in a zig-zag manner.
Floccose.	Covered with wool-like tufts.
Foveate.	Pitted.
Free.	Not united (said of sepals and petals).
Furcate.	Forked.
Fusiform.	Spindle-shaped, i.e., thicker in the middle than at the ends.
Geminate.	Flowers or leaves produced in pairs.
Genus.	An assemblage of species possessing certain characters in common to distinguish them from other plants of their order.
Glabrous.	Smooth; having no hairs.
Glaucous.	Covered with a fine pale green bloom.
Hastate.	Arrow-shaped.
Herbaceous.	Having a succulent stem.
Hirsute.	Hairy.
Hispid.	Bristling.
Humifuse.	Spreading along the ground.
Hypochil.	The lowest section of a labellum very greatly modified in such genera as <i>Stanhopea</i> , etc.
Imbricated.	Overlapping like tiles—usually referring to the arrangement of scales.
Infundibuliform.	Funnel-shaped.
Internode.	Stem between nodes whence leaves spring.
Involute.	Rolled inward.
Labiate.	Lipped; generally having two lips.
Labellum.	One of the three segments of the corolla of an orchid, usually greatly modified.
Lacinate.	Petals deeply fringed or indented.
Lamina.	A plate—the broad part of a leaf.
Lanceolate.	Spear shaped; tapering at each end.

Ligulate.	Strap-shaped.
Linear.	Long and narrow.
Membranaceous or Membraneous.	Having the texture of a membrane.
Monostachya.	Having a single spike.
Muricated.	Covered with short, hard excrescences.
Nodes.	Knots; points from which leaf buds spring.
Obcordate.	Inversely heart-shaped.
Obovate.	Inversely egg-shaped.
Orbicular.	Round (said of a leaf in which the stem is in the centre with veins spreading equally in all directions).
Order.	A large division in the classification of plants. It is often subdivided into tribes.
Ovate.	Egg-shaped.
Panicle.	A branching raceme.
Paniculate.	Forming a panicle.
Patent.	Spreading.
Patulous.	Divergent; spreading outwards.
Pedicel.	Stalk of a flower in a cluster or a small branch of a peduncle.
Peduncle.	Stalk supporting a cluster of flowers.
Pendulous.	Hanging or drooping.
Perianth.	Name sometimes given to the calyx or corolla, or both.
Petal.	One of the separate parts of a corolla. Orchids usually have three petals, the lower one modified into a labellum.
Petiole.	Leaf stalk.
Pili.	Enlarged cells—simple hairs.
Pilose.	Provided with pili.
Pistil.	The female organ of a plant.
Plicate.	Folded or plaited.
Plumose.	Furnished with feathery hairs.
Pruinose.	Frosted.
Pseudobulb.	An enlarged bulbous-like aerial stem covered with a thick epidermis.
Pubescent.	Covered with soft, short downy hairs.
Pulverulent.	Covered with fine, powdery matter.
Pyriform.	Pear-shaped.
Raceme.	Primary peduncle or floral axis with the youngest flowers at the top; a cluster.
Racemose.	Flowering in racemes.
Rachis.	(a) A name sometimes given to the general axis of inflorescence or flower spike. (b) The main stem of a plant.
Radiate.	Said of a flower when the florets of the ray or margin are ligulate, while those of the centre or disk are tubular.
Radicle.	Young root growing from the embryo in the seed.
Raft.	A lattice-like structure used as a support for certain orchids.
Reniform.	Kidney-shaped.
Repand.	Having a slightly wavy margin.
Resuspinate.	Inverted by a twist of the stalk.
Retorse.	Turned backwards.
Retuse.	Blunt—said of a leaf when the apex is flattened or slightly depressed.
Revolvute.	Curled or rolled outwards.
Rhizome.	A root stock; stem which runs along the surface of the soil, sends out roots from the lower side and leaf-buds or branches from the upper side.
Rhomboid.	Oval but somewhat angular in the middle.
Ringent.	Arched or gaping.

Rugose.	Coarsely wrinkled.
Saccate.	Furnished with or having the form of a sac, or pouch; having a very short spur.
Scabrous.	Rough to the touch; having sharp points.
Scale.	Rudimentary leaf, usually covering a leaf bud.
Scandent.	Climbing.
Scapae.	A leafless radical stem bearing flowers either singly or in umbels and racemes.
Scarious.	Membraneous; dry and shrivelled.
Scroviculate.	Pitted; having little depressions.
Secund.	Arranged on one side only.
Sepal.	One of the parts of the calyx—usually three in orchids.
Serrate.	Notched on the edge like a saw.
Sessile.	Said of a leaf or flower without a stem.
Setaceous.	} Bristly; covered with stiff, straight hairs.
Setose.	
Sinuuous.	Undulating; curving in and out.
Spathulate.	Oblong but widening towards the end; spoon-shaped.
Species.	A division of a genus of plants consisting of plants which bear a close resemblance to each other in their essential features and produce similar progeny.
Spur.	A sharp, horn-shaped sac.
Stamen.	The male organ of reproduction in plants—in the case of orchids the stamens and the style are joined in a column.
Stellate.	Star-like.
Stigma.	The upper extremity of the pistil.
Stipule.	Small leaf-like appendage, situated in pairs at the base of the petiole.
Stipulate.	Having stipules.
Strangulated.	Contracted and expanded irregularly; waisted.
Striate.	Marked with longitudinal lines.
Strigose.	Covered with stiff hairs.
Style.	The middle part or filament of the pistil—in orchids joined with the stamens in a column.
Subulate.	Awl-shaped; slender and tapering to a point.
Terete.	Round and long like a taper.
Thalamus.	The floral receptacle.
Throat.	The upper part of a tube.
Tormentose.	Covered with thick, cotton-like growth; downy, woolly.
Truncate.	Appearing as if cut off at the tip.
Tuber.	An underground fleshy stem or modification of a root, usually roundish and of annular duration, with buds from which new plants are produced.
Umbel.	A cluster of flowers with a number of flower stalks or pedicels nearly equal in length, each bearing a single flower, and springing from a common centre.
Uncinate.	Hooked at the end.
Undulate.	Having a waved margin or surface.
Variety.	A plant which differs somewhat from the type of its own species, but not sufficiently so to make it a new species.
Ventricose.	Swelling unequally on one side.
Verrucose.	Warty.
Verticillate.	Whorled.
Viscous.	Covered with a sticky exudation.
Whorl.	Three or more similar structures springing from the same point.

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