



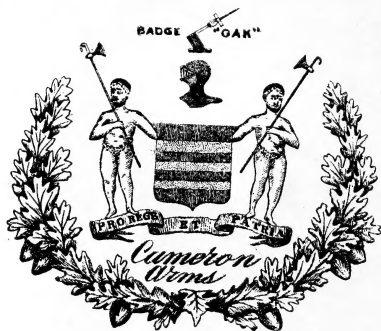
**VOL. VIII HANDBOOKS OF
PRACTICAL GARDENING**

**THE BOOK OF
ORCHIDS**

BY

W. H. WHITE, F.R.H.S.

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ROBERT CAMERON

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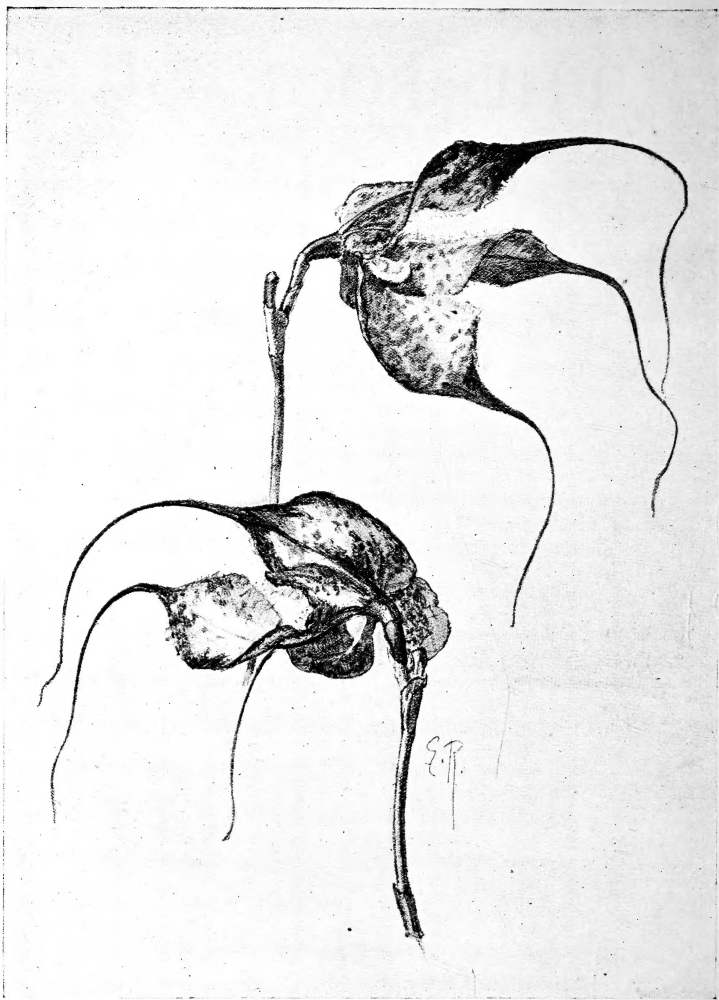
~~John B. Dunn~~

Robert Cameron

August 20, 1930

HANDBOOKS OF PRACTICAL GARDENING—
VIII. EDITED BY HARRY ROBERTS

THE BOOK OF ORCHIDS



MASDEVALLIA CHIMAERA VAR. BELLA
(From a drawing by Ethel Roskrug)

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THE BOOK OF ORCHIDS

BY

W. H. WHITE, F.R.H.S.

ORCHID GROWER TO SIR TREVOR LAWRENCE, BART., PRESIDENT
OF THE ROYAL HORTICULTURAL SOCIETY



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EDITOR'S NOTE

To Orchid growers Mr White needs no introduction, for he has long been recognised as a master of his craft. He is a Devonshire man, both his parents being of that county. He was born at Exeter, his father being employed at Messrs James Veitch's establishment near by. The family afterwards removed to Norbiton, in Surrey, at the National Schools in which village Mr White received his general education. In 1873 he entered the employ of Messrs Veitch at their Coombe Wood nurseries, remaining there for about five years. He then spent five more years in the various departments of the famous Chelsea nurseries of the same firm.

Mr White's first private appointment was as Orchid grower to the late Mr Dorman of Sydenham, with whom he remained seven years. From then until the present time, a period of about thirteen years, he has occupied the post of Orchid grower to Sir Trevor Lawrence, president of the Royal Horticultural Society.

Many first class Orchids have been raised by Mr White, amongst them being *Dendrobium Clio*, *D. Burfordiense*, *D. Enterpe*, *D. Wiganæ* *Xanthochilum* and *D. Melpomene*, as well as *Cypripedium Argo-Morganae*, *C. Eleanor*, *C. pirsuto-Sallierii*, *C. oeno-superbiens*, *C. Olenus Burfordiense* (probably the finest variety of that section), *C. Pollettinum Burfordiense*, and numerous other hybrids.

Whilst at Burford he has succeeded in growing and flowering many beautiful Orchids that are generally considered difficult of cultivation. Amongst these may be named *Grammatophyllum speciosum* (to which the R.H.S. awarded a gold medal and a first class certificate in 1897), *Vanda Miss Joaquim*, *Eulophiella Elisabettæ*, *E. Peetersiana*, *Bulbophyllum grandiflorum* and *Stanbopea Rodigasiana*.

As a writer on his subject, Mr White commenced by contributing "The Orchid Calendar" to *The Orchid Review* during the first twelve months of its existence. He has since been a frequent contributor to *The Gardeners' Chronicle*, and other journals. For nearly thirteen years he has been a member of the Orchid Committee of the Royal Horticultural Society, and has been a frequent and successful exhibitor at the Temple Shows and other meetings of the Society.

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BOOK OF ORCHIDS

INTRODUCTORY

NOTHING that I am aware of has been more remarkable than the rapid extension of Orchid culture during the last quarter of a century, resulting no doubt from the development of the public taste. Looking over the first ten volumes of the *Botanical Magazine* which first appeared in 1787, I find that out of 360 plates only two Orchids were illustrated, whilst in the first ten volumes of the third series of the same magazine, which appeared between the years 1845 and 1854, about one hundred different species of Orchids are illustrated, the total number of plates being the same. Now, so numerous are the species and varieties of Orchids in cultivation, additions moreover being constantly made by new discoveries and by artificial hybridisation, that it would be possible to fill every part of that magazine with illustrations of new Orchids.

The earliest attempts to cultivate Orchids in this country were unsatisfactory, which was not to be wondered at, owing to the almost total absence of any certain knowledge of their natural conditions, and to the imperfect construction of the glass houses, with their defective heating by flues and other contrivances. With improved appliances and better accommodation, and with a more accurate knowledge of the nature and habits of Orchids in their native homes, their cultivation has become as simple as that of most ordinary stove and greenhouse plants. In growing a large and varied

collection of Orchids, however, there still remains a wide field for the exercise of cultural skill, for many stubborn subjects will be met with. Providing, however, that the grower who takes them in hand has a real love for them, and a determination to use his own eyes and his best judgment for their benefit, success generally follows. Thus the records in the horticultural press of the number of plants rendered tractable to cultivation, are becoming more frequent year by year. It is said of Orchids that they, like domestic animals, soon find out whether they are under the care of one who is really fond of them, and that they respond by thriving or failing accordingly. It is this kind of understanding that should be aimed at, as it goes a great way towards securing success, as well as giving pleasure to the pursuit. Unless someone takes an unfeigned and steady interest in the plants, they will not thrive satisfactorily for long together, but if one can be found to watch and attend to their requirements, applying what knowledge he can obtain by visiting other collections, and by studying the cultural practices of others, a good measure of success is sure; and hence some of our smaller amateurs of the present day, by their diligence and real liking for the plants, often grow things to perfection which have puzzled more scientific men.

To cite an instance:—Very few can yet boast of growing successfully, for say half a dozen consecutive years, that beautiful and showy Orchid *Disa grandiflora*, which well deserves its common name of “The Pride of Table Mountain.” Here I may mention the name of Mr Cornish, head gardener at the Joldwynds, near Dorking. Mr Cornish was not by any means an Orchid specialist, but many years ago he was taken with a great liking for this particular Orchid, and, although the accommodation was very limited and old-fashioned, he

made an earnest attempt to cultivate it. This he has done very successfully, so that at the present time thousands of living tubers have been propagated, and at the flowering season hundreds of splendid spikes of bloom may be seen in his greenhouse. Mr Cornish took his keynote, so to say, from the following information. *Disa grandiflora* is found on Table Mountain, growing on the margins of streams and ledges of waterfalls, and during the growing season it flourishes in very wet spongy soil, which consists of peat, sand, and sphagnum moss. The plant may almost be said to grow in water, the soil being so wet. As the dry season progresses, the water gradually recedes, until, at the flowering time, the soil is not nearly so wet, and shortly afterwards the water quite disappears, and the plants are left comparatively dry until the wet season again comes round. The dry season is the period of rest, but even during that time the plants are not without moisture at the roots, the soil in which they grow being sufficiently damp to preserve them in vigour until the growing wet season arrives. I could relate many such instances of successful cultivation, based on study of native conditions.

It is said that the word Orchid is a stumbling-block to many amateurs, and, although their gardeners grow to perfection the inmates of the ordinary stove and greenhouse, they hesitate about undertaking the culture of Orchids. However this may be, I am sure that some of the more useful kinds are of easy cultivation, and no intelligent gardener with ordinary means at hand need fail with them. Some consider it imperative to build special houses for them, such houses running east and west, whilst many consider it necessary that a lean-to or three-quarter span facing north is necessary for the cool growing Orchids. From my own experience, I should say that anyone having houses which he wishes to devote to

Orchid culture, need not be deterred by their facing this way or facing that. I would say further, that in building new ones, he need not greatly inconvenience himself in order to make his houses run in any particular direction, providing that proper convenience is arranged in other respects. But it is advisable that, in building new houses, no two should be placed close together side by side; each should be built apart from others, in order to allow free ventilation through the lower openings made for that purpose. Also let it not be supposed that elaborate or scientifically built houses are absolutely necessary for the culture of Orchids, for I have known several amateurs who grow them in a small way, and who have two or three little houses, which answer perfectly, in the space which one would commonly call a back yard.

IMPORTED PLANTS

At the present time a great number of people take a special interest in Orchids, as anybody who is accustomed to attend auctions and horticultural exhibitions knows. The large attendances and spirited competitions for Orchids, whether they be newly imported plants or hybrids raised by horticultural skill, show that collectors are rapidly increasing in number. Owing to the immense consignments of Orchids now being constantly imported, greater facilities exist for obtaining these plants. Their cost is so very much lower than formerly as to bring them within the means of all who can afford to build a greenhouse or stove in which to cultivate them. It frequently happens at a sale of imported Orchids that enthusiastic growers are carried away by a momentary spirit of competition, and give a great deal more for plants than in all probability they are worth.

That is a weakness of all collectors, but it is not generally a wise or judicious thing to give a large price for imported plants, although they may be judged to be extremely rare, because some collector may, in a short time, bring or send home a very large quantity of the same plant, so that a plant which to-day is purchased at £5 or £10 may be only worth about as many shillings in a very short time.

One thing may justly be said in favour of imported plants. Although they are usually considerably weakened by the severe ordeal through which they have had to pass, from the time they are collected until they arrive in this country, they are of healthy constitution, and are, in consequence, generally easy to establish.

To those who may be commencing to interest themselves in the cultivation of these plants, a few hints on the management of imported Orchids may be of some value. It is advisable that beginners obtaining newly imported plants should ascertain, if possible, not only the country from which they come, but also the elevation at which they were found growing. Differences in elevation very materially affect the treatment to which the plants should be subjected, those coming from a high elevation requiring much less warmth than those from the low lands. One must also consider well the trials which the plants have gone through since growing in their native habitat. Firstly, they are torn from whatever supported them, their roots, and sometimes even, as with *Odontoglossums*, their leaves being cut off. Then they are subjected to a drying process to deprive them of a certain amount of sap, which, if retained, might cause decay during the journey. They are finally packed with some dry material in cases to make therein the long journey home. It is especially trying to those kinds which have to be brought from their high mountain homes through hot tropical countries

before being placed on board the steamship, but, owing to the care taken by the collectors to gather them at the proper season, they generally arrive in good condition.

All newly imported Orchids appear more or less emaciated, having lost through evaporation a portion of their vital fluids. The first great point to be aimed at, therefore, is to bring the plants back to their normal condition by slow degrees after their enforced rest. Any attempts to make them suddenly plump only excites the impaired cellular tissues in places, destroys them in others, and generally ends in failure and total loss of the plants. One of the principal points in reviving dormant life in the plants is to place them, no matter from what part of the world they may come, in a moderately dry and cool atmosphere, giving little or no water for a few days. If the plants be subjected to a temperature that excites them before proper reaction sets in, the consequence is that they lose their foliage before the young roots appear. Each plant should be carefully sponged all over, to cleanse it from dirt and insects, cutting away decayed leaves, bulbs, and dead roots.

In treating of imported plants space does not permit mention being made of the whole of the great Orchid genera, but in some respects similar treatment is required by all, and those that are not enumerated must be left to the judgment and intelligence of the grower who has charge of the collection. I think it will be sufficient as a guide if mention is made of four distinct groups — *Aërides*, *Cypripediums*, *Dendrobiums*, and *Odontoglossums*. In reference to the first division, which will also include *Saccolabium*s, *Vandas*, *Aëranthus*, *Renanthera*, *Phalænopsis*, etc., none of which possess pseudo bulbs, and all, in consequence, on being freshly imported, are generally in a very dry, shrivelled

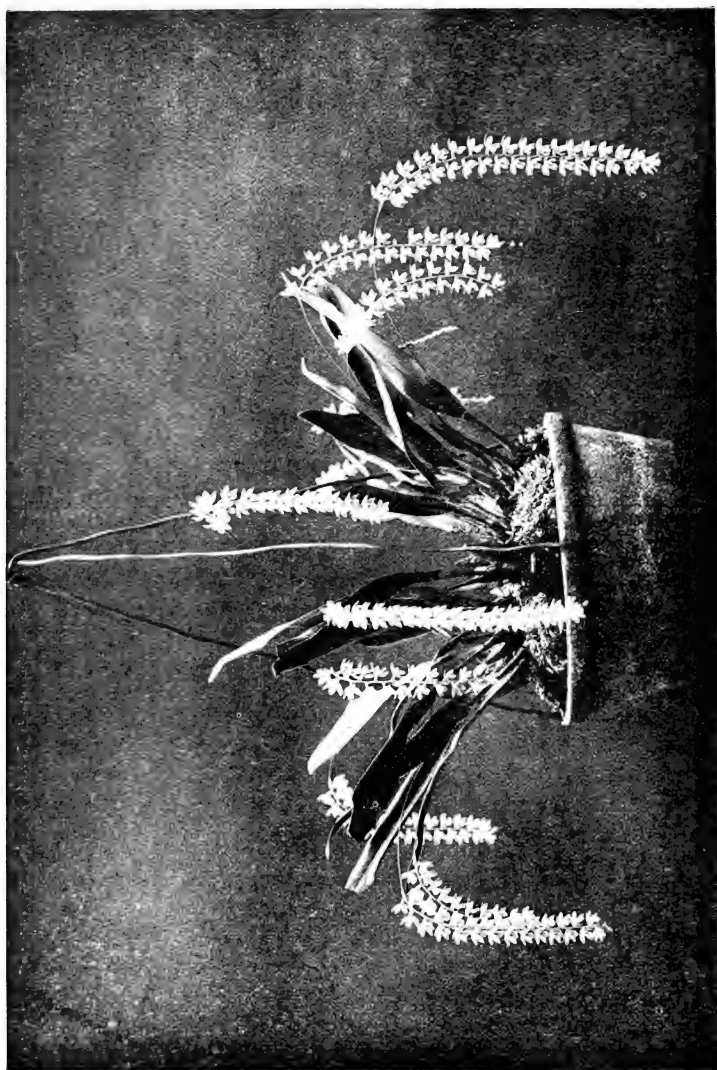
condition, and have but a small number of roots that exhibit any signs of life. These plants should, within a few days after their arrival, be suspended head downwards in an intermediate temperature in a shady part of the house, and be slightly syringed at least once a day. In a very short time the leaves will have assumed their natural colour, and the stems and old root stumps will commence to emit their new succulent roots. Immediately this is observed the plants should be taken down and placed in as small pots as possible (teak wood baskets are preferable for *Phalænopsis*), using the crocks for potting, so as to come up almost to the edge of the pot, covering the whole with good living sphagnum moss, and pressing it down moderately firm.

After potting, place the plants in a warmer atmosphere, in what is generally termed the East Indian house. They will require but little water until thoroughly established, just enough being afforded to keep the sphagnum fresh and green. During this period any exposure to strong sunshine will sometimes cause loss of foliage. The retention of the leaves being necessary to the well-doing of the plants they should be carefully shaded, independently of the other inmates, a few sheets of tissue paper answering very well for this purpose. Newly imported plants of the different genera above-mentioned frequently send out flower spikes, which should always be pinched off, as nothing tends so much to debilitate the plants as early flowering. (Species of *Vanda* and *Angræcum* that require less warmth will be treated of in their respective cultural divisions.)

The genus *Cypripedium* has, under the latest nomenclature, been classified into four sections—*Cypripedulium*, *Selenipedilum*, *Phragmipedilum*, and *Paphiopedilum*. All of them are so widely known in gardens as *Cypripedium* that for the sake of convenience, and to

avoid confusion, I prefer here to keep them under the original name. Imported plants of such species as *C. Stonei*, *C. Rothschildianum*, *C. præstans*, *C. lævigatum*, *C. Lowii*, *C. exul*, *C. Lindleyanum*, *C. Sanderianum*, *C. Parisbii*, *C. candatum*, and others of that section, should be placed in the smallest pots possible, keeping the base of the foliage on a level with the rim of the pot, filling up with rough crocks only, and affording plenty of water through the crocks. When root action begins, remove a few of the crocks, and pot firmly with a mixture of peat and sphagnum moss. The majority of the species may be potted in the same manner immediately on arrival. The principal object of the cultivator, with those species of *Cypripedium* named, should be to prevent water from getting into the growths or lodging in the axils of the leaves, they being extremely liable to turn black and decay from this cause.

In treating of imported Cattleyas, I include *Lælias* of the *purpurata* and *elegans* type, for one section runs so nearly into the other as in some cases to make it difficult to distinguish them. The cultural remarks made in reference to them will also apply to such species as *Brassavola*, *Epidendrum*, *Schomburgkia*, and *Arpophyllum*. All plants of these species should be placed in pots just large enough to allow room for one season's growth, the pots being nearly filled with drainage materials, making each plant quite firm by tying the pseudo bulbs to neat sticks, so as to steady them. This is very important, because if the plants are allowed to sway about every time they are moved they will never become properly rooted. The crocks in which the plants are placed should be watered very sparingly at first. The intermediate house is the proper place for them; here the moisture of the atmosphere at once checks evaporation, and reaction quickly commences. The back pseudo bulbs send forth sufficient sap to enable the leading



PLATYCLINIS PHILIPPENSE
(From a photograph by J. A. Seaman)



growths to distend, and to make a new break, from which sooner or later proceed roots. As soon as the young growths and roots are fairly started, the plants may be potted in the ordinary manner.

Lælias of the aneeps type should have similar treatment, but it is advisable to avoid wetting the rhizomes as they are liable to rot from this cause. *Lælia autumnalis*, *L. albida*, *L. furfuracea*, *L. majalis* and *Cattleya citrina* should be suspended in the Odontoglossum house or cool greenhouse, these requiring less heat than the majority of the others. Imported Cattleyas and Lælias will make a large quantity of root on bare blocks of wood, but I have never seen them make growths in proportion.

All newly imported Dendrobiums, if they arrive in good condition, are easy to manage, and will usually very soon commence to grow. Roots will immediately follow, when the plants may be potted. The dwarf and pendulous varieties succeed best if placed in small shallow hanging pans, with perforations round their sides, through which the air circulates and helps to keep the roots in a healthy condition. These pans are preferable to the ordinary teak basket, as the plants are more easily managed when they require more root room. Baskets are very liable to decay, thereby injuring the roots, and when larger baskets are required, it is exceedingly difficult to remove the plants without doing serious harm to the living roots, owing to the tenacity with which they cling to the wood. Over-potting must be carefully guarded against; for, if the roots get into a mass of sodden compost, they speedily decay and the young growths are prematurely stopped, soon to start again into weak, sickly growth.

The remaining section of imported Orchids to be mentioned is that of the Odontoglossums. This is the most popular family among the cool house Orchids.

The well-known *Odontoglossum crispum* (*Alexandra*) and its very numerous and beautiful varieties, is probably the most extensively grown Orchid in collections. The palm of superiority is universally assigned to this species, on account of its exquisite beauty, its usefulness, and the comparative ease with which it may be cultivated. Where a fairly representative number of the different species of *Odontoglossum* is cultivated, they generally produce an uninterrupted succession of bloom throughout the year. *Odontoglossums* as a rule arrive in this country in a satisfactory condition, owing in great part to the care and intelligence of the collectors, and the rapidity of transit. Where a large number of these plants are obtained, a stage in the coolest house should be set apart for them, and, if the stage consist of open wood-work, it should be overlaid with boards or slates, upon which should be placed a thin layer of sphagnum moss, cocoanut fibre, or finely sifted ashes from the stoke hole. It is advisable to go carefully over the plants at once, cutting away any decayed or rotting portions, and to lay them on the sphagnum, etc., without touching each other. If the plants are imported during warm weather they may be slightly dewed over occasionally, using a very fine syringe or sprayer for the purpose, but those that come over late in the autumn or early spring need no syringing overhead, the moisture arising from the damped parts, and from the earth beneath the stage being sufficient. Too much dampness frequently sets up decay. In due time the new growths and roots will appear, and it is then time to put the plants into pots. It is not good practice to pot up the whole of the plants at one time, it being better to pick out those which have made the best start, and so by degrees to pot up the whole of them. Pot each piece separately, it being almost certain that varieties will differ, for scarcely can two be found exactly alike. Select pots as small as can

conveniently be used. It is not necessary to use broken crocks for drainage, a more suitable substitute being found in the bracken rhizomes found in the peat; this may be broken in pieces or twisted around the bottom of the pot to about an inch in depth. A good general compost for potting *Odontoglossums* consists of equal parts of good fibrous peat and freshly gathered sphagnum moss, with the addition of a moderate quantity of finely broken crocks. Pot the plants firmly, as one would a hard-wooded greenhouse plant, and when finishing off the operation keep a quantity of the live heads of the moss on the surface, so that in a short time the top of the pot will possess a living covering. After potting, keep the atmosphere cool and fairly moist, shade from direct sunshine, and afford but light waterings until each plant has become firmly rooted. After the first growth is formed and new growth has recommenced, the plants should be at once transferred to larger pots.

It is but natural that enthusiastic growers, who have imported plants, are anxious to see their flowers, and to ascertain if there are any spotted varieties among their purchases. I would caution them against allowing the spikes to remain on too long, as is sometimes the case, greatly to the detriment of the plants, causing the bulbs to shrivel, and leaving them in such a debilitated condition that they are scarcely able to form new growths, and often gradually dwindle away. Undoubtedly it conduces greatly to the health of all Orchids if their flower spikes are cut off after a reasonable length of time. The flower spikes of *Odontoglossums* may be stood in water in the cool house, or used for indoor decoration, where they will retain their beauty for several weeks. Small or weakly plants invariably suffer if allowed to bloom at all, consequently it is advisable to remove most of the buds, leaving just one or two to open for the determination of the variety: as soon as

this is known, cut the spike at once. By giving the plants a short period of rest, keeping them rather on the dry side as regards waterings, and afterwards affording them such treatment that they may grow vigorously, many valuable plants may be saved and next season be enabled to send out strong flower spikes without loss of strength.

Evergreen terrestrial Orchids, like *Calanthe veratrifolia*, *C. Sanderiana* and *Phaius*, from warm countries should be potted immediately on their arrival. They prefer a mixture of good fibrous loam, peat, leaf soil and sand, and, though plenty of drainage is necessary, the potting required is more like that accorded to ordinary plants. After being potted they should be put in the warm house, and, when the plants begin to grow, light waterings must be given at long intervals. As the roots and growth increase, water more frequently until at last the plants are properly established.

MATERIALS FOR POTTING

To amateurs and others who may now be commencing to interest themselves in Orchid cultivation, as also to those who have had considerable experience, a few words as to materials for potting may prove useful. Some few years ago when visiting the establishment of M. Delanghe, the well-known horticulturist of Brussels, I was astonished to see a large batch of *Cattleya Mossiae* in the most luxuriant health, and flowering most profusely, not only from the leading pseudo bulbs, but also from smaller growths which had grown out from the back bulbs; and, in addition, a large quantity of *Oncidium sarcodes*, whose pseudo bulbs had attained extraordinary proportions. Being naturally anxious to learn how to attain such marvellous results I asked for

information. M. Delanghe turned out of its pot a plant which to my surprise was potted like an ordinary palm or fern. My informant then told me that it did not pay him to buy peat for Orchids, so he had potted them in what he termed ordinary Azalea compost, and what proved to be a kind of leaf soil (*terre bruyère*). On visiting MM. Peeters' Orchid nurseries I obtained further information. M. F. Peeters, who uses this compost with great success, told me that the compost is not the ordinary leaf soil used in gardens, which is obtained by collecting large quantities of leaves in heaps and allowing them to decay, but is a fibrous forest soil, consisting chiefly of half-decomposed leaves, principally oak leaves. This soil should not be collected indiscriminately, but only those portions that are light, soft to the touch, and a little sandy should be selected. It is best to run the soil through a coarse sieve, rejecting new leaves that have lately fallen, and all decaying pieces of wood and twigs. The best time to procure leaf-soil is during the summer months when it is comparatively dry, as it may then be stored in a dry shed without fear of fermentation. Previously to potting the plants it is advisable again to sift the soil, this time using the finest mesh sieve obtainable, so as to reject the fine earth, for when this is retained the compost is not sufficiently open, and therefore remains wet for too long a period, causing the roots to perish. M. Peeters' method is to select pots sufficiently large to allow the plants for several seasons to develop without getting over the rims. A single crock is placed over the hole in the pot, with about half-a-dozen smaller ones around it. The leaf-soil should be fairly dry, and placed firmly and evenly round the roots of the plant, the rhizome or crown of which should be kept just on a level with the rim. The pot should be filled with the compost to within an inch of the top, this space being then filled

tightly with living finely chopped sphagnum moss, to ensure a light humidity, and to facilitate the emission of roots.

A word as to watering, which is an important point in this new method of Orchid culture. Habituated as we are to the system of saturating our Orchids during the growing season, it is somewhat difficult to reconcile ourselves to the new method. After repotting, it is a good plan to syringe the surface of the pots very lightly several times a day during dry, hot weather, so as to keep the sphagnum moderately wet, as this accelerates root growth. When the young roots begin to bury themselves in the soil, more water may be afforded, using a fine-rosed watering can for the purpose, at first very moderately, increasing the amount in proportion as the roots develop. Even then very careful watering is necessary. Instead of saturating the whole of the compost, it is sufficient to keep the upper part wet, for the moisture will in time descend around the sides of the pot, where, under good culture, a profusion of roots is found. Until growth is well advanced, and the roots are in full activity, the plants should be kept well shaded from strong sunshine. It is necessary to observe the time of rest, for the plants will at that period require less water at the root, and more air and sunshine, so that the newly formed growths may become properly matured, for these (particularly *Cattleyas* and *Lælias*), acquire in this soil a greater fleshiness than in peat and moss.

In Belgium and many other places on the Continent, leaf soil is largely used. It is used also by many of our leading nurserymen and amateurs with every success, its cheapness and labour-saving properties being special recommendations. Here at Burford, a large number of Orchids of various species and hybrids have been grown in this compost during the past twelve months. Those plants, which have become established in it, have

improved in strength, and look more healthy than when in peat and moss, each growth or pseudo bulb showing an appreciable advance on the preceding one. The plants thus experimented upon are *Cattleyas*, *Lælias* and their hybrids, *Odontoglossums*, *Oncidiums*, *Cypripediums*, *Calanthes*, *Epidendrums*, *Cymbidiums*, *Miltonias*, *Zygopetalums*, and many others. It is proper to mention that only a few plants of each genus have been tried, but, as other plants require repotting, many more will be put into this new compost, and especially those that are not growing satisfactorily in the old material.

There are always plenty of people ready to try new things, but I would not advise anyone whose plants are in a satisfactory condition to go in for the new culture on a large scale, but rather to experiment with a small number of plants, so as to find out the applicability of the new system before adopting it generally, until its value has been more thoroughly tested.

ORCHID HOUSES

It may be well now to enumerate the various structures in which Orchids are usually cultivated, and for the benefit of beginners, I group them into four divisions, namely:— East Indian, *Cattleya*, intermediate and cool houses. In these houses or divisions the majority of tropical Orchids will thrive satisfactorily, providing the ordinary requirements of the plants are attended to. At the same time, where a large number of some particular class has to be grown, it is an advantage to give them a structure to themselves. Thus in many places there are besides those mentioned an *Aërides* house, *Dendrobium* house, *Cypripedium* house, Mexican house, and a *Masdevallia* house. Where no such ample accommodation exists,

the cooler part of the East Indian house, or a warmer one in the Cattleya house, will have to be utilized. Each plant should be under the cultivator's personal care, he noting the conditions under which it succeeds best; whether on the bright or shady side of the house, at a warmer or cooler part, and a variety of circumstances which will strike the observant grower. Considering that Orchids come from so many parts of the world, and from different altitudes, it is difficult to suit each one as to its cultural requirements, but a great deal may be done by judiciously selecting certain positions for certain plants. On this point much information may be obtained by visiting other collections, and noting the positions which the best grown plants occupy.

The respective degrees of warmth found conducive to the health of the plants as maintained by fire heat, are as follows:—

East Indian house.—During the summer 65° to 70° by night, and 70° to 80° by day, rising 10° or 15° during sunshine. Winter 60° to 65° by night, and 60° to 70° by day.

Cattleya house.—During summer 60° to 65° by night, and 65° to 70° by day, rising higher with sun heat. Winter 55° to 60° by night, and 60° to 65° by day.

Intermediate house.—The temperature of this house should, as the name implies, be just between that of the Cattleya and that of the cool house.

Cool house.—The temperature should be kept as near 60° as possible by day, and 55° by night during summer. In winter the night temperature may fall to 45° — 50° without injury to the plants, but should be increased several degrees by day.

These temperatures must, however, only be regarded as averages; the maximum temperatures very frequently exceed that given above during the summer, for, while care is necessary during the spring and late autumn months

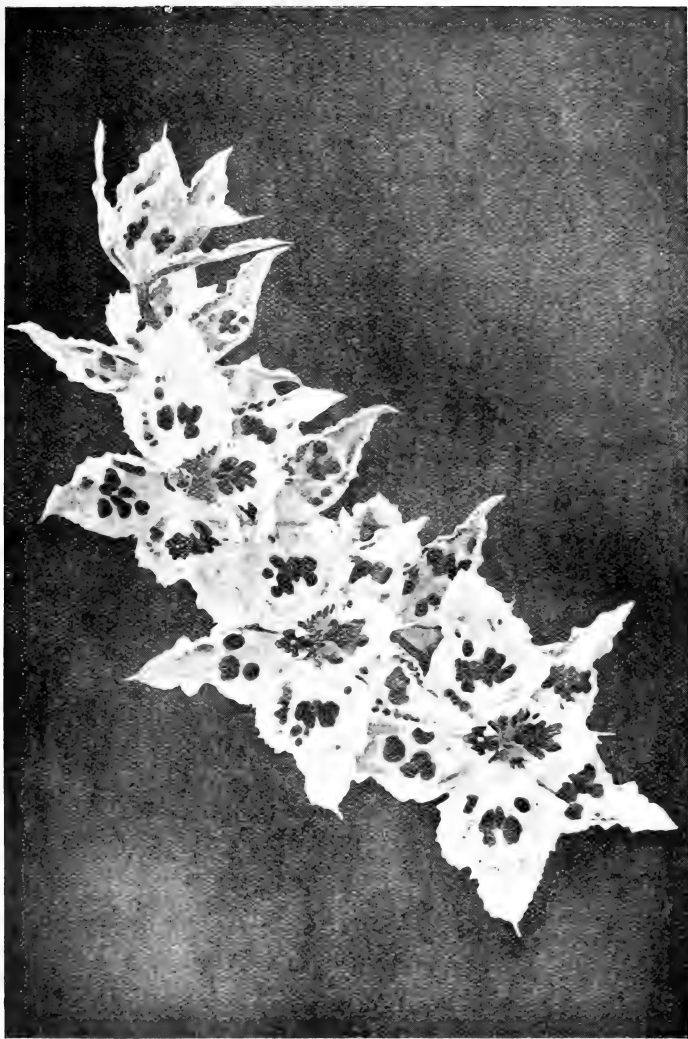
to keep the temperatures as steady as possible, with strong sunshine in summer the temperatures may run up with advantage. Providing there is a circulation of fresh air among the plants, they will flourish. At night an abundance of moisture may be allowed if the temperatures do not fall below those specified. During the winter months these figures should be adhered to during mild weather, but, whilst hard frost or piercing winds occur, the warmth may fall a few degrees with benefit to the inmates. The higher degree of warmth named is proper during the evening, and the lower degree of warmth is what the thermometer should show in the morning. Fire heat at all times should be carefully made use of, and especially during winter, an excess of fire heat being frequently the cause of the plants getting into an unsatisfactory condition. In houses where the proper temperatures cannot be maintained without making the pipes unduly hot, the dessicating heat should be as far as possible counterbalanced by the admission of fresh air, and the use of water for sprinkling the paths. It is also good practice during spells of severe frosts to cover the houses with canvas mats, Archangel mats being cheap and convenient. The ends of these may be neatly tied, and several mats be sewn together in different lengths as required for each house. These may be easily rolled along the lower part of the roof, the coldest part of the house, putting them on at dusk, and taking them off at daybreak. As a safeguard, these mats should be made secure in some manner, and when wet or frozen they should be thoroughly dried before using them again. The cultivator or his assistants, when banking up the fires the last thing at night, should so manipulate the dampers that there may be a fall of several degrees of temperature in the houses by the early morning hours. If the temperature of the various houses should fall

below what is considered right, no water must be afforded to any of the plants, nor any damping down proceeded with, before the temperature has risen to the proper height, as under the circumstances the drier the air of the house the less risk there is of getting the plants chilled, cold and moisture combined being the chief causes of spot and the commonest beginnings of disease.

VENTILATION

Coming, as nearly all Orchids do, from hilly and mountainous countries, pure air is essential to their healthy development. Without it they will not thrive, even in the best of houses and under the best cultural skill. Ventilation must be regulated according to the conditions of the external atmosphere. The general rule is to give as much top and bottom ventilation as possible, providing no direct draught is caused thereby. In the East Indian house, with its high temperature, air cannot be so freely admitted as in the intermediate and cool divisions, or harm will result from the lowered temperature, but with a little judgment sufficient air may be admitted at all times to prevent too close an atmosphere within. Ventilators at the apices of the houses should be open for several hours each day during summer, but during winter or spring, when sunshine and cold winds occur contemporaneously, it is advisable not to open them, sufficient air being admitted through the bottom ventilators.

As regards the *Cattleya*, intermediate, and cool houses, plenty of air may be left on the bottom ventilators both day and night during mild weather, but of course to a lesser extent during severe frosts or cold easterly winds. When top air is given, discretion must be used at all times. My practice is to afford only just



ODONTOGLOSSUM CRISPUM (A SPOTTED VARIETY)

a chink of top air to the *Cattleya* and intermediate houses on warm, sunny days during winter; but, with regard to the cool or *Odontoglossum* house, the treatment is different, because during the month of September the plants are repotted, and by the middle of October they have become settled in the fresh compost. They then commence to make new growths, and a quantity of young roots. Therefore from the middle or end of October the top ventilators are closed, and not opened again until the warm days of spring. In each division it is advisable that the atmosphere for twenty out of the twenty-four hours be as regards moisture two or three degrees near to saturation point. The exceptional four hours should be in the middle of each day, when it is good practice to allow the atmosphere in each division to become several degrees drier, so as to give the plants an opportunity to throw off any excess of superfluous moisture which, if retained, would prevent sound lasting growth. The drying up of each division also enables newly made growth to become properly matured. It should always be remembered that the majority of Orchids require sun-light, though not the sun's direct rays; but there are exceptions, as some few species require dense shade, and others delight in strong sunshine. I do not admire or advocate any kind of permanent shading for Orchids, because in a varying climate, such as we have in England during spring and autumn, the plants may not require shading for several days together, and fixed shading only looks ridiculous: a command over the shading, therefore, is a distinct advantage to the cultivator. Shading is most convenient in the form of roller blinds made of light canvas netting or wooden laths. The latter are extensively used on the Orchid houses at Burford, and are very popular throughout the country. The blinds for the intermediate and cool

houses should, when down, be about six inches above the glass. This is best done by fixing above the roof, from top to bottom, strips of wood or iron on which to run the rollers. By this plan abundance of air passes up between the blind and glass, the benefit of which, as regards the growing of Orchids, especially in summer, cannot be too highly estimated. It is an advantage that the blinds on the East Indian and *Cattleya* divisions roll flat upon the roof glass, as a maximum of sun heat without scorching is the thing required by the inmates of both houses.

WATERING

There can be no doubt that the health of Orchids depends in a great measure on the supply of water, on its quality, and on the time at which and the manner in which it is given. Rain water is most natural, and is, consequently, the best water for the plants, particularly for syringing purposes, and means should be taken to store a sufficient quantity for use. Some cultivators are under the impression that it is essential to have hot water pipes running through all the tanks inside the houses, in order to warm the water before giving it to the plants, and to dispense humidity. Both ideas are wrong, the latter practice especially being at times injurious to the plants in several ways. If the tank in the hottest house be provided with a two-inch branch pipe, which does not interfere with the working of the ordinary pipes, and having a valve outside to regulate the circulation, that will be sufficient. During the summer, when the temperature is about 66° or 68°, and in winter, when it is from 60° to 62°, the valve should be closed, the water being then warm enough for all purposes in that house, but for the *Cattleya* and intermediate

inmates the warmth of the water should be reduced several degrees. If the water in the cool house tank has been there for any length of time, it will be found to be quite warm enough without being heated by means of pipes during summer, but during winter it is often found necessary to add a little water to it from the East Indian house, just sufficient to take the chill off, and it should equal the night temperature of the house. To avoid wasting rain water, hard water should be used for damping the paths and stages.

Beginners in Orchid culture generally find the watering of their plants quite a puzzling operation. They do not begrudge either water, time, or trouble, but after the work is done they are in their own minds far from certain as to whether they have done right or wrong. This, although not pleasant, is a very proper feeling, which time and experience gradually wears away. To such persons two excellent rules may be applied: through the summer keep the plants rather on the wet side, and in winter keep on the dry, especially if they are subjected to a reasonably low temperature. Experience teaches that, when the plants have completed their season's growth, sufficient water only is needed to prevent the leaves of the evergreen species from perishing, and in the case of the deciduous kinds to prevent undue shrivelling of the pseudo bulbs. There are some Orchids that do not care for the least dryness at the root at any time. For these, proper cultural directions will be given when treating of the different species and varieties.

UNCLEANLINESS AND DISEASE

It is well known to all who have experience in Orchid culture that light is indispensable to the well-doing of

the plants. During the dull months of winter, when the least amount of light is at command, it becomes necessary to utilise it to the fullest extent. It is, therefore, good practice, after the shadings are removed, during autumn thoroughly to wash the houses inside and out. Previous to their re-arrangement, the plants should be thoroughly cleaned, and their pots freed from dirt; in fact, everything about them should be made perfectly clean, for no class of plants pay better for cleanliness than do Orchids. Cleaning Orchids is tedious work, which only those interested in their welfare care to do. Those who have had some experience in the sponging of less valuable plants, should alone be trusted to clean the rarer and choicer varieties. It often happens that the leaves of tender plants are split and cracked by careless and inexperienced workers, the damage in some cases being irreparable. It is also well known that the Orchid grower has innumerable enemies to contend with, both by day and night, and he must constantly be on the alert to eradicate them. Cockroaches, wood-lice, slugs, etc., should be diligently sought after and destroyed, or a great deal of damage will soon be done. If thrips or aphides of any kind make their appearance in any of the houses, there is nothing that I know of which is more effectual for their destruction than the XL. ALL. vaporiser. A matter of considerable importance, when the weather is suitable, in August or September, is thoroughly to overhaul and put everything connected with the heating apparatus in good working order, so as to make sure, before winter sets in, that the proper temperatures can be obtained when required.

BOTANICAL ORCHIDS

Among the great Orchid genera there are many species which are neglected, because the individual

flowers are small, or because they are unsuitable for cutting purposes or for house decoration. They are generally termed "Botanical Orchids," many of which have marvellous structural peculiarities, and are a source of wonder to those who see them for the first time, as well as a source of lasting interest to those who care to make a study of them. A *collection* of Orchids should properly aim at embracing the whole of this natural order of plants, made up of tribes and subtribes, of many genera, and a vast number of species. The Orchid collector should follow the example of collectors in other branches of natural history, for example, entomologists, who do not disdain the smallest and least attractive of objects. It is in the endless variety of habit, mode of growth, structure of flower, and peculiarities of fertilisation that the charm of a varied collection of Orchids lies. In such, the most exacting taste could scarcely fail to find something of interest throughout the year. I purpose, in the course of this book, touching upon a few of the more interesting "Botanical Orchids," and shall endeavour to popularise a neglected but extremely wonderful class of plants.

THE ORCHID GENERA

AERIDES

The genus of *Aerides* is spread generally over the Indo-Malayan region. They are handsome epiphytal Orchids with erect stems, on which the foliage is arranged distichously, the elegant drooping racemes of wan, fragrant flowers, with the lips prolonged into curved spurs, being always greatly admired. The following species require the temperature of the East Indian house: *A. crassifolium*, *A. crispum*, *A. Houlettianum*, *A. Lawrenceæ*, and its yellow-tinted variety, *Sanderiana*, *A. Lobbii*, *A. maculosum*, *A. odoratum*, *A. quinquevulnerum*, *A. suavissimum*, and *A. Larpente*. A few kinds as *A. Fieldingii*, *A. affine*, and *A. rubrum*, coming from high altitudes, should occupy a shady corner of the *Cattleya* house, and *A. japonicum* of the cool house. *Aerides* should be grown in pots, as they are more easily managed, and the roots suffer less injury than when baskets are used. Like other Orchids, they should never be subjected to the root disturbance inseparable from repotting oftener than is really necessary. Only those that from various causes have lost a number of their bottom leaves, or which have insufficient pot room, should be repotted. Pot them as advised for imported plants; healthy specimens should have the old sphagnum moss removed from the surface and replaced by new. January and February are the best months for repotting these species. *Aerides* thrive well in leaf soil, and produce vigorous vegetation, but unfortunately they do not

bloom satisfactorily. *Aerides vandarum* and *A. cylindricum* are quite distinct in appearance from the others by having terete stems and leaves. They are from the Sikkim Himalaya, at about 5000 feet elevation, and also from the Khasia Hills (*A. cylindricum* is also reported from Southern India), consequently they require a cool temperature; but to induce them to flower regularly they must be well exposed to the sunlight during the autumn months. The best way to grow them is to train their long slender stems up on teak wood rods, and when in full growth to syringe overhead several times a day.

ACINETA

Acinetas are robust plants, and usually have stout pseudo bulbs, bearing large plicate leaves, and a many flowered inflorescence that is more or less pendulous, and is produced from the base of the bulbs. The following Acinetas are natives of tropical America, from Southern Mexico to Columbia: *A. Barkeri*, *A. chrysantha*, *A. densa*, and *A. Humboldtii*. They should be placed in baskets, using a compost of equal parts of peat and moss, but no crocks should be used for drainage purposes, a layer of moss being placed over the bottom of the basket instead. Suspend them to the roof of the Cattleya house when growing. They require a decided rest in the somewhat cooler temperature of the intermediate house.

AGANISIA

The pretty *Aganisia cærulea*, *A. ionoptera*, and *A. lepida* are also from tropical America, but they require more warmth, and do well with the *Aerides*, potted in leaf soil.

ADA

The bright coloured *Ada aurantiaca* grows on the Eastern Cordillera of New Granada at 8000 feet elevation. Its cultural requirements are exactly the same as prescribed for the cool *Odontoglossums*.

ANGRÆCUM

The genus *Angræcum* include a group of remarkable epiphytal Orchids of variable habit, the most noticeable character being the long tail-like spur dependant from the base of the labellum. Nearly all the species have pure white flowers, many of them being very fragrant. About one half of the *Angræcums* are natives of Madagascar, as *A. articulatum*, *A. citratum*, *A. eburneum* (the largest growing plant of the genus), *A. Ellisii*, *A. fastuosum*, *A. hyaloides*, *A. Humbloti* (*Leonis*), *A. metallicum* and *A. sesquipedale*. The latter species when in bloom always attracts attention on account of the remarkable character of its flowers, which are large, bold, and of ivory whiteness, and furnished with spurs often exceeding a foot in length. *A. Sanderianum* and *A. Scottianum* are from the Comoro Islands, a small group to the north-west of Madagascar. Several, including *A. arcuatum*, are from South Africa. The rare *A. Kotschyi* is reported to be from the neighbourhood of the Zanzibar River. Others as *A. bilobum*, *A. Chailluianum*, *A. distichum*, *A. pellucidum* and *A. pertusum* (known as the fish-bone Orchid), are from the West Coast of Africa. With the exception of *A. Kotschyi* which requires the highest temperature available, *Angræcums* do well in a shady part of the Cattleya house during the summer months, but during winter the coolest end of the East Indian house is more suitable for them. Their general treatment is similar to that of *Aerides*. One other exception is found in *A.*

falcatum which is from Japan; it prefers basket culture, and should be suspended in a light position in the cool house.

ANGULOA

In *Anguloa* we have a small group of species which are not so extensively grown as they deserve to be. The distinct character of their large and handsome flowers should commend them to the notice of Orchid growers. There is nothing that approaches the yellow-flowered *A. Clowesii*, or its white variety *eburnea*, whilst *A. Ruckerii* and *A. uniflora* are suitable companions for it. The *Anguloas* are from the Andes of South America at from 5000 to 7000 feet elevation, they are found growing chiefly on damp moss-covered rocks, and are therefore adapted for the *Cattleya* and intermediate houses. The young growths should be well shaded from direct sunshine, as the leaves are somewhat liable to be infested with red spider, which can only be got rid of by sponging. When in full growth they require copious waterings, but on the completion of the new pseudo bulbs they like a decided rest, and all the light available. Repotting should be done when growth commences: peat and moss is the principal soil, but a little fibrous loam may be used with advantage.

ANÆCTOCHILUS

Anæctochili are not generally cultivated, but they are the most exquisitely beautiful of all the handsome leaved plants, though their insignificant blooms are of no value or importance. A few of the most desirable and distinct varieties may here be enumerated:—*A. Dawsonianus*, *A. Lowii*, *A. Roxburghi*, *A. Sanderianus*, *A. striatus*, *A. setaceus* and *A. petola*. They may be grown in small well-drained pots, in a compost consisting chiefly of sphagnum moss,

broken crocks, and a little peat fibre. After being potted, they appear more attractive if six or eight plants are plunged in moss in a large shallow pan, and a bell-glass with a hole at the apex placed over them. This hole should be stopped with a cork, so that till the plants begin to grow they may, during the greater part of the time, be kept close. The compost used should be kept in a moist but not wet state, and the interior of the bell-glass wiped dry every morning. When the plants have become established and begin to grow, the bell-glass may be tilted a little during the daytime, and the cork removed, but at night it should be closed again. They require plenty of shade, but it is advisable to shade one side of the glass only. When the plants have done growing, the flower spikes push up. These may be pinched off and the plants stood in a corner of the Cattleya house, there to be rested. Whilst here, the plants should not be allowed to get quite dry, but the compost should be always kept moist. If the plants do well, the space within the bell-glass will soon be filled, and the leading growths, as soon as young roots appear, may be divided and repotted into separate pots. *Anectochilus petola*, being the least difficult to manage, is the best variety with which to make a beginning, and, if success eventually followed, the other beautiful varieties could be added to the collection.

ANSELLIA

The genus *Ansellia* is closely allied to *Cymbidium*, and comprises the following varieties:—*A. Africana*, *A. confusa*, *A. congoensis*, *A. gigantea*, *A. humilis* and *A. nilotica*. They require the highest temperature available in our houses, and prefer a compost containing peat of good quality, and a little silver sand. When growing



CATTELYA LABIATA

(From a photograph by J. A. Seaman)

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and rooting freely, they require plenty of root moisture, but when at rest very little is necessary.

ARACHNANTHE

Two of the most remarkable Orchids, unfortunately but now seldom seen in our gardens, are *Arachnanthe Cathcartii*, and *A. Lowii*, perhaps better known under the older name of *Vanda*, to which they are closely allied. The first mentioned species is a native of the hot, damp, shady valleys in the eastern Himalaya. *A. Lowii* is from the low, swampy forest near the coast of Sarawak. Its flowers are borne at regular distances on flexuous spikes, which are often twelve feet long. It is the appearance of the inflorescence itself that arrests attention, there being two kinds of flowers on the same raceme. The two or three lowermost are rather larger than the others, and are of a bright orange dotted with red purple, while all the others are deep chocolate brown, bordered and streaked with yellow. *A. Cathcartii* should be trained to an upright raft made of teak, and placed in a damp position in the East Indian house. It requires constant syringing overhead. When the roots have entwined themselves around the teak wood, the plant will need no further training. Naturally the growth will bend itself towards the light and eventually droop over. The plant will then have attained its flowering size. It is from this species that the generic name *Arachnanthe* was derived, which means a "spider flower," owing to the fancied resemblance of the markings on the flower to the cob-web of a spider. *A. Clarkei* is also a very fine species, and well worthy of culture. *Arachnanthes* require a hot moist temperature always.

ARPOPHYLLUM

Arpophyllum giganteum and *A. spicatum* are well-known as belonging to a small genus with slender pseudo bulbs,

from which are produced dense cylindrical racemes of flowers. Although epiphytal, they easily conform to pot culture, and will grow freely in an intermediate temperature.

ARUNDINA

Arundina is also a small genus, which includes about six species, only two of which are generally known: *A. bambuseifolia*, and *A. philippinense*. Both are terrestrial and should be grown in pots, a compost of fibrous peat, loam, and moss well mixed together being the most suitable. A light position in the East Indian house should be given them.

ASPASIA

Another small section is composed of *Aspasia lunata* and *A. odorata*, both medium-sized epiphytal Orchids from Brazil. They require a compost of peat and sphagnum, with plenty of root moisture, whilst growth is being formed. When resting, they should not be dried too severely. Intermediate temperature is most suitable.

BARTHOLINA

A beautiful terrestrial Orchid is *Bartholina pectinata*, producing from a tuberous root stock a single leaf, and a flower scape about nine inches high, bearing a single, rather large flower with small white, violet-shaded sepals and petals, and a broad lip beautifully fimbriated, and in colour a shade of violet with a green centre. This plant should be grown in a cool greenhouse, and be potted in fibrous loam, leaf-soil and sand.

BATEMANIA

The genus Batemanian consists only of one species, *B. Colleyi*. It is very singular that, although this plant

has been known to science for over sixty years, no other species up to the present time has been added to it. It was named by Dr Lindley in compliment to the late Mr James Bateman, its specific name, *Colleyi*, being derived from the name of his collector who discovered it in Demerara in 1834. The flowers are about three inches across, sepals and petals purplish brown, lips white marked with red. Shallow pans are the most suitable, using sphagnum as the principal compost, but a little peat may be added with advantage. Grow the plant in a warm, moist, shady corner of the *Cattleya* house in summer, in winter selecting a similar position in the East Indian house. Water at all times sufficiently to keep the moss on the surface in a growing condition, but never wet the compost to saturation.

BIFRENARIA

Bifrenarias are nearly related to Maxillarias, the chief difference being in the structure of the pollen apparatus, the pollen masses being attached to the gland by a pair of distinct straps instead of by one. The other difference is that the flowers are racemed, not solitary. The genus include such species as *B. atropurpurea*, *B. aurantiaca*, *B. bicornaria*, *B. Harrisonæ*, *B. inodora* and *B. vitellina*. With the exception of *B. Harrisonæ*, these species are not generally sought after. They require similar culture to that of the Maxillarias.

BRASSIA

Among Orchids that are fantastic in a pre-eminent degree, are the Brassias. The singular and distinct appearance of the spikes, when exhibited amongst other flowers is always interesting and attractive. They are all natives of tropical America, and are usually found growing on trees in the shade, wherefore special atten-

tion must be given to the shading of the plants on bright days in summer. The principal varieties and those which are most interesting and deserving of culture are *B. antherotes*, *B. brachiata*, *B. caudata*, *B. Gireoudiana*, *B. Kieliana*, *B. Lawrenceana*, *B. maculata* and *B. verrucosa*. They should all be grown in pots, in a mixture of peat and moss, and would probably thrive better in the new leaf-soil. When potting, keep the plants well above the rim of the pots, as the bulbs are liable, through too close contact with the soil, quickly to turn black and decay. Grow them in the Cattleya house, and afford moderate waterings at all times.

BROUGHTONIA

Broughtonia sanguinea is the only plant of the genus that I know. It is one of the earliest epiphytal Orchids cultivated in England, having been introduced to the Royal Gardens, Kew, in 1793. It is a native of Jamaica, where it grows upon the trunks of trees not far from the seashore. The flowers are bright crimson purple, of a tint scarcely to be seen in any other Orchid in cultivation; and are produced on arching panicles. *Broughtonia sanguinea* requires but little compost to root in: the best method I have found being to obtain two imported pieces of about equal size, then to make a suitable open raft of teak wood, and to wire one plant on one side and the other on the opposite side, so that in time both pieces may grow together. Suspend the plants in the Cattleya house where they may obtain plenty of light, and sun in moderation. Apply water copiously when growing, but very little will suffice while at rest.

BULBOPHYLLUM

There is a fashion in the appreciation and cultivation of Orchids. At the present time, fashion favours such

species as *Cattleyas*, *Lælias*, *Cypripediums*, and *Odontoglossums*, but there are many genera that are both curious and interesting, and quite as capable of imparting pleasure to an educated horticultural taste as those, the value of which may be reckoned by large figures. Among these may be mentioned the *Bulbophyllums*, a genus of epiphytal Orchids which consists of a very large number of species known to science. Its geographical range is very extensive, probably spreading over a larger area than any other Orchid genus. By far the greater number of *Bulbophyllums* are East Indian and Malayan, but many are found in Africa and Madagascar, and a few species in Central and South America, and even in Australia and New Zealand. The greater number are of botanical interest only, but some have undoubtedly proved to be objects of marked horticultural interest. To describe the genus fully would take up too much space, and would probably prove monotonous to many readers, but a few remarks on the most prominent species may be of interest. The peculiar lip of *B. barbigerum* is one of the most extraordinary organs known among Orchids, the very fine purple threads which form a brush at its point being so delicate that the slightest disturbance of the air sets them in motion. They move to and fro like a tuft of threads cut from a spider's web, the lip itself being articulated with the column by such a very slight joint that to breathe upon the brush is sufficient to produce a rocking movement. *B. comosum* produces drooping racemes of closely-set small white flowers covered with short hair-like processes, the whole head having a resemblance to a bottle brush. A peculiarity, too, is that the entire plant, including its leaves (especially when drying off) and flowers, has a delicate but strong odour of newly-mown hay. The flower of *B. auricomum* is, owing to its pleasant fragrance, a great favourite with the Burmese ladies, who decorate

their hair with it. *B. tremulum* is also very curious, possessing flowers with a peculiar sensitive hairy lip resembling a hand brush. Very singular, too, is the movable lip of such species as *B. Lobbii*, *B. Deareii*, *B. Siamense* and *B. Sillemianum*. The labellum in these cases is so constructed that with a very slight motion it is thrown backward and forward as though it were set upon a delicate hinge. *B. Dayanum* is characterised by its hairy sepals, and *B. Ericssonii* by umbel-like clusters of yellowish white flowers.

B. grandiflorum produces large flowers, the upper sepal being over four inches in length and quite two inches in breadth, the lower sepals being beautifully reticulated. It is a very remarkable plant, and is in fact the largest flowered species known. It was originally discovered in woods on the coast of New Guinea as long ago as 1848, when it was first described and figured, but nothing further was heard of the species until 1895, when it was exhibited at the Royal Horticultural Society of London. *Bulbophyllum Sanderianum* is also remarkable and worthy of more attention. Bulbophyllums generally thrive well in the warmest house whilst growth is being made, but they should be removed to the *Cattleya* house during the resting period. The compact growing kinds should be placed in well-drained shallow pans, and those of more rambling habit in teak-wood baskets. The plants should be suspended near to the roof glass, on the shady side of the house, as they resent sunshine while appreciating light. Plenty of water is essential whilst growing, but when at rest less will suffice. Grow them in peat and sphagnum.

BURLINGTONIA

The Brazilian Burlingtonias are beautiful dwarf-leafy epiphytes, the best being *B. fragrans* and *B. pubescens*. These may be grown in pans as advised for Bulbo-

phyllums, but they require an intermediate temperature always, and must never be allowed to get dust-dry. *B. decora* and *B. rigida*, being of scandent habit, should be grown in pots, and tied up to neat sticks. I may mention that some *Burlingtonias* here were potted in leaf-soil about four months ago, and at the present time look very promising.

CALANTHE

The *Calanthes* are divided into two sections—deciduous and evergreen. The former section is more largely cultivated, the large graceful flower-spikes being valuable for decorative purposes. When cut, they last for several weeks in a cool place. They supply an uninterrupted succession of flowers during the winter months, when Orchid bloom is scarce. The number of true species is very limited, but the varieties have been greatly multiplied during the past ten or fifteen years by hybridisation. The species and hybrids comprising this group have pronounced pseudo bulbs, which should be potted as soon as they begin to start into growth in early spring. The compost in which *Calanthes* should be potted ought to be more retentive of water than that used for most species of Orchids, and may consist of one-half of fibry loam, one-fourth finely chopped sphagnum, and one-fourth leaf soil, adding a moderate quantity of small crocks and coarse silver sand, the whole being well mixed together.

When the pseudo bulbs are potted singly, which is the usual practice, the pots should be of various sizes to suit the plants or the accommodation at hand. Where this is limited, four or five bulbs may be grown together in a sufficiently large pot for the extension or development of the new growths. The pots must be about half filled with drainage materials, over which should be placed a thin layer of turf with the grassy side downwards. This

the roots will find out when the plants are well established, and it will assist strong growth. Pot the bulbs firmly, and leave about half an inch of space from the rim of the pot. This space may be filled up with a top dressing of fibrous loam when the plants are about half way through the season's growth. At that time a number of young fibrous roots will appear on the surface, and readily enter and appreciate the additional compost. The critical time with *Calanthes* is after repotting, until they become established. They require no water for several weeks, merely damping between the pots twice or thrice daily. When the growths show signs of progress, slightly sprinkle the surface of the soil occasionally with a fine-rosed watering can, and as the growths increase in strength gradually increase the amount of water. If the compost becomes unduly moist at this juncture, before the roots are in full activity, the tips of the young growths are liable to turn black, and the health of the plants to be impaired. When the plants are firmly rooted and the growths in full vigour, an abundance of water may be afforded alternately with weak liquid cow-manure. As the new bulbs approach maturity, and the leaves begin to turn yellow, the amount of water must be gradually reduced and liquid manure discontinued altogether. When the leaves have fallen and the flower spikes appear, very little water is needed for their development. After the spikes are cut, water must be withheld entirely, and the plants put on a dry shelf in the same house in which they were cultivated.

Coming from one of the hottest regions of the globe, these *Calanthes* require the temperature of the East Indian house, in which they should have a very light position. Many gardeners grow these plants to great perfection in pine stoves and cucumber houses.

The following species and hybrids would make a good selection:—*C. bella*, *C. Bryan*, *C. Cooksoni*, *C. Harrisii*,

Sandhurstiana, *C. Sedenii*, *C. labrosior*, *C. versicolor*, *C. Veitchi*, *C. V. alba*, *C. Victoria Regina*, *C. William Murray*, *C. revertens*, *C. Sanderian*, *C. Regnierii*, *C. Stevensii*, and the varieties of *C. vestita*. These deciduous *Calanthes* may be easily propagated by taking off the old back bulbs when repotting, and inserting them thickly into pots filled with sphagnum moss. Place them on a shelf, and damp well between the pots occasionally. They will soon commence to grow, but just previous to the appearance of young roots they may be repotted and treated as previously advised for the older examples. In the evergreen section the pseudo bulbs are comparatively small, and the inflorescence, borne on a stout spike, is more of a cluster. *C. Dominii* has pink flowers, *C. masuca* light purple, *C. veratrifolia* pure white, and *C. macroloba* also white, but the flowers are larger. These plants flower about the middle of May, and when well grown they form beautiful objects for several weeks. The same compost as advised for the deciduous kinds will also suit the evergreen section, but the potting should be more like that accorded to ordinary plants. No doubt the new leaf-soil would also suit them admirably.

CATASETUM

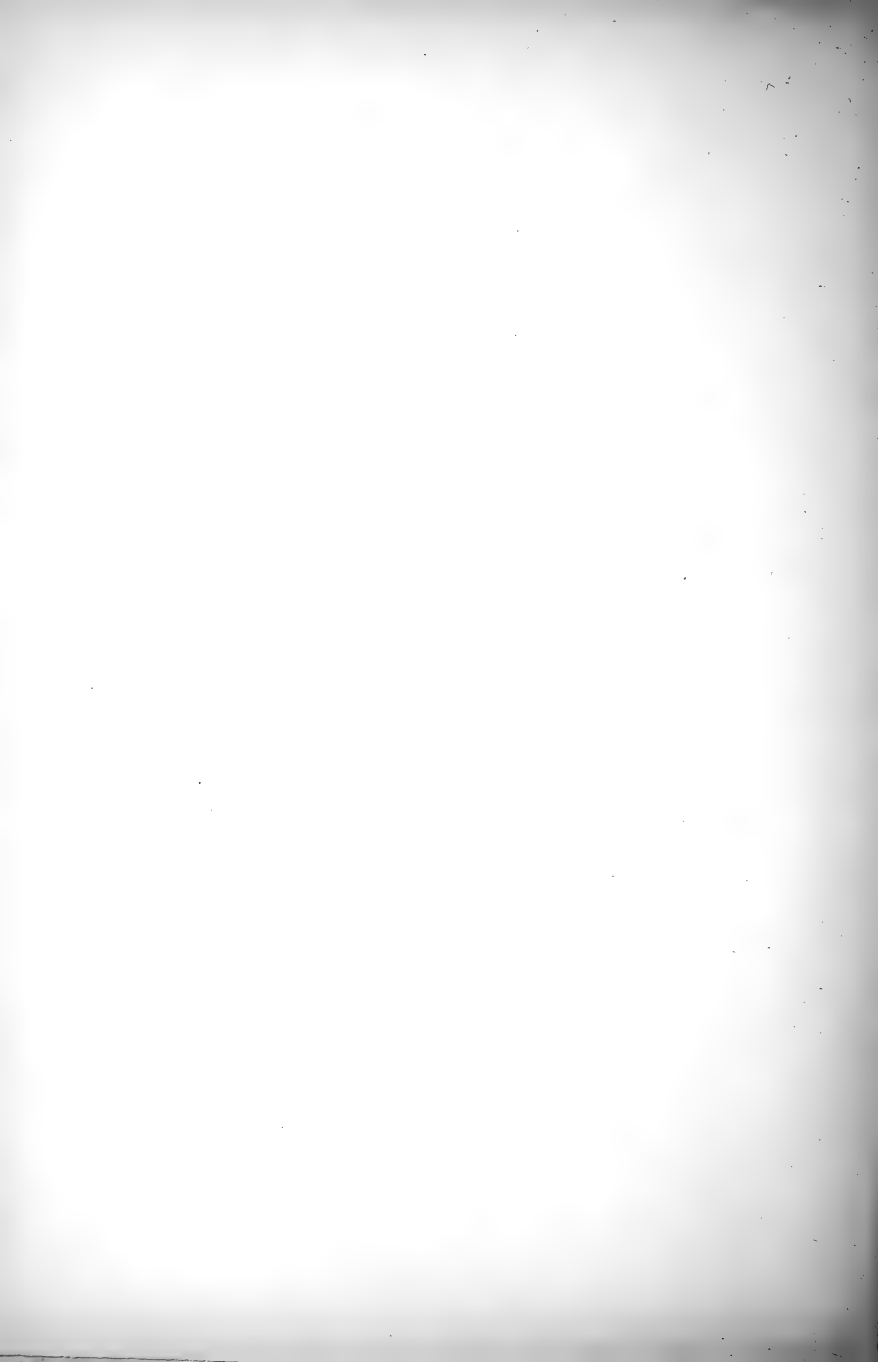
Few groups of plants produce such remarkable and interesting flowers as do the *Catasetums*, their quaint distinctiveness and beauty in structure affording sufficient reasons for their more extended culture. Imported plants, when well grown, undoubtedly yield many surprises. The following varieties are well worth including in a general collection of Orchids: *Catasetum Bungerotii* and its several beautifully distinct forms, including the varieties *C. B. mirabile*, *C. B. Lindenii*, *C. B. imperiale*, also *C. barbatum*, *C. B. spinosum*, *C. Christyanum*, *C. fimbriatum*, *C. scurra*, *C. longifolium*, *C.*

macrocarpum, *C. splendens*, and *C. tabulare*. The *Catasetums* are natives of Central America. The flowers are produced on erect or sub-pendulous spikes, and the plants are characterised by short, stout, usually pointed pseudo bulbs and large plicate leaves, and the freedom with which short aerial roots are produced. It is a remarkable fact that in some species of *Catasetum* there are male and female flowers quite distinct in structure and colour, the one from the other, and, what is most curious, borne on the same plant at different times, yet on several occasions plants have been exhibited that have had flowers of both sexes open on the one spike, and at the same time. A general peculiarity of female flowers is that they reach maturity sooner than males. There are yet many species of which the female flower is unknown, but it is hoped that in course of time they may all be discovered. The fertilisation of the *Catasetum* is also very remarkable, and the remarks of G. S. Jenman in the *Demerara Argosy* of June 8th, 1889, are interesting. He had been watching the course of procedure followed by two or three species of bees which constantly visited some *Catasetum* flowers. These bees belong to the genus *Euglossa*, a genus allied to *Bombus*, which comprises only the common humble bees, and the members of the two genera are about the same size, that is from three quarters to one and a quarter inches long. The members of *Euglossa* are distinguished by the long proboscis they possess, which exceeds the length of the body when stretched its full length. When not employed it is kept folded near the mouth. The smaller of the two species which he captured had two bars of yellow or gold on the base of the body, and the larger one three. In most of the *Catasetums* the female flowers are inverted, the lip, which is in the shape of a hood, being above the other parts, with the column, to which it is attached, under-



CYRTOPIDIUM HARRISIANUM

(From a photograph by J. A. Seaman)



neath it. Each of these two species of *Euglossa* which visited the flowers adopted a different course in entering the cavity of the lip in their search for nectar. The smaller species alighted invariably on the column, walked down its face into the lip and took up the nectar, retreating, when finished, by walking backward on the face of the column again. While inside the flower, however, it kept on without cessation, brushing by contraction the top of the column with the end of its body. By this process, if a male flower were approached and treated in the same way that these female flowers were treated, the pollina would be detached and would adhere to the bee's body, and when the female flower in turn was visited it would be fertilised by the stigma, which is near the end of the column, being brushed by the column, through the contractions of body I have described. The larger species, however, invariably adopted a different course. It alighted on the summit of the lip and walked in, as a house fly walks on a ceiling, and in doing so its back invariably touched the top of the column. In this way the pollina would be liberated by the pressure, and would stick to the back of the insect, and when a female flower was entered it would rub against the stigmatic surface, thus effecting fertilisation of the flower. The sportive character of *Catasetus* is now well known among Orchidists. All the species appear to have the same wonderful power of ejecting their pollen masses, as, on touching the extremity of the column, wherein lie hidden the column horns, with a pencil, the anther case flies off with an elastic force, and takes along with it the pollen mass, the gland at the base of which is covered with a glutinous substance, by which it adheres to anything with which it comes in contact. I may here remark that these singular flowers are not irritable when they first open, it being nearly always several days before they will answer to the touch

and eject their pollen. The stigma of *Catasetum*, too, is also different, as apparently it is not always viscid nor in a condition to receive the pollen.

On account of their mode of flowering, and the way the roots push themselves out into the air, shallow teak wood baskets suit *Catasetums* best, using as a compost peat and sphagnum moss in equal proportions, a moderate quantity of small crocks being mixed with the soil. The plants should be rebasketed annually, as the roots delight in fresh compost, the best time for the operation being just when the new growths appear, which is generally about April; a good deal of care in affording water is necessary till the plants have become re-established, and when in full growth water should be copiously supplied to them, providing the materials get quickly dry. The wires of the baskets should be about twelve inches in length, so as to bring the plants well up to the roof glass, for the maximum of light is essential to their future health. During the season of growth, *Catasetums* prefer the hottest house. They delight in plenty of atmospheric moisture, but object to overhead syringing, as the growths are extremely liable to damp off, especially in their earlier stages. When the plants have made their new growth, they should be placed where they may obtain uninterrupted sunshine, and where the atmosphere is drier and less close than that of the house in which they have been grown. While the leaves remain fresh they should be well supplied with water at the root. So soon as the leaves turn yellow the growth will be matured. The water supply must then be considerably reduced in quantity, and, when the leaves drop, be discontinued entirely. If the plants have been properly ripened, and the pseudo bulbs keep plump, no more water will be required until the plants again show signs of activity. Badly ripened growths, and those that mature during winter, generally

require a little water occasionally to preserve their plumpness. Catasetums after producing their first flower spikes of the season will, if strong, frequently send out others a few weeks later, but these it is advisable to pinch off to prevent the new pseudo bulbs from being weakened and hindered in the finishing.

CATTLEYA

The different species of the genus *Cattleya* are always highly appreciated, not only by Orchid enthusiasts, but also by everyone who admires flowers possessing bright colours and fine forms. Especially is this applicable to those *Cattleyas* which belong to what is generally known as the *C. labiata* section. These have a horticultural importance that is rarely equalled, and certainly not surpassed, by any other section of the great Orchid family. The *labiata* group includes a number of beautiful and distinct forms, which are not only of large size, but have a variety of the most delicate and pleasing tints. Especially striking is the labellum or lip, which in nearly all the varieties is remarkable for the richness of colour, and for the beauty of the pencilings and markings of the throat. Another great interest attached to the different types of *Cattleya labiata* is that some of them are to be had in bloom each month of the year, and for cut flowers they are admirable. *C. Percivalliana* is the first to open its richly-coloured flowers in January. *C. Trianae* is a most variable species, scarcely any two being exactly alike, some varieties being equal in size and beauty to any of the *labiata* section. Among imported plants, however, there is generally a large percentage of inferior varieties, and consequently the best kinds are especially valuable. Its flowers are produced from February to April. *C. Schroderae* opens its flowers in April, and lasts a considerable time, *C. Mendeli* and *C. Warnerii* in May,

and *C. Mossia* also in May, lasting through June. In July and August, *C. Warscewiczii* (*gigas*), *C. Luddemanniana* (*speciosissima*), and *C. Gaskelliana* are conspicuous. Then in September we have the beautiful *C. Dowiana* and its variety *aurea*, also the distinct *C. Rex* and *C. Eldorado*. The type *C. labiata*, or, as it is sometimes called, *C. labiata autumnalis*, commences to bloom in October, and, according to the conditions under which it has been cultivated, it is frequently seen in bloom up to the end of the year. *C. labiata* was first introduced in 1818 from the Organ mountains, north of Rio de Janeiro, in Brazil, the various species or sub-tribes mentioned having all been discovered and sent home since that time. The geographical distribution of the Cattleyas is a very wide one, the greater number of those enumerated occurring in the Columbia-Guiana region. All the species are natives of tropical America, and are spread over an immense territory, though exception must be made as regards *C. Dowiana* (which is a native of Costa Rica), the only species at present known north of the isthmus of Panama. It was discovered by M. Warscewicz about the year 1850, and was dedicated to Captain Dow of the American Packet Service. Other Cattleyas, such as *C. Aclandiae*, *C. amethystoglossa*, *C. bicolor*, *C. Bowringiana*, *C. citrina*, *C. dolosa*, *C. Dormaniana*, *C. Walkeriana*, *C. guttata*, *C. intermedia*, *C. Lawrenceana*, *C. Loddigesii*, *C. Harrisoniae*, *C. maxima*, *C. Schilleriana*, *C. superba*, *C. Skinnerii*, and *C. velutina*, which also bloom at various seasons of the year, are worth adding to the collection. In addition to these species, there are several fine natural hybrids, as *C. Hardyana*, *C. Brymeriana*, *C. Measuresii*, and *C. Binotii*, together with many beautiful crosses raised by artificial hybridisation, which are far too numerous to mention here, but a few may be enumerated, as *C. Lord Rothschild*, *C. Chamberlainiana*, *C. Empress Frederick*, *C. atalanta*, *C. Fowlerii*,

C. Mantinii, *C. Kienastiana*, and *C. Parthenia*. Notwithstanding the enormous extent of territory over which Cattleyas are spread, the climatic conditions under which they grow are so similar that, with few exceptions, it is possible to cultivate them in the Cattleya house. Those from low altitudes, such as *C. superba*, *C. Aclandiae*, *C. Eldorado*, and *C. guttata*, require during the growing season the temperature of the East Indian house, but while in an inactive condition they should be kept in the Cattleya house. *C. citrina* should be grown suspended close to the roof in a cool greenhouse with plenty of sunlight. The compost used for Cattleyas should consist of fibrous peat and moss, in the proportion of two-thirds of the former to one-third of the latter well mixed together. Pots or pans proportionate to the size of the plants should be selected; affording good drainage to at least two-thirds of their depth, secured at the top with a layer of rough sphagnum. The plants on being potted should be elevated a trifle above the rim, and those which have long or heavy pseudo-bulbs should be tied to neat sticks, so as to prevent them swaying about, because, if unstable in their pots, the plants would be likely to suffer. The best time to repot Cattleyas is immediately the young roots are seen pushing from the last-made pseudo-bulb. After potting, careful watering is necessary, and the materials should be kept rather on the dry side. Thus, whenever the compost appears dry on the surface, simply moisten it around the edge of the pot, the object being to induce the roots to lengthen out and attach themselves to the sides of the pot; and, when that has occurred, the amount of root moisture may be gradually increased.

Until growth is well advanced and the roots are in full activity, the plants should be kept well shaded from strong sunshine. All Cattleyas love air and light. There is no class of plants more impatient of a close,

stuffy atmosphere, or a dark, gloomy house. After growth is completed, and during the winter months, plants of this genus should be kept cooler and drier, care being taken not to shrivel the pseudo-bulbs through too much drought. In some collections it will be noticed that when many of the Cattleyas have nearly completed their new growths, the thin outer sheath which encircles the pseudo-bulbs is drawn so tightly around them as to cause moisture to accumulate therein; this must be got rid of by slitting the sheath from top to bottom, thus allowing the moisture to evaporate. If this be not done, decay sets in, when nothing but removal of the affected parts will save the life of a plant. After slitting the sheaths, the plants should be kept on the dry side for a few days, and elevated closer to the roof glass, and if possible afforded a drier and warmer atmosphere.

CHYSIS

Chyses are epiphytal, deciduous Orchids, having stout, fleshy pseudo bulbs a foot or more in length, and broad lanceolate leaves. They are frequently met with in their native habitats suspended from the larger branches of trees by their roots alone. *C. aurea* was the first of the species named, it was found growing in the valley Cumancoa, in Venezuela, whence it was imported into this country in 1834. *C. bractescens* is a Mexican variety of great beauty, introduced in 1840. It has since been imported from Cordova, in the province of Vera Cruz, and from Tabasco. *C. laevis* and *C. Limmenghii* are also from Mexico. Three interesting and handsome hybrids, *C. Chelsonii*, *C. Sedenii*, and *C. langleyense*, which were raised by Mr J. Seden in the establishment of Messrs Veitch of Chelsea, are distinct and highly appreciated by amateurs. All the Chyses thrive best in shallow pans that may be suspended from the roof. These

pans are preferable to the ordinary teak wood baskets, being more easily managed, and the roots being less disturbed when repotting has become necessary. Plenty of drainage should be afforded, and the compost should consist of two-thirds sphagnum moss with one of fibry peat. The plants should be grown at the warm end of the Cattleya house close up to the roof glass. They generally commence to grow towards the end of February, and should be afforded but little root moisture. As soon as the flower spikes, which push up along with the new growths, are visible, the quantity of water may be considerably increased. Immediately the flowers fade, the young breaks commence to emit new roots, and this is the best time to afford more rooting space to those that require it. Afford copious supplies of water when re-established, and all through the growing season. Towards the completion of growth, remove the plants to a warm, sunny corner of the East Indian house, which will assist them to swell up the pseudo bulbs. When the new bulbs have attained their full size, and the leaves begin to turn yellow, water should be gradually withheld, and the plants removed to a cooler and drier atmosphere. Managed in this way, Chyses are amongst the most easily grown and free flowering of Orchids.

CIRRHŒA

Plants of this genus, such as *C. viridi*, *C. viridipurpureum*, and *C. triste*, are seldom sought after, being of little value or importance. They are natives of Brazil and Mexico. The flowers are produced in pendulous racemes. The genus is allied to *Gongora*, and requires similar culture.

CIRRHOPETALUM

Like *Bulbophyllum* this is a genus of remarkable Eastern Orchids, about which a great deal could be written. No description, however, can give an adequate idea of the wonderful construction of the flowers and the quaint distinctiveness of many of the species. Owing to limited space my remarks must be confined to a few of the most interesting varieties. The genus *Cirrhopetalum* consists of upwards of fifty known species, of which many are striking and beautiful, and well worth cultivating. The greater part of them are East Indian, growing among the Himalayan and other mountain ranges, and some inhabit the Malay Archipelago, the island of Mauritius, and China. From the last-named country comes the curious *C. Chinense*, which was introduced about the year 1842. The late Dr Lindley appended the following note in his description of this species:—"There is no longer any occasion for speculative minds to occupy themselves with the investigation of the cause that may have led the Chinese to invent strange figures of men and women with their chins perpetually in motion, for here is the explanation of it. We have here a plant from China, one of whose lobes is exactly like a tongue and chin, which are so unstable as to be in a state of continual oscillation. The flowers are arranged in a circle, and all look outwards, so that on whatever side the umbel is regarded it still presents to the eye the same row of grinning faces and wagging chins." *Cirrhopetalum Medusæ* is another curious and interesting species. The scape is erect, and bears upon its apex a large, dense, globose cluster of flowers, which are cream-coloured, freckled with pink, two sepals of each flower being so much lengthened out as to give the spike the appearance of a head with very long dishevelled hair, hence

the mythological name of Medusæ. There are many varieties among the *Cirrhopetalums* which are not only curious, but are really handsome in appearance. Prominent among these is the plume-bearing *C. Rothschildianum*, the prevailing colour of whose flower is bright crimson purple, blotches of clear yellow appearing on the sepals, the triangular grooved hinged labellum being purple, and the whole flower so attractive that it commands attention from everyone. Its nearest affinities are *C. Collettii*, *C. ornatissimum*, and *C. appendiculatum*, with gem-like appendages. The last named is probably the only single flowered *Cirrhopetalum* known. The following species are representatives of the umbellate section :—*C. Mastersianum*, the umbrella-like spread of whose brown satiny petals reminds one of the parasol of a Liliputian belle, *C. O'Brienianum*, *C. picturatum*, *C. Roxburghii*, *C. gracillimum*, and *C. Cumingii*, with flowers arranged like tiny pink parasols. When stood upon the ground, each umbel of this last-named plant looks as if a caterpillar were curled over its surface. It is closely allied to *C. fimbriatum*, though the colour of the flowers (a warm, reddish purple) is far more brilliant and attractive. The upper sepal and the petals of *C. fimbriatum* are fringed round their margins with long glandular hairs. The fleshy lip has two erect longitudinal keels, and is touched by a very slender bristle, the balance being so nicely adjusted that a slight touch sets the whole of the lips in the umbel oscillating in a very curious fashion. A compact plant of *C. nutans*, smothered with umbels of small white flowers, makes a charming object. *C. refractum* is known as the "Windmill" *Cirrhopetalum*. It has a raceme of golden-yellow flowers, which are arranged around the top of the spike so as to be sensitive to the slightest current of air. *Cirrhopetalums* are all dwarf in habit, and thus occupy but little space, especially as they thrive well in teak

wood baskets or shallow pans suspended to the roof, in which position their umbrella trusses of singular flowers are displayed to the best advantage. Their cultural requirements are the same as for *Bulbophyllum*.

COCHLIODA

This genus, allied to, and requiring similar treatment to *Odontoglossum*, was formerly known under the name of *Mesospinidium*. The flowers of *C. Nætzliana* are borne on sub-pendant spikes and are very showy, being of a bright orange scarlet colour. It is a native of Peru. *C. rosea* is from the same country, the flowers being rose-carmine in colour. *C. sanguinea*, from Ecuador, is rose-pink. *C. vulcanica*, also from Ecuador, has rather larger flowers of a dark rose colour.

CÆLIA

This genus includes four or five species inhabiting the West Indies, Mexico, and Guatemala. *Cælia Baueriana* produces very fragrant flowers on short scapes; it should be grown in the East Indian house. *C. bella* has also sweet-scented flowers. It requires the temperature of the *Cattleya* house; whilst *C. macrostachya* thrives best in an intermediate temperature.

CÆLOGYNE

This genus includes between fifty and sixty named species, widely distributed throughout the East, among which are many species of great horticultural value. The genus *Cælogyne* was founded in 1825 on *C. cristata*, which is one of the most useful, and, at the same time, one of the most popular Orchids known. Its racemes are drooping, the flowers being pure white,



MASDEVALLIA IGNEA
(From a drawing by Ethel Roskrug)

except the orange-yellow disk and lamellæ of the lip. The sub-variety *Lemoniana* is also white, but the disk and fringed lamellæ of the lip is citron yellow. Another lovely and distinct sub-variety is *hololeuca* (*alba*), the flowers being pure white, with no trace of yellow. The compost used for *Cœlogynes* is the usual mixture of fibrous peat and chopped sphagnum moss in equal proportions. *C. cristata* prefers a little rough fibrous loam mixed with it. Those species with long pendulous flower spikes, as *C. Dayana*, *C. flaccida*, *C. Massangeana*, and *C. tomentosa*, are best planted in teak baskets or shallow pans that can be suspended near to the roof glass of the house in which they are cultivated. The repotting or rebasketing of the plants should be performed when they begin to emit new roots; water should be freely given when the plants are growing; but on the completion of growth, and while they are at rest, the plants should be kept moderately dry. Such species as *C. asperata*, *C. Cumingii*, *C. Dayana*, *C. Meyeriana*, *C. Fæstermannii*, *C. Massangeana*, *C. tomentosa*, *C. peltastes*, and *C. pandurata*, which come from hot, damp lowlands in the equatorial zone, should be grown in a shady corner of the hottest house. Such species as *C. cristata*, *C. barbata*, *C. corymbosa*, *C. corrugata*, *C. elata*, *C. flaccida*, *C. graminifolia*, *C. Mossiæ*, *C. Rossiana*, *C. Sanderiana*, and *C. speciosa*, require a lower average temperature, such as is maintained in the *Cattleya* house. *C. ocellata*, *C. ochracea*, *C. fimbriata*, *C. fuliginosa*, and *C. Schilleriana* prefer the cool house in summer and the intermediate house during winter.

COMPARETTIA

This is a small genus, including only about four species, natives of tropical America. The varieties are *C. coccinea*, with bright scarlet lips; *C. falcata*, purplish red,

almost amounting to crimson; *C. macrolepton*, magenta rose; and *C. speciosa*, bright orange scarlet. *Comparettias* are pretty dwarf epiphytes, their chief character being that the lateral sepals end in a long spur, which contains two other spurs formed by the lip. *C. falcata*, the type of the species, was discovered about the year 1835, and is nearly always found growing on oaks and oranges in its native habitat. *Comparettias* require similar culture to that given to *Burlingtonias*, which grow under much the same conditions in their native country.

COLAX

C. jugosus is a very distinct Orchid, and the only *Colax* with which I am acquainted, although I am told that there is one named *C. viridi*. The flowers of *C. jugosus* are about three inches across transversely, the sepals being of a French white, the petals densely spotted and barred with violet purple, and the front lobe streaked and blotched with dark violet purple. It is nearly allied to *Zygopetalum*, with which it has been crossed, and several interesting bigeneric hybrids raised from them, as *Zygotolax Amesiana*, *Z. C. leopardinus*, and *Z. C. Veitchii*. *Colax jugosus* and the hybrids mentioned should be cultivated in pots well drained; they will root freely in a mixture of peat and moss, with a little leaf soil and coarse silver sand mixed with it. The cool house is the proper place for them the whole year round, and, if they can be placed on a dry shelf in the house, some protection will be afforded from damp "spot" to which they are subjected. These plants require plenty of water at the root whilst growing; but, when growth is finished, they should be kept dry. They should always be shaded from strong sunshine.

CORYANTHES

The genus *Coryanthes* is widely diffused in tropical America, and is dispersed over the vast territory that stretches from South Catherina in Brazil to Mexico. The genus was founded on *C. maculata*, to which may be added such wonderful species as *C. macrantha*, *C. Mastersiana*, *C. macrocorys*, *C. leucocorys*, *C. speciosa*, and *C. Wolfii*. Their flowers are among the most extraordinary in form of all Orchids, there being nothing in the whole vegetable kingdom with which they can be aptly compared. It is evident that the flowers of *Coryanthes* are incapable of self-fertilisation; in fact, the whole structure and perfume of the flowers is arranged so as to attract the visits of numerous beautiful metallic-green bees (*Euglossa aurata*). These humble bees, in a very peculiar manner, force their way in and out of the flowers, and so effect their fertilisation. Some interesting details of the structure of *Coryanthes* flowers, and the various contrivances by which their fertilisation is effected, are given in the *Orchid Review*, p. 338 (1894), and in the *Gardeners' Chronicle*, vol. xxi. (1884), p. 482; vol. xxiii. (1885), p. 144; and vol. xxiv. (1885), p. 103. *Coryanthes* have their home in the hot, damp river valleys, or near the low-lying sea-shore. It is, therefore, essential that they be given the highest temperature available in our Orchid houses. They should be placed in shallow baskets, with a very small quantity of good fibrous peat, on the surface of which a few heads of living moss may be pricked in. A moderate supply of water should be afforded at all times.

CYCNOCHES

This genus almost rivals *Coryanthes* in interest, although the flowers are not so large, nor perhaps so

curiously constructed. As in *Catasetum*, they have unisexual flowers, differing in structure from each other. The column in both sexes is curved like a swan's neck, hence the name *Cycnoches*. The following varieties are all worth adding to the collection: *C. aureum*, *C. chlorochilon*, *C. Egertonianum*, *C. Loddigesii*, *C. maculatum*, *C. peruviana*, *C. pentadactylon*, and *C. versicolor*. Their culture is similar to that of *Catasetums*.

CYMBIDIUM

There are probably fifty species of this genus known to science, by far the greater number of which are dispersed over the Indo-Malayan region and tropical Australia. Such varieties as *C. aloifolium*, *C. canaliculatum*, *C. Finlaysonianum*, *C. lancifolium*, *C. madidum*, *C. pendulum*, and *C. sinense* require the temperature of the East Indian house. Others, as *C. affine*, *C. cyperifolium*, *C. chloranthum*, *C. Devonianum*, *C. elegans*, *C. eburneum*, *C. ensifolium*, *C. giganteum*, *C. grandiflorum*, *C. Hookerianum*, *C. longifolium*, *C. Lowianum*, *C. Masterii*, *C. tigrinum*, and *C. Tracyanum* thrive best in a cool shady intermediate temperature. *C. eburneum* is without doubt a first-rate spring flowering Orchid, and is a very popular plant, as also is the robust *C. Lowii*, whose long arching spikes remain in full beauty for several months, and are exceedingly useful for indoor decoration. *C. Tracyanum* is also a very handsome variety, and is gradually becoming plentiful. Two beautiful hybrid *Cymbidiums*, *C. eburneo-Lowianum* and *C. Winnianum* rank high in this section for elegance and distinctness. These hybrids, with the last three species enumerated, are always attractive, and are among the most generally cultivated of the genus. The roots of *Cymbidiums* are thick and fleshy, and should have ample pot room, a compost of fibrous loam, rough peat and sand well drained will

suit them admirably. Abundance of water is necessary during the growing season, keeping them fairly moist during winter. *C. Devonianum* sometimes produces its flower spikes in a downward direction, for which reason shallow baskets are more suitable than pots.

CYPRIPEDIUM

The genus *Cypripedium* was founded by Linnæus on *C. calceolus*, a hardy species, which has become virtually extinct as a wild plant in this country, though it is comparatively plentiful in some localities in Central Europe and Northern Asia. The many different species belonging to this genus are favourite garden plants, the majority being easy to cultivate, and are readily propagated by dividing strong established masses. They are widely distributed in both hemispheres, being found in North and South America, China, Japan, India, Borneo, Java, New Guinea, and the Philippines. As mentioned in the early part of this book, the circumscription of the genus has been somewhat modified by botanists during the past few years, and it has been separated into different sections, but, with the exception of the ovary and a slight difference in the character of the pollen, the floral structure of the South American and the Eastern *Cypripedium* is the same. The foliage of such South American species (now known as *Selenipedium*) as *C. caudatum*, *C. Lindleyanum*, *C. Schlimii*, *C. Sargentianum*, *C. longifolium*, *C. Boissierianum*, and *C. caricinum* (*Pearcei*) is never mottled, but some of the Eastern species, as *C. Lawrenceanum*, *C. Argus*, *C. Hookeræ*, *C. Dayanum*, *C. javanicum*, and *C. superbiens*, have extremely ornamental foliage, and are well worth growing as foliage plants. With but few exceptions, *Cypripediums* do well potted in a compost of rough fibry peat and clean picked sphagnum moss in about equal parts, some broken pieces

of brick or crocks being added to keep the soil free and porous. It is important that the drainage be quite free. It should be afforded by the use of clean broken crocks with which the pots should be filled to one-half or even to two-thirds of their depth, according to the size and strength of the plants. As the roots of *Cypripediums* grow vigorously, ample provision should be made for their development. When repotting, it is not necessary to raise the plants above the rim of the pot, and the compost should therefore be kept just below it so as to render watering easy. After the plants are repotted, their immediate surroundings should be kept constantly moist, and one thorough watering given them. Then, for a few weeks, water should be given very sparingly, just sufficient being afforded as will entice the sphagnum to grow. When well rooted in the new compost, they may be almost deluged with water the whole year round, and they must at all times be carefully protected from strong sunshine, this advice being especially applicable to those species with variegated foliage. Such dwarf growing species as *C. niveum*, *C. bellatulum*, *C. concolor*, *C. Godefroyæ*, and its variety *leucichilum*, are general favourites, especially when in flower, their well-formed flowers being suitable for button-holes or bouquets. Many cultivators find these species more difficult than most *Cypripediums* to grow well. I feel sure that no grower will go so far wrong if he acts as follows: the pan or pot used must be well drained, and the drainage secured by a layer of turf, placing the grassy side downwards. The compost should consist of two-thirds yellow loam, one-sixth pieces of chalk or limestone, and one-sixth coarse leaf soil. About four inches depth of this compost pressed firm by the hand, but not rammed in, will be suitable for the plants to root into. Abundance of water must be given the whole year round. Choose a position in the hottest house, where

the foliage will be within a foot of the roof, and where they may be but slightly shaded at any time. Other species which require an East Indian temperature are *C. Argus*, *C. barbatum*, *C. Boissierianum*, *C. caricinum*, *C. callosum*, with its distinct and valuable variety, *Sanderæ*, *C. ciliolare*, *C. Curtisii*, *C. Chamberlainianum*, *C. Dayanum*, *C. glanduliferum*, *C. Hookeræ*, *C. javanicum*, *C. longifolium*, *C. Lawrenceanum*, *C. Lowii*, *C. Parishii*, *C. philippinense*, *C. Rothschildianum*, *C. Sanderianum*, *C. Stonei*, and *C. tonsum*. Others that thrive best in the intermediate house are *C. Boxalii*, *C. caudatum*, which has ribbon-like appendages often attaining 30 inches in length, *C. Druryii*, *C. Fairieanum*, *C. hirsutissimum*, *C. insigne*, and its numerous distinct varieties, *C. Lindleyanum*, *C. Mastersianum*, *C. purpuratum*, *C. Schlmii*, *C. Charlesworthii*, *C. Spicerianum*, *C. superbiens*, *C. venustum*, and *C. villosum*. The proper time to repot *Cypripediums* is about a fortnight after they pass out of flower, as at that period young growths begin to push up and the plants commence to make fresh roots. Where a representative collection of *Cypripediums* is formed, if the plants are grown clean and strong, scarcely a month of the whole year will elapse but some will be in bloom, the flowers of many species remaining fresh for many weeks. In addition to the species already named, there are many very fine garden hybrids, the result of much labour, skill, and patience. Lack of space forbids their enumeration here, but it may be said that the majority of them are well worth adding to the collection, as among them there are some that are even more free in growth and blooming than many of the original parent species.

CYRTOPODIUM

These are handsome Orchids, with tall pseudo-bulbs. The inflorescence is a tall, branching panicle, produced

from the base of the bulbs. There are only a few species belonging to this genus: *C. Andersonii*, *C. punctatum*, *C. Saintlegerianum*, *C. virescens*, and *C. Woodfordii*. These are found in the West Indies and tropical America. The plants should be potted similarly to the Cymbidiums, but require to be grown in the hottest house, with plenty of light, and liberal supplies of water when growing. After growth is completed they should be gradually dried off, and be kept in a cooler and drier atmosphere.

DENDROBIUM

This is a large, popular, and varied genus of the epiphytal plants, unquestionably one of the most beautiful and the richest in species in the group of Orchids to which it belongs. The genus includes several hundred species and varieties, amongst which there is a surprising diversity of habit, size of plant, colour of flower, some having the most unattractive tints, while others possess flowers adorned with the richest hues known. Dendrobies are distributed over an immense area, from Japan, parts of China, through India, Burmah, and the Malayan Archipelago, to the Philippines and Australia. With so wide a distribution, at considerable and different altitudes, it is but natural that many of the species should differ widely from each other, and for convenience here I divide them into three sections — evergreen, sub-evergreen and deciduous, and nigro-hirsute. The first includes such well-known species as *D. chrysotoxum*, *D. densiflorum*, *D. Farmeri*, *D. Griffithianum*, *D. Harveyanum*, *D. suavisimum*, *D. sulcatum*, and *D. thrysiflorum*. All of them grow well in pots, and prefer a rather shady position in the East Indian house. When growth is once started it is very rapid, and the plants require liberal treatment in every particular. During the resting period, very little water is required to keep the pseudo

bulbs plump, and the leaves fresh and green. Among the sub-evergreen and deciduous section, the following—*D. nobile*, *D. clavatum*, *D. calceolus*, *D. Brymerianum*, *D. Dalhousieanum*, *D. Dearei*, and *D. fimbriatum*—also grow well in the ordinary flower-pot. The first-named is probably the most popular and useful, and at the same time the most variable, of all the Dendrobies, hardly two plants bearing flowers exactly alike. Shallow pans with perforations around their sides, through which the air can circulate, and so help to keep the roots healthy, are to be preferred for such dwarf-growing varieties as *D. atro-violaceum*, *D. albo-sanguineum*, *D. Bensoniae*, *D. capillipes*, *D. Findleyanum*, *D. Johnsoniae*, and *D. Parishii*. These pans are also suitable for varieties with pendulous stems, as *D. chrysanthum*, *D. crassinode*, *D. crepidatum*, *D. cretaceum*, *D. Devonianum*, *D. lituiflorum*, *D. Pierardii*, *D. primulinum*, *D. superbum*, and *D. Wardianum*. Like *D. nobile*, the beautiful *D. phalenopsis Schroderianum* is always highly appreciated, and, as in that species, the flowers are very variable, the colour ranging from deep purple to pure white. As suitable companions to this species, the following may be named: *D. bigibbum*, *D. Goldei*, *D. Statterianum*, and *D. superbiens*. These may also be grown in shallow pans, and suspended close up to the roof glass. Such distinct species as *D. aggregatum* and *D. Jenkinsii* flower profusely when affixed to blocks of dried apple wood from which the bark has been removed, suspended in a light, sunny position. Dendrobiums root very freely in an ordinary mixture of peat and moss; for young seedlings, dwarf and thin-stemmed varieties, I prefer sphagnum moss only. The best time to repot Dendrobiums is when the new growths are starting, which usually occurs soon after flowering. Of course there are exceptions; for instance, *D. phalenopsis* does not recommence to grow for several months after flowering. As regards watering, a great

deal must be left to the judgment of the cultivator. When the new growths commence to root, water should at first be given in small quantities; and, when the roots have obtained a firm hold of the compost, they must be liberally supplied with water till they have completed their growths, after which time the supply should be gradually diminished in quantity. When the plants are at rest, only a very small amount is needed to preserve the plumpness of the newly-formed pseudo bulbs. Plenty of heat and moisture is essential when growing, reasonable exposure to light and air being given to mature the growths. During winter, a cooler and drier atmosphere is necessary. With the exception of *D. Brymerianum*, *D. Dearei*, and *D. Falconeri giganteum*, which require a Cattleya house temperature, all of the Dendrobiums mentioned should be grown in the East Indian house. Such of the nigro-hirsute section as *D. formosum*, *D. Lowii*, and *D. Jerdonianum*, prefer the hottest division; others, as *D. longicornu*, *D. Wattianum*, *D. infundibulon*, and its variety *Jamesianum*, do best in a cool, intermediate temperature. A few Australian Dendrobes, as *D. Kingianum*, *D. speciosum*, *D. lingueforme*, and *D. teretifolium*, thrive well in the cool house. The following distinct and little known species are very curious and interesting, and well worth adding to the collection: *D. amplum*, *D. cœlogyne*, *D. cymbidioides*, and *D. Treacherianum*, all of which do well if suspended in a shady position in the Cattleya house. Besides the species of Dendrobiums named, a considerable number of beautiful garden hybrids have been introduced into cultivation, which have a special interest to horticulturists generally.

EPIDENDRUM

This genus has a wide geographical distribution, scattered over nearly the whole of South America,



ODONTOGLOSSUM CRISPUM
(From a drawing by *Ethe. Roskrugé*)

Central America, the West India Islands, and the United States. There are considerably over four hundred known species spread over this great region, but only a very few are considered to be of any horticultural merit, the majority consisting chiefly of species with inconspicuous flowers, though some of them are delightfully fragrant. Among the best, the following may be mentioned: *E. atro-purpureum*, *E. (Diacrum) bicornutum*, *E. Ellisii*, *E. Endresii*, *E. fragrans*, *E. Frederici Guilielmi*, *E. prismatocarpum*, *E. radicans*, *E. sceptrum*, *E. Stamfordianum*, *E. vitellinum*, *E. xanthinum*, and *E. Wallisii*. *E. bicornutum* requires the warm, moist atmosphere of the plant stove. *E. vitellinum* prefers the cool house at all times. The species generally require cultural treatment similar to that of Cattleyas. Those kinds with flexuose stems, such as *E. radicans*, do well trained around strong, neat sticks, or planted out against pillars, the bright orange scarlet flowers being always useful and attractive to visitors. Several Epidendrum hybrids are very pretty. Such are *E. Dellense*, *E. Endresio-Wallisii*, *E. elegantulum*, and *E. O'Brienianum*. Epidendrums crossed with *Lælias* have produced several pretty and interesting hybrids. *Epidendrum radicans* crossed with *Sophronites grandiflora* brought us the lovely deep crimson *Epiphronites Veitchii*. These hybrids require the same cultural conditions as do the majority of the species.

ERIA

A large genus found chiefly in India and Malaysia. The greater number are small flowered, but several varieties are really worth cultivation, well-bloomed plants of the following species being very pretty and interesting objects:—*E. acervata*, *E. aridostachya*, *E. bracteescens*, *E. densiflora*, *E. excavata*, *E. floribunda*, *E. flava*,

and *E. stellata*. All of them flower very freely, and their cultivation presents no difficulties. The ordinary Orchid compost will suit them, and they may be grown either in pots or shallow pans. The Cattleya house, or that part of the warmer division which is freely ventilated, will suit them.

ERIOPSIS

Epiphytal Orchids, natives of Peru and Columbia. The genus includes only a few species, and the following are the best known:—*E. biloba*, *E. Helenia*, and *E. rutidobulbon*. The colour of their flowers is peculiar, and together with their habit easily distinguishes them from almost every other Orchid in cultivation. The plants should be potted entirely in peat, and grown in the intermediate house the whole year round. To be successful in flowering plants of this genus, it is advisable to keep them fairly dry during the resting period.

EULOPHIA

This genus includes more than fifty species dispersed over tropical Asia and the Indo-Malayan region. They are not generally sought after by amateurs, being chiefly of interest to the botanist only. There is, however, one variety—*E. guineensis*—well deserving of attention. The rich flowers of this beautiful species appear during summer, and last a long time in perfection. The plant should be treated in the same way as the *Calanthes*, except that when growing it does not require so light a position.

EULOPHIELLA

At present this genus contains only two species—*E. Elizabetha* and *E. Peetersiana*. Both are from Madagascar, and are very handsome Orchids. They should

be grown in a damp shady position in the *Cattleya* house in summer, and during winter in a similar position in the warmest house. Place them in well-drained pans, in a mixture of two parts peat, one part fibrous loam, one part moss, and a moderate quantity of finely-broken crocks. They should never be allowed to become really dry even in winter.

GALEANDRA

The members of the *Galeandra* genus occur in tropical America, from Mexico southwards, and consequently they should be grown in the warm house, always choosing a position close up to the glass, providing that the foliage may be well protected from strong sunshine. They should be potted in the same material as that recommended for the *Calanthes*. The best-known species are *G. Batemannii*, *G. Baueri*, *G. Devoniana*, *G. Lagoensis*, and *G. nivalis*.

GOMEZA

A small genus of five or six species, including *G. Barkerii*, *G. foliosa*, *G. planifolia*, and *G. recurva*, natives of Southern Brazil, and producing in winter and early spring drooping racemes of pale yellow or greenish flowers that are appreciated for their pleasant fragrance. Culture similar to that given to cool house *Oncidium*s.

GONGORA

These are worth attention if only for the fantastic structure of their flowers. They are easily grown, free flowering, in habit resembling that of a small *Stanhopea*, and requiring similar culture to that genus. The varieties *G. Armeniaca*, *G. atropurpurea*, *G. bufonia*, *G. maculata*, *G. portentosa*, and *G. Sanderiana* are from tropical America,

GRAMMATOPHYLLUM

The typical species, *G. speciosa*, is a giant among Orchids, the thick growths being from six to seven feet long. The racemes are over seven feet in length and carry over seventy flowers, each bloom being about five inches in diameter. A large specimen in the Botanic Garden, Penang, under the care of Mr Curtis, measures over forty-two feet in circumference. Its flowering under artificial cultivation has been a rare occurrence, and the recorded instances are few. It first flowered in a perfect condition at Nonsuch Park, Surrey, in 1859. Many years after it flowered well at Leigh Park, and again at Burford in 1897. There are at the time of writing two fine spikes on the enormous specimen in the Royal Gardens, Kew. The plant requires the highest temperature available in our houses, and should be grown in sandy peat and leaf soil, water being freely given when in full growth. The primary roots of this plant are stout and fleshy, and from these arise a dense plexus of small prickly roots that spread over the surface of the compost. At the end of the growing season, these secondary roots die off, when the plant should be kept rather drier at the root. *G. multiflorum*, *G. Fenzlianum*, and its superior variety, *Measuresiana*, should be grown in teak-wood baskets and suspended close to the roof of the warm house, where they will be enabled to make sound, enduring growth. *G. Ellisii*, now known as a Grammangis, is a beautiful and distinct species, which unfortunately does not readily conform to our artificial treatment. It thrives best in the Cattleya house during summer and in the East India house in winter, a high-and-dry position near to the roof glass being selected. Its flower spikes come up from the base of the young growths, and before these spikes appear very careful watering is necessary, as the new growths are extremely

liable to damp off. When the spikes are up, every assistance is needed by the plant to develop its flowers and growths, and to this end liberal root watering should be afforded. This species is from Madagascar, whilst the others are distributed over the Malay peninsula and archipelago.

HABENARIA

There is an immense number of species belonging to this genus, the majority being of botanical interest only. It is a widely-distributed genus of terrestrial, tuberous-rooted, deciduous Orchids. There are at least five distinct varieties which are worth adding to any collection. The brilliant scarlet *H. militaris*, *H. rhodochela*, which is bright vermilion; *H. carnea*, which has large flowers of a delicate flesh-pink colour; *H. carnea nivosa*, having flowers equalling the last in size and of pure white; and the fine *H. Susanna*, with large snow-white flowers, often over three inches in diameter, and lips that are beautifully fringed. The proper time for repotting these species is when the plants begin to grow, generally in spring. The tubers then should be turned out of their old soil and be repotted singly in small pots, a crock being placed over the hole at the bottom with the base of the tuber resting upon it, and the top of the same just below the rim. Fill up around the tuber to about half its length with clean crocks, and over these place a thin layer of moss. Then fill up with the following compost, just covering the top of the tuber:—One-half good fibrous peat and loam and one-half finely-chopped sphagnum, some finely-broken crocks, and a sprinkling of coarse silver sand, the whole being well mixed together. Pot moderately firm. The plants should be grown on the shady side of the warmest house, and it is important to have them as near to the

glass as is possible; for, if far away from the glass, the stems become drawn and the flower spikes weak. Water the plants all through the growing season as advised for *Calanthes*. While at rest, an occasional sprinkle on the surface of the soil will assist to keep the tubers plump.

HOULLETIA

A genus allied to *Stanhopea*, and requiring similar culture, except that its members may be grown in a trifle lower temperature. *Houlletias* are natives of Northern Columbia and Southern Brazil. The genus is represented by such well-known species as *H. Brocklehurstiana*, *H. chrysantha*, and *H. odoratissima*.

IONOPSIS

A genus of dwarf-tufted epiphytes, widely dispersed over tropical America. The best known are *I. paniculata* and *I. utricularioides*. The plants should be placed in small perforated pans, using a compost of peat and moss, hung near the glass in the intermediate house, and be freely supplied with water.

IPSEA

I. speciosa is a terrestrial, deciduous Orchid, with tuberous rhizomes. It grows on the mountains in Ceylon, amongst long grass on exposed slopes, at an elevation of about 4000 to 5000 feet. The erect flower scapes are about eighteen inches high, bearing several large bright yellow fragrant blossoms. The cultural treatment of *Ipsea speciosa* is the same as that of the *Pleiones*, but it requires a much higher temperature.

LÆLIA

The characteristic which distinguishes *Lælias* from *Cattleyas* is the number of the pollinia, the former having eight and *Cattleya* only four. So closely are they related that the two genera readily inter-cross, the result being known as *Lælio-Cattleya*. The genus is variable, and has a fairly wide distribution in Brazil and Mexico. Such species as *L. Amanda*, *L. Cowanii*, *L. crispa*, *L. Digbyana*, *L. elegans*, *L. flava*, *L. glauca*, *L. grandis*, *L. harpophylla*, *L. lobata*, *L. Perrinii*, *L. purpurata*, *L. superbiens*, and *L. tenebrosa* require the same cultural treatment as that of the *Cattleyas*. Others, as *L. albida*, *L. anceps*, including its numerous distinct varieties, *L. Autumnalis*, *L. furfuracea*, *L. Gouldiana*, and *L. majalis*, should be placed in well-drained pans that can be suspended close to the roof glass, as it is important that they may receive as much light as possible. Only a thin layer of peat and moss is needed for them to root in. If these plants could have a house devoted entirely to them it would be a decided advantage, as they delight in extremes of temperature. During the growing season, the plants should receive plenty of sunshine, with abundance of air, plenty of water both overhead and at the root, and a temperature hot by day and cool by night. When the season's growth is completed, the supply of water should be gradually diminished, and when quite at rest a cool dry greenhouse is the best place for them. *L. Jongheana*, *L. longipes*, *L. pumila* and its varieties, *Dayana*, *præstans*, etc., should be grown in the intermediate house during winter, and the cool house in summer. *L. monophylla*, from Jamaica, where it grows at 4000 feet about sea level, requires the intermediate house temperature. *L. rubescens* (or *peduncularis*) grows and blooms profusely when suspended in a basket to the roof of the warmest

house. All the *Lælia* and *Lælio-Cattleya* hybrids should be grown in the *Cattleya* house.

LISSOCHILUS

This is a purely African genus, including about forty species, some of which are very stately and handsome when in bloom. *L. giganteus* is an Orchid of gigantic stature. It flowered at Burford in 1888, and produced a spike over eight feet high. It bears such a head of rose-tinted blossoms that few flowers can equal it for beauty and delicacy of form. It requires the highest temperature available. *L. Krebsii* is a sub-tropical species, for which an intermediate temperature is suitable. *Lissochili* should be treated generally as recommended for *Calanthes*.

LUEDEMANIA

A handsome-flowered small genus, comprising the following species:—*L. Lehmannii*, *L. Pescatorei*, and *L. triloba*. They are all well worthy of cultivation, and require similar culture to that of *Acinetas*, which they resemble in habit.

LUISIA

A genus of epiphytal Orchids with terete foliage, and producing their curious flowers usually in clusters from the sides of the stems. The following are the most attractive:—*L. Amesiana*, *L. Psyche*, *L. teretifolia*, and *L. volucris*. Culture similar to *Aerides*, but a trifle cooler.

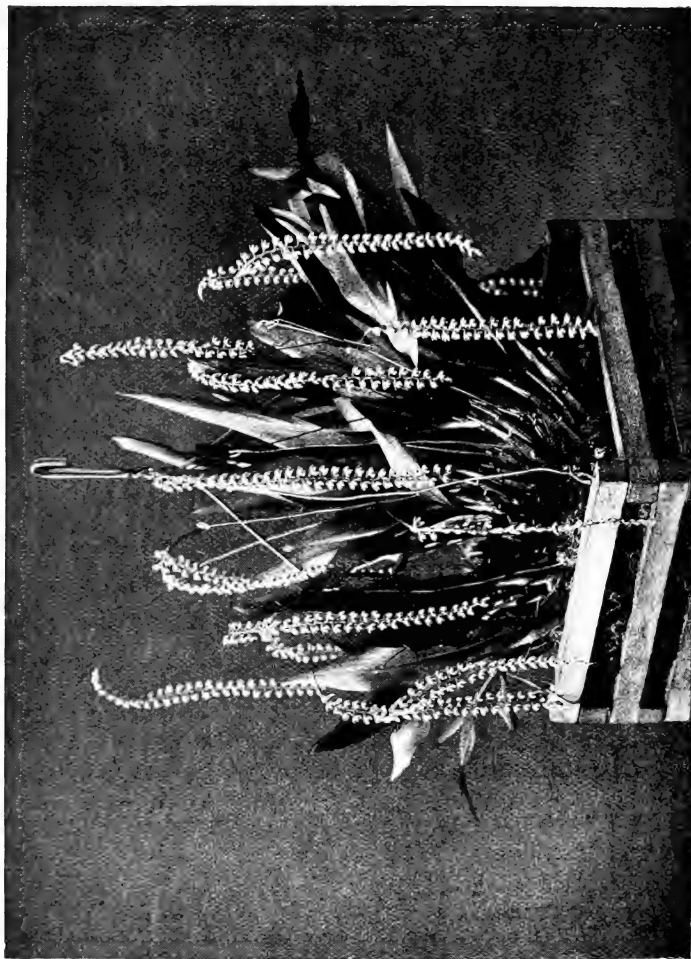
LYCASTE

The geographical distribution of the *Lycastes* is nearly contiguous with that of the *Odontoglossums*, but

their vertical range is generally lower; therefore, being obtained from fairly high altitudes, the intermediate and cool houses suit them best. The plants are characterised by stout ovoid pseudo-bulbs, and bear at their apex one to three leaves, that are sub-evergreen, and rarely persist for more than twelve months. In some of the species—*L. aromatica*, *L. Deppei*, *etc.*—after the leaves have fallen, two sharp, thorn-like processes are left on the cicatrix at the top of the pseudo bulbs. The flowers are carried singly on erect spikes, the number of spikes from one pseudo bulb varying considerably in the different species; instances have been recorded of over twenty flowers having been produced from one pseudo bulb. The genus *Lycaste* includes about twenty-five species, very few of them having found favour with cultivators of Orchids generally. The best of those that attract attention are *L. aromatica*, *L. candida*, *L. cruenta*, *L. Deppei*, *L. gigantea*, *L. lanipes*, *L. lasioglossa*, *L. Mooreana*, *L. macrobulbon Youngii*, *L. Schilleriana*, *L. plana*, and *L. Skinneri*, with its numerous distinct varieties. Several very pretty hybrid *Lycastes* have been raised and are eagerly sought after. The plants should be potted when growth recommences, using a compost consisting chiefly of sandy peat and a little fibrous loam, the pots being about half-filled with drainage materials. When potting, keep the base of the bulbs just below the rim of the pot, and press the compost firmly around them. Water should be very carefully applied for a few weeks after root disturbance, and when in full growth it may be afforded liberally. While at rest the bulbs should not be allowed to shrivel for want of water. During bright days in summer, the plants should be well shaded.

MASDEVALLIA

The typical species is *M. uniflora*, which was discovered between the period of 1777 and 1788, and up to 1832 only two other species were recorded. Since that time, probably 140 species have been introduced into European gardens. Masdevallias are Alpine plants, which have their home on the mountains of tropical America, principally Columbia, where they grow at considerable altitudes, ranging from 6000 to 12,000 feet. In this genus there is a great number of species, interesting either on account of the brilliant colouring of their flowers or of peculiarities in structure. Those species which are characterised by their great brilliance and depth of colour are *M. Veitchiana*, *M. Lindenii*, *M. ignea*, *M. amabilis*, *M. Barlowiana*, *M. cucullata*, *M. coccinea*, and the many beautiful and distinct varieties of the Harryana type. All are of robust growth and very floriferous. Other distinct species well deserving of culture are the yellow-flowered *M. Davisii* and the pure white *M. towarensis*. Such species as *M. ephippium*, *M. elephanticeps*, *M. gargantua*, *M. peristeria*, *M. Trochilus*, and *M. coriacea*, etc., are grown principally for the quaintness of their flowers. *M. macrura* is the giant of them all, having leaves more like those of a *Cattleya* than of a *Masdevallia*. Contrasting greatly in growth with the last-named species, are such charming *Masdevallias* as *M. Arminii*, *M. caudata*, *M. Shuttleworthii*, *M. Estradae*, *M. ionocharis*, *M. Wagonerii*, *M. picturata*, *M. hieroglyphica*, *M. melanopus*, *M. floribunda*, *M. triadactylites*, *M. triangularis*, *M. Lauchiana*, *M. ludibunda*, and *M. xanthina*. Nice tufts of either of these dwarf-growing plants form lovely objects when well flowered. *M. rosea* is a most floriferous species, and a large plant in full bloom is very showy. Owing to their compact habit of growth, these and similar species



PLATYCLINIS COBBIANUM
(From a photograph by J. A. Seaman)



should be placed altogether upon an elevated stage, and as near to the light as possible. When suspended under the roof they are often injured by drought and lack of sufficient atmospheric moisture, which is one of their most essential requirements.

Another diminutive plant is the wonderful *Masdevallia muscosa*, and no plant in the whole collection excites more curiosity and interest when it is in flower, the extraordinary sensitiveness of its labellum being its principal attraction. Upon the slightest touch, at first slowly, then suddenly, it closes itself upwards, to the column where it remains fixed for about half an hour, and then descends to its former position. This arrangement is evidently connected with the fertilisation of the flower. As an example of vegetable mechanism, nothing could be more striking than this.

The grotesque and striking *Masdevallias* of the *Chimæra* group, which includes *M. bella*, *M. Carderii*, *M. Chestertonii*, *M. Lowii*, *M. Backhouseiana*, *M. Gaskelliana*, *M. Houtteana*, *M. nycterina*, *M. erythrochate*, and *M. Wallisii*, should be grown in shallow teak wood baskets. As their flower stalks often grow in a downward direction, like those of a *Stanhopea*, no crocks are required for drainage, and only peat and sphagnum moss kept constantly moist are required for them to root in. These *Masdevallias* are very liable to the attack of red spider which must be kept under by frequently syringing and washing the under sides of the leaves. *Masdevallias* have received considerable attention during the past few years from hybridists, who have succeeded in producing several attractive and interesting hybrids. The best months for repotting *Masdevallias* are about the end of August or February. Previous to repotting, it is advisable that water be withheld from the plants for a few days, for the drier the roots are, the less liable are they to get injured. *Masdevallias* are vigorous

rooting plants and require a good amount of space. The pots should be two-thirds filled with drainage. Peat and sphagnum moss in equal proportions, with a handful of crocks added, is a suitable compost for the roots to ramble amidst. In potting, keep the base of the plant on a level with the rim of the pot, carefully working the compost between the roots, and potting moderately firmly. Afford but little water until the roots have a firm hold of the compost, or both they and the leaves will quickly decay. *Masdevallias* succeed best in a comparatively cool temperature, doing well with the *Odontoglossums* during the summer months, but, if through the winter they can be accommodated with a few degrees more warmth, it will be to their advantage. Shade from all sunshine, keep the atmosphere fairly moist, and never let the plants get the least dry at the root when they are well established. The *M. Chimera* section, *M. towarensis*, *M. Trochilus*, and *M. ephippium* do best in the intermediate house during winter.

MAXILLARIA

The genus *Maxillaria* is an extensive one, including over a hundred species, which are distributed from Brazil to the West Indies, being most numerous probably on the Cordilleras of the Andes where they ascend to 5000 feet or more. The generic name took its rise from the fanciful resemblance of the column and lip to the jaws of an insect. The species vary greatly, and two sectional divisions have been based on the habit of the plants. Such species as *M. tenuifolia*, *M. meleagris*, *M. variabilis*, *M. Houtteana*, and *M. sanguinea* produce scandent or ascending rhizomes. Others, as *M. Amesiana*, *M. elegantula*, *M. fractiflexa*, *M. fucata*, *M. grandiflora*, *M. Sanderiana*, *M. scurrilis*, *M. Hubschii*, *M. luteo-alba*, *M. picta*, *M. striata*, and

M. venusta, have short rhizomes, and clustering pseudo bulbs. Maxillarias are easy to cultivate; the plants should be potted when new roots begin to appear in a compost of three parts sphagnum moss to one of peat. The section with scandent rhizomes are better tied up to teak rods, or on pieces of tree fern. *M. Sanderiana*, which is unquestionably the finest of the genus, *M. Amesiana* and *M. præstans* should be placed in teak wood baskets, as their flower spikes are frequently pendulous, and come through the sides and bottom of the basket. A cool part of the intermediate house is the best place for them; the atmosphere surrounding them should always be moist, and the plants should never be allowed to become really dry. Maxillarias are shade-loving plants, and therefore should at all seasons be carefully protected from the sun's rays.

MEGACLINIUM

Megaclinium is closely allied to Bulbophyllum and Cirrhopetalum, but all the species at present known are confined to Africa. They require similar culture to that given to Bulbophyllums. They are very curious and interesting, and are distinguished chiefly by the flowers being borne on each side of a flattened rhachis. The chief species are *M. bufo*, *M. Clarkei*, *M. falcatum*, *M. minutum*, *M. purpuratum*, *M. scaberulum*, and *M. triste*. The last-named species is a strong grower, and produces an erect spike, the rhachis at its apex having the appearance of a snake in the act of striking, on each side being small blackish flowers, in alternate pairs, like the eyes of some reptile. Of the extraordinary *M. bufo*, the late Dr Lindley made the following remarks: "Let us imagine a green snake to be pressed flat like a dried flower, and then to have a row of toads; or some such speckled reptile, drawn up along the middle in single file, their

backs set up, their four legs sprawling right and left, and their mouths wide open, with a large purple tongue wagging about convulsively, and a pretty considerable approach will be gained to an idea of this strange plant, which if Pythagoras had but known of it, would have rendered all arguments about the transmigration of souls superfluous."

MICROSTYLIS

Usually terrestrial Orchids, widely distributed in the East. The genus is remarkable for the curiously constructed flowers, and the charmingly coloured foliage. The plants are deciduous and require a decided rest such as is given to the deciduous *Calanthes*. They require potting in a compost of peat and sphagnum moss, and when growing a liberal supply of water should be afforded them, thorough drainage being essential. The East Indian house is the proper place for them.

MILTONIA

The geographical distribution of *Miltonias* is peculiar. They occur in two regions of South America, separated from each other by an interval of upwards of 3000 miles. One group composed of such species as *M. Binotii*, *M. Bluntii*, *M. candida*, *M. Clowesii*, *M. cuneata*, *M. festiva*, *M. flavescens*, *M. Joiceyana*, *M. Lamarchiana*, *M. Peetersiana*, *M. Regnelii*, *M. Russelliana*, and *M. spectabilis* is confined to a limited area in Brazil, in the neighbourhood of Rio de Janeiro. All of these have pseudo bulbs and leaves of an ochreous yellow tint. Another group containing such species as *M. phalanopsis*, *M. Roezlii*, *M. Warscewiczii*, *M. vexillaria*, and its numerous distinct varieties is restricted to Northern Ecuador and Columbia. These species have pseudo

bulbs and foliage of a pallid glaucescent hue. *M. Endresii* and the distinct *M. Schroderiana* are from Costa Rica. All the members of the Brazilian group require a temperature such as is maintained in the *Cattleya* house but they do not care for so much sunshine as the *Cattleyas*, therefore they must be carefully shaded independently of the other inmates. The dwarf-growing varieties, like *M. spectabilis*, may be put in shallow pans with an inch of compost about their roots, but the others are best grown in pots, and kept a trifle above the rim. When the plants are in active growth they should be liberally supplied with water, and while at rest they should be kept comparatively dry, but not so dry as to cause the bulbs or leaves to shrivel. *M. Roezlii* requires more heat and moisture. The Columbian species and those from Costa Rica are naturally found in shady and moist situations, therefore a position to correspond should be found for them in the intermediate house. Plants of the popular and charming *M. vexillaria* are now to be seen in almost every collection in this country, and a group of distinct varieties afford one of the most attractive floral sights that can be produced in our Orchid houses during May or June. *M. vexillaria* and its varieties should be grown in winter at the coolest end of the *Cattleya* or intermediate house, with a temperature ranging from 55° to 65°. They should be removed, immediately after the flowers fade, into the cool house, where they should have a light airy position. At all seasons the plants require liberal supplies of moisture. The result of too great heat is that the leaves spot and go off at their points, the growths become weak and unsubstantial, and the plants slowly but surely deteriorate. Return them to the warm house in the autumn when the nights begin to get chilly. The late summer varieties of *M. vexillaria*, as *rubella* and *superba*, produce flowers smaller than the type, but they are

pretty and useful. The beautiful and distinct hybrid *M. Bleuana* and its variety *nobilior*, which was obtained by crossing *M. vexillaria* and *M. Roezlii*, is a splendid addition to the family. *M. vexillaria* succeeds in well-drained peat and sphagnum moss, and, having numerous fibrous roots that ramble over and through the surface of the compost, it should have sufficient pot room for their extension. The plants may be repotted in August to February.

MOOREA

This is a new genus founded by Mr Rolfe, of the Royal Gardens, Kew, and its one species is named *Moorea irrorata*, being worthily dedicated to Mr Moore, Curator of the Royal Botanic Gardens, Glasnevin. It is closely allied to *Houlletia*. The only two plants known to exist are in the collections at Kew and Glasnevin.

MORMODES

A genus of deciduous epiphytes, inhabiting Columbia and Central America as far as Mexico. They are allied to *Catasetum*, and require the same kind of culture, excepting that they come from mountainous regions at a considerable elevation. The *Cattleya* house is the most suitable place for their cultivation. Like *Catasetums*, the whole of the pollinary apparatus, when the beak of the columns is touched ever so lightly, is released and tossed upwards with a jerk to some distance. The labellum, too, is a remarkable organ, being so twisted as partially to arch over the column. The whole genus has many striking floral peculiarities, some of the species being very handsome, whilst others have a delightful fragrance, which is acceptable even among Orchids. The number of species known is about

twenty-four, which includes *M. buccinator*, a species that has been described as one of the most polychromic Orchids in existence, *M. badium*, *M. Cartonii*, *M. collosus*, *M. Greenii*, *M. igneum*, *M. luxatum*, and its ivory-white variety *eburneum*, *M. Ocanæ*, *M. pardinum*, including its bright lemon-yellow coloured variety *unicolor* and *M. Rolfeana*.

NEOBENTHAMIA

N. gracilis is a remarkable species, and at present the only known species in the genus. Its slender stems grow to about six feet high, clothed with narrow leaves; the flower is white, the lip being spotted with rose purple on either side of a central yellow stripe. It should be potted and watered like a *Sobralia*, but requires a much warmer temperature. It is a native of Zanzibar.

ODONTOGLOSSUM

As mentioned in the early part of this work, these cool house plants are deservedly popular with Orchid growers, and many are the striking floral qualities they possess; not only are the flowers of many of them of exquisite beauty, but the elegant arching or pendulous spikes, in which they are generally produced, are extremely useful for cutting and decorative purposes generally. The genus as at present circumscribed includes about a hundred species, many of which are exceedingly polymorphous. These Alpine, or rather Andean, Orchids are found on the most elevated mountain ranges that face the Pacific, extending from Peru to the southern portions of Mexico, at considerable altitudes ranging from 5000 to 10,000 feet above sea level. All the species are pseudo-bulbous, the

oblong, fleshy bulbs being terminated by lance-shaped evergreen leaves, the flower spikes being produced from the base of one or both sides of the last made pseudo bulbs. Most of them will luxuriate in the cool house the whole year round, and some people assert that a saturated atmosphere is necessary at all times. During the dull winter months, if the house be naturally a damp one, very little or no damping beyond the ordinary watering of the plants is necessary, unless a large amount of fire heat has to be employed to keep up the temperature. In this case the flowers and the ground underneath the stages should be lightly sprinkled at dusk, in just sufficient quantities to tone down its desiccating influence. To maintain a saturated atmosphere during cold wintry weather is undoubtedly injurious to the plants. To pass these cool growing species safely through a hot summer, a thorough damping between the pots morning and evening is quite sufficient if the house be properly shaded and ventilated; but, if the house be a dry one, a second watering of the paths may be given between the hours of nine and ten in the morning. For many years my practice has been to allow the atmosphere to become comparatively dry for several hours at middle day. This kind of treatment prevents the bulbs and the tips of the leaves from decaying, and assists strong robust growth. The watering of the plants, too, requires considerable judgment: it is unquestionably injurious to keep the compost always in a saturated condition, as it causes the roots to decay. It is better to wait until each plant becomes properly dry before affording water at the root. After each plant has produced a strong inflorescence, it is advisable to give it a short rest by keeping it comparatively dry at the root, but not so dry as to cause the pseudo bulbs to shrivel. The temperature of the water applied direct to the plants should not be lower

than the night temperature of the house. It is well known that *Odontoglossums* like plenty of fresh air, but this, like damping and watering, must be regulated according to the situation and construction of the house, the season of the year, and the temperature of the external air. Every facility should be afforded for a free circulation of air, but draughts must at all times be avoided. The top ventilators should not be opened when cold or boisterous winds prevail; but there are very few days in the year when the bottom ventilators should be entirely closed. Severe wind and frost must, however, be carefully guarded against. *Odontoglossums* do not appreciate strong light, and must therefore be shaded from all sunshine, especially in hot, sunny weather, when they should be rather heavily shaded, and the blinds kept down so long as the least bit of sunshine plays on the glass. The month of September is, without doubt, the best month to re-pot the majority of the *Odontoglossums*, as at that time the external air is of so genial a nature, that there is little difficulty in maintaining a very suitable atmosphere, which, as every cultivator knows, is of the greatest assistance to the re-establishment of the plants. Also many of the young growths which appear at that period quickly send out new roots from their base, which, having new compost to run in, are well-rooted ere the winter commences. Plants that are in bloom, or are at rest, or are otherwise not in a suitable condition for re-potting in September, may be deferred until the following spring. When re-potting, one of the greatest mistakes into which beginners in Orchid culture fall, is using pots much too large for the plants, over-potting generally ending in injury and failure, and this is especially true as regards the *Odontoglossums*. Pot them as advised for imported plants, when commencing to root. The critical period with

Odontoglossums is just after root disturbance, as it is at that time an easy matter for the beginner to afford too much water, thereby causing the roots to decay, and the loss of much foliage. For a few weeks after re-potting, it is advisable to afford water sparingly; but a decidedly moist atmosphere should be maintained, and as much fresh air admitted into the house as possible, especially when the outside temperature is about 50°, and the hygrometer within a few degrees of the saturation point. When the plants begin to root freely, the amount of water should be gradually increased, and the atmospheric moisture reduced accordingly.

The following list includes a few of the more beautiful and desirable species and varieties that are suitable for the cool house:—*O. aspidorbinum*, *O. Bictonense*, *O. cordatum*, and *O. crispum*. Few Orchids produce flowers better adapted for cutting purposes than those of the last-named species, as they remain fresh for at least ten days or a fortnight when placed in water either in the dwelling-house or where they are grown. Where large quantities of this species are cultivated, some are to be had in bloom throughout the year without intermission. Its flowers vary from pure white, to white tinged with rose, sometimes more or less spotted and blotched with red or chocolate brown. *O. crispum* is a very variable species, and numerous beautiful and valuable forms have appeared. *O. Edwardii*, a very distinct species, the flowers being of a purplish mauve, *O. gloriosum*, *O. Hallii*, *O. luteo-purpureum*, *O. maculatum*, *O. Madrense*, *O. nebulosum*, *O. Nevadense*, *O. Pescatorei*, *O. polyxanthum*, *O. ramosissimum*, *O. sceptrum*, *O. triumphans*, and *O. Uro-Skinnerii*. Besides these, there are numerous supposed natural hybrids, as *O. Adrianeæ*, *O. Andersonianum*, *O. Ruckerianum*, *O. elegans*, *O. excellens*, and *O. Wilbeanum*. Such dwarf-growing species as *Odontoglossum Cervantesii*, *O. Ærstedii*, *O. Rossii*, and the natural hybrids *O.*



ONCIDIUM VARICOSUM
(From a photograph by J. A. Seaman)

Humeanum, *O. aspersum*, and *Duvivierianum* should be grown in shallow pans, and suspended in the cool house. Others, as *O. blandum*, *O. grande*, *O. Harryanum*, *O. bastilabium*, *O. Insleyii*, *O. Kramerii*, *O. læve*, *O. nævium*, and *O. pulchellum* thrive well in the cool house in summer, but prefer the warmth of the intermediate house during winter. For *O. citrosimum*, owing to its spikes being pendulous, baskets or shallow pans that can be suspended from the roof are better than flower pots. It is one of the few *Odontoglossums* which require a warm temperature. Grow the plant with the Mexican *Lælias*, choosing a light position, and near to the ventilator, if possible, so that it can be given a little extra air at night. Afford plenty of water when growing, and, immediately the new growths are properly matured, remove the plant to a cooler and drier temperature, and keep the soil fairly dry until the flower spikes appear in the spring. When really well grown, few plants are more beautiful at flowering-time, or have a more distinct appearance. It is a Mexican species.

O. Londesboroughianum is another Mexican Orchid of great merit, flowering in the middle of winter and lasting several weeks in perfection; like the preceding species it requires warmth, delighting in sun-heat and light. A collector stated that he found plants growing up unshaded rocks, the temperature in the dry season being 110° by day, and 55° by night. It is of rambling habit, and a suitable arrangement may be provided by wiring the rhizome to a piece of tree-fern, or on a large block of wood with a thin coating of moss, and suspending it close up to the roof glass of the house. A vinery probably would suit it, choosing a place where the foliage was scanty. The distinct *O. coronarium* and its variety *miniatum* are not compact growers, for each new growth extends from four to six inches, and it is useless to try to conform it to pot treatment. A long narrow box

with plenty of holes in it, or a teak basket answers the purpose admirably. It delights in having sphagnum moss growing luxuriously around the base of the pseudo bulbs; and a light position in the cool house will suit its cultural requirements. When seen in bloom this species is always greatly admired. *O. retusum* is a rare and distinct *Odontoglossum*, and when grown strong the inflorescence includes over a hundred flowers, with orange-red sepals and petals, and orange-coloured lip.

ONCIDIUM

A large genus of epiphytal Orchids inhabiting the whole of Central America from Mexico and the West Indies to the southern parts of Brazil. Over 250 species have been described, and, besides these, numbers of others are known to exist in various parts of that vast region. The difference in the conditions under which *Oncidium*s grow in their native habitats is very great. Some occur only in the hot moist valleys of the most tropical parts of America, and are found luxuriating under very varied conditions, some in bright sunlight, and others in dense shade; many are found on the Cordilleras of Peru and Columbia at altitudes ranging from 5000 to 9000 feet, and a few ascend to near the snow line on the Andes where frost is frequent. If a representative collection of *Oncidium*s is to be formed, the grower should ascertain if possible the climatic conditions under which they grow in their native country. This would afford him excellent indications as to the treatment each species should receive when transferred to his Orchid houses. Unfortunately I am unable to enumerate anything like a complete list of the various species and their cultural requirements here, but as a guide to inexperienced cultivators the following remarks on the different sections may prove useful: Taking first

the tropical species of which *O. ampliatum*, *O. Carthaginense*, *O. hamatobilum*, *O. Kramerianum*, *O. Lanceanum*, *O. luridum*, *O. papilio* and *O. splendidum* may be cited as examples, it will be found that, to grow these well, a high moist temperature is necessary, though during their seasons of rest they may be removed to the *Cattleya* division. A considerable number of *Oncidiums* belong to the intermediate section, some of the best known being *O. aurosum*, *O. flexuosum*, *O. Brunleesianum*, *O. phymatobilum*, *O. pubes*, *O. sarcoodes*, *O. sphacelatum*, *O. trulliferum* and *O. Wentworthianum*. Probably the most beautiful of the *Oncidiums* are to be found among those that thrive under the same treatment as the cool *Odontoglossums*, and, if a selection were made from those enumerated, the wonderful form and exquisite beauty of their flowers would afford much pleasure to those interested in their welfare. The most familiar are *O. cheiroporum*, *O. concolor*, *O. crispum*, *O. cucullatum*, *O. curtum*, *O. dasytyle*, *O. Forbesii*, *O. incurvum*, *O. lamelligerum*, *O. loxense*, *O. macranthum*, *O. Marshallianum*, *O. olivaceum*, *O. ornithorynchum*, *O. phalenopsis*, *O. prætextum*, *O. serratum*, *O. spilopterum*, *O. superbiens*, *O. tigrinum*, *O. undulatum*, *O. varicosum* and *O. zebrinum*. There are many differences in the habits of the species mentioned. Some, such as *O. Lanceanum* and *hamatobilum*, are distinguished by large fleshy leaves, and the absence of pseudo bulbs. *O. Jonesianum* and *O. cebolleta* have terete fleshy leaves; while a few species as *O. pulchellum* and *O. triquetrum* have nearly equitant foliage. *O. macranthum* and its allies produce long, shortly branched flower spikes which often exceed ten feet in length. *O. macranthum* is undoubtedly one of the handsomest Orchids grown. *O. papilio* is one of the most remarkable Orchids ever introduced into this country, principally on account of the singular appearance and structure of its flowers, which, as the name implies, bear a fanciful

resemblance to the antennæ and proboscis of a butterfly. As is generally known, this plant and its closely allied species *O. Kramerianum* produce long flower stems, which continue to send out flowers for a very long period; as each flower fades, new buds are continually developed at the apex. If this is not checked, the plants quickly deteriorate, therefore those who wish to keep the plants healthy, and have big butterflies on them, should cut each spike away after it has produced three or four flowers. In fact all of the *Oncidiums* are apt to weaken themselves by over-flowering, therefore extra strong spikes should be removed immediately they are fully developed; and plants that are weak would be greatly benefited by having their spikes removed immediately they appear. *Oncidiums* generally do well in the usual compost of peat and sphagnum moss; leaf mould is also a very suitable material in which to grow them. The strong growing varieties should be placed in pots, while for the dwarfed kinds shallow teak wood baskets or pans are preferable, so that they may be hung near the roof glass in their respective houses. When growing, *Oncidiums* require abundance of moisture, but after growth is completed less will suffice. At all seasons water should be carefully supplied to those species without pseudo bulbs.

ORNITHOCEPHALUS

A genus comprising about twenty species of epiphytal Orchids, *O. grandifolius* being probably the only one in cultivation. Its green and white flowers are very pretty and remind one of the beautiful Lily of the Valley. The plant is a native of Brazil, and should be grown in the cool part of the intermediate house, in well drained pots or pans, using a compost of peat and sphagnum or leaf mould. It delights in a moist, shady position, and

plenty of water at all times. It is a dwarf-growing plant, but, if suspended to the roof glass, the leaves often assume a sickly yellowish hue, and it gradually becomes unhealthy.

PACHYSTOMA

P. Thomsoniana is a native of West Africa at a moderate elevation, which indicates a constantly warm moist atmosphere, such as is maintained in the East Indian house. It thrives best in a shallow pan, leaf soil being used for it to root in. This Pachystoma is a very lovely species and is always highly appreciated when seen in perfection.

PAPHINIA

A small genus of very remarkable epiphytal Orchids, all South American. The species—*P. cristata*, *P. grandiflora* and *P. rugosa*, have short clustering pseudo bulbs, bearing two or three leaves. The short scapes are pendant, having generally two flowers. The plants are best cultivated in small shallow pans, with leaf mould for the roots to run into. Although small growing, they should be stood low down upon the stage on the shady side of the East Indian house. As the Paphinias naturally grow in a very humid atmosphere, their immediate surroundings must always be moist, but when not growing water should be given carefully and sparingly.

PERISTERIA

All the known species contained in this genus are of horticultural value. They are natives of Central America. The type species *P. elata* was first known in 1826, and flowered in this country in 1831. It is a strong growing handsome species, the flowers being waxy white with

small lilac specks on the base of the lip, and very sweet scented. It has long been known as the "Dove Orchid," from the fancied resemblance of the column with its beaked anther, and its side wings, to the figure of a dove. Although an old species it is still a favourite with amateurs. It succeeds best in a stove temperature, potted in fibrous loam and peat, and should be given abundance of light and water when growing, but after growth is completed water should be given very sparingly. In fact the plant requires a decided rest, without which, however strong the pseudo bulbs may be, flowering is problematical. Other species as *P. aspersa*, *P. cerina*, *P. guttata*, and *P. pendula*, are well worth including in the best collections.

PHAIUS

A genus comprising about twenty-five species of robust sub-terrestrial Orchids, mostly tropical Asiatic, but also found in parts of Africa, Madagascar, Australia, the Malay Archipelago, the Pacific Islands, China, and Japan. *P. grandifolius* was one of the earliest tropical Orchids introduced into British gardens, it having been brought from China about the year 1778. Other well-known species are *P. bicolor*, *P. Blumei*, *P. maculatus*, *P. Mishmensis*, and *P. Wallichii*. The temperature of the intermediate house will suit them, and they are often seen growing luxuriantly in an ordinary plant stove. When commencing their new growths in the spring, they should be potted in a compost of fibrous loam, mixed with rough peat, well drained. Liberal and frequent waterings must be given during the season of active growth, and during the resting period it is not advisable to allow them to become too dry. All the species prefer rather a shady position. *P. tuberculosis* and *P. Humblotii*, two beautiful Orchids from Mada-

gascar, have both unfortunately caused much disappointment under our artificial treatment. The flowers of the first-named are of remarkable beauty, the wonderful diversity in the colours and markings of the blooms being especially attractive; the structure of the flower is singular, and very difficult to describe. *P. tuberculosis* should be grown in well-drained shallow pans, over the drainage being placed a layer of fibrous peat. Place the plants upon this compost; then cover the surface, filling closely up to the rhizome with clean living sphagnum. Stand the plants low down on the stage in a shady corner of the hottest division, and where they will get plenty of air. The sphagnum and compost should be kept moist all the year round. *P. Humblotii* should be grown as advised for *Pachystoma Thomsoniana*. There are about a dozen beautiful and interesting hybrids of Phaius, and several pretty and distinct crosses between Phaius and Calanthe called Phaiocalanthe.

PHALÆNOPSIS

These beautiful plants are widely distributed throughout the Eastern tropics—Borneo, Sumatra, Java, Philippines, and other islands in the Malayan Archipelago—and a few species are to be found in India. Coming from the hottest and most humid portions of the earth's surface, Phalænopsis should be cultivated in the highest temperature available in our houses. In some gardens a house is specially devoted to their culture, but, where no such accommodation exists, the warmest corner of the East Indian house should be set apart for them. Shallow teak wood baskets, that may be suspended to the roof, are most suitable for growing the plants in, as their roots cling to the rods in the same way as they cling to the bark of trees in their native home. Some cultivators

prefer growing them down upon the stage, and, instead of baskets, use tall upright teak cylinders. In either case three-fourths of their depth should be filled with drainage materials, the remaining space being filled with sphagnum moss, and the plant placed upon this, keeping it slightly raised above the level of the rim. Then surface the whole with moss, some broken crocks being mixed with it to promote drainage. Phalænopses generally commence their growth in the spring, which is the best time to examine them and ascertain if fresh material is necessary or greater space required for root extension. For the first few weeks after root disturbance these plants require very careful watering. Instead of dipping them in the usual way, it is safer to sprinkle with water from a fine rose watering-can the surface moss and the sides of the basket, taking every precaution not to allow water to get into the centre of the plants, or the leaves will decay. Phalænopses require shade, and, as they naturally grow in an atmosphere that is nearly always at saturation point, it should be imitated as closely as possible. A careful periodical sponging of the leaves with clean tepid rain water is advisable, cleanliness being an essential point in their cultivation. When well grown, few Orchids rival these in graceful beauty; they are not only profuse bloomers, but their white or rosy-tinted flowers last in perfection for many successive weeks. *P. amabilis* (Blume), for many years known as *P. grandiflora*, was the first species described (1750), but was not introduced into this country until 1846. Other well-known varieties are *P. aphrodite*, *P. cornucervi*, *P. Esmeralda*, *P. Luedemanniana*, *P. Marie*, *P. rosea*, *P. Sanderiana*, *P. Schilleriana*, *P. speciosa*, *P. Stuartiana*, *P. Sumatrana*, and *P. violacea*. There are also several pretty natural hybrids, as *P. casta*, *P. intermedia*, *P. leucorrhoda*, and *P. Veitchii*. Of artificially raised hybrids there are some, such as *P. F. L. Ames*,

P. Harriette, and *P. Rothschildiana*, whose great beauty has astonished the whole Orchid world, probably the finest of all being *P. John Seden*, which is something quite unique. *P. Lowii* is a lovely little species, of which there are two varieties, one evergreen and the other deciduous, but the flowers are exactly alike. When the deciduous variety ceases to grow and the leaves fall off, the plant must still be kept lightly watered, so as to keep the roots plump.

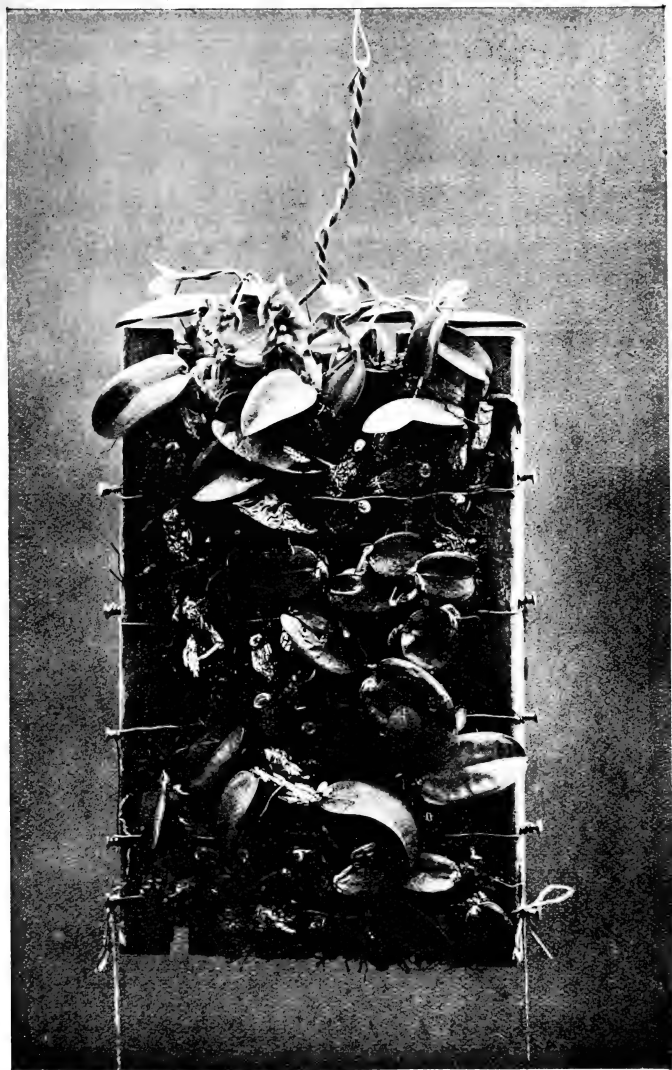
PLATYCLINUS

Until recently this genus was known as *Dendrochilon*. It is a genus of epiphytal Orchids, including about ten species, nearly all natives of Java and the Philippine Islands, those in cultivation, *P. Cobbiana*, *P. filiformis*, *P. glumacea*, and *P. uncata*, being from the last-named group. Although coming from such a hot country the species named thrive best in a *Cattleya* or intermediate temperature. They should be placed in well-drained shallow pans, in a compost of peat and sphagnum or leaf soil, and hung near the glass in a light, but not sunny position, and be freely supplied with water when growing. In summer they delight in a daily overhead syringing of the foliage, and while they are at rest the compost should be kept moist. The yellow flowers of *P. filiformis* are among the smallest in the Orchid family, but the elegant and sweetly perfumed thread-like racemes in which they are collected form a most striking and pretty object. *P. uncata* produces racemes similar to *P. filiformis*, but the flowers are of a greener shade and individually smaller. The silvery spring flowering, *P. glumacea*, is always highly appreciated, and, when properly cultivated, few Orchids can rival this species in grace, the plant being of compact growth, and

producing pendulous crowded racemes of flowers, which have a pleasing fragrance, somewhat like that of new mown hay.

PLEIONE

Few, if any, of our smaller growing Orchids are more beautiful than Pleiones when well grown. During the month of November they form valuable decorative plants, and are also very useful for furnishing cut flowers, especially as at that time there is a scarcity of Orchid bloom. They are Alpine plants, coming from the Himalayan mountains, at elevations ranging from 2000 to 10,000 feet, and are found growing on mossy banks, and at the base of the trunks of lofty trees, sometimes in shade, sometimes fully exposed to the sun. The structure of the flowers of the Pleione is essentially that of *Cœlogyne*, but it may be distinguished from that genus by the pseudo bulbs, which are of annual duration only. The varieties, *P. concolor*, *P. Wallichiana*, *P. præcox*, *P. lagenaria*, and *P. maculata*, should be grown near to the roof glass of the *Cattleya* or intermediate house. Those from greater altitudes, as *P. humilis*, *P. Hookeriana* and its pretty variety, *brachyglossa*, do best when hung up close to a ventilator in the cool house. These cooler-growing species generally flower about January or February. The best time to repot Pleiones is immediately after the flowers fade, but it is not necessary to disturb them annually unless the soil has become soured, as they may be grown in the same pots for two seasons and still produce plenty of flowers. When repotting, turn the plants out of their pots or pans, removing most of the stale soil, and cutting off all roots that are dead. Instead of dividing the pseudo bulbs and bedding them out as is often practised, repot them in clumps, the pseudo bulbs almost touching each other, and merely pull off



SOPHRONITIS CERNUA

(From a photograph by J. A. Seaman)

those which may have grown beyond the main mass of the clumps, and which may be used for increase of stock. The pots or pans used should be three parts filled with drainage materials, over which should be placed a thin layer of rough moss, then one of the potting material, upon which the base of the clump should rest; then fill up around firmly with a compost consisting of equal parts of fibrous loam, peat, and sphagnum moss, mixed with a moderate quantity of coarse silver sand. For a few weeks after repotting, the plants will require watering as advised for *Calanthes*. When thoroughly established and the growths well advanced, they will take almost unlimited supplies. After the pseudo bulbs are matured and the leaves fall off, only sufficient water should be given to prevent them from shrivelling. When in full growth, *Pleiones* delight in having the foliage occasionally well syringed underneath, which will assist growth and keep the leaves clean and free from red-spider. The flowers are produced from small green shoots at the base of the pseudo bulbs, and appear soon after the leaves fade. *Pleione* flowers are easily gathered by giving them a gentle pull, when the stems will readily part from the base of the shoots, and will be much longer than when cut.

PLEUROTHALLIS

There are probably known to science nearly four hundred species of *Pleurothallis*, natives of the mountains of tropical America, at a considerable elevation. The flowers of most of them are inconspicuous, but many are of singular form and gem-like beauty, those generally known and most appreciated being *P. Grobyii*, *P. picta*, *P. punctulata*, *P. Roezlii*, and *P. macrolepharis*. The cultural treatment of all the species is the same as that recommended for *Masdevallias* and *Odontoglossums*.

RENANTHERA

A genus of epiphytal Orchids, natives of tropical Asia and Malaya Archipelago. *Renanthera coccinea* was introduced in the early part of the last century. I may here mention that there is now a plant in the Burford collection which was brought from China in 1815. It is certainly a fine old Orchid, and deserves every attention, but it has always been found a refractory plant in the matter of flowers. The stems, which grow to almost any length, should be fastened to poles of silver birch, to the bark of which the long aerial roots quickly attach themselves. Fix the pole perpendicularly at the sunny end of the Cattleya house, and afford plenty of water with the syringe. *R. Imschootiana*, *R. matutina*, and *R. Storei*, being of more manageable dimensions, may be grown on rafts of teak wood suspended under the roof of the house.

RESTREPIA

This genus is closely allied to *Pleurothallis*, but it is distinguished by the plants having four pollen masses instead of two. Both genera require similar treatment. *R. antennifera* is the largest of the species known. It was discovered by Humboldt, near Pasto, at an elevation of 9000 feet. The flowers, which are borne singly on slender pedicels, are nearly four inches in length, the petals and dorsal sepals being lance-shaped, attenuated into slender tails, which have a remarkable resemblance to the antennæ of a butterfly. The conspicuous lateral sepals are coherent, boat-shaped, and of a yellow colour dotted with red purple. *Restrepia elegans* is a pretty little plant, its flowers very much resembling those of the preceding species. *R. leopardina* is very distinct, the lateral sepals being rich yellow with numerous dots. The flowers of *Restrepias*, when viewed through a

strong lens, are of great brilliancy, and form one of the most attractive of floral objects. About twenty species are known, and all are remarkable for the above characteristics.

RHYNCOSTYLIS AND SACCOLABIUM

These genera are so closely allied that it is not necessary to divide them here. They are natives of India, Burmah, and Malaya. Their culture is very similar to that given to *Aerides*, but they prefer teak-wood baskets, which will admit of the plants being suspended near the glass. *R. caelestis* has bright blue flowers, a colour rare among Orchids, which render it exceptionally interesting to all orchidists. *R. retusa*, *R. guttata*, and *R. premorsa* are charming Orchids when well bloomed, and they spread a pleasing fragrance in the house which is always highly appreciated. *Saccolabium ampullaceum*, *S. curvifolium*, *S. giganteum*, *S. miniatum*, and *S. violaceum* produce racemes of small but highly-coloured flowers. *S. Hendersonianum* is a lovely little species. It has short, narrow leaves, and erect spikes about six inches in length, crowded with small, bright rose-coloured flowers, each flower having a spur about half an inch long.

SARCANTHUS

These are epiphytal Orchids, allied to *Saccolabium*, and require similar culture.

SARCOCHILUS

This genus includes about thirty species, out of which there are only four known to me. *S. Berkeleyi* from Malaya, and *S. purpureus*, better known under the old name of *Camarotis purpurea*, should be grown with the

Aerides, and require similar treatment. *S. Fitzgeraldii* and *S. Hartmannii*, both natives of Australia, should be grown in baskets or shallow pans, with moss only to root in. The roof of the cool house is the proper place for them.

SCHOMBURGKIA

These as a rule do not find favour with amateurs, the large size of the plants and the uncertainty of their flowering being the chief obstacles. There are about a dozen species known to science. *S. Lyonsii*, *S. Tibicinus*, and *S. undulata*, coming from regions of considerable elevations, should be grown with the Mexican *Lælias*, while *S. crispa*, *S. Humboldtii*, and *S. Thompsonii* require a higher average temperature. Their culture is similar to that of *Cattleyas*.

SCUTICARIA

S. Hadwenii and *S. Steelii* are curious epiphytal Orchids, the former from Brazil and *S. Steelii* from British Guiana. The long terete fleshy leaves are pendant, and the plants are best attached to a block of wood or teak raft, furnished with a little live sphagnum moss. *S. Hadwenii* should be grown in the intermediate house, while *S. Steelii* requires the highest temperature available. Both species should be placed in the lightest position possible, and be liberally supplied with water during the growing season, and afterwards be kept comparatively dry.

SOBRALIA

A genus of terrestrial Orchids, natives chiefly of Central America, most of them are free growers, succeeding in an intermediate house. *Sobralias* are free

flowering plants, and some of the varieties, as *S. macrantha*, *S. m. alba* (*Kienastiana*), *S. Lucasiana*, *S. leucoxantha*, and *S. xantholeuca*, produce flowers, both in size and beauty, comparable with the labiata section of Cattleyas, but the individual blooms, having no stalk, are of little use when cut, and they last but for a short time; still the plants, when established, afford a long succession of flowers, which compensates for the blooms being short lived. Other varieties of sterling merit are—*S. albo-violacea*, *S. liliastrum*, *S. Princess May*, *S. Sanderiana*, *S. Virginalis*, and *S. Warscewiczii*. Early spring is the most suitable time to re-pot them, but it is not necessary or desirable to re-pot a *Sobralia* immediately it has filled its pot with roots, as the plants soon become too large and unmanageable if frequently re-potted. They root freely in a compost of lumpy fibrous peat and rough sandy loam, with a small quantity of sphagnum moss. The plants require plenty of water during the growing season, and the compost must not be allowed to get dry, even in winter, or the plants will lose their leaves. When thoroughly pot-bound, *Sobralias* enjoy an occasional dose of weak liquid cow manure, which will assist strong growth. Several *Sobralia* hybrids are well worth including in the collection. Such are *S. Amesiana*, *S. Veitchii*, and *S. Dellense*.

SOPHRONITIS

A well-known genus of dwarf epiphytal Orchids from Brazil. The brilliant scarlet flowers of *S. grandiflora* are always appreciated; other species are the yellow *S. Rossiteriana*, *S. cernua*, and *S. violucea*. The two last-named species prefer the intermediate house, the others thrive best in the cooler division. The plants should be placed in well-drained shallow pans, in a compost of peat and moss, the pans during the winter months being

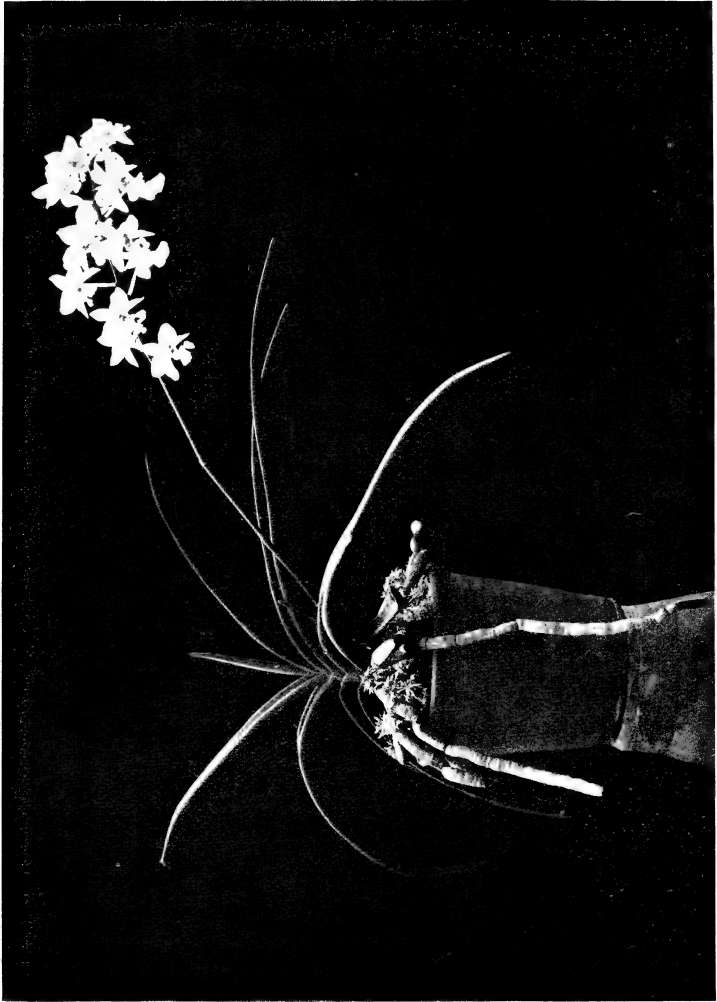
hung near the roof glass, though in summer they are best stood down upon the stage with other plants; they require to be kept moist always. All the *Sophr-Cattleya* and *Sophr-Lælia* hybrids produce very beautiful and interesting flowers, and are eagerly sought after by amateurs.

SPATHOGLOTTIS

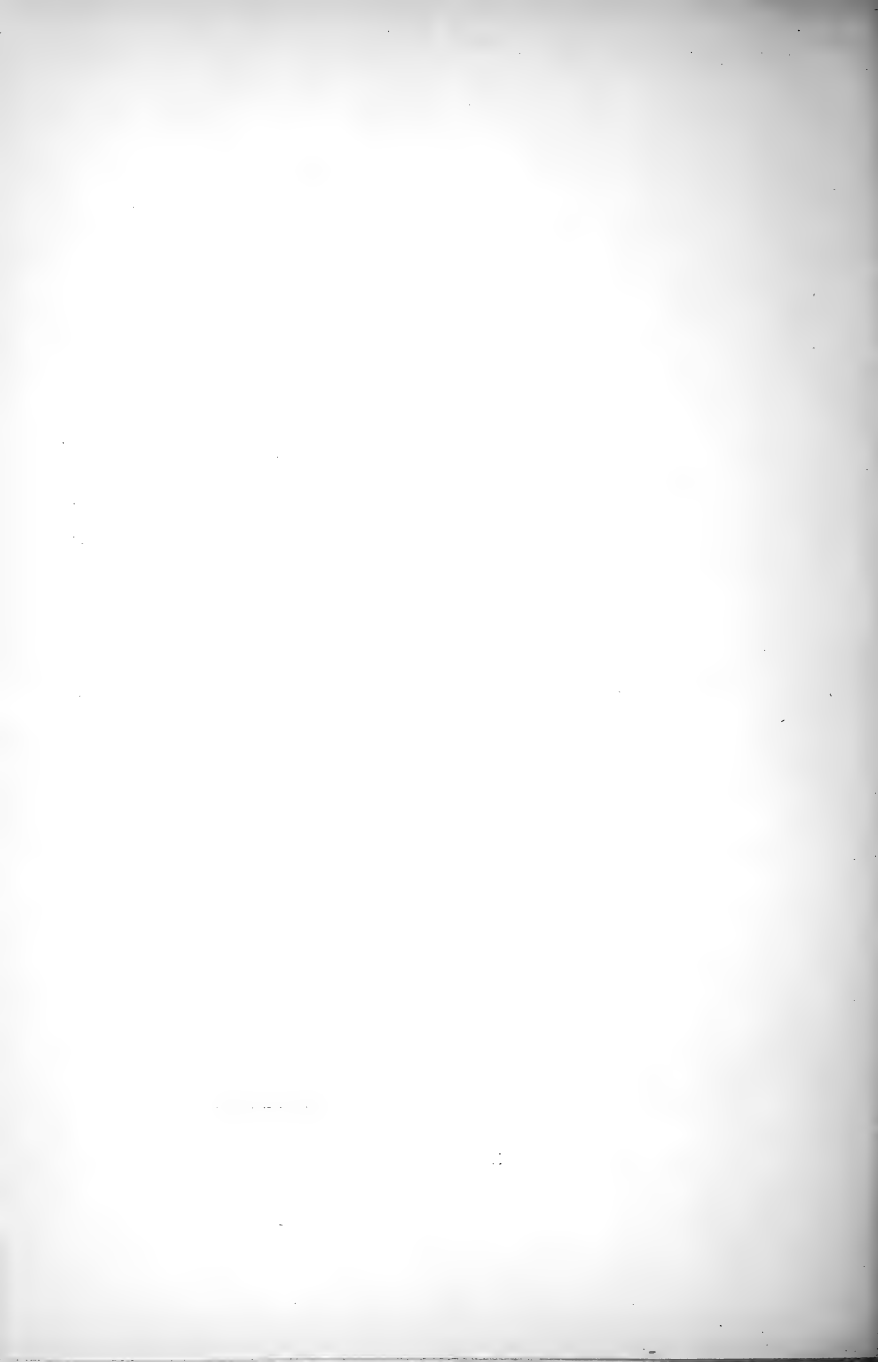
Terrestrial Orchids distributed throughout the East from Burmah to China. The plants may be cultivated as advised for *Pachystoma*. The best known varieties are—*S. aurea*, *S. Fortunei*, *S. Lobbii*, and *S. Viellardii*.

STANHOPEA

Most of the species are natives of Central America; and nearly all of the known varieties possess large, showy, often strongly scented flowers, the lip being of remarkable structure. Over twenty species of *Stanhopea* have been described, a few of the most beautiful being *S. eburnea*, *S. Amesiana*, *S. insignis*, *S. Mastersii*, *S. Lowii*, *S. tigrina*, *S. Rodigasiana*, and *S. Wardii*. The plants succeed in shallow teak baskets, the ordinary drainage not being required, because, if crocks were used, the flowers being pendulous would be broken or deformed by contact with them. The compost should consist of equal parts of peat and moss. The proper time for supplying fresh rooting materials is when the plants are starting into growth. Grow the plants in the *Cattleya* house, close up to the roof, and abundantly supply with water till the flowers open. As the latter are fugacious, great care must be taken to avoid wetting them. After growth is completed, rest the plants in a cool vinery or peach house and afford water occasionally.



VANDA AMESIANA
(From a photograph by J. A. Seaman)



TETRAMICA

This genus is commonly known as Leptotes. The only variety known to me is *T. bicolor*, a native of Brazil. The plant should be grown upon a block suspended near the glass of the Cattleya house, a liberal supply of water being needful when growing. The flowers are small but very pretty, the sepals and petals white, lip purple, sometimes margined or shaded with white.

THUNIA

A small genus, those at present known being confined to North India, Assam, and Burmah. The species most generally cultivated are *T. alba*, *T. Bensonia*, *T. Marshallii*, *T. Brymeriana*, *T. pulchra*, *T. candidissima*, and the distinct hybrid *T. Veitchii*. Thunias should be repotted annually as directed for Calanthes, and water afforded on the same principle. Grow the plants on the sunny side of the East Indian house. The flowers appear on the apex of the new growth, and, immediately they fade, the plants should be placed in more sunlight, and afforded water until the leaves change colour, when it should be gradually discontinued, and the plants removed to a cooler and drier atmosphere.

TRICHOPILIA

Plants of this genus are found on the Andes of South America, at moderate elevations, and northwards as far as Mexico. The greater number of the known species possess large, showy flowers, and the following are worthy of culture:—*T. brevis*, *T. Galeottiana*, *T. marginata*, *T. suavis*, and *T. coccinea*, with its several

distinct varieties. These species should be grown near the roof glass in a shady part of the intermediate house. The sweet-scented *T. fragrans* may be grown in the cool house. Shallow pans or baskets are more suitable than pots, and a mixture of peat and sphagnum, with good drainage, is the best compost for them, or leaf-mould may be tried. At all times water must be carefully given, as the growths are extremely liable to damp off; when growth is completed, very little water is required.

VANDA

The genus contains many handsome species, which in structure resemble the *Aerides*, but there is much less uniformity of habit among its members. Such varieties as *V. Bensoni*, *V. cœrulesens*, *V. concolor*, *V. cristata*, *V. Denisoniana*, *V. lamellata*, *V. Parishii*, *V. Roxburghii*, and *V. Sanderiana* should be afforded the same cultural routine as that prescribed for *Aerides*. *V. Sanderiana* is a rather stubborn species to cultivate; I have found it to thrive best when fastened to a teak-wood raft, suspended in a hot, shady corner of the house, and its roots well syringed several times daily. Those species which require a shady intermediate temperature are—*V. alpina*, *V. Amesiana*, *V. insignis*, *V. Kimballiana*, *V. tricolor*, and *V. suavis*. These also require the same kind of potting as *Aerides*. *V. cœrulea* is a most popular species, its light-blue flowers being always highly appreciated. It is a mountainous species, growing on trees at elevations between 3000 and 4000 feet. Grow the plant in a basket, and suspend it in the coolest part of the *Cattleya* house, and near to a top ventilator, if possible, so that it can have plenty of fresh air when practicable. *V. Hookeriana* thrives best when trained up teak rods

and placed in a sunny position in the warmest house. Its congeneric species, *V. teres*, should be similarly trained, but it requires a few degrees less warmth. *V. Miss Joaquim* is a handsome hybrid between *V. Hookeriana* and *V. teres*; its habit intermediate; blooms as large as *V. teres*; very floriferous, bearing as many as seventeen flowers on a single spike. These terete varieties should be well syringed overhead during the growing season, and occasionally on sunny days in winter, to keep them plump.

ZYGOPETALUM

Zygopetalums, the last of the Orchid genera to be treated here, are epiphytal, and contain many handsome large-flowered species. The number of species known to science is upwards of fifty. These are distributed chiefly through the central parts of America. Under Zygopetalum are included such species as *Bollea*, *Huntleya*, *Pescatorea*, *Batemannia*, *Warscewiczella*, and *Kefersteinia*. These are all shade-loving species, and the atmosphere around them should be always kept moist. The plants should be placed in well-drained pans, using a compost of three parts of sphagnum moss to one of peat; and, when affording fresh compost, it is advisable to elevate the plants well above the rim of the pan. An average temperature of about 60° suits them. *Zygopetalum* or *Zygosepalum rostratum* should be grown in a moist, shady corner of the East Indian house; leaf-mould suits it admirably. The true Zygopetalums, as *Z. Burkei*, *Z. brachypetalum*, *Z. graminifolium*, and *Z. Mackayi*, are of more robust habit, and should be potted in loam and peat in equal parts, with a little moss and sand added. The *Cattleya*, or intermediate house, is the best place for them. *Z. maxillare*, owing

to its creeping rhizome, should be fastened on pieces of tree fern, and be cultivated in the same house as the *Odontoglossums*. *Zygopetalum citrina*, *Z. stapelioides*, and *Z. Rolissonii*, formerly known as *Promenœas*, should be grown suspended in shallow pans in the cool house. All *Zygopetalums* require shade and a constant supply of water during the growing season.

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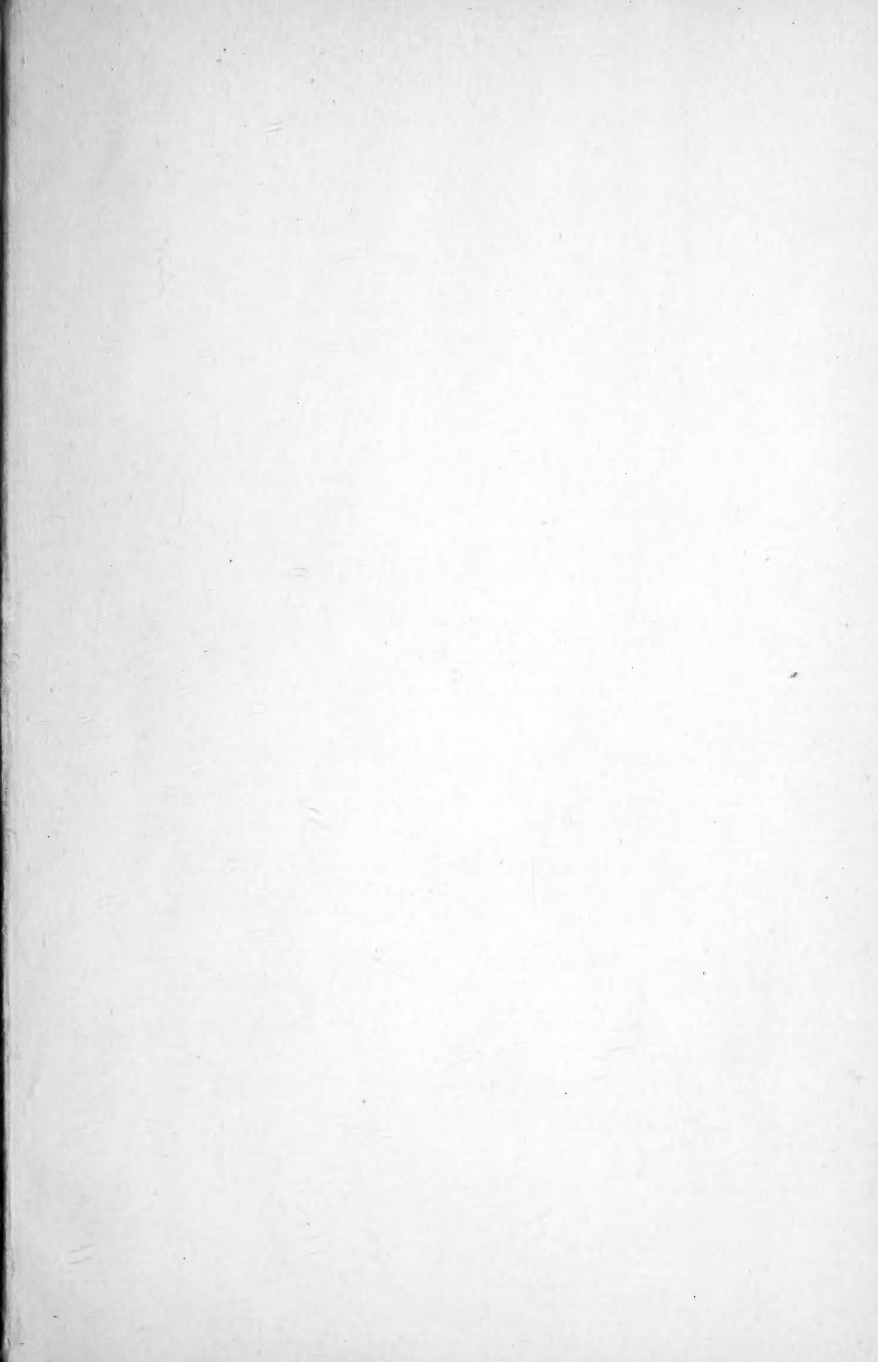
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