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A MANUAL OF ORCHIDACEOUS PLANTS.

VOL. I.

A MANUAL

OF

ORCHIDACEOUS PLANTS

CULTIVATED UNDER GLASS IN GREAT BRITAIN.

VOL. I.

EPIDENDRÆ.

JAMES VEITCH & SONS,

ROYAL EXOTIC NURSERY, 544, KING'S ROAD, CHELSEA, S.W.

1887—94.

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PREFACE.

THIS Manual has been compiled to supply amateurs and cultivators of exotic Orchids with a fuller account of the principal genera, species and varieties cultivated under glass, than is contained in the Manuals hitherto in use.

The rapid extension of Orchid culture during the last quarter of a century, resulting from the increased taste for and appreciation of this beautiful and interesting order of plants, has created the *desideratum* which we have now attempted to supply. The prominent place, too, occupied by Orchids in the columns of the Horticultural Press, and the amount of practical and varied information respecting them disseminated through its agency, has also stimulated the desire to obtain all the leading facts in a condensed form, to which easy reference may at any time be made.

So numerous are the species and varieties of Orchids at present in cultivation, and to which additions are constantly being made by new discoveries and by artificial hybridisation, that the labour attending the compilation of a Manual sufficiently comprehensive to meet the wants of cultivators has necessarily taken up much time. Moreover, the unsatisfactory state of Orchidology, especially in its horticultural aspect at the time this Manual was commenced, and its complicated and unscientific nomenclature, have rendered its compilation within a stated time almost an impossibility.

Under these circumstances we decided upon issuing the work in parts, each part containing a monograph of the cultivated species and varieties of one of the most important genera, or of a group of genera. The parts were issued according

as the materials which came to hand enabled us to complete each, as far as practicable, without reference to their systematic order of sequence. This has necessarily deranged the paging of the whole work, but with the aid of the systematic and alphabetical indexes to the genera appended to each volume, little inconvenience will, it is hoped, be experienced in finding any of the described species.

Little explanation of the plan of the work is here needed; we have only to state that in the scientific classification and sequence of the genera we have followed, with but trifling deviations, the arrangement of Bentham and Hooker as elaborated in their *Genera Plantarum*, the most profound and, at the same time, the most intelligible exposition of the Orchideæ extant. In the nomenclature of the species we have adhered to the Laws of Botanical Nomenclature adopted by the International Botanical Congress, held at Paris in August, 1867.

In the description of the species, we have been compelled to use occasionally a few technical terms; at the end of the second volume we have given a glossary of the terms so used. In the cultural notes we have quoted temperatures in the Centigrade scale with the equivalent Fahrenheit readings, in the hope that the far more rational scale, now almost universally adopted in scientific investigations, may also come into use in horticulture. The literary references in italics indicate coloured plates of the species or variety described.

We gratefully acknowledge our deep obligations to the numerous patrons and friends who have with untiring kindness supplied us with materials for description and illustration of rare and little known kinds, without which the issue of this work in its present form would have been impossible. The various sources from which these materials

have been derived are duly noted in their respective places. The determination of the correct nomenclature of very many species has necessitated constant reference to the original types preserved in the National Herbaria. To the heads of these departments an especial acknowledgment is due, and we tender our warmest thanks to Mr. W. T. Thiselton Dyer, Director of the Royal Gardens at Kew, and to Mr. J. G. Baker, the Keeper of the Herbarium, and his assistants; also to Mr. W. Carruthers, of the Natural History Museum, South Kensington, and to his staff, for their unremitting kindness and assistance in enabling us to inspect the herbarium specimens under their charge, by which many perplexing questions of nomenclature have been definitely settled. We also gladly acknowledge our indebtedness to Dr. Maxwell T. Masters for his article on the Teratology of Orchids and for his assistance in the preparatory notes on the minute anatomy of the leaves. And we must gratefully recognise the unremitting care which our assistant Mr. A. H. Kent has bestowed on the preparation of this work.

JAMES VEITCH & SONS

ROYAL EXOTIC NURSERY, CHELSEA.

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GLOSSARY OF TECHNICAL TERMS.

- Acropetal or basifugal order, applied to flowers produced in succession from a common axis, of which the youngest is nearest the apex as in *Oncidium Papilio*, *Masdevallia Chimera* and other Saccolabiate Masdevallias, *Cypripedium Chamberlainianum* and nearly all the Cypripedes in the section SELENIPEDIA.
- Acuminate, tapering to a point.
- Acute, terminating in a sharp point.
- Adnate, adherent, applied to unlike organs as the column and lip in Epidendrum; the base of the sepals and the foot of the column in Dendrobium, Bulbophyllum, etc.
- Anastomosing, said of veins which sub-divide and join each other as those in the upper sepal of many Cypripedes.
- Amplexicaul, applied to leaves that embrace the stem at their base like those of *Dendrobium formosum*, and many others.
- Ancipitous, two-edged as the pseudo-bulbs of *Trichopilia*, many Oncids, *Odontoglossum*, etc.
- Annulate, surrounded with raised narrow bands or rings as the fleshy stems of *Phaius*, *Chysis*, *Mormodes*, *Cynoches*, etc.
- Anatropous, applied to ovules that are turned down upon themselves so that the true apex points to the base. See Fig. 10, page 87.
- Auriculate, having small rounded lobes or ears as the small basal lobes of the labellum of many Oncidiums.
- Bibracteate, having two opposite bracts of which one is usually larger than the other as in *Cypripedium callosum*, *C. niveum*, etc.
- Bicalcarate, having two spurs.
- Bicuspidate, having two horn-like points as the staminode of *Cypripedium barbatum*, *C. Lawrenceanum* and closely allied species.
- Bifid, divided into two from the middle upwards.
- Bilamellate, applied to the crest of the labellum of *Brassia*, *Odontoglossum*, etc., when it consists of two small vertical plates.
- Calceolate, calceiform, having the form of a slipper as the labellum of *Cypripedium*, *Dendrobium moschatum*, *D. Chrysocrepis*, etc.
- Campanulate, bell-shaped.
- Capsule, the seed vessel.
- Carinate, having a keel or raised line.
- Caudicle, the extension of the smaller end of a pollen-mass into a tail-like point as in most of the OPHRYDEE, in *Calanthe*, *Eria* and a few others. See Morphology, Fig. B, page 22.

- Cauline, belonging to the ascending axis or stem.
- Cespitose, growing in tufts or patches.
- Ciliate, fringed with hairs as the petals of many Cyprripedes.
- Ciliolate, fringed with very short soft hairs.
- Cirri, small thread-like organs more or less spirally twisted as the apical appendages of the labellum of *Phalenopsis amabilis* and *P. Aphrodite*, of the column of *Odontoglossum cirrosum*, etc.
- Clavate, club-shaped, gradually thickening from below upwards as the stems of many Cattleyas, Dendrobies, etc.
- Clinandrium, the chamber at the top of the column in which the pollinia lie.
- Complicate, folded, of leaves in part only.
- Conduplicate, folded longitudinally down the middle the whole length.
- Connate, said of leaves when the bases of two opposite ones are united as in the common Honeysuckle, but in Orchidology it is often applied to two like organs that have grown together along their sides as the lateral sepals in Cyprripidium, Masdevallia, many Oncidiums, etc.
- Connivent, nearly synonymous with convergent, applied to organs that are gradually turned towards each other as the lateral sepals of many Cattleyas.
- Cordate, heart-shaped, when the base of the leaf, foliage or floral, is in the form of two rounded lobes and the apex is pointed, like the hearts of a pack of cards. Cordate-ovate, intermediate between cordate and ovate. Cordate-oblong, longer and less tapering than cordate.
- Corymbose, corymbiform, expresses a modification of the raceme in which the pedicels are gradually shorter towards the summit, as in *Calanthe veratrifolia* and allied species, the Amphiglottide Epidendra, etc.
- Crenulate, said of leaves, whether foliage or floral, when the edge has rounded teeth and sharp angles between them as the labellum of *Aërides japonicum*.
- Cucullate, hooded; the apex of the column of many Oncids and species of allied genera is prolonged into a membranous or petaloid appendage, often turned inwards and resembling a hood.
- Cuneate, wedge-shaped, tapering towards the base.
- Cymbiform, having the form of a boat, as the hypochile of some species of Stanhopea.
- Decurrent, applied to leaves the blade of which is continued down the stem into a kind of foliaceous wing; also to any organ prolonged downwards beyond the point of insertion.
- Deltoid, of the shape of the Greek letter delta Δ .
- Denticulate, having small marginal teeth.
- Dialysis, the converse of connate; when two like organs which normally occur joined together, become separated.

- Digitate, finger-like, usually applied to parts that radiate from a common centre on one side only.
- Dichotomous, branching in pairs like the panicle of *Dendrobium teretifolium*.
- Diphyllous, applied to pseudo-bulbs and stems which produce two leaves at their apex.
- Distichous, arranged in two rows on opposite sides of the stem as the leaves of *Vanda*, *Aërides*, *Dendrobium*, etc.
- Dolabriform, axe-shaped, having one margin straight and thick and the opposite one enlarged, rounded and thin.
- Emarginate, applied to leaves, both foliage and floral, which have a shallow notch at the apex.
- Ensiform, straight and narrow with the point acute like the blade of a sword.
- Epichile. *See Stanhopea*, p. 109.
- Equitant, applied to leaves that are folded one over the other at their base as those of many *Cymbidiums*, *Aërides*, *Vandas*, etc.
- Erose, having the margin irregularly toothed as if gnawed by an insect, like the labellum of *Odontoglossum Cervantesii*.
- Falcate, curved like a reaper's sickle.
- Filiform, thread-like.
- Fimbriate, fringed by fine divisions of the margin as the labellum of *Lycaste lanipes*, *Dendrobium fimbriatum*; the petals of *D. Harveyanum*, etc. In the labellum of *D. Brymerianum* the fimbriation is excessively developed and much branched.
- Foliaceous, leaf-like, having the texture and appearance of leaves.
- Fusiform, spindle-shaped, tapering towards each end like the stems of many of the *Aulizeum Epidendra*.
- Galeate, helmet-shaped.
- Gibbous, with a short obtuse swelling.
- Glabrous, smooth, quite destitute of hairs.
- Hastate, halberd-shaped, having two lobes nearly at right angles to the petiole or claw.
- Hispid, Hispidulous, covered with short stiff hairs.
- Hypochile. *See Stanhopea*, p. 109.
- Imbricating, overlapping like the tiles of a roof.
- Infundibuliform, funnel-shaped.
- Involute, when the lateral margins of an organ (sepal, petal, etc.) are rolled inwards over the blade.
- Laciniaë, the divisions of a leaf, whether foliage or floral, when acute and separated by an acute sinus as the side lobes of the labellum of many *Cœlogynes*, *Cymbidiums*, etc.

- Lamina, the flat expanded part of a leaf or floral segment.
- Ligulate, strap-shaped, narrow and moderately long.
- Limb, as Lamina, but applied to the floral segments only.
- Lanceolate, when the blade is broadest in the middle and diminishes insensibly towards each end. The true lanceolate form is three or four times as long as broad.
- Linear, narrow with the edges parallel. Linear-lanceolate, narrower than lanceolate. Linear-oblong, narrower than oblong.
- Micropyle, the pore or opening in the ovule through which the pollen tubes enter.
- Monophyllous, applied to pseudo-bulbs and stems which produce but one leaf at their apex.
- Mesochile. *See* Stanhopea, p. 109.
- Mucronate, abruptly terminated by a sharp hard point.
- Obcordate, the converse of cordate, narrow at the base and terminating in two rounded lobes; but in the ORCHIDEE an obcordate blade is usually apiculate or pointed at the apex as the labellum of *Brassia Gireoudiana*.
- Oblanceolate, the converse of lanceolate, broader between the middle and the apex. Oblanceolate-oblong, intermediate between oblong and oblanceolate.
- Oblong, the sides parallel and nearly straight, two or three times as long as broad.
- Obovate, the converse of ovate.
- Ovate, egg-shaped in outline, one and a half to twice as long as broad. Ovate-oblong, intermediate between ovate and oblong, broadest near the base.
- Panduriform, fiddle-shaped, of obovate form with two recesses on each side as in the labellum of *Ceelogyne pandurata*, many Oncids and Odontoglots, etc.
- Paniculate, Panicked, branched, applied to the inflorescence only.
- Papillæ, minute epidermal "up-risings" or glandular asperities on the surface.
- Papillose, covered with *papille* as the sepals and lip of many Masdevallias.
- Pectinate, arranged like the teeth of a comb.
- PediceL, the lateral or secondary flower-stalk of a raceme or panicle.
- Perianth, the series of floral segments that surrounds the sexual organs. In orchidology it is sometimes restricted to the lower whorl or sepals as they are conventionally called.
- Petiolate, applied to leaves having a footstalk, in contradistinction to sessile said of leaves in which the footstalk is absent.
- Petiole, the footstalk of a leaf.
- Placentation, parietal and axile. *See* Cyripedium, p. 5 (foot-note).

- Pyriform, pear-shaped.
- Quadripartite, divided into four lobes as the labellum of the Amphiglottide Epidendra.
- Raceme, an inflorescence in which the flowers are arranged on pedicels along an undivided axis.
- Racemed, Racemose, in the form of a raceme.
- Rachis, the axis or stem of an inflorescence.
- Retuse, obtuse with a slight depression at the apex.
- Reniform, kidney-shaped.
- Rhomboidal, approaching four-sided with rounded angles as the petals of *Phalenopsis amabilis*, *P. Aphrodite*, *P. Schilleriana*, etc.
- Revolute, rolled backwards, applied to leaves, sepals, petals, etc., that have their margins rolled back under the blade.
- Saccate, having a depression in the form of a bag or pouch as the labellum of Saccolabium.
- Scandent, climbing, rising by the aid of neighbouring bodies and attaching itself to them like the stems of *Vanda teres*, *V. Hookeriana*, *Sarcochilus (Camarotis) purpurea*, etc.
- Scape, in the ordinary acceptation of the term is the naked peduncle which rises from the crown of many bulbous plants as the Tulip, Hippeastrum, etc. In orchidology it is generally applied to peduncles that spring from the base of pseudo-bulbs as in *Odontoglossum*, *Oncidium*, *Miltonia*, etc.*
- Scarious, dry and membraneous.
- Sepaline, belonging to the sepals as the tube and tails of Masdevallia.
- Secund, having the flowers all turned in one direction as those of *Angraecum citratum*, *Rodriguezia secunda*, etc.
- Serrate, Serrulate, notched like the teeth of a saw.
- Sinuate, having the margin alternately convex and concave.
- Spathaceous, resembling the spathe or floral bract of Aroids.
- Spathulate, narrow at the base, broader and rounded at the apex.
- Staminode. See Cypripedium, p. 7.
- Stellate, rayed like a star.
- Stipes, the strap-like prolongation of the gland or removable disk of the rostellum that support the pollinia in VANDEE. See Morphology, p. 29.
- Subpandurate, approaching pandurate or fiddle-shaped.
- Subulate, awl-shaped, cylindric or nearly so, and terminating in an awl-like point like the minute petals and lip of many Cirrhopetala.

* The inflorescence of most orchids of whatever form or origin is called a spike by nearly all British cultivators. True spikes are however rarely seen in the cultivated ORCHIDEE requiring the protection of a glass-house. Instances occur in *Arpophyllum*, *Cœlia*, *Bulbophyllum*, etc.

- Thyrus, Thyrsoid, a raceme of oval shape of which the central pedicels are a little longer than the outer ones. This form of inflorescence occurs in *Dendrobium densiflorum*, *D. Farmeri*, *D. thyrsoiflorum* and allied species.
- Tomentosa, covered with short matted hairs.
- Tridentate, terminating in three teeth.
- Trigonal, three-angled.
- Triquetral, three-edged.
- Truncate, terminating abruptly, as if a piece had been cut off.
- Trapeziform, having four sides, but the opposite sides not parallel nor the opposite angles equal.
- Umbel, an inflorescence in which the pedicels or secondary axes spring from the same point in the peduncle or primary axis and diverge like the rays of a parasol. The umbel and semi-umbel occur in *Cirrhopetalum*, *Bulbophyllum* and a few others.
- Unguiculate, applied to floral segments when the blade or limb is narrowed at the base into a short petiole or claw.
- Ventricose, bulging or swelling out as the disk of the labellum of *Cynoches chlorochilon*.

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MANUAL

OF

ORCHIDACEOUS PLANTS

CULTIVATED UNDER GLASS IN GREAT BRITAIN.

PART V.

MASDEVALLIA.

PLEUROTHALLIS, CRYPTOPHORANTHUS, RESTREPIA,
ARPOPHYLLUM AND PLATYCLINIS.

JAMES VEITCH & SONS,

ROYAL EXOTIC NURSERY, 544, KING'S ROAD, CHELSEA, S.W.

1889

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TRIBE—EPIDENDREÆ.

SUB-TRIBE PLEUROTHALLÆ.

Cespitose herbs, with slender stems that are not pseudo-bulbous, monophyllous and terminated by a one- or many-flowered inflorescence.

PLEUROTHALLIS.

R. Brown in Aiton's Hort. Kew. ed. II. p. 211 (1813). Lindl. Gen. et Sp. Orch. p. 4 (1830). Benth. et Hook. Gen. Plant. III. p. 488 (1883).

Although *Pleurothallis* is one of the largest genera in the orchidean family, it has hitherto been thought of so little interest to cultivators that it has been passed over in silence by the compilers of every horticultural work on orchids with which we are acquainted, with the exception of Mr. E. S. Rand, who cursorily mentions it.* It has, however, a certain scientific importance as the typical genus around which other genera are grouped, forming the sub-tribe *Pleurothallæ*, of which the most distinctive common characters are given above. This sub-tribe includes in the aggregate, according to Mr. Bentham's estimate, over 650 species, to which additions are frequently being made by new discoveries, so that this one sub-division contains probably more than one-tenth of the whole of the Orchideæ; the species are very unequally divided among ten genera,† some of whose names even are practically unknown to horticulture.

Upwards of 350 species of *Pleurothallis* are known to science, all natives of the mountains of tropical America, at a considerable elevation. They occur on the Andes from Bolivia to Mexico, ascending to 10,000—12,500 feet towards the southern limit of their range; they are also found on the mountains of Brazil and in the West Indies. Although upwards of 100 of the species have at different times been

* Orchids, a description of the species and varieties grown at Glen Ridge, near Boston, U.S.A., p. 375.

† Thus, *Pleurothallis* 350, *Stelis* 150, *Physosiphon* 4, *Lepanthes* 40, *Restrepia* 20, *Brachionidium* 3, *Masdevallia* 100, *Arpophyllum* 6, *Octomeria* 10, *Meiracyllium* 3; all natives of tropical America, from southern Brazil to central Mexico, most of them alpine.

introduced into British gardens, but very few indeed have remained long in cultivation,* and scarcely a dozen have been considered worthy of being figured in works other than those purely devoted to science. The flowers of most of the known species are small, inconspicuous and without fragrance, but there are many of singular form and gem-like beauty which, requiring but little space for their cultivation, should induce amateurs to give some attention to them. The species described below are among the best known; the cultural treatment of these, as will be readily inferred from their alpine character, is that of cool orchids such as we have given in detail under *Masdevallia* and *Odontoglossum*.

To assist the reader to distinguish the species of *Pleurothallis* from those of the closely allied genera, we subjoin a diagnosis of the chief characteristics of the flower:—

The dorsal sepal is free; the lateral two are always coherent into one that is bifid or bipartite at the apex; the petals are shorter and narrower than the sepals; the lip, which is generally shorter than the petals, is articulated at the base of the column. The column is of the same length as the lip, or a little shorter; the pollinia are two in number, and are either pear-shaped or of sub-globose form.

In their vegetation the species of *Pleurothallis* are dwarf, often minute plants.—

The stems are simple, rarely exceeding a few inches in height, enclosed in sheathing scales, and terminating in a solitary leaf that varies in size and form in the different species. The inflorescence springs from the base of the leaf and is generally racemose, but sometimes a 1—2 or few-flowered peduncle.

Pleurothallis is derived from *πλευρὸν* (pleuron), “a rib” or side, and *θάλλω* (thallo), “to bloom,” probably in allusion to the bilateral position of the floral segments with respect to the axis.

Pleurothallis Barberiana.

A minute stemless plant. Leaves petiolate, elliptic, half-an-inch long. Peduncles capillary (as slender as a hair), 2—4 inches long, drooping, 6—12 flowered. Flowers small; sepals free, oblong-lanceolate, aristate, whitish spotted with deep purple; petals ovate, apiculate, longer than the column, whitish with paler spots than the sepals; lip “a linear-oblong, terete, sub-clavate, solid body of purple colour blotched with

* See Hemsley's enumeration in the *Gardeners' Chronicle*, XV. (1881). p. 784; XVI. pp. 10 and 42.

deeper purple, rounded at the tip, and with two teeth opposite the very short claw." Column yellowish.

Pleurothallis Barberiana, Rehb. in Gard. Chron. XVI. (1881), p. 6. *Bot. Mag.* t. 6886. *Masdevallia Culex*, Hort.

The above description conveys but an imperfect conception of this miniature orchid, which is well deserving a place in every collection on account of the singular beauty and curious structure of its flowers that have the fanciful resemblance of a species of gnat. It was introduced by Messrs. Low and Co., of Clapton, who gave no locality, but the plant is generally believed to be of Colombian origin. It is dedicated to Mr. Barber, of Spondon, near Derby.

P. insignis.

Stems slender, 1—2 inches long. Leaves linear-oblong, as long as the stems. Peduncles as long as the leaves, two or more flowered. Flowers large for the genus; sepals ovate-lanceolate, prolonged into slender tails 2 inches long, yellowish white with longitudinal red streaks on the dilated part; petals linear-oblong, "toothed at the tip, and with a filiform tail as long as the sepals inserted between the teeth"; lip three-lobed, the lateral lobes linear, turned upwards and outwards, colourless, the middle lobe linear-oblong, obscurely papillose, with a dense tuft of small bristles at the apex, chocolate-red.

Pleurothallis insignis, Rolfe in Gard. Chron. I. s. 3 (1887), p. 477. *Bot. Mag.* t. 6936.

This is one of the largest flowered species of *Pleurothallis* yet known; the sepals are prolonged into slender tails like those of a *Masdevallia*, and its curiously-shaped bearded lip reminds one of the closely allied species, *Pleurothallis glossopogon*, which it much resembles, and under which name it was first distributed. It differs, however, from that species in its much larger flowers in which the sepals are not puberulous, also in the form of the leaves, and in some other minor characters. It was introduced by us in 1879 from New Granada.

P. Leucopyramis.

Stems 2—3 inches high, slender, invested with dark brown, almost blackish membranous sheaths. Leaves lanceolate-ligulate, as long as the stems. Peduncles slender, erect racemose, the rachis zigzag, many-flowered. Flowers white; upper sepal lanceolate, arched, keeled behind; connate lateral sepals similar, two-keeled, bidentate at the apex; petals and lip very minute, rhomboid-ligulate. Column tridentate at the apex.

Pleurothallis Leucopyramis, Rehb. in *Linnaea* XLI. p. 47 (1877). *Id. Xen. Orch.* III. p. 14.

A very attractive species with small milk-white flowers that are produced freely in the autumn months. Nothing certain appears to be known of its origin, beyond the fact that it was originally in the collection of the late Mr. Wilson Saunders at Reigate, whence it passed to the Botanic Garden at Hamburg. It was also in cultivation in our Chelsea Nursery some years ago, and is believed to have been sent to us from Costa Rica, by Endres. The notice of it in this place may tend to preserve it from oblivion.

P. picta.

A densely-tufted dwarf plant. Leaves linear-spathulate, 1—2 inches long. Peduncles thread-like, erect, as long again as the leaves, loosely racemose above. Flowers small but beautifully coloured; sepals yellow streaked with red, the upper one ovate-lanceolate, acute, the connate lateral two similar, bifid at the tip; petals and lip very minute, the former linear-lanceolate acute, the latter oblong-obtuse, furrowed.

Pleurothallis picta, Lindl. in Bot. Reg. XXI. sub. t. 1797 (1836). Id. t. 1825. Id. Fol. Orch. Pleur. No. 222. Gard. Chron. II. s. 3 (1887), p. 431. *P. surinamensis*, Focke in Miquel's *Stirpes Surinam*, t. 646.

Introduced by Messrs. Loddiges from Demerara in 1834, and occasionally met with in cultivation since. It is closely allied to the equally interesting *Pleurothallis Grobyi* from the same country, which appears to be lost to cultivation; the *P. picta* of the *Botanical Magazine*, tab. 3897, is a totally different species, viz., *P. strupifolia* (Lindl.). "Although a *Pleurothallis*—and it might be a very unfortunate thing to be a *Pleurothallis*—*P. picta* is really a little gem, its numerous racemes of bright yellow and red flowers being very attractive." *

P. punctulata.

Stems about 2 inches high, slightly two-angled. Leaves lanceolate-oblong, sub-acute, narrowed below into a short petiole, blade 3—3½ inches long, erect, exceedingly stiff and leathery, glaucous on the back. Peduncles shorter than the leaves, sheathed at the base by a whitish tubular spathe, one-flowered. Flowers 1¾ inches across the sepals when spread out; upper sepal broadly lanceolate, acute, light yellow spotted with brown-purple; lateral sepals "connate into a concave, oblong body, the minute acute points only free," coloured like the upper one; petals broadly lanceolate, one-third as long as the upper sepals, light vinous red with brown-purple spots; lip oblong, obtuse, concave, papillose above, deep maroon-purple. Column terete with two minute cirri at the apex.

Pleurothallis punctulata, Rolfe in Gard. Chron. IV. s. 3 (1889), p. 756.

* Gard. Chron. loc. cit. supra.

Introduced by us from New Granada in 1885. As may be gathered from the above description, the flowers are large for the genus and handsomely coloured; the species is therefore worthy of a place in every representative collection of orchids. "A curious feature in the plant is to be seen in the leaf, which has a sharp twist at the base, and by which the flower hangs pendulous beneath it."

P. Roezlii.

Stems slender, erect, 3—6 inches high, clothed with pale brown, scarios sheaths. Leaves oblong-lanceolate, emarginate or acute, 5—8 inches long, very leathery, light grass-green. Peduncles longer than the leaves, dull purple, with 2—3 joints, at each of which is a whitish, sheathing, closely appressed, membranous bract, and a similar one at the base of each pedicel; racemes nodding, 5—9 or more flowered. Flowers pendulous, partially expanding, deep sanguineous purple; sepals $1\frac{1}{4}$ inches long, the upper one elliptic-oblong, concave, keeled behind; the lateral two connate into an oval blade with two keels beneath; petals like the upper sepal but smaller; lip tongue-shaped, the margins of the basal half inflexed, the distal half pubescent above. Column white.

Pleurothallis Roezlii, Rehb. in *Linnaea* XLI. p. 13 (1877). Godefroy's *Orchidophile*, 1888, p. 80. *P. laurifolia*, Rehb. in *Xen. Orch.* II. p. 31 (1862), not Humbt. et Kunth.

According to the *Orchidophile*, this plant was discovered by Roezl* in the vicinity of Sonson, situate at a considerable elevation on the western slopes of the central Cordillera of New Granada. As it is said to have been found growing under the same conditions as *Masdevallia macrura*, also one of M. Roezl's discoveries, that is to say, "on the moss-covered blocks of granite that are found scattered over the ground around the town," it may be assumed to have been first detected at the same date as the discovery of that plant, or 1874. It was introduced into France by M. Kienast-Zölly, a zealous orchid amateur of Zurich, and was exhibited by M. Godefroy, of Argenteuil, near Paris, at one of the Royal Horticultural Society's meetings in March, 1885, when it became known to British cultivators for the first time. The above description was taken from a plant in the collection of Sir Trevor Lawrence, Bart., at Burford Lodge, near Dorking. The flowers of this *Pleurothallis* are the most richly coloured yet seen in the genus.

* The only information given in *Linnaea*, respecting the discovery of the plant, is contained in the following brief sentence:—"Hic vir (Roezl) plantas vivas collegit quae miserime perierunt."

CRYPTOPHORANTHUS.

Rodriguez Gen. et Sp. Orch. nov. II. p. 79 (1881). Rolfe in Gard. Chron. II. s. 3 (1887), p. 692.

This is a genus recently founded for the reception of some eight or ten species at present known, some of which had been previously referred to *Pleurothallis* and others to *Masdevallia*, but all showing the same structural peculiarity in their flowers, and differing essentially from both genera in the following character as described by Mr. Rolfe, of the Kew Herbarium, in the *Gardeners' Chronicle*, loc. cit. supra:—

“The flowers do not open at all in the ordinary manner, but the sepals remain united both at base and apex; two small lateral openings on either side, where the upper sepal joins the lateral ones, being the only openings into the flower.”

These lateral openings have suggested the name Window-bearing for these curious orchids, a designation by which they will probably be hereafter popularly known. The scientific name *Cryptophoranthus** refers to the hidden parts of the flower; the petals, lip, &c., being concealed within an almost closed flower, the only opening into which is by a pair of small windows at the side.

The first species of the group now proposed to be brought under *Cryptophoranthus*, that became known to science was described by Dr. Lindley, in the *Botanical Register* for 1836 (sub. t. 1797), under the name of *Specklinia atropurpurea*, but which he subsequently transferred to *Pleurothallis* (*Bot. Reg.* 1842, misc. p. 68); three years later this same plant was figured and described by Sir William Hooker, in the *Botanical Magazine*, t. 4164, as *Masdevallia fenestrata*, Lindl. MS. Mr. Bentham, when dealing with it for the *Genera Plantarum*, admitted that it had apparently with equal right been published in both genera.† This instance is adduced here in order to show the difficulty experienced by these eminent botanists in determining the systematic place of the plant—a difficulty that has arisen in a scarcely less degree with other species that have since been brought to light, and which are now grouped with it. To obviate this difficulty, it is proposed to adopt the genus *Cryptophoranthus*, which the Brazilian botanist Rodriguez created for the reception of three Brazilian species described by himself, and which he was unable to refer to any known genus. To these,

* From κρυπτός (kruptos), “hidden,” φερός (phoros), “bearing,” and ἄνθος (anthos), “a flower.” The compound is non-classical and cumbrous, and it is to be regretted that a more simple designation was not selected by the author.

† Jour. Linn. Soc. XVIII. p. 292.

Mr. Rolfe, of the Kew Herbarium, has added *Pleurothallis atropurpurea*, Lindl. (*Masdevallia fenestrata*, Lindl.), and two or three others of later introduction, all evidently allied to the Rodriguezian species by the same peculiarity of structure in the flowers. The genus "is not included in the main body of the *Genera Plantarum*, but Mr. Bentham obtained Rodriguez's work in time to mention it in the addenda" (p. 1225), where, however, it is reduced to *Pleurothallis*. It will be easily understood from the foregoing how close is the connection between the three genera *Pleurothallis*, *Masdevallia*, and *Cryptophoranthus*; the last named is separated from the two former by the character described above and no other, and the only essential difference between *Pleurothallis* and *Masdevallia* is, that in the latter the sepals are united at their base into a tube, and when this is extremely short or nearly obsolete as in *Masdevallia platyrhachis*, the two genera merge into each other. *Restrepia*, although in the same natural group, is separated from these three genera by its four pollinia, they having only two.

The introduction of the genus into these pages is for the express purpose of bringing under the notice of cultivators two of the best known species included in it, the first having an exceptional interest attached to it on account of the classical investigation respecting the fertilisation of its flowers by the greatest English naturalist of the present century, and the second on account of its bearing the name of one of the most respected of English orchid amateurs of the same period.

Cryptophoranthus atropurpureum.

Stems tufted, 2—3 inches high, clothed with sheathing scales, monophyllous. Leaves elliptic-oblong, acute, 2—4 inches long, bright green above, purplish beneath. Peduncles 2—3 or more from the base of each leaf, one-flowered. Flowers about an inch long, somewhat resembling a bird's head, brownish purple; sepals coherent except at a small opening below the apex which is turned upwards, gibbous below at the base; petals ovate, acute, parallel with the column; lip oblong, acuminate, channelled above and toothed towards the apex. Column semi-terete, the petals, lip and column all minute and concealed by the united sepals. Pollinia 2.

Cryptophoranthus atropurpureum, Rolfe in Gard. Chron. II. s. 3 (1887), p. 693. *Specklinia atropurpurea*, Lindl. in Bot. Reg. sub. t. 1797 (1836). *Pleurothallis atropurpurea*, Lindl. in Bot. Reg. 1842, misc. p. 81. Id. Fol. Orch. Pleuroth. No. 107. *Masdevallia fenestrata*, Lindl. ex Hook. Bot. Mag. t. 4164 (1845).

Introduced from Jamaica to the Royal Gardens at Kew by Purdie in 1843; it had, however, been made known to science seven years previously from dried specimens received from the same island; it also occurs in Cuba. For many years after its introduction it remained in cultivation under the name of *Masdevallia fenestrata*, both at Kew and in a few other orchid collections, rather as a

curiosity than from any other cause, till the late Mr. Darwin showed that the remarkable structure of its flowers rendered it more worthy of attention than it had previously received. He pointed out that the manner in which the flowers are fertilised was altogether unknown, and that he himself failed to make it out satisfactorily. As already stated, the plant has thus acquired a special interest for all those who observe the wonderful contrivances existing throughout the whole race of orchids for the purpose of securing the perpetuation of the species. No apology is needed for introducing here Mr. Darwin's account of the flower of this curious species :—



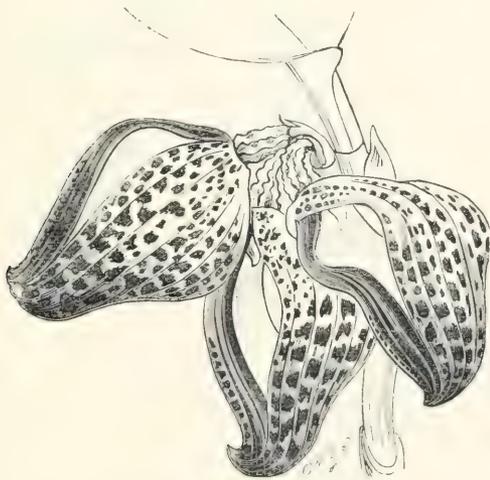
Cryptophoranthus atropurpureum.

“*Masdevallia fenestrata* is an extraordinary flower, for the three sepals always cohere together and never open. Two minute lateral oval windows, seated high up in the flower and opposite each other, afford the only entrance into the flower; but the presence of these two minute windows shows how necessary it is that insects should have access in this case as with other orchids. At the bottom of the roomy and dark chamber formed by the closed sepals, the minute column is placed, in front of which the furrowed labellum stands, with a highly flexible hinge, and on each side the two upper petals,

a little tube being thus formed. Hence, when a minute insect enters, or a larger insect inserts its proboscis through either window, it has by touch to find the inner tube in order to reach the curious nectary at its base. Within this little tube formed by the column, labellum and petals, a very broad and hinged rostellum projects at right angles, the under surface of which is viscid; the minute caudicles of the pollinia projecting out of the anther case, rest on the base of the upper membrane surface of the rostellum. The whole structure of the flower seems carefully intended to prevent the withdrawal of the pollinia, as well as their subsequent insertion into the stigmatic chamber. Some new and curious contrivance has here to be made out."—*Fertilisation of Orchids*, pp. 168-69.

C. Dayanum.

Stems 2—3 inches high, clothed with broad sheathing scales, and bearing a solitary oval leaf 3—4 inches long and 2—3 inches broad,



Cryptophoranthus Dayanum.

(From the *Gardeners' Chronicle*).

tinged with purple when mature. Peduncles from the base of the leaf, very short, one-flowered. Upper sepal joined to the lower connate two at base and apex, ovate-oblong, acute, slightly convex, and with 6—7 shallow keels above, pale yellow spotted with deep reddish purple, the spots smaller and more numerous on the basal portion; lower connate sepals similar with inflexed margins, with a broad keel below and a gibbosity at the base, buff-yellow spotted with purple within, pale buff-yellow beneath, the inflexed margins purple; petals

and lip very minute, pale yellow, the former oblong, obtuse, the latter tongue-shaped.

Cryptophoranthus Dayanum, Rolfe in Gard. Chron. II. s. 3 (1887), p. 693.
Masdevallia Dayana, Rehb. in Gard. Chron. XIV. (1880), p. 295. Id. XXVI. (1886), p. 428, icon. xyl.

This curious plant was first brought under notice by the late Mr. John Day, who acquired it at a sale of orchids at Stevens' Rooms in 1872, when it was offered as a new species of *Restrepia*; it had been sent there by M. Linden, of Ghent, and had presumably been received from New Granada, from which country it was afterwards sent to us by Gustav Wallis. It flowered for the first time in this country in Mr. Day's collection at Tottenham in 1875.

RESTREPIA.

Humbt. et Kunth, Nov. Gen. et Sp. I. p. 366, t. 94 (1815). Lindl. Gen. et Sp. Orch. p. 14 (1830). Benth. et Hook. Gen. Plant. III. p. 491.

The *Restrepias* form a group of small, often minute plants, including about twenty species, all natives of the mountains of tropical America, from Brazil to Mexico, on which they occur at a considerable elevation, growing among moss on the stems of trees and on rocks, but always where the climate is humid. The genus is closely allied to *Pleurothallis*, from which there is little to separate it besides its greater number of pollinia, and its one-flowered peduncles.

The essential characters of the flowers are:—

The dorsal sepals and petals are free, thread-like, and have a small gland at their apex; the lateral sepals are much broader and are coherent; the labellum is generally flat, and is articulated with the base of the column, which is elongated. The pollinia are four in number, and are sub-pyriform or globose.

In their vegetation the *Restrepias* present much the same characteristics as *Pleurothallis*, which need not be here repeated.

About ten species have at different times been introduced into European gardens, all remarkable for the peculiar form of their flowers, some of whose parts bear a fanciful resemblance to the antennæ of certain insects. Some of the species flower several times during the year from the same growth, so that there is scarcely any season in which these curious flowers may not be seen. The genus is dedicated to Joseph E. Restrep, who first investigated the natural history of the Antioquian Andes.

The four forms described below are the most interesting of the group known to us. Their cultural treatment is the same as that of *Masdevallia*.

***Restrepia antennifera*.**

Stems 2—4 inches high, clothed with loosely imbricating spotted sheaths. Leaves ovate, acute, $2\frac{1}{2}$ — $3\frac{1}{2}$ inches long, leathery. Peduncles slender, longer than the leaves. Flowers large for the genus; upper



Restrepia antennifera.

sepal lanceolate, tapering into a filiform tail, pale yellow dotted with red; connate lateral sepals oblong, concave, boat-like, bifid at the apex, bright ochreous yellow densely spotted with brown-purple, the spots arranged in close-set rows; petals like the upper sepal but smaller;

lip oblong, one-third as long as the lateral sepals, appressed to and coloured like them. Column with two narrow toothed wings.

Restrepia antennifera, Humbt. et Kunth. Nov. Gen. et Sp. I. p. 367, t. 94 (1815).
Lindl. Gen. et Sp. Orch. p. 14 (1830). Id. Fol. Orch. Restr. No. 2. *Illus. hort.*
1869, t. 501. *Bot. Mag.* t. 6288. *R. maculata*, Lindl. Orch. Lind. No. 19. *R.*
guttata, Lindl. Fol. Orch. Restr. No. 3.

This is the largest flowered species of *Restrepia* known, and the one most generally cultivated. It is that upon which the genus was founded by Humboldt and his collaborator Kunth, it having been discovered by the distinguished traveller himself at the beginning of the present century, growing on the trunks of trees at 9—10,000 feet elevation, near Pasto, in southern New Granada. It was subsequently detected by Linden (Merida, Bogota), Schlim (Ocaña), Wallis, and other collectors in different localities in New Granada, and even in Venezuela, at altitudes ranging from 7,000 to 12,000 feet. It is thus spread over a large extent of territory, and is found to vary slightly in foliage, size and colour of flower, and in some minor particulars. The form known in gardens as *Restrepia maculata*, which was gathered by Linden at Salto de Teguendana, at 7,000 feet elevation, is a more robust plant than the common type, and has somewhat larger flowers, with the lower connate sepals of a deeper yellow. Another form, to which Lindley doubtfully gave specific rank under the name of *R. guttata*, is a very beautiful one, of which the sepals have purple-crimson spots on a white ground.

R. elegans.

A small tufted plant, smaller in all its parts than *Restrepia antennifera*. Stems $1\frac{1}{2}$ —3 inches high, clothed with stiffish scariosus scales. Leaves elliptic, sub-acute, $1\frac{1}{2}$ inches long. Peduncles usually in pairs, slender, erect. Upper sepal erect, lanceolate, prolonged into a straight tail as long as itself, basal portion white, streaked with purple, tail yellow; connate lateral sepals oblong, concave, yellow dotted with purple; petals similar to the upper sepal, but only half the size; lip clawed, oblong, emarginate, half as long as the connate lateral sepals, and coloured like them. Column slender, bent, whitish.

Restrepia elegans, Karst. Ausw. neuer Gewächse Ven. *vide Bot. Mag.* t. 5966 (1872). Van Houtte's *Fl. des Serres*, VII. t. 743 (1851). Lindl. Fol. Orch. Restr. No. 2. *R. punctulata*, Lindl. in lit. 1846.

A pretty little orchid, much resembling *Restrepia antennifera*, of which it is the representative on the Venezuelan Cordillera, in the province of Caracas. It occurs in the neighbourhood of Tovar, at

an elevation of 5—6,000 feet, growing on the mossy trunks of trees; in this locality it was discovered many years ago by Karsten, a German traveller, and re-discovered some years afterwards by the Belgian collector, Funck, through whom it was introduced into European gardens by M. Linden, about the year 1850.

R. pandurata.

Stems 1—2 inches high, clothed with pale loosely imbricating membranous sheaths. Leaves ovate, acute, $2\frac{1}{2}$ inches long, very stiff and leathery, deep green above, dull purple beneath. Peduncles slender, shorter than the leaves, several in succession produced from the base of each leaf, pale green speckled with dull purple, one-flowered, the ovary sheathed by an acute bract. Upper sepal narrowly lanceolate, tapering into a short tail whitish with purple veins and tip; lateral sepals connate into an oblong, emarginate, concave blade, whitish densely spotted with crimson-purple, the spots arranged in longitudinal lines; petals like the upper sepal, but much smaller, and with three purple streaks on the dilated part; lip coloured like the connate sepals, with the spots more scattered, panduriform, emarginate, with a long bristle on each of the basal lobes. Column elongated, clavate, arching, with two orange spots at the base and a purple streak above them.

Restrepia pandurata, Rehb. in lit. ad. F. W. Moore, Hort. bot. Glasnevin.

A very floriferous species that has been for some time in cultivation in the Royal Botanic Garden at Glasnevin. It has also been imported by us from New Granada, which is thence known to be its native country, but the locality in which it occurs has not been communicated to us. The spots on the connate sepals and lip, when viewed through a pocket lens, are of gem-like brilliancy, and form one of the most attractive of floral objects.

R. xanthophthalma.

A dwarf tufted plant. Stems 1—2 inches high, clothed with imbricating membranous sheaths. Leaves linear-oblong, obtuse, as long as the stems. Peduncles shorter than the leaves, pale yellow, spotted with purple. Upper sepal subulate with a clubbed tip; lower connate sepals oblong, concave, bifid at the apex; lip oblong, rounded at the apex, about one-third as long as the connate lateral sepals.

Restrepia xanthophthalma, Rehb. in Hamb. Gartenz. XXI. p. 300 (1865). R. Lansbergii, *Bot. Mag.* t. 5257.

A native of Guatemala, from which country it was sent to the Royal Gardens at Kew by Salwyn, about the year 1860. Although one of the prettiest of the small-flowered *Restrepias*, it is now rarely

seen in orchid collections. *Restrepia Lansbergii* (Rehb.), with which *R. xanthophthalma* has been confounded, is evidently a different plant* that was discovered by Wagener in 1850, in Caracas, and introduced by him into European gardens.

MASDEVALLIA.

Ruiz et Pav. Fl. Peru et Chili, Prod. 122, t. 27 (1794). Benth. et Hook. Gen. Plant III. p. 492 (1883).

In *Masdevallia* we have a genus of plants as remarkable for the uniformity of their vegetation as for the diversity of form and colour displayed in their flowers. Striking as are the grotesque shapes assumed by the flowers of some of the species, perhaps still more so is the extraordinary brilliancy of the colours of others, while in strong contrast to these, there are other species whose flowers are of so homely a hue as to fail altogether to attract the favour of the greater number of orchid cultivators.

The structure of the flowers of *Masdevallia* presents a curious anomaly when compared with that of the flowers of many of the genera that find favour with amateurs, such as *Cattleya*, *Dendrobium*, many *Odontoglossa*s and *Oncids*, etc., in which the lip is often enormously developed, apparently at the expense of the other floral segments, and it is also the most richly-coloured of all the segments. In *Masdevallia*, on the contrary, the lower whorl of floral segments—the sepals, as they are conventionally called—are the most developed and the most richly-coloured parts of the flower, this development being, no doubt, at the expense of the petals and lip, which are reduced to minute organs† that have but an insignificant influence on the aspect of the flower, and which are not infrequently quite concealed within the tube formed by the cohesion of the sepals at their basal end. Another peculiarity, although not confined to this genus, is seen in the sudden contraction of the sepals into long filiform tails, which are often of a colour different from the basal or tubular portion, and which contribute much to the bizarre appearance of the flowers.

* See Xen. Orch. I. p. 170, t. 60.

† In *Masdevallia Chimera*, *M. Chestertonii* and most other saccolabiate species, the lip is moderately large in comparison with the size of the entire flower, while in *M. Gargantua*, *M. platyglossa*, *M. velifera*, and other coriaceous species it is quite a conspicuous organ, but always less than the sepals.

Curious as are these peculiarities in structure, it is certain that they have an important bearing on the economy of the plants with an especial aim to the fertilisation of the flowers by insect agency, since it is impossible to see by what other means this is effected. The gorgeous colours of the sepals of some species, and the powerful odour (almost fœtor) of the labellum of others have doubtless been given them to attract insects to the flower; these would naturally alight either on the broad lateral sepals, or, where that organ is large enough, on the labellum, which is usually fluted or channelled, or, as in the saccolabiate group, curiously sculptured, but in such a way as to afford a guide to an insect to the bottom of the sepaline tube where honey would be most likely to be secreted, although we have never detected any such secretion in any of the species cultivated by us. It is difficult to see how an insect that has once made its way to the foot of the column, *via* the labellum, can withdraw without carrying away the very small and very light pollinia, and which drop from the anther chamber (clinandrum) upon the slightest touch; moreover the labellum itself is, in the majority of the species, parallel with the column and almost adpressed to it except at the reflexed tip, so that an insect could scarcely make its escape that way without either touching the rostellum or some other part of the sexual apparatus. In the same way, an insect loaded with one or more of the pollinia, on entering a second flower would scarcely fail to deposit them on the stigmatic surface, where they would be retained by the viscid secretion. No instance of a *Masdevallia* being self-fertilising has yet been observed by us, but at least two undoubted natural hybrids (*see infra*) have been introduced with one or other of the recognised parents; it is not possible to imagine that the cross could have been effected otherwise than by insect agency.

The essential characters of *Masdevallia* are:—

The *sepals* are connate at the base, usually into a sub-cylindric or broadly campanulate tube, the free portions, with very few exceptions, being produced into long, slender tails.

The *petals* are small, parallel with the column, and generally narrow.

The *lip* is also small, polymorphous, and articulated at the base of the column.

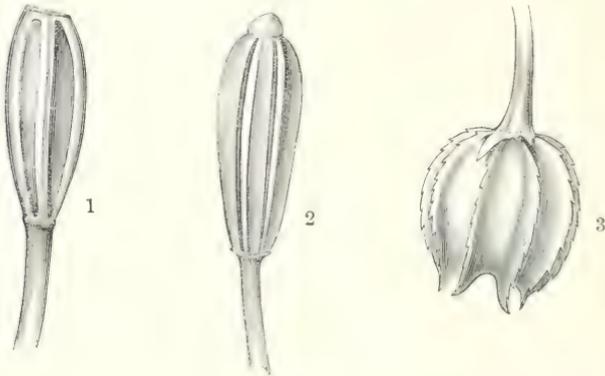
The *column* is either margined or winged, and is sometimes produced at the base into a short foot; the pollinia are two, without caudicle.

The *capsule* is cylindric or fusiform, six-ribbed, from one-half of an inch to an inch long.*

In their vegetation the *Masdevallias* are cæspitose or tufted herbs without pseudo-bulbs.—

* In *Masdevallia Chimæra* and other saccolabiate species, the capsule is ovoid-orbicular, about as large as a medium-sized gooseberry, with three pairs of prominent ribs, more or less serrate at the edge.

The stems are short, erect, invested with membranous sheaths, and monophyllous. The leaves vary but little in form, but considerably in size in the different species. They are usually lanceolate, oblanceolate, or elliptic, attenuated below into channelled foot-stalks, and very leathery in texture. The peduncles, which spring from the base of the foot-stalk, are sometimes clothed with a scariosus sheath, or are distinctly jointed with a small bract at each joint, and at the base of the ovary, often one-flowered, but sometimes 2—5 flowered, or terminating in a many-flowered raceme.



Capsules of *Masdevallia*—(1) *Veitchiana*. (2) *maculata*. (3) *Chimera*.

The genus *Masdevallia* was dedicated to Joseph Masdeval, a Spanish physician and botanist of the eighteenth century, by Ruiz and Pavon, two botanists of the same nationality, who were sent out to Peru by the Spanish Government in 1777 to investigate the *Cinchona* forests of that country; and who, during their stay in South America, compiled a *Flora of Peru and Chili*. The type species is Peruvian, and was named by them *Masdevallia uniflora*, a plant that has not been gathered by any modern collector, but which may be still lurking in the remote valley high up on the Andes, where first discovered; its habitat, according to the founders of the genus, is “in rocky places near Huassahuassi,” wherever that may be.

There is scarcely a genus belonging to the Orchideæ that has been more rapidly extended of late years, through the discoveries of botanical travellers, than *Masdevallia*. *Masdevallia uniflora* was the only species known to its founders, and when, in 1832, Dr. Lindley published the third part of his *Genera and Species of Orchidaceous Plants*, only two more were known to him, *M. caudata* and *M. infracta*,

Thirty years later Reichenbach enumerated thirty-six species in Walper's *Annales Systematicæ*, but from that time forwards an almost uninterrupted stream of new species was poured into Europe, either as living plants or as dried specimens, so that Mr. Bentham, when dealing with Masdevallia for the *Genera Plantarum*, estimated the number at over 100;* and although some of the Reichenbachian species have to be reduced to varieties of previously known types, the number 125 cannot be regarded as an exaggerated estimate at the present time. Of these probably upwards of eighty have been, and may still be in cultivation in botanic gardens and in private collections; but many of them possess so little interest for amateurs in general, that most of such are purposely omitted in the synopsis that follows.

No sectional divisions of the genus were proposed by Mr. Bentham, the extreme difficulty of determining sectional characters from dried specimens alone, especially when the series is imperfect, being almost insuperable. Scattered through his numerous notes and descriptions of species published in the *Gardeners' Chronicle* and elsewhere, Reichenbach has indicated various sectional divisions, but nowhere do we find them brought together into a systematic form. That Masdevallia is not a mere aggregation of species is manifest enough from a comparison of such well-known species as *M. Veitchiana*, *M. Reichenbachiana*, *M. Chimæra*, *M. Estradæ*, *M. polysticta*, *M. triaristella*, etc., etc., hence the want of a scientific classification of the included species has long been felt, both by botanists and by horticulturists. As a step in that direction we have brought together those Reichenbachian sections that include most of the species hereafter described, and have indicated the characters upon which they have been framed,† but, as stated above, other species are cultivated in a few collections, and many more have been described from dried specimens, while others again are but still very imperfectly known. To draw up sectional characters for the whole of the genus is therefore not here intended, as the necessary material for it is not yet available.

I. EUMASDEVALLIA. Lip generally ligulate, or linear-oblong, usually nearly flat, more or less fleshy; petals flat, often somewhat oblique; sepals united below into a tube which is generally but not always longer than broad, the sepaline tails variable in length, breadth, colour, &c.

A very large section, comprising the great bulk of the genus and not easily confounded with the remaining sections. It admits of sub-division into

* With the remark that "plures tamen hortulanis potius quam botanicis distinctæ," which later examination has amply confirmed.

† In this we have been assisted by Mr. R. A. Rolfe, of the Kew Herbarium, to whom we tender our best acknowledgments. Mr. Rolfe kindly placed his notes on this subject at our disposal, and at his suggestion we have reduced several of the Reichenbachian sections to sub-sections of EUMASDEVALLIA. We have also to express our indebtedness to Sir Trevor Lawrence, Bart., M.P., Mr Sydney Courtauld, Capt. Hincks, Mr. Charles Winn, and Mr. F. W. Moore, of Glasnevin, for materials that have enabled us to include in the synopsis that follows several rare and little known species which, without such help, must have been unavoidably omitted or but imperfectly described.

groups of minor importance, which on the whole are very natural and fairly well characterised, thus :—

1. *Coriaceæ*. Perianth distinctly coriaceous, varying from shortly and broadly to narrowly tubular, sepaline tails variable, usually short and rigid ; peduncles one-flowered ; bracts generally small.

To this sub-section belong *Masdevallia calura*, *civilis*, *coriacea*, *elephanticeps*, *floribunda*, *Gargantua*, *Ionocharis*, *leontoglossa*, *Mooreana*, *pachyantha*, *Peristeria*, *platyglossa*, *Reichenbachiana*, *velifera*.

2. *Cucullatæ*. Bracts large and cucullate, which distinguishes the included species from the preceding.

It includes *M. corniculata*, *M. cucullata*, *M. macrura*.

3. *Polyanthæ*. Peduncles few or many-flowered. Flowers generally but not always somewhat coriaceous, differing but little in shape from the preceding groups.

A somewhat polymorphous group, including *M. Ephippium*, *infracta*, *maculata*, *Schlimii*, *tovarensis*.

4. *Coccineæ*. Perianth scarlet, rose-purple, or yellow, sub-membraneous, generally narrowly tubular below, lateral tails always short, or almost absent. Peduncles normally one-flowered, except in *M. racemosa*. A very natural group, easily recognised by the brilliant coloured perianth. All the included species and their hybrids are highly popular among cultivators.

This sub-section includes *M. amabilis*, *Barlaeana*, *coccinea*, *Davisii*, *ignea*, *militaris*, *racemosa*, *rosea*, *Veitchiana*.

5. *Caudatæ*. Perianth membranous, the tubular portion generally short and open, with long slender tails, peduncles one-flowered. A large, varied, and easily recognised group.

Included species, *M. Arminii*, *caudata* (*Shuttleworthii*), *Estradeæ*, *hieroglyphica*, *ludibunda*, *triangularis*, *Wageneriana*.

6. *Amandæ*. Flowers small, and borne in erect racemes, perianth membranous with short tails ; in other characters much resembling the preceding group. The best known species included in it are *M. Melanopus* and *M. polysticta*.

II. SACCOLABIATÆ.* Lip saccate or cochleate, petals club-shaped, keeled and papillose near the apex ; perianth tube short and open, generally more or less hairy. A most distinct section, including the species that are sometimes called by horticulturists the Chimæroid group.

It includes the following, *M. astuta*, *bella*, *Carderi*, *Chestertonii*, *Chimæra*, *Erythrochæte*, *Gaskelliana*, *Houtteana*, *nycterina*, *radiosa*, *Troglodytes*, *Vespertilio*.

III. TRIARISTELLÆ. Perianth tube extremely short ; lateral sepals united almost or quite to apex ; tails lateral, *i.e.*, not a prolongation of

* Reichenbach uses Saccilabiatae in most places, but in one or two instances Saccolabiatae ; as the latter compound is formed more in accordance with classical usage than the former, we have retained it in the text.

the sepals, but inserted below their apex on the lateral margin; peduncles slender, leaves small and narrow. A very natural group of exceptional interest, consisting of dwarf-tufted plants, bearing minute gem-like flowers.

The best known species in this section are *M. gemmata*, *triaristella* and *Tridactylites*.

IV. There is another section of the genus, of which *M. swertiaefolia* and *M. gibberosa* are typical examples, but neither these nor the other included species known to us, with two or three exceptions, are of sufficient horticultural interest to require description in the following pages; the sectional characters are therefore omitted. One peculiarity possessed by this section may, however, be noticed, viz., that the flowers are inverted, the labellum and the lateral sepals are superior, and the dorsal sepal underneath them.

Geographical distribution.—The Masdevallias are alpine plants, which have their home on the mountains of tropical America, chiefly on that portion of the Andes that extends from Peru to the Isthmus of Panama, and their continuation through central America into the Mexican territory. One species has been introduced from the Organ Mountains, near Rio de Janeiro, and a few others are reported from the mountains of Brazil, two or three from the Roraima in British Guiana, and others from the coast range of Venezuela; but by far the greater number inhabit the Cordilleras on the west side of the continent. They first appear on the Peruvian Andes at about the fifteenth parallel of south latitude, from whence they are somewhat sparingly distributed along the mountains northwards for many hundreds of miles, sometimes occurring within the *Odontoglossum* zone, but usually at a higher elevation, and above the limits of the forest. North of the equator, from where the great chain of the Andes divides into three distinct branches or Cordilleras, as they are called, the Masdevallias follow chiefly the central one, gradually increasing in numbers till the fifth parallel is reached, where they appear to attain their greatest development—more than twenty-five species having been observed within a small compass in the vicinity of Sonson.* Northwards from Medellin they diminish rapidly in numbers on the central Cordillera; but on the eastern range from Sogamosa to Ocaña, some of the most brilliant-flowered species of the sub-section *Coccineæ* are abundant, and spread for miles over the higher slopes above the forest. Along the western Cordillera,

* The late M. Roehl in Godefroy's *Orchidophile*, June, 1883, p. 643.

from the latitude of Popayan northwards to Antioquia, the best known saccolabiate Masdevallias occur generally at a lower elevation than their congeners on the central and eastern ranges. North of the isthmus the species are more scattered. Several interesting forms occur in Costa Rica, thence northwards they become more rare, till within the Mexican territory they entirely disappear. The Masdevallias attain their highest vertical range near their southern limit in Peru, where they ascend to between 9,500 and 13,000 feet. In New Granada they occur at a lower elevation, their vertical range extending from 6,000 to 11,000 feet, and perhaps occasionally higher, some small-flowered species ascending to near the snow-line; near Sonson, which may be regarded as a Masdevallia "centre," their altitude is from 6,000 to 7,500 feet. North of the isthmus, as far as the Mexican frontier, the mountains and table-lands have a lower average elevation, and the vertical range of the Masdevallias is accordingly lower than in South America.*

In these elevated regions the Masdevallias live under climatic conditions different from those we experience in Great Britain, and which cannot be but imperfectly imitated in the glass structures in which they are cultivated in this country; nevertheless their culture is not attended with any special difficulties. The climate peculiar to their habitat is none the less eminently deserving of the attention of cultivators, the chief phenomena of which may thus be summarised:— At the great altitude at which the Masdevallias are found, especially towards their southern limit, the pressure of the atmosphere is so much diminished, that the air is not only much rarer but it is also much colder, and its capacity for absorbing moisture is also greatly diminished, but owing to local causes the saturation point is constantly being reached.† Now the average pressure of the atmosphere at sea-

* The region here sketched, and the localities mentioned, are contained in the maps illustrating the distribution of *Odontoglossum* and *Cattleya*, thence rendering the preparation of a special map for *Masdevallia* unnecessary.

† Atmospheric saturation at the altitude at which the Peruvian *Masdevallias* live, and in a somewhat less degree those of New Granada and the other localities named above, signifies something different from what it does at the proximity to sea-level at which they are cultivated in England. The quantity of moisture contained in a given quantity of air at an elevation of 12,000 feet is but a small part of what the same quantity of air is capable of containing at sea-level in the same latitude. Thus, at or near sea-level, "one cubic metre of air saturated with moisture at 25° C. (77° F.) contains 22·5 grammes of water, and if the temperature of the air be reduced to 0° C. (32° F.), it will then be capable of retaining only 5·4 grammes of water." (Roscoe, *Elementary Chemistry*, p. 51.) Or to express these facts in more popular language, a cubic yard of air at sea-level and at the temperature of 77° F. is capable of containing about five-sixths of an ounce of aqueous vapour, but the same quantity of air at the freezing point can only contain about one-fifth of an ounce. Hence at an altitude of 9,000—12,000 feet, where the density of the atmosphere is reduced to nearly one-half, the actual quantity of moisture held in suspension at any temperature is considerably less than at sea-level.

level is nearly fifteen pounds to the square inch, or equal to that of a column of mercury 30 inches high; but at 12,000 feet above sea-level, an altitude reached by several of the Masdevallias, the pressure is reduced to one-half, or to about $7\frac{1}{2}$ pounds to the square inch, and the mercurial column of the barometer stands no higher than 15 inches. By repeated observations the mean annual temperature at sea-level at the equator, and deviating but little from it for several degrees of latitude on either side, is found to be 27.5° C. (82° F.), but at an elevation of 12,000 feet in the same latitude it is only 7° C (45° F.). At this elevation on the Andes of Peru, it has been observed that on clear days, the mean temperature at from one o'clock to three p.m. is nearly doubled, and at night the thermometer sinks to near the freezing point. The atmosphere is, however, constantly charged with moisture, caused by the vapours rising from the hot plains drenched by the equatorial rains on the eastern side of the mountains, and which are drifted thither by aerial currents, or attracted by the mountains themselves. In New Granada the climatic conditions of the *Odontoglossum* and *Masdevallia* zone are not very different from those of Peru, except that in consequence of the lower elevation, the atmospheric pressure is greater, and the mean temperature somewhat higher. Here on clear days the direct rays of a tropical sun cause oppressive heat, while its rapid radiation into space at night produces chilling cold; but both extremes are constantly being modified by the humidity of the atmosphere, scarcely a day passing on which this, at one time or other, is not at the saturation point. At Sonson, rain is frequent; almost every morning there is a dense fog, and on the neighbouring heights the temperature not infrequently sinks below zero (32° F.).* Generally, on the Cordilleras of New Granada and Venezuela, the rainy season lasts throughout the greater part of the year, owing to the immense quantity of aqueous vapour raised from the Atlantic Ocean being constantly blown towards them by the north-east trade wind.

Cultural Note.—The *Masdevallias* are usually cultivated in the “cool” house with *Odontoglossums*, *Oncids*, etc., but where they are made a speciality by amateurs or grown on a large scale by horticulturists, a separate house is assigned to them, in which they can be more efficiently treated according to their requirements, than when mixed with plants of other genera. When a separate house is so devoted to them, a lean-to with an east or north-east aspect should be preferred.

On their native mountains, the *Masdevallias* grow in a variety of situations—on the ground, in the crevices of rocks, on the trunks and branches of trees, and even on the roofs of buildings, but always where there is but little or no soil, or where there is but a small accumulation of

* Roehl in Godefroy's *Orchidophile*, 1883, p. 643.

vegetable matter; hence, as regards potting, Masdevallias should be treated as epiphytal orchids. They are, however, usually vigorous-rooting plants, and require room for the development of their roots, to allow for which pots of sufficient size should be used. The pots should be filled to two-thirds of their depth with a drainage consisting of clean broken crocks that have not been previously used for the same purpose, and the remaining third with a compost of sphagnum moss and fibrous peat in equal proportions; into this compost the roots should be carefully placed, the base of the plants being about on a level with the rim of the pot, or at least not much above it. The best seasons for re-potting Masdevallias are from the middle of January to the end of February, and from the beginning of October to the middle of November.

The temperature of the Masdevallia house should range throughout the year as near as practicable between 10° and 18° C. (50° — 65° F.), the night temperature descending about 5° F. lower than the day. In sultry weather, such as sometimes occurs in July and August, when the external temperature is from 25° to 32° C. (77° — 90° F.), the temperature of the house may be kept down by ventilation, by shading, and by keeping its atmosphere well charged with moisture by frequently watering the floors, stages and any surface from which water can readily evaporate. Generally, by regulating the shading, ventilation, and "damping down," as it is called by gardeners, during the summer, according to external circumstances, the temperature of the house may always be kept a few degrees lower than the external air.

In the humid climate in which the Masdevallias live naturally, their vegetation is at no period of the year interrupted, and hence, when transferred to glass houses in this country, a constant supply of water is one of their most essential requirements. This is usually afforded them in two ways—by maintaining a moist atmosphere in the house in the manner described above, and by direct application of water to the roots of the plants. The frequency with which the damping down should be done, and the quantity of water given at each watering, must be determined by the needs and condition of the plants, and according to the season of the year. Bearing in mind that Masdevallias must never be allowed to get dry at the roots, the cultivator will, by inspection of the plants, be better able to judge how much water should be given to them, and how often they require it, than by following any hard and fast rule. In winter, he may find that damping down once a day in the morning, and watering the roots once every four or five days will be sufficient, or less in time of severe frost, but even then the drying and exhausting effects of fire heat during prolonged cold weather must be counteracted by damping down and by watering the plants. As the season advances, it may be found necessary to damp down both in the morning and in the evening, and to water the plants once in three days or every alternate day; and in summer, damping

down three or four times a day and watering daily may not be found excessive.

And similarly with the ventilation and shading. From what is stated above, it will be readily inferred that the efficient use of both depends chiefly on, and is influenced by the external circumstances of weather; we prefer, therefore, to advise vigilance and a careful observation of these circumstances as they arise, than to attempt to frame any precise directions, which might possibly, if followed to the letter, partially or entirely defeat their own object. From their alpine character, most Masdevallias are naturally light-loving plants; the small dwarf species may therefore, with advantage, be always suspended near the roof-glass of the house in which they are cultivated.

The general cultural treatment here sketched is applicable to the majority of the Masdevallias, but a few exceptions have to be noted:—*Masdevallia towarensis* and the species included in the section SACCOLABIATÆ, *M. Chimæra* and its allies, occur at a lower elevation than the other species, and where the mean temperature is higher. These plants during the winter months are best stationed either in the coolest part of the Cattleya house or in the intermediate house, where they will receive as much light and air as circumstances admit; during the summer they may be removed to the cool house. It is a peculiarity of most saccolabiate Masdevallias, that their flower stalks grow downwards, like those of a Stanhopea; they should therefore be put into shallow baskets made of teak rods placed sufficiently wide apart to allow the egress of the flower stalks, and which may be easily suspended near the roof-glass of the house. No crocks are required for drainage, but peat and sphagnum only to root in, which must be kept constantly moist. These Masdevallias are very liable to the attacks of thrip, which can be kept under by washing with a solution of soft-soap.

SYNOPSIS OF SPECIES AND VARIETIES.

Masdevallia amabilis.

Leaves narrowly oblanceolate, acute, 4—6 inches long, leathery. Scapes slender, erect, as long again as the leaves, one-flowered. Flowers about an inch broad across the lateral sepals, brightly coloured; perianth tube narrow, bent, orange-yellow longitudinally veined with red; free portion of upper sepal oval, orange-yellow, sometimes deep rose with five red veins and contracted to a dull red tail $1\frac{1}{2}$ —2 inches long; lateral sepals connate to more than half their length, oval-oblong, gradually contracted to slender parallel tails, 1— $1\frac{1}{2}$ inches long, orange-yellow densely studded with crimson papillæ, and with three crimson-purple veins; petals and lip oblong, whitish, the former with one, the latter with several red longitudinal streaks.

Masdevallia amabilis, Rehb. in Bonpl. II. p. 116 (1854). Id. Walp. Ann. VI. p. 193. *Illus. hort. n. s. t.* 196 (var. lineata).

First discovered in 1850 by Warszewicz, on the Andes of northern Peru, but not introduced into European gardens till 1872, when it was re-discovered in the same region by Roezl. Its brilliant-coloured flowers bring it under our sub-section *Coccineæ*, its nearest allies being *Masdevallia Barlaeana* and *M. Veitchiana*.



Masdevallia amabilis.

M. Arminii.

Leaves oblong-lanceolate, $1\frac{1}{2}$ inches long, narrowed below into a somewhat slender petiole as long as the blade. Scapes slender, longer than the leaves, one-flowered. Perianth tube short, whitish; free portion of sepals crimson-purple, the dorsal one sub-orbicular, concave; the lateral two broadly oval-oblong, nearly flat, and contracted to filiform, yellowish tails 1—2 inches long. Petals linear-oblong, toothed at the apex, white; lip oblong, reflexed at the tip, where there is a blackish purple warty blotch.

Masdevallia Arminii, Rehb. in Bonpl. II. p. 283 (1854). Id. Gard. Chron. XVIII. (1882), p. 102.

First discovered on the eastern Cordillera of New Granada, in the Pamplona district, more than thirty years ago, by Schlim, but dedi-

cated by the late Professor Reichenbach to his friend Hermann Wagener, by latinising the Christian name. It appears to have been first introduced into European gardens by Messrs. Sander and Co., of St. Albans, in 1882.

M. astuta.

Leaves linear-oblanccolate, acute, complicate at base, 8—10 inches long. Scapes longer than the leaves, first decumbent, then ascending, 3—5 or more flowered, the flowers developed in acropetalous order, that is, successively along the rachis from pedicels springing from the base of the ovary of the next older. Sepals triangular, keeled behind, connate at the base to about one-third of their length, and forming a very short campanulate tube, pubescent on the inner side, cream-white densely spotted with red; tails $2\frac{1}{2}$ inches long, reddish purple, paler towards the tip; petals linear-oblong, with a hairy wart at the reflexed tip, white stained with purple; lip with a long bent claw that is fleshy upwards, and has a deep incision in the upper side; blade saccate with toothed margin and three raised longitudinal plates within, white with a slight reddish tint. Column beaked.

Masdevallia astuta, Rehb. in Gard. Chron. XXVI. (1886), p. 584.

A recent addition to the saccolabiate section, having for its nearest allies *Masdevallia Erythrochate* and *M. Gaskelliana*, connecting these with *M. Chimæra*. It was discovered by Carder, in Costa Rica, and introduced by Messrs. Shuttleworth and Carder, of the Park Road Nursery, Clapham, in 1886. As a species it is one of the handsomest of the group to which it belongs.

M. Barlæana.

Plant dwarf and tufted, with elliptic-lanceolate leaves 4 inches long including petiole. Scapes as long again as the leaves, slender, erect, with two appressed membranous bracts, one-flowered. Perianth tube narrow, slightly bent, prominently keeled and coral-red above, pinkish beneath; free portion of upper sepal small, sub-quadrate, orange-yellow with a median and marginal red lines, and contracted to a filiform red tail $1\frac{1}{2}$ inches long; the lateral two elliptic-oblong, connate to two-thirds of their length, and terminating in long points which cross each other, bright carmine shaded with scarlet and with three sunk crimson lines; petals and lip minute, oblong, white, the latter with a purple spot at the tip.

Masdevallia Barlæana, Rehb. in Gard. Chron. V. (1876), p. 170.

A species with medium-sized but brilliantly coloured flowers, allied to *Masdevallia amabilis*, from which it may be distinguished by the two lateral sepals being more divergent, by the broader and

shorter triangular sinus between them, and by their tails not being parallel. It was discovered by Walter Davis on the Andes of Peru, near Cuzco, and introduced by us in 1875. It was dedicated to Senhor J. B. Barla, at that time the Brazilian Consul at Nice, "well known for his orchidologic works, as well as for his special knowledge of the Floras of Liguria and Sardinia."

M. bella.

Leaves oblong-lanceolate, obtuse, 5—7 inches long. Scapes pendulous, dull purple with an appressed bract at each joint and at the base of the ovary; ovary short, angular, blackish purple. Flowers solitary, large and open, of triangular shape; the sepals pale yellow spotted with brownish crimson, the spots denser on the upper sepal, rarer on the lateral two and chiefly aggregated towards the outer margin; upper sepal triangular, contracted into a long, slender, reddish brown tail, 3—4 inches long; lateral sepals larger, sub-rhomboidal, connate to beyond the middle, and contracted into long slender tails like the upper one; petals small, obcordate, emarginate, yellow spotted with red; lip with a short fleshy claw and concave, shell-like blade, in the hollow of which are numerous raised lines radiating from the claw. Column very small.

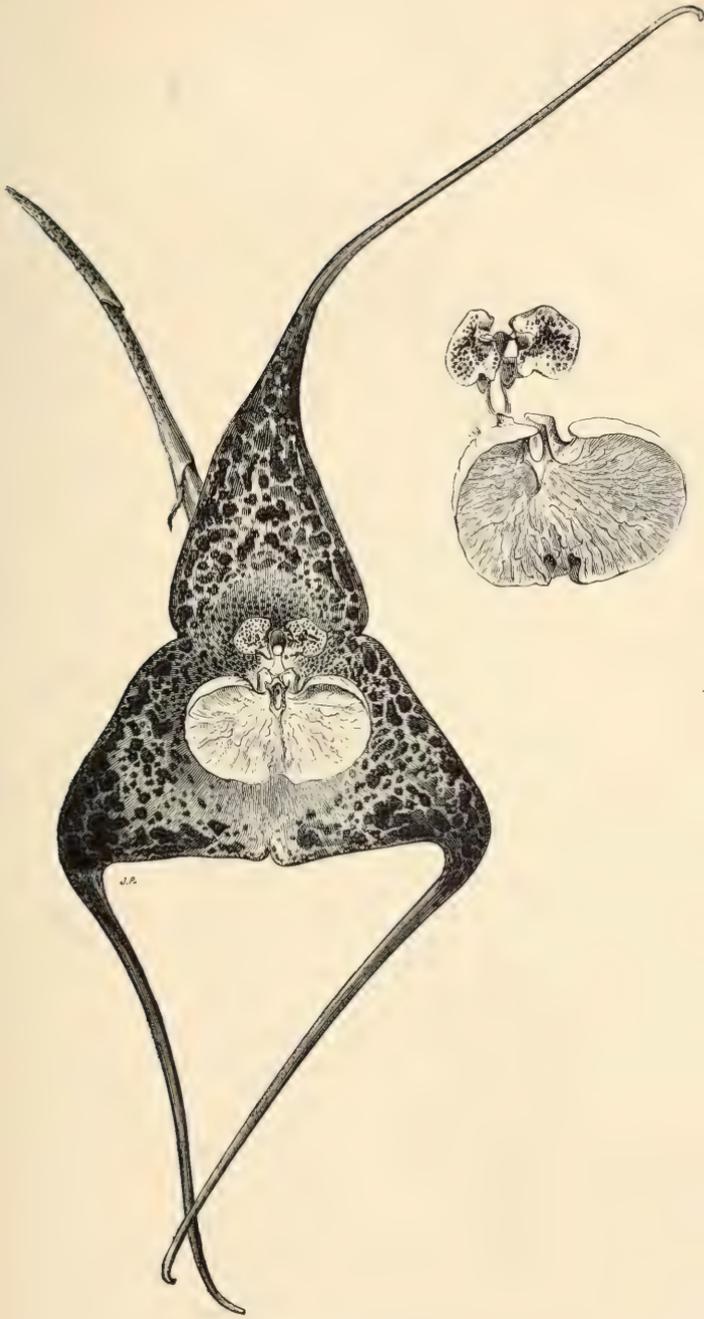
Masdevallia bella, Rehb. in Gard. Chron. IX. (1878), p. 725. Id. XIII. (1880), p. 756, icon. xyl. *Fl. Mag.* n. s. t. 433. *Belg. hort.* XXXIV. (1884), p. 57.

A curious and remarkable species allied to and much resembling *Masdevallia Chimæra*, but easily distinguished from it by its large shell-like labellum. It was discovered by the late Gustav Wallis while collecting for us in New Granada in 1873—4, but who failed to send home living plants. It was introduced four years later by Messrs. Low and Co., of Clapton. Its habitat is in the Frontino district, near Antioquia, on the western Cordillera, at 5,000—7,000 feet elevation, where it grows under the same conditions as *M. Chimæra*, and sometimes even mixed with it.

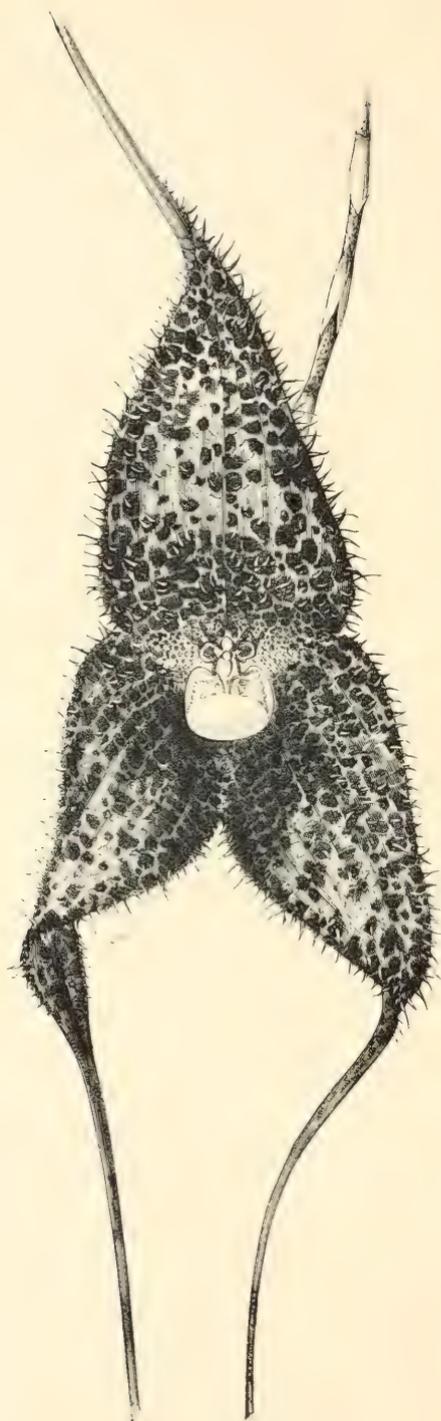
M. calura.

Leaves oblanceolate, 3 inches long, leathery and distinctly stalked. Scapes as long as the leaves, one-flowered. Flowers deep chocolate-red with a blackish shade; perianth tube cylindric, bent; free portion of upper sepal triangular, prolonged into a filiform, orange-yellow tail $1\frac{1}{2}$ —2 inches long; connate lateral sepals oval-oblong, reflexed, minutely papillose on the inner side, with a small triangular sinus between the tails, which are parallel and orange-yellow; petals linear-oblong; lip sub-rhomboidal. Column white.

Masdevallia calura, Rehb. in Gard. Chron. XX. (1883), p. 230.



Masdevallia bella.



Masdevallia Chimæra.

(See page 30.)

A species introduced by Messrs. Sander and Co. from Costa Rica, where it is said to be associated with *Masdevallia Reichenbachiana*. Its deep chocolate flowers with bright yellow tails render it distinct among the small-flowered Masdevallias. The specific name is from *καλὸς* (*kalos*), "beautiful," and *οὔρα* (*oura*), "a tail." *

M. campyloglossa.

Leaves linear-oblong, petiolate, obtuse, 3 inches long, very leathery. Peduncles slender, shorter than the leaves, one-flowered. Flowers about an inch across; perianth tube very short; sepals spreading, triangular, acuminate, dull white with some purple spots at the margin, and three purple veins; petals oblong, mucronate, white; lip longer than the petals, linear-oblong, slightly tapering, bent, obscurely pubescent, white with a purple median line, and a shorter one on each side of it.

Masdevallia campyloglossa, Rehb. in Gard. Chron. X. (1878), p. 588.

Acquired by us amongst other orchids at Stevens' Rooms in 1878, no information being given respecting its origin. As it is still in cultivation in several collections it could not be passed over in this place. Its specific name refers to its bent labellum, from *κάμπυλος* (*kampulos*), "bent," and *γλῶσσα* (*glossa*), tongue—in orchidology, "lip."

M. Carderi.

Leaves spathulate-lanceolate, 3—5 inches long. Scapes slender, pendulous, with 2—3 appressed membraneous bracts, shorter than the leaves, one-flowered. Flowers campanulate, French-white, blotched externally around and near the base of the connate sepals with brown-purple, the inner surface covered with short hairs, and spotted with brown-purple at the base; sepaline tails equidistant, 2 inches long, pale yellow, sometimes spotted with brown-purple; petals linear-oblong, reflexed at the tip, white with a purplish brown mid-line; lip sub-panduriform in outline, the basal half (hypochile) with a longitudinal cleft, the distal half (epichile) shell-like, smooth on the inside.

Masdevallia Carderi, Rehb. in Gard. Chron. XIX. (1883), p. 784. Id. XX. p. 181, icon. xyl.

Introduced by Messrs. Shuttleworth and Carder in 1883, and named after the junior partner of the firm, for many years a collector of orchids in tropical America, and who discovered this pretty *Masdevallia* on the slopes of the western Cordillera of New Granada, near Frontino.

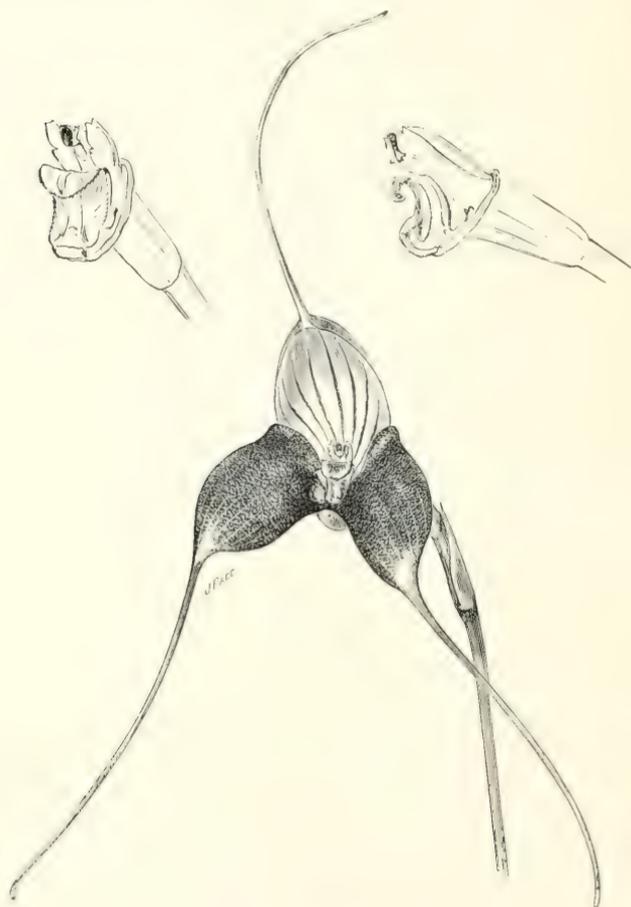
* The specific name is thence a substantive name, and if we interpret rightly Art. 34 of the *Laws of Botanical Nomenclature*, it should take a capital letter, but following custom, we leave it as it is. So also *campyloglossa*, *leontoglossa*, *macrura*, etc.

M. caudata.

Foliis obovato-oblongis, scapo paulo brevioribus, sepalis longissime aristato-caudatis. Hab. in subfrigidis regni Novogranatensis prope S. Fortunato, florens Junio. (Lindl. Gen. et Sp. Orch. p. 193.)

var.—Shuttleworthii.

Leaves obovate-oblong, often elliptic-oblong, 2—3 inches long, narrowed to a slender petiole of about the same length. Scapes equalling or longer than the leaves, with 1—2 acuminate, appressed bracts, one-



Masdevallia caudata Shuttleworthii.

flowered. Flowers 1—1½ inches across, exclusive of the sepaline tails perianth tube short, campanulate gibbous below; upper sepal obovate, concave, light yellow spotted with red and with 5—7 red veins

lateral sepals obliquely ovate, mauve-purple mottled with white; tails yellow, 2 — 3 inches long; petals linear-oblong, white; lip broadly oblong, reflexed at tip, pale mauve.

M. caudata Shuttleworthii, Rehb. in Gard. Chron. V. s. 3. (1889), p. 200.*
M. Shuttleworthii, Rehb. in Gard. Chron. III. (1875), p. 170. *Bot. Mag.* t. 6372.
 Williams' *Orch. Alb. I.* t. 5. Sander's *Reichenbachia I.* t. 13.

var.—*xanthocorys*.

Flowers smaller than in the variety *Shuttleworthii*, with the sepals a little broader at the base, the upper sepal pale yellow with thin brownish red, dotted veins, the lateral sepals pale yellow sometimes faintly tinted and spotted with rose.

M. caudata xanthocorys, supra. *M. Shuttleworthii xanthocorys*, Rehb. in Gard. Chron. XVII. (1882), p. 366.

Masdevallia caudata was one of the first species of the genus that became known to science, a dried specimen having been received by Dr. Lindley in 1831, or even earlier. It remained unknown to horticulture till it was re-discovered by Mr. Shuttleworth in 1874, between Agua Larga and Fusugassinga in New Granada, while collecting orchids for Mr. William Bull, of Chelsea, by whom it was introduced. It has also been detected in the *Odontoglossum crispum* district, near Pacho, growing on the trunks of trees at 6,500—8,000 feet elevation. The variety *xanthocorys* first appeared in the collection of Sir Trevor Lawrence, Bart., at Burford Lodge, near Dorking, in 1882.

M. *Chestertonii*.

Leaves narrowly oblanceolate, sub-acute, 5—7 inches long, leathery. Scapes as long as the leaves, pendulous, one-flowered. Sepals ovate-oblong, keeled behind, with abrupt slender tails an inch long, the blade greenish yellow spotted with blackish purple; petals minute, oblong, yellowish red with an apicular black tumour; lip large, with a grooved claw and transversely reniform, concave blade, pale orange-yellow with numerous radiating raised reddish lines. Column terete, arched, white with a few brownish red spots near the apex.

Masdevallia Chestertonii, Rehb. in Gard. Chron. XIX. (1883), p. 532. *Bot. Mag.* t. 6977.

* The typical *Masdevallia caudata* is but poorly represented in British herbaria, but enough of it remains to remove any doubts as to the propriety of referring Reichenbach's *M. Shuttleworthii* to that species. The late Professor himself also arrived at this conclusion, and gave expression to his belief in the article quoted above, but adopting the unusual course of affixing a varietal name to the form which he considered to be the type. There is, however, still some uncertainty whether *M. caudata* (Lindl.) and *M. Shuttleworthii* (Rehb.) are simply identical, or whether the latter is a variety of the former; until this uncertainty can be cleared up, it appears to us that the safest course is to leave them for the present as they are described in the text.

A very curious species, one of the saccolabiote group, with flowers about the size of those of *Masdevallia nycterina*. It was the last discovery of Chesterton while collecting orchids for Messrs. Sander and Co., in the New Granadian province of Antioquia, a short time previous to his death, in 1883. It is well distinguished by its large, pale red, elaborately sculptured lip with a grooved claw, in which it approaches *M. bella*, but differs from it in the colour both of this organ and of the sepals.

M. Chimæra.

Leaves narrowly oblanceolate, 6—9 inches long, narrowed below into a complicate foot-stalk, invested with membranous sheaths at the base. Scapes slender, 12—15 (or more) inches long,* pushing first downwards and then upwards, but sometimes erect, jointed with a small pale green appressed sheath at each joint, 3—5 or more flowered. Flowers produced singly by successive prolongations of the scape from the joint immediately below the ovary, and issuing from the sheathing bract; very variable in size and colour,† but with the following constant characters:—Perianth tube broadly campanulate, very short; sepals broadly ovate, acuminate, keeled behind, prolonged into slender tails 3—4 inches long, the lateral two connate to about one-half of their length, forming at the suture a deep boat-shaped depression, all more or less pubescent on the inner side and covered with warty spots; petals spatulate, expanded at the tip, into lobes, on which is a blackish purple spot; lip saccate, clawed, the claw (hypochile) fleshy with a broad oval cleft above, the blade (epichile) concave with three parallel or very slightly divergent raised longitudinal lines and with numerous smaller ribs radiating from the outside two to the toothed margin. Column terete, bent at the apex, usually yellow above and white beneath.

Masdevallia Chimæra, Rehb. in Gard. Chron. 1872, p. 463. Id. in *Linnaea* XLI. p. 8 (1877). *Xen. Orch.* II. p. 195, t. 185 and t. 186, fig. 1. Gard. Chron. IV. (1875), p. 258. Id. XIV. (1881), p. 113. *Williams' Orch. Alb.* V. t. 203.

var.—*Backhouseana*.

Flowers among the largest, with shorter tails and hispid pubescence; ground colour of sepals light yellow with cinnamon-red warty spots somewhat sparingly scattered over the central area of each sepal; tails reddish brown; lip white.

M. Chimæra Backhouseana, supra. *M. Backhouseana* in Gard. Chron. XI. (1879), p. 716. Sander's *Reichenbachia* I. t. 19.

* Roehl, the discoverer of the species, states that the plants detected by him near Choco bore flower scapes 2 feet long; a variety collected by Kalbreyer, near the upper limits of its vertical range, had erect scapes little more than 6 inches long.

† The polymorphy of *Masdevallia Chimæra* was first observed by Gustav Wallis. Gard. Chron. IV (1875), p. 258.

var.—Gorgona.

Sepals very hairy, the ground colour canary-yellow densely spotted with deep red-purple except towards the inner margin of the lateral two where the spots are more scattered, and at the base of the upper one where they are replaced by purple dots; lip tinged with pale orange-red.

M. Chimæra Gorgona, supra. M. Gorgona, Hort.

var.—Roezlii.

Sepaline spots blackish and very densely placed, leaving but small traces of the pale ground colour, pubescence very close; lip with a somewhat broader and shorter epichile than in other forms, white or faintly tinted with rose, the raised lines within the sac bright rose.*

M. Chimæra Roezlii, supra. M. Roezlii, Rehb. Xen. Orch. II. p. 196, t. 186, fig. 2.

sub-var.—rubra (Williams' *Orch. Alb. VI.* t. 243), spots chocolate-red and not so dense as in the type.

var.—senilis.

Flowers among the smallest of the *Masdevallia Chimæra* forms; the pubescence on the inner surface of sepals long and whitish, the spots blackish red on a pale yellow ground; lip white with an orange spot within the sac on the basal side

M. Chimæra senilis, supra. M. senilis, Rehb. in Gard. Chron. XXIV. (1885), p. 489.

var.—severa.

Peduncles erect or sub-erect, shorter, and bearing smaller flowers than the typical form; sepals narrower and more acuminate, pale yellow densely spotted with chocolate-red, pubescence close.

M. Chimæra severa, supra. M. severa, Rehb. in Gard. Chron. III. (1875), p. 170.

var.—Wallisii.

Sepals with hispid pubescence, whitish or pale yellow more or less covered with brown-purple warty spots; tails red-purple; lip white sometimes yellowish within the sac.

M. Chimæra Wallisii, supra. M. Wallisii, Rehb. in Gard. Chron. IV. (1875), p. 258. Id. XXIII. (1885), p. 270 (stupenda). M. Chimæra, *Bot. Mag.* t. 6152. *Revue hort.* 1881, p. 130. *Fl. Mag.* n. s. t. 149.

var.—Winniana.

Flowers large; sepals elongated and more acuminate than in the variety *Roezlii* which it closely approaches, and with the tails more slender; pubescence very close, spots dense and blackish; at the base of the upper sepal is a yellow transverse band dotted with purple.

M. Chimæra Winniana, supra. M. Winniana, Rehb. in Gard. Chron. XVI. (1881), p. 198.

* One of the characters relied on by Reichenbach to distinguish this form specifically from his *Masdevallia Chimæra* was the entire edge of the saccate limb of the lip, but we have failed to detect this peculiarity in any of the plants seen by us in cultivation under the name of *M. Roezlii*; in fact, in all the forms we have examined, the margin is more or less denticulate.

This grotesque and striking *Masdevallia* was discovered in 1871 by M. Roezl at Choco, on the Western Cordillera of New Granada,* but he failed to send living plants to Europe at the time. It was, however, introduced shortly afterwards by M. Linden, through Gustav Wallis, who had detected it at Frontino, near Antioquia, mixed with *Masdevallia nycterina*, as the two were sent to M. Linden together, and both were distributed in the first instance under the name of *M. Chimæra*.† The form introduced through Wallis was afterwards found to differ somewhat from Roezl's discovery, and subsequently received the name of *M. Wallisii*, a circumstance which led to much confusion in the nomenclature and identification of both these and other forms.‡ The variety *Backhouseana* was introduced by the firm whose name it bears through their collector, Butler, who found it near Frontino.§ *Roezlii* was introduced by Messrs. Sander and Co., of St. Albans, in 1881; *severa* by Mr. Bull, through Shuttleworth; *senilis* by Messrs. Low and Co.; *Winniana* first appeared in the collection of Mr. Charles Winn, at the Uplands, Sely Hill, Birmingham, a collection exceptionally rich in *Chimæra* varieties.||

The habitat of *Masdevallia Chimæra* is restricted to a comparatively small area on the western Cordillera of New Granada, extending from Frontino, near Antioquia, to a few miles southward of that town. Its vertical range is from 4,500—6,500 feet; it grows chiefly on trees and shrubs, preferring the forks of the branches where there is a small accumulation of decaying vegetable matter, and where there is shade and moisture. In those localities in which *M. Chimæra* is most abundant the atmosphere is always at or near the saturation point, and fogs and mists are almost of daily occurrence for more than nine months of the year; but at the higher limits of its range, where these hygrometric conditions are less pronounced, the plants are much less vigorous, but flower

* Gard. Chron. IV. (1875), p. 233.

† Gard. Chron. 1873, p. 1238.

‡ Gard. Chron. II. (1874), p. 804. Id. III. (1875), p. 40. Id. IV. p. 258.

§ Sander's Reichenbachia, I. sub. t. 19.

|| Besides the varieties described above there are other *Chimæra* forms in cultivation, named and unnamed, so intermediate in character between these varieties that they may with equal right be referred to either of the two between which they stand; the probability is also extremely great that other forms exist in the native habitat of the species, sufficient in number to connect the whole into a confluent series.

more freely; the leaves are smaller and more leathery, the flower scapes shorter and erect, and the flowers are smaller in all their parts.*

The name *Chimæra* is mythological, but although a very fanciful one for plant nomenclature, its application to this species is justified by the singular appearance of the flowers.†

M. civilis.

Leaves linear-oblong, sub-acute, 5—6 inches long. Scapes very short, mottled blackish purple, with a sheathing bract below the short, bent, furrowed ovary, one-flowered. Flowers coriaceous, with a smooth polished surface externally, and emitting a faint fetid odour; perianth tube cylindric, gibbous below at the base, greenish yellow externally, internally deep purple at the base, above which it is spotted; free portion of sepals triangular, prolonged into short recurved tails, greenish yellow; petals sub-spathulate, acute, white with a deep purple sunk mid-line on the inner side, keeled behind; lip oblong, reflexed at apex, channelled above, mottled and dotted with purple. Column stoutish, semi-terete, winged on the inside, greenish above, purple below the stigmatic hollow.

Masdevallia civilis, Rehb. in Bonpl. II. (1854), p. 115. *Bot. Mag.* t. 5476.

Discovered by Warscewicz in Peru, in 1852—3. It was first cultivated in Europe by Consul Schiller, at Hamburg, by whom it was communicated to Sir William J. Hooker, at Kew. The specific name, *civilis*, "relating to citizens or the state," is peculiar, and of which we have seen no explanation respecting its application to this plant. We are indebted to Mr. F. W. Moore, of the Royal Botanic Garden at Glasnevin, for materials for description.

M. coccinea.

Leaves obovate-lanceolate, 6—9 inches long, narrowed below into long petioles. Scapes 12 or more inches long, slightly flexuose, with 3—4 distant joints, at each of which is an appressed spotted sheath. Flowers solitary, magenta-purple in the first introduced form and with the base of the tube white; perianth tube compressed, bent, slightly gibbous below; upper sepal linear, with a triangular base, flexuose above;

* The difference in the size of the leaves and the length of their foot-stalks, noticeable in imported plants, often disappears more or less under cultivation, thence showing that the smaller-leaved forms from the higher limits of the vertical range of the species are but climatic variations.

† The Chimæra of mythology was a monster, the offspring of Typhon and Echidna, that breathed flames of fire; it had the head of a lion, the body of a goat, and the tail of a dragon. After ravaging Lycia and the surrounding countries, it was killed by the hero Bellerophon, who, having obtained possession of the winged horse Pegasus, rose with it into the air and slew the Chimæra with his arrows.

lateral sepals connate to about one-third of their length, semi-ovate, oblique, tapering to approximate tips; petals and lip included in the tube, the former linear-oblong, auricled at the base on the front side, the latter tongue-shaped, cordate at base.

Masdevallia coccinea, Linden ex. Lindl. *Orch. Lind.* p. 5 (1846). *Gard. Chron.* 1868, p. 75. *Rchb. Xen. Orch. I.* p. 197, t. 74. *M. Lindenii*, André in *Illus. hort.* 1870, p. 226, t. 42. *Fl. Mag.* n. s. I. t. 28. Jennings' *Orch.* t. 17.

var.—conchiflora.

Flowers larger, with the lateral sepals broader, more rotund, concave, or shell-like; in colour like the first introduced form.

M. coccinea conchiflora, supra. *M. Harryana conchiflora*, Hort. Bull.

var.—Harryana.

Flowers variable in size and colour, and distinguished from the typical *Masdevallia coccinea* chiefly by the two lateral sepals that are dilated into broad oval-falcate blades, terminating in acuminate tips which are turned towards each other, the two forming an almost orbicular body, varying in size from 1½ to 3 inches in diameter, and in colour from deep sanguineous purple to pale yellow or milk-white; sepaline tube orange-yellow.

M. coccinea Harryana, supra. *M. Harryana*, Rchb. in *Gard. Chron.* 1871, p. 1421. *Fl. Mag.* 1871, t. 555. *Fl. and Pomol.* 1873, p. 169. *Belg. hort.* 1873, t. 21. Van Houtte's *Fl. des Serres*, XXI. t. 2250. *M. Lindenii Harryana*, *Illus. hort.* 1873, p. 167, t. 142. *Bot. Mag.* t. 5990 (*Lindenii*).

sub-vars.—*armeniaca* (*Williams' Orch. Alb. V.* t. 224), deep apricot-yellow with red veins; *atrosanguinea* (*Id.* III. t. 105), deep crimson-purple; *caerulescens* (*Id.* I. t. 24), magenta-crimson toned with bluish purple; *decora* (*Id.* VIII. t. 344), light magenta-purple with deeper veins; *Denisonii* (*Fl. Mag.* n. s. 1873, t. 79), syn. *Bull's blood*, deep sanguineous purple; *leta* (*Gard. Chron.* XI. (1879), p. 716), rosy purple; *miniata* (*Williams' Orch. Alb.* III. t. 110), vermilion-red with crimson veins; *lateritia* (*Hort.*), brilliant magenta-purple; *tricolor* (*Hort.*), magenta-crimson, striped with maroon; *versicolor* (*Gard. Chron.* XVI. (1881), p. 306), deep magenta-crimson veined and shaded with purple-crimson, carmine, and rose. etc., etc.

Masdevallia coccinea was first discovered in 1842—3 “on the southern slopes of the high mountains near Pamplona, at 9,500 feet elevation,” by Linden, from whose herbarium specimen, now preserved at Kew, it was described by Dr. Lindley in the work quoted above. It subsequently became confused with *M. militaris*, discovered some years later by Warszewicz, from whom Dr. Lindley received dried flowers and a coloured drawing which he affixed, in error, to Linden's type specimen. Still later the name became mixed up with *M. ignea*, both in British and continental collections,

and forms of *M. militaris* and *M. ignea* have been cultivated under the name of *M. coccinea*. The typical *M. coccinea* was introduced in 1869, in which year it was re-discovered by Gustav Wallis and sent by him to M. Linden, in whose horticultural establishment, at Ghent, it flowered for the first time in Europe in June in the following year, when it was described by M. André, and figured in the *Illustration Horticole* under the name of *M. Lindenii*. It is abundant on the rocks along the western slopes of the eastern Cordillera of New Granada, near Pamplona, at a great elevation, where it is associated with the small-flowered, in attractive *M. oethodes*, which is



Masdevallia coccinea Harryana.

also very abundant. The variety *conchiflora*, which is very distinct in form but in colour agreeing with the first-introduced form, appeared some years ago in Mr. Bull's horticultural establishment, at Chelsea. Far superior both to the type and to the variety *conchiflora*, from a horticultural point of view, is the variety *Harryana*; this superiority is due to its great variability in colour, which in all the cultivated forms is characterised by great brilliancy, and to a less extent,

in form, and also to the improvement to which it is susceptible under cultivation; these causes have tended to render this *Masdevallia* one of the most popular in cultivation, as is amply testified by the numerous illustrations of it quoted in page 34.* It was discovered by Chesterton, in 1871, near Sogamosa, and was introduced by us in the same year. Its principal locality is on the eastern Cordillera, between Sogamosa and Concepcion, where its vertical range is 7,000—10,000 feet; it is particularly abundant on that part of the Cordillera called the Sierra Nevada de Chita, where it spreads in uninterrupted masses for miles, covering acres upon acres of the upland slopes, growing in the partial shade afforded by the low shrubs that abound in the place. When in bloom these masses of *Masdevallia* present one of the most striking floral sights it is possible to behold, even in tropical lands; it is not only the dazzling brilliancy of the colours displayed by the countless thousands of flowers, but also their astonishing variety; there is scarcely a shade of colour from the deep rich crimson-purple of *Bull's Blood*, through magenta-crimson, crimson-scarlet, scarlet, orange, yellow, to cream-white that is not represented in greater or less abundance, the lighter shades of yellow being the rarest. In the lower limits of its range the leaves are longer, narrower and deeper in colour, the plants less floriferous, the flowers somewhat smaller and of a uniform colour, merging into that of the form known in gardens as *M. Lindenii*, which always occupies the lower zone of the vertical range of the species. On ascending towards the higher limits the foliage becomes dwarfer and paler in colour, and the flowers larger and more variable in colour; it is only at and near the upper limit that the pale yellow and white varieties occur.

M. coriacea.

Leaves linear-lanceolate, very coriaceous, almost fleshy, 5—7 inches long, deep green with a sunk mid-line above, pale green and obscurely keeled beneath. Scapes as long as, sometimes shorter than the leaves, pale green dotted with dull purple, with an appressed bract at the joint below the ovary, one-flowered. Perianth tube broadly cylindrical, whitish yellow with some purple dots along the veins; free portion of upper

* The fine specimens of many of the *Harryana* varieties in the collection of Sir Trevor Lawrence, Bart., M.P., at Burford Lodge, Dorking, are the admiration of all who have had the privilege of seeing them.

sepal triangular, keeled above, coloured like the perianth tube, and prolonged into a short broad tail; lateral sepals oblong, yellowish, prolonged into acuminate points; petals oblong, white with a purple mid-line; lip tongue-shaped, reflexed, hairy above, greenish yellow, with purple mid-line and margined dots.

Masdevallia coriacea, Lindl. in Ann. and Mag. Nat. Hist. XV. (1845), p. 257. Rehb. in Gard. Chron. 1872, p. 1067. M. Brückmülleri, Hort. Low.

Discovered in 1842 on the eastern Cordillera of New Granada, near Bogota, by Hartweg, from whose herbarium specimens it was named and described by Dr. Lindley; it was afterwards found by Linden, Schlim and Weir in the neighbourhood of the same city, where it occurs on fully exposed slopes high up on the Cordillera, but all these collectors failed to send living plants to Europe. It was first imported alive by Messrs. Low and Co. in 1871, and was distributed by them under the name of *Masdevallia Brückmülleri*, in compliment to the collector who sent it to them, it being supposed at the time to be a new species. The specific name, *coriacea*, "leathery," refers to the texture of the flowers.

M. corniculata.

Leaves oblong-lanceolate, 6 inches long, including petiole. Scapes half as long as the leaves, one-flowered, with a large, pale green, prominently keeled, ovate, acuminate bract embracing the ovary and base of perianth tube. Flowers brownish red, mottled with pale yellow; perianth tube broadly cylindric, bent, gibbous below; free portion of upper sepal shortly triangular, suddenly contracted into a slender tail 2 inches long; lateral sepals nearly oblong, reflexed, contracted into slender tails that are shorter than the upper one and which point straight downwards; petals ligulate, longer than the column, white with yellow tips; lip sub-pandurate, papillose at the apex, yellowish spotted with purple, as is the short column.

Masdevallia corniculata, Rehb. in Gard. Chron. IX. (1878), p. 72

var.—inflata.

Flowers somewhat larger, with the perianth tube more inflated, light orange-yellow mottled with brown, paler beneath; tails bright yellow.

M. corniculata inflata, supra. M. inflata, Rehb. in Gard. Chron. XVI. (1881), p. 716.

Introduced by Messrs. Backhouse from New Granada, in 1877, and subsequently imported by other horticultural firms. The variety *inflata* first appeared in Mr. Bull's collection in 1881. This species and the next are well distinguished by the large hood-like bract that sheaths the base of the perianth tube.

M. cucullata.

Leaves oblong-lanceolate, 9—12 inches long, very leathery. Scapes as long as the leaves, with a sheathing bract near the base, and a larger one embracing the ovary and base of sepaline tube. Tube sub-cylindric, with a double gibbosity below; free portion of sepals triangular, keeled, deep maroon-purple; tails $1\frac{1}{2}$ inches long, yellowish green; petals white, oblong, contracted at the tip where there is a blackish purple wart; lip tongue-shaped, deep purple.

Masdevallia cucullata, Lindl. Orch. Lind. p. 4 (1846). Rchb. in Gard. Chron. XIX. (1883), p. 592.

Discovered by Linden, in the forests of Fusagassuga, near Bogota, in New Granada, in 1842, and afterwards gathered by Wallis, Roezl, and others, but not introduced till 1883, when the first plants that reached Europe alive were collected by Carder, for the firm of Messrs. Shuttleworth and Co., in the locality in which the species had been discovered by Linden forty years previously. *Masdevallia cucullata* is known in its native country by the name of *La Viuda*, "the widow,"* which it probably obtained on account of its sombre-coloured flowers that are hooded by a conspicuous bract, the latter character also suggesting the scientific name.

M. Davisii.

Leaves 6—8 inches long, narrowly oblanceolate, thick and leathery. Scapes slender, longer than the leaves, one-flowered. Flowers $1\frac{1}{2}$ —2 inches broad across the lateral sepals, yellow with some orange markings at the base externally; perianth tube sub-cylindric, with a prominent keel above and gibbous beneath at the base; free portion of upper sepal ovate-triangular, ascending, gradually contracted into a slender tail an inch long; lateral sepals oblong, connate to more than half their length, contracted at the apex into slender cusps; petals and lip very small and concealed within the tube, the former oblong, notched at the top, auricled at the base, white, the latter clawed, linear-oblong, brownish. Column semi-terete, toothed at apex.

Masdevallia Davisii, Rchb. in Gard. Chron. II. (1874), p. 710. Id. V. (1876), p. 366. *Xen. Orch.* III. p. 3. t. 203. *Bot. Mag.* t. 6190. Williams' *Orch. Alb.* II. t. 76.

Discovered in 1873 by our collector, Davis, on the eastern Cordillera of Peru, at no great distance from the historic city of Cuzco. It occurs on the slopes of the mountains at an immense elevation, probably not less than 10,500—12,000 feet, growing in loam and moss, and also in decaying vegetable matter collected in the crevices

* Roezl affirms that this name is applied to *Masdevallia macrura* by all the children in the neighbourhood of Sonson. Godefroy's *Orchidophile*, 1883, p. 643.

of the rocks. Its geographical range appears to be very restricted, extending but a few miles along the flanks of the mountain within the vertical limits stated above, but where, however, plants were seen in all stages of growth, from the smallest seedlings to masses of considerable size. Like most of the species with brilliant-coloured flowers (sub-section *Coccineae*), *Masdevallia Davisii* varies in the size of its flowers, and in the shade of their colouring which ranges from rich orange-yellow to light primrose.



Masdevallia Davisii.

M. demissa.

Leaves very leathery, spatulate-cuneate, 6 inches long, tridentate at apex, narrowed below into a channelled petiole. Scapes shorter than the leaves, with a lax, membranaceous bract below the short, bent ovary. Perianth tube half an inch long, funnel-shaped, yellow with three red-brown lines above, deep red-brown below; free portion of upper sepal yellow, triangular at the base, prolonged at apex into a slender

tail an inch long: lateral sepals connate to three-fourths of their length, ovate-oblong, deep red-brown with yellowish veins; tails orange-yellow; petals, lip and column minute and concealed within the tube; the petals and lip oblong, red-brown, the column white.

Masdevallia demissa, Rehb. in Gard. Chron. II. s. 3. (1817), p. 9.

A species of dwarf habit, with red-brown and yellow flowers, resembling on superficial glance a diminished *Masdevallia corniculata*, but the hooded bract of which is replaced in this species by a small loose membranous one, a character which removes it from the sub-section *Oucullatae*. It was recently imported from Costa Rica by Messrs. Shuttleworth and Carder. We are indebted to Mr. Sydney Courtauld, of Bocking Place, Braintree, for materials for description.

M. elephanticeps.

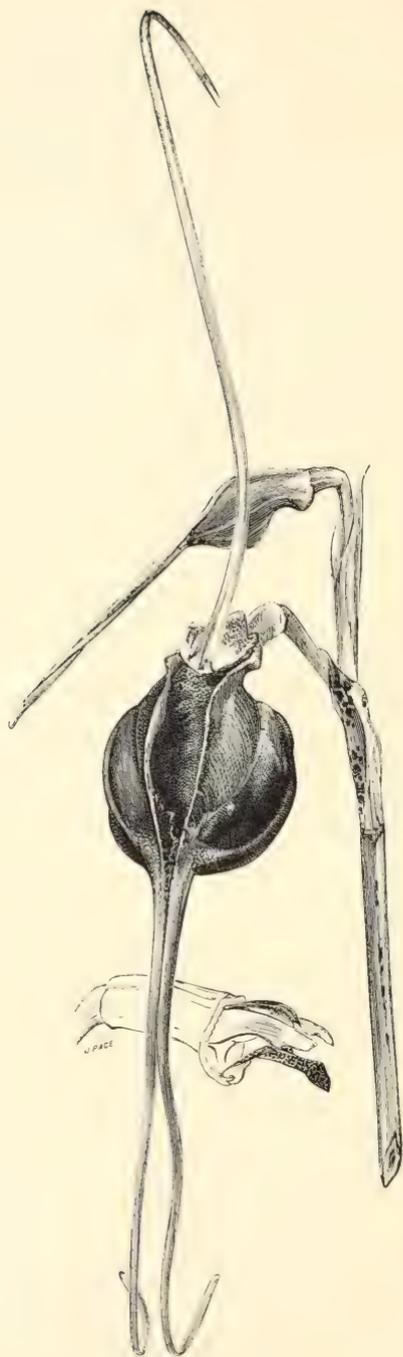
Leaves narrowly spathulate-cuneate, approaching linear-oblong, 6—10 inches long, very leathery. Scapes stoutish, shorter than the leaves, dotted with dull purple, with 2—3 small sheathing bracts, one-flowered. Flowers large for the genus, horizontal or deflexed; perianth tube broadly cylindric, yellowish above, dull purple beneath; upper sepal triangular, elongated, keeled above, gradually contracted into a long coriaceous yellowish tail, 2—3 inches long; lateral sepals reddish purple on the inner side, dull purple beneath, oblong, connate to nearly the middle and contracted into yellowish tails; petals oblong, acute; lip ligulate or oblong, papillose above.

Masdevallia elephanticeps, Rehb. *Xen. Orch. I.* p. 6, t. 3 (1854). Id. p. 194, t. 74 (*pachysepala*). Id. in Bonpl. II. p. 116 (1854). Van Houtte's *Fl. des Serres*, X. t. 997 (copied from *Xen. Orch.*).

This remarkable species was discovered by Warszewicz, in 1850—51, on the eastern Cordillera of New Granada, between Ocaña and Pamplona, at 6,500—10,000 feet elevation, and where many years afterwards it was gathered by Bowman, Brückmüller, and Shuttleworth. It has recently been introduced by more than one horticultural firm, and is now in cultivation in several collections. The variety *pachysepala*, which does not appear to be yet in cultivation, was gathered by Schlim, near Ocaña. The fanciful resemblance of the flower to an elephant's head and trunk, when viewed from above, suggested the specific name.

M. Ephippium.

Leaves narrowly elliptic-lanceolate, 5—7 inches long, attenuated below into a channelled foot-stalk, half as long as the blade. Scapes



Masdevallia Ehippium.

stoutish, flexuose, sharply trigonal, 12 or more inches high, with an obovate compressed bract about an inch below the short ovary, the intervening portion of the peduncle slender and terete. Perianth tube cylindrical, short; upper sepal sub-orbicular, keeled, yellow stained with brown without, concave and tawny yellow within, contracted into a yellow reflexed tail, 3—4 inches long; lateral sepals sub-orbicular, forming a hemispherical cup, ribbed within and without, reddish or chestnut-brown, contracted like the upper sepal into long flexuose yellow tails; petals white, linear, acute, but sometimes 2—3 toothed at the apex; lip oblong, apiculate, clawed and auriculate at the base, toothed towards the apex, reddish brown. Column whitish.

Masdevallia Ehippium, Rehb. in Bot. Zeit. 1873, p. 390. Id. in Gard. Chron. I. (1874), p. 372. Id. Xen. Orch. II. p. 213, t. 195. Bot. Mag. t. 6208. M. Trochilus, Lind. et André, *Illus. hort.* 1874, p. 136, t. 180. *Fl. Mag.* n. s. t. 443. M. acrochordonia, Rehb. Xen. Orch. II. p. 213 (1874). Id. in Gard. Chron. XXIII. (1885), p. 174. Id. XXVI. (1886), p. 526. M. Colibre, nom. vulg. *vide* Roetz.*

The botanical history of this species is somewhat confused. According to Reichenbach, it was first discovered near Loxa, in Ecuador, by Dr. Krause, of Leipsic, who sent it to Messrs. Backhouse,† but some years later he states, in another place, that Wallis was its discoverer, this collector having met with it near Antioquia, in 1873, while on a mission to New Granada for M. Linden;‡ it was shortly afterwards gathered by Roetz and by Patin, near Medellin, and Mr. Shuttleworth informs us that it has been collected by Carder in the neighbourhood of the last-named town. Its New Granadian origin is therefore unquestionably established, and the Loxa locality must be referred to *Masdevallia acrochordonia* (Rehb.); but we have reduced this to a synonym of *M. Ehippium*, as we are unable to detect even a varietal distinction between the plants in cultivation under these names. *M. acrochordonia* was also discovered by Krause, near Loxa, and was introduced from that district, in 1884, by Messrs. Sander and Co. through their collector Hübsch.§ The presence of

* The names applied to this species have not been very felicitously selected. Ehippium (ἔφιππιον) means "a saddle," to which neither the flower nor any part of it bears any especial resemblance; Trochilus (τροχίλος), "a wren," is equally far fetched; Acrochordonia (ἀκρόχορδων) is a Greek word of uncertain signification, but supposed to mean a kind of wart. Colibre (Spanish), Colibri (French), is "humming-bird."

† Gard. Chron. I. (1874), p. 372. Bot. Mag. sub. t. 6208.

‡ Gard. Chron. XXIII. (1885), p. 174. Xen. Orch. II. p. 214.

§ Gard. Chron. XXIII. (1885), p. 174. The statements made here and in I. (1874), p. 372, respecting the discovery of *Masdevallia Ehippium* and *M. acrochordonia*, by Krause, near Loxa, doubtless refer to one and the same species.

M. Ehippium in localities separated from each other by an interval of upwards of a thousand miles, is a singular fact in its history. As a species, its chief peculiarity is seen in the lateral sepals that form a deeply concave bowl-shaped body of a rufous brown colour, and their long flexuose tails that curve away from each other in a singular manner.

M. Erythrochæte.

Leaves linear-oblongate, 6—8 inches long.* Scapes slender, nearly as long again as the leaves, with a closely appressed sheath at each joint and a larger one below the bent ovary, one-flowered. Perianth tube short, patent, yellowish white externally; free portion of sepals ovate-triangular, which, as well as the connate basal portions, are yellowish white spotted with red-purple and studded with numerous white hairs on the inner side; tails 2 inches long, reddish purple; petals minute, oblong, brown at the tips; lip as in *Masdevallia Chimæra*, but smaller, white faintly tinted with rose. Column white.

Masdevallia Erythrochæte, Rehb. in Gard. Chron. XVIII. (1882), p. 392.

Introduced by Messrs. Sander and Co., from Central America. It is very near *Masdevallia Chimæra* and *M. astuta*, from both of which it may be distinguished by its smaller flowers. The specific name, from ἐρυθρός (eruthros), "red," and χείτη (chaité), "long hair," refers to the long slender tails.

M. Estradæ.

A dwarf, densely-tufted plant. Leaves elliptic-spathulate, leathery, 2—3 inches long including petioles, often bifid at the apex. Scapes slender, longer than the leaves, with a sheathing bract near the base, and another below the ovary, one-flowered. Perianth tube short, campanulate; free portion of upper sepal obovate-oblong, concave, almost helmet-shaped; lateral sepals oblong, obtuse, nearly flat with recurved margins, and terminating in long slender tails, 1½—2 inches long, basal half and tails yellow, distal half mauve-purple; petals and lip linear-oblong, whitish. Column white, spotted and margined with purple.

Masdevallia Estradæ, Rehb. in Gard. Chron. I. (1874), p. 435. *Bot. Mag.* t. 6171. *Belg. hort.* 1875, p. 371.

var.—xanthina.

Flowers pale honey-yellow with a mauve-purple spot at the base of the lateral sepals.

M. Estradæ xanthina, supra. *M. xanthina*, Rehb. in Gard. Chron. XIII. (1880), p. 681.

* A foot long, according to Reichenbach. Our description was taken from a plant in the Downside collection.

First found by Gustav Wallis in the garden of a New Granadian lady, named Doña Estrada, to whom it is dedicated. It was introduced in 1873, by Mr. B. S. Williams, of Holloway, from the province of Antioquia, through Patin, a Belgian collector. The variety, which differs from the type in nothing except colour, is doubtless from the same locality in New Granada, for although the materials for description were supplied by us, we have no record of its origin.

M. floribunda.

A dwarf, tufted plant. Leaves oblanceolate-oblong, 3—4 inches long including the foot-stalk. Scapes numerous, slender, decumbent, longer than the leaves, one-flowered. Flowers pale buff-yellow dotted with brown-purple; perianth tube cylindric, with a small gibbosity at the base on the lower side; free portion of sepals very short, that of the upper one triangular, of the lateral two rotund; tails, of which the upper one is the longest, slender, recurved, reddish; petals linear-oblong, toothed at the tip, white; lip "nearly heart-shaped at its base, constricted below the middle and with red-brown blotch at the tip."

Masdevallia floribunda, Lindl. in Bot. Reg. 1843, misc. p. 72. Rehb. in Gard. Chron. VIII. (1877), p. 616. M. Galeottiana, A. Rich. et Gal. Ann. Sc. Nat. s. 3, III. (1845), p. 17. M. myriostigma,* Morren in Belg. hort. 1873, p. 359, t. 33.

A very floriferous species, native of Mexico, and the first Masdevallia from that country that became known to science. It was gathered by Galeotti, in 1840, in the neighbourhood of Vera Cruz, and living plants were probably sent by him to Europe, for one was in cultivation three years later in the collection of the late Mr. Rogers, at Sevenoaks, from whom Dr. Lindley received materials for naming and description. It was re-introduced in 1873, by Messrs. Jacob-Makoy and Co., of Liège.

M. Gargantua.

A robust plant. Leaves oblong, fleshy, 6 inches long. Scapes terete, shorter than the leaves, one-flowered. Flowers large and leathery; perianth tube broadly cylindric, pale yellow-green above, gibbous and stained with dull purple beneath; free portion of upper sepal yellow, triangular, contracted into a tapering reflexed tail 2 inches long; lateral sepals oblong, terminating in divergent tails an inch long, verrucose, brown-purple bordered with yellow on the inner side; petals oblong, whitish; lip tongue-shaped, very hairy, deep purple. Column thick, whitish with some purple markings.

Masdevallia Gargantua, Rehb. in Gard. Chron. VI. (1876), p. 516.

* Calami lapsu passim fere, "myriosigma," which is meaningless. See Gard. Chron. loc. cit. supra.

Introduced by us, in 1874, from the Frontino district in New Granada, through Gustav Wallis. Its nearest allies are *Masdevallia elephanticeps* and *M. Mooreana*, from the latter of which it is not distinguishable in a dried state. When first expanded the flower emits a strong fetid odour. The specific name is that of one of the heroes in Rabelais' once famous story of *Gargantua and Pantagruel*.

M. Gaskelliana.

Leaves linear-lanceolate, acute, 3—4 inches long. Peduncles slender, mottled dull purple and green, one-flowered. Flowers triangular, about an inch across vertically, with a very short campanulate perianth tube; free portion of sepals triangular, with short hispid pubescence on the inner side, keeled behind, the upper one cream-white spotted with red, the lateral two similarly coloured but with the spots aggregated chiefly on the outer half of each; sepaline tails $1\frac{1}{2}$ —2 inches long, pale red-brown; petals ligulate, reflexed at the apex, where there is a brown hairy wart; lip narrowly saccate, with three longitudinal keels within the cavity, pale yellow. Column pale yellow, bent at the apex.

Masdevallia Gaskelliana, Rehb. in Gard. Chron. XX. (1883), p. 294.

Imported in 1882 by Messrs. Sander and Co., origin not recorded. It flowered for the first time in this country in the collection of Mr. Holbrook Gaskell, at Woolton Wood, near Liverpool, to whom it is dedicated. Its nearest affinity is *Masdevallia astuta*, with which the flowers are almost structurally identical but smaller in all their parts; it differs from that species chiefly in its much smaller leaves and one-flowered (?) peduncles.

M. gemmata.

A diminutive plant. Leaves linear, $1\frac{1}{2}$ —2 inches long, somewhat fleshy, grooved on the upper side. Peduncles filiform, decumbent, longer than the leaves, one-flowered. Upper sepal nearly free, triangular at the base, brownish yellow with purple veins, contracted into an orange-yellow filiform tail an inch long; lateral two larger, connate into an oblong, concave, somewhat boat-shaped body, vinous purple with deeper veins and with an orange-yellow tail inserted in each outer margin near the apex; petals and lip very minute, the former linear-oblong, obscurely toothed at the apex, the latter cordate-triangular, purple.

Masdevallia gemmata, Rehb. in Gard. Chron. XX. (1883), p. 294. *M. Trichæte*, Rehb. in Gard. Chron. XX. (1883), p. 360.

A recently introduced species of the TRIARISTELLE section, whose

habitat has not been divulged. It is as curious as it is beautiful, the flower when inverted having the resemblance of a large gnat. "The name *gemmata* refers to the hundreds of papillæ which stand by crowds on the anterior parts of the sepals, and a few on the lip."

M. hieroglyphica.

Leaves elliptic-lanceolate, leathery, 4—5 inches long. Peduncles slender, as long as the leaves, one-flowered. Perianth tube campanulate, gibbous below, mauve-purple, paler at the base; free portion of sepals shortly triangular, violet-purple mottled with white, the upper one with three deep purple longitudinal veins and with a glandular protuberance at the base of the tail; tails thread-like, $1\frac{1}{2}$ inches long, purplish at the base, passing into dull yellow towards the apex; petals oblong, obtuse, white; lip broader, oblong, truncate, purple. Column white with some purplish spots.

Masdevallia hieroglyphica, Rehb. XVIII. (1882), p. 230. Id. in Gard. Chron. XXIV. (1885), p. 584.

Imported by Messrs. Sander and Co., from New Granada, in 1882. As regards colour, it is one of the most distinct of the smaller-flowered *Masdevallias*.

M. Houtteana.

Leaves linear-lanceolate, 5—7 inches long. Scapes slender, procumbent, shorter than the leaves, one-flowered. Flowers $\frac{3}{4}$ -inch in diameter exclusive of the tails; perianth tube campanulate; free portion of sepals shortly triangular, cream-white spotted with purple and densely studded with short white hairs; tails spreading, $1\frac{1}{2}$ inches long, reddish purple; petals small, oblong, dilated at the apex, where there is a dense tuft of short blackish hairs; lip oblong in outline, clawed, the claw (hypochile) curved upwards, broad, with an oval cavity in the upper side, the blade (epichile) sub-rotund, concave, with several radiating raised lines in the hollow, generally white, but sometimes pale pink. Column short.

Masdevallia Houtteana, Rehb. in Gard. Chron. II. (1874), p. 98 (July). Van Houtte's *Fl. des Serres* XX. t. 2106. M. Benedicti, Rehb. Xen. Orch. II. p. 197 (Oct. 1874). M. psittacina, Rehb. in Gard. Chron. V. (1876), p. 817.

An interesting species, and in some of its characteristics a distinct one also; in its vegetation it is not unlike a dwarf sedge, a character by which it may be readily recognised amidst the general uniformity of foliage that prevails throughout the cultivated *Masdevallias*. Its flowers are produced very freely from the rhizome, and, in curious contrast to the rigid upright leaves, lie prostrate on the sphagnum,

or protrude over the rim of the pot or between the rods of the basket in which it is cultivated; they are somewhat variable in size and colour, particularly in the spotting on the sepals. *Masdevallia Houtteana* occurs on the western Cordillera of New Granada, in the neighbourhood of Frontino, where its vertical range is 4,500—6,000 feet elevation; it grows chiefly in small tufts on low trees and shrubs, sometimes on the trunks, but more frequently towards the extremities of the branches; it was first detected by Roezl, and shortly afterwards by Wallis, through whom it was introduced. It is dedicated to the late Louis Van Houtte, the well-known horticulturist of Ghent.

M. ignea.

Leaves elliptic-lanceolate, 3—4 inches long, narrowed below into a channelled petiole, half as long as the blade. Scape slender, 12—15 or more inches long, one-flowered. Flowers $1\frac{1}{2}$ — $2\frac{1}{2}$ inches across vertically, somewhat variable in colour, usually bright cinnabar-red toned with crimson; perianth tube bent, gibbous below; upper sepal with a narrow triangular base, prolonged at the apex into a linear tail that is bent downwards into the sinus between the two lateral sepals, which are connate to more than half their length, elliptic-oblong, pointed, three-nerved, the free portions more or less divergent; petals linear-oblong, auricled below, white, with a purple mid-line; lip similar, recurved at the apex where there is an orange-red stain.

Masdevallia ignea, Rehb. in Gard. Chron. 1871, p. 1482. *Bot. Mag.* t. 5962. *Fl. Mag.* n. s. t. 15. *Fl. and Pom.* 1873, p. 169. *Illus. hort.* n. s. t. 333. *Williams' Orch. Alb.* II. t. 62. Godefroy's *Orchidophile*, 1885, p. 367. *M. coccinea*, Regel's *Gartenfl.* 1876, t. 170, not Lindl.

var.—Massangeana.

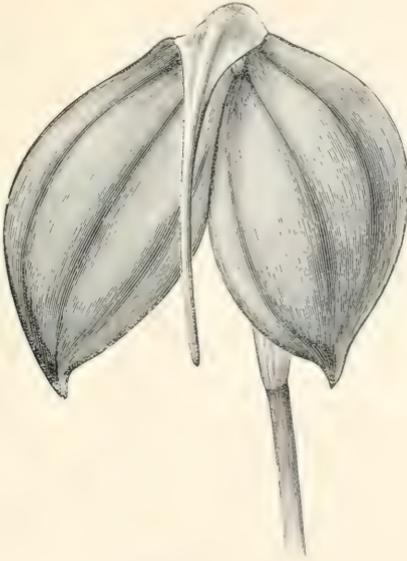
Flowers larger than the commoner forms, with the lateral sepals longer, bright cinnabar-red; perianth tube yellow.

M. ignea Massangeana, Williams' *Orch. Alb.* VI. t. 273.

sub-vars. (distinguished by colour only).—*aurantiaca*, light orange-red; *M. Boddart's* (*Illus. hort.* 1880, t. 357), crimson-scarlet, spotted with pale yellow; *citrina*, light orange-yellow; *Mr. Marshall's* (*Gard. Chron.* 1872, p. 351), yellow, toned with cinnabar-red; *Mr. Hobar's* (*Gard. Chron.* XV. (1881), p. 136), orange-yellow, faintly tinted with mauve-purple.

Introduced by Messrs. Low and Co., in 1870, from the eastern Cordillera of New Granada, on which it spreads from Ocaña southwards as far as Rosa, with a vertical range of 8,500—11,000 feet elevation. In such an extensive range *Masdevallia ignea* affects a

variety of situations, a circumstance which has influenced the habit of the plants and the colour of the flowers; thus, at and near the lower limits of its vertical range, where the soil is deeper and where the plants are often in partial shade, the leaves are longer and less rigid, the peduncles are longer and more slender, and the flowers uniform in colour; towards the higher limits the plants become somewhat dwarfer and the flowers vary a



Masdevallia ignea.

little in colour. On account of the brilliant colour of the flowers, and the improvement of which the species is susceptible under cultivation, *M. ignea* has become a general favourite amongst orchid amateurs.*

M. infracta.

Leaves lanceolate, leathery, 5—6 inches long, bright glossy green. Scapes three-angled, twisted, longer than the leaves. Perianth tube broadly campanulate, bent, with a prominent rib above and a

* It is with much hesitation that we retain this species under the name it is described above, believing that it should be referred to *Masdevallia militaris*, Rehb., which had been introduced by Warszewicz from the same locality twenty years earlier. As we have, thus far, been unable to obtain satisfactory proof of the identity of the two species, and moreover as *M. militaris* is said to be constitutionally distinct from the *M. ignea* in cultivation, it seems to us that the best course is to keep them separate for the present.

gibbosity below at the base, yellowish white; free portion of upper sepal triangular-rotund, concave, yellowish white like the tube, the lateral two oblong-rotund, connate to below the middle, keeled at the suture, the outer half yellowish white, inner half pale violet-purple; tails spreading, $1\frac{1}{2}$ —2 inches long, pale yellow; petals linear-oblong, toothed at the apex, white; lip oblong, reflexed at the spotted red-brown apex.

Masdevallia infracta, Lindl. Gen. et Sp. Orch. p. 193 (1831). *Belg. hort.* 1873, p. 35. Van Houtte's *Fl. des Serres XXIII.* t. 2389. *M. longicaudata*, Lemaire in *Illus. hort.* 1868, p. 109, icon. xyl.

var.—purpurea.

Flowers somewhat larger and of a nearly uniform violet-purple.

M. infracta purpurea, Rehb. in *Gard. Chron.* XX. (1883), p. 460.

A Brazilian species discovered in the early part of the present century by the French traveller and naturalist, Descourtilz, on the wooded mountains which separate Rio de Janeiro from the Campos. It was gathered by Gardner on the Organ Mountains in 1837, and sent by him to Messrs. Loddiges, in whose nursery at Hackney it flowered for the first time in this country in the following year. In a geographical sense, *Masdevallia infracta* is a remotely outlying member of the genus, its nearest ally, so far as at present known, being an inhabitant of the Peruvian Andes, upwards of 2,000 miles distant. The glossy, shining surface of the leaves is a marked feature in this species. Of the two known forms, which are simply colour variations, the purple one is the more showy. The applicability of the name *infracta*, "unbroken," is obscure.

M. Ionocharis.

A dwarf, tufted plant. Leaves elliptic-lanceolate, 3—4 inches long, including the foot-stalk. Scapes numerous, slender, as long as the leaves, bearing a solitary flower half an inch in diameter, and with a compressed tubular bract below the ovary. Perianth tube campanulate, yellowish; the sepals keeled at the back, the free portions very short, rotund, white blotched with violet-purple; tails slender, spreading, about as long as the tube, yellow; petals and lip minute, the former oblong, auricled at the base, the latter clawed, tongue-shaped, apiculate, purplish.

Masdevallia Ionocharis, Rehb. in *Gard. Chron.* IV. (1875), p. 388. *Bot. Mag.* t. 6262.

A pretty free-flowering species introduced by us in 1874, from Peru, through our collector, Walter Davis, who discovered it in the Andean valley of Sandia, in the province of Carabaya, at 9,000—

10,000 feet elevation. The specific name is a compound of two words, *ἰον* (ion), "a violet," and *χάρις* (charis), "pleasure or joy."



Masdevallia leontoglossa.

M. leontoglossa.

Leaves linear-lanceolate, 5—7 inches long, very leathery, sometimes tinged with deep, dull purple. Flowers with very short peduncles; perianth tube broadly cylindric, gibbous below, pale yellow-green with three purple spotted ribs above, and spotted with dull purple beneath; free portion of upper sepal triangular, contracted into a broad tail an

inch long, pale yellow-green with three purple lines on the inner side; lateral sepals oblong, connate to one-half of their length, the free portion triangular, prolonged into short tails, pale yellow-green, spotted with blackish purple warts that are usually arranged in rows, with a blackish purple line between them; petals oblong, acute, white with a purple median line and another shorter one on the inside; lip tongue-shaped, hairy, densely spotted with vinous purple papillæ. Column white with purple edges.

Masdevallia leontoglossa, Rehb. in Bonpl. III. p. 69 (1855). Id. in Walp. Ann. VI. p. 191. Id. in Gard. Chron. XV. (1881), p. 234. Gard. Chron. XXIV. (1885), p. 429. icon. xyl.

A curious species belonging to the sub-section *Coriaceæ*, discovered many years ago in Venezuela by Wagener,* and was introduced about the year 1867 to M. Linden's horticultural establishment at Brussels. It is now in several British collections, where its curious structure and beautiful markings rarely fail to arrest the attention of the observer. The specific name indicates the supposed resemblance of the lip to a lion's tongue.

M. ludibunda.

Leaves elliptic-oblong, 2—3 inches long. Scapes slender, longer than the leaves, one-flowered. Perianth tube short, ochreous yellow; free portion of sepals ovate-oblong, the upper one almost galeate, purple, and prominently keeled above, the lateral two light violet-purple in one variety, pale yellow in another; tails filiform, $1\frac{1}{2}$ —2 inches long, light orange-yellow; petals oblong, toothed at the apex; lip sub-pandurate, yellowish with a blackish wart at the reflexed tip.

Masdevallia ludibunda, Rehb. in Gard. Chron. XVII. (1882), p. 179.

One of the prettiest, and probably one of the rarest of the *Caudatæ* sub-section of Masdevallias. It was introduced by Messrs. Sander and Co. along with *M. caudata Shuttleworthii*, and therefore its habitat is within the geographical range of that species. There are two distinct colour forms in Sir Trevor Lawrence's collection at Burford Lodge, as described above. As a species—if species it is—it stands between *M. caudata* and *M. Estradæ*, and but for the uncertainty respecting the precise habitat of the last-named species, and for the fact that the artificially raised hybrid *caudata-Estradæ* is quite distinct from it, it might be assumed to be a natural hybrid between them; the name *ludibunda*, "sportive," probably has some indirect allusion to such an hypothesis of origin.

* Wagener's explorations extended for some miles along the coast range in the neighbourhood of Caracas, hence the habitat of this species may be surmised.

M. macrura.

A robust plant. Stems about 6 inches high. Leaves elliptic-oblong, 10—12 inches long, and $2\frac{1}{2}$ —3 inches broad, very leathery. Scapes as long as the leaves, one-flowered, the ovary and base of perianth tube sheathed by a whitish membranous keeled bract. Flowers among the largest in the genus; perianth tube short, cylindrical, ribbed, dull tawny yellow shaded with brown externally as are the free portions of the sepals, on the inner side both sepals and tube tawny yellow studded with numerous blackish purple warts; tails paler and without warts; free portion of upper sepal lanceolate, acuminate, prolonged into a stoutish tail, 4—5 inches long; lateral sepals connate to fully one inch beyond the tube, and then tapering into tails as long as the upper one; petals and lip oblong, pale tawny yellow, the lip with a papillose, reflexed tip, and spotted with purple below.

Masdevallia macrura, Rehb. in Gard. Chron. I. (1874), p. 240 and VII. (1877), p. 12, icon. xyl. Id. in Linnea, XLI. p. 11.

Discovered by Roezl in 1871, near Sonson, growing on the moss-covered blocks of granite that are scattered over the ground around the town,* and afterwards found by Patin and other collectors, but not introduced till 1876, when it was collected by Shuttleworth between Frias and Libano, in the province of Tolima, New Granada, and sent by him to Mr. Bull, in whose horticultural establishment at Chelsea it flowered for the first time in this country early in the following year. The plant is a giant among *Masdevallias*, the leaves being among the largest in the genus yet known; the flower, which is proportionately large, is an object of curiosity rather than admiration. The specific name, from *μακρός* (*makros*), "long," and *οὐρά* (*oura*), "a tail," refers to the long sepaline tails.

M. maculata.

Leaves linear-lanceolate, 4—5 inches long. Scapes a little longer than the leaves; few-flowered, three-angled up to within about 2 inches of the short deflexed ovary, the remainder slender, terete, sheathed by two whitish, papery, opposite bracts above the trigonal part, and by two smaller, compressed, acute green ones below the ovary. Perianth tube short, with a prominent rib above, orange-yellow; free portion of upper sepal triangular, gradually contracted into a stoutish yellow tail 3 inches long; lateral sepals connate to below the middle,

* Godefroy's *Orchidophile*, 1883, p. 643. That Roezl was the first discoverer of *Masdevallia Macrura* is emphatically affirmed by Reichenbach in the *Gardeners' Chronicle*, loc. cit. supra. The statement in that journal, III. s. 3. (1888), p. 12, copied from *Lindenia*, that Wallis was the discoverer, and Linden the introducer, must therefore be received with reserve.

the inner half brown-purple, the outer half yellow, and then contracted into pale yellow tails that are sometimes parallel and bent downwards, sometimes crossing each other; petals and lip oblong, the former white, the latter dull purple, papillose and recurved at the apex.

Masdevallia maculata, Klotzsch and Karsten in *Allg. Gartenz.* XV. p. 330 (1847), Rehb. in *Bonpl.* II. p. 23 (1854). Van Houtte's *Fl. des Serres*, XXI. t. 2150.

var.—flava.

Flowers smaller than those of the typical *Masdevallia maculata*, with shorter sepaline tails and of a uniform tawny yellow.

M. maculata flava, supra.

Discovered by Wagener, in the neighbourhood of Caracas, and sent by him to the Botanic Garden at Berlin, where it flowered for the first time in Europe in 1847. The variety appeared amongst an importation of the species from Caracas by Messrs. Sander and Co., in 1881.

M. Melanopus.

Leaves oblanceolate, 4—5 inches long, narrowed below into slender petioles, bidentate at tip. Scapes numerous, longer than the leaves, racemose, 5—7 flowered. Flowers white, sparingly speckled with purple; perianth tube shortly campanulate, three-angled, gibbous below; free portion of sepals sub-orbicular, concave within, keeled behind, and contracted into rather short, slender, bright yellow tails; petals linear-oblong, minute; lip tongue-shaped, dilated at the apex into a round yellow terminal lobe.

Masdevallia Melanopus, Rehb. in *Gard. Chron.* I. (1874), p. 338. *Id.* II. p. 322. *Id.* III. (1875), p. 136. *M. polysticta*, Hook. f. in *Bot. Mag.* t. 6258, not Rehb.

A small-flowered species, one of a batch of three or four discovered by Roehl in the temperate regions of the Andes of northern Peru, and sent by him to M. Ortgies, Inspector of the Botanic Garden at Zurich. It is one of the most attractive of the racemose *Masdevallias* (sub-section *Amandae*), reminding one of the charming little *Odontoglossum blandum*. The specific name, from μέλαν (melan), "black," and πούς (pous), "a foot," probably refers to the blackish stain sometimes seen on the scape just below the ovary.

M. militaris.

"Aff *coccineae*, tepalis inequalibus, binervis; labello apice dilatato integro. Folia oblonga, acuta, basin versus anguste cuneata. Pedunculus validus folio suo vulgo dimidio longior violaceus. Perigonii tubulus incurvus septemlinearis, mento omnino obtusato evanescente, dein bilabiatus; labium superius a basi angustissima triangula, linearisetaceum,

sesquipollicare; labium inferius latissimum medium usque bilobum, lobi trianguli utrinque obtusati, apiculati; tepala ligulata, binervia, altero latere rectilinea, altero lobulato, 3—5 linearia; labellum ligulatum, apice dilatatum, obtusatum, integrum, androclinium margine cucullatum."

"Blüthe $\frac{2}{3}$ der Grösse deren der *M. coccinea*; getrocknet, mennigroth; lebend, scharlach. Neu Granada."—Rchb. f. in Bonpl. II. p. 115 (1854).

Masdevallia militaris, Rchb. loc. cit. Id. in Walp. Ann. VI. p. 193. Id. in Gard. Chron. XIII. (1880), p. 742.

Discovered by Warscewicz on the eastern Cordillera of New Granada, in the neighbourhood of Ocaña, in 1849—50, but the plants he collected died during transmission to Europe, except a few remains that were secured for the collection of the late Mr. Sigismund Rucker, at West Hill, Wandsworth, where they continued to be cultivated till the dispersion of the collection in 1875. It is still one of the rarest of *Masdevallias* in the form in which it was specifically recognised by the late Professor Reichenbach, who, in the *Gardeners' Chronicle*, XIII. (1880), p. 742, thus distinguishes it from *Masdevallia ignea*, "its next critical species."*

"It is very easily recognised by its extremely stiff, dark green leaf of great substance, standing on a petiole shorter than the blade, by a thicker peduncle, a much wider flower tube, and a wider limb. . . The lip is much broader and shorter (?) The plant does not flower very readily, while *Masdevallia ignea*, with its much broader and longer, lighter green, thinner, long-stalked leaves, and much less wide flowers, gives a profusion of bloom."

Although we find no record of the plant having been imported since its first introduction, it was in cultivation in the collections of Sir Trevor Lawrence, Bart., at Burford Lodge, and of the Baroness Rothschild, at Gunnersbury Park, at the date of the publication of the article just quoted, and may probably be still in those collections. We have also since met with plants under the name of *Masdevallia coccinea*, that conform to the characters described in the foregoing quotation.

M. Mooreana.

Leaves with inflated sheaths at their base, linear-oblong, 6—8 inches long, very leathery. Scapes one-flowered, stoutish, shorter than the leaves, obscurely angulate, green spotted with dull purple, sheathed at the base and middle. Tube broad, cylindric with a short gibbosity

* The description in the text is equally applicable to *Masdevallia ignea*, Rchb.

below; upper sepal triangular, gradually contracted into a linear tail, yellow on the inside, with three vinous purple streaks on the paler dilated basal portion; lateral sepals connate to nearly the middle, similar but more acute, the tails parallel, vinous red, covered with innumerable minute blackish purple papillæ on the inner side; tails yellowish towards the tip; petals oblong, acute, white, with a purple mid-line; lip oblong, blackish purple, hairy above. Column greenish white, with blackish purple edges.

Masdevallia Mooreana, Rehb. in Gard. Chron. XXI. (1884), p. 408. Id. II. s. 3 (1887), p. 777. Bot. Mag. t. 7015.

A curious Masdevallia, allied to *M. elephanticeps* and *M. Gargantua*, so near indeed to the last named that it may prove to be only a variety of it, or even identical; its origin does not appear to have been recorded. It is named in compliment to Mr. F. W. Moore, of the Royal Botanic Garden at Glasnevin, near Dublin. It is in cultivation in several collections under the name of *M. melanoxantha*, which, according to the description in the *Gardeners' Chronicle*, IV. (1875), p. 580, must be a different species.

M. muscosa.

Leaves elliptic-oblong, 2 inches long, minutely tridentate at the tip narrowed below into a slender channelled foot-stalk shorter than the blade, very leathery, deep green above, stained with purple beneath. Scapes slender, 6—7 inches long, one-flowered, pale green, clothed with hispid moss-like hairs up to the small appressed bract just below the ovary, then glabrous to the base of the ovary, which is verrucose and bristly and bent horizontally. Flowers $\frac{3}{4}$ inch in diameter; perianth tube short, compressed, gibbous below; sepals narrowly triangular with three veins, prolonged into slender tails an inch long, pale buff-yellow; petals linear, longer than the column, their thickened apices meeting above it; lip clawed, the claw adnate to the bent foot of the column, the blade yellow, maroon at the apical edge, triangular, with the broad side at the apex, and with a yellow ridge from the base to the middle.

Masdevallia muscosa, Rehb. in Gard. Chron. III. (1875), p. 460. Id. I. s. 3. (1887), p. 836.

Of the many remarkable species included in Masdevallia, the flowers of some are distinguished by their brilliant colours, others by their grotesque form, and others again by their microscopic beauty, but *Masdevallia muscosa* stands apart from all these by reason of a peculiarity not yet observed in any other Masdevallia, although known to exist in two or three species belonging to other genera, viz., that of irritability or sensitiveness in the labellum, so

that "when an insect alights on it, it suddenly shuts up against the column and encloses its prey, as it were, in a box." We extract from the *Gardeners' Chronicle* of 25th June, 1887, the following account of the curious mechanism by which this is effected:—

"When a flower first opens, the tails of the sepals curve back and the labellum is seen with its bearded tip folded just beneath the arch of the petals as if held there. Presently, however, the triangular blade falls down and hangs like the lip of an *Oncidium*; this, on being first observed, was surmised to be owing to sensitiveness, and on testing it this surmise was found to be correct. The seat of irritability is only in the yellow ridge on the lip, and on touching this gently with a hair, the lip is at once raised, at first slowly and then closed suddenly, as it were, with a click. In about twenty minutes it descends again, and on being again touched it closes just as quickly as before. A winged aphid placed on the labellum was carried up and held firmly, and the same happened when a house-fly, was tried. Attempts to force the lip down again after it closed showed that the sensitiveness was of precisely the same nature as that of *Dionaea Muscipula* (Venus' Fly-trap), and it could not be made to remain down unless held. An insect alighting on the labellum would certainly touch the ridge, and would be lifted up and enclosed in the "box" formed when the lip is closed. The excessive hairiness of the scapes and ovaries, altogether exceptional among the cultivated *Masdevallias*, is no doubt intended to prevent crawling insects from gaining access to the flowers."

This curious plant was one of the discoveries of Shuttleworth, in New Granada, near San Domingo, on the central Cordillera, in the province of Tolima, while collecting orchids in that country for Mr. Bull, of Chelsea. The sensitiveness of the labellum was first observed by Mr. Bean, the foreman of the orchid department at the Royal Gardens, Kew; and to the Royal Gardens also we are indebted for the materials for description.

M. nycterina.

Leaves linear-oblongate, 6—8 inches long, scapes pendulous or decumbent, shorter than the leaves, warty, deep purple, with a small pale acute bract at the base of the ovary, one-flowered. Flowers patent, triangular in outline; upper sepal triangular, connate with the lateral two at the base, which are ovate-triangular, and connate to below the middle, all keeled behind and contracted into slender, purple-red tails 3 inches long, the inner surface light yellow spotted with red, purple, and studded with short white hispid hairs; petals oblong-

dilated at apex into a rotund yellowish blade, on which are three or four blackish spots; lip with recurved fleshy claw and concave shell-like blade, in the hollow of which are numerous raised lines radiating from the claw. Column small, terete, white.

Masdevallia nycterina, Rehb. in Gard. Chron. 1873, p. 1238. Id. I. (1874), p. 639, icon. xyl. *M. Chimæra*, *Illus. hort.* 1873, t. 117, not Rehb. De Puydt, *Les Orch.* t. 22.

One of the discoveries of Gustav Wallis while collecting plants in New Granada in 1872, and sent by him to M. Linden, who, in error, distributed it under the name of *Masdevallia Chimæra*. Its habitat is in the neighbourhood of Frontino, on the western Cordillera, at 5,000—6,000 feet elevation, where it occurs under the same conditions as *M. bella* and *M. Chimæra*. It is very near the first named species and *M. Vespertilio*. The specific name, from *νυκτερινός*, literally “nocturnal,” may either refer to the sombre hues of the flower, or by metonymy, may be some fanciful allusion, as “the night bird,” the “bat,” etc.

M. pachyantha.

Leaves oblanceolate, 6 inches long, deep green and leathery. Scapes longer than the leaves, one-flowered. Flowers with a vertical diameter of 2—3 inches, exclusive of the sepaline tails; tube broadly cylindric, slightly bent, pale orange-yellow; upper sepal* triangular, keeled above, pale yellow-green with three brown-purple veins, and contracted into a stoutish erect tail an inch long; lateral sepals ovate-oblong, connate to below the middle and prolonged into broad reflexed tails shorter than the upper one, pale yellow-green densely spotted with rose-purple, the spots larger and brighter in colour towards the base; tails bright yellow; petals ovate acute, whitish with a brown-purple median line; lip ligulate, reflexed at the tip, brown below, blackish at the apex. Column terete above, greenish with brown-purple margins.

Masdevallia pachyantha, Rehb. in Gard. Chron. XXI. (1884), p. 174.

Discovered many years ago by Cross, and afterwards found by Lehmann, but not introduced till 1883, when plants collected by Carder, in the valley of the Cauca, near Popayan, in New Granada, were sent by him to the horticultural establishment of Messrs. Shuttleworth and Carder, in Park Road, Clapham, where one of them flowered for the first time in May, 1886. Its nearest affinity is *Masdevallia coriacea*, from which it is chiefly distinguished by its larger flowers with longer and broader sepaline tails, by its differently formed and differently coloured lip, and by its densely

spotted perianth tube and lateral sepals. The specific name, from *παχὺς* (pachus), "thick," and *ἄθος* (anthos), a flower, refers to the leathery texture of the perianth.*

M. *Peristeria*.

Leaves oblanceolate-oblong, 4—6 inches long. Scapes shorter than the leaves, with a loosely sheathing bract at the joint below the ovary, one-flowered. Flowers 4—5 inches across from tip to tip of sepals; tube broadly cylindric, gibbous at the base, and with six prominent ribs, dull yellowish green externally; free portion of sepals triangular, yellow, spotted with purple, and contracted into stoutish, tawny yellow tails, $1\frac{1}{2}$ inches long; petals linear-oblong, acute, pale greenish yellow; lip "with a linear claw, and oblong sub-acute limb which is dilated in the middle and suddenly contracted beyond it, upper surface studded with amethystine papillæ, tip recurved." Column white.

Masdevallia *Peristeria*, Rehb. in Gard. Chron. I. (1874), p. 500. *Bot. Mag.* t. 6159. Van Houtte's *Fl. des Serres*. XXI. t. 2346. *Illus. hort.* s. 3. t. 327.

One of the handsomest of the coriaceous Masdevallias, introduced by us from New Granada, in 1873, through Gustav Wallis, who met with it in the province of Antioquia. The labellum is very singularly coloured, being covered with numerous close-set amethystine papillæ, and the top of the column and the petals have a striking resemblance to the same organs of the flower of the Dove Plant, *Peristeria elata*, which suggested the specific name. A variety with somewhat smaller flowers, and thence called *minor*, is in cultivation in the Royal Botanic Gardens at Glasnevin.

M. *platyglossa*.

Leaves oblong-lanceolate, 6 inches long, rigid, erect. Scapes decumbent, shorter than the leaves, one-flowered. Flowers of semi-transparent texture, and of a uniform light green; tube short, cylindric with a gibbosity below; free portion of sepals triangular, contracted to sharp points, each with three prominent veins; petals ligulate, with a triangular lacinia above the middle; lip oval-oblong, reflexed, and with numerous papillæ at the apex. Column minutely cucullate.

Masdevallia *platyglossa*, Rehb. in Gard. Chron. XVIII. (1882), p. 552.

A native of the province of Antioquia, New Granada, but by whom discovered and introduced we do not find recorded. The broad, fleshy lip, and the absence of the sepaline tails, well distinguish this

* This name is not especially applicable to this species; *Masdevallia elephanticeps*, *M. Gargantua*, *M. Mooreana*, for example, have much thicker perianths.

Masdevallia, the former character suggesting the specific name, which is from *πλατὺς* (platus), "broad," and *γλῶσσα* (glossa), "a tongue," in orchid terminology "lip."

M. polysticta.

Leaves sub-spathulate, emarginate, 5—6 inches long. Scapes longer than the leaves, pale green spotted with dull purple, racemose, 5—7 flowered. Flowers white spotted with purple, on short pedicels, at the base of which is a rather large, inflated, pale green bract; tube short; free portion of the dorsal sepal broadly ovate, concave; of the lateral two narrowly oblong, oblique, convex with a yellow mid-line, all with ciliate margins, keeled behind, and terminating in slender tails that are white and spotted like the blade along the basal half, the distal half bright ochreous yellow; petals and lip minute, the former spathulate, apiculate, the latter oblong and channelled above.

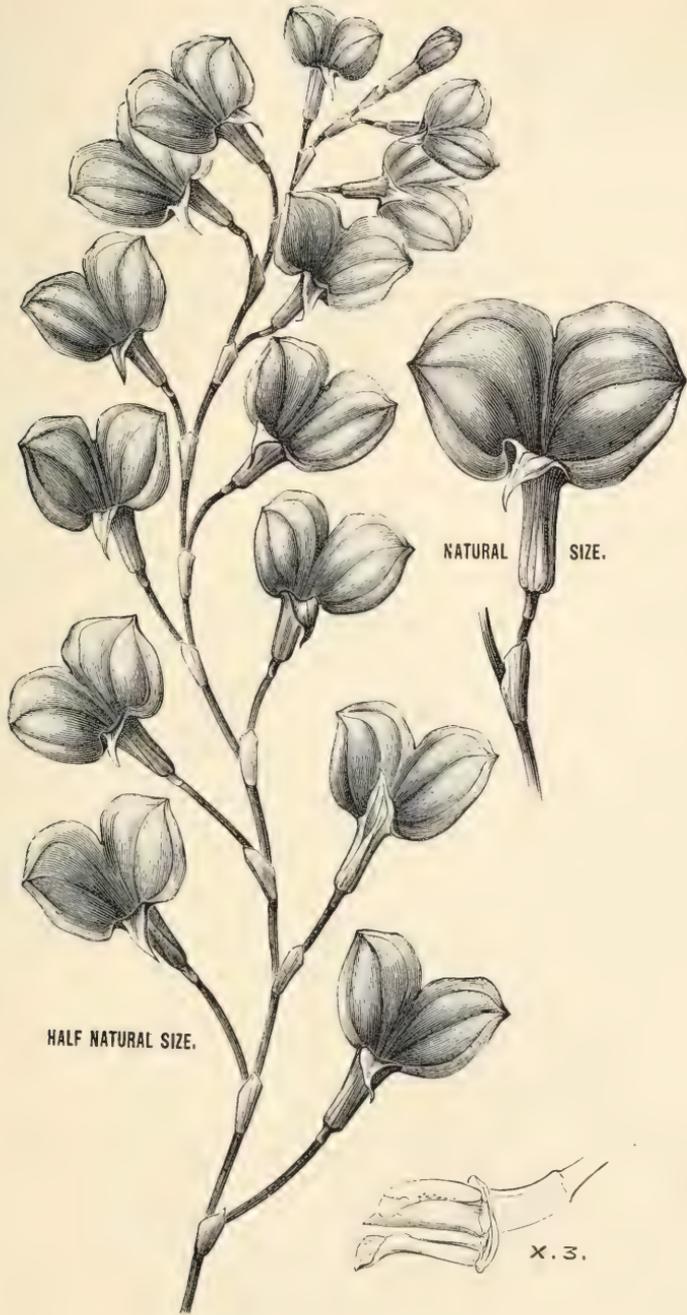
Masdevallia polysticta, Rehb. in Gard. Chron. I. (1874), p. 338. Id. II. p. 290. Id. III. (1875), p. 656. icon. xyl. Bot. Mag. t. 6368. Regel's *Gartenfl.* 1876, t. 869. *Illus. hort.* s. 3. t. 199. *Revue hort.* 1880, p. 250.

Of similar origin as *Masdevallia Melanopus*, with which is also associated a third species, called *M. caloptera*, not yet in cultivation. These, with three or four others known to science, form the subsection *Amandæ*, all the members of which have a racemose inflorescence with rather small, white or light-coloured flowers, more or less spotted. As distinguished from *M. Melanopus*, *M. polysticta* has larger leaves, more robust scapes that are spotted, broader inflated bracts, larger flowers with broader sepals, that are hairy on the inner side and more spotted, and a differently shaped lip, especially at the apical end. It flowered for the first time in England in our Chelsea Nursery, in the spring of 1875. A variety with shorter and stouter tails was communicated to Professor Reichenbach by Sir Trevor Lawrence, Bart., in 1881.* The specific name, from *πόλυς* (polus), "much," and *στικτός* (stiktos), "dotted," refers to the spotted perianth.

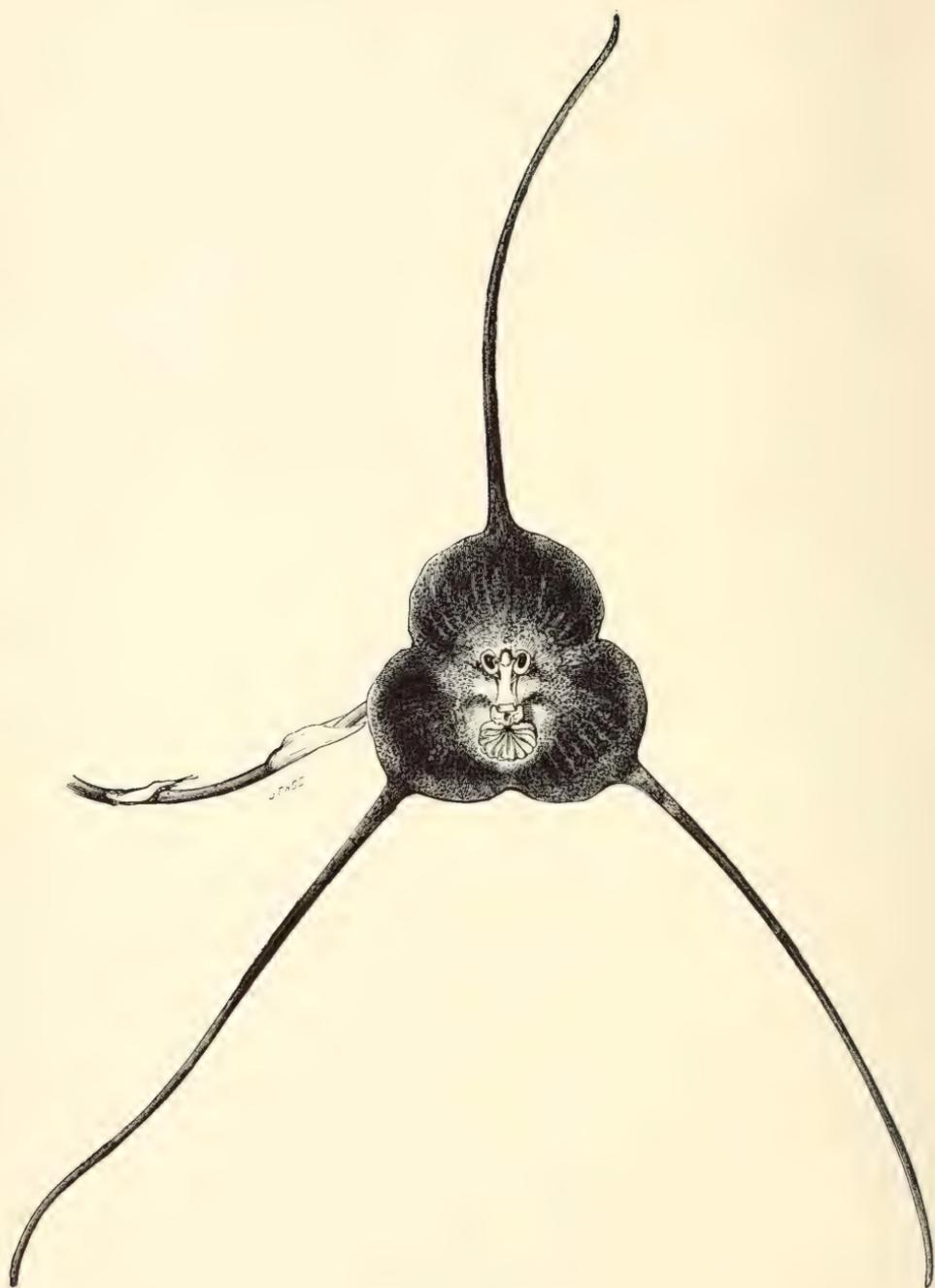
M. racemosa.

Stems erect, $1\frac{1}{2}$ —3 inches high, produced from a creeping rhizome at intervals of $\frac{1}{2}$ —1 inch. Leaves elliptic-oblong, 2—4 inches long. Scape 10—15 inches long, racemose, 8—15 or more flowered. Flowers brilliant orange-red shaded with crimson, sometimes paler approaching yellow; perianth tube cylindric, ribbed, $\frac{3}{4}$ inch long; free portion of

* *Masdevallia polysticta crassicaudata*, Gard. Chron. XVII. (1881), p. 179.



Masdevallia racemosa.



Masdevallia radiosa.

upper sepals triangular, acuminate, reflexed; lateral sepals connate into a broadly obovate, tailless blade 1—1½ inches broad, each with three longitudinal veins that are deeper in colour than the intervening surface; petals and lip minute, whitish, the former oval-oblong, the latter linear-oblong.

Masdevallia racemosa, Lindl. ex. Benth. Pl. Hartw. p. 258 (1839). Id. Ann. et Mag. Nat. Hist. pp. 15, 256 (1845). Rehb. in Bonpl. III. p. 69 (1885). Id. in Gard. Chron. XX. (1883), p. 466. Id. XXI. (1884), p. 737, icon. xyl. *M. racemosa* Crossii, Hort.

Originally discovered in New Granada, by Hartweg, from whose herbarium specimens it was named and described by Dr. Lindley, in 1839. Many years later it was gathered by Cross at Pitayo, near Popayan, whose name thence became attached to the plant, although he failed to send living plants to Europe, as did other collectors after him, it being, it is said, one of the worst of *Masdevallias* to travel. The merit of introduction is due to Mr. Carder, of the firm of Messrs. Shuttleworth and Carder, who succeeded in sending a small consignment of living plants to their horticultural establishment in Park Road, Clapham, in 1883. Mr. Carder gathered these plants on the central Cordillera, between Popayan and Tolima.

As a species *Masdevallia racemosa* is one of the most distinct. Although we have placed it in the sub-section *Coccineæ* chiefly on account of its brilliantly coloured flowers, it is clearly separated from the other members of the group by its creeping rhizome and long racemes of tailless flowers—characters that would, by some, be considered of sufficient value to constitute a separate sub-sectional division.

M. radiosa.

Leaves oblanceolate, 6—8 inches long. Scapes decumbent, shorter than the leaves, three or more-flowered, the flowers produced successively as in *Masdevallia astuta*, *M. Chimera*, and other saccolabiate species. Perianth tube broadly campanulate; free portion of sepals similar and sub-equal, very short, broadly oval, keeled behind, concave, tawny yellow, pubescent, and densely spotted with blackish purple, warty papillæ in front, with a deep depression at the suture of the lateral pair; tails 2—3 inches long, dull blackish purple, paler towards the tips; petals oblong, keeled, dilated at the apex, at which is a blackish wart; lip with a fleshy claw and saccate shell-like blade, white with numerous rose-coloured radiating lamellæ within the sac. Column yellow above, blackish at the tip.

Masdevallia radiosa, Rehb. in Gard. Chron. VII. (1877), p. 684.

Discovered by Gustav Wallis near Frontino, in New Granada, at 8,000 feet elevation, and introduced with other saccolabiate *Masdevallias* collected by him in the same locality in 1873-4.

M. *Reichenbachiana*.

Leaves oblanceolate, acute, 6 inches long, including the erect channelled foot-stalks. Scapes slender, erect, longer than the leaves, 2—4 flowered, the flowers produced in succession from pedicels springing from the joint below the ovary of the next older. Tube funnel-shaped, bent, reddish crimson above, pale yellow beneath; free portion of upper sepal triangular, yellowish white, contracted into a slender tail $1\frac{1}{2}$ inches long; lateral sepals deflexed, connate to one-half of their length, and then suddenly contracted into slender awns, which cross each other at their extremities, yellowish white; petals, lip, and column minute, and concealed within the tube.

Masdevallia Reichenbachiana, Endres, ex. Rehb. f. in Gard. Chron. IV. (1885), p. 257. Rehb. in Gard. Chron. XX. (1883), p. 360 (*aurantiaca*).

A native of Costa Rica, where it was first detected in 1873 by Endres, who sent living plants to Europe shortly afterwards, and at whose desire it was named in compliment to the late Professor Reichenbach, of Hamburg.

M. *rosea*.

Leaves elliptic-lanceolate, acute, 4—6 inches long, narrowed below into erect channelled foot-stalks. Scapes slender, a little longer than the leaves, one-flowered. Tube 1— $1\frac{1}{2}$ inches long, angulate and compressed, reddish above, orange-yellow at the base; free portion of upper sepal filiform, 2 inches long, red above, yellow on the inner side, the lateral two dilated into ovate-lanceolate, concave, rosy carmine lobes, which are connate to about one-third of their length from the base, and terminate in short red tails; petals and lip reduced to minute ligulate white bodies, the latter with a tuft of blackish hairs at the apex. Column arched, white.

Masdevallia rosea, Lindl. in Ann. and Mag. Nat. Hist. XV. p. 257 (1845). Rehb. in Walp. Ann. VI. p. 192 (1861). Id. Otia. Bot. Hamb. p. 14. Id. Gard. Chron. XIII. (1880), p. 648. Id. XVII. p. 628. *Belg. hort.* 1882, p. 65.

Discovered by Hartweg about the year 1842, at a great elevation on the Andes, in the neighbourhood of Loxa, in Ecuador; from the dried specimens brought home by him, it was described by Dr. Lindley in the publication quoted above. It was afterwards found by Dr. Jameson, for many years in the service of the Government of Ecuador as Professor of Botany and Chemistry in the University of Quito. Nothing more was seen or heard of it till

1880, when M. Lehmann, after much toil and many privations, succeeded in reaching the elevated region to which the plant is restricted. By carefully packing the plants he collected, and by a rapid transport across the low-lying hot country that intervenes between the Andes and the Pacific Ocean, a transit that has proved fatal to thousands of beautiful orchids, M. Lehmann had the good fortune to ship his plants in good condition, and which reached England alive. *Masdevallia rosea* is a most floriferous species, and a large plant in full bloom is a very showy object; its long perianth tube is peculiar.

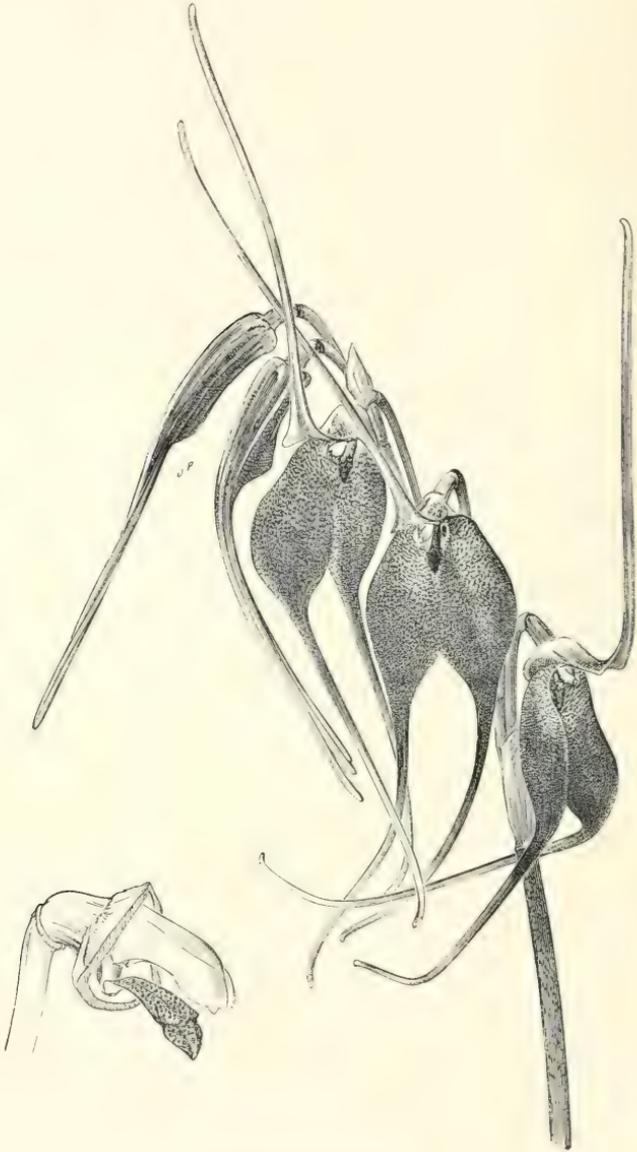


Masdevallia rosea.

M. Schlimii.

Leaves elliptic-ovate, 12 or more inches long, and 3 inches broad. Scapes longer than the leaves, racemose, 5—8 flowered, the pedicel of each sheathed by a whitish, membranous bract. Flowers with a vertical diameter of about $1\frac{1}{4}$ inches, exclusive of the tails; tube short and open, light orange-yellow above; upper sepal triangular, concave, light yellow; lateral sepals connate to beyond the middle, broadly ovate, the free portion divergent, yellow, densely mottled with brownish purple papillæ; tails about 2 inches long, golden yellow; petals linear-oblong, white; lip also linear-oblong, pointed and reflexed at the apex. Column white with two purple stripes on the side opposite the lip.

Masdevallia Schlimii, Linden ex. Lindl. Orch. Lind. p. 5 (1846). Rehb. in Bonpl. II. p. 283 (1854). Id. in Gard. Chron. XIX. (1883), p. 532, icon. xyl. *Bot. Mag*, t. 6740. *M. polyantha*, Lindl. Orch. Lind. p. 6, *vide* Rolfe in Gard. Chron. V. s. 3 (1889), p. 743.



Masdevallia Schlimii.

Native of the mountains of Merida in Venezuela, at 6,000 feet

elevation, where it was discovered by Schlim in 1843—44. It was not introduced into European gardens till 1883, when it was sent to Messrs. Sander and Co., of St. Albans, by one of their collectors. It was shortly afterwards found by our collector, Burke, on the eastern Cordillera of New Granada, near Cocui, whence it spreads northwards along the Cordillera. with a vertical range of 9,000—11,000 feet to near Bucaramanga. In this locality it is purely epiphytal, growing only on the old stunted trees where decaying vegetable matter can rest and accumulate. Its nearest affinity is *Masdevallia Ehippium*, but its large leaves much resemble those of *M. macrura*; its flowers are curious and even showy, but wanting the brilliant tints characteristic of the species included in the sub-section *Coccineæ*.

M. simula.

A minute cæspitose plant. Leaves linear, 2—3 inches long, channelled and bright grass-green above, but sometimes tinged with dull purple, obscurely keeled beneath. Peduncles with ovary $\frac{1}{2}$ — $\frac{3}{4}$ inch high, sheathed by scarious, pale brown bracts, one-flowered. Flowers half an inch in diameter; perianth tube short, upper sepal ovate, acuminate, concave on the inner side, keeled behind, pale yellow, evenly barred with purple; lateral sepals free, ovate, falcate, acuminate, brighter yellow than the upper sepal and with small purple spots; petals linear, greenish; lip much larger, broadly tongue-shaped, dull vinous purple.

Masdevallia simula, Rehb. in Gard. Chron. III. (1875), p. 8.

Introduced by us in 1874 from New Granada, through Chesterton, who gave no locality. It is noticed here on account of its gem-like flowers, which are of surprising beauty when viewed through a common pocket lens.

M. towarensis.

Leaves elliptic-spathulate, 5—6 inches long, obscurely toothed at the apex. Scapes as long as the leaves, three-angled, bi-bracteate at the apex, 2—5 flowered. Flowers an inch across transversely, pure white; tube cylindric, slightly gibbous below; upper sepal filiform, $1\frac{1}{2}$ inches long, dilated into a triangular base; lateral sepals oval-oblong, three-nerved, connate to two-thirds of their length, rather abruptly contracted at their apex into short awns; petals and lip oblong, the former unequally two-lobed, the latter pointed and reflexed at the apex.

Masdevallia towarensis, Rehb. in Bonpl. III. p. 225 (1855). Id. in Linnæa, XXII. p. 318 (1857). *Bot. Mag.* t. 5505. Gard. Chron. 1865, p. 914, icon. xyl. *Fl. and Pomol.* 1873, p. 169. *Illus. hort.* XXVI. t. 363. *M. candida*, Klotzsch.

Discovered about the year 1849 by Wagener, at a place called Tovar, situated at a considerable elevation on the coast range of Venezuela in the province of Caracas. Plants were sent by him to Germany, one of which was subsequently obtained by the late Mr. Sigismund Rucker, in whose collection at West Hill, Wandsworth, it flowered for the first time in this country in November, 1864. *Mas-*



Masdevallia tovarensis.

devallia tovarensis continued to be a comparatively rare plant in British collections till 1880, when a large importation of native plants was received by Messrs. Low and Co., of Clapton. Ever since its first introduction this *Masdevallia* has been one of the most highly prized of orchids on account of its pure white flowers that are produced late in the autumn, and which last nearly till Christmas.

A morphological peculiarity in *Masdevallia towarensis* and also in the allied species *M. Ephippium*, *M. infracta*, and *M. maculata*, that was omitted when drawing up the sub-sectional characters of the *Polyanthæ* Masdevallias, may properly be noticed here. The so-called peduncles or scapes of all these species are sharply three-angled, and the flowers are produced from their apex, the pedicels issuing from a membranous, persistent sheath that is single in *M. Ephippium* and *M. infracta*, but double in *M. maculata* and *M. towarensis*. When the flowers fade the pedicels and ovaries wither and drop with them if infertilised, which is usually the case, but the long, trigonal part does not wither and drop like the flower scapes of most Masdevallias; it continues green and fresh, and if not removed from the plant, more flowers are produced from the apex in the following year precisely in the same way as on the first occasion; the same occurrence has been observed in the third season, so that it may be assumed, in default of direct observation, that so long as the leaf, from the base of which the so-called scape springs, is in a condition to perform its functions, so long will the flowers be produced from the apex of these trigonal scapes on the return of the flowering season. This circumstance shows that there is a material difference between the slender, terete scapes of those Masdevallias that perish when the flowers drop and the more robust, three-angled ones of the species in question, that persist and produce flowers from their apex two, three, or more seasons in succession. The latter are, in fact, bi-, tri-, and even perennial leafless stems, and not scapes in the strict botanical meaning of the term, such as is implied in the foregoing descriptions. It is highly probable, too, that this peculiarity is not confined to the species named above, but in the absence of direct observation we are unable to specify any others by name.

M. triangularis.

Leaves elliptic-oblong, 4—6 inches long, narrowed below into a somewhat slender petiole as long as the blade. Scapes slender, as long as the leaves, with a small, keeled, acute, spotted bract at the base of the ovary, one-flowered. Perianth tube broadly campanulate; sepals triangular-oblong, concave, keeled at the back, the lateral two sub-falcate, tawny yellow, densely spotted with purple; tails filiform, $2\frac{1}{2}$ —3 inches long, brownish purple; petals oblong, tridentate at the tip, white; lip oblong, dilated at the middle and reflexed at the apex, at which there is a small tuft of blackish hairs, white, spotted with red-purple below.

Masdevallia triangularis, Lindl. Orch. Lind. p. 5 (1846). Rehb. in Boupl. II. p. 23 (1854). Id. in Gard. Chron. XVII. (1882), p. 44.

One of the prettiest of the *Caudate* sub-section that was first discovered by Linden, in 1842—3, near Merida, in Venezuela, and re-

discovered a few years later by Wagener, in the province of Caracas. We find no record of its being in cultivation till 1882, it having been imported the year before by Messrs. Sander and Co.

M. triaristella.

"Dwarf, densely tufted. Leaves erect, 1—1½ inches long, slender, subulate and narrowed to both ends, channelled down the face. Scapes 1—2 flowered, very slender and rigid, rough with minute warts, and bearing two or more short appressed sheaths. Flowers nearly an inch long, red-brown with yellow tails; upper sepal small, ovate, concave, suddenly contracted into a flexuose ascending tail, half-an-inch long; lateral sepals combined into a linear-oblong boat-shaped blade, which is notched at the tip, and bears on each margin beyond the middle a filiform tail about the same length as that of the dorsal sepal; petals linear-oblong, three-toothed at the tip; lip tongue-shaped, deeply two-lobed at the base. Column club-shaped."—*Botanical Magazine*.

Masdevallia triaristella, Rehb. in Gard. Chron. VI. (1876), p. 226. Id. 559, icon. xyl. *Bot. Mag.* t. 6268.

A curious and interesting little plant introduced by us from Costa Rica, in 1875, through Endres. It is the type of a very distinct section of the genus called by Reichenbach TRIARISTELLE, of which the distinguishing characters are given in page 18. Allied to it are three or four other species in cultivation, including the next to be described, all of which, with one exception, *Masdevallia gemmata*, have received specific names in reference to their curious sepaline tails, thus *triaristella* means "having three awns"; *tridactylites*, "having three fingers"; *triglochis*, "having three barbs," etc.

M. Tridactylites.

A minute cæspitose plant with erect awl-shaped leaves about 1½ inches long, channelled down the face. Scapes rigid, longer than the leaves, one-flowered. Upper sepal sub-orbicular, concave, keeled behind, ochreous yellow stained with red, and contracted into a yellow filiform tail, slightly swollen at the tip; lower connate sepals boat-shaped, notched at the tip, dull purple, tails similar to that of the upper sepal; petals oblong, acute, purple with yellow margins; lip tongue-shaped, dull purple.

Masdevallia Tridactylites, Rehb. in Gard. Chron. XIX. (1883), p. 784.

Very similar to *Masdevallia triaristella*, but a somewhat larger plant with differently coloured flowers. Its origin is presumably New Granadian, but no locality is recorded.*

* *Masdevallia Tridactylites* approaches the *Restrepias* nearer than any other *Masdevallia* yet observed; this affinity is seen chiefly in the free upper sepal with its club-like tail, and in the comparatively broad lip that is scarcely appressed to the column. Of course its two pollinia clearly separate it from the *Restrepias*, which always have four pollinia.

M. Troglodytes.

Leaves linear-lanceolate, 4—5 inches long, with recurved tridentate tips. Scapes shorter than the leaves, with a small appressed bract at each joint, decumbent, one-flowered. Flowers campanulate, reddish brown on the inside, white with a few brown spots externally; free portion of sepals very short, sub-rotund, prolonged into filiform, divergent, red-brown tails $1\frac{1}{2}$ inches long; petals ligulate, reddish brown bordered with white; lip with hypochile (claw) short, channelled, the epichile (sac) sub-orbicular, concave with one keel inside, white.

Masdevallia Troglodytes, * Morren in Belg. Hort. 1877, p. 97.

Introduced into European gardens by M. Lalinde, a resident of Medellin, in New Granada; it flowered for the first time in the collection of M. Oscar-Lamarche, at Liège, in Belgium, in 1876. Although the flowers are small and in attractive as regards colour, the great profusion in which they are produced secures for the plant a place in many collections. The specific name, *τρογλοδύτης*, "dweller in caves," is a purely fanciful one, like *Chimæra*, *nycterina* and others.

In *Masdevallia Troglodytes*, *M. Houtteana*, and *M. Carderi* (to which others may probably be hereafter added) we have a series of closely-allied forms, which, seen singly, might be mistaken the one for the other. The chief botanical distinction between them consists in the structure of their curious labellum, thus—in *M. Carderi* the hypochile is comparatively broad with the cleft open, and the epichile is narrowly reniform with the concave surface smooth; in *M. Houtteana* the epichile is sub-quadrate and has three equidistant raised lines in the hollow; in *M. Troglodytes* the two divisions of the lip are smaller, and the epichile has but one raised line in its cavity. Moreover, in *M. Carderi* the sinus between the sepals is very shallow; in *M. Troglodytes* a little deeper; in *M. Houtteana* it is angular; the tails of the three species are differently coloured, as are the spots on their perianth tubes. The sedge-like foliage of *M. Houtteana* is peculiar to that species.

M. Veitchiana.

Leaves linear-oblong or linear-oblongate, 6—8 inches long, sub-acute. Scapes 12—18 inches long with two or more appressed, elongate, sheathing bracts, one—rarely two-flowered. Flowers among the largest and most showy in the genus, 2—3 inches across vertically, exclusive of the sepaline tails; perianth tube campanulate; free portion of sepals

* Reichenbach in Gard. Chron. XXIV. (1885), p. 489, sub. *Masdevallia senilis*, states that *M. Troglodytes*, Morr. = *M. Benedicti*, Rehb., but a comparison of the figure in the *Belgique Horticole* quoted above with that of *M. Benedicti* in Xen. Orch. II. t. 186, does not confirm this. The *M. Houtteana* and the *M. Benedicti* in cultivation are unquestionably one and the same species,

broadly ovate, contracted into slender tails, of which the upper one is



Masdevallia Veitchii.

narrower and longer than the others, brilliant orange-red studded with

minute crimson-purple papillæ, the lateral sepals connate to beyond the middle; petals and lip minute, linear-oblong, white, as is also the short semi-terete column.

Masdevallia Veitchiana, Rchb. in Gard. Chron. 1868, p. 814. *Bot. Mag.* t. 5739. Van Houtte's *Fl. des Serres*, XVII. t. 1803. *Fl. Mag.* t. 481. *Fl. and Pomol.* 1873, p. 169. Warner's *Sol. Orch.* II. t. 33. De Puydt, *Les Orch.* t. 25 (Veitchii).

This fine Masdevallia was discovered by Pearce on the lofty Andes of Peru, near Cuzco, at 11,000—13,000 feet elevation, and was introduced by us in 1867. It was gathered in the same locality a few years later by our collector, Davis, who has given us the following particulars respecting its habitat:—*Masdevallia Veitchiana* occurs above the timber line, at the altitude above stated; the plants are found in the crevices and hollows of the rocks with but little soil about their roots, but sometimes where a small quantity of decaying vegetable matter has accumulated; in this case the plants are more robust, and when partially shaded by the stunted shrubs found here and there or by projecting rocks, produce larger flowers; in the former case the plants are more tufted and more floriferous, but the flowers are smaller. At this great altitude, notwithstanding the tenuity of the atmosphere, the heat from the direct rays of an almost vertical sun is very great on clear days, but the nights are damp and chilly; the range of temperature is therefore very considerable. Vapour is constantly rising from the streams and valleys below, keeping the atmosphere always highly charged with moisture; besides this, rain is frequent, even in what is called the dry season.

Under cultivation the flowers of *Masdevallia Veitchiana* are found to vary in size and in the manner in which the papillæ are spread over the surface of the sepals; a large-flowered form is known in gardens under the name of *grandiflora*.*

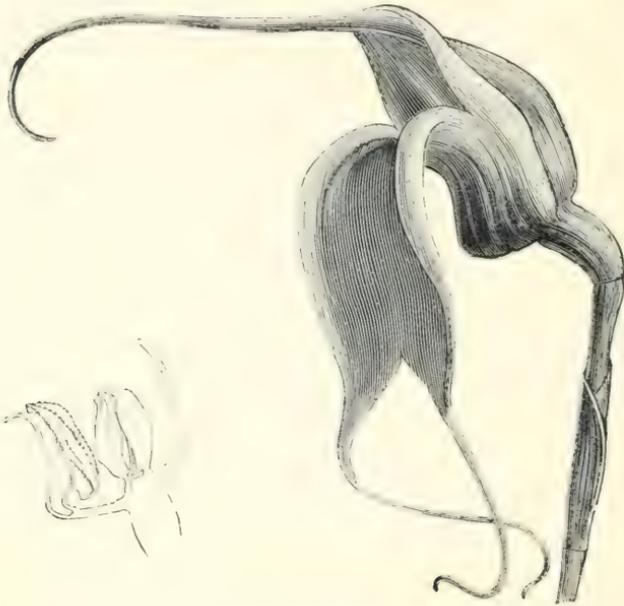
M. velifera.

Leaves linear-elliptic, 6—8 inches long, including the petioles, rigid and erect. Scapes stoutish, one-flowered, half as long as the leaves, with a sheathing bract midway between the base and the ovary, the last-named organ bent forwards at right angles to the peduncle. Tube

* As more than one sub-variety is found in collections under this name, we may state that the original *Masdevallia Veitchiana grandiflora* distributed by us may be recognised by the following characters:—the upper sepal is densely and almost uniformly covered with crimson papillæ, while in the lateral two these are confined entirely to the outer half, the inner half being of the purest orange-scarlet and destitute of papillæ. The foliage of the plant is also more robust, and is produced more slowly than in the ordinary form.

broadly cylindric, gibbous below; upper sepal triangular, contracted into a stoutish tail 2 inches long, ochreous yellow, very smooth and shining without, minutely dotted with red-brown within; the connate lateral sepals oblong, bent downwards, terminating in stoutish tails and coloured like the upper one; petals linear-oblong, greenish white; lip sub-quadrate, narrow at the apex, and covered with chocolate-red, close-set papillæ. Column trigonal, curved, yellowish green.

Masdevallia velifera, Rehb. in Gard. Chron. I. (1874), p. 406 (name only). Id. in II. p. 98. Id. in X. (1878), p. 364. Id. I. s. 3 (1887), p. 745, icon. xyl.



Masdevallia velifera.

(From the *Gardeners' Chronicle*.)

A species with large malodorous flowers sent by Patin from New Granada to Mr. B. S. Williams, in 1874. It is abundant in the neighbourhood of Ocaña, where a few years later it was gathered by Shuttleworth while collecting orchids for Mr. Bull. *Masdevallia velifera* is one of a group of coriaceous *Masdevallias* represented in British collections by *M. elephanticeps*, *M. Gargantua* and *M. Mooreana*, which may possibly be brought into closer connection with each other hereafter by the appearance of intermediate forms.

M. Vespertilio.

Leaves narrowly oblanceolate, 4–6 inches long. Scapes shorter than the leaves, pendulous, one-flowered. Flowers patent, triangular in outline, 1–1½ inches across vertically exclusive of the tails, pale yellow spotted with brown-purple; upper sepal ovate-oblong, acuminate, contracted into a slender tail 1½ inches long; lateral connate sepals sub-quadrate, prolonged into tails like that of the upper one; petals oblong, reflexed at the tip, white blotched with yellowish brown and with a brown papillose blotch on the inner side at the apex; lip with a fleshy grooved claw in which is a broad, longitudinal cleft on the upper side, and with a broad, transverse, shell-like blade, without radiating keels. Column bent, terete above.

Masdevallia Vespertilio, Rehb. in Bot. Zeit. 1873, p. 390. Id. in Gard. Chron. VII. (1877), p. 272. Id. XIII. (1880), p. 712.

One of the saccolabiate Masdevallias that has been gathered by various collectors in the valley of the Cauca, New Granada, (probably in the Frontino district), but not introduced till 1877; it is still rare in British gardens.

M. Wageneriana.

A dwarf, tufted plant. Leaves spathulate, leathery, about 2 inches long. Scapes as long as the leaves, one-flowered. Flowers light buff-yellow with numerous minute red dots sprinkled over the sepals, and some crimson lines at their base; sepals broadly oval-oblong, narrowing very suddenly to slender yellow tails 2 inches long, sharply bent backwards from the base, the upper one concave on the inner side, keeled behind, the lateral two connate to beyond the middle; petals hatchet-shaped, bidentate at apex; lip rhomboidal with reflexed, toothed margin, whitish spotted with red-brown, as is the short semi-terete column.

Masdevallia Wageneriana, Lindl. in Paxt. Fl. Gard. III. p. 74 (1853). Bot. Mag. t. 4921. Rehb. Xen. Orch. I. p. 199, t. 75.

A lovely little plant, discovered in 1849 near the German colony of Tovar in the Venezuelan province of Caracas. It was gathered in the following year by Wagener at Carobobo,* at 6,000 feet elevation, and sent by him to M. Linden, in whose horticultural establishment at Brussels it flowered for the first time in Europe in 1851.

* *Fide* Rehb. Xen. Orch. I. loc. cit. supra, but this name is not found on any map to which we have access.

M. Wendlandiana.

A densely tufted caespitose plant. Leaves linear, 1—2 inches long, including petiole, fleshy, with a depressed mid-line on the face. Peduncles filiform, as long again as the leaves, pale green spotted with dull crimson, one-flowered. Perianth tube cylindric, gibbous and purple below, milk-white above; free portion of sepals narrowly triangular, white, passing into yellow at the tips, the lateral two reflexed; petals and lip very minute, linear-oblong, the petals white, the lip purplish, reflexed at the tip.

Masdevallia Wendlandiana, Rehb. in Gard. Chron. I. s. 3 (1887), p. 174.

Imported from New Granada by Messrs. Sander and Co., and dedicated to Herr Wendland, Director of the Berggarten at Herrenhausen, in Hanover. It is a most floriferous species, "far too pretty and interesting to be relegated to that dubious group known as botanical curiosities."* We are indebted to Mr. F. W. Moore, of the Botanic Garden, Glasnevin, for materials for description.

HYBRID MASDEVALLIAS.

When describing *Masdevallia splendida*,† the late Professor Reichenbach broached the hypothesis that it might be a natural hybrid between *M. Veitchiana* and *M. Barleana* or *M. amabilis*; and when about a year later, a flower of another plant from the same importation was submitted to him for identification, he called it *M. Parlatoresana*,‡ suggesting that that too might be a natural hybrid derived from *M. Veitchiana* and *M. Barleana*. The hypothesis, as regards these two species, has since been confirmed by Seden, who has obtained an artificial hybrid from them, of which *M. Veitchiana* was fertilised with the pollen of *M. Barleana*, the resulting progeny being so near the supposed natural hybrid that it must bear the same name. Moreover, *M. Parlatoresana* is so near *M. splendida* as to admit of no doubt of its being of like origin, probably from the reversed cross, and it must thence be reduced to a variety of the last named. The existence of natural hybrids among Masdevallias is, therefore, an undoubted fact, but to what extent they exist must long remain an uncertainty.

* "W. B." in Gard. Chron. III. s. 3 (1888), p. 563, who states that it requires tropical treatment.

† Gard. Chron. IX. (1878), p. 493.

‡ Id. XI. (1879), p. 172.

Long, however, before *Masdevallia splendida* had been produced artificially, hybridisation among the most showy species had been taken in hand by Seden in our nursery, but with only partial success, caused probably by the fact that *Masdevallia*, as a genus, is far more heterogenous than was at first supposed, whence a mixture of the different sections may not possibly be effected, and more recently progenies have been obtained by other operators. The forms described below include all the undoubted hybrids of which we have cognisance up to the present time, and which naturally fall under two heads, viz., Natural and Garden Hybrids: all have been derived from species included in the *Coccineæ* and *Caudatæ* sub-sections, or from crosses between species belonging to each of them, the only exceptions at present known being *M. glaphyrantha* and *M. Hincksiana*, in which cases a species from the *Polyanthæ* group was selected for one of the parents. Their vegetative organs present scarcely any character by which they may be distinguished from either parent but the flowers, which are intermediate, are distinct, and these only need description.

NATURAL HYBRIDS.

Masdevallia splendida.

Perianth tube slender, nearly an inch long, with a prominent rib above, pale orange-red; free portion of sepals oval-oblong, three-nerved, bright orange-red studded with crimson-purple papillæ; tails an inch long, orange-red; petals, lip and column white, the latter with a purple streak on each side of the stigmatic cavity.

Masdevallia splendida, Rehb. in Gard. Chron. IX. (1878), p. 493.

var.—*Parlatoreana*.

Flowers larger, with the purple papillæ differently distributed over the surface of the sepals.

M. splendida Parlatoreana, supra. *M. Parlatoreana*, Rehb. in Gard. Chron. XI. (1879), p. 172.

Both forms were gathered on the eastern Cordillera of Peru, near Cuzco, by Walter Davis, who sent them to us in a consignment of *Masdevallia Veitchiana* and *M. Barlewana*, with which they were mixed. The variety which is the more attractive of the two forms was dedicated to Professor Parlatore, of Florence, the most distinguished Italian botanist of his time. The artificially-raised hybrid surpasses the wild ones both in size of flower and in the brilliancy of its colours, a circumstance due to the finest forms of *M. Veitchiana* and *M. Barlewana* being selected for parents.

GARDEN HYBRIDS.

Masdevallia caudata-Estradæ.

Parentage expressed by the name.

Upper sepal a nearly uniform rose-purple, yellowish at the base, paler on the outside and with a yellowish keel; lateral sepals soft violet-purple, paler at the apex; tails 2 inches long, orange-yellow; petals and lip white, the latter with minute lilac spots; apex of column maroon-purple.

Masdevallia caudata-Estradæ, Rolfe in Gard. Chron. V. s. 3. (1889), p. 714.

Raised by Seden at our nursery. A very floriferous and handsome hybrid, with flowers much resembling *Masdevallia caudata Shuttleworthii* in size and shape, but also approaching *M. Estradæ* in some of its structural details.

M. Chelsoni.

M. amabilis × *M. Veitchiana*.

Perianth tube bright cinnabar-red, the veins crimson-purple; free portion of upper sepal oval, concave, contracted into a slender tail 2 inches long, brilliant orange-red studded with crimson papillæ; lateral sepals connate to beyond the middle and terminating in two convergent tails coloured like the upper one, the papillæ frequently aggregated in a broad band on the inner half of each.

Masdevallia Chelsoni, Rehb. in Gard. Chron. XIII. (1880), p. 554.

var.—splendens.

Flowers larger, of a deeper orange-red, especially the inner half of each of the lateral sepals, the crimson papillæ denser and more brilliant.

M. Chelsoni splendens, Veitch ex. Rolfe in Gard. Chron. V. s. 3 (1889), p. 619.

Raised by Seden at our nursery, and especially interesting as being the first hybrid *Masdevallia* raised in Europe. As a decorative plant its flowers rank among the most brilliant known; "the colour is indescribably rich orange, crimson, rose, lilac, or a combination of all these, according to the direction in which the light falls upon the flower. No artist could render the colour of the flower faithfully, still more impossible would it be to describe it in words."* The variety was raised from the reversed cross and between two finer varieties of the same species that produced the type.

M. Courtauldiana.†

M. rosea × *M. caudata Shuttleworthii*.

"Upper part of perianth tube and triangular part of the upper sepal with its tail light brownish red, the three principal nerves keeled and

* Gard. Chron. XVII. (1882), p. 222.

† Not seen by us.

brown outside ; lower part of tube and lateral sepals light rose colour ; petals, lip and column white."

Masdevallia Courtauldiana, Rehb. in Gard. Chron. V. s. 3 (1889), p. 200.

Raised by Mr. Norman C. Cookson, of Oakwood, Wylam-on-Tyne, and dedicated to Mr. Sydney Courtauld, of Boeking Place, Braintree, an ardent amateur of Masdevallias. The flower is said to be equal in size to that of *Masdevallia rosea*, with the general shape of *M. caudata Shuttleworthii*.

M. Ellisiana.

M. coccinea Harryana × *M. ignea*.

Flowers nearly as in *Masdevallia ignea* but larger, and with the tail of the upper sepal erect, as in *M. coccinea (Lindenii)*; perianth tube bright yellow at the base, passing into rose-carmine upwards; upper sepal light rose-carmine, tip of tail orange-yellow; lateral sepals of the richest crimson faintly toned with orange-red, the veins deeper as in the parents.

Masdevallia Ellisiana, Rolfe in Gard. Chron. VI. s. 3 (1889), p. 154.

Raised by Seden at our nursery, and dedicated to Lady Howard de Walden, of the Mote Park, Maidstone. For brilliancy and distinctness in colour it is one of the best hybrids yet raised.

M. Fraseri.

M. ignea × *M. coccinea (Lindenii)*.

Perianth tube dull orange-red; free portion of sepals magenta-crimson suffused with orange. The form of the flower is nearly that of *Masdevallia ignea* except that the perianth tube is narrower, and the tail of the upper sepal is not curved downwards into the angle between the two lateral sepals, which terminate in short cusps.

Masdevallia Fraseri, Rehb. in Gard. Chron. XVII. (1882), p. 143.

Raised in the collection of Mr. Fraser, of Dorncleugh, near Aberdeen.

M. Gairiana.

M. Veitchiana × *M. Davisii*.

Upper sepal triangular, elongated, yellow studded with crimson papillæ and contracted into a slender, golden yellow tail; connate lateral sepals broadly oblong, bright orange-yellow with numerous crimson papillæ towards the base and along the veins; the apical sinus rather broad, and the tails short.

Masdevallia Gairiana, Rehb. in Gard. Chron. XXII. (1884), p. 38.

Raised by Seden at our nursery, and dedicated to Mr. John Gair, of The Kilns, Falkirk, the possessor of one of the most select collections of orchids in Scotland. It is a very handsome Masdevallia; the upper

sepal is much like that of *Masdevallia Veitchiana*, but narrower in proportion to its length; the lateral sepals are nearly those of *M. Davisii*, but not so abruptly pointed.

M. Geleniana.

M. caudata Shuttleworthii × *M. Estrade xanthina*.

Flowers intermediate in size between those of the parents. Free portion of upper sepal orange-yellow with numerous purple dots chiefly along the veins; lateral sepals paler with fewer and more minute dots; tails $2\frac{1}{2}$ inches long, bright yellow.

Masdevallia Geleniana, Rehb. in Gard. Chron. II. s. 3 (1887), p. 586.

Raised by Messrs. Sander and Co. at their St. Albans nursery, and dedicated to Baron Hruby von Gelenye, of Peckau, in Bohemia.

M. glaphyrantha.

M. infracta × *M. Barlewana*.

Scapes usually two-flowered. Flowers as large as those of *Masdevallia infracta*; perianth tube brownish red; upper sepal yellowish bordered with rose-purple, and with a rose-purple central streak; lateral sepals rose-purple with three deeper veins in each; tails orange-yellow.

Masdevallia glaphyrantha, Rehb. in Gard. Chron. XXVI. (1886), p. 648.

Raised by Seden at our nursery.

M. Hincksiana.

M. towarensis × *M. ignea*.

Scapes 1—2 (or more) flowered. Flowers as large as those of *Masdevallia towarensis*, clear buff-yellow, the perianth tube and dilated basal portion of the upper sepal paler, this organ nearly as in *M. towarensis*; the lateral sepals connate to nearly the middle, acuminate, with shorter tails and with three nerves; petals and lip white.

Masdevallia Hincksiana, Rehb. in Gard. Chron. II. s. 3 (1887), p. 214.

Raised by Captain Hincks, of Breckenbrough, Thirsk, Yorkshire.

EXCLUDED SPECIES.

Masdevallia		} now referred to ...	Pleurothallis macroblepharis
Culex (Hort.)	... }		(Rehb.)
Dayana (Rehb.)	... „ „		Cryptophoranthus Dayanum (Rolfe)
fenestrata (Hook.)	... „ „		„ atropurpureum (Rolfe)

ARPOPHYLLUM.

Llav. et Lex. Nov. Veg. descript. Orch. p. 19 (1825). Benth. et Hook. Gen. Plant. III. p. 492 (1833).

Quite different as are the Arpophylla in aspect from the Pleurothallids and Masdevallias of tropical America on the one hand, and from such humble herbs as *Malaxis paludosa* and *Liparis Loeselli* of British fens on the other, they nevertheless form one of the connecting links in the chain of orchid affinities between the first and last named genera. They occupy this position chiefly in virtue of the structure of their flowers.

Four or five species of Arpophyllum are at present recognised, all natives of central America and Mexico, and of which one was found not long ago in Jamaica. Two of the species are well known in cultivation in British collections, and a third has been introduced into continental gardens. They differ chiefly from the allied genera in their large size and their long, dense, cylindrical, erect floral racemes, in which the flowers are inverted and spirally arranged round the axis. Their character will be sufficiently understood from the description of the two species given below.

The generic name Arpophyllum, from ἄρπη (harpê),* “a sword,” and φύλλον (phullon), “a leaf,” refers to the form of the leaves.

Cultural Note.—Although strictly epiphytal, the Arpophylla have a semi-terrestrial habit that renders them suitable for pot culture. The pots should be filled to fully two-thirds of their depth with clean broken crocks for drainage, over which should be placed a layer of sphagnum; the remainder and to at least an inch above the rim should be filled with a compost of fibrous peat and chopped sphagnum in equal proportions well mixed together. The plants should be placed in the centre, and held fast by a stick or any other suitable contrivance till firmly established. The general treatment of Arpophylla is in all other respects that of the Cattleyas, with which for cultural purposes they may be associated. They should, however, be placed in the lightest position, as they require but little or no shade except on bright hot days.

Arpophyllum giganteum.

A robust plant. Rhizome creeping, ligneous, as thick as the little finger. Stems terete, compressed, 6—10 inches high, jointed, with an appressed sheath at each joint nearly as long as the internode,

* Hence Harpophyllum would be more correct orthography.

monophyllous. Leaves ligulate, 12—15 inches long, coriaceous, rigid, bronzy purple when first developed, changing to green with age. Peduncle stoutish, issuing from a compressed purplish sheath, pale green dotted with blackish purple and terminating in a dense spike, frequently upwards of a foot long. Flowers very numerous, small, almost sessile, rosy purple, the lip deeper in colour than the other segments; sepals and petals oblong, reflexed at the apex, the petals narrower than the sepals; lip broadly obovate. Column very short; pollinia eight in two series of four.

Arpophyllum giganteum, Lindl. in Ann. Nat. Hist. IV. p. 384 (1840). Warner's *Sel. Orch. I. t. 39* (1862-65).

Discovered by Hartweg in 1839, and introduced by him to the garden of the Horticultural Society of London, at Chiswick. It is a native of Mexico and Guatemala, occurring on the mountains and hills in isolated patches that are frequently remote from each other. Roezl met with it in the first named country on the Sante Comapau in immense masses on the trunks and branches of trees at the summit of the mountain. In this situation the plants are exposed from October to March to the violent storms which occasionally blow from the north with so great impetuosity, that under their influence a man can with difficulty keep on his feet, but which the *Arpophyllum* resists without injury.

A. *spicatum*.

Rhizome as thick as an ordinary writing-pencil. Stems erect, 3—6 inches long, as thick as the rhizome, monophyllous. Leaves linear, 9—12 inches long, complicate, falcate, very leathery. Peduncles with a basal sheath, 6—9 inches long including the dense terminal spike. Flowers one-third of an inch in diameter; sepals and petals pale rose-purple, the former ovate-oblong, the latter similar but narrower and with the margin erose; lip longer than the petals, concave, gibbous at the base, bright purple.

Arpophyllum spicatum, Llav. et Lex. Nov. Veg. descript. II. p. 19 (1825). Lindl. Gen. et. Sp. Orch. p. 151. Id. in Bot. Reg. XXV. misc. No. 16. *Bot. Mag. t. 6022*.

The typical species upon which the genus was founded by the Mexican botanists La Llave and Lexarza, in the early part of the present century. It has been reported from various parts of Mexico, and, like the preceding, was introduced into British gardens by Hartweg.

SUB-TRIBE LIPARIEÆ.

Stems often pseudo-bulbous, one- or many-leaved, racemes terminal. Column sessile, i.e., not produced into a foot; pollinia usually four, in two pairs, inappendiculate.

PLATYCLINIS.

Benth. in Jour. of Linn. Soc. XVIII. p. 295 (1881). Benth. et Hook. Gen. Plant. III. p. 496 (1883).

The only genus in this sub-tribe of which the included species are of any horticultural interest, is *Platyclinis*, established by Mr. Benthham on Blume's second section of *Dendrochilum*. Blume's typical *Dendrochilum* is a Java plant, possessing more of the characters of the *DENDROBIEÆ* than of the *LIPARIEÆ*, but with that he joined others having the characters of the last-named sub-tribe;* it is these that Mr. Benthham has separated from *Dendrochilum*, to which must now be added other species since discovered, the typical species with two or three others being retained under the original generic name. Thus circumscribed, *Platyclinis* includes about ten species, nearly all natives of Java and the Philippine Islands, those in cultivation being all from the last-named group.†

The essential characters of the genus may be thus briefly summarised:—

Epiphytal herbs with small pseudo-bulbs that are covered from below with scarios sheaths, and bear at their apex a single narrow leaf contracted to a short foot-stalk. Flowers small and numerous, in terminal pendulous racemes and usually distichous and alternate along the rachis. Column short, erect, and having two lateral branches or arms.

The generic name is derived from *πλατύς* (*platus*), "broad," and *κλίης* (*klinis*), "a small bed."

Cultural Note.—The plants described below, being natives of a region lying within and near the equatorial zone,‡ require the temperature of

* Journal of Linn. Soc. loc. cit. supra.

† M. Porte, who visited the Philippine Islands a few years after our own countryman, Cuming, had made known the great orchid wealth of those islands, observed of *Platyclinis* (*Dendrochilum*), "Les *Dendrochilum* très-nombreux à une altitude de 500 à 1,000 mètres ne se rencontrent jamais dans les Philippines à une altitude moindre, attachés aux troncs des arbres à deux ou quatre mètres au-dessus du sol. Les forêts dans lesquelles on les trouve sont si humides que, pendant neuf mois de l'année, les sangsues y vivent comme si elles étaient terrestres."—Du Buysson, *L'Orchidophile*, p. 325.

‡ For climate of this zone see notes under *Dendrobium*, page 9.

what is familiarly called the East Indian house. They should be re-potted within a short time after the fall of the flowers, in a compost of peat and chopped sphagnum, such as is generally used for tropical epiphytal orchids with pseudo-bulbs. The pots should have an ample drainage of clean broken crocks to three-fourths of their depth; water must be freely supplied during the growing season, the supply being diminished in the dormant season to a quantity sufficient to keep the compost moist.

Platyclinis Cobbiana.

Pseudo-bulbs sub-conical, elongated, angulate, channelled, $1\frac{1}{2}$ —2 inches long. Leaves elliptic-lanceolate, 6 inches long. Peduncles slender, about a foot long; raceme flexuose, dense. Flowers pale straw-yellow with an orange-yellow lip; sepals and petals elliptic-oblong, acute; lip flabellate, slightly retuse in front. Column white at the apex, greenish below.

Platyclinis Cobbiana, Hemsley in Gard. Chron. XVI. (1881), p. 656. *Dendrochilum Cobbianum*, Rehb. in Gard. Chron. XIV. (1880), p. 748.

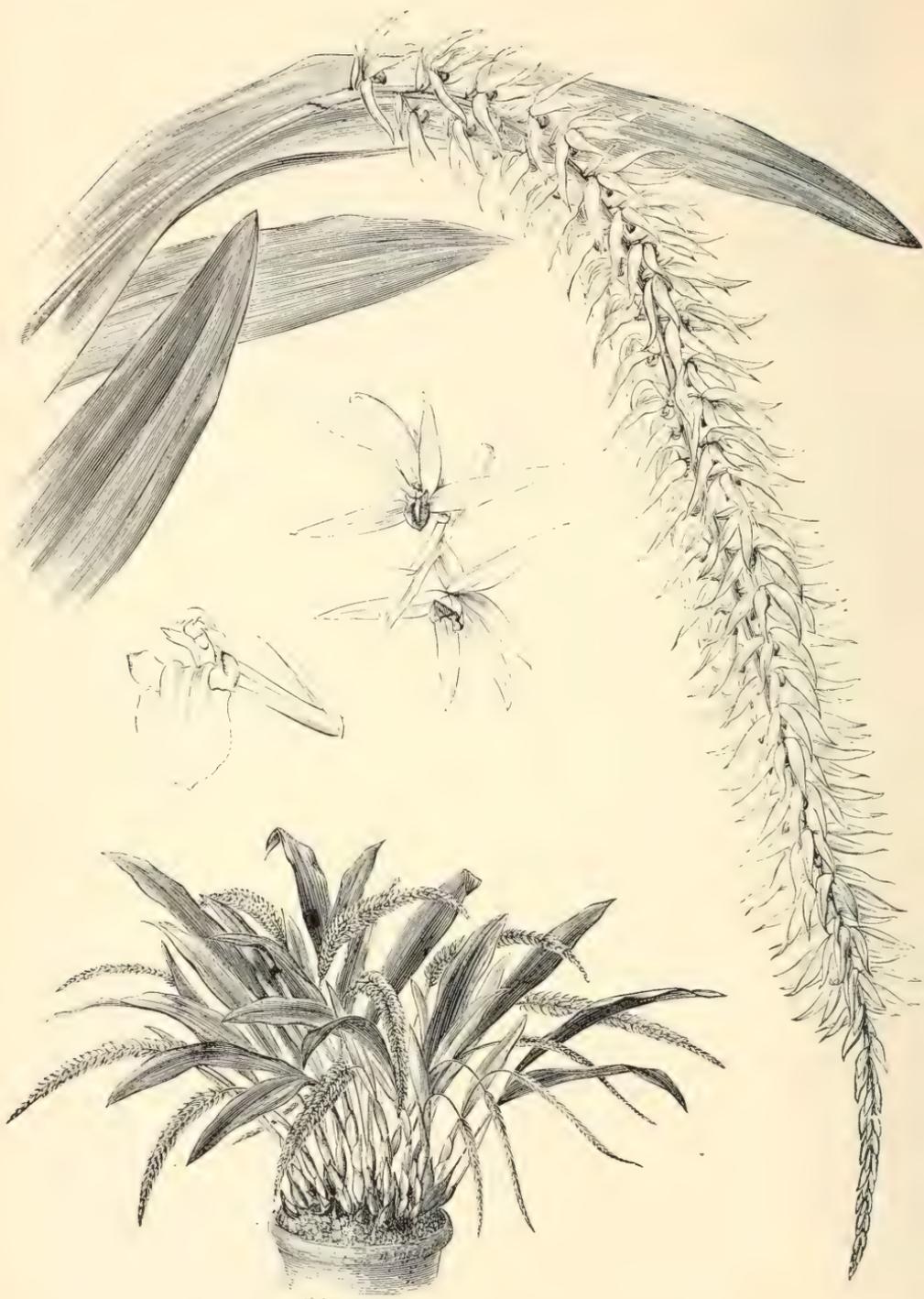
Introduced from the Philippine Islands, in 1879—80, by Messrs. Low and Co., through their collector Boxall, and dedicated by Reichenbach to Mr. Walter Cobb, of Silverdale, Sydenham, in whose collection it flowered for the first time in this country. *Platyclinis Cobbiana* is easily distinguished from the better known *P. glumacea* by its differently shaped pseudo-bulbs, its zigzag rachis, and by its flowering at the opposite season of the year, usually September and October.

P. filiformis.

Pseudo-bulbs ovoid, about the size of a filbert. Leaves linear, 5—6 inches long. Peduncles filiform, 12—15 inches long. Raceme with 50—80, or even more flowers of an uniform canary-yellow; sepals and petals oval; lip shorter than the other segments, obcordate, emarginate.

Platyclinis filiformis, Benth. in Journ. Linn. Soc. XVIII. (1881), p. 295, ined. *Dendrochilum filiforme*, Lindl. Bot. Reg. 1840, misc. No. 113. Regel's *Gartenfl. XVIII.* (1869), t. 604. *Illus. hort.* 1878, t. 323.

One of the discoveries of Cuming during his excursion to the Philippine Islands in 1836—40, and sent by him to Messrs. Loddiges. It flowered for the first time in Europe in Mr. Bateman's collection at Knypersley, in Cheshire, in 1841. Its flowering season is June and July, when, although the individual flowers are among the smallest in the orchid family, the graceful thread-like racemes in which they are collected, form a most striking and pleasing object.



Platyclinis glumacea.

P. glumacea.

Pseudo-bulbs ovoid, about the size of a small walnut, the younger ones sheathed with reddish scales which enclose also the foot-stalks of the leaves and the bases of the scapes. Leaves lanceolate, about a foot long. Peduncles filiform, bearing along the distal half a pendulous raceme of yellowish white, chaff-like flowers. Sepals and petals linear-oblong, acuminate; lip three-lobed, the side lobes pointed, the middle lobe sub-orbicular with two thickish lamellæ on the disc of a deeper yellow than the other parts of the flower.

Platyclinis glumacea, Benth. in Journ. Linn. Soc. XVIII. (1881), p. 295, ined.
Dendrochilum glumaceum, Lindl. Bot. Reg. 1841, misc. No. 58. *Bot. Mag.* t. 4853.

This was also one of Cuming's discoveries in the Philippine Islands, and was sent by him to Messrs. Loddiges about the same time as the preceding species, and in whose nursery it flowered for the first time in 1841. The gracefully pendulous crowded racemes of flowers appear in March and April, which, although of a homely colour, have a pleasant fragrance, somewhat like that of new-made hay.

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The names in italics are varieties or synonyms; those followed by × are hybrids or supposed hybrids.

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A MANUAL

OF

ORCHIDACEOUS PLANTS

CULTIVATED UNDER GLASS IN GREAT BRITAIN.

PART VI.

CŒLOGYNE, EPIDENDRUM,

SPATHOGLOTTIS, PHAIUS, THUNIA, CHYSIS, PLEIONE,
CALANTHE, DIACRIUM, NANODES, Etc., Etc.

JAMES VEITCH & SONS,

ROYAL EXOTIC NURSERY, 544, KING'S ROAD, CHELSEA, S.W.

1890.

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PRELIMINARY NOTICE.

THIS Manual is being compiled to supply amateurs and cultivators of exotic Orchids with a fuller account of the principal genera, species and varieties cultivated under glass, than is contained in the Manuals hitherto in use.

The rapid extension of Orchid culture during the last quarter of a century, resulting from the increased taste for and appreciation of this beautiful and interesting order of plants, has, in our opinion, created the *desideratum* which we are now attempting to supply. The prominent place, too, occupied by Orchids in the columns of the Horticultural Press, and the surprising amount of practical and varied information respecting them disseminated through its agency, has also stimulated the desire to obtain all the leading facts in a condensed form, to which easy reference may at any time be made.

So numerous are the species and varieties of Orchids at present in cultivation, and to which additions are constantly being made by new discoveries and by artificial hybridisation, that the labour attending the compilation of a Manual sufficiently comprehensive to meet the wants of cultivators must necessarily demand much time. Moreover, the present unsatisfactory state of Orchidology, especially in its horticultural aspect and its complicated and unscientific nomenclature, have rendered the compilation of such a Manual within a stated time almost an impossibility.

Under these circumstances, and yielding to the solicitations of patrons and friends, we have decided upon issuing the work in parts, each part containing a monograph of the cultivated species and varieties of one of the most important genera, or of a group of genera.

Little explanation of the plan of the work is here needed; the parts as issued must speak for themselves. We have only to state that in the scientific classification and sequence of the genera we have followed, with but trifling deviations, the arrangement of Bentham and Hooker as elaborated in their *Genera Plantarum*, the most profound and, at the same time, the most intelligible exposition of the Orchideæ extant. In the nomenclature of the species, we have adhered to the Laws of Botanical nomenclature adopted by the International Botanical Congress, held at Paris in August, 1867.

In the description of the species, we have been compelled to use occasionally a few technical terms to avoid cumbrous circumlocutions; at the conclusion of the work we propose giving a glossary of the terms so used. In the cultural notes we have quoted temperatures in the Centigrade scale with the equivalent Fahrenheit readings, in the hope that the far more rational scale, now almost universally adopted in scientific investigations, may also come into use in horticulture. The literary references in italics indicate coloured plates of the species or variety described.

SUB-TRIBE ERIÆ.

*Inflorescence lateral, pseudo-terminal, or from the rhizome distinct from the leaf-bearing pseudo-bulbs. Column almost always extended into a foot. Pollinia eight, four in each cell.**

CÆLIA.

Lindl. Gen. et Sp. Orch. p. 36 (1831). Benth. et Hook. Gen. Plant. III. p. 508 (1833).

Cœlia includes four or five species inhabiting the West Indies, Mexico, and Central America, of which three have been introduced into European gardens. The genus was founded by Dr. Lindley upon a drawing of *Cœlia Baueriana* made by the distinguished botanical artist, Francis Bauer, who, however, "represented the pollen masses as being four in number and concavo-convex, so that by lying in pairs, side by side, each pair formed a hollow body, narrower at back than in front, a circumstance that suggested the name of the genus (from *κοίλος*, hollow). When fresh specimens were subsequently examined, it was found that no such structure as that represented by Bauer exists; on the contrary, the pollinia are eight in number, placed in two series of double pairs, and of the supposed hollowing out no trace is discoverable."† The name Cœlia, nevertheless, was retained by Lindley and adopted by his successors.

The most obvious generic characters are:—The long narrow, more or less folded and veined leaves; the densely racemose scapes (three-flowered only in *Cœlia bella*) which spring from the base of the latest formed pseudo-bulbs; the column produced into a short foot, to which the two lateral sepals are adnate at their base; and the three-winged capsule.

Cultural Note.—*Cœlia bella* requires the average annual temperature of the Cattleya house; a moist atmosphere and a liberal supply of water during its season of growth are requisite to insure the pseudo-bulbs

* *Cœlia*, *Pachystoma*, *Ipsa*, and *Spathoglottis* form part of this sub-tribe, of which *Eria* supplies the type, a genus including upwards of eighty species, none of which properly fall within the scope of the present work. We may, however, mention that *Eria obsca*, *E. cinna-barina*, *E. floribunda*, and two or three others are among the species sometimes met with in private collections.

† Bot. Reg. 1842, sub. t. 36,

attaining their full size, and the flowering of the plant in the following season. *C. macrostachya* requires the same cultural treatment as *Lycaste Skinneri*, *Odontoglossum Insleyi*, and other well-known orchids inhabiting the elevated regions of Central America. *C. Baueriana* requires a higher temperature and a more humid atmosphere than the two first-mentioned species.

Cœlia Baueriana.

Pseudo-bulbs clustered, ovoid or sub-globose, $1\frac{1}{2}$ —2 inches thick, ditriphyllous. Leaves linear, acute, 12—18 inches long, narrowed below into sheathing petioles, deep green with 2—4 pale veins. Scapes stoutish, 4—5 inches long, invested below by 3—5 large lanceolate, acuminate, greenish brown sheaths, densely racemose along the upper half. Flowers with all the segments concave, fragrant, white, on short pedicels, at the base of which is a linear greenish brown bract longer than the ovary and perianth; ovary three-angled, prominently winged at the angles; sepals ovate-lanceolate; petals broadly obovate-oblong; lip shorter than the other segments, with a broad saccate yellow claw and triangular blade. Column very short.

Cœlia Baueriana, Lindl. Gen. et Sp. Orch. p. 36 (1831). *Bot. Reg.* 1842, t. 36 (Baueriana). *Epidendrum tripterum*, Smith Ic. pict. t. 14. *Cymbidium tripterum*, Swartz, N. Act. Ups. VI. p. 70.

Cœlia Baueriana is somewhat widely distributed over the West India Islands and parts of Mexico. It became known to science towards the end of the last century, first as *Epidendrum tripterum*, then as *Cymbidium tripterum*, till removed from the last-named genus by Dr. Lindley, on account of the totally different structure of its flowers. We find no record of its first introduction into British gardens, but it was in cultivation prior to 1842, in which year it was figured in the *Botanical Register*. Dr. Lindley compared it with our native Lily of the Valley, for “although white and inconspicuous, it is so sweet that it must take precedence of most of its race; no hawthorn hedge is more fragrant than a bed of this *Cœlia*.” We are indebted to Mr. F. G. Tautz, of Studley House, Hammersmith, for materials for description.

C. bella.

Pseudo-bulbs globose, smooth, $1\frac{1}{2}$ —2 inches in diameter. Leaves 3—4 from the apex of each pseudo-bulb, elongate, ensiform, acuminate, 15—20 inches long. Scapes 3—5 inches high, sheathed with brown imbricating acute boat-shaped bracts, 3—5 flowered. Flowers fragrant, 2 inches long, tubular below, funnel-shaped above; sepals and petals similar, oblong-obtuse, white, the sepals tipped with rose-purple; lip

obscurely three-lobed, the side lobes linear-oblong, erect, canary-yellow, the middle lobe tongue-shaped, reflexed. Column white, triquetral, three-toothed at the apex.

Cœlia bella, Rehb. Walp. Ann. VI. p. 218 (1861). *Bot. Mag.* t. 6628. Williams' *Orch. Alb. II.* t. 51. *Bifrenaria bella*, Lemaire, *Gard. Fleur.* t. 325 (1853). *Bothriochilus bellus*, Lemaire, *Illus. hort.* III. (1856), p. 30.

The origin of this plant is obscure. According to Lemaire (*L' Illustration Horticole*, loc. cit.) it was sent about the year 1852 to M. Verschaffelt's horticultural establishment at Ghent, by M. Devos, from Sancta Catherina in Southern Brazil. But Sir J. D. Hooker has pointed out (*Botanical Magazine*, sub. t. 6628), that the plant is without doubt, like its congeners, a native of Central America, as there is a specimen of it in Lindley's herbarium, collected by Mr. G. Ure Skinner in Guatemala. It is by far the handsomest species in the genus.

C. macrostachya.

Pseudo-bulbs globose, 2—3 inches in diameter, triphyllous. Leaves lanceolate, acuminate, plicate, 12—15 inches long. Scapes as long as the leaves, the basal portion clothed with large, ovate acute brownish sheaths, the upper two-thirds a crowded spike of partially expanded rose-coloured flowers, the colour deeper at the base and on the spur of the lip, and paler on the petals. Bracts linear, acuminate, longer than the flowers. Sepals oblong, acute; petals obovate-oblong; lip oblong, reflexed, terminating below in a bi-gibbous spur. Column semi-terete, whitish.

Cœlia macrostachya, Lindl. in Benth. *Pl. Hartw.* p. 92 (1842). *Id. Bot. Reg.* 1842, sub. t. 36. *Bot. Mag.* t. 4712. Van Houtte's *Fl. des Serres*, t. 900 (1854), (copied from *Bot. Mag.*). *Rev. hort.* 1878, p. 210.

First sent by Hartweg from the Hacienda de la Llaguna, in Mexico, in 1841, to the Horticultural Society's Garden at Chiswick, and occasionally imported since with other Mexican orchids. Its flowering season is August—September.

PACHYSTOMA.

Blume, *Bijdr.* p. 376 (1825). Benth. *et. Hook. Gen. Plant.* III. p. 511 (1883).

Although founded by the Dutch botanist Blume, on a terrestrial orchid (*Pachystoma pubescens*) which he discovered in Java in the early part of the present century, the genus *Pachystoma* was scarcely known to horticulture even by name till the beautiful species described below—which was sent to us in 1878—was referred to it by

Reichenbach, and subsequently accepted by Bentham, who would, however, have preferred bringing it under *Ipsea*.* The true *Pachystomas*, about seven or eight species, are leafless plants with inconspicuous flowers of a totally different habit from the African plant here described, and are scattered over parts of India and the Malay Archipelago, but none of them possess any horticultural interest.

Pachystoma Thomsonianum.

Pseudo-bulbs orbicular, much like those of a *Pleione*, placed at short intervals on a creeping rhizome, mono-diphyllous. Leaves lanceolate, acuminate, 6—8 inches long. Peduncles slender, as long as the leaves, one or two from the base of each pseudo-bulb, 2—4 flowered. Flowers 3 inches across; sepals and petals white, lanceolate, acute, the dorsal sepal the broadest, the lateral two narrower and falcate; lip three-lobed, the lateral lobes erect, sub-quadrate, greenish, densely spotted with deep purple on the inner side; middle lobe triangular, elongated, tapering to a recurved point, and traversed by five raised longitudinal purple lines which gradually coalesce towards the apex. Column arched, semiterete, green spotted with red.

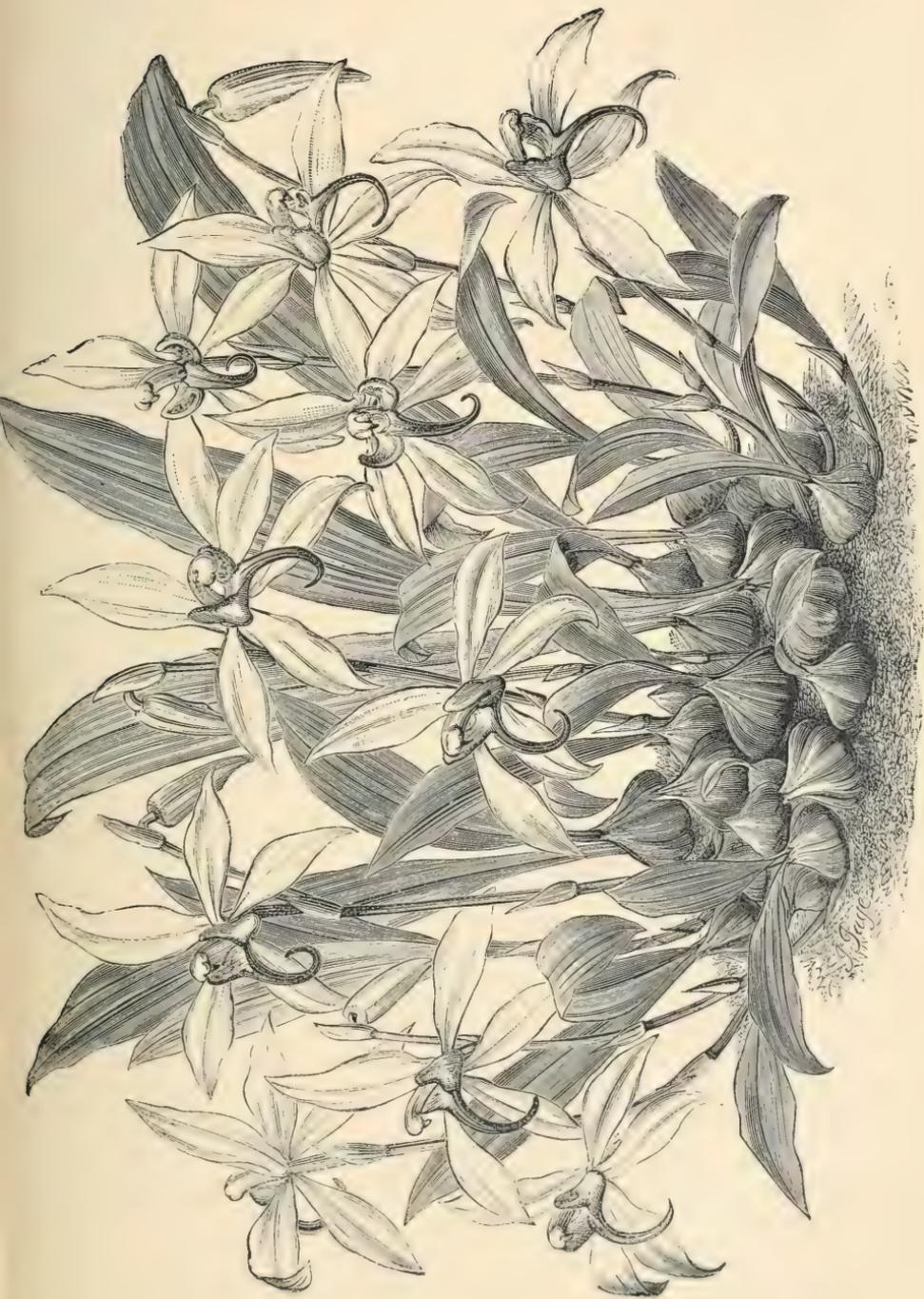
Pachystoma Thomsonianum, Rehb. in Gard. Chron. XII. (1879), pp. 582 and 625, icon. xyl. Id. *Xen. Orch.* III. p. 35, t. 213. *Bot. Mag.* t. 6471. Williams' *Orch. Alb. V.* t. 220.

A native of the mountains of Old Calabar, in West Africa, at a moderate elevation, where it was discovered by Kalbreyer growing on the trunks of trees, and at his request named after Mr. Thomson, for a long time an earnest missionary in that unhealthy region. The species is, as Sir J. D. Hooker justly remarks, "a very lovely one; its graceful form and the purity and brilliancy of its white, and the vividness of its purple, render it one of the most beautiful orchids of its type and habit, which remind one a good deal of some *Cœlogynes*" (*Pleiones*).†

Cultural Note.—Inhabiting one of the hottest parts of the globe, its geographical position indicates its chief cultural requirements, viz., a constantly warm and moist atmosphere, such as is maintained in the *Phalenopsis* house. A suitable provision should be made for its sub-terrestrial, creeping habit, such as a shallow pan or teak basket that can be conveniently suspended near the roof-glass of the house.

* *Jour. of Linn. Soc.* XVIII. p. 304.

† *Bot. Mag.* sub. t. 6471.



Pachystoma Thomsonianum.



Spathoglottis aurea.
From the *Gardener's Chronicle.*

IPSEA.

Lindl. Gen. et Sp. Orch. p. 124 (1831).

Ipsea is made sectional under *Pachystoma* by Bentham, with the remark that it would perhaps be better to restore it to generic rank. We need therefore offer no apology for doing so, especially as the species described below is clearly distinguishable from the typical *Pachystomas* by its leaf-bearing pseudo-bulbs and large showy flowers. *Pachystoma Thomsonianum* should, according to the same authority, be a second species of *Ipsea*,* but there are structural differences observable in the flower, especially in the pollinia and the labellum, that render it very distinct from the Ceylon plant; it is, to our mind, so far as at present known, a monotypic form that should have separate generic rank.

Ipsea speciosa.

Pseudo-bulbs or tuberous rhizomes, sub-globose like corms, from the conical tops of which are produced two but sometimes only one lanceolate leaf, 5—9 inches long, tapering below into a slender petiole. Scapes slender, erect, 12—18 inches high, with 2—3 joints, at each of which is a spatheaceous bract, 1—2 flowered. Flowers 2—3 inches in diameter, canary-yellow with some red lines on the disk of the lip; sepals oblong, obtuse, the lateral two connate at the base of the column, forming a small obtuse spur; petals obovate-oblong, smaller than the sepals; lip three-lobed, the lateral lobes triangular, ascending, the intermediate lobe broadly obcordate, recurved with five wavy keels on the disc, of which the middle one is the longest. Column clavate.

Ipsea speciosa, Lindl. Gen. et Sp. Orch. p. 124 (1831). Thwaites, Pl. zeyl. p. 301. *Bot. Mag.* t. 5701. *The Garden*, XXII. (1882), t. 351. *Gard. Chron.* XVIII. (1882), p. 500. *Pachystoma speciosum*, Rehb. in *Bonpl.* III. (1855), p. 250.

Discovered in the early part of the present century by McRae, on the mountains in the south of Ceylon, where it is “not uncommon amongst long grass on exposed slopes, at an elevation of 4,000—5,000 feet.” It was introduced to the Royal Gardens at Kew, in 1866, by Mr. Thwaites, at that time Director of the Botanic Garden at Peradenia.

Cultural Note.—The cultural treatment of *Ipsea speciosa* is the same as that of the *Pleiones* (see *postea*), but with the average temperature somewhat higher.

* *Ei bene adjunctum videtur Pachystoma Thomsonianum.* Gen. Plant. III. p. 511. See also *Jour. Linn. Soc.* XVIII. p. 304.

SPATHOGLOTTIS.

Blume Bijdr. p. 400 (1825). Benth. et Hook. Gen. Plant. III. p. 511 (1883).

Closely allied to the two preceding genera, and separated from them chiefly on account of the column not being produced at the base, is *Spathoglottis*, including about ten species inhabiting southern China, India, the Malay Archipelago, and some of the islands of the Pacific Ocean. They are terrestrial orchids, with mono-diphyllous pseudo-bulbs, elongated prominently veined leaves, and racemose scapes borne on the rhizome distinct from the pseudo-bulbs. Several of the species have been in cultivation during the past half century, but like other tropical terrestrial orchids, most of them have failed to find favour with amateurs, with the exception of *Spathoglottis aurea* and the recently introduced *S. Vieillardii*. The other three species described in the following pages are still occasionally met with in collections.

The generic name *Spathoglottis* is derived from *σπάθη* (*spathé*), "a spathe," originally the name given to the large bract enclosing the inflorescence of the Palm; and *γλώσσα* (*glossa* or *glotta*), "the tongue," in orchidology the labellum or lip.

Cultural Note.—The native localities of the species indicate the approximate temperature in which they should be cultivated; thus, *Spathoglottis aurea* and *S. Lobbii*, occurring within the equatorial zone, should be grown in the East India house. *S. Vieillardii* and *S. Petri*, although both tropical species, grow wild on mountains at a considerable elevation, whence a somewhat lower or intermediate temperature is sufficient for them; *S. Fortunei*, from Hongkong, may also be associated with them. On account of the terrestrial habit of the *Spathoglottis*, it is usual, as in the case of the *Pleiones*, to mix a small quantity of leaf-mould or loam and a little silver sand with the compost of peat and chopped sphagnum in which they are potted, a drainage of clean crocks being allowed in proportion to the depth of the pots or pans used. The watering must be regulated according to the season, freely given when the plants are in active growth, diminished and even withheld for a time when at rest during the winter season.

Spathoglottis aurea.

Leaves plaited, ligulate-lanceolate, acuminate, 30—40 inches long. Scapes erect, as long as or longer than the leaves, purplish below, green along the rachis, many-flowered. Bracts numerous, spatulate, concave. Flowers 3 inches in diameter; sepals elliptic-oblong obtuse, bright canary-yellow, keeled and streaked with dull orange-red behind; petals generally larger than the sepals, obovate-oblong, but sometimes

similar and equal to them, bright canary-yellow on both sides; lip shorter and smaller than the other segments, three-lobed, the side lobes oblong, roundish and dilated at the apex, incurved, bright yellow densely spotted with red on the basal half; front lobe fleshy, linear spatulate, obtuse, with two broad subulate auricles at the base, bright yellow spotted with red. Crest bi-lamellate, the lamellæ divergent.

Spathoglottis aurea, Lindl. in Jour. of Hort. Soc. Lond. 1850, p. 34. Rehb. in Gard. Chron. IV. s. 3 (1888), p. 92, icon. xyl. S. Kimballiana, Hort. Sander.

Introduced by us in 1849 from Mount Ophir in Malacca, where it was detected by Thomas Lobb growing near *Nepenthes sanguinea* and *Rhododendron jasminiflorum*. Only a very few plants reached England alive, and these gradually died out after flowering one or two seasons. Nothing more was seen or heard of it in a living state till 1886, when it was sold at Stevens' Rooms by its importers, Messrs. Sander and Co., of St. Albans, who had received it from their collector Förstermann.

Spathoglottis aurea is a plant of considerable interest both to botanists and to horticulturists; its large spoon-like cauline bracts are peculiar to it and strongly mark its specific character, while its flowers are the largest and most handsomely coloured in the genus.

S. Fortunei.

Leaves form a tuberous rhizome, usually in pairs, linear-lanceolate, 9—15 inches long. Scapes shorter than the leaves, slender, pubescent, bearing a terminal 5—9 flowered lax raceme. Flowers yellow with the side lobes of the lip streaked and spotted with red; sepals oval-oblong; petals broader, oval; lateral lobes of lip oblong, erect; middle lobe obovate, emarginate; crest consisting of two divergent fleshy lobes, and a central raised line reaching nearly to the apex of the lip. Column winged, triquetral above, concave below.

Spathoglottis Fortunei, Lindl. Bot. Reg. 1845, t. 19. Benth. Fl. Hongkong, p. 355. *Pachystoma Fortunei*, Rehb. Walp. Ann. VI. p. 464 (1861).

First sent by Fortune in 1844 from Hongkong to the Horticultural Society of London, in whose garden at Chiswick it flowered in January in the following year. It is abundant in the island, and it has been also gathered in China on the mountains adjacent to the coast opposite Hongkong.

S. Lobbii.

Pseudo-bulbs of irregular form, compressed. Leaves broadly lanceolate, acute, 7—10 nerved. Scapes slender, 18—24 inches high, pale green and pubescent below, purplish above, 4—6 flowered. Flowers 1½—2

inches across, bright yellow with some lines of red spots on the lateral sepals and at the base of the lip; sepals and petals similar, oval-oblong, acute; lip three-lobed, the side lobes linear-oblong erect, the intermediate lobe obcordate, emarginate, contracted below to a narrow claw on which is a bi-lamellate callus. Column arched, broad at apex.

Spathoglottis Lobbii, Rehb. in Walp. Ann. VI. p. 455 (1861). Id. in Gard. Chron. V. (1876), p. 534. *The Garden*, XXII. (1882), t. 351.

A native of Labuan, in Borneo, where it grows in red sandy earth on the cliffs below the Civil Hospital Flat, its roots being protected by grass and other herbage, but otherwise exposed to a tropical sun.* It also occurs on the slopes of the mountains of Sarawak at 1,200—1,500 feet elevation. It was originally detected by the collector whose name it bears, but who failed to send living specimens to Europe; it seems to have been first introduced by Messrs. Rollisson about the year 1875.

S. Petri.

Pseudo-bulbs sub-globose, $1\frac{1}{2}$ inches in diameter. Leaves narrowly lanceolate, acuminate, 12—18 inches long. Scapes a little longer than the leaves, 9—12 flowered. Flowers $1\frac{1}{2}$ inches in diameter, pale rosy lilac on purplish pedicels, at the base of which is a small ovate deciduous bract; sepals ovate-oblong; petals broader, sub-orbicular, apiculate; lip shorter than the other segments, distinctly three-lobed, the side lobes oblong, incurved, purple on the inner side; front lobe transversely oblong, apiculate; callus heart-shaped, yellow spotted with red. Column sub-clavate, bent, purplish lilac.

Spathoglottis Petri, Rehb. in Gard. Chron. VIII. (1877), p. 392. *Bot. Mag.* t. 6354.

Discovered by Mr. Peter Veitch in the Feejee Islands, in 1876, and sent by him to our Chelsea nursery, where it flowered for the first time in the following year. The deciduous bracts are a marked characteristic of this species, as these organs are persistent in the other species even long after the ripening of the fruit.†

S. Vieillardii.

Pseudo-bulbs ovoid, $2\frac{1}{2}$ inches long. Leaves large for the genus, 30—40 inches long, lanceolate, acuminate, plicate and closely ribbed, cuneate below, and passing into a short petiole, but sometimes sessile. Scapes erect, 18—24 inches high, racemose above, many flowered, the flowers expanding in succession from below upwards, five to ten being

* F. W. B. in *The Garden*, XXII. (1882), p. 188.

† *Bot. Mag.* sub. t. 6354.

in perfection at one time; pedicels (including ovary), 2—2½ inches long, pale purple, at the base of which is a conspicuous oval, acute, concave, cream-coloured bract. Flowers 2 inches across; sepals and petals white, the sepals elliptic-oblong, acute, concave, keeled behind, the petals similar but larger, slightly undulate, not keeled; lip three-lobed, the side lobes oblong-obtuse, turned upwards and inwards, pale red-brown; the middle lobe obcordate, emarginate with a long linear claw at the base of which is a large, bi-lobate, bright yellow callus, below which are two depressed whitish lobules dotted with red. Column clavate, arched, terete above, white sometimes tinted with rose.

Spathoglottis Vieillardii, Rchb. in *Linnaea*, XLI. p. 85 (1877). *Bot. Mag.* t. 7013.
 S. Augustorum, Rchb. in *Lindenia*, I. t. 25 (1886). *Gard. Chron.* XXV. (1886), p. 335.

First discovered by MacGillivray, naturalist to Captain Denham's voyage to the Pacific Ocean, in 1853, in the Isle of Pines, one of the New Caledonian group of islands, and subsequently gathered in New Caledonia by the French botanist whose name it commemorates, and from whose specimens it was described by the late Professor Reichenbach in the serial quoted above.* It was introduced into European gardens by MM. Auguste Linden and Auguste de Ronne in 1885—86, while collecting plants for the Compagnie Continentale d'Horticulture de Gand from the Sunda Isles (?) it is said, but a locality so vaguely stated is misleading, and from its remoteness from New Caledonia, the known habitat of the species, its presence there was hardly to be anticipated. From the published account of one of these travellers in the *Gardeners' Chronicle* loc. cit., we gather that the plant occurs on a mountain, at an elevation of 1,200—1,300 feet at the bottom of a gully surrounded with rocks, where it occupies shaded and damp retreats.

Bot. Mag. sub. t. 7013.

SUB-TRIBE BLETIÆ.

Stems usually pseudo-bulbous at the base; leaves large and folded with prominent longitudinal nerves. Inflorescence (with few exceptions) on separate leafless scapes.

PHAIUS.

Lour. Fl. Coch. Ch. II. p. 529 (1790). Benth. et Hook. Gen. Plant. III. p. 512 (1883). Phajus, Lindl. Gen. et Sp. Orch. p. 126 (1831).

A genus of robust sub-terrestrial orchids, including about twenty species that are spread over tropical Asia, parts of Africa, Madagascar, Australia, some of the islands of the Pacific Ocean, the Malay Archipelago, and extending northwards into China and Japan, occurring generally in low-lying swampy places, but in a few cases at a considerable elevation, often in shade, but sometimes fully exposed to the sun's rays. Mr. Bentham, following the Dutch botanist Blume, has adopted four sectional divisions of the genus, of which two only include species of horticultural interest, viz., the true Phaii (Genuini) and Thunia. The last named section was raised to generic rank by Reichenbach, on account of the totally different habit of the included species, the different form of the inflorescence, and some structural differences observable in the flowers, notably the fringed lamellæ of the lip. As the Thunias require a cultural treatment very different from Phaius, they must necessarily be regarded as horticulturally distinct; we have therefore followed Reichenbach in keeping Thunia separate from Phaius.

The essential characters of Phaius are:—Leaves ample, 4—6 in number from a thickened rhizome or pseudo-bulb; scapes racemose, tall, leafless, many sheathed; sepals and petals free, similar and sub-equal; labellum spurred at the base. Column wingless, pollinia eight, in two bundles of four each.

The name Phaius (*φαιός*) is the Greek word for swarthy, in reference to the prevailing yellow-brown tints of the flowers.

Cultural Note.—The plants should be re-potted in the spring when commencing their new growth in a compost of fibrous loam, and a small quantity of rough peat and chopped sphagnum. Drainage to about one-half the depth of the pot should be secured by means of broken crocks. Liberal and frequent waterings must be given during the season of active growth, and occasionally a little weak manure

water may be used, but during the season of rest only sufficient water should be given to keep the compost moist. The temperature of the intermediate house is sufficient, that is to say, a range of about 13°—20° C. (55°—70° F.) by fire heat, according to the season of the year. The plants should not be exposed to direct sunlight during the summer months; it is not unusual to place them in a shady position in the East India house during active growth, or even in an ordinary stove. All the species of *Phaius* described below usually flower in March and April, with the exception of *Phaius tuberculosus*, which generally flowers earlier.

Phaius grandifolius.

Pseudo-bulbs ovate, as large as a large hyacinth bulb, and sheathed by the imbricating bases of the fallen leaves. Leaves 4—6, oblong-lanceolate, acute, petiolate, 30—40 inches long. Scapes stout, 3—4 feet high, terminating in a 12—18 flowered raceme. Flowers 3—4 inches across; sepals and petals oblong-lanceolate, acute, distinctly nerved, yellow-brown on the inner side, silvery white behind; lip broadly obovate, convolute into a tube to three-fourths of its length, whitish without, pale yellow-brown bordered with rose-purple on the inner side; anterior part open, rose-purple bordered with white; disk yellow streaked with red-purple; spur short, curved.

Phaius grandifolius, Lour. Fl. Coch. Ch. II. p. 529 (1790). Bot. Reg. 1839, misc. 40. Hook. *Cent. Orch.* t. 37. Van Houtte's *Fl. des Serres*, VII. t. 738. Benth. Fl. austral. VI. p. 304. *P. australis*, *P. leucophæus*, *P. Carronii*, F. Muel, *Bletia Tankervilleæ*. R. Br. in Hort. Kew, ed. 2, vol. V. p. 205. *Bot. Mag.* t. 1924. *Limodorum Tankervilleæ*, Ait. Hort. Kew, ed. 1. vol. III. p. 302, t. 12. And many others.

var.—*Blumei*.

Sepals and petals oblong, acute, broader than in the type, deep buff-yellow faintly mottled with red.*

P. grandifolius Blumei, supra. *P. Blumei*, Lindl. Gen. et Sp. Orch. p. 127. *Blume, Orch. Ind. Archipel.* t. 1. Regel's *Gartenfl.* 1865, t. 464.

One of the earliest tropical orchids introduced into British gardens, it having been brought from China about the year 1778 by Dr. John Fothergill; it is also a native of the hot valleys of the lower Himalayan zone, Cochin China, and various parts of eastern Australia, especially in the neighbourhood of Moreton Bay, whence it was sent to the Royal Gardens at Kew, by Allan Cunningham,

* The above is the only character we find in *Phaius Blumei* in cultivation, by which it may be distinguished from *P. grandifolius*. Moreover we have had forms in our houses so nearly intermediate between these, that they might with equal propriety be referred to either. An Australian representative of the variety, figured in the *Botanical Magazine*, t. 6032, under the name of *P. Blumei Bernaysii*, has primrose-yellow flowers, but it is of little value as a horticultural plant on account of the flowers being often self-fertilising before they expand, and thence lasting but a short time in perfection.

in 1824. Over so extensive a region the plant is observed to vary somewhat in habit and the flowers considerably in colour; it has received many names in consequence. The form known as *Phaius Blumei*, first detected on Mount Salak, in Java, by the botanist whose name it bears, is now regarded as a variety of the common type, from which it differs only in the character described above. *P. grandifolius* was introduced to Jamaica by Hinton East in 1787, where it has become thoroughly naturalised, and is now found growing freely in the bush, and sometimes even in the forest, on the hills at 2,000—4,000 feet elevation.* *P. grandifolius* is one of those useful orchids that may be cultivated in any ordinary stove or intermediate house, and when in flower it may even be used for the decoration of apartments from which frost is carefully excluded. Its flowering season is from February to April.

P. Humblotii.

Pseudo-bulbs sub-globose, about $1\frac{1}{2}$ inches in diameter, with 2—3 rings where the leaves have fallen. Leaves broadly lanceolate, acuminate, plicate, 15—20 or more inches long, narrowed below into channelled and winged foot-stalks. Scapes as long as, or longer than, the leaves, racemose, 7—10 or more flowered. Flowers 2 inches in diameter; sepals and petals similar and sub-equal, broadly obovate-elliptic, light rose-purple suffused with white; lip broadly panduriform with crisped and undulate margin, the basal lobes notched at the edge, reddish brown passing into crimson at the margin; the anterior lobe rose-purple with a whitish centre, on which are two large bright yellow teeth pointing inwards. Column slender, bent like a swan's neck, terete and greenish above, grooved below the small stigmatic cavity.

Phaius Humblotii, Rehb. in Gard. Chron. XIV. (1880), p. 812. Id. XXVI. (1886), p. 294. Id. 173 icon. xyl. Sander's *Reichenbachia*, I. t. 17.

Introduced by M. Léon Humblot, a French naturalist and traveller, who had discovered it during an excursion into the interior of Madagascar, in 1879—80. He sent at the same time the beautiful *Phaius tuberosus*, so that to M. Humblot is due the merit of adding to the orchid collections of Europe two of the most remarkable species of the genus yet known.

P. maculatus.

Pseudo-bulbs clustered, ovoid, 4—5 inches long, and $2-2\frac{1}{2}$ inches thick, produced at the apex into a leafy stem 15—20 inches long,

* D. Morris in Gard. Chron. XXIV. (1885), p. 140. We have since had it offered to us by an amateur collector of orchids in Jamaica.



Phaius Humblotii.

(Drawn at Tring Park, the seat of the Right Hon. Lord Rothschild.)



Phaius tuberculatus.

(Drawn in the garden of Sir Trevor Lawrence, Bart., M. P., at Burford Lodge, Dorking.)

bearing 5—7 oblong-lanceolate leaves as long as the stem, and spotted with pale yellow. Scapes 2—3 feet high, racemose along the distal half, many flowered. Flowers 3 inches in diameter; sepals and petals oval-oblong, buff-yellow; lip shorter than the other segments, convolute into a tube, pale buff-yellow, the anterior margin bent downwards, much crisped, and of a chocolate-red colour; spur oblong-obtuse.

Phaius maculatus, Lindl. Gen. et. Sp. Orch. p. 127 (1831). *Bot. Mag.* t. 3960. Hook. *Cent. Orch.* t. 40. Williams' *Orch. Alb. VIII.* t. 381. *Bletia Woodfordii*, *Bot. Mag.* t. 2719. Blume, *Orch. Ind. Archipel.* p. 9.

Native of various parts of the lower Himalayan zone, where it occurs in swampy places. It was one of the numerous discoveries of Dr. Wallich, in the early part of the present century, and who sent it to Kew about the year 1822. Its spotted leaves generally distinguish it from all the cultivated species of *Phaius*, but instances have been observed in which the spots are absent.

P. philippinensis.

Pseudo-bulbs like the rhizome of an *Iris*, 1½—2 inches long, cylindric, with 5—6 rings when the sheaths have fallen. Leaves, two from each growth, lanceolate, acuminate, plicate, 9—15 inches long, narrowed below into a channelled petiole half as long as the blade. Scapes as long as or longer than the leaves, terete with equidistant joints, at each of which is a tubular spathaceous sheath, and terminating in a few-flowered raceme. Flowers leathery in texture, not fully expanding; sepals and petals oblanceolate-oblong, sub-acute, reddish brown, passing into light yellow at the margin, white outside; lip trumpet-shaped with a truncate mouth, the margin recurved, more or less frilled, white with a faint tinge of pink when first expanded, changing with age to pale yellow; spur obsolete, disk with three keels, of which the outside two are the shortest and most elevated. Column clavate, with broad rounded wings.

Phaius philippinensis, N. E. Brown in *Gard. Chron.* VI. s. 3 (1889), p. 239.

Detected by our collector, David Burke, on the slopes of the hills, at 3,000—4,000 feet elevation, in the Island of Mindanao, and thence interesting as being the first species of *Phaius* found in the Philippine Islands. It flowered for the first time in our Chelsea nursery in August, 1889. As a species it is remarkably distinct, especially in the structure of the labellum, which is neither three-lobed nor spurred, but "has a nearly truncate mouth with a slightly frilled, recurved margin, the emarginate apex is not in the least produced."

P. tuberculosus.

Pseudo-bulbs fusiform, annulate, prostrate or slightly ascending, 2—3 inches long. Leaves oblong-lanceolate, acuminate, 10—15 inches long.

Scapes erect, 12—18 or more inches high, sheathed by a whitish bract at each joint and terminating in a 5—7 flowered raceme. Flowers 2—2½ inches in diameter; sepals and petals white, elliptic-oblong, acuminate, with a depressed line above, slightly carinate beneath; lip three-lobed, the side lobes large, sub-orbicular, meeting above the column and forming a wide-mouthed funnel, orange yellow much spotted with red-purple and studded with white hispid hairs; middle lobe sub-quadrate, emarginate, with a crisped edge and deep yellow callus on the disk consisting of three broad denticulate ridges, white blotched with rose; below the callus is a dense tuft of sulphur-yellow hairs. Column clavate, arched, white above, purplish in front.

Phaius tuberosus, Blume, Mus. Bot. II. p. 181 (1856), Rehb. in Gard. Chron. XV. (1881), p. 423. Williams' *Orch. Alb. II.* t. 91. *The Garden*, XXVI. (1884), t. 449. *Limodorum tuberosum*, Thouars, Orch. Hes d'Afr. t. 35. *Bletia tuberosa*, Spreng. Syst. Pl. III. p. 744 (1826). Lindl. Gen. et Sp. Orch. p. 123 (1831).

The most striking of all the species of *Phaius*. The flowers are not only of remarkable beauty, but also of singular structure and very difficult to describe. Although so recently introduced to British gardens, it was known as an herbarium specimen, in the early part of the present century, to the French naturalist Dupetit Thouars, and to the German botanist Sprengel, and through them the species became known to Dr. Lindley, who, following Sprengel, described it in his *Genera and Species of Orchidaceous Plants* under the name of *Bletia tuberosa*. Blume subsequently referred it to *Phaius*, the correctness of which has since been confirmed by its hybridising with the Indian species, *Phaius Walllichii*. The plants at present in cultivation were collected in Madagascar by the brothers Humblot, and through them introduced by Messrs. Sander and Co., in 1880. *P. tuberosus* flowered for the first time in this country in the collection of Sir Trevor Lawrence, at Burford Lodge, in the spring of the following year.

Cultural Note.—Considerable difficulty has been experienced in growing and flowering this most interesting orchid, and much disappointment has ensued therefrom. One of the most successful instances that has come under our notice is that of the plants in the collection of Mr. A. Sillem, at Lawrie Park, Sydenham, where they receive the following treatment:—“The pots in which they are cultivated are large enough to allow the roots to spread freely in all directions; they are first filled to two-thirds of their depth with broken crocks and charcoal, then a layer of peat; on this the plants are placed, and around the stems the pots are filled to the brim with living sphagnum. By this arrangement the plants are in the same condition as they would be if growing on the surface of a bog (and this is probably their natural position); they can also be

freely watered, with rain water when possible, without getting sodden. They are placed in a shady corner of the Phalænopsis house, where the temperature ranges from 18—21° C. (65—70° F.), and where they get plenty of air; the sphagnum and compost are kept moist all the year round, and the leaves are generally sponged over once a week to keep off the thrips that sorely affect this plant.”*

We may add that *Phaius tuberosus* is also successfully cultivated in the Orchid collections of Sir Trevor Lawrence, Baron Schroeder and other amateurs, also in Mr. Wilson's garden at Weybridge. It has been found to thrive in a shaded stove under treatment similar to that described above.

P. Wallichii.

Pseudo-bulbs angulate, 3—6 inches high, di-triphyllous. Leaves elliptic-oblong, acute, nearly a yard long. Scape 3—4 feet high, bearing along its upper part a raceme of 15—20 large and showy flowers spirally arranged round the rachis. Sepals and petals linear lanceolate, 2½ inches long, tawny brown, sometimes margined with yellow, whitish behind; lip broadly oval, convolute over the column, the basal half orange-yellow with a pale purple stain on each side; distal half reflexed at the apex, white with a yellow disk traversed longitudinally by 4—5 red lines, margin erose; spur yellow. Column pale yellow.

Phaius Wallichii, Lindl. Wall. Pl. Asiat. II. p. 46, var. t. 158 (1831). Gen. et Sp. Orch. p. 126. Paxt. Mag. Bot. VI. p. 193. Bot. Mag. t. 7023. P. Mannii, Hort.

var.—bicolor.

Pseudo-bulbs smaller and knobby like the rhizome of some species of Iris. Flowers smaller and differently coloured, especially the labellum, the spur and tube of which is tawny yellow, the front lobe white bordered with rose.

P. Wallichii bicolor, supra. *P. bicolor*, Lind. Gen. et Sp. Orch. p. 123 (1831). Id. *Sert. Orch.* t. 23. *Bot. Mag.* t. 4078. Thwaites, Enum. Pl. zeyl. p. 300.

Widely distributed throughout the lower Himalayan zone, inhabiting hot and damp valleys from Nepal eastwards to Assam and thence spreading southwards into Burmah. It was introduced to Chatsworth, in 1837, by Gibson, from the Khasia Hills, where “it luxuriates beneath a densely umbrageous covering of trees on such portions of rock as are partially covered with vegetable soil.”

The variety, long cultivated as a species under the name of *Phaius bicolor*, is a native of Ceylon, on the hills near Peradenia, at 2,000—4,000 feet elevation, where there is an annual rainfall of 100 inches. It was communicated to Dr. Lindley and probably to the Royal Gardens at Kew, by McRae, in 1836, or the following year.

* Gard. Chron. XXI (1884), p. 520.

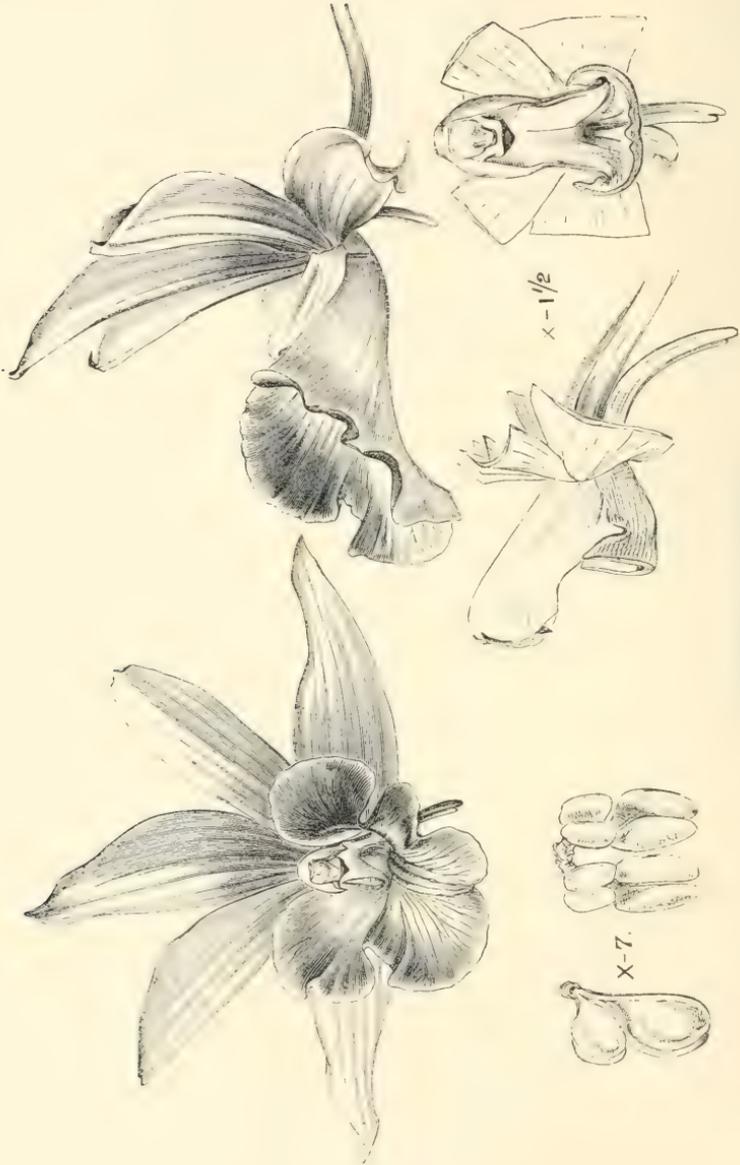
HYBRID PHAIUS.

The only hybrid between species of *Phaius* that has flowered up to the present time is that described below, which was obtained by Mr. Norman C. Cookson, of Wylam-on-Tyne. Previous to its appearance the hybridisation of *Phaius* by hand had, so far as we are aware, been exclusively confined to our own nursery, and even there the operations were on a very limited scale, and undertaken with the sole object of obtaining bi-generic hybrids between *Phaius grandifolius* and *Calanthe vestita* or one of its varieties. Many years ago Dominy raised *P. irroratus*, Rehb. (*Phaio-calanthe irrorata*, Rolfe) from *P. grandifolius* × *Calanthe vestita*, var. *Turneri nivalis*, which flowered for the first time in 1867; and Seden subsequently obtained from *P. grandifolius* × *Calanthe vestita*, var. *rubro-oculata*, another form, described below as *Phaio-calanthe irrorata*, var. *purpurea*. The last-named hybridist has also obtained a progeny of stronger constitution and with handsomer flowers from *P. grandifolius* × *Calanthe Veitchii*, itself a hybrid, so that three species of two distinct genera have participated in its parentage. In all three cases the number of seedlings raised was extremely restricted. It is an interesting fact that these crosses have been effected between an evergreen and a deciduous species, and although their vegetative organs show, as might be expected, some intermediate characters, the evergreen element greatly preponderates, and the habit of all of them is much that of a *Phaius*. The flowers, too, have the triangular outline as seen in *P. grandifolius*, *P. Wallichii*, etc., to which they are also but little inferior in size. The sepals and petals are spreading, lanceolate, sub-equal and nerved nearly as in those species. The lip, also, is much more that of a *Phaius* than of a *Calanthe*, but it is more deeply lobed and has a more slender spur. The column has derived its most obvious characters from both genera, being clavate and stoutish as in *Phaius*, but winged below as in *Calanthe*; the pollinia are eight, the number common to both genera.

Phaius Cooksonii.

P. Wallichii × *P. tuberosus*.

Pseudo-bulbs nearly as in *Phaius Wallichii*. Leaves intermediate between those of the two parents. Scapes shorter than the leaves, five or more flowered. Flowers as large as those of *P. Wallichii*; sepals and petals light rose tinted with yellow-brown along the middle,



Phaiacalanthe Sedeniana.

the sepals lanceolate, the petals shorter, oval-oblong, acute; lip convolute into a broad-mouthed funnel, with a crisped margin that is reflexed at the apex; basal half yellow, which is prolonged to the apex, the lateral areas of the apical half rose spotted with carmine-purple.

Phaius Cooksonii, Rolfe in Gard. Chron. VII. s. 3 (1890), p. 388, fig. 57.

A very interesting hybrid with handsome flowers, of which the sepals and petals are nearly as in the seed parent *Phaius Wallichii*, while in the lip the influence of the pollen parent, *P. tuberosus*, greatly preponderates.

Phaiocalanthe irrorata.

Flowers $2\frac{1}{2}$ inches in diameter; sepals and petals cream-white with a slight tinge of green at the base and of pale rose towards the apex; lip red-purple margined with white, and with a large yellow disk traversed by three white longitudinal raised lines. Column white.

Phaiocalanthe irrorata, Rolfe in Jour. Linn. Soc. XXIV. (1887), p. 168. *Phaius irroratus*, Rehb. in Gard. Chron. 1867, p. 264. *Fl. Mag.* 1869, t. 426.

var.—*purpurea*.

Flowers as large as the preceding; sepals and petals pure white; lip red-purple striated, margin white, disk orange-yellow traversed by three white lines.

P. irrorata purpurea, supra. *Phaius irroratus purpureus*, Rehb. in lit.

As distinguished from *Phaiocalanthe irrorata*, the sepals and petals are of a purer white, the lip somewhat larger and more deeply lobed, its colour is richer, and the white margin broader.

P. Sedeniana.

Scapes stoutish, 2—3 feet high, bearing a 10—15 flowered raceme above. Flowers 2—3 inches in diameter; sepals and petals cream-white tinted with pale yellow and flushed with light rose colour at the base; lip distinctly three-lobed, the side lobes convolute over the column, yellowish with a broad rose-purple border, front lobe bilobate, white with a broad rose-purple border; disk with three raised median lines.

Phaiocalanthe Sedeniana, Rolfe in Gard. Chron. III. s. 3 (1888), p. 136. *Phaius Sedenianus*, Rehb. in Gard. Chron. I. s. 3 (1887), p. 174.

THUNIA.

Rehb. in Bot. Zeit. (1852), p. 764. Hook. f. Bot. Mag. sub. t. 5694.

As distinguished from *Phaius*, *Thunia* has no pseudo-bulbs, but jointed, biennial stems slightly nodose, and invested with leafy sheaths below that gradually pass upwards into true leaves. The

inflorescence is terminal and borne on the young leafy stems; the bracts are persistent.

The flowers are in drooping racemes of five to seven or more; the pedicels are short and enclosed at first in large sheathing spathes; the lip is traversed by 5—7 fringed lamellæ, the spur is short and obtuse, and the column has two small wings at the apex. The pollinia are four, but bipartite or equivalent to eight.

The three forms described below are horticulturally distinct, but scarcely specifically so; they usually flower from May to July. The genus is named after Count von Thun Hohenstein, of Tetschin, in Bohemia.

Cultural Note.—The plants should be re-potted about the middle of March in a compost of fibrous loam, silver sand, rough peat, and chopped sphagnum; the pots should be half filled with broken crocks for drainage, and the remaining space up to the brim with the compost, into which one or more stems may be placed according to the size of the pots used, and held firmly in their places by means of sticks; but they should not be crowded, as the *Thunias* root freely. The plants should then be placed in the lightest position in the East India or *Dendrobium* house, where they should remain till the flower buds appear. Water should be given sparingly at first, but when the young shoots push above the surface of the compost, it should be given more copiously, and occasionally a little manure water may be applied with advantage; the supply should be continued till the flowers are past, and even afterwards an occasional watering should be given so long as the leaves keep green. When these begin to change colour, the plants should then be allowed to enter upon their annual period of rest, and be stowed away in any light and dry place where the temperature does not sink below 10° C. (50° F.) and water entirely withheld.

The *Thunias* are among the very few tropical orchids that admit of being readily propagated. This is usually effected by cutting the previous year's shoots into lengths of about 6 inches each, and inserting them firmly in pots filled with drainage crocks and compost in the same proportion as for rooted plants. This operation should be performed in May or not later than June.

Thunia alba.

Stems $2\frac{1}{2}$ — $3\frac{1}{2}$ feet long. Leaves oblong-lanceolate, acuminate, 6—8 inches long, light green, glaucous beneath, and with a pale mid-nerve. Flowers in racemes of 5—9 or more on short white pedicels, sheathed by a large, white, boat-shaped bract; sepals and petals similar, white, oblong-lanceolate, acute; lip oval, oblong, with fringed anterior margin, white, with five fringed lamellæ on the disk that are sometimes purple,

sometimes citron-yellow and with some purple streaks on each side of them. Column short, slender, semi-terete, winged at the apex.

Thunia alba, Rchb. in Bot. Zeit. 1852, p. 764. *Phaius albus*, Lindl. Gen. et Sp. Orch. p. 128 (1831). Bot. Reg. 1838, t. 33. Bot. Mag. t. 3991. Paxt. Mag. Bot. V. t. 125. Hook. Cent. Orch. t. 39.

sub-vars.—*Dodgsonii* (*Fl. Mag.* n. s. 1878, t. 329), syn. *flavotincta* (Gard. Chron. XX. 1883, p. 334), front part of the lip citron-yellow, streaked with purple; *nivalis*, lip pure white like the other segments.

Originally discovered by Dr. Wallich, growing on trees on one of the lower spurs of the Nepalese Himalayas, and subsequently gathered by one of the collectors for the Botanic Garden at Calcutta, in Sylhet, from which locality it was introduced by Messrs. Loddiges, about the year 1836. It was collected in the same locality in the following year for the Duke of Devonshire by Gibson, who found it growing upon trees in the shady damp forest at 2,000—3,000 feet elevation.* It is widely distributed through the lower Himalayan zone, and thence southwards over the eastern peninsula to the plains of Lower Burmah, Moulmein, etc., where it is quite common.†

T. *Bensoniæ*.

Stems, leaves, and inflorescence as in *Thunia alba*. Flowers 3—4 inches across; sepals and petals amethyst-purple, paler, almost white at the base; the basal part of the lip whitish with entire edge, the distal part amethyst-purple with denticulate edge, and traversed longitudinally by numerous yellow fringed lines, five of which are prolonged to the base of the lip; spur notched. Column white, stained with purple.

Thunia Bensoniæ, Hook. f. Bot. Mag. t. 5694 (1868). Williams' *Orch. Alb. II.* t. 67. *Phaius Bensoniæ*, Hemsley, in Gard. Chron. XVIII. (1882), p. 565.

Discovered by Colonel Benson in the neighbourhood of Rangoon, in 1866, and also on the mountains of Moulmein and Arracan, at 1,500—2,500 feet elevation, where the average yearly temperature is about 27° C. (80° F.), and the annual rainfall often reaches 200 inches, but where from December to February the country around is charred and scorched by the intense heat that prevails at that season.‡ It flowered for the first time in this country in the Royal Gardens at Kew, and in our Chelsea nursery in July, 1867.

Thunia Bensoniæ differs from *T. alba* in having larger flowers of

* For the temperature and other climatic phenomena of the lower Himalayan zone, see introductory notes to *Dendrobium*.

† Col. Benson in Gard. Chron. 1870, p. 796.

‡ Colonel Benson in Gard. Chron. 1870, p. 796, who also states that there is a yellow variety, probably *Thunia Marshalliana*,

a different colour, in which the middle lobe of the lip is longer in proportion to the entire length of that organ, and more oblong, and the column wings toothed.

T. *Marshalliana*.

Stems, leaves, and inflorescence as in the two preceding, except that the stems are usually more robust and taller; sepals and petals white, as is the basal half of the lip, the distal half is yellow, and the fringed lines orange-yellow. Compared with *Thunia alba* and *T. Bensoniæ* the lip is shorter, the hairs forming the fringe of the lamellæ longer and more numerous; the column is shorter and stouter, with the apical wings more dilated.

Thunia Marshalliana, Rehb. in *Linnæa* XII. (1877), p. 65. Regel's *Gartenfl.* 1882, t. 1098. Williams' *Orch. Alb.* III. t. 130.

sub-var.—*ionophlebia*.

Central area of lip pale yellow, the side areas white streaked with purple.

T. Marshalliana ionophlebia, Rehb. in *Gard. Chron.* XXIV. (1885), p. 70.

We find no record of the habitat of this plant beyond the meagre statement that it is a native of Moulmein, where it may be assumed to grow under the same climatic conditions as *Thunia Bensoniæ*.

HYBRID THUNIA.

Up to the present time, the hybrid described below is the only one raised by hand, and this, curiously enough, was obtained by two operators from *Thunia Marshalliana* × *T. Bensoniæ*, first by the late Mr. Toll of Manchester, and shortly afterwards by Seden in our Chelsea nursery. Plants in flower from both progenies were exhibited simultaneously at one of the Royal Botanic Society's shows in 1855—Mr. Toll's under the name of *T. Wrigleyana*, in compliment to Mr. E. G. Wrigley, of Howick House, Preston, and our own as *T. Veitchiana*; but as the materials for description were supplied to the late Professor Reichenbach from the Chelsea seedling, our name has priority of publication.

Thunia Veitchiana.

Sepals and petals white with a flush of mauve-purple towards their tip; side lobes of lip white, intermediate lobe rose-purple with the fringed raised lines orange-yellow.

Thunia Veitchiana, Rehb. in *Gard. Chron.* XXIII. (1885), p. 818. *T. Wrigleyana*, Hort.

BLETIA.

Ruiz et Pav. Prod. 119, t. 26 (1794). Benth. et. Hook. Gen. Plant. III. p. 513 (1883).

A genus of terrestrial orchids, including about twenty species, for the most part natives of tropical America, some of the most showy of which have been occasionally introduced to British gardens, but where they are now scarcely ever seen, except in botanical collections. The *Bletia* most generally cultivated at the present time is the first described below; an outlying member of the genus from China and Japan, and which has been but doubtfully referred to it, but which, with the addition of some American species, now forms the section *BLETILLA* of Bentham. To this we have added descriptions of three species of Bentham's section *EUBLETIA*, derived from the *Botanical Magazine*, two of which were in cultivation in the early part of the present century, and have been occasionally re-introduced since. *Bletia* was founded by the Spanish botanists, Ruiz and Pavon, on *B. catenulata*, a Peruvian species allied to *B. Sherrattiana*, very rarely seen in cultivation, and dedicated by them to their countryman, Don Luis Blet, an herbalist and apothecary. The general characters of the genus will be easily understood from the description of the species given below.

Cultural Note.—The *Bletias*, like *Thunia*, *Pleione*, and some of the *Calanthes*, are deciduous plants, and have alternate seasons of rest and active growth. The pseudo-bulbs should be re-potted as soon as they show signs of starting into growth, in a compost of loam and leaf-mould, giving a drainage of broken crocks to about 2 inches in depth, the pseudo-bulbs being simply covered with the soil, not pressed into it. While growing, the plants should be fully exposed to the light, placed in the *Cattleya* or intermediate house, and freely supplied with water. *Bletia hyacinthina* is a half-hardy species, and may be cultivated in a greenhouse. When the flowering is past, and the foliage begins to change colour, water must be gradually withheld and the plants kept dormant until the following spring.

Bletia hyacinthina.

Pseudo-bulbs tuberiform. Stems 6—9 inches high, furnished with 3—5 lanceolate acute plaited leaves. Peduncles terminal, slender, 6—10 flowered. Flowers on short purplish twisted pedicels, not fully expanding; sepals and petals similar, oblanceolate-oblong, acute, amethyst-purple; lip three-lobed, the side lobes roundish oblong, convolute over the column,* and coloured like the sepals and petals, the middle

* In the true *Bletias* the side lobes of the lip never enfold the column so distinctly as they do in this species.

lobe spreading, sub-quadrate with denticulate margin, and traversed longitudinally by five raised lines that extend to the base of the lip, deep purple. Column semi-terete with two narrow wings, purple above, whitish below.

Bletia hyacinthina, R. Br. in Ait. Hort. Kew; ed. 2, vol. V. p. 206 (1810—13). Lindl. Gen. et Sp. Orch. p. 120. Blume, *Orch. Arch. Ind.* t. 6, fig. 1. Regel's *Gartenfl.* XIII. t. 527 (var. *albo-stricta*). *The Garden*, XVI. (1879), t. 205. *Bletilla stricta*, Rehb. in Bot. Zeit. 1878, p. 75. *Bletia Gebina*, Bot. Reg. 1847, t. 60. *Cymbidium hyacinthinum*, Bot. Mag. t. 1492. And many others.

First introduced from China in 1803, by Mr. Evans, of the East India House; it also occurs wild in various parts of Kiusiu and Nippon in Japan. It is a somewhat variable plant, both in its foliage and in the colour of its flowers. Among the most noteworthy forms that have been in cultivation are:—*albo-striata*, which has the leaves elegantly striped with white, and was introduced by Siebold from Japan. *Gebina*, introduced by Messrs. Loddiges and figured and described by Lindley as a distinct species, has nearly white flowers with a faint tinge of blush. Another form in Sir Trevor Lawrence's collection at Burford Lodge, not specially named, has deep amethyst-purple flowers.

B. *Shepherdii*.

Pseudo-bulbs roundish, about 2 inches in diameter. Leaves broadly lanceolate, tapering at both extremities, 15—20 inches long, deciduous. Scapes longer than the leaves, branched, many flowered. Flowers $1\frac{1}{2}$ inches in diameter, of a uniform deep purple with the lamellæ of the lip white; sepals oblong, acute; petals broader, undulate; lip broadly cuneate, the front lobe strongly undulated, the disk with 5—7 wavy lamellæ. Pollinia eight.

Bletia Shepherdii, Hook. Bot. Mag. t. 3319 (1834). Paxt. Mag. Bot. II. p. 146.

Introduced by the Messrs. Shepherd, of Liverpool, in the early part of the present century from Jamaica, of which island it is a native. It is the richest coloured *Bletia* known to us; it is still occasionally seen in cultivation.

B. *Sherrattiana*.

"Pseudo-bulbs flattened, about 2 inches across. Leaves three or four, plicate, acuminate at either end, raised upon an upright stalk, including which they are nearly a yard long. Flowers of delicate texture, a dozen or more in a somewhat dense terminal raceme, bright rose colour; sepals oblong-lanceolate, obtuse; petals twice as broad, rounded; lip longer than the petals, deeply three lobed, the lateral lobes rounded, spreading, larger than the intermediate one, which is kidney shaped,

emarginate and apiculate; three parallel yellow lamellæ traverse the entire length of the axis of the lip. Column clavate, arched."—Bateman in *Botanical Magazine*, t. 5646.

Imported from New Granada in 1864 by Messrs. Low and Co. It flowered in Mr. Bateman's collection at Knypersley in 1867, and is named after Sherratt, his gardener at that time. It is described as one of the handsomest of Bletias, and coming from a country whose orchid wealth has been repeatedly explored, it is a remarkable fact that nothing appears to have been seen or heard of it since its first introduction; the mention of it in this place may tend to preserve it from oblivion.

B. verecunda.

"Pseudo-bulbs roundish, depressed, marked with rings, the scars of former years' leaves. Leaves ensiform, much acuminate, 2—3 feet long. Scapes 4—5 feet high, purplish below, green and branched above, many flowered. Sepals and petals similar and sub-equal, ovate, acuminate, of a uniform light rose colour, the lateral sepals keeled behind; lip longer than the petals, three-lobed, the lateral lobes curved upwards, purplish rose, yellow at the base streaked with purple lines, the middle lobe dilated and much cupped, deep purple; disk with fine yellow longitudinal lamellæ."—*Botanical Magazine*.

Bletia verecunda, R. Br. in Ait. Hort. Kew, ed. II. vol. V. p. 206 (1810—13).
Lindl. Gen. et Sp. Orch. p. 121. Gard. Chron. XXVI. (1886), p. 140, icon. xyl.
B. acutipetala, Hook. *Bot. Mag.* t. 3217. Helleborine Americana, Martyn. *Limodorum altum*, Linn. *L. verecundum*, Salisb. *L. tuberosum*, Jacq. *Cymbidium verecundum*, Sw. And many others.

Widely distributed over the West India Islands, it is also found in Florida and Mexico. Mr. Hemsley observes that "this orchid was cultivated by Collinson, or rather by Wager, in 1731, from bulbs received by the former as part of a dried specimen, and this is probably the earliest record of the cultivation of an exotic orchid in Great Britain."*

CHYSIS.

Lindl. Bot. Reg. 1837, t. 1937, and 1841, t. 23. Benth. et Hook. Gen. Plant. III. p. 514 (1833).

Although totally distinct in habit and aspect from the four preceding genera, *Chysis* nevertheless possesses the same essential sub-tribal characters.

* Gard. Chron. XVIII. (1832), p. 631.

As a genus, it is easily distinguished by its fleshy fusiform stems that are densely leafy upwards, and thickening after the leaves have fallen; by its short racemes of fleshy flowers produced from the axis of the young growths and in which the lateral sepals are adnate to the foot of the column; the lateral lobes of the lip are erect, and the two-winged column is produced at the base into a foot. Moreover, the pollinia are eight, four in each chamber (*loculus*); the capsule is nearly as large as that of a *Cattleya* of the *labiata* group, but instead of six acute ribs, there are three obtuse ribs alternating with three broad thick plates, beneath which dehiscence takes place when the fruit is mature.

The forms here described are those in cultivation; in addition to them, two or three others are known to science, but not yet introduced into gardens. They are all natives of Mexico and New Granada.

The genus was founded by Lindley upon *Chysis aurea*, one of the few orchids that have the power of self-fertilisation, and which in this case almost always takes place just before the flowers expand, and hence if the flower be examined after expansion, the pollinia are found to be more or less fused together. From this circumstance *Chysis* ($\chi\acute{\upsilon}\sigma\iota\varsigma$, "melting") was selected for the generic name, although it is almost certain that Lindley was not aware of the cause of the fusion of the pollinia when he gave the name, as may be gathered from the laboured description of their appearance in the *Botanical Register* under plate 1937.*

Cultural Note.—*Chysis* may be cultivated either in pots or in teak baskets; the former filled with drainage to two-thirds of their depth are most commonly used. The compost should consist of equal parts of fibrous peat and sphagnum, and the plants should be grown in shade in a temperature ranging from 15—20° C. (60—70° F.) by fire heat according to the season of the year. Water must be supplied liberally during the growing season, but when the plants are at rest they require only a quantity sufficient to prevent the stems from shrivelling; the plants may then be removed to a cooler and drier position either in the same or in another house.

Chysis aurea.

Stems fusiform, 6—9 inches long, attenuated at the base into a foot-stalk and bearing at the apex 4—6 broadly lanceolate, acuminate leaves

* Nor, perhaps, was Mr. Bentham, who asks, "Lindley pollinia superiora cum massa materie viscidulæ semifusa descripsit, an in flore imperfecto vel montroso? In floribus specierum 2 a nobis examinatis, pollinia vidimus omnia 8 perfecto distincte, etsi in uno flore valde inæqualia.

10—15 inches long. Scapes stoutish, a little longer than the stems, 5—7 or more flowered. Flowers 2 inches in diameter; sepals and petals oval-oblong, yellowish red, pale yellow at the base; lip three-lobed, the lateral lobes incurved, also pale yellow, middle lobe roundish, crisped, downy, spotted red and yellow, and with five white raised lines on the disk. Column broad, terete and pale yellow above, concave, and spotted with red beneath.

Chysis aurea, Lindl. *Bot. Reg.* t. 1937 (1837). *Bot. Mag.* t. 3617. Van Houtte's *Fl. des Serres*, t. 671 (copied from the *Bot. Mag.*).

var.—maculata.

Stems longer and more slender than in the Venezuelan and Mexican types, and the flowers differently coloured; sepals and petals white at the base, the remaining area tawny yellow toned with purple; side lobes of lip yellow with a brown-purple stain at the base, middle lobe purple with pale markings.

C. aurea maculata, Hook. *Bot. Mag.* t. 4576.

Discovered by Henchman in 1834, in the valley of Cumancoa (Cumano?), in Venezuela, "growing suspended by long fibrous roots from the lateral branches of trees, so that its pseudo-bulbs, which in their growing state are uncommonly brittle, hang downwards and wave in the wind, which would otherwise be sufficient to break them." It was shortly afterwards introduced by Messrs. Low and Co., of Clapton, through its discoverer. We have since received it from the neighbourhood of Cordova, in Mexico, with *Chysis bractescens*.

Chysis aurea flowers in April and May, but it is not unusual for its flower scapes to appear at other times of the year; owing to its power of self-fertilisation, the flowers last but a short time after expansion. The variety *maculata* first appeared among an importation of Columbian orchids that was offered for sale at Stevens' Rooms, in 1850; it has since been recently re-imported by Messrs. Shuttleworth and Co., of Park Road, Clapham.

C. bractescens.

Stems, leaves, and inflorescence as in *Chysis aurea*, but somewhat more robust. Flowers 3 inches in diameter, on short stout pedicels (including ovary), sheathed by a large foliaceous bract; sepals and petals ivory-white, the former oblong, the latter obovate-oblong; lateral lobes of lip oblong, incurved, white on the outside, yellow streaked with red on the inner side; middle lobe sub-quadrate with a shallow sinus in the anterior margin, yellow streaked and stained with red;

on the basal half of the lip are five slightly divergent fleshy ridges. Column white above, yellow beneath.

Chysis bractescens, Lindl. Bot. Reg. 1840, misc. No. 131. *Id.* 1841, t. 23. *Bot. Mag.* t. 5186. Van Houtte's *Fl. des Serres*, VII. t. 675. *Illus. hort.* 2nd ser. t. 398. Sander's *Reichenbachia I.* t. 18.

Introduced from Mexico by Mr. Barker, of Birmingham, in whose stoves it flowered for the first time in 1840. It has since been frequently received from Cordova, in the province of Vera Cruz, and from Tabasco, where it grows under similar conditions and in the same way as *Chysis aurea*. Its flowering season is March and April. The large bracts and cream-white flowers chiefly distinguish this species from all the others in cultivation.

C. *lævis*.

Stems club-shaped, 12—18 inches long. Leaves ovate-lanceolate, acuminate, spreading, shorter than the stems. Racemes 9—12 flowered; flowers $2\frac{1}{2}$ inches in diameter. Sepals oblong, the dorsal one inflexed, the lateral two falcate and spreading, tawny yellow tinged with brown at the base; petals similar but paler in colour; lip three-lobed, the side lobes folding over the column, pale yellow streaked with red on the inner side, the middle lobe sub-orbicular with crisped margin, bright yellow with five white raised lines on the disk that are confluent towards the base. Column pale yellow spotted with red on the side facing the lip.

Chysis lævis, Lindl. Bot. Reg. 1840, misc. 130. Batem. *Orch. Mex. et Guat.* t. 31. *Illus. hort.* t. 365 (1863). Warner's *Sel. Orch. II.* t. 14.

Introduced from Mexico about the same time as the preceding, by Mr. Barker, in whose collection at Springfield, near Birmingham, it flowered for the first time in 1840. It is distinguished from *Chysis aurea* by its longer stems furnished with more leaves, by its larger flowers with a differently-formed lip which is not downy, and by its flowering later in the year.

C. *Limminghei*.

Stems, leaves, and inflorescence as in *Chysis aurea*, but somewhat smaller in all their parts. Flowers 2 inches in diameter; sepals and petals oval-oblong, white, the sepals with a pale and the petals with a bright purple apical blotch; side lobes of lip incurved towards the column, reddish purple and yellow on the inner side, pale buff-yellow externally; middle lobe oval-oblong, emarginate, bright purple, streaked with white. Column cymbiform, white above, yellow spotted with red on the side opposite the lip.

Chysis Limminghei, Lind. et Rehb. in Otto et Diet. *Allg. Gart. Zeit.* 1858. *Illus. hort.* 1860, t. 240. Warner's *Sel. Orch. I.* t. 34. *C. aurea*, var. *Limminghei*, *Bot. Mag.* t. 5265 (*Lemminghei*). Hensley, *Biolog. Cent. Amer.* III. p. 216.



Introduced in 1857 by M. Linden, through Ghiesbreght, who discovered it in the Mexican province of Tabasco. It is dedicated to Comte Alfred de Limminghe, a Belgian nobleman who was a liberal patron of horticulture in his time. With the exception of the colour of the flowers, which far surpass those of *Chysis aurea* in beauty, there is but very little to distinguish the *C. Limminghei* described above from that species, although the late Professor Reichenbach maintained that the *C. Limminghei* of himself and Linden is a good species distinguishable in the dark by the touch from *C. aurea*.*

HYBRID CHYSIS.

The scarcely specific difference that subsists between at least three of the forms described above, renders cross-fertilisation among them comparatively easy, except that it is scarcely possible to make *Chysis aurea* the seed parent on account of its power of self-fertilisation before its flowers expand, a phenomenon not observed in any other Chysis. Although capsules and seeds are obtainable without difficulty, the raising of seedlings is not thereby attended with any less trouble than in the case of other genera, nor can much variety be expected from so limited a field of operations as Chysis offers to the hybridist. The two hybrids described below were both raised by Seden at our nursery; both are distinct and highly appreciated by amateurs.

Chysis Chelsoni.

C. bractescens × *C. lævis*.

Sepals and petals pale tawny yellow at the base and with a large reddish fawn blotch at the apex; basal half of lip coloured like the basal parts of the other segments; apical half yellow spotted with red, the raised lines white spotted with purple. Column pale yellow spotted with red on the under side.

Chysis Chelsoni, Rehb. in Gard. Chron. I. (1874), p. 535. *Fl. Mag.* n.s. t. 297.

C. Sedeni.

C. Limminghei × *C. bractescens*.

Sepals French-white; petals purer white with a large light rose-purple blotch near the apex; side lobes of lip sulphur-yellow with some purple streaks at the base on the inner side; intermediate lobe amethyst-purple streaked with white. Column white on the upper, pale yellow spotted with purple on the lower side.

Chysis Sedeni, Rehb. in Gard. Chron. XIII. (1880), p. 616.

* Walp. Ann. VI. p. 472. "Species me judice optime *Chysis Limminghei* ipsa luce deficiente, noctu facillime nonnisi tactu a *C. aurea* distingui potest. Hujus labellum apice crispulobatum, illius apice planum," but we have not observed the difference here noted in any of the plants seen by us in cultivation.

SUB-TRIBE CÆLOGYNEÆ.

Stems usually pseudo-bulbous, diphyllous or many-leaved. Peduncles one-flowered or racemose. Column produced at the base into a foot or footless. Pollinia 4; in *Trichosma*, 8.

TRICHOSMA.

Lindl. *Bot. Reg.* 1842, t. 21. Benth. et Hook. *Gen. Plant.* III. p. 518 (1833).

This includes the single species described below, which was at first referred by Lindley to *Cælogyne*, but from which it is separated chiefly by its stems being not thickened into a pseudo-bulb and by its pollinia being eight instead of four. He therefore raised it to generic rank under the name by which it is now generally known, but afterwards, following Reichenbach, he referred it to *Eria*, but here again, as pointed out by Bentham, "the habit, the strictly terminal raceme, and the laterally compressed pollen-masses are those of *CÆLOGYNEÆ* rather than of *ERIEÆ*."* On these grounds, therefore, *Trichosma* is retained. The name is compounded of *θρίξ, τριχὸς* (*thrix, trichos*), "hair," and *κόσμος* (*kosmos*), "ornament," in reference to the fringed lamellæ of the lip.

Trichosma suavis.

Stems tufted, about as thick as a goose quill, 6 inches long, with a few sheathing scales at the base and two opposite oblong-lanceolate recurved leaves at the apex. Racemes from between the leaves 3—5 or more flowered. Flowers fragrant, about an inch in diameter; sepals and petals similar and sub-equal, oblong-lanceolate, cream-white; lip three-lobed, the side-lobes erect, white, streaked on the inner side with red-purple, the middle lobe oblong, acute, reflexed, with five crisped bright yellow lamellæ, the margin on either side being white and brown-purple. Column produced at the base into a foot, to which the lip is articulated and the sepals adnate, there forming a *mentum* or chin, as in *Dendrobium*.

Trichosma suavis, Lindl. *Bot. Reg.* 1842, t. 21. Williams' *Orch. Alb.* III. t. 114. *Cælogyne coronaria*, Lindl. *Bot. Reg.* 1841, misc. No. 178. *Eria coronaria*, Rehb. in *Walp. Ann.* VI. p. 271 (1861). *Id.* in *Gard. Chron.* V. (1876), p. 234. *E. suavis*, Lindl. in *Jour. Linn. Soc.* III. p. 52. *E. cylindripoda*, Griff.

Discovered by Gibson in the Chirra district of the Khasia Hills, in 1836, growing upon trees in densely-shaded woods near the summit of the hills; it flowered for the first time in this country at Chatsworth,

* *Jour. Linn. Soc.* XVIII. p. 307.

in 1841; its usual flowering season is the winter months. It has been frequently imported since its first discovery, and there are few orchid collections of any pretensions in which it is not represented, and where its fragrant flowers render it peculiarly acceptable at a season when comparatively few other orchids are in bloom. It is slightly variable, the deviations from the original type being chiefly in the size of the flowers and in the colour and markings of the lip.

Cultural Note.—The treatment of “cool” orchids, as formulated under *Odontoglossum*, is that which is most suitable for *Trichosma*. If grown in the *Cattleya* house, the coolest and shadiest position must be selected for it.

CÆLOGYNE.

Lindl. Collect. Bot. sub. t. 33 (1821—25). Id. Gen. et Sp. Orch. p. 38 (1831). Benth. et Hook. Gen. Plant. III. p. 518.

This is a noble genus including many species of great horticultural merit, some of which (including *Pleione*) are in flower in every month of the year. About fifty named species are known to science, as well as others that yet remain unnamed and undescribed, widely dispersed over the Indo-Malayan region, one (*Cœlogyne fimbriata*) spreading into southern China. The Cœlogyneæ are particularly abundant in the valleys of the lower Himalayan zone, especially in Sikkim and eastern Nepal, up to about 7,000 feet elevation, but *C.* (*Pleione*) *Wallichii* and *C. Hookeriana* ascend as high as 10,000 feet. “On the ascent from Darjeeling the straight shafts of many of the timber trees are literally clothed with a continuous garment of white-flowered Cœlogyneæ which bloom in a profuse manner, whitening their trunks like snow.”* They are scarcely less common in some parts of the Malay Archipelago, where they occur in moist shady places on rocks and trees by the side of streams, and also on the hill sides, not infrequently at considerable elevation; these Malayan species belong chiefly to the sub-section *Flaccidæ*, and have mostly dull whitish brown or greenish white flowers.

The genus as monographed by Dr. Lindley in his *Folia Orchidacea* is divided by him into three sections, which are adopted by Mr. Bentham in the *Genera Plantarum* nearly as Lindley left them. The first section, NEOGYNE, includes but one species, *Cœlogyne Gardeneriana*,

* Hooker, Him. Jour. I. p. 110.

which for horticultural purposes may be associated with EUCÆLOGYNE (the true Cælogynes). Not so, however, PLEIONE, Lindley's third section, which differs from EUCÆLOGYNE in the one- sometimes two-flowered peduncle, but more especially in the vegetative organs, the clustered pseudo-bulbs and leaves that are deciduous, and in some other characteristics which necessitate for them a cultural treatment quite different from that of the true Cælogynes. We therefore find it advisable to separate the Pleiones from Cælogyne, regarding the former as a sub-genus of the latter.

The section EUCÆLOGYNE was divided by Lindley into sub-sections that are founded chiefly on differences observable in the inflorescence. Of these, *Erectæ* (*Normales*, Bentham), with few-flowered, erect racemes, and *Flaccidæ*, with many-flowered, drooping racemes, are natural and distinct; while *Filifera*, including species with narrow petals, and *Prolifera*, having hard, imbricating scales immediately below the flowers, are somewhat artificial divisions, and may be neglected by cultivators. A fifth sub-section, with erect flexuose racemes, includes two or three Malayan species unknown in cultivation. Of the *Erectæ*, *Cælogyne ocellata* is a good representative type, and of the *Flaccidæ*, *C. flaccida* is the type, and *C. cristata*, *C. Massangeana* and *C. Dayana* are well-known favourites.

The following characters are common to nearly all the species referred to EUCÆLOGYNE:—

The *pseudo-bulbs* are seated on a scaly rhizome, at longer or shorter intervals; they are usually of ovoid form, but sometimes elongated and angulate, and are persistent several years. They bear at their apex two leaves that are sometimes of large size with long foot-stalks and folded (plicate) blades, and are persistent two or more years.

The *inflorescence* is loosely racemose, the scapes as well as the pedicels and ovaries of the flowers are enclosed in sheathing pale brown bracts; these, both cauline and floral, are usually very large, the latter often falling before the flowers.

The *flowers* are either large or of medium size, of which the sepals and petals are nearly similar and sub-equal; in the sub-section *Filifera*, the petals are very narrow; the lip is sessile at the base of the column which it embraces, and is traversed longitudinally either a part or the whole of its length by 2—5 or more fringed or sinuous raised lines. The elongated column is winged on both sides, the wings being gradually dilated upwards. The pollinia are four.

The genus Cælogyne was founded by Dr. Lindley, in 1825, on

the well-known *Cœlogyne cristata*, which had been discovered by Dr. Wallich, in Nepal, the year before. The name is derived from κóιλος (koilos), "hollow," and γυνή (gunè), "a female," in reference to the depression of the stigma.

Cultural Note.—The compost used for the true Cœlogyne is the usual mixture of fibrous peat and chopped sphagnum in equal proportions. The species belonging to the sub-section *Erectæ* are best grown in pots with efficient drainage; those belonging to the sub-section *Flaccidæ*, on account of their long pendulous scapes are best placed in teak baskets or shallow pans that can be suspended near the roof-glass of the house in which they are cultivated. The re-potting of the plants should be performed early in the year when they begin to emit new roots. As regards temperature and watering, the geographical station of the species and its climatic conditions afford the safest guide to practice; thus, those species from elevated localities on the mountain sides, such as *Cœlogyne barbata*, *C. cristata*, *C. elata*, *C. Gardneriana*, etc., require a lower average temperature, such as is maintained in the Cattleya house, than those from the hot damp lowlands in the equatorial zone as *C. asperata*, *C. Cumingii*, *C. Dayana*, *C. pandurata*, etc., which should be grown in the East Indian house, but always in partial shade. The supply of water also should be regulated according to the same conditions and the season of the year, taking care that the compost is, at no time, allowed to get quite dry. For the temperature and rainfall of the equatorial zone and Indo-Malayan region in general, the reader should refer to the notes on the subject under Dendrobium.

Cœlogyne asperata.

Pseudo-bulbs ovate-oblong, angulate, 5—6 or more inches long. Leaves lanceolate, acute, 20—30 inches long. Racemes pendulous, 12—15 inches long, issuing from a sheath composed of 6—8 distichous and alternate, imbricating leafy bracts, 7—10 flowered. Flowers $2\frac{1}{2}$ —3 inches across; sepals lanceolate, keeled; petals similar but narrower, both sepals and petals of a uniform cream-white; lip three-lobed, the side lobes oblong-obtuse, white, streaked with red-brown on the inner side; the intermediate lobe sub-rotund, crisped at the margin; disk with 2—3 unequal warty ridges, orange-red with a central raised line between them that is prolonged to the base, the marginal area pale yellow streaked with red-brown. Column clavate, triquetral, pale straw-yellow with a rounded auricle on each side of the rostellum.

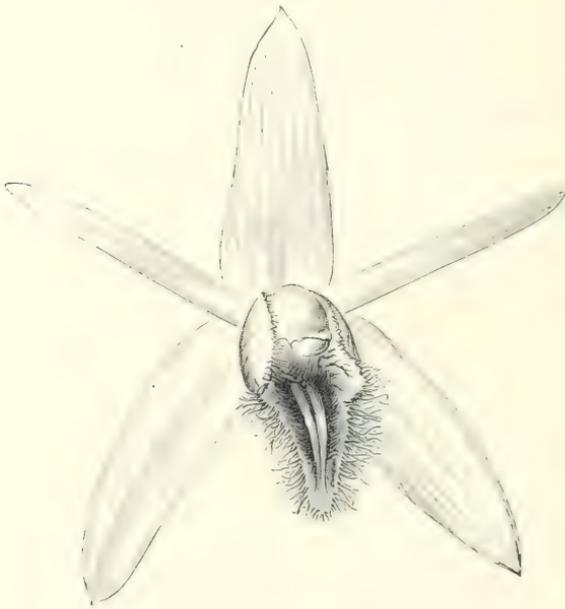
Cœlogyne asperata, Lindl. in Jour. Hort. Soc. Lond. IV. p. 221 (1849). Id. Fol. Orch. Cœlog. No. 6. Linden's Pesc. t. 8. Williams' Orch. Alb. VII. t. 311. C. Lowii, Paxt. Mag. Bot. XVI. p. 225 (1850).

Introduced from Sarawak, in North Borneo, in 1849, by Messrs. Low and Co., whence the species became associated with the name

of the firm. It is widely distributed over the Malay Archipelago from Sumatra to New Guinea, growing in the hot damp lowlands near the coast, and in proximity to streams, attached chiefly to the overhanging branches of large trees, and always in partial shade. It is one of the commonest epiphytes yet met with on the coast of eastern New Guinea.

C. barbata.

Pseudo-bulbs sub-pyriform, bluntly angulate, $1\frac{1}{2}$ —2 inches long. Leaves broadly lanceolate, 12—18 inches long, narrowed below into a short petiole. Peduncles erect, nearly as long as the leaves, terminating in a 6—9 flowered raceme, below which are a number of hard imbricating



Cælogyne barbata.

scaly bracts. Flowers $2\frac{1}{2}$ —3 inches in diameter; sepals and petals white, the former ovate-oblong, acute, the latter linear lanceolate; lip inflated at the base, three-lobed, the side lobes oblong with the anterior margin fimbriate, white externally, pale brown on the inner side; middle lobe oblong, reflexed, fimbriate, blackish brown with three raised lines fringed with shaggy blackish hairs. Column white.

Cælogyne barbata, Griffith Notulæ ad Plant. asiat. III. t. 291 (1851). Lindl. Fol. Orch. Cælog. No. 21 (1854). Williams' *Orch. Alb.* III. t. 143.

First discovered by Griffith in Bhotan, and afterwards by Gibson and Thomas Lobb, on the Khasia Hills, near Mamloo, at 4,000—5,000 feet elevation, and also by Sir J. D. Hooker and Dr. Thomson at Churra Punjee. It does not appear to have been introduced alive till 1878—9, when it was imported by Mr. William Bull. With *Cælogyne elata* and four or five other species, with small greenish flowers that are of no horticultural merit, it forms a sub-section of the genus, characterised by the presence of a number of hard imbricated scales immediately below the raceme, and named by Lindley *Prolifera*, by reason of “a second scaly sheath, being often (perhaps always) produced beyond the first series of flowers, and out of that sheath arises a second series of flowers.” The dusky brown anterior lobe of the lip and the clear white sepals and petals present one of the most remarkable colour contrasts ever seen, even among the Orchideæ. *C. barbata* usually flowers in the late autumn.

C. corrugata.

Pseudo-bulbs ovate-conic, $2\frac{1}{2}$ —3 inches long, angulate and much wrinkled when old. Leaves 6—12 inches long, the shorter ones elliptic-oblong, sub-acuminate, the longest oblong-lanceolate. Peduncles erect, shorter than the leaves, 3—5 flowered. Flowers 2— $2\frac{1}{2}$ inches across vertically, with a brown oblong-acute bract sheathing each pedicel; sepals and petals similar and sub-equal, elliptic-oblong, acute, keeled behind, French-white; lip shorter than the other segments, the side lobes oblong, yellow striped with red on the inner side, the middle lobe ovate, acuminate, white with a yellow disk traversed by three fringed white lamellæ that reach to the base of the lip.

Cælogyne corrugata, Wight, Icon. pl. ind. or t. 1639 (1852). Lindl. Fol. Orch. Cælog. No. 15 (1853). *Bot. Mag.* t. 5601.

A species well distinguished by its curiously wrinkled pseudo-bulbs, first gathered by Dr. Wight about the year 1845 on the Neilgherry Hills in the neighbourhood of Courtallum, Southern India, flowering in August and September, and where it was subsequently found by Thomas Lobb, but who failed to send home living plants. It was first cultivated in England in the Royal Gardens at Kew in 1863, but it is still very rare in British collections.

C. corymbosa.

Pseudo-bulbs ovoid, $1\frac{1}{2}$ —2 inches long, ribbed with a transverse keel a little above the middle. Leaves oblong-lanceolate, acute, 6—8 inches long. Racemes from the young growths before the leaves have

expanded, 3—5 flowered. Flowers 2—3 inches in diameter; sepals and petals cream-white, the former lanceolate-ligulate, the latter linear-lanceolate, all keeled behind; side lobes of lip angulate, toothed at the apex, white with red-brown nerves and markings, and a yellow spot bordered with orange-red at the anterior margin; the middle lobe ovate-lanceolate, acute, entire, white with a transverse yellow bar near the base. Column clavate, arched, white above, yellow below, wings rather broad at the apex.

Cœlogyne corymbosa, Lindl. *Fol. Orch. Cœlog.* No. 16 (1854). *Rehb.* in *Gard. Chron.* VI. (1876), p. 8. *Id.* II. s. 3 (1887), p. 73, *icon. xyl.* *Bot. Mag.* t. 6955.

First detected by Sir J. D. Hooker in 1849 on the Sikkim Himalayas, at 5,000—8,000 feet elevation, and shortly afterwards by the same eminent botanist in company with Dr. Thomson on the Khasia Hills. It was not introduced till 1876, when it was imported by Mr. William Bull, of Chelsea. *Cœlogyne corymbosa* is very near *C. ocellata*, from which it may be distinguished by its differently shaped pseudo-bulbs, and its fewer flowered racemes of larger flowers with a longer and more acute lip; it flowers in the spring months, when its delicate and fragrant blossoms are among the most attractive objects in the orchid house.

C. *cristata*.

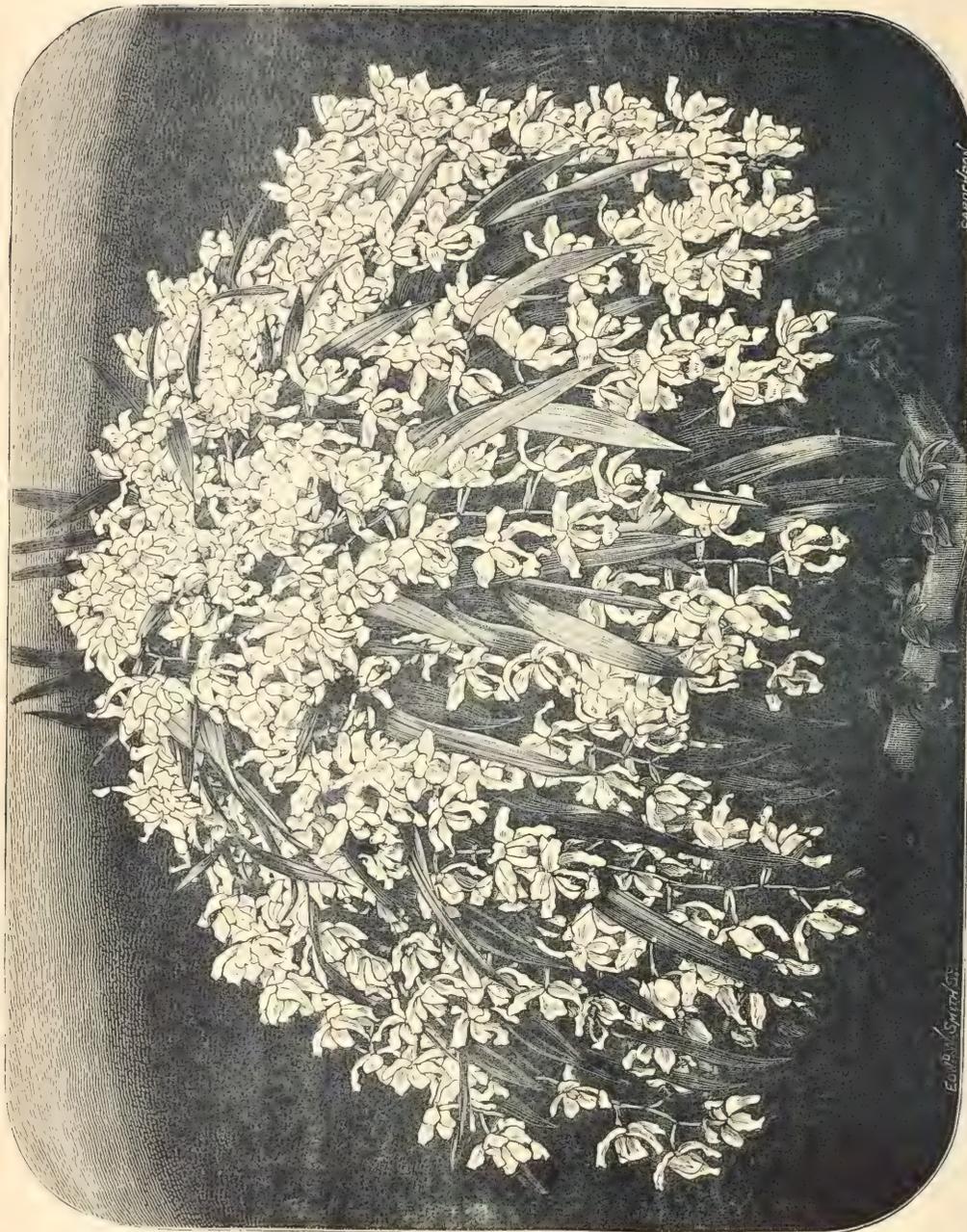
Pseudo-bulbs ovoid-oblong, obscurely angulate, $1\frac{1}{2}$ —2 inches long, produced from a scaly rhizome at intervals of 1—2 inches. Leaves linear-lanceolate, acute, 8—12 inches long. Racemes drooping, as long as, or longer than the leaves, 5—9 flowered. Flowers among the largest in the genus, on whitish pedicels sheathed by reddish brown acute bracts, pure white except the orange-yellow disk and lamellæ of the lip; sepals and petals similar and equal, lanceolate-oblong, acute, much undulated; lip oval, three-lobed, the side lobes incurved, roundish oblong, the intermediate one spreading, transversely oval with the front margin denticulate. Column winged.

Cœlogyne cristata, Lindl. *Collect. Bot. sub. t.* 33 (1821—25). *Id. Gen. et. Sp. Orch.* p. 39 (1831). *Id. Bot. Reg.* 1841, t. 57. *Id. Fol. Orch. Cœlog.* No. 20 (1854). *Regel's Gartenfl.* VIII. t. 245. *Liuden's Pesc.* t. 25. *Warner's Sel. Orch.* I. t. 35. *Van Houtte's Fl. des Serres*, t. 1807 (1867—8). *Jennings' Orch.* t. 7. *Gard. Chron.* VIII (1877), p. 597, *icon. xyl.* *Id.* III. s. 3 (1888), p. 489, *icon. xyl.*

sub-vars.—*Arnigadh* (*Gard. Chron.* III. s. 3 (1888), p. 462), sepals and petals plain, not crisped, keels of the lip orange-yellow; *Chatsworth*, flowers larger, more regular in form, and appearing later in the season; *hololenca* (*Rehb. Gard. Chron.* XX. (1881), p. 563), *syn. alba* (*Williams' Orch. Alb.* II. t. 54), pseudo-bulbs more distantly placed on the rhizome, flowers wholly white; *Lemoniana*, *syn. citrina* (*Godefroy's Orchidophile*, 1888, p. 212), disk and fringed lamellæ of the lip citron (not orange) yellow; *intermedia*, intermediate between the type and *Lemoniana*, with an orange spot at the base of the lip; *maxima* (*Sander's*



Coelogyne cristata.



Cœlogyne cristata (Chatsworth variety).
(From the *Gardener's Chronicle*.)

E. W. SMITH DEL.

SARACHON

Reichenbachia, I. t. 6; *The Garden XXXI.* (1887), t. 585), flowers larger in all their parts; *Trentham*, flowers produced six to eight weeks later than in the other forms.

Cœlogyne cristata was originally discovered by Dr. Wallich, in 1824. Its native home is in the lower Himalayan zone, at elevations ranging from 4,500—7,500 feet from Sikkim westwards through Nepal as far as the 75th meridian, plants which had been collected at Arnigadh at 5,000 feet elevation having been recently sent to Kew from the Botanic Garden at Saharunpore;* it is particularly abundant on the range of hills opposite Cessagurri, in Nepal, growing indifferently upon trees and upon bare rocks, often in full exposure to the sun. It was introduced by Gibson, in 1837, but we find no record of its having flowered in this country till the spring of 1841, when Mr. Barker, of Springfield, near Birmingham, received a Knightian Medal for it at one of the meetings of the Horticultural Society of London, where it attracted marked attention, and has since by general consent been recognised as the *facile princeps* of all Cœlogyne. The varieties described above, although sufficiently distinct for horticultural purposes, differ in little from the original type, except either in the size of the flower, the colour of the disk of the lip and its fringes, or in the time of flowering; they are therefore more strictly sub-varieties or mere variations. The Arnigadh variety was sent to Kew by Mr. Duthie, superintendent of the Botanic Garden at Saharunpore, in January, 1886; the Chatsworth form was brought from India by Gibson, in 1837; *hololeuca* first appeared a few years ago in the collection of Mr. T. A. Titley, at Gledhow, near Leeds; *Lemoniana* first appeared many years ago in the collection of Sir Charles Lemon, at Carclew; *intermedia* is in cultivation at Syon House and other places; the Trentham form has long been cultivated in the Duke of Sutherland's collection at Trentham Hall, in Staffordshire; of the origin of *maxima* we find no record.

Cultural Note.—*Cœlogyne cristata* is a plant that may be easily cultivated in glass structures used for miscellaneous subjects, and as its chaste white flowers are in general request in winter and early spring, the following cultural hints may prove acceptable. The temperature of a warm greenhouse or intermediate house will be sufficient for it, although a summer temperature of 15°—21° C. (60°—70° F.) is by no means too high; a light shading is

* Gard, Chron. III. s. 3 (1888), p. 462.

only necessary when the sun is powerful; at other times the plants should receive all the light possible. During the season of active growth, water should be copiously given, as well as an occasional syringing to keep the bulbs plump and the foliage clean and healthy. As the season advances towards autumn, the waterings must be diminished in frequency and quantity till the plants are quite at rest, when only sufficient must be given to keep the bulbs from shrinking. For large masses of *C. cristata*, square teak baskets are often used, but perforated pans of about 6 inches in depth are still better; the drainage must be ample and free, and the compost should consist of equal proportions of fibrous peat and chopped sphagnum.

C. Cumingii.

Pseudo-bulbs ovate-conical, compressed, 2—3 inches long. Leaves lanceolate-acuminate, 5—8 inches long, including the lengthened petioles. Scapes from the axis of the newest growths, sub-erect, sheathed by yellow-brown bracts, 3—5 flowered. Flowers 2 inches across, French-white with a citron-yellow disk on the lip; sepals lanceolate, acuminate; petals linear-lanceolate; lip three-lobed, the side lobes roundish, turned inwards, the middle lobe reflexed, obovate-oblong with minutely denticulate margin, the disk traversed longitudinally by three central crisped lamellæ that are prolonged to the base of the lip, and two lateral shorter ones, all terminating in front in an orange-red tooth. Column terete and white above, concave on the under side on which is a yellow band.

Cœlogyne Cumingii, Lindl. in Bot. Reg. 1840, misc. No. 178. *Id.* 1841, t. 29. *Bot. Mag.* t. 4645. Van Houtte's *Fl. des Serres*, VIII. t. 764 (copied from Bot. Mag.)

Sent by Cuming from Singapore, in 1840, to Messrs. Loddiges, in whose nursery it flowered for the first time in 1841. It is a pretty and distinct species, usually flowering in the month of August, but it is now rarely seen in British collections. We are indebted to Sir Trevor Lawrence, Bart., for materials for description.

C. Dayana.

Pseudo-bulbs cylindrical-fusiform, angulate, 5—9 inches long. Leaves oblong-lanceolate, acuminate, 24—30 inches long. Scapes quite pendulous 24—30 inches long, racemose from the base, many flowered. Bracts sub-rhomboidal, inflated, as long as the pedicels and ovaries, dusky brown. Flowers 2—2½ inches in diameter; sepals and petals stellate, pale nankeen-yellow, linear-ligulate with reflexed margins, the sepals keeled behind, the petals narrower than the sepals; lateral lobes of lip oblong, reflexed at the anterior edge, brown streaked with white on the inner side; middle lobe sub-quadrate, reflexed, apiculate, with a fleshy disk

consisting of six white erect keels with brown fringes on the anterior side, two of which are prolonged to the base of the lip. Column clavate, slender, arched.*

Cœlogyne Dayana, Rchb. in Gard. Chron. XXI. (1884), p. 826. Williams' *Orch. Abb.* VI. t. 247.

Introduced by us from North Borneo, through Curtis, and dedicated by Professor Reichenbach, at our request, to the late Mr. John Day, of Tottenham. It flowered for the first time in this country at our Chelsea nursery in June, 1884. As a species it is comparable with *Cœlogyne Massangeana* as regards its long pendulous racemes; but in the colour of its flowers, and especially in its vegetative organs, it is thoroughly distinct. In its native country it invariably grows upon the branches of large trees in the hot lowlands near the coast, and on the banks of streams under the same conditions as the closely allied species *C. asperata* and *C. pandurata*.

C. elata.

Rhizome stout, clothed with pale brown scales. Pseudo-bulbs placed at intervals of about 2 inches along the rhizome, ovoid, compressed and bluntly angulate, 3—4 inches long. Leaves stalked, ensiform, acute, 12—18 inches long. Scapes erect, a foot high, with a number of hard, imbricated, brown bracts immediately below the 7—9 flowered raceme.† Flowers on short white pedicels, cream-white; sepals broadly lanceolate; petals linear oblong; lip obovate, obscurely three-lobed, white with an orange-yellow blotch, below which are two waved and crisped crests dotted at the edge with red. Column narrowly winged.

Cœlogyne elata, Lindl. Gen. et. Sp. Orch. p. 40 (1831). Id. Bot. Reg. 1839, misc. No. 151. Fol. Orch. Cœlog. No. 22. *Bot. Mag.* t. 5001.

First detected by Dr. Wallich in Nepal, and introduced by him to the garden of the Horticultural Society at Chiswick, where it flowered for the first time in 1839. It was subsequently found by Sir J. D. Hooker in Sikkim, at 4,000—6,000 feet elevation, and by other explorers in other localities. Still later it was observed by Mr. H. J. Elwes, "growing abundantly at 8,000—9,000 feet elevation, on the slopes of Tongloo, near Darjeeling; in one case a fine old yew tree was covered with it."‡ The flowers, which usually appear in February and March, are among the prettiest of the genus, but the rambling habit of the plant renders it a somewhat awkward subject for cultivation.

* For woodcut of flower of *Cœlogyne Dayana*, see *C. Massangeana*, *infra*.

† As in *Cœlogyne barbata* and thence grouped with it under the sub-section *Prolifera*.

‡ Gard. Chron. XIX. (1883), p. 469.

C. fimbriata.

Rhizome scaly and much branched, spreading over a considerable space. Pseudo-bulbs ovoid-oblong, about the size of a filbert. Leaves linear-lanceolate, acute, 3—4 inches long, reflexed at the tip. Peduncles shorter than the leaves, one- rarely two-flowered. Flowers an inch in diameter; sepals and petals pale dingy yellow, the former lanceolate, acute, the latter linear, reflexed; lip three-lobed, the side lobes erect, roundish, pale dingy yellow streaked obliquely with brown on the inner side, the middle lobe spreading, sub-quadrate with fimbriate margin, brown with a pale border; lamellæ two, fringed, deep brown, convergent at the apex. Column winged, yellowish.

Cœlogyne fimbriata, Lindl. *Bot. Reg.* t. 868 (1825). Id. 1838, misc. No. 172. Id. *Fol. Orch. Cœlog.* No. 29.

The first *Cœlogyne* received alive in England, it having been sent from southern China by Mr. J. D. Parks to the Horticultural Society of London, in whose garden at Chiswick it flowered in 1824. Twenty-five years later it was detected by Sir J. D. Hooker and Dr. Thomson on the Khasia Hills in N. E. India, at 4,000 feet elevation, the Indian form differing slightly in colour from the Chinese type. For materials for description we are indebted to the Royal Gardens at Kew, where this *Cœlogyne* has been in cultivation for some years past. The individual flowers are inattractive, but being produced freely in October and November, a large plant in full bloom at that season forms a pleasing object.

C. flaccida.

Pseudo-bulbs clustered, ovate-oblong, angulate, 2—3 inches long. Leaves petiolate, lanceolate, 7—10 inches long. Racemes slender, pendulous, 8—12 flowered, the rachis and pedicels pale reddish brown. Flowers $1\frac{1}{2}$ inches in diameter; sepals and petals cream-white, the former oblong, acute, keeled behind, the latter linear-oblong; lip broadly ovate, three-lobed with three elevated, flexuose central lines, the lateral lobes white, streaked with red-brown on the inner side, the middle lobe acute, reflexed with a bright yellow blotch on the disk. Column winged, white above, red-brown beneath.

Cœlogyne flaccida, Lindl. *Gen. et Sp. Orch.* p. 39 (1831). Id. *Fol. Orch. Cœlog.* No. 2. *Bot. Mag.* t. 3318. *Bot. Reg.* 1841, t. 31.

Discovered at Noakote, in Nepal, by Dr. Wallich, by whom it was introduced to British gardens about the year 1829. The flowers, which appear in the spring months, are slightly malodorous.

C. flavida.

Pseudo-bulbs ovoid, furrowed, 1— $1\frac{1}{2}$ inch long. Leaves linear-lanceolate,

acuminate, about 6 inches long, petiolate, leathery, deep green. Peduncles erect, shorter than the leaves, with about six hard imbricating distichous scales below the 5—7 flowered raceme. Flowers small, primrose-yellow, the lamellæ of the lip bright yellow; sepals ovate; petals linear; side lobes of lip oblong-obtuse, intermediate lobe oblong, reflexed; lamellæ two, large for the size of the flower. Column semi-terete, wingless.

Cœlogyne flavida, Hook. f. ex. Lindl. Fol. Orch. Cœlog. No. 24 (1854).

Discovered by Thomas Lobb on the Khasia Hills, and afterwards by Cathcart on the Sikkim Himalayas. Our description was taken from a plant recently received at Mentmore from Darjeeling. The presence of the hard imbricating scales below the raceme indicates its affinity to *Cœlogyne barbata* and *C. elata*, to both of which it is far inferior in a horticultural sense.

C. Foerstermanni.*

“Rhizome as thick as a condor’s quill, covered with sepia-brown sheaths. Pseudo-bulbs cylindrate-fusiform, ribbed. Leaves oblong, acute, petiolate, 15—18 inches long. Peduncles longer than the leaves, sheathed at the base by numerous bracts, many flowered; floral bracts linear, apiculate, nearly equal to the stalked ovary. Flowers equal in size to those of *Cœlogyne Cumingii*; sepals and petals lanceolate, white, the sepals keeled behind; lip white with a yellow-brown stain on the disc, three-lobed, the side lobes rounded, the intermediate lobe elliptic, acute, with three denticulate, longitudinal keels.”—Rehb. f. in Gard. Chron. I. s. 3 (1887), p. 798.

This is said to be of Sundaic (?) origin, and was introduced by Messrs. Sander and Co. through their collector Foerstermann.

C. fuliginosa.

Rhizome clothed with brown imbricating scales. Pseudo-bulbs sub-cylindric, angulate, 2—3 inches long, somewhat distantly placed on the rhizome. Leaves broadly lanceolate, acute, 5—7 inches long. Racemes shorter than the leaves, 2—3 flowered. Flowers, of which only one is expanded at one time, 2 inches across; sepals and petals light brownish white with a faint rosy tint, the former oval-oblong, the latter linear, reflexed; lip oblong, three-lobed, the side lobes oblong, erect, coloured like the sepals and petals, the middle lobe orbicular-oblong, fringed at the margin, deep red-brown, and furnished with two crisped, deep brown raised lines with a shallower one between them. Column clavate, slender, bent.

Cœlogyne fuliginosa, Lindl. in Loddiges’ Catalogue. *Bot. Mag.* t. 4440 (1849).
Lindl. Fol. Orch. Cœlog. No. 31 (1854).

Introduced by Loddiges from Northern India, in 1838. Ten

* Not seen by us.

years later it was detected by Sir J. D. Hooker in the Sikkim Himalayas, on rocks in valleys at 5,000 feet elevation, and shortly afterwards by the same eminent botanist, in company with Dr. Thomson, near the summits of the Khasia Hills. The flowers vary in size and colour; the form figured in the *Botanical Magazine** had ochre-yellow flowers of a larger size than those described above, for which we were indebted to the Royal Gardens at Kew, where the species has long been in cultivation. Another plant in the Kew collection bears flowers with a deeper tinge of rose and the brown of the lip deeper and spread over a larger area. The narrow linear petals of this species bring it under Lindley's sub-section *Filiferæ*, its nearest allies being *C. fimbriata* and *C. ovalis*; the specific name, *fuliginosa*, "sooty," refers to the dusky front lobe of the lip.

C. fuscescens.

Pseudo-bulbs sub-cylindric, 3—4 inches long. Leaves oval-oblong, tapering at both ends, 7—10 inches long. Racemes nodding, shorter than the leaves, 5—7 flowered. Flowers not fully expanding, 2—2½ inches across vertically, of transparent texture, and of a pale orange-red colour; dorsal sepal oblong, acute, keeled behind, arching over the column; lateral sepals lanceolate, acute, and also keeled; petals linear; lip oblong, entire, the lateral margins incurved and bordered with red on the inner side, the apical half reflexed, the basal half traversed by three red raised plates which contract to thin converging lines towards the apex. Column clavate, arched.

Cœlogyne fuscescens, Lindl. Gen. et Sp. Orch. p. 41 (1831). Id. Fol. Orch. Cœlog. No. 26. Gard. Chron. III. s. 3 (1888), p. 168. Rolfe in Gard. Chron. III. s. 3 (1888), p. 168.

var.—*brunnea*.

Lip obscurely lobed, the lateral lobes spotted and margined with brown on the inner side; the apical lob echestnut-brown, paler towards the margin, the raised plates deep orange-red.

C. fuscescens brunnea, Lindl. Fol. Orch. Cœlog. No. 21. *Bot. Mag.* t. 5494. *C. brunnea*, Lindl. in Gard. Chron. 1848, p. 71. *C. assamica*, Rehb. *Xen. Orch.* II. p. 111, t. 134, i, s. 9.

As in the case of most of the species inhabiting the rich Cœlogyne districts in Northern India, *Cœlogyne fuscescens* was also one of the discoveries of Dr. Wallich, who detected it during his exploration of

* The figure in the *Botanical Magazine* represents the inflorescence with three expanded flowers, two of which were probably added by the artist, as we have no evidence of more than one flower being expanded at one time in this species.

the Nepalese Himalayas in 1827—8. Twenty years later it was gathered by Sir J. D. Hooker in Sikkim, and shortly afterwards on the Khasia Hills at 3,000 feet elevation. We find no record of the first introduction of the species into British gardens; it was in cultivation at the time Dr. Lindley compiled the monograph of the genus in his *Folia Orchidacea*, and it has been occasionally imported since, specimens for identification having been received by us from various correspondents.

The variety *brunnea*, which is one of the handsomest of Cœlogynes, is stated to have been in cultivation at Syon House in 1844, and four years later Dr. Lindley mentions (*Gard. Chron.* 1848, p. 7) it as being in other collections, but afterwards became lost. It was re-introduced by Messrs. Low and Co., about the year 1864, from Moulmein, through the Rev. C. Parish.

C. Gardneriana.

Pseudo-bulbs cylindric-conical, 5—6 inches long, angulate when old. Leaves oblong-lanceolate, acuminate, 15—20 inches long, including the rather long petiole. Racemes shorter than the leaves, nodding, many flowered. Flowers close-set, not expanding, white with a citron-yellow stain on the lip; the short pedicels and ovaries sheathed by broad, inflated, sienna-brown bracts; sepals oblong, keeled, saccate at the base; petals narrower, linear-ligulate; lip narrowly oblong, bi-saccate at the base, three-lobed, the side lobes rotund in front, the intermediate lobe reflexed, bi-dentate at the tip, and traversed by three elevated lines, of which the outer two are wavy towards the apex.

Cœlogyne Gardneriana, Lindl. in Wallich's *Pl. asiat. rar.* I. 33. *Id. Gen. et Sp. Orch.* p. 41 (1831). *Id. Fol. Orch. Cœlog.* No. 1 (1854). *Pact. Mag. Bot.* VI. p. 73 (1839). *Williams' Orch. Alb.* IV. t. 153.

Originally discovered by Dr. Wallich, and subsequently detected by Griffith and by Sir J. D. Hooker and Dr. Thomson on the Khasia Hills, whence it was introduced to Chatsworth in 1837, by Gibson, who found it "growing upon trees in moist shady woods, and especially in immediate proximity to a waterfall, by which it is constantly bedewed with spray." It flowered for the first time at Chatsworth, in December, 1838, the season in which it usually sends forth its graceful pendulous racemes of milk-white flowers in the glass-houses of Europe. It seems to have been subsequently lost, for no record of its being in cultivation occurred till about the year 1874, when the late Mr. Freeman collected it with *Vanda cœrulea* and other orchids from the Khasia Hills. The gibbous, almost

saccate base of the sepals, bi-saccate lip, and the nearly closed flowers clearly distinguish this from every other species of *Cœlogyne*, and constitute its sectional characters. It is named in compliment to Dr. George Gardner, who, during his travels in Brazil, 1836—41, made known to science for the first time many hundreds of plants, including some of the finest of the Brazilian orchids. Dr. Gardner was afterwards appointed Director of the Botanic Garden at Peradenia, in Ceylon, where he died in 1849 at the early age of 37.

C. *graminifolia*.

Rhizome scaly, the scales glossy blackish brown. Pseudo-bulbs ovoid, angulate, 2 inches long. Leaves linear, exceeding a foot in length, complicate at base, sub-acuminate, leathery, deep green. Scapes 4—6 inches long, sheathed at the base with hard, imbricating scaly bracts, 2—3 flowered. Flowers 2 inches in diameter, on pale orange-red pedicels, the ovaries ribbed and channelled; sepals and petals milk-white, the sepals oblong-lanceolate, the lateral two keeled behind; petals linear-lanceolate; lip shorter than the other segments, three-lobed, the side lobes oblong, with roundish angles, erect, white obliquely streaked with sepia-brown on the inner side; intermediate lobe sub-quadrate, reflexed, bright yellow bordered with white on the apical side; lamellæ 3, of which the middle one is the shallowest, all terminating in a blackish brown line in front. Column clavate, arched, pale orange-red.

Cœlogyne graminifolia, Parish and Rehb. in Trans. Linn. Soc. XXX. (1873), p. 146. *Bot. Mag.* t. 7006. Rolfe in Gard. Chron. III. s. 3 (1888), p. 168.

Discovered by the Rev. C. Parish, in Moulmein, in 1865—66; it also presumably occurs in Assam, and other districts in north-east India, it having been sent to the Royal Gardens at Kew, in 1887, from Shillong, on the Khasia Hills. It was, however, in cultivation in British gardens prior to that date, but from what source the plants were derived we find no record.

C. *lentiginosa*.

Pseudo-bulbs placed at intervals of $\frac{1}{2}$ —1 inch on a stout scaly rhizome, elliptic-oblong, 2—3 inches long, usually four-angled. Leaves oblong-lanceolate, acute, 6—8 inches long. Peduncles stoutish, erect, sheathed below with broad, convolute, green scales, loosely racemose above, about five flowered; bracts linear-oblong, exceeding the ovary. Flowers 1—1 $\frac{1}{2}$ inches across; sepals and petals straw-yellow, the former elliptic-oblong, keeled behind, the latter linear-oblong; side lobes of lip rotund, white bordered and spotted with red-brown on the inner side, the intermediate

lobe broadly trowel-shaped, reflexed, orange-brown, bordered with white, and with three crenate keels, of which the middle one is the shortest.

Cœlogyne lentiginosa, Lindl. Fol. Orch. Cœlog. No. 4 (1854). *Bot. Mag.* t. 5958. Rehb. in Trans. Linn. Soc. XXX. p. 146.

First introduced by us from Moulmein, in 1847, through Thomas Lobb, and occasionally imported since from the same locality. Dr. Lindley described the species from dried flowers only, and from their resemblance to those of *Cœlogyne flaccida* naturally placed it in the same section, *i.e.*, FLACCIDÆ, in which the racemes are pendulous; the peduncles are, however, erect, so that it belongs to the section ERECTÆ. Two forms are known distinguished by colour only; that described above, which we have assumed to be the type and which has straw-yellow sepals and petals and a bright orange blotch on the lip, and that figured in the *Botanical Magazine*, which has green sepals and petals, and is inferior in beauty to the other form.

C. Massangeana.

Pseudo-bulbs sub-pyriform, angulate, 3—5 inches long. Leaves stalked, elliptic-lanceolate, variable in size, the largest 15—20 inches long, and 4—6 inches wide at the broadest. Racemes quite pendulous, 18—24



Cœlogyne Dayana.



C. Massangeana.

inches long, pale green with black pubescent hairs sparsely distributed over the rachis, many flowered; bracts hard, boat-shaped, red-brown, one-third as long as the pedicel and ovary. Flowers 2—3 inches in diameter; sepals and petals light buff-yellow, the former lanceolate-oblong, acute, keeled behind, the latter linear-oblong; lip broadly oval in outline, cordate at the base, three-lobed, the side lobes erect, whitish externally,

brown obliquely streaked with yellow on the inner side, the middle lobe quadrate with a fleshy verrucose brown and yellow disk, below which are three denticulate keels extending to the base of the lip. Column triquetral, bent.

Cœlogyne Massangeana, Rehb. in Gard. Chron. X. (1878), p. 684. *Fl. Mag.* n.s. t. 373. Williams' *Orch. Alb. I.* t. 29. *Bot. Mag.* t. 6979.

This species was first described by Reichenbach in the *Gardeners' Chronicle* for 1878, *loc. cit. supra*, but it had been in cultivation in several French and other continental collections many years prior to that date, under the name of *Cœlogyne assamica*, a name whose origin we have been unable to trace, but which may have been given in the belief that it was the species figured and described in Reichenbach's *Xenia Orchidacea* as *C. assamica*, a totally different plant which must be referred to Lindley's *C. fuscescens brunnea*. Although *C. Massangeana* is one of the most generally cultivated of epiphytal orchids, its native country is virtually unknown; it is reported to be a native of Assam, but the probability is great that it is of Malayan origin, like its nearest congeners, *C. asperata* and *C. Dayana*. It is dedicated to M. Massange de Louvrex, of Baillonville, near Marche, in Belgium, an enthusiastic amateur of orchids. It is one of the freest growing of Cœlogynes, and its long floral racemes, which appear at almost all seasons of the year, are developed with unusual rapidity.

C. ocellata.

Pseudo-bulbs sub-pyriform, $1\frac{1}{2}$ —3 inches long. Leaves narrowly lanceolate, acuminate, 7—10 inches long, narrowed towards the base into a short channelled petiole. Racemes erect, shorter than the leaves; 5 or more flowered, the bracts lanceolate acute, reddish brown, sheathing, longer than the ovaries. Flowers 2 inches in diameter; sepals and petals milk-white, the former oblong, acute, obscurely keeled behind, the latter linear-oblong; lip oblong, with entire margin three-lobed, white with some oblique orange lines on the inner side of the side lobes, also a yellow spot bordered with red at the apex, and 3—4 smaller ones at the base of the middle lobe; disk with three wavy keels that extend to the base of the lip, and a smaller one on each side of them on the middle lobe. Column slender, white bordered with orange.

Cœlogyne ocellata, Lindl. Gen. et Sp. Orch. p. 40 (1831). Id. Bot. Reg. 1839, misc. No. 25. Id. Fol. Orch. Cœlog. No. 18. *Bot. Mag.* t. 3767. *C. punctulata*, Lindl. Collect. Bot. sub. t. 33.

var.—maxima.

Plant larger in all its parts; racemes longer, 6—10 flowered. Flowers half as large again as in the type.

C. ocellata maxima, Rehb. in Gard. Chron. XI. (1879), p. 524. *Fl. Mag.* n.s. t. 365.

Originally discovered by Dr. Wallich, in^t Sylhet, some time in the



Cœlogyne ocellata maxima (flower nat. size).

third decade of the present century, but not introduced till 1838, when it was imported with other Indian orchids by Messrs.



Cœlogyne ocellata maxima (raceme reduced).

Loddiges, in whose nursery at Hackney it flowered in the following

year. It was subsequently gathered by Thomas Lobb on the Khasia Hills, and by Sir J. D. Hooker on the Sikkim Himalayas at 7,000 feet elevation. The variety *maxima* was first brought into notice by Mr. B. S. Williams, of Holloway, in 1879; as seen in the collection of Baron Schroeder, at The Dell, it is not only far superior in beauty to the type, but it is one of the most attractive of orchids. *Cælogyne ocellata* is a variable species; several intermediate forms between the type and the variety *maxima*, as represented by Baron Schroeder's plant, differing only in the size of their flowers, have been observed in cultivation, and besides these there has appeared a variety in which the orange spots on the labellum are absent,* and another in which the spots are sulphur-yellow without the orange border. †

C. ochracea.

Pseudo-bulbs ovoid-oblong, four-angled above, $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long. Leaves narrowly lanceolate, acute, 6—8 inches long, tapering below into a slender foot-stalk. Racemes shorter than the leaves, sheathed below by imbricating scales, 5—7 flowered; bracts lanceolate, longer than the ovaries, reddish brown, deciduous. Flowers nearly 2 inches in diameter, fragrant, milk-white, with some orange-yellow blotches and reddish streaks on the lip; sepals elliptic-oblong; petals linear-lanceolate; lip three-lobed, the side lobes erect, rotund, with denticulate margin in front, the middle lobe ovate-cordate, reflexed; disk with two toothleted lamellæ. Column slender, dilated upwards.

Cælogyne ochracea, Lindl. *Bot. Reg.* 1846, t. 69. Id. *Fol. Orch. Cælog.* No. 11. *Bot. Mag.* t. 4661.

var.—conferta.

Pseudo-bulbs, leaves and flowers smaller in all their parts; in other respects agreeing with the species, except in the shorter-stalked ovaries. †

C. ochracea conferta, Rehb. in *Trans. Linn. Soc.* XXX. p. 146 (1873), sub-species, icon. xyl. t. 30. *C. conferta*, Parish et. Rehb.

First detected by Dr. Griffith in Bhotan and the Khasia Hills, and introduced by Mr. Brocklehurst, of The Fence, near Macclesfield, about the year 1846. The variety *conferta* was first gathered by the Rev. C. Parish, in Moulmein, whence it has recently been

* *Cælogyne ocellata Boddartaiana*, Rehb. in *Gard. Chron.* XVIII. (1882), p. 776.

† This is believed by some to be the *Cælogyne nitida* of Lindley (*Fol. Orch. Cælog.* No. 12), and is in cultivation under that name.

‡ Forsam propria species, sed characteres ad separandam speciem idonei nulli in promptu, nisi forsam ovaria pedicellata adeo brevia, quod tamen et dispositune loci explicari potest. —Rehb. in *Trans. Linn. Soc.* loc. cit. supra.



Cœlogyne pandurata.
(Drawn in the Royal Gardens at Kew.)

sparingly imported; it is one of the most attractive of the small Cælogyne. *Cælogyne ochracea* is sometimes confused with *C. ocellata*, from which it may be distinguished by its shorter and broader leaves, by its deciduous bracts, and chiefly by the characters of the labellum, which has but two keels only, and the apical margin of the side lobes denticulate and not entire, as in *C. ocellata*.

C. odoratissima.

Pseudo-bulbs ovoid, furrowed, $\frac{3}{4}$ —1 inch long. Leaves linear-lanceolate, acute, $1\frac{1}{2}$ —3 inches long. Peduncles filiform, as long as the leaves, usually three flowered; bracts narrowly lanceolate, longer than the ovaries. Flowers about an inch in diameter, fragrant, white with a lemon-yellow blotch on the lip; sepals elliptic-lanceolate; petals narrower, nearly linear; lip obcordate, three-lobed with three longitudinal keels. Column elongated, semi-terete.

Cælogyne odoratissima, Lindl. Gen. et Sp. Orch. p. 41 (1831). Id. Fol. Orch. Cælog. No. 10. *Bot. Mag.*, t. 5462. Thwaites' Pl. zeyl. p. 300. *C. angustifolia*, A. Rich. Ann. Sc. Nat. s. 2, XV. t. 6. Wight, Ic. Pl. Ind. or. t. 1641.

A native of the Neilgherry Hills in southern India, where it was detected by Dr. Wight, towards the middle of the present century, growing on the trunks and branches of trees, and flowering throughout the rainy season from May to October; it also inhabits the Newera Ellia and other elevated parts of the central province of Ceylon. It appears to have been first introduced to the Royal Gardens at Kew in 1863. It is a dwarf, tufted plant with fragrant flowers that may be cultivated in the cool house during the summer months.

C. pandurata.

Pseudo-bulbs from a stout creeping rhizome, oval oblong, compressed, 4 inches long. Leaves cuneate-oblong, 15—20 inches long. Racemes nearly as long as the leaves, pendulous, many flowered; bracts cucullate, deciduous, as long as the pedicels and ovaries. Flowers among the largest in the genus, 4 inches across; sepals and petals similar and sub-equal, linear-oblong, acute, keeled behind, pale green; lip sub-panduriform, the side lobes erect, yellow-green streaked with black, the middle lobe crisped and covered with black warty asperities and traversed by two longitudinal toothed keels.

Cælogyne pandurata, Lindl. in Gard. Chron. 1853, p. 791. Id. Fol. Orch. Cælog. No. 7. *Bot. Mag.*, t. 5084. Rehb. *Xen. Orch.* II. p. 80, t. 121. Van Houtte's *Fl. des Serres*, XX. t. 2139 (copied from *Bot. Mag.*) Williams' *Orch. Alb.* II. t. 63.

Discovered by Sir Hugh Low in 1852, in Sarawak, where it is not uncommon, always growing in the hottest jungles on the trunks of trees in the swampy lowlands adjacent to the coast and river banks,

places that are almost inaccessible during the rainy season. *Cœlogyne pandurata* flowered for the first time in this country in Messrs. Loddiges' nursery at Hackney, in 1853; it is one of the most remarkable of orchids, the unusual colour of its large flowers rarely failing to arrest the attention of the beholder.

C. Parishii.

Pseudo-bulbs oblong, obscurely four-angled, 4—6 inches long. Leaves narrowly elliptic-oblong acute. Peduncles from the apex of the pseudo-bulbs, sheathed at the base by 6—8 imbricating scales, racemose above, usually five flowered. Flowers 2 inches in diameter, pale yellow-green, the lip spotted with black; sepals lanceolate, acuminate, keeled behind; petals linear-lanceolate; lip panduriform, the anterior lobe apiculate, with undulate margin and with five fringed raised lines on the disk, two of which are prolonged to the base of the lip. Column semi-terete, bent.

Cœlogyne Parishii, Hook. *Bot. Mag.* t. 5323 (1862).

Sent to Messrs. Low and Co. in 1861, from Moulmein, by Rev. C. Parish. It is a curious and distinct species, having some resemblance to *Cœlogyne pandurata*, but with very differently-shaped pseudo-bulbs, from the summit of which the inflorescence is produced, and not from the base as in that species; it differs also from *C. pandurata* in the size of the flowers and especially in the structure of the labellum, the anterior lobe of which is shorter and broader in proportion to the length, and has five fringed keels on the disk in the place of the warty crest of *C. pandurata*.

C. Rossiana.

Pseudo-bulbs ovoid or sub-pyriform, much furrowed when old, variable in size in the cultivated plant, the largest 2—3 inches long. Leaves lanceolate, acuminate, 10—12 inches long, narrowed below into a slender petiole, coriaceous. Racemes erect, shorter than the leaves, 7—10 flowered. Flowers $1\frac{1}{2}$ —2 inches in diameter; sepals and petals milk-white, keeled behind, the former narrowly oblong, acute, the latter linear; lip broadly oval, obscurely lobed, the erect side lobes red-brown on the inner side, the front lobe bright yellow, the disk and space between the side lobes white traversed by three longitudinal crenulate keels. Column clavate, slender, bent.

Cœlogyne Rossiana, Rehb. in *Gard. Chron.* XXII. (1884), p. 808. Rolfe in *Gard. Chron.* VI. s. 3 (1889), p. 650.

Imported from Burmah in 1884 by Mr. H. J. Ross, of Castagnolo, near Florence. We are indebted to the Royal Gardens at Kew for materials for description.

C. Sanderiana.

Pseudo-bulbs ovoid, 2—3 inches long, obscurely angulate, much wrinkled when old. Leaves oblong-lanceolate, petiolate, acute, 12—15 inches long, 2—3 inches broad. Racemes pendulous, as long as the leaves, 5—7 or more flowered, the short stalked ovaries sheathed by a pale brown, acute, deciduous bract. Flowers among the handsomest in the genus, $3\frac{1}{2}$ — $4\frac{1}{2}$ inches across when spread out; sepals and petals milk-white, the former lanceolate, acuminate, keeled behind, the latter similar but narrower; lip three-lobed, the side lobes oblong, erect, crisped at the front margin, streaked with red-brown on the inner side, and with a yellow blotch at the crisped front edge; the intermediate lobe oblong acute, reflexed and undulate, and with a bright yellow disk on which are six raised fringed lines. Column triquetral, arched, winged.

Cœlogyne Sanderiana, Rehb. in *Gard. Chron.* I. s. 3 (1887), p. 764.

One of the most recent additions to the genus, and at the same time one of the most beautiful species in it. It was introduced by Messrs. Sander and Co., through their collector Förstermann, in 1887. Its habitat has not been divulged.

C. Schilleriana.

Pseudo-bulbs clustered, small, somewhat flask-shaped, diphyllous. Leaves oblong-lanceolate, acuminate, 4—5 inches long, narrowed below into a short petiole invested with imbricating scales. Peduncles from between the leaves, short, one flowered. Sepals and petals greenish yellow, the former lanceolate, acute, the latter linear; lip obovate-oblong, three-lobed, the side lobes erect, cream-white with a red-brown stripe near the margin, and numerous anastomosing red-brown lines below it; front lobe spreading with dentate margin, light yellow spotted with red-purple; disk with three raised lines that extend to the base of the lip. Column semi-terete.

Cœlogyne Schilleriana, Rehb. in *Berl. Allg. Gartenz.* 1858, p. 189. *Id. Xen. Orch.* II. p. 110, t. 134. *Bot. Mag.* t. 5072. *Van Houtte's Fl. des Serres*, XXII. t. 2302.

Introduced by our Exeter firm, from Moulmein, in 1857, through Thomas Lobb, and dedicated to Consul Schiller, of Hamburg, at that time the most prominent amateur of orchids in Germany. It was placed by the late Professor Reichenbach under *Pleione*, to which it does not conform. It is still occasionally met with in collections, where it is easily recognised, even when not in flower, by its minute, clustered, generally leafless pseudo-bulbs.

C. sparsa.

A dwarf tufted plant. Pseudo-bulbs ovoid, varying in size from that of a filbert to a walnut. Leaves oblong-lanceolate, acuminate, 6 inches

long, with three prominent nerves. Peduncles erect, slender, shorter than the leaves, 3—5 flowered. Flowers not fully expanding, white with an orange blotch on the middle lobe of the lip, and some brown spots and markings on the side lobes; sepals and petals keeled behind, the former lanceolate, acute, the latter linear; side lobes of lip oblong, intermediate lobe sub-quadrate, with three raised lines on the disk. Column winged and hooded.

Cœlogyne sparsa, Rehb. in Gard. Chron. XIX. (1883), p. 306.

A pretty floriferous dwarf species, introduced by Messrs. Sander and Co. from the Philippine Islands in 1882, through their collector Roebelen. The specific name *sparsa*, "sown or scattered," refers, according to its author, to the spotted side lobes of the lip.

C. speciosa.

Pseudo-bulbs ovoid, angulate, $1\frac{1}{2}$ —3 inches long, monophyllous. Leaves oblong-lanceolate, acute, 9—15 inches long, with 3—5 prominent nerves, and narrowed below into a stoutish winged petiole. Peduncles short, sheathed by 4—6 imbricating bracts, usually two-flowered. Flowers among the largest in the genus, with pedicel and ovary very short, ribbed and twisted; sepals and petals 2 inches long, pale yellow-brown, the former oblong, acute, and keeled behind, the latter linear; lip larger than the other segments, nearly oblong in outline, three lobed, and traversed longitudinally by two fringed crests, the side lobes erect, entire, pale brown externally, clouded and reticulated with deep brown on the inner side, as is the space between the fringed crests; the front lobe white, slightly reflexed, denticulate, undulate and with a shallow sinus in the apical margin. Column clavate, bent, winged, whitish.

Cœlogyne speciosa, Lindl. Gen. et Sp. Orch. p. 39 (1831). Id. Fol. Orch. Cœlog. No. 27 (1854). *Bot. Reg.* 1847, t. 23. *Bot. Mag.* t. 4889. *C. salmonicolor*, Rehb. in Gard. Chron. XX. (1883), p. 328. *Chelonanthera speciosa*, Bl. Bijdr. p. 384 (1825).

var.—*albicans*.

Flowers larger than in the type, the lip being 3 inches long; sepals and petals light yellowish green; lip white, the front lobe very pure, the side lobes freckled with red-brown on the inner side and between the fringed crests. Column white.

C. speciosa albicans, supra.

This remarkable *Cœlogyne* was first detected by the Dutch botanist Blume, in the early part of the present century, on the Salak Mountains, in Java, at an elevation of 3,000—5,000 feet, and who published a description and drawing of it in his *Bijdragen* (Contributions to the Flora of Dutch India), under the name of *Chelonanthera speciosa*, a name that no longer has a place in orchid nomenclature, the genus *Cœlogyne*, to which the plant unquestionably

belongs, having been founded by Lindley two years previously on the well-known *C. cristata*. It was first introduced into European gardens by our Exeter firm in 1846, through Thomas Lobb, who gathered it in the locality in which it had been first discovered by Blume. As a species it is slightly variable in the size and colour of its flowers, the most distinct deviation from the type as figured in the *Botanical Register* for 1847, that is known to us being the variety described above, which appeared amongst a recent importation brought to one of the London sale-rooms.

The minute hairs forming the fringe of the crest of the lip are among the most beautiful microscopic objects imaginable, and which must be seen to be appreciated. These hairs are sometimes simple, sometimes dichotomously branched, but in every case are terminated by a cluster of unicellular stellate expansions of even greater delicacy than the pappus of many Composites.

C. testacea.

“Pseudo-bulbs oblong-ovate, varying in size, compressed and angled. Leaves broadly lanceolate, acute, petiolate, with three principal ribs. Racemes clothed with leafy imbricated scales at the base, drooping, bearing 8—10 sub-distichous flowers; bracts large, ovate, brown, concealing the ovary. (Flowers 1—1½ inches across vertically); sepals and petals nearly uniform, oblong-lanceolate, obtuse, sometimes apiculate, pale clayey white, sub-patent; lip broad-oblong, recurved, three-lobed, white spotted and blotched with brown, the side lobes rounded, short; terminal lobe very obtuse, slightly waved, having four elevated lines fringed with glandular hairs. Column terete, compressed, dilated and winged on each side above.”—*Botanical Magazine*.

Celogyne testacea, Lindl. in *Bot. Reg.* 1842, misc. 34. Id. *Fol. Orch. Cœlog.* No. 3. *Bot. Mag.* t. 4785.

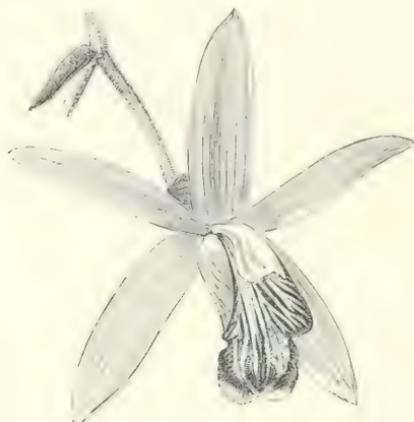
Introduced by Messrs. Loddiges from Singapore, in 1841. It was in cultivation in the Royal Gardens at Kew thirteen years later, but seems to have disappeared from British collections shortly afterwards, and we find no record of its having been re-introduced since. It is surpassed in attractiveness by its near congeners, *Celogyne Massangeana* and *C. Dayana*.

C. tomentosa.

Pseudo-bulbs ovoid, elongate, 2—3 inches long, of a dull deep pea-green colour. Leaves petiolate, variable in shape, 9—12 inches long, the broader ones obovate-lanceolate, with 3—5 prominent nerves, the narrower

ones oblanceolate, acute. Racemes pendulous, the rachis and pedicels roughly tomentose, reddish brown, and bearing 15—20 flowers; bracts oblong-acute, shorter than the ovaries. Flowers 2—2½ inches in diameter; sepals and petals light orange-red, the former lanceolate, acute, keeled behind, the latter linear-lanceolate; lip obovate in outline, three-lobed, the side lobes erect, oblong, rounded in front, white streaked obliquely with red on the inner side; the intermediate lobe sub-quadrate, apiculate, traversed by three toothed keels that extend to the base of the lip. Column clavate, arched, winged above the middle, whitish.

Celogyne tomentosa, Lindl. Fol. Orch. Cælog. No. 5 (1854). Rehb. in Gard. Chron. 1873, p. 843.



Celogyne tomentosa.

Celogyne tomentosa was first described by Dr. Lindley, in 1854, from an herbarium specimen at Kew, gathered a few years previously by Thomas Lobb, who gave no locality. Nothing more was known of it till 1873, in which year it flowered in the collection of Mr. A. D. Berrington, at Pant-y-Goitre, near Abergavenny, who had received it from Borneo, whence it has been occasionally but very sparingly imported since. The tomentose rachis and dark-coloured flowers clearly distinguish this species from its congeners, among which it is one of the handsomest.

SUB-GENUS PLEIONE.

Pleione, Don. Prod. Fl. Nep. p. 36 (1825).

The *Pleiones* are alpine plants inhabiting the lower and middle Himalayan zones, where they have a vertical range of 2,500—10,000 feet, also the summits of the Khasia Hills, and the mountains of Arracan and Moulmein at 3,000—7,000 feet elevation. Most of the

species are abundant in their respective habitats growing on moss-covered rocks and banks, and covering the lower part of the trunks of lofty trees, sometimes in partial shade, sometimes fully exposed. As horticultural plants they are highly valued on account of the brilliant effect produced by masses of their delicately-coloured flowers in the autumn and winter months; the flowers are, however, of comparatively short duration. Besides the species described in the sequel, two others are still imperfectly known to science, *Cœlogyne* (*Pleione*) *diphylla*, and *C. (Pleione) javanica*, the first gathered by Griffith on the Khasia Hills, and the second by Zöllinger near Tijkoya, in Java. The Pleiones are familiarly known as "Indian Crocuses."

The following characters are common to *all* the cultivated species:—

The *pseudo-bulbs* are clustered, of small size, often of peculiar form and sometimes mottled with black; they are of annual duration only.

The *leaves* are solitary and deciduous in most of the species,* falling off before the flowers are developed.

The *peduncles*, one or two from the base of each pseudo-bulb, are enclosed in imbricating bracts of which the upper one is the longest, and which soon shrivels, leaving the peduncle naked; they are one sometimes two flowered; the flowers, especially the labellum, are of brighter and more delicate tints that are seen in the true Cœlogynes.

The *sepals* and *petals* are narrow and spreading; the lip nearly oblong when spread out, more or less rolled over the column at the base and traversed longitudinally by 5—7 fringed keels.

The structure of the flower of *Pleione* is, however, essentially that of *Cœlogyne*, and presents no character whatever by which the two may be generically separated.

Cultural Note.—The Pleiones in their native habitats live under climatic and other conditions† which, with the exception of temperature,

* In *Cœlogyne Hookeriana* the leaves persist till after the fading of the flowers.

† In whatever locality the Pleiones are found wild, the temperature of that locality has what in gardening phraseology is called an intermediate range, and which varies according to the altitude of the locality. Thus the temperature of the Himalayan zone at the lower limits of the Pleiones ranges from 18°—27° C. (65°—80° F.), while at the higher limits in the *Pleione humilis* and *P. Hookeriana* localities the range is 5°—8° C. (10°—15° F.) less, which is very nearly the summer temperature on the summits of the Khasia Hills, the winter temperature being somewhat lower. On the Arracan Mountains, at the altitude at which *P. Reichenbachiana* grows, Colonel Benson estimated the average temperature at 18°—21° C. (65°—70° F.)—(Gard. Chron. 1870, p. 796). The hygrometric condition of all these localities is excessive compared with the climate of England. In Sikkim the atmosphere is at or near the saturation point during six months of the year, the other six months are nearly rainless; on the Khasia Hills the rainfall is one of the heaviest known, and on the mountains of Arracan and Moulmein it ranges from 200 to 250 inches annually; the dry season lasts about three months (December—February); vegetation is then dormant.

cannot be even approximately imitated artificially; the cultural routine here formulated is thence, in a great measure, founded upon experience derived from observation of the behaviour of the plants under the altered conditions of their environment in the glass houses of Europe.

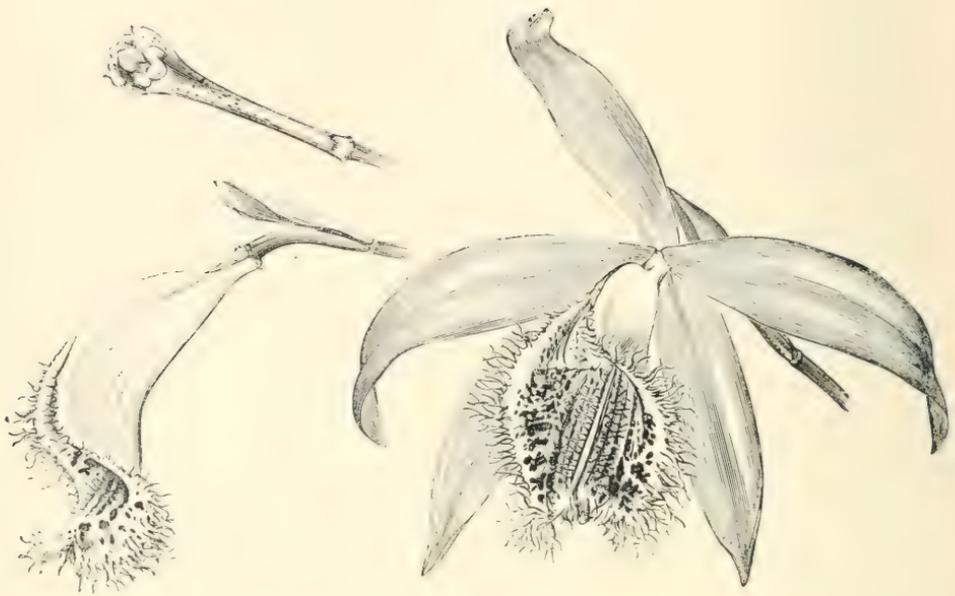
The pseudo-bulbs should be re-potted about a fortnight after they have flowered, that is to say, set in shallow pans in a compost of two-thirds fibrous peat, and one-third chopped sphagnum, to which a little leaf-mould and sand should be added.* The pans should be filled to one half of their depth with broken crocks, for drainage, upon which it is usual to place a layer of sphagnum for the two-fold purpose of keeping the compost damp and preventing its sifting through the drainage. The remainder of the pan should be filled to within half an inch of the rim with compost, in which the bulbs should be placed with their roots half an inch below the surface; the spaces between the bulbs, and between them and the rim should be covered with living sphagnum for retaining moisture. The pans should then be suspended near the roof-glass of any house in which an intermediate temperature is maintained, and water withheld till the plants commence growing, or given only in sufficient quantity to keep the surface sphagnum alive. As the roots and foliage develop, the waterings must be more frequent and more copious, and may be supplemented occasionally by a little weak liquid manure. *Pleione lagenaria*, *P. praecox* and its variety *Wallichiana* may then have a light position in the Cattleya house. *P. Reichenbachiana* and *P. maculata* require a little more heat. *P. humilis* and *P. Hookeriana*, coming from a high alpine region, should be placed close to a ventilator, or in a cooler house. When the foliage begins to turn yellow, the waterings must be diminished in frequency and quantity till only sufficient is given to keep the bulbs plump. While in flower, the Pleiones may be kept in the Cattleya house or in the cool house, provided the temperature at no time descends below 7° C. (45° F.)

Cœlogyne (Pleione) *Hookeriana*.

"Pseudo-bulbs ovoid, smooth, $\frac{1}{2}$ —1 inch long. Leaves 1—2 inches long, elliptic-lanceolate, acuminate, finely plaited. Flowers 2—2 $\frac{1}{2}$ inches across the petals, rose-purple with a paler lip blotched at the apex with brown-purple; sepals and petals variable in breadth, elliptic-lanceolate, acuminate, spreading; lip convolute and cylindrical as far as the lateral lobes extend, then expanded into a small, retuse, terminal lobe; disk with several slender crested lamellæ. Column slender, expanded at the tip."
—*Botanical Magazine*.

Cœlogyne *Hookeriana*, Lindl. Fol. Orch. Cœlog. No. 37 (1854). *Bot. Mag.* t. 6388.

* Some cultivators prefer a smaller proportion of peat, and substitute fibrous loam with a small quantity of dried cow manure.



Coelogyne (Pleione) humilis.

var.—brachyglossa.

Lip shorter and more open than in the type, white with a light yellow disk on which are some brown spots; sepals and petals pale rose.

C. Hookeriana brachyglossa, Rehb. in *Gard. Chron.* I. s. 3 (1887), p. 833.

Discovered in 1849—50 by Sir J. D. Hooker, in the Sikkim Himalayas, at elevations ranging from 7,000 to 10,000 feet, and where it is common on mossy banks. Two varieties were recognised by the discoverer, distinguished from each other by the form of their labellum, one occurring in the lower part of the range of the species (7—8,000 feet), and the other in the higher part (9—10,000 feet). That described and figured in the *Botanical Magazine*, which may be regarded as the type, is from the lower range, and was introduced in 1877 by Mr. Elwes, the author of the splendid monograph of the genus *Lilium*. The other, from the higher range, is a more recent introduction, and was named *brachyglossa* by the late Professor Reichenbach, from materials supplied to him from the rich collection of Sir Trevor Lawrence, Bart., at Burford Lodge.

C. (Pleione) humilis.

Pseudo-bulbs flask-shaped, 1—2 inches long, ribbed, deep green. Leaves oblanceolate, acuminate, 6 inches long. Flowers 2—3 inches across; sepals and petals linear-lanceolate, white tinted with pale lilac; lip oval-oblong, convolute at the base into a short tube, open in front, emarginate and fringed with long white hairs; disk with 6—8 fringed veins, between which are amethyst-purple lines, the marginal area white spotted with amethyst-purple. Column slender, clavate, winged, bent near the apex.

Cœlogyne humilis, Lindl. *Gen. et Sp. Orch.* p. 43 (1831). *Fol. Orch. Cœlog.* No. 41 (1854). *Bot. Mag.* t. 5674. *Pleione humilis*, Don. *Prod. Fl. nep.* p. 37 (1835). Paxton's *Fl. Gard.* II. t. 51.

sub-vars.—*albata* (*Gard. Chron.* III. s. 3 (1888) p. 392), flowers white with light purple radiating lines and two orange spots on the lip; *tricolor* (*Williams' Orch. Alb.* III. t. 102), the lines between the fringed veins of the lip orange-brown, the marginal area spotted with the same colour, and with two yellow stains near the apex.

Native of Nepal, Sikkim and Bhotan, at 7,000—8,000 feet elevation, growing among moss in shady places, and sometimes on the lower parts of the trunks of lofty trees; also of the Garrow and Khasia Hills. It was originally discovered at the beginning of this century by Dr. Buchanan Hamilton in the first named region, and subsequently it was gathered by Griffith near Santagong in Bhotan.

It was first introduced into British gardens by our Exeter firm, along with *Pleione lagenaria*, in 1849, through Thomas Lobb, who found it at Sanahda, on the Khasia Hills.

The sub-variety *albata*, which differs from the type in colour only, was imported by Messrs. Sander and Co. in 1887; and *tricolor*, a very distinct and handsome form as regards colour first appeared in Mr. W. Bull's horticultural establishment in 1880. The flowering season of *P. humilis* is January—February.

C. (Pleione) *lagenaria*.

Pseudo-bulbs about an inch long, somewhat bottle shaped with a rounded protuberance nearly midway between the base and the apex, green mottled with blackish brown. Leaves narrowly oblanceolate, 7—10 inches long. Flowers 2—3 inches across; sepals and petals narrowly lanceolate, rose-lilac; lip oblong, emarginate, the basal half convolute over the column, pale rose-lilac externally, striped with purple on the inner side; the distal half open with undulate margin, purple



Cælogyne (Pleione) *lagenaria*.

with paler transverse streaks and blotches and with a white margin; disk yellow and red with five longitudinal fringed lines. Column clavate, winged at the apex.

Cælogyne lagenaria, Lindl. *Fol. Orch. Cælog.* No. 39 (1854). *Bot. Mag.* t. 5370. *Illus. hort.* 1867, t. 510. Van Houtte's *Fl. des Serres*, XXIII, t. 2386. *Pleione lagenaria*, Lindl. in *Paxt. Fl. Gard.* II. t. 39 (1851). *Warner's Sel. Orch.* I. t. 17. *Jennings' Orch.* t. 47. *De Puydt, Les Orch.* t. 36.

Introduced by our Exeter firm in 1849, through Thomas Lobb, who discovered it on the Khasia Hills, where it is said to be re-

stricted to one or two localities of very limited extent. Ever since its introduction it has been in the highest repute amongst orchid amateurs on account of its beautiful flowers that are produced in October and November. The specific name, from *lagena*, a kind of jug or flagon, refers to the form of the pseudo-bulbs.

C. (Pleione) *maculata*.

Pseudo-bulbs nearly bottle-shaped, fully an inch long, the basal two-thirds cylindric, the apical third conic. Leaves lanceolate, acute, plicate, 6—9 inches long. Peduncles short, sheathed at the base by small greenish scales, and above them by a larger membranous bract, one flowered. Flowers 2 inches in diameter; sepals and petals spreading, similar and sub-equal, lanceolate, acute, white; lip oval-oblong, three-lobed, the side lobes narrow, erect, white streaked obliquely on the inner side with purple, the middle lobe spreading, undulate, with five fringed longitudinal lamellæ that extend to the base of the lip, white with large purple marginal spots and yellow disk. Column slender, terete, white.

Cœlogyne maculata, Lindl. Gen. et Sp. Orch. p. 43 (1831), and in Wall. *Pl. Asiat. rar.* t. 53. Id. *Fol. Orch. Cœlog.* No. 40. *Bot. Mag.* t. 4691. Van Houtte's *Fl. des Serres, XIV.* t. 1470 (copied from *Bot. Mag.*) *Pleione maculata*, Lindl. in *Paxt. Fl. Gard. II.* t. 39 (1851).

var.—*Arthuriana*.

Pseudo-bulbs angulate, smaller than in the type. Flowers also smaller with purple lines on the petals, and with a continuous purple band around the front margin of the lip.

C. maculata Arthuriana, supra. *C. (Pleione) Arthuriana*, Rehb. in *Gard. Chron.* XV. (1881), p. 40.

Discovered by Dr. Wallich towards the end of the second decade of the present century on the Khasia Hills, whence it was introduced by our Exeter firm along with the preceding species, in 1819, through Thomas Lobb. In the following year it was detected by Sir J. D. Hooker and Dr. Thomson, also on the Khasia Hills at 4,000—5,000 feet elevation, and in 1852 it was sent to the Royal Gardens at Kew, from Assam, by Simons. It also occurs in Sikkim at 2,500—3,000 feet elevation. The variety *Arthuriana* was sent to us in 1881 by a correspondent at Rangoon, who gave no locality, and was dedicated by Professor Reichenbach to the memory of the late Mr. Arthur Veitch. The flowering season of *Pleione maculata* is October and November.

C. (Pleione) *præcox*.

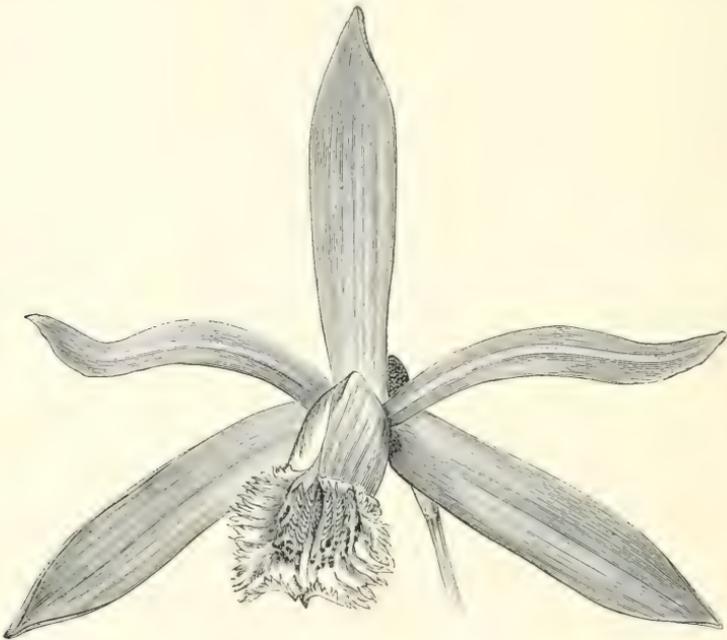
Pseudo-bulbs broadly flask-shaped, about an inch in diameter, warty, mottled green and blackish brown. Leaves broadly lanceolate, 9—12

inches long, plaited and petiolate. Peduncles one- sometimes two-flowered. Flowers 3 inches across vertically; sepals and petals light rose-purple, the former lanceolate, acute, the latter linear; lip oval-oblong, three-lobed, the side lobes convolute over the column, pale rose colour, the front lobe sub-quadrate with fringed margin, and coloured like the sepals and petals, with a bright yellow disk on which are five denticulate lamellæ. Column slender, with two notched wings at the apex.

Cœlogyne præcox, Lindl. Gen. et Sp. Orch. p. 49 (1831). Id. Fol. Orch. Cœlog. No. 42. Paxt. Mag. Bot. XIV. p. 7. *Pleione præcox*, Don. Prod. Fl. nep. p. 37 (1825).

var.—Wallichiana.

Peduncles usually one-flowered. Flowers of a deeper colour and with the veins of the sepals, petals, and convolute lobes of lip usually more



Cœlogyne præcox Wallichiana.

distinctly marked; the front lobe of the lip dentate rather than fringed, and the teeth of the lamellæ of the disk shorter than in the type.

C. præcox Wallichiana, Lind. Fol. Orch. Cœlog. No. 42 (1854). *C. Wallichiana*, Bot. Reg. 1840, t. 24. Bot. Mag. t. 4496. *Pleione Wallichiana*, Lindl. in Paxt. Fl. Gard. sub. t. 51 (1851). *P. præcox Wallichiana*, Jennings' Orch. t. 47. *P. birmanica*, Rehb. in Gard. Chron. XVIII. (1882), p. 840.

First discovered by Dr. Wallich in Sylhet and on the Khasia Hills, where it was collected by Gibson and sent by him to Chatsworth

in 1837. It was found by Sir J. D. Hooker in great abundance during his exploration of the Sikkim Himalayas in 1849—50, on the ascent to Darjeeling, and on the Tonglo at 9,000 feet elevation, growing “on the trunks of all the great trees, attaining a higher elevation than most other epiphytal species,”* and again subsequently on the Kollong Rock, “a steep dome of red granite that rises 400 feet above the level of the surrounding ridges of the Khasia Hills,† and also on the rocks about Nonkreem.‡ Twenty years later the variety was detected by Colonel Benson on the Arracan Mountains at 2,500—3,000 feet elevation. The range of the species is therefore very considerable; its flowering season in the glass houses of Europe is November and December.

C. (Pleione) *Reichenbachiana*.

Pseudo-bulbs 2—2½ inches, cylindric, lobed, and with a conical protuberance at the apex, green spotted and mottled with blackish brown. Peduncles one- rarely two-flowered. Flowers 2 inches across vertically; sepals ligulate, light rosy lilac striated and stained with amethyst-purple in the middle and towards the apex; petals narrower and paler in colour; lip oblong, emarginate, the basal half rolled over the column, white, the distal half open with ciliate margin, white spotted with purple; disk with three fringed lamellæ. Column slender with three notched wings at the apex.

Cœlogyne (Pleione) *Reichenbachiana*, T. Moore in Gard. Chron. 1868, p. 1210. *Bot. Mag.* t. 5753.

Discovered by Colonel Benson on the mountains near Moulmein, at 6,000—7,000 feet elevation, and communicated by him to the Royal Gardens at Kew and to us in 1868. It flowers in February and March, but it is still very rare in European collections. It was dedicated at our request to the late Professor Reichenbach of Hamburgh.

CALANTHE.

R. Brown in Bot. Reg. 1821, sub. t. 573. Lindl. Gen. et Sp. Orch. p. 249 (1833). Benth. et Hook. Gen. Plant. III. p. 520 (1833).

Limited as is the number of species of *Calanthe* suitable for horticulture, the genus has, nevertheless, an especial interest for horticulturists on account of some beautiful forms included in it, that supply an uninterrupted succession of flowers during the winter months, and

* Himalayan Journals, I. p. 166.

† Id. II. p. 29

‡ Id. II. p. 311.

which have been greatly multiplied during the past few years by means of hybridisation.

The genus as at present circumscribed includes about forty species that are widely distributed over the tropical and sub-tropical regions of the Eastern hemisphere, and occurring also very sparingly in Mexico, Central America, and the West Indies. The *Calanthes* are most numerous along the lower Himalayan zone from Assam to Nepal, and again in Java and the neighbouring islands. Northwards they spread into Japan, whose flora includes four or five species, and southwards as far as Sydney in New South Wales, which is the southern limit of *C. veratrifolia*. The genus is represented in South Africa by the beautiful *C. natalensis*, in Mauritius by *C. sylvatica*, in the Society and probably other islands of the Pacific Ocean by *C. gracillima*.

The essential characters of *Calanthe* consist chiefly in the labellum being almost always spurred, three-lobed, with the middle lobe notched, and its claw being adnate to the column, forming either a cylindrical tube, or a broadly turbinate cavity beyond which the column is very rarely produced. The pollinia are eight, in groups of four each; each group is furnished with a short caudicle or bipartite gland.*

Dr. Lindley distributed the *Calanthes* into two sections, "according as the spur of the labellum is elongated, or short or quite obsolete, but the distinction is vague, and not confirmed by more recent observation."† A more natural sectional division may be made by separating the epiphytal or sub-epiphytal species of which *C. vestita* is a well-known type, from the terrestrial species of which *C. veratrifolia* is one of the best known representatives. The most obvious characteristics of each section may be thus stated:—

VESTITÆ. Pseudo-bulbs more or less elongated, angulate, covered with a grey-green reticulated, membranous sheath. Leaves large, plicate, deciduous. Inflorescence hairy, loosely racemose; bracts usually large, inflated and as long as the ovaries.

To this section belongs *Limatodes rosea*, Lindl. and *L. labrosa*, Rchb.; also *L. gracile*, Lindl. not in cultivation; these differ from *Calanthe vestita* chiefly in the base of the lip not being adnate to the column, although enfolding it. The typical *Limatodes pauciflora* of Blume, and one or two other species, none of which are in cultivation, are now referred to Phaius.

* The appendages or caudicles of the pollinia resemble the stipes of the *Vandææ*, but they evidently develop from the pollen itself, and not from the rostellum.

† Bentham in Jour. Linn. Soc. XVIII, p. 309.

VERATRIFOLLE. Pseudo-bulbs none, or a very small, fleshy or tuberous rhizome, emitting long cord-like branched roots. Leaves broad and spreading, persisting longer than one year. Inflorescence densely racemose or corymbose-racemose; bracts small, appressed, much shorter than the ovaries.

Besides the manifest differences in the vegetative organs of the two sections noted above, there is another well-marked distinction between them of considerable horticultural importance that has been brought out by the experiments of the hybridist. These experiments go far to prove that while the species of the VESTITE group cross freely with each other and with the mules resulting from such crosses, and while, so far as the experiments have been carried, the cultivated species of the VERATRIFOLLE will also cross with each other, no species or mule belonging to one of the sections can be induced to cross with any species or mule belonging to the other.

It is a remarkable fact, too, which has been already referred to under Phaius, that bi-generic hybrids have been raised between *Phaius grandifolius* and some of the forms of *Calanthe vestita*, thus proving the two genera to be very nearly allied, which was indeed surmised to be the case long ago by Dr. Lindley, and even by Griffith before him.* This fact indicates plainly that in the systematic arrangement of the genera, Phaius and Calanthe should come closer together than they are usually placed in the best synopses of the Orchideæ, or at least that they should be brought under the same sub-tribe; but the reduction of *C. vestita* to *Phaius vestitus* as proposed by Reichenbach† because mules have been obtained between that species and a Phaius does not appear to us to be at all justifiable.

The genus *Calanthe* was founded by Dr. Robert Brown on *Calanthe veratrifolia*, with which he became acquainted while investigating the flora of Australia. The name means simply "beautiful flower," from *καλὸς* (*kalos*) and *ἄθος* (*anthos*).

Cultural Note.—VESTITE. The species and hybrids comprising this group should be potted as soon as they begin to start into growth in early spring. In removing the pseudo-bulbs from the pots the exhausted soil should be shaken out and the old roots cut off; the pseudo-bulbs should then be re-potted in a compost of two-thirds fibrous loam and one-third peat with the addition of a little sand to assist drainage. If good fibrous loam is not procurable, a compost of three-fourths fibrous peat and one-fourth sphagnum moss may be substituted with the addi-

* Fol. Orch. *Calanthe*, p. I.

† Gard. Chron. 1867, p. 264.

tion of a little dried cow-manure. When the pseudo-bulbs are potted singly, which is the usual practice, small pots should be preferred, from which the plants can be subsequently shifted into others of larger dimensions if necessary. The pots should be filled to one-half their depth with drainage consisting of clean broken crocks, upon which may be placed a layer of sphagnum, and the remainder filled with compost up to the rim. Water must be given sparingly at first until the new growths, in the axis of which the pseudo-bulbs are formed, begin to root freely. As soon as active growth has fairly commenced the plants must receive frequent and liberal waterings at the roots. At this stage, when the pots are well filled with roots, many cultivators supplement the usual waterings with a little weak manure water, applying it about once a week or less frequently according to the condition of the plants. As the new pseudo-bulbs approach maturity and the leaves begin to turn yellow, the waterings must be gradually reduced in frequency and quantity, till at length when the leaves have fallen and the flower scapes appear, they must reach the minimum or only just sufficient to prevent the latter from drooping. After flowering water must be withheld altogether and the pseudo-bulbs allowed to become dormant; they will be most effectively brought into this state by laying the pots on their sides in any dry place such as may be found under one of the stages of the house in which they are cultivated. Coming from one of the hottest regions of the globe, the Calanthes of this section require the temperature of the East Indian house, in which during active growth they should have a light and airy position; they may also be successfully cultivated in a pine stove or a cucumber house.

VERATRIFOLLE. The same compost may be used for the species and hybrids belonging to this group as for the deciduous kinds, giving drainage to about one-third of the depth of the pot. The re-potting should be performed in early spring, and as all the cultivated kinds are vigorous-growing plants that root freely they require ample pot room. They should receive copious waterings while growing, and even in the winter months they must at no time be allowed to get quite dry at the roots. Being evergreen with foliage of stouter texture than that of the **VESTITE** group, they can endure a greater amount of shade, and they may also be grown in a somewhat lower temperature such as is maintained in the intermediate house; for the Japanese species the temperature of an ordinary greenhouse is sufficient. The flowering season of most of the tropical species belonging to this group may be prolonged by removing the plants, as soon as the first flowers have expanded, into a lower temperature and drier atmosphere.

The Calanthes of this group are at all times liable to the attacks of brown scale and green fly (aphides); the former attach themselves to the leaves and may be checked by sponging with soapy water; the latter settle on the flowers and may be dislodged by fumigating.

Calanthe brevicornu.

Leaves oval-oblong or lanceolate, petiolate, acute, 9—12 inches long. Scapes as long as or longer than the leaves, erect, racemose above, many-flowered. Flowers 1—1½ inch in diameter with very short pedicel and ovary; sepals and petals spreading, brownish purple with a paler mid-nerve and margin, whitish at the base; the dorsal sepal elliptic-oblong, acute, the lateral two lanceolate, and at right angles to it; petals similar to the lateral sepals but smaller; lip sub-panduriform, emarginate, red-purple margined with white; disk with three raised lines of which the middle one is the longest, narrow and yellow on the basal side, much dilated and red in front; spur very short.

Calanthe brevicornu, Lindl. Gen. et Sp. Orch. p. 251 (1832). *Sert. Orch.* t. 9 (1838). *Fol. Orch. Cal.* No. 4.

First discovered in Nepal, in 1821—22, by Dr. Wallich, from whose drawing of a plant *in situ* Dr. Lindley's plate in the *Sertun Orchidaceum* was copied. Many years afterwards it was gathered by Sir J. D. Hooker in Sikkim, whence it was recently introduced to the Royal Gardens at Kew. The colour of the flowers is peculiar, and agrees nearly in this respect with the Japanese *Calanthe discolor* figured in the *Botanical Register* for 1840, t. 55.

C. curculigoides.

Leaves elliptic lanceolate, acute, 12—18 inches long. Scapes half as long as the leaves, sheathed below by adherent brownish bracts, densely racemose above. Flowers partially opening, ¾ inch across, pale orange-yellow with a red blotch on the lip; sepals and petals oblanceolate, acute; lip three-lobed, the lateral lobes rotund, erect, the intermediate lobe oblong, acute, reflexed; spur hooked.

Calanthe curculigoides, Lindl. Gen. et Sp. Orch. p. 251 (1832). *Bot. Reg.* 1847, t. 8. *Fol. Orch. Cal.* No. 10. *Bot. Mag.* t. 6104. *Fl. Mag.* N.S. t. 349.

First discovered by Griffith in the Malay peninsula, and shortly afterwards introduced from Malacca by Messrs. Loddiges, in whose nursery at Hackney it flowered in 1845. It has since been gathered at Penang, Singapore and other places. It appears to have been lost to cultivation for many years till its re-introduction in 1873—4 again brought it under the notice of horticulturists. Its dense raceme of scarcely half-expanded, orange-coloured flowers render it singular among the cultivated *Calanthes*. The specific name was suggested by the resemblance of its foliage to that of some species of *Curculigo*.

C. labrosa.

Pseudo-bulbs sub-conical, angulate, 2—3 inches long, with a transverse

depression about an inch below the apex. Scapes hairy, 12—15 inches high, loosely racemose, 7—10 flowered; bracts oblong, acute, half as long as the stalked ovaries. Flowers scarcely an inch in diameter; sepals and petals ligulate, acute, rose-purple, the petals broader than the sepals; lip with a wedge-shaped base that is convolute over the column, and a dilated, undulate blade that is light rose-purple dotted with dark purple, white at the base; spur filiform, hairy, shorter than the ovary. Column semi-terete, short, white at the base, light rose at the apex.

Calanthe labrosa, Rehb. in Gard. Chron. XIX. (1833), p. 44. *Limatodes labrosa*, Rehb. in Gard. Chron. XI. (1879), p. 202.

Sent to us in 1878 by a correspondent in southern Burmah, who gave no locality; it has now almost disappeared from cultivation. It is noticed in this place chiefly on account of its participation in the parentage of one of the most distinct race of hybrid *Calanthes* yet raised—*Calanthe porphyrea*, *C. lentiginosa* and varieties.

C. Masuca.

Leaves oblong-lanceolate, or oval-oblong, acuminate, 9—15 inches long, narrowed below into a fluted petiole. Scapes $1\frac{1}{2}$ —3 feet high, with a closely-appressed bract at each joint, and terminating in a crowded raceme of purplish mauve flowers, on slightly twisted pale mauve pedicels sheathed by a subulate-lanceolate bract; sepals and petals similar, ovate-oblong, acuminate; lip deeper in colour than the other segments, three-lobed, the basal lobes oblong, sub-falcate, the intermediate lobe transversely roundish oblong, emarginate; spur slender, as long as the ovary, furrowed on one side, bifid at the tip; crest reddish brown, three-lobed. Column very short.

Calanthe Masuca, Lindl. Gen. et Sp. Orch. p. 249 (1832). Fol. Orch. Cal. No. 17 (1854). *Bot. Reg.* 1844, t. 37. *Bot. Mag.* t. 4541. *C. emarginata*, Wight, Ic. pl. Ind. or. t. 918. *Eletia Masuca*, Don. Prod. Fl. nep. 30.

Native of the lower Himalayan ranges of Nepal and Sikkim, also of the Neilgherries in the extreme south of India and in the Ambagamowa district in Ceylon, at 2,000—2,500 feet elevation. It was introduced by Messrs. Rollisson, in whose nursery at Tooting it flowered for the first time in this country in 1842.

C. natalensis.

“Leaves elliptic-lanceolate acuminate, 8—12 inches long and 3—5 inches broad, narrowed into a concave petiole. Scapes longer than the leaves, terminating in a pyramidal raceme, 6—8 inches long. Flowers $1-1\frac{1}{2}$ inches in diameter, pale lilac with a darker, redder lip, or with the sepals and petals white suffused with lilac towards the margin only; sepals ovate-lanceolate, acuminate; petals rather shorter and broader; lip three-lobed, the lateral lobes small, oblong, obtuse and curved; mid-

lobe broadly obcordate; disk with a cluster of prominent tubercles at the base and a few smaller ones along the medium line towards the notch at the end; spur slender, incurved, as long as the ovary. Column very short."—*Botanical Magazine*.

Calanthe natalensis, Rehb. in Bonpl. 1856, p. 322. N. E. Brown in Gard. Chron. XXIV. (1855), pp. 78, 136. *Bot. Mag.* t. 6844. *C. sylvatica natalensis*, Rehb. in Linnæa, XIX. p. 374. *C. sylvatica*, Hemsley in Gard. Chron. XIX. (1883), p. 636.

A handsome species with the habit of the well-known *Calanthe veratrifolia*, recently introduced to the Royal Gardens at Kew from King William's Town, in South Africa, near which it grows in "marshy places in woods and forests"; it was, however, known to science many years previously. By some botanists *C. natalensis* is regarded as a geographical form only of a species widely distributed over a broad region of the eastern hemisphere, stretching in an oblique direction from Cape Colony to Japan, and of which *C. sylvatica*, a native of Mauritius and Bourbon, is the type. We prefer, however, following Sir J. D. Hooker and Mr. N. E. Brown in accepting it as a distinct species, especially as the typical *C. sylvatica* is not believed to be in cultivation at the present time. *C. natalensis* is the only known *Calanthe* inhabiting South Africa.

C. pleiochroma.

Leaves oblong-lanceolate, acuminate, plaited, 12—18 inches long. Scapes erect, 18—24 inches high, with a pale sheathing bract at each joint, and terminating in a loose, many-flowered, pyramidal raceme. Flowers $1\frac{1}{2}$ inches in diameter, pale mauve suffused with white; sepals and petals elliptic-oblong, acuminate; lip shorter than the other segments, three-lobed, the side lobes oblong, the intermediate lobe broadly obcordate, emarginate with a violet spot in front of the orange-red calli.

Calanthe pleiochroma, Rehb. in Gard. Chron. 1871, p. 938.

Introduced by us from Japan, and flowered for the first time in our Chelsea nursery in May, 1871. Its nearest affinities are *Calanthe versicolor* and *C. natalensis*, and like them it may hereafter be reduced to varietal rank as a geographical form of *C. sylvatica*.

C. rosea.

Pseudo-bulbs sub-conical, elongated, angulate, 4—5 inches long, with a transverse depression or neck about mid-way between the base and apex, and sheathed at the base by large acuminate scales. Leaves broadly lanceolate, prominently nerved. Scapes about a foot high, pubescent, 7—12 or more flowered. Flowers about 2 inches across vertically, light rose suffused with white, and with a deeper stain on the inner side of the convolute lobes of the lip; sepals and petals lanceolate, acute, with a depressed

median line; lip convolute at the base into a short tube; blade oblong, retuse at apex; spur whitish, shorter than the stalked ovary, at the base of which is a lanceolate acuminate bract.

Calanthe rosea, Benth. in Jour. Linn. Soc. XVIII. p. 309 (1881). *Limatodes rosea*, Lindl. in Paxt. *Fl. Gard.* III. t. 81 (1852). *Fol. Orch.* *Limatodis*, No. 2 (1854). *Bot. Mag.* t. 5312. Van Houtte's *Fl. des Serres*, XXII. t. 2294.

First detected by Thomas Lobb in Moulmein about the year 1850, and sent by him to our Exeter nursery, where it flowered for the first time in the following winter; it was rediscovered about ten years afterwards in the same province by the Rev. C. Parish, who sent plants to Messrs. Low and Co. It is better known in gardens under its original name of *Limatodes rosea* than that under which it is described above, and although a beautiful orchid, it is not now often seen on account of its being surpassed in the beauty of its flowering by *Calanthe Veitchii* × and other hybrids, in whose parentage it has participated, and which also have a more robust constitution. The propriety of reducing it to *Calanthe* is thus shown by Mr. Bentham:—“The facility with which *Limatodes rosea* can be made to hybridise with *Calanthe vestita* has been given as an instance of ready hybridisation between two distinct genera; but the fact appears to be that *Limatodes rosea* itself has all the characters of *Calanthe*, and is indeed a species very nearly allied in every respect to *Calanthe vestita*.”*

C. striata.

Stems formed of the sheaths enveloping the bases of the leaves, 2—6 inches high. Leaves elliptic-lanceolate, acute, 6—10 inches long, narrowed below into a long grooved petiole. Scapes stoutish, erect, 15—20 inches high, loosely racemose above, 10—15 flowered. Flowers 1½—2 inches in diameter; sepals and petals brownish red, striated, bordered and tipped with yellow, pale yellow at the very base, the dorsal sepal oval-oblong, the lateral two oblong-lanceolate; the petals narrow, linear-spathulate; lip three-lobed, bright yellow, the side lobes dolabriform or semi-ovate, the intermediate lobe orbiculate, emarginate, with three raised plates that are reduced to shallow keels in the middle, the outside two again enlarged in front of the cavity formed by the union of the lip with the column; spur incurved, half as long as the ovary. Column terete, short, pale yellow.

Calanthe striata, R. Br. in Bot. Reg. 1821, sub. t. 573. Lindl. *Gen. et Sp. Orch.* p. 251 (1832). *Fol. Orch. Cal.* No. 29. Franch. et Sav. *Enum. Pl. jap.* II. p. 24. *Bot. Mag.* t. 7026. *C. bicolor*, Lindl. *Sert. Orch.* sub. t. 9. (1838). *C. Sieboldii*, Regel's *Gartenfl.* 1869, t. 635. *Limodorum striatum*, Banks, Ic. *Kempff.* t. 3.

* Jour. of Linn. Soc. XVIII. p. 309.

This plant has been known to science since the beginning of the seventeenth century, through a drawing by Kæmpfer, the first European naturalist who visited Japan, which he did in the capacity of physician to the Dutch embassy to that country in 1690. It does not appear to have been in cultivation in European gardens till the middle of the present century, when it was sent to Dr. Lindley by a nurseryman of Ghent. Since then "it has been found by all collectors in the woods near the town of Nagasaki, and by some at Kanagawa." It is said to be a very variable species, the variation occurring in the lobing of the labellum, and in the colour of the flowers. We are indebted to the Royal Gardens at Kew for materials for description.

C. *Textorii*.

Leaves oblong-lanceolate, acute, plaited and petiolate as in *Calanthe veratrifolia*. Scapes robust, 24 or more inches high, pubescent with an acute sheathing bract at each joint and at the base of each pedicel. Flowers $1\frac{1}{2}$ inches across vertically, on white pedicels arranged in a corymbose raceme; sepals oval, apiculate with three longitudinal nerves, white; petals smaller, obovate with one nerve, white stained with pale mauve-purple, afterwards wholly white; lip four-lobed, the basal lobes linear-oblong, oblique, white, the apical lobes larger, oblong, stained with mauve-purple that becomes paler with age. Callus tubercled, at first brick-red, afterwards ochre-yellow.

Calanthe Textorii, Miquel. Prod. p. 156, ex. Franch. et Sav. Enum. Pl. jap. II. p. 26.

Introduced by us in 1877 from Japan through Mr. Charles Maries. There is so little to distinguish it from the widely distributed *Calanthe veratrifolia*, that it may hereafter be reduced to a variety of that species.

C. *tricarinata*.

Leaves broadly oval or oval-oblong, plicate, 5—6 inches long. Scapes erect, pubescent, as long as the leaves, loosely racemose along the distal half, few flowered. Flowers an inch in diameter; sepals oval-oblong, acute, whitish tinted with pale green and with some rose-pink stains; petals narrower, spatulate, acute, the basal half whitish, the apical dilated half stained with rose-pink; lip three-lobed, the side lobes large, spreading, hatchet-shaped with the outer margin toothed, rose-purple bordered with white; the front lobe much smaller, oblong with a deep notch in the anterior margin and three white keels on the disk, rose-

purple bordered with white; spur obsolete. Column white stained with rose.

Calanthe tricarinata, Lindl. Gen. et Sp. Orch. p. 252 (1832). Fol. Orch. Cal. No. 1 (1854). Franch. et Sav. Enum. Pl. jap. II. p. 26.

First discovered by Wallich in Nepal, in the early part of the present century, and many years afterwards by the Russian botanist, Maximowicz, in Japan,* from which country it was introduced by us in 1879, along with *Calanthe Textorii*. It is by no means an inattractive species, easily distinguished from every other cultivated *Calanthe* by the absence of the spur of the labellum.

C. veratrifolia.

A robust plant with spreading ovate or oblong-lanceolate strongly ribbed leaves, 18—24 inches long, that spring from a stoutish slowly creeping rhizome. Scapes erect with an acuminate bract at each joint and a smaller one at the base of each pedicel, and terminating above in a dense corymbose raceme of white flowers. Flowers 2 inches in diameter; sepals obovate-oblong with a small green apiculus; petals obovate-spathulate, apiculate; lip quadripartite, the basal lobes oblong, spreading, the anterior lobes usually broader, but sometimes equal to them, divergent; callus tubercled, yellow; spur slender, straight, half as long as the ovary.

Calanthe veratrifolia, R. Br. in Bot. Reg. 1821, sub. t. 573. *Id.* t. 720 (1823). Lindl. Fol. Orch. Cal. No. 25. Griffith, Ic. pl. Asiat. t. 283. *Bot. Mag.* t. 2615 Benth. Fl. Austr. VI. p. 305. Fitzgerald, *Austr. Orch.* I. part 4. *C. comosa*, Rehb. in Linnaea, XIX. p. 374, ex. Hemsley in Gard. Chron. XIX. (1883), p. 636. *C. Petri*, Rehb. in Gard. Chron. XIV. (1880), p. 326. *C. colorans*, Rehb. in Gard. Chron. XXIV. (1885), p. 360. Williams' *Orch. Alb. V.* t. 218. *C. australis*, Hort.

var.—macroloba.†

Flowers larger, with the basal lobes of the lip broader than in the common form.

C. veratrifolia macroloba, Rehb. in Gard. Chron. IX. (1878), p. 690.

var.—Regnieri.†

Flowers snow-white with a pale yellow lip, the basal lobes of which are nearly semi-lunate, and the calli simpler.

C. veratrifolia Regnieri, Rehb. in Gard. Chron. II. s. 3 (1887), p. 70.

Calanthe veratrifolia is the species upon which the genus was founded, and the first *Calanthe* that was introduced into British gardens. The earliest mention of it as a horticultural plant occurs in the *Botanical Register* for 1823, in which year it flowered in Mr. Colville's nursery at Chelsea, whither it is believed to have been sent by Allan Cunningham, from Sydney, along with *Dendrobium speciosum* and other Australian orchids. It is spread over an immense region in the far East,

* In grassy woods near Lake Conoma in the Island of Jesso.

† Not seen by us.

of which the limits are not very easily defined, but which extends from New South Wales to Japan in one direction, and from the Feejee Islands to Southern India in the other. Among the stations



Calanthe veratrifolia.

within this region in which it has been detected, Illawarra (N. S. Wales),* Rockingham Bay and Moreton Bay in Queensland, Amboyna, Java, Cochin China, Ceylon, and the Neilgherry Hills have

* In New South Wales it is usually found near the banks of streams growing in decayed vegetable matter of so loose a texture that the plants may be pulled from the soil without digging. —Gard. Chron. XX. (1883), p. 722.

been especially mentioned. Over so vast a range it is found to be remarkably constant, but some geographical forms have been recognised that deviate from the Australian type, although in very trivial characters that may be disregarded without inconvenience; the two varieties described above are the most recent that have been brought under notice. The specific name *veratrifolium* was given to this orchid from the resemblance of its foliage to that of *Veratrum nigrum*, a Liliaceous hardy plant, native of central Europe, and frequently seen in the herbaceous borders of old English gardens.

C. vestita.

Pseudo-bulbs sub-conical, bluntly angulate, $3\frac{1}{2}$ —5 inches long, pale greenish grey striated. Leaves appearing after the flowers, broadly lanceolate, acuminate, 18—24 or more inches long, narrowed below into a channelled and winged petiole and prominently ribbed beneath. Scapes sub-erect or nodding, 24—36 inches long, very hairy, racemose from near the base, many flowered; bracts large and conspicuous, ovate lanceolate acuminate, nearly as long as the stalked ovaries. Flowers 2—3 inches across vertically, milk-white with a yellow striated blotch on the lip immediately in front of the column; sepals and petals spreading, the former oval-oblong, apiculate, the latter obovate-oblong, obtuse; lip flat, three-lobed, the side lobes obliquely oblong, obtuse, the front lobe broadly obcordate with a deep cleft in the apical margin; spur slender, decurved, greenish.

Calanthe vestita, Wall. Lindl. Gen. et Sp. Orch. p. 250 (1832). Fol. Orch. Cal. No. 35. Bot. Mag. t. 4671. Van Houtte's *Fl. des Serres*, VIII. t. 816 (copied from Bot. Mag.) Warner's *Sel. Orch. I.* t. 29. *Cytheris Griffithii*, Wight, ic. pl. Ind. or. t. 1751. *Preptanthe vestita*, Rehb. in Bot. Zeit, 1853, p. 493.

sub-vars.—*gigantea* (Williams' *Orch. Alb. V.* t. 211. *Revue de l'hort Belge*, 1889, p. 121, *grandiflora*), plant and flowers larger in all their parts, the spot on the lip orange-red; *rubro-oculata* (Paxt. *Mag. Bot. XVI.* p. 129. Regel's *Gartenfl.* 1873, t. 751.), the blotch on the disk of the lip red-purple.

var.—Regnieri.

Pseudo-bulbs more elongated and with a transverse depression or neck a little above the middle. Scapes erect, the flowers smaller than in the type, with the lip less deeply lobed, which is rose colour, with a crimson-purple blotch at the base that is also spread over the claw and part of the column.

C. vestita Regnieri, supra. *C. Regnieri*, Rehb. in Gard. Chron. XIX. (1883). p. 274. *The Garden*, XXIV. (1883), t. 397.

sub-vars.—*Sander's*, rosy carmine, deeper in colour than *Calanthe Veitchii*; *Stevens'*, white with a small rose-coloured blotch on the disk of the lip; *Williams'* (*Orch. Alb. III.* t. 134), the petals

and lateral sepals pencilled with rose-carmine; the lip deep carmine with a crimson-purple blotch on the disk that is spread over the column.

var.—Turneri.

Pseudo-bulbs as in the variety *Regnieri* but somewhat smaller; scapes erect, the flowers like those of the sub-variety *rubro-oculata*, but appearing later in the season.

C. vestita Turneri, supra. *C. Turneri*, Hort.

sub.-var.—nivalis, flowers wholly white.

To that indefatigable and zealous Indian botanist Dr. Wallich, whose name appears so frequently in these pages, science is also indebted for the first discovery of this beautiful *Calanthe*, it having



Calanthe vestita rubro-oculata.

been detected by him at Tavoy in Tenasserim soon after the annexation of the province in 1826. Later it was gathered by Griffith at Mergui in the same province, but it was not till 1848 that it was introduced into European gardens, when Dr. Kane, of Exmouth, sent from Moulmein to our Exeter firm two of the forms described above, viz., that with the yellow spot on the lip, usually regarded as the type, and its sub-variety with the red-purple spot. Shortly afterwards these two forms and the variety *Turneri*, named in compliment to the late Mr. J. A. Turner, of Pendlebury, near Manchester, one of the most ardent orchid amateurs of that time, were sent to Exeter from the same locality by Thomas Lobb.

The variety *Regnieri* is a comparatively recent introduction from Cochin-China by M. Regnier, of Paris, whose first plants were offered for sale at Stevens' Rooms in the spring of 1883; it is found to be the most variable of all the *vestita* forms as regards the colour of the flowers. The specific name, *vestita*, "clothed," was suggested by the long shaggy hairs that clothe the flowering stems. The flowering season of *Calanthe vestita* and its varieties extends from the beginning of December to the end of February in the following order: first the type and its sub-varieties, then *Turneri*, and lastly *Regnieri*, but with the last two the order is sometimes inverted, and sometimes their flowering is contemporaneous.

HYBRID CALANTHES.

The crossing of *Calanthes* was among the earliest experiments in the hybridisation of orchids made by Dominy, who succeeded, in 1856, in flowering *Calanthe Domini*, which he had raised from *C. Masuca* × *C. furcata*, a species that has long since disappeared from cultivation. This was followed by *C. Veitchii*, raised by him from *C. rosea* × *C. vestita*, which flowered for the first time in 1859. It is a curious fact that notwithstanding the high estimation in which *C. Veitchii* has always been held by horticulturists as a winter-flowering orchid, a period of twenty years elapsed before another hybrid was added to the group to which it belongs, the next acquisition being *C. Sedenii*, raised by the indefatigable hybridist after whom it is named. By this time, however, muling among *Calanthes* of the VESTITE section was being undertaken by many amateur cultivators, notably by Sir Trevor Lawrence, Bart., Mr. Norman Cookson, Mr. Charles Winn and others, so that since the first flowering of *C. Sedenii* in 1878, hybrids and crosses have appeared in almost embarrassing profusion. Nor has the beauty of the seedlings and the interest attending the raising of them alone contributed to bring about these results; the comparatively short period in which the seedlings can be brought into flower, has afforded a stimulus to the same end. The capsule of *Calanthe* usually ripens in three to four months, and the seed takes from two to three months more to germinate; the seedlings, under favourable circumstances, will flower in the third or fourth year, one of the shortest periods known in the experience of orchid hybridisation.

As a natural consequence of the raising of numerous hybrids by different operators from so limited a number of species as are available in the VESTITÆ section, progenies from crossing two of these species, or one of them with one of the varieties of *Calanthe vestita* have been obtained by more than one operator, each of whom has named his own productions independently of the others, and hence the same, or nearly the same form is cultivated under different names. Till all the forms so named can be brought together and compared, and their differences or identity can be shown, we adhere to the course mainly followed in this work, of recognising one name only for seedlings raised from the same cross, adopting the name first published in the horticultural press. Slight differences in colour may always be expected, even among the same progeny, and especially when one of the parents is itself a hybrid; in such cases distinctive vernacular names are often applied for garden use at the pleasure of the raiser, but such names can, of course, have no place in scientific nomenclature.

VESTITÆ HYBRIDS.

Calanthe Aurora.

C. vestita *Regnieri* × *C. rosea*.

Flowers nearly as in *C. vestita* *Regnieri*, bright rose, the sepals and petals paler towards their base, the tube of the lip dark carmine.

Calanthe *Aurora*, supra.

Raised by Mr. Charles Winn, of Selly Hill, Birmingham.

C. Barberiana.

C. vestita *Turneri nivalis* × *C. vestita*.

Pseudo-bulbs intermediate between those of the two parents, slightly constricted at about one-third of their length from the apex. Flower pure white with a small yellow stain on the lip.

Calanthe *Barberiana*, Rehb. in Gard. Chron. XV. (1881), p. 136.

Raised by Mr. J. T. Barber, of Spondon, Derby. Very near this is *Calanthe casta* ×, of the Burford Lodge collection.

C. bella.

C. vestita *Turneri* × *C. Veitchii*.

Flowers as large as the best *Veitchii* forms; sepals and petals delicate light rose suffused with white, the rose colour more developed in some places than in others; lip similarly coloured and with a rose-carmine spot at the base.

Calanthe *bella*, Rehb. in Gard. Chron. XV. (1881), p. 234.

Raised by Seden at our nursery.

C. Hallii.*C. vestita* × *C. Veitchii*.

Flowers white with the exception of the tips of the lateral sepals which are pale green and a light cream-yellow stain on the disk of the lip. The two front lobes of the lip are small and distinct from those in either parent.

Calanthe Hallii, Hort. Hall.

Cultivated in the collection of the late Mr. Hall, of Upper Tulse Hill, Camberwell.

C. lentiginosa.*C. labrosa* × *C. Veitchii*.

Flowers intermediate in size between those of the two parents; in form nearly like *Calanthe labrosa*, especially the lip, the claw of which is adnate to the column, forming with it a wide-mouthed funnel, the



Calanthe lentiginosa carminata.

blade obscurely four-lobed with crisped margin, convolute over the column at the base; in colour white with a faint flush of pale rose at the base of all the segments, the base of the lip spotted with bright rose.

Calanthe lentiginosa, Rehb. in Gard. Chron. XIX. (1883), p. 44.

sub.-vars.—*rosea*, light rose with deeper spots on the lip; *carminata*, rose-carmine, the side lobes of the lip toned with scarlet.

Raised by Seden at our nursery. The sub-variety *carminata* is the richest coloured hybrid *Calanthe* yet obtained.

C. porphyrea.*C. labrosa* × *C. vestita rubro-oculata*.

Flowers more nearly in form like those of the seed than of the pollen parent, with the lip more open, sub-orbicular, three-lobed; spur

broad, whitish; sepals and petals carmine-purple, the lip paler, white at the base, spotted with carmine-purple.

Calanthe porphyrea, Rehb. in Gard. Chron. XXI. (1884), p. 76.

Raised in the collection of Sir Trevor Lawrence, Bart. at Burford Lodge. It is one of the handsomest of hybrid *Calanthes*, easily distinguished from the preceding by its differently formed and differently coloured labellum.

C. Sandhurstiana

C. rosea × *C. vestita rubro-oculata*.

Flowers as in *Calanthe Veitchii* as regards form; deep rose-carmine, the sepals somewhat paler than the petals and the lip with a deeper spot at the base.

Calanthe Sandhurstiana, Goss. and Rehb. in Gard. Chron. XV. (1881), p. 391. *C. burfordensis*, Hort. Lawr. and probably *C. sanguinaria*, Rehb. in Gard. Chron. XXV. (1886), p. 331.

Raised by the late Mr. P. H. Goss, of Sandhurst, Torquay. One of the best coloured of the *Calanthe Veitchii* group of hybrids. It differs but little from the following except in colour, but being derived from a different parentage we keep it distinct. A variety with paler flowers is in cultivation at Burford Lodge under the name of *C. amabilis*.

C. Sedenii.

C. Veitchii × *C. vestita rubro-oculata*.

Flowers nearly as in *Calanthe Veitchii*, but of a deeper colour, clear rose-carmine with a deeper blotch surrounded with white at the base of the lip.

Calanthe Sedenii, Rehb. in Gard. Chron. IX. (1878), p. 168. *C. Alexandri*, Hort. Cookson.

Raised by Seden at our nursery, where it flowered for the first time in 1878, and subsequently obtained from the same cross by Mr. Norman C. Cookson, of Wylam-on-Tyne. One of the best of the rose-coloured *Calanthes*.

C. Veitchii.

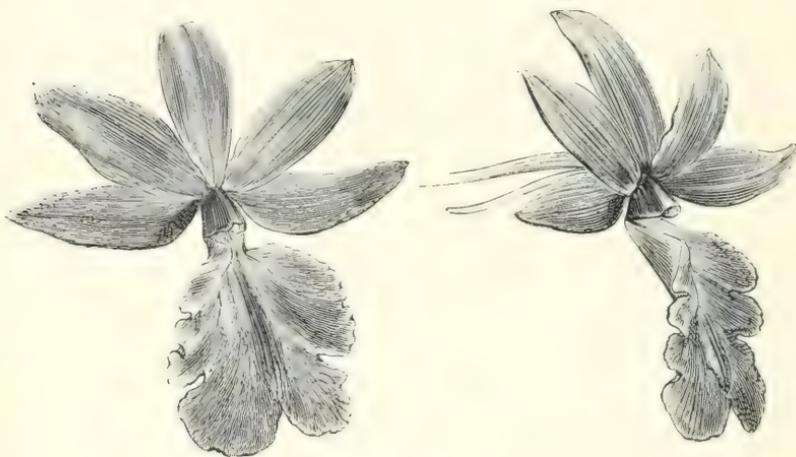
C. rosea × *C. vestita*.

Pseudo-bulbs 7—9 inches long, elongated as in *Calanthe rosea*, but much more robust, with a depression or neck at about one-third of their length from the base. Flowers nearer those of *C. rosea* but with a four-lobed lip as in *C. vestita* less deeply cleft, bright rose with a white spot at the base of the lip, the basal lobes of which are rolled inwards towards the column, and not adnate to it.

Calanthe Veitchii, Lindl. in Gard. Chron. 1859, p. 1016. *Bot. Mag.* t. 5375. Regel's *Gartenjl.* 1873, t. 751. *Fl. Mag.* t. 280. Jennings' *Orch.* t. 48. Williams' *Orch. Alb. I.* t. 31.

sub.-vars.—*alba*, flowers wholly white; *versicolor*, flowers variable, some rose, some white, others with one or more of the segments rose, and the remainder white.

Raised by Dominy at our Exeter nursery in 1856, the first hybrid of the VESTITE section obtained, and one of the most useful and popular of winter-flowering *Calanthes*; it is the type of a group of hybrids in all of which *Calanthe rosea* has participated in the parentage, either directly or mediately through *C. Veitchii*. The white form was also originally raised by Dominy, unknown to himself at



Calanthe Veitchii.

the time, at our Exeter nursery, whence it was sold to Mr. Wentworth Buller, of Strete Raleigh, Devonshire, for the typical form; at the dispersion of Mr. Buller's collection, it passed into the hands of the late Mr. John Day. The white form has since been raised by Mr. J. T. Barber, Mr. Norman C. Cookson (*C. Cooksonii*), and by Sir Charles Strickland, Bart.*

VERATRIFOLÆ HYBRIDS.

Calanthe Dominii.

C. Masuca × *C. furcata*.

A robust plant with the habit of *Calanthe Masuca*. Flower stems nearly as in *C. Masuca*, and terminating in a large corymbose, many-flowered raceme. Flowers 2 inches in diameter, intermediate between those of the two parents, light mauve-purple suffused with white, the lip deeper in colour than the other segments and with a yellow three-toothed callus at its base.

Calanthe Dominii, Lindl. in Gard. Chron. 1858, p. 4. *Bot. Mag.* t. 5042.

* Gard. Chron. VII. s. 3 (1890), p. 132.

This *Calanthe*, the only hybrid in the *VERATRIFOLLE* section known to us, will always be regarded with interest as being the first hybrid orchid that flowered, although not the first seedling raised by hand. It flowered for the first time at Exeter, in October, 1856, and was in due course submitted to Dr. Lindley for examination and naming. He accordingly named it after our then foreman, Mr. Dominy, "in order to put upon permanent record the name of the first man who succeeded in the operation of hybridising orchids."*

ARUNDINA.

Blume, Bijdr. p. 401 (1825). Benth. et Hook. Gen. Plant. III. p. 521 (1833).

Arundina includes about six species that are spread over eastern Asia from southern China to the Malay Archipelago, and also over parts of India and Ceylon. It is most nearly allied to *Calanthe*, from which the spurless labellum that enfolds the column at its base, and the reed-like leafy stems chiefly distinguish it. The most obvious characters of the genus will be readily understood from the description of *A. bambusæfolia* given below, which has large handsome flowers, and is occasionally met with in orchid collections. Another showy species, *A. densa*, sent from Singapore by Cuming, to Messrs. Loddiges, in whose nursery at Hackney it flowered in 1842, seems to have been long since lost to cultivation; and a third, *A. speciosa*, the species upon which the genus was founded, said to be very handsome, has not yet been introduced; the other species known to science have smaller and less showy flowers.

The generic name *Arundina*, "reed-like," refers to the slender reed-like stems, common to all the known species.

Arundina bambusæfolia.

A terrestrial plant. Stems terete, erect, as thick as an ordinary writing pencil, 2—4 feet high, pale green and leafy above. Leaves linear-lanceolate, acuminate, 9—12 inches long, gradually smaller upwards, the upper ones reduced to sheathing bracts. Peduncles terminal, short and few flowered. Flowers 2—2½ inches across; sepals and petals rosy lilac, the former narrowly lanceolate, the latter ovate-oblong, acute; lip broadly oval-oblong, obscurely three-lobed, the side lobes coloured like the sepals and petals, convolute over the column, recurved in front where they are of a deeper colour; the intermediate lobe open, bipartite, deep purple; disk white, fleshy, with two undulated lamellæ that are prolonged to

* Gard. Chron. 1858, p. 4.

the base of the lip, and a third shallower and shorter one between them. Column slender, clavate, narrowly winged on each side of the stigmatic cavity, pale purple. Anther two-celled; pollinia eight, four in each cell, disk-like, compressed, pale yellow.

Arundina bambuseifolia, Lindl. Gen. et Sp. Orch. p. 125 (1831). Bot. Reg. 1841, misc. No. 5. Wight, Ic. pl. Ind. or. V. t. 1661. Williams' *Orch. Alb.* III. t. 139.

This pretty orchid first became known in the early part of the present century through Dr. Roxburgh, Superintendent of the Botanic Garden at Calcutta; it was subsequently noted by Wallich, Griffith and other Indian botanists. It is a native of N. E. Bengal, Assam, and north Burmah, and was first introduced into British gardens by Messrs. Loddiges, in whose nursery it flowered for the first time in 1841.

Cultural Note.—A compost of fibrous peat and loam, such as is used for terrestrial orchids with slender stems, the *Sobralias* for example, is the most suitable. The drainage of the pots should be ample, and water freely supplied during the growing season. A light position in the East India house should be given to the species described above.

SUB-TRIBE LÆLIEÆ.

*Inflorescence nearly always terminal. Pollinia in one or two series of 4 each, those of each series lying side by side, ovate, laterally compressed, and connected by a pollinary appendage in the form of two linear lamina often uniting into one, and ascending from the base of the lower or single series along their outer edge; the upper series, when present, descending from the upper end of the lamina, and often smaller than the lower series.**

DIACRIUM.

Benth. in Jour. Linn. Soc. XVIII. p. 312 (1831). Benth. et Hook. Gen. Plant. III. p. 526 (1833).

The three or four species, or marked varieties of one species, now referred to *Diacrium*, were made sectional by Lindley under *Epidendrum*, but "the peculiar bi-cornute labellum which is neither adnate

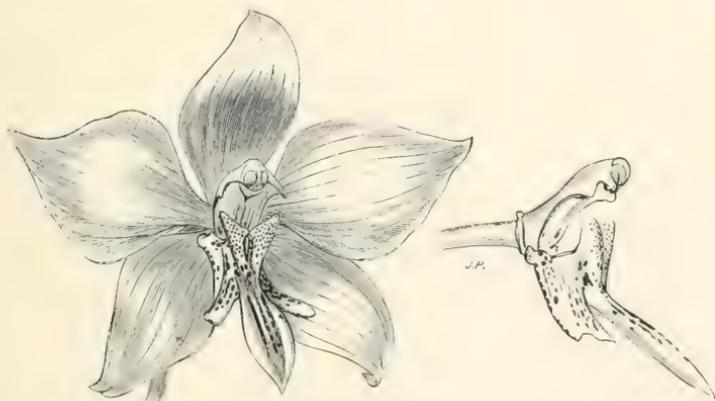
* Bentham in Jour. Linn. Soc. XVIII. p. 311.

to, nor parallel with the column, gives the flower a very different aspect from that of the true species of *Epidendrum*, and cannot be included in them without doing violence to the generic character.”* They are natives of the West India Islands and Central America, of which one only, the typical species described below, is generally cultivated in the orchid collections of Great Britain. A second form, under the name of *Epidendrum bigibberosum*, was cultivated many years ago by Consul Schiller, of Hamburg, and has within the last few years been introduced into British collections from the valley of the Magdalena, where it occurs in the damp jungle that lines the river-side; it is simply a miniature form of the type as regards its flowers.

The name *Diacrium* is obscure; it is probably derived from *διάκρισις* (*diakrisis*), “a separation,” presumably referring to the separation of the lip from the column.

Diacrium bicornutum.

Stems fusiform or sub-cylindric, 6—9 or more inches high, sheathed by the scarious bases of the fallen leaves. Leaves usually three or four from the summit of the stems, oblong-lanceolate, 6—9 inches long,



Diacrium bicornutum.

acute or emarginate, very leathery. Peduncles terminal, a foot long, sheathed at each joint by a membraneous, acute bract, and bearing at its extremity a short raceme of 3—5 or more fragrant flowers.† Flowers 2—2½ inches in diameter; sepals and petals spreading and slightly con-

* Bentham in Jour. Linn. Soc. XVIII. p. 312. A glance at the figure of the column and lip given in the text will at once confirm the justice of this remark.

† In exceptionally rare instances, 12—20 flowers. Gard. Chron. III. s. 3 (1888), p. 746.

cave, pure white, the sepals oval-oblong, the petals broadly oval, acute; lip smaller than the other segments, sessile and at a right angle to the column, white, dotted with purple, three-lobed, the side lobes oblong, oblique, the middle lobe lanceolate, acute; crest fleshy, two-lobed, the lobes horn-like, erect, yellowish. Column broad, semi-terete above, winged, white with some purple spots and markings at the base on the inner side.

Diaerium bicornutum, Benth. in Jour. Linn. Soc. XVIII. p. 312 (1881). Rolfe in Gard. Chron. II. s. 3 (1887), p. 44, icon. xyl. *Epidendrum bicornutum*, Hook. Bot. Mag. t. 3332 (1834). Paxt. Mag. Bot. V. p. 245 (1838). Schomb. Fl. Brit. Guiana, III. p. 907. Lindl. Fol. Orch. Ep. No. 82. Jennings' Orch. t. 21. Williams' Orch. Alb. IV. t. 157.

First introduced by Messrs. Shepherd, of Liverpool, in 1833, from Trinidad, where it is found growing on rocks or small islets so close to the sea that they must often be bathed by salt spray; it flowered for the first time in this country in the collection of Earl Fitzwilliam, at Wentworth, near Rotherham, in April of the following year, which is its normal season of flowering in the glass houses of Europe. Some years later it was detected by Sir Robert Schomburgk in Demerara, where it grows on the trunks of trees on the banks of the river; the flowers of the Demerara plant are said to differ from the Trinidad type, in having the petals spotted with purple like the lip. It has also been gathered in Tobago and other West India islands.

Cultural Note.—This orchid has frequently proved disappointing, a circumstance partly due, we have no doubt, to the difficulty of importing it in sound condition. Its hollow stems are inhabited by small ants, which find ingress through a cleft at the base that invariably occurs in the new growths under cultivation, and probably also in a wild state; they are prone to decay from within, and frequently crack during transmission, and in however small a degree they may be so affected, the plants never get well established in the glass houses of this country, and die in the course of two or three years after importation. With thoroughly sound plants the case is more hopeful; teak baskets are usually preferred, and as they require but a very small quantity of compost, a good drainage can always be secured. The compost should consist of the usual proportions of sphagnum and fibrous peat, with which many cultivators mix some pieces of charcoal. The habitat of the species indicates a high temperature and moist atmosphere, and these conditions are therefore necessary, especially while the plant is growing.

EPIDENDRUM.

Linn. Gen. p. 272, No. 688 (1737). Id. ed. VI. p. 464, No. 1016 (1764). Lindl. Fol. Orch. (1853). Benth. et Hook. Gen. Plant. III. p. 529 (1883).

The "father of modern botany," Linnæus, referred all the tropical epiphytal orchids which he knew and which were about thirty in all, to *Epidendrum*; but these consisted of species that had been brought from India and Africa as well as from South America and Mexico, and therefore included forms that differed widely from each other. This simple classification soon failed to meet the requirements of science, so that even before the eighteenth century closed, his countryman, Oloff Swartz, began to lay the foundation of a more scientific classification of the tropical Orchideæ by separating from *Epidendrum cochleatum*, *E. ciliare* and *E. nocturnum*, which he retained under *Epidendrum*, the most divergent of the other Linnæan species, and founding new genera upon them; and as additions were constantly being made to the Orchideæ by the discovery of new species, the process was continued by succeeding botanists, notably by our own distinguished countrymen Dr. Robert Brown and Dr. John Lindley, especially the last named, during whose life-long labours a large number of new genera were established, and most of the older ones became tolerably well circumscribed, including the Linnæan *Epidendrum*, but which even in Lindley's time had become the most extensive genus in the Order. As elaborated in the *Folia Orchidacea* published in 1853, *Epidendrum* then included over three hundred species, but since that time numerous additions have been made, so that upwards of four hundred species good and bad are now known to science. A genus so extensive and varied must necessarily present much that is perplexing both to the scientist and to the horticulturist; hence to meet the exigences of a progressive science like botany it is not surprising that an occasional revision should be called for, whence it happens that species previously included have to be removed, and others formerly regarded as generically distinct have to be added. Some such changes have been found necessary in the case of *Epidendrum*,* and have therefore resulted in corresponding changes in nomenclature. As instances of separation we may cite *E. bicornutum* (Hook.) and its near ally and perhaps variety *E. bigibberosum* (Rehb.) The first named

* This genus has been twice revised since the publication of Lindley's *Folia Orchidacea* in 1853, first by Reichenbach, in Walper's *Annales Botanices*, 1861—5, and secondly by Bentham, in the *Genera Plantarum*, 1883. We have followed the last-named revision.

and two other allied forms were made sectional by Lindley, but are now raised to generic rank by Bentham under the name of *Diacrium*, the best known or type being that described in page 79. Instances of addition occur in the *Barkerias*, but they are made sectional. Reichenbach has indeed merged all the *Cattleyas* into *Epidendrum*, but in this he stands alone.*

Nearly one-half of the known species of *Epidendrum* have been introduced into gardens in the course of the past hundred years, but scarcely one-third of these or one-sixth of the whole are considered to be of any horticultural merit; the remainder consists chiefly of species with inconspicuous flowers, often of dingy colours and sometimes of such robust growth that they may be looked upon as being among the coarsest weeds of the orchid world; it should be noted, however, that the flowers of many of them are delightfully fragrant. The following diagnosis, abridged from the *Genera Plantarum*, includes all the most important floral characteristics of *Epidendrum*.

The *inflorescence* is terminal with few exceptions.

The *sepals* are free, equal and spreading, but sometimes reflexed.

The *petals* are similar and sub-equal, often a little narrower than the sepals.

The *lip* has an erect claw more or less adnate to the column, appressed to it only in a few species; the blade is spreading and usually deeply lobed.

The *column* is often narrow and semi-terete, sometimes with two small wings or auricles.

The *pollinia* are four, ovate or flattened, two in each anther cell, where they are separated by a septum or partition.

The *capsule* is ovoid or oblong with six prominent ribs, sometimes winged.

Nevertheless the essential character of *Epidendrum* and that by which a flower is most easily recognised as belonging to the genus, consists in the lip being appressed or more or less united to the column. With the vegetative organs of *Epidendrum* the case is not so simple, for throughout the genus, even as it now stands, there exist remarkable differences in habit, and it is upon these differences chiefly that the sectional divisions of the genus have been founded; the extent of the attachment of the lip to the column being also regarded as an important character for the same end. As the sectional divisions have a practical use in the operations of the cultivator, we here give the leading features of each as enunciated by Bentham.

* Walp. Ann. Bot. vol. VI. p. 311, et seq. and Xen. Orch. II. pp. 27—36.

I. BARKERIA. Stems either scarcely or at all thickened, or forming narrow spindle-shaped pseudo-bulbs, 2—4 (rarely more) leaved at the top. Lip shortly adnate to the base of the column.

This section includes the *Barkerias* of Knowles and Westcott, and *Epidendrum Skinneri*.

II. ENCYCLIUM. Stems usually more or less thickened into oval or elongated pear-shaped pseudo-bulbs that are 2—3 leaved at the top. Lip adnate to the base of column to less than half its length.

The species in this section are very numerous, and were classified by Lindley into three series, thus—(1) *Holochila*, labellum quite entire as in *Epidendrum Brassavola*, *E. vitellinum*, *E. prismatocarpum*, etc. (2) *Sarcochila*, labellum thickish and minutely toothed as in *E. glaucum*, *E. ochraceum*. (3) *Hymenochila*, labellum three-lobed, petal-like, as in *E. atropurpureum*, *E. nemorale*, *E. dichromum*, etc.

III. AULIZEUM. Stems more or less thickened into elongated spindle-shaped pseudo-bulbs, 1—2 (rarely 3) leaved at the top. Lip adnate to the column to the apex of the latter.

This includes two sub-sections—(1) *Schistochilæ*, labellum tri-partite, or more or less three-lobed, as in *E. ciliare*, *E. falcatum*. (2) *Holochila* (Benth.), *Osmophytum* (Lindl.), labellum quite entire as in *E. cochleatum*, *E. inversum*, etc.

IV. EUEPIDENDRUM. Stems cylindric, reed-like, 3—5 feet long, leafy; leaves distichous and alternate. Lip adnate to the column the whole of its length.

This is the largest of the sectional divisions, and includes most of the species with densely racemose and paniculate inflorescence. These have been arranged by Bentham into ten series, distinguished chiefly by the habit of the plant and the form of the inflorescence; the most important of these series, in a horticultural sense, are the third (*Nutantes*), including *E. cnemidophorum*, *E. Cooperianum*, and the sixth (*Amphiglottideæ*), including *E. cinnabarinum*, *E. euctum*, *E. radicans*, *E. xanthinum*, etc., etc.

V. PSILANTHEMUM. Stems leafy, thickened into spindle-shaped pseudo-bulbs. Inflorescence produced from the base of the stem, not terminal as in the other sections.

This section includes one very distinct species only—*E. Stamfordianum*.

Geographical distribution.—No genus of epiphytic orchids, *Dendrobium* perhaps excepted, is spread over an area so vast and continuous as *Epidendrum*. The species are scattered over well-nigh the whole of the South American Continent from the southern tropic to the isthmus; they are also abundant in Central America, the West India Islands, and Mexico. Three species, *Epidendrum cochleatum*, *E. tampense*, and *E. conopseum*, occur within the territories of the United States; the last named is frequent on evergreen trees near the coast from Louisiana to

Port Royal in South Carolina; it is therefore the most northern epiphytal orchid known in the western hemisphere. Of the four hundred described species that are spread over this great region, by far the greater number have been gathered in elevated localities, especially on the Andes from Bolivia northwards to the isthmus, and their continuation through Central America to the Mexican plateau, where and throughout the West Indies the Epidendra are among the commonest of orchids, in some places forming immense tufts that literally strangle the trees to which they attach themselves. So far as at present known they are less abundant within the Brazilian territories, but several are reported from the Organ Mountains and the Serras of Minas Geraes. Throughout the mountain districts they usually occur at a moderate elevation like the Cattleyas and Lælias, but there are some remarkable exceptions—thus it is said of *E. frigidum*, “a singular plant with stems a foot and a half high, densely covered with leaves and bearing racemes of small pale rose flowers, grows on wet rocks at but little distance from perpetual snow at the height of 13,000 feet, both on the Sierra Nevada of Merida in Venezuela and the volcano of Pasto in Peru.* While a great number of the species are restricted to localities of limited extent there are some as *E. ciliare*, *E. fragrans*, and *E. variegatum* that are distributed over an enormous area, and others again like *E. frigidum* mentioned above, which although not common have been gathered in localities widely remote from each other.

Cultural Note.—The greater number of the species described in the following pages have been introduced either from the mountain regions of South America, where they occur at elevations and live under climatic conditions similar to those of the New Granadian Cattleyas, or from the elevated plateau of Mexico and Guatemala, where they are found under nearly the same conditions as *Lælia anceps* and its immediate allies *L. autumnalis*, *L. rubescens*, &c. The cultural treatment of the Epidendrams is thence easily deducible from a knowledge of their habitat, or more comprehensively from their sectional classification, thus—those species included in the AULIZEUM and EUEPIDENDRUM sections, and which have cylindrical or fusiform stems† may be associated for cultural purposes with the Cattleyas of the *labiata* group, that is to say, they should receive the same cultural treatment as those Cattleyas; and those included in the ENCYCLIUM, and which have ovoid pseudo-bulbs, and all the Barkerias may

* Lindley, Fol. Orch. Ep. No. 286.

† *Epidendrum cnemidophorum* and *E. Stamfordianum*, although having fusiform stems, being natives of the mountains of Guatemala should be grown with the Mexican Lælias.

be cultivated in the same house and under the same conditions as the Mexican *Lælias*. No cultivator need be under any apprehensions of failure from adopting the sectional divisions as a basis for cultural purposes as here suggested; the classification of the *Epidendra* sketched above is so simple that no one of ordinary intelligence would scarcely fail to assign to any species brought before him, its correct sectional place. As we have given the cultural treatment of the *Cattleyas* and *Lælias* in detail under their respective headings, those details need not be repeated here.

Epidendrum alatum.

ENCYCLIUM. Pseudo-bulbs pyriform, 3—4 inches long, di-triphyllous. Leaves lorate, leathery, 12—15 inches long. Peduncles erect, purplish, longer than the leaves, paniculate, many flowered. Flowers fragrant, 2 inches in diameter; sepals and petals similar, linear-spathulate with revolute margin, the basal half pale greenish yellow, the distal half brownish purple; the side lobes of the lip sub-quadrate, erect, pale yellow with a few red streaks at the base; the middle lobe broadly deltoid, undulate, light yellow bordered with orange and traversed longitudinally by several lines of minute purple hairs.

Epidendrum alatum. Batem *Orch. Mex. et Guat. t.* 18 (1839—43). Lindl. *Fol. Orch. Ep. No.* 53. *E. calochilum*, *Bot. Mag.* t. 3898. *E. longipetalum*, Lindl. in Paxt. *Fl. Gard. I.* t. 30 (1850). *E. formosum*, Klotzsch, *Allg. Gart. Zeit.* 1853, p. 201.

Discovered by Mr. G. Ure Skinner in 1837, in Honduras, growing in company with *Epidendrum Stamfordianum*; afterwards detected by Hartweg, in Guatemala. It has since been frequently imported with other Central American orchids.

E. arachnoglossum.

EUEPIDENDRUM. Stems cylindric, 3—5 feet high, leafy above. Leaves sessile, ovate-oblong, obtuse, 3—4 inches long. Peduncles almost entirely invested with closely adherent scarious bracts and terminating in a dense many-flowered nodding raceme. Flowers on greenish crimson pedicels an inch long, rich magenta-crimson, except the orange-yellow fleshy disk of the lip; sepals and petals similar, elliptic-oblong; the petals with toothed margin, the sepals entire; lip three-lobed, each lobe spreading and fimbriated, the middle one with a deep cleft in the anterior margin. Crest consisting of four bright orange central teeth, with a smaller white one on each side and a broad denticulate plate in front.

Epidendrum arachnoglossum, Rehb. ex. André in *Revue Hort.* 1882, p. 554.

Discovered by M. Edouard André, in 1876, on the volcano of Puracé, in southern New Granada, at an elevation of 6,000 feet, in limited numbers, growing upon trees in company with *Epidendrum paniculatum*. M. André was also the introducer of the plant, and the first to flower it in Europe. Owing to the slow elongation of the

rachis after the lowermost flowers have expanded, the raceme continues in bloom four or five months.* A variety called *candidum*, differing nothing from the species except in the flower being dull white instead of magenta-crimson, is described in the *Gardeners' Chronicle*, XXV. (1886), p. 362. The specific name, literally "spider's-tongue," refers to the form of the labellum.

E. aromaticum.

ENCYCLIUM. Pseudo-bulbs sub-globose, smooth, pea-green, 2—3 inches in diameter, di-triphyllous. Leaves linear, rigid, 9—12 inches long. Scape 2—3 times as long as the leaves, much branched. Flowers numerous, fragrant, about an inch in diameter; sepals and petals oblong-lanceolate, pale primrose-yellow; lip three-lobed, the side lobes oblong, oblique, appressed to the column except at their apex, the middle lobe rotund, whitish streaked with red.

Epidendrum aromaticum, Batem. *Orch. Mex. et Guat.* t. 10. (1843). Lindl. *Fol. Orch. Ep.* No. 55. Saunders, *Ref. Bot.* II. t. 89. *E. incumbens*, Lindl. in *Bot. Reg.* 1840, misc. No. 84.

Native of Guatemala, whence it was sent to Mr. Bateman by Mr. G. Ure Skinner, in 1835. Its pleasant fragrance is its chief recommendation. The colour of the sepals and petals varies in different plants from dull olive-green shaded with brown to pale primrose-yellow.

E. atropurpureum.

ENCYCLIUM. Pseudo-bulbs ovoid, 3—4 inches long, di-triphyllous. Leaves lanceolate or linear-oblong, 12—15 inches long, often dull greenish purple. Peduncles stoutish, erect, half as long again as the leaves, and terminating in a 5—10 flowered raceme. Flowers among the largest in the genus, $2\frac{1}{2}$ inches in diameter; sepals and petals obovate-oblong with incurved tips, chocolate-brown in the centre, pale yellow-green at the base and apex; lip three-lobed, the lateral lobes oblong, erect with the tips turned away from the column, white streaked with pale purple; the middle lobe broadly obovate, undulate, white with a purple blotch near the base. Column triquetral, white; anther orange-yellow.

Epidendrum atropurpureum, Willdenow, *Sp. Pl.* IV. p. 115 (1805), ex. Rehb. in Bonplandia, 1854, p. 19. Williams' *Orch. Alb.* IV. t. 149. *E. macrochilum*, Hook. *Bot. Mag.* t. 3534 (1836). Lindl. *Fol. Orch. Ep.* No. 79. *The Garden*, XXXII. (1887), t. 619.

var.—Randinum.

Leaves of a deep purplish hue, longer and narrower than in the type. Flowers somewhat larger with broader sepals and petals that are scarcely undulated, these organs are russet-brown bordered with light yellow-green; side lobes of lip broader, more rotund and more

* As in *Epidendrum cinnabarinum*, *E. erectum*, *E. elongatum*, *E. xanthinum* and other species in sub-section *Amphiglottidæ*.

spreading, the intermediate lobe white with a red-purple rayed blotch on the disk.

E. atropurpureum Randonium, L. Linden et Rodegas in *Lindenia*, II. t. 1. *E. Randonium*, B. de Rodr. *vide* Linden and Rodegas.

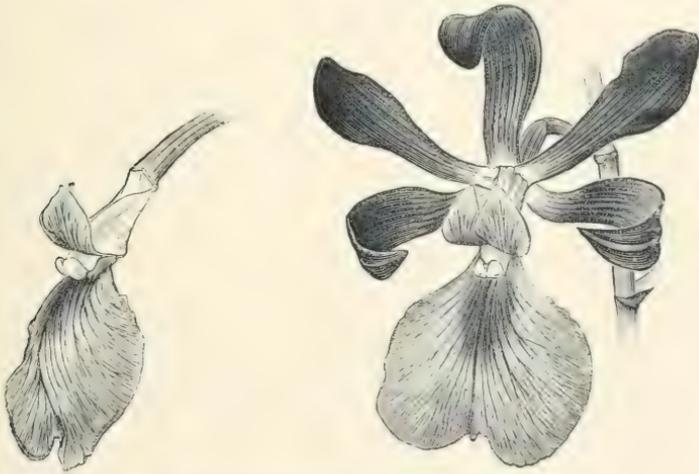
var.—roseum.

Flowers smaller than in the white-lipped form; sepals and petals deep purplish brown; lip rose colour with a purple blotch near the base.

E. atropurpureum roseum, Rehb. in Linden's *Pesc.* t. 27. *Illus. hort.* 1868, t. 541. *E. macrochilum* roseum, Batem. *Orch. Mex. et Guat.* t. 17. *Paxt. Mag. Bot.* XI. p. 243. Van Houtte *Fl. des Serres*, IV. t. 372 (copied from Paxton).

sub.-var.—*roseo-purpureum*, sepals and petals deep chocolate-brown, the whole of the lip magenta-purple.

This species is better known in British gardens under the name of *Epidendrum macrochilum* than under that we have described it above, but which we have adopted on the authority of Reichenbach, who quotes in *Bonplandia*, 1854, p. 19, Willdenow's description of an herbarium specimen gathered by Humboldt and Bonpland between Santa Barbara and Puerto Cabello, in Venezuela, in the



Epidendrum atropurpureum, var. *roseum*.

beginning of the present century, and which was published many years prior to the appearance of Sir William Hooker's *E. macrochilum* in the *Botanical Magazine*.

Epidendrum atropurpureum has a wide range in Central and South America; it was first detected by the travellers Humboldt and Bonpland as stated above; many years afterwards it was gathered

by Wagener and Purdie near Caracas, and by Mr. G. Ure Skinner in Guatemala, growing in company with the beautiful *Cattleya* that bears his name; it has also been received from Mexico, Panama, and New Granada, and quite recently the very distinct variety described above under the name of *Randianum*, which was first discovered at Teffé, on the south bank of the Amazon, 1,500 miles above Pará, has since been brought from Itaituba, near the Tapejos Falls, upwards of 1,000 miles distant from Teffé.* *E. atropurpureum* was first introduced by Mr. Horsfall, of Liverpool, in whose collection it flowered in 1836. The variety *roseum* was introduced by Mr. G. Ure Skinner from Guatemala, where the flower is known among the natives by the name of Boca del Dragon or "Dragon's Mouth." The variety *Randianum* was sent by Mr. E. S. Rand, of Pará, to the Compagnie Continentale d'horticulture de Bruxelles in 1885.

E. aurantiacum.

AULIZEUM. Stems clavate, attenuated below, 10—12 inches long, diphyllous. Leaves linear-oblong, acute, 4—6 inches long, very leathery. Peduncles issuing from a pale membranous spathe, shorter than the leaves, 6—12 flowered. Flowers $1\frac{1}{2}$ inches in diameter, orange-red; sepals and petals similar and sub-equal, lanceolate, acute; lip ovate, convolute over the column at the base, reflexed at the apex. Column pale greenish yellow.

Epidendrum aurantiacum, Batem. in Bot. Reg. 1838, misc. 11. Id. *Orch. Mex. et Guat.* t. 12 (1843). Lindl. *Fol. Orch. Ep.* No. 1 (1853). Regel's *Gartenfl.* (1856), t. 158. *E. aureum*, Lindl. *vide* Hemsley in Gard. Chron. XX. (1883), p. 42.

Introduced in 1835 by Mr. G. Ure Skinner, from Guatemala, where it is said to be plentiful in some localities, sometimes growing on exposed rocks where it is subject to great extremes of heat and cold. It was also detected by Karwinsky and other travellers in Mexico, growing on trees, especially on *Taxodium mexicanum*, as well as on bare exposed rocks. The plant has altogether the habit of a *Cattleya*, with which also it agrees in the lip being united to the base of the column only and not adnate to it. Except its smaller flowers it possesses scarcely any character to distinguish it from *Cattleya*.†

* E. S. Rand in lit.

† *Epidendrum aurantiacum* characteres potius *Cattleyæ* ostendit a qua vix nisi floribus minoribus distinguitur (*Benth. et Hook. Gen. Plant. III.* p. 529), especially *Cattleya Skinneri*, from which it can scarcely be distinguished when not in flower. It has been found growing with this *Cattleya* upon the stem of the same tree, and among one of our importations of *C. Skinneri* many years ago was a plant that bore strong traces of being a natural hybrid between that species and *E. aurantiacum*. See *Cattleya (Epicattleya) guatemalensis* ×, Part II. p. 86.

E. auritum.

ENCYCLIUM. Pseudo-bulbs placed at intervals of about an inch on a stoutish ascending rhizome, oval-oblong, compressed, $1\frac{1}{2}$ inches long, monophyllous. Leaves narrowly ligulate, 6 inches long. Peduncles from the axis of the young growths, as long as the leaves, sheathed at the base by imbricating green scales, 3—5 flowered. Flowers an inch in diameter with a rather strong apple fragrance; sepals and petals light yellow, keeled behind, the sepals lanceolate, acuminate, spreading, the petals much shorter, linear-oblong, erect, reflexed at the tip; lip linear-oblong, scarcely appressed to the column, not lobed, with a broad keel beneath that is dilated at the apex, of a deeper yellow than the other segments, and with a purple stain at the base. Column three-toothed at the apex, yellow with a purple marginal line round the stigma.

Epidendrum auritum, Lindl. Bot. Reg. 1843, misc. No. 4. Id. Fol. Orch. Ep. No. 13. *Dinema pubescens*, Lindl. Bot. Reg. 1840, misc. No. 112.

First sent to Mr. Bateman, in 1839, from Guatemala by Mr. G. Ure Skinner. It is a curious species, in which the flower scapes are produced from the axis of the young growths before the pseudo-bulbs are matured, and in which the lip is neither lobed nor adnate to the column but attached to its base only and scarcely appressed to it; in other respects it conforms to the sectional characters of ENCYCLIUM. For materials for description we are indebted to Mr. G. C. Raphael, of Castle Hill, Englefield Green, who recently received the plant from Mexico.

E. Barkeriola

BARKERIE. A diminutive plant. Stems 2—3 inches high, each furnished with about four linear-lanceolate, acute leaves. Peduncles slender, nodding, 3—5 flowered. Flowers $1\frac{1}{2}$ inches across vertically; sepals and petals similar and sub-equal, elliptic-lanceolate, acute, pale lilac suffused with white; lip oblong with the lateral margins depressed, white with an amethyst-purple transverse blotch near the anterior edge, and sometimes a second smaller one below it. Column greenish white spotted with purple.

Epidendrum Barkeriola, supra. *Barkeria Barkeriola*, Rehb. in Gard. Chron. XXII. (1884), p. 616.

Introduced by Messrs. Sander and Co. of St. Albans, in 1884. Native country not recorded. It is very near *Epidendrum (Barkeria) elegans*, of which it is probably an alpine form.

E. bicameratum.

ENCYCLIUM. Pseudo-bulbs elongated, ovoid or sub-conic, slightly compressed, $1\frac{1}{2}$ —2 inches long, usually pale pea-green, diphyllous. Leaves

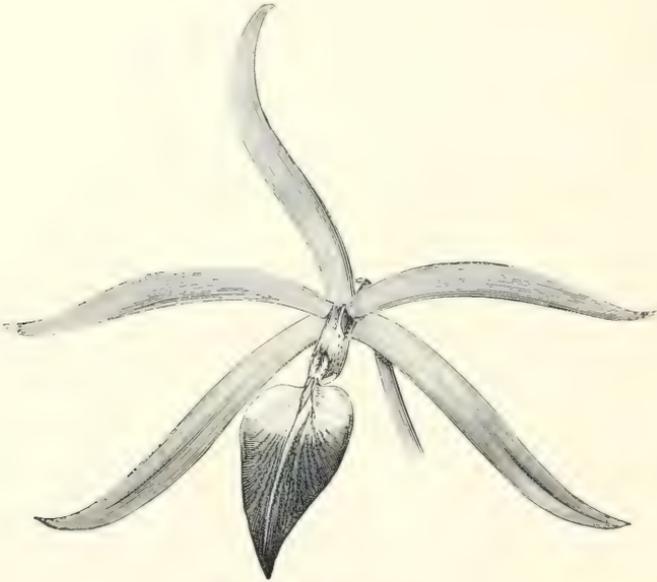
broadly linear, acute, 6 inches long, very leathery. Peduncles erect, 12—15 inches long, issuing from a compressed spathe, slender, glaucous, 15—20 flowered. Flowers about an inch in diameter, inverted; sepals and petals similar and equal, obovate-oblong, apiculate, deep sepia-brown bordered with orange-brown; lip white, three-lobed, the side lobes roundish oblong, incurved over the column, the intermediate lobe transversely oblong, reflexed with a three-ribbed oblong plate at the base, in front of which are three purple spots. Column short, triquetral, greenish.

Epidendrum bicameratum, Rehb. in Gard. Chron. 1871, p. 1194. E. Karwinskyi, Rehb. in Gard. Chron. 1869, p. 710, not in Bonpl. IV. p. 327. E. *squalidum*, Lindl. Fol. Orch. Ep. No. 20, not Llav. et Lex.

First discovered by Karwinsky more than half a century ago, in the neighbourhood of Oaxaca in Mexico, and subsequently gathered by Galeotti and other botanical explorers in Central America. It was introduced by us, in 1868, amongst an importation of *Epidendrum vitellinum*, and is still occasionally met with in collections.

E. Brassavolæ.

ENCYCLIUM. Pseudo-bulbs pyriform, elongate, compressed, 4—6 inches long, diphylous. Leaves spreading, oblong-lanceolate, emarginate, 6—9 inches



Epidendrum Brassavolæ.

long, Racemes issuing from a narrow compressed sheath, 3 inches long, erect, 1—2 feet long, dull crimson and green, 6—9 flowered. Flowers 3—4 inches in diameter; sepals and petals similar, linear-lanceolate,

acute, incurved, reflexed at the tip, nankeen-yellow, purplish behind; lip trowel-shaped, apiculate, with 1—3 longitudinal raised lines, pale yellow but sometimes white at the base, apical area purple. Column green spotted with purple, three-toothed at the apex.

Epidendrum Brassavolae, Rehb. in Bot. Zeit. 1852, p. 729. Lindl. Fol. Orch. Ep. No. 7 (1853). Bot. Mag. t. 5664. Batem. in Gard. Chron. 1867, p. 682.

A distinct species first discovered by Warscewicz, in Veragua, on the volcano of Chiriqui at 8,000 feet elevation, about the year 1848, and communicated by him to Professor Reichenbach, who described it in Mohl and Schlechtendal's *Botanische Zeitung* for 1852. It was subsequently found by Mr. G. Ure Skinner on the mountains of Guatemala, and sent by him to Mr. Bateman, in whose collection at Biddulph Grange, in Staffordshire, it flowered in 1867. It has since been frequently imported, and is found to be somewhat variable in the size and colour of the flowers.

E. ciliare.

AULIZEUM. Stems clavate, compressed, 4—6 inches long, diphyllous. Leaves oblong, leathery, 4—6 inches long. Peduncles as long as or longer than the leaves, 5—7 flowered, the pedicels sheathed by large compressed greenish bracts; sepals and petals linear acuminate, 2 inches long, pale yellow-green; lip shorter than the other segments, white, tripartite, the lateral lobes deeply fimbriate, the middle lobe filiform. Column white.

Epidendrum ciliare, L. Sp. Plant. ed. II. p. 1349 (1764). Bot. Reg. t. 784 (1824). Bot. Mag. t. 463. Lindl. Fol. Orch. Ep. No. 90. *E. cuspidatum*, Lodd. Bot. Cab. t. 10 (1818). Bot. Reg. t. 783.

One of the commonest of Epidendrums and one of the first epiphytal orchids cultivated in British gardens. According to the *Botanical Register*, it was first introduced in 1790, from the West Indies, by a Mr. Elcock; four years later it was among the few epiphytal orchids then cultivated in the Royal Gardens at Kew, and in 1799 it flowered in Mr. Whiteley's nursery at Old Brompton. In the first decade of the present century it was in cultivation in the nurseries of Messrs. Loddiges, at Hackney, and of Mr. Colville, at Chelsea; and from that time to the present it may be assumed to have been rarely absent altogether from the stoves of this country for any lengthened period. *Epidendrum ciliare* is spread over tropical America between the 5th and 20th parallels of north latitude, including several of the West India Islands, varying a little in the size of its stems, inflorescence and flowers in different localities. The plant has the habit of a *Cattleya* of the *labiata* group, with which it

has sometimes been confused when out of flower; it is frequently imported mixed with *Cattleya labiata* Mossie. It flowers in December and January.

E. cinnabarinum.

EUPEPIDENDRUM. Stems slender, terete, 3—4 feet long, dull purple and green, leafy along the distal half. Leaves ovate-lanceolate, acute, 3—5 inches long, reflexed at apex. Peduncles greatly elongated, bearing at their extremity a dense raceme of bright red flowers, the rachis continuing to lengthen and produce new flowers for several weeks in succession. Flowers $1\frac{1}{2}$ —2 inches across, bright cinnabar-red with the disk of the lip yellow; sepals and petals similar and sub-equal, lanceolate, acute; lip three-lobed, the side lobes sub-quadrate with lacinate margin, the middle lobe smaller, oblong, emarginate, constricted near the toothed truncate apex, with two tubercles at the base, and a broad raised median line extending the whole length. Column terete, cinnabar-red, yellow at the apex; anther case green.

Epidendrum cinnabarinum, Lindl. Gen. et Sp. Orch. p. 106 (1831). *Bot. Reg.* 1842, t. 25. *Fol. Orch. Ep.* No. 218 (1853).

First discovered by Salzmänn, a German collector, in sandy thickets near Bahia, and afterwards gathered by Martius on the "Serra de Sincorà, and on rocks near Villa Rica in the province of Minas, growing 4—5 feet high." It was imported from Pernambuco by Messrs. Loddiges, in whose nursery it flowered for the first time in May, 1840; it is one of the finest of the red-flowered *Epidendrums*.

E. cnemidophorum.

EUPEPIDENDRUM. Stems stoutish, leafy, 4—6 feet high. Leaves lanceolate, acute, 6—8 inches long. Racemes nodding, many flowered. Flowers fragrant, on long white pedicels sheathed at the base by a small green bract, about an inch in diameter, red spotted with pale yellow, the lip rose colour; sepals oblong-obtuse; petals narrower, almost linear; lip three-lobed, lobes fleshy, entire, the lateral two rotund, the intermediate one obovate with a deep cleft in the anterior margin, from which to the base are two raised whitish lines. Column clavate.

Epidendrum cnemidophorum, Lind. *Fol. Orch. Ep.* No. 168 (1853). *Gard. Chron.* 1864, p. 292 and p. 364. *Bot. Mag.* t. 5656.

Discovered by Mr. G. Ure Skinner, who failed to introduce it till 1864, in which year he sent a few plants to some of his personal friends and to our Chelsea nursery, which fortunately survived the voyage. It is a native of the province of Quesaltenango, in Guatemala, where it is found at a considerable elevation on the slopes of deep ravines,

growing amidst ferns and moss, its stems sometimes attaining a height of 6 feet or more. The flowers are among the handsomest of the genus, and under the influence of direct sunlight scent the whole house in which the plant is growing. It is said to be a rare species in its native country, which may account for its being but seldom seen in the orchid collections of Europe. The specific name, from *κνημίς-ἴδος*, a greave for the protection of the leg, hence "a sheath," and *φορὸς*, "bearing," refers to the numerous blunt, pale green, spathe-like bracts that sheath the base of the peduncle.

E. cochleatum.

AULIZEUM. Stems pseudo-bulbous, oblong, elongate, compressed, 3—4 inches long, diphyllous. Leaves oblong-lanceolate, acute, 6 inches long. Peduncles erect, longer than the leaves, sheathed by a scarios brown bract at the base, and terminating in a 4—7 flowered raceme. Flowers 3—4 inches in diameter; sepals and petals linear, greenish white; lip sub-orbicular or fan-shaped when spread out, concave, shell-like, apiculate, traversed by numerous radiating lines, deep maroon-purple beneath, yellow-green above with a large maroon-purple blotch on each side; calli, three, white. Column white stained with purple; anther case orange-yellow.

Epidendrum cochleatum, L. Sp. Plant. ed. II. p. 1351. Lindl. Fol. Orch. Ep. No. 128 (1853). *Bot. Mag.* t. 572. *E. lancifolium*, *Bot. Reg.* 1842, t. 50.

One of the few epiphytal orchids known to Linnæus, and the first on record to flower in this country, which it did in the Royal Gardens at Kew in 1787, it having been sent there the year before from the West Indies by Mr. Hinton East, with *Epidendrum fragrans*, but which did not flower for the first time till a year after *E. cochleatum*.

Epidendrum cochleatum has a wide range in the West Indies, Mexico, and Central America, whence it spreads into New Granada and Venezuela; it is also one of the few epiphytal orchids that occur within the territories of the United States, it having been discovered quite recently at Jupiter Inlet on the Atlantic coast of Florida. The specific name, *cochleatum*, literally "spiral like the shell of a snail," refers to the fancied resemblance of the lip to the shell of some species of snail.

E. conopseum.

EUEPIDENDRUM. "Stems slender, 1—3 inches high, diphyllous. Leaves oblong-lanceolate, acute, 2—3 inches long. Peduncles as long again as

the leaves, 5—6 or more flowered. Flowers scarcely an inch across vertically, pale yellowish green spotted with purple; sepals cuneate-spathulate, spreading; petals similar but narrower; lip three-lobed, the lobes sub-equal, the lateral two roundish oblong, the intermediate one sub-quadrate, emarginate with two white calli at the base. Column reddish at the margin.”—*Botanical Magazine*.

Epidendrum conopseum, R. Br. in Ait. Hort. Kew, V. ed. 2, p. 219 (1810—13).
Lindl. Gen. et Sp. Orch. p. 106. Id. Fol. Orch. Ep. No. 269. *Bot. Mag.* t. 3457.

This little plant is more interesting from its geographical position than from any other cause, for those floral characters that usually attract the attention of horticulturists are here almost entirely absent. It was discovered in West Florida in the early part of the present century by Drummond, one of the most energetic botanical explorers of the southern States of his time. It is now known to be spread over a considerable part of the coast region, extending from Port Royal Inlet, South Carolina, about lat. 32 N. through Florida and along the northern shores of the Gulf of Mexico, as far as Louisiana. It is occasionally sent by English residents in Florida to their relatives at home, by whom it is cultivated as a souvenir of their absent friends.

E. Cooperianum.

EUEPIDENDRUM. Stems erect, stoutish, 24—30 inches high. Leaves confined chiefly to the upper portion of the stem, oblong-lanceolate, amplexicaul, 6 inches long. Racemes nodding, many flowered. Flowers $1\frac{1}{2}$ inches in diameter; sepals oval-oblong, yellowish brown; petals linear, of similar but brighter colour; lip bright rose, three-lobed, the lateral lobes much the largest, sub-rotund, the intermediate lobe small, reniform, emarginate with a broad raised line from the notch to the base where there are two white calli. Column coloured like the lip.

Epidendrum Cooperianum, Batem. in *Bot. Mag.* t. 5654 (1867). Rehb. in Gard. Chron. XVII. (1882), p. 460 (caloglossum).

Introduced from the neighbourhood of Rio de Janeiro in 1865. It flowered for the first time in this country in the following year, in the collection of Mr. Cooper, at Alpha House, Old Kent Road, after whom it is named, and shortly afterwards in the late Mr. Dawson's collection, at Meadow Bank, near Glasgow.

E. criniferum.

EUEPIDENDRUM. Stems 12—15 inches high, slender, leafy throughout. Leaves linear-lanceolate, 3—4 inches long, sessile, acute. Racemes sub-erect, 6 or more flowered. Flowers about 2 inches in diameter; sepals

spreading, subulate-lanceolate, acute, yellow blotched with brown-purple; petals linear, similarly coloured; lip three-lobed, the side lobes semi-ovate, fringed with upturned bristles, white; middle lobe linear, straight, pale yellow; calli two. Column white with a purple blotch at the apex.

Epidendrum criniferum, Rehb. in Gard. Chron. 1871, p. 1291. *Bot. Mag.* t. 6094.

Discovered by Endres in Costa Rica, and introduced by us in 1871. The specific name, from *crinis*, "a lock of hair," and *ferre*, "to bear," refers to the fringed side lobes of the lip. The species is still very rare in the orchid collections of this country.

E. dichromum.

ENCYCLIUM. Pseudo-bulbs ovoid-cylindric, 3—4 inches long, diphyllous. Leaves ligulate, acute, 9—12 inches long, very leathery. Peduncles paniculate, 18—24 inches long, nodding, many flowered. Flowers 2 inches in diameter; sepals broadly spatulate, pale rose tinted with ochreous yellow; petals broader, obovate, pale rose; lip three-lobed, lateral lobes rotund-oblong, erect with reflexed anterior margins, which are purple; middle lobe spreading sub-orbicular, emarginate, crimson-purple striated with deep purple, with two fleshy lamellæ on the disc. Column triquetral, with two short wings, white stained with purple.

Epidendrum dichromum, Lindl. in Bot. Reg. 1843, misc. No. 119. *Id.* Fol. Orch. Ep. No. 76, 1853. Rehb. in Gard. Chron. 1866, p. 219. *Bot. Mag.* t. 5491 (amabile). *E. amabile*, Godefroy's *Orchidophile*, 1887, p. 304.

An exceptionally fine species first introduced from Pernambuco, in 1843, by M. Quesnel, of Havre, and re-introduced in 1864 by Messrs. Low and Co., of Clapton, from Bahia. In its native country it is said to grow "in exposed places on the margin of rivers, establishing itself on the branches of low straggling bushes, and sending its roots down into the sand amidst which they grow."* The flowers are variable in colour, the sepals and petals being sometimes nearly white, sometimes deep rose, while in the form with which we are best acquainted they are as described above. The specific name, *δὶχρῶμος* (*dichromos*), "of two colours," which is not especially appropriate to this species, was first applied to it by Dr. Lindley on the erroneous information that it had pure white sepals and petals and a rose-coloured labellum.

E. eburneum.

EUEPIDENDRUM. Stems terete, slender, 20—30 inches high, furnished along the upper half with linear-oblong leaves, 3—4 inches long. Peduncles 4—6 flowered. Flowers 3—4 inches across from the top of

* Bateman, in *Bot. Mag.* sub. t. 5491.

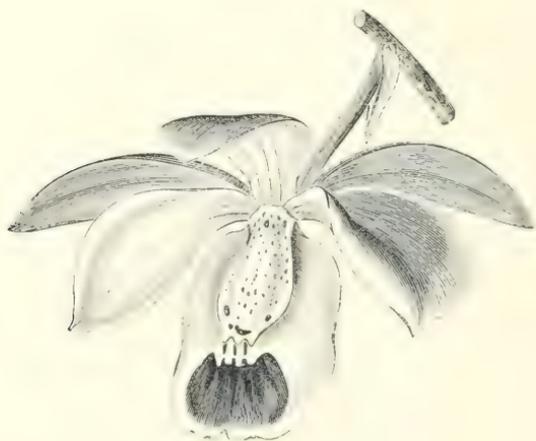
the dorsal sepal to the apex of the lip; sepals and petals linear-lanceolate, acute, pale yellow-green; lip orbicular-cordate, slightly concave, ivory-white with two small yellow calli at the base. Column short, stoutish, white.

Epidendrum eburneum, Rehb. in Gard. Chron. 1867, p. 404. *Bot. Mag.* t. 5643.

Discovered by Mr. P. Henderson, of the Royal Mail Packet Company's service, by whom it was sent to Mr. T. R. Tuffnell, of Spring Grove, Isleworth, with whom it flowered in December, 1866. It was found within a few miles of Colon, in Panama, growing in swamps close to the railway.

E. elegans.

BARKERIA. Stems terete, 9—12 inches high. Leaves linear-lanceolate, acute, 3—4 inches long. Peduncles as long again as the stems, the rachis blotched with purple and green, sheathed at each joint by an elongated bract, and terminating in a loose 5—7 flowered nodding raceme. Flowers $1\frac{1}{2}$ inches across; sepals and petals nearly equal, obovate-lanceolate, lilac-purple suffused with white. Lip obovate obtuse



Epidendrum elegans.

(Copied from the *Botanical Magazine*.)

with deflexed lateral margins, white with a large rosy purple blotch near the apex. Column spathulate, petaloid, yellow-white dotted with purple; anther yellow.

Epidendrum elegans, Rehb. Walp. Ann. VI. p. 374 (1861). *Parkeria elegans*, Knowles and Westcott's, *Fl. Cab. II.* t. 49. *Bot. Mag.* 4784 (1854). Van Houtte's *Fl. des Serres*, IX. t. 959. *Illus. hort. I.* t. 23. Linden's *Pesc.* t. 10. *Fl. Mag.* n.s. t. 394.

This plant, better known in gardens under the name of *Barkeria elegans*, is the typical species of the former genus *Barkeria*, but afterwards merged by Reichenbach, and subsequently by Bentham, into *Epidendrum*. It was introduced from Mexico in 1837 by Mr. Barker, of Birmingham, through his collector, Ross; but it seems to have disappeared from the orchid collections in this country soon afterwards. It was re-introduced in 1853 by Mr. Linden, through Ghiesbreght, who collected it on the slopes of the Guerrero Mountains near the Pacific coast of Mexico, north of Acapulco, where it grows chiefly on stunted *Crescentia* trees.*

E. elongatum.

EUEPIDENDRUM. Stems terete, as thick as an ordinary writing-pencil, 12—18 inches long. Leaves oblong-lanceolate, sub-acute, leathery, $2\frac{1}{2}$ —3 inches long. Peduncles greatly elongated, jointed with a sheathing bract at each joint, and terminating in a crowded corymbose raceme of bright rose-coloured flowers. Flowers about an inch across; sepals and petals similar and equal, obovate-lanceolate, spreading; lip three-lobed, all the lobes with denticulate margin, the side lobes roundish, the intermediate lobe much larger, obovate oblong, emarginate; crest bilamellate, the lamellæ toothed, bright yellow.

Epidendrum elongatum, Jacq. Ic. Pl. rar. III. t. 604. *Bot. Mag.* t. 611 (1803).
Lindl. Fol. Orch. Ep. No. 231 (1853). *E. crassifolium*, Hook. *Bot. Mag.* t. 3543.

A native of Jamaica and probably other West India Islands, that has been in cultivation since the beginning of the present century. It is the typical species of the large sub-section *Amphiglottideæ*, distinguished by the elongated peduncles terminating in short dense racemes of often very showy flowers, that continue a long time in bloom. We are indebted to the Royal Gardens at Kew, for materials for description.†

E. Endresii.

EUEPIDENDRUM. A small plant. Stems slender, 6—9 inches high, leafy throughout. Leaves ovate-cordate, acute, about an inch long, amplexicaul, almost perfoliate. Racemes erect, 9—12 flowered. Bracts subulate, half as long as the stalked ovaries. Flowers on short white

* Linden's *Pescatorea*, sub. t. 10.

† Very near *Epidendrum elongatum* is *E. ellipticum* (Graham) and *E. crassifolium* (Hook. *Bot. Mag.* t. 3543) which is referred by Lindley (Fol. Orch. Ep. No. 230) to Graham's species. On comparing recently received fresh specimens of *E. elongatum* of West Indian origin with the drawing of *E. crassifolium* in the *Botanical Magazine* we failed to detect any essential difference, notwithstanding that the last named was said to have been received from Rio de Janeiro.

pedicels, about an inch across vertically, pure white with a few violet spots on the lip and column; sepals oval-oblong, apiculate; petals clawed, narrower than the sepals, linear-oblong; lip sub-pandurate, the side lobes auriculate, the intermediate one bilobate, the segments divergent. Column short, terete.

Epidendrum Endresii, Rehb. in Gard. Chron. XIX (1883), p. 432. Id. XXII (1885), p. 504, icon. xyl.



Epidendrum Endresii.
(From the *Gardeners' Chronicle*.)

A lovely species. It was discovered by Endres while collecting for us in Costa Rica, in 1873, but who failed to send home living plants. It was re-discovered by Mr. F. Lehmann, in March, 1878, who only succeeded in transmitting to Europe one or two plants

alive.* Nor have the efforts of subsequent collectors met with a much better reward, for after frequent attempts to import it, only a very few plants have survived the voyage. Our description was taken from one that flowered in Sir Trevor Lawrence's collection, at Burford Lodge, in March, 1884.

E. evectum.

EUEPIDENDRUM. Stems stoutish, tufted, 3—5 feet high, swollen at the base, leafy almost from the base. Leaves oblong-lanceolate, 4—6 inches long, amplexicaul, acute. Peduncles slender, nodding, 18 or more inches long, bearing at their extremity a loose, many-flowered sub-cylindric raceme. Flowers on reddish-coloured pedicels about an inch in diameter, rich magenta-purple; sepals and petals similar, obovate, obtuse; lip with three fringed lobes, of which the middle one is divided into two spreading segments. Column reddish brown.

Epidendrum evectum, Hook. f. *Bot. Mag.* t. 5902.

This closely resembles *Epidendrum arachnoglossum* described above, from which it is easily distinguished by its more robust stems, its looser racemes of larger and brighter coloured flowers with a differently-shaped labellum; it was known long before the introduction of that species, it having been sent to Kew by Purdie, where it was in cultivation many years prior to its being figured in the *Botanical Magazine* in 1871. It is a native of New Granada, from which country it has since been sparingly imported.

E. falcatum.

AULIZEUM. Rhizome as thick as an ordinary writing pencil, from which the stems are produced at intervals of 1—2 inches. Stems like the rhizome 1—2 inches long, monophyllous. Leaves linear-lanceolate, acuminate, fleshy, 6—12 inches long, channelled on one side. Peduncles 2—5 from the axil of the leaf and sheathed at their base by 2—3 pointed bracts 4—6 inches long, one flowered; sepals and petals similar and sub-equal, lanceolate, acute, $2\frac{1}{2}$ inches long, pale yellow-green; lip spreading, the side lobes sub-rhomboidal with a sinus in the outer margin, white, the intermediate lobe acicular, pale yellow-green at the tip; calli two, ovoid, pale yellow. Column white.

Epidendrum falcatum, Lindl. in *Tayl. Ann. Nat. Hist.* 1840. *Id. Fol. Orch. Ep.* No. 91 (1853). *E. Parkinsonianum*, Hook. *Bot. Mag.* t. 3778 (1840). *Rehb. in Gard. Chron.* IX. (1878), p. 724. *E. aloifolium*, Batem. *Orch. Mex. et Guat.* t. 25 (1843). *E. lactiflorum*, A. Rich. *Brassavola Pescatorei*, Hort.

Discovered by Hartweg, in 1837, growing on rocks and loose stones near Oaxaca in Mexico, and shortly afterwards collected by Ross in the

* *Gard. Chron.* XXIII (1885), p. 504.

neighbourhood of Orizaba, for Mr. Barker, of Birmingham, in whose collection at Springfield it flowered in 1839; it was also sent about the same time to the Woburn collection by Mr. Parkinson, Her Majesty's Consul-General in Mexico. The plants sent home by these collectors received different names at the hands of the orchid authorities of that time; Hartweg's specimens were named *Epidendrum falcatum* by Dr. Lindley; the Woburn plant was named after Mr. Parkinson by Sir William Hooker, and Mr. Barker's plant was named *E. aloifolium* by Mr. Bateman. This is to be regretted, for although the plant is not of any special horticultural interest, it is still met with in different collections under all these names. The species is, however, a variable one owing to diversity of station throughout its somewhat extensive distribution. It always grows in an inverted position, whether on the trunks of trees or on bare rocks, where it attains much smaller dimensions, and where it is often exposed to great extremes of temperature and to several months of drought.

E. fragrans.

AULIZEUM. Rhizome stoutish, ligneous. Stems narrowly fusiform, compressed, 3—4 inches high, mono-diphyllous. Leaves lanceolate, acute, 8—12 inches long. Peduncles short, few flowered. Flowers inverted, 2 inches in diameter, very fragrant; sepals and petals reflexed, cream-white, the former ovate-lanceolate, green behind, the latter oval and of the same colour on both sides; lip sub-orbicular, apiculate, concave, with a fleshy callus at the base, white streaked with purple. Column greenish white.

Epidendrum fragrans, Swartz. Fl. Ind. occ. III. p. 1487. *Bot. Mag.* t. 1669 (1814). *Lindl. Fol. Orch. Ep.* No. 122. *E. æmulum*, *Lindl. Bot. Reg.* t. 1898 (1836). *E. cochleatum*, *Bot. Mag.* t. 152.

One of the most widely distributed of all the *Epidendrums*; it is common in Dominica, Jamaica, and other West Indian Islands; it occurs in British, French, and Dutch Guiana, in Northern Brazil and Venezuela; it has also been reported from Guatemala. Over so large an area the plant varies considerably in habit and aspect according to locality and station. A variety called by Dr. Lindley *megalanthum*, "has flowers 4 inches in diameter with vivid stripes of purple-crimson on the lip."* *Epidendrum fragrans* flowered at Kew for the first time in this country in 1778, whither it had been sent by Mr. Hinton East. Some years later plants were pre-

* *Fol. Orch. Ep.* No. 122.

sented to the Apothecaries' Garden at Chelsea by Commodore Gardner, where one of them flowered in February, 1796; it was therefore one of the first epiphytal orchids introduced into British gardens.

E. Frederici Guilielmi.

EUEPIDENDRUM. A robust plant with stems 4—5 feet high, as thick as a man's thumb, but usually smaller under cultivation. Leaves oblong, obtuse, 6—9 inches long. Peduncles sheathed at the base by a spathaceous bract, paniculate, many flowered. Flowers red-purple, 2 inches in diameter, on slender reddish purple pedicels, 3—4 inches long; sepals and petals similar, spreading, cuneate-lanceolate, acute; lip shorter than the other segments, three-lobed, the side lobes rotund, the middle lobe deltoid, acute; calli two, white.

Epidendrum Frederici Guilielmi, Warsc. et Rehb. in Bonpl. II. p. 110 (1853).
Rehb. *Xen. Orch. I.* p. 153, t. 51 (1856). *Illus. hort.* 1871, t. 48. De Puydt,
Les. Orch. t. 19.

Discovered on the Andes of northern Peru at 6,000—8,000 feet elevation, about the year 1851, by Warscewicz, who failed to communicate the exact locality. It was rediscovered some years afterwards by Gustav Wallis while collecting plants for M. Linden, of Ghent, but only a single plant of this orchid reached Europe alive. It has since been re-introduced, but in number so restricted that it is still rare in European collections. Its flowers are among the handsomest of the genus, but the unwieldy size of the plant is an obstacle to its finding favour with many amateurs. It was dedicated to the late King Frederick William, of Prussia.

E. fucatum.

ENCYCLIUM. Pseudo-bulbs crowded, ovoid, but sometimes sub-pyriform, elongated, diphyllous. Leaves linear, rigid, 7—10 inches long. Peduncles slender, 2 feet long, branched along the distal half. Flowers very numerous, 1½ inches in diameter, delightfully fragrant; sepals and petals linear-spathulate, deep ochreous yellow; lip free, white streaked with purple, three-lobed, the side lobes erect, linear-oblong, roundish at the apex, the middle lobe obcordate; crest bi-lamellate.

Epidendrum fucatum, Lindl. in Bot. Reg. 1838, misc. No. 17. Id. Fol. Orch. Ep. No. 36. E. Sagreanum, A. Rich.

Brought from Havannah in the spring of 1835 by Captain Sutton, and sent to Sir Charles Lemon's collection at Carelew, where it flowered for the first time in July, 1837. Like other Cuban orchids it is now but rarely seen in British gardens; its specific name *fucatum*, literally "dyed," "beautified," probably refers to the labellum.

E. glumaceum.

AULIZEUM. Pseudo-bulbs from a stout ascending rhizome, pyriform, compressed, diphylous. Leaves oblong-lanceolate, 6—8 inches long. Peduncles erect, as long as the leaves, racemose. Flowers inverted, $1\frac{1}{2}$ inches in diameter; sepals and petals linear-lanceolate, acute, the petals a little broader than the sepals, white striped with pale rose on the inner side, white on the outer side which, owing to the inverted position of the flowers, is most exposed to view; lip obovate, acuminate, stained and streaked with rose in the centre, white at the margin. Column white, spotted with crimson; anther-case yellow.

Epidendrum glumaceum, Lindl. *Bot. Reg.* 1840, t. 6. Id. *Fol. Orch. Ep.* No. 123.

Discovered in 1837 by Gardner, on the Pedro-Bonito Mountain, in the Brazilian province of Pernambuco, growing on branches of *Vellozia candida*, and shortly afterwards introduced by Loddiges, of Hackney. The flowers are pretty and fragrant. The specific name refers to the long, brownish, sharp-pointed scales resembling the glumes of grasses out of which the floral racemes grow, a character which chiefly distinguishes this species from the closely-allied *Epidendrum inversum*.

E. Hanburii.

ENCYCLIUM. Pseudo-bulbs ovoid, 3 inches long, diphylous. Leaves narrowly ensiform, coriaceous, about a foot long. Racemes as long again as the leaves, purple with a small appressed bract at each joint, many flowered. Flowers $1\frac{1}{2}$ inches in diameter; sepals and petals spreading, clawed, spatulate, brown-purple; lateral lobes of lip oval-oblong, erect, claret-purple, the intermediate lobe sub-quadrate, undulate with a median raised line from which branch numerous radiating veins, bright claret-purple. Column triquetral, white at the base.

Epidendrum Hanburii, Lindl. in *Bot. Reg.* 1844, misc. No. 60. Id. *Fol. Orch. Ep.* No. 77. Regel's *Gartenfl.* t. 398.

A species allied to *Epidendrum dichromum* and *E. phæniceum*, and sometimes confounded with the last named; it is occasionally imported from Mexico along with other orchids from that country. It was first introduced by Loddiges in 1843, and on its flowering, was dedicated by Dr. Lindley to the late Mr. Robert Hanbury, of The Poles, near Ware. It usually flowers in March and April.

E. ibaguense.

EUEPIDENDRUM. Stems terete, as thick as an ordinary writing pencil, 2—3 feet high, leafy upwards. Leaves oblong, acute, 3—4 inches long, amplexicaul, very leathery. Peduncles elongated, terminating in a dense corymbose raceme of bright orange-red flowers with a yellow fleshy tripartite callus on the disk of the lip. Flowers 1— $1\frac{1}{2}$ inches in diameter; sepals oblong, acute, spreading; petals similar but smaller;

lip three-lobed, all the lobes deeply fimbriated, the lateral two cordate, the middle one obcordate, emarginate.

Epidendrum ibaguense, Humbdt. et Kunth. Nov. Gen. et Sp. I. p. 352 (1815).
Lindl. Fol. Orch. Ep. No. 233. *Fl. Mag.* 1868, t. 390.

First discovered by Humboldt and Bonpland in the beginning of the present century, on the central Cordillera of New Granada, between Ibagué and Tolina, at 4,500 feet elevation. It was next gathered by Linden, who introduced it into Belgium in 1844; a little later it was found by Hartweg, near Loxa, in Ecuador, and by Jamieson, near Quito. It was first introduced into British gardens from the Ecuadorean Cordillera in 1867, by Messrs. Backhouse, of York.

E. inversum.

AULIZEUM. Pseudo-bulbs fusiform, elongated, compressed, 3—4 inches long, diphyllous. Leaves lorate-oblong, leathery, 4—6 inches long. Peduncles as long as the leaves, sheathed at the base by two opposite whitish brown membranous bracts, racemose, 7—12 or more flowered. Flowers crowded, fragrant, pale straw colour, but sometimes white striated with light rose, with a purple blotch on the lip, and sometimes with a few purple spots at the base of all the other segments; sepals and petals linear-lanceolate with recurved tips; lip obovate, apiculate; calli three, bright yellow.

Epidendrum inversum, Lindl. in Bot. Reg. 1839, misc. No. 125. Id. Fol. Orch. Ep. No. 124.

Native of Minas Geraes in Brazil, whence it was introduced by Messrs. Loddiges in 1839. It is occasionally met with in British collections, flowering in October and November, but sometimes in the spring months; the flowers when first expanded emit an odour somewhat like that of our native Catmint. The specific name refers to the position of the flowers, the labellum being uppermost, but this peculiarity is common to many species of *Epidendrum*.

E. ionosmum.

ENCYCLIUM. Pseudo-bulbs globose, 1½—2 inches in diameter, diphyllous. Leaves oblong-lanceolate, 3—4 inches long. Peduncles racemose at the extremity, few flowered. Flowers fragrant, 1½ inches in diameter; sepals and petals obovate, concave, greenish brown bordered with pale yellow; lip three-lobed, the side lobes oblong, oblique, erect, toothed on the apical side, yellow streaked with red, the middle lobe transversely oblong, emarginate, slightly crisped, yellow with some red streaks and markings.

Epidendrum ionosmum, Lindl. Bot. Reg. 1838, misc. No. 87. Id. Fol. Orch. Ep. No. 73. Rolfe in Gard. Chron. III. s. 3 (1888), p. 716.

Native of British Guiana, whence it was first introduced by Loddiges about the year 1838. Its chief, if not its sole recommendation is the delightful violet fragrance of its flowers, which suggested the specific name. Dr. Lindley remarked* that "the Western world wants no violets where this charming plant is found, for it fills the air with a fragrance as delicate and delicious as that of our favourite wild flower."

E. leucochilum.

EUPIDENDRUM. A robust plant. Stems from a stout ligneous rhizome, as thick as an ordinary writing-pencil, 15—24 inches high with 3—5 oblong-lanceolate, obtuse leaves at their upper end. Peduncles issuing from a compressed sheath, 5—9 flowered. Flowers on stoutish pedicels, including ovary, 3—4 inches long; sepals and petals similar and equal, linear, acute, reflexed, light yellow-green; lip three-lobed, ivory-white, the side lobes obliquely ovate, entire, the middle lobe linear, acute, keeled above, with two divergent lamellæ at the base. Column terete, forming with the claw of the lip a funnel-like aperture.

Epidendrum leucochilum, Klotzsch in *Allg. Gartenzeit*, 1843, p. 145 (1844). Lindl. *Fol. Orch. Ep.* No. 158 (1853). Paxt. *Fl. Gard.* III. p. 146 with fig. Rehb. in *Gard. Chron.* III. (1875), p. 780. *E. Imperator*, Hort.

Found wild in various parts of the eastern Cordillera of New Granada and Venezuela, from Pamplona to Caracas, at 6,000—9,000 feet elevation. It was discovered by Linden in 1842, and subsequently gathered by Schlim and other collectors in different localities. It was in cultivation at the time Lindley compiled the monograph of the genus for his *Folia Orchidacea*, but seems to have been subsequently lost; its reappearance in British gardens in 1875, under the name of *Epidendrum Imperator*, has again brought it under notice.

E. Lindleyanum.

BARKERIA. Stems terete, 8—12 inches high, as thick as a goose-quill. Leaves oblong-lanceolate, acute, 4—5 inches long. Peduncles very slender, 18—24 inches long, nodding, racemose, many flowered. Flowers 2 inches across vertically, bright rosy purple except the white disk of the lip, on slender pale purple pedicels, at the base of which is a subulate, pale green bract; sepals and petals lanceolate, acuminate, the petals broader than the sepals; lip oblong-quadrate, apiculate. Column with narrow wings, three-toothed at the apex.

Epidendrum Lindleyanum, Rehb. *Walp. Ann.* VI. p. 375 (1861—5). *Bot. Mag.* t. 6098. *Barkeria Lindleyana*, Batem. in *Bot. Reg.* 1842, misc. No. 5. *Id. Orch. Mex. et Guat.* t. 28. *Paxt. Mag. Bot.* XIII. p. 193.

* *Bot. Reg.* loc. cit. supra.

var.—Centeræ.

Flowers larger with the lip more acute; the column blotched with purple; the flowers generally of a deeper colour, especially the apical portion of the lip.

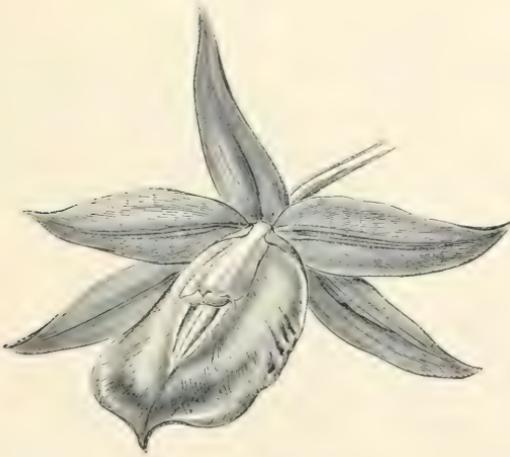
E. Lindleyanum Centeræ, supra. *Barkeria Lindleyana* Centeræ, Rehb. in Gard. Chron. 1873, p. 1597. *The Garden*, XXVII. (1885), t. 490.

var.—cyclotellum.

Flowers magenta-purple with disk of lip white; petals and lip broader, the latter emarginate, not apiculate.

E. Lindleyanum cyclotellum, supra. *Barkeria cyclotella*, Rehb. in Gard. Chron. XIII. (1880), p. 72. *Williams' Orch. Alb.* IV. t. 148.

This species is better known in cultivation under the name of *Barkeria Lindleyana*; it is of Central American origin and occurs at intervals near the Pacific coast, from Costa Rica to Mexico. It was originally discovered by Mr. G. Ure Skinner, in Costa Rica, and sent by him, in 1839, to Mr. Bateman, in whose collection at Knypersley



Epidendrum Lindleyanum.
(Copied from the *Botanical Magazine.*)

it flowered for the first time in this country, in 1841. The variety *Centeræ* was introduced by us from Costa Rica, in 1873, through M. Endres; it is dedicated to Mrs. Center, the wife of the then superintendent of the Panama Railway. The variety *cyclotellum* is of more recent introduction, and is, we believe, of Mexican origin. The variability of the species is further seen in the various unnamed forms, differing in colour only, that have been sent to us from time

to time by correspondents, one of the most distinct of which had white sepals and petals.

Epidendrum Lindleyanum flowers in November and December, when the rich colour of its elegant racemes of flowers renders it one of the most striking ornaments of the orchid house at that dull season of the year.

E. myrianthum.

EUPEPIDENDRUM. Stems cylindric, slender, 3—5 feet high, spotted with black along the upper leafy portion. Leaves linear-lanceolate, acute, 4—5 inches long. Panicles loosely branched, many flowered. Flowers of a uniform bright purplish rose, on long slender purple pedicels; sepals ovate-oblong; petals linear spathulate; lip quadripartite, the basal lobes oblong-obtuse, the anterior two subquadrate, as broad again as the basal two, and with the apical margin denticulate; at the base of the lip are two short, bright yellow lamellæ. Column short, thickened at the apex.

Epidendrum myrianthum, Lindl. *Fol. Orch. Ep. No. 184* (1854). *Bot. Mag. t. 5556*.

One of the handsomest of the paniculate *Epidendras* that was originally discovered by a Mr. Klee on the mountains of Guatemala, but its introduction is due to Mr. G. Ure Skinner, who sent plants to Mr. Bateman, in whose collection at Knypersley it flowered for the first time, many years after its introduction, in June, 1865. We are indebted to Sir Trevor Lawrence, Bart., for materials for description.

E. nemorale.

ENCYCLIUM. Pseudo-bulbs pyriform or sub-globose, 2—3 inches long, pale green, di-triphyllous. Leaves linear-lorate, very coriaceous, rigid, erect, 9—12 inches long. Peduncles about 2 feet long, reddish green, densely spotted with greyish warts, and terminating in a many flowered panicle. Flowers 3—4 inches in diameter; sepals and petals similar, spreading, linear-lanceolate, light rosy mauve; lip three-lobed, the small side lobes triangular, erect, rosy mauve, the intermediate lobe much larger, ovate-rhomboid, acute with dentate margin, light mauve streaked with purple; callus bi-lamellate, white. Column angulate, winged, rosy mauve.

Epidendrum nemorale, Lindl. in Hook. *Jour. Bot.* III. 82. *Id. Fol. Orch. Ep. No. 60* (1853). Warner's *Sel. Orch. I. t. 13*. Godefroy's *Orchidophile*, 1888, p. 304. *E. verrucosum*, Lindl. not Sw. *Bot. Reg.* 1844, t. 51.* *Bot. Mag. t. 4606*. *Pact. Mag. Bot. XIII.* (1847), p. 101.

* The original *Epidendrum verrucosum* of Swartz is a very different plant, with simple erect warty stems, and flowers with pale green sepals and petals, and a yellow lip. It is a native of Jamaica and other West India islands.

First imported by Loddiges, from Mexico, about the year 1843. It grows upon trees near Sultepec, and it also occurs in various localities in the province of Oaxaca. *Epidendrum nemorale* is one of the most attractive of the section to which it belongs, but it has frequently proved disappointing to the cultivator; it requires the



Epidendrum nemorale.

same treatment as the *Lælias* and other orchids inhabiting the Mexican highlands, the details of which are given in our introductory notes to *Lælia*, Part II., pp. 53—55.

E. nocturnum.

EUPEPIDENDRUM. Stems stoutish, 18—30 inches high, leafy above. Leaves linear, sometimes oblong-lanceolate, 6—8 inches long. Peduncles issuing from a long compressed bract, 8—10 flowered. Flowers on

slender pedicels, 3—4 inches long; sepals and petals linear, acuminate, pale ochraceous yellow, sometimes greenish white; lip white, three-lobed, the lateral lobe semi-ovate, crenate with a deep sinus between them, in which is the linear-oblong intermediate one, at the base of which are two yellow (sometimes white) calli, with a raised line between them.

Epidendrum nocturnum, L. Sp. Plant. 1349 (1764). *Bot. Mag.* t. 3298 (1834). *Bot. Reg.* t. 1961 (*latifolium*). Lindl. *Fol. Orch.* Ep. No. 254. *E. discolor*, A. Rich. et Galeot. *E. tridens*, Poepp. (*vide* Lindl.). *E. Spruceanum*, Lindl. *Fol. Orch.* No. 253, ex. Hemsley, *Biolog. Cent. Amer.* III. p. 235.

Widely distributed through the West India Islands and tropical America from Mexico to Peru. It was one of the true *Epidendra* known to Linnæus, to whom it was probably communicated by Jacquin, an excellent French botanist of the last century, who gathered it on the island of Martinique. It was one of the earliest epiphytal orchids introduced into European gardens, it having been in cultivation in 1816 and probably earlier; it usually flowers in the early spring months, when the pleasant fragrance of its flowers, which is most powerful towards evening and at night, is its chief recommendation. *Epidendrum longicolle*, from Demerara* is probably a narrow-leaved, small-flowered geographical form of *E. nocturnum*.

E. ochraceum.

ENCYCLIUM. Pseudo-bulbs elongated, pyriform, 1—1½ inch long, diphyllous. Leaves linear, 3—5 inches long, sedge-like with a depressed mid-nerve above, keeled beneath. Peduncles slender, terete, erect, half as long as the leaves, racemose, 9—12 flowered. Flowers ½ an inch in diameter, with a small acuminate bract at the base of the short ovary; sepals and petals similar, roundish oblong, orange-brown; lip yellow, three-lobed, the side lobes rotund, embracing the column, the front lobe smaller, broadly oblong, emarginate, with a tridentate callus at its base. Column triquetral, three-toothed at the apex.

Epidendrum ochraceum, Lindl. *Bot. Reg.* 1838, t. 26, and misc. No. 15. *Fol. Orch.* Ep. No. 18.

A small-flowered species discovered by Mr. G. Ure Skinner, in Guatemala, and sent by him in 1835 to Sir Charles Lemon, in whose collection at Carclew it flowered in July of the following year; subsequently it was received by Messrs Loddiges from Oaxaca, in Mexico. It is not uncommon in southern Mexico and Guatemala, whence it is occasionally imported with other orchids.

E oncioides.

ENCYCLIUM. Pseudo-bulbs narrowly oblong, sub-terete, 3—4 inches long, di-triphyllous. Leaves narrowly ensiform, 18—25 inches long,

* *Bot. Mag.* t. 4165.

sub-acuminate, leathery. Peduncles erect or sub-erect, pale green, from 3—4 feet high under cultivation, occasionally much higher in a wild state, loosely paniculate, many flowered. Flowers fragrant, $1\frac{1}{2}$ inches in diameter; sepals and petals clawed, obovate, red-brown margined and striated with yellow, the claw wholly yellow; lip three-lobed, buff-yellow with some red-brown streaks on the front lobe, the side lobes narrowly oblong, the intermediate lobe sub-rotund, cuspidate, with three keels on the disk. Column auriculate at the apex.

Epidendrum oncidoides, Lindl. *Bot. Reg.* t. 1623 (1833). Id. *Fol. Orch. Ep.* No. 29. E. affine, Focke, *Allg. Gartenz.* 1843, p. 229. E. spectabile, Id. p. 341. E. guatemalense, Klotzsch, Id. 1852, p. 246. E. graniticum, Lindl.

First cultivated by Mr. Richard Harrison, of Liverpool, from whose specimen the coloured drawing in the *Botanical Register* was taken; its native country was then unknown. Ten years later it was gathered by Schomburgk on the granite ridges of the rivers Cuyumi and Guayna, in Demerara, and subsequently by Focke, in Surinam. It is a stately species almost entirely neglected by amateurs of the present day.

E. pallidiflorum.

EUEPIDENDRUM. Stems terete, 12—18 inches high. Leaves linear-oblong, obliquely emarginate, 5—7 inches long, confined to the upper part of the stem. Peduncles longer than the leaves, drooping, usually paniculate, many flowered. Flowers an inch across, pale yellow, with some purple streaks* at the apex of the column and on the side lobes of the lip; sepals and petals similar and sub-equal, oblanceolate; lip three-lobed, the lateral lobes sub-quadrate, the intermediate lobe similar, with the anterior margin involute and with a thickish raised median line, on each side of which, in front of the column, are two short lamellæ, each with an obtuse tooth.

Epidendrum pallidiflorum, Hook. *Bot. Mag.* t. 2980 (1830). Lindl. *Fol. Orch. Ep.* No. 180.

Native of Dominica (and probably other West India islands), whence it was sent to the Glasgow Botanic Garden, in 1828 or 1829; it is not now often seen in the orchid collections of this country. Its pleasantly-fragrant flowers are produced in profusion in December and January.

E. paniculatum.

EUEPIDENDRUM. Stems terete, erect, 3—4 feet high, leafy along the upper portion. Leaves narrowly lanceolate, acute, 5—7 inches long. Panicle 12—15 inches long, many flowered. Flowers fragrant, $\frac{3}{4}$ inch

* The purple streaks are sometimes entirely absent, or but faintly represented.

in diameter, variable in colour, usually pale rose or lilac, sometimes passing into white; sepals oblong-spathulate; petals filiform; lip quadripartite, the two basal lobes broadly obovate, the anterior two broadly linear, divergent; calli two, sometimes yellow, sometimes white, in front of which are three small raised lines.

Epidendrum paniculatum, Ruiz et Pax. Flor. Peruv. et Chil. p. 243 (1794). Lindl. Gen. et Sp. Orch. p. 108 (1831). Id. Fol. Orch. Ep. No. 174 (1853). *Bot. Mag.* t. 5731. *Illus. hort.* n.s. t. 211. *E. falsiloquum*, Rehb. in Gard. Chron. XXIII. (1885), p. 566.

One of the first epiphytal orchids known to science, and one of the most widely distributed of the genus. It was discovered more than a century ago by the Spanish botanists Ruiz and Pavon, near Huayaquil (Guayaquil?) in Peru, and has since been gathered by various collectors in many localities in tropical South America widely remote from each other, but always at a considerable elevation on the Cordilleras from Bolivia northwards to Venezuela. As a species it is very variable, due doubtless to diversity of station and its wide distribution, the variability being observable chiefly in the height of the stems, the form and size of the leaves, and in the colour of the flowers; the date of its first introduction does not appear to have been recorded.

E. patens.

EUEPIDENDRUM. Stems cylindrical, as thick as an ordinary writing-pencil, 1—3 feet high, jointed at intervals of 1—2 inches, leafy at top only. Leaves oblong-lanceolate, leathery, 4—6 inches long. Peduncles pendulous, usually racemose but sometimes branched at the base, many flowered. Flowers $1\frac{1}{2}$ inches in diameter, yellowish green when first expanded, changing to white with age; sepals and petals subequal, oblong, acute with revolute margins; lip three-lobed, the lobes nearly equal, the lateral two roundish, the intermediate one bifid; calli two. Column clavate

Epidendrum patens, Swartz, Fl. Ind. occ. III. p. 1495. Lindl. Gen. et Sp. Orch. p. 108 (1831). Id. Fol. Orch. Ep. No. 235 (1853). *Bot. Mag.* t. 3800 (1841).

Native of Jamaica, Trinidad, and other West India islands, whence it is occasionally imported with other orchids; it is also said to have been gathered by the late Mr. G. Ure Skinner, in Guatemala. Although not a particularly handsome species, it scarcely deserves Dr. Lindley's somewhat disparaging description; its long pendulous racemes resemble on superficial view those of a *Dendrobium* of the sub-section *Calostachyææ* (*D. densiflorum*, &c.), a character by which it may be easily recognised among the cultivated *Epidendra*.

E. phœniceum.

ENCYCLIUM. Pseudo-bulbs sub-rotund, ovate, diphyllous. Leaves linear-oblong, erect, leathery, 6—9 inches long. Peduncles paniculate, 2—3 feet high. Flowers, $1\frac{1}{2}$ —2 inches in diameter; sepals and petals sub-equal, obovate-lanceolate, deep bronze-purple shaded with brown and with a pale green apiculus; lip three-lobed, lateral lobes oblong, erect, recurved at apex, the middle lobe sub-rotund, wavy, emarginate, rose purple veined with deep crimson-purple; calli two. Column triquetral, auricled, rose-purple and white.

Epidendrum phœniceum, Lindl. *Sert. Orch.* t. 46 (1838). *Id. Bot. Reg.* 1841, misc. No. 120. *Id. Fol. Orch. Ep. No. 78.* *Paxt. Mag. Bot. IX.* p. 97. Van Houtte, *Fl. des Serres, II.* 1846, t. 8, and *IV.* t. 306 (*vanillosum*).

Introduced from Cuba, in 1840, by Messrs. Loddiges, in whose nursery at Hackney it flowered for the first time in this country in the spring of the following year. Although one of the most striking of *Epidendrums* as regards colour, it is now but rarely if ever seen in the orchid houses of Europe, owing to its inhabiting an island that affords but few orchids worthy of cultivation, and thence the importation of this species has become neglected.

E. polybulbon.

ENCYCLIUM. A dwarf creeping plant. Rhizome somewhat wiry, branched and emitting numerous short thread-like roots. Pseudo-bulbs produced from the rhizome at intervals of about an inch, ovoid, $\frac{1}{2}$ inch long, sheathed at the base by brown scales, diphyllous. Leaves ovate-oblong, obtuse, emarginate, 1— $1\frac{1}{2}$ inches long. Peduncles issuing from a compressed sheathing bract, slender, as long as the leaves, one flowered. Flowers an inch in diameter; sepals and petals spreading, linear, acute, the petals the narrowest, in one form tawny yellow with a brown median area, in another light yellow; lip white with a short claw and sub-quadrate blade which has a depressed median line. Column purplish brown, with two cirri at the apex.

Epidendrum polybulbon, Swartz, *Prod.* p. 124 (1788). *Id. Fl. Ind. occid. III.* p. 1491. Hook. *Exot. Fl. II.* t. 112. *Dinema polybulbon*, Lindl. *Gen. et Sp. Orch.* p. 111 (1831). *Bot. Mag.* t. 4067.

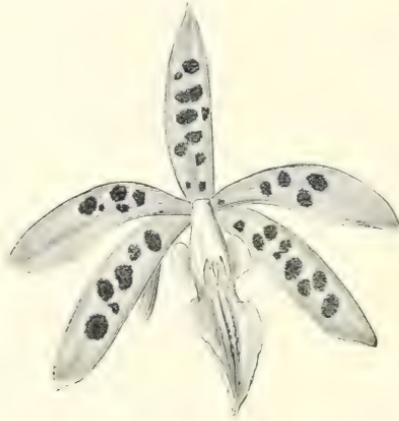
A native of the West Indies and Mexico that became known to science more than a century ago, but does not appear to have been introduced into British gardens till 1841—2, when plants were presented by Mr. Horsfall, of Liverpool, to the Botanic Garden of that town. It is a dwarf, floriferous, and by no means in attractive species.

E. prismatocarpum.

ENCYCLIUM. Pseudo-bulbs ovoid, elongated, tapering upwards, 4—5

inches long, di-triphyllous. Leaves ligulate, flaccid, 12—15 inches long. Peduncles erect, longer than the leaves, bearing along the upper half a many-flowered raceme. Flowers $1\frac{1}{2}$ inches in diameter; sepals and petals similar and sub-equal, oblong lanceolate, shortly acuminate, pale greenish sulphur-yellow, the sepals with several black-purple roundish spots, the petals with fewer spots, sometimes without them; lip with two white rectangular auricles at the base, the blade trowel-shaped, acuminate with two raised lines on the disk, rose-purple tipped with yellow. Column semi-terete, winged, tipped at the apex, pale yellow.

Epidendrum prismatocarpum, Rehb. in Bot. Zeit. 1852, p. 729. Id. *Xen. Orch. II.* p. 83, t. 123. Lindl. Fol. Orch. Ep. No. 23. *Bot. Mag.* t. 5336. Warner's *Sel. Orch. I.* t. 9.



Epidendrum prismatocarpum.

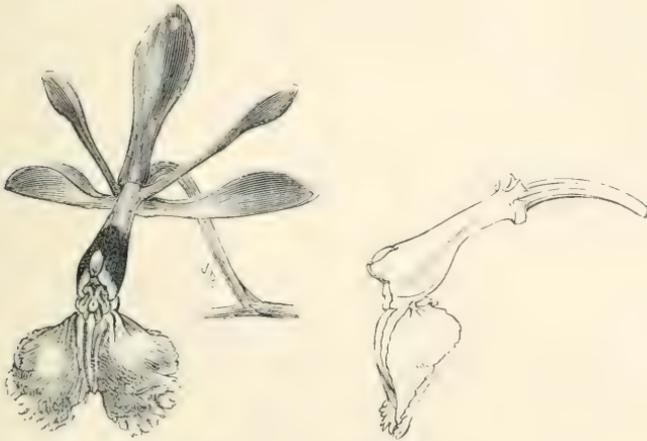
Discovered by Warszewicz, in 1849, on the volcano of Chiriqui, in Veragua, Central America, at 5,000 feet above sea-level, where it flowers in November, but in the glass-houses of Europe it usually flowers from May to August, and occasionally later. It was introduced in 1856 by Bridges. The specific name refers to the three sharp angles of the short ovary.

E. Pseudepidendrum.

EUEPIDENDRUM. Stems terete, 24—36 inches high, brownish-purple and leafy above. Leaves linear-oblong, acuminate, 5—7 inches long. Raceme few flowered. Flowers 2—3 inches across, on slender compressed pedicels sheathed at the base by an acute brown bract; sepals and petals green, the former elliptic-spathulate, the latter linear-spathulate; lip sub-orbicular, retuse, with erose margin, orange-red; disk with five ridges.

Epidendrum Pseudepidendrum, Rehb. *Xen. Orch. I.* p. 160, t. 53 (1856). Id. in *Gard. Chron.* 1872, p. 763. *Bot. Mag.* t. 5929.

This is also one of the discoveries of Warscewicz, who detected it growing upon a species of *Ficus* on the Cordillera of Chiriqui, in Central America, at 4,000 feet elevation, where it flowers in January and February. It was introduced by us in 1871. A sub-variety called *auratum* has a golden yellow lip with a large red disk. The contrast between the bright red labellum and the green sepals and petals is very striking.



Epidendrum Pseudepidendrum.

E. purum.

EUEPIDENDRUM. Stems tufted, cylindric, 12—20 inches high, attenuated below, leafy upwards. Leaves narrowly lanceolate-oblong, 5—8 inches long. Peduncles drooping, paniculate, many flowered. Flowers fragrant when first expanded, less than an inch across, of a uniform pale yellow-green; sepals linear-lanceolate; petals linear; lip three-lobed, the side lobes sub-triangular, the middle lobe oblong, acute with two raised lines at the base in front of the column.

Epidendrum purum, Lindl. in Bot. Reg. 1844, misc. No. 75. Id. Fol. Orch. Ep. No. 289.

Introduced into the collection of the late Mr. Rucker, at West Hill, Wandsworth, in 1844, by Linden, from Caracas; it was subsequently gathered by Purdie, near La Paz, in Colombia, from which country it has been since occasionally imported with other orchids. It flowers in the winter months, when its pleasant fragrance forms its chief attraction.

E. radiatum.

AULIZEUM. Rhizome creeping, ligneous, as thick as an ordinary writing-pencil. Stems shortly fusiform, stalked, 3—5 inches long, much compressed and strongly ribbed, di-tri-phyllous. Leaves linear-ligulate, sub-acuminate, 10—15 inches long. Racemes issuing from a short compressed sheath, 7—10 or more flowered. Flowers $1\frac{1}{2}$ inches in diameter; sepals and petals reflexed, cream colour, the former narrowly oblong, acute, the latter much broader, oval; lip concave, shell-like with undulate margin, white with radial bright purple lines. Column terete above, green with some purple dots, and with two yellow teeth at the apex between which is a small white fringed lacinia.

Epidendrum radiatum, Lindl. Bot. Reg. 1841, misc. No. 123. *Id.* 1842, t. 45. *Id.* Fol. Orch. Ep. No. 130. *E. marginatum*, Link, Klotzsch and Otto, Ic. Pl. t. 36. *E. bracteolatum*, Presl. Reliq. Haenk. p. 100 (these syns. ex. Lindl. Fol. Orch. loc. cit.).

First imported from Mexico by Messrs. Loddiges, of Hackney, in 1841, and shortly afterwards sent to the Horticultural Society of London, by Hartweg, who gave no locality. It had been previously detected by Dr. Schiede, growing on rocks at the Hacienda de la Laguna, and it was subsequently found by Galeotti in Oaxaca and other places, and also by Mr. G. Ure Skinner in Guatemala. Its nearest affinities are *Epidendrum cochleatum* and *E. fragrans*, with both of which it has occasionally been confused, especially with the last named, from which it differs in little besides its more strongly ribbed stems, its larger flowers with broader segments, and in the lip not being apiculate.

E. radicans.

EUEPIDENDRUM. Stems scandent, several feet long, often branched near their base, and emitting from opposite the leaves thread-like roots, 12—20 or more inches long. Leaves ovate-oblong, 2 inches long, emarginate. Peduncles slender, sheathed by imbricating adherent bracts, and terminating in a many-flowered corymbiform raceme. Flowers $1\frac{1}{2}$ —2 inches in diameter on pale orange-red pedicels; sepals and petals spreading, elliptic-oblong, acute, rich cinnabar-red shaded with deep scarlet; lip with three spreading fringed lobes, of which the middle one is bipartite, bright orange-yellow, deeper towards the margin.

Epidendrum radicans, Pavon M.S. ex. Lindl. Gen. et Sp. Orch. p. 104 (1831), and Fol. Orch. Ep. No. 220 (1853). Paxt. Mag. Bot. XIII. p. 145. *The Garden*, XXIV. (1883), t. 412. Williams' *Orch. Alb.* IV. t. 161. *E. rhizophorum*, Batem. in Bot. Reg. 1838, misc. No. 10.

sub-var.—*fuscatum* (Gard. Chron. V. s 3. (1889), p. 43), perianth totally suffused with a peculiar purple tint, verging a little to mauve and to reddish brown.

Introduced from Guatemala in 1839 by Mr. G. Ure Skinner, who stated that "in its native country it grows among long grass and dried leaves and flowers from October to January." It was shortly afterwards sent by Hartweg from southern Mexico to the Horticultural Society of London; it flowered for the first time in this country in Mrs. Lawrence's collection at Ealing. *Epidendrum radicans* is the most brilliant of the red-flowered Epidendrums; the plant is of semi-scandent habit, and when trained to a trellis or some such suitable contrivance, its showy flowers are rendered very effective. The sub-variety, which deviates from the type in colour only, is in cultivation in Sir Trevor Lawrence's collection at Burford Lodge.

E. raniferum.

EUEPIDENDRUM. Stems terete, erect, leafy along the upper half, 2—3 feet high, jointed, the internodes clothed with membranous striated sheaths. Leaves narrowly lanceolate, acute, 3—5 inches long. Racemes drooping, few flowered. Flowers 2 inches in diameter; sepals and petals spreading in a stellate manner, bright yellow-green spotted with red-brown, the sepals ligulate, convex, the petals linear; lip deeply four-lobed, the two basal lobes obliquely oblong with a cleft in the outer margin which is also irregularly toothed, white with a yellowish stain at the edge; the anterior lobes linear, divergent, yellow; crest two-lobed, white spotted with purple. Column terete, dilated at the apex, greenish white.

Epidendrum raniferum, Lindl. Gen. et. Sp. Orch. p. 109 (1831). Id. Bot. Reg. 1842, t. 42. Id. Fol. Orch. Ep. No. 167. Fl. Mag. n. s. t. 445.

This species first became known to science from a dried specimen preserved in Mr. A. B. Lambert's collection, which had been gathered in Mexico. It was probably first introduced in a living state from that country by Mr. Barker, of Birmingham, from whose collection Dr. Lindley received the materials for figuring and description in the *Botanical Register* for 1842, at which time it was in cultivation in several places. A little later it was sent to Messrs. Loddiges, from British Guiana, by Dr. Schomburgk, who met with it on the banks of the River Essequibo growing on the stems of trees.* The species is a variable one, not only in the colour of the flowers but also in the lobing and denticulation of the lip; the Guiana form is distinguished from the Mexican by its brighter yellow flowers with a white lip that is somewhat differently lobed. We are indebted to Sir Trevor Lawrence, Bart., for materials for description.

* Reisen in Britisch. Guiana, III. p. 906.

E. Sceptrum.

AULIZEUM. Stems from a stoutish rhizome, clavate, compressed, 9—12 inches long, bearing near their summits 3—4 ligulate leaves, 8—12 inches long. Peduncles erect, 18—24 inches long, racemose along the distal two-thirds. Flowers inverted, numerous, $1\frac{1}{2}$ inches in diameter; sepals and petals bright golden yellow spotted with blackish purple, the upper sepal and petals linear-oblong, acute, the lateral sepals narrowly spatulate; lip sub-orbicular, apiculate, deep purple, the disk milk-white spotted with maroon-purple. Column greenish.

Epidendrum Sceptrum, Lindl. *Orch. Lind.* No. 50 (1846). *Id. Fol. Orch. Ep.* No. 111 (1853). *Illus. hort. n.s. XXVIII.* (1881), p. 96.

Native of the eastern Cordillera of New Granada, at 5,000—7,000 feet elevation, from Ocaña northwards to Santa Marta, and of the mountains of Venezuela, between Pamplona and Merida. It was first detected by Linden near the Indian village of Jaji (?) growing on the trunks of decaying trees, and was subsequently gathered by other collectors in various localities. It was introduced by its discoverer in 1843. The species is a variable one as regards the size and colour of the flowers.

E. Schomburgkii.

EUEPIDENDRUM. Stems terete, slender, 24—30 or more inches high, leafy along the upper portion. Leaves oblong or oblong-lanceolate, 3—4 inches long. Peduncles greatly elongated, jointed with a linear acuminate bract at each joint, and terminating in a loose corymbose, many-flowered raceme. Flowers $1\frac{1}{2}$ —2 inches in diameter, bright vermilion-red, the apex of the column orange-yellow; sepals and petals spreading, similar and sub-equal, linear-lanceolate, acute; lip three-lobed, fringed at the margin, the side lobes broadly rotund, falcate, the intermediate one triangular-cuneate with two median raised lines, at the base of which is a two-lobed yellow callus.

Epidendrum Schomburgkii, Lindl. in *Bot. Reg.* 1838, misc. No. 16. *Id. t.* 53. *Pact. Mag. Bot. X.* p. 121. *E. fulgens*, Brongn. *Voy. Duperrey*, t. 43, ex. Lindl. *Fol. Orch. Ep.* No. 219. *E. pristis*, Rehb. in *Gard. Chron.* XXVI. (1886), p. 262.

Discovered by Dr. Schomburgk during his second expedition into the interior of British Guiana in 1837, growing on trees on the banks of the Commewyne River, and sent by him to Messrs. Loddiges, of Hackney, in whose nursery it flowered in the following year. According to Dr. Lindley,* it has also been gathered in Surinam by Focke, at Pernambuco in Brazil by Gardner, and on the Andes of Quito by Jamieson; the geographical distribution of

* *Fol. Orch. Ep.* No. 219.

the species is therefore most remarkable, the two last-named localities being separated from each other by the entire breadth of the South American Continent at its widest part, and both remote from the station in which it was first discovered.

E. selligerum.

ENCYCLIUM. Pseudo-bulbs ovoid, clothed when young with pale membranous sheaths, smooth and pea-green when older, variable in size, the largest 3—4 inches in diameter, diphyllous. Leaves linear-ligulate, 9—12 inches long, leathery, deep green. Peduncles 3—4 feet long, loosely paniculate, many flowered. Flowers fragrant, $1\frac{1}{2}$ inches in diameter; sepals and petals similar and equal, clawed, spatulate, concave, brown with a pale margin; lip adnate to the column at the base only, three-lobed, the side lobes spreading, roundish oblong, white, the intermediate lobe ovate, apiculate, crisped, light purple; disk fleshy, scooped. Column triquetral, winged, green above.

Epidendrum selligerum, Batem. in *Bot. Reg.* 1833, misc. No. 66. Lindl. *Fol. Orch. Ep.* No. 26.

First sent from Guatemala by Mr. G. Ure Skinner to Mr. Bateman in 1836, and, *fide* Lindley, subsequently detected by Galeotti, near Oaxaca, in Mexico, growing on rocks and trees at an elevation of 3,000 feet. It is occasionally imported with other Mexican and Guatemalian orchids, the plant from which our description was taken being an instance and which flowered in our houses in the summer of 1889. As a species it comes near *Epidendrum ionosmum*, from which its larger-sized pseudo-bulbs and leaves and especially the acute, not emarginate, labellum of its flowers chiefly distinguish it. The specific name, *selligerum* ("saddle-bearing"), refers to the saddle-like disk of the labellum.

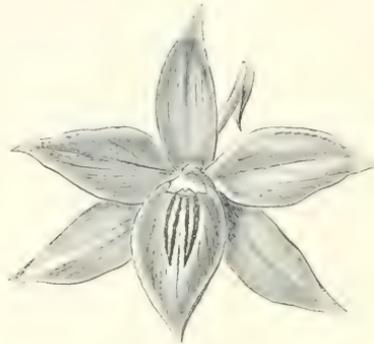
E. Skinneri.

BARKERIA. Stems slender, 6—12 inches high, resembling those of the smaller fasciculate *Dendrobes*. Leaves lanceolate, acute, 3—5 inches long, Peduncles slender, a foot or more in length, jointed below with a closely adherent acute whitish bract at each joint, racemose above. Flowers on slender pedicels, $1\frac{1}{2}$ inches long, coloured like the perianth which is bright magenta-purple except the yellow disk and orange lamellæ of the lip; sepals and petals ovate-lanceolate, acute; lip oval-oblong with three long and two short elevated lines, the longer ones confluent at the apex.

Epidendrum Skinneri, Batem. in *Bot. Reg.* 1836, t. 1881. *Bot. Mag.* t. 3951. Lindl. *Fol. Orch. Ep.* No. 196. Warner, *Sel. Orch. I.* t. 38. *Barkeria Skinneri*, Paxt. *Mag. Bot. XV.* (1849), p. 1. De Puydt, *Les Orch.* t. 6.

One of the numerous discoveries of Mr. G. Ure Skinner, who sent

it to Mr. Bateman in 1835, in whose collection at Knypersley, in Cheshire, it flowered in January of the following year. It grows upon trees on the mountains near the city of Guatemala at a considerable elevation, where the temperature is intermediate or ranging from 13°—21° C. (55°—70° F.). It has long been well known under the name of *Barkeria Skinneri* as one of the handsomest of winter-flowering



Epidendrum Skinneri.

orchids, but it is now rarely seen in British gardens; it is said to be nearly exterminated in its native country by the clearing of the forests for coffee plantations.

E. spectabile.

BARKERIA. Stems terete, 3—5 inches high, each bearing at its summit 2—4 oblong-lanceolate, acute leaves, 3—4 inches long. Peduncles issuing from a scarious brownish sheath, racemose, 5—10 flowered. Flowers 2—3 inches across vertically, rosy lilac, the lip paler and spotted with deep purple; sepals linear-lanceolate; petals ovate-lanceolate; lip ovate-lanceolate, traversed by 3—5 raised lines.

Epidendrum spectabile, Rehb. Walp. Ann. VI. p. 375 (1861—5). Benth. et Hook. Gen. Plant. III. p. 529 (1883). *Barkeria spectabilis*, Batem. Bot. Reg. 1842, misc. No. 45. Id. *Orch. Mex. et Guat.* t. 33. *Bot. Mag.* t. 4094. Paxt. *Mag. Bot.* X. p. 169.

A very handsome species, now very rarely seen in collections, but where cultivated is known under the name of *Barkeria spectabilis*. It is a native of southern Mexico and Guatemala, inhabiting the mountains near the Pacific Coast at a moderate elevation.* It was first sent from the last-named country by Mr. G. Ure Skinner about the same time as the preceding species, and was subsequently sent

* The localities in which it occurs do not appear to have been recorded.

by Hartweg, from Mexico, to the Horticultural Society of London, in whose garden at Chiswick it flowered in the summer of 1842.

E. Stamfordianum.

PSILANTHEMUM. Stems fusiform, 9—12 inches long, attenuated below into a slender footstalk, di-triphyllous. Leaves oblong-lanceolate, 6—9 inches long. Peduncles from the base of the stems and exceeding them in length, racemose, sometimes paniculate. Flowers numerous, fragrant, $1\frac{1}{2}$ inches across vertically; sepals lanceolate-oblong, acute, yellow spotted with red; petals similar but smaller, narrower at the base, and with fewer but larger spots; lip three-lobed, the side lobes ovate-oblong, white or very pale yellow, the front lobe clawed, transversely oblong with fimbriate margin, yellow; crest bipartite, violet-purple. Column terete, violet-purple at the apex.

Epidendrum Stamfordianum, Batem. *Orch. Mex. et Guat.* t. 11 (1837—43).
Lindl. *Fol. Orch. Ep.* No. 88. *Bot. Mag.* t. 4759. *E. basilare*, Klotzsch in
Allg. Gart. Zeit. 1843, p. 193. *E. cynostalix*, Rehb. in *Bot. Zeit.* 1852, p. 731.



Epidendrum Stamfordianum.

var.—Wallacei.

Stems and inflorescence shorter than in the Guatemalian type; sepals and petals yellow densely spotted with purple; lip cream-white spotted with purple.

E. Stamfordianum Wallacei, Rehb. in *Gard. Chron.* I. s. 3 (1887), p. 543.

sub-vars.—*Mr. Lee's* (*Gard. Chron.* III. s. 3 (1888), p. 521), sepals and petals buff-yellow with purple hieroglyphic markings, lip light rose spotted with purple; *Sir Trevor Lawrence's*, sepals and petals vinous-red bordered with yellow, lip light yellow spotted with rose.

Discovered by Mr. G. Ure Skinner on the shores of Lake Isabel, near San Mico in Guatemala, in 1837, and sent by him to Mr. Bateman, in whose collection at Knypersley it flowered in the spring of the following year. Since that date it has been gathered in various localities in Central America and Colombia by different collectors; its geographical range is thence known to extend from Mexico southwards to a district on the eastern Cordillera of New Granada, south of Bogota. Throughout so extensive a range, the species shows a slight variability in the flower, chiefly in the form of the labellum and in the colour of the perianth. It was named in compliment to the Earl of Stamford, of Enville Hall, Staffordshire. As stated in the introductory notes, the radical inflorescence is peculiar to this species; it thence forms by itself the section *PSILANTHEMUM*.

E. stenopetalum.

EUEPIDENDRUM. Stems tufted, cylindrical, as thick as an ordinary writing-pencil, 12—24 inches high, the newest formed leafy from the base. Leaves linear-oblong, 3—4 inches long, amplexicaul, emarginate or obtuse, leathery, deep green. Peduncles 5—7 or more flowered. Flowers $1\frac{1}{2}$ inches in diameter, rosy mauve with a square white blotch on the lip immediately in front of the column; sepals lanceolate, sub-acuminate; petals broader, ovate, acute; lip broadly obovate, adnate to the short column to half the length of the latter. Column purple.

Epidendrum stenopetalum, Hook. *Bot. Mag.* t. 3410 (1835). Lindl. *Fol. Orch.* Ep. No. 247. Rolfe in *Gard. Chron.* II. s. 3 (1887), p. 616. *E. lamellatum*, Lindl. *Bot. Reg.* 1843, misc. No. 60.

A species with attractive rose-coloured flowers that was first introduced from Jamaica, in 1834, to the Botanic Garden at Glasgow, where it flowered in February in the following year. It has occasionally been imported since that date, as mention is made of its being cultivated in Mr. Booth's collection at Flotbeck, near Hamburg; in Sir C. Lemon's collection at Carclew, in Cornwall; and quite recently we have received flowers from M. Witte, Superintendent of the Botanic Garden at Leyden, whence plants had been received from Surinam, in Dutch Guiana. It is also said to occur in Honduras, Panama, and near San Cristobal, in Venezuela; its presence in the last named locality, however, seems to require confirmation.

E. Syringothyrsus.

EUEPIDENDRUM. Stems slender, erect, 4—5 feet high, leafy upwards. Leaves elliptic-lanceolate, acute, 6—7 inches long. Peduncles clothed with brown sheathing bracts at the base, and terminating in a dense thyrsoid raceme, 5—7 inches long. Flowers an inch in diameter on slender horizontal red-purple pedicels (including ovary) $1\frac{1}{2}$ inches long; sepals and petals spreading, elliptic-lanceolate, red-purple, the petals narrower than the sepals; lip three-lobed, coloured like the other perianth segments with the exception of the white disk on which are three yellow calli, the lobes subquadrate, the middle one apiculate.

Epidendrum Syringothyrsus, Rehb. MSS. in horto. Veitchiano, 1868. Id. Xen. Orch. III. p. 22. *Bot. Mag.* t. 6145.

First communicated to the late Professor Reichenbach, by Mandon,* who gathered it in 1858 in the neighbourhood of Sorata, in Bolivia, and also in the Andean valley of Challasuya, growing upon rocks amidst shrubs and ferns, a temperate elevated region 8,000—9,000 feet above sea level. It was introduced to our Chelsea nursery by Pearce, in 1868, and flowered for the first time in May of the following year. It is one of the handsomest of the spathaceous *Epidendra*, but it is still very rare in European gardens.

E. tampense.

ENCYCLIUM. “Pseudo-bulbs ovoid, small and narrowed above, monophyllous. Leaves narrowly linear, 6 inches long by $\frac{1}{8}$ inch broad. Peduncle slender, exceeding the leaves, brownish. Flowers $1\frac{1}{4}$ inches across; sepals linear, obtuse, narrowed below, light yellowish brown; petals similar but more narrowed below; lip white, the front lobe rounded, obtuse, with a number of purple lines that become confluent into a blotch, the side lobes linear with a few faint purple lines. Column greenish white with a pair of short teeth on the angles, and 3—5 purple stripes on the back.”—Rolfe in *Gard. Chron.* IV. s. 3 (1888), p. 150.

Epidendrum tampense, Lindl. in *Bot. Reg.* 1847, sub. t. 35. Id. *Fol. Orch. Ep.* No. 34.

First communicated to Dr. Lindley by Dr. Torrey, “the Nestor of American botany,” about the year 1847. It is a small slender species, occurring in the neighbourhood of Tampa Bay in Florida, and nowhere else, so far as at present known; it is therefore especially interesting to American orchidologists as being one of the very few epiphytal orchids found wild within the United States territory. It is rarely seen in British gardens.

* Xen. Orch. III. p. 22.

E. tigrinum.

AULIZEUM. Stems from a stout, slowly creeping, woody rhizome, sub-cylindric, slightly compressed, 7—10 inches long, invested below with imbricating brown sheaths, and with two joints near the apex from which the oblong, obtuse, sessile leaves, 6—8 inches long, spring. Peduncles stoutish, erect, longer than the leaves, racemose, 6—9 flowered. Flowers fleshy, scentless, $1\frac{1}{2}$ —2 inches in diameter; sepals and petals oblong, acute, bright yellow-green spotted with black-purple, many of the spots ocellated; lip shorter than the other segments, obovate, obscurely emarginate with three raised lines on the disk, minutely pubescent, nankeen-yellow with a striated red stain in front of the column. Column very thick, trilobate at apex, light nankeen-yellow.

Epidendrum tigrinum, Lindl. Orch. Lind. p. 9 (1846). Id. Fol. Orch. Ep. No. 116 (1853).

Introduced in 1843 by Linden, who had discovered it in the Merida district of Venezuela, at 5,000—6,000 feet elevation, and occasionally imported since with other orchids from the same region. It is very near *Epidendrum variegatum*, from which it is easily distinguished by its longer and more slender stems, and by its fewer-flowered raceme of larger scentless flowers with a differently shaped labellum.

E. tovarense.

EUPEPIDENDRUM. Stems terete, erect, 9—12 inches high, nearly as thick as the little finger, leafy above. Leaves oval-oblong, 4—5 inches long, $1-1\frac{1}{2}$ inches broad. Peduncles 6—8 inches long, issuing from a long and narrow compressed sheath and terminating in a few-flowered raceme. Flowers milk-white; sepals and petals linear-spathulate, the petals the narrowest; lip three-lobed, the side lobes sub-quadrate, the intermediate one oblong-obtuse, emarginate.

Epidendrum tovarense, Rehb. in *Linnæa*, XXII, p. 338. Lindl. Fol. Orch. Ep. No. 160 (1853). *E. sinuatum*, Lindl. *vide* Hemsl. in Gard. Chron. XX. (1883), p. 634.

Discovered by Wagener about the year 1850, in the Tovar district in Venezuela, where it occurs on the mountains at a considerable elevation; it was subsequently cultivated in the Botanic Gardens at St. Petersburg and other places on the Continent; its first introduction into British gardens does not appear to have been recorded, but it is occasionally imported from Caracas with other orchids from Venezuela.

E. variegatum.

AULIZEUM. Stems fusiform, compressed, 6—9 inches high, tapering

above and below, di-triphyllous. Leaves oblong-lanceolate, obtuse, 6—9 inches long. Racemes longer than the leaves, many flowered. Flowers fragrant, 1—1½ inches in diameter; sepals and petals narrowly obovate-oblong, pale yellow, sometimes yellow-green blotched with purplish brown, the petals smaller than the sepals; lip very short, cordate, acute with two raised longitudinal lines, and a downy callus at the base, bright rose colour, but sometimes white spotted with rose.

Epidendrum variegatum, Hook. *Bot. Mag.* t. 3151 (1832). Lindl. *Bot. Reg.* 1839, t. 11. Id. *Fol. Orch.* Ep. No. 117. *E. crassilabium*, Poeppig. *E. pachycephalum*, Klotzsch. *E. pamplonense*, Rehb.

var.—*coriaceum*.

Stems shorter and thicker; leaves broader, shorter and more leathery. Flowers light yellow spotted with red-brown, the lip paler than the other segments.

E. variegatum coriaceum, Lindl. *Fol. Orch.* Ep. No. 117. *Flor. de Cristo*, vulg. *E. coriaceum*, *Bot. Mag.* t. 3595.

Widely distributed over South America and the West Indies. It is said to have been originally discovered by the French naturalist, Descourtilz, near Ilha Grande, in Brazil, growing on fallen trees fully exposed to the sun. It was subsequently gathered by Mr. W. Harrison, near Rio de Janeiro, and sent by him to his brother at Liverpool, in whose collection it flowered in 1832. In the course of the next twenty years it was detected by various explorers and plant collectors near the Rio Negro in Brazil, in New Granada, British Guiana, Jamaica, and other places. It is one of the most variable of *Epidendra*, a circumstance that may be accounted for by its great diversity of station throughout its extensive habitat. Specimens collected in many localities widely remote from each other were compared by Dr. Lindley, who was persuaded that the various forms were only varieties of one and the same species, some of which he distinguished by name, but they are now known only in herbaria with the exception of *coriaceum*, which was first introduced from Demerara in 1837; it is very distinct, and is in cultivation in the Royal Gardens at Kew, and at Flotbeck Park, near Hamburg.

E. varicosum.

ENCYCLIUM. Pseudo-bulbs ovoid, 2—3 inches long, prolonged at the apex into a slender di-triphyllous stem, 4—6 inches long. Leaves linear-lanceolate, acuminate, 6 inches long. Peduncles erect, dull purple, 12—18 inches long, racemose along the upper half. Flowers about an inch in diameter; sepals and petals brown, the former linear-oblong, the latter linear-spathulate; lip fleshy, quadrate in outline, 4 cleft, varicose, white

spotted with rose on the basal half; crest tuberculose. Column dull white-brown.

Epidendrum varicosum, Batem. in Bot. Reg. 1838, misc. No. 37. Lindl. Fol. Orch. Ep. No. 71 (1853). Rehb. Xen. Orch. I. p. 163.

First discovered by Mr. G. Ure Skinner in Guatemala, afterwards by Warscewicz in Costa Rica and Veragua, by Galeotti, on porphyry rocks near Oaxaca, in Mexico, at 7,000—8,000 feet elevation, and by Hartweg at the Hacienda del Carmen, in the same country. It has thence an extensive range in Central America, and like all widely distributed species, is found to be variable, especially in the labellum and its calli, from which circumstance it has received many names at the hands of botanists.* It is a curious and distinct plant, well distinguished by its bottle-shaped pseudo-bulbs, its narrow, acuminate leaves, and the short, warty labellum of its flowers.

E. virens.

ENCYCLIUM. Pseudo-bulbs sub-conic, elongated, 3 inches long, invested with a greyish membraneous sheath, but bare and furrowed when old, di-triphyllous. Leaves linear, 12—15 inches long. Peduncles loosely paniculate, 24—30 inches long, many flowered. Flowers an inch in diameter; sepals and petals clawed, narrowly oval, pale yellow-green stained with brown in the centre; lip adnate to the column at the base only, three-lobed, white with some purple markings in front of the bilamellate callus, the lateral lobes oblong, oblique, sub-erect, the intermediate lobe sub-quadrate, apiculate, spreading. Column clavate with two small apical wings; green streaked with purple.

Epidendrum virens, Lindl. in Paxt. Fl. Gard. I. sub. t. 30 (1850-51). Id. Fol. Orch. Ep. No. 54. E. Wageneri, Klotzsch. E. ochranthum, A. Rich.

Abundant in Guatemala and Southern Mexico, whence it is frequently imported along with other more showy orchids from the same region; it was first discovered by Mr. G. Ure Skinner, in Guatemala. *Epidendrum virens* is nearly allied to *E. alatum*, from which it may be distinguished by its narrower leaves and more straggling panicles of smaller flowers of a duller colour.

E. vitellinum.

ENCYCLIUM. Pseudo-bulbs elongated, ovoid, or sub-conic, 1½—2 inches long, diphyllous. Leaves linear-lanceolate, 6—9 inches long, glaucous green. Peduncles slender, nodding, covered with a glaucous bloom, 15—18 inches long, racemose along the upper half, 10—15 flowered. Flowers

* *Epidendrum leiobulbon*, Hook. E. Lunæanum, A. Richard. E. quadratum, Klotzsch. E. phymatoglossum, Rehb. E. chiriquirense, Rehb. ex. Lindley, Fol. Orch. Ep. No. 71.

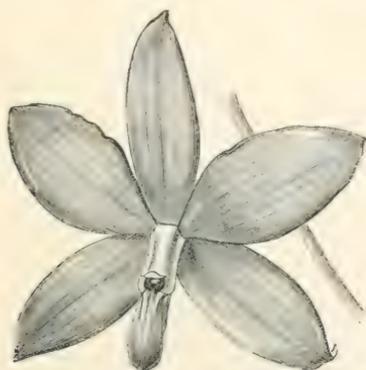
1½ inches across, bright cinnabar-red, except the lip and column which are orange-yellow; sepals and petals stellate, broadly lanceolate, acute; lip narrower and shorter than the other segments, linear-oblong, thickened in the middle where there is a raised line.

Epidendrum vitellinum, Lindl. Gen. et Sp. Orch. p. 97 (1831). Id. *Sert. Orch.* t. 45 (1838). Id. *Fol. Orch. Ep. No. 4.* *Bot. Reg.* 1840, t. 35. *Bot. Mag.* t. 4107. *Paxt. Mag. Bot. V.* p. 49. *Illus. hort. I.* t. 4 (1854). Van Houtte's *Fl. des Serres*, X. t. 1026.

var.—majus.

Pseudo-bulbs shorter and thicker, *i.e.*, more truly ovoid. Scapes shorter, erect with a denser raceme of larger flowers with broader segments that are more brilliantly coloured.

E. vitellinum majus, Veitch, *Fl. Mag.* t. 261 (1866). Jennings' *Orch.* t. 31. De Puydt *Les Orch.* t. 20 (copied from *Fl. Mag.*). Williams' *Orch. Alb. I.* t. 4.



Epidendrum vitellinum majus.

The typical *Epidendrum vitellinum* first became known to science from a specimen preserved in Mr. Aylmer Lambert's herbarium, which is said to have been collected by Dr. Coulter, in 1830, on the high mountains near Xalapa, in Mexico; it was shortly afterwards gathered by Karwinsky, and later by Galeotti on the Sierra of Oaxaca, at 6,000—7,000 feet elevation, and subsequently by Mr. G. Ure Skinner in Guatemala. The first living plants received in England were collected by Hartweg on the Cumbra of Totontepeque, and the first to flower in England was one in Mr. Barker's collection at Springfield, near Birmingham, in 1839. A few years later some plants were received at Kew from Oaxaca, which flowered in the Royal Gardens in 1844. *E. vitellinum* continued to be comparatively rare in European gardens till M. Roezl some twenty years later collected a considerable quantity of the variety *majus*, which he succeeded in sending to Europe in good

condition. M. Roezl had previously met with the old form on the Cofre de Perote, but the plants sent to Europe (the variety *majus*) were obtained near the Vera Cruz and Mexico railway, a few leagues from Orizaba, growing upon old and stunted oaks in a district where it rains regularly from one to two hours a day from May to October, and where from December to February dense fogs are common and frosts are by no means rare during the night,* but in the hottest months the temperature ranges from 15°—21° C. (60°—70° F.) From that time to the present *E. vitellinum majus* has been universally recognised as the finest Epidendrum of its colour in cultivation; the original type is now but rarely seen.

E. Wallisii.

EUEPIDENDRUM. Stems slender, erect, 4—6 feet high, leafy above, the internodes spotted with dull purple. Leaves lanceolate, acuminate, 4—5 inches long. Racemes 3—5 flowered, terminal and from the axils of the uppermost leaves. Flowers about 2 inches across; sepals and petals oblong-obtuse, canary-yellow, spotted with blackish purple, the petals sometimes with but few spots; lip large and spreading, broadly obovate



Epidendrum Wallisii.

in outline with a deep apical cleft and two lateral smaller ones, the margin notched, white streaked and stained with purple, and having three raised orange lines at the base, of which the middle one is the longest. Column short, thick, pale yellow.

Epidendrum Wallisii, Rehb. in Gard. Chron. IV. (1875), p. 66 and IX. (1878), p. 462. *Williams' Orch. Alb. II.* t. 74.

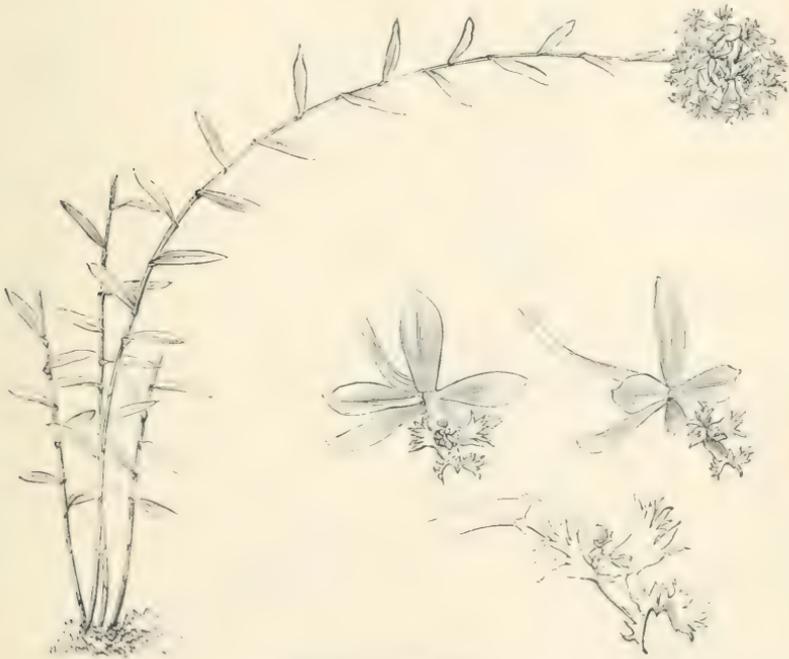
Introduced by us in 1874, through Gustav Wallis, who communicated no locality; it is now known to inhabit the Frontino district, on the

* Belgique horticole, 1883, p. 233.

western Cordillera of New Granada, growing in light situations at 4,000—7,000 feet elevation. The species is of horticultural merit chiefly on account of its large flowers and the continuity with which they are produced, a strong established plant being seldom out of flower. It is botanically interesting on account of the inflorescence being both terminal and lateral, a peculiarity that has been observed only in one or two other species of *Epidendrum*.

E. xanthinum.

EUEPIDENDRUM. Stems as thick as a goose-quill, 18—24 or more inches high, dull purple, leafy throughout. Leaves oblong lanceolate, sessile, obtuse, 3—4 inches long, Peduncles nearly as long as the



Epidendrum xanthinum.

(Drawn at Baron Schroeder's, The Dell, near Staines.)

stems, terminating in a dense head of bright yellow flowers that are sometimes tinted with orange; sepals and petals lanceolate, acute; lip three-lobed, all the lobes fringed, the front one deeply cleft.

Epidendrum xanthinum, Lindl. in Bot. Reg. 1844, misc. p. 18. Id. Fol. Orch. Ep. No. 229.

First discovered by Martius, and afterwards gathered by Gardner on the Serro de Frio, in the Brazilian province of Minas Geraes. It was

introduced by Messrs. Loddiges about the same time as *Epidendrum inversum*.

HYBRID EPIDENDRUM.

The only hybrid *Epidendrum*, obtained artificially, that has flowered up to the present time is that described below, which was raised by Seden, at our nursery, from *E. radicans* and *E. evecum*. It combines in a remarkable manner the characters of the parents;



1, *Epidendrum Obrienianum*. 2, *E. radicans*. 3, *E. evecum*.
(From the *Gardeners' Chronicle*.)

in habit it much resembles *E. radicans*, as it bears roots along the stems, but the flowers are well nigh intermediate in form, as will be seen from the annexed engraving; in colour they are brilliant carmine, thus blending the purple of *E. evecum* with the bright scarlet of *E. radicans*. It is named after Mr. James O'Brien, of Harrow-on-the-Hill,

Epidendrum Obrienianum.*E. evectum* × *E. radicans*.

Stems as in *Epidendrum radicans*, emitting white cord-like branching roots, 12—20 inches long. Flowers $1\frac{1}{2}$ inches in diameter, of a uniform bright carmine, the calli on the lip bright yellow; sepals and petals oblong-lanceolate, longer than in *E. evectum*, less narrowed at the base than in *E. radicans*; lip with three fringed lobes, as in both parents, the front lobe bipartite; crest consisting of two erect large teeth with two smaller ones behind them, and a rounded keel in front and between them.

Epidendrum Obrienianum, Rolfe in Gard. Chron. III. s. 3 (1888), p. 770.

SUB-GENUS NANODES.

Lindl. in Bot. Reg. 1832, t. 1541.

Nanodes was founded by Lindley upon a small-flowered species* introduced from Rio de Janeiro, in 1829, by the Horticultural Society of London, with which Reichenbach afterwards joined the far more curious and attractive species described below. With these may be grouped two other species inhabiting the Andes of Central and South America, one of which, *Epidendrum (Nanodes) Matthewsii*, has been in cultivation for some time past in the Royal Gardens at Kew.† The type species, *N. discolor*, and *N. Medusa*, were doubtfully referred to *Epidendrum* by Benthams, to which they conform as regards the union of the lip and the column, but their stems, prostrate in the first named species, and pendulous in *N. Medusa*, furnished with fleshy glaucous leaves, impart to them a habit so distinct from all the cultivated *Epidendras* that for horticultural purposes it is better to keep them separate.‡

Epidendrum (Nanodes) Medusæ.

Stems tufted, quite pendulous, as thick as the little finger, 6—10 inches long, sheathed by the imbricating bases of the leaves. Leaves fleshy, lanceolate, acute, 2—3 inches long, glaucous green. Flowers 3 inches across vertically, solitary or in pairs, terminal, with short terete bent ovaries that are pale green spotted with purple; sepals linear-oblong, acute, keeled behind, vinous-red in the middle, green at the base and

* *Nanodes discolor*, now rarely seen in cultivation. The name *Nanodes* (νανώδης) is the Greek word for pigmy.

† Gard. Chron. XXVI. (1886), p. 459.

‡ These characters, distinct as they are from a horticultural point of view, are of sectional value only. The above-mentioned species form the sub-section *Nanæ* of Benthams under *Epidendrum*, Gen. Plant. III. p. 531.

apex; petals similar but narrower and with slightly revolute margin; lip very large, adnate to the column the entire length of the latter, with which it forms a funnel-like tube, the blade sub-orbicular, concave, bifid at the apex, densely and coarsely fringed at the margin, deep vinous purple. Column terete, green spotted with dull purple.

Epidendrum Medusæ, Benth. in Gen. Plant. III, p. 531 (1833). *Nanodes Medusæ*, Rehb. in Gard. Chron. 1867, p. 432. *Bot. Mag.* t. 5723. Van Houtte's *Fl. des Serres*, XVII. t. 1771.

Introduced in 1867 by Messrs. Backhouse and Son, of York, from the Andes of Ecuador, although probably first discovered a short time previously by Wallis, who sent a rude sketch of the flower to M. Linden of Ghent, by whom it was communicated to the late Professor Reichenbach. It flowered for the first time in this country in the collection of the late Mr. John Day, at Tottenham, in the summer of 1868. It is one of the most singular amongst orchids, "its stout culms, its pale, glaucous foliage, and the extraordinary appearance and lurid purple of the flower give it a most sinister aspect."*

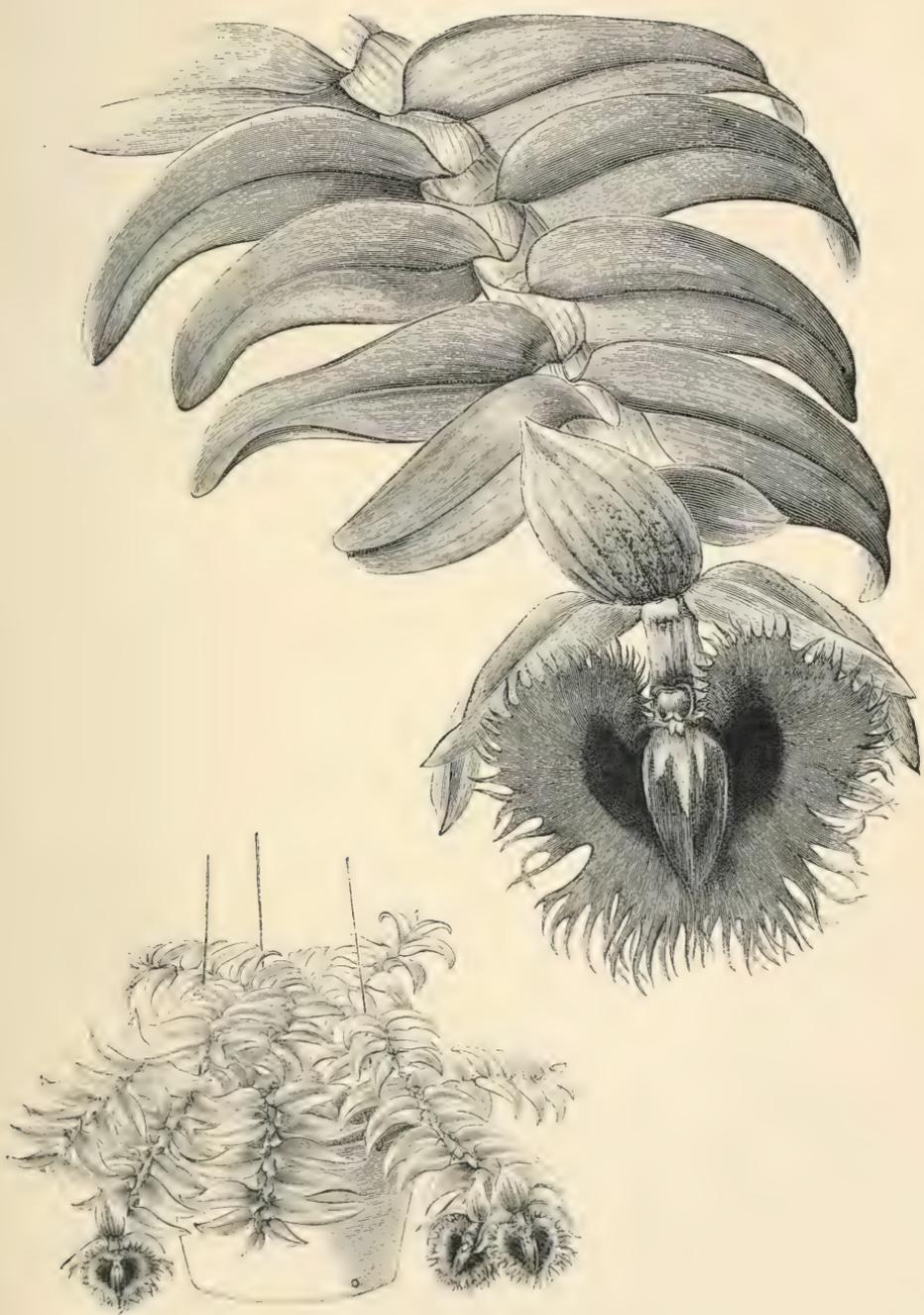
CULTURAL NOTE.—*Nanodes Medusæ* should be grown in the Odontoglossum house and receive treatment similar to that given to the dwarf growing Odontoglots. Pans with ample drainage or teak baskets that can be suspended near the roof-glass should be preferred. The compost of sphagnum moss and peat should be kept constantly moist, and the plant while growing should receive a liberal supply of water. The flowers of this orchid are among the most persistent in the order.

BROUGHTONIA.

R. Br. in Ait. Hort. Kew, ed. II. vol. V. p. 217 (1810—13). Benth. et Hook. Gen. Plant. III, p. 531 (1833).

A small genus including only two known species inhabiting the West Indies, of which the type has long been in cultivation. With this Mr. Rolfe has joined *Læliopsis domingensis*, Lindl.,† already described in page 98 of Part II. of this work, on the ground that it conforms to the essential characters of the genus in having four pollinia, in the presence of a spur that is adnate to the ovary, and in the side lobes of the lip embracing the footless column, the two last-named characters clearly separating *Broughtonia* from *Epidendrum* into which it was merged by Reichenbach.‡ The genus was dedicated

* *Bot. Mag.* sub. t. 5723. † *Gard. Chron.* V. s. 3 (1839), p. 491. ‡ *Walp. Ann.* VI, p. 324.



Epidendrum (Nanodes) Medusæ.

by Dr. Robert Brown to Mr. Arthur Broughton, an English botanist of the early part of the present century.

Broughtonia sanguinea.

Pseudo-bulbs clustered, roundish ovate, sometimes compressed, $1\frac{1}{2}$ —2 inches long, pale pea-green, diphyllous. Leaves linear-oblong, obtuse, 3—4 inches long, very leathery. Peduncles terminal, slender, erect or nodding, 12 or more inches long with a small appressed bract at each joint, racemose along the distal half, 6—9 flowered. Flowers bright crimson-purple with an orange yellow blotch at the base of the lip, $1\frac{1}{2}$ inches in diameter with reddish purple pedicel and ovary; sepals lanceolate, acute; petals oval-oblong, nearly three times as broad as the sepals; lip sub-orbicular with denticulate margin produced at the base into a slender spur that is adnate to the ovary. Column short, dilated at the apex.

Broughtonia sanguinea, R. Br. in Ait. Hort. Kew, ed. 2, V. p. 217 (1810—13). Lindl. Gen. et. Sp. Orch. p. 118 (1831). *Bot. Mag.* t. 3076. *B. coccinea*, Hook. *Bot. Mag.* t. 3536 (1836). Hook. *Cent. Orch.* t. 36. *Epidendrum sanguineum*, Sw. Prod. p. 124. Rehb. in Walp. Ann. Syst. VI. p. 324. Van Houtte's *Fl. des Serres*, XXII. t. 2315.

One of the earliest epiphytal orchids cultivated in England, it having been introduced to the Royal Gardens at Kew, in 1793, by Mr. Walter Ewer. It is a native of Jamaica, where it grows upon the old trunks of *Bombax*, *Rhizophora*, *Conocarpus* and other trees not far from the sea-shore, often in company with *Brassavola nodosa*. The colour of its flowers is rich and bright, and of a tint scarcely to be seen in any other orchid in cultivation.

Cultural Note.—*Broughtonia sanguinea* requires but little compost, and it is thence best cultivated in a teak basket, or on a block or raft that can be suspended near the roof-glass. A tropical temperature and a moist atmosphere being essential, it should have a light position in the East India house.

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The names in italics are varieties or synonyms; those followed by × are hybrids.

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A MANUAL

OF

ORCHIDACEOUS PLANTS

CULTIVATED UNDER GLASS IN GREAT BRITAIN.

PART VII.

PHALÆNOPSIS, AÉRIDES, VANDA,

ANGRÆCUM, ARACHNANTHE, RENANTHERA, RHYNCHOSTYLIS,
SACCOLABIUM, STAUROPSIS, Etc.

JAMES VEITCH & SONS,

ROYAL EXOTIC NURSERY, 544, KING'S ROAD, CHELSEA, S.W.

1891.

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PRELIMINARY NOTICE.

THIS Manual is being compiled to supply amateurs and cultivators of exotic Orchids with a fuller account of the principal genera, species and varieties cultivated under glass, than is contained in the Manuals hitherto in use.

The rapid extension of Orchid culture during the last quarter of a century, resulting from the increased taste for and appreciation of this beautiful and interesting order of plants, has, in our opinion, created the *desideratum* which we are now attempting to supply. The prominent place, too, occupied by Orchids in the columns of the Horticultural Press, and the surprising amount of practical and varied information respecting them disseminated through its agency, has also stimulated the desire to obtain all the leading facts in a condensed form, to which easy reference may at any time be made.

So numerous are the species and varieties of Orchids at present in cultivation, and to which additions are constantly being made by new discoveries and by artificial hybridisation, that the labour attending the compilation of a Manual sufficiently comprehensive to meet the wants of cultivators must necessarily demand much time. Moreover, the present unsatisfactory state of Orchidology, especially in its horticultural aspect and its complicated and unscientific nomenclature, have rendered the compilation of such a Manual within a stated time almost an impossibility.

Under these circumstances, and yielding to the solicitations of patrons and friends, we have decided upon issuing the work in parts, each part containing a monograph of the cultivated species and varieties of one of the most important genera, or of a group of genera.

Little explanation of the plan of the work is here needed; the parts as issued must speak for themselves. We have only to state that in the scientific classification and sequence of the genera we have followed, with but trifling deviations, the arrangement of Bentham and Hooker as elaborated in their *Genera Plantarum*, the most profound and, at the same time, the most intelligible exposition of the Orchideæ extant. In the nomenclature of the species, we have adhered to the Laws of Botanical nomenclature adopted by the International Botanical Congress, held at Paris in August, 1867.

In the description of the species, we have been compelled to use occasionally a few technical terms to avoid cumbrous circumlocutions; at the conclusion of the work we propose giving a glossary of the terms so used. In the cultural notes we have quoted temperatures in the Centigrade scale with the equivalent Fahrenheit readings, in the hope that the far more rational scale, now almost universally adopted in scientific investigations, may also come into use in horticulture. The literary references in italics indicate coloured plates of the species or variety described.

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SUB-TRIBE SARCANTHÆÆ.

Stems not pseudo-bulbous (monopodial), creeping or ascending, bearing adventitious roots often along their whole length. Leaves distichous, coriaceous, sometimes fleshy. Inflorescence always lateral, axillary or leaf-opposed; flowers sometimes solitary, but more often racemose or paniculate.*

STAUROPSIS.

Rehb. in Hamb. Gartenz. 1860, p. 117. Benth. et Hook. Gen. Plant. III. p. 572 (1833).

Stauropsis was founded by Reichenbach on a curious Vanda-like orchid from the Philippine Islands, unknown in cultivation, which Lindley had previously referred to Blume's *Trichoglossis*, but which does not conform to the essential characters of that genus. Subsequent additions made chiefly by Bentham, have raised the number of species now referred to Stauropsis to six or seven, most of these having been originally described as *Vandas*, and two of them with *Arachnanthe Louii*, made sectional under that genus,† but the absence of a spur to the labellum, and the different form of the sepals and petals, exclude them from Vanda. These same two species, which are those described *infra*, were referred by Reichenbach to Gaudichaud's *Fieldia*,‡ but as this name had been previously taken up by a genus of GESNERIACEÆ|| it could not be retained, and the two species were accordingly merged by Bentham into Stauropsis.§

The name Stauropsis is derived from *σταυρός* (stauros) "a cross," and *ὄψις* (opsis) "the appearance," but its applicability to this genus is obscure. The cultural treatment of the species here described is the same as that for *Aërides* and *Vanda*, and is formulated under the first-named genus.

*These sub-tribal characters are derived exclusively from the vegetative organs of the included species, by far the greater number of which present the formal aspect of an upright stem with strap-shaped often curved leaves pointing in two directions only, so familiar to the cultivators of *Vandas*, *Aërides*, *Saccolabiums*, etc.

†Lindley, *Fol. Orsh. Vanda*, p. 2.

‡Walper's *Annales Systematicæ VI.* p. 370.

||Gen. Plant. II. p. 1012. A monotypic genus, native of Australia, discovered in the early part of the present century, and dedicated to Mr. Barron Field, Judge of the Supreme Court of New South Wales. The species is figured in *Bot. Mag.* t. 5083.

§*Journ. Linn. Soc.* XVIII. p. 331. Mr. Bentham remarks, "I can discover no difference between these species (*Vanda Batemanii* and *V. gigantea*) and Reichenbach's genus *Stauropsis*, and have therefore adopted the latter name for the whole group."

Stauropsis fasciata.

Stem as thick as an ordinary writing-pencil, and about 18 inches high in plant observed, from which are produced cord-like, branching, aërial roots several feet long. Leaves very leathery, oblong, obtuse, 3—4 inches long, sometimes apiculate, sometimes unequally two-lobed at the apex. Racemes stoutish, ascending, longer than the leaves, four or more flowered. Flowers 2 inches in diameter, with rather short, three-angled, stalked ovaries; sepals and petals similar and sub-equal, light chestnut-brown barred with yellow, obovate-oblong or elliptic-oblong, acute, the lateral sepals falcately curved; lip three-lobed, shorter than the other segments, white with some red-brown dots on the front lobe, the side lobes erect, nearly hatchet shaped, the intermediate lobe spreading, ovate-oblong, acute, with two falcate auricles at the base, and a rounded erect plate on the disk. Column short, coloured like the sepals and petals.

Stauropsis fasciata, Benth. Gen. Plant. III. p. 572 (1883). *Trichoglottis fasciata*, Rehb. in Gard. Chron. 1872, p. 699. Williams' *Orch. Alb. V.* t. 203.

The native country of this singular Orchid has not been recorded, but like all the species in this and the nearest allied genera, it is unquestionably of Asiatic origin. It was introduced in 1872. We are indebted to Sir Trevor Lawrence, Bart., for materials for description.

S. gigantea.

Stems robust, thicker than a man's thumb, 20 or more inches high. Leaves broadly strap-shaped, very leathery, recurved, 18—24 inches long, closely imbricating, unequally two-lobed at the apex. Racemes drooping, about a foot long, 6—9 or more flowered. Flowers of coriaceous texture, about 3 inches in diameter, yellow with ocellated chestnut-brown spots, the spots on the sepals darker and more numerous, the lip and column paler; sepals and petals similar and sub-equal, obovate-oblong, obtuse, the sepals stained with dull red-purple behind, the lateral two prominently keeled; the petals smaller than the sepals, and less prominently keeled; lip much smaller than the other segments, fleshy, incurved, linear-oblong, with three white longitudinal keels of which the middle one reaches to the apex, and with two erect, rounded auricles at the base, and a small, two-toothed callus between them. Column three-angled, very short and thick.

Stauropsis gigantea, Benth. in Journ. Linn. Soc. XVIII. p. 331 (1881). Hook. f. Fl. Brit. Ind. VI. p. 27. *Vanda gigantea*, Lindl. Gen. et Sp. Orch. p. 215 (1832). Id. Fol. Orch. *Vanda* No. 2. Id. in Gard. Chron. 1858, p. 312. *Bot. Mag.* t. 5189. *V. Lindleyana*, Griffith Not. ad Plant. Asiat. III, p. 353 (1851). *Illus. hort.* VIII. t. 277. *Fieldia gigantea*, Rehb. *Xen. Orch.* II. p. 39, t. 112 (1862). Id. Walp. Ann. VI. p. 871 (1864).

First discovered by Dr. Wallich in Moulmein, shortly after the annexation of the province in 1826. Later it was found by Griffith

growing on large trees of *Lagerstroemia Reginae*, on the banks of the Tenasserim River; and by Thomas Lobb in the locality in which it was first detected by Dr. Wallich. It flowered for the first time in Europe in Mr. Robert Warner's collection at Broomfield, in April, 1858, and at the same time in Mr. Booth's collection at Flotbeck, near Hamburg, its contemporaneous appearance at these places thus affording an opportunity for the examination of fresh materials by the greatest orchid authorities of that time (Lindley and Reichenbach). It was exhibited by Mr. Warner at the meeting of the Horticultural Society of London, held at St. James's Hall on April 21st, where it is reported to have "certainly disappointed expectation," a circumstance which goes far to explain why it is so rarely seen in British gardens at the present time. For materials for description we are indebted to Mr. F. Wigan, of Clare Lawn, East Sheen, whose collection includes some fine old orchids now but rarely met with in cultivation.

The specific name must be assumed to refer to the large size of the flowers and leaves rather than to the habit of the plant, which under cultivation has never been observed to attain but moderate dimensions compared with the Goliath-like stature of its congener next to be described.

S. *lissochiloides*.

Stem very stout, ligneous below, attaining a height of several feet, and 1—2 inches in diameter. Leaves spreading or slightly decurved, broadly ligulate, 18—24 inches long, embracing the stem at their base, unequally bilobate at apex, very rigid and coriaceous. Racemes sub-erect, longer than the leaves, 12—20 flowered. Flowers fleshy, 3 inches in diameter, somewhat distantly placed along the rachis, on green twisted pedicels, each with six shallow keels; sepals and petals similar and sub-equal, obovate-oblong, yellow densely spotted with red-purple, purplish crimson beneath, the margins becoming reflexed as the flower increases in age; lip like a pelican's bill, three-lobed, the side-lobes rotund, erect, buff-yellow with longitudinal veins, between them is a thick, rounded, raised plate; the anterior lobe fleshy, boat-shaped, with three shallow keels above, and a broader one with a median sunk line beneath. Column very short and thick, red freckled with yellow above, white and purple around the stigmatic hollow.

Stauropsis lissochiloides, Benth. in Journ. Linn. Soc. XVIII. p. 381 (1831). *Vanda lissochiloides*, Lindl. Gen. et Sp. Orch. p. 216 (1832). Blume, *Rumphia IV.* p. 41, t. 194. *V. Batemanii*, Lindl. Bot. Reg. 1846, t. 59 (Batemanii). Id. Fol. Orch. *Vanda*, No. 1 (1853). Van Houtte's *Fl. des Serres XVIII.* t. 1921-2. *Fieldia lissochiloides*, Gaudichaud, Voyage, p. 424, t. 36 (1826). Rehb. Xen. Orch. II. p. 38 (1862). Id. Walp. Ann. VI. p. 876 (1864).

The botanical history of this remarkable orchid is sketched in outline by the literary quotations given above, which we now proceed to fill up. It was first made known to science by the French botanist, Gaudichaud, who discovered it growing on large trees and on bare rocks, on one of the small islands in the Molucca group during his trip in the ill-fated vessel *L'Uranie*, commissioned by the French Government in 1817 to sail on a voyage of discovery round the world, and which was wrecked on the Falkland Islands in 1820;* chiefly owing to this accident the botanical results of the voyage were not published till 1826. He founded upon this orchid the genus *Fieldia*, in compliment to Mr. Barron Field, of Sydney, New South Wales, at whose hands he had received great kindness during his stay in the then infant colony†; but Lindley when compiling his *Genera and Species of Orchidaceous Plants* referred it to *Vanda*, retaining Gaudichaud's specific name *lissochiloides*; Reichenbach, however, adopted Gaudichaud's genus *Fieldia* many years afterwards in his synopsis of the ORCHIDÆE, published in Walper's *Annales Systematicæ*, Vol. VI., *loc. cit. supra*, but it could not be retained for the reason already stated. In the meantime the plant had been re-discovered by the Dutch botanist, Blume, on the island of Bali, situated near the eastern extremity of Java, growing in the same manner as observed by Gaudichaud. It remained unknown to horticulture till 1841—2, when it was sent by Cuming from the Philippine Islands. It flowered for the first time in this country in Mr. Bateman's collection at Biddulph Grange in Staffordshire, in the summer of 1846. Dr. Lindley availed himself of the occasion to figure and describe the plant in the *Botanical Register* of that year, changing the specific name to *Batemanii* in compliment to the most prominent orchid amateur of that time, assigning as a reason that "there is only the slenderest resemblance between the flowers of this plant and those of the

* Charles Gaudichaud-Beaupré was one of the most laborious travellers of his time, and the very many discoveries he made, and his great and protracted sufferings in the cause of science, should preserve his name from oblivion. He was born at Angoulême in 1780. He became "Pharmacien de la marine" in 1810, and in that capacity he was attached to the exploring ship, *L'Uranie*. He subsequently made long voyages in *La Physicienne*, *L'Harmonie* and *La Bonté*, during which he visited many tropical and sub-tropical countries, both in the Eastern and Western Hemispheres. After his return to his native country from his last voyage, he devoted much of his time to botanical pursuits; but he had suffered so much from the effects of his voyages that he was very feeble and infirm for several years prior to his death, which happened at Paris in 1854.

† See page 1.

terrestrial African genus, *Lissochilus*." * The late Mr. John Gould Veitch visited the Philippine Islands in 1864, and detected this orchid growing in great abundance close to the sea-shore on the small island of Guimares in company with *Cypripedium philippinense*, and quite recently it has been observed by David Burke and other collectors on that island and also in Mindanao. In the last-named locality it grows fully exposed on bare rocks on the sea-shore, often within a few feet of high water mark. The stems sometimes attain a height of ten to twelve feet, from which are produced numerous stout, cord-like roots that cling so firmly to the rocks to which the plants affix themselves as to resist the force of the monsoon, which blows with a violence unknown in this climate. It is scarcely less abundant on many of the small uninhabited coral islets scattered among the Molucca group, where it grows under the same conditions as in Mindanao.

As a horticultural plant *Stauropsis lissochiloides* is confined to comparatively few collections. It is a giant among orchids, comparable in this respect with *Angraecum eburneum*, and hence its unwieldy size takes up more house-room than can be conveniently assigned to it. Moreover, its flowers, although handsome and lasting upwards of three months, are surpassed in attractiveness by many of the dwarfer species of *Vanda*.

ARACHNANTHE.

Blume., *Flor. jav. Praef.* p. 6 (1828). *Id. Rumphia IV.* p. 55, t. 196 (1850). Benth. et Hook. *Gen. Plant. III.* p. 572 (1833).

Under *Arachnanthe* are now brought two of the most remarkable orchids seen in European gardens, viz., *Arachnanthe Cathcartii* and *A. Lowii*. They were both originally introduced as *Vandas*, but have since been removed from that genus chiefly on account of the different form of their perianth segments, especially the labellum which is neither saccate nor spurred, moreover it is articulated on

* Adding, "The name (*lissochiloides*) is, however, on record, and the strict rules of botanical nomenclature seem to forbid the change, but it is so manifestly absurd to retain for a plant a name that has originated in some misconception, that we venture for once to disregard the rule for the sake of common sense." If names are to be altered "for the sake of common sense," *Stauropsis lissochiloides* is certainly not singular in that respect.

the base of the column, and motile, not affixed to it as in *Vanda*. To these must be added *A. Clarkei*, a fine species recently introduced from the Sikkim Himalaya, but which is still comparatively rare in British gardens. These three species are the only *Arachnanthes* at present in cultivation.

The genus was founded by Blume on the Linnean *Epidendrum Flos-aëris*, which he described and figured in his *Rumphia* under the name of *Arachnanthe moschifera*, a curious orchid, widely distributed over the Malay Archipelago, and formerly, if not at present, cultivated in Japan, where it was noted and figured by Kaempfer in his *Amœnitates*,* towards the end of the seventeenth century. To this, the type species, Mr. Bentham added the two species first named above, and two others — not in cultivation — previously referred to *Renanthera* by Lindley and Reichenbach;† and subsequently another species, discovered by the late Dr. Maingay in Malacca, has been added by Sir J. D. Hooker.‡ The number of species now included in the genus is six.

The generic name is derived from ἀράχνη (arachne), “a spider,” and ἄνθος (anthos), “a flower,” from a fancied resemblance of the markings on the flower of the type species to the cobweb of a spider.

Arachnanthe Cathcartii.

Stem as thick as an ordinary writing pencil, several feet long, leafy along the distal half or more.§ Leaves linear-oblong, 6—8 inches long, unequally two-lobed at the apex, recurved, very leathery. Racemes stoutish, longer than the leaves, 3—5 or more flowered. Flowers distant, 3 inches in diameter; sepals and petals similar and sub-equal, orbicular-oblong, concave, pale yellow, crossed by numerous wavy, often confluent red-brown bands; lip three-lobed, the side lobes small, roundish oblong, incurved, white streaked with red; the intermediate lobe yellow, reniform with obscurely dentate margin, the centre very thick with crenate border; calli two-ribbed, fleshy, pale yellow

* Notes and sketches of what the traveller saw, and which he afterwards published in a book under this name.

† *Renanthera Salingii*, Lindl. Gen. et Sp. Orch. p. 217, and Rehb. Xen. Orch. II. p. 41, t. 113. *R. bilinguis*, Rehb. Xen. Orch. I. p. 7, t. 4.

‡ Flora of British India, VI. p. 28.

§ “This plant as well as *Arachnanthe Clarkei* is distinctly pendulous in habit, and never under any conditions does it assume an erect position in the Himalayan forests.” “R. P.” in Gard. Chron. VIII. s. 3 (1890), p. 269.

spotted with red. Column very thick, buff-yellow passing into red-brown around the stigma and anther.

Arachnanthe Cathcartii, Benth. in Journ. Linn. Soc. XVIII. p. 332 (1881). Gen. Plant. III. p. 573. Hook. f. Fl. Br. Ind. VI. p. 27. Pfützer, Grundzüge, p. 11, with fig. (1832). *Vanda Cathcartii*, Lindl. Fol. Orch. Vanda, No. 17 (1853). Hook. f. *Illus. Himal. Pl.* t. 23. *Bot. Mag.* t. 5345. *Illus. hort.* V. t. 187 (copied from *Illus. Himal. Pl.*). Van Houtte's *Fl. des Serres.* XII. t. 1251 (also copied from *Illus. Himal. Pl.*). Gard. Chron. 1870, p. 1409, icon. xyl. *Fl. Mag.* N.S. t. 66. Jennings' *Orch.* t. 10. Williams' *Orch. Alb.* IV. t. 168. *Esmeralda Cathcartii*, Rchb. Xen. Orch. II. p. 39 (1862). Id. Walper's Ann. VI. p. 871 (1864).

To meet the exigencies of a progressive science like Botany, a change in the nomenclature of certain plants is often unavoidable. Several causes may arise to necessitate such a change, for example—the genus to which a species is first referred may not have been clearly circumscribed, or it may have been thrown into confusion by the addition of species that do not conform to its essential characters. *Vanda Cathcartii* is an instance of this; so long ago as 1862 the late Professor Reichenbach challenged the propriety of referring this plant to *Vanda*, and created for its reception a new genus which he called *Esmeralda*;* but the change seems to have attracted but little notice till the revision of the ORCHIDÆE was undertaken by Mr. Bentham for the *Genera Plantarum*. That eminent systematist, although agreeing with Reichenbach as to the propriety of removing it from *Vanda*, found it unnecessary to adopt his *Esmeralda*, as the flowers conform sufficiently to Blume's much older genus, *Arachnanthe*; and he accordingly brought it under that genus.

The following particulars of its origin are given by Sir J. D. Hooker in the *Botanical Magazine*, sub. t. 5845:—"It is a native of hot, damp, shady valleys in the eastern Himalaya, delighting in the neighbourhood of waterfalls where it is exposed to constant humidity; it was discovered by myself in 1848, and transmitted to the Calcutta Botanic Garden, where, after flowering, it was sent off to England, but did not survive the voyage.† Repeated attempts were subsequently made to introduce it with more or less success, and the honour of first flowering it in this country is, I believe, due to Messrs. Veitch, whose plant produced one flower in March of the present year (1870)." From that time forward *Arachnanthe*

* Xen. Orch. II. loc. cit. supra.

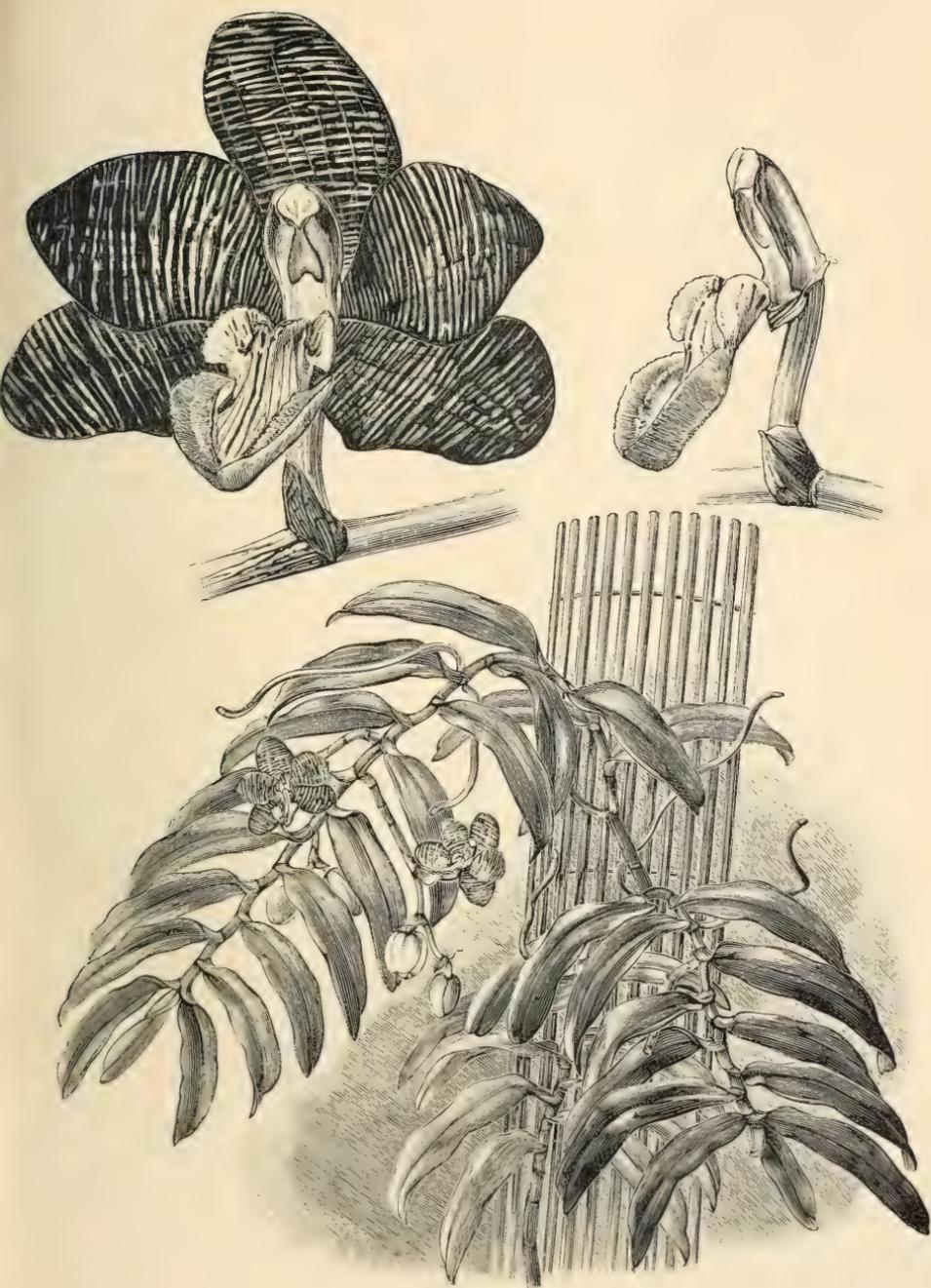
† Reichenbach affirms that it had been previously discovered by Griffith. "Lange vor der Reise von J. D. Hooker und Thomson hatte sie Herr Lindley von Griffith mit zahlreichen Blüthen anderer Seltenheiten in grossen Alkoholgläsern." Xen. Orch. II. t. 39.

Catcartii has occasionally had a place in many orchid collections both in Europe and America, and the estimation in which it has been held by horticulturists has found expression in the numerous coloured plates of it that have appeared in gardening publications. It usually flowers in the early months of the year, but it is not an uncommon occurrence for its racemes to be produced much later, and even in opposite seasons. The species is dedicated to the memory of Mr. James F. Catcart, of the Indian Civil Service, an ardent amateur naturalist, and one of the earliest explorers of the rich flora of the eastern Himalaya.* For materials for description and figuring we are indebted to Mons. le Duc de Massa, of the Château de Franconville, near Luzarches, in France, and Mr. Charles J. Lucas, of Warnham Court, near Horsham.

Cultural Note.—*Arachnanthe Catcartii* has always been a difficult plant to import alive, and even when it survives the voyage to Europe the most solicitous care on the part of the cultivator frequently fails to preserve it alive for any length of time in the glass houses of this country. At least two circumstances may be adduced as probable causes of failure: the impossibility of approximately imitating the climatic conditions under which it thrives in its native home, and the delicate constitution of the plant itself derived from its environment, by which it is deprived of the hardening influence of direct sunlight. "Thickly wooded gorges in close proximity to streams where light is of the most sombre description, quite beyond the warming influence of the sun, and where a continual high state of humidity during the whole year is maintained, are one and all necessary to its existence . . . From May till October the forests are maintained in a constant state of saturation by a drenching and almost continuous rainfall, while, during the other half of the year, a high degree of humidity is kept up by the splashing of the stream a few feet off, and the dense canopy of foliage overhead that checks evaporation."† Hence it is that good specimens, growing freely and flowering regularly, are rarely seen in British orchid collections, and therefore it is with much satisfaction that we are enabled to record an instance of the successful cultivation of this orchid in the garden of Sir George Macleay at Pendell Court, Bletchingley. Here "the plant is trained against a wall partly over a water tank in a small stove, where the temperature during winter is about 12°—15° C. (55°—60° F.), and the wall always more or less damp from the

*An account of his life and labours is given by Sir J. D. Hooker in the introduction to his *Illustrations of Himalayan Plants*.

† "R. P." in Gard. Chron. VIII. s. 3 (1890), p. 269.



Arachnanthe Cathcartii.



Arachmanthe Lowii.

moisture arising from the tank. In this situation the lowermost breaks also flower, but which, when detached from the parent plant, fail to do so. Moreover the old plant seems to suffer if it be shortened in the manner sometimes practised on some species of *Vanda*.*

A. *Clarkei*.

Stem as thick as an ordinary writing pencil, about a foot high in plants observed. Leaves linear-oblong, 3—6 inches long, gradually shorter upwards, unequally bilobate at apex. Peduncles ascending, 2—3 flowered. Flowers 3 inches in diameter; sepals and petals bright chestnut-brown barred with light yellow, the sepals linear-oblong, cuneate at the base, the lateral two falcately curved; petals similar but narrower; lip three-lobed, a little shorter than the other segments, the basal lobes erect, rotund, light yellow, almost white, streaked with red, the front lobe fleshy, "broadly roundish with a small lobule at the apex," chestnut-brown with 7—9 radiating white keels, of which the middle one is the broadest.

Arachnanthe Clarkei, Rolfe in Gard. Chron. IV. s. 3 (1888), p. 567. *Bot. Mag.* t. 7077. Hook. f. Fl. Brit. Ind. VI. p. 28. *Esmeralda Clarkei*, Rehb. in Gard. Chron. XXVI. (1886), p. 552.

Discovered in 1875 in the Sikkim Himalaya, at 6,000 feet elevation, by Mr. C. B. Clarke, F.R.S., the excellent Indian botanist, and introduced by Messrs. Low and Co., of Clapton, in 1885 or '6; it flowered for the first time in this country in the autumn of 1886, in the collection of the late Mr. John Day, at Tottenham. Its near affinity to *Arachnanthe Cathcartii* was recognised by the late Professor Reichenbach, who referred it to his genus *Esmeralda* as *E. Clarkei*, but for the reason already stated, that name cannot be accepted. As in *A. Cathcartii*, the labellum is a most curious organ; it is articulated to the foot of the column in such a way that the slightest touch imparts to it an oscillatory motion. *A. Clarkei* flowers in September and October.

The conditions under which *Arachnanthe Clarkei* grows in the Sikkim Himalaya are thus described by a correspondent of the *Gardeners' Chronicle*; they afford, therefore, indications for its cultural treatment. "It occurs on a thickly wooded crest or ridge, at an altitude of about 6,000 feet, where sun and wind have free play amidst its surroundings, drenched with cool rain and driving mists during the wet season, exposed to a fair amount of sunshine during the remainder of the year, and visited by a sprinkling of snow at the commencement of the new year. At this altitude the temperature during the hottest month of the year,

* Communicated to the *Gardeners' Chronicle*, III. s. 3 (1888), p. 106, by Mr. F. Ross.

rarely exceeds 24° C. (75° F.) in the shade, while in the two coldest winter months the thermometer ranges from about -1° to + 7° C. (30°—45° F.). As a consequence of being exposed to the hardening influence of the weather *A. Clarkei* assumes a much more stunted appearance, and never at any time approaches the straggling length of *A. Cathcartii*. The flowers open in October and last about six weeks.*

A. *Lowii*.

Stems robust, often an inch in diameter, attaining a length of 3—5 or more feet under cultivation, and sometimes branched near the base. Leaves spreading, linear-oblong or strap-shaped, 20—30 inches long, complicate at base, two-lobed at apex, deep glossy green. Racemes several, from the axils of the leaves, 6—9 or more feet long, pendulous, the rachis crimsonish brown, scabrous, pubescent, bearing flowers along the entire length at intervals of 3—5 inches. Flowers dimorphous with pedicel and ovary less than an inch long, clothed with a dense, hispid, pale brown pubescence, and sheathed on the lower side by a broadly ovate acute, green bract; the two (rarely three—four under cultivation†) lowermost flowers with broader, shorter, and more fleshy sepals and petals that are elliptic-oblong, bright tawny yellow with some brown dots sprinkled over the surface; the ordinary flowers about 3 inches in diameter, with linear-oblong, acute, undulated sepals and petals, deep red or chocolate-brown, with some light yellow spaces chiefly towards and at the apex; lip identical in structure in both kinds of flowers, much shorter than the other segments, somewhat slipper-shaped with the toe much contracted, on which is an incurved horn, and behind this a short fleshy plate, the central area light purple, the remainder yellow spotted with purple, except the apex and horn which are wholly yellow. Column very short and thick, greenish spotted with purple above, white dotted with rose in front.

Arachnanthe Lowii, Benth. in Journ. Linn. Soc. XVIII. p. 331 (1831). *Id. Gen. Plant.* III. p. 573. Rolfe in Gard. Chron. IV. s. 3 (1888), p. 628. *Vanda Lowii*, Lindl. in Gard. Chron. 1847, p. 239. *Id. Fol. Orch. Vanda* No. 3 (1853). *Illus. hort.* XI. t. 417. De Puydt, *Les Orch.* t. 46. Warner's *Sel. Orch.* II. t. 4. *Renanthera Lowii*, Rehb. Xen. Orch. I. p. 89 (1855). *Bot. Mag.* t. 5475. Van Houtte's *Fl. des Serres.* XXI. t. 2256—7. Sander's *Reichenbachia* II. t. 71. *Vanda Lindleyana*, Hort. Low (not Griffith).

var.—*Rohdeniana*.

Plant dwarfier, with the leaves narrower and shorter than in the type. The lowermost yellow flowers, four in number, placed closer together, and separated from the ordinary ones by an interval of 9—12 inches; the latter of a brighter colour and differently spotted.

A. Lowii Rohdeniana, supra. *Vanda Rohdeniana*, Hort. Lüddemann.

* "R. P." in Gard. Chron. VIII. s. 3 (1890), p. 269.

† One—four in a wild state, in which they have never been observed to be entirely absent.

Among the many fine orchids discovered by Sir Hugh Low in Sarawak, this is unquestionably the most remarkable, for it possesses characters so distinct from every known orchid that it may well be doubted whether its relegation to *Arachnanthe* by Bentham is destined to be final; for the present it may be best left where the eminent systematist has placed it. In the absence of any published date, it may be assumed that Sir H. Low first detected it in 1845 or 6, about which time he sent it to his father at the Clapton Nursery, with the request that it might be called *Vanda Lindleyana*, in compliment to the most distinguished orchidologist of that time. Dr. Lindley, however, declined the honour, and transferred the name to the discoverer, "who certainly ought, before all others, to be associated with one of the finest which he has discovered in Borneo."*

The aspect of this orchid in its wild state is most peculiar. As seen by Sir Hugh Low, "the plants were hanging horizontally from the main stem of a large tree, from each of which depended two, three or four chains of flowers, ten to twelve feet long."† The observations of later collectors all bear testimony to the same remarkable appearance of the plants when in flower, with the addition that from some of the older plants as many as eight or ten long, pendulous racemes have been counted. *Arachnanthe Lowii* is always found in the neighbourhood of water, generally on the higher branches of the loftiest trees along the river banks, and overhanging the smaller streams sometimes in company with *Cypripedium Lowii*. It is abundant in the low, swampy forest near the coast of Sarawak, where it was collected by Curtis, who informed us that in the rainy season many of the trees on which it grows are only accessible by means of a canoe. Since its first discovery *A. Lowii* has been frequently imported, but owing to the length of time required for transmission, and perhaps the peculiar constitution of the plants themselves, derived from their environment in their native home, not many are preserved alive for a long time after their arrival in Europe; but when once established they will live and flower for many years under the same cultural treatment as that given to the tall-growing species of *Vanda*. One of the first plants to flower in England was sent home by our collector, Thomas Lobb, which flowered imperfectly at Exeter the second or third year after

*Gard. Chron. 1847, p. 239.

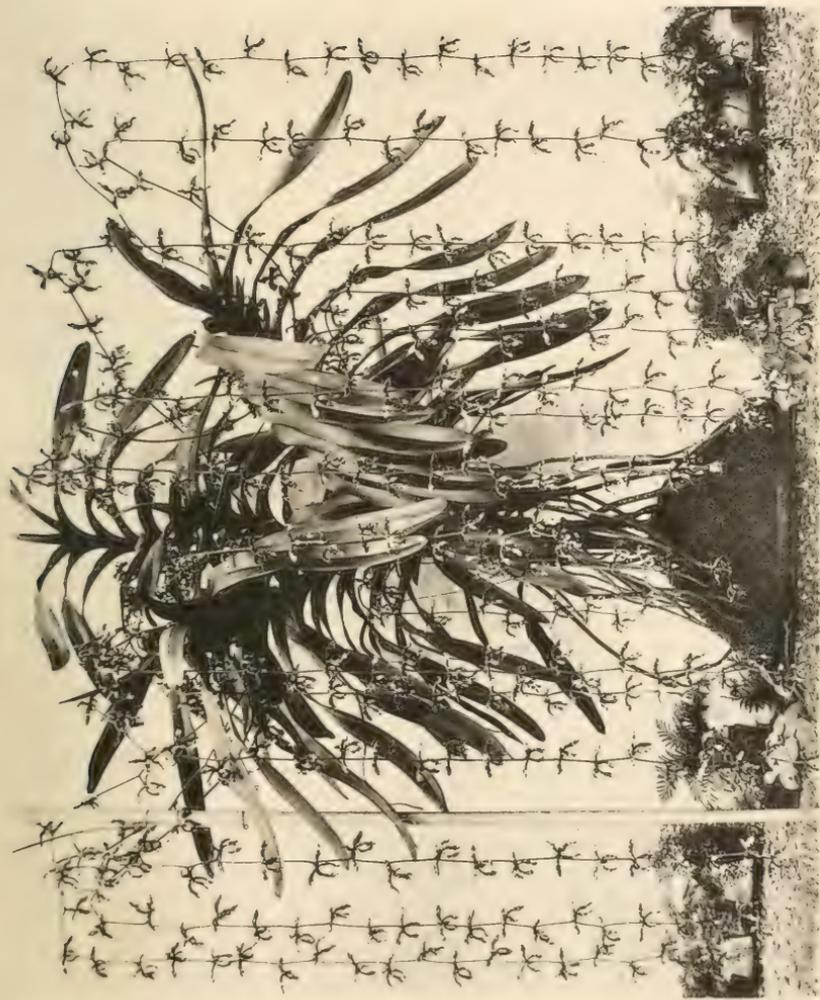
† Idem.

its arrival; but it was not till the autumn of 1862, when this grand orchid flowered in greater perfection in the collection of the late Mr. Sigismund Rucker, at West Hill, Wandsworth, that the extraordinary character of the inflorescence was first fully appreciated. A plant had previously flowered in the collection of Herr Reichenheim, at Berlin, and after an examination of fresh materials supplied from that collection, the late Professor Reichenbach removed the species from *Vanda* to *Renanthera*.

It is not so much the unusual appearance of the inflorescence itself that arrests the attention of the beholder, as the constant occurrence of two kinds of flowers on the same raceme, the two (sometimes three) lowermost being somewhat larger than the others, their perianth segments broader, and of a bright orange or tawny yellow dotted with red-purple, while all the others are deep chocolate-brown bordered and streaked with yellow. An examination of the two kinds of flowers produced by a plant in one of our houses in the summer of 1889 convinced us that structurally they are essentially the same. The dimorphism remains a mystery that has yet to be solved.

One of our illustrations represents the flowering of the grand plant of *Arachnanthe Lowii* in the collection of Baron Alphonse de Rothschild at Ferrières-en-Brie, in France, in July, 1885. M. Bergman, to whose courtesy we are indebted for the illustration, informs us that in 1887, when the plant flowered again, the inflorescence was still more extraordinary, and that 650 flowers were counted on the plant on that occasion.

Deviations from the usual type occasionally occur. The variety described above first appeared in M. Lüddemann's nursery at Paris, and is now in the collection of M. le Duc de Massa at the Château de Franconville, near Luzarches, in France. A raceme kindly sent to us by Monsieur le Duc showed no tangible character by which the plant can be specifically separated from the type, and the name, *Rohdeniana*, under which it is cultivated, can only be regarded as a varietal one for garden use. *Renanthera Rohaniana*, described by Reichenbach in *Xenia Orchidacea*, I. p. 89, is unknown to us. It is said to differ from *Arachnanthe (Renanthera) Lowii* in the keel of the lip; it was in cultivation 30 years ago in the collection of Prince Camille de Rohan, at Sichrow, in Bohemia.



Arachnanthe (Vanda) Lowii.

In the garden of Baron Alphonse de Rothschild, at Ferrières-en-Brie, France, July, 1885.

PHALÆNOPSIS.

Blume Bijdr. p. 294 (1825). Id. Rumphia IV. p. 52, t. 199 (1848). Benth. et. Hook. Gen. Plant. III. p. 573 (1833).

The sub-tribe of which we are now treating is exceptionally rich in species that are in high favour with orchid amateurs, and among them several of the Phalænopses unquestionably occupy the foremost rank. This is owing, not only to the surpassing beauty and attractiveness of their flowers, especially of those species included in Bentham's section, EUPHALÆNOPSIS, but also to their peculiar form, by which they may be distinguished at a glance from all other cultivated orchids. These species and the hybrids derived from them also produce their flowers in great profusion, and continue long in bloom at a season when exotic flowers are much appreciated. Besides these well-known favourites, there are now brought under Phalænopsis a goodly number of "forms" whose flowers are of different aspect and texture, but which conform to the essential characters of the genus as at present circumscribed. These with the first mentioned group form a series which connect the genus with *Arachnanthe* on the one hand, and with *Doritis* on the other, a small genus including about five species, and to which is now referred *Phalænopsis Wightii* (Rchb.) In the chain of affinities presented by this series, occasional interruptions occur that may be bridged over by future discoveries, but which serve at present to limit sectional divisions. Moreover the genus has been enlarged by the introduction of several undoubted natural hybrids, and by others obtained artificially in the glass houses of Europe. In its horticultural aspect Phalænopsis therefore presents a very varied and interesting group of species and hybrids, not less remarkable for the range of colour than for the variety in form and texture observable in the flowers.

The following diagnosis includes all the most important floral characteristics of Phalænopsis.

The *sepals* are free and spreading

The *petals* are similar, or much broader and then contracted at the base, rarely narrower.

The *labellum* is attached to the apex of the short foot of the column, or continuous with it; it is spurless, spreading, or at a small angle with the column.*

*Throughout the genus the labellum is of very complex structure, exceedingly difficult to describe in words.

The *column* is semi-terete, straight or slightly curved, and produced at the base into a short foot.

The *pollinia* are sub-globose, waxy, usually of a deep orange-red, and attached to the gland by a long slender caudicle.

The *capsule* is sub-cylindric, almost fusiform, with six furrows in EUPHALÆNOPSIS; angulate with the perianth segments persistent in STAUROGLOTTIS.

In their vegetation the Phalænopses are dwarf epiphytal herbs that attach themselves to the stems and branches of large trees, generally in shade, always in proximity to water, whether as running streams, the deltas of rivers, or close to the sea-shore. A few species, as *Phalænopsis Lowii*, *P. Parishii*, and *P. Esmeralda*, are deciduous in their native home, and grow on the branches of small bushes and even on limestone rocks.

The *stems* are very short and are sheathed by the bases of the leaves. From their base are produced numerous flexuose, aërial *roots*, that in most of the species of Phalænopsis proper are compressed, rugose, of a dull brown or greyish hue, and cling with extraordinary tenacity to the surfaces over which they creep. In other species the roots are cylindric, smooth, somewhat slender, at first green, changing with age to a greyish white; roots with characters intermediate between these are also of frequent occurrence.

The *leaves*, always few in number, are distichously arranged as in the allied genera, but the arrangement is often more or less apparently distorted, owing to the shortness of the stems on which they are close-set. They are usually of ovate, oblong, or obovate-oblong form, often very large, leathery in texture, and of a glossy green, but in a few species mottled with grey.

The *peduncles* are either simple and few flowered, or branched and many flowered, in the latter case sometimes attaining a considerable size; the bracts are usually small, ovate, and appressed to the base of the ovary.

A morphological peculiarity that occurs in the roots and peduncles of Phalænopsis has here to be noticed. Both organs are proliferous, that is to say, adventitious buds are produced by them, which, under favourable circumstances, ultimately develop into young plants that may be detached from their parent; the rate of development is, however, often extremely slow. Proliferous roots have been observed on *Phalænopsis Stuartiana*, *P. Schilleriana*, and *P. deliciosa*; of the observed instances, the proliferation has occurred most frequently in the first named species, of which a specimen with a miniature plant on one of its roots, and having two tiny leaves, was brought under the notice of the Orchid Conference at South Kensington, in May, 1885; a similar growth has been observed on the roots of *P.*

Schilleriana; the observed case in *P. deliciosa*, a species that is no longer in cultivation, at least in Great Britain, rests on the authority of the late Professor Reichenbach, who mentioned it in one of his communications to the Orchid Conference.* We find no record of proliferation occurring on the roots of any other species of Phalænopsis, but the phenomenon has been noticed in other genera, in *Cyrtopodium*, in *Saccolabium*,† and especially in our native Birds' Nest orchid, *Neottia Nidus-avis*, which was observed by Dean Herbert so long ago as 1833,‡ by Vaucher, a German botanist, in 1841, and subsequently by others.

Proliferation of the peduncle is a more frequent occurrence; it always takes place at one of the nodes, usually that immediately below the lowermost flowers when the inflorescence is racemose, or as before the lowermost branch when paniculate.§ Many of the species of Phalænopsis in cultivation produce proliferous peduncles, but the range of observation has been too restricted, and the recorded instances too few to admit of the formulating of any general law that pervades the phenomenon. Moreover the cultivators of these choice plants, as a rule, cut off the peduncles as soon as the flowering is over, as their retention on the plant would greatly weaken it, either by proliferation, or by continuous flowering, and even cause it to perish. The most frequently observed causes of proliferation of the peduncle have occurred in *Phalænopsis Lüddemanniana*, *P. Schilleriana*, *P. Stuartiana*, less frequently in *P. rosea*, *P. Aphrodite*, *P. intermedia*. The most common case of successive branching of the peduncle after the first flowers have fallen occurs in *P. amabilis*.||

Phalænopsis affords a conspicuous example of the rapid enlargement of a genus through the activity of the orchid collectors of the present time in searching out new species and varieties, and through the further multiplication of forms by the skill of the hybridist in the glass houses of Europe. Only one species was known to Linnæus, which was an herbarium specimen sent to him by Osbeck, and to which he gave the name of *Epidendrum amabile* (1753), (*Phalænopsis amabilis*, Bl.), and this was the only one known to science for nearly a whole century, till Cuming discovered a

* Report of the Orchid Conference in the Journal of the Royal Horticultural Society, p. 18. † Idem.

‡ Magazine of Botany and Gardening, *vide* A. D. Webster in Gard. Chron. XXIII. (1885), p. 769.

§ See fig. in Gard. Chron. IV. s. 3 (1888), p. 389.

|| Proliferation of the peduncle in other genera have been observed in *Oncidium abortivum* by Mr. Swan (Gard. Chron. II. s. 3 (1887), p. 554); in *Angræcum Leonis* by another correspondent (Id. IV. s. 3 (1888), p. 515); and in *Phaius grandifolius* after the stem had been cut off and thrown under the stage (Idem).

second species in the Philippine Islands in 1838, which by an unfortunate error Dr. Lindley referred to the *P. amabilis* of Blume, but from which it is clearly distinct. Ten years later a third species, *P. rosea*, was sent to our Exeter firm from the Philippine Islands by Thomas Lobb, who also sent with it *P. intermedia*, since proved to be a natural hybrid between *P. Aphrodite*, Cuming's discovery, and *P. rosea*. During the next fourteen years the number of species from various sources had increased to eleven, up to the time when the genus was monographed by Reichenbach in the first part of his *Xenia Orchidacea II.*, which he published in 1862. Twenty years later, when revising the ORCHIDÆ for the *Genera Plantarum*, Mr. Bentham estimated the number of species at fifteen, but so rapidly were additions made between 1875—85, that Mr. Rolfe enumerates thirty-four species in his revision of the genus published in the *Gardeners' Chronicle* in 1886; but as this number includes three or four that must be reduced to varieties or synonyms of other species, and one or two others that are undoubted natural hybrids, the actual number of known species may be fairly estimated at about thirty, two-thirds of which are in cultivation.

Mr. Bentham admitted but two sectional divisions, which are thus distinguished:—

EUPHALÆNOPSIS. Petals much broader than the sepals, and contracted at the base; lip with two antennæ-like appendages at the apex, but which are sometimes reduced to small teeth.

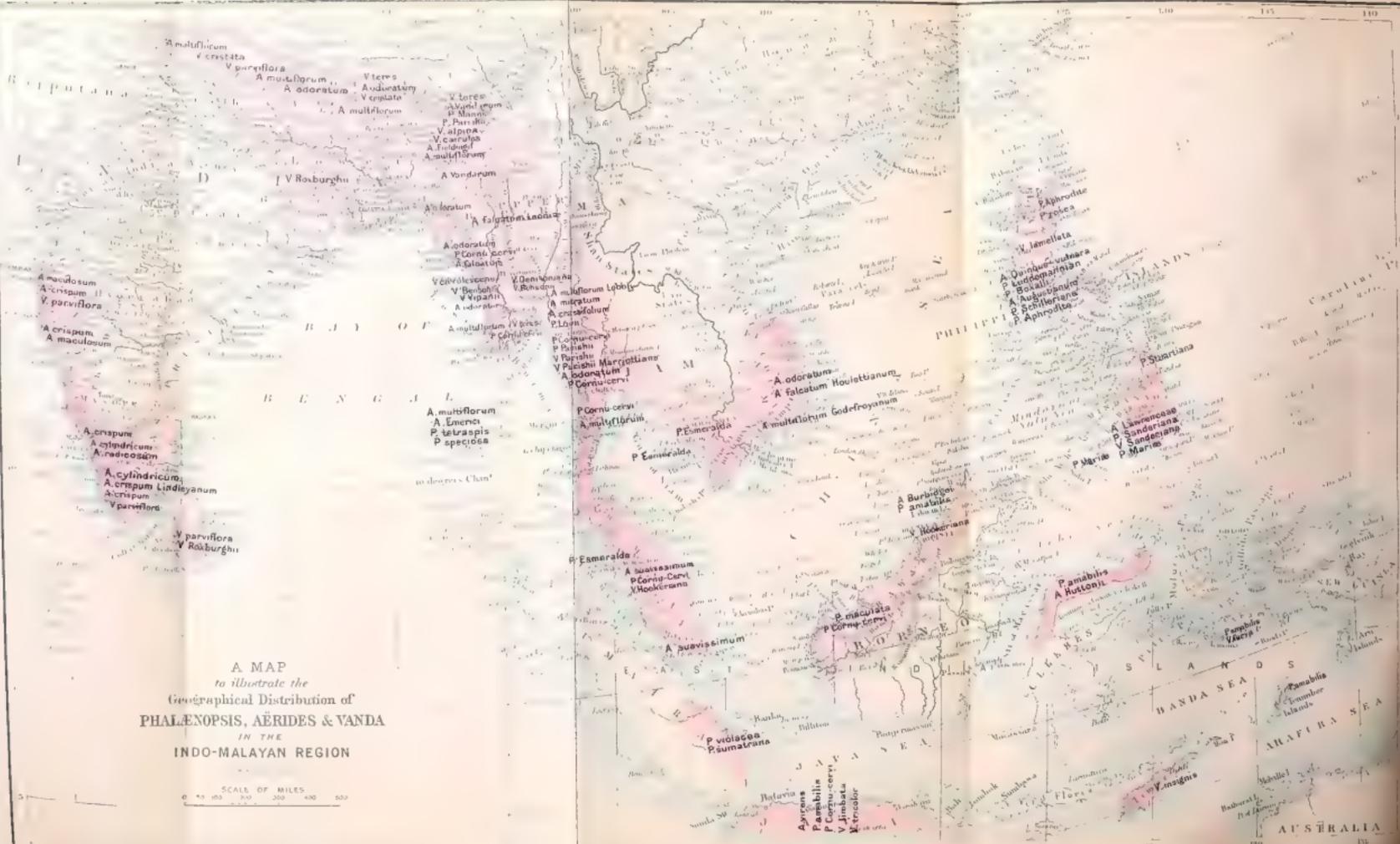
The included species are *amabilis*, *Aphrodite*, *Sanderiana*, *Schilleriana*, *Stuartiana*, and the hybrids in the parentage of which these species have participated.

STAUROGLOTTIS. Petals equal to, rarely smaller than the sepals; the middle lobe of the lip entire,* without the apical appendages of EUPHALÆNOPSIS.

This section includes *amethystina*, *Boxalli*, *Cornu-cervi*, *Lüddemanniana*, *Mannii*, *maculata*, *Mariæ*, *Parishii*, *rosea*, *speciosa*, *sumatrana*, *tetraspis*, *violacea* and others known to science but not in cultivation.

Besides those enumerated above, there are two other interesting species in cultivation that cannot properly be included in either section, viz., *Phalanopsis Lowii* and *P. Esmeralda*. Mr. Bentham included the first named in EUPHALÆNOPSIS, but it differs from all the species in that section in two important characters, viz., the absence of the apical

* In three species notched at the apex, *vide* Rolfe in Gard. Chron. XXVI, (1886), p. 276.



A MAP
to illustrate the
Geographical Distribution of
PHALAENOPSIS, AERIDES & VANDA
IN THE
INDO-MALAYAN REGION

SCALE OF MILES
0 100 200 300 400 500

appendages of the lip, and in having a curious proboscis-like rostellum; moreover its leaves are deciduous in its native home, and generally so under cultivation in the glass houses of Europe. *P. Esmeralda*, which would otherwise be included in *STAUROGLOTTIS*, is singular in having a pair of slender linear appendages on the claw of the labellum. To meet these obvious deviations from the other sectional types Mr. Rolfe has proposed two new sections for their reception, *PROBOSCIDIODES* for *P. Lowii*, in reference to the curious elephant's-trunk-like appendage of its column, and *ESMERALDA* for the species of that name.*

The generic name *Phalænopsis* is derived from *φάλανα* (*phalaina*), "a moth," and *ὄψις* (*opsis*), "the appearance." It seems to have been suggested to the Dutch botanist, Blume, by the fancied resemblance of the flowers of *Phalænopsis amabilis* (*P. grandijlora*, Lindl.), the species upon which the genus was founded, to some of the tropical moths while on the wing, in the same manner that our native species of *Ophrys* have received the popular names of Fly Orchis, Bee Orchis, Spider Orchis, etc., from the supposed resemblance of their flowers to those familiar insects.

Geographical Distribution. — The geographical distribution of the species of *Phalænopsis* will be best understood from an inspection of the accompanying map, on which are inscribed the names of all the species whose habitats are known. By far the greater number of these are insular, and the few that occur on the mainland of the Asiatic continent are, with two exceptions, natives of the south-eastern peninsula, and are always found at no great distance from the sea shore. All the species included in the section *EUPHALÆNOPSIS* are natives of the Philippine Islands, except the type, *Phalænopsis amabilis*, which has a wide range in the Malay Archipelago. On the mainland one species occurs in Cochin China, two in Moulmein, one, *P. Cornu-cervi*, in the delta of the Irawaddy, and thence southwards as far as Java and other islands in the Malay Archipelago, and one, *P. Mannii*, an outlying member of the genus, is found in Assam, living under different climatic conditions and environment from all its congeners.† With the exception of the last-named species, it is thence seen that the genus is spread over a region lying between the 15th parallel of north and the 8th parallel of south latitude, and between the 95th and 125th meridians of east longitude, and therefore within what is geographically

* Gard. Chron. XXVI. (1886), p. 276.

† A sub-variety of *Phalænopsis Parishii* also occurs in Assam, but not in the same locality as *P. Mannii*.

termed the equatorial zone. We have already described in some detail, under *Dendrobium*, the climatic phenomena of this zone, the most salient characteristics of which may be conveniently repeated here, since, under similar conditions, most of the species of *Vanda*, *Aërides*, and other members of the sub-tribe *SARCANTHÆÆ* live, notably those species that are in high estimation amongst cultivators of orchids.

The temperature of the equatorial zone is remarkable for its uniformity throughout the year, the extreme range of the thermometer from the lowest to the highest, at Batavia for example, rarely if ever exceeding 15° C. (27° F.), while at other stations it is considerably less. The highest day temperature is usually 33° — 35° C. (90° — 95° F.), while it seldom falls below 21° — 24° C. (70° — 75° F.) at night, the coolest hours being just before sun-rise. The annual rainfall is modified by local circumstances; in the Malay Archipelago and the southern Philippines it ranges from 80 to 90 inches; in these islands the atmosphere is nearly always saturated with moisture, and, owing to the great weight of vapour which its high temperature enables it to hold in suspension, a very slight fall in the thermometer is accompanied by the condensation of a large absolute quantity of atmospheric vapour, so that copious dews and heavy showers of rain are produced at comparatively high temperatures and low altitudes.* In Moulmein the annual rainfall is much greater than in the Malay Archipelago, and is distributed over ten months of the year, the remaining two months, from about the middle of January to the middle of March, being rainless; in the Andaman Islands, which are still nearer the equator, the dry season rarely exceeds four or five weeks; in Cochin China the climatic phenomena approach those of the Malay Archipelago, except that there is a decidedly dry season of about two months' duration. Within the equatorial zone the sea and land breezes are among the most prevalent and constant of the aerial currents, and within their influence nearly all the finest species of *Phalænopsis* live. The northern Philippines, Moulmein, and southern Burmah being within the sphere of the monsoons, the atmospheric disturbances in those countries are more violent at certain seasons of the year.

Cultural Note.—The introduction of species of *Phalænopsis* from the neighbourhood of the equator to the high latitude of Great Britain, to be cultivated in artificially heated glass houses, has been one of the

* Wallace's *Tropical Nature*, p. 15.

most difficult cultural problems horticulturists have been called upon to solve. The most accurate knowledge of the environment of the species in their native home affords, at best, but a subordinate aid to the solution of that problem, for an attempt to imitate the conditions under which they grow wild would simply prove impracticable, apart from the great difference in the climatic phenomena of places situated in latitudes so far removed from our own. A few instances quoted from authentic sources will make this clear. In north Borneo, *Phalænopsis amabilis* (*P. grandiflora*, Lindl.) grows high up on trees screened from the sun by a leafy canopy, deluged with rain for more than half the year, and constantly fanned by cool sea breezes.* In strong contrast to this, *P. Lowii* grows on limestone rocks that rise suddenly out of the delta of the rivers Gyne, Ataran, and others in Tenasserim, where the country surrounding these hills is under water the greater part of the year, and where, during the dry season, the plants are literally scorched, nothing remaining but the roots.† Again, in contrast to both the preceding cases, *P. tetraspis* grows suspended from the branches of Mangrove trees, a few feet above water along the swampy shores of the Andaman Islands;‡ and *P. Stuartiana* has been observed on the coast of Mindanao, growing on the branches of trees so close to the sea that it can scarcely fail to be washed by the salt spray during a storm. It is thence evident that the conditions under which Phalænopses can be grown successfully in this country can only be ascertained from experiment and from observations, extended over a long period, of the behaviour of the plants under the altered circumstances in which they are placed. The experiments, at first necessarily of an empirical character, have now extended over more than half a century, and the results derived from them may be fairly reckoned among the best achievements of the horticultural skill of the present day, for Phalænopsis may now be said to be firmly established in European gardens.

It will be directly inferred from the geographical distribution of the genus that the Phalænopses require a higher average temperature than the majority of the cultivated orchids, and to meet this requirement a separate house or compartment of a house is, when practicable, especially devoted to them. A low-pitched house is almost invariably preferred, but in the constructive details much diversity prevails, one cultivator preferring one kind of arrangement, another another kind, each affording some advantages that secure for it a preference. The most prominent instance of the successful cultivation of these plants known to us is at Tring Park, the seat of the Right Honourable Lord Rothschild; a general description of the house in which they are grown will thence serve better than any form of construction that we

* Burbidge, *Gardens of the Sun*, p. 52.

† Major-Gen. E. S. Berkeley in *Gard. Chron.* I. s. 3 (1887), p. 280.

‡ *Idem.* II. s. 3 p. 74.

can suggest. The Phalænopsis house at Tring Park is a half-span, and being the inner division of a long range facing south, no cold air from the opening of outer doors can enter it. The floor is 2 feet below the surface of the ground, and there are front and back beds covered with slate slabs; the front bed for the smaller plants averages $2\frac{1}{2}$ feet from the roof-glass, the back bed for the specimen plants averages $4\frac{1}{2}$ feet from the roof. The house is heated principally by hot-water pipes in the pathway, and by two 4-inch pipes in each of the covered beds; in addition to these there are two 1-inch hot-water pipes both along the front and along the back, placed as near the roof as possible. Ample ventilation is provided for along the whole length at top; the shading is effected by means of a roller blind, and on hot, bright days with the addition of an upright canvas screen 10 feet high, placed immediately in front of the house, and which can be set up and removed at pleasure. The plants are for the most part cultivated in upright teak cylinders, the potting material being that described *infra*. Many of them have been thus cultivated for ten years, and have not only flowered in a satisfactory manner, but have greatly increased in size.

The cultural routine practised by the most experienced growers of Phalænopsis may be thus formulated:—

Temperature.—Phalænopses usually commence their season's growth in March, at which time the temperature of the house should be gradually raised till the end of April, when the night temperature should not be allowed to sink below 21° C. (70° F.), and the day temperature should range from 24° — 27° C. (75° — 80° F.), according to the brightness of the weather. These temperatures should be maintained till the middle of November, from which time they should be gradually diminished up to the end of the year, when the plants enter upon their resting season, which continues till about the end of March. During this season, the night temperature should range from 15° — 18° C. (60° — 65° F.), according to the state of the weather, raised in the daytime to 18° — 21° C. (65° — 70° F.), or even a little higher on bright days.

Watering.—This must be regulated according to the season, as Phalænopses grow naturally in an atmosphere that is nearly always saturated with vapour. The humidity of the house during the growing season must be maintained to near the saturation point; this is effected chiefly by "damping down," that is to say, by sprinkling with water all the available surface within the house from which it will evaporate freely, as the floors, side-walls, stages, etc.; this should be performed at least three times a day in sultry weather. During the winter months the "damping down" may be restricted to once a day, or so often as is sufficient to counteract the drying effect of the hot-water pipes, and no more water should be applied direct to the plants than is sufficient to

keep the surface sphagnum alive and moist. : When water is applied direct, it should be poured on the sphagnum only, never on the foliage of the plants.

Ventilation and Shading.—No very precise directions can be given for ventilating the Phalænopsis-house. Air should be admitted during the growing season, whenever the external temperature is sufficiently high to allow of its being done without risk ; this is best effected by means of the lower ventilators, which should always be placed close to the hot-water pipes, that the air may be warmed by them during its ingress. The necessity for providing as much ventilation as is practicable, where so high a temperature has to be constantly maintained, is one of the most serious cares of the cultivator. The shading of the house, too, requires unceasing vigilance, especially during the growing season, when the sensibility of the leaves to direct sunlight is most apparent, for if exposed to it but for a short time when the sun is powerful, they soon lose their rich glossy colouring, and get a scorched, unhealthy appearance from which they seldom recover.* Generally speaking, shading must be regulated according to the season and the brightness of the weather. During the winter months little or no shading is necessary.

Potting, etc.—Phalænopsis may be grown in pots, baskets, or cylinders made of teak-wood rods, or even on blocks of wood and rafts. Baskets and cylinders made of stoutish rods are preferred by many cultivators for the species of EUPHALÆNOPSIS, as their roots can thence cling to the rods in the same way as they cling to the bark of trees in their native home ; but they are not free from objections, the greatest of which is that as soon as the wood begins to decay the roots of the plants will not cling to it. For species of the section STAUROGLOTTIS, which are mostly of smaller size, the pot, basket, or cylinder should be filled to three-fourths of its depth with clean, broken crocks for drainage, and on the top of these many cultivators place horizontally some straight pieces of charcoal ; but we have long discontinued the use of this substance from our inability to detect the slightest advantage derived from it. The remaining space should be filled with living sphagnum, and the plant placed in the centre, raised above the level of the rim by means of the sphagnum, and some smaller broken crocks mixed with it to promote drainage. It is usual to suspend the basket from the roof.

Should the atmosphere of the Phalænopsis-house be allowed to get dry, thrips will multiply with great rapidity, and soon disfigure the

* "The robust growth of *Phalænopsis amabilis* (*P. grandiflora*, Lindl.) astonishes all who see the plant growing in its native habitat for the first time, and how tightly the plants are lashed upon the trunk or branch on which they grow. Here, high up in mid-air and under a fierce sun, all the leaves are occasionally scorched off, or dried off by sun and wind during an exceptionally dry monsoon ; but the plant's energy still lives in its roots, which, securely lashed to the bark of trees, remain firm and strong, and no sooner does the wet season arrive than leaves and flowers are produced as if by magic."—F. W. B. in *The Garden*, XXIV. (1883), p. 560.

foliage of the plants; the washing of the leaves with a sponge dipped in tepid water is an efficacious remedy that should be used as often as thrips are detected. A moderate fumigation may also be used with good results, provided the operation is performed when the foliage is dry. The house should be fumigated towards evening, and again on the following morning before it is "damped down." Cockroaches occasionally gnaw through the thick roots of vigorous-growing specimens, and should be got rid of. Slugs lurk in the fresh sphagnum, and grow with surprising rapidity, and with corresponding voracity; they should be assiduously sought for and destroyed, as the mischief they do is sometimes irreparable.

SYNOPSIS OF SPECIES AND VARIETIES.

Phalænopsis amabilis.

Leaves broadly obovate-oblong, 6—12 inches long, sometimes attaining greater dimensions under cultivation, the smaller leaves emarginate, the larger ones mucronate. Peduncles of variable length, green tinged with dull purple, ascending or arching, paniced, but sometimes racemed, many-flowered. Flowers 3—4 inches across the petals; sepals and petals white, the dorsal sepal elliptic-oblong, the lateral two lanceolate-oblong, oblique; petals very broad, sub-rhomboidal, contracted at the base; lip three-lobed, the side lobes incurved towards the column, clawed, sub-quadrate, rounded on the apical sides, yellow at the base, spotted with red on the claw; the front lobe linear-hastate, with two basal auricles and two long apical tendrils, curled inwards; crest two-lobed, yellow spotted with red. Column short, sub-clavate.

Phalænopsis amabilis, Blume, Bijdr. p. 294, t. 44 (1825). Id. *Rumphia*, IV. t. 194 and 199. Lindl. Gen. et Sp. Orch. p. 213 (1832.) *P. grandiflora*, Lindl. in Gard. Chron. 1848, p. 39, icon. xyl. *Bot. Mag.* t. 5184. De Puydt, *Les. Orch.* t. 34. Williams' *Orch. Alb.* VI. t. 277. *Epidendrum amabile*, L. Sp. Pl. ed. I. p. 953 (1753). *Cymbidium amabile*, Roxb. Fl. Ind. III. p. 457 (1832).

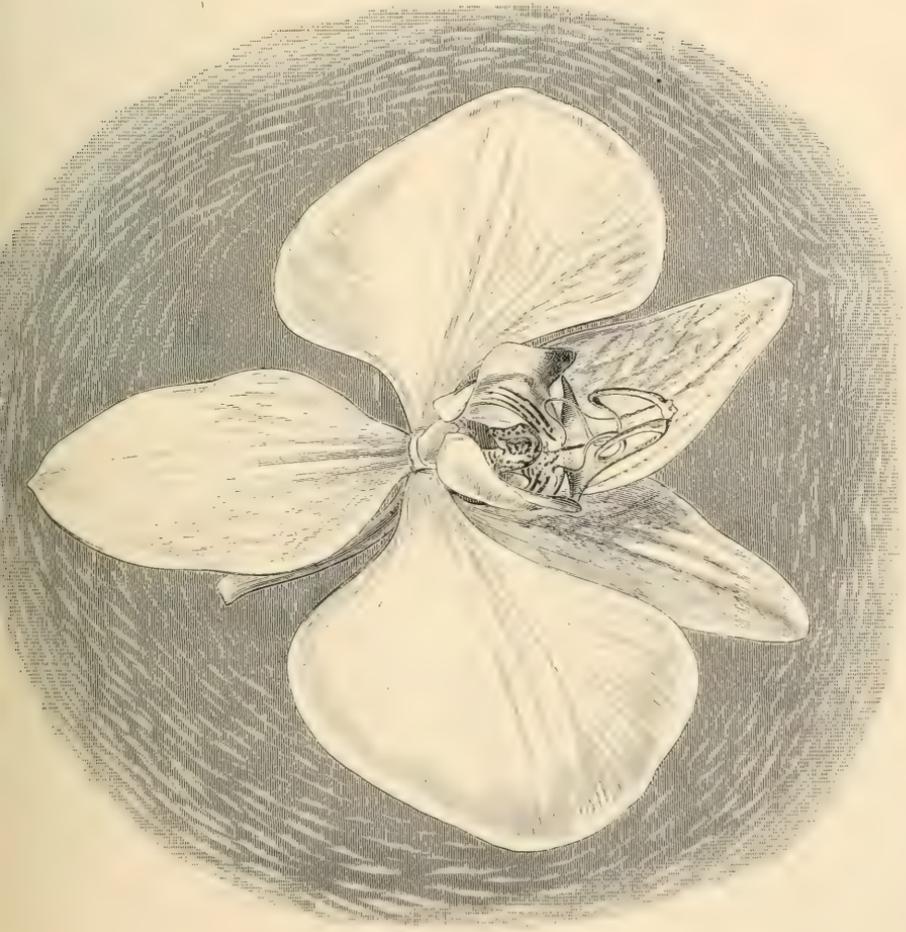
var.—*aurea*.

Peduncles greenish yellow. Flowers usually larger than the typical form, with broader sepals and petals; the front half of the lateral lobes of the lip, with the entire front lobe, including the cirri, light yellow.

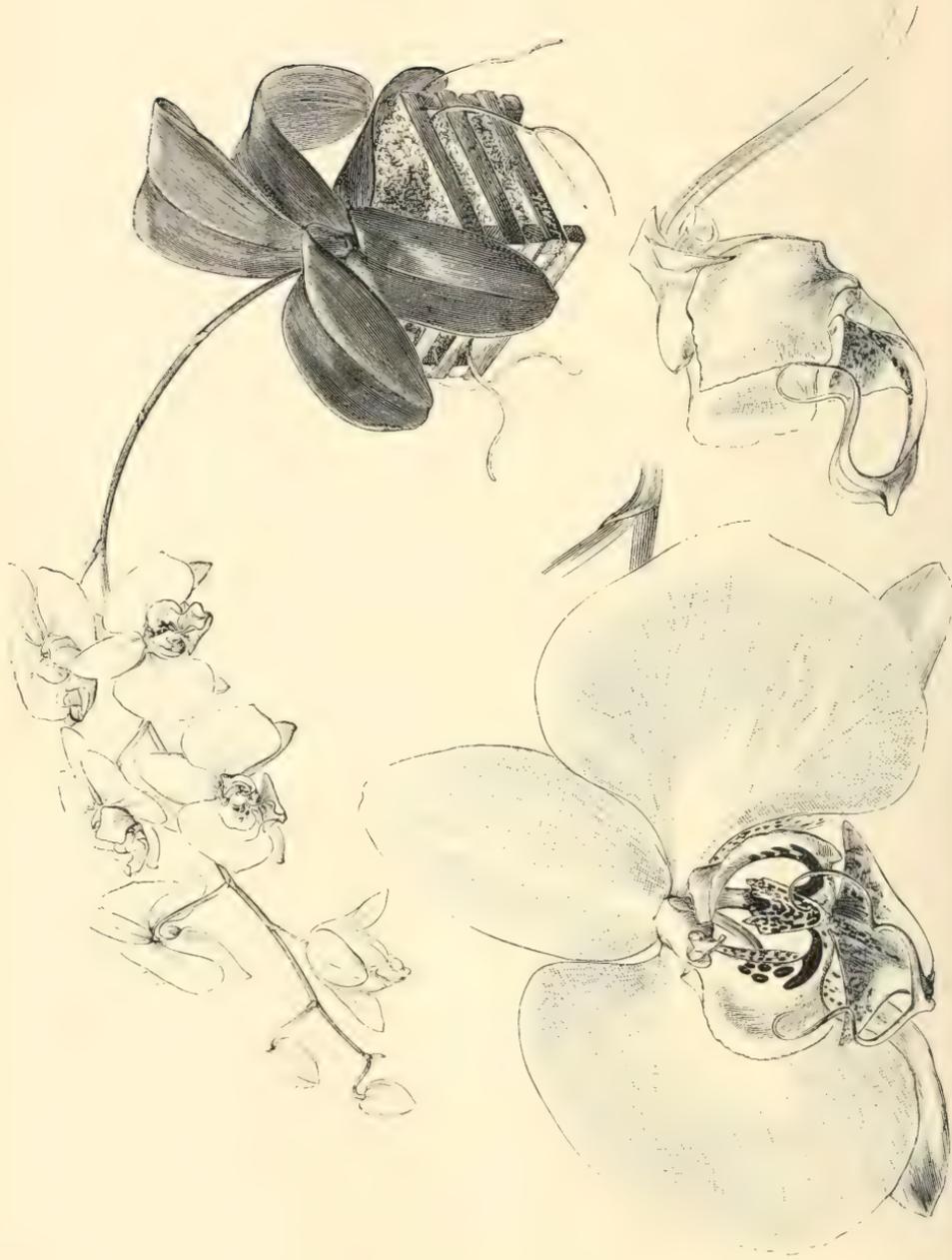
P. amabilis aurea, Rolfe in Gard. Chron. XXVI. (1886), p. 212. *P. grandiflora aurea*, Warner's *Sel. Orch.* II. t. 7. Sander's *Reichenbachia* I. t. 11.

The botanical history of this lovely orchid is sketched by Mr. R. A. Rolfe in the second volume of the *Gardeners' Chronicle* of 1886, p. 168, from which we extract the following:—

It appears to have been first discovered in the island of Amboina, by Rumphius, who gave a description and figure of it under the name of *Angræcum album majus*, in his *Herbarium amboinense*, which



Phalaenopsis amabilis.



Phalaenopsis Aphroditae.

he published in 1750. Two years later it was detected by Osbeck, on New Island, at the western extremity of Java, and specimens preserved by him were sent to Linnæus, who described the plant in the first edition of his *Species Plantarum*, published in 1753, under the name of *Epidendrum amabile*.* In 1798 it was introduced from the Moluccas to the East India Company's botanic garden at Calcutta, as we are informed by Dr. Roxburgh, who, when compiling his *Flora indica*, published many years later, removed it from *Epidendrum* and placed it under Swartz's genus, *Cymbidium*, to which it is much more nearly allied. We next hear of it through Dr. Horsfield, who found it in 1809 in the district of Patjitan, on the south coast of Java, and again some years later, through Dr. Blume, who detected it on the small island of Nusa Kambangan, and who founded upon it the genus *Phalænopsis*, which he published in 1825; in that genus it is doubtless destined to remain.

The merit of introducing *Phalænopsis amabilis* to British gardens is due to Thomas Lobb, who sent plants from Java to our Exeter firm in 1846; it flowered for the first time in this country in September of the following year, in the collection of Mr. J. H. Schroeder, at Stratford Green, on which occasion it received the name of *Phalænopsis grandiflora* from Dr. Lindley, a name that cannot be retained, for reasons stated under *P. Aphrodite*, *infra*. Since its introduction by Lobb, *P. amabilis* has been gathered in various parts of the great Malayan Archipelago. All the collectors sent out by our firm into that region mention it, and all agree in reporting that it is found close to the sea-shore, sometimes high up on the trunks of lofty trees, sometimes much lower down, even in positions where it was scarcely beyond the reach of the salt spray. Burbidge found it in Labuan and north Borneo, and noticed that the Bornean differed from the Java form in its thinner leaves, less vigorous growth, and in the other characters described above under the variety *aurea*. Curtis detected it in north Celebes, where its flowers are smaller than the Java form; and Burke met with a small-flowered variety in south-east New Guinea, growing on the thick aerial roots of the Screw-pine (*Pandanus*). The geographical distribution of *P. amabilis* is there-

* The type specimen sent by Osbeck to Linnæus is still in an excellent state of preservation in the Linnean Herbarium at Burlington House. For an inspection of this most interesting specimen we are indebted to the courtesy of the officers of the Linnean Society.

fore very extensive; it is, so far as at present known, the most widely distributed of all the species of EUPHALÆNOPSIS.

P. amethystina.

Roots flattened towards the apex. Leaves oblong-cuneate, 3—4 inches long, 1—1½ inch broad. Peduncles simple or branched, longer than the leaves, few-flowered. Flowers comparatively small; sepals and petals white, the former obovate-oblong, the lateral two adnate at their base to the foot of the column, the petals a little smaller than the sepals, oblong-spathulate; lip bright amethyst-purple, striated and margined with white, three-lobed, the side lobes spathulate-oblong, the apical margin denticulate, the front lobe shortly clawed, broadly obovate, with a semi-lunar sinus in the anterior margin; crest with two divergent teeth. Column short, anther beaked.

Phalænopsis amethystina, Rehb. in Gard. Chron. 1865, p. 602. Id. 1870, p. 1731, icon. xyl.

Vaguely stated to be of Sundaic origin, probably Java or Sumatra. It flowered in the collection of Mr. C. Stead, at The Knoll, near Leeds, in 1870, and in the Royal Gardens at Kew, in November, 1888 and following years. It is a dwarf, elegant little plant, flowering in the late autumn. We are indebted to the Royal Gardens at Kew for materials for description.

P. Aphrodite.

Leaves elliptic-oblong, variable in size, 8—15 inches long, 2—3½ inches broad, of a uniform deep green above, purplish beneath. Peduncles 2—3 feet long, arching, green mottled with dark purple, sometimes racemed, sometimes loosely paniced, many flowered. Flowers 2½—3½ inches across the petals; sepals and petals white, the upper sepal oblong, obtuse, the lateral sepals ovate-falcate, acute, keeled behind; petals rhomboidal, as broad again as the sepals; lip three-lobed, the claw and basal area of the side lobes pencilled and spotted with purple and with a pale yellow stain on each side; the side lobes clawed, broadly oval, ascending and incurved; the front lobe hastate with very acute basal angles, and bearing at the apex two long recurved crumpled cirri; crest bi-lobate, the lobes toothed at the apical end, yellow spotted with red. Column short, terete, white; anther beaked.

Phalænopsis Aphrodite, Rehb. in Hamb. Zeit. 1862, p. 35. Id. Xen. Orch. II. p. 6. Rolfe in Gard. Chron. XXVI. (1886), p. 212. *P. amabilis*, Lindl. (not Blume) in Bot. Reg. 1838, t. 34. Paxt. Mag. Bot. VII. p. 49 (1840). Van Houtte's *Fl. des Serres*, I. t. 36. Bot. Mag. t. 4297.

var.—*Dayana.*

The purple markings of the lip extend over a greater area, including the front lobe, which has a broad median, and marginal lines of the same colour.

P. Aphrodite Dayana, supra. *P. amabilis Dayana*, Williams' *Orch. Alb. I.* t. 11 (1882).

var.—*gloriosa*.

Differs but little from the variety *Dayana*, except that the leaves are of a lighter green, the red on the front lobe of the lip more diffused, and its claw white.

P. Aphrodite gloriosa, supra. *P. gloriosa*, Rchb. in Gard. Chron. III. s. 3 (1888), p. 554. *The Garden*, XXXV. (1889), t. 697.

This *Phalænopsis* was first sent from Manila, by Cuming, in 1837, to Messrs. Rollisson—one plant only surviving the voyage—in whose nursery at Tooting it flowered in the autumn of that year, and was figured by Dr. Lindley in the *Botanical Register*, under the name of *Phalænopsis amabilis*, in the erroneous belief that it was the same species as that upon which Blume had founded the genus thirteen years previously, but which was not then in cultivation. And when in 1847 the true *P. amabilis*, of Blume, was sent to our Exeter firm by Thomas Lobb, Dr. Lindley, although recognising it as distinct from the *P. amabilis* figured in the *Botanical Register*, failed to correct the mistake he had fallen into respecting the Manila plant, and gave the name of *P. grandiflora* to Lobb's introduction. Through this unfortunate error, the substitution of *grandiflora* for the true *amabilis* has been perpetuated to the present time, notwithstanding that Reichenbach had noted and corrected it so long ago as 1862.* A comparison of the accompanying woodcuts of the two species shows that they differ essentially in the form of the labellum, and also in some minor particulars; *P. Aphrodite* is further distinguished from *P. amabilis* by the deeper glossy green of its leaves, that are also purplish beneath.

In its native home *Phalænopsis Aphrodite* is spread generally over the islands of Luzon, Mindoro, and the adjacent small islands; and although the inroads made upon it by collectors have resulted in the removal of an immense number of plants in the aggregate, it is still abundant in those localities.

The two varieties described above, which were introduced by Messrs. Low and Co., differ but little from each other; *Dayana* appeared many years ago in the collection of the late Mr. John Day, at Tottenham; *gloriosa* is a comparatively recent introduction.

* Xen. Orch. Orch. II. p. 6. The error has since been repeatedly pointed out by the late Professor Reichenbach in Gard. Chron. *passim*, notably in III. (1875) p. 302, sub. *P. leucorhoda*; also by Van Houtte in Fl. des Serres, sub. *P. Lüddemanniana*, t. 1636; by Mr. Nicholson in *Dictionary of Gardening*, III. p. 92; by Mr. R. A. Rolfe, in Gard. Chron. V. s. 3 (1889), p. 88.

The specific name, *Aphrodite*, is mythological, and is the Greek name of the goddess Venus, selected doubtless on account of the great beauty of the flowers.

P. Boxalli.

Leaves ovate-oblong, 5—6 inches long. Peduncles terete, stoutish, as long as or longer than the leaves, racemose, 9—12 flowered. Flowers $1\frac{1}{2}$ inches in diameter, on slender whitish pedicels sheathed at the base by a small, acute, green bract; sepals lanceolate, acute, yellow blotched and barred transversely with red-brown; petals shorter and narrower than the sepals, linear-oblong; lip of very complex structure; in front of the short claw are two reflexed, oblong, whitish plates, representing the side lobes, each having a cirrus or bristle on the anterior side; the front lobe is anchor-shaped, with a pale yellow fleshy plate, having a purple tooth near its base. Column clavate, with a small rounded wing on each side of the stigma, reddish brown towards the base, yellow above.

Phalænopsis Boxalli, Rehb. in Gard. Chron. XIX. (1883), p. 274.

Introduced in 1882, by Messrs. Low and Co., from the Philippine Islands, through their collector, Boxall; it belongs to the section STAUROGLOTTIS, its nearest affinities being *Phalænopsis Cornu-cervi* and *P. Mannii*. We are indebted to Baron Schroeder, of The Dell, Staines, for materials for description.

P. Cornu-cervi.

Leaves oblong, or ovate-oblong, sub-acute, cuneate at base, leathery, bright glossy green. Peduncles sub-erect or nodding, racemose along the distal half, the rachis broad and compressed, 7—12 flowered. Flowers $1\frac{1}{2}$ —2 inches in diameter, expanding in succession from below upwards, three to five being open at one time; sepals and petals spreading, elliptic-oblong, acute, yellow-green barred and blotched with red-brown, the petals a little narrower than the sepals, and the lateral sepals partially falcate, keeled behind; lip shorter than the other segments, white, clawed, three-lobed, the side lobes oblong, erect, the front lobe crescent-shaped, hollow, with an awned callus at the base. Column semi-terete, with two tubercles at the base.

Phalænopsis Cornu-cervi, Blume et Rehb. in Hamb. Gartenz, 1860, p. 116. Hook. f. Fl. Brit. Ind. VI. p. 29. *Polychilos Cornu-cervi*, Kuhl et Hasselt, Orch. jav. ed. Breda, t. 1 (1827). Lindley, Fol. Orch. *Polychilos*, No. 1 (1853). Miquel, Fl. ind. bat. III. p. 681. *Bot. Mag.* t. 5570.

The following interesting account of the geographical distribution of *Phalænopsis Cornu-cervi* and its environment *in situ*, communicated to the *Gardeners' Chronicle* by Major-General E. S. Berkeley, affords at least one phase of orchid life in a tropical jungle, of which we still know too little:—

"This curious orchid is found in abundance on the stunted bushes in the swampy islands at the mouth of the river Irawaddy. In this situation, being exposed to the sun during the dry season, it loses its leaves, its roots being kept plump by the night dews, and it consequently has a distinct resting season. When growing in the shade it has no resting season, loses none of its leaves, and continues in flower throughout the year.

"*Phalænopsis Cornu-cervi* is found from Akyab (lat. 19° N.) throughout the whole of Lower Burmah, and southwards down to Tavoy, Mergui, and Perak, also in Java, occasionally on the hills, abounding in the plains, flourishing luxuriantly in the dense shade of the forest, where it is protected from dry winds. In 1870 the Bamboos in the jungle between Pegu and Shoagun flowered, and, as is the habit of many Bamboos, the clumps died and rotted down, thus rendering it possible to penetrate into a forest which had been closed for years. The few scattered trees growing in the Bamboo jungle were Mango trees; the trunks of these trees were found covered with huge masses of *P. Cornu-cervi*, growing in the densest shade, where they had been unmolested for many years. The plants presented masses of leaf growth of extraordinary vigour, and bore such quantities of flowers as would delight an English orchidist; this was the solitary orchid found in this shady forest. Unfortunately, the deciduous variety, which bears comparatively very poor flowers, is that which survives the journey to England, the large evergreen form found in the jungle being too soft to travel."

Besides the localities indicated in the foregoing extract, our collectors Curtis and Burke detected this orchid growing on trees on the limestone hills of Sarawak. They noted that in this district the flowers are variable in colour, some being prettily marked, while the majority are pallid and in attractive.

The specific name, *Cornu-cervi*, is literally "stag's horn," suggested probably by the flattened rachis of the inflorescence.

P. Esmeralda.

Roots stoutish, white, radiating on all sides from the base of the short stems. Leaves oblong or elliptic-oblong, acute, 5—8 inches long. Peduncles usually deep green, but sometimes spotted with blackish purple, slender, erect, 15—20 or more inches high, racemose along the distal half, many flowered. Flowers about an inch in diameter, on short pedicels spirally arranged round the rachis; sepals and petals varying in colour in different plants from amethyst-purple to pale lilac or almost white, the dorsal sepal and petals oval-oblong, acute; the lateral sepals ovate-oblong, and more acute than the dorsal one; lip three-lobed, the lateral lobes roundish, erect, varying in colour from deep purple to pale mauve, but sometimes orange-red and brownish red;

the intermediate lobe generally deep purple, oblong, acute, with a bi-lamellate crest, below which is an oblong disk with two cirri on the basal side. Column slender, terete above, the stigmatic cavity large, elliptic in outline; anther beaked.

Phalænopsis Esmeralda, Rehb. in Gard. Chron. II. (1874), p. 582. *Rev. hort.* 1877, t. 107. *Fl. Mag.* n.s. t. 358. *Williams' Orch. Alb.* VII. t. 321. Hook. f. *Fl. Brit. Ind.* VI. p. 31. *P. antennifera*, Rehb. in Gard. Chron. XI. (1879), p. 398. *Id.* XVIII. (1882), p. 520. *P. Regnieriana*, Rehb. in Gard. Chron. II. s. 3 (1887), p. 746. *P. Buyssoniana*, Rehb. in Gard. Chron. IV. s. 3 (1888), p. 295.

Introduced from Cochin China in 1874 by M. Godefroy, of Argenteuil, near Paris, who found the plant in two localities on the island of Pluquoc in the Gulf of Siam, growing on isolated rocks in the midst of a small thicket of coniferous trees; and in Cambodia, between Pursat and Phnum-Bat, also growing upon bare rocks, in no instance upon the trunks of trees. During the dry season the plants lose their leaves, and all vegetation on the rocks, on which they grow, disappears. It has since been gathered by Curtis on one of the Langkawai islands, where it grows in peat and sand at the foot of trees.

Phalænopsis Esmeralda is distinguished from every other cultivated species of *Phalænopsis* by its erect, many-flowered racemes, the flowers of which vary considerably in colour in different plants, and especially by the presence of two cirri at the base of the lip and not at the apex as in *EUPHALÆNOPSIS*, a character that separates the species both from that section and from *STAUROGLOTTIS*. Although the flowers are comparatively small, they are often brilliantly coloured, and being produced in the late summer and autumn months, they render the species a useful one in the orchid house at that season. The colour variations are too numerous to admit of separate notice; among them must be included the three forms quoted in our literary references that were admitted by Reichenbach to specific rank, but which we have reduced to synonyms.

P. Lowii.

Stem none, roots numerous, spreading. Leaves elliptic-oblong, 2—4 inches long, acute or emarginate, deciduous. Peduncles slender, sub-erect or arching, dull purple and green, 10—15 or more inches long, loosely paniculate upwards, usually few flowered, but in strong plants many flowered. Flowers 1½—2 inches in diameter; sepals elliptic-oblong with a pale purple keel behind, the lateral two with the inner margin reflexed, white with a faint flush of amethyst-purple on the basal half;

petals three times as broad as the sepals but coloured like them, sub-rhomboidal, the outer margin rotund; lip three-lobed, the side lobes erect and resembling two incurved horn-like bodies that are white with a yellow spot; the middle lobe deep purple, oblong, with two small teeth at the base and a raised mid-line that is dilated and thickened near the apex. Column curved, pale purple and convex above, concave beneath; anther with a long beak reflexed at the apex somewhat resembling an elephant's trunk.

Phalænopsis Lowii, Rehb. in Bot. Zeit. 1862, p. 214. Id. Xen. Orch. II. p. 139, t. 151. Bot. Mag. t. 5351. Warner's Sel. Orch. II. t. 15. Van Houtte's Fl. des Serres, XVIII. t. 1910. The Garden, IX. (1876), t. 14. Gard. Chron. II. s. 3 (1887), p. 745, icon. xyl. Hook. f. Fl. Brit. Ind. VI. p. 30. P. proboscidioides, Parish in lit. ad Low, *vide* Rehb.



Phalænopsis Lowii.

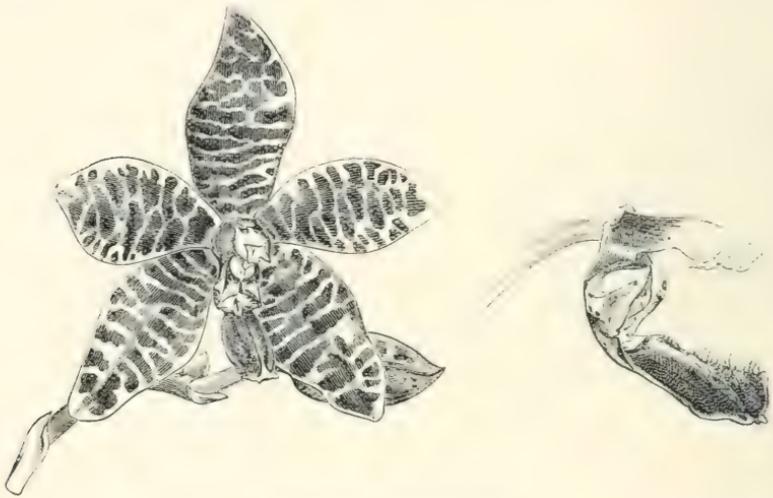
A lovely species discovered by the Rev. C. S. Parish, in Moulmein, Burmah, through whom it was introduced by Messrs. Low and Co. in 1862. Major-General E. S. Berkeley, who has seen *Phalænopsis Lowii* in its native home, writes in the *Gardeners' Chronicle* of 1887 (I. s. 3, p. 279):—

“This plant loses all its leaves in its native habitat immediately after flowering. It grows on limestone rocks, and on the branches of small bushes growing in the crevices of the rocks. The surrounding country is under water the greater part of the year, and the rainfall is excessive; by the end of November the country dries up, and in January the flower stems and leaves have withered, nothing remaining but the roots; these cease to grow, but are kept plump by the heavy dew that falls at night. The resting season is short, as showers fall in March when the plants at once begin to put forth fresh leaves. This species grows on the north-east side of the limestone hills, and

is thence protected from the effects of the afternoon heat of a tropical sun. During the rains the limestone rocks are covered with many beautiful annual Balsams and tuberous Begonias; this will give a hint to the gardeners of the kind of moist heat required to grow *Phalænopsis Lowii* in perfection."

P. *Lüddemanniana*.

Leaves not usually more than three—five on one plant, oblong or oval-oblong, 6—9 inches long and 2—3½ inches broad. Peduncles procumbent, as long as the leaves, 5—7 or more flowered. Flowers 2 inches in diameter; sepals and petals elliptic-oblong, the sepals chestnut-brown with some narrow, pale yellow transverse streaks and



Phalænopsis Lüddemanniana.

whitish margin, the basal half with a broad amethyst-purple median band; the petals smaller than the sepals, bright amethyst-purple with whitish margin and with some chestnut-brown spots towards the apex; lip clawed, three-lobed, the side lobes erect, oblong, retuse and two-toothed at the apex, white with some light purple stains, and with a bright yellow lobule in front; the intermediate lobe fleshy, obovate-oblong, keeled above, bright amethyst-purple with a pale margin, and with some erect white bristles along the keel. Column terete, white, stained with light purple, anther beaked.

Phalænopsis Lüddemanniana, Rchb. in Mohl. et Schl. Bot. Zeit. 1865, p. 146. Id. in Gard. Chron. 1865, p. 410. Bot. Mag. t. 5523. Van Houtte's *Fl. des Serres*, XVI. t. 1635 (copied from the Bot. Mag.). Rev. hort. 1872, t. 390. Florist et Pomol. 1865, p. 257.

sub-vars.—*delicata* (Gard. Chron. 1865, p. 434), the clustered stripes on the sepals and petals narrow, the amethyst-purple confined to the very

base; *hieroglyphica* (Gard. Chron. II. s. 3 (1887), p. 586), sepals and petals cream-white covered with small cinnamon spots and markings; *ochracea* (Gard. Chron. 1865, p. 434), the stripes on the sepals and petals light ochre-yellow; *pulchra* (Gard. Chron. IV. (1875), p. 36), upper part of sepals and petals port-wine colour, the inferior part, as well as the lip and column, amethyst-purple, the transverse bars nearly obliterated.

Introduced by Messrs. Low and Co., in 1864, from the Philippine Islands, where it is abundant in the neighbourhood of Manila, and named in compliment to the late M. Lüddeemann, a well-known orchidist of Paris, who was the first European cultivator to bring the plant into bloom. The variability in the colour of the flowers of this species has been observed from the time of its first introduction; the sub-varieties described above being among the most distinct. Our illustration represents a richly coloured form in the collection of Baron Schroeder at The Dell.

P. maculata.

A diminutive plant. Leaves elliptic-oblong, 2—4 inches long. Peduncles ascending, as long as, or longer than the leaves, few flowered. Flowers $\frac{1}{2}$ — $\frac{3}{4}$ inch in diameter; sepals oval-oblong, acute, cream-white, with three—five red-brown transverse blotches; petals similar but narrower; lip fleshy, three-lobed, the lateral lobes angular, erect, white spotted with red-brown, and with a small yellow callus on the inner side; the intermediate lobe convex with a raised median line above, bright red. Column terete, white.

Phalænopsis maculata, Rehb. in Gard. Chron. XVI. (1881), p. 134.

Introduced by us in 1880, from Sarawak, in Borneo, through Curtis, who found it on the limestone hills at an altitude of 1,000—1,500 feet, growing on damp, almost bare rocks under the shade of large trees, many of which are loaded with tufts of *Phalænopsis Cornu-cervi*. It is one of the smallest of the genus.

P. Mannii.

Leaves variable in size, the largest obovate-oblong, or oblanceolate-oblong, sub-falcate acute, 6—8 inches long, $1\frac{1}{2}$ —2 inches broad. Peduncles as long as, or longer than the leaves, usually with two—three short branches, 10—15 or more flowered. Flowers about 2 inches across vertically; sepals and petals golden yellow barred and blotched with chestnut-brown, linear-oblong, acute with slightly reflexed margins, the lateral sepals falcately curved, the petals narrower and shorter than the sepals; lip of peculiar form and structure, shorter than the other

perianth segments, three-lobed, the side lobes erect, oblong, truncate, light yellow; the front lobe also light yellow, anchor-shaped, saccate at the base, the flukes of the anchor pubescent and denticulate; in front of the side lobes is an erect, purplish tooth, and behind that is a slender upright plate terminating in two divergent cirri. Column clavate with two tooth-like protuberances at the base, golden yellow stained with red on the side opposite the lip.

Phalænopsis Mannii, Rehb. in Gard. Chron. 1871, p. 902. Hook. f. Fl. Brit. Ind. VI. p. 30.

Discovered in 1868 by Mr. Gustav Mann, a gentleman in the service of the Indian Forest Department. No locality is given with Reichenbach's description, but as the plant has since been received from Assam its habitat is thence known. So far as at present known, *Phalænopsis Mannii** is an outlying member of the genus, living at a higher altitude and under climatic conditions that differ from those under which all the other species have been found.

Cultural Note.—This *Phalænopsis* is successfully cultivated by Mr. Richard Maries, in his nursery at Mythop, near Lytham, Lancashire. Mr. Maries informs us that the plants are grown in baskets, with a drainage of broken crocks and charcoal, upon which sphagnum alone is placed. The baskets are suspended near the glass of a span-roofed house, exposed to the full light of the afternoon sun, where in winter the temperature is not more than 7° C. (45° F.), and even lower in very cold weather. The plants continue in flower for upwards of three months.

P. Mariæ.

Leaves deflexed, narrowly obovate-oblong, 6—10 inches long, bright glossy green. Peduncles as long as, or longer than the leaves, usually branched, few flowered. Flowers distant, 1½—2 inches in diameter, on short, slender, pale pedicels; sepals and petals similar and sub-equal, oval-oblong, obtuse, yellowish white, with 4—5 broad, chestnut-brown, transverse bands and an amethyst-purple stain at the base; lip shorter than the other segments, three-lobed, the lateral lobes narrowly oblong, erect, incurved towards the column, white with a purple stain in the middle, and a yellow lobule on the anterior side; the intermediate lobe fleshy, bright amethyst-purple, obovate-oblong, with a recurved spur at the base, keeled above, the keel clothed with white hairs. Column terete, anther beaked.

Phalænopsis Mariæ, Burbidge in lit ad nos. Williams' *Orch. Alb. II.* t. 80. *Bot. Mag.* t. 6964.

A handsome species, closely allied to *Phalænopsis Lüddemanniana*

* Perhaps not strictly isolated from all its congeners; a sub-variety of *Phalænopsis Parishii* has been gathered by Lobb, Mann, and Keenan in Assam.

and *P. sumatrana*, first detected in 1878 by Mr. F. W. Burbidge, Superintendent of Trinity College Botanic Garden, Dublin, while travelling for us in the Malay Archipelago. He found it in Sulu, the largest of a group of small islands lying between north-east Borneo and Mindanao, growing on the hills at a considerable elevation, where it appears to be rare, as only four plants were found by its discoverer, who named the species in compliment to his wife. Some years later it was imported by Messrs. Low and Co. from the neighbouring island of Mindanao, where it is more plentiful, and where it was subsequently gathered by our collector, David Burke, on the hills near the south-east coast; in this locality it grows on the trunks and branches of trees always in dense shade, which seems essential to its well-being.

P. Parishii.

A diminutive plant with flattened, fleshy roots. Leaves elliptic or elliptic-oblong, 2—4 inches long, of an uniform deep green. Racemes as long as the leaves, 5—9 flowered. Flowers $\frac{3}{4}$ inch in diameter; sepals and petals white, the dorsal sepal oblong, the lateral two broader, ovate-oblong; petals obovate; lip "with a short claw bent at right angles to the limb," three-lobed, the lateral lobes very small, horn-like, bent backwards, yellow spotted with purple; the front lobe almost triangular, bright rose-purple: crest semi-lunate with a fimbriate outer margin, white with a yellowish brown centre, below this is "a linear appendage, projecting forwards and divided to near the base into four slender filaments." Column white, spotted with purple on the anterior face.

Phalænopsis Parishii, Rehb. in Bot. Zeit. 1865, p. 146. Id. in Gard. Chron. 1865, p. 410. Id. *Xen. Orch.* II. p. 144, t. 156. Id. in Saunders' *Ref. Bot.* I. t. 85. *Bot. Mag.* t. 5815. Hook. f. *Fl. Brit. Ind.* VI. p. 31.

Introduced from Moulmein in 1864, by Messrs. Low and Co., through the Rev. C. S. Parish, after whom it is named. It had, however, been discovered twenty years previous to that date by our collector, Thomas Lobb, during his mission to Assam, in 1849—50, and where it has since been gathered by Mann and Keenan; the Assam plant is said to differ from the Moulmein type in the colour of the flowers, especially the labellum. In Moulmein it is generally found on the branches of trees covered with moss, where it is subject to great heat and moisture during the growing season; in the dry season it loses its leaves.* The structure of the lip of the orchid is very singular, and quite unlike that of any other species known to us; it is also motile upon the slightest pressure being applied to it.

* Major-General E. S. Berkeley, in Gard. Chron. I. s. 3 (1887), p. 280.

P. rosea.

Leaves oval-oblong, 4—6 or more inches long, usually notched at the apex. Peduncles racemose or paniculate, ascending and pale green as far as the lowermost flower or branch; slightly zigzag, thickened, and dull purple along the rachis, which is nodding, many-flowered, continuing to lengthen and produce flowers for many weeks in succession. Flowers $1\frac{1}{2}$ inches in diameter; sepals oblong, acute, white with a light rose-purple stain in the middle; petals narrowly rhomboidal, with a larger and deeper stain than on the sepals; lip three-lobed, the lateral lobes sub-spathulate, incurved, light rose-purple, with 4—5 longitudinal dark purple streaks on the inner side; the intermediate lobe shortly clawed, ovate, acute, brown at the base, the blade bright rose-purple; crest two-lobed, bright yellow spotted with red. Column terete, stained with rose-purple; anther beaked.

Phalænopsis rosea, Lindl. in Gard. Chron. 1848, p. 671. icon. xyl. Id. in Paxt. *Fl. Gard. II.* t. 72 (1852). *Bot. Mag.* t. 5212. Van Houtte's *Fl. des Serres*, XVI. t. 1645. Jennings' *Orch.* t. 27. Williams' *Orch. Alb. VI.* t. 268. *P. equestris*, Rehb. in Linn. XXII. p. 364 (1849). Id. Xen. *Orch. II.* p. 4.

var.—leucaspis.

Flowers somewhat smaller, with shorter and broader segments; sepals pale rose-purple mottled with white; petals and lip deeper in colour than the sepals; callus whitish with yellow-brown dots.

P. rosea leucaspis, Rolfe in Gard. Chron. XXVI. (1886), p. 276. *P. equestris leucaspis*, Rehb. in Gard. Chron. XV. (1881), p. 688.

This is the commonest of the Philippine Islands' *Phalænopses*; it is abundant in the hot valleys and along the streams in the neighbourhood of Manila, and is spread generally over the island of Luzon, often associated with *Phalænopsis Aphrodite* and *P. Schilleriana*. It was introduced in 1848 by our Exeter firm, through Thomas Lobb. The variety is said to have first appeared in the collection of M. Pescatore, at St. Cloud, near Paris, soon after the introduction of the species.

P. Sanderiana.

Leaves oblong or ovate-oblong, 6—10 inches long, $2\frac{1}{2}$ —4 inches broad, usually dark green, but occasionally more or less spotted and marked with grey, which sometimes disappears with age. Peduncles 20—30 inches long, pale greenish purple spotted with white, terminating in a loose 7—12 or more flowered raceme.* Flowers 3 inches in diameter; sepals oval-oblong, the upper one light rose-pink, the lateral two paler and mottled with white; petals shortly clawed, the blade very broad, sub-rhomboidal and coloured like the upper sepal; lip three-

* Probably branched in the stronger plants.

lobed, the lateral lobes broad, sub-orbicular, incurved over the column, the apices nearly meeting, white, faintly spotted with pale rose externally, with a yellow blotch at the base on the inner side; the front lobe hastate, curved upwards at the apex, which is prolonged into two flexuose, incurved tendrils an inch long, the blade white with some longitudinal purple streaks at the base; crest bilobate, each lobe bidentate at the tip, bright yellow spotted with red. Column terete, white with a rose-purple stain at the apex.

Phalænopsis Sanderiana, Rehb. in Gard. Chron. XIX. (1883), p. 646. *The Garden XXIV.* (1888), pl. 407. Godefroy's *Orchidophile* (1885), p. 18. Williams' *Orch. Alb. V.* t. 209.



Phalænopsis Sanderiana alba.

sub-vars.—*alba*, flowers white with a few light purple spots at the base of the side lobes of the lip and some yellow spots on the crest; *marmorata* (Gard. Chron. XX. (1883), p. 812), the lateral sepals with rows of small purple spots at the base, the side lobes of the lip with three nearly parallel purple lines, the front lobe marbled with purple; *punctata* (Gard. Chron. VII. s. 3 (1890), p. 78), the lateral sepals spotted like those of *Phalænopsis Stuartiana*.

Introduced by Messrs. Sander and Co. from the Philippine Islands in 1882, through their collector, Roebelin; it was shortly afterwards

gathered by our collector, David Burke, in the neighbourhood of Davao, on the south-east coast of Mindanao, where it is associated with *Vanda Sanderiana* and *Aërides Lawrenceæ*; it has also been detected on the small island of Serangano, growing on the trunks and branches of trees close to the sea-shore.

Ever since its first flowering in this country *Phalænopsis Sanderiana* has been generally regarded as a natural hybrid between *P. Aphrodite* and *P. Schilleriana*, and the structure of the flower certainly affords strong evidence of such an origin; it has the general aspect of *P. Aphrodite* with the colour of *P. Schilleriana*, but lighter and more diffused over the whole surface; the trowel-shaped front lobe of the labellum with its apical tendril-like appendages and the side lobes are those of *P. Aphrodite*, while the crest is more like that of *P. Schilleriana*. If we accept the theory of its hybrid origin, the proper place of *P. Sanderiana* would be in the group of natural hybrids of which *P. leucorhoda* is the type, and which bears unmistakeable marks of being derived from the same pair of species. Nevertheless there are other circumstances attending the environment of *P. Sanderiana* that must not be overlooked, of which the most prominent are these:—It has been brought from a locality remote from the habitat of the supposed parents, of whose presence in that locality no evidence is forthcoming; it has been imported unmixed in considerable numbers, and not as in the case of undoubted hybrids as isolated plants, whose appearance among the importations of the assumed parents is comparatively a rare occurrence. On these grounds, therefore, we recognise *P. Sanderiana* as a species in the ordinary acceptance of the term; but whether species or hybrid it is, without question, one of the most beautiful of the section to which it belongs—EUPHALLENOPSIS.

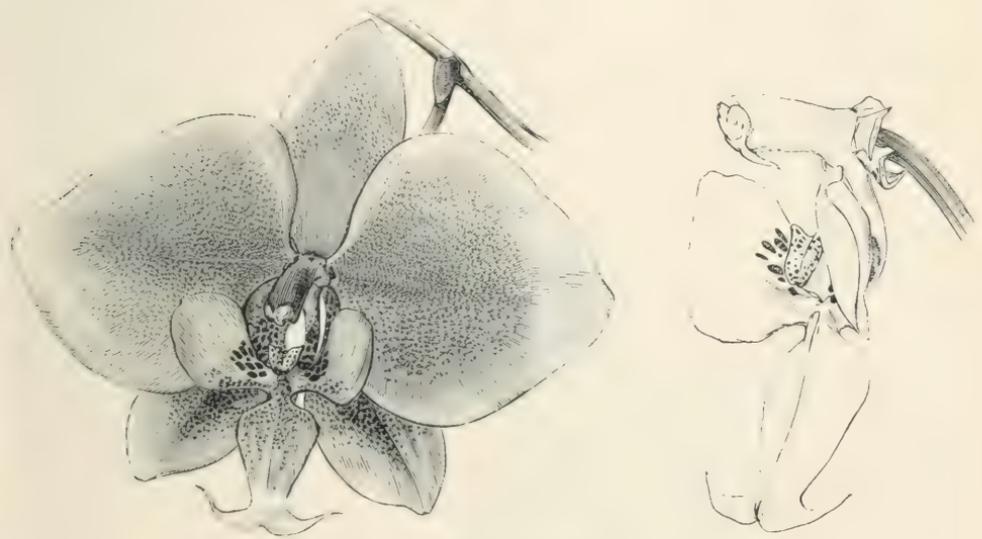
P. Schilleriana.

Leaves elliptic-oblong, variable in size, and rarely exceeding 3—5 in number, the largest 12—15 or more inches long, and 4—4½ inches broad, deep dull green, marbled and blotched with grey, the grey blotching frequently taking the form of irregular transverse parallel bars. Peduncles sometimes attaining a length of 3 or 4 feet, loosely branched, greenish crimson mottled with white, with a small deciduous bract at each node. Flowers 3—3½ inches in diameter, but less when the flowers are very numerous; sepals and petals delicate rose-purple suffused with white, the lateral sepals dotted with purple on the inner basal half, the sepals elliptic-oblong, the petals sub-rhomboidal, twice as broad as the sepals; lip clawed, three-lobed, the claw long, white spotted with red-purple; the side lobes rounded, oblong, falcate, incurved, white with a yellow stain spotted with red at the base; the front lobe broadly unguiculate then cordate, gradually contracted towards the apex, and terminating in

two incurved appendages like the flukes of an anchor, white or pale rose-purple, usually dotted with amethyst-purple; crest a short column terminating in two spreading lobes, bright yellow spotted with red. Column semiterete; anther beaked.

Phalænopsis Schilleriana, Rehb. in Hamb. Gartenz. 1860, p. 144. Id. in Gard. Chron. 1860, p. 216. Id. *Xen. Orch. II.* p. 1. t. 101. Warner's *Sel. Orch. I.* t. 1 (1862). Id. *III.* t. 5 (splendens). Van Houtte's *Fl. des Serres, XV.* t. 1559—60. *Illus. hort. X.* t. 348. *Bot. Mag.* t. 5530. Regel's *Gartenfl.* 1868, t. 581. Jennings' *Orch.* t. 15. De Puydt. *Les Orch.* t. 35. *Fl. Mag. n.s.* 1877, t. 257.

sub-vars.—*immaculata* (Gard. Chron. III. (1875), p. 429), the spots of the lip and its crest absent; *vestalis* (Gard. Chron. XVII. (1882), p. 330), flowers wholly white.



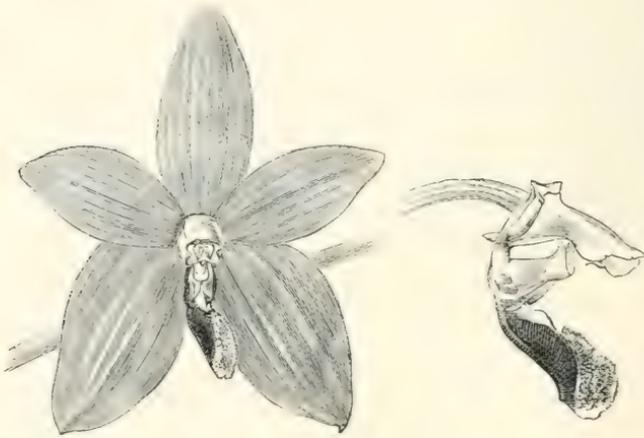
Phalænopsis Schilleriana.

This superb *Phalænopsis* was introduced from Manila in 1858 by the late Consul Schiller, of Hamburg, in whose collection at Ovelgönne, on the Elbe, it flowered for the first time in Europe, in the spring of 1860, and to whom it is appropriately dedicated. In the following year it was imported by M. Porte, a French merchant, trading in the Philippines, whose plants were acquired by the late Mr. B. S. Williams, of Holloway, one of which flowered for the first time in this country in Mr. Robert Warner's collection at Broomfield, Chelmsford, in February, 1862. From that time to

the present *Phalænopsis Schilleriana* has held a foremost place in the estimation of orchid amateurs.*

Phalænopsis Schilleriana grows under the same conditions as *P. Aphrodite*, with which it is sometimes found associated; both species grow on the trunks and branches of trees, to which they affix themselves by means of their clasping, flattened roots, often so high up as to render the ascent both difficult and dangerous. A small village named Lueban, near Manila, has been for many years past one of its best known stations, but owing to the frequent inroads made upon it, it is now becoming very scarce there.

Besides the sub-varieties described above, which are simply colour variations, variability has also been observed in the labellum of *Phalænopsis Schilleriana*, especially in the form, size, and colour of the anchor-like apical appendages of the front lobe. The late Mr. John Day, who seems to have been the first to notice this variability, has illustrated it in one of his valuable "Scrap-books" by drawings of fifteen different forms.

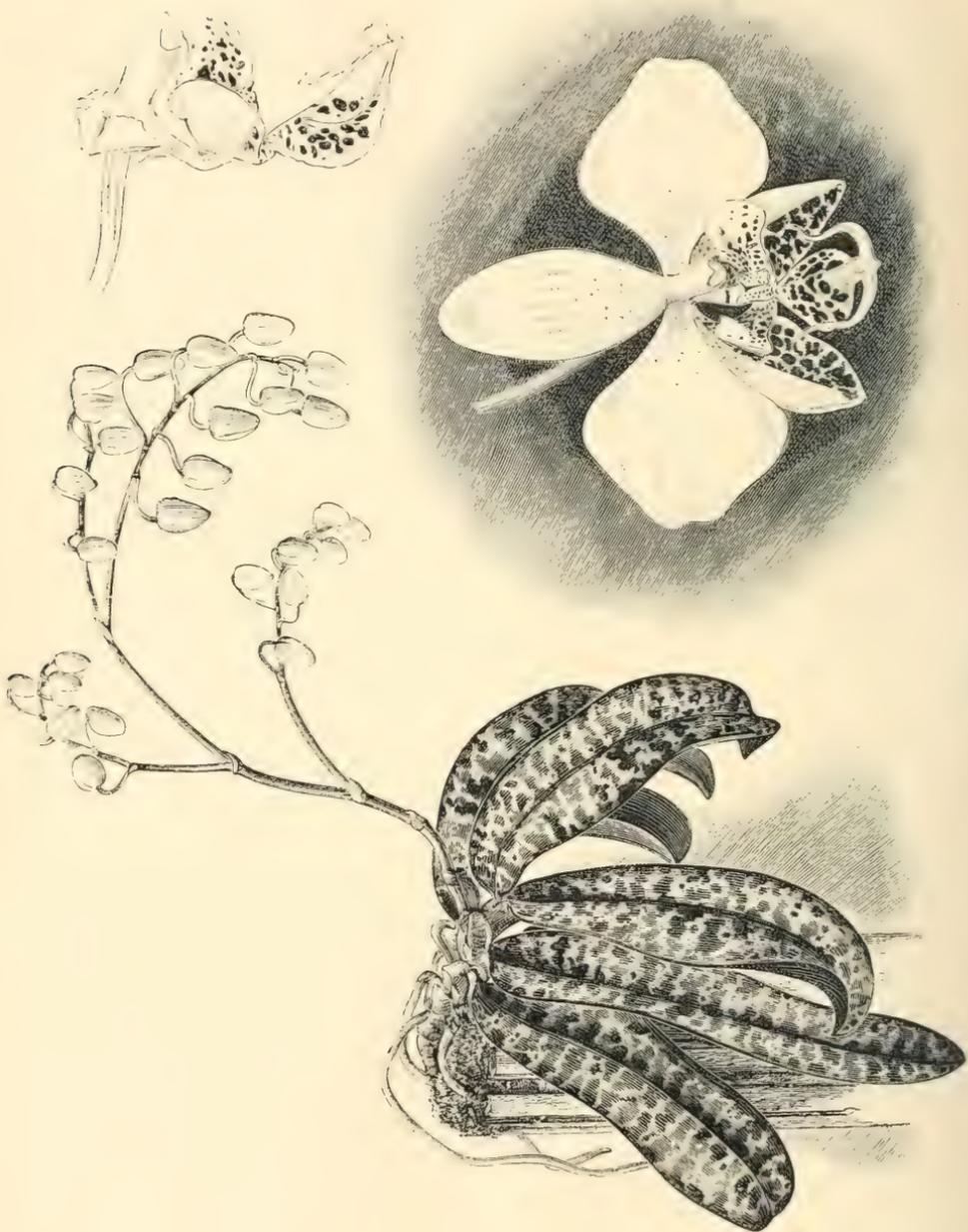


Phalænopsis speciosa.

P. speciosa.

Leaves obovate-oblong, 7—12 inches long, and $2\frac{1}{2}$ —3 inches broad, of a uniform bright green. Peduncles drooping, longer than the leaves, sometimes branched, 9—12 or more flowered. Flowers 2 inches in diameter: sepals and petals spreading in a stellate manner, amethyst-purple with a pale margin, the lateral sepals with a yellowish mucro;

* A very fine lot of *Phalænopsis Schilleriana* is cultivated at Henham Hall, Wangford, the seat of Earl Stradbroke.



Phalenopsis Stuartiana.

the sepals oval-oblong; the petals narrower, elliptic-oblong, acute; lip shorter than the other segments, three-lobed, the side lobes erect, oblong, truncate, with an orange yellow protuberance on the inner side, purple at the base, orange in the middle, white at the apex; the front lobe fleshy, oblong, with an acute, pubescent keel above, amethyst-purple. Column white, swollen at the toothed apex.

Phalænopsis speciosa, Rehb. in Gard. Chron. XV. (1881), p. 562. Williams' *Orch. Alb. IV.* t. 158. Hook. f. Fl. Brit. Ind. VI. p. 30.

sub-vars.—*Christiana* (Gard. Chron. XVIII. (1882) p. 745), sepals and column rose-purple, petals white; *Imperatrix* (Sander's *Reichenbachia II.* t. 51), flowers deep rose-purple with some white markings on the sepals and petals.

Discovered by Major-General E. S. Berkeley growing upon trees, as he himself informs us, in several of the smaller islands of the Malay Archipelago, and introduced by him in 1881; it is one of the handsomest of the species included in the section STAUROGLOTTIS.

P. *Stuartiana*.

Leaves elliptic-oblong, 7—12 or more inches long, and 3—4 inches broad, freckled above with transverse grey blotches, which often disappear with age, purplish red beneath like those of *Phalænopsis Schilleriana*. Peduncles drooping, of variable length, branched, many-flowered. Flowers $1\frac{1}{2}$ — $2\frac{1}{2}$ inches in diameter; sepals elliptic-oblong, the dorsal one white, sometimes with a few purple dots on the basal half; the lateral two with a sunk median line, the outer half white, the inner half pale yellow densely spotted with red-purple; petals much larger than the sepals, sub-rhomboidal, white, sometimes with a few purple dots scattered over the basal half; lip three-lobed, with a short, thick, golden yellow crest, split at the summit into two oblong lobes; the lateral lobes of the lip obliquely obovate-oblong, the basilar part yellow spotted with red-purple, the distal part whitish with fewer spots; the intermediate lobe narrow at the base, suddenly enlarged into a sub-rhomboidal blade with two anchor-like appendages at the apex, light yellow, sometimes white spotted with red-purple.

Phalænopsis Stuartiana, Rehb. in Gard. Chron. XVI. (1881), p. 748. Id. p. 753, icon. xyl. *Fl. and Pomol.* 1882, p. 49. Williams' *Orch. Alb. V.* t. 237. *Bot. Mag.* t. 6622.

sub-vars.—*bella* (Gard. Chron. III. s. 3 (1888), p. 200), the side lobes of the lip with linear red marks, the front lobe with large purple-chocolate blotches; *Baron Hruby's* (Id. XXI. (1884), p. 372), sepals and petals purple on the back with a white margin; *nobilis* (Williams' *Orch. Alb. I.* t. 39), flowers larger in all their parts with fewer and larger spots on the lateral sepals and lip; *punctatissima* (Gard. Chron. XVII. (1882), p. 44), sepals and petals covered with minute purple dots in addition to the usual spots on the lateral sepals and lip.

Discovered by Boxall near Surigao, in the extreme north-east of the island of Mindanao in 1881, while collecting Orchids in the Philippine Islands for Messrs. Low and Co., and named in compliment to the former head of that firm, the late Mr. Stuart Low. It was shortly afterwards gathered by our collector, David Burke, in the same locality and around Lake Maynit, in north-east Mindanao, where it is abundant. Like all the other species of *EUPHALÉNOPSIS*, it is always found in close proximity to water, in some places so close to the sea-shore that it can scarcely fail to be washed by the salt spray during the prevalence of storms.

P. sumatrana.

Leaves obovate or obovate-oblong, sub-acute, 6—10 inches long. Peduncles ascending, as long as the leaves, 5—9 flowered. Flowers about 2 inches in diameter; sepals and petals similar and sub-equal, ovate-oblong, acute, cream-white barred with red-brown, the petals a little narrower and more cuneate than the sepals; lip shortly clawed, three-lobed, the side lobes ligulate-oblong, erect, truncate, the apex prolonged backwards into a kind of tooth, white with some orange spots on the inner side; the front lobe fleshy, oblong in outline with a prominent keel above, with two small erect teeth at the base and a dense tuft of short, hispid hairs at the apex, white with some purple streaks on each side of the keel. Column semi-terete, notched at the apex.

Phalenopsis sumatrana, Korth. et Rehb. in Hamb. Gartenz. 1860, p. 115. Rehb. in Gard. Chron. 1865, p. 506, icon. xyl. *Bot. Mag.* t. 5527. Van Houtte's *Fl. des Serres*, XVI. t. 1644 (copied from the Bot. Mag.). *P. zebrina*, Teijsm. et Binn. Pl. nov. in hort. Bogor. cult. p. 15 (1863). *Flore des Jardins des Pays Bas*, IV. p. 146.

sub-vars.—*Mr. Kimball's* (Gard. Chron. IV. s. 3 (1888), p. 6), sepals and petals broader, bright yellow with red transverse bands, lip light yellow; *paucivittata* (Id. XVII. (1882), p. 628), the red-brown bars on the sepals and petals fewer and paler, the purple streaks on the lip darker; *sanguinea* (Id. XV. (1881), p. 782), the lateral sepals dark red-brown with a few yellow-green markings.

The original discoverer of *Phalenopsis sumatrana* was the Dutch naturalist, Dr. Korthals, formerly at the head of the scientific staff commissioned to investigate the natural history of the Dutch possessions in the Malay Archipelago, who met with it in southern Sumatra some time prior to 1839. His sketch of it preserved at Leyden was all that was known of it till it was re-discovered by Teijsman in 1859 along with *P. violacea*, in the Sumatran province of Palembang, and was sent by him to the Botanic garden attached

to the University of Leyden, under the name of *P. zebrina*, where, under the able management of M. Witte, the Superintendent, it flowered for the first time in Europe in 1861, one plant only surviving the journey. It was first introduced into this country by Messrs. Low and Co. in 1864, and flowered for the first time in the collection of the late Mr. Jehn Day, at Tottenham, in the summer of the following year. In 1881 it was detected by Curtis, at that time collecting for us in the Malay Archipelago, in the hot, damp forests of Palembang, growing on trees overhanging streams and water-courses, generally on the trunks and much shaded, sometimes associated with *P. violacea*.

The two last-named sub-varieties noticed above appeared among Curtis' collection. Two others were noticed and named by Teijsman, but which are now probably lost to cultivation. *P. sumatrana* usually flowers in May and June.

P. tetraspis.

Leaves obovate, cuneate, 8—9 inches long and 2—3 inches broad. Peduncles much shorter than the leaves, 3—5 flowered. Flowers $1\frac{1}{2}$ —2 inches in diameter, ivory-white, the pedicels sheathed at the base by a small triangular deciduous bract; sepals and petals similar, spreading, oval-oblong, acute, the two lateral sepals broader than the dorsal one; lip fleshy, three-lobed, the side lobes ligulate, curved upwards and inwards, truncate at the free end, yellowish on the outer side; the front lobe sub-rhomboidal, with a tuft of bristles at the apex; crest sub-conic. Column swollen at the base.

Phalænopsis tetraspis, Rehb. Xen. Orch. II. p. 146 (1868). Id. in Gard. Chron. XV. (1881), p. 562. Hook. f. Fl. Brit. Ind. VI. p. 30.

Originally discovered by Thomas Lobb, while collecting for us in Malaysia, who gave no locality, and whose dried flowers were communicated by us to the late Professor Reichenbach. The first living plants received in this country were sent to Mr. William Bull, of Chelsea, in 1881, by Major-General E. S. Berkeley, who had detected them in the Andaman Islands, "growing on Mangrove and other trees in muddy swamps, at the extreme end of the creeks, where the water is fresh, and where the plants hang from the branches a few feet above the water, growing with extraordinary luxuriance."*

P. violacea.

Leaves variable in size, broadly oval or elliptic-oblong, the largest 6—9

* Gard. Chron. II. s. 3 (1887), p. 74.

inches long, 3—4 inches broad, bright shining green. Peduncles stoutish, short, sheathed at each joint by a triangular, acute, pale green, keeled bract, 2—5 or more flowered. Flowers 2—3 inches in diameter, the dorsal sepal and petals similar, ovate-oblong, mucronate, greenish white with a bright violet-purple blotch at the base, which sometimes spreads to beyond the middle; the lateral sepals oblong, acute, sub-falcate, with a depressed mid-line and keeled behind, the inner half violet-purple to two-thirds of the length, the apical third whitish, the outer half greenish white; lip shortly clawed, three-lobed, the side lobes oblong, erect, truncate, golden yellow, with a small yellow crest between them that is prolonged in front into a narrow plate, bifid at the apex; the front lobe bright violet-purple, obovate-oblong, apiculate, keeled above, and with two small bristles at the basal end of the keel, concave beneath. Column thickened at the base, terete above, deep purple.

Phalænopsis violacea, Teijsm. et Binn. Pl. nov. in hort. Bogor. cult. p. 16 (1863). *Flore des Jardins des Pays Bas*, IV. p. 129. Rehb. in Gard. Chron. X. (1878), p. 234. *Fl. Mag.* n.s. t. 342 (1879). Gard. Chron. XVI. (1881), p. 145, icon. xyl. Williams' *Orch. Alb.* IV. t. 182. Hook. f. *Fl. Brit. Ind.* VI. p. 29.



Phalænopsis violacea.

sub-vars.—*alba* (Pl. nov. in hort. Bogor. cult. p. 17), sepals and petals French-white, the side lobes and crest of the lip yellow, the front lobe light rose; *Baron Schroeder's* (*Illus. hort.* 1885, t. 173. Gard. Chron. XVIII. (1882), p. 680), the basal half of all the segments bright purple, the colour partially broken up into lines; *Mr. Bowring's* (Gard. Chron. XXII. (1884), p. 262), light yellow with a broad purple stain on the lateral sepals and some purple markings at the base of the petals and

dorsal sepal; *Mr. Murton's* (Id. X. (1878), p. 234), light lemon-yellow with a purple blotch at the base of the lateral sepals, the base of the column and middle lobe of the lip stained with the same colour.

Phalænopsis violacea was discovered by Teijsman, near Palembang, in Sumatra, and was sent by him to the Botanic garden at Leyden in 1859, and at the same time to the collection of M. Willinck, at Amsterdam. It was first described in the publication quoted above by M. Witte, the Superintendent of the Leyden garden, where it flowered for the first time in Europe in 1861, and two years later it was again described by its discoverer in the list of new plants cultivated in the Botanic garden at Buitenzorg, in Java; this description is the first usually quoted by botanists, Teijsman being undoubtedly the author of the name. Nothing more appears to have been heard of it till it was sent by Mr. Murton, of the botanic garden at Singapore, to Mr. M. H. Williams, of Tredrea in Cornwall, in whose collection it flowered in 1878, and later in the same year a plant from the same source flowered in our Chelsea nursery. Two years afterwards we received a consignment of plants from southern Sumatra, which had been collected by Curtis, who found them growing under the same conditions as *P. sumatrana*, with which *P. violacea* is sometimes associated.

The colour of the flowers of this species varies considerably, especially as regards the area covered by the purple; besides the sub- or colour varieties noted above, several others not seen by us have received distinguishing names.

HYBRID PHALÆNOPSES.

The existence of natural hybrids among Phalænopses was first broached by Dr. Lindley in 1853, when a plant which had been imported by us from the Philippine Islands along with *Phalænopsis Aphrodite*, was found upon flowering to combine the characters of that species with those of *P. rosea*; he thence surmised that it might be a natural mule between them, and he accordingly named it *P. intermedia*.* Subsequently other forms bearing marks of hybridity were introduced from the same rich Phalænopsis region; some of them evidently derived from the same parentage as the

* Paxton's *Flower Garden*, III. p. 163.

first introduced hybrid, others from a different parentage in which *P. Schilleriana* may have participated. There is thence in cultivation a group of supposed natural hybrids, which have originated from *P. Aphrodite*, *P. Schilleriana*, and *P. rosea*.

Among the experiments undertaken by Seden in hybridising species of *Phalænopsis* one has proved to be of exceptional interest from a scientific point of view. He fertilised *Phalænopsis rosea* with the pollen of *P. Aphrodite*, and the resulting progeny was the *P. intermedia*, of Lindley. This was the second instance in which the existence of natural hybrids among orchids has been proved by direct experiment.* Subsequent crosses between other species have resulted in adding several beautiful and distinct forms to the list of cultivated *Phalænopses*.

Hybrid *Phalænopses* thence fall under two headings, the first comprising those introduced from the habitats of the species from which they have been derived; the second, those raised artificially in the glass houses of Europe. In accordance with the course adopted in this work, the hybrids derived from the same pair of species are brought under the same name, and deviations from the first described form are described as varieties of that form.

NATURAL HYBRIDS.

Phalænopsis intermedia.

Leaves as in *Phalænopsis Aphrodite*, but rarely attaining the dimensions of the larger ones under cultivation. Peduncles usually paniculate, but sometimes simple and racemose. Flowers about 2 inches in diameter; sepals elliptic-oblong, white; petals also white, sub-rhomboidal, much broader than the sepals; lip with an incurved white claw spotted with red, three-lobed; the side lobes erect, orbicular-spathulate, light amethyst-purple, the front lobe broadly cordate, with two reflexed cirri at the apex, reddish purple; crest two-lobed, yellow spotted with red. Column terete, amethyst-purple.

Phalænopsis intermedia, Lindl. in Paxt. Fl. Gard. III. p. 163, fig. 310 (1853).
P. Lobbii, Hort.

var.—*Brymeriana*.

Sepals and petals white with light amethyst-purple veins, the lateral sepals spotted with purple at the base, the petals with a purple stain

* See Masdevallia, p. 72.

near the base; the side lobes of the lip light purple streaked with red, the front lobe red-purple.

P. intermedia Brymeriana, Rehb. in Gard. Chron. V. (1876), p. 366. *Fl. Mag.* N.S. t. 263.

var.—Portei.

Flowers somewhat larger than the typical form; sepals and petals white with a purple stain at the base of each, the basal area of the side lobes of the lip light tawny yellow spotted with red, the apical area amethyst-purple, the front lobe amethyst-purple toned with red.

P. intermedia Portei, Rehb. in Bot. Zeit. 1863, p. 168. Warner's *Sel. Orch.* II. t. 2. *Fl. Mag.* N.S. t. 162. *P. Portei*, Gard. Chron. V. (1876), p. 370, with figs.



Phalænopsis intermedia.

Phalænopsis intermedia first appeared as a solitary plant among an importation of *P. Aphrodite* received by our Exeter firm from Thomas Lobb in 1852, and this remained the only one known of this hybrid till two more were brought from the Philippine Islands, in 1861, by a French trader named M. Porte, and which differed from the original *P. intermedia*, and received the varietal name under which it is described above. Thirteen years elapsed before another addition was made to the group, and then it was amongst an importation of Messrs. Low and Co.; one of these plants flowered in Mr. Brymer's collection, at Ilington House, Dorchester, in the spring of 1876, which differing from the preceding introductions was named in compliment to that gentleman. Since that date the typical form and also the two varieties have appeared very

sparingly amongst importations by different horticultural firms, the flowers showing some trifling deviation in colour from the first described forms, such as usually happens among hybrids, whether naturally or artificially raised. The finest specimen of *P. intermedia* we have yet seen is in the collection of the Right Honourable Lord Rothschild, at Tring Park.

As already stated *Phalænopsis intermedia* has been raised artificially by Seden, from *P. Aphrodite* and *P. rosea*; the plant raised from them flowered for the first time in our Chelsea nursery in the spring of 1886.

P. leucorhoda.

A supposed natural hybrid between *Phalænopsis Aphrodite* and *P. Schilleriana*. Leaves sometimes wholly green as in the first-named species, sometimes freckled with grey, but not so much as in *P. Schilleriana*, the grey frequently disappearing with age. Flowers as large as those of *P. Aphrodite*; sepals and petals white, more or less stained with rose-purple on the basal half; lip nearly as in *P. Schilleriana*, with the apical tendrils of *P. Aphrodite*, but somewhat shorter; the side lobes white spotted with red and with a yellow stain at the front margin; the front lobe white with a yellow stain at the base.

Phalænopsis leucorhoda, Rehb. in Gard. Chron. III. (1875), p. 301. *Fl. Mag.* N.S. t. 166.

var.—casta.

Sepals white, the dorsal one with a light purple stain at the base, the lateral two with a light yellow stain spotted with red at the base; petals wholly white; all the lobes of the lip white with a yellow stain spotted with red at the base like the lateral sepals, but brighter; the front lobe, as in *Phalænopsis Aphrodite*, with the basal angles less acute and with the apical tendrils broader and shorter.

P. leucorhoda casta, supra. *P. casta*, Rehb. in Gard. Chron. III. (1875), p. 590. Williams' *Orch. Alb. V.* t. 229. Sander's *Reichenbachia II.* t. 87.

var.—Cynthia.

Leaves as in *Phalænopsis Schilleriana*; sepals and petals white flushed with light rose-purple towards the base, the lateral sepals dotted with red on the inner basal half; the side lobes of the lip nearly as in *P. Aphrodite*, white spotted with purple on the basal half; the front lobe nearly as in *P. Schilleriana*, with short, anchor-shaped apical appendages, white with a yellow stain at the base, spotted and marked with purple.

P. leucorhoda Cynthia, supra. *P. Cynthia*, Rolfe in Gard. Chron. VII. s. 3. (1890), p. 132. *Id.* p. 227.

Phalænopsis leucorhoda was introduced from the Philippine Islands by Messrs. Low and Co., in 1874, amongst an importation of the supposed parents; *costa* was introduced in like manner about the same time by the same firm. Several intermediate forms have since appeared in various collections that have well nigh bridged over the not very broad difference that originally separated them. *Cynthia* first appeared in the collection of Mr. F. Wigan, at Clare Lawn, East Sheen, where it flowered in the spring of 1890; it was probably introduced by Messrs. Low and Co., as a *Phalænopsis* in their establishment produced flowers shortly afterwards that were almost identical with those of Mr. Wigan's plant.* The influence of *P. Schilleriana* greatly preponderates in this supposed hybrid, and it may possibly have resulted from the reversed cross of that which produced *P. leucorhoda* and its variety *costa*.

The forms we have here described constitute one of the most beautiful groups of *Phalænospses* in cultivation.

P. Veitchiana.

A supposed natural hybrid between *Phalænopsis Schilleriana* and *P. rosea*. Leaves nearly as in *P. rosea* with a few faint greyish markings irregularly scattered over the surface. Flowers 2 inches in diameter; sepals white with a flush of light purple below the middle; petals sub-rhomboidal, broader than the sepals, white with a deeper purple stain; the side lobes of the lip broadly spatulate, incurved, the basal half white spotted with red, the apical half crimson-purple; the front lobe somewhat lyre-shaped, with two straight, pointed teeth at the apex, crimson-purple. Column purplish.

Phalænopsis Veitchiana, Rehb. in Gard. Chron. 1872, p. 935. Id. XXI. (1884), p. 270 (brachyodon). *Fl. Mag.* N.S. t. 213.

This is one of the rarest as well as one of the most distinct of the natural hybrids. It first appeared as a solitary specimen among one of our own importations prior to 1872, in which year it flowered for the first time. It remained the only plant known of *Phalænopsis Veitchiana* till a second was imported by Messrs. Low and Co. in 1883, which differed but little from the first, except in the shorter, thicker, apical teeth of the front lobe of the labellum.

* Gard. Chron. VII., s. 3 (1890), p. 227.

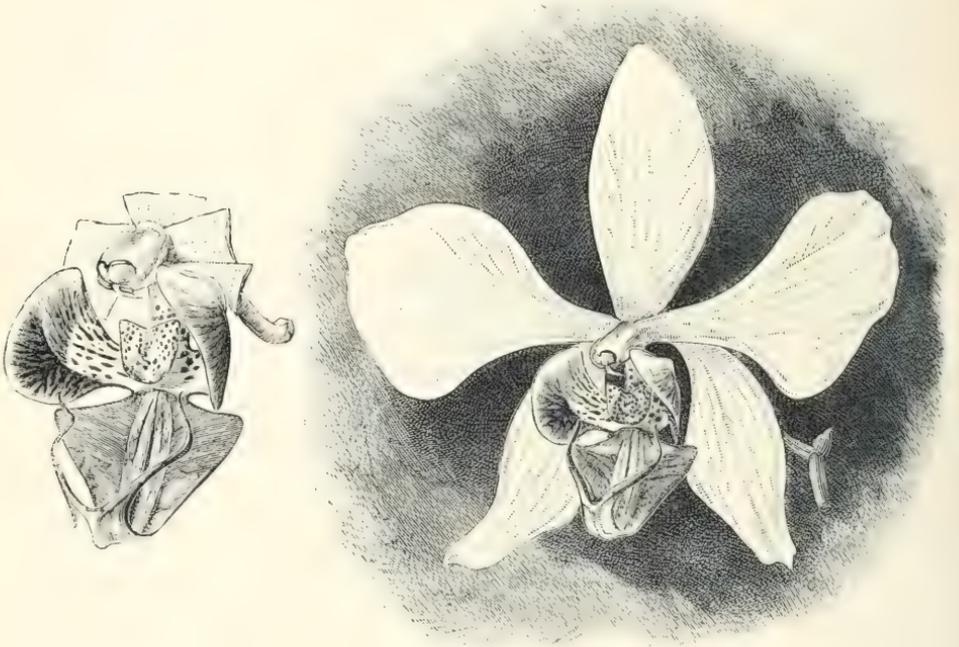
GARDEN HYBRIDS.

Phalænopsis "F. L. Ames."

P. amabilis × *P. intermedia*.

Leaves oval-oblong, bright green. Flowers 3 inches in diameter, with the general shape of those of *P. amabilis*; sepals and petals white; lip suffused and marked with a peculiar shade of reddish purple; the side lobes white externally, spotted with light purple at the base on the inner side, above which the colour runs into lines; the front lobe is striated with reddish purple in front, and suffused with the same colour behind; crest yellow spotted with red.

Phalænopsis "F. L. Ames," Rolfe in Gard. Chron. III. s. 3 (1888), p. 200, icon. xyl.



Phalænopsis "F. L. Ames."

Raised by Seden at our nursery. A most interesting and distinct hybrid, of which three species are concerned in the ancestry, the pollen used being that of *P. intermedia*, itself a natural hybrid between *P. Aphrodite* and *P. rosea*. The colour of the labellum is very peculiar, and strongly marks the individuality of this beautiful Phalænopsis, which is dedicated to the Hon. F. L. Ames, of North Easton, Massachusetts, a liberal patron of horticulture, and the possessor of one of the finest orchid collections in cultivation.

P. Harriettæ.*P. amabilis* × *P. violacea*.

Leaves strictly oval, bright green. Peduncles two or more flowered. Flowers about 3 inches in diameter, intermediate between those of the parents; sepals and petals cream colour, much spotted and stained with rose-purple on the basal half, the dorsal sepal oval-oblong, the lateral sepals ovate-oblong, keeled behind, the colour confined to the inner half, as in *Phalænopsis violacea*; petals much broader and obtuse, as in *P. amabilis*; lip distinctly clawed, the lateral lobes intermediate in

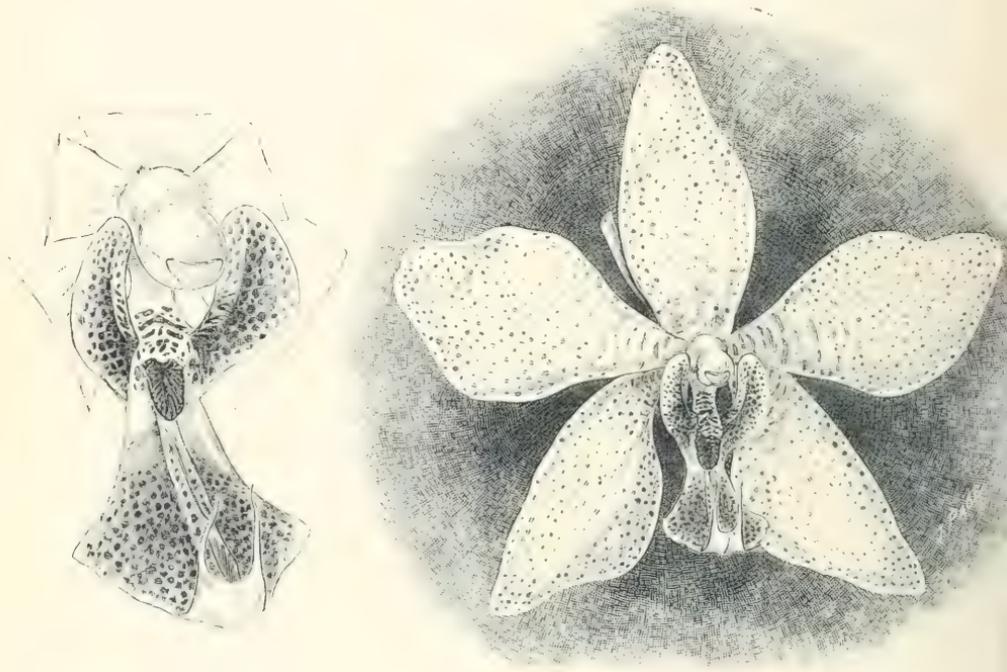


Phalænopsis Harriettæ.

shape between the broad spreading ones of *P. amabilis* and the narrow appressed fleshy ones of *P. violacea*, cream colour spotted with brown-purple below, rose-purple above; the intermediate lobe broadly trowel-shaped with the lateral angles somewhat acute and the apex distinctly notched, fleshy, and bright rose-purple, as in *P. violacea*. Column stained with rose-purple

Phalænopsis Harriettæ, Rolfe in Gard. Chron. Id. s. 3 (1888), p. 8, icon xyl, *The Garden*, XXXVIII. (1890), t. 766.

Raised by Seden at our nursery. A very beautiful and interesting hybrid that has for its parents species belonging to two distinct sections of the genus. The remarkable manner in which the floral characters of these species have been blended may be gathered from the above description and the accompanying woodcut. The only plant raised has been acquired by the Hon. Erastus Corning, of Albany, U.S.A., and is named in compliment to that gentleman's daughter.



Phalænopsis "John Seden."

P. "John Seden."

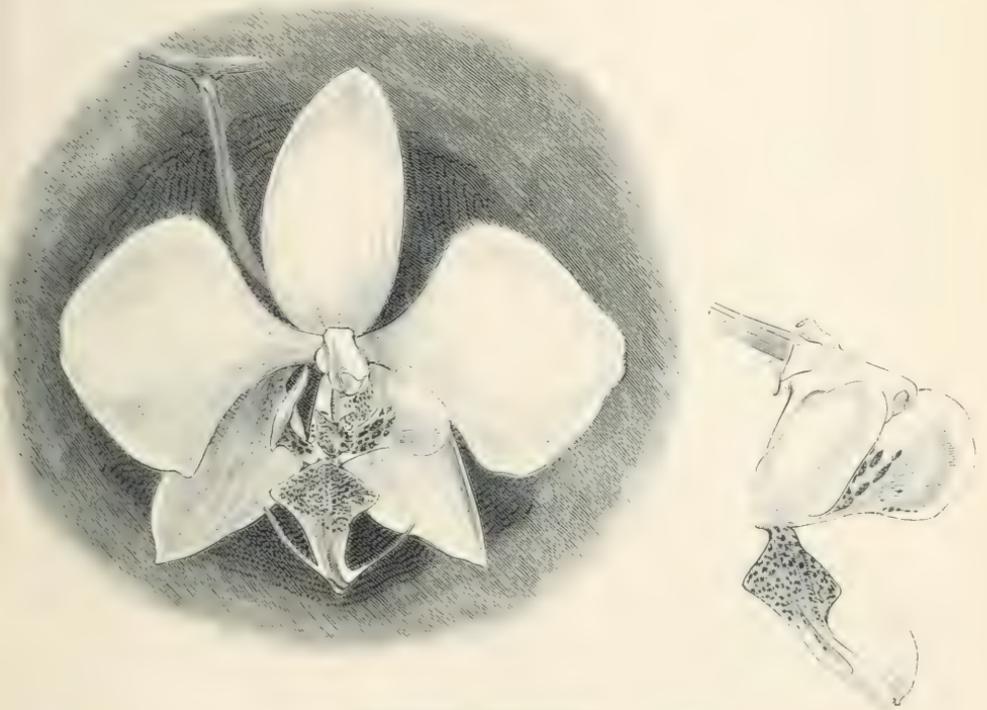
P. amabilis × *P. Lüddemanniana*.

Leaves oval-oblong, dark glossy green. Flowers 3 inches in diameter, the sepals and petals ivory-white densely and uniformly dotted all over with beautiful light purple, the claw of the lip similarly dotted, the lobes suffused with reddish purple; sepals elliptic-oblong, the lateral two oblique; petals similar but broader and more obtuse; lip intermediate in all the lobes, the lateral two fleshy and sub-erect; the front one nearly diamond-shaped with the sharp keel of *Phalænopsis Lüddemanniana*, but destitute of its long hairs, upturned at the apex, and bearing a pair of awl-shaped tendrils; crest yellowish, oblong,

deeply channelled, narrowed in front, and terminating in two acute points.

Phalænopsis "John Seden," Rolfe in Gard. Chron. III. s. 3 (1888), p. 331, icon. xyl.

Raised by Seden at our nursery. "Of all the many surprises which have emanated from that wonderful laboratory at the Royal Exotic Nursery this is altogether unsurpassed, something quite unique; its great beauty is acknowledged by all who have seen it."* This fine hybrid is now in the collection of Baron Schroeder, at The Dell.



Phalænopsis Rothschildiana.

P. Rothschildiana.

P. Schilleriana × *P. amabilis*.

Leaves freckled with grey, as in *Phalænopsis Schilleriana*. Flowers about 3 inches in diameter, with the general shape of those of *P. amabilis*; the dorsal sepal and petals white, the outer half of the lateral sepals also white, the inner half light yellow spotted with purple towards the base; the side lobes of the lip nearly as in *P. amabilis*, pale yellow on the inside, spotted with purple at the

* Gard. Chron. loc. cit. supra.

base; the front lobe stained with yellow and spotted with red from the base to beyond the middle, the apical area white, the tendrils anchor-shaped at the base with the arms elongated into slender cirri; crest bright canary-yellow dotted with red-purple.

Phalænopsis Rothschildiana, Rehb. in Gard. Chron. I. s. 3 (1887), p. 606.

Raised by Seden at our nursery. It is dedicated to the Right Hon. Lord Rothschild, a distinguished amateur of *Phalænopses*, and whose cultivation of these plants at Tring Park is probably the best in Europe.

RHYNCHOSTYLIS.

Blume, Bijdr. p. 285, t. 49 (1825). Rehb. in Walp. Ann. VI. p. 887 (1864). Benth. et Hook. Gen. Plant. III. p. 574 (1883).

The genus *Rhynchostylis* was founded by Blume upon the beautiful species commonly known in gardens as *Saccolabium Blumei*, and which Reichenbach adopted in his monograph of the ORCHIDÆ published in Walper's *Annales Botanices Systematicæ*, in 1864, joining with the type species Lindley's *Vanda violacea*, a plant that is much nearer *Saccolabium*, and is now referred to that genus. Bentham has followed Reichenbach in adopting Blume's *Rhynchostylis* for the type species, to which must now be added the scarcely less beautiful Siamese species recently introduced and cultivated under the name of *Saccolabium cæleste*, but which conforms to the type in every essential generic character.

The following are the most obvious characters that distinguish *Rhynchostylis* from *Saccolabium*:—

In *Rhynchostylis* the column is produced at its base into a kind of foot, to the apex of which the labellum is attached, and not simply continuous with the ovary with the labellum sessile at its base as in *Saccolabium*. Moreover, in *Rhynchostylis* the saccate spur of the labellum is much compressed and opposed to the front lobe, while in *Saccolabium* the spur or saccate base usually (not always) projects straight downwards at a right angle to the front lobe.

The name *Rhynchostylis* is derived from *ῥυγχος* (*rhynchos*), "a beak," and *στυλος* (*stylos*), "a pillar," in reference to the beaked column of the flower, but as this character pervades most of the allied genera the name is not especially applicable to the species of *Rhynchostylis*.

Cultural Note.—The cultural treatment of the species and varieties here referred to *Rhynchostylis* is the same as that of *Saccolabium*.

Rhynchostylis cœlestis.

Stem stoutish, apparently attaining but a moderate height, emitting from below numerous cord-like roots. Leaves ligulate, fleshy, 4—6 inches long, channelled above, acutely keeled beneath, closely imbricating at the base, unequally lobed and toothed at the apex. Peduncles erect, densely racemose along the distal half. Flowers crowded, $\frac{3}{4}$ -inch in diameter, on white or pale blue, furrowed and slightly twisted pedicels; sepals and petals similar and sub-equal, oval-oblong, obtuse, the lateral sepals the broadest, white with an indigo-blue apical blotch; lip obovate-oblong, the saccate spur much compressed and slightly curved, the basal half of the blade white, the apical half bright indigo-blue. Column very short; anther beaked, dark blue.

Rhynchostylis cœlestis, Rehb. in Gard. Chron. XXIII. (1835), p. 692. *Saccolabium cœleste*, Rehb. in Gard. Chron. loc. cit. Williams' *Orch. Alb.* VIII. t. 361.

The bright blue of this pretty orchid, a colour so rare among the epiphytal ORCHIDÆÆ, renders it exceptionally interesting to amateurs. The information respecting its origin is of a very meagre description, and all that appears to have been divulged is contained in the following paragraph extracted from Williams' *Orchid Album*, sub. t. 361:—"This species was collected and sent home by M. Roebelin, who states that he found it growing upon isolated trees in the rice fields of Siam, these trees being charred stumps which had survived the fires used in clearing the ground for cultivation."

R. retusa.

Stems as thick as the little finger, rarely exceeding a few inches in height under cultivation. Leaves ligulate, spreading or arching, 9—12 inches long, imbricate at base, obliquely two-lobed or truncate at the apex, paler beneath with several yellowish longitudinal lines. Racemes pendulous, longer than the leaves. Flowers crowded, $\frac{3}{4}$ -inch in diameter, on short grooved twisted pedicels, at the base of which is a minute scaly bract; sepals oval-oblong, acute, the lateral two much the broadest; petals narrowly oblong, both sepals and petals white, spotted with amethyst-purple; lip deeply saccate at the base, the sac much compressed, the blade obovate-oblong, channelled above, reflexed at the apex, wholly purple. Column short; anther beaked.

Rhynchostylis retusa, Blume, Bijdr. p. 286 (1825). Rehb. in Walp. Ann. VI. p. 887 (1854). Hook. f. Fl. Brit. Ind. VI. p. 32. *Saccolabium Blumei*, Lindl. in Bot. Reg. 1841, misc. No. 115. Id. *Sert. Orch.* t. 47. Linden's *Pesc.* t. 21 (majus). *Illus. hort.* 1868, t. 545 (majus). De Puydt, *Les Orch.* t. 27. Williams' *Orch. Alb.* IV. t. 169. Id. V. t. 238 (Russelianum).

var.—guttata.

Leaves longer, narrower, and more closely set on the stem, sub-pendulous, not arching. Flowers somewhat smaller, more crowded, and often more densely spotted.

R. retusa guttata, Rehb. in Walp. Ann. VI. p. 887 (1864). *R. guttata*, Rehb. in Bonpl. II. t. 93. *Saccolabium guttatum*, Lindl. Gen. et Sp. Orch. p. 220. Id. in Journ. Linn. Soc. III. p. 32. *Bot. Mag.* t. 4108. Warner's *Sel. Orch.* II. t. 18 (Holfordianum). *S. Rheedii*, Wight, Icon. Pl. Ind. or. 1346—7. (1852). *Sarcanthus guttatus*, Lindl. in *Bot. Reg.* t. 1443 (1831). *Aërides guttatum*, Regel's *Gartenfl.* 1863, t. 415. *Epidendrum retusum*, L. Sp. pl. 1351. (1753).

var.—præmorsa.

Plant more robust. Leaves shorter and broader, spreading, more distant and distinctly premorse at the apex. Racemes longer. Flowers usually paler and with fewer spots.

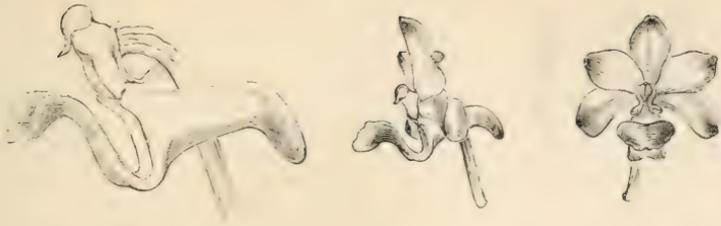
R. retusa præmorsa, Rehb. in Walp. Ann. VI., p. 887. *R. præmorsa* Bl. Bijdr., p. 286. *Saccolabium præmorsum*, Lindl. Gen. et Sp. Orch. p. 221. *S. guttatum giganteum*, Godefroy's *Orchidophile*, 1888, p. 272.

Rhynchosstylis retusa is one of the most widely distributed of Indian orchids; the geographical area over which it is spread is probably as great or even greater than that occupied by any other epiphytal species.* It is found in nearly all parts of Hindostan where the climatic conditions are such as to allow it to live and thrive; also in Ceylon; it is scarcely less abundant in the British provinces in the eastern peninsula, especially in the plains of Lower Burmah,† whence it spreads southwards into Java, where it is common, and where it has established itself in immense numbers in the Teak plantations formed by the Dutch in that colony. Over so extensive a region the plant is found to preserve a remarkable uniformity in the size and colour of its flowers, while in habit its variability is more pronounced, the forms described above being well marked in that respect, and not likely to be confused with each other.

The following graphic account of this orchid as seen in the south of India is communicated by "J. L." to *The Garden*, XXXVIII. (1890), p. 607:—"In Malabar it mostly affects the jungle and marshy banks of sluggish-flowing rivers thick with trees of low stature and thorny undergrowth composed of *Solanum ferox*, spiny Acacias, and the like, where croak innumerable frogs, speaking eloquently of malaria, ague, and fever, and where crawls the deadly cobra, and where other reptiles and insects of strange appearance are abundant. In the midst of such surroundings, pendent from the branches of trees, may be seen the charming blooms of the *Saccolabium* (*Rhynchosstylis*) spreading a fragrance around which compels

* *Cattleya labiata* and its varieties extend over the South American continent from Rio de Janeiro to Darien; but the interval which separates the Brazilian type from its Colombian varieties is probably immensely in excess of the area over which *C. labiata* is actually spread.

† Col. Benson in Gard. Chron. 1870, p. 796.



Rhynchosstylis caelestis.



Rhynchosstylis retusa.

the explorer to linger in the locality, even at the risk of subsequent attacks of jungle fever. Curiously enough the plants are never found in groups, but singly, with long distances between the individual plants. They come into flower during September and October, or immediately after the south-west monsoon rains cease, and from that date till the first spring showers fall in March or April, these epiphytes enjoy complete rest. They are throughout nearly the whole of this period of rest more or less protected from the east winds that prevail for so many months, and they are under the influence of dense fogs during the night and early morning. During the prevalence of the south-west monsoon, which is their growing season, the temperature rarely falls below 21° C. (70° F.), that is, when the sky is cloudy and the rain is pouring in torrents, perhaps for three and four weeks at a time. From the end of October till the end of April, the season of rest, the thermometer frequently falls in the night and early morning to 9° C. (48° F.), so that the range of temperature under which they live in southern India is considerable."

The form now recognised as the type was detected by Dr. Blume during a journey through Java in 1823—4, a short time previous to the publication of his "Contributions" (*Bijdragen*) to the flora of that island, in which it was first described under the now accepted name of *Rhynchostylis retusa*. It was introduced from Java by Messrs. Loddiges in 1838—9, and was figured and described in Dr. Lindley's *Sertum Orchidaceum*, under the name of *Saccolabium Blumei*, on the occasion of its first flowering in this country. It has since been gathered in Lower Burmah, and in other localities in the eastern peninsula. Long, however, before the publication of Blume's *Bijdragen* specimens of the Indian form known in gardens as *Saccolabium guttatum* had been transmitted to Europe, through which the plant became known to Linnæus, who included it in his genus *Epidendrum*, as he did all the epiphytal orchids known to him. The first notice of it as a horticultural plant occurs in the *Botanical Register* for 1831, where it is figured under the name of *Sarcanthus guttatus*. In the letter-press accompanying the plate Dr. Lindley states that "he saw in 1820, in Sir Joseph Banks' library, a specimen in full flower that had been sent from the Royal Gardens at Kew," and this was probably the first time of its flowering in England. Ten years later a plant was presented to the Horticultural Society of London by the East India Company through Dr. Wallich, which flowered at Chiswick in 1831. From that time to the present the species has been uninterruptedly represented in British orchid collections.

SARCOCHILUS.

R. Br. Prod. p. 332 (1810). Benth. et Hook. Gen. Plant. III. p. 575 (1888).

The genus *Sarcochilus* possesses but a secondary interest for the cultivators of epiphytal orchids, for although it includes several beautiful species, these are so poorly represented in British collections or are known under other names, that the genus is frequently overlooked by amateurs, and altogether neglected in the popular orchid hand-books. As reconstituted by Mr. Bentham in the *Genera Plantarum*, it includes about thirty species, many of which had been previously distributed among several genera,* the founders of these relying chiefly upon the form of the labellum and the habit of the plant, which vary from species to species; but the discovery of other species modifying the value of these characters, suggested the propriety of uniting them all under one genus.

The species now included in *Sarcochilus* are spread over India, Malaysia, Australia, and the islands in the South Pacific Ocean. The five described in the following pages are among the best known, although not often seen in cultivation. The generic name is derived from *σάρξ σαρκός*, "flesh," and *χεῖλος*, "a lip," in reference to the fleshy texture of that organ.

Sarcochilus Berkeleyi.

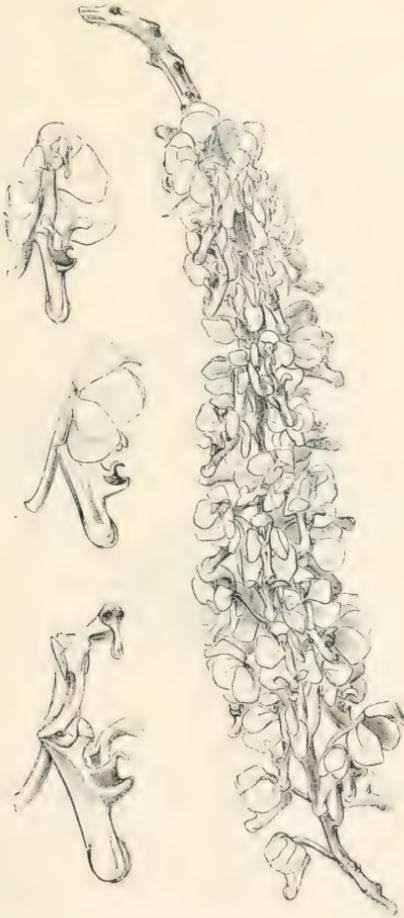
Stem as thick as an ordinary writing pencil, 3—6 inches high in plants observed. Leaves spreading, strap-shaped, 5—6 or more inches long, obtuse or emarginate. Racemes pendulous, longer than the leaves, the rachis pale green, swollen at the base of the pedicels and grooved along the interspaces. Flowers crowded, $1\frac{1}{2}$ inch across vertically, cream-white with a purple stain on the labellum; the dorsal sepal and petals broadly obovate, the former concave, almost galeate; the lateral sepals larger, oblong, obtuse, spreading; lip attached to the foot of the column, clawed, saccate, compressed, three-lobed, the side lobes erect, falcately linear; the front lobe with two erect, horn-like processes above, and prolonged below

* Thus: *Dendrocolla*, Blume, Bijdr. p. 286. *Thrixspermum*, Lour. Fl. cochinch. II. p. 519. *Ornitharium*, Lindl. in Paxt. Fl. Gard. I. p. 188. *Micropera*, Dalz. in Hook. Kew Journ. III. p. 282. *Chiloschista*, Lindl. in Bot. Reg. sub. t. 1522. *Gunnia*, Lindl. in Bot. Reg. sub. t. 1699. *Camarotis*, Lindl. Gen. et Sp. Orch. p. 219. Reichenbach (Walp. Ann. VI. p. 497) brought under *Sarcochilus* nearly all the species included in the genus by Bentham, but subsequently removed most of them to *Thrixspermum* (Xen. Orch. II. p. 120) as being more ancient than *Sarcochilus*, a course Mr. Bentham did not adopt, "on the very sufficient grounds that the name is utterly bad in construction, and because the description of the type is so incomplete that it would have been impossible to recognise the plant intended by it." (Bot. Mag. sub. t. 7011.)

into a compressed tube dilated at the apex. Column short, greenish ; anther beaked.

Sarcochilus Berkeleyi, Hook. f. Fl. Brit. Ind. VI. p. 37 (1890). *Thrixspermum Berkeleyi*, Rehb. in Gard. Chron. XVII. (1882), p. 537.

A very handsome species, discovered by Major-General E. S. Berkeley, as he himself informs us, in several islands in the Malay Archipelago. It is known in gardens under the name of *Thrixspermum Berkeleyi*, to



Sarcochilus Berkeleyi.

which genus it was referred by Reichenbach, who first described it ; but *Thrixspermum* being now merged into *Sarcochilus*, Loureiro's barbarous name will, it is to be hoped, disappear from orchid nomenclature.

S. Fitzgeraldi.

Stems very short, usually with 3—5 linear-oblong leathery leaves 3—5 inches long. Peduncles slender, drooping, longer than the leaves, 6—9 or more flowered. Flowers an inch in diameter, on white pedicels (and ovary) sheathed at the base by a small subulate bract; sepals and petals similar and sub-equal, spreading, oval, obtuse, white densely spotted with rose-purple towards the base; lip shorter than the other segments,



Sarcochilus Fitzgeraldi.

saccate, three-lobed, the side lobes erect, roundish oblong, white spotted with rose-purple; the front lobe small, sub-conical, gibbous below, bright yellow. Column very short.

Sarcochilus Fitzgeraldi, F. Mul. Frag. VII. p. 115 (1870). Fitzgerald, *Orch. Austral. I.* part 2.

One of the rarest and most attractive of Australian orchids. It is dedicated by Baron Ferdinand von Müller, Director of the Botanic Garden at Melbourne, to the excellent monographer of Australian orchids, Mr. Robert Fitzgerald, of Sydney, who has given the following account of it:—"It was discovered by myself in a deep gorge of the mountains,

at the head of the Billinger river, associated with a strangely proliferous form of *Dendrobium Kingianum* and clumps of *Sturmia* (*Liparis*) *reflexa*. It is found within the spray of the Naroo Falls and the surrounding streams, in masses, clinging to the dripping rocks and covering the black basalt with its green roots that stretch for yards over the smooth surface."*

We are indebted to Sir Trevor Lawrence, Bart., for materials for description and illustration.

S. Hartmanni.

Stems about 2 inches long, each with three—five leaves. Leaves hard and fleshy, linear-oblong, 3—5 inches long, obtuse, sometimes toothed at the apex. Peduncles stoutish, longer than the leaves, loosely racemose, many flowered. Flowers $\frac{1}{2}$ — $\frac{3}{4}$ inch in diameter, on short white pedicels spotted with red, and sheathed at the base by a small triangular bract; sepals and petals white spotted at the base on both sides with red, the sepals oval-oblong, the petals similar but narrower; lip shorter than the other segments, saccate with two falcately oblong erect side lobes that are white striated with red-purple, and a small conical intermediate one with a two-lobed orange-yellow callus. Column very short.

Sarcochilus Hartmanni, F. Mul. Frag. VIII. p. 248 (1874). *Bot. Mag.* t. 7010. *S. rubricentrum*, Fitzg. in Gard. Chron. XIV. (1880), p. 33. Id. *Orch. austral.* II. part I. *Thrixspermum Hartmanni*, Rehb. in Gard. Chron. VII. (1877), p. 716.

Native of the mountain woods near Toowoomba, in Queensland, where it was discovered by the late Mr. Charles Hartmann, an amateur botanist of that settlement. It was subsequently detected by Mr. E. Ramsay, F.L.S., at Cairns, in the same colony. Its very stout, erect peduncles with longer racemes of differently coloured smaller flowers distinguish it from the closely allied *Sarcochilus Fitzgeraldi*.

S. luniferus.

"Leaves in the ordinary state of the plant, none. Roots very many, 3—5 inches long, flattened. Peduncles 1—2 inches long, stout, decurved, hispidulous, green, purple-spotted with two—three white, ovate, acute scales. Racemes drooping, many flowered. Flowers $\frac{1}{2}$ inch in diameter; sepals and petals elliptic-oblong, obtuse, yellow spotted with orange-red; lip white, saccate with large erect, ovate, obtuse side lobes, a minute recurved mid-lobe, and two thick ridges on the papillose disk." (*Botanical Magazine*).

Sarcochilus luniferus, Hook. f. *Bot. Mag.* t. 7044. Id. *Fl. Brit. Ind.* VI. p. 37. *Thrixspermum luniferum*, Rehb. in Gard. Chron. 1868, p. 768. Id. *Trans. Linn. Soc.* XXX. p. 136.

* *Australian Orchids*, loc. cit. supra.

A pretty and very curious orchid cultivated in the Royal Gardens at Kew. One of its most noticeable peculiarities is the absence of leaves in the ordinary state of the plant (a character it possesses in common with a few other species of *Sarcochilus*), although a few small leaves occasionally appear under cultivation. It was one of the numerous discoveries of the Rev. C. Parish, near Moulmein, and was introduced to British gardens by Messrs. Low and Co. in 1868. The specific name refers to the form of the labellum as seen in front.

S. purpureus.

Stems scandent, 2—3 feet long, as thick as an ordinary writing pencil, and from which are produced numerous white, cord-like, branching roots. Leaves linear-oblong, 3—4 inches long, sessile, bifid at the apex, keeled beneath. Racemes longer than the leaves, many flowered. Flowers crowded, about an inch in diameter, light rose-purple, the lip a little darker than the other segments; sepals and petals elliptic-oblong, the lateral sepals adnate to the base of the lip; lip shorter than the other segments, compressed and narrowed at the base, dilated towards the apex into a funnel-like tube with a narrow, oval aperture, below which is a whitish awl-shaped appendage.

Sarcochilus purpureus, Benth. in *Gen. Plant.* III. p. 576 (1833). Hook. f. *Fl. Brit. Ind.* VI. p. 36. *Camarotis purpurea*, Lindl. *Gen. et Sp. Orch.* p. 219 (1832). *Id. Sert. Orch.* t. 19. *Id.* in *Journ. Linn. Soc.* III. p. 37. *Paxt. Mag. Bot.* VII. p. 35. *C. rostrata*, Rchb. in *Walp. Ann.* VI. p. 881 (1864). *Aërides rostratum*, Roxb. *Fl. ind.* III. p. 474 (1832).

This pretty orchid first became known to science in the early part of the present century through Dr. Carey, who cultivated it in his garden at Serampore in Bengal, whence it was obtained by Dr. Wallich for the Calcutta Botanic Garden in 1819, and whose excellent drawing by a native artist was reproduced in Dr. Lindley's *Sertum Orchidaceum*.^{*} It was subsequently found wild in the forests of Sylhet and on the Khasia Hills; and from the last-named locality it was introduced to Chatsworth by Gibson in 1837. It flowered for the first time in this country in Messrs. Loddiges' nursery at Hackney in 1839. Although generally cultivated by orchid amateurs of the last generation under the name of *Camarotis purpurea*, it is but rarely seen in the orchid collections of the present time.

^{*} Still the best coloured plate of this orchid known to us.

AËRIDES.

Loureiro, Fl. cochinch. II. p. 523 (1790). Lindl. Gen. et Sp. Orch. p. 328 (1832). Penth. et Hook. Gen. Plant. III. p. 576 (1883).

The elegant drooping racemes of fragrant, wax-like flowers, and the comparative facility with which the species can be cultivated in the glass-houses of Europe, have always secured for *Aërides* a large amount of favour from orchid amateurs, so that in most collections the genus is represented by its most admired species. From a botanical point of view, however, it must be admitted that a more perplexing genus as regards the limitation of species is scarcely to be found throughout the ORCHIDÆ, for it includes an unknown number of "forms," some of them perhaps natural hybrids, which in many instances approach each other so closely that it is extremely difficult to define clearly the differences that separate them, or to determine the specific characters by which the one may be distinguished from the other, if species they are, but nevertheless showing some characteristic in habit, in the inflorescence, or in the colour of the flowers, by which they are recognised as distinct by horticulturists. Many of these "forms" fall naturally into groups, each of which is represented by a well-recognised species that may be regarded as the type of the group; *Aërides odoratum*, *A. multiflorum* and *A. falcatum* are instances of such; around each of these well-marked species may be grouped a number of forms that can only be distinguished from the type by characters of scarcely sufficient value to be considered specific.

The essential characters of *Aërides* may be thus expressed:—

The *sepals* are spreading, the lateral two broader than the upper one, and adnate at their base to the foot of the column.

The *petals* are similar to the upper sepal, rarely different.

The *labellum* is affixed to the foot of the column, is three-lobed, and produced into a spur that is usually turned upwards on the back of the labellum.

The *column* is short and thickish, produced more or less at its base into a foot; the anther is beaked.

In a wild state the *Aërides* affix themselves to the trunks and branches of living trees, rarely to dead and prostrate ones. The young plants are usually erect or ascending, and emit from their base numerous cord-like roots that creep over the bark or along the cracks and crevices of it, clinging to the tree with extraordinary tenacity, and holding the

plants so firmly as to enable them to resist any of the ordinary force of Nature that would affect their stability or cause their displacement. As the stems continue to lengthen, adventitious roots are constantly produced from the preceding year's growth, which attain a great length, frequently branch, and become pendent by their own weight. These roots thence form in time a tangled, cord-like mass that cannot be aptly compared with any phase of vegetation seen in our climate. The annual lengthening of the stem is well marked by the foliage, which in a wild state is of biennial duration; the roots too that are farthest removed from the foliage gradually cease to perform their functions and die off. The inflorescence is produced from the axils of the leaves of the preceding year, which begin to wither in the short, dry season that ensues after the growth of the current year is completed. As the stem of an *Aërides* lengthens by successive yearly growths it gradually deviates from its ascending position, first becoming more inclined, then taking a horizontal direction, and finally by its own weight and the weight of its appendages it is brought into almost an inverted or, if near enough to the ground, a prostrate position, when its further lengthening is checked or even arrested by the obstacles it encounters. Nevertheless, the stems of *Aërides* are virtually interminate, they would continue to lengthen indefinitely if no physical obstacles or checks intervened. Stems have been observed from 15—20 feet long, but long before that length has been attained young shoots spring from the base of the parent stem, which in time become independent plants; the stem also produces lateral shoots when a fracture has occurred, or when growth at the apex has been arrested by some physical cause. As the leaves wither the stem becomes lignified, sapless, and gradually loses all signs of life beyond a certain distance below the foliage; probably the life of no part of the stem under the most favourable circumstances exceeds five years.

Such is the general view of the most obvious period of the life history of an *Aërides* in its native home.* Many exceptional cases are doubtless to be met with, but in none that have come to our knowledge has the general law been greatly departed from.† Under the artificial conditions to which the *Aërides* are subjected in the glass houses of Europe, some modifications of the general law of their growth as sketched above are occasionally observable, especially in the longer persistence of the foliage and prolonged life of the stem.

* The above general view of the life history of an *Aërides* is also applicable to *Vanda*, *Saccolabium*, etc., and other allied genera, with but some modification, and therefore will not be repeated under them.

† *Aërides japonicum* is a diminutive species, whose stem probably never exceeds a few inches in height under the most favourable circumstances; its life history is, however, essentially the same as that of other *Aërides*.

The species of *Aërides* admit of a division into two very distinct sections according to their vegetation and habit, viz., *PLANIFOLIE*, in which the leaves are flat, leathery, and spreading, and *TERETIFOLIE*, in which the leaves are cylindric, fleshy, and grooved in front. Of the last-named section two species only, *Aërides mitratum* and *A. Vandarum*, are known to us to be in cultivation. All the other cultivated forms belong to the flat-leaved section, throughout which a general uniformity of habit prevails, so that the following short diagnosis of the vegetative organs will serve for all:—

The *stems* are cylindric, deviating but little in thickness from that of a man's little finger, ligneous below, leafy upwards, emitting long, cord-like, often branched, aërial roots.

The *leaves* are strap-shaped, keeled beneath, embracing the stem at their base, obtuse or obliquely two-lobed at their apex, very leathery in texture.

The *inflorescence* is lateral, either simple or branched, decurved and usually longer than the leaves; very viscid in the *odoratum* group from a honeyed secretion along the rachis and from the base and foot of the column.

The *flowers* are often crowded and inverted, that is, the labellum is uppermost,* the pedicels are sheathed by a small scale-like bract at the base.

The genus was founded by the Portuguese missionary and botanist, Loureiro, upon *Aërides odoratum*, which he detected in Cochin-China some time prior to 1790, the year in which he published his *Flora cochinchinensis*. His selection of the name is explained by the following quaint extract from that work, which would be spoiled by translating:—"Mirabilis hujus plantæ proprietas est, quod ex sylvis domum delata et in aëre libero suspensa, absque ullo pabulo vegetabili, terreo vel aqueo, in multos annos duret, crescat, floreat et germinet. Vix crederem nisi diuturna experientia comprobassem." The name *Aërides* is a grammatical form called a patronymic, and means literally "children of the air."†

Geographical distribution.—The *Aërides* are spread generally over the Indo-Malayan region, excluding the arid tracts in the north-west of Hindostan and the dry central plateau of the Deccan, where the

* But owing to the pendulous habit of the inflorescence the flowers appear to the spectator in their natural position.

† The name itself is unknown in classic Greek, but it is correctly formed from ἀἴρ, ἄερος, "the air," hence the proper pronunciation is ā-ēr-ī-dēs.

climatic conditions are unsuitable for orchid life. On the map illustrating the geographical distribution of *Phalænopsis* we have also inscribed the authenticated localities of the most important of the cultivated *Aërides*, from which a better idea of the distribution of the genus will be derived than can be conveyed by verbal description. From an inspection of the map it will be seen that closely-allied forms occur in localities remote from each other, a circumstance that tends far to show that such forms are but geographical deviations from a common type, and may in some measure account for the difficulty attending the botanical limitation of the species.

Cultural Note.—The *Aërides* should be cultivated in what is usually called the “East Indian house,” where they may be associated with other orchids from the Indo-Malayan region. Although the mean temperature of that region is one of the highest observed in the world, it is found by experiment that most orchids brought thence to the high latitude of Great Britain thrive better in the glass-houses of this country in an average lower temperature than in a temperature raised by artificial heat to nearly the same mean as that of their native home. Thus, while the mean temperature for the whole year of parts of India and Malaysia, in which *Aërides* abound, is as high as 27° C. (80° F.), the temperature suited for them in the glass-houses of Great Britain should not be higher than 21°—24° C. (70°—75° F.) from March to October, the period during which the plants are in active growth, raised by sun-heat on bright days 6° C. (10° F.) higher, and reduced 3° C. (5° F.) by night, that is to say, to 18°—21° C. (65°—70° F.). In the winter months a night temperature of 15°—18° C. (60°—65° F.), raised a little higher in the daytime is sufficient. It is well known among cultivators that a high temperature maintained by fire-heat debilitates, while sun-heat strengthens the plants, hence a light shading only is necessary during the middle of the day in the summer months, while from October to March no shading is required. The ventilation must be regulated according to the season; the rule is—admit as much fresh air into the house as possible, and as often as it can be done without draughts and too rapid a lowering of the temperature of the house. A high degree of humidity must be maintained during the growing season by damping down and by the direct application of water to the plants; in winter the watering must be restricted to just so much as is sufficient to keep the sphagnum moist and to counteract the drying effects of the hot-water pipes. Pots are usually preferred, although teak baskets are used by some cultivators, especially when it is desired to grow the plants into large specimens; in either case they should be filled with clean, broken crocks to three-fourths of their depth, the

larger and coarser pieces being placed at the bottom; some cultivators add pieces of charcoal, but we have never detected any advantage derived from its use. The drainage should be surfaced with living sphagnum that must be kept constantly moist. In January, or February at the latest, the old sphagnum should be removed and replaced by new, and those plants whose lowermost leaves have withered should be taken out of the pots and their stems cut back at the base so far as to allow the fresh leaves to be close to the sphagnum.

Thrips and scale are great enemies of *Aërides*; the first can be kept in check by fumigation and the use of tobacco powder, the latter by sponging with soft soap dissolved in tepid water.

SYNOPSIS OF SPECIES AND VARIETIES.

Aërides Augustianum.*

“Leaves arching, 6—7 inches long and $1\frac{1}{4}$ inch broad, dark green and unequally bi-lobed at the apex. Racemes arching, a little longer than the leaves. Flowers of a light rosy shade, $1-1\frac{1}{4}$ inch long; sepals and petals roundish oblong, obtuse; lip three-lobed, the side lobes falcate, oblong, rounded, or nearly truncate above, margin entire; the front lobe much longer, broadly oblong, margins crenulate, apex somewhat bilobed; spur longer than the front lobe, nearly straight.” (R. A. Rolfe, in Gard. Chron. VII. s. 3 (1890), p. 9.).

Aërides Augustianum, Rolfe in Gard. Chron. loc. cit. and p. 233, icon. xyl.

Discovered in the Philippine Islands by M. Auguste Linden, to whom the species is dedicated, and recently introduced by the Société anonyme d’Horticulture Internationale of Brussels.

A. crassifolium.

Leaves 6—7 or more inches long, and $1\frac{1}{2}$ —2 inches broad, unequally bi-lobed at the apex. Peduncles longer than the leaves, loosely racemose. Flowers $1-1\frac{1}{2}$ inch across vertically; sepals oblong, obtuse, the lateral two the broadest, bright rose-purple, paler at the base; petals oval-oblong, coloured like the sepals; lip three-lobed, the side lobes semi-lunate or crescent-shaped and coloured like the sepals and petals; the intermediate lobe broadly ovate, obtuse, deep rose purple, at the base are two keels that are divergent in front; spur bent, compressed, greenish at the tip.

Aërides crassifolium, Rehb. and Parish in Trans. Linn. Soc. XXX. p. 145 (1873). Rehb. in Gard. Chron. VII. (1877) p. 596; VIII. p. 492, icon. xyl. Warner’s *Scl. Orch.* III. t. 12. Godefroy’s *Orchidophile*, 1885, p. 370. Hook. f. *Fl. Brit. Ind.* VI. p. 46.

* Not seen by us.

A very handsome species introduced by Messrs. Low and Co., from Moulmein, through the Rev. C. S. Parish in 1864, but which did not flower in this country till several years afterwards, on the first occasion in 1872 in the collection of the late Mr. John Day, at Tottenham, and in the following year in that of the late Mr. Dodgson, at Beardsworth, Blackburn. It is very near *Aërides fulcatum*, from which it is chiefly distinguished by its dwarfer and more robust stems, its broader and more leathery leaves, and its looser racemes of larger and differently coloured flowers.

A. crispum.

Stems usually dull violet-purple along the leafy part. Leaves spreading, 5—8 inches long, $1\frac{1}{2}$ —2 inches broad, bi-lobed at the apex with a small mucro between the lobes. Peduncles 3—5 times as long as the leaves, generally racemose, but sometimes branched. Flowers among the largest in the genus, with a pleasant pine-apple fragrance, nearly 2 inches across vertically, on short, partially twisted grooved pedicels; sepals and petals white lightly stained with rose-purple behind, and with a faint flush of the same near the apical end in front, oval-oblong, obtuse, the lateral sepals larger and the petals smaller than the dorsal sepal; lip three-lobed, the side lobes small, erect, roundish oblong, white, streaked with rose-purple on the inner side; the middle lobe broadly ovate, saddle-like, with serrate margin, rich amethyst-purple, and with a white grooved callus at the entrance of the saccate base; spur small, horn-like, compressed. Column white; anther yellowish.

Aërides crispum, Lindl. in Wallich's Cat. 7319. Id. Gen. et Sp. Orch. p. 239, (1832). *Bot. Reg.* 1842, t. 55. *Bot. Mag.* t. 4427. Van Houtte's *Fl. des Serres*, V. t. 438. *Illus. hort.* 1857, t. 123. *Gard. Chron.* 1859, p. 24, icon. xyl. Hook. f. *Fl. Brit. Ind.* VI. p. 45. A. Brookei, Batem. in *Bot. Reg.* 1841, misc. No. 116. *Pact. Mag. Bot.* IX. p. 145. Van Houtte's *Fl. des Serres*, I. p. 42.

var.—Lindleyanum.

Peduncles branched. Flowers somewhat larger than in the type, the dorsal sepal and petals tinted with light purple, the side lobes of the lip greenish, the middle lobe rich amethyst-purple bordered with white.

A. crispum Lindleyanum, supra. *A. Lindleyanum*, Wight Ic. t. 1677. Lindl. in *Jour. Linn. Soc.* III. p. 41. *Rchb.* in *Walp. Ann.* VI. p. 897.

var.—Warneri,

Leaves ascending, shorter and narrower than in the type. Racemes longer with smaller flowers; sepals and petals white very faintly suffused with light rose-purple; lip deep rose-purple with a narrow white margin.

A. crispum Warneri, Williams' *Orch. Alb.* VII. t. 293. *A. Warneri*, Hort.

Aërides crispum was first discovered by Dr. Wallich, in the valley of Courtallum in the extreme south of India, in the early part of the present





Acridos crassifolium.
(From the *Gardener's Chronicle*.)

On 25.5.55

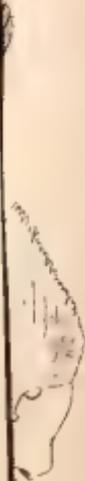
W. H. S.



Aërides crispum.



Aërides crassifolium.
(From the *Gardener's Assistant*.)



Aërides crispum.

century, but it was not introduced into British gardens till many years afterwards. It flowered for the first time in this country in Sir Richard Brooke's collection at Norton Priory, in Cheshire, in 1841, on which occasion it received the name of *A. Brookei* from Mr. Bateman, who was unacquainted with Dr. Wallich's herbarium specimen which had been previously named *A. crispum* by Dr. Lindley. The variety *Lindleyanum*, a very fine form but now rarely seen, was detected by Dr. Wight on the Neilgherry Hills in the south of India about the year 1850, and was dedicated by him to the eminent orchidologist as a distinct species. The variety *Warneri*, also a rare form, first appeared in the collection of the late Mr. C. H. Warner, at Hoddesden, in 1857. To the *A. crispum* group may probably be added *A. illustre*, described by Reichenbach in the *Gardeners' Chronicle*, XVIII. (1882), p. 71, which had been introduced by Messrs. Low and Co. amongst an importation of *A. crispum*.

A. Emerici.

Leaves 9—12 inches long and 1—1½ inch broad. Racemes shorter than the leaves, sub-pendulous, the rachis viscid. Flowers an inch long, on pale purple, slightly twisted pedicels; sepals and petals broadly obovate-oblong, white with a light amethyst-purple blotch at the apex of each; side lobes of lip rounded, erect, spotted with purple inside at the basal end; the intermediate lobe very small, narrowly oblong, acute, deep amethyst-purple; spur funnel-shaped, incurved. Column very short.

Aërides Emerici, Rehb. in Gard. Chron. XVIII. (1882), p. 586. *Bot. Mag.*, t. 6728. Hook. f. Fl. Brit. Ind. VI. p. 47.

Discovered by Major-General Emeric S. Berkeley in the Andaman Islands and introduced by him in 1882. It is also found on the small islets to the north of the Andamans known as the Coco Islands. It belongs to the group of which *Aërides odoratum* is the type, and is distinguished from that species chiefly by its longer racemes of smaller and differently-coloured flowers.

A. falcatum.

Leaves 6—8 inches long and 1¼—1½ inch broad, glaucescent above, striated with dark lines beneath. Racemes as long as or longer than the leaves. Flowers loosely arranged along the rachis, 1¼ inch long; sepals and petals white with a small light amethyst-purple apical blotch, broadly oval, the lateral sepals broader and the petals narrower than the

dorsal sepal; lip three-lobed, the lateral lobes falcate or crescent-shaped, spreading, light amethyst-purple; the front lobe broadly obovate, somewhat saddle-shaped, emarginate with denticulate margin, and with two shallow median keels above, deep amethyst-purple; spur short, compressed, greenish.

Aërides falcatum, Lindl. in Paxt. Fl. Gard. II. p. 142 (1852). Rehb. in Walp. Ann. VI. p. 897. *Xen. Orch. I.* p. 220, t. 92. Gard. Chron. III. s. 3 (1888), p. 744. Hook. f. Fl. Brit. Ind. VI. p. 46. *A. expansum*, Rehb. in Gard. Chron. XVIII. (1882), p. 40. *A. Larpentæ*, Hort. *A. Mendelii*, Hort.

var.—Houlletianum.

Leaves a little longer and narrower. Racemes shorter and denser, the flowers smaller in all their parts, light tawny yellow with an apical purple spot on each segment, the margin of the front lobe of the lip fimbriate rather than denticulate, and the median keels shorter.

A. falcatum Houlletianum, supra. *A. Houlletianum*, Rehb. in Gard. Chron. 1872, p. 1194. Id. V. (1878) p. 756. *Xen. Orch. III.* t. 204. *A. Picotianum*, Hort. French.

var.—Leonïæ.

Leaves more distant. Flowers larger with front lobe of the lip a little broader; sepals and petals white with a small amethyst-purple apical spot, and some dots of the same colour towards the base of the petals and lateral sepals; the side lobes of the lip dotted and marked with light amethyst-purple, the central and apical area of the front lobe deeper purple, the remainder white dotted like the other segments.

A. falcatum Leonïæ, supra. *A. expansum* Leonïæ, Rehb. in Gard. Chron. XVIII. (1882), p. 40. Williams' *Orch. Alb. VII.* t. 328. *A. Leonïæ*, Godefroy's *Orchidophyte*, 1885, p. 301 (Leonæi).

This species first became known to science and to horticulture in 1847, when a plant, whose origin is not recorded, flowered in the garden of Sir George Larpent, at Roehampton, and was exhibited by his gardener at the Chiswick Show of the Horticultural Society of London, under the provisional name of *Aërides Larpentæ*, the name by which it is still best known in many orchid collections. Five years later the species was described by Dr. Lindley in Paxton's *Flower Garden* as *Aërides falcatum*, and again in 1858 by Reichenbach in his *Xenia Orchidacea*, its origin being unknown to both botanists. It has since been imported under various names from Arracan and Upper Burmah. Its habitat is thence known, that of the typical *A. falcatum* being at no great distance from Akyab.

The variety *Houlletianum* first appeared in 1868 in the nursery of the late M. Lüddemann, at Paris, at whose request it was named by Reichenbach four years later when better materials for description

were supplied from the same source, in compliment to M. Houlet, the Curator of the Jardin des Plantes. It flowered for the first time in this country in May, 1876, in the garden of Sir Trevor Lawrence, Bart., at Burford Lodge; the plant had been received in 1873 from Cochin China. The variety *Leonæ* was received by Mr. H. J. Ross, of Castagnola, near Florence, in 1879, from Dr. Clement Williams, of Mandalay. It had been discovered the year before by Mr. Allan Goss, of Rangoon, in compliment to whose wife it was named. Two years later it became generally distributed among British collections.

A. Fieldingii.

Leaves 7—10 inches long, 1—1 $\frac{3}{4}$ inch broad, the lower ones deflexed, the upper ones spreading or slightly ascending. Peduncles 18—24 or more inches long, generally racemose, but sometimes branched near the base. Flowers crowded, 1 $\frac{1}{2}$ inch across vertically; the dorsal sepal and petals obovate, obtuse, amethyst-purple suffused with white, but sometimes with the basal half white dotted with purple; lateral sepals broadly oval, white with a pale purple apical spot; lip nearly deltoid or trowel-shaped, much acuminate, slightly compressed laterally, with two small basal lobes rolled inwards over the mouth of the small, funnel-like, whitish spur, amethyst-purple mottled with white.

Aërides Fieldingii, Jennings' *Orch.* t. 20 (1875). *Belg. Hort.* 1876, t. 18-19, p. 225. Williams' *Orch. Alb.* VII, t. 309. De Puydt, *Les Orch.* t. 3. Hook. f. *Fl. Brit. Ind.* VI. p. 45. *Aërides*, "Fox Brush," Rehb. Allgem. Gartenz. 1855, p. 225.

var.—Williamsii.

Leaves longer and more deflexed. Racemes more dense. Flowers white with some purple markings at the base of the front lobe of the lip.

A. Fieldingii Williamsii, supra. *A. Williamsii*, Warner's *Sel. Orch.* I. t. 21.

Introduced by us through Thomas Lobb, in 1850, along with *Vanda carulea*, and subsequently exhibited by us at the principal metropolitan and other horticultural shows as the "Fox Brush" *Aërides*, a name whose origin we are unable to trace, but which evidently refers to the aspect of the inflorescence. It was afterwards named *Aërides Fieldingii* in compliment to Colonel Fielding, an officer in the Indian army, and curiously enough, although this name has been in use among horticulturists for upwards of forty years, it was not botanically recognised till accepted by Sir J. D. Hooker in the recently published part XVII. of his *Flora of British India*, the previously published descriptions and figures being exclusively confined to horticultural literature.

Its principal station is Shillong in north-east India and the adjacent hills, whence it has been occasionally imported since its first introduction. The variety *Williamsii*, which is extremely rare, was, Mr. Warner states, first imported by us with *Aërides Fieldingii* through Thomas Lobb. *A. Fieldingii* approaches very closely *A. multiflorum*, from which it is distinguished by its different habit, and especially by the much acuminate lip of its differently-coloured flowers.

A. *Huttonii*.

Leaves 7—10 inches long, $\frac{3}{4}$ —1 inch broad. Racemes longer than the leaves. Flowers an inch long, rose-purple, the lip deeper coloured, the pedicels much paler; sepals and petals similar, broadly oblong, rounded at the apex; lip with a stout incurved, funnel-shaped spur, at the mouth of which are three erect lobes, of which the middle one is the narrowest. Column short, anther yellow.

Aërides Huttonii, supra, and Hort. Veitch, 1867. *Saccolabium Huttonii*, Hook. f. *Bot. Mag.* t. 5681.

Introduced by us through Henry Hutton in 1866. It was sent with other plants collected by him in the Malay Archipelago, which reached us after his early and lamented death without any indication of the locality. As only a few plants were received alive, *Aërides Huttonii* continued to be very rare in cultivation till 1882, when it was re-discovered by Curtis in north Celebes, growing on mangrove trees near the sea-shore. As a species it is distinct, and botanically interesting as connecting *Aërides* with *Saccolabium*: the characters of the labellum conforming more to the first than to the last-named genus it is here brought under it.

A. *japonicum*.

Stems very short. Leaves few, linear—rarely oval-oblong, 3—4 inches long. Peduncles longer than the leaves, loosely racemose, 7—10 flowered. Flowers fragrant, greenish white with some red bars on the basal half of the lateral sepals, and some amethyst-purple stains on the lip; sepals and petals oval-oblong, the petals a little smaller than the sepals; lip with two erect lobules at the base, first oblong, then broadly obovate with crenulate margin, and concave with a raised median ridge; spur funnel-shaped, half as long as the lip.

Aërides japonicum, Rehb. in Hamb. Gartenz. 1863, p. 210. *Bot. Mag.* t. 5798. *Illus. hort.* 1883, t. 461. Sô Mokou, XVIII. fol. 22, sub. Nago-ran.

First introduced from Japan by M. Linden, of Brussels, in 1862,

and subsequently by ourselves. According to Franchet and Savetier* it grows on shrubs in the hilly districts of Kiusiu, and in other places. "The presence of *Aërides* in so high a northern latitude as Japan is a remarkable fact in botanical geography, testifying to the warmth of the southern coasts of that archipelago, and to the extension of a Malayan type of vegetation to so high a parallel.† The climatic influence of so high a latitude has, however, manifested itself in the diminished stature of the plant, which is the smallest *Aërides* known. The form of the labellum is peculiar in this species and distinctly separates it from every other.

A. *Lawrenceæ*.

Leaves 9—12 inches long, and $1\frac{1}{2}$ —2 inches broad. Racemes as long as or longer than the leaves. Flowers fragrant, of wax-like texture, the largest of the *odoratum* type; sepals and petals white



Aërides Lawrenceæ.

with a rich amethyst-purple apical blotch, the upper sepal and petals oval-oblong, the lateral sepals much broader, broadly oval; lip prolonged at the base into a horn-like, incurved, green spur, deeply three-lobed, the side lobes somewhat hatchet-shaped with denticulate margin, white, the intermediate lobe oblong with dentate margin, rich amethyst-purple, the colour sometimes prolonged between the side lobes as far as the green tip of the spur.

Aërides Lawrenceæ, Rehb. in Gard. Chron. XX. (1883) p. 460. Williams' *Orch. Alb.* VI. t. 270. *The Garden*, XXXV. (1889), t. 702.

* Enum. Pl. jap. 11. p. 29, but these authors have confused it with *Angracum falcatum*, and although they have quoted the figure of this plant in *Sô Mokou*, they omit that of *Aërides japonicum* given in fol. 22.

† Bot. Mag. sub. t. 5793.

sub-var.—*Sander's* (Gard. Chron. XXII. (1884) p. 134), flowers pale fawn-yellow with the same parts amethyst-purple as in the type, the side lobes of the lip deeper yellow and spotted with purple on the front side.

Aërides Lawrenceæ was introduced by Messrs. Sander and Co. from the Philippine Islands in 1883, through their collector, Roebelin, and shortly afterwards by ourselves through our collector, David Burke. Its habitat is in south-east Mindanao, where it is abundant, especially around Davao, growing on the trees in light shade, but sometimes quite exposed. It is often associated with *Vanda Sanderiana* and *Phalænopsis Sanderiana*, and these three noble orchids have even been observed growing together on the same



Aërides Lawrenceæ, Sander's variety.

tree. Sander's sub-variety, for it differs in nothing except colour, was introduced at the same time as the species.

This *Aërides* approaches very closely the typical *Aërides odoratum*, the most obvious difference being the longer racemes loaded with larger flowers in which the purple spots are much brighter. It is appropriately dedicated to Lady Lawrence, wife of the respected President of the Royal Horticultural Society.

A. *Leeanum*.

Leaves 7—9 inches long and $1\frac{1}{2}$ inch broad. Peduncles as long again as the leaves, racemed and pendulous along the distal half. Flowers less than an inch long, on pale rose-purple pedicels; sepals broadly oval-oblong, obtuse, rose-purple, white at the base; petals oval, smaller than the sepals but coloured like them; lip small for the genus, three-lobed, the side lobes rotund, incurved, almost enclosing the small intermediate lobe in front; the intermediate lobe ovate-triangular, deep purple;

spur straight, longer than the side lobes, green tipped. Column with a very short foot.

Aërides Leeanum, Rehb. in Gard. Chron. XV. (1881), p. 656.

A species or "form" whose origin has not been divulged, with the habit of *Aërides* *Quinque-vulnera* but apparently allied to *A. Thibantianum* (Rehb. Gard. Chron. 1866, p. 100), which we have been unable to identify with any of the forms known to us in cultivation. It was introduced by Messrs. Low and Co. some time prior to 1881, and is named in compliment to Mr. Lee, from whose collection at Downside, since dispersed, materials for description were sent to the late Professor Reichenbach.

A. maculosum.

Leaves 6—9 inches long, and $1\frac{1}{4}$ — $1\frac{3}{4}$ inch broad. Peduncles longer than the leaves, usually branched near the base. Flowers about $1\frac{1}{2}$ inch long; sepals and petals oval-oblong, white at the base, the remaining area stained and spotted with amethyst-purple; lip with a broad claw, on each side of which is a small auricle; blade nearly flat, ovate-oblong, obtuse, entire, amethyst-purple, paler at the margin, and with two small white tubercles at the base, the claw and its auricles white streaked with purple; spur short, horn-like, incurved, green tipped. Column white; anther yellowish.

Aërides maculosum, Lindl. in *Bot. Reg.* 1845, t. 58. Paxt. *Mag. Bot.* XII. p. 49. Hook. f. *Fl. Brit. Ind.* VI. p. 451. *Saccolabium speciosum*, Wight. *Icon. Pl. Ind.* or t. 1674—75 (1852).

var.—Schroederi.

Stems more robust and taller. Leaves more distant and longer; peduncles stouter and more branched, the sepals and petals narrower with the apical stain larger and brighter, the front lobe of the lip longer and of a deep amethyst-purple.

A. maculosum Schroederi, Henfrey, in *Garden Mag. Bot.* XI. p. 121, icon. xyl. Linden's *Pesc.* t. 33.

A native of the Western Ghauts of India, from Mahabaleshwar, its northern limit, to Travancore in the south, but quite local, in one or two places associated with *Aërides* *crispum*. It was introduced by Messrs. Loddiges, of Hackney, and Messrs. Rollisson, of Tooting, and flowered for the first time in this country in the nurseries of those firms in July, 1844. The variety first appeared some years later in the collection of Mr. J. H. Schroeder, at Stratford Green. Both the type and the variety are still comparatively rare in British collections.

As a species its nearest affinities are *Aerides multiflorum* and *A. crispum*, between which it is intermediate, but approaching nearer the first named; the flowers are smaller than those of *A. crispum*, with the almost flat labellum of *A. multiflorum*.

A. mitratum.

Stems very short in the cultivated plants, bearing at their apex three—five or more semi-terete leaves 7—15 inches long, deeply channelled on the upper side. Racemes usually from below the leaves and shorter than they, ascending or sub-erect, many flowered. Flowers $\frac{3}{4}$ inch long, shortly pedicelled; sepals and petals sub-equal, broadly oval-oblong, white tinted with mauve-purple at the apex; lip “broadly trulliform, obtuse with a horn-like projection on each side at the base,” amethyst-purple; spur short, much compressed, projecting backwards, mitre-shaped.

Aerides mitratum, Rehb. in Bot. Zeit. 1864, p. 415. Id. in Gard. Chron. I. s. 3 (1887), p. 834. *Bot. Mag.* t. 5728.

An attractive species, first introduced by Messrs. Low and Co., in 1864, from Moulmein, through the Rev. C. S. Parish. A single plant only survived the voyage, which was acquired by the late Mr. John Day, in whose collection at Tottenham it flowered for the first time in April, 1868. The plant subsequently died and the species became lost to cultivation till the autumn of 1886, when it was re-introduced by Mr. Shuttleworth, of Clapham, and shortly afterwards by Messrs. Sander and Co., through their collector Försterman. The specific name refers to the fancied resemblance of the spur of the lip to a bishop’s mitre; its tapering cylindric leaves place it in the section TERETIFOLÆ.

A. multiflorum.

Leaves 7—9 inches long, $\frac{1}{2}$ — $\frac{3}{4}$ inch broad. Peduncles longer than the leaves, racemose, but sometimes branched near the base. Flowers $\frac{3}{4}$ inch long, the upper sepal and petals oval-oblong, the basal area white with 2—3 or more purple spots, the apical area light amethyst-purple; the lateral sepals broader, sub-orbicular, white with a faint light purple stain; lip cordate obtuse, slightly convex above, light amethyst-purple, deeper along the middle; spur short, straight, compressed laterally. Column with two rounded auricles on the foot.

Aerides multiflorum, Roxb. Pl. of the coast of Coromandel III. p. 68, t. 271 (1819). Id. Fl. ind. III. p. 475. Rehb. in Walp. Ann. VI. p. 896. Morren. Belg. Hort. 1876, p. 286. Hook. f. Fl. Brit. Ind. VI. p. 44. A. affine, Wallich’s Cat. No. 7316. Lindl. Gen. et Sp. Orch. p. 239 (1832). Id. *Sert. Orch.* t. 15. Id. in Journ. Linn. Soc. III. p. 41. *Bot. Mag.* t. 4049. De Puydt, *Les Orch.* t. 2. A. roseum, Paxt. *Fl. Gard.* II. t. 60 (1852). *Illus. Hort.* III. t. 88 (1856). Warner’s *Sel. Orch.* III. t. 22 (superbum). A. trigonum, Klotzsch in Allgem. Gartenz. 1855, p. 177.



Aërides multiflorum, var. *Lobbii*.

var.—Godefroyanum.

Leaves complicate, longer and more leathery. Flowers somewhat larger with broader segments that are more brightly coloured.

A. multiflorum Godefroyanum, supra. *A. Godefroyanum*, Rehb. in Gard. Chron. XXV. (1886) p. 814. Godefroy's *Orchidophile*, 1887, p. 241.

var.—Lobbii.

Stem usually shorter, the leaves much crowded, lying almost flat one upon the other; peduncles much longer, with one—two branches; flowers more numerous and more richly coloured.

A. multiflorum Lobbii supra. *A. Lobbii*, *Illus. hort.* XV. (1868), t. 557. Williams' *Orch. Alb.* I. t. 21.

var.—Veitchii.

As compared with var. *Lobbii*; the leaves are more distant and more spreading, the racemes shorter with more branches; the flowers lighter in colour; sepals and petals white dotted with rose at the apical end; lip light rose-purple.

A. multiflorum Veitchii, Morren. in *Belg. hort.* 1881, p. 123. *A. Veitchii*, De Puydt, *Les Orch.* t. 4.

With the exception of *Aërides odoratum*, *A. multiflorum* is the most widely distributed of all the East Indian species. It occurs in the lower valleys of the Himalaya, from Kumaon to Assam, and thence spreads southwards into Lower Burmah, where it is one of the commonest orchids of the country. It has also been gathered at Mergui, in the Andaman Islands, and in Cochin China.

Aërides multiflorum first became known to science towards the end of the last century, when it was discovered in Sylhet by Dr. William Roxburgh, the first Director of the Botanic garden at Calcutta, and many years afterwards near Sheopore, in Nepal, by his successor, Dr. Wallich.* It was introduced to British gardens by Messrs. Loddiges, in whose nursery, under the name of *A. affine*, it flowered in 1837. The variety *Godefroyanum* was introduced from Saigon, in Cochin China, by the well-known orchidist of Argenteuil, near Paris, whose name it bears; the plant is very distinct in foliage from the Indian type, but the flowers are structurally identical. The variety *Lobbii*, the handsomest and most generally cultivated of all the *multiflorum* forms, was introduced by us from Moulmein in 1851, through Thomas Lobb. The variety *Veitchii* was also introduced from Moulmein through Lobb along with the variety that bears his name, of which it is presumably a seminal form;

* Sert. Orch. sub. t. 15.

it is extremely rare. The form cultivated under the name of *A. roseum* has not even a varietal character to distinguish it from the type.

A. odoratum.

Leaves 6—8 inches long and $1\frac{1}{2}$ —2 inches broad. Racemes nodding, as long as or longer than the leaves. Flowers an inch long, fragrant; sepals and petals oval-oblong, obtuse, white with an amethyst-purple apical blotch, the lateral sepals broader, and the petals narrower than the dorsal sepal; lip funnel-shaped, prolonged at the base into a horn-like spur, three-lobed, the side lobes erect, roundish oblong, white, sometimes with a faint tinge of light purple, and some scattered purple spots; the intermediate lobe small, linear oblong with denticulate but sometimes entire margin, white with a broad purple median band.

Aërides odoratum, Lour. Fl. cochinch. p. 525 (1790). Lindl. Gen. et Sp. Orch. p. 239 (1832). Id. Journ. Linn. Soc. III. p. 41. *Bot. Mag.* t. 4139. Regel's *Gartenfl.* VI. t. 272. Hook. f. Fl. Brit. Ind. VI. p. 47. *A. cornutum*, Roxb. Fl. ind. III. p. 472 (1832). *Bot. Reg.* t. 1485. *A. Dayanum*, Hort.

var. *birmanicum*.*

Flowers smaller, the apical blotch on the sepals reduced to light purple lines, the middle lobe of the lip narrower with a few teeth at the margin.

A. odoratum birmanicum Rehb. in Gard. Chron: II. s. 3. (1887), p. 272.

The longest known and the most widely distributed of all the *Aërides*, the species upon which the genus was founded, and the first that was brought under cultivation in the glass-houses of Europe. It was introduced to the Royal Gardens at Kew in the year 1800 from China, it is said, but more probably from Cochin China in which country it had been discovered a few years previously by Loureiro. It was subsequently obtained from Dacca by Dr. Roxburgh, and later from Noakote, in Nepal, by Dr. Wallich, who sent it to the Horticultural Society of London, in whose garden at Chiswick it flowered in the summer of 1831, and it has been in cultivation ever since. It is widely dispersed over north-east India, Burmah, and the eastern peninsula. Many localities are recorded in which it has been gathered, and its fragrant flowers are everywhere noted as being an especial attraction both to natives and strangers. The variety *birmanicum* was recently introduced by Messrs. Low and Co. through their collector Boxall. Another variety, in which the middle lobe of the lip has a bi-cuspidate tip, is preserved in herbaria.

* Not seen by us.

A. *Quinque-vulnera*.

Leaves 9—12 inches long, 1—1½ inch broad, complicate at base, unequally bi-lobed at the apex. Racemes usually longer than the leaves. Flowers somewhat less than an inch across vertically; the dorsal sepal and petals similar and equal, oval-oblong, obtuse, white with a bright amethyst-purple apical blotch and some purple dots scattered over the remaining area; the lateral sepals broadly oval or sub-orbicular, similarly coloured; lip three-lobed, prolonged at the base into an incurved, horn-like, green spur; the side lobes erect, triangulate-oblong, rotund in front, white faintly dotted with purple; the intermediate lobe oblong with revolute and denticulate side margins, deep amethyst-purple. Column white.

Aërides Quinque-vulnera, Lindl. Sert. Orch. t. 30 (1830) (*quinquevulnerum*). Paxt. *Mag. Bot.* VIII. p. 241 (1841). Jennings's *Orch.* t. 30. *A. Fenzlianum*, Rehb. and *A. jucundum*, Rehb. ex Morren. Belg. hort. 1876, p. 289.*

Discovered by Cuming during his mission to the Philippine Islands, 1836—40, and sent by him to Messrs. Loddiges, in whose nursery at Hackney it flowered for the first time in this country in August, 1837. It grows upon trees in the hot valleys in the neighbourhood of Manila, whence it has been occasionally imported since its first introduction. The specific name, literally "five wounds," refers to the apical spots on the three sepals and two petals, which in this species are usually very distinct and bright in colour.

A. *radicosum*.

Leaves 7—10 inches long, ¾—1¼ inch broad. Peduncles stoutish, ascending, as long as the leaves, racemed, rarely branched, dull purple and furrowed along the rachis. Flowers on pale rose-purple pedicels, ¾ inch across vertically; sepals and petals broadly oval, the lateral sepals the largest, light rose-purple spotted with deep purple; lip three-lobed, the side lobes very small, rotund, erect, coloured like the sepals and petals, the middle lobe oblong, acute, deep rose-purple; spur horn-like, short and compressed laterally. Column with two small rounded whitish wings below the stigma.

Aërides radicosum, A. Rich. in *Ann. Sc. nat.* XV. p. 65 (1841). Hook. f. *Fl. Brit. Ind.* VI. p. 46. *A. rubrum*, Hort. *Saccolabium Wightianum*, Lindl. *Gen. et Sp. Orch.* p. 221 (1832). Rehb. in *Walp. Ann.* VI. p. 884. Wight, *Icon. Pl. Ind. or. t.* 917. *S. rubrum*, Wight, *Icon. t.* 1673 (not Lindl.). *S. ringens*, Lindl. *Gen. et Sp. Orch.* p. 221. *Id.* in *Journ. Linn. Soc.* III. p. 36.

First discovered in southern India by Heyne, and afterwards on the Pulney Hills, and at Quilon by Dr. Wight, and again later near Ootacamund by Perrotet, a botanist attached to the French Ministry

* To *Aërides Quinque-vulnera* may also probably be referred *A. Roebelini* (Rehb. in *Gard. Chron.* XXI. (1854), p. 510) and *A. marginatum* (*Id.* XXIII. (1855), p. 533).

of Marine, from whose specimens it was figured and described by Achille Richard under the name adopted above, which is the oldest published name under the right genus. We find no record of its first introduction into British gardens, in which it is better known as *Aërides rubrum*.

A. *Savageanum*.

Leaves 7—9 inches long, 1—1 $\frac{1}{4}$ broad. Racemes as long as the leaves. Flowers less than an inch across vertically; sepals oval-oblong, the basal half white dotted and stained with crimson-purple, the apical half crimson-purple; petals similar but narrower; lip deep crimson-purple, with a greenish spur that is quite straight, the side lobes roundish oblong, erect; the intermediate lobe small, linear-oblong, incurved with denticulate margin.

Aërides Savageanum, Hort. Sander.

The *Aërides* described above was acquired by us at a sale under the above name, and flowered in our houses in the summer of 1890. We are unable to refer it to any species known to us; we can find no scientific authority for the name nor any record of its origin and introduction. It is very distinct as regards the colour of its flowers, which are the darkest we have yet seen in the genus.

A. *suavissimum*.

Leaves 7—9 inches long, and 1 $\frac{1}{4}$ —1 $\frac{1}{2}$ inch broad. Racemes nearly as long again as the leaves. Flowers very fragrant, somewhat crowded, on purplish pedicels (including ovary) an inch long; sepals and petals spreading, white suffused with pale lilac, and with a rose-lilac apical blotch, the dorsal sepal broadly oval, the lateral two larger, subquadrate; petals like the dorsal sepals but smaller; lip prolonged at the base into a horn-like spur, three-lobed, the side lobes erect, oblong-rotund, buff-yellow spotted with purple, the middle lobe much smaller, linear-oblong with denticulate margin, paler in colour than the side lobes.

Aërides suavissimum, Lindl. in Journ. Hort. Soc. Lond. IV. p. 264 (1849). Id. *Pact. Fl. Gard. II.* t. 66. Rolfe in Gard. Chron. VII. s. 3 (1890) p. 43. Hook. f. *Fl. Brit. Ind.* VI. p. 47. *A. flavidum*, Lindl. in *Pact. Fl. Gard. II.* p. 101 (1852). *A. Reichenbachianum*, Linden in Koch and Fintelmann's *Wochenschrift*, 1858, p. 61. Rehb. *Xen. Orch. II.* t. 104. *A. nobile* Warner's *Sel. Orch. I.* t. 11 (1862). Regel's *Gartenfl.* 1870, t. 641. *A. Rohanianum*, Rehb. in *Gard. Chron.* XXI (1884), p. 206.

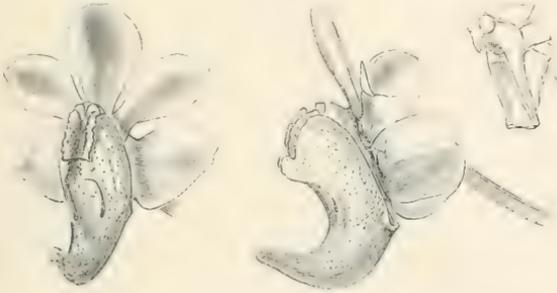
var.—*Ballantineanum*.

Racemes shorter, fewer flowered, and appearing earlier in the year. Flowers somewhat smaller; sepals and petals white with an amethyst-purple apical blotch on each; the side lobes of the lip tawny yellow

dotted with purple, the front lobe light purple, the spur white dotted with purple.

A. suavissimum Ballantineanum, Hook. f. Fl. Brit. Ind. VI. p. 47 (1890). *A. Ballantineanum*, Rehb. in Gard. Chron. XXIV. (1885), p. 198.

Although one of the most generally cultivated of the genus, the geographical distribution of *Aërides suavissimum* is very imperfectly known. It was first introduced from the Straits of Malacca by Messrs. Loddiges, in whose nursery it flowered in 1849, and it has since been imported by several horticultural firms, but we find no locality recorded besides the vague one given by Dr. Lindley here quoted from the Journal of the Horticultural Society of London.* Its affinity to *A. odoratum* is so near that more definite characters are wanted to distinguish it from that species than the structure



Aërides suavissimum.

of the flower affords. From a horticultural point of view, however, it is abundantly distinct from *A. odoratum* in its much longer racemes of smaller and differently coloured flowers that are produced later in the season. The variability of *A. suavissimum* was observed soon after its introduction, but the forms that have received distinguishing names represent differences too trivial to require separate description. The most distinct deviation from the type with which we are acquainted is the variety described above, which has been named in compliment to Mr. Ballantine, the excellent gardener to Baron Schroder, at The Dell, near Staines.

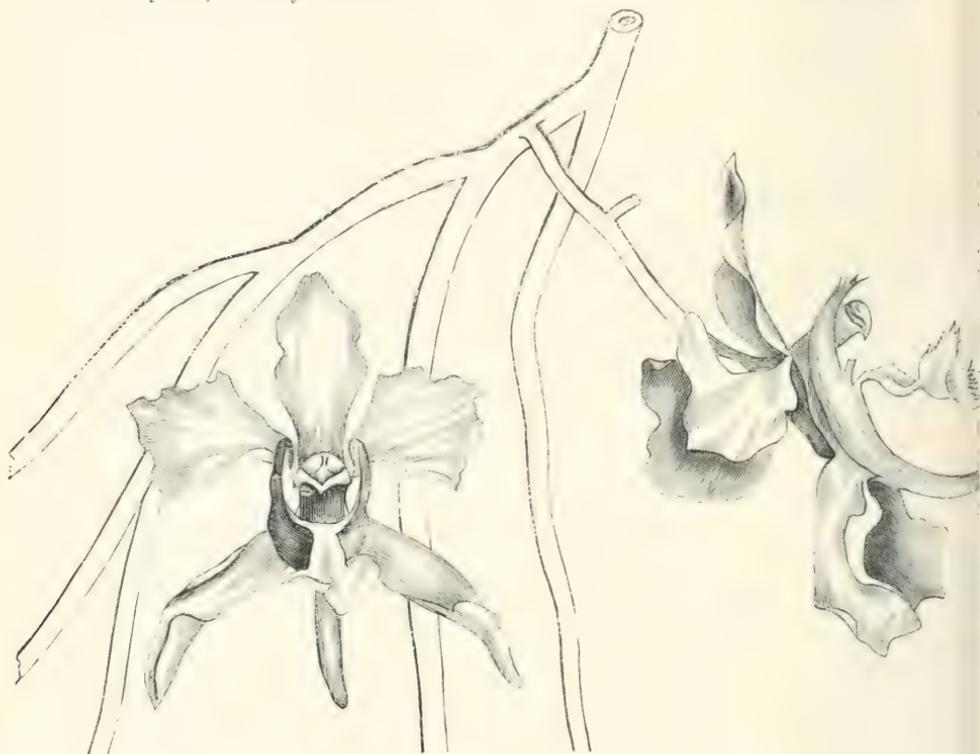
A. Vandarum.

Stems terete, slender, somewhat flexuose, several feet long. Leaves terete, slender, 6—8 inches long, acuminate, with a shallow sunk line

* F. W. Burbidge saw it growing luxuriantly in Singapore, but it may have been an introduced plant there. (*Gardens of the Sun*, p. 18).

on the upper side. Flowers solitary or in short 2—3 flowered racemes, white, 2 inches across vertically; sepals and petals of semi-transparent texture, the sepals obovate-oblong, much undulated, the petals spreading, sub-rhomboidal, much broader; side lobes of the lip linear-falcate, acuminate, unequally toothed at the apex, and bearing a small toothed lobe near the inner base; middle lobe bent downwards, broadly obovate with crenulate margin, clawed, the claw with three elevated short plates; spur subulate, terete, $\frac{3}{4}$ inch long.

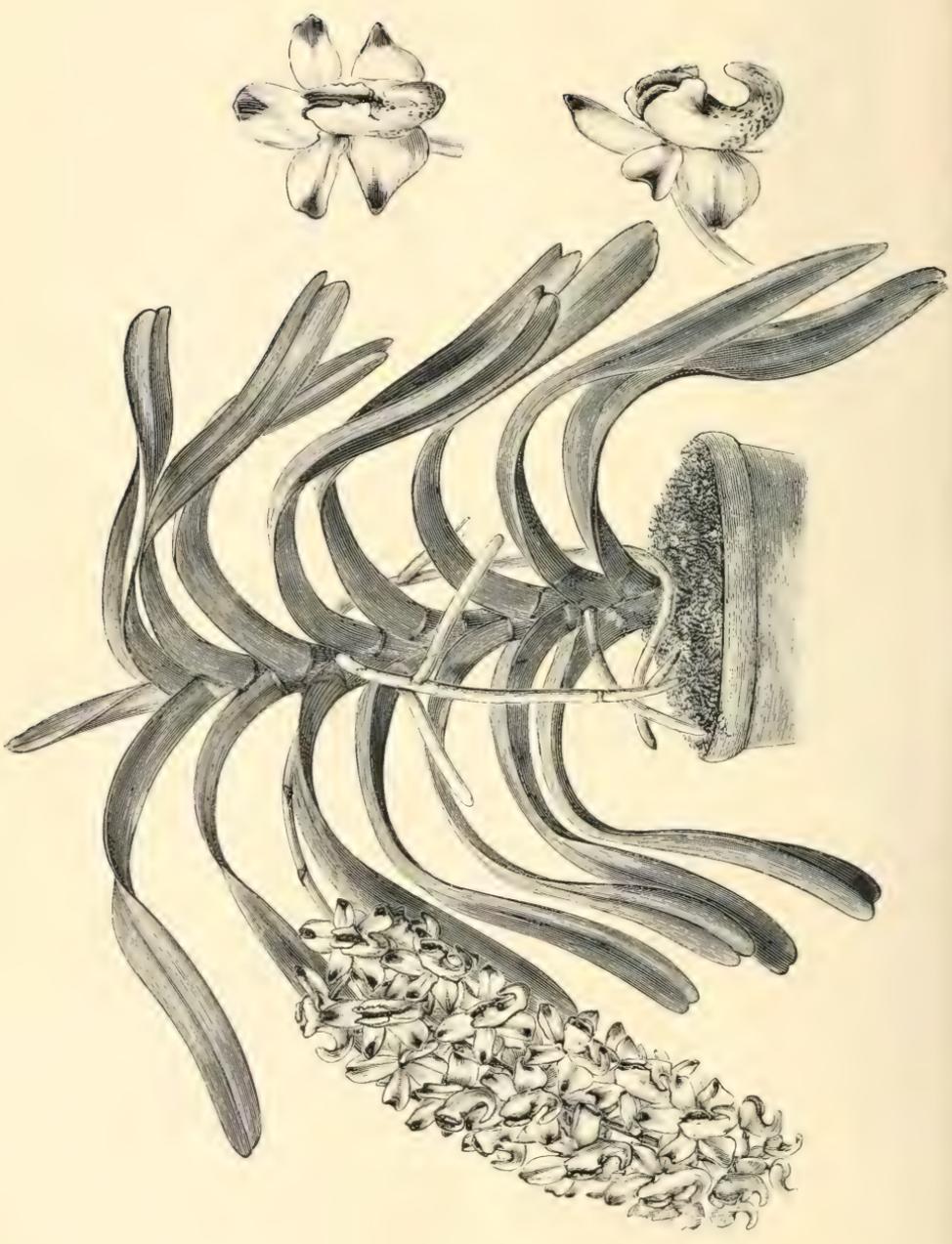
Aërides Vandarum, Rehb. in Gard. Chron. 1867, p. 997; III. (1875), p. 591; XXIV. (1885), p. 629, icon. xyl. Williams' *Orch. Alb. III.* t. 116. Hook. f. Fl. Brit. Ind. VI. p. 44. *A. cylindricum*, Hook. *Bot. Mag.* t. 4982 (not Lindl). Lindl. in Journ. Linn. Soc. III. p. 41 (Sikkim plant). Gard. Chron. III. (1875), p. 537, icon. xyl.



Aërides Vandarum.

(From the *Gardeners' Chronicle*.)

The earliest notice we find of this singular *Aërides* occurs in the *Botanical Magazine* of 1857, tab. 4982, where it is figured and described under the name of *Aërides cylindricum*, a species with a very different labellum, which had been discovered in southern India in the early part of the present century, and which is not,



Aërides virens

so far as we are aware, in cultivation. The materials for figuring were supplied by Mr. Parker, of Hornsey, in whose nursery it flowered in February, 1857, and this was probably the first occasion of its flowering in this country.

Aërides Vandarum occurs in the Sikkim Himalaya, at 5,000 feet elevation; also on the Khasia Hills at 4—5,000 feet elevation, and in Manipur at about the same altitude. It is thence a sub-tropical plant, a circumstance of which cultivators should take note.

A. *virens*.

Leaves 7—10 inches long and 1—1¼ inch broad. Peduncles longer than the leaves, racemose along the distal two-thirds. Flowers fragrant, exceeding an inch across vertically; sepals and petals broadly oval, obtuse, white with a bright purple apical blotch, the lateral sepals broader and the petals narrower than the dorsal sepal; lip somewhat resembling a ram's horn, deeply three-lobed, the side lobes much the largest, oblong, erect with the outer margin appressed to the column, white spotted with purple below and around the green-tipped spur; the front lobe small, oblong, entire, but sometimes bi-dentate at the apex, incurved towards the beak of the anther, sometimes wholly purple, sometimes white with a median purple band.

Aërides virens, Lindl. in Bot. Reg. 1843, misc. No. 48. *Id.* 1844, t. 41. Paxt. Fl. Gard. II. sub. t. 66. Williams' *Orch. Alb.* IV. t. 160. *Id.* VII. t. 298 (Ellisii).

Introduced in 1843 by Messrs. Loddiges from Java, where it is one of the commonest of orchids. Around Batavia it has established itself on the Tamarind trees that were planted by the early Dutch settlers to shade the roads. During the short dry season these trees lose some of their foliage, the *Aërides* are then partially exposed to direct sunlight, but during the remainder of the year they are in shade.

Compared with *Aërides odoratum*, of which *A. virens* is scarcely other than a geographical form—the leaves are generally (not always) a little longer and narrower, more distant and more decurved; the racemes are longer with the flowers more distantly placed along the rachis; the flowers are a little larger with larger and brighter purple spots.

RENANTHERA.

Loureiro, Fl. cochinch. II. p. 521 (1790). Lindl. Gen. et Sp. Orch. p. 217 (1832). Benth. et Hook. Gen. Plant. III. p. 577 (1833).

Renanthera includes five or six species, natives of tropical Asia and the Malay Archipelago, of which the two here described are well known in cultivation.* The only other species known to us to have been in cultivation, but which seems to have been long since lost, is *Renanthera micrantha* (erroneously figured in the *Botanical Register*, 1843, t. 41, as *R. matutina*), which was sent by Cuming from the Philippine Islands, and flowered at Chatsworth in December, 1842. The structure of the column, and especially of the pollinary apparatus of *Renanthera*, indicates a close affinity with *Aërides* and *Vanda*, to one or other of which most of the species except the type were in the first place referred, but the different form of the perianth, more particularly the lateral sepals, which are usually longer than the other segments and are parallel or nearly so, clearly distinguishes *Renanthera* from both those genera. The generic name, from *ren*, "a kidney," and *anthera*, refers to the kidney-shaped pollinia, but that form is by no means peculiar to this genus.

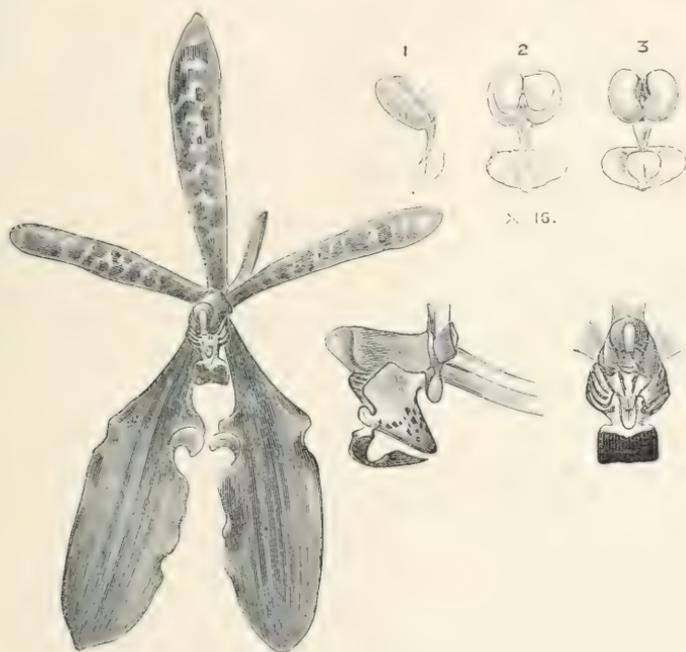
Renanthera coccinea.

Stems cylindric, as thick as the little finger, 7—10 or more feet long, leafy upwards. Leaves oblong, 4—5 inches long, amplexicaul, obliquely emarginate and very leathery. Panicles from opposite one of the upper leaves, 2—3 feet long and bearing from 100 to 150 flowers; bracts scale-like, roundish ovate, brownish red. Flowers $3\frac{1}{2}$ inches across, vertically; upper sepal and petals linear-spathulate, bright red spotted with yellow, the petals a little narrower and shorter than the sepal; lateral sepals clawed, oblong, lobate on the inner side near the base, deep vermilion-red; lip small, sessile on the base of the column, with a conical saccate spur beneath, three-lobed, the side lobes erect, truncate, pale yellow streaked on the inner side with red; the intermediate lobe ovate, acuminate, reflexed, deep red with a pale yellow bi-lamellate callus at the base. Column terete, wingless, deep red.

Renanthera coccinea, Lour. Fl. cochinch. II. p. 637 (1790). Lindl. in *Bot. Reg.* t. 1131 (1828). Id. Gen. et Sp. Orch. p. 217. *Bot. Mag.* t. 2997-8 (1830). *Faxt. Mag. Bot.* IV. p. 49 (1833). *Warner's Sel. Orch.* II. t. 37. Hook. f. Fl. Brit. Ind. VI. p. 48.

* The essential characters of the genus will be readily derived from the descriptions of these two species.

This grand old orchid, one of the earliest of the Asiatic epiphytal species cultivated in the glass-houses of Great Britain, was introduced some time previous to 1817, but owing to the imperfect treatment to which it was subjected in those early days of orchid cultivation, resulting from the crude ideas that then prevailed respecting the epiphytal character of the plants, it could not be induced to flower till 1827. In that year Mr. Fairbairn, the gardener at Claremont, brought a plant into flower by tying moss around the stems, which he kept constantly moist, and at the same time exposed the whole



Renanthera coccinea.

plant as much as possible to direct sunlight. This is the first recorded instance of its flowering in this country; three years later it flowered in the garden of Earl Fitzwilliam at Wentworth Woodhouse, near Sheffield, and subsequently at Chatsworth and in other collections, the occasion of its flowering being always regarded as an exceptional one and deserving of especial notice on account of the difficulty of inducing the plant to produce its gorgeous panicles. Even at the present time the difficulty of flowering *Renanthera coccinea* regularly

has not been generally overcome, of which the cultural experience of it recorded in the horticultural press during the past twenty-five years affords ample evidence.

Renanthera coccinea is the typical species upon which the genus was founded by the Portuguese missionary and botanist, Loureiro, who described it in his *Flora cochinchinensis*, published in 1790, but in terms so brief and with such a peculiarity of diction that it was overlooked by botanists till it flowered in the glass-houses of Europe, when its extraordinary inflorescence attracted general attention. It is in high repute in its native country, where it is frequently trained to verandahs and other suitable places. It is also a great favourite with the Chinese of the southern provinces of the empire, by whom it has been assiduously cultivated from time immemorial, and among whom it is probably an introduced plant; its flowers are frequently introduced by them into the quaint but generally faithful drawings which they employ for various artistic purposes.

The only known stations of the plant are the Moscos Islands, opposite Tavoy and Cochin China.

Cultural Note.—*Renanthera coccinea* is one of those orchids that require a special treatment to induce it to flower regularly, and in the numerous communications to the horticultural press respecting it during the past twenty-five years there is expressed a general concurrence in its being a refractory plant, and details are given of the various methods employed by different cultivators to overcome the difficulty. As our space does not permit us to quote these various methods, each of which may be suitable for its own case, we can only refer to one of the most successful instances known to us.

At Chatsworth this orchid has been successfully cultivated for more than half-a-century.* The plants are placed on the west side of the large conservatory fully exposed to the sun after 1 p.m. Pieces of the stems about a foot long, having a few roots, are attached to poles of the Silver Birch 8—12 feet long and about 6 inches in diameter with the bark on; these poles are fixed perpendicularly in a border, no potting material whatever being used for the plants. As the stems increase in length the new aerial roots emitted by them soon attach themselves firmly to the birch poles. From the beginning of May to the end of September fire heat is dispensed with; the temperature of the house being entirely controlled by the state of the weather is thence subject to great fluctuations, thus on bright days it frequently rises to 32° C. (90° F), notwithstanding the greatest possible amount of

* A plant was acquired in 1836 which flowered two years afterwards, when it was figured in Paxton's *Magazine of Botany*.

ventilation is used; in dull weather it sinks to 13° C. (55° F.), while in changeable weather it will vary as much as 11° C. (20° F.) in the course of the day. In severe weather the temperature of the house has been observed as low as 3° C. (36° F.), hence there is an annual range of nearly 30° C. (55° F.); nevertheless the mean summer temperature is about 24° C. (75° F.), and that of winter about 8° C. (47° F.). During the summer the plants are syringed three or four times a day, in winter two or three times a day according to the weather, or as the birch poles happen to be wet or dry. Strong and healthy stems flower annually, and occasionally twice a year, continuing in bloom several months.* The conditions under which *Renanthera coccinea* is so successfully cultivated at Chatsworth are peculiar and scarcely to be attained in less favoured places; the particulars here given may, however, serve as useful hints to cultivators of this orchid.

R. matutina.

Stems as thick as an ordinary writing pencil, 2—3 feet high under cultivation, leafy upwards. Leaves linear-oblong, 4—6 inches long, very leathery, channelled above, obliquely emarginate or two-lobed at the apex. Peduncles wiry, flexuose, branched, many flowered. Flowers bright reddish crimson toned with yellow, changing with age into orange-yellow, 2 inches in diameter, on slender pedicels that are coloured like the perianth; sepals and petals similar, linear, acute, the lateral sepals at first parallel then divergent; lip much smaller than the other segments, saccate, sub-cylindric, compressed with a small tongue-shaped reflexed lobule in front. Column very short.

Renanthera matutina, Lindl. Gen. et Sp. Orch. p. 218 (1832). Rchb. *Xen. Orch. I.* p. 90, t. 35 (1855). Miquel, Fl. ind. bat. III. p. 698. Linden's *Pesc.* t. 12. *Aërides matulinum*, Blume, Bijdr. p. 698 (1825).

Discovered in 1824 by Blume, growing on trees at the foot of Mount Salak, in Java, and where twenty years later it was re-discovered by Thomas Lobb, through whom it was introduced by our Exeter firm in 1846. For many years afterwards it was one of the rarest of cultivated orchids, but subsequent importations have caused it to become more generally distributed. Being less refractory to the cares of the cultivator than *Renanthera coccinea*, and being too of more manageable dimensions, it has proportionally gained in favour. The cultural treatment of *R. matutina* is the same as that of *Aërides* and *Vanda*.

* For these particulars we are indebted to Mr. Owen Thomas, the excellent gardener to the Duke of Devonshire, at Chatsworth.

VANDA.

R. Br. in Bot. Reg. t. 506 (1820). Lindl. Gen. et Sp. Orch. p. 215 (1832). Benth. et Hook. Gen. Plant. III. p. 578 (1883).

The following synopsis includes all the species known to us to be in cultivation, and among them are assuredly some of the finest orchids ever introduced. Seven or eight other species are also known to science, but none of them can be said to possess any especial attraction for the horticulturist. Perhaps the most striking feature in Vanda, from a horticultural point of view, is the remarkable range of colour observable in the flowers of the different species, and even in varieties of the same species, surpassing in this respect every other genus of cultivated orchids. With the exception of the brilliant red seen in the allied genus, *Renanthera*, well nigh every variety of colour is represented throughout the Vandas; the tessellation of the floral segments of the type species and its immediate allies is also an attractive feature. Another property that renders the Vandas valuable as decorative plants is the persistency of their flowers, those of some of the species continuing fresh for upwards of three months.

The essential characters of the genus are seen chiefly in the form of the labellum and in its attachment to the column; these characters may be thus technically expressed:—

The lip is affixed to the base of the column; it is saccate at its base or obtusely spurred; the lateral lobes are sometimes large, sometimes reduced to minute auricles, rarely 0; the middle lobe is variable in form, the disk of which is fleshy and usually ridged or lamellate.

Even when divested of those species which do not conform to these characters, and which have long been known in gardens as Vandas, but are now referred to other genera,* Vanda is still a polymorphous genus whose limits it is difficult to define, and which presents much that is perplexing to the systematist; thus aberrant forms are seen in *Vanda Sanderiana* which has a close affinity with the *Arachnanthes*, *V. parviflora* is better known as an *Aërides*, *V. densiflora* and *V. violacea* may with equal right be placed under *Saccolabium*, to which genus they are, in fact, referred in this work.

In their vegetation the Vandas resemble the *Aërides* except that

* See *Staurosis*, *Arachnanthe*, and *Saccolabium*.

there is much less uniformity of habit among them. Some of the species are slow growing, and never in a wild state attain the dimensions of their more robust congeners, *Vanda tricolor*, *V. cerulea*, etc., the most obvious part of whose life-history is essentially the same as an *Aërides*. *V. teres* is a scandent plant scrambling to the top of high trees, while *V. Hookeriana* of similar aspect is of much lower stature, and creeps over the low jungle growth, or affixes itself to the stems of a species of *Pandanus* (Screw-Pine).

No satisfactory sectional divisions of *Vanda* have yet been established. Dr. Lindley distributed the species into five sections in his monograph of the genus in *Folia Orchidacea*, published in 1853, of which the first, FIELDIA, has by general consent been removed from it. The remaining four were adopted by Reichenbach a few years later when revising the genus for Walper's *Annales Botanices*, but they are separated by very artificial characters except perhaps two which Sir J. D. Hooker has retained in the *Flora of British India*, viz., EUVANDA and ANOTA, the last of which is chiefly distinguished from the true *Vandas* by the more densely flowered racemes, and by the absence of side lobes in the labellum. A sectional division into flat and round-leaved species as in *Aërides* (PLANIFOLIE and TERETIFOLIE) breaks down in *V. Amesiana* and *V. Kimballiana*, which are transitional species as regards the form of their leaves.

The name *Vanda* was communicated to Dr. Robert Brown, the founder of the genus, by the eminent oriental scholar and linguist, Sir William Jones. It is a Sanscrit word of rather wide import, for it seems to have been used for the common *Vanda* of Bengal and north-east India (*Vanda Roxburghii*), and also for any orchid of similar habit, as *Aërides odoratum*; it was also applied to a parasitical plant, as the *Loranthus* or Mistletoe. The genus was selected by Lindley as the type of one of the fundamental (tribal) divisions of the order (VANDEÆ).

Geographical distribution. — The geographical distribution of the *Vandas* will be best understood by a reference to the map illustrating that of *Phalænopsis* and *Aërides*, to which we have also added *Vanda*. Certain peculiarities in the distribution of these genera are worthy of notice; thus, the *Phalænopses* are almost invariably insular or littoral; nearly all the most distinct types of *Aërides* are widely dispersed; but the species of *Vanda*, with the exception of *Vanda parviflora* and *V. Roxburghii*, are very local. It is a curious fact, too, that where *Aërides* is abundant a *Vanda* is to be found not far off; *V. Sanderiana* is associated with *Aërides Lawrenceæ* in

south-east Mindanao; *V. lamellata* occurs with *Aërides Quinque-rubra* near Manila; *V. cerulea* grows near *Aërides Fieldingii* on the Khasia Hills; *V. tricolor* is mixed with *Aërides virens* in Java; and other instances are indicated on the map.

Cultural Note.—The cultural routine for the majority of the Vandas is the same as that for *Aërides*. Special cultural notes are given under the description of those species that are exceptions to the general rule.

SYNOPSIS OF SPECIES AND VARIETIES.

Vanda alpina.

Stem but a few inches high and not thicker than a goose's quill. Leaves broadly linear, 2—3 inches long, unequally bi-lobed at the apex. Peduncles with one—two joints, at each of which is a scariosus bract, one—two flowered. Flowers $1\frac{1}{2}$ inch across, vertically; sepals and petals light yellow-green, the dorsal sepal spatulate-oblong, the lateral two ovate-oblong, the petals linear-oblong, all more or less incurved; lip fleshy, saccate at the base, three-lobed, the side lobes triangular, erect, concave, and blackish purple on the inner side; the front lobe cordate at the base, gently reflexed, and with two horn-like cirri at the apex, striped longitudinally with blackish purple and light yellow. Column short, semi-terete, whitish.

Vanda alpina, Lindl. Fol. Orch. Vanda No. 25 (1853). Rehb. in Walp. Ann. VI. p. 870 (transcribed from Fol. Orch.). Hook. f. Fl. Brit. Ind. VI. p. 53. *V. Griffithii*, Lindl. in Paxt. Fl. Gard. sub. t. 41. *Luisia alpina*, Lindl. in Bot. Reg. 1838, misc. No. 101.

Discovered by Gibson in 1836 at Nungklow on the Khasia Hills, and introduced by him to Chatsworth in the following year. It was subsequently detected by Sir J. D. Hooker and Dr. Thomson on the same hills at 3,500—5,000 feet elevation, where, in the winter months, hoar-frost is formed on the ground and snow has been known to fall. It is very near *Vanda cristata*, of which it may be only an alpine form, and to which it is inferior in beauty. We are indebted to Mr. R. Irwin Lynch, Curator of the Botanic Garden, Cambridge, for materials for description.

V. *Amesiana*.

Stems but a few inches high. Roots numerous and very thick in proportion to the size of the plant. Leaves fleshy, semi-terete with a grooved face, 7—12 inches long, narrowed from the base to the acute tip. Peduncles ascending, longer than the leaves, dull green dotted with deep purple, racemose, rarely paniculate along the distal half.

Flowers fragrant, $1\frac{1}{2}$ inch across, on somewhat slender, slightly twisted angulate pedicels (including ovary) $1\frac{1}{2}$ inch long; sepals and petals sub-similar and sub-equal, oval-oblong obtuse, white with a delicate flush of light rose-purple; lip three-lobed, the small basal lobes sub-quadrate with rounded distal end, white slightly tinted with rose; the intermediate lobe broadly clawed, the blade transversely oblong, emarginate, reflexed at the sides, and traversed by three thickened longitudinal central lines, amethyst-purple, much paler, sometimes white at the margin; spur saccate, compressed. Column white stained with purple.

Vanda Amesiana, Rehb. in Gard. Chron. I. s. 3 (1887) p. 764; II. p. 586; V. (1889) p. 233. Williams' *Orch. Alb. VII.* t. 296. *Bot. Mag.* t. 7139.

A very pretty recent addition to the genus introduced by Messrs. Low and Co., in the first instance accidentally (it is said) among other things, but subsequently followed by a large importation. The habitat of the species is now known to be on the hills in the southern Shan States at 4,000—5,000 feet elevation, growing mostly on rocks fully exposed to the sun, but sometimes on trees in partial shade.* It flowers in December and January; the temperature at that season ranging from about 2° — 18° C. (36° — 65°) in the course of twenty-four hours, the ground being sometimes quite white with hoar-frost in the early morning (4—6 a.m.). In the dry season the plants are much shrivelled, as the deposit of dew on these hills is much lighter than in the equatorial zone. It is dedicated to the Hon. F. L. Ames, of North Easton, Massachusetts, a well-known patron of horticulture and an ardent amateur of orchids. *Vanda Amesiana* is remarkable for the unusual thickness and number of the aerial roots produced from the base and lower part of the stem, apparently at the expense of that organ, which, so far as cultural experience has yet reached, attains but very limited dimensions. The rose-purple colouring of the flowers is very variable, no two plants producing flowers exactly alike in this respect, being deeper in some, lighter in others, and even nearly disappearing in the horticultural variety called *alba*.

V. Bensonii.

Leaves 7—10 inches long, and $\frac{1}{2}$ — $\frac{3}{4}$ inch broad, obliquely truncate, and toothed at the apex. Racemes ascending, longer than the leaves, 10—15 or more flowered. Flowers 2 inches in diameter, on white

* This information reached us too late to admit of the habitat of this species and the allied *Vanda Kimballiana* which is associated with it, being indicated on the map illustrating the geographical distribution of the genus.

twisted angulate pedicels; sepals and petals similar and sub-equal, shortly clawed with a broadly ovate obtuse blade, yellow or yellowish green veined and reticulated with chestnut-brown, pale rose or whitish behind; lip broadly clawed, the claw yellowish above and with a triangular white auricle on each side; the blade fleshy, convex with three raised median lines, cordate-oblong, expanding at the apex into two oblong-falcate lobes, light rose-purple; spur short, funnel-shaped, compressed. Column light rose-purple.

Vanda Bensonii, Batem. in *Bot. Mag.* t. 5611 (1866). Rchb. in *Gard. Chron.* 1867, p. 180, icon. xyl. Id. *Xen. Orch.* II. p. 138. Van Houtte's *Fl. des Serres*, XXII. t. 2329. Hook. f. *Fl. Brit. Ind.* VI. p. 51.

Introduced by us in 1866 through General Benson, who had discovered it in Lower Burmah, between Prome and Tongu, associated with *Saccolabium giganteum* and *Rhynchosstylis retusa*. It occurs on trees in a deciduous jungle fully exposed to the sun in the dry season, when the temperature frequently rises to 45° C. (112° F.) in the shade and when its leaves are often scorched.*

V. cærulea.

Leaves leathery, 5—8 inches long, $\frac{3}{4}$ —1 inch broad. Racemes erect or sub-erect, longer than the leaves, 8—15 or more flowered. Flowers 3—4 inches in diameter, on light blue pedicels 2 inches long, ribbed and twisted; sepals and petals clawed, the claw of the petals slightly twisted, broadly obovate, the two lateral sepals longer and broader than the upper three segments, all of a soft light blue faintly tessellated with azure-blue; lip much shorter than the petals, linear-oblong, three-lobed, the side lobes with a short, incurved cusp at the apex; the front lobe nearly parallel with the column, deep blue, obtuse at the apex, where there are two small tubercles each with 2—3 thickened ridges above; spur short, conical, with a bipartite callus at its mouth. Column white above with a violet stain below the stigma.

Vanda cærulea, Griffith MS. ex. Lindl. in *Bot. Reg.* 1847, sub. t. 30. Lindl. in *Paxt. Fl. Gard.* I. t. 36. Id. *Fol. Orch.* *Vanda* No. 18. Id. in *Journ. Hort. Soc. Lond.* vol. VI. p. 8 (1851), icon. xyl. (*lapsus calami cærulescens*). Rchb. *Xen. Orch.* I. p. 8, t. 5 (1854). Van Houtte's *Fl. des Serres* VI. t. 609 (copied from *Paxt. Fl. Gard.*) Linden's *Pesc.* t. 29. *Illus. hort.* 1860, t. 246. Warner's *Sel. Orch.* I. t. 18. Jennings' *Orch.* t. 34. De Puydt, *Les Orch.* t. 45. Williams' *Orch. Alb.* VI. t. 282. Sander's *Reichenbachia* II. t. 57. Godefroy's *Orchidophile*, 1890, p. 369. Hook. f. *Fl. Brit. Ind.* VI. p. 51.

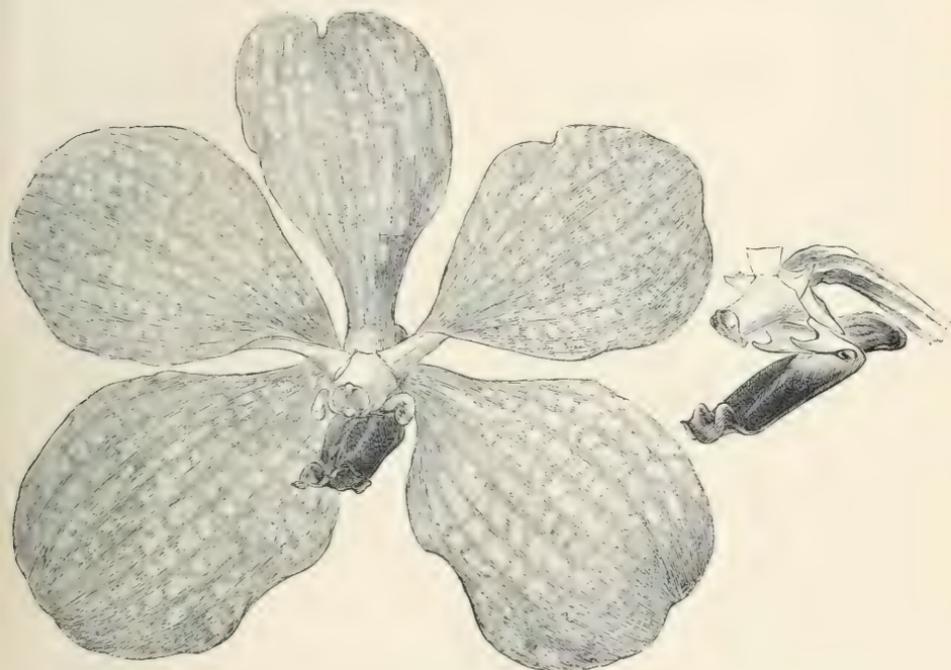
This lovely *Vanda* was first discovered by the excellent Indian botanist and explorer, William Griffith, in November, 1837, on the Khasia Hills, growing on large *Gordonia* trees amidst oaks and pines, in a locality which he describes as "really delightful, reminding one much of England."† The first published notice of it appeared in

* *Gard. Chron.* 1870, p. 311.

† *Private Journals and Itinerary Notes*, p. 181.

the *Botanical Register* for 1847, sub. t. 30, where it is described by Dr. Lindley from a dried specimen sent to him by Griffith. Three years later it was re-discovered by Sir J. D. Hooker and Dr. Thomson on the Khasia Hills, and from the *Himalayan Journals** of the first-named distinguished botanist we extract the following lucid description of its native habitat:—

“In the oak woods near the village of Lermal, *Vanda cœrulea* grows in profusion. The high grassy hills which it inhabits are elevated from 3,000 to 4,000 feet; the trees on which it grows are small, gnarled and very sparingly leafy, so that the Vanda is fully exposed to



Vanda cœrulea.

sun, rain and wind. There is no moss or lichen on the branches with the Vanda, whose roots sprawl over the dry rough bark. The atmosphere is, on the whole, humid, and extremely so during the rains, but there is no damp heat or stagnation in the air, and at the flowering season the temperature ranges between 15° and 26° C. (60°—80° F.); there is much sunshine, and both air and bark are dry during the day. In July and August, during the rains, the temperature is a little higher, but in winter it falls much lower.”

* Vol. II. p. 322.

Before, however, these classic journals were published, our energetic collector, Thomas Lobb, had made his way to the Khasia Hills and despatched a consignment of plants to our Exeter firm, which fortunately arrived in good condition. One of the first plants to flower was exhibited by us at the meeting of the Horticultural Society of London, held in Regent Street on December 3rd, 1850, when it was received with marked favour. As a proof of the high estimation in which this orchid has been and is still held by amateurs, we need only point to the unusual number of coloured illustrations of it published in the horticultural periodicals quoted above.

Cultural Note.—Not much can be added to the above description of the conditions under which *Vanda cœrulea* grows in its native home. Mr. C. B. Clarke, the excellent Indian botanist, communicates to the *Gardeners' Chronicle* (*I.* s. 3 (1887), p. 77) the following:—"In Shillong station on the Khasia hills, at 5,000 feet altitude, it is not unusual for 8 to 10 degrees (Fahr.) of frost to occur in the month of January. At this level, and even higher, *Vanda cœrulea* grows very fast and flowers profusely. It comes into flower in October at the end of the rains and remains long in flower." These climatic data therefore afford but a slender clue to the cultural treatment of the plant, as any approach to imitating the extensive range of temperature to which it is subjected on its native hills, and the excessive downpour of rain upon it during the growing season is simply impracticable in the glass-houses of this country. The practice of the most experienced cultivators is to give *V. cœrulea* the lightest position in the East Indian house during the period of active growth, usually suspending it in a teak basket near the roof-glass, and supplying it with abundance of moisture. As soon as the flowers are ready to expand it is then removed to a cooler and drier house in which the range of temperature does not exceed 10°—15° C. (50°—60° F.).

V. *cœrulescens*.

Leaves 5—8 inches long, $\frac{3}{4}$ inch broad, channelled above and strongly keeled beneath, two-lobed at the apex, the lobes terminating in spiny tips. Racemes nearly as long again as the leaves, many flowered. Flowers 1—1½ inch in diameter, on twisted pedicels (including ovary) 1½—2 inches long; sepals and petals obovate-spathulate, pale blue; lip deep blue, three-lobed, the side lobes small, oblong, the intermediate lobe obovate, emarginate with deflexed margin and two thickened median ridges above; spur short, incurved. Column blue; anther yellowish.

Vanda cœrulescens, Griffith, *Notulæ*, p. 352 (1851). Lindl. *Fol. Orch.* *Vanda*, No. 19 (1853). Rehb. in *Gard. Chron.* 1869, p. 491, and 1870, p. 527, icon. xyl. *Bot. Mag.* t. 5834. Williams' *Orch. Alb. I.* t. 48. *Fl. Mag.* n. s. t. 256. Hook. f. *Fl. Brit. Ind.* VI. p. 50.

sub-vars.*—*Boxall's* (Gard. Chron. VII. (1877), p. 749. *Bot. Mag.* t. 6328), sepals and petals paler than in the type, disk of the lip with dark blue stripes alternating with light ones, and passing into violet-blue at the apical edge; *Captain Vipan's* (Gard. Chron. XXV., p. 752) (1886), sepals and petals white, lip stained and spotted with light purple; *Low's* (Gard. Chron. VIII. (1877), p. 102), sepals and petals light mauve suffused with white; lip and column amethyst-purple toned with carmine.

To the energetic Indian explorer, William Griffith, science is also indebted for the first discovery of this blue Vanda, which, if not so striking in aspect as the preceding species, is scarcely less worthy of cultivation. Griffith detected it at Psembo, near Blamo, in Upper Burmah, in April, 1837; he made an imperfect sketch of it *in situ* and preserved a dried specimen, both of which were sent to Kew. Nothing more was seen of it for thirty years until Colonel (now General) Benson re-discovered it on the Arracan Mountains west of Prome, growing on deciduous trees at 1,000—1,500 feet elevation. A dried specimen and coloured drawing were communicated by him to Kew in 1867, and in the following year it was introduced by us through him. It flowered for the first time in this country in our Chelsea nursery in February, 1869. The sub-varieties named after Low and Boxall were introduced in 1877 by Messrs. Low and Co. through their collector, Boxall, and Captain Vipan's by the gallant officer whose name it bears in 1885—6. The usual flowering season of *Vanda cœrulescens* is June and July.

V. concolor.

Leaves 7—9 inches long and about an inch broad, obliquely bilobate, sometimes tridentate at the apex. Racemes ascending, as long as the leaves, 7—10 flowered. Flowers somewhat distant, 2 inches in diameter, on rather long, greenish, twisted and ribbed pedicels; sepals and petals yellow-brown, white behind, obovate-oblong, obtuse, undulate; lip three-lobed, the basal lobes oblong, erect, white streaked with red on the inner side, the front lobe oblong, retuse, constricted at the middle, with five raised lines on the yellow basal half, the apical half yellow-brown; spur short, conic. Column white.

Vanda concolor, Blume, Rumphia IV. p. 49, sub. *V. furva* (1848). Lindl. Fol. Orch. Vanda, No. 5 (1853). Godefroy's *Orchidophile*, 1887, p. 144. *V. Roxburghii unicolor*, Hook. *Bot. Mag.* t. 3416. *V. furva*, Lindl. in *Bot. Reg.* 1844, misc. No. 42 (not Blume).

* Horticultural forms of the type species presenting no tangible botanical differences entitling them to rank as varieties (*Bot. Mag.* sub. t. 6328).

Introduced by Messrs. Loddiges prior to 1835, in which year it flowered in the garden of Earl Fitzwilliam, at Wentworth Woodhouse, near Sheffield. It is now but rarely seen in orchid collections, the homely colour of its flowers offering but little attraction to amateurs. Its habitat is vaguely stated to be China.

V. *cristata*.

Leaves 5—7 inches long, $\frac{1}{2}$ — $\frac{3}{4}$ inch broad, irregularly three-toothed at the apex. Racemes usually shorter than the leaves, 5—6 flowered. Flowers 2 inches in diameter on twisted six-ribbed pedicels; sepals and petals incurved, of a uniform light yellow-green, the former spathulate-oblong, the latter narrower, linear-oblong; lip broadly oblong, with two incurved triangular basal lobes above the short conical spur; the blade traversed longitudinally by 5—7 thickish raised white lines between which are deep red-purple stripes, and terminating in front in two lateral horn-like processes, and a similar smaller one beneath at the sinus between the other two. Column white.

Vanda cristata, Lindl. Gen. et Sp. Orch. p. 216 (1832). Id. Sert. Orch. fig. 3, in frontisp. Id. Fol. Orch. *Vanda*, No. 23. *Bot. Reg.* 1842, t. 48. *Bot. Mag.* t. 4304. *Regel's Gartenfl.* 1870, t. 680. *Williams' Orch. Alb.* VII. t. 290. Hook. f. *Fl. Brit. Ind.* VI. p. 53. *V. striata*, Rchb. *Xen. Orch.* II. p. 137.

A very distinct *Vanda*, inhabiting the lower or tropical Himalayan zone from Kumaon eastwards into Bhotan. It was gathered by the earlier Indian botanists in various localities along that rich orchid belt, first in 1818, in Nepal, by Dr. Wallich, who subsequently sent it to the Royal Gardens at Kew, where probably it flowered for the first time in Europe, but no date is recorded. It was next found by Griffith in Bhotan, subsequently by Cathcart in Sikkim, and later by Falconer near Darjeeling. Messrs. Rollisson, of Tooting, in whose nursery it flowered in 1842, were probably the first to distribute it among the orchid collections of Great Britain.

V. *Denisoniana*.

Leaves pale green, 7—12 or more inches long, and about $\frac{3}{4}$ inch wide. Racemes shorter than the leaves, few flowered. Flowers $2\frac{1}{2}$ inches across vertically; sepals and petals more or less reflexed, much undulated, ivory-white, the upper sepal and petals oblong-spathulate, the lateral sepals broader, obliquely obovate; lip three-lobed, the side lobes erect, rotund, concave on the inner side, and of a purer white than the other parts of the lip; the intermediate lobe oblong, contracted at the middle and with an angular sinus in the anterior margin, convex above, with four—five longitudinal thickened raised lines, greenish white; spur

conical; callus two-lobed, on each side of which is a semi-lunate orange-yellow blotch.

Vanda Denisoniana, Benson and Rehb. in Gard. Chron. 1869, p. 528. *Bot. Mag.* t. 5811. *Illus. hort.* 1872, t. 105. Hook. f. *Fl. Brit. Ind.* VI. p. 51.

var.—hebraica.*

“Sepals and petals sulphur-yellow marked with numerous spots, transverse short bars and figures comparable with the Greek letter Λ ; lip sulphur-yellow, the lateral lobes paler; spur orange inside.”

V. Denisoniana hebraica, Rehb. in Gard. Chron. XXIV. (1885), p. 39. Williams' *Orch. Alb.* VI. t. 248.



Vanda Denisoniana.

Discovered by Colonel (now General) Benson growing in sheltered and shaded spots on large trees on the Arracan Mountains westward from Prome, at an altitude of 2,000—2,500 feet, where the mean temperature is about 21° C. (70° F.), and the average yearly rainfall is from 90—100 inches.† It was introduced by us through Colonel Benson in 1868, and it flowered for the first time in this country

* Not seen by us.

† Colonel Benson in Gard. Chron. 1870, p. 796, who gives the following further particulars of the climate of that part of Lower Burmah:—“These mountains (Arracan) form as it were a barrier to the south-west monsoon, arresting its force to the eastward, consequently the country around Prome and Thayetmyo has a considerably drier climate than that about Rangoon and Moulmein. Thus the rainfall on the Prome or east side is very much less than on the west side, which is exposed to the full volume of the south-west monsoon coming direct from the ocean. Although the rainfall on the east side is greatly diminished in intensity, yet rain clouds hang about the tops of these hills, giving them a watery vapour, an atmosphere in which these plants (orchids) delight, but without a great deluge of rain.”

in our Chelsea nursery in April of the following year, when it was dedicated by the late Professor Reichenbach to Lady Londesborough. The variety, which is a horticultural form of great merit, differing in nothing from the type except in colour, appeared some years ago amongst an importation by the late Mr. B. S. Williams, of Holloway.

V. *Hookeriana*.

Stems cylindric, somewhat slender, 5—7 or more feet long in the wild state, much shorter under cultivation. Leaves like the stems, but more slender, 2—3 inches long, channelled on the face, and mucronate at the apex. Peduncles from the upper part of the stem, 2—5 or more flowered. Flowers $2\frac{1}{2}$ inches in diameter, on white, slightly twisted, obscurely grooved pedicels $1\frac{1}{2}$ inch long; sepals obovate-oblong, the upper one bent forward and much undulated, white faintly flushed with light purple, the lateral two narrower and keeled behind, wholly white; petals broadly oval, undulated, white flushed with light purple and dotted with deeper purple, chiefly on the inferior half; lip three-lobed, the side lobes triangular-falcate, amethyst-purple with paler striations; front lobe broadly fan-shaped, itself three-lobed, the lobes rounded with crenulate margin, white much spotted and marked with amethyst-purple, the spots and markings aggregated towards the short claw below which is a two-lobed, white, fleshy crest; spur short, acute. Column terete, bent, purple above, paler beneath; anther shortly beaked.

Vanda Hookeriana, Rehb. in Bonpl. IV. p. 324 (1856). Id. in Gard. Chron. XVIII. (1882), p. 488. *The Garden*, XXIII. (1883), t. 370. Williams' *Orch. Alb.* II. t. 73. *Illus. hort.* 1883, t. 484. Sander's *Reichenbachia*, II. t. 74. Hook. f. Fl. Brit. Ind. VI. p. 50.

This lovely *Vanda* was communicated to Sir W. J. Hooker, at Kew, by Motley, some time prior to 1856, in which year the herbarium specimen was examined by the late Professor Reichenbach, and the species described by him in Seeman's *Bonplandia*. There can be but little doubt, however, that the plant had been previously met with by Thomas Lobb and Sir Hugh Low, for Mr. Burbidge, who has also seen it *in situ*, states that it is common in north Borneo along rivers and in brackish swamps near the sea. It is particularly abundant along the Tandaram and Limbang Rivers, about twenty miles from Brunei, and there Lobb, Low and others obtained it,* but failed to introduce it alive. It was not till 1879 that a very few living plants at length reached this country, and these were received by us from a correspondent at Labuan, and were immediately afterwards

* *The Garden*, XXII. (1883), p. 10. Id. XXXVIII. (1890), p. 72.



Vanda Hookeriana.

acquired by Lord Rothschild. None of them could be induced to flower till September, 1882, but since that date the flowering of *Vanda Hookeriana* has been an annual occurrence at Tring.

In Borneo, *Vanda Hookeriana* is epiphytal, often growing on a slender-stemmed species of *Pandanus* above the water or mud fully exposed to the blazing sun. It has since been discovered in the district of Kinta, in Perak, in a long valley formed by ranges of limestone hills, and watered by the Perak River, by Major Frowd Walker, who has communicated the following particulars of its habitat to *The Garden*,† through Mr. B. D. Knox, of Caversham, Reading:—

“The district is thickly studded with marsh; these marshes are full of thick low jungle not more than 5 feet high, quite or almost destitute of forest, and therefore exposed to the full rays of the sun. In some of these marshes *Vanda Hookeriana* is found creeping over the jungle growth; the stems rest on the top of the bushes, and the aerial roots cling to them. The flowers are always seen on the top of the bushes in the blazing sun, and are produced all the year round. So common is this flower in the district that it is called the ‘Kinta weed.’ The observed temperature in Kinta during the year 1889 ranged from 18°—36° C. (64°—97° F.), and the rainfall exceeded 150 inches.”

Cultural Note.—At Tring Park *Vanda Hookeriana* is cultivated in a house almost entirely devoted to the allied *V. teres*, and which we have described in the cultural note relating to that species. For *V. Hookeriana* pots 6 inches in diameter at the rim are preferred; the pots are filled with a mixture of broken crocks and charcoal, and surfaced with sphagnum moss that is kept constantly saturated. The plants, about four in number to each pot, are affixed by means of copper wire to a piece of board 15—18 inches long, 6 inches broad at top, and about $\frac{1}{4}$ inch thick; the boards with the plants so affixed to them are plunged to the bottom of the pots, so that the lower part of the stems is buried in the mixture of crocks and charcoal. The treatment as regards temperature, watering, etc., is the same as for *V. teres*, and is given in detail under that species.

V. insignis.

Leaves 9—12 inches long, and about an inch broad, obliquely incised and toothed at the apex, strongly keeled beneath. Racemes scarcely longer than the leaves, 4—7 flowered. Flowers 2—2 $\frac{1}{2}$ inches in diameter, on white, twisted, grooved pedicels; sepals and petals obovate-spathulate, bright tawny yellow with dark brown oblong spots that are confluent at the margins and apex; lip sub-pandurate, with two short white basal

† XXXVIII. (1890), p. 210.

auricles and two low white ridges between them; blade broadly clawed, semilunar, concave with entire edge, bright rose purple; spur conic, compressed, recurved. Column very thick, stained with pale rose.

Vanda insignis, Blume, *Rumphia*, IV. p. 48, t. 192, f. 2 (1848). Lindl. in Paxt. Fl. Gard. II. p. 19, icon. xyl. Rehb. in Gard. Chron. 1868, p. 1259. Bot. Mag. t. 5759. Jennings' *Orch.* t. 46. Williams' *Orch. Alb.* IV. t. 172.

var.—Schroederiana.

Sepals and petals light yellow shaded with orange; lip cream-white with two orange lines in front of the spur.

V. insignis Schroederiana, Rehb. in Gard. Chron. XX. (1883), p. 392. *The Garden*, XXV. (1884), t. 429.

First discovered by Blume in the island of Timor some time prior to 1848, the date of the publication of *Rumphia* in which it is figured and described. It was re-discovered by our collector, Hutton, in 1866, and introduced by us through him in the following year; it flowered for the first time in this country in our Chelsea Nursery in the autumn of 1868. It continued to be very rare in British collections till re-imported by us in 1882 through Curtis, at that time collecting for us in the Malay Archipelago. It occurs along the coast of Timor and the adjacent small island of Semaó, and on low hills up to 1,000 feet elevation, growing on low trees where it gets but slight shade, and flowering in March and April. The variety *Schroederiana* was received with Curtis' consignment, a single plant only; it is a most remarkable colour deviation from the type, and one of the handsomest of Vandas; it is now in the collection of Baron Schroeder, at The Dell.

The *Vanda insignis* described above should not be confounded with another *Vanda* sometimes met with in cultivation under the same name, which is but a colour variation of *V. tricolor*.

V. Kimballiana.

Leaves sub-cylindric, acuminate, 6—9 inches long, channelled down the face, deep green with a purplish bronzy hue. Peduncles slender, scarcely longer than the leaves, with a small papery sheath at each of the joints, and a small, brown, acute bract at the base of the stalked ovaries, 8—12 flowered; pedicels (with ovary) $1\frac{1}{4}$ inch long, obscurely grooved, very pale purple. Flowers $1\frac{1}{2}$ —2 inches in diameter; upper sepal and petals shortly clawed, obovate-spathulate, white sometimes faintly flushed with pale purple, and with light purple nerves; lateral sepals longer than the upper one, oblong, falcate, white; lip three-lobed, the side lobes ovate-triangular terminating in an incurved, horn-like cirrus,

yellowish spotted with red-brown on the inside; the middle lobe broadly ovate, undulate, crisped and erose at the margin, with three parallel keels in the middle, amethyst-purple; spur incurved, nearly an inch long, pale purple. Column white.

Vanda Kimballiana, Rehb. in Gard. Chron. V. s. 3 (1889), p. 232. *The Garden*, XXXVII. (1890), t. 747. *Bot. Mag.* t. 7112.

Introduced by Messrs. Low and Co. about the same time as *Vanda Amesiana*, to which it is nearly allied; its terete leaves would also indicate an affinity with *V. teres* and *V. Hookeriana*, but the floral characters differ widely from both. Its habitat is on the hills



Vanda Kimballiana.

in the southern Shan States at 4,000—5,000 feet elevation, where it is associated with the allied *V. Amesiana* growing under the conditions we have described in page 89. It is dedicated to Mr. W. S. Kimball, of Rochester, New York, one of the most zealous orchidists in the United States.

V. lamellata.

Leaves 12—15 inches long, $\frac{1}{2}$ — $\frac{3}{4}$ inch broad, obliquely bi-dentate at the apex and strongly keeled beneath. Racemes erect or sub-erect, as long as the leaves, many flowered. Flowers 1—2 inches in diameter, light yellow blotched with chestnut-brown; sepals and petals oblong, obtuse, the lateral sepals the broadest and sub-falcate; lip prolonged at the base into a short obtuse spur, three-lobed, the basal lobes auriculate, rotund, erect, white; the intermediate lobe oblong-retuse at the apex and traversed longitudinally by two raised plates that are broadest at the middle.

Vanda lamellata, Lindl. in Bot. Reg. 1838, misc. No. 125. Id. Fol. Orch. Vanda, No. 20.

var.—Boxalli.

Leaves somewhat longer and narrower than in the type. Racemes longer and bearing more flowers. Flowers more brightly coloured; sepals and petals cream-white,* the superior half of the broader lateral sepals also cream-white, the inferior half red-brown, the basal auricles of the lip white spotted with light purple, the blade rose-purple.

V. lamellata Boxalli, Rehb. in Gard. Chron. XIII. (1880), p. 743. Id. XV. (1881), p. 87, icon. xyl. *The Garden*, XIX. (1881), t. 287. Williams' *Orch. Alb.* VIII. t. 338.



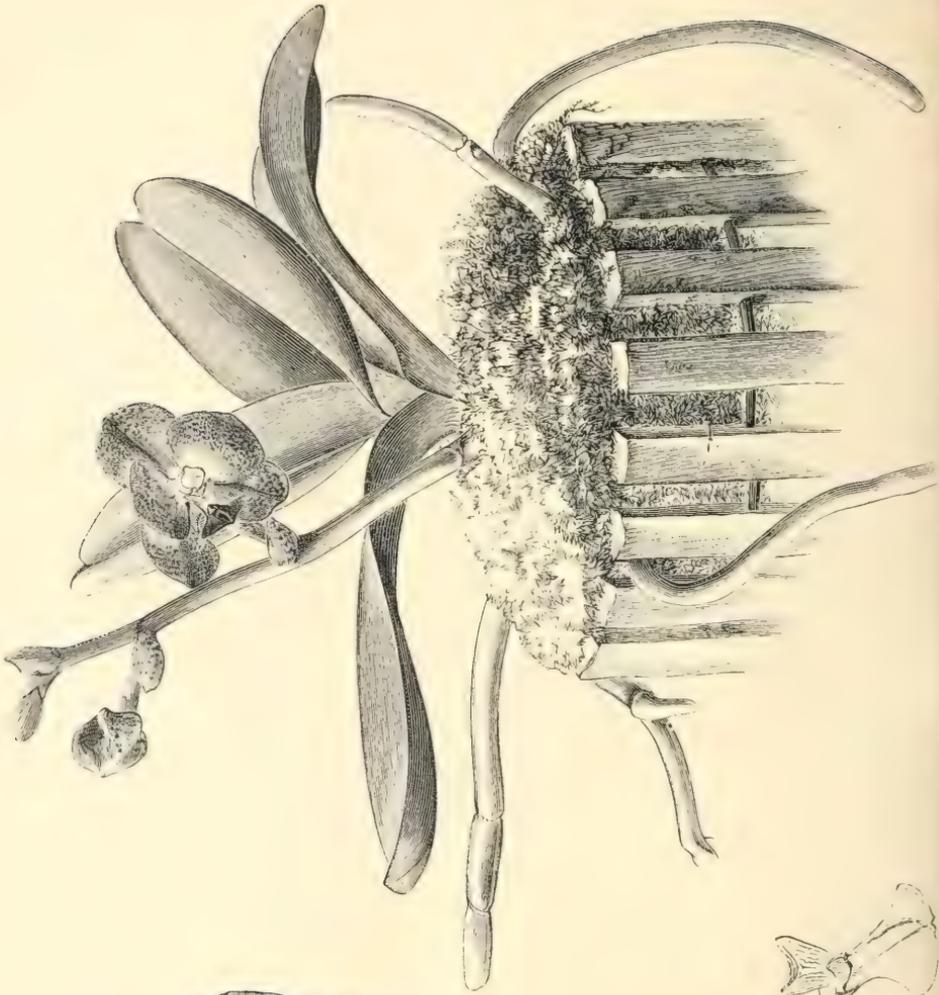
Vanda lamellata Boxalli.
(From the *Gardeners' Chronicle*.)

The typical *Vanda lamellata* was first sent to Messrs. Loddiges from the Philippine Islands by Cuming in 1838, but it is now very rarely seen in the orchid collections of this country. The variety, which has flowers of brighter and more showy colours, was introduced by Messrs. Low and Co. in 1879, through the collector whose name it bears. Both the type and its variety grow on trees in the hot damp valleys in the neighbourhood of Manila.

V. *limbata*.

“Leaves 6—8 inches long and $\frac{3}{4}$ — $1\frac{1}{2}$ inch broad. Racemes as long as the leaves, 10—12 flowered. Flowers 2 inches in diameter; sepals and petals nearly equal and similar, spatulate, bright cinnamon colour within and tessellated, with a golden border, pale and suffused with lilac externally; lip three-lobed, pale lilac, produced behind into a short, conic, obtuse spur; lateral lobes small, rounded; mid lobe quadrate,

* Light yellow in the plate in Williams' *Orchid Album*, loc. cit.



slightly fiddle shaped, obscurely mucronate at the truncate tip; disk tumid with 5—7 parallel grooves, margins reflexed; claw with a prominent callus."—*Botanical Magazine*.

Vanda limbata, Blume, *Rumphia*, IV. p. 49, sub. *V. furva* (1848). Lindl. *Fol. Orch.* *Vanda* No. 13. *Bot. Mag.* t. 6173. Warner's *Sel. Orch.* III. t. 9.

A native of Java, where it was detected by Dr. Blume prior to 1848, the date of the publication of *Rumphia*. It was introduced to British gardens by the late Mr. B. S. Williams, of Holloway, not, however, from Java, but from Paris where he had acquired the plants figured in the *Botanical Magazine* and Warner's *Select Orchidaceous Plants* some time previous to their flowering in the summer of 1874. It is so seldom seen in cultivation that it may be assumed to be a rare species in its native island.

V. Parishii.

Leaves elliptic-oblong, 6—9 inches long, $2\frac{1}{4}$ —3 inches broad, sessile or sheathing at the base, unequally bi-lobed or emarginate at the apex. Peduncles stoutish, sub-erect, longer than the leaves, racemose along the distal half, 7—10 or more flowered. Flowers fleshy, 2 inches in diameter; pedicels stoutish, slightly twisted, with a broad subulate bract at their base; sepals broadly oval-oblong, keeled behind, greenish yellow spotted with red-brown; petals sub-orbicular, broader than the sepals but coloured like them; lip with two rounded auricles at the base, and produced behind into a short gibbous spur; blade sub-rhomboidal with a raised median line and a conic protuberance at its base, magenta-purple with pale margin. Column very short and thick, white.

Vanda Parishii, Rehb. *Xen. Orch.* II. p. 138 (1867). Id. in *Gard. Chron.* 1870, p. 890. Williams' *Orch. Alb. I.* t. 15. Hook. f. *Fl. Brit. Ind.* VI. p. 51.

var.—Marriottiana.

As compared with the type the racemes are fewer flowered, the flowers somewhat smaller but more symmetrical in outline, and with proportionately broader sepals and petals that are bronzy red toned with brown, passing into rose-purple towards the base, white at the very base; the basal auricles of the lip white streaked with rose-purple, the blade magenta-purple.

V. Parishii Marriottiana, Rehb. in *Gard. Chron.* XIII. (1880), p. 743. Id. XV. (1881), p. 726. Williams' *Orch. Alb. II.* t. 61. N. E. Brown in *Gard. Chron.* XIX. (1883), p. 307 (purpurea).

The typical *Vanda Parishii* was discovered in Moulmein in 1862 by the Rev. C. S. Parish and shortly afterwards lost; it was re-discovered in 1870 and imported by Messrs. Low and Co., but it is still comparatively rare in British collections. The variety, which is greatly preferred by amateurs, although structurally identical, is a

very remarkable deviation from the type as regards colour. It flowered for the first time in this country in the collection of Sir W. H. Marriott, Bart., at the Down House, Blandford, to whom it is appropriately dedicated.

V. parviflora.

"Leaves lorate, unequally notched at the apex, and having a mucro at the sinus beneath. Racemes longer than the leaves, many flowered; sepals and petals testaceous, spreading, sub-uniform, obovate-spathulate; lip three-lobed, the side lobes small, incurved, the middle lobe large, broadly oblong, dilated and crenate at the apex, white above with elevated lamellæ on the thick fleshy disk that is stained and spotted with purple; spur moderately long, obtuse, incurved."—*Botanical Magazine*.

Vanda parviflora, Lindl. in *Bot. Reg.* 1844, misc. No. 57. Wight, *Icon.* t. 1669. Hook. f. *Fl. Brit. Ind.* VI. p. 50. *V. testacea*, Rehb. in *Gard. Chron.* VIII. (1877), p. 166. *Aërides Wightianum*, Lindl. *Gen. et Sp. Orch.* p. 238 (1832). *Id.* in *Journ. Linn. Soc.* III. p. 40. *Bot. Mag.* t. 5138. *A. testaceum*, Lindl. *Gen. et Sp. Orch.* p. 238.

This is the commonest and most widely dispersed of all the Indian Vandas, and in this respect it presents a remarkable exception to the restricted habitats of most of the other species. It occurs in the tropical Himalaya from Kumaon eastwards into Assam; in Burma generally and other parts of the eastern peninsula; on the western Ghauts from Bombay southwards to Travancore; also in Ceylon. It appears to have been first introduced into British gardens in 1844 by Messrs. Loddiges; and it has been since frequently imported with other Indian orchids; it is best known in cultivation under the name of *Aërides Wightianum*.

V. Roxburghii.

Stems 12—20 inches high under cultivation. Leaves linear, curved, very leathery, 5—7 inches long, and $\frac{1}{2}$ — $\frac{3}{4}$ inch broad, tridentate at the apex. Racemes ascending, longer than the leaves, 5—9 or more flowered. Flowers 2 inches in diameter, on white, grooved, slightly twisted pedicels; sepals and petals oval-oblong, undulated, pale green tessellated with brown on the inner side, white behind; lip three-lobed, produced behind into a conic, obtuse spur, the side lobes small, lanceolate, acute, white; the intermediate lobe first roundish then quadrate with a notch in the anterior margin, convex above, violet-purple, paler towards the base. Column white.

Vanda Roxburghii, R. Br. in *Bot. Reg.* t. 506 (1820). *Bot. Mag.* t. 2245 (1821). Lindl. *Gen. et Sp. Orch.* p. 215 (1832). Van Houtte's *Fl. des Serres*, II. t. 11. Wight's *Icon.* III. t. 916. Williams' *Orch. Alb.* II. t. 59. Hook. f. *Fl. Brit. Ind.* VI. p. 52. *V. tessellata*, Paxt. *Mag. Bot.* VII. p. 265 (1840). *V. tesselloides*, Rehb. in *Walp. Ann.* VI. p. 864 (1864). *Cymbidium tesselloides*, Roxb. *Fl. ind.* III. p. 463 (1832).

The species upon which the genus was founded and the first Vanda that was introduced into British gardens. It was cultivated by Sir Joseph Banks in the early part of the present century, and flowered for the first time in his stove at Springrove in the autumn of 1819. It is common in various parts of Bengal, growing upon different kinds of trees but principally on the Mango (*Mangifera indica*); it also occurs on the Concan Hills in the Bombay Presidency and in Ceylon.

It was named in compliment to Dr. William Roxburgh, one of the earliest pioneers of Indian botany and Director of the Botanic Garden at Calcutta from 1797 to 1814.

V. Sanderiana.

Leaves 12—15 inches long and about an inch broad, complicate at base, truncate, cuspidate, sometimes unequally two-lobed at apex. Racemes sub-erect, generally shorter than the leaves, 7—10 flowered. Flowers flat, $3\frac{1}{2}$ — $4\frac{1}{2}$ inches in diameter, the pedicels and ovary six-ribbed, twisted, pale brown at the base, passing into light purple upwards; bracts oblong, acute, pale yellow-green; sepals broadly obovate, the dorsal one delicate rose colour suffused with white; the lateral two divergent, somewhat larger than the dorsal one, tawny yellow with sanguineous red anastomosing prominent veins; petals rhomboid-ovate, smaller than the sepals, coloured like the dorsal sepal with a tawny blotch spotted with red on the side next the lateral sepals; lip small in proportion to the other segments, bipartite, the hypochile transversely oblong, concave, with an inflexed anterior margin, variable in colour, usually dull tawny yellow streaked with red on the inner side; the epichile shortly clawed, roundish oblong, strongly recurved at the apex, with three prominent ridges on the disk, reddish brown. Column very short, buff-yellow.

Vanda Sanderiana, Rehb. in Gard. Chron. XVII. (1882), p. 588; XX. (1883), p. 440, icon. xyl. Williams' *Orch. Alb. III.* t. 124. *Illus. hort.* XXXI. t. 532. *Rev. hort.* 1885, p. 372. Sander's *Reichenbachia II.* t. 62. *Bot. Mag.* t. 6983. Esmeralda Sanderiana, Rehb. in Gard. Chron. XVII. (1882), p. 588 (sub. V. Sanderiana).

This remarkable Vanda, one of the most appreciable gains to horticulture during the last decade, was discovered by M. Roebelin, the energetic collector of Messrs. Sander and Co., who succeeded, in 1882, in reaching the previously unexplored portion of south-east Mindanao, where he detected this and the scarcely less remarkable *Aërides Lawrenceæ* and *Phalænopsis Sanderiana*. Our own collector, David Burke, also succeeded in reaching the same region a few months later, and from that time these fine orchids became

generally distributed among the orchid collections of Europe and America. The principal station of *Vanda Sanderiana* is at Davao on the south-east coast of Mindanao, at places growing on trees that overhang the beach, and where the long trailing roots of this orchid are often within reach of the salt spray. It flowered for the first time in this country in the summer of 1883 in the collection of Mr. Lee, at Downside, Leatherhead, since dispersed.

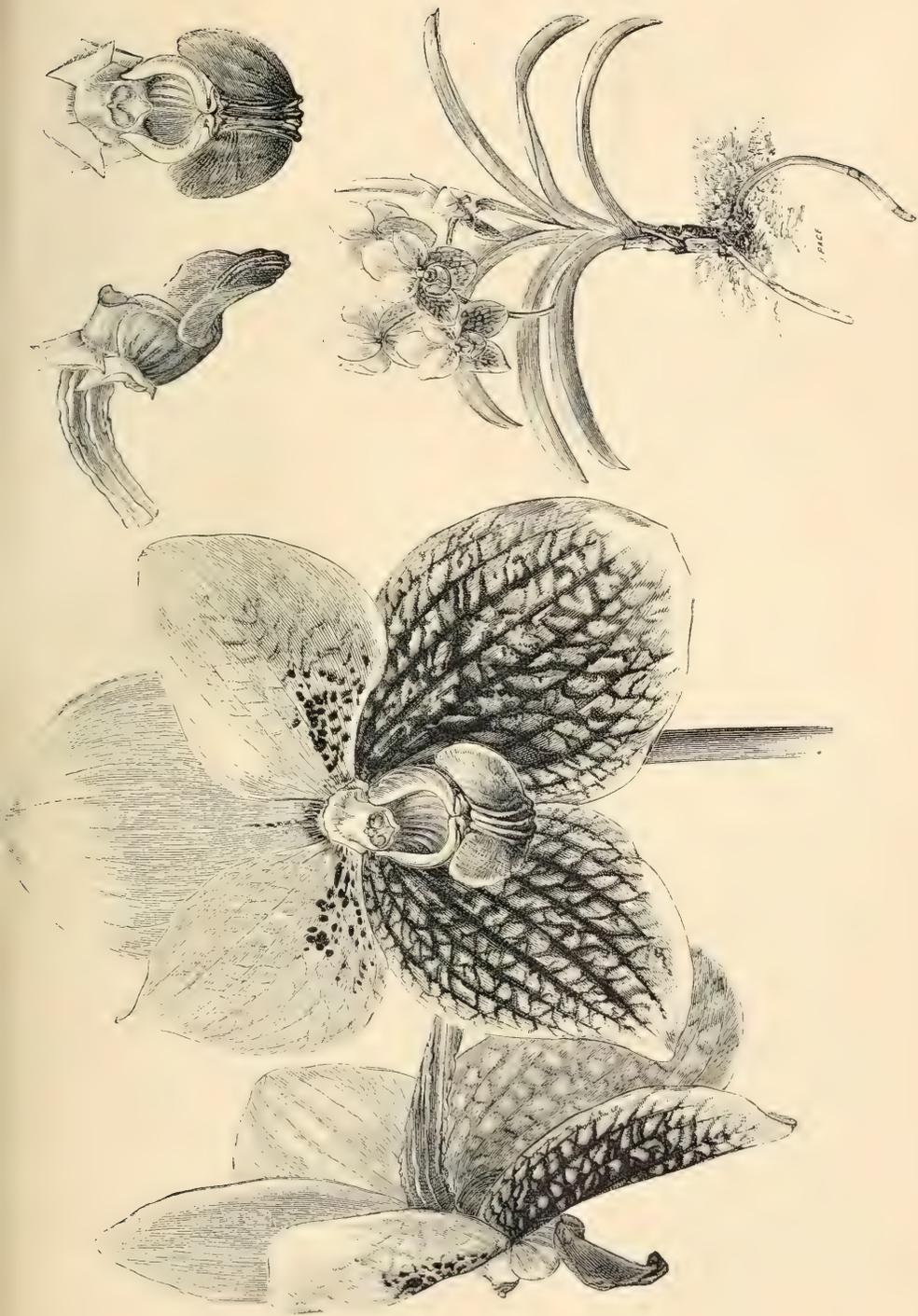
The flowers of *Vanda Sanderiana* show some striking peculiarities—their large flat sepals and petals give them the aspect of a *Miltonia*, with which genus, however, the affinity is remote; their partially transverse colouration, combined with other characters, is more significant and indicates affinity with *Arachnanthe Cathcartii*. The absence of the spur to the labellum, and the somewhat different attachment of that organ to the column places *V. Sanderiana* on the verge of the genus, connecting it with *Arachnanthe*.

V. teres.

Stems terete, as thick as an ordinary writing pencil, several feet long, but usually much reduced under cultivation. Leaves like the stem, 4—5 inches long, distichously and alternately arranged at an acute angle to it. Peduncles from the upper part of the stem only, and from opposite the leaves, 7—10 inches long, few flowered. Flowers 3—4 inches in diameter on whitish pedicels that are ribbed and twisted; sepals and petals pale rose-purple often suffused with white, the sepals spreading vertically and the petals horizontally; dorsal sepal ovate, obtuse; lateral two sub-rhomboidal, obtuse with a hooked apiculus on the under side near the apex; petals sub-orbicular, a little larger than the dorsal sepal and undulate at the margin; lip three-lobed, the side lobes roundish, convolute over the column, tawny yellow with bands of red spots on the inner side; the front lobe with a broad claw and broadly obcordate blade deeply cleft at the apex, and with the lateral margins revolute, pale rose-purple; spur funnel-shaped, compressed laterally. Column white; anther beaked.

Vanda teres, Lindl. Gen. et. Sp. Orch. p. 217 (1832). Id. Fol. Orch. *Vanda* No. 16. *Bot. Reg.* t. 1809 (1836). *Bot. Mag.* t. 4114. *Pact. Mag. Bot. V.* p. 193. Warner's *Sel. Orch. III*, t. 2. Sander's *Reichenbachia*, I. t. 27. Hook. f. *Fl. Brit. Ind.* VI. p. 49. *Dendrobium teres*, Roxb. *Fl. ind.* III. p. 485 (1832).

sub-vars.—*aurorea* (Gard. Chron. XXI. (1884), p. 271), sepals and petals white faintly suffused with light rose-purple, lip light rose, spur pale buff-yellow; *candida* (Williams' *Orch. Alb.* IX. t. 409), sepals and petals white, side lobes of lip and spur pale yellow, front lobe white with a faint flush of light rose on the disk.



Vanda Sanderiana.



Vanda teres.

Vanda teres is widely distributed over north-east India, Assam and Upper Burmah; it is always found in the hot plains and valleys scrambling over the branches of the largest trees and exposed to the full glare of the sun. It was first detected by Dr. Wallich in Sylhet in the early part of the present century, and living plants were brought by him to England about the year 1829, but none of them flowered till 1836; in that year it flowered for the first time in this country in the gardens of the Duke of Northumberland at Syon House. Several variations in the colour of the flowers have since been observed, the two described above being the most distinct that have come under our notice.

Cultural Note.—*Vanda teres* requires a special treatment to induce it to flower regularly, and as this orchid is very successfully cultivated at Tring Park, an outline of the method adopted there will serve better than any formal directions we can give. The plants are cultivated in a half-span house almost exclusively devoted to this *Vanda*; it forms in fact a compartment of the range in which the *Phalænopses* are grown at Tring Park, and has therefore the same aspect, that is, it faces nearly due south. The floor of the house is sunk 2 feet below the surface of the ground. A bed, enclosed by brick-work, $3\frac{1}{2}$ feet high and $2\frac{1}{2}$ feet wide extends along the north side of the house, heated by hot-water pipes placed about a foot above the floor of the house, and about a foot above the pipes is fixed a perforated iron stage forming the floor of the bed. The bed is thence 18 inches deep from the top of the brick-work and is filled with broken crocks and charcoal in the proportion of three-fourths of the former and one-fourth of the latter; the depth of the bed is increased by a board 6 inches wide placed on the brick-work, and the layer of crocks and charcoal raised to within 2 or 3 inches of the top of this board. On these the plants are arranged in rows about 6 inches apart with an interval of 4 inches in the row; the space between the rows and plants is filled with fresh sphagnum 2 inches deep; by these means constant saturation and free drainage are efficiently maintained. After the plants are established no shading is used, so that on bright days in summer the temperature often rises from 38° — 52° C. (100° — 120° F.) when the ventilators are closed, and which are only used in the morning. In winter the lowest temperature is 15° — 18° C. (50° — 65° F.) During the growing season the plants are constantly syringed. Another set of plants is cultivated in the same way on a lower and narrower bed along the south side of the house, and separated from the higher bed by a pathway, on one side of which is fixed the principal series of pipes for heating the house.

V. tricolor.

Leaves curved, 15—18 inches long, imbricating at base, unequally two-lobed at apex. Racemes stoutish, ascending or spreading, shorter than the leaves, 7—10 or more flowered. Flowers fragrant, fleshy, $2\frac{1}{2}$ —3 inches in diameter, on angulate, twisted pedicels 2—3 inches long, white usually stained with pale purple at the base; sepals and petals similar, varying in different plants from obovate-oblong to orbicular-obovate, narrowed into a short claw at the base, undulate, leathery, more or less densely spotted with bright red-brown on a light yellow ground, the spots arranged in longitudinal rows and often confluent, sometimes covering the greater part of the surface, white behind; lip three-lobed, the side lobe sub-quadrate, curved inwards, white; the intermediate lobe sub-panduriform, deeply emarginate, convex above, with three ridges, two of which extend to the apical margin, whitish at the base with some red-brown streaks, the remaining area bright magenta-purple; spur short, compressed, white. Column short, much swollen laterally at the base.

Vanda tricolor, Lindl. in Bot. Reg. 1847, sub. t. 59. Id. in Paxt. *Fl. Gard. II.* t. 42. Id. *Fol. Orch. Vanda*, No. 10. *Bot. Mag.* t. 4432 (1849). Van Houtte's *Fl. des Serres*, VI. t. 641 (1850). Linden's *Pesc.* t. 42. Warner's *Sel. Orch. II.* t. 39. De Puydt, *Les Orch.* t. 48. Williams' *Orch. Alb. II.* t. 77. *V. suaveolens*, Blume, Rumph IV. p. 49 (1848).

var.—planilabris.

The front lobe of the labellum less convex with the ridges almost obsolete, the notch in the apical margin shallower, usually magenta-purple with the apical part much paler, but sometimes light rose-purple.

V. tricolor planilabris, Lindl. *Fol. Orch. Vanda*, No. 10. Id. in Paxt. *Fl. Garden*, II. sub. t. 42. Williams' *Orch. Alb. II.* t. 87.

var.—suavis.

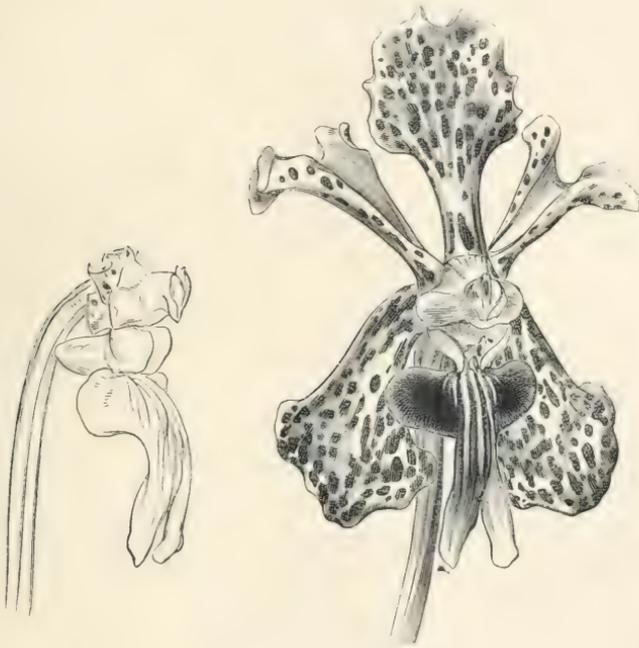
Racemes longer and bearing more flowers; sepals and petals white with fewer spots that are red-purple; the middle lobe of the lip a little narrower with the margins more reflexed,* the basal half deep purple, the apical half paler.

V. tricolor suavis, supra. *V. tricolor*, Rehb. in Walp. *Ann.* VI. p. 866 (1864). *V. suavis*, Lindl. in *Gard. Chron.* 1848, p. 351. Id. *Fol. Orch. Vanda*, No. 9. Rehb. *Xen. Orch.* I. p. 26, t. 12 (1854). Linden's *Pesc.* t. 8. *Bot. Mag.* t. 5174. Van Houtte's *Fl. des Serres*, t. 1604—5 (1862). De Puydt, *Les Orch.* t. 47. Jennings' *Orch.* t. 23. *Gard. Chron.* XXII. (1884), p. 237. icon. xyl. Williams' *Orch. Alb. IV.* t. 180. Godefroy's *Orchidophile*, 1886, p. 301.

sub-vars.—*Chatsworth* (Williams' *Orch. Alb. VII.* t. 324, sub. *V. suavis*), sepals and petals white densely and evenly spotted with red-purple, basal half of lip deep purple, apical half much paler; *Dalkeith*, sepals and petals pale yellow densely spotted with red-purple in longitudinal rows with occasional interruptions and irregularities, lip bright red-purple with some white streaks at the base; *flava* (*Fol. Orch. Vanda*, sub.

* This character is not constant.

No. 10), "flowers wholly yellow except a faint violet stain on the lip"; * *formosa*, sepals and petals bright yellow uniformly covered with oblong red-brown spots arranged in rows that are frequently confluent; *Mr. Dodgson's*, sepals and petals light amber-yellow more sparingly spotted with red-brown than in most of the sub-varieties, lip light magenta-purple; *Mr. Gottschalcke's* (Williams' Manual, p. 608, sub. *V. suavis*), sepals and petals white densely spotted with red-purple, lip rose-purple with white anterior margin; *insignis* (Warner's *Sel. Orch. I. t. 7*), sepals and petals bright yellow regularly spotted with red-brown; lip rose-carmine passing into white at the margin; *Dr. Patterson's* (*The Garden*,



Vanda tricolor, var. *suavis*.

XXIII. (1883, t. 375), sepals and petals cream colour much spotted with dark chestnut-brown, the spots confluent at the margin, lip magenta-purple with five slightly divergent white lines at the base, of which the middle one is the longest; *pratexta* (Godefroy's *Orchidophile*, 1886, p. 301), sepals and petals light sulphur-yellow bordered with pale rose, and with broad oblong spots scattered over the yellow area.

Vanda tricolor was introduced by us from Java in 1846, through

* This form is unknown to us; that usually cultivated as *Vanda tricolor flava* has the perianth segments sparingly spotted with red-brown as represented in the *Botanical Magazine*, t. 4432.

Thomas Lobb, who had discovered it in the western part of the island, and where it had been detected probably earlier by Dr. Blume, who found it growing on the stems of the sugar Palm (*Arenga saccharifera*), and who described it under the name of *V. suaveolens* in his *Rumphia* published in 1848, but as Dr. Lindley's name has priority of publication, Blume's *suaveolens* must sink as a synonym. It has since been occasionally imported from Java, where it occurs on the hills in the western part of the island at 1,500—2,500 feet elevation, growing chiefly on large trees that were originally planted to shade the now abandoned coffee plantations. From its first introduction, *V. tricolor* has been observed to be very variable in the colour of its flowers, and on account of the high repute in which this orchid has been held by amateurs, many distinguishing names have been given to colour deviations from the type. The most distinct of these are the varieties *planilabris* and *suavis*, which differ from the typical *V. tricolor* in the characters described above. Dr. Lindley gave specific rank to *suavis*, in which he has been followed by horticultural writers, but as it was long since pointed out by Sir W. J. Hooker,* there are no structural differences of sufficient value to separate them specifically. It is always associated with *V. tricolor* in its native home, and is imported mixed with it, but in numbers small in proportion to the type; it was first introduced by us through Thomas Lobb at the same time as *V. tricolor* and was for many years one of the rarest of Vandas in cultivation. The sub-varieties are more difficult to discriminate, and their nomenclature is in great confusion from different forms having received the same name, and the same form different names in different collections. Those described above are for the most part from materials kindly supplied by Baron Schroeder, from his rich collection at The Dell; and by Mr. Owen Thomas, gardener to the Duke of Devonshire, at Chatsworth, and which, we believe, accurately represent the forms originally so named.

V. *Vipanii*.

Leaves linear, about a foot long, decurved, imbricating at the base, unequally bi-dentate at the apex. Racemes shorter than the leaves, 5—7 flowered. Flowers 2 inches in diameter on white, twisted, grooved

* Bot. Mag. sub. t. 5174.

pedicels; sepals and petals clawed, undulate, broadly oval, the lateral sepals a little larger, and the petals a little smaller than the dorsal sepal, dark brown tessellated with pale brown, white behind; lip deeply three-lobed, the basal lobes roundish, white spotted and stained with purple; the front lobe cordate at the base, contracted at the middle, and with a deep sinus in the anterior margin, olive green toned with brown, sometimes rose-purple; spur conic, short. Column white.

Vanda Vipanii, Rehb. in Gard. Chron. XVIII. (1882). p. 134.

Discovered in Burmah by Captain J. A. Vipan a short time previous to the publication of the name. It is still a very rare and little known species in cultivation. The above description was taken from a plant that flowered in our houses in the summer of 1887.

EXCLUDED SPECIES.

<i>Vanda Batemanii</i> (Lindl.)	now referred to	<i>Stauroopsis lissochiloides</i> (Benth.)
<i>Catheartii</i> (Lindl.)	„ „	<i>Arachnanthe Catheartii</i> (Benth.)
<i>gigantea</i> (Lindl.)	„ „	<i>Stauroopsis gigantea</i> (Benth.)
<i>Lowii</i> (Lindl.)	„ „	<i>Arachnanthe Lowii</i> (Benth.)

SACCOLABIUM.

Blume, Bijdr. p. 292 (1825). Benth. et Hook, Gen. Plant. III. p. 538 (1883).

Saccolabium includes upwards of forty species, most of which are plants of dwarf habit bearing racemes of small flowers offering but little attraction to the cultivator. By far the greatest number of the *Saccolabiums* inhabit British India, where, in some localities, they are among the commonest of orchids; a few other species known to science are scattered over the Malay Archipelago. Sir J. D. Hooker has distributed the Indian species, including several previously referred to Lindley's *Acampe*, into seven series each distinguished by some common character observable in the structure of the flower, or in the vegetative organs.*

Of the nine species described in the following pages, two, *Saccolabium giganteum* and *S. violaceum*, are aberrant; the first was brought under *Saccolabium* by Lindley but afterwards removed by him to *Vanda*;

* Fl. Brit. Ind. VI. p. 55. All the Malayan species known to us may be referred to one or other of these series (sections).

the second was described by him as a *Vanda* but omitted in his monograph of the genus published a few years later in the *Folia Orchidaceae*; † three belong to the section CALCEOLARIA of Hooker (*Latilabellata* of the *Genera Plantarum*), characterised chiefly by the hemispheric sac of the labellum, of which *S. calceolare* (Lindl.) is the type species, but *S. bellinum* (Rehb.) is the best known in cultivation; and the remaining four to SPECIOSÆ of Hooker (*Genuinæ* of the *Genera Plantarum*) which, as the name implies, includes species with highly coloured flowers, as *S. curvifolium*, *S. ampullaceum*, etc.

The characters that mainly distinguish *Saccolabium* from the allied genera *Rhynchostylis*, *Aërides*, and *Vanda*, are seen chiefly in the form of the labellum and its attachment to the column. Under *Rhynchostylis* we have stated the characters by which that genus is separated from *Saccolabium*; from *Aërides* *Saccolabium* is separated by the column not being produced into a foot, and the very different form of the spur or sac of the labellum; from *Vanda* it is chiefly distinguished by the form of the perianth segments, especially of the labellum. These genera, as at present circumscribed, are fairly natural ones; they, however, overlap each other at places along the frontier lines that have been set up between them, so that the placing of the same species under more than one of these genera by different botanists has been inevitable, and hence the number of synonyms that occur in the literary references.

The generic name *Saccolabium* is derived from *saccus*, "a bag," and *labium*, "a lip," in reference to the saccate labellum, afterwards needlessly altered by its author, Blume, to *Saccochilus*, from *σάκκος* and *χίλος*, the Greek equivalents for *saccus* and *labium*.

Cultural Note.—Coming from one of the hottest regions of the globe, and where the season of rest of the vegetation of that region is of very limited duration, the *Saccolabiums* require the highest temperature usually maintained in the glass-houses of Europe, and a constantly moist atmosphere that should approach saturation during the growing season. Generally speaking the cultural treatment formulated under *Aërides* is that best suited for *Saccolabium* and *Rhynchostylis*.

Saccolabium acutifolium.

Stem as thick as an ordinary writing pencil, not more than a foot high under cultivation. Leaves linear-oblong, sub-acuminate, 4—6 inches long. Racemes much shorter than the leaves, dense, many flowered. Flowers crowded, fleshy, $\frac{3}{4}$ inch in diameter; sepals and petals light greenish yellow spotted with red-brown, obovate-oblong, obtuse, the petals

† They are retained under *Saccolabium* by Bentham, *Gen. Plant.* III. p. 579, but referred to *Vanda* by Sir J. D. Hooker, *Fl. Brit. Ind.* VI. p. 53.

a little the narrowest; lip a sub-globose almost hemispheric sac that is bright yellow spotted with red, and a small triangular whitish blade fringed with glandular hairs. Column very short, stained with pale purple.

Saccolabium acutifolium, Lindl. *Gen. et Sp. Orch.* p. 223 (1832). Id. *Sert. Orch. Frontisp.* No. 2. Id. in *Journ. Linn. Soc.* III. p. 33. Hook. f. *Fl. Brit. Ind.* VI. p. 61. *S. denticulatum*, Paxt. *Mag. Bot.* VII. p. 145 (1840). *Bot. Mag.* t. 4772.

A native of Sikkim and the Khasia Hills, whence it is occasionally imported with other orchids. It was first cultivated by the Rev. J. Clowes, of Broughton Hall near Manchester, about the year 1837, and very shortly afterwards it was introduced to Chatsworth by Gibson. It much resembles on superficial view a miniature *Saccolabium bellinum*, to which species it is inferior in beauty. It is easily distinguished among the cultivated *Saccolabiums* by its sharply pointed leaves that are often obliquely twisted.

S. ampullaceum.

Stems short, rarely exceeding 6 inches high under cultivation. Leaves linear-ligulate, 5—6 inches long, channelled above, keeled beneath, obliquely truncate and irregularly toothed at the apex. Racemes erect, shorter than the leaves. Flowers crowded, about $\frac{3}{4}$ inch in diameter, bright rose-carmine, the column white and anther yellow; sepals and petals similar and sub-equal, obovate, spreading; lip shorter than the other segments, linear, reflexed, produced at the base into a cylindric, compressed spur longer than the blade, at the entrance of which are two rounded protuberances.

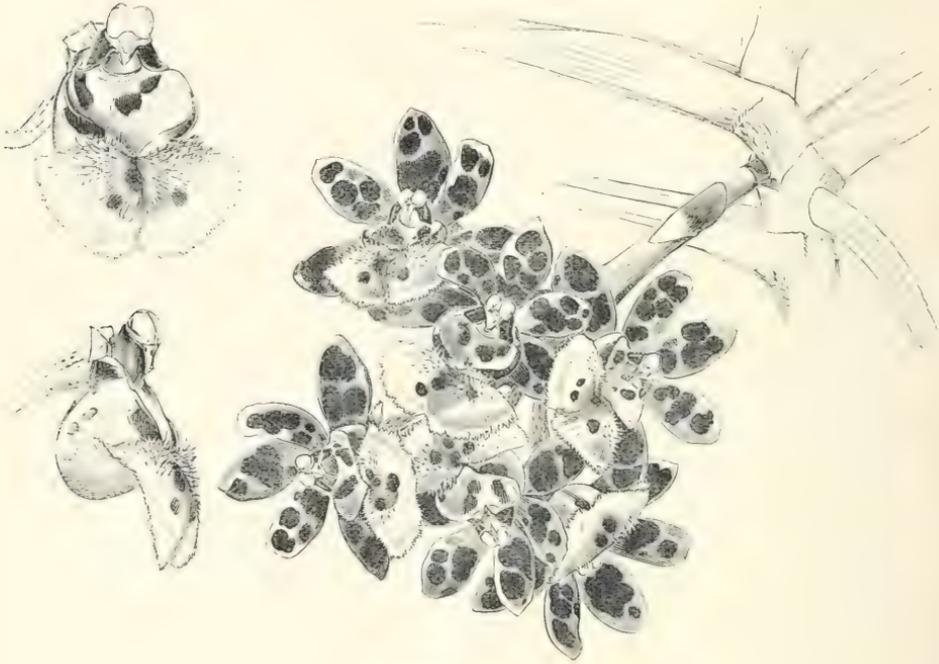
Saccolabium ampullaceum, Lindl. *Sert. Orch.* t. 17 (1838). Id. in *Journ. Linn. Soc.* III. p. 35. Paxt. *Mag. Bot.* XIII. p. 49. *Bot. Mag.* t. 5595. *Fl. Mag.* t. 393 (roseum). Williams' *Orch. Alb.* IV. t. 191. Hook. f. *Fl. Brit. Ind.* VI. p. 64. *Aerides ampullaceum*, Roxb. *Fl. ind.* III. p. 476 (1832).

This pretty *Saccolabium* became known to science in the early part of the present century through Dr. Roxburgh, one of whose collectors detected it in Sylhet some time prior to 1814, the date of Dr. Roxburgh's death. It was subsequently gathered by various Indian botanical explorers in the tropical Himalaya, along which it occurs at 1,000—3,000 feet elevation from Nepal eastwards. It has also been reported from Burmah and Tenasserim. The earliest notice of it as a horticultural plant occurs in Paxton's *Magazine of Botany* for 1847, where is figured one of the plants brought by Gibson from the foot of the Khasia Hills to Chatsworth in 1837. Dr. Lindley's plate in the *Sertum Orchidaceum*, although published nearly ten years earlier, was copied from a drawing in the possession of the East India Company by a native artist. *Saccolabium ampullaceum*

first became generally distributed among the orchid collections of this country through an importation of Messrs. Low and Co. about the year 1865.

S. bellinum.

Stems but a few inches high. Leaves strap-shaped, 7—12 inches long, bi-lobate at the apex. Peduncles stoutish, 3—4 inches long, recurved, few flowered. Flowers sub-corymbose, somewhat crowded, fleshy, $1\frac{1}{4}$ inch in diameter; sepals and petals spreading and slightly incurved, similar and sub-equal, obovate-oblong, yellow blotched with blackish purple; lip



Saccolabium bellinum.

a sub-globose sac and semi-lunate blade, the sac white with a few purple spots on the basal concave side, and with a large ochreous blotch in the centre; the blade two-lobed, papillose or pubescent above, fimbriate-denticulate at the margin, whitish with an orange-yellow disk, spotted with purple. Column very short; anther with a short, broad beak.

Saccolabium bellinum, Rehb. in Gard. Chron. XXI. (1884), p. 174. Williams' *Orch. Alb. IV.* t. 156. *Bot. Mag.* t. 7142. Hook. f. *Fl. Brit. Ind.* VI. p. 61.

Discovered in 1873 by Boxall in Burmah, and introduced by Messrs. Low and Co. It is the most generally cultivated of the

calceolate *Saccolabiums*, and the handsomest known of all of them. Botanically it much resembles a large state of *Saccolabium calceolare*, the type of the section, a species with small, inattractive flowers very common in the tropical Himalaya; that and *S. bellinum* may be regarded as the extremes of a series that are, in part, connected by *S. intermedium* and *S. acutifolium*.*

S. bigibbum.

"Stem very short. Leaves few, linear-oblong, 3—4 inches long and 1 inch broad, bifid at the apex. Racemes shorter than the leaves, almost corymbiform, drooping, many flowered. Flowers pale yellow with faint red markings on the edge of the spur; sepals and petals similar, spreading, spatulate, obtuse or sub-acute with a broad flat claw; sac of lip large in proportion to the size of the flower, sub-hemispherical and laterally compressed; blade broadly triangular with erose and ciliated margins."—*Botanical Magazine*.

Saccolabium bigibbum, Rehb. in *Bot. Mag.* sub. t. 5767 (1869). Id. *Otia Hamburg*, p. 43 (1878). Hook. f. *Fl. Brit. Ind.* VI. p. 61.

Discovered by General Benson in Lower Burmah and introduced by us through him in 1868. It is a dwarf plant with light yellow flowers and is still occasionally imported with other Burmese orchids.

S. curvifolium.

Stem short and stoutish, ligneous below, sheathed above by the imbricating bases of the crowded leaves. Leaves linear, 7—10 inches long, decurved, premorse and bi-dentate at the apex. Racemes erect, many flowered. Flowers crowded, about an inch across vertically, bright cinnabar-red; sepals and petals similar, obovate-oblong, sub-acute; lip linear-oblong, truncately emarginate, with a light orange keel and two tubercles at the base, where it is produced into a slender cylindrical spur, at the entrance of which on each side is a short, roundish, erect lobe. Column short, cinnabar-red; anther purple.

Saccolabium curvifolium, Lindl. *Gen. et Sp. Orch.* p. 222 (1832). *Illus. hort.* XII. t. 493 (1866). De Puydt, *Les Orch.* t. 38 (1880). Williams' *Orch. Alb.* III. t. 107. Hook. f. *Fl. Brit. Ind.* VI. p. 65. *S. rubrum*, Lindl. *Gen. et Sp. Orch.* p. 222. *S. miniatum*, *Bot. Mag.* t. 5326 (not Lindl.).

Both the botanical and horticultural history of this plant is somewhat confused from its having been mixed up with that of *Saccolabium miniatum*, a species from Java with flowers of nearly the same colour and structure. It is certain, however, that *S. curvifolium* was first made known to science by Dr. Wallich, who discovered

* See Sir J. D. Hooker's *Flora of British India*, VI. p. 61.

it in the early part of the present century in the eastern tropical Himalaya, where it was afterwards gathered by Griffith and other Indian botanists, and whence it was subsequently introduced into European gardens. The earliest record we find of its flowering in this country is in the *Botanical Magazine*, sub. t. 5326, where it is stated to have flowered in the Royal Gardens at Kew in the summer of 1862. It was shortly afterwards imported by Messrs. Low and Co., and thence became generally distributed among the orchid collections of Europe. *S. curvifolium* has the most richly-coloured flowers in the genus; although always of a bright red, they vary in the shade of colouring from light orange-scarlet to deep cinnabar-red. The flowering season is May and June.

S. giganteum.

Stem as thick as a man's forefinger, seldom exceeding a few inches high under cultivation. Leaves broadly ligulate, 9—12 inches long and 2—3 inches broad, sheathing at the base, unequally two-lobed at the



Saccolabium giganteum.

apex, very leathery, bright green with paler longitudinal lines on both sides. Racemes drooping, as long as the leaves. Flowers fragrant, on short white pedicels, at the base of which is a small shrivelled bract; sepals oval-oblong, white with a few amethyst-purple spots; petals narrower, oblong, acute, white with an apical-purple spot; lip oblong, undulate, produced backwards into a short funnel-shaped compressed spur, and with three lobes at the free end, of which the lateral two are rounded and the middle one narrowly oblong, bright amethyst-purple with darker veins. Column green spotted with purple.

Saccolabium giganteum, Lindl. Gen. et Sp. Orch. p. 221 (1832). *Bot. Mag.* t. 5635 (1867). Jennings' *Orch.* t. 8. Williams' *Orch. Alb. II.* t. 56. Sander's *Reichenbachia*, I. t. 22. *Vanda densiflora*, Lindl. in Paxt. *Fl. Gard.* sub. t. 42 (1851). Id. *Fol. Orch. Vanda*, No. 22 (1853). *Gard. Chron.* 1862, p. 1194. Van Houtte's *Fl. des Serres*, XVII. t. 1765. Hook. f. *Fl. Brit. Ind.* VI. p. 53.

var.—illustre.

Racemes somewhat longer, with the flowers more loosely arranged; the flowers larger and more brightly coloured, especially the labellum.

S. giganteum illustre, Rehb. in Gard. Chron. XXI. (1884), p. 44. *Illus. hort.* s. 3, t. 517.

sub-var.—*Mr. Petot's* (Rehb. in Gard. Chron. XXIV. (1885), p. 746.

Godefroy's *Orchidophile*, 1886, p. 163), the perianth segments wholly white.

Saccolabium giganteum first became known to science in the early part of the present century through Dr. Wallich, who received from one of his collectors a dried specimen gathered near Prome in Lower Burmah. Nothing more was seen of it till 1859, when the late Dr. Sumner, Bishop of Winchester, received some plants from a friend in Burmah, one of which flowered for the first time in the bishop's garden at Farnham Castle in the autumn of 1862. It continued to be extremely rare till re-introduced by us in 1866, through Colonel (now General) Benson, who has communicated the following particulars of its habitat:—

“*Saccolabium giganteum* is not found in Rangoon or Moulmein or south of that place,* but travelling northwards beyond the extreme influence of the south-west monsoon, the plant appears first in small quantities and of small size, but on approaching the drier climate of Prome and Thayetmyo, where the hot winds blow and where the thermometer in the dry season is about 45° C. (112° F.) in the shade, the plant is found in great profusion and luxuriance on trees in a deciduous jungle, exposed to the rays of a tropical sun, and in most cases with its leaves scorched.†”

The variety *illustre*, of which the varietal characters are not very clearly defined, is said to have been introduced by M. Linden in 1882-3. The sub-variety is a white-flowered form discovered by the late Auguste Regnier in Cochin China, and introduced by M. Godefroy, of Argenteuil, who states in his *Orchidophile* that *Saccolabium giganteum* is one of the commonest orchids of that country, growing on trees along the skirts of the forest, sometimes on the highest branches; when in flower its powerful fragrance always makes its presence known.

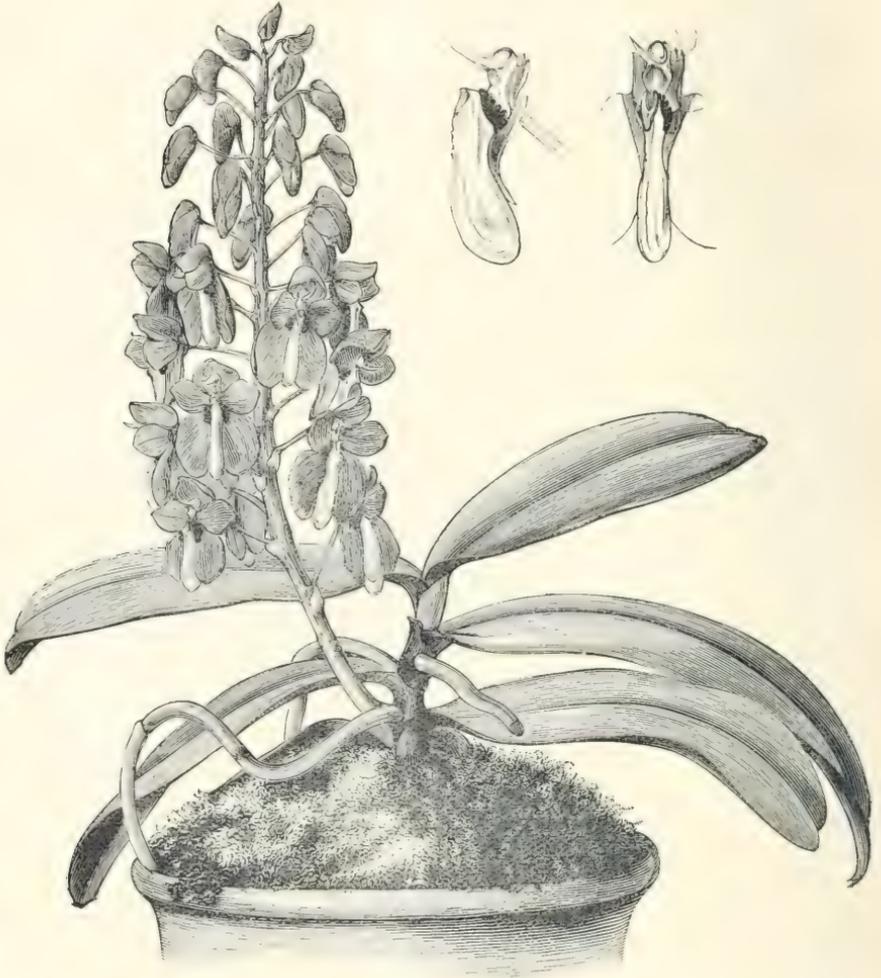
S. Hendersonianum.

Stem very short, with 3—5 or more narrowly ligulate, sub-acute, curved leaves, 3—5 inches long. Racemes erect, as long as the leaves,

* *Id est*, within the British territories.

† Gard. Chron. 1870, p. 311.

many flowered. Flowers crowded, bright rose colour with a paler lip and spur, on short, pale green pedicels, at the base of which is a small triangular bract; dorsal sepal sub-orbicular, concave, the lateral



Saccolabium Hendersonianum.

two larger, obovate-oblong; petals obovate, smaller than the lateral sepals; lip reduced to a compressed, cylindric, slightly falcate spur, at the mouth of which are three small teeth representing the lobes.

Saccolabium Hendersonianum, Rehb. in Gard. Chron. IV. (1875), p. 356. *Bot. Mag.* t. 6222. *Williams' Orch. Alb.* VI. t. 275.

Imported in 1874 by Messrs. Henderson, of the Wellington

Nursery, at St. John's Wood, who gave no locality. In the *Botanical Magazine*, sub. t. 6222, it is stated, on the authority of the late Professor Reichenbach, to have been in Europe ever since 1862. It has since been gathered in north-west Borneo by Curtis, who informs us that it prefers the neighbourhood of rivers and streams, where it grows on trees of *Lagerstræmia indica*, generally in partial shade, but sometimes fully exposed. In its native home it flowers very freely, and one of the prettiest floral sights he met with in that region was a dead, leafless tree overhanging a stream covered with *Saccolabium Hendersonianum* in full bloom.

S. *miniatum*.

Stem very short. Leaves linear, 3—4 inches long, strongly keeled beneath, imbricate at base, obliquely truncate, or unequally two-lobed at apex. Racemes erect, as long as the leaves, 10—15 flowered. Flowers about $\frac{3}{4}$ inch in diameter, bright orange-red; sepals and petals ovate-oblong, acute; lip linear-oblong, obtuse, recurved, produced at the base into a slender cylindric spur longer than the limb, on each side of the aperture of which are two small auricles. Column very short; anther purple.

Saccolabium miniatum, Lindl. in Bot. Reg. 1847, sub. t. 26. *Id.* t. 58. Miquel, Fl. Ind. bat. III. p. 692.

Introduced by us from Java in 1846 through Thomas Lobb, but now very rarely seen in the orchid collections of this country. It is very near *Saccolabium curvifolium*, from which it is chiefly distinguished by its smaller size, shorter and narrower leaves, and its shorter racemes of smaller flowers with differently shaped perianth segments.

S. *violaceum*.

Stem as thick as a man's little finger, rarely exceeding 10—15 inches high under cultivation. Leaves broadly strap-shaped, decurved, very leathery, 9—12 inches long, 1—1 $\frac{1}{2}$ inch broad, imbricate at base, unequally bi-lobed at apex, with pale longitudinal striations beneath. Racemes pendulous, shorter than the leaves, many flowered. Flowers fragrant, about an inch in diameter, on short grooved pedicels; sepals oval-oblong, the lateral two broader than the dorsal one; petals similar but narrower; both sepals and petals white spotted with amethyst-purple; lip amethyst-purple, oblong, undulate, with a small oblong lobule at the apex, depressed at the middle, below which are

three broad ridges; spur sub-conic, compressed, green. Column terete, very short; anther beaked.

Saccolabium violaceum, Lindl. ex. Warner's *Sel. Orch. I.* t. 14 (1862-65). De Puydt, *Les Orch.* t. 39. *Vanda violacea*, Lindl. in *Bot. Reg.* 1847, t. 30.



Saccolabium violaceum (Mr. Harrison's variety).

sub-var.—*Mr. Harrison's* (*Bot. Mag.* t. 5433. Williams' *Orch. Alb. V.* t. 236), perianth segments wholly white, column green, anther yellow.

Discovered by Cuming near Manila, and sent by him to Messrs. Loddiges, of Hackney, about 1840. It is now known to be quite common throughout the Philippine Islands, always occurring in hot, damp valleys, often on the Mangroves growing in the swamps along the coast. The sub-variety was communicated to the Royal Gardens at Kew in 1863 by Messrs. Low and Co., who imported it from the island of Pulo-copang in the China Sea (not found on any map within our reach), and named it in compliment to Mr. C. H. Harrison, "a gentleman greatly interested in the introduction and cultivation of Indian orchids." The nearest affinity of *Saccolabium violaceum* is the Burmese *S. giganteum*, from which it differs chiefly in the form of the labellum. It usually flowers in the early spring.

EXCLUDED SPECIES.

<i>Saccolabium Blumei</i> (Lindl.), now referred to <i>Rhynchostylis retusa</i> (Blume.)			
<i>cœleste</i> (Rehb.)	"	"	<i>cœlestis</i> (Rehb.)
<i>guttatum</i> (Lindl.)	"	"	<i>retusa</i> (Blume).
<i>præmorsum</i> (Hort.)	"	"	"

ANGRÆCUM.

Thouars, Fl. des Iles. Afr. tab. 48 (1822). Benth. et Hook. Gen. Plant. III. p. 583 (1883).

The most noticeable character presented by *Angræcum* on a superficial inspection of the cultivated species, is unquestionably the long tail-like spur dependent from the base of the labellum. This curious appendage is that by which the *Angræcums* are most readily recognised by horticulturists, but remarkable as it is, it is also present in other orchids allied to them, as *Cryptopus*, *Mystacidium*, etc., and is not thence of itself sufficient for the limitation of the genus; other characters must be joined with it to admit of *Angræcum* being defined in such a way that the included species may form a natural group; these additional characters are found in the labellum and column, and may be thus technically described.

The *labellum* is affixed to the base of the column, the lateral lobes are very small or obsolete, and the blade is spreading and usually entire.

The *column* is very short and wingless; the caudicle of the pollinia is flat, single, or double; the rostellum is entire or deeply cleft (two-lobed).

The caudicle of the pollinia and its gland combined with the form of labellum afford excellent characters for a sectional division of the genus, and upon them Mr. Bentham has established the three following:—*

I.—MACROURA. Lamina of the labellum flat, often broad; the pollen masses each with a distinct caudicle and gland.

This includes *Leonis*, *sesquipedale*, and a few others not in cultivation.

II.—LISTROSTACHYS. Lamina of the labellum usually continuous with the spur, more or less concave at the base and tapering into a point; the pollen masses attached to distinct caudicles, the glands either distinct or more or less united.

The species of this section best known in cultivation are *arcuatum*, *caudatum*, *Chailluanum*, *pellucidum*, *pertusum*.

III.—EUANGRÆCUM. Lamina of the labellum flat, the caudicle of the pollen masses narrow, single, and entire.

This section includes *articulatum*, *bilobum*, *citratum*, *eburneum*, *Ellisii*, *falcatum*, *fastuosum*, *modestum*, and many others.

Although of considerable interest from a botanical point of view, the above sectional divisions have no practical bearing on the cultural treatment of the species included in them.

* Gen. Plant. III. p. 583.

In their vegetation the Angræcums conform to the sub-tribal characters described at the beginning of this section, but they vary considerably in habit *inter se*, thus *Angræcum eburneum* is one of the most robust orchids known, while *A. hyaloides* is one of the smallest. *A. sesquipedale* and *A. caudatum* are about midway between them as regards size; and nearly all the other cultivated species stand, in this respect, between these and *A. hyaloides*.

The *leaves* in the taller species are strap-shaped, complicate at the base and truncate or unequally two-lobed at the apex; in the dwarfer species they are much shorter, usually oval-oblong, or some modification of that form, obtuse or obliquely two-lobed at the apex; in all the species very coriaceous in texture, and deep green in colour. The equitant leaves of *Angræcum Leonis* and the terete ones of *A. Scotianum* are the most obvious deviations among the cultivated species.

The *inflorescence* is usually racemose, but in *Angræcum fragrans*, *A. Germinyianum*, and a few other species not in cultivation, the flowers are solitary. The racemes are few or many flowered, in the latter case the arrangement of the flowers along the rachis is extremely formal, being produced from the joints alternately and distichously and also secund, that is, all turned towards the same side as in *A. citratum*, *A. pertusum*, etc.

A peculiarity occurs in the few-flowered and in some of the many-flowered racemes that must here be noticed; the apical flower expands first and the others follow in centripetal order, the lowermost flower opening last, which is the reverse of what takes place in the racemes of the best known genera in this sub-tribe. Moreover, the apical flower, so far as this phenomenon has been observed by us, is the largest, followed by a gradual diminution of size downwards (*Angræcum Ellisii*, *A. modestum*, *A. sesquipedale*, etc.).

The generic name is a Latinised form of Angrek, the Malay name for all orchids of the *Aërides* and *Vanda* habit of growth. The number of species has been variously estimated from twenty-five to sixty according to the views held by different botanists respecting the circumscription of the genus. As defined in the *Genera Plantarum* the number of the included species at present known to science may be estimated at fifty.

Geographical distribution.—Nearly one-half of the cultivated Angræcums are natives of Madagascar, where they and other species known to science form the most prominent feature of the ORCHIDÆE of that great island. Three remarkable species have been introduced from the Comoro islands, a small group to the north-west of

Madagascar, and several others are known to inhabit the Mascarene islands (Mauritius, Bourbon). The greater number of the known species are therefore concentrated within a comparatively limited area; these are all insular and presumably quite local. Our information respecting the dispersion of the species indigenous to the African continent is still very imperfect. In south Africa (extra-tropical) seven or eight species occur, including *A. arcuatum*, all of which are quite local, while the tropical species, *A. Kotshyi*, has been reported from the country of the sources of the Nile and from the neighbourhood of the Zambesi, places that are upwards of 2,000 miles distant from each other. Seven or eight species have been introduced from the west coast of Africa, chiefly from Sierra Leone, of which four are still in cultivation, including the sombre *A. caudatum*, and others are known as herbarium specimens. One of the west African Angræcums, *A. bilobum*, has recently been discovered to be represented by a variety in Zanzibar, separated from the type by the whole breadth of the continent at its widest part. Two or three species were discovered by Dr. Welwitsch in Angola, and one by Schimpfer in Abyssinia. The assumption that the Angræcums may be generally spread over tropical Africa, where the climatic conditions are suited to orchid life, thence appears to us to be a perfectly logical one. The most surprising fact, however, in the geographical distribution of Angræcum is the presence of *A. falcatum* in Japan, a species with all the essential characters of a true Angræcum, but separated from its congeners by an interval equal to one-fourth of the circumference of the globe.

Cultural Note.—The geographical stations of the Angræcums and their environment *in situ*, where known, should indicate the cultural treatment of the plants in the glass houses of Europe. Coming from one of the hottest regions of the globe, they require the highest temperature usually maintained in the orchid houses of this country, such as the East Indian house, and where a highly humid atmosphere is kept up during the growing season, and where shading is used on bright days in summer. The dwarf species may be grown in teak baskets suspended near the roof-glass, or, where a pure atmosphere is always available, on a teak raft surfaced with sphagnum that can be always kept moist. We have seen the latter method, which appears to be that most natural to the plants, very successfully practised by cultivators whose houses are situated beyond the influence of London fog. Although *Angræcum arcuatum* and *A. falcatum* are extra-tropical species they thrive well in the coolest part of the East Indian house suspended near the roof-glass.

SYNOPSIS OF SPECIES AND VARIETIES.

Angræcum arcuatum.

Stems 2—5 inches high, about as thick as an ordinary writing pencil, leafy from the base. Leaves narrowly oblong, 3—4 inches long, very leathery, emarginate, or unequally bi-lobed at the apex. Racemes as long as the leaves, few flowered. Flowers white on short green triquetral pedicels sheathed at the base by a triangular brown bract; sepals and petals linear-lanceolate, grooved on the face, very acuminate, reflexed, the sepals broader than the petals; lip similar to the petals but shorter and more fleshy; spur large for the size of the flower, greenish, recurved towards the tip. Column very short.

Angræcum arcuatum, Lindl. in *Comp. Bot. Mag.* II. p. 204 (1836). Id. in *Pact. Fl. Gard.* II. p. 120 (1852). *Harv. Thes. Cap.* II. p. 5, t. 107 (1863). Bolus in *Journ. Linn. Soc.* XIX. p. 338 (name only). *Listrostachys arcuata*, Rehb. in *Walp. Ann.* VI. p. 907.

A native of the Albany district in the extreme south-east of Cape Colony, growing on low trees and limestone rocks in the neighbourhood of Graham's Town, where it was first discovered by the botanical traveller, Burchell, in the early part of the present century. It was introduced by us in 1851; it flowers in the spring months.

A. articulatum.

Stem thickish, 3—5 inches high in the cultivated plants. Leaves oval or obovate-oblong, 3—5 inches long and 1—1½ inch broad, emarginate or obliquely two-lobed at the apex, very leathery. Peduncles stoutish, pale green, jointed at intervals of about half-an-inch, 9—15 inches long, pendulous, racemose from near the base. Flowers pure white, about 1¼ inch in diameter, on short, pale orange-red pedicels; the dorsal sepal and petals elliptic-oblong, acute, the lateral sepals similar but narrower; lip broadly oval-oblong, acute, larger than the other segments; spur 3—4 inches long.

Angræcum articulatum, Rehb. in *Gard. Chron.* 1872, p. 73. Sander's *Reichenbachia*, II. t. 55. *A. descendens*, Rehb. in *Gard. Chron.* XVII. (1882), p. 553.

Discovered by the Rev. W. Ellis during his second missionary visit to Madagascar. He succeeded in bringing home only three plants alive, which he cultivated at Rose Hill, Hoddesden, Herts, where he resided after his return to England, but they were subsequently acquired by the late Mr. John Day. Materials for description were supplied to the late Professor Reichenbach from Hoddesden towards the end of the year 1871, which is the earliest evidence extant of its flowering in this country. It continued to be very rare in the orchid collections of Europe till recent importations caused it to become more generally

distributed. As distinguished from its nearest congener, *Angræcum Ellisii*, it is a much smaller plant with shorter leaves and somewhat smaller flowers with a much shorter spur. It flowers in March and April.

A. bilobum.

Stem 3—5 inches high, as thick as an ordinary writing pencil. Leaves obovate-oblong, 4—5 inches long, unequally bi-lobed at the apex. Racemes drooping, as long again as the leaves, 7—10 flowered. Flowers white, about an inch in diameter, on reddish brown pedicels with a small acute bract at their base; sepals, petals and lip nearly uniform, lanceolate, acuminate, the petals a little narrower and the lip a little broader than the sepals; spur slender, longer than the pedicel and ovary, pale orange-red. Column short, sub-triquetral.

Angræcum bilobum, Lindl. in Bot. Reg. 1840, misc. No. 151. *Id.* 1841, t. 35. Rehb. in Walp. Ann. VI. p. 904. *A. apiculatum*, Hook. in *Bot. Mag.* t. 4159 (1845).

var.—*Kirkii*.*

Leaves narrower and slightly dilated at the apex. Racemes shorter with fewer flowers. Flowers with somewhat narrower segments.

A. bilobum Kirkii, Rehb. in Gard. Chron. XVIII. (1882), p. 488. Williams' *Orch. Alb.* IV. t. 162.

First discovered by Mr. Bowdich at Cape Coast Castle, on the west coast of Africa, some time prior to 1840, in which year it flowered in Messrs. Loddiges' nursery at Hackney. Four years later it was introduced to the Royal Gardens at Kew from Sierra Leone, whence it has been since occasionally imported with other orchids. The variety *Kirkii* was sent to the late Mr. B. S. Williams, from Zanzibar, by Sir John Kirk in 1881. According to the late Professor Reichenbach it had been previously sent by the German botanical traveller Hildebrandt from east Africa to the Botanic Garden at Hamburgh, where it flowered in 1875. The presence of this species on the two opposite coasts of the African continent, separated by an interval of upwards of 3,000 miles, is a remarkable fact in its geographical distribution.

A. caudatum.

Stem as thick as the little finger, 8—12 inches high in plants observed, leafy from the base and emitting cord-like roots 2—3 feet long, whose growing points have a glaucous hue unlike any other cultivated *Angræcum*. Leaves crowded, broadly strap-shaped, 12—15 inches long and 1½ inch broad, recurved, closely imbricating at base, unequally bi-lobed at apex. Peduncles spreading, or slightly depressed,

* Not seen by us.

18—21 inches long, brownish green, jointed, with a short, cylindrical, appressed bract at each joint, racemose and zig-zag along the distal two-thirds, 5—7 or more flowered. Flowers distant, inverted, 3 inches across vertically; sepals and petals similar and sub-equal, linear-lanceolate, acuminate, with slightly revolute margins and incurved tips, olive-green toned with pale brown; lip clawed, obcordate-cuneate with a green awl-shaped apical mucro, the claw channelled at the entrance of the flexuose, pale brown spur that is 8—9 inches long. Column terete, brown, the rostellum prolonged into an awl-shaped red-brown beak; the anther also beaked, the beak of the anther shorter than that of the rostellum and appressed to it.

Angræcum caudatum, Lindl. in *Bot. Reg.* t. 1844 (1836). *Bot. Mag.* t. 4370. Sander's *Reichenbachia* II. t. 67. Godefroy's *Orchidophile*, 1887, p. 80. Williams' *Orch. Alb.* VIII. t. 358. *The Garden*, XXXIX. (1891), t. 804. *Listrostachys caudata*, Rehb. in *Walp. Ann.* VI. p. 907 (1864).

A native of Sierra Leone, whence it was introduced about the year 1834, by Messrs. Loddiges, in whose nursery at Hackney it flowered for the first time in this country in August of the following year. It appears to have been subsequently imported in limited numbers, as it was generally cultivated by the most prominent amateurs of the period 1840—60,* among whom it was in high repute on account of its very curious flowers, of which the unusual colour, the long tails, and the remarkable sexual apparatus are striking peculiarities. It has since become quite rare in British gardens, and at the present time it is represented in but few collections.

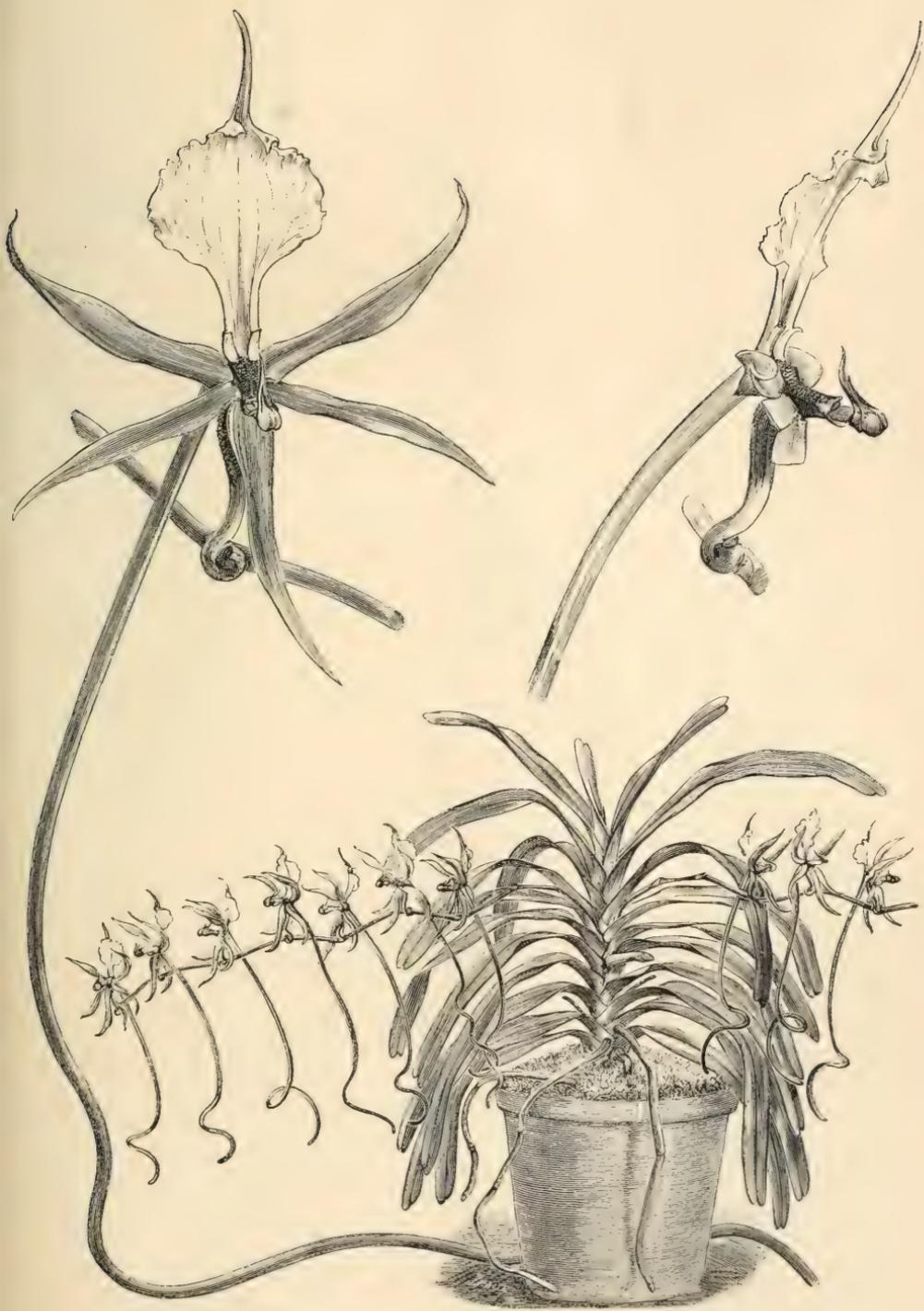
A. Chailluanum.

Stems as thick as the little finger, 6—10 or more inches high. Leaves linear-oblong, 5—8 inches long, 1½ inch broad, loosely imbricate at base, unequally two-lobed at the apex. Peduncles as long as the leaves, drooping, racemose, 6—10 flowered. Flowers milk-white, with a brownish boat-shaped bract at the base of the stalked ovary; "sepals, petals, and lip, all of equal length and similar, narrow, lanceolate-subulate with slender, acuminate, recurved points; spur slender, flexuose, 4 inches long, greenish." Column short, with both rostellum and anther beaked, the beak of the latter the shortest.

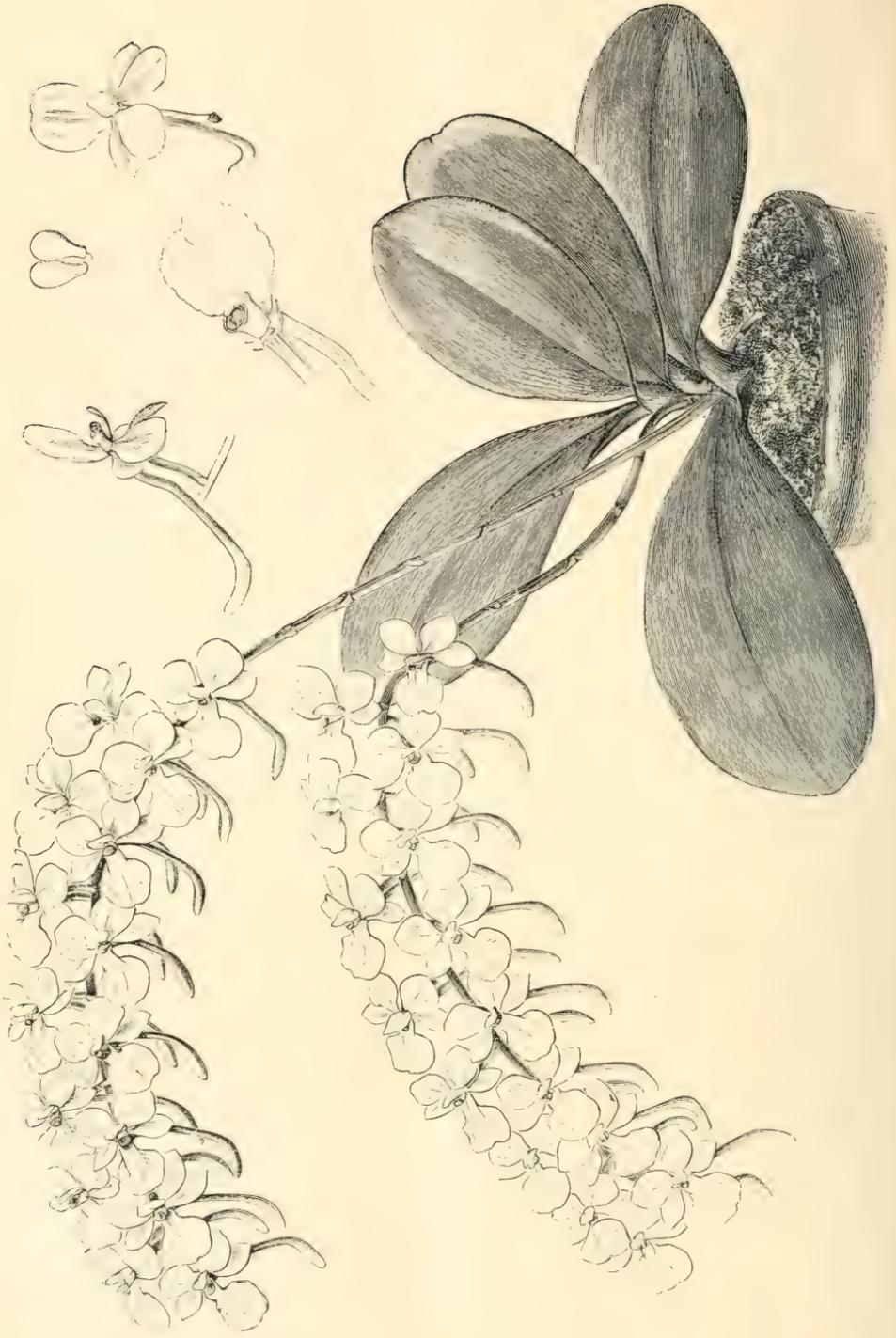
Angræcum Chailluanum, Hook. f. in *Bot. Mag.* t. 5589 (1866).

Sent from the Gaboon in West Africa, in 1865, to the Royal Gardens at Kew by M. du Chaillu, and also from the Nun river on the same coast by M. Gustav Mann, collector for the Royal

* Mr. James Bateman, Mr. Sigismund Rucker, Mr. George Barker, Mr. John Day, Mr. J. H. Schroeder, Sir Charles Lemon, and others.



Angraecum caudatum.



Angreecum citratum.

Gardens. It is near the South African species *Angræcum arcuatum*, to which it was at first referred by Dr. Lindley.

A. citratum.

Stems short, rarely exceeding 3—4 inches high in the orchid houses of this country, with six—ten ovate or ovate-oblong leaves, 3—5 inches long, and 1—1½ inch broad, acute or unequally lobed at the apex. Racemes pendulous, 15—20 or more inches long. Flowers $\frac{3}{4}$ inch in diameter, of a uniform French-white or pale straw colour, on short pedicels, all turned upwards and rather close set (distichous and secund) along the rachis; sepals broadly obovate, obtuse; petals elliptic-oblong, narrower than the sepals; lip with a short claw and sub-orbicular, emarginate, flat blade; spur slender, twice as long as the pedicel. Column very short and thick.

Angræcum citratum, Thouars, Orch. Hes. Afr. t. 61 (1822) *Bot. Mag.* t. 5624. *Illus. hort.* XXXIII, t. 592 (1886). Williams' *Orch. Alb.* VII. t. 300. *Lindenia* V. t. 238. Ridley, in *Journ. Linn. Soc.* XXI. p. 481.

Although discovered in Madagascar by the French botanist, Du Petit Thouars,* the founder of the genus, towards the end of the last century and figured by him in the work quoted above, no further record or notice of it is to be found till 1865, in which year a plant whose origin we are now unable to trace, but which, we believe, was obtained from Mr. Ellis, flowered in our Chelsea Nursery, and was subsequently figured and described in the *Botanical Magazine*. At that time *Angræcum citratum* was exceedingly rare in British orchid collections, and continued to be so till the opening of the Suez Canal afforded facilities for the more rapid transmission of plants from Madagascar. *A. citratum* is abundant in the neighbourhood of Tamatava on the east coast, occurring on the margins of lakes and swamps, where it grows chiefly on small shrubs forming the undergrowth of the forest, often in dense shade, and always where the atmosphere is constantly saturated with moisture.

The specific name refers to the colour of the flowers (citron-coloured), but in the glass-houses of Europe the flowers are almost

* The story of the life of Aubert du Petit Thouars is a very singular one, but too long for insertion here. The primary object of his visit to the Mascarene Islands was to search for the celebrated navigator La Perouse and his companions, at that time supposed to be lost; but owing to many accidents, on his arrival at the Isle of France (Mauritius) he found himself without friends and without resources; he accordingly applied to one of the rich planters in the island for employment, which he obtained, and for which his great botanical knowledge stood him in good need. He remained on the island ten years, occasionally making a voyage to Madagascar and other islands. He returned to Paris in 1802, but the results of his botanical labours in those distant lands were not published till 1822.

invariably French-white or very pale straw-yellow. The flowering season is from February to April.

A. cryptodon.

Stems 1—3 inches high with three—four obovate-oblong leaves, 3 inches long. Racemes with a russet-brown rachis, pendulous, 8—10 inches long, few flowered. Flowers $1\frac{1}{2}$ inch in diameter, on short reddish pedicels with all the segments first reflexed, then spreading; sepals and petals similar, linear-lanceolate, sub-acuminate, the sepals pale orange-red, the petals white; lip white, sub-cordate, apiculate; spur slender, 4—5 inches long, pale orange-red. Column white.

Angræcum cryptodon, Rehb. in *Gard. Chron.* XIX (1883), p. 307. Ridley in *Journ. Linn. Soc.* XXI. p. 482.

A neat dwarf species introduced by Messrs. Low and Co. from Madagascar in 1882, through their collector, Curnow. It is well distinguished horticulturally by its russet-brown peduncle and pale orange sepals and spur. The applicability of the specific name, literally "concealed tooth," is obscure.

A. eburneum.

Stems very robust, 2—4 or more feet high in the orchid houses of Europe, ligneous below, sheathed by the equitant bases of the leaves upwards. Leaves ascending, recurved towards the tips, ligulate, 18—24 inches long, 2 inches broad, very leathery, complicate towards the base, singularly oblique at the apex. Peduncles robust, ascending, as long again as the leaves, sheathed at each joint by a scale-like bract, racemose along the distal half, 9—12 or more flowered. Flowers sub-distichous and alternate, inverted, 3—4 inches in diameter; sepals and petals similar, spreading, lanceolate, acute, light green; lip broadly cordate, abruptly acuminate, ivory-white, concave, with a fleshy longitudinal crest at the base; spur 3 inches long, green. Column very short and thick, pale green.

Angræcum eburneum, Thouars, *Orch. Hles. Afr. t.* 65 (1822). Lindl. *Gen. et Sp. Orch.* p. 245 (1832). *Bot. Reg. t.* 1522. *Bot. Mag. t.* 4761. Williams' *Orch. Alb. I. t.* 41. Godefroy's *Orchidophile*, 1885, p. 168 (superbum). Ridley in *Journ. Linn. Soc.* XXI. p. 480. *A. superbum*, Thouars, *Orch. Hles. Afr. t.* 62. Lindl. *Gen. et Sp. Orch.* p. 245. *A. Brongniartianum*, Linden's *Pesc. t.* 16.

var.—virens.

Flowers somewhat smaller, the disk of the lip stained with pale green.

A. eburneum virens, Hook. in *Bot. Mag. t.* 5170. *A. virens*, Lindl. in *Bot. Reg.* 1847, sub. t. 19. Id. in *Paxt. Fl. Gard. I. p.* 25, figs 9 and 10.

The origin of this remarkable orchid is thus stated by Dr. Lindley in the *Botanical Register* for 1832, sub. t. 1522:—"It is not uncommon in the island of Bourbon, growing upon trees,

where it was found both by Colonel Bory de St. Vincent and by Du Petit Thouars. It was also met with at St. Mary's, Madagascar, by the unfortunate Forbes, by whom the only plant known to exist in Europe (1832) was sent to the Horticultural Society of London, in whose garden at Chiswick it flowered in November, 1831." *Angræcum eburneum* continued to be very rare in British gardens for a long time afterwards, the only record we find of it being the figure and description in the *Botanical Magazine* for 1854 of a plant that flowered in the Royal Gardens at Kew, and which had been derived from the collection of the Rev. John Clowes. It was subsequently sparingly imported both from Bourbon and Madagascar; the Madagascar plant differing from the Bourbon type in its somewhat more cordate labellum had received specific rank from the founder of the genus under the name of *A. superbum*, but this difference has since been found to be inconstant, and thence scarcely varietal. The variety *virens*, which seems to be a small state of the type, first appeared in Messrs. Loddiges' nursery in 1847, and again thirteen years later in the Royal Gardens at Kew; it is probably now lost to cultivation.

Angræcum eburneum offers a remarkable contrast to all the other cultivated Angræcums in the unusual dimensions attained by it even in the glass-houses of Europe; it is not only the Goliath of its own genus, but it is a giant among orchids, comparable in size and aspect with *Stauropsis lissochiloides* (*Vanda Batemanii*). Stately as is the aspect of the plant, especially when in flower, it takes up more house room than can be often conveniently assigned to it, which goes far to account for its comparative rarity in the orchid collections of Great Britain.

A. Ellisii.

Stems as thick as the little finger, 10 inches high in plant observed. Leaves narrowly oblong, 5—8 inches long and $1\frac{1}{2}$ —2 inches broad, emarginate or unequally bi-lobed at the apex, very leathery. Peduncles 18—21 inches long, first arching, then pendulous, racemed along the distal two-thirds, bearing 12—20 or more flowers on greenish pedicels springing from a small protuberance on the rachis and sheathed at the base by a small scaly brown bract. Flowers very pure white, the apical ones about $2\frac{1}{2}$ inches in diameter, those towards and at the basal end of the raceme somewhat smaller; sepals and petals similar and sub-equal, elliptic-oblong, acute, the dorsal sepal inflexed at the

apex, the petals and lateral sepals reflexed; lip nearly similar to the other segments, but broader, elliptic-oblong, acute; spur slender, 6—7 inches long, tinged with pale orange-red.

Angræcum Ellisii, Rehb. in *Flora*, 1872, p. 278. *Gard. Chron.* III. (1875), p. 277, icon. xyl. *Fl. Mag.* n.s. t. 191. Ridley in *Journ. Linn. Soc.* XXI. p. 483.

This very rare and curious *Angræcum* was discovered about the year 1854 by the Rev. W. Ellis, during his first missionary journey in Madagascar, and who brought home but three living plants, one of which shortly afterwards died: he sold the remaining two to the late Mr. B. S. Williams, of Holloway, one of which was acquired by Mr. John Day, in whose orchid collection at Tottenham it flowered for the first time in England. *Angræcum Ellisii* has since been sparingly imported, first by ourselves in 1879-80 through Curtis, who found it growing on the margins of lakes and swamps in partially exposed places in north-east Madagascar, and later by other firms. An importation of *A. articulatum* in 1881 was accidentally sold in one of the London auction rooms under the name of *A. Ellisii*, whence has arisen in some collections a confusion between the two species. *A. Ellisii* is a much larger plant than *A. articulatum*, with longer racemes of larger flowers, which, although structurally very near those of the last-named species, may be easily distinguished from them by their Gardenia-like fragrance and their much longer pale orange-red spur.

A. falcatum.

A diminutive plant. Stems 1—2 inches high, each with 3—5 somewhat falcately linear, acute leaves, 2—3 inches long, channelled on the face, sharply keeled beneath. Peduncles shorter than the leaves, 3—5 or more flowered. Flowers fragrant, milk-white, about $\frac{3}{4}$ inch in diameter, on slender pedicels 2 inches long; sepals and petals similar and equal, linear-oblong, acute; lip three-lobed, the side lobes minute, tooth-like, the intermediate lobe narrowly oblong, retuse; spur filiform, curved, as long as the pedicel.

Angræcum falcatum, Lindl. *Gen. et Sp. Orch.* p. 237, in note (1832), sub. *Ecceclades falcata*. Benth. in *Journ. Linn. Soc.* XVIII. p. 336 (1811). *Limodorum falcatum*, Swartz in *Nov. Act. Up.* VI. p. 79 (1799). *Bot. Reg.* t. 283 (1818). *Bot. Mag.* t. 2097. *Ecceclades falcata*, Lindl. *Gen. & Sp. Orch.* p. 237 (1832). Franch. et Sav. *Enum. pl. Jap.* II. p. 28. *Aërides Thunbergii*, Miq. *Prod.* p. 137. *Sô Mokou*, XVIII. fol. 24. *Orchis falcata*, Thunb. *Fl. jap.* p. 26.

The unpretending little orchid described above has an exceptional interest attached to it, not only from a scientific point of view on account of its geographical position and from the difficulty experienced

by the older botanists in determining its systematic place, but also in a horticultural sense as being the first *Angræcum* cultivated in the glass-houses of Europe, and one of the earliest of the Japanese orchids ever introduced.

It was detected on the hills near the port of Nagasaki in southern Japan by Thunberg some time between 1773 and 1778.* So little was known at that time of the epiphytal orchids that Thunberg at first referred it to the terrestrial genus *Orchis*, with which it has but a slender affinity, but subsequently removed it to *Limodorum*, a monotypic genus widely dispersed over the Mediterranean region, to which it is scarcely more nearly related than to *Orchis*. In this, however, he was followed by his countryman Swarz, the greatest orchid authority of his time, and doubtless owing to the influence of this authority it was figured both in the *Botanical Register* (1818) and in the *Botanical Magazine* (1819) under the name of *Limodorum falcatum*. Lindley, was the first botanist to bring it under *Angræcum*, but afterwards removed it to *Ceecoclades*, a genus which he had founded upon a Brazilian plant previously described and figured as an *Angræcum*,† but now somewhat doubtfully referred to *Eulophia*; the other species brought by Lindley under *Ceecoclades* were removed by Reichenbach to *Saccolabium* with the exception of the little Japanese plant, our present subject, which he seems to have overlooked. This enlargement of *Saccolabium* was sanctioned by Bentham, who, however, rightly restores the Japanese plant to the genus in which Lindley first placed it.‡ That a species of *Angræcum* should be found in a country so remote from its congeners as Japan, is a phenomenon for which no explanation can be offered.

Angræcum falcatum was first introduced into British gardens by Dr. Roxburgh, who sent plants to Sir Abraham Hume about the year 1813, and by whom they were cultivated in a hot-house in his garden at Wormley Bury, near Cheshunt. It probably became lost to cultivation for a number of years, till it was re-introduced by ourselves and other firms from its native country within the last quarter of a century. Besides the locality in which it was first detected by Thunberg, it has been reported from Kiu-siu and Kin-bo-san.

* Carl Peter Thunberg was a Swedish physician and botanist, a pupil and one of the immediate successors of Linnæus in the Chair of Botany in the University of Upsal. In 1771 he obtained a situation as surgeon to one of the Dutch East India Company's vessels, and sailed from Amsterdam for the East. He landed at the Cape of Good Hope and made several excursions into the interior, and after having remained at the Cape three winters he sailed in 1773 for Java, and subsequently visited Japan. He returned to his native country in 1779, and published a *Flora japonica* in 1784.

† Bot. Reg. t. 618.

‡ Gen. Plant. III. p. 579.

A. fastuosum.

A dwarf plant. Stems 1—2 inches high, with 3—5 oval-oblong spreading leaves, 2—3 inches long, with a depressed mid-line, emarginate or unequally bi-lobed at apex. Peduncles short, stoutish, pale green, 2—4 flowered. Flowers fragrant, $1\frac{1}{2}$ inch in diameter, of the purest white; sepals and petals similar and sub-equal, narrowly elliptic-oblong, acute; lip broader than the other segments, obovate-oblong, obtuse, with a raised mid-line; spur slender, 3 inches long, that sometimes has a reddish tinge along the distal half.

Angræcum fastuosum, Rehb. in *Gard. Chron.* XVI. (1881), p. 748 and 844; XXIII. (1885), p. 533, icon. xyl.

One of the discoveries of the French naturalist and traveller, M. Léon Humblot, through whom it was introduced by Messrs. Sander and Co. in 1881, but, it would seem, in very limited numbers, the only plant known to us in cultivation for some years afterwards being in the collection of Sir Trevor Lawrence, Bart., at Burford Lodge, by whom it was exhibited at the Royal Horticultural Society's meeting on April 22nd, 1884, presumably the first occasion of its flowering in England. A recent importation has caused it to become better known. Like the species last described it is a diminutive plant, but totally different in aspect, both in its foliage and flowers; the purity and fragrance of the latter render the species one of the most admired in the genus.

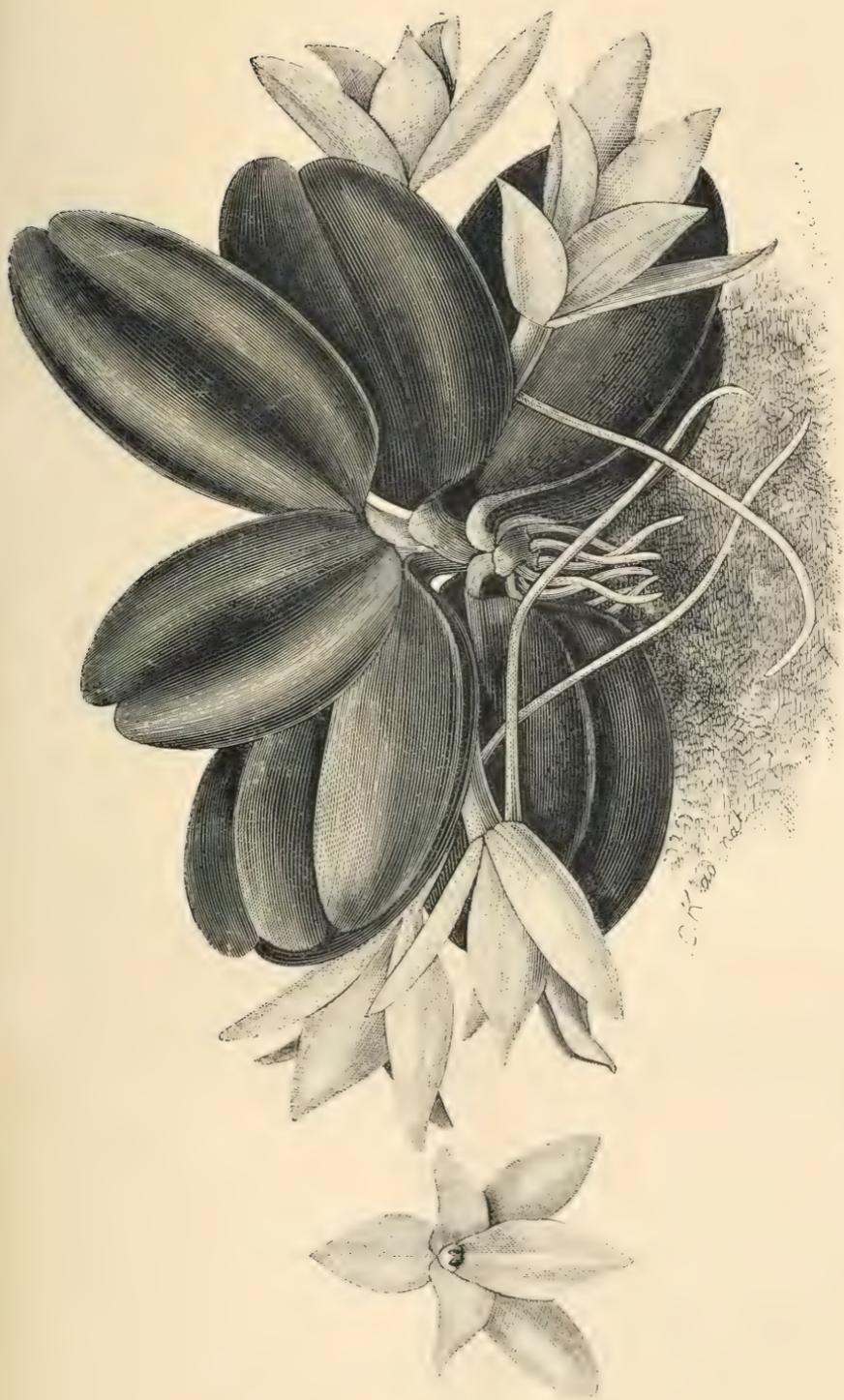
A. fragrans.*

"Stems 6—10 or more inches high, as thick as a goose-quill. Leaves few, towards the top of the stem, lorate, 3—4 inches long, $\frac{1}{2}$ — $\frac{3}{4}$ inch broad, deeply two-lobed at the tip. Peduncles ascending, 2— $2\frac{1}{2}$ inches long including ovary. Flowers solitary, 2 inches in diameter, white, fragrant; sepals and petals linear, spreading and recurved; lip as long as the sepals, hastately lanceolate, grooved down the centre; spur slender, longer than the sepals, green. Column very short."—*Botanical Magazine*.

Angræcum fragrans, Thouars, *Orch. Hes. Afr.* t. 54 (1822). Lindl. *Gen. et Sp. Orch.* p. 246 (1832). *Bot. Mag.* t. 7161. *Aërobium fragrans*, Spreng. *Syst. veg.* III. p. 716 (1826). *Aëranthus fragrans*, Rehb. in *Walp. Ann.* VI. p. 899 (1864).

A species that has been known to science from the early part of the present century, and at present in cultivation in the Royal Gardens at Kew, whither it was sent by Mr. Horne, Director of the Botanic Garden at Pamplémousse, near Port Louis in Mauritius, of which island it is a native, and also of the neighbouring island of Bourbon.

* Not seen by us.



Angraecum fastuosum.
(From the *Gardeners' Chronicle.*)

The chief interest attached to the plant will be gathered from the following extract:—

“The leaves of *Angræcum fragrans* are imported from Mauritius, and in a dry state have an odour which much resembles vanilla; it is sufficient to touch the fresh leaves for the fingers to remain impregnated with their aroma. In Mauritius, and even in France, a very agreeable tea is prepared from the leaves, which is used as a digestive, and even recommended in diseases of the respiratory organs. Mixed with ordinary tea they impart to it an extremely agreeable perfume.”*

A. fuscatum.

Stem short, not exceeding a few inches high in the cultivated plants. Leaves oblong-cuneate, 4—5 inches long, obtuse or unequally bi-lobed at the apex. Racemes flaccid and sub-pendulous, longer than the leaves, many flowered, the rachis russet-brown tinged with green, the pedicels springing from a cushion-like out-growth as in *Angræcum Ellisii*, and sheathed at the base by a small triangular bract. Flowers 1—1½ inches in diameter, cream-white; sepals and petals similar and sub-equal, lanceolate, acute; lip broader than the other segments, oblong to beyond the middle, and then somewhat suddenly acuminate; spur slender, about three times as long as the stalked ovaries.

Angræcum fuscatum, Rchb. in Gard. Chron. XVIII. (1882), p. 488. Regel's *Gartenflora*, 1886, p. 589, t. 1234. Rev. hort. 1887, p. 235, fig. 49.

Introduced by Messrs. Low and Co., from Madagascar, in or before 1882, in the autumn of which year it flowered in several collections, both British and continental. It is very near *Angræcum Ellisii*, from which it can scarcely be distinguished except by its smaller size, its more flaccid and brownish peduncles, and its smaller flowers, with a much shorter and more slender spur; it also approaches very closely *A. articulatum*, but is a little “larger in all its parts.” More definite characters are wanting to distinguish it specifically from either species, between which it is intermediate.

A. Germinyanum.

Stem slender, scandent, 12—18 inches high under cultivation, leafy along the upper part. Leaves linear-oblong, 2—3 inches long, sessile, unequally bi-lobed at apex. Flowers solitary, on slender green pedicels produced from opposite a leaf about half-way up the stem, pure white; sepals linear, 2½—3 inches long, from a narrowly lanceolate base; petals similar, but shorter and more slender; lip quadrate with rounded angles, shell-like, suddenly contracted in the middle into a filiform, reflexed tail,

* M. Gobley in *Chemical Gazette* ex Gard. Chron. 1850, p. 599.

an inch long; spur slender, 3 inches long, greenish white. Column very short.

Angræcum Germinyanum, Hook. f. in *Bot. Mag.* t. 7061.

A very remarkable species, "discovered in 1886 in the interior of Madagascar, in the same forests with *Phaius tuberculosus* and *P. Humboldtii*," by M. Leon Humblot, the French naturalist and traveller, by whom it was sent to Messrs. Sander and Co.; a very few plants reached this country alive, so that it is still quite rare in cultivation. It flowered for the first time in England in the Royal Gardens at Kew, in May, 1888, and is dedicated to Comte Adrien de Germiny, of Gouville, near Rouen, one of the most munificent patrons of horticulture in France. The long attenuated perianth segments of this species easily distinguish it from every other cultivated *Angræcum*.

A. *hyaloides*.

A diminutive plant. Stems scarcely exceeding an inch in height with 5—7 oval-oblong spreading leaves, obtuse or unequally two-lobed at the apex. Racemes a little longer than the leaves, 10—15 flowered. Flowers small, distichous and alternate, transparent white, on short, white pedicels; sepals, petals, and lip similar and sub-equal, oval-oblong, acute, the sepals the narrowest; spur slender, as long as the pedicel.

Angræcum hyaloides, Rehb. in *Gard. Chron.* XIII. (1880), p. 136. Godefroy's *Orchidophile*, 1889, p. 347.

The most admired of the minute *Angræcums* and invariably characterised in the horticultural press as "a little gem." It was introduced by us in 1879 through Curtis, who discovered it in north-east Madagascar growing on small shrubs forming the undergrowth of the dense forest along the low, swampy coast, always in shade. The flowers are produced in great profusion for the size of the plant, and are of a delicate, semi-transparent texture, which suggested the specific name (from *ύ'αλοσ*, crystal).

A. *Kotschyi*.

Stem short, emitting stoutish, flexuose, grey-brown roots that are sometimes 20—30 inches long. Leaves few but variable in size and shape, the largest obovate-oblong, 5—7 inches long, unequally bi-lobed at the apex and very leathery, the smaller ones narrowly oblong, 3—4 inches long, sub-acute or emarginate. Racemes quite pendulous, 7—10 or more flowered. Flowers white, 1½ inch in diameter, on pale red-brown pedicels 1½ inch long; the dorsal sepal and petals ovate-oblong,



Angrecum Kotschyi.

acute, reflexed; the lateral sepals longer and narrower, lanceolate, acute, spreading; lip with a broad claw and sub-rhomboidal, apiculate blade; spur very long for the size of the flower, slender, twisted, 8—9 inches long, pale red-brown.

Angræcum Kotschyi, Rehb. in Gard. Chron. XIV. (1880), pp. 456 and 693, icon. xyl. Id. XXII. (1884), p. 712. Williams' *Orch. Alb. IV.* t. 179.

The botanical history of this curious *Angræcum* was sketched by the late Professor Reichenbach in the *Gardeners' Chronicle*, loc. cit., from which we extract the following particulars:—It was first discovered in 1838 by Theodor Kotschy, who gave no locality; it was next met with by C. J. Meller in 1860, in the valley of the Shiré river, not far from its junction with the Zambesi. Two years later it was gathered by Captain Grant in the region of the upper Nile, whose specimen (imperfect) is preserved in the Kew Herbarium. In 1876 it was found by the German botanical traveller, Hildebrandt, on the coast of Zanzibar, and three years later living plants were sent by Sir John Kirk, the British Consul at Zanzibar, to Mr. Gerald Walker, who had previously introduced *Angræcum Scottianum*, and from whom we acquired them. It flowered for the first time in this country in our Chelsea Nursery in the autumn of 1880.

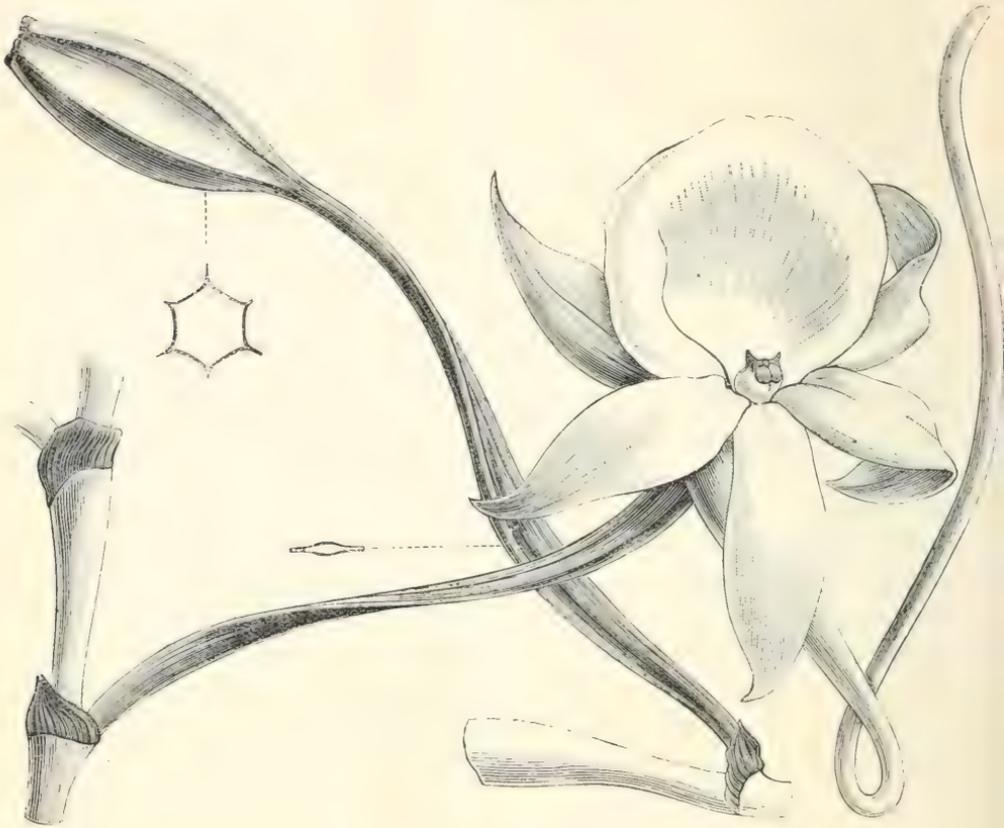
It is evident from the above sketch that *Angræcum Kotschyi* is widely dispersed over eastern Africa, occurring in Zanzibar and in the countries administered both by the East and South African Companies. Although we are not aware of its having been imported since its first introduction, and is now, in consequence, a very rare plant in European gardens, its re-introduction may be very reasonably looked for at no very distant date.

A. Leonis.

Stem as thick as the little finger, a few inches high in the imported plants, ligneous below, the upper part concealed by the bases of the equitant leaves. Leaves fleshy, ensiform, falcate, 5—10 inches long, the blade vertical from the cohesion of the halves at their upper surface on either side of the mid-nerve. Peduncles stoutish, erect, or sub-erect, racemose, 3—7 or more flowered. Flowers white, 2—3 inches in diameter, on compressed, ancipitous, narrowly winged pedicels 3 inches long, including the short six-ribbed ovary; sepals and petals lanceolate, acuminate, recurved, keeled behind, the petals a little shorter and

broader than the sepals; lip cordate, cuspidate, concave, produced at the base into a flexuose spur 5—6 inches long, funnel-shaped and compressed at its upper part, and with a short elevated plate at its aperture, the dilated half white, the distal slender half green. Column very short, the rostellum produced in front into two rounded plates.

Angræcum Leonis, supra. *Aëranthus Leonis*, Rehb. in *Gard. Chron.* XXIII. (1885), p. 726; XXIV. p. 80, icon. xyl. *Williams' Orch. Alb. V.* t. 213.



Angræcum Leonis.

(From the *Gardeners' Chronicle*.)

Discovered by M. Leon Humblot in the Comoro islands, and introduced by him into European gardens in 1885. It is a remarkable addition to the genus, and in a horticultural sense one of the most useful of *Angræcums* on account of the freedom with which its chaste blossoms are produced. Botanically it is a very interesting plant; its leaves are equitant, that is to say, the upper surfaces on each side of

the mid-nerve cohere to each other, except at the base,* like the leaves of some species of *Iris*, and the blade is thence brought into a vertical position and imparts a habit to the plant that is peculiar to the species so far as our present knowledge of the genus extends. The ancipitous winged pedicels, the funnel-like upper part of the spur of the labellum, the cleft rostellum and the double caudicles of the pollinia are also noteworthy characters, the last two indicating a near affinity with *A. sesquipedale*.

We are unable to follow Reichenbach in referring *Angræcum Leonis* and *A. sesquipedale* to Lindley's genus *Aëranthus*, of which the only genuine species known are *A. grandiflorum*, the type, and *A. Arachnitis* (*Dendrobium Arachnitis* of Thouars). The first is figured in the *Botanical Register*, t. 817, and the second in the *Botanical Magazine*, t. 6034 (wrongly spelt *Acranthus*). Both are natives of Madagascar, and have been in cultivation but are now probably lost, as neither of them are sufficiently attractive to secure the favour of amateurs. A reference to the figures we have quoted will show at a glance that these plants differ notably from *Angræcum* in habit, in the form of the flower, and especially in the spur of the labellum, which is more that of an *Aërides* than an *Angræcum*.

A. modestum.

Stems short, as thick as an ordinary writing-pencil, emitting numerous slender, branched, aerial roots. Leaves narrowly oblong, or narrowly obovate-oblong, 4—6 inches long, sub-acute or obliquely emarginate. Peduncles descending, 10—15 or more inches long, brownish green with numerous joints along the basal part, at each of which is a small, obtuse, closely appressed bract, and a similar one at the base of each pedicel. Flowers pure white, about an inch across vertically, on short, pale, orange-red pedicels; sepals lanceolate; petals broader, ovate-lanceolate acute; lip broadly ovate, apiculate; spur slender, $2\frac{1}{2}$ —3 inches long, white. Column very short.

Angræcum modestum, Hook. f. in *Bot. Mag.* t. 6693 (1883). *Gard. Chron.* III. s. 3. (1888), p. 428. A. Ellisii, *Lindenia II.* (1886), t. 92. A. Sanderianum, Rehb. in *Gard. Chron.* III. s. 3 (1888), p. 168. *Rev. hort.* 1888, p. 516. *Rev. hort. Belge*, 1889, p. 217.

The plant figured in the *Botanical Magazine* under the above name was presented by the Dowager Lady Ashburton to the Royal Gardens at Kew, where it flowered in April, 1883, and this was probably the first time of its flowering in this country. Five years later the species was imported from Madagascar by Messrs. Low and Co., and about the same time Messrs. Sander and Co. received a consignment

* The leaves of *Angræcum eburneum*, *A. sesquipedale*, and *A. pertusum* show a tendency to the same peculiarity.

of plants of an *Angræcum* collected in the Comoro islands by M. Leon Humblot which received the name of *Angræcum Sanderianum* from the late Professor Reichenbach. Plants of both importations subsequently flowered in our houses contemporaneously and thence afforded an opportunity for comparison, with this result, that structurally the flowers of the Madagascar and Comoro plants are identical, but the leaves of the latter are broader, and the racemes longer than those of the former. We have therefore reduced the second name to a synonym of the first, the slight differences observable in the vegetative organs being scarcely of even varietal value.

A. *pellucidum*.

Stems very short. Leaves few, narrowly oblong, 10—12 inches long and 2 inches broad, recurved, imbricating at the base, obliquely two-lobed at the apex. Racemes pendulous, longer than the leaves, many flowered. Flowers of semi-transparent texture, close-set, spirally arranged round the rachis, on very short pedicels, yellowish white; sepals and petals similar and sub-equal, linear-lanceolate; lip cordate-ovate, truncate at the apex, and fimbriate at the margin; spur short for the genus, not longer than the lip and bent under it.

Angræcum pellucidum, Lindl. in *Bot. Reg.* 1844, t. 2. *Listrostachys pellucida*, Rehb. in *Walp. Ann.* VI. p. 907 (1864).

Dr. Lindley remarked of this orchid that "its flowers are as delicate and transparent as if they were flakes of snow fixed by frost in the very act of melting; each part of the lip is studded and bordered with little crystalline elevations, and the whole fabric of the blossom is as fragile as thin plates of glass." There is doubtless a little hyperbole in this encomium, nevertheless the flowers of *Angræcum pellucidum* are very peculiar in texture, shape and colour. It was introduced from Sierra Leone by Messrs. Loddiges in 1842, but it is now rarely seen in British gardens. Our description was taken from a plant in the collection of Sir Trevor Lawrence, Bart., at Burford Lodge. The double caudicle of the pollinia places the species in the section *LISTROSTACHYS* of Bentham.

A. *pertusum*.

Stem 6—12 inches high, as thick as the little finger. Leaves narrowly strap-shaped, 6—8 inches long, sheathing at the base, unequally and obliquely two-lobed at the apex. Peduncles nearly as long as the leaves, arching, racemose from near the base. Flowers scarcely exceeding half-an-inch in diameter, white, close-set and symmetrically

arranged (secund) along the upper side of the rachis; sepals broadly ovate, concave; petals similar but smaller; lip obovate-spathulate; concave above; spur slender, decurved, greenish, a little longer than the blade.

Angræcum pertusum, Lindl. in Paxt. Mag. Bot. VII. p. 237 (1840). *Bot. Mag.* t. 4782. *A. Pescatoreanum*, Lindl. in Jour. Hort. Soc. IV. p. 263 (1849). *Listrostachys pertusa*, Rehb. in Walp. Ann. VI. p. 908 (1864).

Angræcum pertusum was first cultivated by Messrs. Loddiges, in whose nursery at Hackney it flowered in 1840, but who left no record of its origin. Nine years later a plant, which had been received from the Isle of Bourbon, flowered in the collection of M. Pescatore, at St. Cloud, Paris, but on materials being sent to Dr. Lindley for naming he failed to identify it with Messrs. Loddiges' plant, and named it *A. Pescatoreanum*, which Reichenbach afterwards reduced to a synonym of *A. pertusum* (*Listrostachys pertusa*). The Isle of Bourbon is its only known station.

The extreme formality of the inflorescence has acquired for this orchid among gardeners the name of the "fish-bone *Angræcum*," from its fancied resemblance to the spine of a small fish.

A. *Scottianum*.

Stems cylindrical, as thick as a goose-quill, 12—20 or more inches high, green and leafy along the upper third, clothed with brown sheaths below. Leaves terete, 3—4 inches long, deeply grooved on the upper side, spreading and recurved. Peduncles slender, as long as the leaves, one—two flowered. Flowers inverted, 1½—2 inches in diameter; sepals and petals similar, linear, acute, pale straw-yellow changing to white, the petals a little the narrowest; lip transversely oblong, concave and pure white above, with a mucro on the anterior edge, and prolonged at the base into a pale reddish brown slender spur 4—5 inches long. Column very short, with two small hatchet-shaped wings in front.

Angræcum Scottianum, Rehb. in Gard. Chron. X. (1878), p. 556. Id. Xen. Orch. III. p. 75, t. 239, fig. 2. Gard. Chron. XIV. (1880), p. 136, icon. xyl. *Fl. Mag.* n. s. t. 421. *Bot. Mag.* t. 6723. Godefroy's *Orchidophile*, 1886, p. 387.

First obtained by Sir John Kirk in 1878 from Johanna, one of the Comoro islands, and sent by him to Mr. Gerald Walker, from whom we acquired the few plants that survived the voyage; it was also sent about the same time to the Royal Gardens at Kew. The species is dedicated to Mr. R. Scott, of Cleveland, Walthamstow, in whose garden it flowered for the first time in this country in 1879; it flowered shortly afterwards in our Chelsea Nursery, and in the following year at Kew. An importation in 1885 through M. Leon

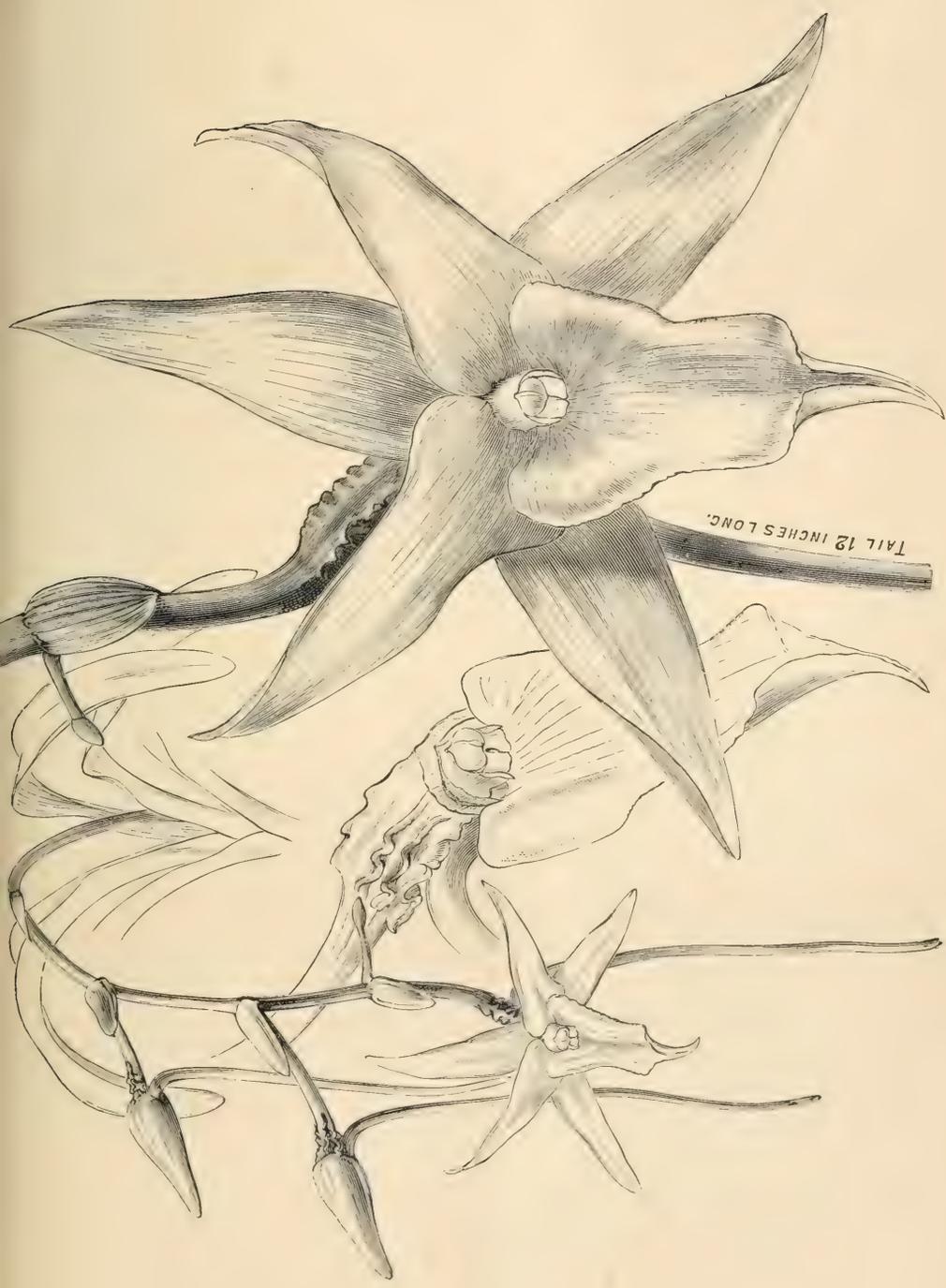
Humblot has caused the plant to become generally distributed among the orchid collections of Europe, where it is readily distinguished from all other *Angræcums* by its slender stem of semi-scandent habit, its terete leaves, and its large, almost square lip.

A. sesquipedale.

Stem as thick as the little finger, rarely exceeding 2—3 feet high under cultivation, ligneous below, closely sheathed by the imbricating bases of the leaves upwards. Leaves ligulate-oblong, wavy, about a foot long and $1\frac{1}{2}$ —2 inches broad, complicate and sheathing at the base, unequally two-lobed at the apex, deep green. Peduncles as long as the leaves, 2—4 flowered; bracts ovate, acute, keeled, brownish, much shorter than the stalked, three-furrowed ovary. Flowers the largest in the genus, 5—7 inches in diameter, somewhat fleshy, ivory-white; sepals and petals similar, broad at the base and gradually acuminate, the petals contracted near the base and narrower than the sepals; lip broader than the other segments, cordate at the base, then oblong and irregularly serrated, and terminating in a reflexed acuminate tip; spur greenish, nearly a foot long, flexuose towards the tip. Column very short and thick, the rostellum produced into two sub-quadrate lobes that almost conceal the stigma.

Angræcum sesquipedale, Thouars, *Orch. Hes. Afr.* tt. 66-67 (1822). Lindl. in *Gard. Chron.* 1857, p. 253; XII. (1879), p. 305, icon. xyl. *Bot. Mag.* t. 5113. Van Houtte's *Fl. des Serres*, XIV. t. 1413. Warner's *Sel. Orch.* I. t. 31. *Illus. hort.* XIII. t. 475. Regel's *Gartenfl.* 1872, t. 744. Jennings' *Orch.* t. 3. *Lindenia*, IV. t. 175. Ridley in *Journ. Linn. Soc.* XXI. p. 475. *Aëranthus sesquipedalis*, Lindl. *Gen. et. Sp. Orch.* p. 244 (1833). Sander's *Reichenbachia*, I. t. 14.

This, the *facile princeps* of *Angræcums*, was discovered towards the end of the last century by the French botanist, Du Petit Thouars, the founder of the genus, but it did not become generally known to science till after the publication, in 1822, of his history of the plants found in Madagascar. It was quite natural that both botanists and horticulturists should long to see so remarkable a plant in the glass-houses of Europe, but owing to the circumstances of the times, a period of thirty-three years elapsed before the wish was realised. To the Rev. W. Ellis, the missionary and historian of Madagascar, is due the merit of first introducing it. In 1855 he succeeded in bringing home, with plants of other species of *Angræcum*, three living plants of *Angræcum sesquipedale*, one of which flowered in his garden at Hoddesden, Herts, in the spring of 1857. It continued to be very rare in cultivation for many years afterwards, the many attempts made to re-introduce it meeting with but partial success in consequence of the length of time occupied in



Angraecum sesquipedale.

transmission. Since the opening of the Suez Canal, *A. sesquipedale* has been imported by ourselves and other firms, so that there is now scarcely an orchid collection of note, either in Great Britain or on the Continent, in which it is not represented by one or more specimens.

The account given by Mr. Ellis to Dr. Lindley of the conditions under which this orchid grows in Madagascar, and published in the *Gardeners' Chronicle* for 1857, has been transcribed almost as often as the plant has been figured. This account is, however, the best if not the only one known to us, and this must be our excuse for reproducing it here in an abridged form:—

“It occurs in the lowest and hottest districts, generally on straggling trees along the edge of the forest, or in parts where the trees are only thinly spread over the country. It grows most frequently on the driest parts of the trunks and branches of thinly leaved trees, and occasionally near the ground. It grows most abundantly where there is plenty of light and air. The leaves are neither numerous nor large, and in its wild state the plant most frequently presents a starved appearance and straggling habit. The roots are few in number, frequently running down the tree on which it grows 12 to 18 feet,* and so tough and adhering so tenaciously to the bark that a considerable force is required to break or detach them.”

Du Petit Thouars called the species *sesquipedale*, “a foot and a half,” in reference to the length of the flowers from the tip of the dorsal sepal to the end of the spur. The name doubtless implies a slight exaggeration. We know of no instance of which the spur has exceeded a foot in length.

This spur performs the office of a nectary for the secretion of honey. The late Mr. Charles Darwin thence asked, “What can be the use of a nectary of such disproportional length? We shall, I think, see (he continues) that the fertilisation of the plant depends on this length, and on the nectar being contained only within the lower and attenuated extremity. It is, however, surprising that any insect should be able to reach the nectar. Our English sphinxes have probosces as long as their bodies, but in Madagascar there must be moths with probosces capable of extension to a length of 10 or 11 inches.” He then proceeds to describe the sexual apparatus of the Angræcum, and the contrivances he employed to effect the removal of the pollinia in the same way that an insect would withdraw them with its proboscis. The inference he draws from his experiments is perfectly logical, and may be best expressed in

* See *Aërides*, pp. 61, 62.

his own words. "If the *Angræcum* in its native forests secretes more nectar than the vigorous plants in our hothouses, so that the nectary becomes filled, small moths might obtain their share, but they would not benefit the plant. The pollinia would not be withdrawn till some huge moth with a wonderful long proboscis tried to drain the last drop. If such great moths were to become extinct in Madagascar, assuredly the *Angræcum* would become extinct also. On the other hand, as the nectar, at least in the lower part of the nectary (spur) is stored safe from depredation by other insects, the extinction of the *Angræcum* would probably be a serious loss to those moths."*

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The names in italics are varieties or synonyms ; those followed by × are hybrids.

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* *Fertilisation of Orchids*, pp. 197—262.

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A MANUAL OF ORCHIDACEOUS PLANTS.

VOL. II.

A MANUAL
OF
ORCHIDACEOUS PLANTS

CULTIVATED UNDER GLASS IN GREAT BRITAIN.

VOL. II.

VANDEÆ—CYPRIPEDIÆ.

JAMES VEITCH & SONS.

ROYAL EXOTIC NURSERY, 544, KING'S ROAD, CHELSEA, S.W.

1887—94.

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CORRIGENDA.

Under Masdevallia.

- Page 32, 18th line from top, for Sely read Selly.
 ,, 37, 5th ,, ,, for margined read marginal.
 ,, 44, 7th ,, ,, bottom, for in read on.

Under Dendrobium.

- Page 63, 13th line from top, for VIII. read VII.

Under Cattleya.

- Page 14, 14th line from top, for in read from.
 ,, 22, bottom line, for Otterpool read Otterspool.
 ,, 33, 18th line from bottom, for t. 368-69 read t. 1689.
 ,, 38, 2nd ,, ,, top, for 5685 read 5683.

Under Lælia.

- Page 62, 19th line from top, for 1885 read 1884.
 ,, 82, 9th ,, ,, for 163 read 173.

Under Trichocentrum.

- Page 170, 13th line from top, for R. triquetrum read T. triquetrum.

Under Cochlioda.

- Page 189, 6th line from bottom, leave out "the German botanist."

Under Odontoglossum.

- Page 4, 11th line from bottom, for Linnæan read Linnean.
 ,, 13, 18th ,, ,, for 1846 read 1840.
 ,, 16, 12th ,, ,, for 1847 read 1844.
 ,, 31, 10th ,, ,, top, for James read Thomas Dawson.
 ,, 49, 6th ,, ,, bottom, for 157 read 1857.
 ,, 53, 12th ,, ,, for candidissimum read candidulum.

Under Miltonia.

- Page 105, the woodcut represents *Miltonia Roezlii* not *M. Roezlii alba*.
 ,, 106, 8th line from bottom, for Kegel's read Regel's.

Under Phalænopsis.

- Page 33, 2nd line from top, for Superintendent read Curator.
 ,, 47, 3rd ,, ,, for *costa* read *casta*.

Under Sarcochilus.

- Page 60, 16th line from bottom, for p. 35 read p. 25.

Under Angraecum.

- Page 127, 18th line from top, leave out "it is probably now lost to cultivation."
 ,, 137, 7th ,, ,, bottom, for Walker read Waller.

Under Cypripedium.

- Page 1, 4th line from bottom, for Aspasia read Apostasia.
 ,, 45, 19th ,, ,, top, for 1887 read 1888.
 ,, 64, 10th ,, ,, for Im Thurm read Im Thurn.

634.63

V53m

pt. 8

A MANUAL

OF

ORCHIDACEOUS PLANTS

CULTIVATED UNDER GLASS IN GREAT BRITAIN.

PART VIII.

ONCIDIUM AND MILTONIA,

ADA, BRASSIA, GOMEZA, IONOPSIS, ORNITHOCEPHALUS.

JAMES VEITCH & SONS,

ROYAL EXOTIC NURSERY, 544, KING'S ROAD, CHELSEA, S.W.

1892.

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PRELIMINARY NOTICE.

THIS Manual is being compiled to supply amateurs and cultivators of exotic Orchids with a fuller account of the principal genera, species and varieties cultivated under glass, than is contained in the Manuals hitherto in use.

The rapid extension of Orchid culture during the last quarter of a century, resulting from the increased taste for and appreciation of this beautiful and interesting order of plants, has, in our opinion, created the *desideratum* which we are now attempting to supply. The prominent place, too, occupied by Orchids in the columns of the Horticultural Press, and the surprising amount of practical and varied information respecting them disseminated through its agency, has also stimulated the desire to obtain all the leading facts in a condensed form, to which easy reference may at any time be made.

So numerous are the species and varieties of Orchids at present in cultivation, and to which additions are constantly being made by new discoveries and by artificial hybridisation, that the labour attending the compilation of a Manual sufficiently comprehensive to meet the wants of cultivators must necessarily demand much time. Moreover, the present unsatisfactory state of Orchidology, especially in its horticultural aspect and its complicated and unscientific nomenclature, have rendered the compilation of such a Manual within a stated time almost an impossibility.

Under these circumstances, and yielding to the solicitations of patrons and friends, we have decided upon issuing the work in parts, each part containing a monograph of the cultivated species and varieties of one of the most important genera, or of a group of genera.

Little explanation of the plan of the work is here needed; the parts as issued must speak for themselves. We have only to state that in the scientific classification and sequence of the genera we have followed, with but trifling deviations, the arrangement of Bentham and Hooker as elaborated in their *Genera Plantarum*, the most profound and, at the same time, the most intelligible exposition of the Orchideæ extant. In the nomenclature of the species, we have adhered to the Laws of Botanical nomenclature adopted by the International Botanical Congress, held at Paris in August, 1867.

In the description of the species, we have been compelled to use occasionally a few technical terms to avoid cumbrous circumlocutions; at the conclusion of the work we propose giving a glossary of the terms so used. In the cultural notes we have quoted temperatures in the Centigrade scale with the equivalent Fahrenheit readings, in the hope that the far more rational scale, now almost universally adopted in scientific investigations, may also come into use in horticulture. The literary references in italics indicate coloured plates of the species or variety described.

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p. 8

1896

ONCIDIUM.

Swartz in K. Vet. Acad. Stockh. Nya, Handl. XXI. p. 239 (1800). Lindl. Gen. et Sp. Orch. p. 196 (1832). Benth. et Hook. Gen. Plant. III. p. 562 (1883).

The genus *Oncidium* was formed out of the heterogeneous group of species brought by Linnæus under *Epidendrum* by his successor Oloff Swartz. Swartz knew but five species when he founded the genus, but so rapid has been the progress of discovery since, that upwards of three hundred have now been published, including doubtless several horticultural varieties; and of these, nearly three-fifths are said to have been in cultivation at one time or other. Besides the species known to science, numbers of others are known to exist in the vast forests and along the river valleys of the great South American continent,* where many have been seen by explorers, and especially by orchid collectors who have voluntarily passed them over. The genus *Oncidium* is thence one of the most extensive in the Orchidean family, and spreads over an area as great as that occupied by *Epidendrum*, with which, in fact, it nearly coincides geographically. In its botanical aspect *Oncidium* is, as Mr. Bentham aptly put it, "a natural genus now well known and rarely confounded with its allies."† But, as already stated under *Odontoglossum*, it unites with that genus in one direction, and it also merges into *Miltonia* in another, and hence it has occasionally happened that the same species has been referred to *Odontoglossum*, to *Oncidium*, or to *Miltonia* by different authors.

In a horticultural sense, although *Oncidium* includes a large number of species with handsome flowers of striking and even peculiar colours that render them of exceptional interest as decorative plants, there are many of them that are not regarded by the cultivators of orchids as an unmixed gain, for whether the circumstances attending the environment of the plants in their native forests are too imperfectly known, or the climatic conditions under which they live cannot be approached sufficiently near by artificial means, or from some physiological cause inherent in the plants themselves, certain it is that of the thousands of *Oncids* that have been imported from Central and

* See Wallace's *Travels on the Amazon and Rio Negro*, p. 178.

† Journ. of Linn. Soc. XVIII, p. 238.

South America a very small proportion of them have remained denizens among us for any length of time.

The following diagnosis from the *Genera Plantarum* defines the extent of the genus:—

The *sepals* are generally sub-equal, spreading or reflexed; they are either all free or the lateral two are connate at their base; in some species the lateral sepals are much longer and narrower than the dorsal one.

The *petals* are either similar to the dorsal sepal or larger.

The *lip* is affixed to the base of the column by a short claw that is divergent or spreading;* the side lobes are adnate to the claw and usually small or obsolete, the intermediate lobe is spreading, very broad, emarginate or bifid (in the section *MICROCHILA* entire, narrow and reflexed); the disk at the apex of the claw is conspicuously crested or tuberculate.

The *column* is short and thick, with a petaloid wing on each side of the stigma, below which there is a prominent protuberance.

The *pollinia* are two, globose or inversely egg-shaped, united to the gland by linear or flattened caudicles (stipes).

The *capsule* is usually ovoid-oblong, sometimes fusiform, more or less rostrate.

Generally.—The essential characters of *Oncidium* are the short thick winged column that is nearly always tumid below the stigma, and the tuberculated or much-toothed crest of the labellum;† the first-named character chiefly separates it from *Odontoglossum* and the latter from *Miltonia*. Besides these there are characters in the habit and inflorescence by which cultivators recognise many species of *Oncidium*.

The vegetative organs of *Oncidium* are essentially the same as those of *Odontoglossum*, and are fully described under that genus; it is here only necessary to notice some of the most obvious deviations that occur in the cultivated species.

In *Oncidium zebrium*, and in a less degree in *On. flexuosum*, the rhizome is much developed and becomes scandent. In *On. Papilio*, *On. Kramerianum*, *On. ampliatum*, and one or two others, the pseudo-bulbs are disk-like with the sides more or less corrugated. *On. bicallosum*, *On. carthaginense*, *On. Cavendishianum*, *On. Lanceanum*, *On. luridum* and two or three other allied species are without pseudo-bulbs, but

* In *Odontoglossum* the claw of the lip is always parallel with the face of the column.

† This is an important character in the determination of species, but often so complicated in structure as to render it extremely difficult to describe. In cases of doubt the reader should always refer to a good drawing of the species when one is accessible.

have leaves that are much larger and thicker in texture than the pseudo-bulbous species. *On. Cebolleta*, *On. Jonesianum*, and three or four other species not known to be at present in cultivation, have terete, fleshy leaves, channelled on one side. Another deviation from the usual ensiform leaves of *Oncidium* is seen in *On. pulchellum*, *On. tetrapetalum*, *On. urophyllum*, and three or four others that are now but rarely if ever seen in cultivation; all these have rigid, triquetral, equitant leaves. The inflorescence of many *Oncids* is remarkable for the extraordinary length attained by the peduncle, which sometimes rambles in a flexuose, irregular manner for several yards, branched at irregular intervals, and bearing flowers that may be sometimes counted by the hundred. No species of *Odontoglossum* is yet known with a peduncle longer than 3—4 feet.

The genus *Oncidium*, as above stated, was founded by Swartz, the Swedish botanist, at the beginning of the present century on the West Indian species *altissimum*, *carthaginense*, *Cebolleta*, *tetrapetalum* and *variegatum*, which he separated from the Linnæan genus *Epidendrum*. The name is derived from the Greek word ὄγκος (*onkos*), “a tumour or swelling,” in reference to the warty excrescences always present on the labellum.*

Lindley distributed the species known to him, two hundred in all, into fourteen series or sections,† by far the greater number of which are founded upon characters so artificial that it is not surprising that a better acquaintance with many of the species and the subsequent introduction of new ones should tend to break down the sectional framework which Lindley so laboriously put together. Accordingly when Mr. Bentham revised the genus for the *Genera Plantarum* he reduced the sections to four, retaining only one founded on floral characters, viz., *MICROCHILA*, and restricting it to those species in which the front lobe of the labellum is small, narrow, and entire, as in *Oncidium macranthum*, *On. superbiens*, *On. serratum*, *On. zebrinum*, and other well-known and admired kinds.‡ The characters of the other three sections are derived from the leaves; these are *EQUITANTIA*, including those species with distichous, equitant leaves, as *On. pulchellum*, *On. tetrapetalum*, *On. urophyllum*, etc.; *TERETIFOLIA*, including *On. Cebolleta*, the type, *On. Jonesianum*, and three or four others with long fleshy terete leaves; and *PLANIFOLIA*, to which is referred all the species with flat leaves, except those included in *MICROCHILA*, thus lumping together a large majority of the species, some of which differ as much from each other in habit and inflorescence as they do from

* Swartz derived *Oncidium* from ὄγκιδιον, a word that does not occur in classical literature, but is rightly formed as a diminutive of ὄγκος.

† *Folia Orchidacea*, published in 1855. ‡ The genus *Cyrtorchilum* of Humboldt and Kunth.

the species included in the other sections. Nevertheless, having regard to the extremely artificial nature of Lindley's sectional arrangement of the species of *Oncidium*—of many of which he himself complained “that the badness of materials, the imperfections of drawings and descriptions, and the misinformation so common in gardens concerning countries, have rendered errors unavoidable,”* a complaint that unfortunately holds true to a great extent at the present day,—and then to our ignorance of species that are believed to lurk in the depths of the South American forests, and of which not a scrap of information is yet available for scientific use, it is evident that a complete systematic arrangement of the species of *Oncidium* at the present time is simply impracticable. We may, however, remark with respect to Bentham's enormous section *PLANIFOLIA*, that such groups as that represented by *On. luridum* and its allies,† which are included in it, are almost as distinctly sectional as the *On. Cebolleta* group; and that the long, linear, erect dorsal sepal and petals of *On. Papilio* and its allies also afford a distinctive character which, although it did not escape Mr. Bentham's notice,‡ was adopted by Dr. Lindley for his section *GLANDULIGERA*.

Geographical Distribution.—Owing to the vagueness of the information that has been communicated respecting the habitats of most of the species in cultivation and the total absence of it in the case of others and of some known only as herbarium specimens, the geographical distribution of *Oncidium* can only be stated in general terms. Thus, we know that *Oncids* have been gathered on the South American continent from Montevideo to the Isthmus of Panama, an expression that includes the whole of it as far as the 35th parallel of south latitude, but from which must evidently be excluded the Pampas of the Argentine Republic, the Campos of Brazil, the Savannahs of Venezuela, the arid tract along the Pacific coast, and other places of indefinable extent in which the climatic conditions are unsuited to orchid life. North of the Isthmus the *Oncids* are spread over Central America, Guatemala, and southern Mexico, becoming fewer in number in proceeding northwards till they disappear about the 20th parallel of north latitude. They are also generally dispersed over the West Indian Islands. Over this enormous area are spread an unknown number of species, most of them

* *Folia Orchidacea*, *Oncidium*, Introductory note.

† The sub-section *Sarcoptera* of Lindley, *Miltoniastrum* of Reichenbach.

‡ *Oncidium Papilio* Lindl. et *On. Kramerianum* Rchb. insignes sunt sepalo postico petalisque erectis longe linearibus.—Gen. Plant. III. p. 563.

doubtless extremely local, some more widely distributed, while there are not wanting instances, as *Oncidium Cebolleta*, that have been reported from places thousands of miles from each other.* So far as at present known, the species are also very unequally scattered over this region. On the Organ Mountains and in the parts of the provinces of Rio de Janeiro, Minas Geraes and San Paulo immediately contiguous to them, a large number of species are aggregated; another aggregation of species occurs on the Andes of Ecuador, and thence northwards along the Cordilleras Oncids are comparatively numerous; but in other parts of South America and north of the Isthmus they appear to be much dispersed and even isolated in places. The diversity of station they affect is also very great: some occur only in the hottest and dampest river valleys or in proximity to the coast, of such is the group of which *On. carthaginense* and *On. Lanceanum* are well-known types; while in strong contrast to these the beautiful Ecuadorean varieties of *On. cucullatum* ascend to near the snow-line on the Andes near Quito. The Oncids included in the section MICROCHILA as limited by Bentham are also alpine; they are all found on the Cordilleras of Peru and Colombia, rarely ascending above 9,000 feet or descending below 5,000 feet. The species with equitant leaves are confined to the West Indian Islands and the maritime region of South America in their immediate neighbourhood. The most northern species known to us are *On. tigrinum* and *On. hastatum*, the most southern *On. bifolium* and *On. viperinum*; the most southern Andean species is probably *On. heteranthum* or *On. Weddelli*.

Cultural Notes.—In our introductory notes above we have intimated that Oncidiums generally are not regarded horticulturally as an unmixed gain in consequence of the comparatively small number of them that have, as yet, proved to be sufficiently tractable under cultivation for several years in succession. Of those species that rank among the most long-lived, the following are well known:—*ampliatum*, *cheirophorum*, *divaricatum*, *flexuosum*, *hastatum*, *incurvum*, *leucochilum*, *longipes*, *macranthum*, *ornithorhynchum*, *phymatochilum*, *pulvinatum*, *serratum*, *sphacelatum*, *tigrinum*, *trulliferum*, *Wentworthianum*; to these should be added the less frequently seen *auriferum*, *Batemanianum*, *excavatum*,

* We have seen herbarium specimens of the little *Oncidium iridifolium* from Panama, British Guiana, Trinidad, Bahia and Para in Brazil, the Andes of Quito, and Ibagué in New Granada—indeed, this plant appears to be ubiquitous in tropical America from Bananal in Brazil northwards.

insculptum, *Schlimii*, *volvox*.* Experience has long since amply demonstrated that *ampliatum* requires the highest temperature available in orchid culture, while *cheiroporum*, *incurvum*, *insculptum*, *leucochilum*, *macranthum*, *ornithorhynchum*, *serratum* and *tigrinum* thrive under the same treatment as the cool *Odontoglossa*; *auriferum*, *Batemanianum*, *divaricatum*, *flexuosum*, *excavatum*, *hastatum*, *longipes*, *phymatochilum*, *pulvinatum*, *sphacelatum*, *trulliferum*, and *Wentworthianum* should be grown in an intermediate temperature with abundance of moisture during their growing season; all of which is conformable to what is known of these plants in their native home. With respect to the cultural treatment of the other *Oncids* described in the following synopsis, it is unfortunately necessary to speak with much reserve. Unquestionably the climatic conditions under which they grow in their native countries and the circumstances of their environment *in situ* when they can be ascertained, afford excellent indications of the treatment they should receive when transferred to the glass-houses of Europe, but such information has been forthcoming to only a very limited extent. As stated under the geographical distribution of the genus, the sub-section *Sarcoptera*, distinguished by large fleshy leaves and the absence of pseudo-bulbs, including *bicallosum*, *carthaginense*, *Cavendishianum*, *hematochilum*, *Lanceanum*, and *luridum*, are always found in the hottest and dampest places and generally in shade; these circumstances suggest a cultural treatment accordingly. On the other hand, the varieties of *cucullatum* that occur on the Andes of Ecuador, not far from the line of perpetual snow, live under conditions that cannot be approximately imitated artificially, but yet we have in our houses *Masdevallia* thriving satisfactorily that are found nearly under the same conditions which also should be suggestive.† *Cebolleta*, at least at its southern limit, and *Jonesianum* occur where there is a decided alternation of wet and dry seasons, the latter being from three to four months and even of longer duration, during which the plants are scorched by the direct rays of tropical sun. As to the Brazilian species from the neighbourhood of Rio, which live under nearly the same conditions as the *Cattleyas* and *Lælias* from the same region and which have proved to be so easy of cultivation, it is certainly paradoxical that these *Oncids* should refuse to thrive; two circumstances should at least be noticed—their inflorescence, at least in the greater number of them, is out of all proportion to the size of the plants, and their flower scapes are produced within a short time after importation and often before the plants can become established in their new home; it has thence been urged that cultivators should forego

* This enumeration is not assumed to be a complete one of the *Oncids* that can be satisfactorily cultivated in the glass-houses of Great Britain. The experience of other growers may enable them to add others that are here omitted.

† See *Masdevallia*, p. 20.

the flowering till the plants have acquired sufficient strength to produce their inflorescence without prejudicial results. The experiment is certainly worth the trial.

SYNOPSIS OF SPECIES AND VARIETIES.

Oncidium altissimum.

Pseudo-bulbs ovate-oblong, compressed, with very acute edges, 3—3½ inches long and 2—2½ inches wide, mono-diphyllous. Leaves ligulate, acute, 10—12 or more inches long. Peduncles several feet long, shortly branched from below the middle upwards, each branch bearing 3—5 flowers; bracts membranous, whitish, very acute, ½ inch long. Flowers 1½ inches in diameter; sepals and petals similar and sub-equal, narrowly oblong, undulated, pale yellow, barred and blotched with pale chestnut-brown along the central area; the lateral sepals free and divergent; lip three-lobed, the side lobes small, turned backwards, oblong, rounded at the free end, bright yellow; the front lobe with a broad saddle-like red-brown claw and transversely oblong emarginate blade, yellow above, white beneath; crest ten-toothed, the teeth arranged in two series of five each, of which the central one of the front five is the largest. Column wings narrow and rounded.

Oncidium altissimum, Swartz in K. Vet. Acad. Stockh. Nya. Handl. XXI. p. 240 (1800). *Bot. Mag.* t. 2990 (1830). Lindl. *Gen. et Sp. Orch.* p. 200. *Id. Bot. Reg.* t. 1851 (1836). *Id. Fol. Orch. Oncid.* No. 150. *Epidendrum altissimum*, Jacquin. *Amer.* p. 229, t. 141.

One of the first Oncids that became known to science and to horticulture. It was introduced to the Royal Gardens at Kew in 1793 by Rear-Admiral Bligh, but was shortly afterwards lost. It was sent to the Botanic Garden at Glasgow from the island of St. Vincent about the year 1829, and a few years later it was imported by Messrs. Loddiges, of Hackney. It is still occasionally seen in orchid collections, but it has declined in favour since the appearance of its more brilliantly-coloured congeners. *Oncidium altissimum* is generally dispersed over the West Indian Islands, British Guiana, and adjacent parts of South America, often growing in immense masses in the forks of the largest branches of the forest trees.

On. ampliatum.

Pseudo-bulbs broadly ovate or sub-orbicular, much compressed, almost discoid, 2½—4 inches in diameter, the flattened sides much wrinkled and mottled with dull purple, red and grey-green, changing

to blackish brown when old, diphyllous. Leaves oblong or oblanceolate-oblong, 8—12 inches long and $1\frac{1}{2}$ —3 inches broad, complicate at the base, very leathery, dark green. Peduncles stoutish, sub-erect or arching, variable in length, the longest sometimes attaining 3—4 feet, branched towards the extremity. Flowers numerous, $1-1\frac{1}{2}$ inches in diameter; sepals almost concealed by the petals and lip, the lateral two free, spathulate-oblong, concave at the dilated part, pale yellow, with 1—2 red-brown blotches; petals clawed, sub-orbicular, bright canary-yellow, white behind; lip large and spreading, with a short claw, two small oblong basal auricles with reflexed margin and a transverse broadly oblong blade with a cleft in the anterior margin, bright canary-yellow, whitish beneath; crest thick, three-toothed, white spotted with red. Column with a light yellow apical toothed wing and a smaller one on each side of the stigma.

Oncidium ampliatum, Lindl. Gen. et Sp. Orch. p. 202 (1832). *Bot. Reg.* t. 1699 (1835). *Fol. Orch. Oncid.* No. 90. Van Houtte's *Fl. des Serres*, XX. t. 2140—41 (majus). Sander's *Reichenbachia*, II. t. 70.



Oncidium ampliatum.

Discovered by Cuming in 1831—2 near the Gulf of Nicoya, in Costa Rica, and introduced by Mr. Richard Harrison, of Liverpool, in whose garden it flowered in March, 1835. It was subsequently gathered by Mr. G. Ure Skinner, Warscewicz, Purdie and other collectors in various parts of Central America from Guatemala to the Isthmus of Panama, and whence it has since been frequently imported. It has also been detected in Trinidad, where herbarium specimens were gathered by Dr. Bradford in 1846; and in New Granada by Burke, who saw it growing on trees overhanging streams flowing into the Magdalena at 500—1,000 feet elevation in partial shade. The species is variable in the size of its pseudobulbs, leaves and inflorescence, and especially in the flowers, which

sometimes exceed $1\frac{1}{2}$ inches in diameter, but are frequently much less. The largest form, known in gardens as *ampliatum majus*, is a very handsome one on account of the singular purity of the yellow of its labellum. The usual flowering season of this species is April and May.

On. anthocrene.

Pseudo-bulbs oblong, 4—6 inches long, compressed, furrowed on the flattened sides, diphyllous. Leaves ligulate-oblong, acute, 9—12 inches long, $1\frac{1}{2}$ —2 inches broad. Peduncles arching, 2—4 feet long, racemed or paniced, many flowered. Flowers $1\frac{1}{2}$ — $2\frac{1}{2}$ inches in diameter; sepals and petals similar and sub-equal, oblong-lanceolate, much undulated, chestnut-brown, barred and margined with yellow, the petals brighter in colour than the sepals, the lateral sepals free and divergent; lip three-lobed, the side lobes small, oblong, yellow spotted with brown, the front lobe with a broad claw and obovate, cuspidate much undulated blade, light yellow with a broad red-brown band in front of the crest.

Oncidium anthocrene, Rehb. in Linnæa, XLI. p. 102 (1877). Williams' *Orch. Alb.* IX. t. 392.

A handsome species, not often seen in European collections, that was originally discovered by Gustav Wallis while collecting for us in New Granada in 1872—3, and subsequently by Chesterton, neither of whom divulged the locality in which it occurs. The above description was taken from one of Chesterton's plants that flowered in our houses several years ago. The specific name is a fanciful one, meaning "fountain of flowers," from *ἄθος*, a flower, and *κρήνη*, a fountain.

On. aureum.

Pseudo-bulbs ovoid, elongated, 1— $1\frac{1}{2}$ inches long, mono-diphyllous. Leaves linear-lanceolate, 4—5 inches long. Scapes 15—21 inches long, erect, pale green, terminating in a 5—7 flowered raceme with a zig-zag rachis; bracts minute, glumaceous. Flowers $1\frac{1}{4}$ inches across vertically; sepals and petals pale greenish yellow with a faint purplish tinge near the base, the dorsal sepal and petals oblong, acute, the lateral sepals longer, narrower and connate to the middle; lip bright golden yellow, the claw short and fleshy, the blade first quadrate then expanded, broadly oblong, retuse, apiculate, undulate, the upper surface finely corrugated; crest a cluster of small upright teeth with a small vertical cleft plate on each side. Column wings small, toothed.

Oncidium aureum, Lindl. Sert. Orch. sub. t. 25 (1839). Id. Fol. Orch. Oncid. No. 67 (1855). Rehb. in Walp. Ann. VI. p. 732 (1863). *Odontoglossum festatum*, Rehb. in Bonpl. II. (1854), Apr. 1. *Od. hemichrysum*, Rehb. in Bonpl. II. (1854), Apr. 15.

A very distinct species, first detected by Matthews on the high mountains near Andimarca in Peru, in 1838, and afterwards by Warscewicz near the sources of the Amazon. Both Lindley and Reichenbach have noted that in the specimens gathered by these collectors the labellum and its crest were somewhat different; in Matthews' type "the lip is as broad as long," in Warscewicz's "longer than broad." It is evidently the latter form that is now cultivated. We are indebted to Baron Schroeder, of The Dell, for materials for description.

On. auriferum.

Pseudo-bulbs ovoid, much compressed with acute edges, 2—2½ inches long, monophyllous. Leaves linear, sub-acute, 7—10 inches long. Peduncles longer than the leaves, glaucous, loosely paniced, the branches short and few flowered. Flowers an inch across vertically; sepals and petals citron-yellow with 2—3 transverse pale brown bars, the dorsal sepal elliptic-oblong; the lateral sepals and petals longer and narrower, the former free; lip citron-yellow with a pale red blotch next the crest, three-lobed, the basal lobes small, oblong with revolute margin, the front lobe transversely oblong, deeply two-lobed with crenulate margin; crest a thickened triangular white ridge with two small teeth in front and three minute ones on each side. Column with a narrow wedge-shaped wing on each side of the stigma.

Oncidium auriferum, Rehb. in *Linnaea*, XXII. p. 847 (1848). Lindl. *Fol. Orch. Oncid.* No. 181 (1855).

Discovered by the Belgian collectors Funck and Schlim in 1846—7 on the mountains of Merida in Venezuela at 5,000—7,000 feet elevation, and occasionally imported since with other orchids from the same locality. It is very near *Oncidium panchrysum*, from which it may be distinguished by its more slender inflorescence with smaller flowers that are not self coloured. Materials for description were sent to us from the Royal Gardens at Kew, and by Mr. T. B. Haywood, of Woodhatch, Reigate.

On. barbatum.

Pseudo-bulbs oval-oblong, 2—2½ inches long, compressed, monophyllous. Leaves linear or oval-oblong, 3—4 inches long, acute or emarginate. Peduncles slender, pale green spotted with red-brown, loosely paniculate and few flowered at the extremity. Flowers about an inch in diameter; sepals clawed, oval-oblong, undulate, yellow blotched with chestnut-brown, the lateral two narrower, connate to one-third of their length; petals

similar but broader; lip bright yellow, three-lobed, the lobes obovate and nearly equal, the lateral two obtuse, the intermediate one apiculate; crest dotted with red, seated on a circular disk that is fringed at the margin, five-toothed, the posterior two divergent, the anterior three smaller, tuberculose. Column wings roundish or sub-quadrate.

Oncidium barbatum, Lindl. Collect. Bot. t. 27 (1821-25). Id. Gen. et Sp. Orch. p. 200. Id. Fol. Orch. Oncid. No. 47. *On. ciliatum*, Lindl. in *Bot. Reg.* t. 1660 (1835). *On. microglossum*, Klotzsch, ex Lindl. Fol. Orch.

Discovered by Swainson in the neighbourhood of Rio de Janeiro, and sent by him to the Botanic Garden at Glasgow, at that time directed by Dr., afterwards Sir W. J. Hooker, where it flowered for the first time in 1819. It was afterwards cultivated by Mr. Cattley at Barnet, by Sir Charles Lemon at Carlew under the name of *Oncidium ciliatum*, by our predecessor at the Royal Exotic Nursery, Mr. Knight, and by Messrs. Loddiges of Hackney. It is now less frequently seen than formerly, being surpassed as a horticultural plant by other Oncids with more showy flowers. The species is a variable one, especially in the form and size of the front lobe of the lip, and in the colour of the sepals and petals, whence several varieties have been noted and distinguished by name. The specific name refers to the fringed or bearded disk on which the crest is seated.

On. Batemanianum.

Pseudo-bulbs ovoid or sub-conic, 3—4 inches long, obscurely angulate when old, di-triphyllous. Leaves linear-lanceolate, acute, 7—9 inches long. Peduncles 3—4 feet long, sparingly branched towards the extremity. Flowers $1\frac{1}{4}$ inches across vertically; sepals and petals much undulated, light yellow heavily barred and blotched with chestnut-brown, the dorsal sepal ovate, acute, bent forwards, the lateral two free, clawed, lanceolate, acute, reflexed; the petals broadly ovate, reflexed and twisted; lip bright yellow with two narrowly oblong basal auricles and a transversely roundish oblong blade with a broad sinus in the anterior margin; crest of complicated structure, consisting of four series of narrow plates, all more or less toothed; the back series including five plates in a compact row, the front series three, of which the middle one is the largest, the lateral series each consisting of two larger and two smaller teeth. Column with two ear-like wings.

Oncidium Batemanianum, Knowles and Westcott, Fl. Cab. III. p. 183, t. 137 (1840). Lindl. Fol. Orch. Oncid. No. 185 (1855). *On. ramosum*, Lindl. in Bot. Reg. XXI. sub. t. 1920 (1837). *On. spilopterum*, Lindl. in Bot. Reg. 1844, misc. No. 76. Id. 1845, t. 40. *On. Pinellianum*, Journ. of Hort. Soc. Lond. 1848, p. 17, with fig. *On. gallopavinum*, in Ann. Gand. I. p. 13.

This handsome species was first cultivated in 1839 by Mr. George Barker, of Birmingham, who had obtained it from M. Parmentier at Paris. It was figured and described by Knowles and Westcott in their *Floral Cabinet* for 1840 without any indication of its habitat; it had, however, been previously described in the *Botanical Register* for 1837 by Lindley, under the name of *Oncidium ramosum*, from a panicle gathered by Martius in the Brazilian province of Minas Geraes, and subsequently it was figured in the same periodical for 1845 as *On. spilopterum*, from specimens received by Loddiges from Brazil, who also exhibited a plant at one of the Horticultural Society's meetings in 1848 as *On. Pinellianum*. All these names, which tend to show the variability of the species, were merged by Lindley when revising the genus for his *Folia Orchidacea* into Knowles and Westcott's *Batemanianum*, given in compliment to his friend the author of *Orchidacea of Mexico and Guatemala*.

Oncidium Batemanianum is a species with tall sparingly branched panicles of remarkably bright-coloured flowers, of which the crest of the labellum is of peculiarly complicated structure. Although tractable under cultivation it is now rarely seen in orchid collections. We are indebted to the Royal Gardens at Kew for materials for description.

On. Baueri.

Pseudo-bulbs oval-oblong, slightly compressed, 3—4 inches long, diphyllous. Leaves ensiform, acuminate, 10—15 or more inches long. Peduncles 5—7 or more feet long, branched from near the base, branches numerous, gradually shorter upwards, the lower ones 7—10 flowered. Flowers 1—1¼ inches in diameter; sepals and petals linear-lanceolate, undulate, yellowish green spotted with red-brown, the lateral sepals free and divergent; lip three-lobed, all the lobes yellow, the basal two small, obcordate, the front one transversely oblong, emarginate, broadly clawed, the claw red-brown with a fleshy whitish crest, consisting of three series of teeth, two lateral groups of four each and one of three teeth in front. Column with two short truncate wings.

Oncidium Baueri, Lindl. Gen. et Sp. Orch. p. 200 sub. *On. altissimum* (1832).
Id. Fol. Orch. Oncid. No. 154. *On. altissimum*, *Bot. Reg.* t. 1651.

A species with a long straggling inflorescence that has been known to attain a length of 10 feet under cultivation, sometimes confused with *Oncidium altissimum*, from which it may be distinguished by its larger and smoother pseudo-bulbs, its longer and narrower leaves,

and its smaller flowers with a differently-shaped labellum and crest. It is widely distributed over the West Indian Islands and adjacent parts of the South American continent, notably in British Guiana, where it was gathered by the brothers Schomburgk during their exploration of the colony in 1840-44.* It appears to have been first cultivated by Mr. Colville, of Chelsea, who received a medal for it from the Horticultural Society of London in 1833 under the name of *On. altissimum*. The species is dedicated to Francis Bauer, the eminent botanical draughtsman of that period.

On. bicallosum.

Pseudo-bulbs none. Leaves oblong-lanceolate, 8—12 inches long, complicate at base, keeled at the back, very leathery. Scapes stoutish, erect, longer than the leaves, usually racemose along the upper half, but sometimes branched, many flowered. Flowers about 2 inches across vertically; sepals and petals similar, obovate-spathulate with undulate margin, yellow toned with brownish green, the dorsal sepal concave, almost galeate, the lateral two narrower; lip bright canary-yellow, three-lobed, the basal lobes small, sub-spathulate; the front lobe large and spreading, transversely oblong with a shallow sinus in the anterior margin; crest white dotted with red, bipartite, the posterior part sub-reniform, the anterior part with three rounded tubercles. Column wings small, decurved.

Oncidium bicallosum, Lindl. in Benth. *Plant. Hartw.* p. 94 (1839). *Bot. Reg.* 1843, t. 12. *Fol. Orch. Oncid.* No. 135. *Bot. Mag.* t. 4148. *Illus. hort.* XII. t. 458.

A native of Guatemala. It was first detected by Mr. G. Ure Skinner, who sent plants to Woburn Abbey gardens and to Mr. Bateman, and afterwards by Hartweg while collecting orchids in Central America for the Horticultural Society of London. It flowered for the first time in this country in Mr. Bateman's collection at Knypersley in the autumn of 1842, and in the following year in the Royal Gardens at Kew, whither the Woburn collection of orchids had been removed. It is very near *Oncidium Cavendishianum*, from which it is distinguished by its larger and differently coloured flowers, and especially by the form of its column wings and crest, that of the latter suggesting the specific name.

* Ueber die ganze Region verbreitet an den Ufern der Flüsse auf Baumstämmen. Blüht. in April und Mai. *Reisen III.* p. 913.

On. bifolium.

Pseudo-bulbs ovoid, about the size of a walnut diphyllous. Leaves linear-oblong, acute, 3—5 inches long. Scapes slender, glaucous, about a foot long, loosely racemose, 7—10 or more flowered. Flowers $1\frac{1}{2}$ inches across vertically; sepals and petals small, oblong, undulate, yellow barred and spotted with red-brown, the two lateral sepals connate to the middle, and with acuminate, recurved tips; lip clawed, broadly transversely oblong with a sinus in the anterior margin, bright yellow; the claw with two small auricles and a crest consisting of four lamellæ, of which the posterior one is broad and tuberculated, the lateral two shallow and toothed, and the anterior one the most projected and having two small divergent teeth in front of it. Column wings narrow.

Oncidium bifolium, Sims in *Bot. Mag.* t. 1491 (1812). Loddiges, *Bot. Cab. t.* 1845. Lindl. *Gen. et. Sp. Orch.* p. 197. *Id. Fol. Orch. Oncid.* No. 73.

A somewhat diminutive but very attractive species that was first sent to Messrs. Loddiges, in 1812, by a gentleman who brought it from Montevideo; it is thence one of the earliest of the *Oncids* cultivated in this country. Its geographical position is noteworthy on account of its being one of the two most southern species of *Oncidium* known, the other being *Oncidium viperinum*; although its precise locality has not been indicated, it is known to inhabit the hills in the neighbourhood of Montevideo, whence it is occasionally imported.

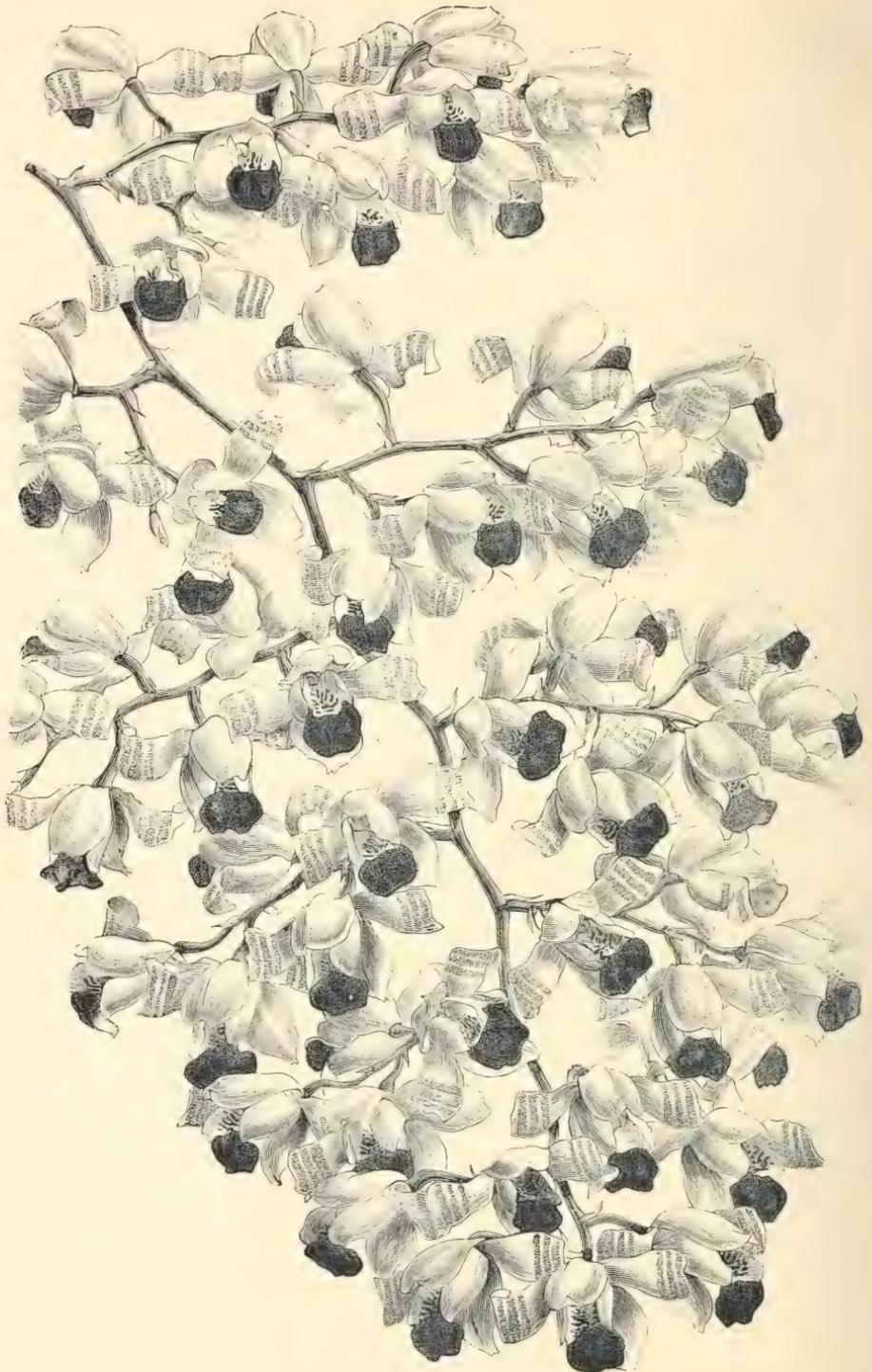


Oncidium bifolium.

On. bracteatum.

Pseudo-bulbs oval-oblong, much compressed, 3 inches long and $1\frac{1}{2}$ inches broad, diphyllous, the two leaves linear-ligulate, usually if not always of unequal length, 8—12 inches long and an inch broad. Scapes 3—4 feet long, scabrous, the nodes 2—3 inches apart, at each of which is an acute pale brown spathaceous bract and a similar smaller one at the base of each pedicel, paniced towards the extremity, the branches short, 2—3 flowered. Flowers an inch across vertically; sepals and petals bright yellow-green densely spotted with blackish purple, the dorsal sepal and petals linear-oblong, acute, the lateral sepals longer and narrower, prominently keeled behind; lip broadly clawed with two minute basal auricles and a transversely oblong emarginate blade; claw red-brown, blade and auricles light yellow, white beneath; crest bluntly conical. Column wings very narrow.

Oncidium bracteatum, Rehb. in *Bot. Zeit.* 1852, p. 695. *Id.* in *Walp. Ann.* VI, p. 786. Lindl. *Fol. Orch. Oncid.* No. 139.



Oncidium Brunleesianum.
(From the *Gardeners' Chronicle*).

Discovered by Warscewicz in 1849—50 on Chiriqui in Veragua, growing on trees at 6,000—7,000 feet elevation. It is a very distinct species, easily recognised by its large spathaceous bracts. We are indebted to the Royal Gardens at Kew for materials for description.

On. Brunleesianum.

Pseudo-bulbs narrowly oblong, compressed, slightly attenuated upwards, 3—5 inches long, di-triphyllous. Leaves ligulate-oblong, acute, longer than the pseudo-bulbs. Peduncles 10—15 or more inches long, mottled with dull crimson, paniculate along the distal half, the branches alternate and distichous, 3—7 flowered. Flowers $\frac{3}{4}$ inch in diameter; sepals and petals bent forwards, pale yellow, the petals with some faint red transverse markings on the apical half, the dorsal sepal oblong, obtuse, the lateral two connate into an ovate sub-acute body, bifid at the tip; petals narrowly oblong, acute; lip sub-orbicular when spread out, three-lobed, the side lobes incurved towards the column, bright yellow, the intermediate lobe much smaller, reflexed, deep maroon-crimson, almost black; between the side lobes is a shallow lucid plate stained with purple and with two erect white teeth near the middle. Column terete, wings broad, roundish, anther hooded.

Oncidium Brunleesianum, Rehb. in *Otia. Bot. Hamb.* p. 87, ex. *Gard. Chron.* XIX. (1883), p. 340. *Gard. Chron.* I. s. 3 (1887), p. 672, with fig. *Williams' Orch. Alb. V.* t. 206.

A singular *Oncidium*, remarkable for the form and colour of its flowers, which are among the most distinct in the genus. It is an anomalous form, the most obvious structural peculiarities of which may be thus briefly summarised:—The sepals and petals are bent forwards, but in this it agrees with *Oncidium pubes*, the nearest allied species; the side lobes of the lip are turned inwards over the column like those of a *Cattleya*, and the front lobe is reflexed and richly coloured, as is often seen in that genus; the crest is reduced to a shallow plate with two small teeth; the usual protuberance below the stigma is absent.

The plant is as beautiful as it is curious. It was first introduced in 1879 by Mr. J. Brunlees, of Victoria Street, Westminster, who sent a portion of an inflorescence to the late Professor Reichenbach without, it appears, giving any indication of its origin. We transcribe from the *Gardeners' Chronicle* its subsequent history.

“In 1883 Mr. W. B. Lemon, of Moat Lodge, Beckenham, obtained through an engineer of Rio de Janeiro, a small parcel of mixed orchids,

not necessarily collected at Rio,* among which was an *Oncidium* resembling *Oncidium sarcodes*, but which upon flowering proved to be a very different species. In 1885 it was awarded a First Class Certificate by the Royal Horticultural Society, and in February of the following year it again flowered in Mr. Lemon's collection, producing a densely branched panicle of upwards of 150 flowers. The main plant then passed into Baron Schroeder's collection at The Dell, a piece taken from it remaining with Mr. Lemon.† Sir Trevor Lawrence also has a plant of this rare *Oncidium*, and so far as we know, the three mentioned comprise the whole of it in England at the present day."‡

Since the publication of the foregoing extract the horticultural history of *Oncidium Brunleesianum* has remained materially the same. We have been informed, however, that two plants have been recently imported from Rio de Janeiro, one of which was sent to America.

The species is doubtless an extremely rare one in its native country. We are indebted to Baron Schroeder for materials for description.

On. cæsium.

Pseudo-bulbs clustered, sub-globose or broadly ovoid, 1—1½ inches in diameter, of a peculiar olive tint, diphyllous. Leaves linear, acute, 6—7 inches long. Peduncles slender, erect, longer than the leaves, pale green mottled with dull crimson, usually terminating in a five-flowered, lax raceme. Flowers 1½ inches across vertically; sepals and petals greenish tinged with rose, shortly clawed, oval-oblong, the dorsal sepal the broadest, reflexed and with a green keel behind; lip bright canary-yellow, three-lobed, the basal lobes obliquely sub-quadrate with reflexed margins, the front lobe broadly clawed, transversely oblong with a deep cleft in the anterior margin; crest nearly circular in outline, obscurely five-toothed. Column wings hatchet shaped, spreading.

Oncidium cæsium, Rehb. in Regel's *Gartenfl.* 1854, t. 80. Id. Xen. Orch. I. p. 94, t. 36, fig. 2. Lindl. in Gard. Chron. 1854, p. 219. Id. Fol. Orch. Oncid. No. 159.

First cultivated in Herr Hofrath Keil's garden at Leipsig in 1853, and although it has since appeared at intervals in a few other orchid collections, its origin is unknown to science. Its nearest affinity is the better-known *Oncidium reflexum*, from which it is easily distinguished by its peculiarly coloured pseudo-bulbs, and the differently shaped auricles of the labellum. Our description

* In Williams' *Orchid Album*, sub. t. 206, it is stated to be "a native of La Plata, having been gathered with a batch of *Oncidium varicosum* on the Rio de la Plata," but the statement does not appear to us to be supported by sufficient evidence.

† This has since passed into the collection at The Dell.

‡ I. s. 3. (1887), p. 672.

was taken in the Royal Gardens at Kew. The application of the specific name is obscure; classically, *cæsium* relates to the eyes, thence greyish, greyish green, etc.

On. caminiophorum.

Pseudo-bulbs sub-orbicular, or broadly ovate, much compressed, $1\frac{1}{2}$ inches long, and $1-1\frac{1}{4}$ inches broad, ribbed and furrowed on the flattened sides, monophyllous. Leaves linear-oblong, obtuse or obscurely emarginate, 3—5 inches long. Peduncles longer than the leaves, paniced, many flowered. Flowers an inch across vertically; sepals and petals similar and sub-equal, obovate-oblong, the basal half brown, the apical half yellow, the lateral sepals free and spreading parallel with the petals; lip sub-panduriform, the basal lobes rotund, yellow spotted with red, the front lobe transversely oblong, emarginate, bright yellow with a chestnut-brown band in front of the crest; crest quadrate, tuberculose with a curved ridge in front. Column wings small, truncate.

Oncidium caminiophorum, Rehb. in Bot. Zeit. 1852, p. 857. Lind. Fol. Orch. Oncid. No. 153.

Our knowledge of this species is derived solely from a plant in the Royal Gardens at Kew from which our description was taken. The flowers, although small, are remarkably bright in colour, and bear some resemblance, on superficial view, to those of *Oncidium reflexum*. *On. caminiophorum* was discovered by Wagener in the Caracas district about the year 1850, and introduced by him shortly afterwards into German gardens. The specific name is fanciful, or at the best but obscurely refers to the form of the crest; it is derived from *καμίνος* (*kaminos*), "a furnace or hearth," and *φορὸς* (*phoros*), "bearing."

On. candidum.

Pseudo-bulbs narrowly oblong, compressed, 2 inches long, monophyllous. Leaves linear, acute, 9—12 inches long, complicate at base. Peduncles slender, erect, dull purple, longer than the leaves, 5—7 flowered. Flowers about an inch in diameter, milk-white; dorsal sepal oblong, acute, the lateral two concealed by the lip, connate and together of the same size and shape as the dorsal one; petals similar but broader; lip longer than the other segments, triangular-oblong, sub-acute; crest an obovate yellow plate with several small tubercles on the surface. Column wings narrow, denticulate.

Oncidium candidum, Lindl. in Bot. Reg. 1843, misc. No. 76. Id. Fol. Orch. No. 52 (1855). Benth. et. Hook. Gen. Plant. 111. p. 563. N. E. Brown in Gard. Chron. XX. (1883), p. 233. *Palumbina candida*, Rehb. in Walp. Ann. VI. p. 699 (1863). Id. in Gard. Chron. 1865, p. 793. *Bot. Mag.* t. 5546.

This very interesting species was discovered by Hartweg, in Guatemala, in 1840, while collecting orchids and other plants in that country for the Horticultural Society of London. It is supposed that most of the plants sent home by him perished, as there is no record of any of them having flowered except one that was acquired by Messrs. Loddiges, and which flowered in their nursery in 1843; on the breaking up of their collection a few years later, this plant passed into the hands of Consul Schiller, of Hamburg.* We find no further mention of this *Oncidium* till 1865, when a plant flowered in the collection of the late Mr. John Day, by whom it was exhibited at one of the Royal Horticultural Society's meetings in June of that year, and this plant was figured in the *Botanical Magazine*. The species is better known in European gardens under the name of *Palumbina candida* than under that of *Oncidium candidum*.

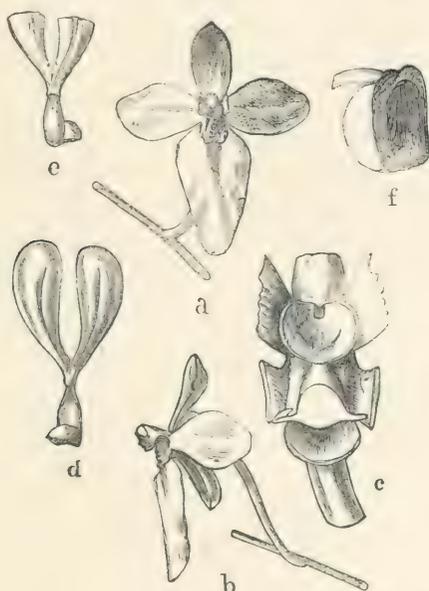
The botanical history of *Oncidium candidum* is curious. Dr. Lindley never saw the plant that flowered in Messrs. Loddiges' nursery; the only evidence he possessed of it was a drawing which must have been inaccurately executed, as it represented the caudicle (stipes) double with four pollinia; he therefore doubtfully referred it to *Oncidium*, adding that "until it shall have been re-examined it is safest to leave it where it stands."† Assuming the structure as represented by this drawing to be correct, Reichenbach founded upon it the genus *Palumbina*,‡ and yet, with Consul Schiller's plant previously at hand, and which had been acquired at his request, he, two years later, re-publishes in the *Gardeners' Chronicle* his genus *Palumbina*, one of its distinguishing characteristics being described thus: *Caudicula pollinis (sic) utriusque caudiculæ tertiæ communi inserta*," an expression we are unable to understand, as no such structure is observable in the pollinary apparatus of the flower. The true structure is clearly shown by Mr. N. E. Brown in the *Gardeners' Chronicle loc. cit.*, and whose accurate drawings of the details of the flower are here reproduced by the courtesy of the publisher. We have since been able to verify the correctness of these floral details from an examination of flowers produced in our houses.

* Reichenbach in Gard. Chron. 1865, p. 793.

† Fol. Orch. Oncid. No. 53.

‡ Walp. Ann. VI. p. 699.

The plant was properly restored to *Oncidium* by Mr. Bentham in the *Genera Plantarum*, and Reichenbach's *Palumbina* must now disappear from the list of genera.



Oncidium candidum.

a, front view; b, side view of flower; c, column x 4; d, pollinia x 12; e, caudicle gland and lower part of pollinia x 12; f, side view of gland and part of the caudicle x 40.

On. carthaginense.

Pseudo-bulbs none. Leaves coriaceous, erect, oblong, acute, keeled behind, 9—12 or more inches long and $2\frac{1}{2}$ — $3\frac{1}{2}$ inches broad, dull dark green sometimes spotted with red. Scapes 3—5 feet long, purplish with numerous short branches each bearing 2—5 or more flowers. Flowers about an inch in diameter, with reflexed crisped segments, usually white, more or less blotched with purplish rose; sepals and petals clawed, oval-oblong; lip sub-panduriform, the basal lobes oblong, obtuse, the front lobe transversely oblong with a shallow sinus in the anterior margin; crest with five tubercles, of which the central and two front ones are simple, the posterior two complex. Column wings spreading, rose colour.

Oncidium carthaginense, Swartz in K. Vet. Acad. Stockh. Nya. Hand. XXI. p. 240 (1806). Lindl. Gen. et Sp. Orch. p. 201 (1832). Id. Fol. Orch. Oncid. No. 130. Rehb. in Walp. Ann. VI. p. 781. Id. Xen. Orch. I. p. 236, t. 99, No. 3. *On. sanguineum*, Lindl. *Sert. Orch.* t. 27 (1838). *On. Huntianum*, *Bot. Mag.* t. 3806 (1841). *On. luridum Henchmanii*, Knowles and Westcott, *Fl. Cab.* t. 97 (1840). *On. Oerstedii*, Rehb. in Bonpl. 1854. *Epidendrum undulatum*, *Bot. Mag.* t. 777 (804).

This *Oncidium* occurs in various parts of Central America as far north as the Real del Monte, in Mexico, especially in the neighbourhood of the Caribbean Sea; it also occurs in Jamaica and other West Indian Islands. Dispersed over so extensive an area, the species is found to be a variable one as regards the size and colour of its flowers, whence have originated the numerous names that have been given to it. The adopted specific name is derived from Cartagena, on the Caribbean coast of New Granada, from its having been first detected by the French botanist Jacquin, about the middle of the last century, in the dense forests in the vicinity of that port. Towards the end of that century it was gathered by Swartz in Jamaica, and many years afterwards by Oersted in Nicaragua, by G. Ure Skinner in Guatemala, by Purdie near Santa Martha, by Wagener in Caracas, and by other botanical travellers in other localities. It is one of the five species upon which Swartz founded the genus *Oncidium*; it is also interesting as being one of the first *Oncids* cultivated in British gardens, it having flowered in the garden of Mr. Edward Woodford at Vauxhall, in May, 1804, when it was figured for the *Botanical Magazine*.

On. Cavendishianum.

Pseudo-bulbs none. Leaves from a stout rhizome, very coriaceous, elliptic-oblong, sub-acute, 7—10 or more inches long, and 2—3 inches broad, keeled at the back. Scapes stoutish, erect, 24—36 inches high, terminating in a many-flowered panicle. Flowers fragrant, about $1\frac{1}{2}$ inches in diameter, much undulated; sepals and petals sometimes wholly yellow, sometimes yellow-green spotted with red, clawed, obovate, the petals a little narrower than the sepals; lip bright yellow, three-lobed, the side lobes obovate, the front lobe transversely oblong with an angular sinus in the anterior margin; crest with four tubercles in the form of a cross, and a fifth central one that is larger and more prominent than the others. Column wings curved, yellow spotted with red.

Oncidium Cavendishianum, Batem. Orch. Mex. et. Guat. t. 3 (1840). Lindl. Fol. Orch. Oncid. No. 134. *On. pachyphyllum*, Hook. in *Bot. Mag.* t. 3807 (1841). Godefroy's *Orchidophile*, 1888, p. 241.

Discovered by Mr. G. Ure Skinner in the neighbourhood of the city of Guatemala, and one of the first orchids sent to England by that gentleman, it being included in his first consignment to Mr. Bateman at Knyppersley in 1835. A few years later plants were sent by Mr. Parkinson, the British Consul in Mexico, to the

Woburn collection, where one of them flowered in 1841, and from that time to the present frequent mention is made of it in the horticultural periodicals. It was collected by Roezl in 1875 near Colima, in the Mexican provinces of Michoacan,* thus indicating that it is spread over a considerable area in the neighbourhood of the Pacific coast. *Oncidium Cavendishianum* is one of a small group including that last described, distinguished by the absence of



Oncidium Cavendishianum.

pseudo-bulbs and by their large thick leathery leaves, a group of which we have already made mention in our introductory notes. It was named by Mr. Bateman in compliment to the then Duke of Devonshire, the most munificent patron of horticulture of his time, and under whom the late Sir Joseph Paxton commenced the modern system of orchid culture at Chatsworth. Its usual flowering season is April and May.

On. Cebolleta.

Leaves from a stout rhizome, sub-cylindric, elongate, tapering to a point, grooved on the face, 6—15 or more inches long. Peduncles longer than the leaves, stiffish, erect, spotted with crimson, loosely paniculate, many flowers. Flowers variable in size, the best forms 1—1½ inches in diameter; sepals and petals undulate, dull yellow spotted with reddish brown, the former clawed, obovate-oblong, the latter linear-oblong; lip canary-yellow, three-lobed, the side lobes obovate-oblong, the intermediate lobe transversely oblong, emarginate; crest an elevated rounded plate, behind which are two large teeth and some smaller ones on each side. Column wings small.

* La Belgique Horticole, 1882, p 96.

Oncidium Cebolleta, Swartz in K. Vet. Acad. Stockh. Nya. Handl. XXI. p. 240 (1800). Lindl. Gen. et. Sp. Orch. p. 206 (1833). Id. Fol. Orch. Oncid. No. 42. *Bot. Reg.* t. 1994. *Bot. Mag.* t. 3568. *On. juncifolium*, Lindl. Collect. Bot. p. 27 (1821-25). *On. longifolium*, Lindl. in Bot. Reg. 1841, misc. 56, and 1842, t. 4. *Epidendrum Cebolleta*, Jacquin. *E. juncifolium*, Linn. Sp. Pl. 1351.

One of the first *Oncids* known to science, and so far as at present known, the most widely dispersed species in the genus. It was first discovered by Jacquin in the forests of Cartagena, about the same time as he discovered *Oncidium carthaginense*, and in common with that species it is one of the five upon which Swartz founded the genus *Oncidium*. In more recent times it has been gathered by Hartweg in Mexico, by Spruce in the Brazilian province of Para, by various collectors in the West Indies, and within the last few years it has been sent from Paraguay with *On. Jonesianum*; its dispersion is thence almost conterminous with the geographical distribution of the genus. Over such an extensive region it is not surprising that it should vary, more or less, in some of its characteristics, a circumstance to which it owes its many synonyms. The earliest notices we find of its flowering in this country are in Messrs. Low's nurseries at Clapton in 1837, in the Botanic Garden at Glasgow in the following year, and shortly afterwards in Mr. Horsfall's collection at Liverpool. *On. Cebolleta*, as already mentioned in our introductory notes, is the typical species of the section TERETIFOLIA, distinguished by their rounded tapering leaves; the specific name is the Spanish word for a small onion.

On. cheirophorum.

Pseudo-bulbs ovoid-orbicular, quite smooth, much compressed, about an inch in diameter, monophyllous. Leaves linear, acute, 3—6 inches long. Peduncles slender, usually longer than the leaves, nodding, densely paniculate with short branches, many flowered. Flowers $\frac{1}{2}$ inch in diameter, bright buttercup-yellow, the crest of the lip much paler, sometimes whitish; sepals and petals sub-equal, orbicular-obovate, concave; lip three-lobed, the lobes variable, the lateral two orbicular or oblong, the intermediate one usually broader than long, emarginate; the crest a central ridge, two-lobed in front, and with two lateral plates at the posterior end. Column wings large, dolabriform; anther beaked.

Oncidium cheirophorum, Rehb. in Bot. Zeit. X. (1852), p. 695. Id. *Xen. Orch.* I. p. 191, t. 69, fig. 1. Lindl. Fol. Orch. Oncid. No. 124. *Bot. Mag.* t. 6278. Regel's *Gartenfl.* XXII. t. 827. Godefroy's *Orchidophile*, 1885, p. 102. *Lindenia*, III. t. 126.

Discovered by the Polish botanical traveller and collector, Warszewicz, in 1848—9, on the volcano of Chiriqui in Veragua,

growing upon oaks at 8,000 feet elevation, and introduced by him to the gardens of Senator Jenisch and Consul Schiller, near Hamburg, where it flowered for the first time in Europe in 1852. At the altitude at which this *Oncid* grows Warscewicz observed that the temperature frequently falls during the night to 4°—7° C. (40°—45° F.), a circumstance which suggests cool treatment in the glass-houses



Oncidium cheiroporum.
a, natural size; b. enlarged.

of Europe. The specific name “Wallflower-bearing” refers to the resemblance of the colour of the flowers to that of species of *Cheiranthus*. *Oncidium cheiroporum* is well known as one of the prettiest of the small-flowered *Oncids*, and one of the most tractable under cultivation.

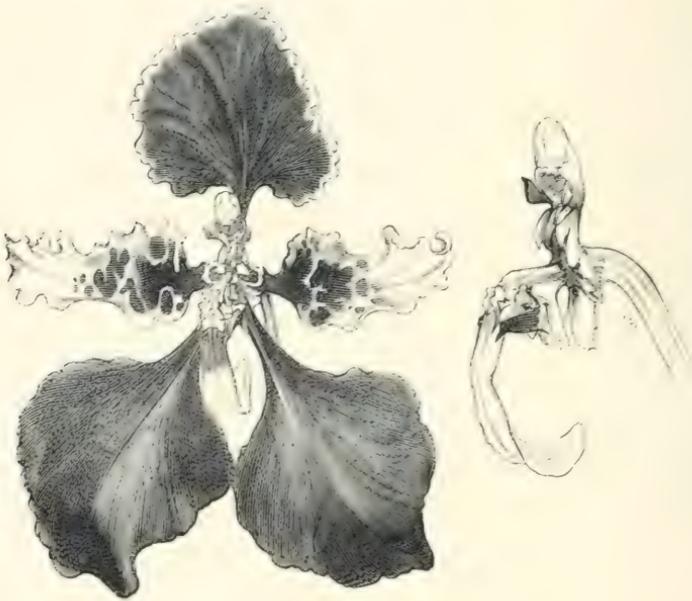
On. chrysodipterum.

Pseudo-bulbs oblong, compressed, 3 inches long, mono-diphyllous. Leaves broadly strap-shaped, sub-acuminate, cuneate at base, 15—20 inches long. Scape flexuose, 7—9 or even more feet long, with short branches at irregular intervals, each bearing 3—5 or more flowers. Flowers 3 inches across vertically; sepals with a semi-terete claw grooved on the face and slightly reflexed, the dorsal sepal cordate-orbicular, undulate at the margin, bright chestnut-brown with a narrow yellow border; the lateral two divergent, broadly ovate, sub-acute, keeled behind, wholly brown; petals much smaller with a shorter claw, ovate-lanceolate, incurved and strongly undulated at the margin, bright gamboge-yellow spotted with brown on the basal half only; lip linear, reflexed, yellow stained with brown in front of the crest, with two triangular deflexed

auricles at the base; crest a semi-terete white plate produced in front into numerous yellow teeth in five series of twos and threes. Column brownish with a small hastate wing on each side of the stigma and two linear deflexed auricles below it.

Oncidium chrysodipterum, supra.

A remarkably handsome *Oncid* acquired by us at one of the London orchid sales, and which, when it flowered in our houses in the spring of 1891, we were unable to refer to any species known to us. It is very near *Oncidium serratum* and *On. lamelligerum*,



Oncidium chrysodipterum.

from both of which it differs in its petals, crest, and column, but like them it is doubtless of Andean origin. The original plant is now in the fine collection of the Hon. F. L. Ames at North Easton, Massachusetts. The specific name, literally "golden wings," refers to the petals, which are exceptionally bright and attractive.

On. chrysomorphum.

Pseudo-bulbs ovoid, $1\frac{1}{2}$ inches long, compressed, smooth, with very acute edges, di-triphyllous. Leaves linear, sub-acute, 7—9 inches long, coriaceous. Scapes stoutish, erect, 18—21 inches high, paniced from the middle, the branches distichous and alternate, short and curved downwards; bracts spathaceous, sheathing $\frac{1}{2}$ inch long. Flowers numerous,

crowded, $\frac{3}{4}$ inch in diameter; sepals and petals similar and sub-equal, reflexed, spathulate, obtuse, golden yellow; lip lighter in colour than the other segments, oblong, dilated both at the base and at the apex into two roundish lobes; crest nearly oblong, with two teeth in front and two on each side. Column wings obsolete.

Oncidium chrysomorphum, Lindl. Fol. Orch. Oncid. No. 188 (1855). Rehb. in Walp. Ann. VI. p. 811. Id. in Gard. Chron. VIII. (1877), p. 358.

A very distinct species of which we find but little recorded beyond the intimation that it is a native of the Caracas region, and that it was gathered by Purdie in the extreme north of New Granada. It appears to have been first cultivated by the late Serjeant Cox, at Mill Hill, in 1877, flowering in the winter months. We are indebted to Mr. F. W. Moore, of Glasnevin, for materials for description.

On. chrysopyramis.

Pseudo-bulbs oval-oblong, $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long, compressed with acute edges, diphyllous. Leaves linear-ligulate, sub-acuminate, 5—6 inches long. Peduncles slender, arching 18—24 inches long, loosely paniculate, many flowered. Flowers about $\frac{3}{4}$ inch across vertically, of a uniform canary-yellow; upper sepal and petals clawed, oblong, apiculate, concave, keeled behind; lateral sepals free, linear-oblong, falcate, keeled behind; lip panduriform with a deep cleft in the anterior margin; crest with three projecting teeth in front and two bipartite lateral ones between which is a minutely tuberculose cushion. Column wings falcate, two-lobed, bent over the anther and denticulate at the outer edge.

Oncidium chrysopyramis, Rehb. in Bonpl. 1854, May 1. Lindl. Fol. Orch. Oncid. No. 98.

One of Warscewicz's discoveries on the Andes of Ecuador or Southern New Granada about the year 1852, and since occasionally imported with other orchids from the same region. Our description is from a plant that flowered in our houses in June, 1889. It is very near the better known *Oncidium pyramidale*, "from which it differs in having much smaller flowers, a thinner and weaker panicle, and very narrow two-lobed column-wings."*

On. concolor.

Pseudo-bulbs oval-oblong, $1\frac{1}{2}$ —2 inches long, ribbed, di-triphyllous. Leaves lanceolate-ligulate, acute, 6 inches long. Peduncles drooping, as long again as the leaves, usually racemed and many flowered. Flowers about 2 inches across vertically, bright canary-yellow; dorsal sepal and petals elliptic-oblong, acute, the lateral sepals longer, narrower and more

* Lindley, Fol. Orch. Oncid. No. 97.

acute, connate to about half their length; lip clawed, the blade spreading, orbicular or broadly cordate, emarginate; crest bi-lamellate. Column wings tooth-like, ascending.

Oncidium concolor, Hook. *Bot. Mag.* t. 3752 (1840). Lindl. *Fol. Orch. Oncid.* No. 65 (1855). *The Garden*, XIII. (1878), t. 111. Williams' *Orch. Alb. I.* t. 1. *Rev. hort.* 1881, p. 30. *Illus. hort.* s. 3, t. 487. Sander's *Reichenbachia I.* t. 30. *Lindenia V.* t. 205. *On. unguiculatum*, Klotzsch, ex. Lindl. *Fol. Orch. Cyrtorchilum citrinum*, *Bot. Mag.* t. 4454 (1849).

Discovered by Gardner on the Organ Mountains in 1837, and sent by him to the Woburn collection, where it flowered in 1840; it was subsequently gathered by Sellow and Glaziou, both of whom sent



Oncidium concolor.

herbarium specimens to Europe, but it continued to be very rare in European gardens till 1876, in which year we received a consignment of plants from a correspondent at Rio de Janeiro. The drooping racemes of self-coloured flowers of the purest yellow render this species one of the most admired in the genus; its flowering season is April and May.

On. cornigerum.

Pseudo-bulbs sub-cylindric, compressed, 2—3 inches long, monophyllous. Leaves elliptic-oblong, sub-acute, 3—5 or more inches long. Scapes slender, arching or pendulous, 15—24 inches long, pale green dotted with dull crimson, with an acute, striated, closely appressed bract at each joint, much branched along the distal half. Flowers somewhat crowded, about $\frac{3}{4}$ inch in diameter; sepals and petals yellow spotted and barred with red-brown, the dorsal sepal obovate-oblong, concave, bent forward over the column, the lateral sepals oblong, connate to beyond the middle; petals clawed, obovate, obtuse; lip panduriform,

bright yellow, the basal lobes small, horn-like, turned upwards and inwards, the front lobe roundish oblong with crenulate margin; crest bipartite, the posterior part bi-lamellate, the anterior part much tubercled. Column wings spreading, linear-triangular.

Oncidium cornigerum, Lindl. in *Bot. Reg.* t. 1542 (1832). *Id. Gen. et Sp. Orch.* p. 199. (1833). *Id. Fol. Orch. Oncid.* No. 55. *Bot. Mag.* t. 3486. *On. chrysocephala*, Rehb. in *Gard. Chron.* III. s. 3 (1888), p. 72.

First cultivated in 1830 by Dean Herbert, who had received plants from Brazil, one of which he presented to Earl Fitzwilliam, in whose collection at Wentworth Woodhouse it flowered in perfection in 1835, and was then figured in the *Botanical Magazine*. It was subsequently gathered by Miers near Rio de Janeiro, by Gardner on the Serra do Mar, by Weir in 1861—2 in the province of San Paulo while collecting for the Royal Horticultural Society of London, and it has since been occasionally very sparingly imported with other orchids from these localities. The specific name, "horn-bearing," refers to the basal lobes of the labellum.

On. crispum.

Pseudo-bulbs oblong, compressed, 3—4 inches long, brownish ribbed and furrowed on the flattened side, di-triphyllous. Leaves oblong-lanceolate, 6—8 inches long, 1—2 inches broad. Scapes 30—45 inches long, glaucescent, mottled with dull crimson and green, loosely paniculate, rarely racemose. Flowers with all the segments much crisped and undulated, variable in size, 2—3 inches in diameter, bright chestnut-brown sometimes spotted and margined with yellow, and nearly always with a bright yellow spot in front of the crest; sepals clawed, oval-oblong, the lateral two connate to about one-third of their length and hidden by the lip; petals broadly oval or sub-orbicular with a short claw and crenulate margin; lip three-lobed, the basal lobes auriculate, the anterior lobe large, with a broad claw and sub-orbicular blade; crest tri-lamellate, the front lamella much the largest, horn-like, the posterior two multi-dentate. Column wings large, toothed.

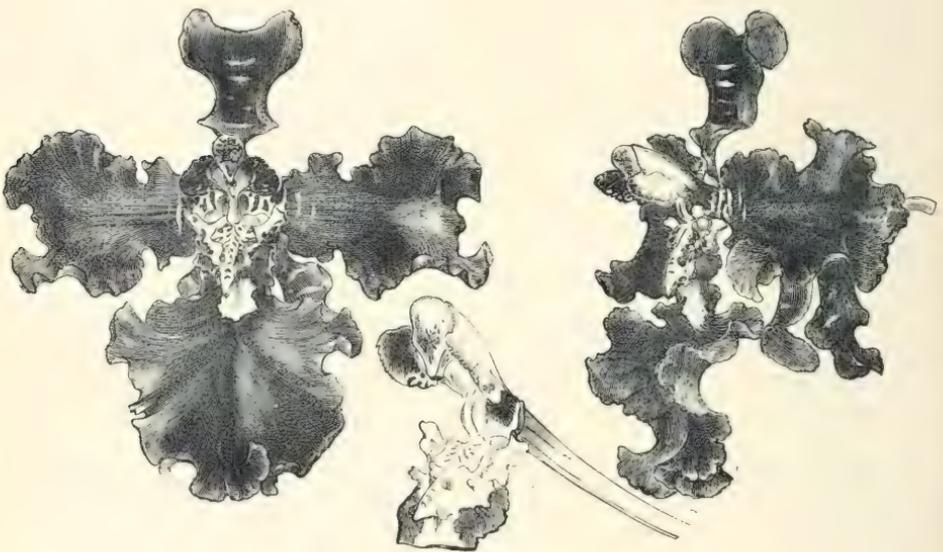
Oncidium crispum, Lodd. *Bot. Cab.* t. 1854 (1832). Lindl. *Gen. et Sp. Orch.* p. 197 (1833). *Id. Bot. Reg.* t. 1920 (1837). *Id. Fol. Orch. Oncid.* No. 161. *Bot. Mag.* t. 3499. Warner's *Sel. Orch. II.* t. 26. Van Houtte's *Fl. des Serres, XXI.* t. 2147—8. *Fl. Mag.* t. 485 (*grandiflorum*). *Gard. Chron.* X. s. 3 (1890), p. 422.

The early history of this superb species is thus briefly sketched by Dr. Lindley:—

"The first notice I had of the existence of this species was the finding in the Herbarium of Sir William Hooker, a drawing and one single dried flower of it which had been sent from the Organ Mountains in Brazil, with a memorandum that from fifty to sixty flowers frequently

grow on a stalk. A small specimen of it shortly after flowered with Messrs. Loddiges, and it has subsequently blossomed in many collections, but never with the vigour that it possesses in the wild state."*

Among the earliest cultivators of *Oncidium crispum* were Mrs. Horsfall and Mr. Richard Harrison, of Liverpool, whose commercial relations with Rio de Janeiro offered facilities for obtaining many of the finest orchids found in its neighbourhood, of some of which they were the first introducers. Since their time this beautiful *Oncid* has been imported by thousands, but only to display its



Oncidium crispum.

splendid inflorescence for a very few times, and, perhaps, in numerous cases, only once, and then to perish, so intractable has it hitherto proved under cultivation. As stated in the above description the flowers vary in size and colour, the most distinct deviation known to us in the last named character being the sub-variety *flavum*, in which the flowers are deep yellow with the central area of each segment paler.

* Bot. Reg. sub. t. 1920. The inferior flowers Dr. Lindley here complains of might have resulted from the exhaustion of the plants during transit, which at that period occupied three times as long as at present.

On. cryptocopis.*

"Pseudo-bulbs lanceolate, much compressed, 4—5 inches long and an inch broad. Leaves a foot long, lanceolate, acute. Panicle 3—5 feet long, much branched, slender, with sheathing, lanceolate, scarious bracts; pedicels flexuous, 3—5 inches long, also bracteate. Flowers 3 inches across the tips of the sepals, pale chestnut with golden crisped margins of the sepals and petals and a broad yellow middle lobe of the lip; upper sepal deltoid-ovate with a short broad claw; lateral sepals parallel, much longer than the upper, with long claws and an obovate cuneate limb; petals ovate-lanceolate with broad claws; lip about half as long as the petals, reflexed; lateral wings small, hatchet-shaped, recurved; middle lobe consisting of a long flat claw and a transversely oblong blade turned completely back; crest tuberculose. Column with two small spreading wings and two subulate decurved horns in front."—*Botanical Magazine*.

Oncidium cryptocopis, Rehb. in Gard. Chron. 1870, p. 827. *Bot. Mag.* t. 5858.

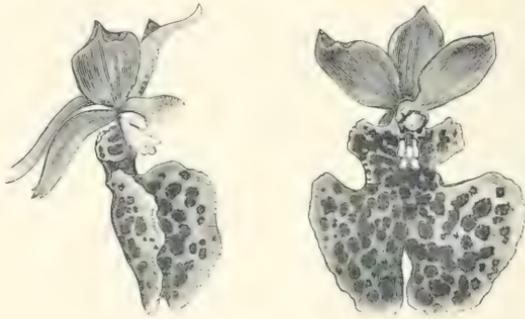
One of the *MICROCHILA* group of *Oncids* imported by Mr. William Bull, of Chelsea, from the Andes of Peru in 1869 along with *Oncidium serratum*, with which it is comparable as regards the size and colour of its flowers, and apparently distinct from that species in the form of its petals and the structure of the labellum which is peculiar. It flowered in May, 1870, in Mr. Bull's nursery, but we find no record of its being in cultivation since. The specific name, from *κρυπτός* (*kruptos*), "hidden," and *κοπίς* (*kopis*), "a dagger," refers to the dagger-like wings below the stigma.

On. cucullatum.

Pseudo-bulbs ovoid, sometimes oval-oblong, $1\frac{1}{2}$ —3 inches long, compressed, mono-diphyllous. Leaves linear-ligulate, acute, 6—8 inches long, complicate at base. Scapes slender, erect or nodding, purplish green, 15—24 inches high, loosely paniced, sometimes racemed along the distal half, 8—12 flowered. Flowers about $1\frac{1}{2}$ inches across vertically, variable in colour; sepals and petals similar, oval-oblong, acute, the lateral sepals concealed by the lip, connate, bifid at the tip, deep chestnut-brown, sometimes greenish or olive-green and not unusually with a narrow yellow margin; lip light rose-purple spotted in various ways with purple-crimson, three-lobed, the side lobes small, roundish, the front lobe large and spreading, transversely oblong, emarginate; crest with two pairs of tubercles and a fifth smaller one between the posterior pair, bright orange-yellow. Column thickish hooded.

* Not seen by us.

Oncidium cucullatum, Lindl. Sert. Orch. sub. t. 21 (1838). Id. Fol. Orch. Oncid. No. 69. Paxt. *Fl. Gard.* III. t. 87 (1852—3). *Belg. Hort.* 1869, p. 337, pl. 19. Van Houtte's *Fl. des Serres*, VIII. t. 835. Id. XXIII. t. 2457. *The Garden*, XXII. (1882), t. 350 (*giganteum*). *Lindenia*, II. t. 81. *Leiochilus sanguinolentus*, Lindl. in Bot. Reg. 1844, misc. 91.*



Oncidium cucullatum.

var.—macrochilum.

Leaves and racemes longer, the latter flexuose and many flowered; lip broader than in all the *cucullatum* forms, wholly purple.

On. cucullatum macrochilum, Lindl. Fol. Orch. Oncid. No. 69 E.

var.—nubigenum.

Plant smaller in all its parts; sepals and petals variable in colour, generally light greenish brown, sometimes with a pale margin; lip narrow at the base with the middle lobe almost sessile, white with a violet spot in front of the three-tubercled crest.

On. cucullatum nubigenum, Lindl. Fol. Orch. Oncid. No. 69 D. *Bot. Mag.* t. 5708. *On. nubigenum*, Lindl. Gen. et Sp. Orch. p. 197 (1833).† *Rehb.* in *Gard. Chron.* 1867, p. 376. *Belg. Hort.* 1869, p. 337.

var.—Phalænopsis.

Pseudo-bulbs somewhat smaller and more ovoid, the leaves narrower, the scapes more slender and generally fewer flowered than in the commoner *cucullatum* forms, and the flowers differently coloured; sepals and petals milk-white barred with deep purple; lip white with slight flush of rose-purple and with some dark purple spots around the crest.‡

On. cucullatum Phalænopsis, supra. *On. Phalænopsis*, *Rehb.* in *Gard. Chron.* 1869, p. 416. *Illus. hort.* 1870, t. 3. *Williams' Orch. Alb.* II. t. 96. *Lindenia* II. t. 123.

* Evidently described from an abnormal form said to have been sent from La Guayra, but which Lindley himself afterwards referred to *Oncidium cucullatum*. The locality too is doubtful.

† It will be seen from our literary references that Lindley's *nubigenum* is an older name for this species than *cucullatum*, or in other words, the var. *nubigenum*, supra, is the typical form. It is usual when one species, or one that was at first assumed to be such, is reduced to a variety of another, for the holder of the two to be retained as the specific name. In this case Lindley, unintentionally perhaps, reversed the usual practice; but as his specific name *cucullatum* is accepted by other eminent orchid authorities, we do not feel justified in disturbing the nomenclature.

‡ The distinction between this and the preceding variety is not very clear; practically it is a difference of colour only, the variety *nubigenum* being intermediate in this respect between *On. cucullatum* and the variety *Phalænopsis*.

sub-vars. (distinguished by colour only).—*andigenum* (Gard. Chron. 1869, p. 416), sepals and petals pale yellow, dotted with purple, lip white heavily blotched with purple; *Dayanum* (Gard. Chron. 1872, p. 539), name only; *olivaceum*, sepals and petals deep olive-brown, lip light rose-purple spotted with deep purple; *spathulatum* (Fol. Orch. Oncid. No. 69 C.), racemes nodding, many flowered, sepals and petals spotted with purple, lip spotted only at the base.

The botanical history of this beautiful Oncid is made up of a number of fragmentary notes dispersed in a very irregular manner throughout the horticultural and botanical literature of the last sixty years, these fragments being in most cases of a very meagre description, and not infrequently contradictory. It is scarcely possible to make a connected narrative out of them, and the best that can be done is to bring them together into a kind of chronological order.



Oncidium cueullatum, var. *Phalenopsis*.

The species first became known to science through Dr. Jamieson, a Scotch botanist, who obtained a professorship in the university of Quito a few years after the Spanish South American colonies had established their independence. In 1831—2 Dr. Jamieson sent dried flowers to Sir W. J. Hooker, which he had gathered from plants growing on the decaying trunks of trees at 11,000—13,000 feet elevation on Asuay, one of the higher eminences of the Ecuadorian Andes, and from these Dr. Lindley described the species in his *Genera and Species of Orchidaceous Plants* under the fanciful name of *nubigenum*, or “cloudborn,” in allusion to the altitude at which the plant was found. Ten years later Linden discovered an *Oncidium* in the forests of Quindiu, on the central Cordillera of New Granada, and sent living plants to Europe, one of which flowered in the

collection of Mr. Thomas Brocklehurst at Macclesfield, in February, 1842, and to which Lindley gave the name of *cucullatum*, in reference to the hooded anther,* and which he subsequently adopted as the type. *Oncidium cucullatum* was afterwards gathered by Schlim, a Belgian collector, at Las Vetas, in the state of Pamplona on the eastern Cordilleras, at 9,000—10,000 feet elevation, and near Ocaña at a somewhat less altitude; by Purdie on the Sierra Nevada of Santa Martha, at 7,500—9,000 feet; by Lehmann on Potaré, in the state of Cauca, at 9,000 feet elevation; and by other collectors in various localities, but always at a considerable elevation.

Some time after its first discovery Jamieson again gathered the original form, the variety *nubigenum* supra, on the western slopes of Pichincha, at 8,000—9,000 feet, and Hartweg and William Lobb found it in the same locality in 1842. The merit of first introducing it to British gardens is due to Messrs. Backhouse, of York, who imported it from Ecuador in 1867—68, and about the same time it was collected for M. Linden's horticultural establishment at Brussels by Gustav Wallis, in whose consignment first appeared the beautiful variety *Phalenopsis*, and another named by Reichenbach *andigenum*. The variety *nubigenum* has since been detected by Lehmann on the western slopes of Chimborazo, at 8,000—10,000 feet elevation.

It is thence evident that *Oncidium cucullatum*, in the collective sense here used, is strictly an alpine plant inhabiting the cooler regions of the Andes from the equator northwards to the Caribbean Sea, and growing under conditions which no available horticultural appliances can approach. It has been imported in great quantities during the last thirty years, and the many plants that have recently flowered in our houses afford ample evidence of the great variability of the species as regards the colour of its flowers, and in a much less degree, some trifling deviations in structure, but in no case sufficient to justify the splitting up of one of the most distinct types of *Oncidium* known into a number of so-called species, all of which are connected by intermediate forms. Of the sub-varieties, those enumerated above have been distinguished by a separate name, but there are many others of equal merit that might be distinguished in like manner for horticultural use.

* This character is not peculiar to this species.

On. curtum.

Pseudo-bulbs oblong, 3 inches long, diphyllous. Leaves ligulate, acute, 6—12 inches long. Scapes 24—36 or more inches long, loosely paniced, many flowered. Flowers 2 inches in diameter; sepals clawed, oval-oblong, obtuse, chestnut-brown more or less barred with bright yellow, the dorsal one concave, the lateral two connate to one-third of their length and hidden by the lip; petals oval-oblong, emarginate, wavy, broader than the sepals, chestnut-brown margined with yellow; lip with two small oblong yellow auricles at the base and a fan-shaped emarginate blade, bright yellow with a broad margined zone of chestnut-brown spots; crest consisting of an erect central rounded plate with two smaller plates behind, all warted, two rounded teeth in front and numerous warts on each side. Column wings small, truncate.

Oncidium curtum, Lindl. in *Bot. Reg.* 1847, t. 68. Id. *Fol. Orch. Oncid.* No. 36.

Introduced by us from the Organ Mountains in Brazil, in 1841—2, through William Lobb, whence it has been sparingly imported since. Like most *Oncids* the species is variable in the colour of its flowers, which sometimes closely resemble those of the much later introduced *Oncidium proctextum*, but from which *On. curtum* may be easily distinguished by the very different crest of the lip and often by its much brighter colours. The specific name *curtum*, “shortened,” refers to the truncate wings of the column.

On. dasytyle.

Pseudo-bulbs about the size of a walnut, compressed, ancipitous and furrowed when old, mono-diphyllous. Leaves linear-lanceolate, sub-acute, 5—6 inches long. Scapes slender, 12—18 inches long, racemose or paniculate, few flowered. Flowers $1\frac{1}{2}$ inches in diameter, the dorsal sepal and petals sub-equal, elliptic-lanceolate, acuminate, pale yellow blotched with red-brown; the lateral sepals connate to the middle, longer than the dorsal one and of a duller colour; lip pale yellow, clawed and auriculate at the base, the blade large, broadly reniform; crest cordiform, two-lobed, blackish crimson. Column wings sub-quadrate, anther beaked.

Oncidium dasytyle, Rehb. in *Gard. Chron.* 1873, pp. 253, 432. *Bot. Mag.* t. 6494.

First introduced by the late Mr. B. S. Williams, of Holloway, who imported it in 1872 from the Organ Mountains along with other well-known *Oncids* from that region. It is one of the prettiest of the winter-flowering species; its dark-coloured crest is peculiar, to which its specific name refers, and which is derived from $\delta\alpha\sigma\upsilon\tilde{\varsigma}$ (*dasus*), “thick,” and $\tau\acute{\upsilon}\lambda\eta$ (*tulè*), “a callosity.”

On. divaricatum.

Pseudo-bulbs sub-orbicular, very much compressed, almost discoid, 1—1½ inches in diameter, monophyllous. Leaves narrowly oblong, 9—12 inches long, very coriaceous. Peduncles dull purple mottled with pale green, 4—6 feet long, much branched, the branches slender, many flowered. Flowers an inch in diameter; sepals and petals clawed, chestnut-brown with a golden yellow blotch at the apex, the sepals obovate, the dorsal one concave, the lateral two divaricate; the petals longer, oblong, obtuse; lip three-lobed, the side lobes the largest, sub-orbicular entire, yellow spotted with chestnut-brown; the intermediate lobe transversely oblong, emarginate, yellow with a chestnut spot in front of the crest; crest cushion-like, four-lobed. Column wings rounded.

Oncidium divaricatum, Lindl. in *Bot. Reg.* t. 1050 (1827). *Id. Gen. et. Sp. Orch.* p. 205 (1833). *Id. Fol. Orch. Oncid.* No. 119. *Pact. Mag. Bot.* III. p. 4 (1837).

One of the first of the Brazilian *Oncids* cultivated in Great Britain, and one of the most tractable under cultivation. It first became known to science in the early part of the present century through the French traveller, Descourtilz, who detected it growing on the trunks of large trees on the Serra das Argoas in the district of Ilha Grande, and at Corcovado near Rio de Janeiro. It was introduced to British gardens by Mr. Heatherly, the British Vice-Consul at Rio de Janeiro, who sent plants to the Horticultural Society of London, one of which flowered for the first time in the Society's garden at Chiswick in October, 1826. It was subsequently imported by Loddiges, Knight and other horticultural firms.

Oncidium divaricatum is one of a group of *Oncids* including four species forming Lindley's sub-section *Pulvinata*, characterised chiefly by the papillose cushion-like crest of the lip. The other three are *On. sphegiferum*, *On. pulvinatum*, and *On. Harrisonianum*. These members of the *Pulvinata* group may thus be distinguished from each other:—

In *On. divaricatum* the crest is distinctly four-lobed, the lateral lobes of the lip flat and entire.

In *On. sphegiferum* the crest is oblong and entire, the side lobes of the lip denticulate.

In *On. pulvinatum* the crest is circular, the side lobes of the lip fimbriate; and generally, the leaves are broader than those of the other three species.

In *On. Harrisonianum* the crest is five-toothed, and the habit and aspect of the plant very different from all the others.

The variability in the colour of the flowers of *Oncidium divaricatum*

was observed when the species was first introduced, one form being wholly brown or coppery red, but which is now rarely seen.

On. euxanthinum.

"Pseudo-bulbs ellipsoid, flattened, 2—3 inches long, diphyllous. Leaves linear-ensiform, acute, 8—10 inches long. Scapes slender, drooping, with a broad, many-flowered panicle longer than the leaves. Flowers about an inch in diameter, bright golden yellow with some red dots on the disk of the lip and bars across the sepals and petals; dorsal sepal obovate, obtuse, arching over the column; lateral sepals united into an obovate bifid body with acute lobes; petals longer than the sepals, oblong undulate; lip shortly clawed, three-lobed, the lateral lobes orbicular, the mid-lobe reniform, much broader than long, with an acute sinus in the anterior margin; crest with several warts in a transverse line and a prominent conical horn and other smaller warts." —*Botanical Magazine*.

Oncidium euxanthinum, Rehb. in Gard. Chron. 1869, p. 1158. *Bot. Mag.* t. 6322.

A very pretty *Oncid*, allied to *Oncidium bifolium*, but distinguished from that species by its larger pseudo-bulbs, broader leaves, panicled inflorescence, and especially by the very different crest of the labellum. It was imported by us from Brazil in 1869, the locality not being communicated by the collector; the plate in the *Botanical Magazine* was drawn from a plant that flowered in our houses in the autumn of 1871. It appears to be now lost to cultivation, but its dwarf habit and bright coloured flowers should cause it to be sought for by collectors.

On. excavatum.

Pseudo-bulbs ovate-oblong, compressed, 3—5 inches long, monophyllous. Leaves linear-ligulate, 12—20 inches long. Scapes stoutish, glaucescent, 2—3 feet long, paniculate, many flowered. Flowers 1½ inches in diameter; sepals undulated, yellow with 2—3 red-brown bars on the basal half, the dorsal one obovate-oblong, the lateral two narrower and free, oval-oblong; petals also undulated, larger than the sepals, obovate-oblong, emarginate, sometimes wholly yellow, sometimes with 1—2 red-brown spots near the base; lip three-lobed, the basal lobes small, oblong, convex, red-brown, the front lobe transversely oblong, emarginate, bright canary-yellow; crest convex, studded with small tubercles arranged in five lines, and with a decurrent shallow plate on each side. Column wings roundish, retuse.

Oncidium excavatum, Lindl. Sert. Orch. sub. t. 25 (1838). Id. Bot. Reg. 1839, misc. No. 150. Id. Paxt. Fl. Gard. I. sub. t. 21. Id. Fol. Orch. *Oncid*, No. 85. *Bot. Mag.* t. 5293. *On. aurosum*, Rehb. in Bonpl. I. 1854 (May). *Illus. hort.* 1870, t. 34. *Lindenia*, V. t. 221.

A very handsome species, first discovered by Matthews, in 1838, at Chachapojas in Northern Peru, and afterwards by Spruce on the Andes of Ecuador, and by Warszewicz near the sources of the Amazon. It flowered in Messrs. Loddiges' nursery at Hackney in 1839, but we find no further record of its being in cultivation till 1862, when it flowered in the collection of the late Mr. Thomas Dawson, at Meadowbank, near Glasgow, who had obtained it at a sale, and on which occasion it was figured in the *Botanical Magazine*. It was again figured in the *Illustration horticola* for 1870, under the name of *Oncidium aurosum*, from plants collected by Gustav Wallis, in



Oncidium excavatum.

1865, in southern Ecuador, and sent by him to M. Linden's horticultural establishment at Brussels. Since that date it has been generally cultivated, and has proved to be very variable in the size and colour of its flowers.

The specific name *excavatum* was suggested to Dr. Lindley "by a deep pit excavated on the under side of the labellum near the base, and only to be seen by looking at the back of the flower and putting aside the two lateral sepals."

On. falcipetalum.

Pseudo-bulbs ovate-oblong, 3—4 inches long, diphyllous. Leaves variable in size, ligulate, or lanceolate-ligulate, acute, 12—15 or more inches long and 1—2 inches broad. Peduncles stoutish, flexuous, several feet long, branched at irregular intervals, each branch bearing 3—5 flowers; bracts oblong, acute, $\frac{1}{2}$ inch long. Flowers $2\frac{1}{2}$ —3 inches in diameter; sepals russet-brown with a narrow yellow margin,

clawed, the dorsal one orbicular, the lateral two ovate, acute; petals much smaller, falcate, acute, the margins much undulated, yellow spotted with brown on the basal half; lip linear, reflexed, purplish brown; crest a narrow ridge, in front of which is a cluster of sharp tubercles. Column with a horn-like wing on each side of the stigma.

Oncidium falcipetalum, Lindl. in Orch. Linden. No. 76 (1846). Id. Fol. Orch. Oncid. No. 7.

One of the most distinct of the *serratum* group of MICROCHILA Oncids; its narrow, sickle-like petals and cluster of sharp-pointed tubercles on the front part of the crest mainly distinguishing it from its congeners. Like them it is a native of the Andes at a considerable elevation, but towards their northern limits only and within the Venezuelan territory. It was detected by Funck near Merida, and afterwards by Wagener and Fendler near Tovar, in the province of Caracas. We find no record of its first introduction into British gardens; it flowered in our houses in the autumn of 1886.

On. *fimbriatum*.

Pseudo-bulbs narrowly oblong, diphyllous. Leaves linear or ligulate-oblong, acute. Scapes 2—3 feet long, drooping, slender, pale green spotted with dull purple, loosely paniculate, many flowered; bracts acute, appressed, $\frac{1}{2}$ inch long, greyish white. Flowers about $\frac{3}{4}$ inch in diameter; sepals and petals spreading, bright yellow-barred and streaked transversely with red, the dorsal sepal ovate-oblong, concave, the lateral two free, linear-oblong, acute; petals clawed, oblong, obtuse; lip sub-pancuriform, the basal lobes auriculate, the front lobe sub-reniform with minutely fimbriate margin, wholly yellow; crest bipartite.

Oncidium fimbriatum, Lindl. Gen. et Sp. Orch. p. 199 (1832). Id. Fol. Orch. Oncid. No. 54. Rehb. in Gard. Chron. XI. (1879), p. 298. Rolfe in Gard. Chron. V. s. 3 (1889), p. 584.

A Brazilian species that became known to Dr. Lindley some time prior to 1832 through a drawing of a single flower in the portfolio of the botanical artist Francis Bauer, and which is now preserved in the British Museum. Nothing more appears to have been heard of it till June, 1878, when Mr. Kramer, of Flotbeck, near Hamburgh, submitted an inflorescence of an *Oncidium* to the late Professor Reichenbach, which he identified as Lindley's *Oncidium fimbriatum*, from a tracing which he had made of Bauer's drawing. We have no evidence of its being in cultivation in British gardens before the spring of 1889, when we received a large panicle loaded with flowers accompanied by a photograph of the plant from Mr. O. O. Wrigley, of Bridge Hall, Bury, Lancashire, which proved to be

this rare species. Both inflorescence and photograph are now in the Herbarium at Kew.

On. flexuosum.

Rhizome ascending, stoutish, clothed with imbricating pale brown scales and emitting dense fascicles of white thread-like roots from below the pseudo-bulbs which are produced at intervals of 1—2 inches. Pseudo-bulbs oval-oblong, $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long, compressed, mono-diphyllous. Leaves linear- or lanceolate-oblong, acute, 4—7 or more inches long. Scapes 24—36 inches long, usually dull purple, paniculate at the extremity, the branches and their ramifications wiry, flexuose, and many flowered. Flowers variable in size, $\frac{3}{4}$ — $1\frac{1}{4}$ inches across vertically, bright yellow with a red-brown blotch at the base of all the segments; sepals and petals minute, similar, obovate-oblong, the lateral sepals connate, bifid at the apex; lip clawed, with two basal auricles and a transversely oblong, emarginate blade; crest bipartite, the posterior half a downy cushion, the anterior half usually 3—5 toothed. Column wings subquadrate, bent forward.

Oncidium flexuosum, Sims in *Bot. Mag.* t. 2203 (1821). Lodd. *Bot. Cab.* No. 424. Lindl. *Gen. et Sp. Orch.* p. 199. Id. *Fol. Orch. Oncid.* No. 81. *Rchb. in Gard. Chron.* 1872, p. 358 (*radiatum*).

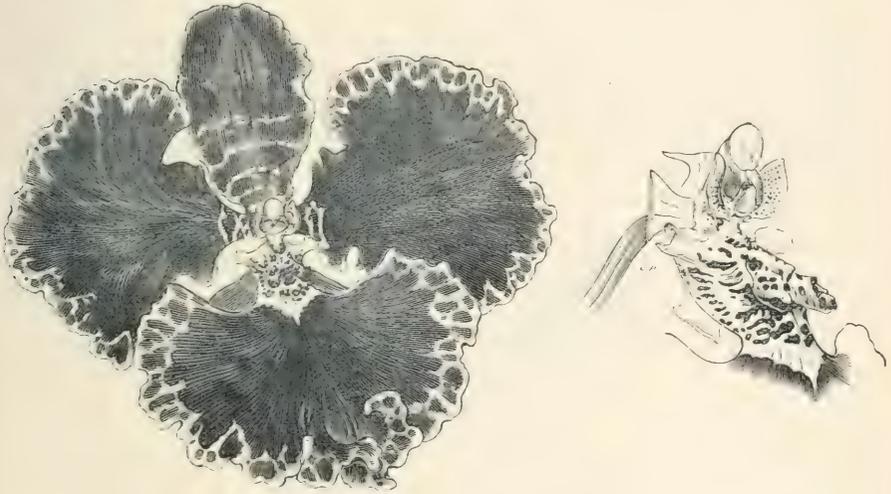
A well-known bright-coloured *Oncid* that has been in cultivation during the greater part of the present century, it having been introduced from Brazil by Messrs. Loddiges about the year 1820. The only localities we find for it are—the Organ Mountains where it was gathered by Gardner, and Bahia where it was collected by Blanchet. *Oncidium flexuosum* is easily distinguished by its creeping rhizome, and the flexuose wiry branches of its inflorescence; it is probably the most easily cultivated species in the genus.

On. Forbesii.

Pseudo-bulbs oblong, 2—3 inches long, compressed, mono-diphyllous. Leaves oblong-ligulate, acute, sometimes mucronate, 6—10 or more inches long. Scapes mottled with dull purple and green, 18—36 inches high, paniced, rarely racemed. Flowers 2— $2\frac{1}{2}$ inches in diameter, all the segments bright chestnut-brown with a narrow golden yellow border; upper sepal broadly oval, the lateral two narrowly oblong, connate to one-third of their length and concealed by the lip; petals clawed, suborbicular, with crisped margin; lip broadly clawed with two, usually bright yellow auricles at the base and a large fan-shaped, two-lobed blade; crest warty, five-lobed. Column wings roundish, purplish violet spotted with red.

Oncidium Forbesii, Hook. *Bot. Mag.* t. 3705 (1839). Lindl. *Fol. Orch. Oncid.* No. 60. Williams' *Orch. Alb. III.* t. 104. *Rchb. in Gard. Chron.* XI. (1870), p. 524, figs. 71 and 72. *Lindenia IV.* t. 164.

One of the handsomest of the genus, and often called from the yellow border of all the floral segments the "gold-laced Oncid." It was discovered by Gardner on the Organ Mountains in 1837,



Oncidium Forbesii.

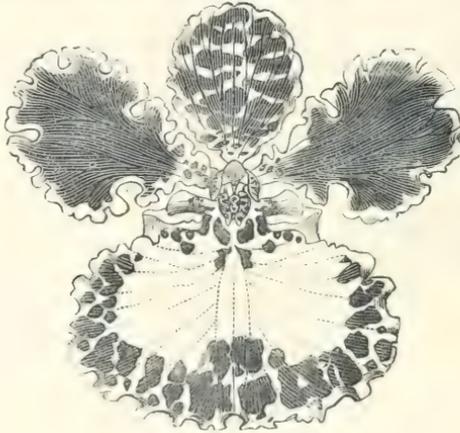
and sent by him to the collection of the Duke of Bedford at Woburn, where it flowered in October of the following year, and after whose gardener, Mr. Forbes, it was named by Sir William Hooker.

On. Gardneri.

Pseudo-bulbs ovoid, 2—3 inches long, much compressed and furrowed longitudinally when old, diphylous. Leaves linear- or oblong-lanceolate, obtuse, 6—9 inches long, dark green above, often purplish beneath. Scapes 18—36 inches long, with a small sheathing pale bract at each joint and at the base of each pedicel, paniced along the distal half, many flowered. Flowers about 2 inches in diameter; sepals clawed, obovate-oblong, brown barred with yellow, the dorsal one concave, the lateral two connate to beyond the middle; petals much larger, shortly clawed, sub-orbicular with undulate margin, chestnut-brown with numerous yellow markings along the margin; lip spreading fan-shaped with two small auricles at the base, bright yellow with a broad zone of red-brown confluent spots next the undulate margin; crest a fleshy triangular body with the apex in front studded with red-brown warts, on each side of the apex are two warty protuberances. Column wings narrow roundish.

Oncidium Gardneri, Lindl. in Lond. Journ. Bot. II. p. 662 (1843). Id. in Bot. Reg. 1847, sub. t. 66. Id. Fol. Orch. Oncid. No. 57. Williams' *Orch. Alb. I.* t. 12. *Fl. Mag.* n.s. t. 401. Gard. Chron. XVI. (1881), p. 86, icon. xyl. *On. flabelliferum*, Paxt. *Mag. Bot. XVI.* p. 65. *On. pretextum*, Morren in *Belg. hort.* 1877, p. 357, not Rehb.

Very little is recorded of the botanical history of this beautiful Oncid. It was discovered by Gardner on the Organ Mountains about the same time as *Oncidium Forbesii*, but it does not seem to have been introduced with it; it was probably first cultivated by Messrs. Rollisson, who received plants from M. Pinel in 1846. Its appearance in British gardens at long intervals and in limited quantity



Oncidium Gardneri.
(From the *Gardeners' Chronicle.*)

would imply that it is a rare plant in its native country; it was dedicated to its discoverer by Dr. Lindley.* Very near *On. Gardneri* and probably still more rare is *On. amictum*, figured in the *Botanical Register* for 1847; this fine species had been introduced a short time previously by Messrs. Loddiges; it is here mentioned with the view of preserving it from oblivion.

On. graminifolium.

"Pseudo-bulbs ovoid, compressed, 2—3 inches long, diphyllous. Leaves grass-like, linear-lanceolate, acute, 7—9 inches long. Scapes slender, flexuose, 3—5 feet long, loosely paniced, many flowered. Flowers $1\frac{1}{2}$ —2 inches across vertically; sepals and petals similar and sub-equal, the lateral sepals free and spreading, ovate-oblong, acuminate, yellow blotched with chocolate-brown; lip bright yellow, scarcely lobed and somewhat unguiculate, broadly obovate with a deep

*See Part VI. Cœlogyne, p. 42.

cleft in front and with an obscurely crenulate margin; crest an elevated keeled ridge with three acute lobes. Column wings roundish."

—*Botanical Magazine*.

Oncidium graminifolium, Lindl. *Sert. Orch. sub. t. 48* (1838). *Id. Fol. Orch. Oncid. No. 110*. *On. filipes*, Lindl. *Sert. Orch. sub. t. 48*. *On. Wrayae*, Hook. *Bot. Mag. t. 3854* (1841). *Cyrtochilum filipes*, Lindl. *Bot. Reg. 1841, t. 59*.

A distinct but somewhat variable species that has probably not been seen in British collections for some years past, although from the many localities in which it has been gathered it cannot be assumed to be a rare species, and may therefore be expected to appear at any time among importations of Central American *Oncids*. It was originally sent by Mr. G. Ure Skinner from Guatemala to Mr. Bateman, and subsequently to the Horticultural Society of London by Hartweg, who found it on the mountains of Oaxaca, at 8,000—9,000 feet elevation; it was afterwards gathered by Galeotti at San Pedro, Nolasco, Talea, and other places in southern Mexico.

On. hæmatochilum.

Pseudo-bulbs none. Leaves oblong, acute, 9—12 inches long, very leathery, dull green spotted with reddish brown. Scapes dull purplish red, 15—24 inches long, paniced above, many flowered. Flowers 2 inches in diameter; sepals and petals clawed, yellow-green heavily blotched with chestnut-brown; the dorsal sepal sub-orbicular, the lateral two free, oblong; petals obovate-oblong, undulate: lip broadly clawed with two oblong auricles at the base, the blade transversely oblong, emarginate; the claw, auricles and crest dark rose-purple, the blade sanguineous red with a yellow margin spotted with red; crest five-partite, of which the middle one is a raised sub-triangular plate, the others much tuberculated. Column wings kidney-shaped, bent downwards, rose-purple.

Oncidium hæmatochilum, Lindl. in *Paxt. Fl. Gard. I. t. 6* (1850). *Id. Fol. Orch. Oncid. No. 182*. *Williams' Orch. Alb. I. t. 32*.

First imported in 1847 by Messrs. Loddiges from New Granada, it is said, and since that date it has appeared at intervals in various orchid collections in Great Britain; its habitat is, however, virtually unknown to science. Its nearest affinity is *Oncidium Lanceanum*, from which the differently shaped crest of the labellum chiefly distinguishes it. The specific name is derived from *αἷμα*, "blood," and *χῆλος*, "a lip."

On. Harrisonianum.

Pseudo-bulbs orbicular, generally compressed and disk-like, about an inch in diameter, monophyllous. Leaves linear-oblong, 3—6 inches long, recurved, fleshy, glaucous green densely spotted with grey. Scapes slender,

about a foot long, paniced beyond the middle. Flowers numerous and somewhat crowded, $\frac{3}{4}$ inch in diameter; sepals and petals oblong or obovate-oblong, bright yellow blotched with red, the lateral sepals free; lip three-lobed, the basal lobes auriculate, spotted with red, the front lobe clawed, transversely oblong, wholly yellow; crest consisting of five erect teeth, of which the four outside ones are roundish, the central one much narrower and horn-like. Column wings deltoid.

Oncidium Harrisonianum, Lindl. Gen. et Sp. Orch. p. 202 (1832). Id. in *Bot. Reg.* t. 1569 (1833). Id. *Fol. Orch. Oncid.* No. 120. *On. pallidum*, Lindl. in *Bot. Reg.* 1840, misc. No. 108.

Discovered on the Organ Mountains by Mr. William Harrison, and sent by him to his relative, Mrs. Arnold Harrison, of Liverpool, in whose collection it flowered in October, 1832. It was subsequently found by Martius on the Serra de Piedade, in the province of Minas Geraes. It is a dwarf species with bright flowers, easily distinguished by its glaucous pseudo-bulbs and recurved leaves, and especially by the remarkable crest of its labellum.

On. hastatum.

Pseudo-bulbs ovoid, 3—4 inches long, compressed ancipitous, usually with 2—3 shallow ridges on each of the flattened sides, mono-diphyllous. Leaves oblong-lanceolate, 6—9 inches long. Scapes pale green, sometimes mottled with dull crimson, 4—5 feet long, paniculate, with short distant branches each bearing 3—4 or more flowers. Flowers $1\frac{1}{2}$ inches in diameter; sepals and petals stellate, lanceolate, acute, chocolate-brown bordered and barred with light yellow-green; lip three-lobed, the lateral lobes white or light yellow, the intermediate lobe halberd-shaped, claret-red passing into yellow-green at the apex; crest consisting of two parallel keels terminating in two teeth and with two smaller lateral teeth. Column wings rounded, white.

Oncidium hastatum, Lindl. in *Pact. Fl. Gard.* I. p. 5 (1851). Id. *Fol. Orch. Oncid.* No. 192. *On. stelligerum*, Rehb. in *Gard. Chron.* 1873, p. 1398. *Odontoglossum hastatum*, Batem. *Orch. Mex. et Guat.* t. 20 (1843). *Od. phyllochilum*, Morren in *Ann. Gand.* t. 271.

sub-vars.—*atratum* (*Fol. Orch. Oncid.* No. 192 B.) lip claret-red; *flavescens* (Id. No. 182 A), lip straw-yellow; *M. Roesl's* (*Gard. Chron.* VI. (1876), p. 36), side lobes of lip pale yellow, the middle lobe rose-pink; *Mr. Wilson's*, side lobes of lip white, the middle lobe rose-pink bordered with white.

Oncidium hastatum was first introduced from Mexico, in 1837, by Messrs. Loddiges, from whom Mr. Bateman obtained materials for figuring and description in his *Orchidaceæ of Mexico and Guatemala*, which he completed in 1843. Very little is recorded of it during the forty years that followed its introduction; it is incidentally

noticed by Dr. Lindley in Paxton's *Flower Garden* for 1851, on the occasion of its being figured by M. Morren in a Belgian periodical, under the name of *Odontoglossum phyllochilum*, adding that "it is an old inhabitant of English gardens, where it has long been known under the name of *Oncidium hastatum*." It continued to be very rare in British gardens till it was imported in quantity by Messrs. Low and Co. in 1875, and about the same time a large number of plants were sent to Europe by Roezl, who collected them in the neighbourhood of Colima near the Pacific coast, where this orchid is very abundant.

The aspect of *Oncidium hastatum* when in flower is remarkable; its long loose panicles over which its star-like flowers are not very thickly scattered are made attractive by the surprising variety of colours, some of strong contrast, to be seen in each flower. We know of no orchid in which this peculiarity is more apparent.

On. heteranthum.

Pseudo-bulbs ovoid, 2 inches long, much compressed, smooth and ancipitous, diphyllous. Leaves linear, acute, 3—5 inches long. Scape 3—4 feet long, branched almost from the base, the branches 3—5 inches long, the lower ones with a slender zigzag rachis and a short secondary branch from each node. Flowers numerous, but all aborted except the terminal one on each primary branch, the aborted flowers consisting of five filiform, reflexed whitish segments, the perfect flowers $\frac{3}{4}$ inch in diameter; sepals and petals cream-white with two—three broad brown bars, the sepals linear-oblong, the petals broader, oval-oblong; lip somewhat lyre-shaped, constricted near the truncate apex, the basal part red-brown, the apical part yellow; crest consisting of about nine tubercles arranged in three transverse rows of two, four, and three. Column hooded.

Oncidium heteranthum, Poeppig et Endl. Nov. Gen. et Sp. I. p. 34, t. 60, ex Lindl. Fol. Orch. Oncid. No. 187 (1855).

A curious species first detected by the German botanist, Poeppig, on the Andes of Bolivia more than half a century ago, and where it was shortly afterwards gathered by Matthews. As will be seen from the above description, the terminal flowers of the primary branches of the panicle only are perfect, all the others being reduced to thread-like segments longer than the organs they represent. This peculiarity also occurs in a more irregular manner in *Oncidium abortivum*, a native of Caracas.

We are indebted to Mr. O. O. Wrigley, of Bridge Hall, Bury, Lancashire, for materials for description.

On. hians.

Pseudo-bulbs about the size of a hazel nut, slightly compressed and ancipitous, monophyllous. Leaves varying from oval to linear-oblong, acute, 1—2 inches long, leathery and slightly glaucous. Scapes slender, almost filiform, purplish, 9 or more inches long, few flowered. Flowers of peculiar structure and appearance, about $\frac{1}{2}$ inch in diameter; sepals and petals quite uniform, narrowly oblong, red-brown with a yellow margin; lip obscurely lobed, linear-spathulate, emarginate, yellow with some red-brown spots; crest white, very large in proportion to the size of the lip, four-lobed, erect. Column wings large, sub-quadrate, white.

Oncidium hians, Lindl. in Bot. Reg. 1838, misc. No. 124. Id. Fol. Orch. Oncid. No. 122. Regel's *Gartenfl.* 1888, t. 1250.

One of the most curious species of *Oncidium* that has ever come under our notice, although not one that will receive much favour from amateurs. The structure of the crest is peculiar, and which Dr. Lindley not inaptly likened to the four fingers of the hand hollowed out and closed together; this extraordinary organ is as long as the column and parallel with it, the two together having the fanciful resemblance of a gaping mouth which suggested the specific name.* It was first introduced in 1838 from the vicinity of the gold mines in Brazil (Ouro Preto?) by Messrs. Rollisson of Tooting, but it seems to have been lost to cultivation for many years. It was sent to the Imperial Botanic Garden at St. Petersburg in 1887 by Lietze from Brazil, and since that date it has reappeared in British gardens. Mr. James O'Brien, of Harrow, kindly sent us materials for description.

On. hyphaematicum.

Pseudo-bulbs oblong, compressed, 3—4 inches long, monophyllous. Leaves about a foot long, ligulate-lanceolate, complicate at base. Scapes 4—5 feet long, much branched, pale purple below the branches, with a whitish sheathing bract at each joint. Flowers numerous, $1\frac{1}{2}$ inches in

* In this case the crest of the labellum has, without doubt, been developed at the expense of the front lobe, which is reduced to a very narrow blade. Its importance in the economy of the plant is, however, evident; for an insect visiting the flower would be more likely to alight on the prominent crest than on any other organ as the easiest, if not the only means of approach to the base of the labellum where honey would be secreted. In returning it could scarcely fail to touch the sensitive rostellum, and carry away the pollinia which the insect on alighting on another flower in the same way would certainly deposit on its stigma, and thence its fertilisation would be effected. An insect less than the common house-fly would be sufficient to accomplish this.

diameter; sepals and petals oblong, acute, much undulated, red-brown tipped with yellow; lip with a broad claw and broadly reniform, apiculate blade, bright canary-yellow stained with red-purple beneath; crest with five keels, of which the outside two are the shortest. Column pale yellow, with a hatchet-shaped pale wing on each side of the stigma.

Oncidium hyphaematicum, Rchb. in Gard. Chron. 1869, p. 814. Regel's *Gartenfl.* 1871, t. 676.

A handsome species introduced in 1867 from Ecuador by Messrs. Backhouse, of York, but now quite rare if not lost to cultivation. The specific name is peculiar and refers to the colour of the flowers on the outside, from *ὑφαιμάτικός*, "covered with blood."

On. incurvum.

Pseudo-bulbs ovoid, 3—4 inches long, compressed with 3—5 elevated ribs on the flattened sides, di-triphyllous. Leaves linear-ligulate, acute, 12—15 inches long. Scapes 3—5 feet long, paniced, the branches distichous and alternate, gradually smaller upwards, each branch loosely racemose. Flowers an inch in diameter; sepals and petals linear-lanceolate, undulate, rose-pink tipped and spotted with white; lip three-lobed, the lateral lobes small, roundish oblong, pink and white, the front lobe clawed, spreading, sub-rotund, apiculate, the claw pink, the blade white; crest yellow, five-toothed, the middle tooth much the largest. Column wings narrow, white; anther not beaked.

Oncidium incurvum, Barker in Bot. Reg. 1840, misc. No. 174. *Id.* 1845, t. 64. Batem. *Orch. Mex. et Guat.* t. 29 (1843). *Bot. Mag.* t. 4824. *Illus. hort.* 1855, t. 49. Lindl. *Fol. Orch. Oncid.* No. 72.

sub-var.—*album*, flowers wholly white with the exception of the yellow crest of the labellum.

Originally introduced from Mexico by Mr. George Barker, of Birmingham, in whose collection at Springfield it flowered for the first time in this country in 1840. It was collected by Ross in the province of Oaxaca, and subsequently by Galeotti at Talea in the same province, at an elevation of 4,000—5,000 feet. The specific name was given by Mr. Barker in reference to the tendency of the petals to curve inwards when the flowers first open, the colour of which is unusual in the genus and comparable with that of *Oncidium ornithorhynchum*.

On. insculptum.

Pseudo-bulbs ovoid, compressed, smooth, 3—5 inches long, 1½—2 inches broad, diphyllous. Leaves ensiform, 12—18 inches long, complicate at base. Scapes 7—10 or more feet long, pale brownish green, flexuose paniculate along the distal half, the branches distant, short, and few

flowered. Flowers $1\frac{1}{2}$ inches in diameter, sepia-brown with a metallic lustre, the sepals and petals with a narrow straw-yellow margin, the crest also straw-yellow but sometimes white; sepals and petals clawed, the margin crisped and undulated; dorsal sepal orbicular, the lateral two oval-oblong; petals broadly oval; lip narrowly oblong with the lateral margins revolute and the apex reflexed; there are two curved auricles at the base below the crest, which is a thickened triquetral plate toothed in front. Column wings very narrow.

Oncidium insculptum, Rehb. in Gard. Chron. 1872, p. 1035.

A remarkable species introduced by Messrs. Backhouse from Ecuador, which flowered for the first time in this country in the collection of the late Mr. John Day, at Tottenham, in 1872. The labellum is very peculiar both in form and colour; the side lobes are small and reflexed so as not to be visible from the front; the middle lobe is covered with numerous warts, and its reflexed apex is of a greyish blue colour, a tint not to be seen in any other species of *Oncidium* yet introduced; the prominent crest somewhat resembles a Roman nose. We are indebted to the Royal Gardens at Kew for materials for description.

On. Jonesianum.

Pseudo-bulbs none. Leaves as in *Oncidium Cebolleta*, from which this species cannot be distinguished when not in flower. Peduncles 15–20 inches long, pale green mottled with purple, racemose, 10–15 flowered. Flowers 2–3 inches in diameter; sepals and petals obovate-oblong, undulate, yellowish white spotted with chestnut-brown; lip clawed with two yellow and red auricles at the base of the claw, the blade transversely oblong with a deep sinus in the anterior margin, undulate, white with some red spots in front of the crest which consists of a broad central ridge with lateral processes at each end much tubercled. Column wings oblong, white dotted with red.

Oncidium Jonesianum, Rehb. in Gard. Chron. XX. (1883), p. 781. *Bot. Mag.* t. 6982. Williams' *Orch. Alb.* IV. t. 183. *The Garden*, XXXI. (1887), t. 583. *Lindenia* II. t. 72. Godefroy's *Orchidophile*, 1886, p. 50. Regel's *Gartenfl.* 1888, t. 1272.

sub-vars.—*flavens* (*Orch. Alb.* VIII. t. 360), sepals and petals pale yellowish green spotted with yellow, lip wholly white; *phæanthum* (*Reichenbachia* I. t. 21), sepals and petals reddish brown, the front lobe of the lip wholly white.

By far the handsomest of the small group of Oncids (TERETIFOLIA) to which it belongs, and indeed one of the most attractive in the genus. It was introduced by Mr. Horsman, of Colchester, in 1883 through M. Saint Leger, a Brazilian plant collector of French

origin, who discovered it in 1878 in northern Paraguay, about 60 miles south of the river Apa which separates that country from the Brazilian province of Parana, and afterwards imported from the same region by Messrs. Sander and Co. It was dedicated by the late Professor Reichenbach to the Rev. Morgan Jones, "an enthusiastic lover of orchids." Among the sub-varieties, of which there are many, *phæanthum* is a very distinct one which occurred among the plants acquired by Sir Trevor Lawrence, Bart. No *Oncidium* has been received in our time with greater applause than *Oncidium Jonesianum*, and with none has the attempted culture more signally failed.

On. *Kramerianum*.

Pseudo-bulbs orbicular, compressed, 1—1½ inches in diameter, rugose, monophyllous. Leaves elliptic-oblong, 6—9 or more inches long, 2—2½ inches broad, deep green mottled with blackish green above, spotted with dull purple beneath. Scapes slender, terete, 20—30 or more inches long, jointed at intervals of 1½—2 inches, the nodes swollen, the internodes sheathed to one-third of their length by pale brown, acute bracts. Flowers several, produced singly by successive elongations of the peduncle from the joint immediately below the ovary (as in *Oncidium Papilio*). Dorsal sepal and petals similar, erect,* linear-spathulate, 2—2½ inches long, undulate towards the apex, reddish brown; lateral sepals oval-oblong with serrulate, undulate margin, deflexed, orange-red mottled with golden yellow; lip sub-pandurate, the lateral lobes rotund, yellow spotted with red-brown, the front lobe transversely oblong with a sinus in the anterior margin, bright canary-yellow bordered with red; crest prominent with two basal and three front lobes, deep bronzy purple. Column with two horizontal plate-like wings beneath the stigma, and two cirri above terminating in a blackish gland.

Oncidium Kramerianum, Rehb. *Xen. Orch. I.* p. 80, t. 33 (1855). *Fl. Mag.* 1870, t. 465. Van Houtte's *Fl. des Serres XIX.* t. 1956. *Belg. hort.* 1874, p. 258. *Lindley VI.* t. 246. De Puydt, *Les Orch.* t. 31. *On. Papilio Kramerianum*, Lindl. *Fol. Orch.* *Oncid.* No. 197 (1855). Jennings' *Orch.* t. 11. *On. nodosum*, Regel's *Gartenfl.* 1880, t. 1018 (*papilioniforme*).

This remarkable *Oncidium* was originally discovered by Warszewicz on the slopes of Chimborazo in Ecuador, at 3,000 feet elevation, about the year 1852, and was shortly afterwards introduced by him to the garden of Herr Jenisch at Flotbeck Park near Hamburg, where it flowered in 1854, and after whose gardener, Kramer, it is named. It continued to be very rare in European gardens until its discovery

* When the flowers first expand, but after a few days the petals are often deflexed at a considerable angle from the dorsal sepal.

in other localities on the Andes of Ecuador and New Granada; in the last named country it has been found on all the three Cordilleras at 1,000—3,000 feet elevation growing on old trees more or less exposed to direct sunlight.



Oncidium Kramerianum.

The flowers of *Oncidium Kramerianum* much resemble those of the well-known "Butterfly Orchid" *On. Papilio*, the peculiar structure of which we have pointed out under that species, and from which *On. Kramerianum* may be chiefly distinguished by the following characters which, so far as our observations have extended, are tolerably

constant. In *On. Kramerianum* the pseudo-bulbs are more orbicular and often smaller, the leaves shorter and less profusely spotted; the peduncles are shorter with the nodes at shorter intervals, not flattened and ancipitous above. The flowers are generally a little smaller with the upper sepal and petals shorter and differently coloured; the claw or isthmus of the front lobe of the lip is shorter and the blade is of a brighter colour than in *On. Papilio*.

On. lamelligerum.

Pseudo-bulbs elongate-ovate or flagon-shaped, 4–6 inches long, di-phyllous. Leaves linear-ligulate, acuminate, 15–20 or more inches long. Scapes 5–7 or more feet long, flexuose, distantly branched, many flowered. Flowers 3 inches across vertically; sepals clawed, light brown, the upper one sub-orbicular with crisped yellow margin; the lateral two divergent, longer than the upper one, ovate-oblong, obtuse, keeled behind and more or less incurved; petals clawed, ovate-oblong, sub-acute, much crisped towards the apex, the basal half light brown with some narrow, transverse, yellow streaks, the apical area light yellow; lip linear-oblong, acute, light yellow stained with pale purple, the basal lobes oblong, denticulate, concave, purple; crest white, consisting of an acute edged median plate with two lateral processes at each end and with a few small teeth between them. Column wings hatchet-shaped, purple.

Oncidium lamelligerum, Rehb. in Gard. Chron. VI. (1876), p. 808. Id. X. (1878), p. 684. Williams' *Orch. Alb.* VII. t. 315. *Lindenia*, VI. t. 278.

Discovered by Edward Kladoch in Ecuador in 1875–6, and introduced to European gardens shortly afterwards. It flowered for the first time in this country in the autumn of 1878, in the collection of Mr. Charles Dorman, at The Firs, Sydenham; it has since flowered in several collections, the flowers in some instances showing slight deviations in colour from the first introduced type. For materials for description we are indebted to Mr. Charles Winn, of Selly Hill, Birmingham, and to Messrs. Charlesworth and Shuttleworth, of Bradford and Clapham.

On. Lanceanum.

Pseudo-bulbs none. Leaves from a stoutish rhizome, elliptic-oblong, 12–18 inches long and 3–5 inches broad, erect, coriaceous, deep dull green more or less spotted with purple. Scapes from the base of the latest formed leaves and longer than them, erect, paniced above. Flowers numerous, 2–2½ inches in diameter, very fragrant; sepals and petals similar, oval-oblong, obtuse, yellow or yellow-green much spotted with chocolate-brown; lip usually dark purple or rose-purple, less frequently with the front lobe white, three-lobed, the side lobes triangular-oblong,

the intermediate lobe with a broad claw and transversely oblong blade; crest an elevated fleshy plate that is obscurely bi-lamellate behind. Column wings oblong, oblique, purple.

Oncidium Lanceanum, Lindl. in *Trans. Hort. Soc. n.s. II.* p. 100, t. 7 (1836). Id. in *Bot. Reg. XXII.* (1836), t. 1887. Id. *Fol. Orch. Oncid.* No. 133. *Paxt. Mag. Bot. IV.* p. 169. Knowles and Weste. *Bot. Cab.* t. 79. De Puydt, *Les Orch.* t. 32. Van Houtte's *Fl. des Serres, XVIII.* t. 1842—3. *Gard. Chron. XXI.* (1884), p. 609, with fig. *Williams' Orch. Alb. III.* t. 129 (*Louvrexianum*) *Lindenia, I.* t. 16 (*superbum*). *The Garden, XXIX.* (1886), t. 539. Sander's *Reichenbachia, II.* t. 73.



Oncidium Lanceanum.

(From the *Gardeners' Chronicle*.)

First introduced from Surinam (Dutch Guiana) in 1834 by Mr. John Henry Lance, who communicated to Dr. Lindley the following account of it, which has been frequently transcribed into the different periodicals where this *Oncid* is figured, but which is still the best extant:—

“The first specimen of this splendid epiphyte I discovered was growing on the trunk of a large tamarind tree in a noble avenue of these trees close to the Government House in Surinam. I afterwards found a great number of plants in different parts of the colony; they were generally attached to the stems or branches of the Tamarind,* the Sapodilla,† or

* The name of Tamarind is given in different tropical countries to various species of Leguminous trees belonging chiefly to the genera *Acacia*, *Inga*, *Dialium* and *Pithecolobium*.

† *Sapota Achras*.

the Calabash trees,* appearing to prefer those to any other; however, on being tied to the branches of the Orange, the Soursop,† the Mammee,‡ and even the *Brugmansia arborea*, it grew well upon them all and produced vigorous stems with upwards of twenty blossoms on each stem. The scent is extremely fragrant and is retained after the flower is dried, only becoming fainter and more of a spicy odour than when fresh. The plant remains in full beauty ten or twelve days, a long period in that climate; and I found that it always required a shady situation and a living stem to grow upon, without which it would not produce its flowers in the highest perfection.”§

It flowered for the first time in this country in Messrs. Loddiges' nursery shortly after its introduction, and not long afterwards in the Horticultural Society's garden at Chiswick, in the orchid collections at Chatsworth, Wentworth, and other places. *Oncidium Lanceanum* is not confined to Surinam; it was found by the brothers Schomburgk in many places in British Guiana, and we have seen an herbarium specimen from that colony gathered by Mr. Jenman, Curator of the Botanic Garden at Georgetown.

On. Leopoldianum.||

“Vegetative organs not seen. Panicle very long, branching, many flowered. Bracts broadly ovate, acute, $\frac{1}{3}$ inch long. Flowers about $1\frac{3}{4}$ inches in diameter; sepals shortly unguiculate, the dorsal one broadly elliptic, obtuse; the lateral two elliptic-ovate, obtuse; petals elliptic-ovate, sub-acute, a little shorter and narrower than the lateral sepals; lip fleshy, trulliform, slightly three-lobed, sub-acute, the basal lobes rounded; crest consisting of three short fleshy parallel plates, the central one being higher than the other. Column wings rounded and fleshy.”
—R. A. Rolfe in Gard. Chron. VIII. s. 3 (1890), p. 556.

Oncidium Leopoldianum, Rolfe in Gard. Chron. loc. cit. *Lindenia*, VI. t. 274.

“This is a very handsome *Oncidium*, recently introduced by Messrs. Linden, L' Horticulture Internationale of Brussels, from the Andes of South America, and dedicated to His Majesty Leopold II., King of the Belgians. Its nearest ally is *Oncidium corynephorum*, Lindl., a fine species discovered by Matthews in Peru, in 1838, and known only by dried specimens.”

On. leucochilum.

Pseudo-bulbs oval-oblong, $3\frac{1}{2}$ —5 inches long, much compressed with 2—3 prominent ribs on the flattened sides, diphyllous. Leaves ligulate,

* *Crescentia Cujete*.

† *Anona muricata*.

‡ *Mammea americana*.

§ Trans. of Hort. Soc. loc. cit. supra.

|| Not seen by us.

acute, 8—12 inches long. Scapes 5—7 feet long, branched almost from the base, the branches slender, distant, gradually shortening upwards. Flowers numerous, $1\frac{1}{2}$ inches in diameter; sepals and petals similar and sub-equal, elliptic-oblong, acute, greenish brown barred with light yellow-green; lip white, three-lobed, the side lobes small, oblong, obtuse, the intermediate lobe broadly clawed, transversely oblong, emarginate; crest a narrow raised plate with two minute teeth on each side, terminating in one long erect tooth and two smaller horizontal ones in front. Column wings hatchet-shaped, rose-pink, the face below the stigma bright yellow.

Oncidium leucochilum, Batem. in Bot. Reg. sub. t. 1920 (1837). *Id. Orch. Mex. et Guat.* t. 1 (1840). *Pact. Mag. Bot.* VII. p. 241. Lindl. *Fol. Orch. Oncid.* No. 167. Regel's *Gartenfl.* 1873, t. 763 (speciosum). Rehb. in *Gard. Chron.* 1873, p. 978 (Dawsonianum). *Cyrtochilum leucochilum*, Planchon in Van Houtte's *Fl. des Serres*, V. t. 522 (1849). *Belg. hort.* 1885, p. 287.

Originally discovered on the mountains of Guatemala in 1835 by Mr. G. Ure Skinner, who sent plants to Mr. Bateman at Kuypersley, where it flowered for the first time in this country in the autumn of the following year. Three years afterwards it was detected by Hartweg, near Malacotan, in southern Mexico, and a little later it was imported from that country by Mr. H. Bunney, of the Kingsland Nursery and subsequently by other horticultural firms. On account of the remarkable combination of colours observable in its flowers, *Oncidium leucochilum* is justly regarded as one of the most attractive of the genus. Many variations in colour have appeared in different gardens, but none of them sufficiently distinct to require separate notice; in all of them the lip when first open is white, a character which suggested the specific name λευκός, "white," and χῆλος, "a lip."

On. Lietzei.

Pseudo-bulbs sub-cylindric, compressed, 3—5 inches long, invested to half their length by whitish membranous sheaths. Apical leaves two, oblong-lanceolate, acute, 6—8 inches long. Scapes slender, 30—36 inches long, dull purple mottled with white below, paniced above. Flowers numerous, not fully expanding, bright red-brown sometimes spotted with yellow; upper sepal obovate-oblong, concave, the lateral two connate into a narrow oblong blade bidentate at the apex; petals nearly equal and similar to the upper sepal, with undulate margin; lip broadly obovate-oblong with two basal linear reflexed auricles, and a fleshy tuberculose crest on the disk in front of which are two erect teeth. Column wings oblong, obtuse, sub-falcate, white.

Oncidium Lietzei, Regel's *Gartenfl.* 1881, t. 1044. *Id.* 1887, t. 1279 (aureo-maculatum).

This species, if species it is, was first described by Dr. Regel in the *Gartenflora* for 1881 from plants sent to the Imperial Botanic Garden at St. Petersburg from Brazil by Lietze. A variety is figured in the *Gartenflora* of 1887 under the name of *aureo-maculatum* which differs from the type in the floral segments being spotted with yellow; a third variety named *bicolor* is also mentioned. Dr. Regel compares *Oncidium Lietzei* with *On. amictum*, Lindl., figured in the *Botanical Register* for 1847 which we have mentioned under *On. Gardneri*, but it is much nearer *On. pubes*, so near indeed that, when more ample materials for comparison are available, it may hereafter be reduced to a variety of that species. Our description was taken in the Spring of 1890 from a plant in the collection of Mr. F. G. Tautz at Hammersmith, since dispersed.

On. Limminghei.

Pseudo-bulbs roundish, compressed, $\frac{3}{4}$ inch in diameter, rugose, monophyllous. Leaves sessile, ovate, oblique, acute, 1—1 $\frac{1}{2}$ inches long, dull green speckled with crimson. Peduncles filiform, 4—5 or more inches long, bearing 3—5 flowers that expand in succession, each flower 1 $\frac{1}{2}$ inches in diameter; dorsal sepal and petals similar and equal, oval, obtuse, slightly undulated, tawny brown with a paler margin; the lateral sepals smaller than the dorsal one, with which they are united at their base, light yellow barred with red-brown; lip with two rounded basal auricles that are yellow spotted with red; the blade transversely oblong, emarginate, bright yellow with some red spots near the anterior margin; crest an elevated plate with two smaller parallel lamellæ behind. Column wings bipartite, pectinate, the superior part the smallest and incurved.

Oncidium Limminghei, Morren in *Belg. hort.* 1856, p. 353. Lindl. *Fol. Orch.* Oncid. No. 198. Van Houtte's *Fl. des Serres*, XVIII. t. 1827. Rehb. in *Gard. Chron.* 1868, p. 1114. *Lindenia*, I. t. 20.

A very interesting species that first became known to science and to horticulture through the late Professor Morren, of Liège. Plants were sent to Belgium from Caracas,* by the Dutch Consul, M. Van Lousberghe, one of which flowered in the Botanic Garden at Liège, in August, 1855, whence it was communicated to Dr. Lindley by Professor Morren in time for insertion in the Monograph of *Oncidium* in the *Folia Orchidacea*, published in October of that year. Since that time it has been sparingly imported, but it is believed to be

* It is extremely doubtful whether this *Oncid* is a native of Caracas. The precise habitat is probably known only to the collectors who send it to Europe from that port.

as rare as it is curious. The species was dedicated to Comte Alfred Limminghe, at that time one of the most liberal patrons of Belgian horticulture. Our description is from a plant that flowered in the collection of Mr. Lee, at Downside, Leatherhead, since dispersed.

Oncidium Limminghei belongs to the small section of the genus of which *On. Papilio* is the type. The flowers are produced by successive elongations of the rachis as in that species; the dorsal sepal and petals are similar and of a duller colour than the other segments, but not elongated as in *On. Papilio* and *On. Kramerianum*; they are also differently shaped from the lateral sepals, which are brightly coloured. Another peculiarity is seen in the leaves, which usually lie flat on the surface of the block to which the plant is affixed; the mid-nerve is not the geometric diameter of the leaf, but divides the blade into two unequal parts as in the *Begonia* and *Lime*.

On. longipes.

Pseudo-bulbs ovoid, elongate, $\frac{3}{4}$ —1 inch long, in clusters of threes and fours from a slightly ascending rhizome as thick as an ordinary writing-pencil, mono- oftener diphyllous. Leaves linear-oblong, mucronate, 4—6 inches long. Scapes as long as the leaves, 3—5 or more flowered. Flowers 1—1 $\frac{1}{2}$ inches in diameter; sepals and petals pale red-brown streaked transversely with yellow and with yellow tips, spatulate or narrowly oblong, undulate, the lateral sepals longer and narrower than the dorsal one; lip bright canary-yellow, three-lobed, the side lobes roundish oblong, the front lobe transversely oblong, emarginate; crest an oblong fleshy disk covered with numerous small whitish warts, and with two prominent teeth in front. Column wings very narrow, almost obsolete.

Oncidium longipes, Lindl. in Paxt. Fl. Gard. I. No. 76 (1851). Id. Fol. Orch. Oncid. No. 45. *On. janeirensis*, Rehb. in Bonpland. Apr. 1854.

var.—*Croesus*.

Flowers somewhat larger and differently coloured; sepals and petals dark brown-purple, lip golden yellow with a brown-purple band around the crest.

On. longipes *Croesus*, supra. *On. Croesus*, Rehb. Hamb. Gartenz. 1857, p. 314. *Fl. Mag.* n.s. t. 40. *The Garden*, XXXV. (1889), t. 706. *On. longipes*, *Bot. Mag.* t. 5193.

Although one of the most frequently seen, and one of the most tractable of *Oncids* under cultivation, scarcely anything has been divulged respecting its origin beyond the statement that it was

originally introduced from Rio de Janeiro about the year 1850, and that it has since been gathered near Novo Friburgo, on the Organ Mountains. It has been generally cultivated since that date, its small size and free-flowering habit having secured for it the favour of many amateurs. As a horticultural plant the variety *Cræsus* is superior to the type, the strong contrast between the golden yellow of the labellum and the brown-purple of the other segments being very striking; it was introduced about the same time as the species, but it has always been very rare.



Oncidium longipes.

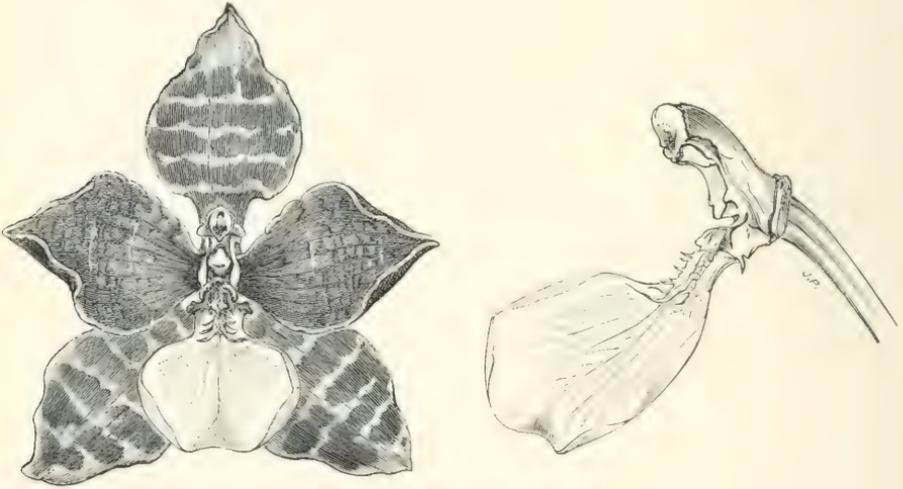
Very near *Oncidium longipes*, and probably only a variety of it is *On. uniflorum*, figured in the *Botanical Register* of 1843, t. 43, which, according to Dr. Lindley, differs from *On. longipes* in its one-flowered peduncles and "in the crest of the labellum consisting of an oblong cluster of numerous small smooth fingers, and in the wings of the column being conspicuously two-lobed."* The figure, however, shows no such striking difference except in the column wings. It was introduced from the Organ Mountains by Sir Charles Lemon, in whose collection at Carelew, in Cornwall, it flowered in November, 1842. We find no record of its being in cultivation since that date.

* Fol. Orch. Oncid. No. 44.

On. loxense.

Pseudo-bulbs ovoid, 4–5 inches long, monophyllous. Leaves narrowly lanceolate, 9–15 inches long and $1\frac{1}{2}$ –2 inches broad. Scapes straggling, $3\frac{1}{2}$ –5 feet long. Flowers distant, 3 inches in diameter; sepals shortly clawed, the lateral two free, oval-oblong, obtuse, undulate with a prominent keel behind, cinnamon-brown barred with light yellow; petals similar but broader and less prominently keeled behind, bright olive-brown with a few scattered yellow, transverse markings; lip coriaceous, transversely and broadly oblong, obscurely apiculate and with two minute auricles near the base of the rather broad claw, bright orange-yellow, paler on the disk; crest a fleshy protuberance with four shallow plates behind and a raised median fringed plate in front, on each side of which are numerous bristles springing from the protuberance.

Oncidium loxense, Lindl. in Paxton's Fl. Gard. II. p. 126 (1852). Id. Fol. Orch. Oncid. No. 21. Rehb. in Gard. Chron. XXII. (1884), pp. 584 and 616. Williams' *Orch. Alb. X.* t. 439.



Oncidium loxense.

One of the finest of *Oncidiums*, and at the same time one whose botanical history is of the briefest description.

It was originally discovered in 1842 near Loxa, in Ecuador, by Hartweg, who found but a single plant with a panicle nine feet long. Many years afterwards Messrs. Backhouse, of York, obtained a coloured sketch prepared by their correspondent Dr. Krause;* and lastly in 1883 it was rediscovered by Edward Klaboch, who sent plants to Messrs. Sander and Co., of St. Albans, and these

* *Fide* Reichenbach in Gard. Chron. XXII. (1884), p. 584.

were probably the first to reach Europe alive. It is believed to be a very rare species in its native home, where, so far as at present known, it is confined to a district of limited extent.

Our description was taken from a plant that flowered in our houses in the Spring of 1891, and which is now in the superb collection of Baron Schroeder at The Dell.

On. luridum.

Pseudo-bulbs none. Leaves from a stout rhizome, oval-oblong, variable in size, 12—18 or more inches long, very leathery and generally with some small brown spots on both sides. Scapes 3—6 feet long, dull red-brown, loosely paniculate, the branches distant, short, 3—5 flowered. Flowers $1\frac{1}{2}$ inches in diameter, very variable in colour, usually yellow or red-brown with some yellow markings and spots; sepals and petals clawed, much undulated at the margin; upper sepal broadly oval or sub-orbicular, concave on the inner side; lateral sepals free, spatulate oblong; petals oblong, obtuse; lip three-lobed, the side lobes small, rounded with revolute margin; the front lobe shortly and broadly clawed, transversely oblong, emarginate; crest five-lobed, the front lobe an erect rounded plate, yellow spotted with red, on each side of this is a smaller, rounded rose-coloured tubercle, the two posterior lobes white, much tuberculated. Column wings reniform, pink or white.

Oncidium luridum, Lindl. in *Bot. Reg.* t. 727 (1823). *Id. Gen. et Sp. Orch.* p. 201 (1833). *Id. Fol. Orch. Oncid.* No. 131. *Bot. Mag.* t. 3603 (1837). *On. cuneatum*, Lindl. *Collect. Bot. sub. t.* 27. *On. olivaceum*, Lindl. *Gen. et Sp. Orch.* p. 202. *Epidendrum guttatum*, Lin. *Sp. Pl.* p. 1351. *Cymbidium guttatum*, Wild. *Sp. Pl.* IV. p. 102.

var.—intermedium.

Peduncles shorter, more rigid and with flexuose branches. Flowers larger with all the segments bright yellow, with numerous circular red-brown spots.

On. luridum intermedium, Lindl. *Fol. Orch. Oncid.* No. 131. *On. intermedium*, Knowles and Westc. *Fl. Cab. II.* p. 53, t. 60. *Williams' Orch. Alb. VIII.* t. 345.

sub-vars.—*atratum* (*Journ. Hort. Soc.* VI. (1851), p. 54, with fig), sepals and petals olive and rose, lip brown; *guttatum* (*Bot. Reg.* 1839, t. 19), sepals and petals chestnut-brown spotted and margined with yellow, lip paler, column whitish; *M. Morren's* (*Fol. Orch. Oncid.* No. 131 E), sepals and petals pale rose spotted with crimson and tipped with yellow, lip cinnamon-brown; *Mr. Dodgson's* (*Williams' Manual*, p. 490), flowers orange-yellow barred with dark brown; *purpuratum* (*Gard. Chron.* 1848, p. 149, with fig.), sepals and petals speckled with purple, lip crimson as in *Oncidium Lanceanum*.*

* Probably a natural hybrid between *Oncidium luridum* and *On. Lanceanum*. It does not appear to have been seen since its introduction by Messrs. Loddiges in 1847.

Oncidium luridum was one of the few Oncids known to Linnæus, which, as in the case of all other epiphytal orchids which he knew, he included in *Epidendrum* under the name of *Epidendrum guttatum*, his type being a Jamaica plant which Lindley believed to agree with the sub-variety *guttatum* described above. "The name *luridum* ought therefore in strictness to be abolished; but that of *guttatum* applies so generally to the whole genus that there would be more inconvenience than advantage in the measure."† The species is widely dispersed over the West Indian Islands, the adjacent parts of Central and South America, and also southern Mexico. Within this extensive region it was gathered by many of the earlier botanical collectors, among whom may be mentioned Dr. Bradford (Trinidad), Dr. Schomburgk (British Guiana), Hartweg (Mexico), White (Cuba), McFadyen (Jamaica), whose specimens are still preserved in British herbaria. It was first cultivated by Mr. Griffin, of South Lambeth, in 1823, whose plant, of which the origin is not stated, was figured in the *Botanical Register* and described and named by Dr. Lindley, who failed to identify it as the *Epidendrum guttatum* of Linnæus. Twelve years later *On. luridum* was brought by Cross from Trinidad to the Botanic Garden at Glasgow, and from that time to the present it has probably been rarely absent from British collections.

The variety *intermedium* is the handsomest of all the *luridum* forms we have seen; it was first sent from Cuba, in 1837, by a Spanish merchant of Havana to Mr. George Barker, of Birmingham, but was subsequently lost; it has recently reappeared in cultivation and is now in the collection of Baron Schroeder, at The Dell. Of the sub-varieties, *guttatum*, which is properly the type, is distinct; it was first imported by Messrs. Rollisson, of Tooting, in 1838, and is at present in cultivation in the Royal Botanic Garden at Glasnevin.

On. macranthum.

Pseudo-bulbs variable in size and shape, usually oval-oblong or ovoid-conic, more or less compressed, 4—6 inches long and 2—2½ inches broad, diphyllous. Leaves narrowly lanceolate, acute, 15—18 inches long.

† Bot. Reg. 1839, sub. t. 16. *Luridum*, however, is the oldest name under the right genus, and such a name is accepted by many botanists, as it prevents complications and inconveniences that would arise if an older specific name under a genus to which the plant is no longer referred were insisted on.



Oncidium macranthum.

Scapes flexuose, scandent, 7—10 or more feet long, paniced, the branches short, distant and few flowered. Bracts boat-shaped, $\frac{3}{4}$ inch long. Flowers the largest in the genus, sometimes 4 inches in diameter; sepals clawed, orbicular-oblong, undulate, yellow toned with light brown; petals similar to the sepals but with a shorter claw and more undulate; lip much smaller than the other segments, hastate, the two lateral lobes horn-like, violet-purple at the base; the intermediate lobe tongue-shaped, attenuated to a reflexed tip, white bordered with violet-purple; crest cylindric with three larger violet-purple teeth in front and three smaller white ones behind. Column wings hatchet-shaped, brownish purple.

Oncidium macranthum, Lindl. Gen. et Sp. Orch. p. 205 (1832). Id. Fol. Orch. Oncid. No. 1. Id. in Paxt. Fl. Gard. II. p. 126. *Bot. Mag.* t. 5743. *Fl. Mag.* 1868, t. 386. Warner's *Sel. Orch.* II. t. 17. Jennings' *Orch.* t. 42 (1875). Gard. Chron. 1869, p. 739, with fig. Rehb. in Gard. Chron. XIV. (1880), p. 8 (Williamsonian). *The Garden*, XXIV. (1883), pl. 416. Sander's *Reichenbachia*, II. t. 64. *Lindenia*, IV. t. 152.

The earliest evidence of the existence of this superb *Oncidium* was a single flower in the herbarium of the Spanish botanists Ruiz and Pavon, which was acquired by Mr. A. B. Lambert, the author of *The Genus Pinus*, and now in the Natural History Museum at South Kensington. This flower was probably gathered about the year 1780, the locality given being Guayaquil, in Ecuador, but as this town is a port on the estuary of the River Palenque and situated near the arid coast, the specimen must have been obtained from the neighbouring Cordillera. A long interval elapsed before it again came under the cognisance of science, the first to rediscover the species being Matthews, who gathered it in 1838 at Tunguragua, on the Eastern Cordillera of Ecuador, at 10,000 feet elevation. It was next gathered by Hartweg near Alausi, by Professor Jamieson of Quito, near Calicali, and by Spruce at Llala and also in Matthews' locality, but none of these botanical collectors sent living plants to Europe. The first notice of it as a horticultural plant occurs in the horticultural journals of 1868, in the spring of which year it flowered for the first time in this country in the collection of Lord Londesborough at Norbiton, and shortly afterwards at Farnham Castle, and in our Chelsea nursery. No indication is given of the origin of these plants, which were doubtless all imported at the same time.

Oncidium macranthum is now well known as a magnificent species of easy culture, one plant of which when in flower "is enough to ornament a house of considerable dimensions."

On. maculatum.

Pseudo-bulbs ovoid, 3—4 inches long, much compressed, with 2—3 ribs on each of the flattened sides, diphyllous. Leaves linear-ligulate, 7—10 inches long. Scapes 12—18 inches long, racemose along the distal half, rarely paniculate. Flowers 2 inches in diameter; sepals and petals sub-equal, lanceolate-oblong, acute with reflexed tip, yellow, sometimes yellow-green heavily blotched with dark chestnut-brown; lip oblong-ovate, apiculate, obscurely three-lobed, the side lobes reduced to small triangular auricles, the basal half white, the apical half yellowish; crest consisting of four plates, of which the two middle ones are the largest, white streaked with red. Column wings narrow, horn-like below.

Oncidium maculatum, Lindl. *Sert. Orch.* sub. t. 48 (1838). *Id. Fol. Orch. Oncid.* No. 113 (1855). Knowles and Westc. *Fl. Cab. II.* t. 57. *Cyrtorchilum maculatum*, Lindl. in *Bot. Reg.* 1838, t. 44. *Id. Sert. Orch.* t. 25. *Bot. Mag. t.* 3836 (ecornutum). *Id. t.* 3880.

A species very common in some parts of the Mexican province of Vera Cruz. It was first sent to the Horticultural Society of London by Hartweg in 1837; and two years later it was sent to the Woburn collection by Mr. Parkinson, Her Majesty's Consul in Mexico. For some years after its introduction, *Oncidium maculatum* was one of the most popular of the genus, but it is now rarely seen in amateur collections; at that time it was generally known as *Cyrtorchilum maculatum*.* It is one of the most variable of Oncids as regards the colour of its flowers.

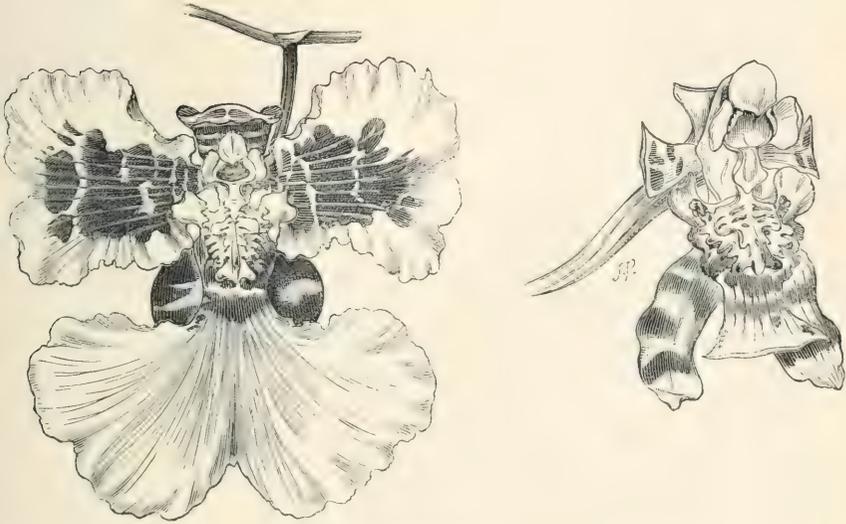
On. Marshallianum.

Pseudo-bulbs ovate-oblong, 4—6 inches long, compressed, diphyllous. Leaves oblong-lanceolate, acute, 7—12 or more inches long, complicate at base. Panicles 3—5 or more feet long, much branched. Flowers variable in size and colour, the finest forms 2½—3 inches across vertically; dorsal sepal obovate-oblong, concave, dull yellow barred with pale red-brown; lateral sepals nearly concealed by the lip, oblong, connate to about one-third of their length, and coloured like the dorsal one;

* Although *Cyrtorchilum* has long since disappeared from the list of genera, it frequently occurs in the orchid literature of the period above referred to. It was founded by Humboldt and Kunth in the early part of the century on *Cyrtorchilum undulatum* (*Oncidium undulatum* of Lindley), a very different plant from that figured under this name in Williams' *Orchid Album*, VIII. t. 368. It is chiefly distinguished from *Oncidium* by the labellum being much smaller than the other segments, its front lobe narrow, entire and bent back under the crest, the character that suggested the generic name, *κυρτός*, "bent," and *χείλος*, "a lip"; it thence corresponds to Bentham's section *MICROCHILA*. The group of species to which this form of the lip is peculiar, combined with other characters both floral and vegetative, constitute as fairly a natural genus as *Miltonia* or *Odontoglossum*; but the *Cyrtorchilum* of Humboldt and Kunth as thus circumscribed was afterwards thrown into confusion by the addition of such species as *Oncidium maculatum*, *On. concolor*, *Miltonia flavescens*, *Odontoglossum bicktonense* and others which do not conform to its essential character, and which subsequently led to its rejection.

petals broadly obovate-oblong, emarginate, undulate, bright canary-yellow spotted with red-brown in the centre; lip clawed, the claw auriculate, the blade large, spreading, two-lobed, broadly oblong, bright yellow, the claw and crest spotted with orange-red; crest consisting of a median triangular erect plate with two large teeth on the basal side, two smaller ones in front, and two minute ones on each side. Column wings short, quadrate, whitish.

Oncidium Marshallianum, Rehb. in Gard. Chron. 1866, p. 682. *Bot. Mag.* t. 5725. *Fl. Mag.* n.s. t. 285. Regel's *Gartenfl.* 1879, t. 979. Williams' *Orch. Alb. V.* t. 240. *Lindenia V.* t. 202.



Oncidium Marshallianum.

Introduced by Messrs. Low and Co. in 1865, through their collector, Blunt, along with *Oncidium crispum*, from which it may be distinguished when not in flower by its bright green pseudo-bulbs; its habitat may therefore be assumed to be on the Organ Mountains, near Novo Friburgo, in the Brazilian province of Rio de Janeiro, whence it has since been frequently imported. It is nearly allied to *On. pectorale*, introduced many years previously, but now rarely seen, from which it differs chiefly in the form of its sepals and lip, and especially in the crest of the last-named organ. Like most of the members of the sub-section to which it belongs (*Tetrapetala-macropetala*, of Lindley), and of which it is one of the handsomest, it is found to vary in the size and colour of its flowers, which usually expand in May and June.

It is dedicated to Mr. William Marshall, of Auchinraith, Bexley, well known as a former exhibitor of orchids. Our illustration represents a fine form in the collection of Sir Trevor Lawrence, Bart., at Burford Lodge.

A remarkable *Oncidium*, figured in Godefroy's *Orchidophile* for 1888, page 47, under the name of *On. Mantinii*, may here be noticed. It flowered in M. Truffaut's horticultural establishment at Versailles in the previous year, and had been acquired from M. Binot, an orchid collector at Petropolis in Brazil, with plants of *On. crispum*. It has the aspect of being a natural hybrid, of which *On. Marshallianum* is presumably one parent. Another supposed natural hybrid is figured in Williams' *Orchid Album*, IX. t. 405, under the name of *On. Larkinianum*; in this case the characteristics of *On. Marshallianum* evidently greatly preponderate.*

On. Martianum.

Pseudo-bulbs ovoid, $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long, much compressed with three—four ribs on each of the flattened sides, monophyllous. Leaves oblong, acute, 5—7 inches long. Scapes paniced, as long again as the leaves, many flowered. Flowers $1\frac{1}{2}$ inches in diameter; sepals and petals small, yellow barred with chestnut-brown; the dorsal sepal clawed, sub-orbicular, concave; the lateral two connate at the base, linear-oblong; petals oval-oblong, apiculate, undulate at the margin; lip large in proportion to the size of the flower, bright canary-yellow with some red-brown spots around the crest, three-lobed, the side lobes roundish oblong, the front lobe shortly clawed, transversely oblong with a shallow sinus in the anterior margin; crest a triangular erect plate with two smaller ones on each side. Column wings triangular, dentate at the outer margin.

Oncidium Martianum, Lindl. in *Bot. Reg.* 1837, sub. t. 1920. Id. *Fol. Orch. Oncid.* No. 74. *On. bicolor*, Lindl. in *Bot. Reg.* 1843, t. 66.

First discovered by the German botanist and explorer, Dr. Martius, of Munich, in the Brazilian province of Minas Geraes, and imported from Brazil by Messrs. Loddiges about the year 1842. We are indebted to Mr. F. W. Moore, of Glasnevin, for materials for description.

On. microchilum.

Pseudo-bulbs ovoid or sub-orbicular, much compressed, $1\frac{1}{2}$ —2 inches long, monophyllous. Leaves rigid and leathery, oblong or elliptic-oblong,

* Doubtless other natural hybrids exist among *Oncids*, including some described in these pages as species, but the marks of hybridity in any such cases do not appear to be sufficiently evident to admit of their being classed as mules.

keeled behind, 7—12 inches long, $2\frac{1}{2}$ —3 inches broad, sub-acute, complicate at base, slightly glaucous. Scapes robust, issuing from a carinate inflated sheath, very glaucous, 3—4 feet long, branched along the distal half, the branches short, few flowered. Flowers $1\frac{1}{4}$ inches in diameter; sepals elliptic-oblong, keeled behind, the dorsal one broader than the lateral two, and concave, pale brown with some yellow markings; petals narrower than the sepals, oblong, obtuse, undulate, incurved, chestnut-brown (sometimes brown-purple) barred and margined with yellow; lip three-lobed, the intermediate lobe reduced to a small white protuberance, with a purple spot; the side lobes rotund, convex, white with some purple spots at their base; crest somewhat kidney-shaped, tuberculose, white with yellow and brown spots in front, reddish brown behind. Column wings triangular, white; anther beaked.

Oncidium microchilum, Batem. in Bot. Reg. 1840, misc. 193. Lindl. in *Bot. Reg.* 1843, t. 23. Id. *Fol. Orch. Oncid.* No. 21. Saunder's Ref. Bot. II. t. 122.

Discovered in Guatemala in 1838, and sent to Mr. Bateman by Mr. G. Ure Skinner, who afterwards communicated to Dr. Lindley the following particulars respecting its habitat:—

“I first found *Oncidium microchilum* on the top of the Cuesta of Puentezuelas, in 1838. It was growing on a bare rock with a quantity of dead leaves and grass about its bulbs, and its roots woven into the interstices of the rock; it was very much exposed to the sun, except during the middle of the day, when a ledge of rock seemed to afford it a little shade. I afterwards found it in great abundance on the rocky banks of the river Michatayal. I never saw it except in such situations, generally exposed and always among rocks. The temperature generally of the above habitats is about 20° C. (68°—70° F.), and from being exposed, cold at nights.”

It was subsequently found by Hartweg in the same country. Although Mr. Bateman received the first living plants sent to England, it flowered for the first time in the collection of Mr. Harter, of Broughton, near Manchester, in 1841. *Oncidium microchilum* is the only species of the section MICROCHILA (*Cyrtochilum*) known to us whose habitat is north of the isthmus of Panama; it is remarkable for the almost obsolete intermediate lobe of the labellum, and for the variety of colours present in the flowers, which are, however, variable in this respect.

On. *Micropogon*.

Pseudo-bulbs broadly ovoid, 2— $2\frac{1}{2}$ inches long, compressed with acute edges, and with 2—3 ribs on each of the flattened sides, monodiphylous. Leaves linear-oblong, rounded at the apex, 4—6 inches long.

Scapes 12—18 inches long, pendulous, racemose, 7—10 or more flowered. Flowers variable in size in different plants, the largest $1\frac{1}{2}$ inches across vertically; sepals linear-oblong, acuminate, yellow barred with red-brown, the lateral two connate at their base; petals clawed, sub-orbicular, bright canary-yellow; lip with three sub-equal bright yellow lobes, the lateral two orbicular, the intermediate one broadly obovate; crest "tumid, covered with conical yellow and brown tubercles, margins expanded and pectinately toothed." Column wings deltoid.

Oncidium Micropogon, Rehb. in Bonpl. 1854, p. 90. Id. Xen. Orch. I. p. 179, t. 63, fig. 2. Lindl. Fol. Orch. Oncid. No. 40. Regel's *Gartenfl.* 1855, t. 136. *Bot. Mag.* t. 6971. *On. dentatum*, Klotzsch ex Rehb. Xen. Orch. loc. cit.

Oncidium Micropogon was first cultivated in Consul Schiller's garden at Ovelgönne, near Hamburg, in 1853, and two years later it is mentioned by Reichenbach in his *Xenia Orchidacea* as being in several gardens on the Continent. The plants were supposed to have been imported from Santa Catherina in southern Brazil, and they appear to have died out within a few years as nothing more was seen of the species till it was re-introduced by Messrs. Sander and Co. in 1886. It is very near *On. barbatum*, from which it is distinguished by its much larger flowers with differently shaped sepals, petals and crest. The specific name has nearly the same meaning as *barbatum*, "bearded," from *μικρός*, "small," and *πώγων*, "a beard."

On. nanum.

Pseudo-bulbs none. Leaves from a creeping rhizome, oval-oblong, 3—6 inches long, dull pea-green spotted with red. Scapes decumbent, panicled, the branches short and few flowered. Flowers $\frac{3}{4}$ inch in diameter; sepals and petals similar, obovate-oblong, obtuse, incurved, yellow spotted with red-brown; lip bright yellow, transversely oblong with two small auricles at the base; crest large for the size of the flower, two-lobed, the front lobe at right angles to the back one. Column wings linear, deflexed, and "tipped with a lucid gland."

Oncidium nanum, Lindl. in Bot. Reg. 1842, misc. No. 30. Id. Fol. Orch. Oncid. No. 107. Schomb. Reis. in Brit. Guiana, III. p. 913.



Oncidium nanum,
enlarged.

A curious little plant deserving of notice on account of its richly coloured flowers. It was first discovered by Schomburgk growing on the trunks of trees on the banks of the Pomeroon River in British Guiana, and sent by him to Messrs. Loddiges in 1842. According to Dr. Lindley, it was also detected by Spruce near the junction of the Rio Negro with the Amazon.

On. nigratum.

Pseudo-bulbs ovoid-oblong, 4—5 inches long, compressed, ribbed and furrowed on the flattened sides, diphyllous. Leaves broadly lanceolate, about a foot long. Scapes flexuose, 10—15 feet long, loosely branched, the branches bearing from five to fifteen flowers. Flowers an inch in diameter; sepals and petals linear-oblong, undulate, reflexed, white with 2—3 black-purple blotches on each; lip shorter than the other segments, pale yellow with a red-brown bar in front of the crest, three-lobed, the side lobes rotund with revolute margin, the intermediate lobe oblong, apiculate; crest many toothed, the teeth arranged in four longitudinal rows. Column wings narrow, pale yellow.

Oncidium nigratum, Lindl. in Paxt. Fl. Gard. I. No. 122 (1851). Id. Fol. Orch. Oncid. No. 105. Rehb. in Gard. Chron. XIX. (1883), p. 790.

Discovered by Schomburgk during his exploration of British Guiana, 1840—44, and sent by him to Messrs. Loddiges, in whose nursery it did not flower till some years afterwards, but was subsequently lost. It was re-introduced by us in 1881 through our collector David Burke, who found it on the southern slopes of the Roraima Mountain at 5,000—6,000 feet elevation. Although the flowers are small they are produced in great profusion on the long rambling panicle, and are among the most distinct in the genus; they have some resemblance on superficial view to the pretty *Odontoglossum blandum*.

On. obryzatum.

Pseudo-bulbs oval-oblong, much compressed, 2—3 inches long, ribbed and channelled on the flattened sides, monophyllous. Leaves linear-oblong, sub-acute, 6—9 inches long. Scapes scandent, 4—6 feet long, paniculate, the branches short and few flowered. Flowers about an inch across vertically; sepals and petals narrowly spatulate, obtuse, yellow barred with red-brown on the basal half. Lip auriculate at the base, the blade broadly clawed, transversely oblong, deeply two-lobed, of a paler yellow than the other segments; crest a triangular median raised plate with two teeth in front, one on each side and a cluster of smaller ones behind. Column wings toothed, prolonged and nearly meeting above the anther.

Oncidium obryzatum, Rehb. in Bonpl. 1854, p. 198. Id. in Gard. Chron. XII. (1879), p. 456 (*dasystalix*). Regel's *Gartenfl.* 1878, t. 925. Lindl. Fol. Orch. Oncid. No. 95.

Very little has been divulged respecting the origin of this *Oncid.* It is vaguely stated to be a native of Peru, and that it was first discovered by Warscewicz about the year 1852. It is not now often seen in the orchid collections of this country, but we have quite recently received a fine panicle from Mr. F. W. Moore, of the Royal

Botanic Garden, Glasnevin. The specific name, literally "refined gold"—*ὄβρυζον χρυσίον*—refers to the colour of the flowers.

On. ornithorhynchum.

Pseudo-bulbs oval-oblong, compressed, 1—2 inches long, diphyllous. Leaves linear-lanceolate, 7—10 inches long. Scapes pendulous or arching, longer than the leaves, paniced, many flowered. Flowers about $\frac{3}{4}$ inch across vertically, rose-lilac; sepals and petals oblong, the lateral sepals free and divaricate, the petals broader and undulated; lip sub-panduriform, the lateral lobes with reflexed margins and sometimes of a darker colour than the rest of the flower, the anterior lobe emarginate; crest consisting of five yellow, toothed lamellæ, in front of which are two horn-like teeth. Column wings triangular toothletted; anther beaked.

Oncidium ornithorhynchum, Hbdt. et Kunth, Nov. Gen. Plant. I. p. 345, t. 80 (1815). Lindl. Gen. et Sp. Orch. p. 204 (1832). Id. in *Bot. Reg.* 1840, t. 10. Id. *Fol. Orch. Oncid. No. 189.* Batem. *Orch. Mex. et Guat.* t. 4. *Bot. Mag.* t. 3912. Knowles and Westc. *Pl. Cub. III.* t. 136.

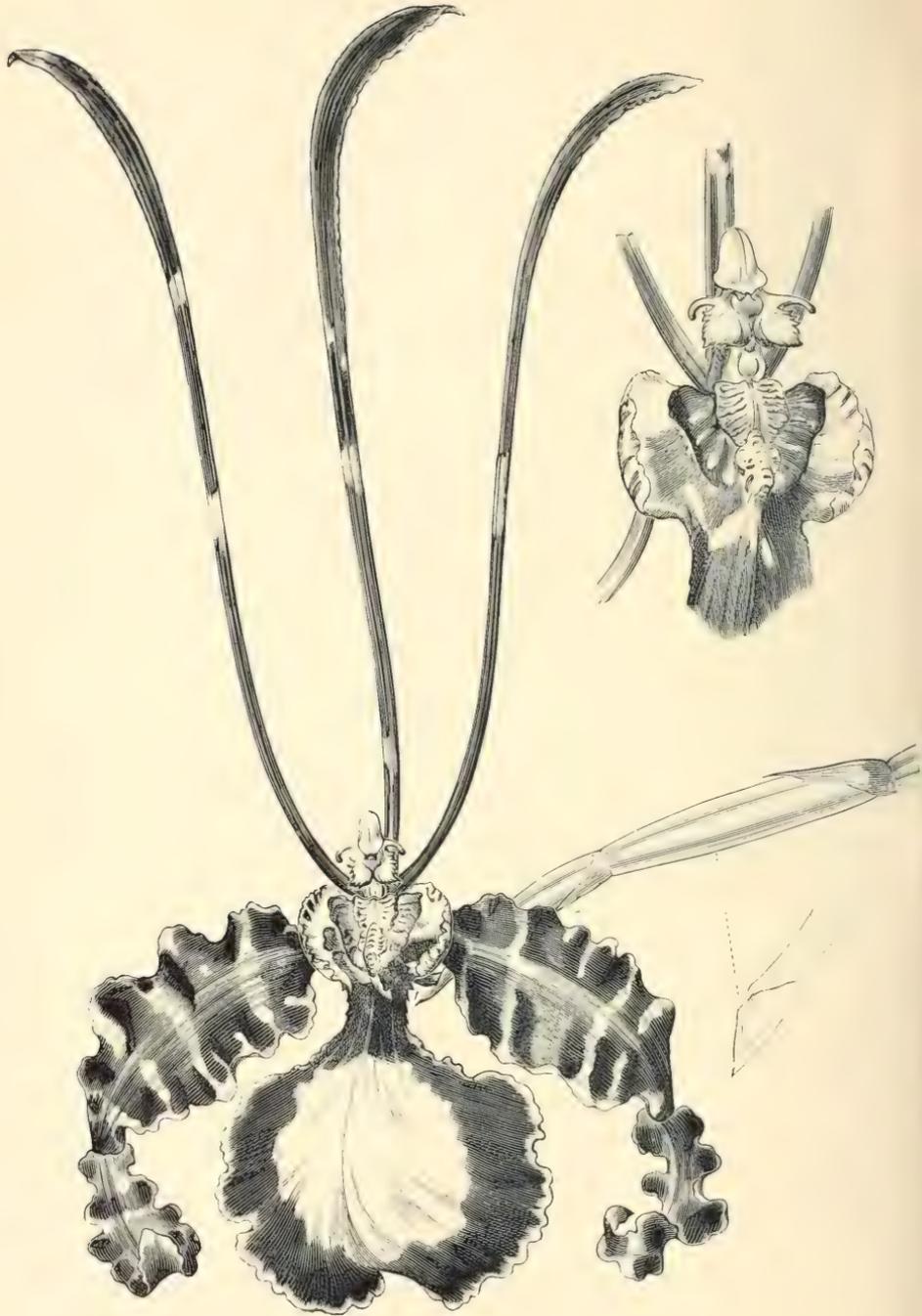
sub-var.—*albiflorum* (Gard. Chron. 1873, p. 503. *Fl. Mag.* n.s. t. 398), flowers dull white, the crest of the lip yellow as in the type.

Oncidium ornithorhynchum is a native of southern Mexico and Guatemala, occurring in several localities but always at a considerable elevation. It was originally discovered by Humboldt in the beginning of the present century on the mountains near Valladolid, in the Mexican province of Michoacan. It was not introduced into British gardens till 1836, when it was received simultaneously by Mr. Bateman from Guatemala through Mr. G. Ure Skinner, and by Messrs. Loddiges from Oaxaca probably through Karwinsky. The white-flowered form first appeared in the collection of the late Mr. John Day, at Tottenham, in 1873

The specific name, from *ὄνυχος*, "a beak," and *ὀρνίθος*, "of a bird," refers to the beaked anther, whence this *Oncid* is sometimes popularly known as the Bird's Bill *Oncidium*, but this character is common to all the species included in Lindley's sub-section *Rostrata* as well as to many others.

On. panchrysum.

Pseudo-bulbs broadly ovate, much compressed, $2\frac{1}{2}$ inches long, monophyllous. Leaves ligulate, sub-acute, 9—12 inches long. Scapes stoutish, erect, as long again as the leaves, paniced and many flowered. Flowers of a uniform bright canary-yellow, $1\frac{1}{4}$ inches across vertically; sepals ovate-oblong, acute, the lateral two free and divergent; petals similar but broader and obtuse at the apex; lip sub-panduriform, the basal



Oncidium Papilio.

lobes rotund, the front lobe transversely oblong, emarginate; crest five-lobed. Column wings obsolete.

Oncidium panchrysum, Lindl. in Journ. Hort. Soc. IV. p. 267 (1849). Id. Fol. Orch. Oncid. No. 180 (1855). *On. anomalum*, Rehb. in Linnæa XXII. p. 845 (1849).

Originally discovered by Linden in New Granada in 1842, and subsequently gathered by Funck and Schlim on the eastern Cordillera, between Pamplona and Ocaña, at 7,000—8,000 feet elevation. It is a handsome species with pure yellow flowers, a character expressed by the name from πᾶν, "all," and χρῦσεος, "golden"; it may be recognised by the delicate glaucescence that covers the green portion of the scape.

On. Papilio.

Pseudo-bulbs oval-oblong or sub-orbicular, $1\frac{1}{2}$ —2 inches long, much compressed, wrinkled, monophyllous. Leaves elliptic-oblong, 6—9 inches long, $2-2\frac{1}{2}$ inches broad, coriaceous, dull green much mottled and blotched with purplish crimson which is most developed on the under side. Scapes 2—4 feet long, jointed, with a sheathing acute bract at each joint, terete from the base to beyond the middle, the upper portion flattened and ancipitous. Flowers several, produced singly by successive elongations of the peduncle from the joint immediately below the ovary, variable in size; dorsal sepal and petals $3\frac{1}{2}$ — $4\frac{1}{2}$ inches long, linear, slightly dilated towards the apex, dull reddish crimson, yellowish green at the back; lateral sepals oblong, sub-acuminate, decurved and undulate, bright chestnut-red with some narrow transverse yellow markings; lip three-lobed, the side lobes small, rounded, yellow spotted with red; anterior lobe broadly clawed, sub-orbicular with a shallow sinus in the front margin, canary-yellow with a broad bright red marginal band; crest a thickened obscurely three-lobed elevated plate, with two small protuberances on the basal side, white spotted with red. Column wings lacerated, much dilated below, and with two cirri above having a blackish gland at their tip.

Oncidium Papilio, Lindl. in *Bot. Reg.* sub. t. 910 (1825). Id. *Gen. et Sp. Orch.* p. 203 (1832). Id. *Fol. Orch. Oncid.* No. 197. *Bot. Mag.* t. 2795 (1828). *Id.* t. 3733 (1840). Knowles et Westc. *Fl. Cab. I.* t. 12. *Paxt. Mag. Bot. V.* p. 175. Van Houtte's *Fl. des Serres*, IX. t. 920. *Illus. hort.* s. 3, t. 500 (Eckhardtii). Jennings' *Orch.* t. 11 (pictum). Williams' *Orch. Alb. VI.* t. 279 (majus).

Oncidium Papilio is one of the most remarkable orchids ever introduced into European gardens, not only on account of the singular appearance of its flowers but also for their scarcely less curious structure, a peculiarity, however, which they share with the allied species *On. Kramerianum* and *On. Limminghei* already described. The flowers are not produced in racemes or panicles like those of most other *Oncids*, but in the same manner as those of the *Saccolabiate*

Masdevallias (*Masdevallia Chimæra*, etc.); that is to say—after the first flower has expanded and which is apparently terminal, a second flower is produced from the joint immediately below the ovary, and which usually (not always) expands after the first flower has faded; in like manner a third flower is produced from the node below the ovary of the second, then a fourth in the same way; in fact an indefinite succession of flowers may be produced in this manner till the plant is exhausted or till some check is applied. The most obvious structural peculiarities are—the excessive elongation and parallelism (when first open) of the dorsal sepal and petals, and their dull coloration, while the lateral sepals are dilated and as brightly coloured as the labellum. The curious glandular appendages of the column wings are also deserving of notice.

Oncidium Papilio was introduced from Trinidad, in 1824, by Sir Ralph Woodford, the Governor, who sent living plants to several collections, one of which flowered for the first time in this country in the nursery of Mr. Colville, at Chelsea, in the spring of the following year; but the earliest efforts to cultivate it in glass-houses in Great Britain do not appear to have been very successful, judging from the distorted flowers that were first figured. Of the sub-varieties, of which there are many, none require especial notice except that known in gardens as *majus* or *giganteum*; this is the finest of all the *Papilio* forms, the dorsal sepal and petals sometimes attaining a length of 5—7 inches.

The bizarre appearance of the flowers suggested the specific name of *Papilio* or the Butterfly.

On. pectorale.

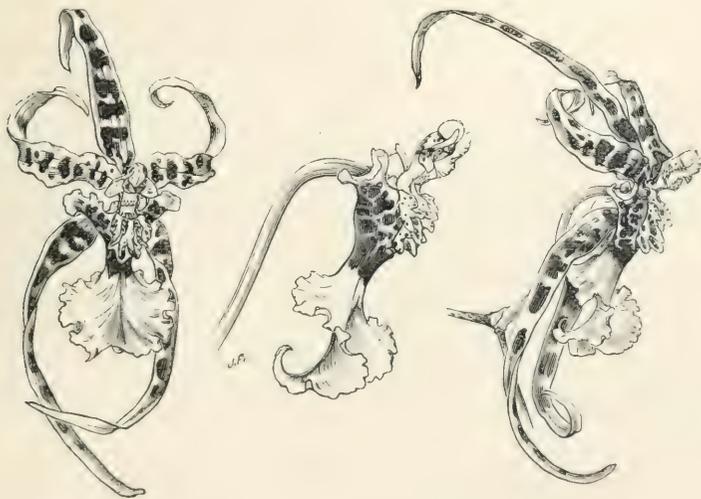
Pseudo-bulbs ovoid, compressed, $1\frac{1}{2}$ —2 inches long, diphyllous. Leaves linear-lanceolate, 6—8 inches long. Scapes longer than the leaves, racemose, but sometimes paniculate, many flowered. Flowers $1\frac{1}{2}$ —2 inches in diameter; sepals oval-oblong, chestnut-brown barred and margined with yellow, the lateral two connate to about one-half of their length; petals similar but larger, chestnut-brown with a narrow yellow border and a few yellow spots; lip auriculate at the base, the blade clawed, sub-orbicular, undulate with a cleft in the anterior margin, bright yellow; crest convex, tuberculose, the tubercles blackish crimson. Column wings rounded, brown spotted with yellow.

Oncidium pectorale, Lindl. *Sert. Orch.* t. 39 (1838). Id. *Fol. Orch. Oncid.* No. 62.
On. Pollettianum, Rehb. in *Gard. Chron.* XXVI. (1886), p. 326.

First cultivated by Mr. Buller, of Downs, near Exeter, in 1838, who had received it from Rio de Janeiro, whence it was subsequently imported by Messrs. Loddiges. It seems to have been lost to cultivation for many years till it reappeared in the collection of Mr. H. M. Pollett, at Fernside, Bickley, in 1886. This plant differing in some trivial characters from Lindley's type, was made a new species by Reichenbach with the proviso that it might be a natural hybrid between *Oncidium dasytyle* and *On. Gardneri*; but on comparing Mr. Pollett's specimen with the type preserved in the herbarium at Kew its identity with Lindley's *On. pectorale* was satisfactorily established.

On. phymatochilum.

Pseudo-bulbs ovoid-oblong, compressed, 3—4 inches long, monophyllous. Leaves narrowly elliptic-oblong, 9—12 or more inches long. Scapes slender, pale green spotted with dull crimson, 3—5 feet long, loosely paniculate. Flowers 2 inches in diameter, crumpled; sepals and petals



Oncidium phymatochilum.

reflexed, linear, acuminate, pale yellow banded and spotted with brown, but sometimes ivory-white spotted with orange-red, the petals broader and the free lateral sepals longer than the dorsal sepal; lip white spotted with red around the crest, three-lobed, the lateral lobes auriculate, oblong, obtuse, the intermediate lobe trowel-shaped, with a reflexed

acuminate tip; crest triangular in outline, many toothed, the three front teeth much the largest. Column wings lacinated, white spotted with red.

Oncidium phymatochilum, Lindl. in Gard. Chron. 1848, p. 139, with fig. Id. in Paxt. Fl. Gard. I. sub. t. 18, p. 78 (1850—51), Id. Fol. Orch. Oncid. No. 191. Bot. Mag. t. 5214. Linden's Pesc. t. 35. Van Houtte's *Fl. des Serres*, XXIII. t. 2465.

A very elegant species, first cultivated by the Rev. John Clowes, of Broughton Hall, near Manchester, and by Messrs. Loddiges, of Hackney, about the year 1840, neither of whom left any record of its origin, which remained unknown to science till its habitat was revealed by M. Pinel, a French merchant trading in Brazil, who collected it in the neighbourhood of Novo Friburgo and sent plants to various correspondents in France and Belgium, including M. Van Volxem of Brussels, one of whose plants was figured in Linden's *Pescatorea*, published in 1860.

Oncidium phymatochilum is a remarkably distinct species both as regards its flowers and its vegetative organs, and one not likely to be confused with any other; it has been inaptly compared with *Odontoglossum navium*. The specific name refers to the crest of the labellum, from *φύμα*, "a tumour," and *χῆλος*, "a lip."

On. prætextum.

Pseudo-bulbs ovoid, $1\frac{1}{2}$ —2 inches long, compressed, diphyllous. Leaves ensiform, sub-acute, 5—7 or more inches long. Scapes 30—40 inches long, paniculate, arching. Flowers fragrant, $1\frac{1}{2}$ inches in diameter; sepals pale chestnut-brown barred with yellow, the dorsal one clawed, obovate-oblong, obtuse, the lateral two narrower, oblong, connate at their base; petals as broad again as the dorsal sepal, wholly brown; lip with a broad claw, at the base of which are two square yellow auricles; blade fan-shaped, yellow with a broad brown margin; crest consisting of two lamina that are confluent behind, and two projecting lobes in front, all warded, light yellow spotted with brown. Column wings rounded, yellow and red.

Oncidium prætextum, Rehb. in Gard. Chron. 1873, p. 1206. Id. XV. (1881), p. 720. Id. in Regel's *Gartenfl.* (1887), p. 1. t. 1238. Bot. Mag. t. 6662.

First discovered by the Danish botanist, Dr. Warming, in Lagoa Santa,* and afterwards in the province of São Paulo, in southern Brazil, by Mr. E. D. Jones who sent it to Mr. J. H. Wilson, of Liverpool, in 1873; it was shortly afterwards imported by ourselves from Rio de Janeiro.

* Not found on any map to which we have access.

Oncidium pretextum has been occasionally confused with *On. curtum*, to which it is nearly allied, but from which it may be distinguished by its different crest, by its narrower lateral sepals which are connate at the base only, and sometimes by its smaller flowers which are usually of a duller colour. The specific name refers to the brown marginal band of the lip, and was suggested by a similar ornament on the Roman *toga*.

On. pubes.

Pseudo-bulbs sub-cylindric, tapering, 2—2½ inches long, diphyllous. Leaves narrowly oblong-lanceolate, 3—5 inches long. Scapes 15—24 inches long, paniced, the branches distichous and alternate, gradually shorter upwards; bracts small, subulate. Flowers about an inch in diameter, variable in colour, red-brown barred and spotted with yellow; dorsal sepal and petals clawed, obovate, obtuse, incurved; lateral sepals connate into an oblong blade, bifid at the apex; lip three-lobed, the side lobes linear, reflexed, the intermediate lobe broadly obovate, emarginate, red-brown bordered with yellow; crest tuberculose, pubescent, toothed in front. Column wings oblong, sub-falcate, obtuse.

Oncidium pubes, Lindl. in *Bot. Reg.* t. 1007 (1826). *Id. Gen. et Sp. Orch.* p. 199 (1832). *Id. Fol. Orch. Oncid.* No. 70 (1855). *Bot. Mag.* t. 3926 (*flavescens*). *On. bicornutum*, *Bot. Mag.* t. 3109 (1831).

A species of somewhat singular aspect, originally discovered by Descourtilz in the forests near Bananal, in the Brazilian province of Minas Geraes.* It was introduced by the Horticultural Society of London, in 1824, through David Douglas, who brought it from Rio de Janeiro. Seven years later it was sent to Mrs. Arnold Harrison, of Aigburth, near Liverpool, by Mr. William Harrison, who had gathered it in woods 60 miles inland from Rio; it was afterwards found by Gardner and by Miers on the Organ Mountains; it is doubtless dispersed over a considerable area in southern Brazil. The specific name refers to the soft villous hairs around the margin of the stigma.

On. pulchellum.

Pseudo-bulbs none. Leaves radical, usually in pairs or in fours, equitant, linear-lanceolate, 3—5 or more inches long, acutely keeled behind. Scapes slender, erect, 12—15 inches high, racemose or loosely paniculate, 12—20 or more flowered. Flowers an inch across vertically, white with a flush of rose on all the segments; dorsal sepal ovate,

* Ex Lindl. *Fol. Orch. Oncid.* No. 70.

cuneate, concave, the lateral two connate into an oblong, spatulate blade, bidentate at the apex and concealed by the lip; petals like the dorsal sepal; lip sub-quadrate, four-lobed, the lobes rounded and nearly equal; crest three-lobed, in front of which is an ochreous spot. Column wings ovate-oblong, rose-pink.

Oncidium pulchellum, Hook. in *Bot. Mag.* t. 2773 (1827). Lindl. *Gen. et Sp. Orch.* p. 206 (1832). Id. in *Bot. Reg.* t. 1787 (1836). Id. in *Paxt. Fl. Gard. I.* sub. t. 33. Id. *Fol. Orch. Oncid.* No. 31.

First discovered by Mr. C. S. Parkes in Demerara growing on trees, who sent it to the Liverpool Botanic Garden, where it flowered for the first time in this country in June, 1827. Many years afterwards it was detected by Schomburgk on the southern slopes of the Roraima, growing on sandstone rocks and flowering in November. It is also a native of Jamaica, where it has been gathered by several botanists. Although one of the prettiest of the small *Oncids* it is not often seen in cultivation.

Oncidium pulchellum is one of a small group of species dispersed over the West Indies and neighbouring parts of Central and South America, distinguished by the absence of pseudo-bulbs and by their rigid equitant leaves, that is to say—the front surfaces of the leaf on each side of the mid-nerve are brought into contact and grow together except at their edges, the leaf then often resembles a reaping-hook with a groove along the back.*

On. pulvinatum.

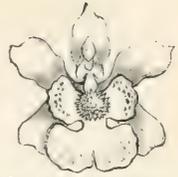
Pseudo-bulbs orbicular-oblong, compressed, $1\frac{1}{2}$ —2 inches in diameter, monophyllous. Leaves rigid, erect, oblong, acute, 9—12 inches long and 2— $3\frac{1}{2}$ inches broad. Scapes slender, flexuose, 5—7 or more feet long, loosely paniculate. Flowers very numerous, an inch in diameter; sepals and petals similar and sub-equal, clawed, oval-oblong, the upper sepal concave and bent forwards, the basal half red-brown, the apical half yellow; lip three-lobed, light yellow spotted with red, the side lobes rotund with fimbriate margin, the intermediate lobe transversely oblong, emarginate; crest a circular papillose cushion, whitish spotted with red. Column wings rounded.

Oncidium pulvinatum, Lindl. in *Bot. Reg.* 1838, misc. No. 115. Id. 1839, t. 42. Id. in *Paxt. Fl. Gard. II.* icon. xyl. No. 126. Id. *Fol. Orch. Oncid.* No. 118.

First cultivated by Mr. Richard Harrison, of Aigburth, Liverpool, who received it from his brother William at Rio de Janeiro in 1838, and he probably obtained it at Novo Friburgo, its known

* The section *EQUITANTIA* of Lindley and Bentham.

habitat. It closely resembles *Oncidium divaricatum* in habit and aspect, but is distinguished from that species by its differently shaped labellum, the crest of which is entire (not lobed).* Like *On. divaricatum* it is one of the most tractable of Oncids under cultivation.



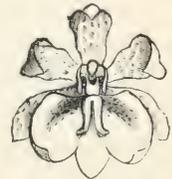
Oncidium pulvinatum
(slightly diminished).

On. pumilum.

Pseudo-bulbs none. Leaves from a creeping rhizome, oblong, acute, 2—4 inches long, rigid, erect. Scapes as long as or longer than the leaves, paniculate, the branches short, and the flowers small and crowded. Sepals and petals minute, oblong-spathulate, obtuse, yellow spotted with red-brown; lip three-lobed, yellow, the side lobes the largest, roundish oblong, the intermediate lobe sub-quadrate, truncate; crest bipartite, the two parts divergent, each consisting of two parallel ridges. Column wings oblong, acute, decurved.

Oncidium pumilum, Lindl. in *Bot. Reg.* t. 920 (1825). *Id. Gen. et Sp. Orch.* p. 205. *Id. Fol. Orch. Oncid.* No. 106. *Id. in Paxt. Fl. Gard.* II. icon. xyl. No. 132. *Bot. Mag.* t. 3581.

A curious little plant first cultivated by Dean Herbert at Spofforth, Yorkshire, in 1825, whither it had been sent from Rio de Janeiro by one of his correspondents who had found it growing on the trunk of *Bombax Ceiba* near Botofogo. It has since been gathered in several localities in the neighbourhood of Rio, where it forms large tufts on the trunks of *Crescentia* and other trees. We are indebted to Mr. O. O. Wrigley, of Bridge Hall, Bury, Lancashire, for materials for description. This species should not be confused with *Oncidium nanum*, which has larger flowers with a different labellum and crest.



Oncidium pumilum
(enlarged).

On. pyramidale.

Pseudo-bulbs ovoid, 1—2 inches long, compressed, diphyllous. Leaves linear-ligulate, 5—8 inches long, dark dull green. Peduncles erect or nodding, 12—15 or more inches long, paniced, many flowered. Flowers an inch in diameter, bright canary-yellow with some red spots and markings on all the segments; sepals and petals reflexed, the sepals linear-oblong, keeled behind, the lateral two free; the petals broader, oval-oblong; lip sub-panduriform, the basal lobes roundish-oblong, the front lobe obovate, emarginate; crest whitish, consisting of about ten

* See page 31.

small teeth. Column with two narrow ascending wings that meet above the anther; anther beaked.

Oncidium pyramidale, Lindl. in Ann. Nat. Hist. XV. p. 384. Id. Fol. Orch. Oncid. No. 98.

A species rarely seen in British gardens, and of whose origin scarcely anything appears to be known beyond the simple fact that it was first discovered by Hartweg in woods near Pasto in southern Colombia in 1842. We are indebted to Mr. O. O. Wrigley for materials for description.

On. raniferum.

Pseudo-bulbs clustered, oblong, 1—2 inches long, tapering upwards, compressed, furrowed, diphyllous. Leaves linear, grass-like, 5—8 inches long. Scapes as long as the leaves, sparingly branched, many flowered. Flowers small but showy, bright yellow, the crest of the lip orange-red; sepals and petals reflexed, oblong; lip three-lobed, the side lobes linear-oblong, spreading, the front lobe broadly obovate with the anterior margin obscurely crenulate; crest large for the size of the flower, consisting of an oblong obscurely bipartite cushion curiously tubercled. Column wings very narrow.

Oncidium raniferum, Lindl. in Bot. Reg. sub. t. 1920 (1837). Id. 1838, t. 48. Id. Fol. Orch. Oncid. No. 194. Bot. Mag. t. 3712.

First introduced from Brazil in 1837 by Mr. Knight, our predecessor at the Royal Exotic Nursery, and shortly afterwards found by Gardner on the Organ Mountains, whence it has since been occasionally imported with other orchids. It was aptly characterised by Sir W. J. Hooker as “a sprightly little orchidaceous plant.” The specific name, a fanciful one, meaning “frog-bearing,” was suggested by the curious form of the crest which somewhat resembles the figure of a frog *couchant*. We are indebted to Mr. F. W. Moore, of Glasnevin, for materials for description.

On. reflexum.

Pseudo-bulbs ovoid, 1½ inches long, compressed, mono-diphyllous. Leaves linear-lanceolate, acute, 6—8 inches long. Peduncles slender, straggling, 24—30 inches long, pale green mottled with dull crimson, sparsely branched along the distal half. Flowers 1½ inches across vertically; sepals and petals similar and sub-equal, linear-oblong, acute, undulated and reflexed, light yellow-green barred with dull red-brown, the lateral sepals free and divaricate; lip large and spreading, three-lobed, bright gamboge-yellow with some red spots on and around the crest; the basal lobes roundish oblong with revolute margins; the front lobe broadly clawed, transversely oblong with a sinus in the anterior

margin; crest with about ten tubercles of nearly equal size. Column wings hatchet-shaped, denticulate; anther beaked.

Oncidium reflexum, Lindl. in Bot. Reg. sub. t. 1920 (1837). Id. Fol. Orch. Oncid. No. 158. Rehb. Xen. Orch. I. p. 93, t. 36, fig. 1. *On. pelicanum*, Lindl. in Bot. Reg. 1840, misc. No. 216. Id. 1847, t. 70. *On. cruentum*, Hort. Low.

A native of southern Mexico, first detected by Count Karwinsky about the year 1832, and introduced shortly afterwards through him by Messrs. Loddiges. Some years later it was received by Mr. Bateman from the Botanic Garden at Munich, under the name of *Oncidium pelicanum*, and is figured as such in the *Botanical Register* for 1847. It was afterwards imported by Messrs. Low and Co., and distributed by them under the name of *On. cruentum*.* *On. reflexum* is a bright coloured species frequently met with in orchid collections.

On. Retemeyerianum. †

"Pseudo-bulbs nearly obsolete. Leaves cuneate, oblong-acute, more or less keeled on the inferior side, very thick with a purplish hue. Peduncles stout with a few distant acute sheaths, purplish dotted with green, racemed, many flowered; bracts acutely triangular, one-third to one-half as long as the stalked ovary. Flowers fleshy, about 2 inches in diameter; sepals and petals oblong, apiculate, pale yellow with light chocolate-brown spots, the petals a little broader than the sepals; lip constricto-pandurate, deep purplish violet, yellow around the crest which consists of two pairs of blunt tubercles and an 'interjected' central one. Column wings rounded, bent downwards, yellow."—Saunders' *Refugium Botanicum*.

Oncidium Retemeyerianum, Rehb. in Bot. Zeit. 1856, p. 513. Id. Xen. Orch. III. p. 43, t. 218. Saunders' Ref. bot. II. t. 74 (1869). Belg. hort. 1872, t. 14, p. 152. Rolfe in Gard. Chron. VI. s. 3 (1889), p. 294.

Described as a very curious species, distinct in the colour and substance of its flowers, that first appeared in the garden of Herr Retemeyer at Bremen, in 1856, and in the following year in the nursery of M. Chantin at Paris. Ten years later it was sent to the late Mr. Wilson Saunders from Mexico, and thence its native country became known; it has subsequently been sent from that country to several horticultural establishments, both in England and on the Continent. It belongs to the *Sarcoptera* group of Oncids, and has therefore for its allies the better known *Oncidium Lanceanum* and *On. Cavendishianum*, but anomalous in some of its characters.

* *Fide* the late Mr. John Day in Scrap Book No. 10. It is highly probable that *Oncidium funereum* of the Mexican botanists La Llave and Lexarza is the same species as *On. reflexum* described above, but their description is too vague to render the identity certain.

† Not seen by us.

On. sarcodes.

Pseudo-bulbs variable in size, sub-fusiform, compressed, 4—6 inches long, di- rarely tri-phyllous. Leaves oblong, acute, complicate at base, 6—10 inches long. Scapes slender, dull purple freckled with pale green, 3—5 feet long, branched along the distal half, the branches short, few flowered. Flowers $1\frac{1}{2}$ —2 inches in diameter; sepals and petals chestnut-brown bordered with yellow, the dorsal sepal obovate, concave, the lateral two smaller, obovate-oblong, keeled behind; petals obovate, obtuse with undulate margin; lip bright yellow with a few red-brown spots around the crest, three-lobed, the side lobes small, oblong with reflexed margin, the front lobe transversely oblong with undulate margin; crest an oblong plate lobed in front, and with a tooth on each side near the middle, light yellow dotted with brown. Column wings sub-triangular.

Oncidium sarcodes, Lindl. in Journ. Hort. Soc. IV. p. 266 (1849). Id. Fol. Orch. Oncid. No. 84 (1855). Van Houtte's Fl. des Serres, VI. p. 237, with fig. Warner's *Sci. Orch. I.* t. 23. *Illus. hort.* s. 3, t. 165 (1874). *Lindenia*, V. t. 234. *On. Rigbyanum*, Paxt. *Mag. Bot. XVI.* p. 257 (1850).

Although one of the most admired of *Oncids*, and one that is generally cultivated, the records of the botanical and horticultural history of *Oncidium sarcodes* are of the slenderest description. It was first received by the Horticultural Society of London in April, 1849, from Mr. P. N. Don, and from that time to the present its precise habitat does not appear to have been divulged. The importations are received from Rio de Janeiro, and the plants are said to be collected in the neighbourhood of Novo Friburgo, on the Organ Mountains.

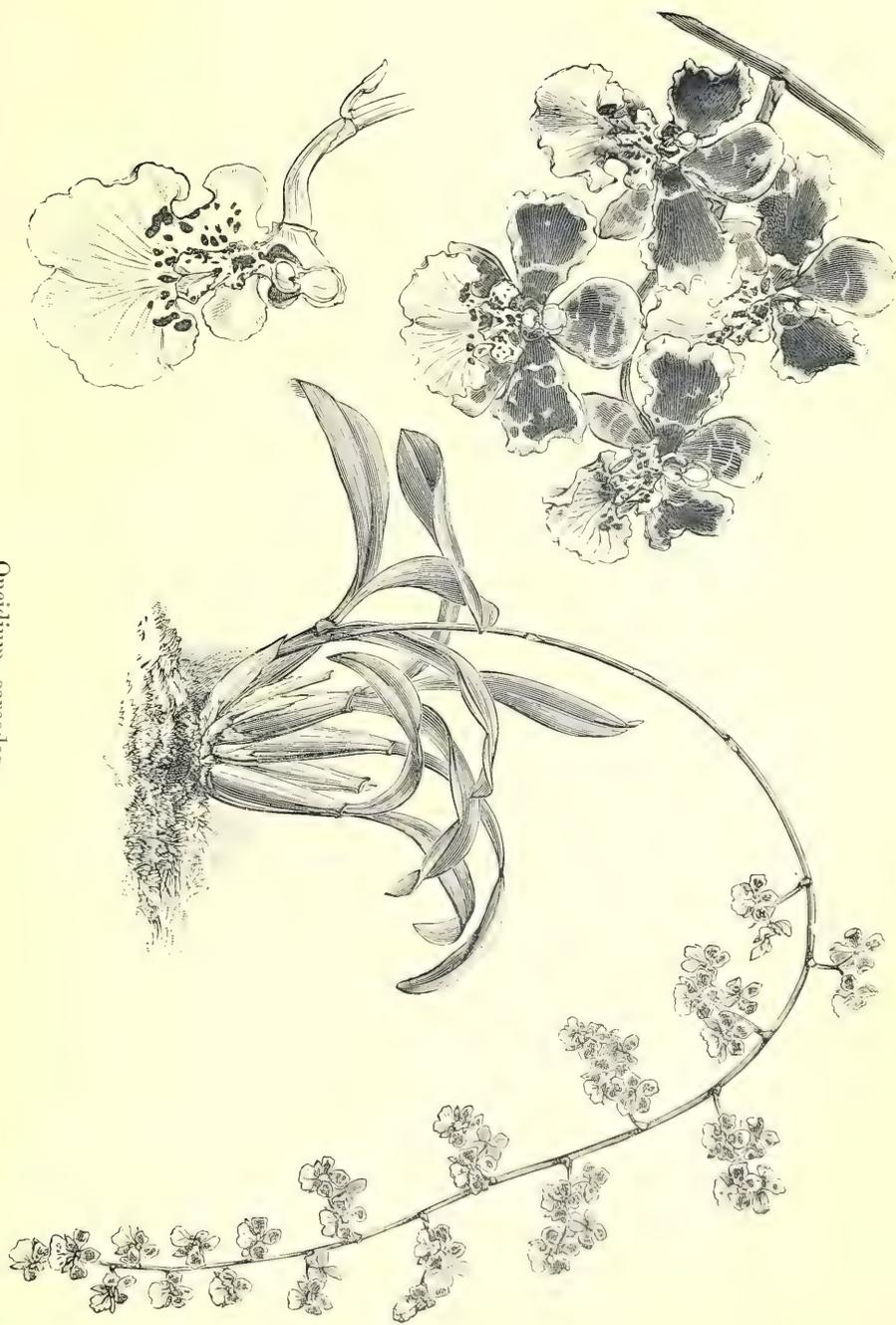
The specific name *sarcodes* (*σαρκώδης*), "flesh-like," refers to the peculiar red-brown of the flowers.

On. Schlimii.

Pseudo-bulbs ovoid, much compressed with acute edges, and with 2—3 ribs on each of the flattened sides, diphyllous. Leaves narrowly lanceolate, 8—12 inches long. Scapes slender, flexuose, 4—5 feet long, loosely paniculate. Flowers exceeding an inch in diameter, very numerous; sepals and petals yellow, with 2—3 red-brown blotches; the dorsal sepal and petals similar and equal, spreading, clawed, oblong, obtuse; the lateral sepals narrower, linear-oblong; lip with two basal auricles and a two-lobed reniform blade that is broadly clawed, yellow with a red-brown band around the crest, which consists of 9—10 teeth, of which the central one is the most prominent. Column with two small rounded wings below the stigma, and a spreading toothletted one on each side of it that is produced upwards into a horn-like cirrus; anther beaked.

Oncidium Schlimii, Lindl. in Paxt. *Fl. Gard.* II. p. 168 (1852). Id. *Fol. Orch. Oncid.* No. 128.

Oncidium sarcoodes.



A native of the eastern Cordillera of New Granada near Ocaña, where it was detected by Linden in 1842 at 3,000—4,000 feet elevation,* and where some years later it was gathered by Schlim, by whom probably it was introduced into European gardens; it was first cultivated in this country by Mr. Brocklehurst, of The Fence, near Macclesfield. The flowers of this Oncid are brightly coloured and produced in great profusion; the curious column wings and beaked anther well distinguish the species. We are indebted to the Royal Gardens at Kew for materials for description.

On. serratum.

Pseudo-bulbs ovoid, compressed, 4—5 inches long, diphyllous. Leaves narrowly lanceolate, 9—15 or more inches long. Scapes flexuose, 5—7 or more feet long, distantly branched, many flowered. Flowers 3 inches across vertically, on pedicels 2 inches long, sheathed at their base by an ovate-lanceolate pale bract about $\frac{1}{2}$ inch long; sepals clawed, the dorsal one sub-orbicular, crisped at the margin, chestnut-brown with a narrow yellow border; the lateral two ovate-oblong, deflexed and then curving upwards and sideways like a saddle; petals like the lateral sepals but shorter, more crisped, and indented at the apex, chestnut-brown to two-thirds of their length, the apical third bright yellow; lip much smaller than the other segments, linear-spathulate, reflexed with two small hatchet-shaped basal lobes, purplish brown; crest a central white projecting plate with two acute teeth in front and a notched plate on each side. Column wings dagger-shaped, ascending, red-brown.

Oncidium serratum, Lindl. Sert. Orch. sub. t. 48 (1838). Id. Paxt. Fl. Gard. II. p. 126, with fig. Id. Fol. Orch. Oncid. No. 6. Gard. Chron. 1850, p. 279, with fig. *Bot. Mag.* t. 5632.

This singular Oncid was first made known to science by Matthews, who sent a rude copy of an old Spanish drawing from Peru (Ecuador?) to Sir W. J. Hooker, at Kew, about the year 1838. It was first cultivated in Europe by M. Pescatore, of La Celle, St. Cloud near Paris, who sent the flower to Dr. Lindley in 1850, from which the woodcut in Paxton's *Flower Garden* was taken. It has since been occasionally imported from the Andes of Ecuador. The flowers are of remarkable form and very difficult to describe; when first open the petals cling together by the interlocking of their crispatation, so that they cannot be easily separated.

* It is stated in the *Gardeners' Chronicle*, VI. s. 3 (1889), p. 42, that *Oncidium Schlimii* has been imported by Messrs Charlesworth and Shuttleworth in a batch of *Odontoglossum cirrosium*, that is to say, 800—1,000 miles distant from the Ocaña locality.

Oncidium serratum is the type species of a group of Oncids belonging to the section MICROCHILIA, characterised chiefly by the elongated lateral sepals, the dorsal one being almost orbicular, the curiously crisped petals which often cling together when first open, and by the dagger-shaped column wings. The group includes *On. trifurcatum*, Lindl.,* *On. trilingue*, Lindl.,† *On. tetracopis*, Rehb.,‡ *On. plagianthum*, Rehb.,|| *On. cryptocopis*, Rehb., *On. ludens*, Rehb.,§ *On. lamelligerum*, Rehb., *On. monachicum*,** Rehb., *On. chrysodipterum*, nobis, and probably others, whose specific characters have not been sufficiently defined to admit of their being technically distinguished the one from the other. Till authentic materials can be brought together for a more critical examination and comparison, it is perhaps safest to leave them as they are, although they all bear so strong a likeness to each other as to form a race of Oncids that might be included under one species, the different forms representing the different links in a chain of affinities too close to be rent asunder by separate specific names. Moreover, the habitats of all occur within a limited area on the Ecuadorean Andes, and most, if not all of them have been imported with *On. serratum*.

On. sessile.

Pseudo-bulbs ovate-oblong, 3—4 inches long, much compressed, with about three rounded ribs on each of the flattened sides, diphyllous. Leaves ensiform, acute, 8—15 inches long, the whole plant of a pea-green colour. Scapes 12—24 inches long, branched along the distal half, the branches somewhat distant, alternate, spreading. Flowers numerous, 1½ inches in diameter, canary-yellow with the basal half of the sepals and petals dotted with red-brown; sepals and petals oblong, obtuse, undulate, the dorsal sepal a little the broadest, the lateral two spreading nearly parallel with the petals; lip three-lobed, the side lobes roundish oblong, the front lobe larger, transversely oblong, deeply emarginate; crest sub-conic, oblate, tuberculose, white dotted with red. Column wings narrow, denticulate.

Oncidium sessile, Lindl. in Paxt. *Fl. Gard. I.* t. 21 (1851). Id. *Fol. Orch. Oncid.* No. 174 (1855). Williams' *Orch. Alb. V.* t. 228.

A native of Caracas and northern Colombia. It was first discovered on Santa Martha by Purdie, who sent it to the Duke of Northumberland, in whose gardens at Syon House it

* *Fol. Orch. Oncid.* No. 4. † Paxt. *Fl. Gard.* II. t. 63. ‡ *Gard. Chron.* 1873, p. 915.

|| *Gard. Chron.* 1873, p. 915.

§ Id. XXIII. (1885), p. 756. ** *Gard. Chron.* XIX. (1883), p. 368, with fig.

flowered in 1851. It has since been occasionally imported from Caracas with *Cattleya labiata* Mossiæ. The specific name was suggested by the absence of the stalk or *unguis* in the sepals and petals, so generally characteristic of Oncids.

On. sphacelatum.

Pseudo-bulbs nearly oblong, compressed with acute edges, 4—6 inches long, di-triphyllous. Leaves linear-ligulate, somewhat rigid, 15—24 inches long. Scapes 3—5 feet long, mottled with dull purple, much branched, the branches short. Flowers numerous, brightly coloured, exceeding an inch in diameter; sepals and petals narrowly oblong, undulate, reflexed at the tip, dark chestnut-brown barred with yellow; lip sub-panduriform, golden yellow with a red-brown band in front of the crest; crest a fleshy plate, three-lobed in front, toothed at the sides. Column wings small, oblong, depressed.

Oncidium sphacelatum, Lindl. Sert. Orch. sub. t. 48 (1838). Id. *Bot. Reg.* 1842. t. 30. Id. *Fol. Orch. Oncid.* No. 151. *On. Massangei*, Morren in *Belg. hort.* 1877, p. 124.

A handsome species, well known as one of the most useful of Oncids in a horticultural sense, being of easy culture and constantly flowering during April—June. It was first collected for the Horticultural Society of London in southern Mexico by Hartweg, in 1840, and shortly afterwards it was received from Honduras by Messrs. Loddiges, in whose nursery it flowered for the first time in this country in February, 1841. It was next sent from Guatemala by



Oncidium sphacelatum.

Mr. G. Ure Skinner to Mr. Bateman and other amateurs, and has doubtless been in cultivation ever since. A peculiarity by which *Oncidium sphacelatum* may be recognised is seen in the bud just before expansion; the points of the sepals and petals are here always bent back like five recurved horns. The specific name *sphacelatum*

(non-classical) is a fanciful one derived from *σφάκελος*, "tremor" or "agitation."*

On. sphegiferum.

Pseudo-bulbs broadly oval, almost orbicular, 1—1½ inches in diameter, much compressed, monophyllous. Leaves elliptic-oblong, 6—8 inches long, leathery, pale green. Scapes 3—4 feet long, paniced, many flowered. Flowers about an inch in diameter, bright orange with a reddish stain at the base of all the segments; sepals and petals clawed, the former oval, the latter oblong, apiculate; lip sub-pandurate in outline, the basal lobes rounded with denticulate margins, the front lobe transversely oblong, emarginate, of a lighter orange than the sepals and petals; crest oblong, cushion-like, minutely papillose. Column wings narrowly oblong.

Oncidium sphegiferum, Lindl. in *Bot. Reg.* 1843, misc. 23. Id. *Pact. Fl. Gard.* II. icon. xyl. No. 124. Id. *Fol. Orch. Oncid.* No. 117. Rolfe in *Gard. Chron.* III. s. 3 (1888), p. 716.



Oncidium sphegiferum.

First introduced from Brazil by Messrs. Loddiges in 1842—3, but we find no further evidence of its being in cultivation till 1887, when a plant, supposed to have been imported with *Oncidium divaricatum* or *On. pulvinatum*, flowered in our Chelsea nursery. An herbarium specimen was gathered by Miers at Corcovado, near Rio de Janeiro, thus indicating that its habitat is within the restricted area occupied by the members of the *Pulvinata* group, to which it belongs.† Its bright orange flowers render it distinct among the cultivated *Oncids*.

On. stramineum.

"Pseudo-bulbs none. Leaves 6—8 inches long, oblong-lanceolate, sub-acute, contracted into a short, stout petiole, very rigid, thick and coriaceous. Panicle stout, inclined or drooping, more or less branched. Flowers crowded, ¾ inch across, white speckled with red on the lateral sepals, lip and column; sepals and petals widely spreading, almost orbicular, the dorsal sepal concave; lip very shortly clawed, lateral lobes oblong, obtuse, falcately recurved; middle lobe broadly stalked, kidney-shaped, smaller than the lateral lobes; warts of the crest two on each side, more or less confluent. Column with broad wings."—*Botanical Magazine*.

Oncidium stramineum, Lindl. in *Bot. Reg.* 1838, misc. No. 63. Id. 1840, t. 14. Id. *Fol. Orch. Oncid.* No. 123. *Bot. Mag.* t. 6254.

* In the *Gardeners' Chronicle*, 1842, p. 382, Dr. Lindley calls it the scorched *Oncidium*.

† See *Oncidium divaricatum*, p. 34.

One of the first orchids collected by Hartweg for the Horticultural Society of London during his mission to Mexico and Central America, 1837—42. He sent it from Vera Cruz in 1837, but as the plant was found in company with *Berberis tenuifolia* and other temperate forms, the true locality is probably on the eastern slopes of Orizaba at 3,000—4,000 feet elevation, one of the richest tracts of vegetation in Mexico. It belongs to a small sub-section of the genus (*Paucituberculata* of Lindley) including *Oncidium cheiroporum*, *On. hians*, *On. Warneri*, and one or two others in which the crest consists of an even number of tubercles, 2—4.*

Although a pretty and distinct species with whitish or straw-coloured flowers with a pleasant primrose fragrance, it is now but rarely seen in cultivation.

On. suave.

Pseudo-bulbs ovoid, 3 inches long, compressed, ancipitous, with 2—3 shallow ribs on each of the flattened sides. Leaves linear, acuminate, 6 or more inches long. Peduncles slender, 18—21 inches long, paniculate, the branches short, distant and few flowered. Flowers fragrant, exceeding an inch in diameter; sepals and petals uniform, narrowly lanceolate, acute, reflexed at the tip, dark sepia-brown, obscurely keeled behind; lip bright yellow blotched with red-brown around the crest, three-lobed, the side lobes oval-oblong; the intermediate lobe broadly clawed, transversely oblong, emarginate; crest five-toothed, the central one much the largest. Column wings large, hatchet-shaped, bright yellow.

Oncidium suave, Lindl. in Bot. Reg. 1843, misc. No. 22. Id. in Paxt. Fl. Gard. II. fig. 135. Id. Fol. Orch. Oncid. No. 161. *On. Wendlandianum*, Rehb. in Bonpl. II. p. 91 (1850). *On. macropterum*, A. Rich. Orch. Mer. t. 32. *On. lanceans*, Hort. Sand. Cat. p. 46.

First imported from Mexico by Messrs. Loddiges through Deppe in 1835, and subsequently gathered by Schiede, Galeotti and other Mexican collectors in the neighbourhood of Oaxaca. We are indebted to Mr. F. W. Moore, of Glasnevin, for materials for description.

On. superbiens.

Pseudo-bulbs elongate-ovate, 3—4 inches long, compressed, monophyllous. Leaves broadly linear, almost ensiform, 12—15 or more inches long. Scapes flexuose, 4—5 or more feet long, branched at irregular intervals, the branches usually short and few flowered; bracts boat-shaped, sub-acute, $\frac{3}{4}$ inch long. Flowers 3—3 $\frac{1}{2}$ inches in diameter; sepals clawed, wavy, reddish brown tipped with light yellow, the dorsal one somewhat

* The predominating number throughout *Oncidium* is five.

trulliform with a cordate base, the lateral two ovate, obtuse; petals similar to the lateral sepals but smaller with a shorter claw, more undulate and reflexed at the apex, light yellow barred with brown on the basal half; lip plum-purple, "trulliform, auricled, shortly clawed with a raised tubercled yellow fleshy crest towards the base and a prominent acute tubercle on each auricle." Column yellow and brown with a small ascending auricle on each side of the stigma.

Oncidium superbiens, Rehb. in *Linnaea*, XXII. p. 843 (1848). Id. in *Gard. Chron.* 1872, p. 904. Lindl. *Fol. Orch. Oncid.* No. 9. *Bot. Mag.* t. 5980. Williams' *Orch. Alb.* VI. t. 276. *On. undulatum*, Williams' *Orch. Alb.* VIII. t. 368 (not of Lindl.)



Oncidium superbiens.

One of the handsomest of the MICROCHILA Oncids, almost rivalling the handsome *On. macranthum* in the size and varied colouring of its flowers. It is a native of the eastern Cordillera of New Granada at 8,000—9,000 feet elevation; it was first detected by Purdie, about the year 1843, on Santa Martha, and by Fünck and Schlim between Pamplona and Ocaña, in 1847. It was introduced by us in 1871, and flowered for the first time in this country in our Chelsea nursery in the spring of the following year.

On. tectum.

Pseudo-bulbs broadly ovoid, compressed, an inch long, diphyllous. Leaves linear-ligulate, acute, 3—5 inches long. Peduncles slender,

18—24 inches long, sometimes racemed, oftener paniced, the branches zigzag and few flowered. Flowers $\frac{3}{4}$ inch in diameter, bright canary-yellow with 1—2 red-brown bars on each segment; sepals linear-oblong, acute, the lateral two free; petals broader, oval-oblong; lip with two rounded basal lobes and a transversely oblong deeply emarginate blade; crest a nearly circular disk with many tubercles, those at the circumference tooth-like. Column wings bipartite, the lower halves spreading, the upper halves prolonged and meeting above the anther.

Oncidium tectum, Rehb. in Gard. Chron. III. (1875), p. 780.

A species now rarely seen in other than Botanic gardens, introduced by us from New Granada, in 1874, through Gustav Wallis, who did not give the locality of this or indeed of any of his discoveries. The zigzag growth of the branches of the inflorescence is here more conspicuous than in any other *Oncidium* known to us. The applicability of the specific name is obscure.

On. tetrapetalum.

Pseudo-bulbs none. Leaves in tufts of 4—5 or more from a creeping rhizome, fleshy, triquetral with acute edges, equitant at the base, channelled on one side, 3—6 inches long. Scapes erect, dark purple, 18—24 inches high, racemose, or sparingly branched, many flowered. Flowers an inch across vertically; sepals and petals clawed, broadly oblong, sub-acute, undulate, keeled behind, the lateral sepals connate and concealed by the lip, bright chestnut-red barred and marked with yellow; lip broadly clawed, with two horn-like basal auricles and a transversely reniform, emarginate blade, white with a red blotch in front of the crest, which consists of seven tubercles, three in front and four in two pairs behind, all pointing forwards. Column wings somewhat scimitar-shaped, pale rose dotted with yellow.

Oncidium tetrapetalum, Wild. Sp. Plant. IV. p. 112, ex. Lindl. Gen. et Sp. Orch. p. 198 (1832). Lindl. Fol. Orch. Oncid. No. 36. *On. pauciflorum*, Lindl. Gen. et Sp. Orch. p. 198. *On. tricolor*, Hook. Bot. Mag. t. 4130 (1844). *On. quadripetalum*, Sw. in K. Vet. Acad. Stockh. Nya. Handl. XXI. p. 240* (1800).

A very pretty species that was known to science in the last century, and which during the last sixty years has been frequently introduced into British gardens, but like most of the equitant *Oncids* has proved a refractory subject under cultivation. It is a native of the West Indies and adjacent countries on the American continent, Jamaica, Dominica, Mexico, Cumana (Venezuela) being

* This is therefore the oldest name of this species, but being a mongrel word, half Latin, half Greek, it was rejected by the older botanists.

among the recorded stations of this plant. It varies somewhat in habit and still more so in the colour of its flowers, and has received several names in consequence.

On. tigrinum.

Pseudo-bulbs sub-globose, compressed, 3—4 inches in diameter, di-triphyllous. Leaves linear-oblong, obtuse, folded at the base, 9—12 inches long. Scapes robust, erect, 24—36 inches high, loosely paniced; bracts small, subulate, appressed. Flowers about 3 inches across vertically, fragrant; sepals and petals similar and sub-equal, narrowly oblong, undulate, reflexed at the tip, bright yellow heavily blotched with brown; lip large and spreading, almost flat, wholly yellow, broadly clawed, the basal lobes small and rounded, the blade transversely and broadly oblong, emarginate; crest consisting of two short ridges and a large central one, terminating in three blunt teeth. Column wings ear-shaped.

Oncidium tigrinum, La Llave et Lex. Nov. Veg. Descript. p. 36 (1825). Lindl. Gen. et Sp. Orch. p. 203 (1832). Id. Fol. Orch. Oncid. No. 157. Williams' *Orch. Alb. III.* t. 137. *Rev. hort.* 1889, p. 176. Sander's *Reichenbachia, II.* pl. 88. On. *Barkeri*, Lindl. *Sert. Orch.* t. 48. Id. in Bot. Reg. 1841, misc. No. 174. *Paxt. Mag. Bot. XIV.* p. 97. *Illus. hort. I.* t. 2. *Odontoglossum tigrinum*, Lindl. *Fol. Orch. Odont.* No. 10 (1852).

var.—splendidum.

Pseudo-bulbs smaller and monophyllous, both pseudo-bulbs and leaves changing with age to a bronzy purplish brown. Peduncles shorter, usually racemed and fewer flowered. The sepals and petals are more reflexed, and the claw of the lip somewhat broader.

On. *tigrinum splendidum*, Hook. f. in *Bot. Mag.* t. 5878. Van Houtte's *Fl. des Serres, XVIII.* t. 1825. On. *splendidum*, A. Richard, *vide* Rehb. in *Gard. Chron.* 1870, p. 1213. De Puydt, *Les Orch.* t. 33. Williams' *Orch. Alb. VIII.* t. 373. Sander's *Reichenbachia, II.* t. 78. Godefroy's *Orchidophile*, 1891, p. 304.

var.—unguiculatum.

Panicles looser and the flowers smaller; the sepals and petals sometimes spotted, not barred; the claw of the blade of the lip longer and narrower.

On. *tigrinum unguiculatum*, Lindl. *Fol. Orch. Oncid.* No. 157. On. *unguiculatum*, Hort.

This fine *Oncid* was first made known to science by the Mexican botanists, La Llave and Lexarza, who gave a description of it in their *Novarum Vegetabilium Descriptiones*, published in 1825.* It was first cultivated in this country by Mr. Barker, of Birmingham, who introduced it from Mexico in 1839 or 40; it forms the subject of the last plate in Lindley's superb work, *Sertum Orchidaceum*, under the name of *Oncidium Barkeri*, in compliment to the introducer,

* That portion of it devoted to orchids is called *Opusculum Orchidaceum*.



Oncidium tigrinum, var. *splendidum*.

Lindley at that time failing to identify it with La Llave's *Oncidium tigrinum*. The habitat given by the Mexican botanists is the Irapean Mountains, not far from Valladolid, but a recent attempt to collect it there seems to have failed.* According to Lindley it was afterwards gathered by Ghiesbreght in Michoacan,† and many years later it was found by Roezl near Colima, on the mountains skirting the Pacific coast.‡

The variety *splendidum* first became known to the French botanist, Achille Richard, through a dried specimen, probably communicated to him by Galeotti; its introduction into French gardens is due to the late M. Quesnd, of Havre, who received plants from Guatemala about forty years ago,§ some of which he distributed among his friends, including M. Herment, of Caen, in Normandy, whence this gentleman's name became erroneously associated with its introduction. It does not appear to have found its way into British gardens till some years afterwards, the earliest occasion of its flowering in this country being in the collection of Lord Londesborough, at Norbiton, in the spring of 1870. It continued to be very rare for many years till a recent importation by Messrs. Sander and Co. has caused it to become generally distributed. Usually described in the horticultural periodicals as a species, it has but the slenderest claim to such a distinction, the characters relied upon to separate it from *Oncidium tigrinum* being chiefly the pseudo-bulbs and leaves, which are certainly distinct in aspect, but show no difference that might not have been brought about by local environment.|| The variety *ungiculatum*, in which the structural deviations from the type as seen in the flowers are more conspicuous than in the variety *splendidum*, finds less favour with amateurs than either; it is occasionally imported with the species. *On. tigrinum* and its varieties flower in the winter months and continue a long time in bloom.

Oncidium tigrinum is called by the country people of Mexico Flor de Muertos, or "Flower of the Dead," in accordance with a custom that has prevailed in the country almost from the time of its first

* Reichenbachia, II. p. 87.

† Fol. Orch. Oncid. No. 157.

‡ Belg. hort. XXXII. (1882), p. 100.

§ Godefroy's Orchidophile, 1891, p. 304.

|| More convincing than anything we can say on this point is a comparison of the various coloured plates quoted in our literary references.

occupation by the Spaniards in the sixteenth century, by which all the most conspicuous native orchids have been associated with their religious observances.

On. triquetrum.

Pseudo-bulbs none. Leaves in tufts of 3—4 or more, linear, acute, 3—5 inches long, fleshy, triquetrous, the angles very acute, channelled on one side. Scapes slender, longer than the leaves, terminating in a 10—15 flowered raceme. Flowers an inch across vertically; sepals broadly lanceolate, acute, purplish green, the lateral two connate and together equal to the dorsal one, bi-dentate at the tip; petals ovate, undulate, white tinged with pale green and spotted with purple; lip cordate-ovate with two rounded basal auricles, white spotted and streaked with purple; crest small, sub-globose, orange-yellow. Column wings oblong with the outer margin crenulate.

Oncidium triquetrum, R. Br. in Ait. Hort. Kew, ed. 2, vol. V. p. 216 (1813—15).
Lindl. Gen. et Sp. Orch. p. 205 (1832). Id. Fol. Orch. Oncid. No. 30. *Bot. Mag.*
t. 3393.

One of the prettiest of the equitant Oncids, although like its congeners and from the same cause it is but rarely seen in British gardens. It was originally introduced to the Royal Gardens at Kew by Admiral Bligh from St. Ann's, in Jamaica, in 1793; and again from the same island, to which so far as at present known it is confined, by Mr. Horsfall, of Liverpool, about 1833, by whom plants were distributed among the orchid collections at Wentworth, Chatsworth, etc. It is very near *Oncidium pulchellum*, from which it is easily distinguished by its very differently-shaped labellum.

On. trulliferum.

Pseudo-bulbs oblong, compressed, much elongated, 4—7 inches long, di-triphyllous, brownish green. Leaves variable in size, narrowly oblong or lanceolate-oblong, narrowed at the base, sub-acute, 6—9 or more inches long, 1—2 inches broad. Scapes about 2 feet long, loosely paniced along the distal third. Flowers nearly an inch across vertically, on short, slender pedicels, sheathed at the base by a minute auricular bract; sepals and petals bright yellow barred with red-brown, oval-oblong, obtuse, the dorsal sepal the shortest and concave, the lateral two free and divergent; lip bright yellow, broadly clawed with two rounded basal auricles and a trowel-shaped blade with serrulate margin; crest primarily three-lobed, each lobe much warded and toothed, the front lobe somewhat saddle-shaped, yellow, the posterior two divergent and spotted with red-brown. Column wings narrow; anther beaked.

Oncidium trulliferum, Lindl. in *Bot. Reg.* 1839, t. 59. Id. *Fol. Orch. Oncid.*
No. 190. *Regel's Gartenfl.* 1877, t. 922.

“Originally imported from Brazil by Messrs. Loddiges, in whose nursery it flowered in September, 1838.” This is all that has been published respecting its origin, and we find no precise habitat attached to herbarium specimens. Its native home is doubtless in the rich *Oncidium* region lying to the north and west of Rio de Janeiro. We are indebted to the Royal Gardens at Kew for materials for description.

On. unicorne.

Pseudo-bulbs oval-oblong, compressed, 2—3 inches long, diphyllous. Leaves linear-lanceolate, acute, 5—9 inches long. Scapes erect or inclined, as long again as the leaves, pale glaucous green, loosely paniced above. Flowers $\frac{3}{4}$ inch across vertically; sepals lanceolate, the lateral two connate almost to the apex, pale greenish or reddish brown; petals broader, oblong, undulate, red-brown tipped with light yellow, both sepals and petals reflexed; lip with a fleshy claw and sub-panduriform emarginate blade, of which the basal half is red and the apical half yellow; crest prolonged into an incurved reddish horn as long as the column. Column slender, wingless, but with the characteristic swelling below the stigma.

Oncidium unicorne, Lindl. in Bot. Reg. 1837, misc. No. 76. Id. Fol. Orch. Oncid. No. 71. Rehb. in Gard. Chron. XIV. (1880), p. 652 (pictum). *On. monoceras*, Hook. Bot. Mag. t. 3890.

First imported by Messrs. Rollisson from Rio de Janeiro in 1839, and shortly afterwards sent from that city by Mr. Hunt to the Duke of Bedford, in whose collection at Woburn Abbey it flowered in January, 1840. It has been reported from several localities in southern Brazil; it was detected by Gardner on the Organ Mountains, afterwards by Regnell in Minas Geraes, and later by Weir in São Paulo.

On. urophyllum.

Pseudo-bulbs none. Leaves equitant, ensiform, curved, 4—6 inches long, acuminate, dull dark green. Scapes slender, drooping, 18—24 inches long, dull brownish crimson, loosely paniced, many flowered. Flowers about an inch in diameter; sepals and petals yellow, blotched with chestnut-brown, the sepals linear-acute, the lateral two connate almost to their apex; the petals obovate, apiculate; lip three-lobed, canary-yellow, the basal lobes small, obovate; the front lobe clawed, broadly reniform with a sinus in the anterior margin; crest red and white, consisting of eight teeth arranged somewhat in quineuncial order. Column wings dolabriform, spreading.

Oncidium urophyllum, Lind. Sert. Orch. sub. t. 48 (1833). Id. Bot. Reg. 1842, t. 54. Id. Fol. Orch. Oncid. No. 33. Rolfe in Gard. Chron. IX. s. 3 (1891), p. 701.

First cultivated by Messrs. Loddiges in 1840—41, who informed Dr. Lindley that it had been imported from Brazil, which, however, is an error, as the plants cultivated in the Royal Gardens at Kew were received from the West Indian Island of Antigua, the only authentic habitat of the plant yet known. It is one of the equitant Oncids with tail-like leaves that suggested the specific name, from *ὄψα*, "a tail," and *φύλλον*, "a leaf." We are indebted to the Royal Gardens at Kew for materials for description.

On. varicosum.

Pseudo-bulbs oval-oblong, compressed, furrowed, 3—4 inches long, di-rarely tri-phyllous. Leaves ligulate-lanceolate, 6—9 inches long. Scapes nodding, glaucous, 3—5 feet long, flexuose and branched beyond the middle. Flowers variable in size, attaining their maximum in the variety *Rogersii*; sepals and petals small and inconspicuous, dull yellow barred with pale red-brown; dorsal sepal oval, concave; lateral sepals connate to beyond the middle, obovate; petals narrowly oblong with crisped margin; lip very large, bright yellow, sometimes with a red-brown blotch in front of the crest, the basal auricles roundish, the blade transversely and broadly reniform, 2—3 lobed; crest consisting of "two triple teeth one standing before the other, and of a little ring of varicose veins placed on each side of it." Column wings oblong, denticulate.

Oncidium varicosum, Lindl. in Bot. Reg. sub. t. 1920 (1837). Id. in Journ. Hort. Soc. Lond. V. p. 143 (1850). Id. Fol. Orch. Oncid. No. 79.

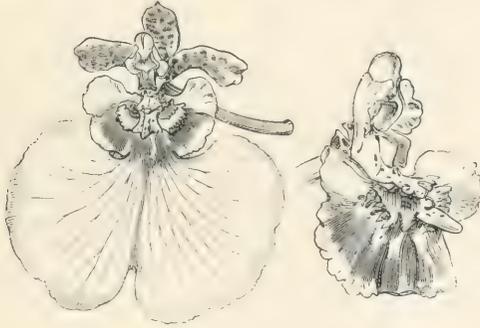
var.—*Rogersii*.

Panicles much larger and more spreading. Flowers the largest of all the forms of *Oncidium varicosum*; the blade of the lip fully 2 inches across, and made four-lobed by three deep clefts in the anterior margin.

On. varicosum Rogersii, Rehb. in Gard. Chron. 1870, p. 277, with fig. *Fl. Mag.* 1870, t. 477. *Florist and Pomol.* 1870, p. 25. Warner's *Sel. Orch.* II. t. 31. Jennings' *Orch.* t. 29. *Belg. hort.* 1878, p. 172.

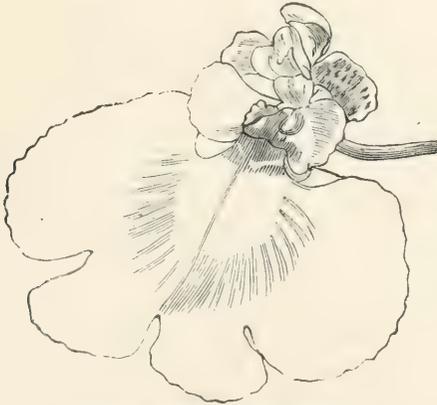
Oncidium varicosum first became known to Dr. Lindley about the year 1837, through a specimen in the herbarium of Dr. Martius, which had been gathered in Brazil by Prince Maximilian, of Wied Neuwied. It was introduced to European gardens by M. de Jonghe, of Brussels, through Libon, who had rediscovered it in 1846 growing on the trunks of large trees in the neighbourhood of Yta, in the province of São Paulo. M. de Jonghe, in 1848, presented a plant to the Horticultural Society of London, which flowered in the Society's garden at Chiswick in the following year, the first occasion of its flowering in this country. The variety *Rogersii* first appeared

in the collection of Dr. Rogers, of East Grinstead, who exhibited it at a meeting of the Royal Horticultural Society in November,



Oncidium varicosum.

1868, when it was generally recognised as one of the finest Oncids ever seen in cultivation; it has always been extremely rare. The



Oncidium varicosum var. *Rogersii*.
(From the *Gardeners' Chronicle*.)

specific name, from *varex*, "a swollen vein," was suggested by the ring of varicose veins around the crest of the labellum.

On. viperinum.

Pseudo-bulbs ovoid, obscurely four-angled, an inch long, diphyllous. Leaves linear-oblong, acute, 2 inches long, pea-green. Peduncles slender, erect, 5—7 or more inches long, few flowered. Flowers about an inch in diameter; sepals and petals small, much undulated, pale red-brown

barred with light yellow; the upper sepal elliptic-oblong, incurved, the lateral two free; the petals oblong, reflexed; lip canary-yellow, with two small rounded basal auricles and a large transversely oblong, emarginate blade; crest very complex, mainly a fleshy bipartite protuberance toothed and warted, and with two small teeth on each side. Column wings small, rounded.

Oncidium viperinum, Lindl. Gen. et Sp. Orch. p. 197 (1832). Id. Fol. Orch. Oncid. No. 77. *On. confragosum*, Lindl. in Bot. Reg. 1838, misc. No. 92.

Originally discovered by Tweedie in the early part of the present century, growing upon dead trees in Uruguay, in the neighbourhood of Montevideo. Coming from the same country as *Oncidium bijolium*, which it much resembles in habit, Dr. Lindley aptly compared it with that species, from which it is distinguished by its differently shaped pseudo-bulbs, its longer peduncles bearing smaller flowers with a different lip, and especially by its crest. The curious form of the latter, which Lindley fancifully likened to a cluster of young vipers' heads as seen in profile, suggested the specific name.

On. volvox.

Pseudo-bulbs oval-oblong, 2—4 inches long, compressed, ribbed and furrowed on the flattened sides, diphyllous. Leaves narrowly ligulate, sub-acute, 8—12 inches long, complicate at base. Scapes very slender, brownish, flexuose, 3—5 feet long, with a minute whitish bract at each joint, branched at short intervals, the branches 2—3 flowered. Flowers an inch in diameter; sepals and petals similar and equal, linear-oblong, obtuse, undulate, yellow much spotted with red-brown to two-thirds of their length, the lateral sepals free and spreading parallel with the petals; lip sub-panduriform, the basal lobes roundish oblong, convex, bright yellow; the front lobe with a short broad claw, transversely oblong, emarginate, canary-yellow with a red-brown band around the crest, paler beneath; crest consisting of a central raised plate bidentate at the apex, and with 5—7 teeth on each side in two uneven rows. Column wings narrow.

Oncidium volvox, Rehb. in Bonpl. II. p. 13 (1854). Id. Xen. Orch. I. p. 234, t. 99, No. 1. Lindl. Fol. Orch. Oncid. No. 156.

Discovered by Wagener in the vicinity of Caracas, and sent by him to Herr Keferstein, in whose collection at Halle, in Germany, it flowered for the first time in Europe in 1854. We find no record of its first introduction into British gardens. The above description was taken from a plant that flowered in our houses in the autumn of 1891, and about the same time we received an inflorescence from Mr. F. W. Moore, of Glasnevin. The specific name refers to the twining, convolvulus-like axis of the inflorescence.

On. Warszewiczii.

Pseudo-bulbs ovate-oblong, compressed with acute edges, mono-diphyllous. Leaves ligulate-cuneate, complicate at base, 7—10 inches long. Scapes 15—21 inches long, rendered ancipitous by opposite and alternate sheathing bracts, 10—15 or more flowered, the floral bracts triangular, acute, keeled, as long as the stalked ovaries. Flowers $1\frac{1}{4}$ inches across vertically, of a uniform golden yellow; dorsal sepal and petals oval-oblong with undulate margin; lateral sepals connate almost to the apex, concave above, two-keeled beneath; lip with a long and narrow claw, at the base of which are two small auricles, the blade sub-orbicular, bilobed with an apiculus in the sinus between the lobes; crest five-toothed. Column wings narrow.

Oncidium Warszewiczii, Rehb. in Bot. Zeit. 1852, p. 693. Id. in Gard. Chron. 1871, p. 560, and l. (1874), p. 48. Lindl. Fol. Orch. Oncid. No. 56. *Lindenia*, II. t. 88. *On. bifrons*, Lindl. in Gard. Chron. 1857, p. 84, *vide* Rehb. in Gard. Chron. 1871, p. 675.

Originally discovered by Warszewicz on Chiriqui, in Veragua, growing upon oaks at 8,000—10,000 feet elevation, where the temperature often sinks to 5° C. (41° F.). It was imported by us from Costa Rica in 1870. It is one of the most distinct *Oncids* ever introduced, for although somewhat resembling in its large spathaceous bracts *Oncidium bracteatum* from the same region, the flowers are very different in shape and colour.

On. Warneri.

Pseudo-bulbs ovoid-conical, $1\frac{1}{2}$ inches long, green spotted with dull purple, diphyllous. Leaves linear, grass-like, 5—6 or more inches long. Scapes slender, erect, racemose, 8—12 flowered. Flowers small but showy, about an inch across vertically; sepals and petals variable in colour, sometimes pale brown, sometimes yellow stained and streaked with purple towards their base; the sepals narrowly elliptic-oblong, the lateral two free; the petals similar but a little shorter and broader, also apiculate; lip bright yellow, four-lobed, the basal lobes rotund, the anterior lobes smaller, oblong, divergent; crest oblong thickened at the posterior end and with a shallow sunk line. Column wingless.

Oncidium Warneri, Lindl. Fol. Orch. Oncid. No. 125 (1855). *Odontoglossum Warneri*, Lindl. in Bot. Reg. 1845, misc. p. 54. *Id.* 1847, t. 20.

A remarkable *Oncidium*, more interesting perhaps in a botanical than in a horticultural sense. The labellum of the flower affords a striking instance of the polymorphism of that organ in *Oncidium*, but its simple crest is more that of an *Odontoglossum*; the absence of the "ears" or column wings would also bring it within that genus or even *Miltonia*; the protuberance at the base of the column

in front, however, indicates its true place. It was first exhibited by Mr. C. B. Warner at a meeting of the Horticultural Society of London in May, 1845, and had probably been imported by Messrs. Loddiges from Mexico. We received materials for description from the collection of Sir Trevor Lawrence, Bart., at Burford Lodge, and from Mr. F. W. Moore, of Glasnevin.

On. *Wentworthianum*.

Pseudo-bulbs ovate-oblong, 3—4 inches long, compressed, furrowed, often barred and spotted with brown, diphyllous. Leaves ligulate, acute, 9—12 or more inches long. Scapes flexuose, several feet long, branched; the branches distant, slender, the longer ones again branched and many flowered. Flowers an inch or more in diameter; sepals and petals yellow blotched with red-brown except on the apical area, linear-spathulate, undulate at the margin, the two lateral sepals free and divergent; lip with two rounded pale yellow basal lobes, and a transversely oblong two-lobed blade, denticulate at the margin, yellow with some red-brown spots around the crest; crest triangular, toothed at each angle, with a smaller tooth on each side and two more in front of the apical angle. Column wings narrow.

Oncidium Wentworthianum, Batem. in Bot. Reg. 1840, misc. No. 194. Id. *Orch. Mex. et Guat.* t. 39. Lindl. *Fol. Orch. Oncid.* No. 195. Id. *Pact. Fl. Gard.* II. icon. 127.



Oncidium Wentworthianum.

One of the numerous discoveries of Mr. G. Ure Skinner in Guatemala. He detected it on the mountains of Santa Rosa in 1839 and sent it to Mr. Bateman, in whose collection at Knypersley it flowered in the following year; it was subsequently sent to the Horticultural Society of London from the same country by Hartweg. It was named in compliment to Earl Fitzwilliam, whose collection of orchids at Wentworth, near Rotherham, was at that time one of the finest in England.

On. *Widgrenii*.

Pseudo-bulbs oblong, thickened at the middle, 2 inches long, monophyllous. Leaves narrowly oblong, acute, 4—5 inches long. Scapes slender, sub-erect or nodding, about a foot high, racemed or paniced, 12—15 or more flowered. Flowers about an inch in diameter, brightly coloured; sepals yellow with narrow transverse red-brown bars, the dorsal one oblong-cuneate, obtuse, the lateral two linear-oblong, connate at the base; petals like the dorsal sepal, but wholly red-brown and undulate at the margin; lip with a long claw,

three-lobed, the side lobes linear, incurved, yellow, the front lobe roundish, emarginate, red-brown; crest consisting of a large number of tubercles running down the centre from the base to the front lobe. Column with two large incurved wings and a small apical hood.

Oncidium Widgrenii, Lindl. Fol. Orch. Oncid. No. 50. Rolfe in Gard. Chron. V. s. 3 (1889), p. 557.

This is probably a very rare species, with a restricted habitat. Prior to 1889 nothing was known of it beyond an herbarium specimen gathered by Widgren in the Brazilian province of Minas Geraes, preserved at Kew, and the description and note in Lindley's *Folia Orchidacea*. In the year mentioned, Mr. Draper, gardener to the Marquis of Londonderry, at Seaham Hall, near Sunderland, sent the inflorescence of an *Oncidium* to Kew for identification, and shortly afterwards supplied us with the materials from which our description was taken, and which were identified for us by Mr. Rolfe, of the Kew Herbarium. Mr. Draper states that the plants came from the neighbourhood of Rio de Janeiro. It is a handsome species with bright-coloured flowers that should be sought for by the collectors of Brazilian orchids.

On. xanthodon.*

"Pseudo-bulbs narrow-ovoid, much compressed, 5 inches long, monophyllous. Leaves 18—24 inches long and 2—2½ inches broad, narrow linear-obovate, acute. Scape very slender, 6—8 feet long, much branched, twining, greenish brown; branches slender, flexuous; bracts ovate-lanceolate, ½ inch long; ovary and pedicel together nearly 2 inches long. Flowers 1½ inches in diameter, of a rich chocolate-brown with golden crisped and crenate edges; sepals and petals very similar, waved and reflexed, clawed; blade broadly ovate, rounded or almost hastate at the base; lip smaller and narrower than the petals; basal portion irregularly quadrate, sessile, two-lobed at the apex; disk prominent with several tubercular calli which are yellow, shining, and viscid; blade spatulate, recurved, acute. Column short, curved like the letter S, with small lateral wings at the apex."—*Botanical Magazine*.

Oncidium xanthodon, Rehb. in Gard. Chron. 1868, p. 1338. *Bot. Mag.* t. 5756.

Introduced in 1863 from the Ecuadorean Andes by Messrs. Backhouse, of York. Although closely allied to *Oncidium serratum*, and originating in the same region as the group of *Oncids* noticed under that species, the plate and description in the *Botanical Magazine* show that it is sufficiently distinct to require separate notice, and that it is one of the series of *serratum* affinities that will doubtless retain its specific rank.

* Not seen by us.

On. zebrinum.

Rhizome almost as thick as the little finger, sheathed by the persistent whitish bases of the fallen scales that are lanceolate and at first brownish. Pseudo-bulbs produced from the rhizome at intervals of 4—6 inches, ovoid-oblong, compressed, 4—5 inches long and 2 inches broad at the widest, diphyllous. Leaves ligulate, acute, 10—15 inches long. Panicles flexuose, 7—10 or more feet long, the branches short and few flowered. Flowers $1\frac{1}{2}$ inches in diameter; sepals and petals similar and sub-equal, narrowly oblong, much undulated, reflexed at the apex, white with 5—7 zebra-like,



Oncidium zebrinum.

(From the *Gardeners' Chronicle*.)

transverse, red-brown stripes; lip smaller than the other segments, sub-quadrangle at the base, oblong-triangular, reflexed, white spotted with red-brown; crest oblong, tuberculated, bright yellow sometimes marked with red. Column wings reduced to two small teeth.

Oncidium zebrinum, Rchb. in *Bonpl.* II. p. 12 (1854). *Id.* *Gard. Chron.* 1872, p. 1355, with fig. *Lindl. Fol. Orch. Oncid.* No. 16. *Bot. Mag.* t. 6138. *Odontoglossum zebrinum*, Rchb. in *Linnaea*, XXII. p. 849 (1849). *Lind. Fol. Orch. Odont.* No. 40.

Native of the Cordillera of Venezuela, in the province of Caracas, where it was discovered, probably by Moritz, in 1847, and whence it has been sent to Europe, dried or living, by various collectors. It flowered for the first time in England in Mr. Bull's nursery at Chelsea, in September, 1872. The species is readily distinguished by its long, creeping rhizome, more marked in this respect than any other *Oncid* known to us; also by its white zebra-striped flowers, which much resemble those of an *Odontoglossum*.

MILTONIA.

Lindl. in Bot. Reg. sub. t. 1976 and t. 1992 (1837). Id. Fol. Orch. 1853. Benth. et Hook. Gen. Plant. III. p. 563 (1838).

Miltonia is one of the comparatively few genera of orchidaceous plants of which the whole of the included species are more or less worthy of cultivation, and it is here accordingly monographed in its entirety. In addition to the handsome species long cultivated in gardens as *Miltonias*, a group of orchids whose flowers are of exceptional beauty are now included in the genus, but which have hitherto been generally known as *Odontoglossums*; these, however, conform so much more closely to the generic characters of *Miltonia* than to those of *Odontoglossum* that they are unhesitatingly referred to the former genus by botanists, and accepted as such by many horticulturists. The genus *Miltonia*, in this enlarged sense, is on the whole a natural one that may be conveniently retained both in scientific classification and for garden use, although there are difficulties in technically defining its limits.*

The relationship subsisting between *Miltonia*, *Odontoglossum* and *Oncidium* has been already noticed in the introductory notes to the synopsis of those genera, but in treating of *Miltonia* we are brought into contact with another genus, *Brassia*, which although separated from *Miltonia* by fairly well-expressed characters, and the included species of which are usually recognised by horticulturists by the very distinct aspect of their inflorescence, nevertheless follows so closely

* Reichenbach monographed *Miltonia*, as far as it was then known, in his *Xenia Orchidacea*, vol. I. p. 128, published in 1855, but removed the whole of the species, together with those of *Brassia*, to *Oncidium*, when compiling his Synopsis of the Orchideæ for Walper's *Annalen Botanices*, vol. VI. published in 1863, placing both series between Lindley's sub-sections *Integrilabia* and *Pulvinata*.

after *Miltonia* that the two genera merge into each other in *Miltonia flavescens*, which may, with almost equal right, be referred to either.

It will be convenient in this place to recapitulate briefly the characters by which *Miltonia* is chiefly separated from the closely related genera just mentioned—

From *Odontoglossum*.—By the short column, the wings of which are very narrow and usually entire. By the sessile labellum affixed to the base of the column and spreading from it at a considerable (usually a right) angle, the crest of which is either obsolete or reduced to a few short raised lines.

From *Oncidium*.—By the absence of tumidity in the column below the stigma. By the sessile and almost entire labellum destitute of a tuberculated or toothed crest. By the floral segments being nearly always in one plane, in many of the species quite flat, the lateral sepals being always free.

From *Brassia*.—By the winged or auriculate column. By the broader and shorter sepals and petals that are not elongated (except in *Miltonia flavescens*) into linear acuminate segments.

In their vegetation the *Miltonias* conform to *Odontoglossum*, under which the vegetative organs have been fully described. It should be noted, however, that a deviation from the usual dark green that prevails throughout *Odontoglossum* is observable in many of the species of *Miltonia*. Thus—in *Miltonia spectabilis* and other Brazilian species the pseudo-bulbs and foliage are of an ochreous yellow tint, in *M. Roezlii* and other Colombian species they are of a pallid hue, and in *M. vexillaria* they are glaucescent, characters which serve as distinguishing marks of those species.

The genus was founded by Dr. Lindley on *Miltonia spectabilis* and dedicated to the late Earl Fitzwilliam (Viscount Milton), “one of the oldest and most zealous friends of Natural Science in this country.” It includes fourteen species, two supposed natural hybrids and one artificial hybrid raised in European gardens.

Geographical Distribution.—The geographical distribution of the *Miltonias* is somewhat peculiar and analogous in a restricted sense to that of the *Cattleyas*, for they occur in two regions of South America, separated from each other by an interval of upwards of 3,000 miles. One group of species is confined to a limited area in southern Brazil in the immediate neighbourhood of Rio de Janeiro, and another group is restricted to northern Ecuador and Colombia. One (*Miltonia Endresii*) has its station in Costa Rica, and the

precise habitat of one (*M. Schroederiana*) has not been divulged, but is vaguely stated to be Central America. Very little too has been divulged respecting the habitats of the Brazilian species and of their environment *in situ*, but coming from the neighbourhood of Rio de Janeiro, the climatic conditions under which they live are known by analogy and from cultural experience to be much the same as those described under *Cattleya* at page 3. The Colombian species are found on the Cordilleras at 1,000—6,000 feet elevation,* where the atmosphere is very humid throughout the year.

Cultural Note.—The cultural treatment of the Miltonias, so far as regards the potting, watering, and ventilation, is essentially the same as that formulated under *Odontoglossum* (page 10—11). The Miltonias, however, grow under climatic conditions somewhat different from those under which the greater part of the *Odontoglossum* are found, especially in respect of temperature, and this circumstance has to be taken into account in their cultural treatment. Moreover the climatic conditions under which the Brazilian species live in their native home are not quite the same as those of the Colombian species, for their seasons are opposite; hence for cultural purposes the Miltonias arrange themselves into two groups.

All the members of the Brazilian group, that is to say, *anceps*, *candida*, *Clowesii*, *cuneata*, *flavescens*, *Regnelli*, *Russelliana*, and *spectabilis* with its numerous varieties and the two supposed natural hybrids of Brazilian origin, require an intermediate temperature such as is maintained in the *Cattleya* house, where it ranges throughout the year from 13° to 20° C. (55°—70° F.) by fire-heat, with such increments by sun-heat as circumstances admit, the higher temperatures being of course attained in summer when the plants are in active growth, and when they should be liberally supplied with water. On warm bright days the Miltonias must be shaded from the direct rays of the sun during the middle hours of the day, but at other times they should receive as much light as possible. *Miltonia spectabilis* and its varieties being plants with creeping rhizomes are usually cultivated in shallow pans with about an inch of compost about their roots which should at no time be allowed to get dry.

Of the Colombian Miltonias that have pallid pseudo-bulbs and foliage, *vexillaria*, *Phalenopsis* and *Endresii* require a temperature of 10°—13° C. (50°—55° F.) by fire-heat, allowing it to rise by sun-heat during the growing season to 15°—20° C. (60°—70° F.); but too great a deviation from the mean should be avoided. These readings correspond nearly with *Cattleya* temperatures, but as this group of Miltonias is found to

* *Miltonia Roezlii* and *M. Warszewiczii* in the lower and hotter zone, and *M. vexillaria* and *M. Phalenopsis* in the higher zone, occasionally associated with *Cattleyas*.

thrive better under a more equable temperature throughout the year than under the wider range allowed to Cattleyas, it is the practice of many cultivators to place them with, or under the same conditions as Cattleyas during the winter months, and to remove them to the Odontoglossum house in the summer. *Miltonia Roezlii* requires more heat and more shade, and may be cultivated in pans suspended near the roof-glass of the warmest house. *M. Warscewiczii* also requires more heat and shade than either the Brazilian or Colombian species except *M. Roezlii*. *M. Schroederiana* is a rare species of which we have had no cultural experience. All the Colombian Miltonias are naturally found in shady and moist situations; under cultivation therefore the supply of moisture must not be intermittent, but simply varied in amount according to the season of the year. Those with pallid pseudo-bulbs and leaves are particularly liable to the attacks of thrip and red-spider, and the freeing of the plants from these pests is one of the most onerous duties of the cultivators of them.

SYNOPSIS OF SPECIES AND VARIETIES.

Miltonia anceps.

“Pseudo-bulbs oblong, compressed, 2—3 inches long, diphylous. Leaves linear-oblong, sub-acute, 4—6 inches long. Peduncles longer than the leaves, two-edged, sheathed by long, alternate, compressed bracts, one flowered. Flowers 2—2½ inches in diameter; sepals and petals similar, oblong-lanceolate with recurved tips, yellow-green; lip sub-panduriform, white with 2—3 purple longitudinal streaks on the disk, in front of which are a few purple spots; basilar lamellæ two, with a small tooth between them. Column wings purple.”—*Botanical Magazine*.

Miltonia anceps, Lindl. *Fol. Orch. Milt.* No. 7 (1853). *Rehb. Xen. Orch. I.* p. 56, t. 21. *Bot. Mag.* t. 5572. *Odontoglossum anceps*, Klotzsch in *Allg. Gartenz.* 1851, p. 250. *Oncidium anceps*, *Rehb.* in *Walp. Ann.* VI. p. 758 (1863).

Originally introduced by Messrs. Loddiges from Brazil, and subsequently, about the year 1850, it was sent to Herr Jenisch's collection at Flotbeck, near Hamburg, by Allardt. It was re-introduced by Messrs. Low and Co. in 1864, through their collector Blunt, and flowered in Mr. Bateman's collection at Knypersley in the spring of the following year. We find no record of its habitat nor any notice of its having flowered in this country since the last mentioned date.

M. candida.

Pseudo-bulbs ovoid, elongated, compressed, 3—4 inches long, diphylous. Leaves linear-oblanccolate, acute, complicate at base, 9—15 inches long.

Peduncles stoutish, 15—20 inches long, 3—5 flowered. Flowers 3 inches in diameter; sepals and petals similar and sub-equal, narrowly oblong, apiculate, chestnut-brown tipped and spotted with yellow; lip roundish obovate with undulate margin, convolute into a broad funnel-like tube, white with two light violet-purple blotches on the disk, and with 5—7 raised lines that are slightly divergent, of which the two next the middle one are more prominent than the others. Column with a narrow wing on each side of the stigma.

Miltonia candida, Lindl. in *Bot. Reg.* 1838, misc. No. 29, and 1845, sub. t. 8. *Id. Serit. Orch.* t. 21. *Id. Fol. Orch. Milt.* No. 9. *Pact. Mag. Bot.* VI, p. 241. *Bot. Mag.* t. 3793 (*flavescens*). *Rehb. Xen. Orch. I.* p. 132, t. 54 (*Jenischiana*). *Williams' Orch. Alb. V.* t. 200 (*grandiflora*). *Oncidium candidum*, *Rehb.* in *Walp. Ann.* VI. p. 763 (not Lindl.)



Miltonia candida.

Long known as one of the handsomest of the Brazilian Miltonias, but of which nothing has been recorded of its habitat or of its discovery. It flowered for the first time in this country (imperfectly) in Messrs. Loddiges' nursery in 1833. According to Sir William Hooker it was originally imported from Brazil by the Earl of Arran, by whom it was communicated to the Royal Botanic Garden at Glasnevin, whence were derived the materials for the plate and description in the *Botanical Magazine*. The species is slightly variable in the colour of its flowers which are produced in the autumn months.

M. Clowesii.

Pseudo-bulbs narrowly ovate-oblong, compressed, attenuated upwards, 3—4 inches long, diphyllous. Leaves linear-ligulate, 12—18 inches long. Peduncles nearly as long again as the leaves, racemose along the distal half, 7—10 flowered. Flowers 2—3 inches in diameter; sepals and petals similar and sub-equal, lanceolate, acuminate, chestnut-brown barred and tipped with yellow; lip sub-panduriform, produced at the apical margin to an acuminate point, the basal half violet-purple the distal half white; crest consisting of 5—7 raised lines of unequal length that are sometimes white, sometimes yellow, of which the middle one is the broadest, and the two next to it are the longest. Column wings very narrow, entire.

Miltonia Clowesii, Lindl. *Sert. Orch.* t. 34 (1839). *Id. Fol. Orch. Milt. No. 3. Bot. Mag.* t. 4109. *Paxt. Mag. Bot. IX.* p. 241. *Rchb. Xen. Orch. I.* p. 130. *Regel's Gartenfl. III.* t. 160. *Belg. hort.* 1876, p. 174. *Odontoglossum Clowesii*, Lindl. in *Bot. Reg.* 1839, misc. 153. *Brassia Clowesii*, Lindl. in *Bot. Reg.* 1844, misc. p. 7. *Oncidium Clowesii*, *Rchb. in Walp. Ann. VI.* p. 760 (1863).

sub-var.—*castanea* (*Rchb. Xen. Orch. I.* p. 30), sepals and petals chestnut-brown, paler towards the tips, stained with plum colour at the base; lip wholly plum-purple, shaded with maroon at the base, paler at the apex.

Miltonia Clowesii was first detected by Gardner in a ravine of the Organ Mountains, and sent by him to the Rev. John Clowes, in whose garden at Broughton Hall, near Manchester, it flowered in the autumn of 1839. It has been occasionally received since from correspondents in Rio de Janeiro and the adjacent province of Minas Geraes. The sub-variety *castanea*, which is a very handsome form, that was first noticed by Reichenbach many years ago, recently reappeared in our houses, when the above description was taken.

M. cuneata.

A robust plant with a stoutish creeping rhizome. Pseudo-bulbs ovate-oblong, compressed, 3—4 inches long, diphyllous. Leaves narrowly lanceolate, acute, 9—15 inches long. Peduncles as long again as the leaves, erect, racemed above, 5—8 flowered; bracts triangular, acute, glumaceous. Flowers $2\frac{1}{2}$ —3 inches in diameter; sepals and petals similar, oblong-lanceolate, acuminate, with recurved tips and undulate margin, chestnut-brown tipped with light yellow and sometimes with a few yellow streaks near the base; lip white with a long narrow claw and sub-quadrate, undulate blade, on the disk of which are two slightly divergent raised plates that are sometimes spotted with rose. Column wings narrow, denticulate.

Miltonia cuneata, Lindl. in *Bot. Reg.* 1844, misc. No. 28. *Id.* 1845, t. 8. *Id. Fol. Orch. Milt. No. 8.* *Rchb. Xen. Orch. I.* p. 131. *Illus. hort.* 1860, t. 237. *Williams' Orch. Alb. I.* t. 46. *M. speciosa*, Klotzsch in *Allg. Gartenz. XVII.* p. 129. *Oncidium speciosum*, *Rchb. in Walp. Ann. VI.* p. 761 (1863).

The first notice of *Miltonia cuneata* occurred in 1844, at which date it was cultivated by Messrs. Rollisson at their nursery at Tooting; many years afterwards it was sent to M. Verschaffelt's horticultural establishment at Ghent by a French correspondent, M. Pinel, from Brazil. Beyond this not a scrap of information is forthcoming respecting its habitat, its discoverer, or the date of its introduction.

M. Endresii.

Pseudo-bulbs ovate-oblong, compressed, $1\frac{1}{2}$ —2 inches long, monophyllous. Leaves linear-lanceolate, acute, 9—12 inches long, pale green. Scapes as long as the leaves, slightly compressed, pale green, 3—5 flowered; bract small, acute, appressed. Flowers flat, $2\frac{1}{2}$ inches in diameter, on rather long pedicels, white with a light red-purple blotch at the base of each segment; sepals and petals similar and sub-equal, oval-oblong, acute, the dorsal sepal apiculate; lip broadly panduriform, the basal lobes small, roundish, the front lobe with a shallow sinus in the anterior margin; crest semi-lunate, produced into three short keels in front, pubescent, bright yellow. Column wings very narrow, light rose-purple.

Miltonia Endresii, Nicholson, Dict. Gard. II. p. 368 (1886). *Odontoglossum Warscewiczii*, Rehb. in Bot. Zeit. 1852, p. 692. Id. Gard. Chron. III. (1875) p. 270. Id. *Xen. Orch.* I. p. 208, t. 81. *Bot. Mag.* t. 6163. Lindl. Fol. Orch. Odont. p. 24.

This is one of the rarest species of the genus; it was discovered by Warscewicz about the year 1849 on the Cordillera of Veragua, at 4,500—6,000 feet elevation, growing upon leguminous trees; it was detected by its discoverer only in two localities, in both of which the plants appeared to be very restricted in numbers. Twenty-two years afterwards it was re-discovered by Wallis while collecting plants for M. Linden, but who failed to introduce it into European gardens. It was not till 1873, when it was found by Endres while collecting plants for us in Central America, that its introduction was at length effected under very difficult circumstances. The first introduction consisted of a single plant only, and a very small one too, all the others collected with it having perished during transmission; but two years later Endres succeeded in bringing home a few plants, one of which flowered in our Chelsea nursery in 1875. As a species it is distinct, its systematic place being between *M. Phalenopsis* and *M. Roezlii*.

M. flavescens.

Pseudo-bulbs oval-oblong, 4—5 inches long, compressed, diphyllous. Leaves linear-ligulate, about a foot long. Scapes longer than the leaves

sheathed by distichous and alternate pale brown membranous bracts, the floral bracts linear, acuminate, longer than the pedicels. Raceme 7—10 flowered; sepals and petals linear-oblong, acute, 2 inches long, straw-yellow, the petals a little broader and shorter than the sepals; lip shorter than the other segments, ovate-oblong, acute with undulate margin, slightly contracted below the middle, white streaked and marked with red-purple on the basal half, which is also pubescent and traversed by 4—6 radiating lines. Column wings obsolete.

Miltonia flavescens, Lindl. Ser. Orch. sub. t. 48 (1839). Id. in Bot. Reg. 1845, sub. t. 8. Id. Fol. Orch. Milt. No. 6. Rehb. Xen. Orch. I. p. 129. Regel's *Gartenfl.* 1890, t. 1328. *Cyrtorchilus stellatum*, Lindl. Ser. Orch. t. 7. *C. flavescens*, Lindl. in *Bot. Reg.* t. 1627 (1833). *Oncidium flavescens*, Rehb. in Walp. Ann. VI. p. 757 (1863).

Originally discovered by the French traveller and naturalist, Des-courtiz, in the early part of the present century, near Bananal, in the Brazilian province of Minas Geraes, and subsequently gathered by Regnell, Miers, and other botanists in southern Brazil. It was introduced in 1832 by Mr. William Harrison, a British merchant residing at Rio de Janeiro, who sent plants to his brother Richard at Aigburth, Liverpool. In a horticultural sense the species is not in high repute, but it is botanically interesting as connecting *Miltonia* with *Brassia*, it differing from the last named genus in little except the stellate arrangement of the sepals and petals, which are nearly of equal length, and the long acuminate bracts.

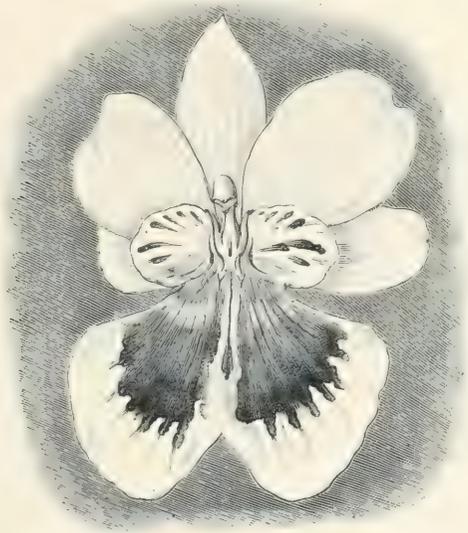
M. *Phalænopsis*.

Pseudo-bulbs ovoid, compressed, 1—1½ inches long, pale green, monodiphyllous. Leaves linear, 5—9 inches long, complicate at base, tapering at apex, pale green. Scapes shorter than the leaves, 3—5 flowered. Flowers flat, 2—2½ inches in diameter; sepals and petals white, the sepals oval-oblong, acute, the petals broader, elliptic, obtuse; lip four-lobed, the basal lobes short, rotund, white with some light purple streaks; the anterior lobes larger, sub-quadrate, white blotched with light purple; crest with three small blunt teeth, on each side of which is a yellow spot. Column wings very short.

Miltonia Phalænopsis, Nicholson, Diet. Gard. II. p. 369 (1886), with fig. *M. pulchella*, Hort. ex Batem. *Odontoglossum Phalænopsis*, Rehb. in Bonpl. II. p. 278 (1854). Id. in Walp. Ann. VI. p. 844. Linden's *Pesc.* t. 44. Warner's *Scl. Orch.* I. t. 30. Batem. *Monogr. Odont.* t. 3.

This was the first of the group of Colombian *Miltonias* distinguished by their large flat flowers and pallid foliage that was introduced into European gardens, it having been sent to M. Linden's horticultural establishment at Brussels by Schlim, in 1850. Its principal station is on the western slopes of a branch of the eastern

Cordillera, almost parallel with the River Magdalena, near Ocaña; it grows chiefly on the trunks and branches of trees in more or less shade, and always in humid situations at 4,000—5,000 feet elevation; it also occurs in the Carara district under similar conditions, but at a lower elevation.



Miltonia Phalenopsis.

M. Regnelli.

Pseudo-bulbs ovate-oblong, compressed, 2—3 inches long, pale yellow-green, diphyllous. Leaves linear-ligulate, acute, about a foot long. Peduncles as long as, or longer than the leaves, 3—5 flowered. Flowers flat, 2—3 inches across vertically; sepals and petals white, sometimes faintly tinted with rose towards their base, the sepals oblong-lanceolate, apiculate; the petals broader, elliptic-oblong, acute; lip broadly obovate, obscurely three-lobed, light rose streaked with rose-purple and with a white margin; crest consisting of 7--9 radiating pale yellow lines, of which the three central ones are the most prominent and most brightly coloured. Column wings narrow, prolonged upwards.

Miltonia Regnelli, Rehb. in *Linnaea*, XXII. p. 851 (1848). *Id. Xen. Orch.* I. p. 133, t. 47, icon. xyl. *Lindl. Fol. Orch. Mitt.* No. 5 (1853). *Bot. Mag.* t. 5436. De Puydt, *Les Orch.* t. 26. Godelroy's *Orchidophile*, 1889, p. 113 (*purpurea*?). *M. cereola*, *Illus. hort.* XII. t. 446 (1865). *Oncidium Regnelli*, Rehb. in *Walp. Ann.* VI. p. 760 (1863).

sub-vars.—*purpurea* (*Fl. Mag.* 1870, t. 490. *Williams' Orch. Alb.* II. t. 72), sepals and petals light rose-purple margined with white, lip rich

magenta-purple with darker veins and reticulations, lines of the crest white, except the middle one which is bright yellow.

A beautiful species discovered by Dr. Regnell in 1846 in the Brazilian province of Minas Geraes (it is said), but not introduced into European gardens till some years afterwards, its first appearance being at a horticultural exhibition held at Hamburg in September, 1855; the plant had been brought from Santa Catherina in Brazil.* The species had, however, been previously detected in the same province by Devos, the discoverer and introducer of *Loelia purpurata*, but who failed to send living plants to Europe on account of the length of time occupied, in those days, in the transmission of plants from Brazil to Belgium. A few years after its first appearance in Hamburg it was communicated by Gautier to M. Verschaffelt, of Ghent, in whose nursery it flowered in 1865, when it was figured in the *Illustration horticole* under the name of *Miltonia cereola*. The sub-variety, a very striking one, was introduced in 1869.

Miltonia Regnellii comes nearer to the Colombian Miltonias than any of the Brazilian species, a circumstance the more remarkable as it is geographically the most remote.

M. Roezlii.

Pseudo-bulbs ovate-oblong, compressed, 2—2½ inches long, pale green, monophyllous. Leaves linear, acute, 9—12 inches long, pale green. Scapes shorter than or as long as the leaves, rather slender, 2—5 flowered. Bracts subulate-lanceolate, shorter than the pedicels. Flowers quite flat, 3½—4 inches across, white with a purple blotch at the base of each petal, and an orange-yellow disk at the base of the lip; sepals obovate-oblong, acute; petals similar but broader; lip broadly obovate with an angular sinus in the anterior margin, a small horn-like auricle on each side of the base, and three raised lines on the disk with two small teeth in front of them. Column wings obsolete.

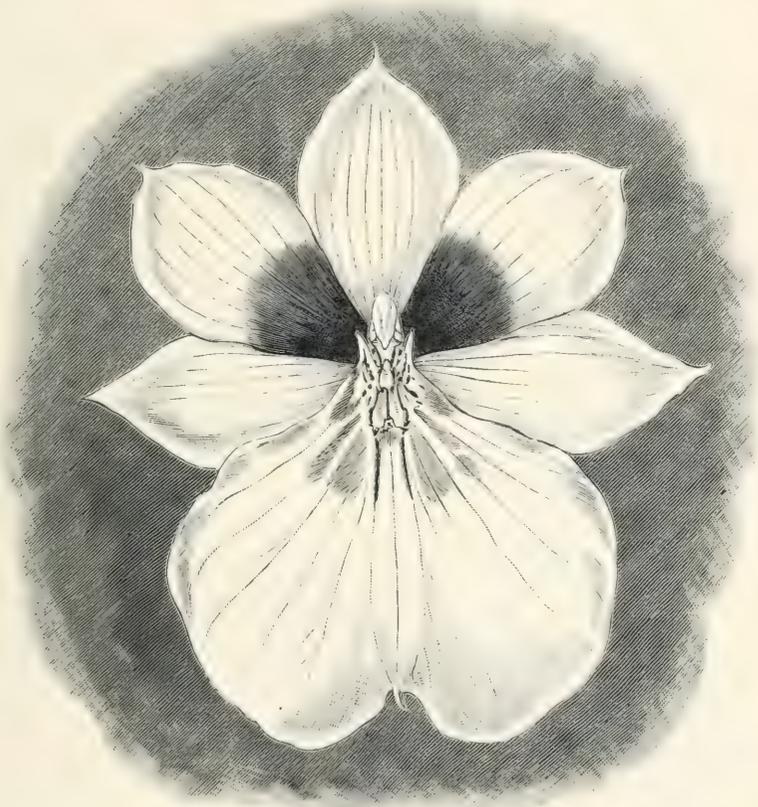
Miltonia Roezlii, Nicholson, Dict. Gard. II. p. 369 (1886). *Rev. de l'Hort. Belg.* 1891, p. 132. *Odontoglossum Roezlii*, Rehb. in Gard. Chron. 1873, p. 1303, with fig. Id. Xen. Orch. II. p. 191, t. 132, fig. 1. *Bot. Mag.* t. 6085. *Batem. Monogr. of Odont.* t. 30. *Fl. Mag.* n.s. t. 90. *The Garden*, X. (1876), t. 31. *Williams' Orch. Alb. II.* t. 64. *Sander's Reichenbachia*, II. t. 69. *Godefroy's Orchidophile*, 1886, p. 27, icon. xyl.

sub-vars.—*alba* (*Fl. Mag.* n.s. t. 164), flowers wholly white except the yellow disk of the lip, which is paler than in the type; *Warnham Court*, flowers large, the purple blotch on the petals larger and shaded with maroon.

* *Fide* Rehb. in Xen. Orch. I. p. 134.

The following particulars relating to the first discovery of this beautiful plant were communicated to M. Godefroy, of Argenteuil, by the late Benedict Roezl:—

“Towards the end of March, 1873, I was going down the little river Dagua which flows into the Pacific Ocean. Like all the streams which flow into the ocean from the western Cordillera of New Granada,



Miltonia Roezlii alba.

the current is rapid. I had reached to about ten miles from the outlet when my attention was arrested by the trunk of a tree that was being borne along down the stream upon which was an orchid, quite unknown to me, in full bloom. I immediately requested my negro to secure the treasure, a matter of considerable difficulty owing to the strength of the current. He at length succeeded in detaching the plants, three in number, from the log, and which proved to be a new species of *Miltonia* (*Odontoglossum*), allied to *Miltonia vexillaria* and *M. Phalenopsis*.

Some months later, the plant (*vic*), with other novelties, was acquired by Mr. William Bull, of Chelsea, for 250 francs."*

Such in substance is Roezl's own account of the discovery of this plant that deservedly bears his name, of which it may be remarked that the locality given is not found on any map to which we have had access, and that the plants in cultivation have, with the above exception, been brought from the valley of the Cauca, on the eastern or opposite side of the western Cordillera.

Chesterton was the next collector to detect it; he brought some cases of plants in good condition to our nursery in 1877, but, *more suo*, did not divulge the true locality in which they had been gathered. He was closely followed by Roezl's nephew, Francis Klaboch, who sent some plants to Europe in the following year; since then it has been frequently imported. Its habitat is now known to be in the province of Antioquia, on the slopes of the hills near the river Atrato, a tributary of the Cauca, growing on trees and rocks mostly in shade at 1,000—2,000 feet elevation, sometimes associated with *Oncidium Kramerianum*.

M. Russelliana

Pseudo-bulbs ovate-oblong, compressed, 2—3 inches long, diphyllous. Leaves narrowly lanceolate, 6—9 inches long. Scapes 15—24 inches long, green mottled with dull purple; bracts sheathing, acute, pale brown, $\frac{1}{2}$ inch long, the floral ones shorter. Racemes 5—9 flowered; flowers 2—2 $\frac{1}{2}$ inches in diameter when spread out; sepals and petals similar, oblong-lanceolate, acute, reddish brown tipped with pale yellow; lip cuneate-oblong, retuse, apiculate, the lateral margins sub-sinuate, the basal two-thirds rose-lilac, the apical third white or light yellow; disk with three raised lines, of which the middle one is the shortest, the lateral two dilated in front into two erect plates. Column wings ovate, acute, yellow.

Miltonia Russelliana, Lindl. Sert. Orch. sub. t. 48 (1840). Id. in Bot. Reg. 1845, sub. t. 8. Id. Fol. Orch. Milt. No. 4. Paxt. Mag. Bot. VII. p. 217 (1840). Rehb. Xen. Orch. I. p. 131. *Oncidium Russellianum*, Lindl. in Bot. Reg. t. 1830 (1836). Rehb. in Walp. Ann. VI. p. 761 (1863). Kegel's *Gartenfl.* 1880, t. 1012 (*pallidum*).

Introduced to the Woburn collection in 1835 from Rio de Janeiro, and named in compliment to the Duke of Bedford. The only habitat we find recorded is Tejuco, in the province of Rio de Janeiro. Our description is from a plant that was in the Downside collection, since dispersed; it is one of the least attractive of the Miltonias, not now often seen.

* *Orchidophile*, 1883, p. 476.

M. Schroederiana.

Pseudo-bulbs ovoid-oblong, $1\frac{1}{2}$ —2 inches long, diphyllous. Leaves linear-oblong, acute, 5—7 inches long. Scapes erect, longer than the leaves, racemed above, 7—9 flowered; bracts small, acute, glumaceous. Flowers fragrant, $2\frac{1}{2}$ inches across vertically; sepals and petals with revolute margins, linear-oblong, acute, chestnut-brown tipped and marked with light yellow; the sepals keeled behind, the lateral two divergent and a little longer than the dorsal one, the petals falcately turned towards the dorsal sepal; lip sub-pandurate, the basal half nearly oblong, rose-purple, the apical half sub-quadrate, apiculate, convex above, milk-white; crest consisting of three protuberances with a shallow raised line on each side of them. Column white above, yellow in front, the wings very narrow.

Miltonia Schroederiana, supra. Odontoglossum Schroederiana, Rehb. in Gard. Chron. I. s. 3 (1887), p. 364. Williams' *Orch. Alb. VIII.* t. 382. Sander's *Reichenbachia*, II. t. 96.



Miltonia Schroederiana.

A very handsome species imported from Central America by Messrs. Sander and Co. some time prior to 1885, in January of which year a plant was exhibited by Baron Schroeder at the Royal Horticultural Society's meeting; it is still very rare in British gardens. We are indebted to Baron Schroeder for materials for figuring and description.*

* The plant described by Reichenbach in the *Gardeners' Chronicle* of 1882, Vol. XVII., p. 700, under the name of *Odontoglossum Schroederianum*, and which is also in Baron Schroeder's collection at The Dell, is a true *Odontoglossum*, and quite distinct from that described under the same name in the *Gardeners' Chronicle* of 1887, vol. I. s. 3, p. 364, which is the *Miltonia* figured and described above. Both in Williams' *Orchid Album*, IX. sub. t. 382, and Sander's *Reichenbachia*, II. sub. t. 96, the two are confused together.

M. spectabilis.

Rhizome stoutish, creeping, scaly, as thick as a goose-quill. Pseudo-bulbs produced from the rhizome at short intervals, ovate-oblong, compressed, 3—4 inches long, diphyllous. Leaves linear-ligulate, 4—6 inches long, both pseudo-bulbs and leaves usually of an ochreous yellow hue. Scapes as long as the pseudo-bulbs and leaves, sheathed by alternate, imbricating ancipitous bracts, and a larger one embracing the ovary, one flowered. Flowers nearly flat, 3 inches in diameter; sepals and petals lanceolate-oblong, acute, the petals a little the broadest, white or cream colour, sometimes tinged with rose towards the base; lip large, spreading, obovate-orbicular, vinous purple with 6—8 longitudinal veins of a deeper shade, the margin white or pale rose; crest tri-lamellate, the lamellæ terminating in small erect plates, usually yellow. Column wings sub-triangular, rose-purple.

Miltonia spectabilis, Lindl. in Bot. Reg. sub. t. 1976 (1837). *Id.* t. 1992. *Id.* 1845, sub. t. 8. *Id.* Fol. Orch. Milt. No. 1. *Bot. Mag.* t. 4206. *Paxt. Mag. Bot.* VII. p. 97. *Rehb. Xen. Orch.* I. p. 129. *Illus. hort.* VI. t. 216. *The Garden*, XXXI. (1887), t. 593. *Macrochilus Fryanus*, Knowles and Westc. *Fl. Cab.* II. t. 45 (1837). *Oncidium spectabile*, Rehb. in Walp. Ann. VII. p. 759 (1863).

var.—Moreliana.

Flowers usually larger than the type and very distinct in colour; sepals and petals plum-purple; lip bright rose-purple with deeper veins and reticulations.

M. spectabilis Moreliana, Henfrey's Gard. Mag. Bot. III. p. 41, with fig. Van Houtte's *Fl. des Serres*, X. t. 1008. De Puydt, *Les Orch.* t. 27. *Lindenia*, III. t. 105. *Williams' Orch. Alb.* VIII. t. 364. *M. Moreliana*, Warner's *Sel. Orch.* I. t. 32. *Fl. Mag.* n.s. III. t. 143. *Jennings' Orch.* t. 37. *M. spectabilis purpureo-violacea*, *Bot. Mag.* t. 4425.

sub.-vars. (distinguished by colour only).—*bicolor*, flowers white with a large plum-purple blotch at the base of the lip; *lineata* (*Lindenia*, II. t. 62), lip with 7—9 purple lines radiating from a blotch of the same colour at the base to the margin; *radians* (*Rehb. Xen. Orch.* I. p. 130. *Williams' Orch. Alb.* IV. t. 164), flowers white with six club-shaped purple rays on the disk of the lip; *rosea* (*Illus. hort.* 1867, t. 524), flowers light rose with purple longitudinal lines on the lip; *virginialis* (*Illus. hort.* 1869, t. 573), flowers white with a broad wedge-shaped purple blotch at the base of the lip.

Miltonia spectabilis, as already stated, is the species on which the genus was founded and, with the exception of *M. flavescens*, which previous to the introduction of *M. spectabilis* had been referred to *Cyrtochilum* and *M. Russellianum*, which had been figured and described as an *Oncidium*, it is one that has been longest known to science and to horticulture, and yet up to the present time its precise habitat is known only to the orchid collectors at Rio de Janeiro. Lindley indeed states that it was gathered by Weddell

on the Serra de Estrada, but no such locality is to be found on any modern map of Brazil within our reach. Thus in the case of three of the longest known and finest of the Brazilian Miltonias, *spectabilis*, *candida*, and *cuneata*, the dates of their discovery, the names of their discoverers, and their precise habitats are virtually unknown.



Miltonia spectabilis.

The subject of our present notice was originally sent to the Birmingham Botanical and Horticultural Society from Brazil, in 1835, by a Mr. Fry, and was dedicated to that gentleman by Knowles and Westcott in their *Floral Cabinet* under the name of *Macrochilus Fryanus*, but as this name was published one month later than Dr. Lindley's *Miltonia spectabilis* in the *Botanical Register*, it cannot be accepted. It flowered for the first time in this country in Messrs. Loddiges'

nursery at Hackney in 1837, and a little later in the same year in Mr. George Barker's collection at Birmingham. It has been frequently imported since, and among these importations have appeared from time to time the various forms described above. The variety *Moreliana* is one of the most remarkable colour deviations from the typical form to be found among orchids;* it was sent to M. Morel, of St. Mandé, near Paris, in 1846, by his Brazilian correspondent, M. Porte, and was shortly afterwards cultivated by Messrs. Knight and Perry, our predecessors at the Royal Exotic Nursery. All the sub-varieties noted above are decidedly handsome, and most of them well-marked horticultural forms.

The estimation in which *Miltonia spectabilis* is held, has found expression in the unusual number of coloured plates of it and its varieties that have appeared in the horticultural periodicals at intervals from the date of its first flowering in this country down to the present time.

M. vexillaria.

Leaves linear-lanceolate, acute, keeled beneath, imbricate at base, distichous and alternate, usually 6—8 to one growth, the lower two shorter than those above, and the upper two partially enclosing at their base a flattened oval-oblong pseudo-bulb $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long, which is monophyllous at the apex, the whole plant of a glaucous pea-green colour. Scapes usually two from each pseudo-bulb, but sometimes three or more, slender, arching, 12—20 inches long, racemed, 4—7 flowered. Flowers variable in size and colour, 3—4 inches across vertically, usually light rose-colour, but often varying from rose-carmine to almost white or white flushed with light rose; sepals and petals similar and sub-equal, obovate-oblong; lip flat, sub-orbicular, two-lobed in front, and with a small ovate ascending auricle on each side at the base; crest yellow, two-lobed at base, prolonged in front into three short teeth. Column wings obsolete.

Miltonia vexillaria, Benth. in Journ. Linn. Soc. XVIII. p. 327 (1881). Benth. et Hook. Gen. Plant, III. p. 563 (1883). Nicholson, Dict. Gard. II. p. 369, with fig. Sander's *Reichenbachia*, I. s. 2, t. 29. *Odontoglossum vexillarium*, Rehb. in Gard. Chron. 1867, p. 901; 1872, p. 667; 1873, pp. 580 and 644 with figs. Id. *Xen. Orch.* II. p. 190, t. 182. *Bot. Mag.* t. 6037. *Fl. Mag.* n.s. t. 73. Batem. *Monogr. Odont.* t. 29. Jennings' *Orch.* t. 36. *Illus. hort.* XX. t. 113. *Revue hort.* 1876, p. 390. Warner's *Sel. Orch.* II. t. 38. *Bely. hort.* XXX. p. 257. Van Houtte's *Fl. des Serres*, XX. t. 2058.

* The reader will here doubtless call to mind the equally remarkable variety of *Vanda Parishii* called *Marriottiana*.

var.—Leopoldii.

Sepals and petals recurved beyond the middle, rose suffused with white; lip concave, of a deeper rose than the other segments, and with a deep blood-red blotch at the base, of triangular shape, having a broad cusp at the apex and two short lateral rays.

M. vexillaria Leopoldii, Hort. et supra.

var.—rubella.

Flowers smaller than in the original type and appearing later in the year, rose-pink, the sepals and petals bordered with white, the lip with a large white space in front of the yellow disk.

M. vexillaria rubella, supra. *Odontoglossum vexillarium rubellum*, Hort. *Od. vexillarium Klabochianum*, Hort.

var.—stupenda.

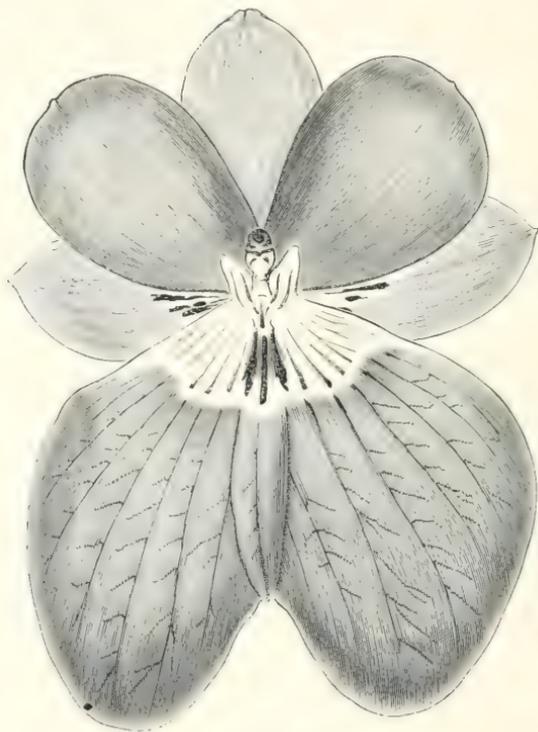
Flowers the largest of the species yet seen, vertical diameter 5 inches, breadth of the labellum $3\frac{1}{2}$ —4 inches; colour light rose suffused with white.

M. vexillaria stupenda, supra.

sub-vars. (distinguished by colour only).—*alba* (Williams' *Orch. Alb. V.* t. 227, syn. *Mr. Measures'* var. syn. *Fairy Queen*), pure white, sometimes with a faint roseate tinge at the base of the sepals and petals; *albicans*, white with a few red streaks in front of the pale yellow disk of the labellum; *Herr Lehmann's* (*Gard. Chron. XIII.* (1880), p. 586), sepals and petals rose, the lateral sepals with three dark stripes, the white area of the labellum also striped; *leucoglossum* (*Gard. Chron. XIV.* (1880), p. 296), sepals and petals light rose, lip white; *Mr. Cobb's*, sepals and petals light rose passing into white at the margin, lip white with three small orange-yellow lines, at the base of which the middle one is the longest; *Mr. Hill's* (*Gard. Chron. XIV.* (1880), p. 296), rose with two purple lines on the lateral sepals and three at the base of the labellum, which is dotted with purple; *Mrs. H. Ballantine*, sepals white, petals with the central area rose-pink, lip rose-pink with a narrow white margin and with a white transverse band in front of the yellow disk; *M. Wiol's* (*Gard. Chron. XVII.* (1882), p. 826), white with two short purple lines on the lateral sepals and three in front of the yellow disk of the labellum; *rosea* (Williams' *Orch. Alb. VIII.* t. 348), bright rose with a narrow white zone in front of the yellow disk of the labellum; *rubra* (*Fl. Mag.* n.s. t. 461), deep rose, the lip with darker veins and with three divergent blood-red streaks in front of the yellow disk; *Sander's* (*Gard. Chron. X. s. 3* (1891), p. 394), sepals white flushed with light rose, the lateral two with dotted crimson lines near the base, petals light rose, lip with a sanguineous triangular blotch with several thick lines radiating from it; *superba* (*Gard. Chron. XVI.* (1881), p. 324. Williams' *Orch. Alb. IV.* t. 171. *Lindenia V.* t. 201,

syn. *Lawrenciana*. Gard. Chron. XXII. (1884), p. 396), rose-pink, the lateral sepals with 1—2 red-purple streaks near the base, the lip with a large triangular rayed blotch at the base, of maroon-purple toned with red and bordered with a zone of the purest white.

This popular and charming *Miltonia* is supposed to have been originally discovered by Bowman, while collecting plants in New Granada in 1866—67, and where he shortly afterwards succumbed to the climate and fatigue. This belief is strengthened by the



Miltonia vexillaria.

following passage that occurs in his letter of October 14th, 1867, to the late Mr. James Veitch, giving an account of his journey across New Granada from Buenaventura to Bogota:—"Another good plant is the scarlet *Odontoglossum*; this is the brightest I have yet seen among orchidaceous plants." From the route taken, it is probable that he met with the plant, assuming that the extract refers to *Miltonia vexillaria*, in some locality on the western slopes of the coast Cordillera, but where it is comparatively rare. It first became

known in a tangible form through a dried flower brought to a British horticultural firm under circumstances amusingly related by Reichenbach in his first announcement of the species,* but which was not followed by its immediate introduction. In the meantime it had been re-discovered by Wallis while collecting plants in New Granada for M. Linden, but he too failed to introduce it into European gardens. Disappointment also attended Roezl, who was commissioned in 1871 by M. Linden to collect it in the locality in which it had been found by Wallis, but from the delay and difficulty of transmission the plants were all dead when they reached Belgium. Enough, however, had by that time transpired to excite a most lively interest in the plant, and an ardent desire to see it blooming in the plant houses of Europe. With the slenderest scrap of information then available, Chesterton, early in the year 1872, undertook at our request to endeavour to seek it out and to bring a consignment home. That he succeeded in bringing it to England, and its flowering for the first time in our houses in the spring of 1873, are well-known facts in its history. The interest awakened by its actual presence in our midst and the general admiration accorded to it soon caused it to become a favourite with amateurs of orchids.

The veil of mystery that so long shrouded this lovely plant during its early history has since been torn away, and we are now in possession of ample details respecting its habitat and the conditions under which it grows in its native home. For this valuable information, science and horticulture are in a great measure indebted to one of the ablest observers of orchid life in the Andean region who has ever lived and travelled in it, Herr F. C. Lehmann, the German Consul in that country, from whose communication to the Berlin *Gartenflora*† we extract the following details:—

The southern limit of *Miltonia vexillaria* is on the western slopes of the snow-capped "Huarmi-Urcu," and the volcano of Coatacachi, in the provinces of Esmeralda and Imbabura, in northern Ecuador; here and on the western slopes of the volcanic peaks of Chiles, Cumbal, and Mallama, in southern Colombia, occur the varieties *Lehmanni*, *albicans*, and *Measuresiana* (*alba* supra). The species thence spreads northwards along the central mountain region and the western slopes of the West

* Gard. Chron. 1867, p. 901.

† Jahrgang 38 (1889), p. 350.

Cordillera, as far as the sources of the rivers Sinu and San Jorge, in the province of Antioquia, in North Colombia. Over this region it occurs in greater or less quantity in isolated patches. Among the best-known stations are the central Cordillera, between Frontino and Sonson, on the Tavallones de Cali, the undulated plateau of Popayan, and the western slopes of the volcanos of northern Ecuador. The whole region in which *Miltonia vexillaria* grows is well defined and similarly bounded. With one exception, the variety *albicans* which occurs at 4,000—4,500 feet elevation on the river Cuaiquer, the lower and higher limits of *Miltonia vexillaria* are almost everywhere about 4,750 and 6,500 feet above sea-level. The average mean temperature of the year between these limits fluctuates between 16.5°—19.5° C. (62°—67° F.), that of the variety *albicans* 20°—21° C. (68°—70° F.); the extreme daily range when the mornings are clear and the days bright is from 12° C. (53° F.) minimum, to 25° C. (77° F.) maximum. Generally speaking, *Miltonia vexillaria* is found isolated in places influenced by local climatic conditions, being most abundant at its medium altitude; it always occurs on the borders of the denser mountain forests which have below them either open or park-like stretches covered with low bushes or coarse savannah grass, and above, the extremely humid and almost impenetrable and luxuriant forests that cover the Cordilleras at that altitude. The characteristic hygrometric peculiarity of the whole region over which *Miltonia vexillaria* is spread is, that it is constant nearly throughout the year; even in what is called the dry season the air is only relatively less humid. The daily changes in the weather may be thus summarised:—During the dry season the day breaks clear, but soon after sunrise a thick mist settles over the forest till about 10 a.m.; it then ascends higher, and the rays of the sun begin with difficulty to penetrate it; the air is then filled with a bluish mist that shuts out the distant view. A light shower of rain falls in the afternoon about 2 o'clock, which often continues till evening, when it gives place to a thick mist. During the rains there is generally a light wind blowing towards the mountains from the lower river valleys. In the rainy season the circumstances are nearly the same, except that the rain is more copious, the drops heavier, and the showers of longer duration. At times the rain is continuous for several days in succession; the atmosphere is then at the saturation point.

Of the varieties described above scarcely anything has been divulged respecting their origin. Herr Lehmann, indeed, states that *rubella* is a geographical form first gathered by Wallis in 1876, and subsequently by himself, but gives no locality; *Leopoldi* and *stupenda* are both very distinct forms whose origin is unknown to us. The colour variations or sub-varieties are innumerable, often gliding into each other by insensible gradations so that it is almost futile to

designate them by name; those designated above are fairly distinct and may without difficulty be identified. This variability in colour is, however, one of the greatest excellencies of the species in a horticultural sense, and the large groups of *Miltonia vexillaria* now to be seen in many of the orchid collections in this country afford in their flowering season, May and June, one of the most attractive floral sights that can be produced from among the ORCHIDEE.*

M. Warscewiczii.

Pseudo-bulbs oblong, compressed, 4—5 inches long, 1 inch broad, monophyllous. Leaves linear-oblong obtuse, 5—7 inches long. Scapes exceeding in length the pseudo-bulbs and leaves, usually paniced but sometimes racemed, many-flowered; bracts acuminate, shorter than the ovary. Flowers somewhat crowded, 2 inches across vertically; sepals and petals similar and sub-equal, oblong-spathulate, undulate, brownish red, sometimes yellow, sometimes white at the tip; lip broadly oblong with a medium cleft in the anterior margin, rose-purple with a red-brown disk and white margin, white at the very base where there are two small yellow teeth. Column wings rounded, red-purple.

Miltonia Warscewiczii, Rehb. Xen. Orch. I. p. 132 (1855). Id. in Gard. Chron. 1867, p. 277; V. (1876), p. 394; VII. (1877), p. 202. *Bot. Mag.* t. 5843. Williams' *Orch. Alb. V.* t. 216. *Oncidium fuscatum*, Rehb. in Walp. Ann. VI. p. 763 (1863). Van Houtte's *Pl. des Serres*, XVIII. t. 1831. *Illus. hort.* XXI. t. 156. *Odontoglossum Weltonii*, Hort.



Miltonia Warscewiczii.

A very handsome species originally discovered by the German

* The enormous inroads constantly being made upon *Miltonia vexillaria* by orchid collectors in New Granada would seem to threaten its extinction were it not that the extensive geographical area over which it is dispersed affords an assurance that it exists in quantity too large to be sensibly diminished by that means, except in particular localities, for a long time to come. Moreover, the reproductive power of the plant is so great as to secure its perpetuation against adverse influences. Herr Lehmann estimates that about 75 per cent. of the flowers produce capsules in a wild state with germinating seeds; the seeds easily and quickly germinate, but many of the young plants perish.

botanist, Pœppig, who detected it in 1830 on the Peruvian Andes, near Cuchiro.* It was next found by the Polish traveller and collector, Warszewicz, who brought to Europe dried specimens from which the plant was first described, and the species was accordingly dedicated to him. It was introduced to European gardens by Linden in 1868, through Wallis, probably from New Granada, in which country it had been detected by Purdie many years previously. Quite recently it was found by our collector, Burke, growing on small trees and shrubs close to the ground and on moss-covered stones at 2,000—3,000 feet elevation, near the Rio Verde, in the province of Antioquia. A plant exhibited at a meeting of the Royal Horticultural Society in October, 1869, was probably the first that flowered in this country. *Miltonia Warszewiczii* is the only species in the genus yet known with a paniced inflorescence, the flowers of which vary considerably in colour in different plants.

HYBRID MILTONIAS.

SUPPOSED NATURAL HYBRIDS.

Two *Miltonias* of supposed hybrid origin have appeared among the importations of the Brazilian species. The hypothesis of this origin rests upon the presence of characters in the floral and, in a less degree, in the vegetative organs of the offspring that are evidently blendings of the characters of the corresponding organs of the presumed parents in the manner described below.

Miltonia Bluntii.

Pseudo-bulbs from a creeping rhizome as in *Miltonia spectabilis*, and bearing two apical leaves of larger size than usually seen in that species. Scapes sheathed by ovate-lanceolate bracts and terminating in a few-flowered raceme. Flowers nearly as large as those of *M. spectabilis*; sepals and petals stellate, whitish yellow with some red-brown blotches in the central area, the sepals lanceolate, the petals broader and less acute; lip obovate with the side margins depressed, the apical part much undulated and white, the basal part purplish crimson as in *M. Clowesi*.

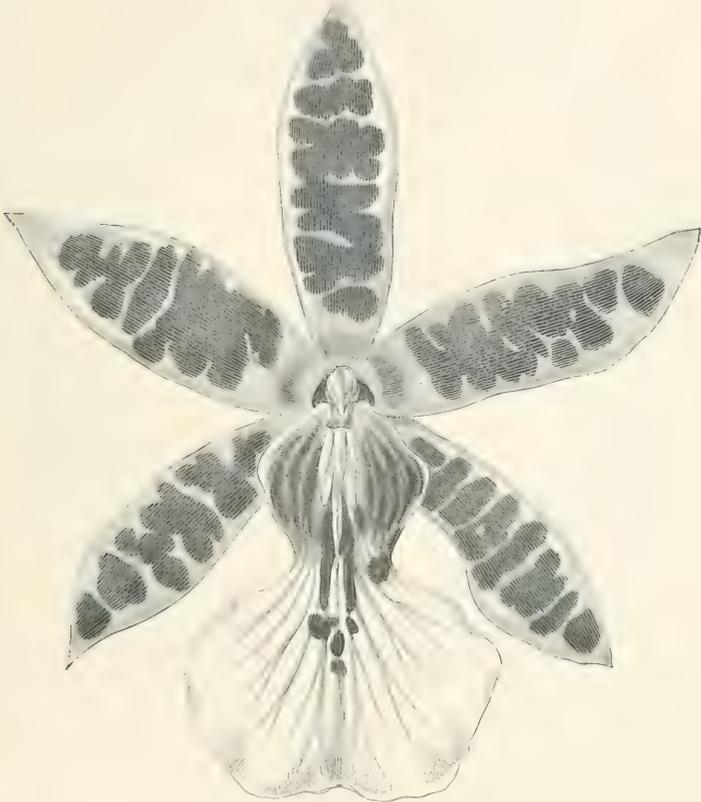
Miltonia Bluntii, Rehb. in Gard. Chron. XII. (1879), p. 489.

* We give this on the authority of the late Professor Reichenbach (Xen. Orch. I. p. 132), whose evidence was an imperfect specimen in Pœppig's herbarium. "Eadem speciem seu valde affinem, jam diu novimus ex herbario Poppigiano sed statu deplorabili."

var.—Lubbersiana.

Flowers larger than the original form, about 4 inches across vertically; sepals and petals light yellow with broad close-set purplish brown bars and blotches, and with a purple stain at the base; the basal area of the lip purple with several red-brown lines, the apical area much lighter.

M. Bluntii Lubbersiana, Rehb. in Gard. Chron. II. s. 3 (1887), p. 649. Godefroy's *Orchidophile*, 1890, p. 176.



Miltonia Bluntii, var. *Lubbersiana*.

A supposed natural hybrid between *Miltonia spectabilis* and *M. Clowesii*, in which the first named greatly preponderates in the vegetative organs and the latter in the colour of the flowers, the segments of which are intermediate between the two. The original form was sent to Mr. Richard Bullen, of the Woodlands Nursery, Lewisham, from Rio de Janeiro, in 1879, by Blunt, formerly orchid collector for Messrs. Low and Co. The variety, which is among the handsomest of

Miltonias, appeared in 1887 in the nursery of M. Peeters at St. Gilles, Brussels, and is named in compliment to M. Lubbers, Curator of the Botanic Garden of that city.

M. festiva.

Rhizome, pseudo-bulbs and leaves as in *Miltonia spectabilis*. The 2—3 flowered peduncles sheathed with ancipitous bracts as in that species, but shorter; sepals and petals nearly as in *M. flavescens*, light yellow; lip more that of *M. spectabilis*, but with an acute apex, light purple.

Miltonia festiva, Rehb. in Gard. Chron. 1868, p. 572.

A supposed natural hybrid between *Miltonia spectabilis* and *M. flavescens*. It was sent for identification to Professor Reichenbach in 1865 by M. Liiddemann, of Paris; a few years later it appeared in Messrs. Low's nursery at Clapton, and in 1877 a plant flowered in our Chelsea nursery. Since that date we find no evidence of its being in cultivation.

GARDEN HYBRIDS.

The only hybrid *Miltonia* raised artificially that has yet flowered is that here described, and which has been obtained by two operators from the crossing of the same pair of species, first by M. Bleu, of Paris, Secrétaire Général de la Société nationale de l'Horticulture de France, and secondly by ourselves.

Miltonia Bleuana.

M. vexillaria × *M. Roezlii*.

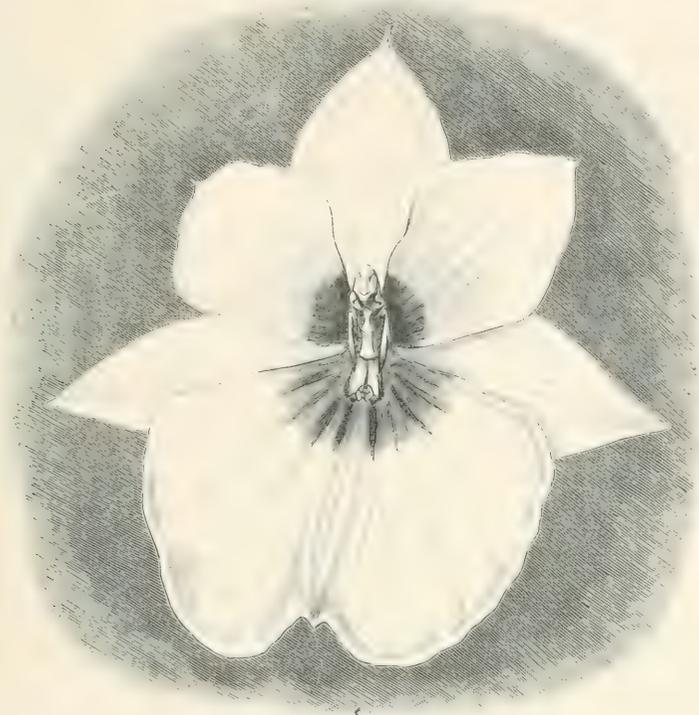
Vegetative organs nearly as in *Miltonia vexillaria*. Flowers 3—4 inches across vertically; sepals and petals intermediate, the former wholly white, the latter white with a rose-purple stain at the base; lip also intermediate, having the broader obovate form of *M. Roezlii* and the apical sinus but not so deep, of *M. vexillaria*, white with a fan-shaped rayed red-brown blotch in front of the yellow disk which is also intermediate in shape between that of the two parents.

Miltonia Bleuana, Gard. Chron. V. s. 3 (1889), p. 203. *Lindenia*, IV. t. 176. Sander's *Reichenbachia*, I. s. 2, t. 32. Williams' *Orch. Alb.* IX. t. 412 (splendens). M. Bleu, Godefroy's *Orchidophile*, 1889, p. 45. Id. *Miltonopsis Bleu*, p. 145, with fig.

sub-var.—*aurea* (*Orchidophile*, 1889, p. 145, with fig.), flowers white with a faint flush of light rose at the base of the petals, and with the yellow disk at the base of the lip somewhat enlarged.

The seeds obtained by M. Bleu from his cross were sown in April, 1884, and the first flower expanded early in January, 1889. Seden's cross was effected a little later; the seeds were not sown till January,

1885, and the first flower of the progeny did not expand till the Spring of 1891. In the clearer atmosphere and warmer climate of Paris M. Bleu succeeded in raising more seedlings in a shorter time than we did, and they also showed some differences in colour, *inter se*, among which that noted above is sufficiently distinct to have a name for garden use.



Miltonia Bleuana.
(From the Chelsea cross.)

BRASSIA.

R. Br. in Ait. Hort. Kew. ed. 2, V. p. 215 (1813). Lindl. Gen. et Sp. Orch. p. 212 (1833). Benth. et Hook. Gen. Plant. III. p. 564 (1833).

The Brassias occupy but a subordinate place, in a horticultural sense, in the group of genera to which they are nearest allied. This is owing to the absence generally of the bright colours and varied tints which render so many of their congeners among the *Oncidiums* and *Miltonias* so highly appreciated by the cultivators of

orchids. But although the flowers of most of the Brassias are of a homely and in attractive hue, there are not wanting forms in which strong colour contrasts are present, as in *Brassia Antherotes* and *B. Keiliana tristis*; and in most of the cultivated species the flowers are more or less pleasantly fragrant.

The botanical relationship between Brassia and Miltonia has been already stated.* Its affinity to Oncidium is also very close, from which, as Lindley long since pointed out, "there is nothing in reality that separates it except its very short earless column and entire bilamellate lip combined with elongated lateral sepals."† Nevertheless, there is a distinctness in the inflorescence by which the species can be recognised as Brassias at a glance, and which affords characters sufficiently definite to admit of the genus being retained. These characters may be expressed thus—

The *scapes* are always racemed and of a definite length, comparable with that of the leaves; the bracts are short and inconspicuous in all the cultivated species, except in *Brassia Keiliana*.

The *sepals* are long, linear, acuminate, and often tail-like.

The *petals* are similar, but shorter and narrower, and are placed either at a small angle to the dorsal sepal or turned towards it in a falcate manner.

The *lip* is sessile at the base of the short wingless column, entire, usually flat, bilamellate at the base, and about the same length as the petals.

The *vegetative organs* of the Brassias conform nearly to the Miltonias and to many of the Oncidiums; the pseudo-bulbs are mono-diphyllous, the leaves below them in the new growths are few, the lowermost being reduced to scales.

The genus was founded by Dr. Robert Brown on *Brassia maculata*, and named in commemoration of Mr. Brass, a skilled botanical draughtsman who collected seeds, plants, and dried specimens on the Guinea coast and in South Africa for Sir Joseph Banks and others in the early part of the present century. Upwards of twenty species have been published, some of which are but little known, and in others more definite characters are wanting by which they may be technically distinguished from each other.‡ They are

* See page 95.

† Folia Orch. Brassia, p. 1. In Walp. Ann. VI. p. 765, Reichenbach has brought all the Brassias under Oncidium.

‡ Some of the Brassias hitherto regarded as species approach each other so closely in structural details that they have been surmised to be geographical forms of one widely dispersed type.

all natives of tropical America, of which the greater number are dispersed over the West Indian Islands and the adjacent parts of Guiana, Venezuela, and New Granada; three or four are reported from Guatemala and Costa Rica, two from the Peruvian Andes, and one is vaguely stated to be a native of Brazil.

Cultural Note.—There is scarcely any group of orchids that has proved more tractable under cultivation than the Brassias. All the introduced species grow freely under the treatment usually given to the warmer Oncids, the routine for potting, watering, shading, &c., being the same. As the Brassias are usually found growing on trees in shade, attention must be given to the shading of the plants especially on bright days in the summer months; the supply of water must be constant, but regulated as to quantity according to the season. The temperature is indicated by the geographical stations of the species; thus the West Indian and Central American kinds may be grown in the East Indian house, but many cultivators prefer an intermediate temperature such as is maintained in the warmest position in the Cattleya house. For those species whose native homes are on the Cordilleras of South America an intermediate temperature is undoubtedly the best.

Brassia Antherotes.

“Racemosa; sepalis caudatis, petalis bene brevioribus, labello oblongo acuminato antrorsum dilatato antice bene acuminato, callo baseos ligulato antice connato basi dilatato ampliato intus puberulo velutino, linea angulata utrinque anteposita.”—H. G. Reichenbach, fil. in Gard. Chron. XII. (1879), p. 782.

Flowers deep yellow, the sepals and petals blotched with blackish purple, the lip spotted with the same colour in the central part and on each side of the crest.

Brassia Antherotes, Rehb. in Gard. Chron. loc. cit. Williams' *Orch. Alb.* IV. t. 159.

Discovered by the brothers Klaboch on the Andes of Colombia, and probably introduced by them. It was cultivated by the late Provost Russel, of Falkirk, in 1879, which is the earliest notice we find of its flowering in this country. It is one of the richest coloured Brassias known, but still very rare in gardens.

B. brachiata.

Pseudo-bulbs from a stout ligneous rhizome, ovoid-oblong, compressed, 3—5 inches long. Leaves linear-lanceolate, acute, 9—12 inches long. Scapes 2—3 times as long as the leaves, dull purple mottled with pale green, terminating in a 7—10 flowered raceme. Flowers among the largest in the genus; sepals 6 inches long, light yellow-green with 2—3 brown-purple spots near the base; petals about two-thirds as long as the

sepals, with 10—15 spots near the base; lip light yellow, the basal half oblong with revolute margins, and spotted with dark green flattened warts; the apical half cordate, acuminate with but few warts; crest bilamellate, elevated at the apex, white spotted with orange.

Brassia brachiata, Lindl. in Benth. Plant. Hartweg, p. 94 (1839). Id. in *Bot. Reg.* 1843, misc. No. 2, and 1847, t. 29. Id. *Fol. Orch.* *Brassia*, No. 8. Linden's *Pesc.* t. 31. *Oncidium brachiatum*, Rehb. in Walp. *Ann.* VI. p. 768.

One of the discoveries of Hartweg during his mission to Central America for the Horticultural Society of London, 1838—43. He detected it near the Hacienda de la Laguna, in Guatemala, and it was probably introduced through him; it flowered for the first time in this country in Messrs. Rollisson's nursery at Tooting, in 1843. It is very near *Brassia verrucosa*, of which, in fact, it is a gigantic form, but at the same time one of the finest in the genus.

B. caudata.

Pseudo-bulbs oblong, 3—4 inches long and 1 inch broad. Leaves oblong-ligulate, 7—9 inches long. Scapes as long again as the leaves, 7—10 flowered; sepals and petals light greenish yellow with large dark brown spots on the broader basal portion, the dorsal sepal about 3 inches long, the lateral two prolonged into slender tails as long again as the dorsal one; petals about one-third the length of the dorsal sepal; lip oblong with an acuminate tip, light yellow with some red-brown spots in front of the short bilamellate crest, which is white spotted with orange.

Brassia caudata, Lindl. in *Bot. Reg.* X. t. 832 (1824). Id. *Gen. et Sp. Orch.* p. 212 (1833). Id. *Fol. Orch.* *Brassia*, No. 5. *Bot. Mag.* t. 3451 (1835). *Epidendrum caudatum*, Linn. *Sp. pl.* p. 1349. *Oncidium caudatum*, Rehb. in Walp. *Ann.* VI. p. 766.

This species is botanically interesting as being one of the few epiphytal orchids known to Linnæus, and scarcely less so in a horticultural sense on account of its being one of the first *Brassias* cultivated in this country. It is a native of Jamaica and probably other West Indian islands, and was introduced by Mr. Lee, of Hammersmith, about the year 1823. The long attenuated tail-like lateral sepals, greatly exceeding in length the dorsal one, distinguishes this species from most of its congeners.

B. Gireoudiana.

Pseudo-bulbs broadly oblong, much compressed, 3—4 inches long, 2—2½ inches broad, mono-diphyllous. Leaves narrowly oblong, acute, 6—12 inches long, leathery, bright green. Scapes as long again as the leaves, 7—10 flowered; sepals yellow-green spotted with brown

near the base, the dorsal sepal $3\frac{1}{2}$ —4 inches long, the lateral two $4\frac{1}{2}$ —5 inches long; petals half as long as the dorsal sepal, the apical half yellow-green, the basal half brown; lip broadly obovate, apiculate, light yellow, the basal and central area spotted with brown, the bilamellate crest orange-yellow.

Brassia Gireoudiana, Rehb. in Allgem. Gartenz. XXII. (1854), p. 273. Id. *Xen. Orch. I.* p. 79, t. 32.* *Oncidium Gireoudianum*, Rehb. in Walp. Ann. VI. p. 768.

Discovered by Warscewicz in Costa Rica, and introduced by him into Germany. It flowered for the first time in Europe in the garden of Herr Nauen, at Hamburg, after whose gardener, Gireoud, it is named.

B. Keiliana.

Pseudo-bulbs clustered, narrowly ovate, $1\frac{1}{2}$ —2 inches long. Leaves lanceolate, acute, 7—10 inches long. Scapes longer than the leaves, many flowered; bracts subulate, acute, nearly as long as the pedicel and ovary; sepals and petals yellow-green spotted with brown on the broader basal portion, the sepals $2\frac{1}{2}$ —3 inches long, the petals about half as long; lip triangular-oblong, contracted at the apex into an acuminate tail, whitish with some brown spots in front of the two-keeled crest.

Brassia Keiliana, Rehb. in Paxt. Fl. Gard. 1852, p. 114. Id. in Bot. Zeit. 1852, p. 761. Id. *Xen. Orch. I.* p. 126, t. 45 (three forms). Regel's *Gartenfl.* 1862, t. 365. Lindl. Fol. Orch. Brassia, No. 16. *Oncidium Keilianum*, Rehb. in Walp. Ann. VI. p. 770.

var.—*tristis*.

Sepals and petals dark sepia-brown; lip with the apical tail longer and springing more abruptly from the light yellow blade.

B. Keiliana tristis, Rehb. *Xen. Orch. I.* p. 126, t. 45, fig. 3. Williams' *Orch. Alb. VIII.* t. 347.

Native of the Cordilleras of northern Colombia and Venezuela, at 5,000—7,000 feet elevation. It was first discovered by Wagener in the province of Caracas, and introduced by him into Germany about the year 1852; it is dedicated to Hofrath Keil, of Leipsig.

The species is a variable one, especially as regards the colour of its flowers; the variety *tristis* is a very remarkable one in this respect.

B. Lanceana.

Pseudo-bulbs ovate-oblong, 3—5 inches long, much compressed, ribbed and furrowed on the flattened sides, diphyllous. Leaves oblong or

* Reichenbach was of opinion that the herbarium specimen gathered by Mr. G. Ure Skinner at San Salvador, and referred by Lindley to *Brassia maculata*, is the species here described and figured.

oblanccolate, acute, 9—12 inches long. Scapes as long as or longer than the leaves, 7—10 or more flowered. Sepals and petals light yellow spotted with brown on the basal half, the sepals $2\frac{1}{2}$ —3 inches long, the petals half as long; lip oblong, acute, undulate, cream-white with a few brown spots in front of the white and orange two-lobed crest.

Brassia Lanceana, Lindl. in *Bot. Reg.* t. 1784 (1836). *Bot. Mag.* t. 3577 (1837). *Id.* t. 3794 (*viridiflora?*). Lindl. *Fol. Orch. Brassia*, No. 2. *Oncidium suaveolens*, Rehb. in *Walp. Ann.* VI. p. 765.

var.—macrostachya.

Flowers much larger, “bright yellow slightly spotted with brown; lip much paler; lateral sepals very acuminate, three or four times longer than the lip.”

B. Lanceana macrostachya, Lindl. *Fol. Orch. Brassia*, No. 2. *B. macrostachya*, Lindl. *Sert. Orch.* t. 6.

var.—pumila.

Plant dwarf. “Flowers pale yellow stained with dull purple at the base of the sepals; lip contracted in the middle, yellowish brown at the base.”

B. Lanceana pumila, Lindl. *Fol. Orch. Brassia*, No. 2. *B. pumila*, Lindl. in *Bot. Reg.* 1845, misc. 62.

The type was discovered in Surinam (Dutch Guiana) by Mr. John Henry Lance, who sent plants to the Horticultural Society of London, in 1834. The variety *macrostachya* was imported from Demerara by Loddiges, in whose nursery it flowered in 1836; it is probably not now in cultivation; it appears to bear a similar relation to the type as *Brassia brachiata* to *B. verrucosa*. The variety *pumila* was gathered by Linden in Caracas, and was cultivated by Mr. Barker, of Birmingham, in 1845; it has probably since disappeared from cultivation.

B. Lawrenceana.

Pseudo-bulbs, leaves and inflorescence as in *Brassia Lanceana*. Sepals and petals light yellow spotted with brown on the basal half, the sepals about 3 inches long, the petals half as long; lip oblong-lanceolate, acute, light yellow; crest two-keeled, truncate in front, white spotted with orange-yellow.

Brassia Lawrenceana, Lindl. in *Bot. Reg.* 1841, misc. No. 6, and t. 18. *Id.* *Fol. Orch. Brassia*, No. 3. *B. cochleata*, Knowles and Westc. *Fl. Cab.* t. 53,* ex Lindl. *Fol. Orch. loc. cit.* *Oncidium Lawrenceanum*, Rehb. in *Walp. Ann.* VI. p. 766.

var.—longissima.

Flowers much larger and differently coloured, the sepals 7 inches long; sepals and petals orange-yellow with large red-purple blotches on the

* This drawing is so imperfectly executed that it is impossible to say with certainty to which species the plant it represents should be referred.

broader basal portion; lip light yellow with a ring of purple spots at the base; crest two-ridged, slightly pubescent and terminating in tubercles.

B. Lawrenceana longissima, Rehb. in Gard. Chron. 1868, p. 1313. *Bot. Mag.* t. 5748.

The original *Brassia Lawrenceana*, figured by Lindley in the *Botanical Register*, and whose origin is doubtful, was cultivated by Mrs. Lawrence at Ealing Park, in 1840. Knowles and Westcott's *B. cochleata* was sent to Messrs. Low and Co. from Demerara, by their collector Henchman, in 1839. The variety *longissima*, if variety it is, and which immensely surpasses Lindley's type in size and colour, is a native of Costa Rica, and flowered for the first time in this country in Mr. Wentworth Buller's collection at Strete Raleigh, near Exeter, in 1868. It is the most remarkable *Brassia* known.

Brassia Lawrenceana is only known to us by the figure and description quoted above, and by which we are unable to distinguish it from *B. Lanceana*. The variety *longissima* is a far more distinct form that cannot be referred with certainty to *B. Lanceanum*, and which may hereafter receive separate specific rank. Its habitat too is very remote from the supposed origin of Lindley's type or of Knowles and Westcott's *B. cochleata*.

B. maculata.

Pseudo-bulbs oblong, much compressed, smooth, 3—4 inches long, monophyllous. Leaves narrowly oblong, sub-acute, 6—8 inches long. Scapes as long again as the leaves, many flowered. Sepals and petals yellowish green spotted with brown on the basal half, the sepals about 3 inches, the petals 2 inches long; lip broadly clawed, cordate, acute, cream-white dotted with brown-purple; the bilamellate crest orange-yellow, slightly pubescent.

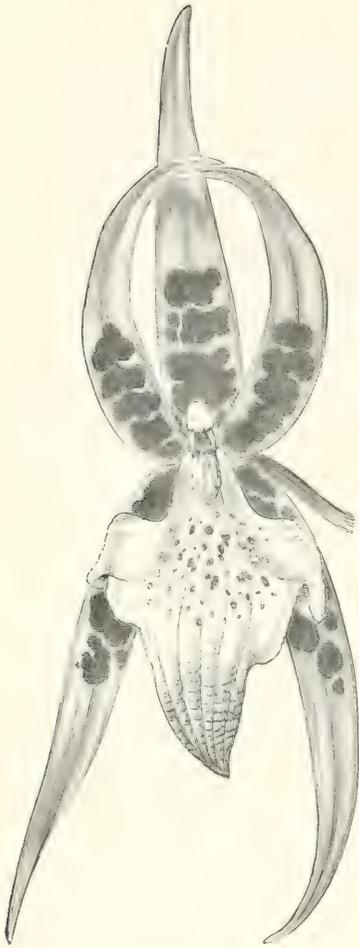
Brassia maculata, R. Br. in Ait. Hort. Kew. ed. 2, V. p. 15 (1813). *Bot. Mag.* t. 1691. Lindl. Gen. et Sp. Orch. p. 212. Id. Fol. Orch. *Brassia*, No. 1. *Pact. Mag. Bot.* VI. p. 5. B. Wrayæ, Hook. in *Bot. Mag.* t. 4003. *Oncidium Brassia*, Rehb. in Walp. Ann. VI. p. 765.

var.—guttata.

"Flowers much smaller and greenish, with the spots distributed pretty equally over the surface."

B. maculata guttata, Lindl. in *Fol. Orch. Brassia*, No. 1. *B. guttata*, Lindl. in *Pl. Hartw.* p. 94.

The species on which the genus was founded and the first *Brassia* cultivated in British gardens. It was introduced from Jamaica in the early part of the present century by Sir Joseph Banks, who presented plants to the Royal Gardens at Kew, where one of them

*Brassia maculata.*

mottled with green and dull crimson, 10—15 flowered. Sepals and petals light yellow-green with some dark green spots at the base, the sepals 3—4 inches long, the petals about half as long; lip broadly clawed, cordate, apiculate, white with numerous dark green flattened warts on the claw and basal area of the blade; crest two-lobed, pubescent, orange-yellow with two small white teeth in front.

Brassia verrucosa, Lindl. in Bot. Reg. 1840, misc. No. 66. Id. Fol. Orch. Brassia, No. 9. Batem. *Orch. Mex. et Guat.* t. 22. *Oncidium verrucosum*, Rehb. in Walp. Ann. VI. p. 769.

A native of Guatemala and probably southern Mexico. It was introduced by Messrs. Rollisson, in whose nursery at Tooting it

flowered in April, 1814. The variety *guttata* was gathered by Hartweg in Guatemala, in 1836—7.

B. signata.

Pseudo-bulbs ovoid-oblong, compressed, 3—5 inches long, di-triphyllous. Leaves broadly strap-shaped, sub-acute, 9—12 inches long. Scapes longer than the leaves, 7—10 or more flowered. Flowers small for the genus; sepals and petals bright green spotted with brown on the basal half, the sepals 2 inches long, the petals shorter and narrower; lip oval, shell-like, suddenly contracted to an acuminate tip, white with two brown-purple spots in front of the bilamellate crest, at the base of which is a yellow spot.

Brassia signata, Rehb. in Gard. Chron. XVI. (1881), p. 6.

A small-flowered species introduced in 1881 by Messrs. Backhouse, of which the habitat is not recorded. The above description was taken from a plant that flowered in our houses in May, 1891.

B. verrucosa.

Pseudo-bulbs ovoid, much compressed, 3—4 inches long, ribbed and furrowed on the flattened sides. Leaves linear-acute, 9—12 or more inches long. Scapes as long again as the leaves,

flowered in April, 1840. The warted labellum well distinguishes this species from all the cultivated Brassias except *B. brachiata*, but this has flowers as large again as those of *B. verrucosa*.

GOMEZA.

R. Br. in Bot. Mag. t. 1748 (1815). Benth. et Hook. Gen. Plant. III. p. 565.

A small genus including five or six species, natives of southern Brazil, having the habit of the smaller Odontoglosses, and producing in winter and early spring drooping racemes of pale yellow or greenish flowers that are appreciated for their delightful fragrance. The genus was founded by Dr. Robert Brown on *Gomezia recurva*, a species that was cultivated in the old Apothecaries' Garden at Chelsea in the early part of the present century. It commemorates the name of Bernardino Gomez, a Portuguese physician and botanist. The generic characters will be recognised from the descriptions of the species given below which are well known and frequently met with in orchid collections where they are cultivated on account of their pleasant fragrance and where they are better known as Rodriguezas, Dr. Lindley having unaccountably confounded them with that genus.*

Cultural Note.—Coming from the same region and growing, so far as at present known, under similar conditions as the smaller Brazilian Miltonias, *Miltonia spectabilis*, *M. flavescens*, &c., the cultural treatment of those species is also that which has been found to be most suitable for the Gomezias, and need not therefore be here repeated.

Gomezia Barkeri.

Pseudo-bulbs narrowly oblong, 3—4 inches long, diphyllous. Leaves linear-lanceolate, acute, 5—7 inches long. Scapes longer than the leaves, loosely racemose, many flowered. Flowers light yellow-green with some red spots on the lip and an orange line round the stigma; sepals and petals linear-oblong, undulate, the lateral sepals connate to the middle; lip ovate-oblong, acute, reflexed; crest two small plates produced in front into two short raised lines. Column with a small auricle on each side below the anther.

Gomezia Barkeri, Benth. Gen. Plant. III. p. 566 (1883). *Rodriguezia Barkeri*, Hook. in Bot. Mag. t. 3497 (1836). *Odontoglossum Barkeri*, Rehb. in Walp. Ann. VI. p. 854 (1864).

* Quite as inexplicable is the placing of them under *Odontoglossum* by Reichenbach in Walp. Ann. VI. p. 853.

Introduced from Brazil by Mr. George Barker, of Birmingham; it flowered for the first time in this country in the Botanic Garden of that town in January, 1836. It is the least interesting of the Gomezas now cultivated.

G. foliosa.

Pseudo-bulbs narrowly ovate-oblong, 2—3 inches long, much compressed, diphyllous. Leaves linear, acute, about 6 inches long. Racemes longer than the leaves, the rachis and pedicels very pale green, the latter sheathed by subulate, acuminate bracts as long as themselves. Flowers very fragrant, $\frac{3}{4}$ inch across vertically; sepals and petals light buff-yellow, the dorsal sepal and petals linear spathulate, undulate; the lateral sepals longer, connate at the base; lip much shorter than the other segments, ovate-oblong, reflexed, light buff yellow with two white keels on the disc. Column wingless, white with an orange spot below the stigma.

Gomezia foliosa, Benth. Gen. Plant. III. p. 566 (1883). *Pleurothallis foliosa*, Hook. in *Bot. Mag.* t. 2746 (1827). *Rodriguezia suaveolens*, Lindl. Gen. et Sp. Orch. p. 195 (1833). *Odontoglossum foliosum*, Rehb. in Walp. Ann. VI. p. 854 (1864).

First cultivated in the Botanic Garden of Trinity College, Dublin, in 1825, whither it had been introduced from Brazil by the Curator, Mr. Mackay. It is the prettiest and sweetest of the Gomezas; its fragrance has been compared to that of the violet and cowslip combined.

G. planifolia.

Pseudo-bulbs ovoid, compressed, about 2 inches long, diphyllous. Leaves lanceolate, acute, 4—5 inches long, more or less recurved. Racemes longer than the leaves, the rachis and pedicels whitish, the bracts acute and shorter than the stalked ovaries. Flowers light greenish yellow, very fragrant; sepals and petals oblong, acute, undulate, the lateral sepals connate nearly to their tips; lip much shorter than the other segments, broadly oblong, acute, reflexed with two oblong tubercles on the disk. Column white with an orange line round the stigma.

Gomezia planifolia, Benth. Gen. Plant. III. p. 566 (1883). *Rodriguezia planifolia*, Lindl. Gen. et Sp. Orch. p. 195 (1833). *Bot. Mag.* t. 3504. *Odontoglossum planifolium*, Rehb. in Walp. Ann. VI. p. 853 (1864).

Introduced by Messrs. Loddiges about the year 1822. It is sometimes confused with the preceding species, from which it is distinguished by its smaller pseudo-bulbs, its broader and shorter leaves, also by the lateral sepals being connate nearly to their tips, and by its differently shaped labellum. Its pleasant fragrance is its chief recommendation.

G. recurva.

Pseudo-bulbs ovoid, compressed with acute edges, 2—3 inches long, di-triphyllous. Leaves linear-oblongate, 8—12 inches long. Racemes as long as or longer than the leaves with a pale yellow rachis; bracts awl-shaped, nearly as long as the ovaries. Flowers $\frac{3}{4}$ inch across vertically, light yellow; dorsal sepal and petals oblong-spathulate, undulate; lateral sepals connate into an oblong blade deeply bifid at the apex; lip shorter than the lateral sepals, ovate, acute, reflexed at the apex and with two short raised plates at the base.

Gomezia recurva, R. Br. in *Bot. Mag.* t. 1748 (1815). *Rodriguezia recurva*, Lindl. *Gen. et Sp. Orch.* p. 195 (1832). *Odontoglossum recurvum*, Rehb. in *Walp. Ann.* VI. p. 853 (1864).

The species upon which the genus was founded and which had been introduced from Brazil to the Apothecaries' Garden at Chelsea, where it flowered, probably for the first time in this country, in 1815. It seems to have been subsequently lost. We received the specimen from which the above description was taken from the collection of Mr. H. J. Cuming at Foston Hall, Derby, in 1887. It comes very near *Gomezia planifolia*, but it is a more robust plant with larger pseudo-bulbs and leaves, and with longer racemes of brighter yellow flowers.

ADA.

Lindl. *Fol. Orch.* 1853. Benth. et Hook. *Gen. Plant.* III. p. 506 (1833).

A small genus of which two species are now known, both of them natives of the Cordilleras of Colombia, and both among the handsomest orchids of their colour ever brought under cultivation. The type species is the well-known *Ada aurantiaca*, which was discovered upwards of half-a-century ago; the second species has only been brought to light within the last few years through the exertions of the excellent orchidologist whose name it bears.

Ada is placed by Mr. Benthham in the small group of genera belonging to the sub-tribe ONCIDEE, distinguished by their usually, not always, monophyllous pseudo-bulbs and by their flowers not fully expanding.* It is not known to whom the genus is dedicated.

* The group includes *Neodryas*, *Trizeuxis*, *Ada*, *Sutrina*, Andean genera, and *Trigonidium*, chiefly British Guianian, in all about twenty species, some of them very curious, but none, with the exception of the two *Adas*, of any horticultural merit.

Ada aurantiaca.

Pseudo-bulbs in tufts, narrowly ovate-oblong, compressed, 3—4 inches long, mono-diphyllous. Leaves linear-ligulate, acute, 7—12 inches long. Scapes as long as the pseudo-bulbs and terminal leaves taken together, bracteate, the bracts subulate, acute, sheathing, $\frac{1}{2}$ inch long; racemes arching, 7—12 or more flowered. Flowers bright cinnabar-red, only expanding from above the middle; sepals and petals linear-lanceolate, very acute, with a sunk median line on the face; the petals shorter and narrower than the sepals and with a purple streak on the median line; lip half as long as the sepals, narrowly oblong, acuminate, with two short keels at the base. Column very short, concave below the stigma.

Ada aurantiaca, Lindl. *Fol. Orch.* 1853. *Bot. Mag.* t. 5435 (1864). *Illus. hort.* 1872, t. 107. Williams' *Orch. Alb. II.* t. 53. *Brassia cinnabarina*, Lindl. *Fol. Orch.* Brassia, No. 15 (1853). *Mesospinidium aurantiacum*, Rehb. in *Walp. Ann.* VI. p. 857 (1864).

This bright-coloured orchid was discovered by the Belgian collector, Schlim, about the year 1851—2 on the eastern Cordillera of New Granada between Ocaña and Pamplona at 8,500 feet elevation. It remained unknown to horticulture till the desire to possess the beautiful *Odontoglots* from the same region induced the sending of several collectors to New Granada at the same time,* and by whom a few plants of the *Ada* were sent to Europe in 1853; among the first of these to flower was one in Mr. Bateman's collection at Biddulph Grange, near Congleton, in January, 1864; but the usual flowering season of established plants is February and March. Frequent importations since the date mentioned above have rendered *Ada aurantiaca* one of the best known and most appreciated of cool orchids.

Cultural Note.—Growing at an altitude and under conditions similar to those under which most of the *Odontoglots* from the same region are found, its cultural treatment is precisely the same as that of the cool *Odontoglots*.

Ada Lehmanni.†

"Habit of *Ada aurantiaca* but more rigid. Leaves arcuate, linear, acute, coriaceous, dark green more or less marbled with grey blotches, 8—12 inches long. Scapes erect, rather shorter than the leaves, racemes with 5--8 flowers; bracts lanceolate, acute, shorter than the pedicels. Sepals and petals sub-similar, linear-lanceolate, acute, somewhat fleshy,

* See *Odont.* p. 30.

† Not seen by us.



Ada aurantiaca.

bright cinnabar-orange; lip oblong-lanceolate, acuminate with incurved undulate margins and recurved apex, about three-quarters as long as the sepals, white except the very fleshy, linear, thickened callus which is deep orange and extends from the base to near the apex, and on each side of which is a recurved white hook. Column short, dull yellow with a pair of large auricles at the base."—R. A. Rolfe in Gard. Chron. X. s. 3 (1891), p. 34.

Ada Lehmanni, Rolfe in Gard. Chron. loc. cit.

"Introduced to Europe by Mr. F. C. Lehmann, the German Consul in the Republic of Colombia, and first brought under notice in September, 1888, by Mr. James O'Brien, of Harrow, who sent it to Kew for determination. It is a very distinct species, distinguished from *Ada aurantiaca* by its more rigid habit, shorter, broader and darker green leaves which are everywhere marbled with grey, and by its white lip; it is also a decidedly summer-flowering plant."

IONOPSIS.

Humboldt et Kunth, Nov. Gen. et Sp. I. p. 348, t. 83 (1815). Benth. et Hook. Gen. Plant. III. p. 567 (1883).

A genus of dwarf epiphytes with small, narrow, stiffish leaves produced in tufts of threes and fours from a creeping rhizome, and with loose panicles of small but very pretty flowers. The following characters described by Lindley, distinctly limit the genus:—

The sepals and petals are short and erect, of which the two lateral sepals form a small bag; the lip is long, reflexed at the upper half and furnished at the base with four processes, of which two are thin membranous auricles within the edge of the lip, and two much more fleshy calli within the auricles themselves.*

The species, however, are not so clearly defined, for although nine have been published, it is highly probable that most of them are only varieties of two or three widely dispersed types that are spread over tropical America, including the West Indies, from Mexico to Brazil. The genus was founded by Humboldt and Kunth on *Ionopsis pulchella*, which was discovered by the great traveller in northern Colombia, near Cartagena, and which is still but imperfectly known to science. The name is compounded of 'ίov, "a violet," and ὄψις, "the appearance," but why so selected, is not at all clear.

* Folia Orchidacea, Ionopsis, page 1.

Cultural Note.—We have never seen any forms in cultivation besides the two here described. These are usually attached to small blocks or rafts, with some sphagnum around their roots and suspended from the roof of the intermediate house. Like the Oncids of the section *EQUITANTIA* which they much resemble in habit and aspect, the Ionopses are short lived in the glass-houses of Europe; they have a tendency to produce flowers out of proportion to the strength of the plants, and in order to prolong their life as much as possible, it is advisable to apply a check such as is often applied to species of *Phalenopsis*, by occasionally removing the incipient inflorescence.

Ionopsis paniculata.

Leaves linear-lanceolate, acute, 4—6 inches long, channelled on the face, keeled behind. Peduncles slender, panicled, 15—20 or more inches long. Flowers numerous, less than an inch across vertically, on slender pedicels sheathed at the base by a minute scale-like bract; sepals and petals white, narrowly oblong, acute, the petals a little the broadest; lip clawed, the blade large in proportion to the other segments, rounded two-lobed, white with a purple spot in front of the small bipartite yellow callus.

Ionopsis paniculata, Lindl. in *Bot. Reg.* sub. t. 1904 (1836). Id. *Fol. Orch.* *Ionopsis*, No. 9. *Bot. Mag.* t. 5541. Van Houtte's *Fl. des Serres*, XXII. t. 2333.

Originally discovered by Descourtilz at the beginning of the present century in the primeval forests of São Paulo, in southern Brazil. It remained unknown to horticulture till it was imported by Messrs. Low and Co., in whose Clapton nursery it flowered for the first time in this country in the autumn of 1864.

I. utricularioides.

Leaves linear, acuminate, curved, 3--4 inches long, green when first developed, changing with age to dull vinous purple. Peduncles slender, dull purple, 9—12 inches long, panicled above. Flowers white, sometimes with a small rose-purple spot at the base of the lip, $\frac{3}{4}$ inch in diameter, on slender pale purple pedicels; sepals and petals collectively forming a funnel enclosing the column, the sepals lanceolate, the petals oblong, obtuse, longer and broader than the sepals; lip broadly clawed, transversely roundish oblong with a deep sinus in the anterior margin, produced at the base into a short truncate spur, in front of which are two small tubercles

Ionopsis utricularioides, Lindl. in *Collect. Bot.* t. 39 (1821—25). Id. *Gen. et Sp. Orch.* p. 194. Id. *Fol. Orch.* *Ionopsis*, No. 5. *I. tenera*, Lindl. in *Bot. Reg.* t. 1904 (1836).

This is the best, and next to the type the longest known of

all the species of *Ionopsis*.* It is widely dispersed over Central America from Oaxaca southwards, the West Indian Islands, and the adjacent littoral of Venezuela. It was first introduced into British gardens by Sir Ralph Woodford, who sent it from Trinidad with *Oncidium Papilio* and other orchids to the Horticultural Society of London, in whose garden at Chiswick it flowered in May, 1824. We next read of its being cultivated by Sir Charles Lemon at Carlew in 1836; his plant had been brought from Cuba, and was figured and described in the *Botanical Register* under the name of *Ionopsis tenera*.† The species is a variable one, but the deviations from the type do not appear to be sufficiently distinct to require separate notice.‡

ORNITHOCEPHALUS.

Hook. Exot. Fl. t. 127 (1825). Benth. et Hook. Gen. Plant. III. p. 568 (1883).

A very remarkable genus, of which the most essential character is the long slender rostellum, to which the equally long caudicle or stalk of the pollen masses is attached by means of its terminal glandular disc, the latter organ lying so closely appressed to the elongated rostellum that the two appear to be but one body. This extraordinary structure is shown in the accompanying woodcut of *Ornithocephalus grandiflorus*, figs. 3, 4, and 5, the largest flowered species in the genus, and that in which this curious apparatus can be best seen. About twenty species are known to science, scattered over tropical America from Mexico to southern Brazil, but all of them with the exception of *O. grandiflorus* are diminutive and inconspicuous plants of far greater interest to the botanist than to the horticulturist. Of these species three or four have found their way into British gardens from time to time. *O. ciliatus* is mentioned by Sir Joseph Paxton|| as being in cultivation in 1844, "but in no

* It is highly probable that Humboldt's *Ionopsis pulchella* and Lindley's *I. utricularioides* are one and the same species.

† There seems to us to be no doubt that this is only a geographical form of *Ionopsis utricularioides*, and we have therefore unhesitatingly referred it to that species.

‡ Lindley has noted five such deviations with the remark that they do not appear to possess any clear marks of distinction; they are evidently geographical forms.

|| Mag. Bot. XI. p. 70.

way likely to attract notice save by the singularity of its form; and *O. Oberonia* was in the late Mr. Wilson Saunder's collection at Reigate in 1869.*

The genus was founded by Sir William Hooker on *O. gladiatus*, a native of Trinidad, which was introduced to the Botanic Garden at Glasgow in 1824; † the remarkable form of the column and its appendages suggesting the name which is compounded of *ὄρνις* *ὀρνίθου* and *κεφαλή*, literally "a bird's head."

Ornithocephalus grandiflorus.

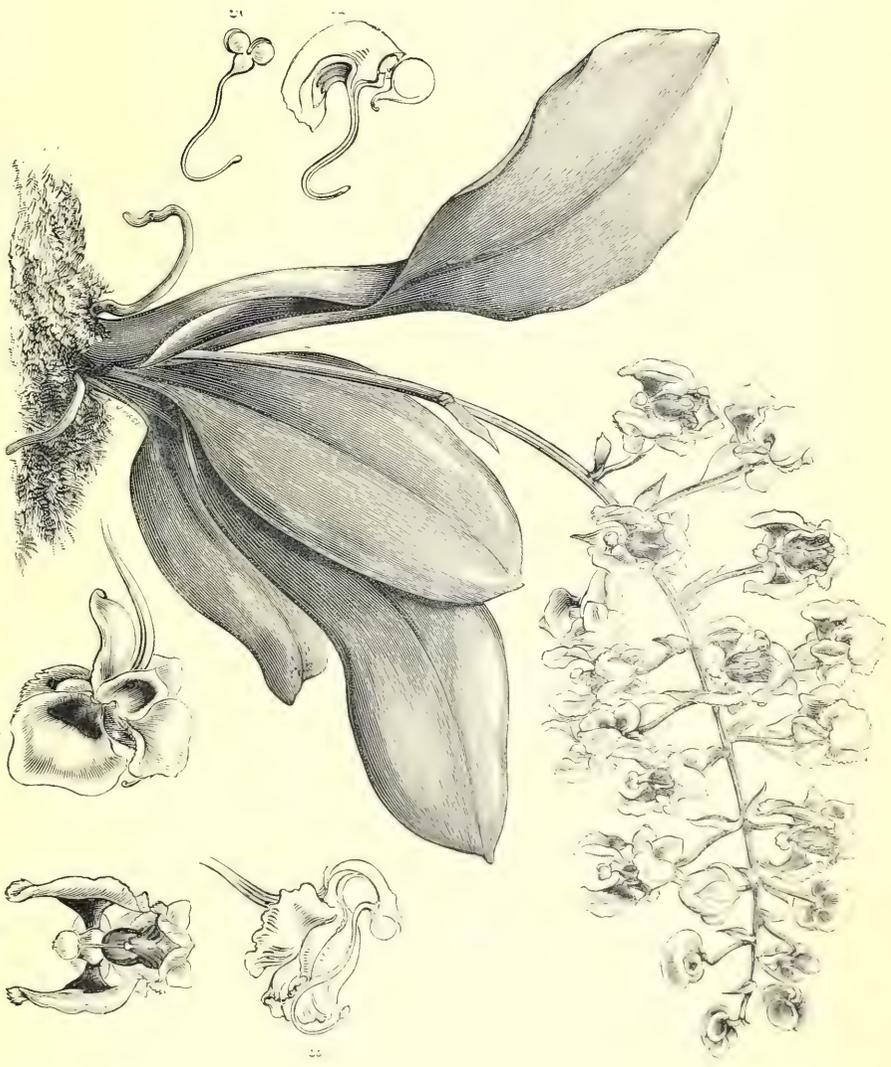
Leaves narrowly oblong, obtuse, 4—6 inches long, 4—6 on one growth, in the axis of which the small pseudo-bulb is formed. Peduncle from the axil of the uppermost leaf, longer than the leaves, arching, racemose, many flowered; bracts small, subulate, acute. Flowers $\frac{3}{4}$ inch in diameter; sepals and petals white with a bright green spot at the base, suborbicular, concave, the lateral sepals the smallest and reflexed; lip suborbicular, saccate and strongly keeled beneath, on the short claw of which is a horse-shoe shaped green callus with a crisped fan-like prolongation in front. Column white, bent like a swan's neck, the rostellum of which is produced into a thread-like appendage parallel with the callus of the lip as far as its anterior margin, and then bent upwards and inwards, terminating in a small yellow gland.

Ornithocephalus grandiflorus, Lindl. in Ann. Soc. Nat. Hist. IV. (1840), p. 383. Rehb. in Walp. Ann. VI. p. 493. Id. in Gard. Chron. XVIII. (1882), p. 168. Belg. hort. 1884, p. 89.

This is the handsomest species yet known in the genus, and worthy of a place in the most select collections of orchids. It was originally discovered by Gardner on the Organ Mountains in southern Brazil in 1837, and was described by Dr. Lindley shortly afterwards from Gardner's herbarium specimen in the periodical quoted above. Nothing more appears to have been seen of it till 1882, when fresh specimens for identification were sent to Professor Reichenbach by M. Witte, curator of the University Botanic Garden at Leyden, and about the same time from M. Lüddemann at Paris; two years later it was figured in *La Belgique Horticole*, and described by M. Morren from a plant in the Botanic Garden at Brussels. A recent importation has caused it to become well known in British gardens, where it flowers in May and June.

* Gard. Chron. 1869, p. 988.

† Probably through Sir Ralph Woodford, the Governor.



Onithocephalus grandiflorus.

(1) side view, (2) front view of flower natural size; (3) column and lip, (4) rostellum, (5) pollinia and caudicle, enlarged.

Cultural Note.—No special cultural treatment is required for *Ornithocephalus grandiflorus*. Coming from the Organ Mountains, its geographical station indicates an intermediate temperature in the glass-houses of Europe with the usual attention to watering, etc., which is given to other orchids from the same region.

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A MANUAL

OF

ORCHIDACEOUS PLANTS

CULTIVATED UNDER GLASS IN GREAT BRITAIN.

PART IX.

CYMBIDIUM, ZYGOPETALUM, LYCASTE,

ACINETA, ANGULOA, BIFRENARIA, COCLIODA,
COMPARETTIA, CYNOCHES, GRAMMATOPHYLLUM, GALEANDRA,
MAXILLARIA, MORMODES, RODRIGUEZIA, STANHOPEA,
TRICHOPILIA, Etc., Etc.

JAMES VEITCH & SONS,

ROYAL EXOTIC NURSERY, 544, KING'S ROAD, CHELSEA, S.W.

1893.

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PRELIMINARY NOTICE.

THIS Manual is being compiled to supply amateurs and cultivators of exotic Orchids with a fuller account of the principal genera, species and varieties cultivated under glass, than is contained in the Manuals hitherto in use.

The rapid extension of Orchid culture during the last quarter of a century, resulting from the increased taste for and appreciation of this beautiful and interesting order of plants, has, in our opinion, created the *desideratum* which we are now attempting to supply. The prominent place, too, occupied by Orchids in the columns of the Horticultural Press, and the surprising amount of practical and varied information respecting them disseminated through its agency, has also stimulated the desire to obtain all the leading facts in a condensed form, to which easy reference may at any time be made.

So numerous are the species and varieties of Orchids at present in cultivation, and to which additions are constantly being made by new discoveries and by artificial hybridisation, that the labour attending the compilation of a Manual sufficiently comprehensive to meet the wants of cultivators must necessarily demand much time. Moreover, the present unsatisfactory state of Orchidology, especially in its horticultural aspect and its complicated and unscientific nomenclature, have rendered the compilation of such a Manual within a stated time almost an impossibility.

Under these circumstances, and yielding to the solicitations of patrons and friends, we have decided upon issuing the work in parts, each part containing a monograph of the cultivated species and varieties of one of the most important genera, or of a group of genera.

Little explanation of the plan of the work is here needed; the parts as issued must speak for themselves. We have only to state that in the scientific classification and sequence of the genera we have followed, with but trifling deviations, the arrangement of Bentham and Hooker as elaborated in their *Genera Plantarum*, the most profound and, at the same time, the most intelligible exposition of the Orchideæ extant. In the nomenclature of the species, we have adhered to the Laws of Botanical nomenclature adopted by the International Botanical Congress, held at Paris in August, 1867.

In the description of the species, we have been compelled to use occasionally a few technical terms to avoid cumbrous circumlocutions; at the conclusion of the work we propose giving a glossary of the terms so used. In the cultural notes we have quoted temperatures in the Centigrade scale with the equivalent Fahrenheit readings, in the hope that the far more rational scale, now almost universally adopted in scientific investigations, may also come into use in horticulture. The literary references in italics indicate coloured plates of the species or variety described.

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TRIBE—VANDEÆ.

SUB-TRIBE EULOPHIÆ.

*Terrestrial herbs, rarely epiphyte, with leafy stems often thickened into pseudo-bulbs. Leaves few, plicately-veined, often narrow. Racemes simple, rarely branched.**

EULOPHIA.

R. Br. in Bot. Reg. t. 686 (1822). Benth. et. Hook. Gen. Plant. III. p. 535 (1833).

Eulophia includes more than fifty species dispersed over tropical Africa and the Indo-Malayan region, but very few of them have been introduced into European orchid collections, and these are cultivated chiefly in botanic gardens. The genus is noticed here solely for the purpose of inserting the type species which is a very handsome one, and, in a horticultural sense, the best Eulophia yet seen in cultivation.

Eulophia guineensis.

Pseudo-bulbs clustered, sub-globose, approaching ovoid, $1\frac{1}{2}$ --2 inches in diameter, monophyllous. Leaves elliptic-oblong or linear-oblong, sub-acuminate, 7—10 inches long, narrowed below into a slender petiole, one-third to one-half as long as the blade. Scapes stoutish, pale green, 24—36 inches long, racemose along the distal half, many-flowered; cauline bracts sheathing, 2 inches long; floral bracts much smaller, linear, acuminate. Flowers 2 inches across vertically; sepals and petals similar and equal, and but slightly divergent from each other, linear, acuminate, twisted, greenish purple, sometimes rose-purple with paler margin; lip of peculiar shape and structure, three-lobed, the side lobes small, adnate to the column at their superior margin, and forming with it a funnel-shaped cavity that is prolonged into a slender spur as long as the pedicel and ovary; the front lobe large and spreading, sub-

* This sub-tribe includes but three genera, viz., Eulophia, from *εύλοφος*, "handsomely crested," in reference to the crest of the type species; Lissochilus, from *λισσός*, "smooth," and *χείλος*, "a lip"; and Galeandra, a hybrid word from the Latin *galca*, "a helmet," but this perhaps from *γαλήνη*, and *άνθη άνδρος*, "an anther," in reference to the helmet-like cap of the anther. It is, however, a very natural sub-division of the VANDEÆ.

rhomboidal with crenulate margin, light rose-purple with darker veins, and with a dark purple stain at the base. Column short, much compressed, rounded and purple above, nearly flat and whitish below.

Eulophia guineensis, R. Br. in *Bot. Reg.* t. 686 (1822). *Bot. Mag.* t. 2467. Lindl. *Gen. et. Sp. Orch.* p. 181. Williams' *Orch. Alb. II.* t. 89 (purpurata). *The Garden XIX.* (1881), t. 277.

Introduced in 1821 from Sierra Leone by George Don, collector for the Horticultural Society of London, in whose garden at Chiswick it flowered in the following year. It was also sent to Messrs. Loddiges in 1822 by George Hawkins, who collected it in Los, one of the small islands off the coast of Sierra Leone. For materials for description we are indebted to Sir Trevor Lawrence, Bart., in whose collection at Burford Lodge this orchid has long been successfully cultivated, flowering usually in August and September.

Cultural Note.—The following details of the cultural treatment of *Eulophia guineensis* at Burford Lodge was communicated to *The Garden* by the late Mr. Spyers:—"The plant is potted in a mixture of peat and sphagnum, but sometimes fibrous peat, charcoal and broken crocks are used, the pots being half full of drainage. During the growing season the plant is kept in a shady position in the East Indian house with liberal supplies of water. When in flower it is moved to a more airy position in the intermediate house. Being deciduous it does not require a large amount of water from the time when its foliage changes colour till the growing season commences again,"*

LISSOCHILUS.

R. Br. in *Bot. Reg.* t. 573 (1821). Lindl. *Collect. Bot.* t. 31. Benth. et. Hook. *Gen. Plant.* III. p. 536 (1883).

This genus is very closely allied to *Eulophia*, differing chiefly in the petals being much larger and usually more brightly coloured than the sepals; but as this character, as Mr. Bentham remarks, is observed in some of the Asiatic species of *Eulophia*† the two genera may hereafter be merged into one.

Lissochilus is a purely African genus, including about thirty species, but of these very few are cultivated in European gardens, those described in the following pages being among the most noteworthy.

Cultural Note.—Being natives of one of the hottest regions of the world *Lissochilus giganteus* and *L. Horsfallii* require the highest

* *The Garden*, vol. XIX. (1881), p. 332.

† *Journ. Linn. Soc.* XVIII. p. 317.

temperature available in the orchid houses of Europe. *L. Krebsii* is a sub-tropical species for which an intermediate temperature is suitable. They should all be potted in fibrous loam, and treated generally as recommended for *Eulophia guineensis* (see supra).

Lissochilus giganteus.

A robust stately plant. Leaves narrowly lanceolate, acute, 3—5 feet long. Scapes erect, 6—8 or more feet high, racemed above the middle, many-flowered; bracts large, broadly oval-oblong, apiculate, shorter than the stalked ovaries. Flowers $2\frac{1}{2}$ —3 inches across the petals; sepals turned sharply back, spatulate, concave at the apex, greenish with a faint tinge of rose; petals large, erect, broadly obovate-oblong, obtuse, light rose-purple; lip three-lobed, produced at the base into a broad funnel-shaped spur, light rose-purple with some darker streaks on the front lobe, the side lobes rounded, erect, the intermediate lobe semi-orbicular, obtuse, with three yellow keels extending to the base of the funnel. Column semi-terete, bent, white.

Lissochilus giganteus, Welwitsch ex Rehb. in Flora, XLVIII. (1865), p. 187, and in Gard. Chron. III. s. 3 (1888), p. 616, with fig. Williams' *Orch. Alb. X.* t. 457.

This is an orchid of gigantic stature and an extraordinary plant in many respects, affording another illustration of the old adage, "Semper aliquid novi ex Africâ provenit." It was originally discovered by Dr. Welwitsch some time prior to 1862 in Angola, in Portuguese Africa, where it is widely dispersed, and also along the valley of the Congo. Dr. Welwitsch informed the late Professor Reichenbach that the plant is occasionally submerged and afterwards roasted in a soil as hard as brick.*

We copy from the *Gardeners' Chronicle* the following extract from Johnston's "Congo" relating to this remarkable orchid:—

"The hot sun and the oozy mud call into existence a plant life which must parallel in rank luxuriance and monstrous growth the forests of the coal measures, and reproduce for our eyes in these degenerate days somewhat of the majesty of the vegetable kingdom in bygone epochs. In the marshy spots near the river shore are masses of that splendid orchid *Lissochilus giganteus*, a terrestrial species that shoots up often to the height of 16 feet from the ground, bearing such a head of red-mauve scented blossoms as scarcely any flower in the world can equal for beauty and delicacy of form. These orchids with their light green spear-like leaves and their tall swaying flower stalks, grow in groups of forty and fifty together, often reflected in

* Gard. Chron. loc. cit. supra. Conditions that would appear to render its cultivation in the glass-houses of Europe an impossibility; nevertheless the plant at Burford Lodge lives and thrives.

the shallow pools of stagnant water round their bases, and filling up the foreground of the high purple-green forest with a blaze of tender peach-like colour."

The merit of introducing it into European gardens is due to M. Auguste Linden, who brought it from the Congo in 1887. Its first flowering in this country at Burford Lodge, in May, 1888, and subsequent appearance at a meeting of the Royal Horticultural Society, was an event of unusual interest. We are indebted to Sir Trevor Lawrence, Bart., for materials for description.

L. Horsfallii.

"Leaves lanceolate, narrowed below into a channelled petiole, 2—3 feet long. Scapes as long again as the leaves, terminating in a somewhat dense, many-flowered raceme; bracts sheathing, ovate-acute; sepals lanceolate, acuminate, an inch long, bent backwards, purplish brown; petals spreading, sub-quadrate, obtuse, white suffused with rose; lip funnel-shaped at the base, three-lobed, the lateral lobes large, erect, rounded, green streaked with crimson-purple, the intermediate lobe ovate, obtuse, of a deep puce colour, with three whitish elevated ridges on the disk which extend to the base. Column short, semi-terete, two-toothed at the apex."—*Botanical Magazine*.

Lissochilus Horsfallii, Batem. in *Bot. Mag.* t. 5486 (1865).

A stately species sent from Old Calabar to Mr. Horsfall, of Bellamour Hall, Staffordshire, in whose collection it flowered in October, 1864. It is now probably lost to cultivation, but the mention of it in this place may help to preserve it from oblivion.

L. Krebsii.

Pseudo-bulbs ovoid or elliptic-oblong, $1\frac{1}{2}$ —3 inches long, marked with concentric scars. Leaves about six to each pseudo-bulb, elliptic-lanceolate, acuminate, sheathing at the base, the longest 18—24 inches long. Scapes stoutish, erect, 4—5 feet high, terminating in a loose raceme of 20—30 or more flowers, the rachis continuing to lengthen and produce flowers after the lowermost have expanded; bracts lanceolate, acuminate, as long as the ovaries. Flowers $1\frac{1}{4}$ inch in diameter; sepals spatulate-oblong, apiculate, keeled behind, reflexed, reddish brown mottled with green; petals broadly oval, obtuse, bright buttercup-yellow; lip three-lobed, saccate between the lateral lobes which are roundish and ascending, red-brown on the inside, yellow externally; the intermediate lobe sub-orbicular, emarginate, folded in the middle, bright yellow with two purple lateral blotches; spur short, obtuse. Column semi-terete, cream-white.

Lissochilus Krebsii, Rehb. in *Linnaea*, XX. p. 685 (1847). *Bot. Mag.* t. 5861.

var.—purpuratus.

Pseudo-bulbs and flowers larger than in the original form, the sepals deep purplish brown, the petals and middle lobe of lip bright canary-yellow, the side lobes chocolate-purple streaked with darker lines.

L. Krebsii purpuratus, H. N. Ridley in *Gard. Chron.* XXIV. (1885), p. 102. Williams' *Orch. Alb.* VI. t. 259.

Originally described by Reichenbach from specimens sent to Europe by the collector whose name it bears. It was introduced to the Royal Gardens at Kew, in 1867, by Mr. Sanderson, who sent living plants, along with other species, from Natal.* The variety, which is superior to the original form as a horticultural plant, was introduced from Natal in 1885 by Mr. E. A. Heath, F.L.S., who kindly sent us flowers for description.

GALEANDRA.

Lindl. *Illus. Orch. Pl.* t. 8 (1830-38). *Id. Gen. et Sp. Orch.* p. 186 (1832). Benth. et Hook. *Gen. Plant.* III. p. 536 (1883).

The Galeandras may, in a restricted sense, be regarded as the representatives in the western Continent of the Eulophias of Asia and Africa, for the number of species is scarcely a sixth of that of Eulophia, and although spread over a considerable area it is a limited one compared with the range of the Eulophias. The Galeandras occur sparingly in tropical America, from Mexico southwards, none, so far as we know, having been reported south of the Amazon. The broad funnel-shaped spur of the labellum and the almost sessile pollinia chiefly separate Galeandra from Eulophia.

Cultural Note.—The Galeandras require the same cultural treatment as that applied to Eulophia and Lissochilus, with unremitting attention throughout the year to watering, shading, freeing the plants from insect pests, etc.

Galeandra Batemanii.

Pseudo-bulbs variable, conic or ovoid, elongated, 4—6 inches long, marked with concentric scars and prolonged at the apex into a deciduous leafy stem. Leaves lanceolate, acute, 6—12 inches long. Racemes terminal, many-flowered. Flowers $2\frac{1}{2}$ inches long; sepals and petals similar and sub-equal, bent backwards, spatulate-oblong, acute, variable in colour, buff-yellow, or green tinted with brown, tawny brown, etc.; lip large, sub-orbicular, with a deep cleft in the anterior margin, the

* *Bot. Mag.* sub. t. 5361.

basal half rolled over the column into a tube and prolonged below into a funnel-shaped spur, usually light yellow; the apical half open, rose-purple bordered with white. Column semi-terete, pale green.

Galeandra Batemanii, Rolfe in Gard. Chron. XII. s. 3 (1892), p. 431. *G. Baueri*, Lindl. in Bot. Reg. 1840, t. 49. Batem. Orch. Mex. et Guat. t. 19.* Paxt. Mag. Bot. XIV. p. 49. Rehb. in Walp. Ann. VI. p. 649. Williams' Orch. Alb. VI. t. 267.

Introduced from Mexico in 1838 by Mr. Barker, of Birmingham, through his collector Ross, who communicated the following particulars of its habitat:—

He met with it at a place called Kisatipa, ten leagues from Melacatapec, growing at the upper end of a dry ravine, terminating half-way up the mountains in a south-west aspect. The temperature varies from 20°—25° C. (69°—77° F.) by day, and falls to about 15° C. (59° F.) by night. The mountains surrounding this ravine, that is, on the north-east side, are covered with a great variety of Orchidæ, whilst on the south side of the ravine there are none to be found. On the top of the mountains there is a continual mist all the year, December to February excepted; the atmosphere is particularly moist and warm.†

It was subsequently sent from southern Mexico to the Horticultural Society of London by Hartweg; it was also detected by Mr. G. Ure Skinner in Guatemala. The species is named in compliment to Mr. James Bateman, the veteran orchidologist, by whom it was first described and figured in his *Orchidaceæ of Mexico and Guatemala*.‡ The usual flowering season of *Galeandra Batemanii* is July—August.

This plant has been in cultivation for more than half a century under the name of *Galeandra Baueri*, in the erroneous belief that it was the same species as the original *G. Baueri* described by Lindley in his *Illustrations of Orchidaceous Plants*. The error originated in Mr. Bateman having mistaken the Mexican plant discovered by Ross for the same species as that collected by Martin in French Guiana, a locality, as he himself observed, 1,000 miles away.

G. Baueri.

“Stems clustered, sub-cylindric or fusiform, 15—20 inches long. Leaves lanceolate, sharply acuminate, 7—9 inches long. Racemes terminal, drooping, many-flowered; bracts subulate, acute, longer than the pedicels. Flowers 1½—2 inches across vertically; sepals and petals similar and equal, lanceolate, acute, yellow, sometimes with a brownish hue; lip infundibuliform, obscurely three-lobed, the side

* The plate here quoted is confused by the introduction of parts of another plant belonging to a different species.

† Bot. Reg. 1840, sub. t. 49.

‡ See Mr. Rolfe's note in the *Gardeners' Chronicle*, loc. cit. supra.

lobes rolled over the column into a tube and produced into a long straight spur; the front lobe spreading, much undulated at the margin, mucronate at the apex; the tube deep yellow, the front lobe paler with red-purple lines. Column semi-terete, concealed within the tube."—*Botanical Magazine*.

Galeandra Baueri, Lindl. in *Illus. Orch. Pl. Gen.* t. 8 (1832—38). *Id. Gen. et Sp. Orch.* p. 187. *Bot. Mag.* t. 4701 (floribus luteis). *G. cristata*, Lindl. in *Bot. Reg.* 1844, misc. No. 69.

This is a very different species from that cultivated in gardens under the name of *Galeandra Baueri*. It was originally collected by Martin in French Guiana, and on his specimen which is still preserved in the Lindleyan herbarium now located at Kew, Dr. Lindley founded the genus, dedicating the type species to Francis Bauer, a skilful microscopic draughtsman who prepared the drawings in Lindley's *Illustrations* quoted above, and for many other botanical works published during the first half of the present century. It was first introduced into British gardens by Messrs. Loddiges in 1840, but did not flower till four years later; we next find it flowering in the gardens of Syon House in 1853, on which occasion it was figured in the *Botanical Magazine*, and subsequently in our own houses; since then it seems to have disappeared from cultivation.

G. Devoniana.

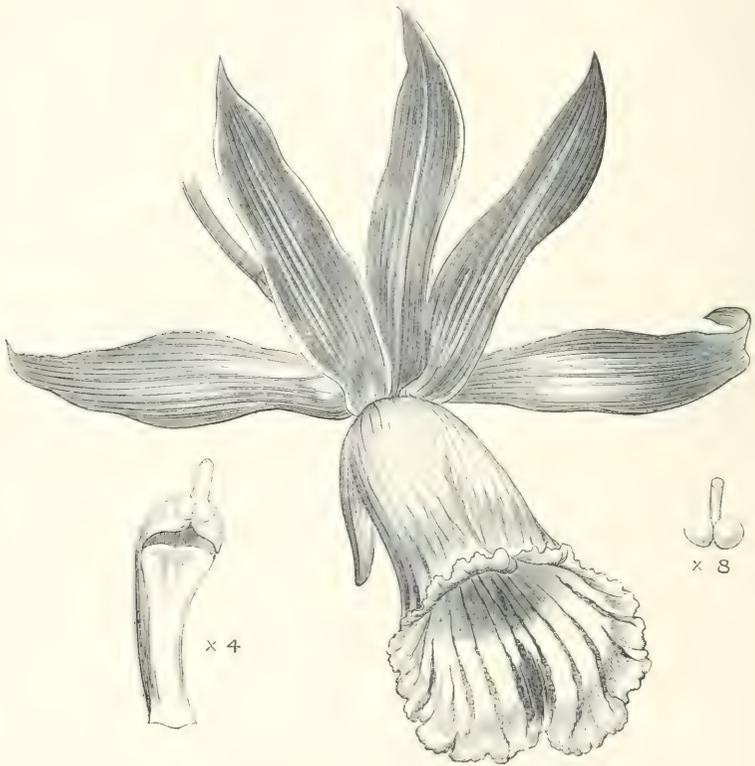
Stems tufted, as thick as the little finger at the base, attenuated and leafy upwards, 18—24 or more inches high. Leaves sheathing at the base, lanceolate, acuminate, 5—7 inches long. Peduncles terminal, few-flowered; bracts sheathing, linear, acuminate, pale brown. Flowers 3—4 inches across vertically; sepals and petals uniform, lanceolate, acute, brownish green, sometimes striated with light green; lip large, obscurely three-lobed, the side lobes convolute over the column into a wide tube that is produced into a short deflexed spur, the tube white, spur green; the front lobe deflexed, sub-quadrate, with four shallow lamellæ on its disk, white streaked with purple. Column narrowly winged, greenish spotted with purple.

Galeandra Devoniana, Schomb. ex Lindl. *Sert. Orch.* t. 37 (1838). Schomb. *Reisen.* III. p. 912. *Paxt. Mag. Bot.* VIII, p. 145. *Bot. Mag.* t. 4610. Warner's *Sel. Orch.* I. t. 37. Rehb. in Walp. *Ann.* VI. p. 649. *Illus. hort.* 1874, t. 176. *Lindenia*, II. t. 80 (var. *Delphina*).

A very handsome species that was first discovered by Schomburgk, who sent to Dr. Lindley the following particulars respecting it:—

“During our peregrinations we have seen this plant nowhere else than on the banks of the Rio Negro, a tributary of the Amazon,

where in the neighbourhood of Barcellos we found it growing in large clusters on the trees which lined the river, sometimes on the *Mauritia aculeata*, or even on the ground where the soil consisted of vegetable mould. It was so luxuriant in growth that some of the large clusters of stems which sprouted from a common root were from 10—12 feet in circumference. The stems were often from 5—6 feet high; at the lower part almost of a purple appearance but changing into green higher up. As the flower is not only larger than the



Galeandra Devoniana.

generality of its tribe, but handsome, I availed myself of this opportunity of naming it in honour of the Duke of Devonshire, one of the most successful cultivators of this, one of the most interesting tribes among monocotyledonous plants."

It was subsequently detected by the same energetic explorer in British Guiana, growing on the trunks of trees on the banks of the river Berbice; and afterwards by Spruce and Wallace in the

same locality in which it was first discovered by Schomburgk, the first named of whom sent living plants to the Royal Gardens at Kew in 1851. It is occasionally imported from that locality along with *Cattleya superba* and *C. labiata Eldorado*.

G. nivalis.

Stems terete, 6—12 inches long, jointed at intervals of about an inch, the internodes invested with a whitish membranous sheath.



Galeandra nivalis.
(From the *Gardeners' Chronicle*.)

Leaves linear, acute, 5—8 or more inches long. Racemes short, few-flowered; bracts linear, acuminate. Flowers 2 inches across vertically; sepals and petals similar and equal, narrowly oblong, acute, light olive-green; lip sub-orbicular, rolled over the column into a funnel-like tube and prolonged at the base into a slender yellow-green spur, white with

a purple blotch on the disk, below which are two tooth-like tubercles prolonged into diverging lines to the base.

Galeandra nivalis, Hort. Gard. Chron. XVII. (1882), p. 537, with fig. *Illus. hort.* XXXII. (1885), t. 555.

We find nothing recorded of the origin of this elegant species nor any authority for the name. It flowered at Burford Lodge in the spring of 1882, on which occasion it was exhibited at a meeting of the Royal Horticultural Society and figured in the *Gardeners' Chronicle*. We are indebted to Sir Trevor Lawrence, Bart., for materials for description.

SUB-TRIBE CYMBIDIEÆ.

*Terrestrial or more or less epiphyte. Stems foliate, often thickened into pseudo-bulbs. Leaves usually long and narrow, but sometimes broader, and plicately nerved. Racemes simple, rarely branched. Labellum not spurred.**

CYMBIDIUM.

Swartz, in K. Vet. Acad. Stockh. Nya. Handl. XX. p. 236 (1800), pro parte. Lindl. Gen. et Sp. Orch. p. 161 (1832). Benth. et Hook. Gen. Plant. III. p. 536 (1883).

The botanical history of *Cymbidium* is much complicated, and to follow the changes the genus has undergone since its first publication lies beyond the scope of this work; we can therefore only note a few of the most salient points.

The genus was founded by Swartz, the Swedish botanist,† and published by him at the same time as *Dendrobium*, *Oncidium*, *Vanilla*, and some others of less interest in a horticultural sense. Besides three genuine Asiatic species, Swartz included in *Cymbidium* three or four others of West Indian origin and three or four from South Africa, so that the genus was much mixed at the very beginning. This confusion continued to accumulate till Lindley dealt with the genus in his *Genera and Species of Orchidaceous Plants*, and even there, as he himself records that “*Cymbidium* as understood in that work is no doubt made up of several very different

* The chief character that separates this sub-tribe from the *EULOPHIÆ* is the absence of the spur in the labellum.

† See *Dendrobium*, p. 5.

genera, the characters of which, from want of sufficient information, and the knowledge of a greater number of species, cannot be positively made out."* During the existence of the *Botanical Register*, Lindley removed many of the anomalies as materials came to hand, and many years later Reichenbach, in Walper's *Annales Botanices Systematicæ*, did much to reduce the genus to more natural limits. It remained for Mr. Bentham to circumscribe it as it now stands, the principal change made by him being the removal of Lindley's *Cymbidium elegans* and *C. Mastersii* to the *Cyperorchis* of Blume.

The essential characters of *Cymbidium* are thus tersely stated by Sir J. D. Hooker:—†

Stem very short, rarely elongate, and pseudo-bulbous. *Leaves* very long, narrow, and coriaceous, rarely short. *Scape* loosely sheathed; flowers often large, in sub-erect or drooping racemes.

Sepals and *petals* sub-equal, free, erect or spreading.

Lip sessile at the base of the column and embracing it upwards, base concave, side lobes erect, mid-lobe recurved; disk with usually two pubescent ridges.

Column long and not produced into a foot; anther one- or imperfectly two-celled; pollinia 2, deeply grooved or 4, sub-globose or pyramidal, sessile on the broad strap or gland.

About thirty species are known to science, by far the greater number of which are dispersed over the Indo-Malayan region and tropical Australia, ascending to 5,000—6,000 feet on the Khasia Hills, and even higher on the Himalaya of Nepal and Sikkim; outlying species occur in Japan and New Caledonia. Some of the cultivated species are well known for their stately aspect and the imposing dimensions they attain.

Cultural Note.—The roots of *Cymbidium* are thick, fleshy and freely produced, ample pot-room should thence be provided for their development; they should also be allowed good drainage by means of broken crocks to not less than one-third of the depth of the pot. The compost should consist of fibrous loam and rough peat in the proportion of two-thirds of the former and one-third of the latter, many cultivators using in addition a little silver sand to assist drainage, and some use chopped living sphagnum in the place of rough peat. For those species whose habitat is on the Khasia Hills and the Nepalese Himalaya—*C. Devonianum*, *C. eburneum*, *C. giganteum*, etc.—an intermediate temperature is found to be most suitable, while the

* Gen. and Sp. Orch. p. 161.

† Flora of British India, vol. VI. p. 8.

purely tropical species require more heat. The watering must be regulated according to the season of the year, the treatment of the *Cymbidiums* in this respect being much the same as that of the *VERATRIFOLLE* section of the *Calanthes*.*

Cymbidium canaliculatum.

"Stems nearly pseudo-bulbous, 1—3 inches long. Leaves linear, acute, the longest about a foot long. Raceme as long as the leaf, lax pendulous, many-flowered; pedicels very slender, together, with the short ovary an inch long. Flowers coriaceous, $\frac{2}{3}$ inch in diameter; perianth segments spreading, the petals rather smaller, elliptic-oblong, sub-acute, concave, brown with green margins; lip shorter than the petals, white with pinkish blotches, three-lobed, the lateral lobes narrow and small, the middle lobe ovate, sub-acute; disk with two low ridges. Column white, blotched with purple."—*Botanical Magazine*.

Cymbidium canaliculatum, R. Br. Prod. p. 331 (1810). Lindl. Gen. et Sp. Orch. p. 164. Müller Fragm. vol. V. p. 95. Bot. Mag. t. 5851. Benth. Fl. Austr. VI. p. 302.

Cymbidium canaliculatum is somewhat sparingly distributed over north and east Australia from Arnheim's Land and Cape York southwards to Hunter's River, in New South Wales, where it was first gathered by Bidwill; the geographical and also the climatic range of the species is therefore considerable. It was first discovered by Dr. Robert Brown in the beginning of the present century, near Cape York, in north-east Australia, and where in 1865 it was re-discovered by the late John Gould Veitch, who first introduced it to British gardens.

C. chloranthum.

Leaves ensiform, recurved, 15—20 inches long, sub-acute. Racemes as long as the leaves, erect or arching, many-flowered. Flowers 2 inches in diameter; sepals and petals nearly uniform, spreading, oblong, obtuse, yellow-green with a few red spots near the base; lip broadly oblong, three-lobed, the side lobes small, roundish oblong, incurved, red on the inside; the front lobe sub-quadrate, yellowish white spotted with red; disk with two crenulate lamellæ that extend to the base of the lip. Column semi-terete, yellow stained with red.

Cymbidium chloranthum, Lindl. in Bot. Reg. 1843, misc. No. 102. Id. in Journ. Linn. Soc. III. p. 29. Bot. Mag. t. 4907. Rehb. in Walp, Ann. VI. p. 623.

The origin of this is not certainly known; it was first cultivated by Messrs. Loddiges in 1843, and was reported by them to be a

* See *Calanthe*, p. 62.

native of Nepal, but this habitat has not been confirmed by its discovery in that country since its first introduction. It has reappeared at intervals in several orchid collections both in this country and on the continent, and the plant may still be in cultivation. It is very near *Cymbidium canaliculatum*, a circumstance which suggests an Australian origin.

C. Devonianum.

Stems obscurely pseudo-bulbous, each with 3—5 leaves. Leaves broadly strap-shaped, acute, 7—12 or more inches long, narrowed below into a channelled petiole about one-fourth as long as the blade. Racemes stoutish, as long as the leaves, quite pendulous, sheathed at the base with 3—5 brown membranous boat-shaped scales. Flowers numerous, 1—1½ inch in diameter; sepals and petals similar, ovate-lanceolate, variable in colour, sometimes olive-green spotted with purple, sometimes buff-yellow streaked with vinous purple, the petals shorter and more acute than the sepals; lip obscurely lobed, shorter than the other perianth segments, broad ovate or sub-cordate; the blade reflexed, sometimes deep sanguineous purple, sometimes light rose-purple with a darker blotch near each lateral margin. Column bent, with two small rounded wings, greenish yellow with some red spots at the apex.

Cymbidium Devonianum, *Pact. Mag. Bot.* X. p. 97 (1843). Lindl. in *Gard. Chron.* 1843, p. 431. Rehb. in *Gard. Chron.* XV. (1881), p. 375. Williams' *Orch. Alb.* IV. t. 170. Hook. f. *Fl. Brit Ind.* VI. p. 10.

Originally discovered by Gibson on the Khasia Hills, and introduced by him to Chatsworth in 1837, but where it did not flower till the spring of 1843. Gibson found it growing on the trunks of decayed trees and in the forks of the branches of old trees where some vegetable matter had accumulated. It was next gathered by Sir J. D. Hooker and Dr. Thomson on the Kollong Rock in the same region, at 5,000 feet elevation. The Kollong Rock is a very remarkable geological phenomenon; it is scarcely less interesting from a botanical point of view, on account of the number and variety of the orchids found on it and in its immediate vicinity. A brief account of it, extracted from the *Himalayan Journals* of Sir J. D. Hooker, may be suitably introduced here:—

“The Kollong Rock is a steep dome of red granite, accessible from the north and east, but almost perpendicular to the southward, where the slope is 80° for 600 feet. The elevation is 400 feet above the mean level of the surrounding ridges, and 700 feet above the bottom of the valleys. The south or steepest side is encumbered with

enormous detached blocks, while the north is clothed with a dense forest containing red tree-rhododendrons and oaks. The hard granite of the top is covered with matted mosses, lichens, lycopodiums and ferns, amongst which are many curious and beautiful air plants, as *Eria*, *Ceologyne* (*Wallichiana*, *maculata* and *elata*), *Cymbidium*, *Dendrobium*, etc., some of them flowering profusely; and though freely exposed to the sun and wind, dews and frost, rain and droughts, they were all fresh, bright green and strong, under very different treatment from that to which they are exposed (1849—51) in the damp, unhealthy, steamy orchid houses of our English gardens.”*

Cymbidium Devonianum appears to have been very rare in British gardens for many years after its first introduction till it was collected by Gustav Mann in Sikkim, and Freeman in Assam, 1868—75. The species is a variable one as regards the colour of the flower; its usual flowering season is April and May.

C. eburneum.

Stems obscurely pseudo-bulbous sheathed by the imbricating bases of the leaves. Leaves 9—15 to each growth, strictly linear, acute, 15—24 inches long. Peduncles stoutish, erect, much shorter than the leaves, sheathed by about three alternate, lanceolate, finely-acuminated bracts, sometimes one—usually two-flowered. Flowers 3 inches in diameter, very fragrant; sepals and petals similar, oblong or ovate-oblong, acute, ivory-white, the dorsal sepal concave and apiculate, the petals a little narrower than the sepals and sub-falcate; lip broadly ovate-oblong, three-lobed, the side lobes incurved towards the column, ivory-white, the intermediate lobe with crisped margin, ivory-white, sometimes with some scattered purple dots around the ochraceous disk; crest an oblong, fleshy, grooved and pubescent, yellow plate, thickened at the apex, and with three raised lines extending the whole length. Column clavate, triquetral, with two narrow wings, white above, concave in front with a purple stain.

Cymbidium eburneum, Lindl. in *Bot. Reg.* 1847, t. 67. Id. in *Journ. Linn. Soc.* III. p. 28 (1853). *Pact. Mag. Bot.* XV. p. 145 (1849). *Bot. Mag.* t. 5126 (1859). *Warner's Sel. Orch.* I. t. 27. *Jennings' Orch.* t. 16. *Regel's Gartenfl.* (1880), p. 155, icon. xyl. *Gard. Chron.* XVII. (1882), p. 496, with fig. Id. XX. (1884), p. 77, with fig. *Hook. f. Fl. Brit. Ind.* VI. p. 11.

var.—Dayi.

Leaves narrower and longer; flowers ivory-white with a row of purple spots on each side of the disk of the lip.

C. eburneum Dayi, *Jennings' Orch.* t. 16. *C. Dayanum*, Rehb. in *Gard. Chron.* 1869, p. 710.

* Vol. II. p. 295.

var.—*Parishii*.

Leaves broader and shorter; disk of the lip orange-yellow spotted with purple, the marginal area on each side also spotted with purple.

C. eburneum *Parishii*, Hook. f. *Fl. Brit. Ind.* VI. p. 12. *C. Parishii*, Rehb. in *Trans. Linn. Soc.* p. 144 (1873). *Id. Xen. Orch.* III. p. 55. t. 224. *Id.* in *Gard. Chron.* X. (1878), p. 74. *Williams' Orch. Alb. I.* t. 25.

Cymbidium eburneum, formerly so rare, is now one of the most generally cultivated species in the genus. It was originally discovered by the excellent botanical explorer, William Griffith, about the year



Cymbidium eburneum.

1837, at Myrung on the Khasia Hills, at 5—6,000 feet elevation, but ten years elapsed before its beautiful fragrant flowers were seen in British gardens, the first occasion of its flowering in this country being in the spring of 1847 in the nursery of Messrs. Loddiges at Hackney. For many years afterwards it continued to be very rare in the orchid collections of Europe till easier access to its habitat and quicker transport of plants to Europe caused importations to

become more frequent. Its discovery in Sikkim by Mr. C. B. Clarke and its presence in Moulmein indicate a more extensive range of the species than was at first suspected.

The origin of the variety *Dayi* is vaguely stated to be Assam, whence it was obtained by the late Mr. John Day, through his nephew, Captain Williamson, of the Indian army, who sent him many orchids from that region. The variety *Parishii* is a remarkable one both in a horticultural and geographical sense, affording another instance of the presence of the same species in Assam and Moulmein. According to Reichenbach it was one of the earliest discoveries of the Rev. C. S. Parish, who in 1867 sent two plants to Messrs. Low, of Clapton, one of which was acquired by the late Mr. John Day, in whose collection at Tottenham it did not flower till 1878. A plant in Mr. W. Leach's collection at Fallowfield, Manchester, had, however, flowered a short time previously, and this was the first time of its flowering in England; it is still rare in British gardens.

C. *Finlaysonianum*.

Leaves 20—30 inches long, ensiform, obliquely obtuse, coriaceous. Racemes about 2 feet long, the rachis obscurely angulate, pale green, pendulous, and many-flowered; basal sheaths short and inflated. Flowers 2 inches in diameter; sepals and petals linear-oblong, obtuse or sub-acute, dull tawny yellow, sometimes with a reddish median line; lip three-lobed, the side lobes oblong, erect, deep vinous red; the intermediate lobe oblong, apiculate, much reflexed at the apex, white with a yellow disk and vinous purple apical spot; the disk with two red ridges that extend to the base of the lip. Column arched, reddish purple above, spotted below the stigma.

Cymbidium Finlaysonianum, Lindl. Gen. et Sp. Orch. p. 164 (1832). Hook. f. Fl. Brit. Ind. VI. p. 11. *C. pendulum*, Lindl. in *Bot. Reg.* 1846, t. 25. Id. 1844, t. 24 (brevilabre). *Williams' Orch. Alb.* X. t. 437. *C. Wallichii*, Lindl. Gen. et Sp. Orch. p. 165.

var.—*atropurpureum*.

Leaves narrower and longer. Racemes longer with larger flowers; sepals and petals maroon-purple with a rich velvety gloss, the front lobe of the lip white with a few purple spots.

C. Finlaysonianum atropurpureum, supra. *C. pendulum atropurpureum*, Lindl. in *Gard. Chron.* 1854, p. 287. *Bot. Mag.* t. 5710.

The plant we have described above is the *Cymbidium pendulum* figured in the *Botanical Register* of 1840, and again in the same serial of 1844; the first drawing was made from a specimen sent to Dean Herbert by Dr. Wallich, and the second from a plant

sent from Singapore to Messrs. Loddiges by Cuming, the object of the second plate being to show the variability of the species. It is also that which is cultivated in gardens under the name of *C. pendulum*, but unfortunately the name cannot be retained for this species. On reference to Lindley's types preserved in the Herbarium at Kew, it is clear that *his C. pendulum*, that is, the plant now under notice, is not the species so named by Swartz, but it is that discovered by Finlayson in Cochin China in the early part of the present century, and named after him by Lindley. It appears to have an extensive range in Malaysia.

The variety *atropurpureum*, which is a very handsome one, has long been known in the orchid collections of Europe; it was cultivated in 1854 by Mr. John Knowles, of Manchester, who had received it from Borneo, but according to Dr. Lindley it had been collected by Cuming in the Philippine Islands many years previously. Our knowledge of it is derived from an exceptionally fine form in the collection of Baron Schroeder, at The Dell, Staines.

C. giganteum.

Stems pseudo-bulbous, compressed, 4—6 inches long. Leaves linear-ligulate, acute, 24—30 or more inches long, convolute into a tube and yellowish to 3—4 inches from the base, distinctly keeled on the under side. Scapes robust, as long as the leaves, sheathed below with brown, membranous, ovate-oblong, acute bracts 2—2½ inches long; raceme 7—10 or more flowered. Flowers distant, 3—4 inches across; sepals and petals light yellow-green striped longitudinally with red, the former oblong, acute, the latter narrower, linear-oblong, acute, sub-falcate; lip oblong, three-lobed, the side lobes erect, coloured like the sepals and petals; the middle lobe downy above, reflexed with undulate and ciliate margin, yellow spotted with red, disk with two ciliated lamellæ that are confluent at their apices. Column clavate, arched, terete, and pale yellow above, concave and streaked below the stigma.

Cymbidium giganteum, Lindl. Gen. et Sp. Orch. p. 163 (1832). Id. *Sert. Orch.* t. 4. *Bot. Mag.* t. 4844 (1855). *Pact. Mag. Bot.* XII. p. 241 (1846). Rehb. in Walp. Ann. VI. p. 626. Williams' *Orch. Alb.* VI. t. 284. Hook. f. Fl. Brit. Ind. VI. p. 12. *Iridiorchis gigantea*, Blume, *Orch. Arch. Ind.* p. 91. t. 26.

This striking *Cymbidium* is a native of the tropical Himalaya from Kumaon in Nepal eastwards to Bhotan and the Khasia Hills, ascending to 4,000—5,500 feet; its lowest observed vertical range being in Sikkim where it descends to 1,000 feet; it is essentially a mountain plant, never spreading into the plains, and always

inhabiting the jungle at a short distance from the ground. Its climatic range is considerable:—At Kollong on the Khasia Hills the rainfall from April to November is about 90 inches, and the daily temperature is 19°—21° C. (65°—70° F.), rarely rising to 26° C. (80° F.); from November to April the season is almost rainless, and the temperature in January and February falls below zero C. (32° F.) nearly every night. In Sikkim the rainfall during the same period reaches almost 150 inches, and in the summer months the temperature often rises to 32° C. (90° F.); the winter months are not quite rainless and the temperature never sinks to the freezing point.

Cymbidium giganteum was first discovered by Dr. Wallich in 1821, and subsequently introduced by him into British gardens. It was sent to Chatsworth in 1837 by Gibson, who found it on the Khasia Hills “in great abundance in the thick umbrageous forests growing on the trunks of trees, and especially upon those which had begun to show tokens of decay; the specimens which occupied the hollows of old trees partially filled up with decomposing vegetable matter, always presenting the most luxuriant and healthy appearance.” The illustrations quoted above show that the flowers vary considerably in depth of colouring.

C. grandiflorum.

Leaves 20—25 inches long, ligulate, acute, dilated below into ribbed and grooved sheaths striated with two shades of green. Scapes very robust, sheathed below by long and narrow acuminate bracts; racemes nodding, 7—12 flowered. Flowers the largest in the genus, 4—5 inches across; sepals and petals similar and sub-equal, oblong, acute, green, the petals a little narrower than the sepals; lip three-lobed, triangular, acute, ciliate at the margin, light yellow with lines of red-purple dots on the inner side; the intermediate lobes cordate, crisped and fringed at the margin, yellow spotted with red-purple; between the side lobes are two ciliated lamellæ as long as the lobes themselves. Column terete and green above, spotted with red below the stigma.

Cymbidium grandiflorum, Griff. Notul. III. p. 342 (1851), and Icon. Plant. Asiat. t. 321. Hook. f. Fl. Brit. Ind. VI. p. 12. Gard. Chron. XI. s. 3 (1892), p. 267. *C. Hookerianum*, Rehb. in Gard. Chron. 1866, p. 7. Batem. in *Bot. Mag.* t. 5574. *C. giganteum* (in part), Lindl. in Journ. Linn. Soc. III. p. 29.

An old denizen of British gardens, but which has never received much attention from the cultivators of orchids, chiefly on account of the prevailing green colour of its flowers, which are also slow

to expand. It was introduced by our Exeter firm through Thomas Lobb, the first plant flowering at Chelsea in 1866, on which occasion it was described by Reichenbach in the *Gardeners' Chronicle* under the name of *Cymbidium Hookerianum*, in compliment to Dr. (now Sir Joseph) Hooker, who had then but recently succeeded his father in the Directorship of the Royal Gardens at Kew. The plant had, however, been many years previously registered by Griffith, its original discoverer, as *C. grandiflorum* in the publications quoted above.

Its habitat is the eastern Himalaya, ascending to 5,000—7,000 feet in East Nepal, Sikkim, and Bhotan, growing under the same climatic conditions and local environment as *Cymbidium giganteum*.



Cymbidium Lowianum.

C. *Lowianum*.

Stems and leaves as in *Cymbidium giganteum*. Racemes robust, arching, bearing 18—25 flowers. Flowers 3—4 inches across transversely; sepals and petals similar, oblong-lanceolate, acute, greenish-yellow with reddish veins, the sepals obscurely keeled behind, and the petals a little narrower than the sepals; lip three-lobed, the side lobes roundish-oblong, erect, light buff-yellow; the intermediate lobe deltoid, reflexed with slightly undulate margin, and covered with a velvety pubescence, dark red-crimson with a pale buff-yellow margin, white at the base;

crest two-keeled, the keels convergent towards their apices. Column triquetral, arched, concave below the stigma, yellow spotted with red.

Cymbidium Lowianum, Rehb. in Gard. Chron. XI. (1879), pp. 321 and 405, with fig. *Fl. Mag.*, n.s. t. 353. *C. giganteum Lowianum*, Rehb. in Gard. Chron. VII. (1877), p. 685. Hook. f. *Fl. Brit. Ind.* VI. p. 13.

sub.-var.—*concolor* (Gard. Chron. IX. s. 3 (1891), p. 107), the apical area of the lip bright buff-yellow, all traces of the red-erimson entirely absent.

Cymbidium Lowianum was sent to Messrs. Low from Burmah, in 1877, by Boxall; it flowered for the first time in this country in their Clapton nursery in the spring of 1879. It has since been detected by our own collector on the hills around Bhamo in some places associated with *C. grandiflorum*, growing under much the same conditions as observed by Gibson on the Khasia Hills. As a horticultural plant *C. Lowianum* is unquestionably superior to its nearly *C. giganteum*; its longer racemes of brighter coloured flowers, the length of time they continue in perfection and the pleasing habit of the plant all combine to render it when in flower one of the most striking objects in the orchid house.

Cymbidium giganteum, *C. grandiflorum*, *C. Lowianum* and *C. longifolium*, the last named rare in cultivation, form a very natural group of Cymbids, all inhabiting the tropical Himalaya from Nepal to north-east Burmah under much the same conditions of climate and environment. It is a question whether they should be regarded as specifically distinct or only as varieties of one well-defined type; we incline to the latter view, a view strengthened by the recent appearance of an intermediate form in *C. Traceyanum*. For horticultural convenience it is doubtless best to keep them distinct for the present.

C. madidum.

Stems pseudo-bulbous, sub-cylindric, 3—4 inches long. Leaves ensiform, sub-erect, 20—30 inches long, sheathing at the base. Racemes pendulous, as long as the leaves, many-flowered. Flowers an inch in diameter; sepals and petals oval-oblong, obtuse, dull nankeen-yellow, the sepals spreading, the petals smaller and erect; lip obscurely three-lobed, the side lobes rotund, erect, stained with vinous purple; the intermediate lobe roundish-oblong, coloured like the sepals and petals; lamellæ none, "in room of which is a shining exudation all along the axis."

Cymbidium madidum, Lindl. in Bot. Reg. 1840, misc. p. 9. Rehb. in Walp. Ann. VI. p. 624. Rolfe in Gard. Chron. VI. s. 3 (1889), p. 406. *C. albuceiflorum*, F. Muell. Fragm. Phyt. Austral. I. p. 188. Benth. Fl. Austral. VI. p. 303.

This was first imported by Messrs. Rollisson in 1840, but seems to have been soon lost to cultivation. Its re-appearance in British

gardens is a matter of some interest, as its identity with the *Cymbidium albucaeflorum* of Mueller and therefore its north Australian origin is now proved. We are indebted for materials for description to Mr. G. C. Raphael, of Castle Hill, Englefield Green.

C. pendulum.

Stems pseudo-bulbous, 2—3 inches long, sheathed by the bases of the lowermost leaves. Leaves broadly linear, distichous, equitant at base, 12—20 or more inches long, very rigid, sub-erect and obliquely two-lobed at the apex. Racemes shorter than the leaves, pendulous or decurved, many-flowered. Flowers $1\frac{1}{2}$ —2 inches in diameter; sepals and petals narrowly oblong, acute, recurved at the tips, light yellow with a vinous purple median band, often striated or broken into streaks; the petals somewhat shorter and more acute than the sepals; lip elliptic-oblong, obscurely three-lobed, dark plum-purple with pale yellow longitudinal lines; the side lobes narrow, erect, the front lobe or epichile small, sub-quadrate, reflexed with two yellow bilobate calli at its base. Column vinous purple, anther yellow.

Cymbidium pendulum, Swartz. in Nov. Act. VI. p. 73 (1800). Lindl. Gen. et Sp. Orch. p. 165. Rehb. in Walp. Ann. VI. p. 624 (excl. var. *brevilabre*). *C. aloifolium*, Hook. f. Fl. Brit. Ind. VI. p. 10 (not of Sw.). *Epidendrum pendulum*, Roxb. Corom. Pl. I. p. 35, t. 44. *E. aloides*, Curtis in *Bot. Mag.* t. 387 (1797).

Much confusion exists respecting the identity of this species which has been known in gardens for upwards of a century as *Cymbidium aloifolium*. It is, moreover, encumbered with a tangled synonymy, which it is impossible to unravel without a careful examination and comparison of original types preserved in herbaria. This research has been recently undertaken by Mr. Rolfe, of the Kew Herbarium, and we unhesitatingly accept his decision. The species here described is beyond question the true *C. pendulum* of Swartz, not of Lindley, the latter being now referred to *C. Finlaysonianum*; it has been confused with the last-named species and with the closely allied *C. aloifolium* of Swartz, the *C. bicolor* of Lindley, whose habitat is restricted to southern India and Ceylon, and which has not, so far as we can discover, been in cultivation.

Cymbidium pendulum (as here understood) has been gathered in many localities in the lower Himalayan zone from eastern Nepal to Sikkim, and from Assam southwards as far as Tenasserim and the Andaman Islands; it also occurs in southern China. Although of inferior merit as a horticultural plant it is especially interesting as being one of the first *Cymbidiums* introduced into British gardens.

A few years prior to 1797 a plant was sent from India to Mr. Vere, of Kensington, who did not succeed in flowering it up to that date, but in that year it flowered in the nursery of Messrs. Grimwood and Wykes at Kensington, on which occasion it was figured in the *Botanical Magazine*.

C. tigrinum.

Pseudo-bulbs ovoid, 1—1½ inch long, each bearing 3—5 oblong-lanceolate, recurved leaves 3—6 inches long. Scapes slender, sub-erect, longer than the longest leaves, 3—5 flowered; bracts small, ovate-lanceolate. Sepals and petals similar and sub-equal, linear-oblong, acute, 2 inches long, olive-green, paler at the margin and spotted with red at the base; the petals sometimes paler and with more spots than the sepals; lip oblong, three-lobed, the side lobes rotund, erect, yellow striped obliquely with broad red-brown bands; the intermediate lobe sub-quadrated, apiculate, reflexed, white with short brown-purple transverse streaks; between the side lobes are two raised white lines. Column clavate, arched, pale olive-green above, spotted with red below the stigma.

Cymbidium tigrinum, Parish, MS. in *Bot. Mag.* t. 5457. Hook. f. *Fl. Brit. Ind.* VI. p. 9.

Discovered in 1863 by the Rev. C. S. Parish upon rocks on the mountains of Tenasserim at 6,000 feet elevation, and sent by him to Messrs. Low, of Clapton. It is one of the most distinct of *Cymbidiums*, but not often seen in cultivation. We are indebted to Mr. F. Wigan, of Clare Lawn, East Sheen, for materials for description.

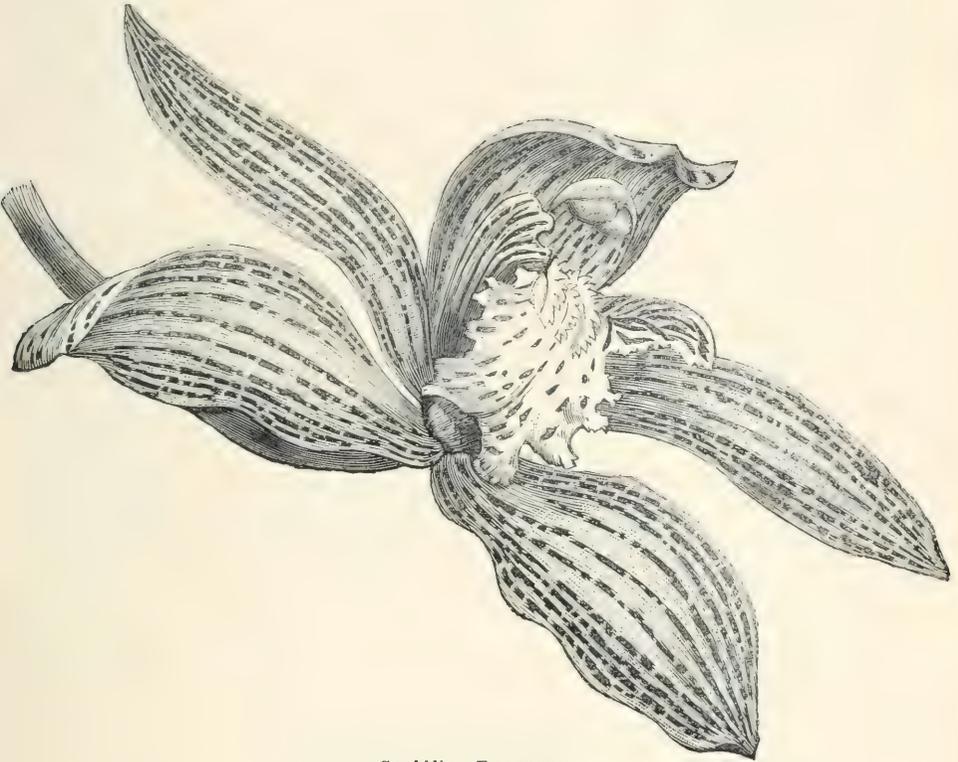
C. Traceyanum.

Stems and leaves as in *Cymbidium giganteum*. Racemes 3—4 feet long, bearing 16—20 flowers. Flowers 4—5 inches across; the sepals and petals greenish yellow with longitudinal lines of red-crimson dots and streaks, the sepals oblong, acute, the petals similar but much narrower; lip three-lobed, the side lobes roundish oblong, light yellow, obliquely streaked with red-crimson; the intermediate lobe broadly oblong, reflexed, crisped and fringed at the margin, cream-white spotted with red-crimson. Column greenish spotted with red.

Cypripedium Traceyanum, Hort. Gard. Chron. VIII. s. 3 (1890), p. 718.

A very handsome *Cymbidium*, very near *Cymbidium grandiflorum* and intermediate between that species and *C. giganteum*. It was acquired at a sale of *C. Lowianum* by Mr. A. H. Tracey, of Twickenham, and was not distinguishable from it till it flowered. The plant,

the only one known, is now in the magnificent collection of Baron Schroeder at The Dell.



Cymbidium Traceyanum.
(From the *Gardeners' Magazine*.)

HYBRID CYMBIDIUMS.

Three hybrid *Cymbidiums* artificially obtained are known to us, of which two have flowered, both of them taking a high rank among hybrid orchids for elegance and distinctness; in both cases the progeny was very restricted in numbers but very vigorous in growth.

Cymbidium eburneo-Lowianum.

Parentage expressed by the name.

Pseudo-bulbs and leaves intermediate between those of the two parents, with the yellowish striations at the base characteristic of *Cymbidium Lowianum*. Racemes longer than in *C. eburneum*, and bearing more flowers. Flowers equal in size to the best *eburneum* forms; sepals

and petals similar and sub-equal, oblong, lanceolate, light nankeen-yellow, the petals and lateral sepals spreading, the dorsal sepal bent forward; lip nearly as in *C. Lowianum*, ivory-white on the inner side with a V-shaped red-crimson blotch on the reflexed front lobe; lamellæ of the disk bright yellow. Column ivory-white with a reddish stain below the anther.

Cymbidium eburneo-Lowianum, Gard. Chron. V. s. 3. (1889), p. 363.

C. Winnianum.

C. giganteum × *C. eburneum*.

Stems and leaves nearly as in *Cymbidium eburneum*. Racemes robust, nearly as long as the leaves, 10—15 flowered; bracts much acuminate as in *C. eburneum*. Flowers of the general shape of those of *C. giganteum* with all the segments narrower, 4 inches across transversely; sepals and petals ivory-white, the dorsal sepal narrowly oblong, the lateral two similar but sub-falcate; the petals linear-oblong, and falcately curved; lip nearly as in *C. giganteum*, ivory-white rather densely spotted with crimson along the base of the side lobes and the crisped margin of the front lobe; between the side lobes are two pubescent orange-yellow lamellæ that are confluent and almost hirsute at their apex. Column semi-terete, bent, narrowly winged, greenish above, spotted with crimson below the stigma.

Raised by Mr. Charles Winn, of Selly Hill, Birmingham.

Cymbidium Winnianum, supra.

CYPERORCHIS.

Blume, Mus. bot. Lugd. I. p. 48. (1849). Benth. et Hook. Gen. Plant. III. p. 538.

This genus was founded by the Dutch botanist, Blume, on *Cymbidium elegans* (Lindl.), to which were afterwards added *C. Mastersii* (Griff.), and *C. cochleare* (Lindl.), the latter species of no horticultural merit. These three species are separated from *Cymbidium* chiefly by their narrow perianth segments which are connivent to the middle or beyond it; the flowers, therefore, do not fully expand like those of a true *Cymbidium*; also by the straight narrow lip of which the front lobe or epichile is very short, and by their much more dense racemes. They are all natives of the sub-tropical Himalaya and the Khasia Hills, ascending to 4,000—6,000 feet.

Cultural Note.—The cultural treatment of the two species described below is precisely the same as that applied to the *Cymbidiums* from the same region and altitude.

Cyperorchis elegans.

Stems short, sheathed at the base by the brown, distichous, truncate bases of the fallen leaves, becoming with age a sub-conic, tapering pseudo-bulb, 2—3 inches long. Leaves numerous, linear, bifid at the tip, 15—20 inches long, pale striated yellow-green at the base on the under side, grass-green above. Scapes shorter than the leaves, sheathed at the base by brown acuminate scales. Racemes dense, pendulous, many-flowered. Flowers $1\frac{1}{2}$ inch long, of a uniform light ochreous yellow; sepals and petals similar, linear-oblong with acute, recurved tips; lip narrowly wedge-shaped, three-lobed, the side lobes very narrow, the front lobe short, oblong, obtuse, with two close, orange raised lines on the disk. Column slender, terete above, nearly flat on the side opposite the lip.

Cyperorchis elegans, Blume, Orch. Archip. Ind. p. 93. t. 48C, icon analyt. (1849). *Bot. Mag.* t. 7007. Hook. f. Fl. Brit. Ind. VI. p. 14. *Cymbidium elegans*, Lindl. Gen. et Sp. Orch. t. 163. Id. *Sert. Orch.* t. 14. Id. in Journ. Linn. Soc. III. p. 28. Rehb. in Gard. Chron. III. (1875), p. 429.

Cyperorchis elegans was originally discovered by Dr. Wallich, in 1821, in the forests of Nepal. Then Griffith detected it on the Khasia Hills near Myrung in 1835; it was afterwards gathered by Sir Joseph Hooker in Sikkim (1849) and much more recently by Mr. C. B. Clarke in Manipur; other localities are also given in which it has been found by Indian botanists and explorers in the same region. Its range therefore in the lower Himalayan zone and north-east Bengal is considerable. We find no record of its first introduction into British gardens.

C. Mastersii.

Stems ligneous, 4—9 or more inches high and $\frac{3}{4}$ —1 inch in diameter. Leaves distichous and closely imbricating at the base, arching or sub-erect, 20—30 inches long, acute. Racemes short, 7—10 flowered; basal sheaths 3—4, lanceolate, acuminate, pale green. Flowers about 2 inches long, ivory-white, usually with some rose-purple spots on the lip, almond-scented; sepals and petals linear-oblong, the petals a little the narrower; lip slightly saccate at the base, three-lobed, the side lobes roundish-oblong, partially embracing the column, the front lobe (epichile) oval, reflexed with undulate margin; disk with two orange raised lines evanescent below. Column terete and green above, almost flat below the stigma, bent at the apex.

Cyperorchis Mastersii, Benth. in Journ. Linn. Soc. XVIII. p. 318 (1881). Hook. f. Fl. Brit. Ind. VI. p. 15 (1890). *Cymbidium Mastersii*, Griffith M.S. ex Lindl. in *Bot. Reg.* 1845, t. 50. Lindl. in Gard. Chron. 1845, p. 643. Id. in Paxt. *Fl. Gard.* III. t. 78. *Fl. Mag.* n.s. t. 391. *Lindenia*, V. t. 222. Sander's *Reichenbachia*, II. t. 66 (album). *C. affine*, Williams' *Orch. Alb.* III. t. 140. *Fl. Mag.* n.s. t. 346.

For the discovery of this beautiful orchid both science and horticulture are indebted to the energetic Indian explorer William Griffith, who met with it on the Khasia Hills about the same time as *Vanda cœrulea*, 1836—37. It also occurs in Sikkim and Manipur, its vertical range being 4,000 — 6,000 feet; it usually affixes itself to the stems and branches of trees, often 20—30 feet from the ground, growing under the same climatic conditions as those stated under *Cymbidium giganteum*. It was imported by Messrs. Loddiges in 1841, but it did not flower till December, 1844; it continued to be a rare plant in British gardens for some years afterwards, till collected by Simons in Assam in 1856—57. It was named by Mr. Griffith after Mr. Masters, one of the principal superintendents of the Botanic Garden at Calcutta, during the Directorship of Dr. Wallich.

ANSELLIA.

Lindl. in Bot. Reg. 1844, sub. t. 12. Benth. et Hook. Gen. Plant. III. p. 537.

Among those who accompanied the ill-fated Niger expedition of 1841—42 was Mr. Ansell, a gardener, who, when at Fernando Po, found in Clarence Cove, growing on the stem of an oil palm (*Elæis guineensis*) an epiphyte of which a dried specimen came into the possession of Dr. Lindley. On this specimen he founded the genus *Ansellia* in commemoration of the discoverer.

Two years later living specimens, whose origin is not stated but undoubtedly west African, which had been received by the Rev. John Clowes and Messrs. Loddiges, flowered for the first time and one of Loddiges' plants was figured in the *Botanical Register* of 1846, t. 30, under the name of *Ansellia africana*. But on comparing this figure with the Fernando Po type specimen preserved in Lindley's herbarium at Kew, it is evident that it does not represent the original *A. africana*, but another form for which Mr. N. E. Brown has proposed the name of *A. confusa*. It is this form that is best known in gardens as *A. africana*. Quite recently a plant collected by the Earl of Scarborough on the banks of the Haka river, Elephant Forest, near Lake Chad, and sent to Kew for identification, proves to be this *A. confusa*.

In the meantime an *Ansellia* had been received by the late Mr. Wilson Saunders from Natal, and which had been discovered by the German traveller Gueinzuis, but not introduced by him. This is the same as that described by Reichenbach in Walper's *Annales Botanices* under the

name of *Ansellia gigantea*. It is this form that is represented by a single flower in plate 4965, fig. 3, of the *Botanical Magazine* and is named by Sir W. Hooker *A. africana*, var. *natalensis*.

Some years later another *Ansellia* was detected by Speke and Grant during their expedition to the Upper Nile in 1860—63 (*A. nilotica*). And lastly, not long ago an *Ansellia* was introduced from the Congo by the Compagnie Continentale d'Horticulture de Gand (*A. congoensis*). Thus the genus is shown to be represented in at least five localities or regions in Africa widely remote from each other, and plants from all of them have been, and probably may be still in cultivation. That these *Ansellias* are very closely related to each other is so manifest that the observed structural differences in their flowers seem barely sufficient to entitle them to separate specific rank; but we agree with Mr. N. E. Brown that they cannot at present be accepted as mere varieties of the original type, although admitting the extreme possibility of their being ultimately connected by intermediate forms.

Ansellia is closely allied to *Cymbidium*, from which its very different habit, its terminal inflorescence, and its bipartite (= four) pollinia chiefly distinguish it.

Cultural Note.—*Ansellia africana* and its varieties require the highest temperature available in the orchid houses of Europe; in other respects the cultural treatment is precisely the same as that of the *Cymbidiums*.

Ansellia africana.

Stems tufted, 18—25 or more inches long, cylindric, as thick as a man's thumb, sheathed by the long withered bases of the fallen leaves. Leaves from the upper portion of the stem ligulate-lanceolate, acute, 5—7 or more inches long, usually five-nerved. Peduncles terminal, as long as the leaves, paniced, many-flowered. Flowers 2 inches in diameter, light yellow-green spotted with brown-purple; sepals narrowly oblong; petals elliptic-oblong, as broad again as the sepals; lip three-lobed, the side lobes oblong, erect; the intermediate lobe ovate, reflexed with two keels on the disk and four or five folds in front of them. Column elongate, terete above, concave on the face.

Ansellia africana, Lindl. in *Bot. Reg.* 1844, sub. t. 12. *Bot. Mag.* t. 4965.*
excl. fig. 3. N. E. Brown in *Lindenia*, II. sub. t. 64.

A. confusa.

Stems and leaves longer than in *Ansellia africana*, the latter also narrower and more acuminate. Flowers smaller with the sepals and petals similar and sub-equal, narrowly oblong, obtuse, light yellow-green

* The plant here figured seems well-nigh intermediate between the typical *Ansellia africana* and *A. confusa*.

spotted with brown-purple; lip three-lobed, the side lobes coloured like the sepals and petals, the front lobe bright yellow with two keels on the disk, and the marginal area verrucose.

Ansellia confusa, N. E. Br. in *Lindenia*, II. sub. t. 64. *A. africana*, Lindl. in *Bot. Reg.* 1846, t. 30. *Paxt. Mag. Bot.* XIII. p. 241. *Regel's Gartenfl.* III. t. 95. *Williams' Orch. Alb.* VIII. t. 367.

A. congoensis.

Stems shorter and stouter than in *Ansellia africana*. Leaves linear, acuminate, 12—15 inches long with three pale nerves. Racemes simple, many-flowered. Flowers $1\frac{1}{4}$ inch in diameter; sepals and petals similar and sub-equal, pale yellow spotted with chocolate-brown, the apical spots the larger, oval-oblong, acute; the sepals keeled behind, the petals a little broader and not keeled; lip three-lobed, the side lobes oblong, erect, light yellow heavily striped with red-brown on the inner side; the intermediate lobe narrower than in *A. africana*, obovate with two longitudinal keels, bright yellow. Column clavate, yellowish.

Ansellia congoensis, Rodigas in *Illus. hort.* XXXIII. p. 143 (1886). *Lindenia*, II. pl. 64.

A. gigantea.

Stems, leaves and inflorescence as in *Ansellia africana*. Flowers smaller with narrower segments; sepals and petals oblong, obtuse, pale yellow, or yellowish green with small red-brown spots on the basal half only; lip three-lobed, deeper yellow than the other segments, the disk with three keels and not crisped at the margin.

Ansellia gigantea, Rehb. in *Walp. Ann.* VI. p. 627. *Id.* in *Gard. Chron.* IX. (1878), p. 398. *Saunders' Ref. Bot.* II. t. 136. N. E. Brown in *Lindenia*, II. sub. t. 64. *A. africana natalensis*, Hook. in *Bot. Mag.* t. 4965, fig. 3.

A. nilotica.

Stems, leaves and inflorescence as in *Ansellia africana*; sepals and petals narrowly oblong, canary-yellow heavily blotched with chocolate-brown; lip nearly as in *A. gigantea*, bright canary-yellow with three keels on the disk and verrucose in front of them.

Ansellia nilotica, N. E. Brown in *Lindenia*, II. sub. t. 64. *A. africana nilotica*, Baker.

GRAMMANGIS.

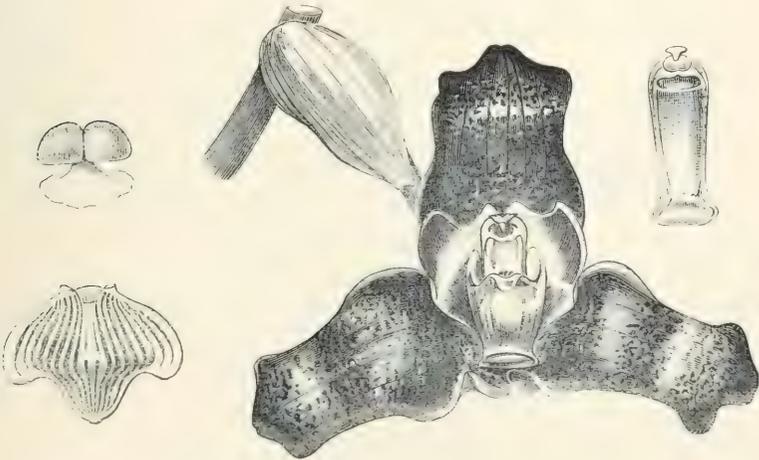
Rehb. in *Xen. Orch.* II. p. 17 (1862). Benth. et Hook. *Gen. Plant.* III. p. 537. (excl. sp. javanica).

Among the orchids allied to *Cymbidium* is the remarkable one discovered and introduced many years ago by the Rev. W. Ellis, from Madagascar, and which Lindley referred to the Malayan genus

Grammatophyllum; but on account of the very different form of its perianth, Reichenbach separated it from that genus and founded upon it a new genus with the above name.* Mr. Bentham would also join with it *Cymbidium Huttonii* figured in the *Botanical Magazine* of 1867, t. 5676, a plant of Malayan origin introduced by us through Hutton, but which has long since disappeared from cultivation, and which if re-introduced would probably receive separate generic rank. Of the propriety of separating the Madagascar plant from Grammatophyllum, a comparison of the woodcuts given below of that and the Malayan *Grammatophyllum Fenzlianum* can leave but little doubt.

Grammangis Ellisii.

Stems fusiform, four-angled, clothed with closely adherent, pale membranous sheaths. Leaves 4—7 or more from the upper part of the stem, ligulate, obtuse, 15—25 inches long, 2—2½ inches broad,



Grammangis Ellisii.

deciduous. Scapes from the base of the stems, stoutish, arching, racemose, 12—15 flowered; bracts ovate, acuminate, almost as long as the ovaries. Flowers 2—3 inches across the lateral sepals; sepals obovate-oblong with slightly revolute margins and reflexed tip, the dorsal one bent forward, tawny yellow, usually transversely streaked, but sometimes densely spotted with red-brown, always with a broad yellow transverse belt

* The meaning of the name is obscure; the author has given no explanation.

near the apex; petals much smaller than the sepals, erect with spreading tip, oval-oblong, acute, yellow, sometimes cream colour at the base, light rose-purple at the apex; lip as long as the petals, saccate at the base, three-lobed, the side lobes rotund, erect, straw-yellow or white; the intermediate lobe ovate-triangular, reflexed and yellow at the apex, traversed longitudinally by several white ridges, the furrows between them being reddish crimson; between the side lobes is a narrow, three-ridge white plate that projects in front above the ridges on the intermediate lobe. Column terete, incurved, white, or yellow.

Grammangis Ellisii, Rehb. Xen. Orch. II. p. 17 (1862). Benth. in Journ. Linn. Soc. XVIII. p. 318 and Ridley in XXI. p. 472. *Lindenia*, VIII. t. 338. *Grammatophyllum Ellisii*, Lindley ex Hook. *Bot. Mag.* t. 5179 (1860). Van Houtte's *Fl. des Serres*, XIV. t. 1488-89 (copied from Bot. Mag.). Rehb. in Gard. Chron. X. (1878), p. 333. Id. XIV. (1880), p. 326 (Dayana). Williams' *Orch. Alb.* IV. t. 147. Godefroy's *Orchidophile*, 1886, p. 352.

This is one of the most distinct of orchids; its flowers, as the accompanying woodcut shows, are of peculiar shape, and in addition they present a most singular and varied combination of colours even for an orchid, and are, moreover, very sweet scented. Its discoverer, the Rev. W. Ellis, informed Dr. Lindley that he "found it growing on a branch of a tree about the size of a man's leg, and stretching over a river at about 25 feet above the water. The roots were abundant, but short, white, fleshy and matted together, a little larger than the roots of *Ansellia africana*." The first introduced plants were cultivated by Mr. Ellis himself, at Hoddesdon, Herts, where one of them flowered for the first time in August, 1859.

Grammangis Ellisii is unfortunately a refractory subject under cultivation, and although frequently imported since its first introduction, its sojourn in the orchid houses of Europe is rarely of long duration.

GRAMMATOPHYLLUM.

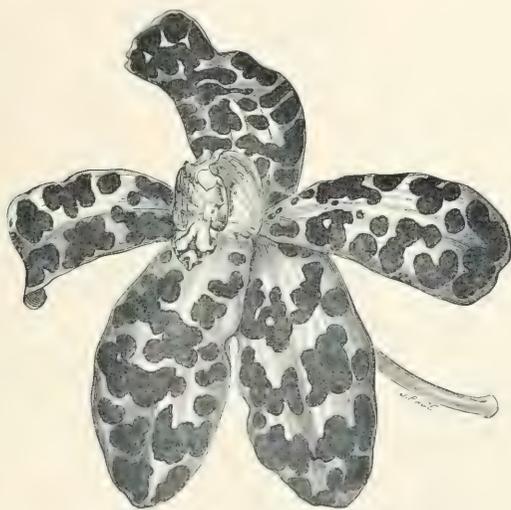
Blume, Bijdr. p. 377, t. 20 (1825). Rehb. Xen. Orch. II. p. 16. Benth. et Hook. Gen. Plant. III. p. 539.

Grammatophyllum includes four or five species dispersed over the Malay peninsula and archipelago. The species are more remarkable for the gigantic dimensions they attain—especially the typical species, *Grammatophyllum speciosum*—than for the attractiveness of their flowers, which are generally of a sombre hue. On account of the amount of space they take up, and the high temperature they require, they are cultivated in but few private collections.

The genus is closely allied to *Cymbidium*, from which it differs chiefly in the structure of the pollinary apparatus. Its general characters will be gathered from the description of the species that follow. The name is derived from *γράμμα*, "a mark or character," and *φύλλον*, "a leaf," in allusion to the markings on the perianth segments, the type species was thence fancifully called the Letter Plant.

Grammatophyllum Fenzlianum.

Stems pseudo-bulbous, clavate-fusiform, slightly compressed, 4—6 inches long and 2—3 inches broad, partially invested with white membraneous sheaths, 3—5phyllous. Leaves narrowly oblong or lanceolate-oblong, 12—18 inches long and 2—2½ inches broad, dark green and leathery. Scapes from the base of the stems, arching, 3—4 feet long, racemed



Grammatophyllum Fenzlianum, var. *Measuresianum*.

from near the base, many-flowered; bracts small, scale-like. Flowers somewhat distant, 2½ inches in diameter; sepals and petals pale yellow-green spotted with brown, the sepals narrowly elliptic-oblong, the petals oblanceolate, reflexed at the apex and narrower than the sepals; lip shorter than the other segments, three-lobed, the side lobes oblong, erect, yellowish obliquely striped with brown, the intermediate lobe oblong, obtuse, pubescent on the disk, reflexed; between the side lobes is a channelled white plate. Column terete, bent, whitish.

Grammatophyllum Fenzlianum, Rehb. Xen. Orch. II. p. 16 (1862).

var.—*Measuresianum*.

Flowers much larger and more brightly coloured; sepals and petals emerald-green blotched and spotted in various ways with dark brown-purple; side lobes of lip light yellow with oblique brown lines, the front lobe white with three brown lines at the apex.

G. Fenzlianum *Measuresianum*, supra. *G. Measuresianum*, Hort. *G. Seegerianum*, Hort.

Amboyna is given by Reichenbach as the habitat of this species, of which very little appears to be known. A plant, whose origin we are now unable to trace, flowered some years ago in our houses, which Reichenbach identified as his *Grammatophyllum Fenzlianum*, and from this the above description was derived. To this species we have referred with some hesitation the recently introduced *G. Measuresianum*, whose origin has not been divulged, but which is without much doubt eastern Malayan, as we can detect no other differences than those stated above. As a horticultural plant the variety is far superior to the original form, and whether species or variety only, it worthily bears the name of Mr. R. H. Measures, of The Woodlands, Streatham, for many years a most successful cultivator of orchids.

G. multiflorum.

Stems, leaves and inflorescence nearly as in *Grammatophyllum Fenzlianum*. Flowers $1\frac{1}{2}$ inch in diameter; sepals and petals brownish purple with green margins and a green median line, the former subspathulate, obtuse, the latter oblong, keeled behind; lip three-lobed, the side lobes roundish oblong, sub-falcate, erect, light yellow streaked with red-brown; the intermediate lobe oblong with rounded anterior margin, and with four shallow white keels on the disk produced to the base of the lip as a grooved linear-oblong plate. Column clavate, arched, white spotted with brown.

Grammatophyllum multiflorum, Lindl. in *Bot. Reg.* 1838, misc. No. 80, and 1839, t. 65. *Pact. Mag. Bot.* VI. p. 217. *Rehb. Xen. Orch.* II. p. 16.

var.—*tigrinum*.

Flowers with broader and differently-coloured segments; sepals and petals yellow-green heavily blotched with brown-purple; lip light yellow with red-brown markings.

G. multiflorum tigrinum, Lindl. in *Bot. Reg.* 1842, t. 69.

The typical form was discovered by Cuming in the Philippine Islands and plants were sent home by him from Manila in 1837; one of these flowered in Mr. Bateman's collection at Knypersley in

1838, on which occasion the species was figured in the *Botanical Register*, and another in the following year at Baron Dimsdale's, Campfield Place, Herts, which was figured in Paxton's *Magazine of Botany*. Scarcely anything is recorded of its subsequent history. The variety which first appeared shortly after the introduction of the species has much handsomer flowers and is still occasionally seen in cultivation. For materials for description we are indebted to Baron Schroeder, The Dell, Staines.

G. speciosum.

Stems sub-cylindric, compressed, 5—8 or more feet high, and 3 inches in diameter at the thickest, gradually tapering upwards, leafy along the apical third of their length.* Leaves distichous, linear-ligulate, 18—24 inches long, sub-acuminate, sheathing and sharply keeled at the base. "Scape as thick as a man's finger, 5—7 feet long, radical, erect, quite glabrous and many-flowered. Flowers distant, 5—6 inches in diameter, each with a large ovate-lanceolate, concave, greenish bract, an inch long; sepals and petals spreading and undulated, broadly oblong or sub-obovate, yellow spotted and blotched with deep red-purple; lip small for the size of the flower, three-lobed, the lobes obtuse, the side lobes convolute over the column; the disk furrowed with three plates more elevated in the centre, and marked with ciliated red lines; the middle lobe ovate, entire. Column curved, semi-terete, partially spotted with red."†

Grammatophyllum speciosum, Blume, *Bijdr.* p. 377 (1825). *Id. Rumphia, IV.* p. 47, t. 191. *Lindl. Gen. et Sp. Orch.* p. 173. *Paxt. Fl. Gard. II.* t. 69. *Rehb. Xen. Orch. II.* p. 16. *Bot. Mag.* t. 5157. *Van Houtte's Fl. des Serres, XIII.* t. 1386 (copied from *Bot. Mag.*) *Gard. Chron. X.* (1878), p. 181, fig. and *VII.* s. 3 (1890), p. 297. *Hook. f. Fl. Brit. Ind. VI.* p. 18. *Cymbidium scriptum*, Sw. *Gabertia scripta*, Gaud. *Epidendrum scriptum*, Linn.

This gigantic orchid excited the wonder of travellers in Malaysia long before it found its way into British gardens. The physician Rumphius was probably the first European scientist who became acquainted with it, and through him, or through Osbeck who visited the Malay Archipelago about the middle of the last century, it became known to Linnæus and to his successor Oloff Swartz. Many years afterwards it was detected by Finlayson in Cochin China, and

* The roots of this plant are developed in a remarkable manner; the primary roots are stoutish and persistent; from these arise a dense plexus of branching secondary roots that spread over the surface of the compost in the pots and beyond the rim; they attain a length of 4—5 inches, with numerous rootlets along the basal half, and die off at the end of the growing season. Paxton observed a similar phenomenon in *Grammatophyllum multiflorum*, and it is probably an essential character of the genus.

† Our description of the plant was taken at Burford Lodge. The inflorescence we have not seen, and we have therefore copied the floral details from the *Botanical Magazine*.

by the French botanist Gaudichaud in the Moluccas, the latter of whom described and figured it in his *Voyages botaniques* under the name of *Gabertia scripta*, a name that cannot be retained as the results of the voyage were not published till after the appearance of Blume's *Bijdragen*, in which the genus *Grammatophyllum* was founded upon it. But it was not till Blume published a coloured plate of it in *Rumphia*, nearly a quarter of a century later, that the true character of the plant became known, and the surprise of botanists and the longing of horticulturists were awakened. It was introduced by Messrs. Loddiges, and flowered for the first time imperfectly, in their Hackney nursery in 1852. From that time to the present its flowering in the glass-houses of Europe has been a rare occurrence, and the recorded instances are few. In 1859 it flowered in perfection in the collection of Mr. W. G. Farmer at Nonsuch Park, Surrey; many years afterwards we learn from the *Gardeners' Chronicle* that it flowered well in the collection of Sir G. Staunton at Leigh Park, and we believe the late Mr. John Day succeeded in flowering it once, although as in Loddiges' case, very imperfectly.

The following extract from a letter received from Mr. James Herbert Veitch during his Indian travels will convey an idea of the enormous dimensions attained by this gigantic orchid in its native habitat:—"In the Botanic Garden at Penang, a specimen on a rising ground isolated from other plants and surrounded by a shrubbery was carefully measured; the circumference was $42\frac{1}{2}$ feet; the stems are from 6 to 7 feet long, the capsules *with* their stalk are $7\frac{1}{2}$ inches, *without* it 5 inches long. One of the preceding year's racemes, of which there were thirty, was $7\frac{1}{2}$ feet long. The plant is in fine condition, nearly all the stems being clothed with foliage of a good colour."

The geographical range of the species is very extensive. Besides the localities named above: it occurs in Java around Buitenzorg, where Blume's type was gathered; it was found by Parish in Tenasserim, its probable northern limit; by Scortechini in Perak; by Burbidge in Borneo on a prostrate trunk of *Dryobalanops aromatica* (Camphor Tree); and also in the Sulu Islands growing upon a Durian Tree.

POLYSTACHYA.

Hook. Exot. Fl. t. 103 (1825). Benth. et Hook. Gen. Plant. III. p. 540.

Polystachya includes about forty species, chiefly African with a few outlying members in south India, Ceylon and Malaysia, and even sparingly represented in tropical America. The genus, however, possesses so little interest in a horticultural sense that it is only mentioned here for the purpose of bringing under notice the two pretty dwarf species described below.

Polystachya Ottoniana.

Pseudo-bulbs clustered, ovoid, $\frac{1}{2}$ inch long, prolonged at the apex into a slender, compressed stem $1-1\frac{1}{2}$ inch long, from the summit of which are produced two linear, emarginate, grass-like leaves of unequal length, the longer one about 4 inches long, the shorter about half as long. Peduncles slender, issuing from between the leaves and as long as the shorter of the two, one-flowered. Flowers $\frac{1}{2}$ inch in diameter, white, the sepals with a purple median line on the outside, and the lip with a yellow blotch on the disk; dorsal sepal oblong, acute, the lateral sepals ovate, acute, adnate to the foot of the column, and forming with it and the base of the lip a broad *mentum* or chin; lip oval-oblong, obscurely lobed, reflexed at the apex. Column semi-terete; anther purple.

Polystachya Ottoniana, Rehb. in Otto. Hamb. Gartenz. XI. p. 249 (1853). Bonpl. III. p. 217 (1857). Walp. Ann. VI. p. 638 (1863). H. Bolas in Journ. Linn. Soc. XXV. p. 186. *P. capensis*, Sanderson in Harv. Thes. Cap. II. p. 51, t. 179 (1863).

A very attractive little orchid when massed and in full bloom. It was introduced into German gardens in 1847 from South Africa, where it is plentiful in places in the eastern provinces from Uitenhage to Natal. Materials for description were sent to us from Burford Lodge. The species is named in compliment to Herr Otto, Director of the Botanic Garden at Hamburg at the time of its introduction.

P. pubescens.

Pseudo-bulbs crowded, about the size of a small filbert, elongated, di-triphyllous. Leaves oblong-lanceolate, 3—4 inches long, the first or lowermost leaf where there are three, much smaller than the upper two between which the erect peduncle arises. Peduncles longer than the leaves, flattened below with sub-acute edges, pubescent; racemose above, 12—20 flowered; bracts triangular, acute. Flowers inverted, bright yellow, the lip and inferior half of the sepals streaked with red; sepals ovate, acute; petals somewhat smaller, obovate-oblong, obtuse; lip smaller

than the other segments, three-lobed, the side lobes roundish oblong, pubescent on the inner side, the intermediate lobe ovate, reflexed at the tip. Column very short, clavate.

Polystachya pubescens, Rehb. in Walp. Ann. VI. p. 643 (1863). *Bot. Mag.* t. 5586. *Lindenia*, IV. t. 170. H. Bolas in Journ. Linn. Soc. XXV. p. 186. *P. Lindleyana*, Sand. in Harv. Thes. Cap. II. p. 50. t. 178. *Epiphora pubescens*, Lindl. in Comp. Bot. Mag. No. 19, p. 201; and Bot. Reg. 1840, misc. No. 103.

This is the prettiest of the *Polystachyas* known to us, and one that has recently become much distributed among the orchid collections of this country. It was originally discovered by Burchell, in Kaffraria, and afterwards collected by Drége, for Messrs. Loddiges, in whose nursery it flowered in 1840. It has since been gathered in several localities in south-east Africa from Uitenhage to Delagoa Bay.

SUB-TRIBE CYRTOPODIEÆ.

*Terrestrial or epiphyte with leafy stems that are often pseudo-bulbous. Leaves plicate or with prominent veins. Scapes produced from the base of the stems or pseudo-bulbs, racemose or paniculate. Column more or less produced into a foot.**

CYRTOPODIUM.

R. Br. in Ait. Hort. Kew. ed. 2, vol. V. p. 216 (1813). Benth. et Hook. Gen. Plant. III. p. 541.

With *Cyrtopodium* Mr. Bentham joined the *Cyrtopera* of Lindley, on the ground that the geographical distinction between them can no longer be maintained. Unfortunately this view cannot be accepted, as the true *Cyrtopods* are exclusively American, and the Asiatic species of *Cyrtopera* have a nearer affinity with *Eulophia*. The only species of *Cyrtopodium* known to us to be in cultivation are *C. Andersonii* and *C. punctatum*. They are well distinguished by their long fleshy stems and tall branching inflorescence with numerous showy flowers that are produced continuously for several weeks in succession.

* This sub-tribe includes twenty-one genera "whose general character is to have the prominent mentum of MAXILLARIÆ with the foliage and habit of CYMBIDIÆ, thus forming a connecting link between those two sub-tribes, but with limits not always quite so definite as could be wished, for there are here and there species offering exceptions to one or other of the characters."—G. Bentham in Journ. Linn. Soc. XVIII. p. 319.

The generic name is derived from *κύρτος*, "curved," and *πούς* *πόδος*, "a foot," in reference to the curved foot of the column.

Cultural Note.—The compost recommended for *Cyrtopodiums* is a mixture of fibrous loam and some rough peat, to which some cultivators add a little well-rotted cow-manure; this should be placed on an ample drainage of broken crocks. As they are heat-loving plants they should be placed in the highest temperature available while in active growth, but they may be removed into an intermediate temperature when the season's growth is matured. Owing to their robust habit the supply of water must be copious and constant during the growing season.

Cyrtopodium Andersonii.

Stems fusiform or sub-cylindric, more or less curved, 2—3 feet long and $1\frac{1}{2}$ inch thick, sheathed at the joints by the persistent bases of the fallen leaves. Leaves lanceolate, sub-acuminate with about three prominent nerves, 15—24 inches long. Scapes stoutish, erect, 3—5 feet high, terete, pale fulvous green; cauline bracts ovate, acuminate, sub-ventricose, 1— $1\frac{1}{2}$ inch long; floral bracts similar, but smaller and more open. Panicle many-flowered; flowers about 2 inches in diameter; sepals and petals broadly ovate, obtuse, apiculate; petals a little broader and longer, obovate, obscurely keeled behind, both sepals and petals chrome-yellow, sometimes more or less tinted with green towards the apex; lip three-lobed, of a deeper and brighter yellow than the other segments, the side lobes obovate, erect, the intermediate lobe broader, sub-quadrate, concave, the central area regularly furrowed, the marginal area rugose; between the side lobes is a raised plate densely spotted with red. Column short, triquetral, yellow-green sometimes stained with brown.

Cyrtopodium Andersonii, R. Br. in Ait. Hort. Kew. ed. 2, vol. V. p. 216 (1813). *Bot. Mag.* t. 1800 (1816). *Bot. Reg.* 1841, t. 8. Lindl. Gen. et Sp. Orch. p. 188. Rehb. in Walp. Ann. VI. p. 667. *Cymbidium Andersonii*, Bot. Repository, t. 651. *C. cardiochilum*, Lindl. in Journ. Hort. Soc. IV. p. 266 (1849). Williams' *Orch. Alb.* IV. t. 176.

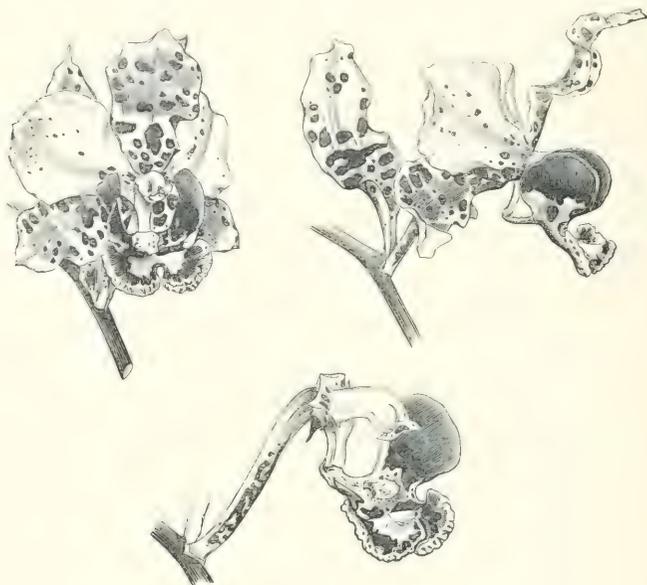
The species on which the genus was founded, and one of the first tropical orchids cultivated in this country. It was originally sent to Mr. Thomas Evans—a liberal patron of horticulture in the early part of the present century—from the island of St. Vincent, in the West Indies, by Mr. Alexander Anderson, after whom it is named. It is also found in other parts of the West Indies and on the neighbouring mainland. Dr. Lindley states that from the fleshy stems the shoemakers obtain a kind of paste or glue which they use for the purposes of their art.* *Cyrtopodium Andersonii* is

* Bot. Reg. sub. t. 8. The application of any part of an orchid plant to any economic use is so rare that the circumstance is here expressly noticed.

occasionally seen in orchid collections under the name of *C. cardiochilum*, which cannot, however, be botanically separated nor, in our opinion, horticulturally distinguished from the type.

C. punctatum.

Stems, leaves and inflorescence as in *Cyrtopodium Andersonii*, except that the leaves are much more acuminate. Cauline bracts spathaceous, broadly oval, 5—6 inches long, yellowish green stained and blotched with reddish brown chiefly on the basal half; floral bracts much smaller, oblong-lanceolate, $1\frac{1}{2}$ inch long, and brightly coloured like the sepals. Flowers 2 inches in diameter; sepals and petals oval-oblong,



Cyrtopodium punctatum.

undulate, the former bright tawny-yellow barred and spotted with cinnamon-brown, the latter bright tawny-yellow with few, often without spots; lip much shorter than the other segments, three-lobed, the side lobes oblong-spathulate, curved inwards, brick-red; the intermediate lobe semi-lunate with crisped margin, yellow bordered with red; crest a much tuberculated oblong plate, white dotted with red. Column semiterete, bent, yellow-green.

Cyrtopodium punctatum, Lindl. Gen. et Sp. Orch. p. 188 (1832). Id. *Sert. Orch.* t. 12. *Bot. Mag.* t. 3507. Rehb. in Walp. Ann. VI. p. 666. Van Houtte's *Fl. des Serres*, XXII. t. 2352. Godefroy's *Orchidophile*, 1885, p. 270. Williams' *Orch. Alb. V.* p. 202. *Lindenia*, VIII. t. 344. *C. Saintlegerianum*, Rehb. in Gard. Chron. XXIII. (1885), p. 756, and IV. s. 3 (1888), p. 180, with fig. *Epidendrum punctatum*, Linn. Sp. Pl. ed. II. p. 1349.

In this very handsome *Cyrtopodium* we have a remarkable instance of constancy in character over a geographical range which is equalled in extent by that of few other species of orchids, for its limits in tropical America, both northern and southern, almost coincide with the limits of epiphytal orchid life on that continent. It was originally discovered in Cuba in the last century by Plumier, through whose specimens it became known to Linnæus. In the early part of the present century it was gathered by Mackenzie in St. Domingo; by Deppe and Schiede in Mexico; in northern Brazil by Martius, and in southern Brazil by Gardner. But long before it was gathered by Gardner it was found by Swainson, the introducer of *Cattleya labiata*, who sent it to the Botanic Garden at Glasgow, where it was cultivated many years before it could be induced to flower, a circumstance by no means surprising or unusual under the treatment to which orchids were at that period subjected. At length in 1835 its first panicle of flowers expanded, on which occasion it was figured in the *Botanical Magazine*, and a little later the species was again figured in Lindley's superb *Sertum Orchidaceum*. The latest phase in its history was to some extent a surprise; this was its discovery in northern Paraguay in 1878 by M. de Saint Leger, and its subsequent importation from that region. Although the Paraguayan plant received separate specific rank from Reichenbach, it conforms strictly to the common type and must bear the same name.

ZYGOPETALUM.

Hook. in Bot. Mag. t. 2748 (1827). Rehb. in Walp. Ann. VI. p. 650 (1863). Benth. et Hook. Gen. Plant. III. p. 542 (1883).

The limits of a genus are often difficult to define; the difficulty may arise from various causes, and none more so than the progress of discovery. A species may appear in cultivation that was previously unknown to science, and the botanist who deals with it, finding characters in the flowers structurally different from every known genus, creates a new one for its reception. Another species may afterwards come to light having some structural analogy to the former, but at the same time differing from it in some apparently essential character that forbids its being referred to the genus founded upon the former species, or to any other, and in consequence

another genus is proposed for its reception. The process may be repeated for a third and even for a fourth species, and so on. This is precisely what has happened with species now included in the genus under review.

About the year 1826 Mr. Mackay, of the Trinity College Botanic Garden, Dublin, introduced from Brazil a beautiful and now well-known orchid which, on flowering, he submitted to Sir William Hooker, who found it so unlike any described species in the structure of its flowers that he had no hesitation in founding upon it the genus *Zygopetalum*. Some years later another orchid was discovered in British Guiana by Schomburgk, and a specimen was sent by him to Mr. Bateman, who named it *Huntleya sessiliflora*,* but did not publish a diagnosis of his new genus. Lindley subsequently referred other species to Bateman's *Huntleya*, including *H. Melcagris*, which was the first that was figured and described, and is thence the type species of that group, and *H. violacea* figured in his *Sertum Orchidaceum*. But as these two species differ somewhat from each other in the characters of the labellum and column, Reichenbach removed them from *Huntleya*, referring the first to Lindley's *Batemaniana*,† and founding upon the second his own genus *Bollea*.

Then followed the discoveries of Warscewicz in Central America, some of which were constituted a new genus by Reichenbach under the name of *Pescatorea*, and others under the name of *Warscewiczella*; and besides these Lindley referred other species to *Warrea* which diverge from the type species of that genus far more than they do from that of *Zygopetalum*. Thus a series of genera were founded, all bearing an evident relation to each other, but which on first examination seemed to be sufficiently distinct from each other to require a separate generic nomenclature. As new species came to light from that apparently inexhaustible treasury of orchid life, the tropical region of Central and South America, the original lines of demarcation were much obliterated, and *Zygopetalum*, *Huntleya*, *Bollea*, *Warscewiczella*, *Pescatorea*, *Warrea* (in part) and *Batemaniana* (in part) became a confused group of genera, the limits of each of which could not be clearly determined. So long ago as 1863 this unsatisfactory classification became so evident that Reichenbach, when compiling his synopsis of the ORCHIDÆ for Walper's *Annales Botanices*, merged nearly all of them into *Zygopetalum*, including also his own genus *Kefersteinia* and Lindley's *Promenæa*. The propriety of this course was strengthened by subsequent discoveries, so that when Mr. Bentham undertook the revision of the ORCHIDÆ for the *Genera Plantarum* he unhesitatingly

* It is quite uncertain what this plant is; by some it is supposed to be *Huntleya violacea* (Lindl.).

† Lindley's type species is still retained under *Batemaniana*. See *infra*.

adopted it, adding *Batemanian* except the type species, and restoring *Zygopetalum rostratum* (Hook.) and another species which Reichenbach had separated under the name of *Zygosepalum*. The genus *Zygopetalum* thus enlarged may still seem to many horticulturists to be made up of heterogeneous elements that ought to be kept distinct, at least for garden use, but after full consideration we are satisfied that the course adopted by Mr. Bentham is that which should be accepted, especially as every fresh discovery tends to confirm it.

The genus is confessedly a polymorphous one, but the following characters fairly circumscribe it:—

The *sepals* are sub-equal and spreading, either free or joined at the very base; the lateral two are adnate to the short foot of the column.

The *petals* are similar and nearly equal to the sepals.

The *lip* is affixed to the foot of the column, forming with it a short, obtuse *mentum* or chin; the lateral lobes are usually small and erect, sometimes embracing the column, the blade large and spreading. The transverse crest is very prominent and fleshy, either entire or lobed, rarely fimbriated.

The *column* is incurved, semi-terete, wingless, or shortly winged at the apex. The anther is two-celled, the pollinia four, sessile on the gland or viscid disk that rests on the rostellum.

From the above diagnosis it is evident that the prominent fleshy crest, which is often furrowed, rarely fringed, and nearly always more deeply or differently coloured than the other parts of the flower, is the chief distinguishing character of the genus.

In their vegetation the *Zygopetala*, even in the enlarged sense in which the genus is here understood, are remarkably uniform, the most obvious variations being the presence or absence of pseudo-bulbs; the one, two or many-flowered scapes, and the smaller size of the species hitherto known as *Promeneas* and *Kefersteinias*.

The number of species known to science is upwards of fifty. These are spread over the South American continent from the cooler parts of southern Brazil to the isthmus of Panama; and also over Central America, southern Mexico, and the West Indies.

The following sectional divisions are proposed by Mr. Bentham, of which we give the most obvious characters:—

I. EUZYGOPETALUM. Scapes many-flowered; the labellum broad with its crest thick, entire or lobed. This includes the type species *Z. Mackayi*, also *Z. Burkei*, *Z. maxillare*, *Z. graminifolium*, and others.

II. ZYGOSEPALUM. Scapes few-flowered, sepals and petals narrowly acuminate. *Z. rostratum* and *Z. Kegelii*] the latter not known in cultivation.

III. HUNTLEYA. Scapes one-flowered; the labellum clawed and its crest distinctly fimbriated; the column broad and crenulate at the apex. *Z. Melagris*, *Z. Burtii*.

IV. BOLLEA. Scapes one-flowered; sepals and petals broad; the labellum shortly clawed, the crest thick and elevated; the column broad and arching. *Z. cœleste*, *Z. Lalindei*.

V. WARCEWICZELLA. Scapes one-flowered; sepals and petals nearly as in *Euzygopetalum*, but sometimes undulated; the labellum often very broad. *Z. cerinum*, *Z. cochleare*, *Z. Dayanum*, *Z. discolor*, *Z. Klambochorum*, *Z. lamellosum*, *Z. Lehmanni*, *Z. marginatum*, etc.

VI. PROMENÆA. Scapes as in *Warszewiczella*, but the plants of much smaller size; the column often but not always with raised longitudinal lines on the face below the stigma. *Z. gramineum*, *Z. stapelioides*, *Z. xanthinum*.

Cultural Note.—The species included in the section *EUZYGOPETALUM* present no difficulty in respect of their cultivation; in fact, the type species, *Zygopetalum Mackayi* and its varieties are among the easiest of orchids to grow satisfactorily. For these, pots corresponding to the size of the plants should be selected, in which a drainage of clean broken crocks should be placed to about two-thirds of the depth, and over these a layer of moss to keep the drainage free from the soil above. The compost should consist of one-half fibrous peat and one-half fresh sphagnum, with a sprinkling of silver sand; the potting should be repeated annually when the plants begin to produce new roots. *Z. maxillare* and *Z. graminifolium*, which have creeping rhizomes, and in their native country affix themselves to the stems of tree ferns, should be either attached to pieces of tree-fern stems or to blocks of wood, but they may also be grown in pots. All these species come from the same region as *Cattleya Loddigesii*, *C. intermedia*, *Lælia purpurata*, *L. elegans*, etc.; their cultural treatment as regards temperature, ventilation, shading, etc., is essentially the same as for that group of orchids. It is given in detail under *Cattleya*, but it may be useful here to remind cultivators that the winter or resting season temperature should range from 15°—18° C. (60°—65° F.) in the day and about 3° C. (5° F.) lower in the night, and the summer or growing season temperature should range from 18°—21° C. (65°—70° F.) in the day and about 3° C. (5° F.) lower in the night. The supply of water must be constant during the growing season, as *Z. Mackayi* roots very freely in the compost, and *Z. maxillare* when on a block has its roots exposed. *Z. rostratum* requires more heat than the Brazilian species, and should have a shady position in the East Indian house. Generally speaking, the *Zygopetalums* require more shade than the *Cattleyas* and *Lælias*.

The species included in the section *PROMENÆA* are also of easy culture. Being of small size, teak baskets or shallow pans that can

be suspended near the glass should be preferred. They may be treated like the smaller *Odontoglossa*, as *Od. Rossii* and *Od. Cervantesii* during the summer months, but they should be removed to the intermediate house for the remainder of the year.

The disappointing experience of the past twenty years in the cultivation of the species now comprising the sections HUNTLEYA, BOLLEA and WARSCEWICZELLA forbids the formulating of any course of treatment for them. Doubtless several causes have combined to bring about the failure to establish this fine group of orchids in the glass-houses of Europe, but none more so than the withholding of reliable information respecting their geographical station and their environment *in situ*. All attempts to cultivate them hitherto have been purely empiricisms, and even if the climatic and other conditions cannot be approximately imitated artificially, yet it must evidently be in the interests of importers and collectors to impart such information they possess as may tend in any degree to assist the cultivator.

SYNOPSIS OF SPECIES AND VARIETIES.

Zygopetalum brachypetalum.

Pseudo-bulbs ovate-oblong, compressed, 2—2½ inches long, ribbed and furrowed on the flattened sides, di-triphyllous. Leaves linear-ligulate or narrowly lanceolate, sub-acuminate, conduplicate at base, 15—20 or more inches long. Scapes as long as the leaves, loosely racemed, 7—10 flowered; bracts foliaceous, ovate, acute, slightly inflated, about an inch long. Flowers 2½ inches across vertically; sepals and petals uniform, narrowly oblong, acute with margins more or less revolute, brown tinged with green towards the base; lip broadly clawed, expanding into a sub-orbicular emarginate blade, light mauve, almost white at the margin, and veined with bright mauve-blue; crest horse-shoe shaped, ridged and furrowed, white with a few blue lines. Column short, semi-terete, white stained with brown and green.

Zygopetalum brachypetalum, Lindl. ex Rehb. in Walp. Ann. VI. p. 660.* Journ. Hort. Soc. IV. (1849), p. 12, with fig.

A very handsome species flowering in mid-winter. It was exhibited by M. de Jonghe, of Brussels, at a meeting of the Horticultural Society of London on December 5th, 1848, when it received an award. In the report of the meeting published in the Society's Journal (*loc. cit. supra*) it is stated that this species was originally brought into notice by Mr. Waterhouse, of Halifax, in the year 1840 and is little known. M. de Jonghe informed Dr. Lindley

* Bot. Reg. XXX. (1844), misc. 5 is quoted by Reichenbach but we do not find it there.

that it was found by his collector Libon in 1847 on the peak of Itabira in the province of Minas Geraes in Brazil. It is very near *Zygopetalum Mackayi*, differing from it chiefly in its much longer and narrower leaves; in its smaller and less fleshy flowers that are differently coloured; in its differently-shaped lip and narrower crest that is not excavated in front. We are indebted to Sir Trevor Lawrence, Bart., for materials for description.

Z. Burkei.

Pseudo-bulbs sub-tetragonal, compressed, 2—4 inches long, di-triphyllous. Leaves linear-oblongate, acute, conduplicate at base, 9—12 inches long. Scapes stoutish, erect, longer than the leaves, about five-flowered; bracts cymbiform, about half as long as the pedicel and ovary. Flowers $2\frac{1}{2}$ inches in diameter; sepals and petals similar and sub-equal, oval-oblong with reflexed margins, the lateral sepals more acute than the dorsal one, green, with 7—9 chocolate longitudinal lines which are sometimes broken up into dots and become more or less diffused towards the apex of the segments; lip broadly clawed with a small auricle on each side of the crest, and expanding into a sub-orbicular, undulate, milk-white blade, irregularly dentate at the margin; crest fleshy, semi-circular in front, with about thirteen violet-purple ribs. Column very thick, terete, pale yellow with some purple streaks above, streaked longitudinally with purple below the stigma; the apical wings very narrow and toothed.

Zygopetalum Burkei, Rehb. in Gard. Chron. XX. (1883), p. 684. Williams' *Orch. Alb.* t. 142.

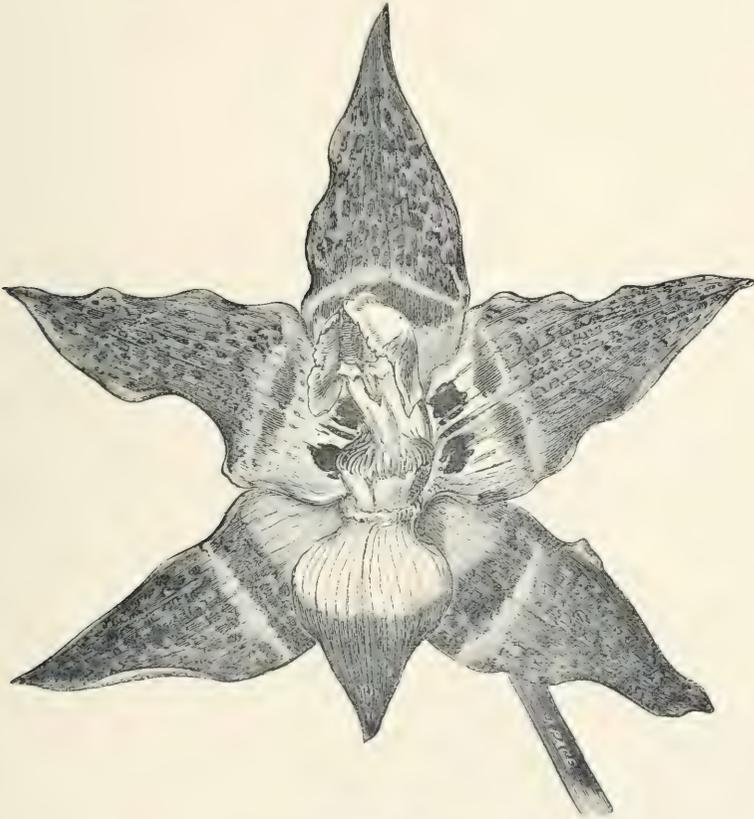
A very handsome species belonging to the section EUZYGOPETALUM of Bentham, introduced by us in 1881 from the Roraima in British Guiana through our collector, David Burke, after whom it is named, and who found it growing on rocks at about 6,000 feet elevation in the swamps in which *Cypripedium Lindleyanum* and *Heliamphora nutans* have their home; it is still very rare in European collections. The contrast between the pure white blade of the labellum and the green sepals and petals formally streaked with red-brown is very striking.

Z. Burtii.

Pseudo-bulbs none. Leaves radical, narrowly elliptic-oblong, acute, 10—15 inches long. Peduncles stoutish with a sheathing, acute, greenish bract at each joint, one-flowered. Flowers 3—4 inches in diameter, all the segments more or less fleshy; sepals and petals sub-equal, ovate-oblong, acute, white at the very base, then yellow, the

apical half red-brown with some yellow spots, the petals with some crimson-purple streaks at the base; lip clawed, narrowly elliptic-oblong, acute, reflexed, the basal half white, the apical half red-brown; crest a semi-circular white plate fringed with long, narrow, light-purple, incurved teeth. Column triquetral, winged and hooded with the margin jagged, pale green with a purple spot on each side of the stigma.

Zygopetalum Burtii, Benth. in *Gen. Plant.* III. p. 543 (1883). *Batemaniana Burtii*, Rehb. in *Gard. Chron.* 1872, p. 1099. *Bot. Mag.* t. 6003. *Fl. Mag.* n.s. t. 101. Regel's *Gartenfl.* 1883, t. 1114.



Zygopetalum Burtii.

From the *Gardening World*.)

var.—Wallisii.

Flowers larger with all the segments narrower and more acuminate; sepals chestnut-brown, white at the very base; petals chestnut-brown, yellow at the base with a brown-purple blotch broken into lines; lip

darker than the other segments, the crest whitish and the fimbriæ red-brown.

Z. Burtii Wallisii, supra. *Batemanian Burtii* Wallisii, Roehl in Godefroy's *Orchidophile*, 1883, p. 477. *Batemanian Wallisii major*, Williams' *Orch. Alb. IV.* t. 185.

Originally discovered by Endres in 1867 in Costa Rica, and shortly afterwards imported by us from that country; it flowered for the first time in Great Britain in the collection of the late Mr. Burnley Hume, at Winterton, in Norfolk, in the summer of 1872. The comparatively few plants that have flowered since show that the species is variable in the size and colour of the flowers, but no structural deviations from the first described type have been observed by us. The variety, a very handsome one, was detected by Wallis, and afterwards by Roehl and other collectors in New Granada, none of whom divulged its precise habitat. Roehl states that a similar variety is found in Ecuador.* Our engraving represents a Colombian form.

Zygopetalum Burtii, better known as *Batemanian Burtii*, is one of a group of orchids forming the sections BOLLEA, HUNTLEYA, and WARSCEWICZELLA as defined above, that have hitherto proved difficult to cultivate. The following account of the climate of Costa Rica, the native country of *Z. Burtii*, *Z. cerinum*, *Z. discolor* and others, communicated to the *Gardeners' Chronicle*† by Richard Pfau, an orchid collector in Central America, may prove suggestive:—

“The temperature of Costa Rica is remarkable for its equability, especially for the minima which are reached every day just before sunrise. At my station the maximum was 26° C. (79° F.) by day, and never below 15° C. (60° F.) by night. In the mountain region the temperature is about 2° C. less for every 1,000 feet of elevation. The temperature is about the same all through the rainy season, and even in the dry season the difference is only about 1° C. The greatest heat observed in the dry season at an altitude of over 3,000 feet was 30° C. (86° F.) in March, 1881. On the slopes facing the Atlantic it rains every day in the year; on the slopes facing the Pacific there is a dry and a rainy season, the rainy season lasting from May till November, the remaining part of the year being absolutely dry. During the rainy season the atmosphere is saturated with moisture. At other times the north wind dries up everything, but the nights are nevertheless very damp; the dew is exceedingly heavy at all times of the year.”

* Godefroy's *Orchidophile*, loc. cit.

† Vol. XX. (1883), p. 599.

"Pescatoreas, Bolleas and Warscewiczellas grow in the dark shadows of the virgin forest on stones or on the stems and lower branches of trees; these require shade, too much light would kill them."

Z. candidum.

Pseudo-bulbs none. Leaves radical, ligulate-cuneate or oblanceolate, acute, reflexed at the tips, pale green. Scapes whitish, slender, much shorter than the leaves, one-flowered; bracts $\frac{1}{2}$ inch long, sheathing, membranous, pale brown. Flowers 2 inches in diameter; sepals and petals lanceolate, acute, white; the dorsal sepal bent forwards, the petals and lateral sepals more or less reflexed; lip obscurely three-lobed, the side lobes obliquely oblong, incurved towards the column, white with the front margin light violet; the intermediate lobe sub-orbicular with a striated violet blotch on the disk, the marginal area light violet striated with white; crest a thin transversely oblong plate toothed along the front margin. Column white, triquetral, dilated at the apex.

Zygopetalum candidum, Rehb. in Walp. Ann. VI. p. 656 (1863). *Warrea candida*, Lindl. in Paxt. Fl. Gard. I. p. 32, icon. xyl. (1851). *Warscewiczella candida*, Rehb. in Bot. Zeit. 1852, p. 36. Linden's *Pesc.*, t. 15. *Huntleya candida*, Hort.

A handsome but rare species in European gardens somewhat more tractable under cultivation than many of its congeners, introduced from Bahia in Brazil in 1848 by M. Morel, of Paris; its habitat, however, is said to be in the interior of the province, several hundred miles from the coast. It has been occasionally imported with *Cattleya Aclandiae*, *Loelia grandis*, and other orchids from the same region; it thence requires the same temperature as those orchids but more shade.

Z. cerinum.

Leaves four to six to each growth, the lower ones short, the upper ones oblong-ligulate, acute, 7—10 or more inches long. Peduncles 3—4 inches long, one-flowered, sheathed by 2—3 lanceolate, acute bracts. Flowers 3 inches in diameter; sepals and petals light citron-yellow, the dorsal sepal and petals similar and sub-equal, obovate, obtuse, concave towards the apex; the lateral sepals broader, oval-oblong, sub-acute; lip clawed, bright yellow, oval-oblong, convex with the lateral margins reflexed and the upper surface covered with warty excrescences; crest semi-circular, regularly ridged and furrowed, the ridges red-brown. Column terete, light yellow below the stigma; anther red-purple.

Zygopetalum cerinum, Rehb. in Walp. Ann. VI. p. 651 (1863). Id. in Van Houtte's *Fl. des Serres*, XVII. t. 1815. *Huntleya cerina*, Lindl. in Paxt. Fl. Gard. III. p. 62, icon. xyl. (1853). *Bot. Mag.* t. 5598. *Pescatorea cerina*, Rehb. *Xen. Orch.* I. p. 184, t. 65. *Fl. Mag.* N.S. t. 93. *Williams' Orch. Alb.* IX. t. 394.

One of the discoveries of Warscewicz in 1849—50 on the volcano of Chiriqui in Veragua at 8,000 feet elevation it is said, but this is probably excessive, as one of our own collectors reported it at 2,000—3,000 feet growing under climatic conditions similar to those described under *Zygopetalum Burtii*. It was first cultivated in this country by the late Mr. Sigismund Rucker, at West Hill, Wandsworth, who appears to have been the sole possessor of the species till imported by us in 1865. Occasional importations since that date have caused it to be one of the best known and most generally cultivated species of its section.

Z. cochleare.

Pseudo-bulbs none. Leaves broadly oblanceolate, 7—12 inches long, cuneate below into a broad channelled foot-stalk. Peduncles shorter than the leaves, sheathed at the base by an oblong acute bract, and by a similar smaller one at the base of the ovary, one-flowered. Flowers delightfully fragrant, $2\frac{1}{2}$ inches in diameter; sepals and petals of wax-like texture, French-white, the dorsal sepal and petals narrowly oblong, acute; the lateral sepals broader, ovate, oblong, greenish yellow at the apex; lip sub-quadrate, concave towards the base, slightly reflexed at the apex, white with broad, close-set, violet-purple longitudinal lines; crest semi-lunate, frilled. Column semi-terete, clavate, French-white stained with violet-purple below the stigma.

Zygopetalum cochleare, Lindl. in *Bot. Reg.* 1836, t. 1857, and 1844, misc. No. 15. *Bot. Mag.* t. 3585. *Z. flabelliforme*, Rehb. in *Walp. Ann.* VI. p. 652 (1863). *Z. Gibbeziæ*, *Lindenia*, IV. t. 181. *Warscewiczella cochlearis*, Rehb. in *Bot. Zeit.* 1852. p. 714. *Huntleya imbricata*, Hort.

Discovered by Descourtilz in the early part of the present century on the high mountains separating the provinces of São Paulo and Minas Geraes, in southern Brazil, and first introduced in 1835—6 by our predecessor, Mr. Knight. Its pleasant fragrance is its chief recommendation. We are indebted to Sir Trevor Lawrence, Bart., for materials for description.

Z. cceleste.

Pseudo-bulbs none. Leaves 6—10 to each growth, oblong-lanceolate, acuminate, 6—12 inches long, $1\frac{1}{2}$ —2 inches broad. Peduncles stoutish, sub-erect or nodding, shorter than the leaves, with a small sheathing bract at each joint, one-flowered. Flowers 3—4 inches in diameter, the sepals and petals bluish violet, paler at the margin and base, yellowish at the tips; the dorsal sepal broadly obovate and bent forwards, the lateral two oval-oblong; the petals like the dorsal sepal, but more spreading; lip shorter than the other segments, with a larger

buff-yellow semi-circular crest occupying three-fourths of the area of the entire lip, deeply grooved longitudinally into numerous rounded ridges; the small ovate blade with recurved margin and tip, and coloured like the sepals and petals. Column broad, arching, convex and bluish violet above, concave and yellow in front, hairy and spotted with red towards the base.

Zygopetalum cœleste, Rehb. in Gard. Chron. V. (1876) p. 756. *Bollea cœlestis*, Rehb. in Gard. Chron. VII. (1877), p. 366. *Bot. Mag.* t. 6458. *Regel's Gartenfl.* 1882, t. 1075. *Godefroy's Orchidophile*, 1882, p. 42. *Paxt. Fl. Gard.* re-issue, I. pl. 15. *B. pulvinaris*, Rehb. *Lindenia*, II. t. 61.

A most remarkable orchid on account of the unusual but very handsome colour, as well as the large size of its flowers. Its history was very imperfectly known till M. Roezl communicated to Godefroy's *Orchidophile*, in 1883, the following particulars of its habitat:—

“On the route from Beneventura to Calli over the western Cordillera of Colombia, at about 6,000 feet elevation, extend impenetrable forests on the left side; the place is called Salado. Some years ago I sent my nephew, Edward Klaboch, for *Masdevallia Chimera*, which occurs in great quantity and in great variety in this locality. He discovered some tufts of a *Pescatorea* growing on a tree about a yard from the ground. A *Pescatorea* at 6,000 feet elevation seemed to me to be somewhat strange, and when visiting the same district in the following year I found that it was *Bollea cœlestis*.

The locality where this plant grows is rather cold during the night; the thermometer sinks to 8°—10° C. (46°—50° F.), and sometimes even lower; during the day it rises to 15°—20° C. (60°—72° F.). This difference between the day and night temperature causes a copious condensation of moisture, and even when it does not rain the plant is constantly damp. Its stout roots penetrate or creep under the rotten leaves of the different trees. Tufts 20—30 inches in diameter occur frequently with 30—40 flowers open at one time.”*

These particulars should afford a clue to the habitat of the plant, and suggest its cultural treatment if re-discovered. It was introduced in 1876 by Messrs. Backhouse, of York, but it is now become very rare in British collections, if it has not entirely disappeared.

Z. Dayanum.

Pseudo-bulbs none. Leaves in tufts of 6—8, oblanceolate-oblong, acute, equitant at base, 10—15 inches long. Peduncles 3—4 inches long, one-flowered, with a small green sheathing bract below the middle and a larger brownish one at the base of the ovary. Flowers 3 inches across the lateral sepals; sepals and petals fleshy, cream-white tipped with pale green; the sepals oblong-obtuse, concave; the petals about

* *Godefroy's Orchidophile*, 1883, p. 567.

one-third smaller, obovate, obtuse; lip with a short claw and convex sub-orbicular blade, white stained with crimson; crest semi-circular, plaited, deep crimson. Column short and broad, white above, yellow below the stigma; anther crimson.

Zygopetalum Dayanum, Benth. in Gen. Plant. III. p. 543 (1883). *Pescatorea Dayana*, Rehb. in Gard. Chron. (1873), p. 575; and II. (1874), p. 226. *Bot. Mag.* t. 6214 (rhodaera).

sub-vars.—*candidula* (Gard. Chron. III. (1875), p. 342, with fig.), sepals and petals pure white; *rhodaera* (*Bot. Mag.* loc. cit.), sepals and petals with bright red tip; *splendens* (Gard. Chron. (1873), p. 575), sepals and petals with violet blotches at the apex.

Discovered by Gustav Wallis in New Granada and introduced by us in 1873. On flowering in the several collections among which the plants were distributed, either the markings of the perianth were found to be variable or altogether absent as in the sub-varieties noted above. The precise habitat of the species which has hitherto been known in gardens as *Pescatorea Dayana* was not intimated to us by the collector. The species commemorates the late Mr. John Day, of Tottenham.

Z. discolor.

Leaves in tufts of 5—7, oblanceolate, sharply acuminate, conduplicate at base, 6—12 inches long. Peduncles shorter than the leaves, one-flowered; bracts sheathing, membranous, brown. Flowers 2 inches in diameter; sepals spreading, ivory-white; the dorsal one elliptic-oblong, acute; the lateral two longer and narrower, oblong-lanceolate; the petals oval-oblong, obtuse, white tinted with light violet on the apical half; lip violet-purple with paler margin, three-lobed, broadly obovate in outline, the side lobes narrow and turned inwards; the intermediate lobe spreading, slightly concave; crest semi-circular, broken up into digitate segments. Column short, clavate, white.

Zygopetalum discolor, Rehb. in Walp. Ann. VI. p. 655 (1863). *Warrea discolor*, Lindl. in Journ. Hort. Soc. IV. p. 265 (1849). Id. in Paxt. Fl. Gard. I. p. 73. *Bot. Mag.* t. 4830. *Warszewiczella discolor*, Rehb. in Bot. Zeit. 1852, p. 636. Id. *Xen. Orch. I.* p. 221. t. 93.

Discovered by Warszewicz in 1848 on the volcano of Carthago in Costa Rica, growing on *Erythrina* trees at 4,000—9,000 feet elevation. The few plants introduced by the discoverer were sold at Stevens' Rooms, one of which acquired by the late Mr. R. S. Holford flowered in his collection at Westonbirt, in Gloucestershire, in 1849, on which occasion the species was described by Lindley in the Journal of the Horticultural Society under the name of *Warrea discolor*. It was subsequently gathered by Oersted in the same

country; and in 1857 Wendland collected it between Naranjo and Carthago. It was shortly afterwards figured by Reichenbach in his *Xenia Orchidacea* as *Warsceviczella discolor*, the name by which it is still best known in gardens; he afterwards merged it in *Zygopetalum*. It is very near *Zygopetalum marginatum*, from which it is chiefly distinguished by its much narrower leaves and smaller flowers, of which the petals are comparatively broader and the lip differently lobed.

Z. gramineum.

Leaves radical, narrowly lanceolate, acute, conduplicate at base, 5—8 inches long. Peduncles clustered, slender, 2—3 inches long, one-flowered, bi-bracteate at the base of the ovary, and with a single, smaller subulate bract near the base of the peduncle. Flowers $1\frac{1}{4}$ inch in diameter; sepals and petals oval-oblong, light yellow-green with lines of red-purple dots; lip broadly ovate, concave, minutely denticulate at the margin, yellow densely spotted on the disk with red-purple, the spots smaller and fewer towards the margin; crest a four-lobed maroon-purple plate of peculiar shape not easily described.* Column semi-terete, downy above, spotted like the perianth.

Zygopetalum gramineum, Lindl. in Bot. Reg., 1844, misc. No. 15. Rehb. in Walp. Ann. VI. p. 657. *Kiefersteinia graminea*, Rehb. in Bot. Zeit. 1852, p. 634. Id. *Xen. Orch. I.* p. 67, t. 25. fig. 2. *Bot. Mag.* t. 5046.

First detected by Hartweg about the year 1841 on the Pacific side of the Western Cordillera of New Granada near Popayan, but not introduced by him. According to Reichenbach† it was shortly afterwards found by Linden in Merida at 5,000 feet elevation, and a few years later by Funck and Schlim in the same province. It was subsequently collected in Caracas by Wagener, by whom it was introduced into Germany. On its flowering in German gardens Reichenbach named it *Kiefersteinia graminea* in compliment to Herr Kieferstein, at that time the possessor of one of the best orchid collections in Germany, but afterwards restored it to *Zygopetalum* to which it had been, in the first place, referred by Lindley.

Z. graminifolium.

Pseudo-bulbs about the size of a filbert, from a slender creeping rhizome, bearing at their apex 3—5 linear or linear-lanceolate,

* Callus baseos depressus carnosus nunc rhombus, nunc triangulus, dimidio antico grosse (sic) dentato, sinu semper in medio.—Rehb. *Xen. Orch. I.* p. 68.

† *Xen. Orch.* loc. cit. supra.

acuminate, grass-like leaves 8—12 inches long. Scapes erect, stoutish for the size of the plant, longer than the leaves, 5—7 flowered; bracts sheathing, ovate or lanceolate, acute. Flowers 2 inches in diameter; sepals and petals similar and sub-equal, spathulate-oblong, acute, bronzy blackish brown with some green spots and markings; lip broadly obovate or obovate, emarginate, convex, violet-blue streaked with white; crest large, horse-shoe shaped, ridged and furrowed, deep violet-blue. Column clavate, bent, violet-blue above, white below the stigma.

Zygopetalum graminifolium, Rolfe in Gard. Chron. XII. s. 3. (1892), p. 179.
Lindenia, VIII. t. 339.

This is a recent addition to the section EUZYGOPETALUM, having for its nearest affinity *Zygopetalum maxillare*, from which it is distinguished by its more slender rhizome, smaller pseudo-bulbs, and narrow grass-like leaves.* It was introduced by Messrs. Sander and Co. from South Brazil, where it grows on the stems of *Lomaria Boryana* and probably other tree-ferns. We are indebted to Mr. C. J. Lucas, of Warnham Court, for materials for description.

Z. grandiflorum.

Pseudo-bulbs ovoid, furrowed, 2—3 inches long, diphyllous. Leaves broadly lanceolate, acuminate, upwards of a foot long. Scapes much shorter than the leaves, 3—5 flowered; bracts ovate-lanceolate, acute, about half as long as the furrowed ovary, pale green. Flowers 3 inches in diameter; sepals and petals broadly lanceolate, much acuminate, light green with 5—7 longitudinal brown bands; lip broadly ovate, acuminate, three-lobed, the side lobes roundish oblong, erect, much lacerated at the margin, white; the front lobe with dentate margin reflexed, white with 10—12 longitudinal, red-purple raised lines; crest semi-circular, covering the basal third of the lip, ridged and furrowed, orange-yellow, the ridges red and with projecting teeth in front. Column terete and white above; wings oblong, projecting, the front margin fringed.

Zygopetalum grandiflorum, Benth. in Gen. Plant. III. p. 543. (1883). *Batemanian grandiflora*, Rehb. in Bonpl. IV. p. 323. (1856). Id. in Walp. Ann. VI. p. 555. *Bot. Mag.* t. 5567.

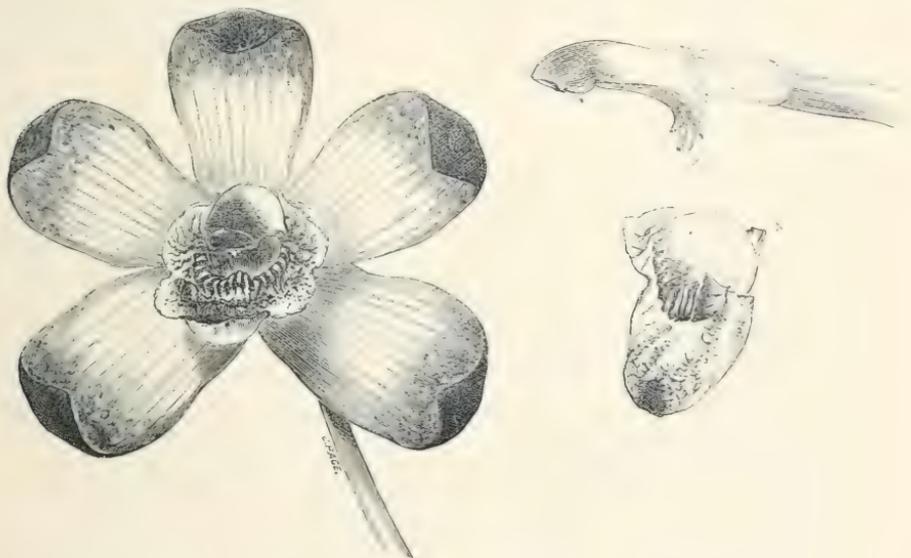
Originally introduced from New Granada by Linden, but we find no date or locality recorded. Among the earliest cultivators of this orchid in this country was the late Mr. Sigismund Rucker, in whose collection at West Hill, Wandsworth, it flowered in 1865, on which occasion the plant was figured in the *Botanical Magazine*. For

* So far as regards these characters, the plant is sufficiently distinct from *Zygopetalum maxillare*; but in its floral characters it differs so little as to suggest a doubt as to its claim to specific rank. Its precise habitat is withheld, which precludes for the present any hypothesis of its being a geographical form of *Z. maxillare*.

materials for description we are indebted to Mr. Charlesworth, of the firm of Charlesworth and Shuttleworth, of Bradford and Clapham, who detected it in the province of Truxillo, in northern Peru. It is an anomalous species placed by Mr. Bentham in the section HUNTLEYA, but differing from the sectional type in having pseudo-bulbs and a 3—5 flowered inflorescence.

Z. Klabochorum.

Pseudo-bulbs none. Leaves tufted, equitant at the base, lanceolate, acute, 12—15 inches long, and about 2 inches broad. Peduncles short with 1—2 joints at each of which is a small, subulate, brownish bract, and a similar larger one at the base of the ovary, one-flowered. Flowers fleshy with spreading segments, $3\frac{1}{2}$ —4 inches in diameter;



Zygopetalum Klabochorum.

sepals and petals oval-oblong, sub-acute, more or less incurved at the tips, the basal half white, the apical half brownish purple; lip half as long as the other segments, ovate-oblong when spread out, the margin incurved and with a shallow sinus at the apex, white densely covered with crimson-purple papillæ; crest prominent, semi-circular, scolloped into parallel ridges that are crimson-purple, the furrows between them white. Column crimson-purple, short, triquetral, concave below the stigma.

Zygopetalum Klabochorum, Rehb. in Gard. Chron. XI. (1879), p. 684. *Pescatorea Klabochorum*, Rehb. in Gard. Chron. loc. cit.; and XII. (1879), p. 167. Williams' *Orch. Alb. I.* t. 17. Paxt. *Fl. Gard.* re-issue I. t. 21. Regel's *Gartenjl.* 1890, t. 1324.

This is one of the finest of the species included in the section *WARSCIEWICZELLA*, but unfortunately, like many of its congeners, it is a refractory subject under cultivation, and thus far no information has been accorded respecting the conditions under which it grows in its native country. It was discovered by Franz Klaboch in Ecuador, and was dedicated by Reichenbach to him and his brother conjointly, both of whom fell victims to the toils and dangers of orchid-collecting on the Andes of Ecuador and Colombia. It flowered for the first time in this country in several collections in the summer of 1879, the flowers showing some variability in the depth and extent of coloration. Although no locality is recorded, *Zygopetalum Klabochorum* has since been imported from Ecuador; its habitat is therefore known to orchid collectors in that country. We are indebted to Mr. C. J. Lucas, of Warnham Court, for the flower here figured.

Z. Lalindei.

"Leaves elliptic-lanceolate, acuminate, gradually narrowed below, a foot long more or less, strongly five-nerved. Flowers $2\frac{1}{2}$ —3 inches broad, on peduncles about 3 inches long with 2—3 sheathing bracts; sepals spreading and recurved at the tip, broadly ovate-oblong, rose coloured with straw-yellow tip, the lower margin of the lateral two also straw-yellow; petals oblong, obtuse, rose-coloured with white margins; lip ovate-hastate, margins and tip recurved, the latter obtusely pointed, golden yellow; disk with raised, close-pressed smooth lamellæ. Column broader than the raised disk of the lip, arched, rose coloured."—*Botanical Magazine*.

Zygopetalum Lalindei, Rchb. in Gard. Chron. II. (1874), p. 33. *Bollea Lalindei*, Rchb. in Gard. Chron. loc. cit. *Bot. Mag.* t. 6331. B. Patinii, *Fl. Mag.* n.s. t. 147.

A handsome species discovered by M. Lalinde, a resident of Medellin, in New Granada, by whom it was sent to Europe through M. Patin, a Belgian, settled in the same city. A very noticeable structural peculiarity is the great breadth of the column, the distinguishing character of the section *BOLLEA*, which in this species completely arches over the plaited palate of the labellum, and is even broader in proportion to the size of the flower than in the closely allied *Zygopetalum cæleste*.

Z. lamellosum.

"Leaves narrowly lanceolate, about a foot long, narrowed to the base, five-nerved. Peduncles stout, 3 inches long with two appressed,

oblong-obtuse sheaths, and a similar bract appressed to the ovary. Flowers $2\frac{1}{4}$ inches in diameter, of a nearly uniform yellow colour, except the lip which is yellowish white with an orange and brown crest; dorsal sepal elliptic, acute; lateral two larger, oblong; petals spathulate-oblong, acute; lip nearly orbicular in outline with a cordate base, concave with decurved margin; crest semi-circular, much raised and formed of narrow, close-set, concentric plates. Column stout, curved, striated down the face."—*Botanical Magazine*.

Zygopetalum lamellosum, Benth. in Gen. Plant. III. p. 543 (1883). *Pescatorea lamellosa*, Rehb. in Gard. Chron. IV. (1875), p. 225. *Bot. Mag.* t. 6240.

Introduced by us from New Granada about the same time as *Zygopetalum Dayanum*, to which it is closely allied. It was one of the discoveries of Gustav Wallis while collecting for us in that rich orchid region, but who never divulged the localities in which they were made. It seems to have long since disappeared from cultivation.

Z. Lehmanni.

Leaves distichous, the lower ones reduced to foliaceous scales, the upper ones linear-ligulate, acute, upwards of a foot long. Peduncles about one-third as long as the leaves, one-flowered; bracts lanceolate, acute, pale brown. Flowers fleshy, $2\frac{1}{2}$ —3 inches in diameter; sepals and petals plum-purple with symmetrical longitudinal white stripes, white at the very base; the sepals elliptic-oblong, with a yellowish green apiculus; the petals broader, obovate-oblong, obtuse; lip oval-oblong, emarginate, with two small erect, triangular, basal auricles that are vinous purple; the blade densely studded with bristle-like papillæ arranged in close-set lines; crest large, semi-circular, ridged and furrowed, chestnut-brown. Column triquetral, slightly curved, vinous purple.

Zygopetalum Lehmanni, Rehb. in Gard. Chron. XII. (1879), p. 424. *Pescatorea Lehmanni*, Rehb. in Gard. Chron. loc. cit. Williams' *Orch. Alb. II.* t. 57. Regel's *Gartenfl.* 1883, t. 1123.

Discovered by and named after Mr. F. C. Lehmann, the German Consul in New Granada, who sent it to M. Ortgies, of the Botanic Garden at Zurich. No locality is recorded, but it is said to occur at an altitude of 3,500—4,500 feet, where the temperature is very equable— 17° — 19° C. (64° — 67° F.) average mean—and the humidity very copious throughout the year. It is without doubt a beautiful orchid, but like many of its congeners it is a difficult plant to import alive, and it has thus far baffled the efforts of cultivators to grow it successfully.

Z. Lindenii.

Pseudo-bulbs none. Leaves ligulate or broadly oblanceolate, acute, narrowed and conduplicate at the base, 7—9 inches long. Peduncles very short, pale green, one-flowered; bracts sheathing, lanceolate, acute, $\frac{1}{2}$ inch long. Flowers 3 inches across vertically, white with some longitudinal and rayed purple streaks on the disk of the lip; sepals and petals lanceolate, acuminate, the lateral sepals a little longer than the dorsal one; lip obscurely three-lobed, broadly obovate or sub-orbicular with crenulate margin, the basal lobes small, triangular, incurved; crest broadly triangular, bi-cuspidate. Column triquetral, bent.

Zygopetalum Lindenii, Rolfe in *Lindenia VIII.* t. 337. Warscewiczella *Lindenii*, Journ. of Hort. June, 1892. p. 461, icon. xyl.

A handsome species belonging to the section **WARSCIEWICZELLA**, recently introduced by L'Horticulture Internationale of Brussels, and exhibited at a meeting of the Royal Horticultural Society of England on June 7th, 1892. Its habitat has not been divulged.

Z. Mackayi.

Pseudo-bulbs ovoid, 2—3 inches long, much wrinkled when old, di-triphyllous. Leaves linear-lanceolate, sub-acuminate, conduplicate at base, 12—20 inches long, distinctly nerved. Scapes stoutish, 20—30 or more inches long, 5—7 or more flowered; bracts somewhat inflated, ovate, acute, nearly as long as the ovaries. Flowers distant, 3 inches across vertically; sepals and petals similar and equal, ligulate-lanceolate, acute, light yellow-green blotched with purplish brown; lip broadly clawed, auricled at the base, and then suddenly enlarged into a broad fan-shaped, emarginate blade, white spotted and streaked with violet-purple, the streaks and spots often arranged in radiating lines; crest horse-shoe shaped, regularly ridged and furrowed, toothed along the front margin. Column clavate, triquetral, yellow-green spotted with red-brown, whitish below the stigma.

Zygopetalum Mackayi, Hook. in *Bot. Mag.* t. 2748 (1827). Lindl. Gen. et Sp. Orch. p. 187. Id. in Bot. Reg. 1844, misc. No. 15. Rehb. in Walp. Ann. VI. p. 661. Williams' *Orch. Alb. IX.* t. 427. *Eulophia Mackaiana*, Lindl. in *Bot. Reg.* t. 1433 (1831).

var.—crinitum.

Flowers usually smaller; the veins of the labellum fringed with short papillose bristles that are sometimes violet-blue, sometimes red-crimson; marginal area pure white.

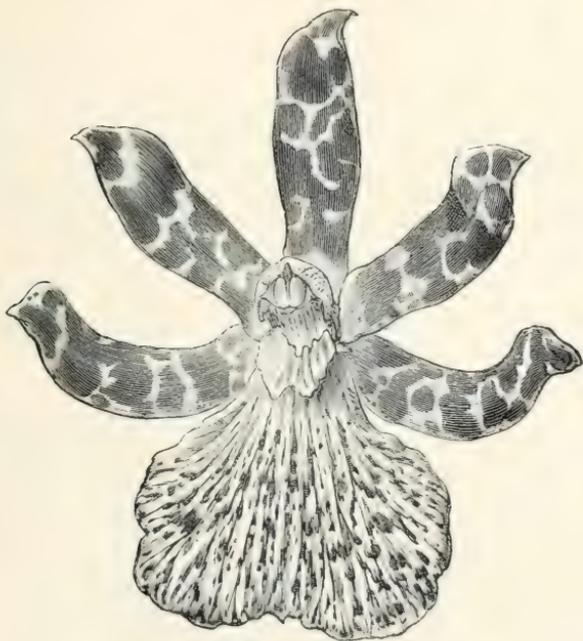
Z. Mackayi crinitum, Lindl. Gen. et Sp. Orch., p. 187. *Bot. Mag.* t. 3402. *Z. crinitum*, Lodd. *Bot. Cab.* t. 1687. Lindl. in Bot. Reg. 1844, misc. No. 15. Rehb. in Walp. Ann. VI. p. 661. Williams' *Orch. Alb. IX.* t. 410. *The Garden, XLII.* (1892) t. 870.

var.—intermedium.

Pseudo-bulbs longer and narrower. Leaves longer and more acuminate. Scapes shorter, stouter, and fewer-flowered; the coloured lines on the lip paler, much interrupted and broken up into spots.

Z. Mackayi intermedium, supra. *Z. intermedium*, Lindl. in Bot. Reg. 1844, misc. No. 15. Sander's *Reichenbachia*, I. t. 15. *Lindenia*, V. t. 216. *Z. Mackayi*, Paxt. Mag. Bot. III. p. 97. Rehb. in Walp. Ann. VI. p. 661.

The typical form was introduced from Brazil in 1826 by Mr. Mackay, of the Trinity College Botanic Garden at Dublin. The variety *crinitum* first appeared in the Wentworth collection of Earl Fitzwilliam in 1835, and two years afterwards it was gathered by



Zygopetalum Mackayi.

Gardner on the Organ Mountains. The variety *intermedium* first appeared in 1837 in the collection of Mr. Bowe, of Manchester, when it was figured in Paxton's *Magazine of Botany* as *Zygopetalum Mackayi*, its deviation from the original form not being then noticed. The geographical range of the species has been vaguely stated to be southern Brazil, from Santa Catherina to the Organ Mountains, probably along the coast range between 28° and 22° S. The two

varieties, of which the habitat of one only appears to be certainly known, may thence be geographical forms, but more definite information respecting the precise localities in which the type as well as its varieties occur, is much required.

Zygopetalum Mackayi has always been in high repute among cultivators on account of the pleasant perfume of its flowers which generally appear in the autumn and winter months, and on account of the facility with which it adapts itself to the artificial conditions of the glass-houses of Europe, so much so that it is one of the few orchids met with in gardens where but few others are cultivated.

Z. marginatum.

Leaves radical, in tufts of fours and fives, oblanceolate, acute, 6—12 inches long. Peduncles 4—5 inches long, one-flowered; bracts small and sheathing. Flowers 2—2½ inches across vertically, very fragrant; sepals and petals yellowish white, ovate-lanceolate, acute, the lateral sepals narrower and the petals broader than the dorsal sepal; lip sub-orbicular when spread out, obscurely three-lobed, the side lobes incurved towards the column, yellowish white; the front lobe slightly concave, refuse or emarginate, white striated with violet-purple on the disk and with a broad margin of rose—sometimes mauve-purple; crest prominent, sub-quadrate, strongly ridged and furrowed. Column short, semi-terete, white.

Zygopetalum marginatum, Rehb. in Walp. Ann. VI. p. 654 (1863). *Warrea marginata*, Rehb. in *Bot. Zeit.* X. (1852). p. 636. *W. quadrata*, Lindl. in Gard. Chron. 1853, p. 647. *Bot. Mag.* t. 4766. *Warscewiczella marginata*, Rehb. *Xen. Orch.* I. p. 61, t. 23, fig. 2. Linden's *Pesc.* t. 6. *W. velata*, Rehb. *Xen. Orch.* I. p. 60 (1854), fig. 1. Batem. in *Bot. Mag.* t. 5532. *Zygopetalum velatum*, Rehb. in Walp. Ann. VI. p. 655.

The origin of this species is obscure. Reichenbach states that it first appeared in M. Linden's horticultural establishment at Brussels, whence it became distributed among several European gardens; and in *Pescatorea* the merit of introducing it is assigned to Linden, but no information is given as to date, although New Granada is stated to be its native country. The first recorded instance of its flowering in England was in Jackson's nursery at Kingston, in 1853; the plant was supposed to have been collected by Warscewicz in Central America. This collector had given Reichenbach a sketch and herbarium specimen of a *Warscewiczella* without indicating any locality, and which he afterwards named *W. velata*. Some years later a *Warscewiczella* was collected in New Granada by Blunt for

Messrs. Low and Co., which on flowering was referred by Reichenbach to *W. velata*. The late Mr. Day informed us that Blunt's plants proved somewhat variable in the size and colour of the flowers, and that he was unable to distinguish some of the forms from the original *W. marginata* which he had cultivated.

The above description was taken from a plant that flowered in our houses a few years ago, and on comparing the flower with the plates of *Warrea quadrata* and *Warszewiczella velata* in the *Botanical Magazine* it proved to be intermediate between them. We have therefore no hesitation in reducing the latter to a synonym of the former,* or which is the same thing, in referring both to *Zygopetalum marginatum*.

Z. maxillare.

Rhizome creeping, flexuose, as thick as an ordinary writing pencil. Pseudo-bulbs ovate-oblong, 2—3 inches long, more or less compressed, diphyllous. Leaves narrowly lanceolate, sub-acuminate, prominently veined, narrowed at the base, 8—15 inches long. Scapes erect or slightly nodding, as long as or longer than the leaves, 5—7 or more



Zygopetalum maxillare.

flowered; bracts brown, ovate, acute, about an inch long. Flowers $2\frac{1}{2}$ inches across vertically; sepals and petals spreading, bronzy brown with light green transverse streaks; the sepals oval-oblong, apiculate; the petals similar but narrower; lip three-lobed, the side lobes narrowly oblong, erect, joined to the semi-lunate violet-purple, fleshy crest that is

* The analytical details of the two forms in *Xenia Orchidacea*, I. t. 23, appear to have been drawn from imperfect materials; they are evidently too crude to be reliable.

ridged and furrowed on the inner side; the front lobe sub-orbicular with sinuate margin, violet-blue, paler at the margin. Column broad, arched, concave below the stigma.

Zygopetalum maxillare, Lodd. *Bot. Cab.* t. 1776. Lindl. *Gen. et Sp. Orch.* p. 188 (1832). Id. in *Bot. Reg.* 1844, misc. No. 15. *Pact. Mag. Bot.* IV. p. 271 (1838). *Bot. Mag.* t. 3686. Rehb. in Walp. *Ann.* VI. p. 660.

var.—Gautieri.

Plant somewhat more robust. Flowers a little larger with all the segments broader; the violet-blue of the labellum sometimes spotted and striated with deeper blue.*

Z. maxillare Gautieri, Regel's *Gartenfl.* XIX. t. 644. *Z. Gautieri*, *Illus. hort.* XIV. t. 535. Williams' *Orch.* *Alb. I.* t. 28. *Lindenia*, VI. p. 284.

Zygopetalum maxillare was originally introduced from Rio de Janeiro in 1829 by Messrs. Loddiges through their correspondent, Mr. Warre. Nine years later it was detected on the Organ Mountains by Gardner, who was the first to communicate to Dr. Lindley the fact that this orchid always grows on the stems of tree-ferns, upon pieces of which it is often imported. The variety *Gautieri* differs so little from the original form that we hesitatingly give it even varietal distinction; it was originally sent to M. Verschaffelt, of Ghent, in 1867, from Santa Catherina, in southern Brazil, by M. Gautier.

The species was named *maxillare* by Messrs. Loddiges, from the fanciful resemblance of the crest and column to the jaws of an animal; the rich violet-blue of the labellum—an unusual colour in orchids—has caused the species to be much appreciated by amateurs.

Z. Meleagris.

Leaves distichous and alternate, ligulate, acute, equitant at base, 9—12 inches long. Peduncles much shorter than the leaves, one flowered. Flowers fleshy, 3 inches in diameter; sepals and petals similar and sub-equal, spreading, ovate-lanceolate, acuminate, white at the base, yellow in the centre, and the apical half red-brown speckled with yellow; lip with a short broad claw and cordate, apiculate blade, white with the apical area yellowish brown, and with a semi-circular fringed white crest at the base. Column acutely triquetral, white with a bilobed greenish wing on each side of the stigma.

Zygopetalum Meleagris, Benth. in *Gen. Plant.* III. p. 543 (1833). Huntleya *Meleagris*, Lindl. in *Bot. Reg.* 1833, misc. No. 20; and 1839, t. 14. Godefroy's *Orchidophile*, 1889, p. 49. *Bateman's Meleagris*, Rehb. *Xen. Orch.* I. p. 185, t. 66. figs. 1 and 2. Id. in Walp. *Ann.* VI. p. 555. Regel's *Gartenfl.* 1883. t. 1114, fig. 2.

* In the typical form figured in *L'Illustration horticole*, the anterior lobe of the lip is white.

A native of southern Brazil, first discovered by Descourtilz in the early part of the present century in damp woods on the banks of the Rio de Pirapitinga, near Bananal, in the province of Minas Geraes. It was introduced by Messrs. Rollisson, in whose nursery at Tooting it flowered in 1838, but it was very rare in European gardens for many years afterwards, and even at the present time it is not often seen. We are indebted to Baron Schroeder for materials for description.

The specific name *Meleagris* is the Greek name of the Guinea-fowl, and was doubtless suggested by the fancied resemblance of the curious spotting of the flower to that of the plumage of the Guinea-fowl.

Z. rostratum.

Rhizome stoutish, sheathed with imbricating, ovate, acute scales. Pseudo-bulbs oblong, much compressed, mono-diphyllous. Leaves lanceolate, acute, 7—10 inches long. Scapes much shorter than the leaves, 1—2 flowered; bracts foliaceous, ovate, acute, $\frac{1}{2}$ -inch long. Flowers $3\frac{1}{2}$ —4 inches across vertically; sepals and petals similar, linear-lanceolate, acuminate, more or less undulated or twisted, pale brown tinged with rose, white at the base, greenish at the apex; lip large, cordate, acuminate, recurved at the tip, white with some purplish streaks at the base; crest horse-shoe shaped, obscurely ribbed and furrowed, light yellow streaked with purple. Column semi-terete with two short sub-rotund wings; anther beaked.

Zygopetalum rostratum, Hook. in *Bot. Mag.* t. 2819 (*Zygopetalum*), Lindl. in *Bot. Reg.* 1844, misc. No. 15. Williams' *Orch. Alb.* II. t. 78. *Lindenia* II. t. 68. *Zygosepalum rostratum*, Rchb. in *Walp. Ann.* VI. p. 666.

Very little is recorded of this remarkable orchid since it first became known to science. Sir William Hooker, who first described it, states that it was introduced from Demerara in 1827 by Mr. C. S. Parker, of Liverpool.* Thirteen years later the brothers Schomburgk found it growing on the trunks of trees along the banks of the Demerara and Essequibo rivers.† After them a German gardener visiting Surinam gathered it near Mariepaston.‡ And lastly Mr. Everard in Thurm met with it on the banks of the Barabara river in north-west Guiana, "in the dense shade, clinging close to the undersides of the tree stems, almost dipping into the water."§

* *Bot. Mag.* sub. t. 2819.

† *Reisen*, III. p. 912.

‡ *Walp. Ann.* VI. p. 666.

§ *Proceedings of Royal Geog. Soc.* XIV. p. 675 (1892), whence we learn its peculiar habit which may partly account for the indifferent success that has hitherto attended its cultivation.

From these notes it appears to be spread over the littoral region of Guiana, always in shade in proximity to water. The specific name *rostratum*, "beaked," refers to the beak-like prolongation at the apex of the column.

Z. stapelioides.

Pseudo-bulbs about the size of a filbert, compressed, with a rib on each of the flattened sides, di-triphyllous. Leaves broadly lanceolate, acute, 3—4 inches long, greyish green. Scapes spreading or sub-pendulous, as long as the leaves, 1—2 flowered; bracts small, ovate, acute, sheathing. Flowers $1\frac{1}{2}$ —2 inches in diameter; sepals and petals ovate-oblong, acute, keeled at the back, pale green spotted and barred with brown-purple, the petals a little broader and more densely spotted than the sepals; lip three-lobed, the side lobes roundish oblong, erect, coloured like the sepals; the intermediate lobe orbicular, concave, lurid purple, sometimes freckled with light yellow; crest a semi-lunate plate with a broad raised keel at the middle. Column semi-terete, pale green; rostellum beaked.

Zygopetalum stapelioides, Rehb. in Walp. Ann. VI. p. 658 (1863). *Maxillaria stapelioides*, Lindl. Gen. et Sp. Orch. p. 146 (1832). Id. in *Bot. Reg.* 1839, t. 17. *Bot. Mag.* t. 3877. *Promenaea stapelioides*, Lindl. in *Bot. Reg.* 1843, misc. p. 13.

A dwarf species first detected by Herr Link, Director of the Botanic Garden at Berlin, during a mission to Brazil some time prior to 1830. It was afterwards gathered by Gardner on the Organ Mountains near Rio de Janeiro, by whom it was introduced into British gardens, where it is best known under the name of *Promenaea stapelioides*. The specific name refers to the *Stapelia*-like spotting of the flowers.

Z. Wailesianum.

Pseudo-bulbs none. Leaves linear or linear-lanceolate, acute, 6—8 inches long. Peduncles half as long as the leaves, one-flowered; bracts sub-triangular, acute, sheathing. Flowers $1\frac{1}{2}$ —2 inches in diameter, white with a violet-blue disk on the lip, the crest of which is also marked with violet-blue lines; sepals and petals similar, ovate-lanceolate, acute; lip broadly obovate or sub-quadrate, cuneate at the base, obscurely lobed, the basal lobes small and incurved; crest semi-lunate with five keels terminating in front in as many projecting teeth. Column triquetral, arched.

Zygopetalum Wailesianum, Rehb. in Walp. Ann. VI. p. 656 (1863). Id. *Xen. Orch.* III. p. 50, t. 222 (very poor). *Warrea Wailesiana*, Lindl. in *Journ. Hort. Soc.* IV. p. 264 (1849). Id. in *Pact. Fl. Gard.* I. p. 73, icon xyl.

One of the discoveries of Gardner in southern Brazil during an

excursion up the river Parahiba in search of *Zygopetalum Meleagris*. He sent a plant to Mr. George Wailes, of Newcastle-on-Tyne, which flowered in 1849, on which occasion it was named *Warrea Wailesiana* by Dr. Lindley. It was afterwards detected in the province of Bahia by Porte, one of M. Linden's collectors; and it has recently been sent to Europe by Binot, a French collector residing at Petropolis, on the coast-range near Rio de Janeiro. Our description was taken from a plant in the Royal Gardens at Kew; it is unquestionably one of the most attractive species in the section to which it belongs (WARSCIEWICZELLA).

Z. Wendlandi.

Leaves in tufts of 5—7, distichous and alternate, the lowermost reduced to leafy scales, the upper ones linear-ligulate or lanceolate, acute, 7—10 inches long. Peduncles 3—4 inches long, enclosed by a leafy sheath at the base, bi-bracteate at the base of the ovary, one-flowered. Flowers $2\frac{1}{2}$ inches in diameter; sepals and petals similar, lanceolate, acute, pale yellowish green, the petals a little smaller than the sepals; lip shortly clawed, sub-orbicular, crisped and irregularly dentate at the margin, recurved at the apex, the central area light violet-blue, the marginal area white; crest semi-lunate scolloped into slightly divergent ridges, violet-blue. Column short, white, terete above, winged at the apex.

Zygopetalum Wendlandi, Rehb. in Beitr. Orch. Centr. Amer. p. 74 (1860). Id. in Regel's *Gartenfl.* 1888, t. 1267. Sander's *Reichenbachia*, II. t. 53. Warszewiczella *Wendlandi*, Rehb. in lit. ex Williams' *Orch. Alb.* III. t. 126 (discolor).

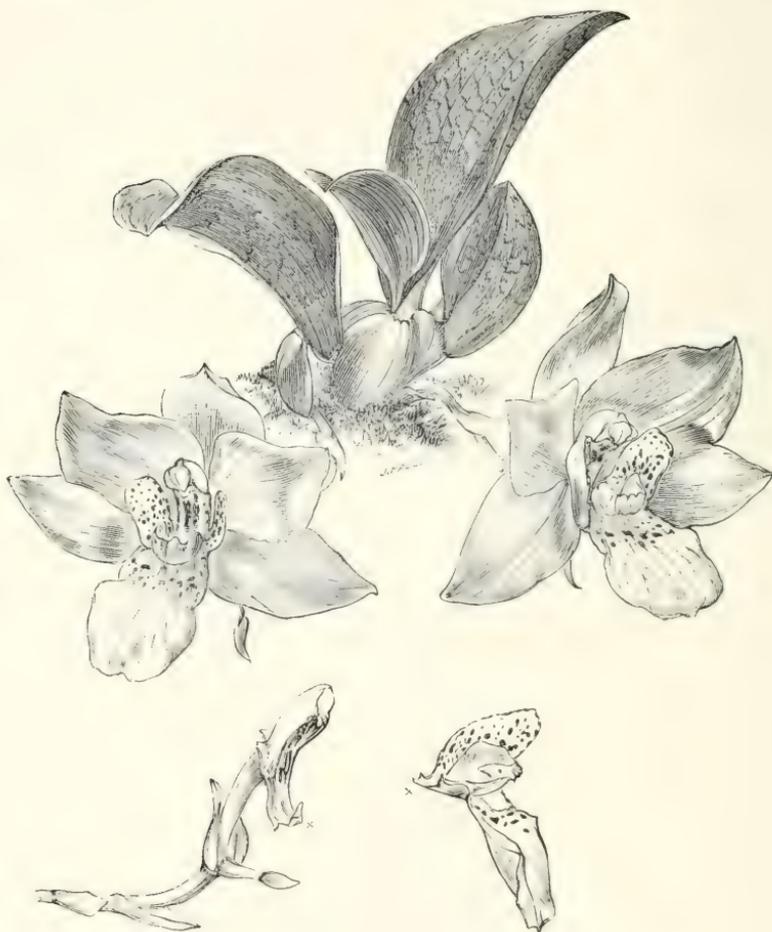
Discovered by Herr Wendland during a botanical excursion to Costa Rica undertaken in 1858—59 at the request of the late King George of Hanover, and sent by him to the Herrenhausen Berggarten. It has since been imported into this country, and was quite recently represented in several orchid collections.

Z. xanthinum.

Pseudo-bulbs ovoid, compressed with acute edges, sub-tetragonal when old, about an inch long, diphyllous. Leaves oval-oblong, shortly petiolate, 2— $3\frac{1}{2}$ inches long. Peduncles shorter than the leaves, with an ovate, acute, membraneous bract at the base and a similar one at the base of the ovary, 1—2 flowered. Flowers about 2 inches in diameter, bright citron-yellow with some red spots on the lip and column; sepals ovate, acute, keeled behind; petals broader, elliptic-oblong acute; lip three-lobed, the side lobes oblong, obtuse, erect; the intermediate lobe obovate-oblong, spreading; crest a semi-lunate,

erect, fleshy plate toothed at the edge and with a tubercle on the inner side. Column triquetral, bent, concave below the stigma.

Zygopetalum xanthinum, Rehb. in Walp. Ann. VI. p. 659 (1863). Sander's *Reichenbachia*, 2nd ser. I. t. 11. *Z. citrinum*, Nicholson, Dict. Gard. IV. p. 245. Rolfe in Gard. Chron. III. s. 3 (1888), p. 94. *Promenæa xanthina*, Lindl. in Bot. Reg. 1843, misc. p. 13. *P. citrina*, Don. Hort. Camb. ed. 13, p. 720 (1845), ex Williams' *Orch. Alb. I. t. 7*. *Maxillaria xanthina*, Lindl. in Bot. Reg. 1839, sub. t. 17.



Zygopetalum xanthinum.

This is one of the prettiest and most distinct of the genus; it is free flowering and of easy culture, and on account of its dwarf habit, occupying but little space. It has long been known in gardens as *Promenæa citrina*, for Lindley's original name, *xanthina*, which is equally appropriate, seems to have been lost sight of for

many years. The date of its introduction does not appear to have been recorded, although it is highly probable that living plants were sent home by Gardner, who detected it on the Organ Mountains in 1837. Lindley named and described the plant from Gardner's specimens as *Maxillaria xanthina*, but afterwards separated it from that genus, founding upon it and other allied species a new genus, which he called *Promenæa*. Lindley believed this plant to be the same species as that discovered in the early part of the present century by Descourtilz on the coast-range of Minas Geraes (Ilha Grande), and which he called *Epidendrum Jonquille*; if so, the intrepid French traveller and explorer was the actual discoverer of this interesting orchid.

HYBRID ZYGOPETALUMS.

Hybrids between species of *Zygopetalum* are still few in number, and of those that have been raised, the vigorous-growing type species *Zygopetalum Mackayi*, its variety *crinitum* and *Z. maxillare* have participated in the parentage of all of them. Of the four hybrids described below, the first two are the results of crosses effected between the two species mentioned by two different operators, one using the original *Z. Mackayi* and the other its variety *crinitum*; and as a natural consequence the two hybrids very closely resemble each other. A fairly numerous progeny was obtained from both crosses.

The last two are of exceptional interest, for they are generic crosses between *Zygopetalum* and *Colax*. In conformity with the nomenclature adopted in this work for bigeneric hybrids they take the name of *Zygocolax*.* In both cases the progeny was extremely restricted.

Zygopetalum Clayi.

Z. Mackayi crinitum × *Z. maxillare*.

Pseudo-bulbs and leaves intermediate. Flowers as large as those of the seed parent; sepals and petals brownish purple with a narrow green margin and sometimes with a few narrow transverse green streaks; lip nearly as in the pollen parent, purplish blue with darker lines; the

* Thus *Soprocattleya*, Part II. p. 92. *Phaiacalanthe*, Part VI. p. 17.

ridges of the crest dark violet-blue, the furrows whitish. Column violet-purple above, streaked below the stigma.

Zygopetalum Clayi, Rehb. in Gard. Chron. VII. (1877), p. 684. Williams' *Orch. Alb. II.* t. 50.

Raised by Colonel Clay, of Wallassy, Birkenhead.

Z. Sedenii.

Z. maxillare × *Z. Mackayi*.

Pseudo-bulbs and leaves nearly as in *Zygopetalum maxillare*. Racemes 6—9 flowered. Flowers intermediate in size between those of the parents; sepals and petals brownish purple with a metallic gloss and sometimes with 2—3 pale transverse bands; lip bright violet-blue, more or less striated; crest and column dark violet-blue.

Zygopetalum Sedenii, Rehb. in Gard. Chron. II. (1874), p. 290.

Raised by Seden at our nursery. This was the first hybrid *Zygopetalum* raised.

Zygocolax leopardinus.

Zygopetalum maxillare × *Colax jugosus*.

Pseudo-bulbs ovoid, compressed, 1—2 inches long, diphyllous. Leaves linear-lanceolate, acute, 6—9 inches long. Racemes 3—5 flowered. Flowers 2 inches in diameter; sepals and petals oblong-lanceolate, whitish spotted and marked with brown-purple; lip three-lobed, the side lobes rotund, erect, indigo-blue; the fleshy crest between them nearly as in *Zygopetalum maxillare*, the ridges blue and the furrows white; the front lobe transversely roundish oblong, indigo-blue, sparingly mottled with white. Column broad, purplish blue, anther white.

Zygocolax leopardinus, supra. *Zygopetalum leopardinum*, Rehb. in Gard. Chron. XXVI. (1886), p. 199.

Raised by Seden at our nursery. The influence of the pollen parent seems to have been quite subordinate. It is decidedly the handsomest of the *Zygopetalum* hybrids yet obtained.

Z. Veitchii.

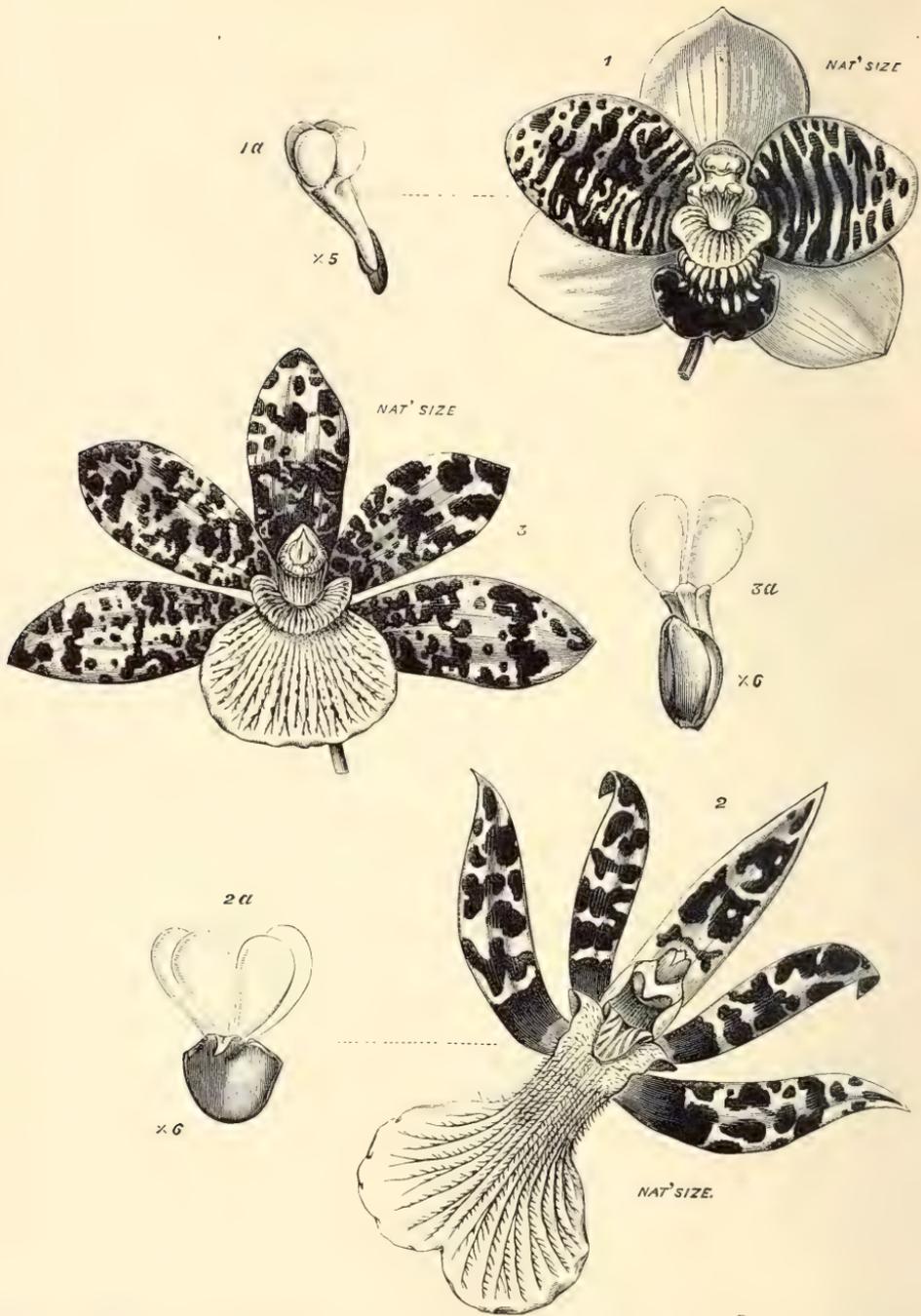
Zygopetalum Mackayi crinitum × *Colax jugosus*.

Pseudo-bulbs broader and shorter than in *Colax jugosus*; the leaves narrower, and the racemes shorter and fewer-flowered than in *Zygopetalum Mackayi*. Flowers 3 inches across the lateral sepals; sepals and petals similar and sub-equal, spreading, broader than in the *Zygopetalum*, narrower than in the *Colax*, light yellow-green much spotted and blotched with brown-purple; lip with two basal auricles, sub-orbicular, the central area white with radiating lines of violet-purple papillæ, the marginal area violet-purple striated. Column yellow-green spotted with brown-purple.

Zygocolax Veitchii, Rolfe in Gard. Chron. I. s. 3. (1887), p. 765. Id. in Journ. Linn. Soc. XXIV. p. 170, with figs.



Zygopetalum Sedenii.



1, *Colax jugosus*; 1a, its pollinia. 2, *Maxillaria Mackayi crinitum*; 2a, its pollinia

3, *Zygocolax Veitchii*; 3a, its pollinia.

(Copied from the Journal of the Linnean Society.)

Raised by Seden at our nursery. In this hybrid the influence of the pollen parent is manifested very distinctly, both in the vegetative organs as described above and in the floral organs as shown very clearly in the accompanying illustration of the hybrid and its parents. In addition we may note that while in *Colax* the leaves of the young growths appear before the scapes and in *Zygopetalum* the reverse takes place, in the hybrid the leaves and scapes appear almost simultaneously. This hybrid, whether in its botanical or horticultural aspect, is one of the most interesting we have yet raised.

COLAX.

Lindl. in *Bot. Reg.* 1843, misc. p. 50. *Rehb.* in *Walp. Ann.* VI. p. 553 (1863).

Under *Colax* Lindley grouped three species from southern Brazil previously referred to *Maxillaria*,* but which he removed from that genus on account of the peculiar structure of the pollinary appendage; this remarkable structure is shown in the accompanying illustration of *Zygocolax Veitchii*.† Mr. Bentham merged *Colax* into *Lycaste*, but its pollinary appendage as clearly distinguishes it from *Lycaste* as from every other genus, and on that ground it is here retained. Its proved affinity to *Zygopetalum* through the bigeneric hybrids described in page 66 shows that its systematic place is very near that genus. The generic name is the Greek word κόλαξ, "a parasite."

Colax jugosus.

Pseudo-bulbs elongate-ovoid, 2—3 inches long, diphyllous. Leaves broadly lanceolate, acuminate, 6—9 inches long. Scapes about as long as the leaves, sheathed by pale green acute bracts, 2—3 flowered. Flowers 2—3 inches across transversely; sepals oval-oblong, obtuse, French-white; petals obovate-oblong densely spotted and barred with violet-purple (very rarely with rose-purple); lip shorter than the other segments, shortly clawed, three-lobed, the side lobes rotund streaked with violet-purple; the front lobe semi-circular with numerous fleshy pubescent keels, streaked and blotched with dark violet-purple. Column stoutish, bent towards the apex, hairy in front, spotted with violet-purple.

Colax jugosus, Lindl. in *Bot. Reg.* 1843, misc. p. 51. *Rehb. Xen. Orch.* I. p. 107. t. 41. Id. in *Walp. Ann.* VI. p. 553. *Bot. Mag.* t. 5661. *Illus. hort.* 1872, t. 96. *Maxillaria jugosa*, Lindl. in *Bot. Reg.* 1840, misc. No. 104. *Lycaste jugosa*, Benth. in *Gen. Plant.* III. p. 548.

* *Maxillaria viridis*, *Bot. Reg.* t. 1510; *M. placanthera*, *Bot. Mag.* t. 3173; and *M. jugosa*, *Bot. Reg.* 1841, misc. No. 104.

† This appendage is thus described by Mr. Rolfe in the *Gardeners' Chronicle*, I. s. 3 (1887), p. 766:—"It has no distinct gland, but consists entirely of a thin wavy membrane, strengthened by an elevated line in the middle, and gradually narrowing to a line at the point where the gland is usually found."

The horticultural history of *Colax jugosus* is of the briefest description. It was first imported from Brazil by Messrs. Loddiges in 1840, and has doubtless been in cultivation ever since, although it was very rare during the twenty-five years immediately following its introduction. Its precise habitat does not appear to have been recorded, although it is evidently known to the orchid collectors of Rio de Janeiro.

AGANISIA.

Lindl. in Bot. Reg. 1839. misc. No. 65. Benth. et Hook. Gen. Plant. III. p. 544.

A genus of about ten species dispersed over tropical America, in which Mr. Benthham has included *Warrea cyanea* (Lindl.) and Reichenbach's *Koellensteinia*. The genus is singular in the sub-tribe in which it is placed, in the base of the column not being produced into a foot. The following are the best known species in cultivation.

Aganisia cyanea.

Leaves lanceolate, acuminate, plicate, 7—10 inches long. Peduncles erect, longer than the leaves, racemed and few-flowered along the apical half. Flowers about an inch in diameter; sepals and petals broadly oval-oblong, the sepals white with a faint tinge of blue, the petals veined and margined with indigo-blue; the dorsal sepal concave, the lateral two longer and narrower and the petals smaller than the dorsal sepal; lip fan-shaped, apiculate, undulate, white at the base, the marginal area blue; crest with 4—5 slightly divergent lamellæ. Column clavate, bent.

Aganisia cyanea, Benth. in Gen. Plant. III. p. 544 (1883) (*lapsus calami cinerea*). Rolfe in Gard. Chron. VI. s. 3. (1889), p. 492. *Warrea cyanea*, Lindl. in Bot. Reg. 1844, misc. No. 3; and 1845, t. 28.

An orchid now but rarely seen, remarkable for the pure blue of its labellum. It was originally imported by Messrs. Loddiges from Colombia, but no locality is recorded. The plant described above is in the collection of Sir Trevor Lawrence, Bart., at Burford Lodge, Dorking.

A. ionoptera.

Pseudo-bulbs clustered, ovoid, about the size of a filbert, monodiphyllous. Leaves narrowly lanceolate, sub-carminate, 4—7 or more inches long. Scapes purplish, about a foot long, racemed above the middle, 7—10 or more flowered; cauline bracts distant, lanceolate, acute, sheathing; floral bracts similar, shorter than the ovaries.

Flowers about an inch in diameter; sepals and petals ovate-oblong acute, the sepals white, but sometimes coloured like the petals, the petals violet-blue, white at the tip; lip broadly pandurate, the basal lobes erect, the front lobe spreading, white streaked with violet-purple; crest fleshy, obscurely bilobed, white spotted with violet-purple. Column terete, very short with two narrow wings.

Aganisia ionoptera, Nicholson, Dict. of Gard. I. p. 35 (1885). *Lindenia*, VI. t. 287. *Bot. Mag.* t. 7270. *Koellensteinia ionoptera*, Rehb. in Gard. Chron. 1871. p. 1451.

An attractive species first discovered by Gustav Wallis in Peru or Ecuador and sent by him to Messrs. Linden. It has been recently re-imported but its precise habitat has not been divulged. It was originally described by Reichenbach under the name of *Koellensteinia ionoptera*.

A. pulchella.

Rhizome creeping, slender, closely invested with imbricating brown scales. Pseudo-bulbs distant, ovoid, scarcely an inch long, monophyllous. Leaves oval-oblong, acute, 4—5 inches long, narrowed below into a slender petiole half as long as the blade. Racemes erect, as long as the leaves, 4—6 flowered. Flowers more than an inch in diameter; sepals and petals sub-equal, ovate-oblong, acute, white; lip bipartite, the hypochile sub-rotund, concave, spotted with red; the epichile much larger, broadly ovate, entire, with a yellow disk and white margin, and with a yellow glandular crest at its base. Column semi-terete with two incurved wings at the apex.

Aganisia pulchella, Lindl. in *Bot. Reg.* 1839, misc. No. 65; and 1840, t. 32. Rehb. in Walp. Ann. VI. p. 505.

This is the species on which the genus was founded but it is now rarely seen in other than botanic gardens, although rightly characterised by Lindley as a very pretty orchid. It was originally sent by Mr. Brotherton to Messrs. Loddiges in 1839 from British Guiana, where it was shortly afterwards detected by the brothers Schomburgk growing on the stems and branches of trees along the banks of the river Demerara.

ACACALLIS.

Lindl. Fol. Orch. 1853. Benth. et Hook. Gen. Plant. III. p. 544.

A monotypic genus founded by Lindley on a species discovered by Dr. Spruce near Manaos in northern Brazil. Reichenbach afterwards referred it to *Aganisia*, but Bentham restored it to *Acacallis* on the ground that the curious appendage to the labellum and the

large auricles of the column may warrant its retention as a distinct genus.*

Acacallis cyanea.

Rhizome creeping, as thick as a goose-quill. Pseudo-bulbs produced at intervals of 1—2 inches, ovoid, much compressed, $1\frac{1}{2}$ —2 inches long, mono-diphyllous. Leaves oblong-lanceolate, acute, 4—6 inches long, narrowed at the base into a short petiole. Scapes longer than the leaves, slender, purplish, racemose, 3—7 flowered. Flowers 2— $2\frac{1}{2}$ inches in diameter; sepals and petals light mauve suffused with white, the sepals broadly oval, obscurely keeled behind; the petals a little broader, sub-orbicular, apiculate; lip with a somewhat long and narrow fringed claw and reniform limb that is rose-purple, concave, undulate at the margin, and very shortly acuminate; crest semi-lunate with a three-toothed appendage in front, ochreous yellow. Column white, triquetral, with two sub-quadrate wings that are rose-purple bordered with white.

Acacallis cyanea, Lindl. Fol. Orch. (1853). Rehb. in Walp. Ann. VI. p. 505. *Aganisia cerulea*, Rehb. in Gard. Chron. XXV. (1886), p. 720.† Williams' *Orch. Alb.* VIII. t. 374. *A. tricolor*, *Lindenia*, I. t. 45. *A. cyanea*, *Lindenia*, III. t. 110 (not of Benth).

This is a very distinct orchid as regards the colour of the flowers and the structure of the labellum. It was first detected in 1851 near the junction of the Amazon and Rio Negro rivers by Dr. Spruce, who reported that in its native forests the sepals and petals are of a pure blue, which has not however been verified in the few plants that have flowered in Europe. It was not introduced into cultivation till many years after its discovery; the earliest notice we find of it is its flowering in the collection of the Honourable Erastus Corning, at Albany, New York, in 1882; and three years later in the garden of Mr. Walter Holland, at Moseley Hill, Liverpool, and this was probably the first occasion of its flowering in England. Owing to the remoteness of its habitat, it has always been a rare plant in European orchid collections.

Cultural Note.—The habitat of *Acacallis cyanea* is in one of the hottest and most humid regions in the world, and therefore it requires the highest temperature available in the orchid houses of this country. On account of its scandent habit it should be affixed to a block of wood or raft; in other respects its cultural treatment is that of orchids usually grown in the East Indian house.

* Journ. Linn. Soc. XVIII. p. 321.

† The plant described by Reichenbach under this name in the *Gardeners' Chronicle*, VI. (1876), p. 226, is evidently a different species.

ERIOPSIS.

Lindl. in Bot. Reg. 1847, sub. t. 9. Benth. et Hook. Gen. Plant. III. p. 545.

A South American genus, including three or four species, of which the two described below are the best known. The colour of the flowers of these two species, especially of *Eriopsis Rutidobulbon*, is peculiar, and together with their habit, easily distinguishes them from almost every other orchid in cultivation. The essentially distinguishing characters of the genus are, however, the peculiar lamellæ of the lip and the almost quadrangular gland of the pollinary apparatus.

Cultural Note.—Both *Eriopsis biloba* and *E. Rutidobulbon* occur at a considerable elevation on the Cordilleras of South America, and may therefore receive cultural treatment similar to that of other orchids from the same region. They may be grown in the cool house, or better in the coolest part of the Cattleya house during the summer near the glass; but it is advisable to keep them in the intermediate house during the winter months, as in that case they are in an equable temperature the whole year which the climate of their native home suggests.

Eriopsis biloba.

Pseudo-bulbs clustered, ovate-conic, elongated, 2–3 inches long. (Leaves not seen). Scapes radical, 20–25 inches long, dull purple mottled with green, racemose along the distal half, many-flowered; bracts scale-like, minute. Flowers $1\frac{1}{4}$ inch in diameter; sepals and petals similar and sub-equal, narrowly oblong, obtuse, the sepals tawny yellow bordered with red-brown, the petals darker with more brown; lip concave, transversely roundish oblong with an obcordate lobule at the apex and a sub-quadrate fleshy plate at the base traversed by two raised lines which terminate in front in two teeth; the blade tawny yellow densely dotted with purple. Column clavate, light green.

Eriopsis biloba, Lindl. in Bot. Reg. 1847, sub. t. 9. and t. 18. Rehb. in Walp. Ann. VI. p. 662. E. Schomburgkii, Rehb. in Bonpl. III. p. 67 (1855).

When Dr. Lindley founded the genus on this species nothing was known of its origin; the specimen was sent to him by Mr. J. Blandy, of Reading, who had acquired the orchid collection of Mr. George Barker, of Birmingham, shortly after that gentleman's decease in 1845, and among which were many rare species, some of them undetermined at the time. From that time to the present *Eriopsis biloba* has received but little attention from cultivators, and scarcely anything is recorded respecting it. Its geographical range

is still unknown to science, although it is certain that it inhabits the northern Cordilleras of South America at a considerable elevation. Materials for description were kindly sent to us by Mr. Shuttleworth, of Park Road, Clapham, who informs us that the plant was received from the Roraima, in British Guiana.*

E. Rutidobulbon.

"Pseudo-bulbs ovate-oblong, 2—3 inches long, of a dark purplish black colour singularly rough or wrinkled, di-triphyllous. Leaves broadly lanceolate, striated and somewhat coriaceous. Scapes 12—18 inches long, dark purple, bearing a many-flowered raceme. Flowers $1\frac{1}{2}$ —2 inches in diameter; sepals and petals similar, oblong-obtuse, orange-yellow, red-purple at the margin; lip obtusely spurred at the base, broadly ovate, three-lobed, the disk lamellated with a dull crest; the lateral lobes broad, involute; the front lobe small, orbicular, white with dark purple spots, the rest of the lip orange-red dotted with dark purple. Column semi-terete, greenish."—*Botanical Magazine*.

Eriopsis Rutidobulbon, Hook. in *Bot. Mag.* t. 4437 (1849). Rehb. in Walp. Ann. VI. t. 662, and Bonpl. II. p. 281. Williams' *Orch. Alb.* VIII. t. 337. *E. biloba*, Linden's *Pesc.* t. 20 (not of Lindl.).

Introduced to the Royal Gardens at Kew in 1849 by Purdie, who found it growing on the stem of a Palm tree in the temperate region of Antioquia, in North Colombia, at an elevation of 4,000—5,000 feet. Purdie remarked that it is very rare in the region in which he travelled, and he succeeded in bringing home only one plant, the only one, in fact, that he met with.† The species figured in Linden's *Pescatorea* as *Eriopsis biloba* is evidently not that species, but *E. Rutidobulbon*. In the letterpress accompanying the figure it is stated that Linden discovered the plant in 1841 "dans les petits bois de la Savanna" (wherever that is), associated with *Cypripedium caudatum Lindenii* (*Uropedium Lindenii*, Lindl.)‡ It continued to be very rare in European gardens for many years after its first introduction; recent importations have caused it to be more generally distributed.

* It is highly probable that this is not the only station of this plant.

† *Bot. Mag.* sub. t. 4437.

‡ Under *Uropedium Lindenii*, *Pescatorea*, plate 2, it is stated that Linden discovered this curious Orchid in 1843 growing among the underwood scattered over the meadow-like Savannas lying between the Cordillera of Merida and Lake Maracaybo. This is, perhaps, the locality meant, but there is a discrepancy in the dates.

WARREA.

Lindl. in Bot. Reg. 1843, misc. p. 14. Benth. et Hook. Gen. Plant. III. p. 545.

In his revision of *Maxillaria* in the miscellaneous matter of the *Botanical Register* of 1843, Dr. Lindley separated *Maxillaria Warreana* from that genus on account of the very different form of its perianth, and founded upon it the genus which he named in compliment to Mr. Warre, a correspondent of Messrs. Loddiges, who introduced the plant from Brazil, as they erroneously reported, its actual habitat being in northern Colombia. The only genuine *Warrea* known to us is the species here noticed, which is a very handsome one, and which should not be omitted from this work, although now but rarely seen.

Warrea tricolor.

"Pseudo-bulbs sub-cylindric, attenuated upwards, 4—5 inches long. Leaves oblong-lanceolate, acuminate, much attenuated at the base, 12—18 inches long. Scapes longer than the leaves, terete, jointed, purple, sheathed with closely appressed bracts, racemed above, 8—10 or more flowered. Flowers large and sub-globose; sepals and petals similar, roundish ovate, concave, acute, white tinged externally with yellow, the two lateral sepals ending below in an obtuse spur; lip obovate, white, beautifully painted within with yellow and dark purple, the basal half concave with three elevated ridges, the apical half spreading, obscurely lobed and waved and with several crisped lamellæ. Column short, semi-cylindric."—*Botanical Magazine*.

Warrea tricolor, Lindl. in Bot. Reg. 1843, misc. p. 14. Rehb. Xen. Orch. I. p. 63. t. 24, figs. 1 and 2. *Maxillaria Warreana*, Lindl. Gen. et Sp. Orch. p. 148 (1832). Lodd. *Bot. Cab.* t. 1834. *Bot. Mag.* t. 4235.

First cultivated by Messrs. Loddiges in 1829, but it appears to have been but little known till it was introduced from Santa Martha, in northern Colombia, by Purdie to the Royal Gardens at Kew, where it flowered in 1845; its habitat thence became known, and it has since been sparingly imported from the same region.

EXCLUDED SPECIES.

Warrea	}	now referred to <i>Zygopetalum candidum</i> (Rehb.)		
<i>candida</i> (Lindl.)				
<i>cyanea</i> (Lindl.)		...	„	<i>Aganisia cyanea</i> (Benth.)
<i>discolor</i> (Lindl.)		...	„	<i>Zygopetalum discolor</i> (Benth.)
<i>quadrata</i> (Lindl.)		...	„	„ <i>marginatum</i> (Rehb.)
<i>marginata</i> (Rehb.)		...	„	„ <i>marginatum</i> (Rehb.)
<i>Walesiana</i> (Lindl.)		...	„	„ <i>Walesianum</i> (Rehb.)

BATEMANIA.

Lindl. in *Bot. Reg.* t. 1714 (1835). Benth. et. Hook. *Gen. Plant.* III. p. 540.

Dr. Lindley founded this genus on the plant described below "in compliment to Mr. James Bateman, of Knypersley Hall, Cheshire, an ardent collector and successful cultivator of orchidaceous plants." To this species Reichenbach subsequently added several others, which deviate so much from the type that Mr. Benthham removed them to *Zygopetalum*, to which they much more nearly conform. The genus *Batemania* thus reduced is, so far as at present known, monotypic; the single species, however, possesses so little horticultural merit that from an amateur's point of view it very inadequately commemorates the labours of the veteran orchidologist. Our description was taken from a plant in the former collection of Mr. F. G. Tautz, at Studley House, Hammersmith; the species may therefore be still in cultivation. It is named after Colley, Mr. Bateman's collector in Demerara, where he discovered it in 1834

Batemania Colleyi.

Pseudo-bulbs ovate-oblong, compressed, 2—3 inches long, obscurely four-angled and furrowed, mono-diphyllous. Leaves broadly lanceolate, acute, narrowed at the base, 7—10 inches long. Racemes pendulous, 4—7 or more flowered; bracts short, broadly ovate, sub-acute. Flowers distant, about 3 inches in diameter; dorsal sepal and petals similar and sub-equal, elliptic-oblong, vinous purple toned with brown; lateral sepals narrowly oblong, falcate with the inner margin infolded, the margin green, the remaining area vinous purple toned with brown; lip white with a reddish stain at the base of the intermediate lobe, appressed to the column, three-lobed, the side lobes rotund, the front lobe sub-quadrate, emarginate; crest small, bifid, toothed in front. Column semiterete, white spotted with red; anther hooded; pollinia two.

Batemania Colleyi, Lindl. in *Bot. Reg.* t. 1714 (1835). *Bot. Mag.* t. 3818. Rehb. in Walp. *Ann.* VI. p. 554. Williams' *Orch. Alb.* VIII. t. 341.

EXCLUDED SPECIES.

Batemania	}	now referred to <i>Zygopetalum Burtii</i> (Benth.)			
<i>Burtii</i> (Rehb.)					
<i>grandiflora</i> (Batem.)	<i>grandiflorum</i> (Benth.)
<i>Wallisii</i> (Hort.)	<i>Burtii</i> (Benth.)
<i>Meleagris</i> (Rehb)	<i>Meleagris</i> (Benth.)	

BIFRENARIA.

Lindl. Gen. et Sp. Orch. p. 152 (1832), and Bot. Reg. 1843, misc. No. 67. Benth. et Hook. Gen. Plant. III. p. 546.

The Bifrenarias are associated with the orchid culture of the past in a much higher degree than with that of the present, and, with the exception of *Bifrenaria Harrisoniæ*, which has to a greater or less extent held its ground for the greater part of a century, they have long since receded before the more brilliant ORCHIDÆE of the temperate regions of the Andes and southern Brazil. Of the ten described species, seven or eight of them were introduced into European gardens and figured in the botanical serials of the first half of the century, nearly all of them as Maxillarias, to which genus they were originally referred, but afterwards removed by Lindley by reason of the different structure of their pollinary apparatus. This differs from Maxillaria proper in having the pollen masses attached to the gland by a pair of distinct straps or caudicles, instead of one; the generic name from *bi* for *bis*, "twice," and *frenum*, "a strap or bridle," was suggested by this character. Bifrenaria further differs from Maxillaria in the flowers being racemed, not solitary.

The species here noted are still in cultivation; they are natives of the hot damp valleys of Guiana and Brazil, and thence require the cultural treatment usually applied to the occupants of the East Indian house.

Bifrenaria atropurpurea.

Pseudo-bulbs sub-conic, four-angled, 2—3 inches long, much corrugated when old, monophyllous. Leaves oblong-lanceolate, acute, 6—10 inches long. Scapes sheathed at the base with ovate, inflated brown bracts, 3—5 flowered. Flowers 2 inches in diameter when spread out; sepals and petals dull claret-red with a yellowish stain in the centre; the dorsal sepal and petals elliptic-oblong acute; the lateral sepals broader, oblong, keeled behind, adnate to the lip and foot of column at the base, and forming with them a short obtuse spur; lip oblong, incurved at the sides, reflexed and undulated at the apex, bright rose suffused with white; crest a thickish oblong plate obscurely toothed at the front margin. Column short, terete, claret-red; anther white.

Bifrenaria atropurpurea, Lindl. Gen. et Sp. Orch. p. 152 (1832). Id. in Bot. Reg. 1843, misc. p. 52. Rehb. in Walp. Ann. VI. p. 547. *Maxillaria atropurpurea*, Lodd. Bot. Cab. t. 1877.

Introduced by Messrs. Loddiges from Rio de Janeiro in 1828,

through their correspondent Mr. Warre, and occasionally imported since with other south Brazilian orchids. It is the species on which the genus was founded, and with the exception of *Bifrenaria Harrisoniæ*, the first *Bifrenaria* introduced into cultivation. Its chief attraction is the pleasant fragrance of its flowers.

B. aurantiaca.

Pseudo-bulbs ovoid, ribbed and spotted, 1—1½ inch long, monophyllous. Leaves 5—8 inches long, oval-oblong, acute, narrowed below into a short channelled petiole. Scapes longer than the leaves, racemed along the distal half, few-flowered. Flowers an inch in diameter, deep yellow spotted with orange; sepals and petals similar and sub-equal, oblong, undulate, sub-acute; lip clawed, three-lobed, the side lobes roundish oblong, deflexed; the front lobe somewhat fan-shaped with a deep cleft at the apex and with a truncate crest at the base. Column semi-terete, pubescent.

Bifrenaria aurantiaca, Lindl. in *Bot. Reg.* t. 1875 (1836), and 1843, misc. p. 52. *Bot. Mag.* t. 3597. Rehb. in Walp. *Ann.* VI. p. 550.

A native of British Guiana, whence it was first introduced in 1835, and where it was afterwards detected by the brothers Schomburgk along the banks of the Essequibo and Pomeroon rivers, growing on the stems and branches of trees.

B. Harrisoniæ.

Pseudo-bulbs broadly ovoid, obscurely four-angled, 2—3 inches long, monophyllous. Leaves elliptic-oblong, acute, 9—12 inches long, 3—4 inches broad, leathery and dark green. Scapes shorter than the leaves, usually two from the base of the latest-formed pseudo-bulbs, sheathed with a pale brown, acute bract, about an inch long at each joint, and a larger one at the base of the ovary, 1—2 flowered. Flowers fleshy, about 3 inches across the lateral sepals; sepals and petals spreading, oval-oblong, obtuse, ivory-white; the dorsal sepal concave, the lateral two a little larger, slightly falcate, adnate to the produced foot of the column, and forming with it and the base of the lip a funnel-shaped obtuse spur; lip three-lobed, vinous purple with darker purple veins; the side lobes oblong, incurved, the intermediate lobe sub-quadrate, emarginate, hairy above, the margins much notched; crest very hairy, orange-yellow. Column clavate, arched, white.

Bifrenaria Harrisoniæ, Rehb. in Bonpl. III. p. 217 (1855). *Id.* Xen. *Orch.* I. p. 224, t. 94, fig. 2. *Id.* in Walp. *Ann.* VI. p. 547. *Lindenia*, V. t. 239. *Maxillaria Harrisoniæ*, Lindl. in *Bot. Reg.* t. 897 (1825). *Id.* Gen. et Sp. *Orch.* p. 148. *Bot. Mag.* t. 2927. Paxt. *Fl. Gard.* II. p. 196 (*grandiflora*). *Dendrobium Harrisoniæ*, Hook. *Exot. Fl.* t. 120 (1825). *Lycaste Harrisoniæ*, Williams' *Orch. Manual*, p. 579.

sub-vars.—*alba* (*Bot. Reg.* 1841, misc. No. 68), sepals and petals cream-

white with a slight tinge of violet at the apex, lip paler than in the original form; *eburnea* (Williams' *Orch. Alb.* III. t. 100, Lycaste), sepals and petals ivory-white, lip yellow, streaked with red-purple; *purpurascens*, sepals and petals light plum-purple, front lobe of lip dark plum-purple.

The botanical and horticultural history of those orchids that have been longest in cultivation is often the most obscure, because in the early days of orchid culture very little care was taken to



Bifrenaria Harrisoniae.

ascertain habitats or to record the dates of introduction. *Bifrenaria Harrisoniae* is an instance of this. All that is recorded respecting its origin is, that it was sent by Mr. William Harrison, a British merchant residing in Rio de Janeiro, to his brother Richard at Liverpool, and that on flowering it was named by Sir William Hooker in compliment to another member of the family, Mrs. Arnold Harrison, the possessor of one of the finest collections of orchids at that time. The probable date of introduction is thence 1821—22. In a note in Walper's *Annales Botanices*, Reichenbach states

that it was gathered by Gardner, who found it on moist shady rocks at Praha Vermelha, a locality not found on any map to which we have access.

The sub-varieties noted above are pretty and fairly distinct, especially the last named, which was sent to us by the late Mr. H. J. Buchan, of Wilton House, Southampton.

B. inodora.

Pseudo-bulbs, leaves and inflorescence as in *Bifrenaria Harrisonia*. Flowers 3 inches in diameter; sepals oblong, obtuse, the lateral two with a mucro at their apex, apple-green; petals much smaller but brighter in colour, sub-rhomboidal; lip white, yellow or dull rose colour, three-lobed, the side lobes sub-triangular, erect, the intermediate lobe broadly oval, hairy, reflexed, crisped at the margin; crest a fleshy grooved plate toothed and projecting in front; spur sub-cylindric, half as long as the ovary. Column curved, terete above, concave below the stigma, white, sometimes greenish yellow.

Bifrenaria inodora, Lindl. in Bot. Reg. 1843, misc. Nos. 63 and 67. Rehb. *Xen. Orch. I.* p. 223. t. 94. fig. 1. *B. aurantiaca*, Williams' *Orch. Alb. IX.* t. 386 (not of Lindl.).

"Imported from Rio de Janeiro in 1839, and added to Sir Charles Lemon's collection at Carclew, where it flowered in April, 1843"; such is the earliest account of its origin. We next read of its being gathered by the Belgian collector, Libon, in Minas Geraes, and afterwards cultivated by Consul Schiller and other German amateurs. Quite recently it has reappeared in British gardens, our description being taken from a plant that flowered in our houses in May, 1891. The flowers are variable in colour, some forms being more attractive than others.

B. vitellina.

Pseudo-bulbs clustered, ovoid, four-angled, $1\frac{1}{2}$ inch long, monophyllous. Leaves lanceolate, acute, 9—12 inches long, narrowed below into a short petiole. Scapes shorter than the leaves, crimsonish mottled with pale green, terminating in a lax, few-flowered raceme. Flowers an inch in diameter, orange-yellow with a maroon spot on the lip; sepals and petals oval-oblong, apiculate; the lateral sepals sub-falcate and spreading, the petals smaller and parallel with the column; lip cordate, three-lobed, the side lobes sub-triangular, erect; the intermediate lobe roundish with crisped margin; crest a flat plate thickened in front; spur short, obtuse. Column terete, whitish.

Bifrenaria vitellina, Lindl. in Bot. Reg. 1843, misc. No. 67. Rehb. in Walp. Ann. VI. p. 549. *Maxillaria vitellina*, Lindl. in Bot. Reg. 1839, t. 12. *M. barbata*, Knowles and Westc. *Fl. Cab. II.* t. 83. Lindl. in Bot. Reg. 1841, misc. No. 141.

An attractive species originally imported from Brazil by Messrs. Loddiges, in whose nursery it flowered in June, 1838. As in the case of most of the earliest imported orchids from Rio de Janeiro, no locality was recorded, although it is certain that the plant was gathered at no great distance from that city. We received materials for description from Burford Lodge and from Glasnevin.

EXCLUDED SPECIES.

Bifrenaria Hadwenii (Lindl.), now referred to *Scuticaria Hadwenii* (Benth.)

PAPHINIA.

Lindl. in Bot. Reg. 1843, misc. p. 14. Rehb. in Walp. Ann. VI. p. 614 (1863).

The type species, like many more of the South American VANDEE, was originally described and figured as a *Maxillaria*. In his revision of that genus in the *Botanical Register* of 1843, Dr. Lindley removed it from *Maxillaria* on account of the different structure of its pollinary apparatus: in *Maxillaria* the pair of double pollen masses are sessile or nearly so, on a crescent-shaped gland; in *Paphinia* they are connected with a small roundish gland by a long slender caudicle (stipes). This is an important difference from a botanical point of view, and justifies the separation of *Paphinia* from *Maxillaria*; but in *Lycaste* we find a similar condition of things, and on that ground chiefly Mr. Bentham reduced *Paphinia* to a synonym of *Lycaste*; but here again other characters have to be taken into account by the systematist: in *Lycaste* the scapes are with one exception* one-flowered, and always erect; in *Paphinia* they are oftener two or more flowered and pendulous, and the flowers strikingly different in colour; and more important than this is the different form of the labellum in the two genera: in *Paphinia* this organ, as will be seen from the description of the species that follow, has quite a complex structure; in *Lycaste* it is comparatively simple. On these grounds we have retained Lindley's genus *Paphinia*, not only for garden use, but also if merged into *Lycaste*—itself a very natural genus—the homogeneity of the latter would be greatly impaired.

* *Lycaste tetragona*.

Four species, all South American, have been figured and described, of which the last introduced is unknown to us.

Cultural Note.—The plants being of small size with a pendulous inflorescence, they are best cultivated in shallow pans near the glass of the East Indian house, care being taken to shade them from too powerful direct sunlight during the summer months. The pans should be filled to about two-thirds of their depth with the usual drainage material, and the remainder with a mixture of sphagnum moss and fibrous peat on which the plants should be placed, not inserted, so that the base of the pseudo-bulbs may be on a level with the rim of the pan. As the Paphinias naturally grow in a very humid atmosphere, constant attention must be given to the supply of water, and also to keeping the plants free from insect pests.

Paphinia cristata.

Pseudo-bulbs clustered, ovate-oblong, 1—1½ inch long, di-triphyllous. Leaves lanceolate, acute, plicate, 7—10 inches long. Peduncles slender, quite pendulous, 1—3 flowered; bracts nearly an inch long, loose, membranous, brownish. Flowers 3—4 inches in diameter; sepals and petals similar, broadly lanceolate, sub-acuminate, the basal half pale yellow streaked transversely with chocolate-brown, the apical half wholly brown but sometimes streaked longitudinally with pale yellow; lip shorter than the sepals and petals, clawed, the blade fleshy, distinctly bipartite, dark chocolate-purple; the hypochile transversely oblong with the front angles acute, the epichile sub-rhomboidal with a tuft of white hairs at the apex. Crest an oblong raised plate, bidentate at the top, below which are four prominent tubercles. Column semi-terete with a tooth-like auricle on each side of the stigma, yellowish green banded with chocolate towards the base; rostellum beaked.

Paphinia cristata, Lindl. in *Bot. Reg.* 1843, misc. p. 14. *Bot. Mag.* t. 4836. Van Houtte's *Fl. des Serres*, IV. t. 335. Williams' *Orch. Alb.* I. t. 34. *Lindenia*, I. t. 30 (Randii). *Maxillaria cristata*, Lindl. in *Bot. Reg.* t. 1811.

sub-var.—*Modiglianiana* (*Lindenia*, III. t. 117).

Flowers white except the anther which is light yellow.

Paphinia cristata is the type species, and the only one that was known for many years till the discovery of *P. rugosa* and *P. grandiflora* in 1876. It was first cultivated in this country in 1836 by Mr. Knight, our predecessor at the Royal Exotic Nursery, who had received it from Trinidad. A few years later it was detected by the brothers Schomburgk on the banks of the Kamwatta river, in British Guiana, growing on the trunks of trees; and subsequently by Purdie in northern Colombia, by whom it was sent

to the Royal Gardens at Kew. The sub-variety, a very beautiful and distinct one, was recently introduced by L'Horticulture Internationale of Brussels.

P. grandiflora.

Pseudo-bulbs broadly ovoid or sub-globose, about an inch in diameter, diphyllous. Leaves broadly lanceolate, acuminate, 7—10 inches long. Scapes short, pendent, 2—3 flowered. Flowers the largest in the genus; dorsal sepal 3 inches long, ovate-lanceolate, acute, the basal half yellowish white with numerous irregular transverse chocolate-purple bands, the apical half wholly chocolate-purple sometimes with a narrow yellowish white margin; lateral sepals similar but sub-falcate; petals similar to the sepals but more narrowed towards the base; lip clawed, distinctly bipartite, the claw blackish purple; the hypochile obovate-oblong, yellowish white with two incurved linear light brown auricles; the epichile with a narrow claw having two dark purple falcate teeth at the base of the sub-orbicular fleshy blade that is covered with whitish shaggy hairs. Column greenish, spotted with purple.

Paphinia grandiflora, Rodr. Gen. et Sp. Orch. nov. I. p. 124 (1877). *P. nutans*, Houll. in Rev. Hort. 1878, p. 188 (ex descript.). *P. grandis*, Rehb. ex Williams' *Orch. Alb. IV.* t. 145.

A very remarkable orchid, and the handsomest species in the genus; the colour of the perianth segments is rich and effective, and contrasts strongly with the small pale labellum which, as our description shows, is of very complex structure. It first became known to science in 1877 through the Brazilian botanist, Rodriguez; it first appeared in British gardens in 1883, flowering in the autumn of that year.

P. rugosa.

Pseudo-bulbs smooth, ovoid, elongated, 1½ inch long, diphyllous. Leaves linear-lanceolate, acuminate, 4—6 inches long. Scapes short, pendent, with an appressed bract at the base of the ovaries, 2—3 flowered. Flowers 2—3 inches in diameter; sepals lanceolate, acuminate, light yellow dotted with red; lip clawed, the hypochile crescent-shaped with two sub-falcate, erect auricles, red-purple; the epichile also red-purple, sub-rhomboidal, reflexed, with two broad auricles and a dense tuft of white bristles at the apex. Column clavate, bent, greenish yellow, with a narrow rounded wing on each side of the stigma.

Paphinia rugosa, Rehb. in *Linnaea*, XLI. p. 110 (1877). Id. in *Gard. Chron.* XII. (1879), p. 520; and XIV. (1880), pp. 102 and 778. Sander's *Reichenbachia*, s. 2, vol. 1. t. 11.

One of the discoveries of Gustav Wallis in New Granada in 1876, and shortly afterwards gathered by Franz Klaboch. Three years

later it was introduced into British gardens by Messrs. Sander and Co. through Chesterton, and it flowered for the first time in this country in the collection of Sir Trevor Lawrence, Bart., at Burford Lodge, in the summer of 1880. About the same time we received a small consignment through Kalbreyer. Neither of these collectors divulged its precise habitat; it is reported to be a rare plant, confined to a small area, and growing upon high trees in dense shade.

LYCASTE.

Lindl. in Bot. Reg. 1843, misc. p. 14. Benth. et Hook. Gen. Plant. III. p. 547.

Lycaste, a very natural genus not often confused with any other, includes about twenty-five species; but with one notable exception (*Lycaste Skinneri*) not many of them have hitherto found much favour with cultivators of orchids. This want of appreciation has probably arisen from the fact that the flowers of many of the species, although of large size and even of stately aspect, are often of homely or pallid colours that fail to attract favour. But among those species with smaller flowers there are some that possess pleasing although by no means brilliant colours, and in addition, some of them have a pleasant fragrance; they are thence represented in many collections. It may be observed, as a fair index of the favour accorded to the Lycastes, that very few of them, with the exception of *L. Skinneri*, have been figured in the horticultural serials devoted to the illustrations of orchids.

The essential characters of the genus may be thus formulated:—

The *sepals* are sub-equal and spreading, the lateral two adnate at their base to the foot of the column, and forming with it a short *mentum* or chin.

The *petals* are similar to the sepals in shape, but often much smaller and parallel with the column, rarely spreading.

The *lip* is affixed to the foot of the column; it is either sessile or shortly clawed, three-lobed, with the lateral lobes erect and the terminal one reflexed, and ciliolate or fimbriate at the margin, but sometimes entire; on the disk between the side lobes is a fleshy, grooved plate.*

* The form and size of this plate affords in several instances a good character for the determination of the species;—thus, in *Lycaste Linguella* it is excessively developed, forming a semi-cylindric tube; in *L. lasioglossa* it is reduced to a small tongue-shaped callosity; while in *L. Skinneri* it is well-nigh intermediate between those two.

The pollinia are four in two pairs, attached to the small gland by a long slender caudicle (stipes).

In their vegetation the *Lycastes* are remarkably uniform, so much so that the following general description of the pseudo-bulbs, leaves and inflorescence applies to all the species in the following synopsis:—

The *pseudo-bulbs* are of ovoid form more or less furrowed, with rounded ribs or obscurely angulate, and bearing at their apex 1—3 leaves that are sub-evergreen, rarely persisting more than twelve months, often much less.

The *leaves* are of oblong-lanceolate or elliptic-lanceolate form, more or less acuminate, with about five pale nerves and plaited; they are always narrowed below into a channelled foot-stalk.

The *scapes* arise from the base of the latest-formed pseudo-bulbs, and are, except in one species, one-flowered; they have from two to four joints with a membranous brown sheath at each joint, and a similar but larger bract at the base of the ovary.*

The geographical distribution of the *Lycastes* is nearly conterminous with that of the *Odontoglots* with the exception of one outlying member in southern Brazil. They occur on the Cordilleras of tropical America from Mexico to Bolivia, but their vertical range is generally lower than that of the *Odontoglots*. Like the *Odontoglots*, too, the species are somewhat aggregated towards the northern limit, becoming fewer and more dispersed till the southern limit is reached. All the Andean *Lycastes* occur within the region coloured light brown on the maps illustrating the distribution of *Odontoglossum*.

Cultural Note.—The climatic conditions under which the Andean *Lycastes* grow are fully stated in the notes on the geographical distribution of *Odontoglossum* and *Cattleya*.† The *Lycastes* of Mexico, Central America and Colombia, generally speaking, occur within the higher range of the *Cattleyas* and the lower range of the *Odontoglots*; as regards temperature therefore, they occupy a mean position between the two, and as regards humidity they live in a region in which there is nominally a dry season of three or four months only. The climate of the zone within which they are found on the Andes of Peru is not, so far as known, essentially different from that of their range in Colombia. The cultural routine is a very simple one:—The plants should have ample pot room as they root freely; a compost of rough fibrous peat and sphagnum moss with a drainage of broken crocks to

* The number of scapes produced from one pseudo-bulb varies considerably in the different species and even in the same species. We have observed instances in which from 15 to 20 flowers have been produced from a single pseudo-bulb.

† *Odontoglossum*, p. 9; and *Cattleya*, p. 6.

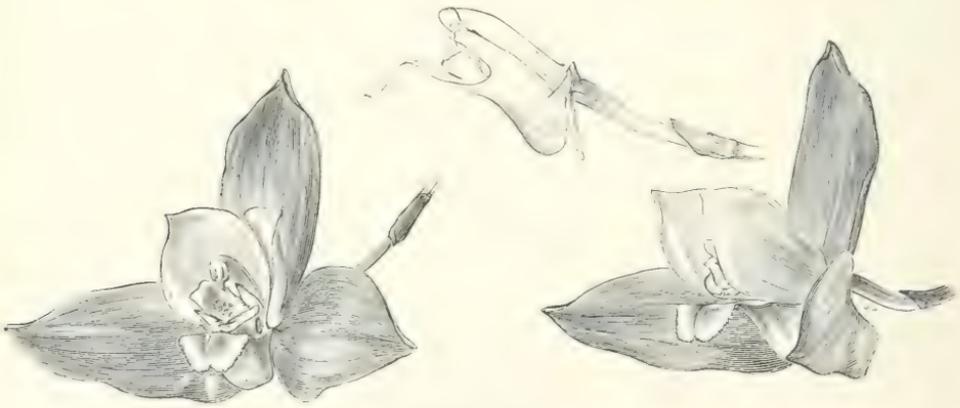
three-fourths of the depth of the pot is found to be the most suitable, and upon this the plants should be placed with the base of the pseudo-bulbs about on a level with the rim of the pot. Water should be freely supplied during the growing season, and even when the plants are at rest the compost should at no time be allowed to become dry. Light shading should be used during bright days in summer, but at other times the plants should receive as much light as possible.

Lycaste Skinneri may be grown in the cool house so long as the temperature does not sink below 10° C. (50° F.). Red spider sometimes attacks the leaves on the under side which causes them to turn yellow; when they are detected the leaves should be sponged with a weak insecticide.

SYNOPSIS OF SPECIES AND VARIETIES.

Lycaste aromatica.

Pseudo-bulbs $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long, dark dull green, mono-diphyllous. Leaves 7—10 inches long. Scapes slender, 4—6 inches long. Flowers with a strong aromatic fragrance, about $1\frac{1}{2}$ inch across the lateral sepals; sepals ovate-oblong, acute, fulvous yellow; petals similar, bright



Lycaste aromatica.

orange-yellow; lip three-lobed, the side lobes oblong, free at the apical end, incurved over the column, orange-yellow spotted with red; the intermediate lobe oblong, obtuse, reflexed, coloured like the petals; plate of disk grooved, thickened and truncate at the apex. Column slender, semi-terete, slightly bent, pubescent below the stigma.

Lycaste aromatica, Lindl. in Bot. Reg. 1842, misc. p. 16. Rehb. in Walp. Ann. VI. p. 600. *Maxillaria aromatica*, Hook. Exot. Flora, t. 219 (1823). Lindl. Gen. et Sp. Orch. p. 146. Bot. Reg. t. 1871.

First sent by Lord Napier from Mexico to the Botanic Garden at Edinburgh some time previous to the year 1826; it is therefore an old denizen of British gardens, in which its pleasant fragrance has always secured for it a place; its Mexican habitat does not appear to have been recorded. In the miscellaneous matter of the *Botanical Register* of 1844, p. 41, Dr. Lindley mentions a variety "with very clear yolk-of-egg yellow flowers, and the middle lobe of the lip dilated and almost two-lobed," said to have been received from Lima by Mr. Barker, of Birmingham, but which seems to have been since lost.

L. candida.

Pseudo-bulbs $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long. Leaves 9—12 inches long. Scapes one-third as long as the leaves. Flowers about 2 inches in diameter; sepals oval-oblong, acute, reflexed at the tip, pale green sometimes freckled or spotted with light rose; petals smaller, whitish more or less tinted with light rose; lip obovate-oblong, obscurely three-lobed, of a purer white than the petals, and with a few rose-purple spots; plate of disk thin, oblong, thickened and emarginate at the apex. Column slender, terete, bent towards the apex, hairy below the stigma, white spotted with rose.

Lycaste candida, Lindl. in Paxt. Fl. Gard. II. p. 37, icon. xyl. (1852). Rehb. in Walp. Ann. VI. p. 604. *L. Lawrenceana*, Hort.

One of the dwarfest species in the genus. It was discovered by Warszewicz in Central America in 1849—50, and introduced by him shortly afterwards. Horticulturists distinguish the sub-variety, in which all the floral segments are more or less tinted with rose, by the name of *Lycaste Lawrenceana*.

L. ciliata.

Pseudo-bulbs 2—3 inches long, diphyllous. Leaves 7—10 inches long. Scapes a little longer than the pseudo-bulbs. Sepals and petals green, ovate-lanceolate, the lateral sepals sub-falcate, the petals smaller than the sepals; lip oblong, three-lobed, the side lobes erect, white; the terminal lobe fringed, with a larger concavity at its base and a smaller one at its apex, pale buff-yellow; plate of the disk rather broad, grooved, with three raised lines in the concavity. Column trigonal, arched, white.

Lycaste ciliata, supra, not of Rehb.* *Maxillaria ciliata*, Ruiz et Pav. Fl. Peruv. p. 226; and Syst. Veg. p. 221 (1798). *Bot. Reg.* t. 1206. *Bot. Mag.* t. 4081. *Dendrobium ciliatum*, Pers. Syst. Pl. p. 523 (1805).

Materials for description, under the name of *Lycaste Barringtonia*,

* Bonpl. IV. p. 324; and Walp. Ann. VI. p. 606.

were sent to us from the Royal Botanic Garden at Glasnevin by Mr. F. W. Moore, who called our attention to the confusion that has long existed respecting this species. On comparing the flowers with the figures of *Maxillaria ciliata* in the *Botanical Register* and *Botanical Magazine*, we were satisfied that the Glasnevin plant must be referred to that species. Now Lindley (*Bot. Reg.* 1844, misc. p. 43) reduced *M. ciliata* to a synonym of *M. Barringtoniæ* of Loddiges,* when he removed the latter to *Lycaste*; this is a West Indian species figured and described in Hooker's *Exotic Flora* as *Dendrobium Barringtoniæ*, and in Smith's *Icones* as *Epidendrum Barringtoniæ*. Unfortunately both Loddiges' and Hooker's figures are imperfect, but there is sufficient evidence in them to raise a doubt whether the Peruvian *Lycaste ciliata* and the West Indian *L. Barringtoniæ* are one and the same species, a doubt that we are unable to clear up. It is scarcely necessary to add that the plant figured as *L. Barringtoniæ* in the *Botanical Magazine*, t. 5706, is not the West Indian species but the Peruvian *L. costata*.

Lycaste ciliata was first gathered by the Spanish botanists, Ruiz and Pavon, at Muña and Chinchao, in Peru, more than a century ago. The plant is of no horticultural merit whatever; it is introduced here solely with the view of bringing under notice the confusion that exists respecting it.

L. costata.

Pseudo-bulbs 3—5 inches long, compressed with 3—5 strong ribs in each of the flattened sides, diphyllous. Leaves 20—25 inches long including the rather long channelled petiole. Scapes about one-fourth as long as the leaves; bracts large and slightly inflated. Flowers 4 inches across vertically, ivory-white; dorsal sepal oblong, acute, incurved over the column; lateral sepals oblong, falcate, sub-acute; petals linear-oblong, sub-acute, lying immediately under the dorsal sepal and incurved over the column in the same way; lip three-lobed, the side lobes sub-rhomboidal with the front angle very acute; the intermediate lobe ovate-oblong with the side margins fimbriate; plate of disk very thick, grooved and emarginate. Column triquetral, bent, hairy at the base.

Lycaste costata, Lindl. in *Bot. Reg.* 1843, misc. p. 15. Id. in *Gard. Chron.* 1854, p. 663. Rehb. in *Walp. Ann.* VI. p. 605. Regel's *Gartenfl.* 1869, t. 620, and 1885, t. 1141. Williams' *Orch. Alb.* VIII. t. 384. *Lindenia* V. t. 220. *Lycaste Barringtoniæ*, *Bot. Mag.* t. 5706 (*grandiflora*). *Maxillaria costata*, Lindl. in *Bot. Reg.* 1838, misc. p. 93.

* *Bot. Cab.* t. 1834.

Originally detected in 1838 on the Peruvian Andes by Matthews, from whose herbarium specimen it was first named and described. It was introduced in 1854 by the late Mr. Robert Hanbury, of The Poles, near Ware. *Lycaste costata* is well known for the imposing dimensions it attains and for its large flowers that are pleasantly fragrant at night; it has been occasionally confused with *L. Barringtonie* and *L. lanipes*, the latter having much smaller flowers with a differently-shaped lip.

L. cruenta.

Pseudo-bulbs $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long, compressed with 2—3 ribs on each of the flattened sides, diphyllous. Leaves 15—18 inches long. Scapes about 6 inches long. Flowers $2\frac{1}{2}$ inches across the lateral sepals; sepals spreading, ovate-oblong, acute, light fulvous green; petals oval-oblong, orange-yellow spotted with red at the base; lip three-lobed, the side lobes rounded and erect, the intermediate lobe sub-quadrate and reflexed, blood-red at the base, the remaining area orange-yellow sometimes with some red transverse streaks; plate of disk short, thickened and truncate in front. Column broad, terete, orange-yellow above, crimson and hairy below the stigma.

Lycaste cruenta, Lindl. in Bot. Reg. 1843, misc. p. 15. Rehb. in Walp. Ann. VI. p. 601. Williams' *Orch. Alb. VIII.* t. 375. *Maxillaria cruenta*, Lindl. in Bot. Reg. 1842, t. 13.

One of the discoveries of Mr. G. Ure Skinner in Guatemala and sent by him to Mr. Bateman in 1841; it also occurs sparingly on the eastern Cordillera of Colombia some miles south of Ocaña. It is one of the most generally cultivated of the *Lycastes*, much resembling *Lycaste aromatica*, from which it is chiefly distinguished by its larger scentless flowers, of which the labellum is of a different shape and has a dark sanguineous blotch at the base, a character that suggested the specific name.

L. Deppei.

Pseudo-bulbs $2\frac{1}{2}$ — $3\frac{1}{2}$ inches long, compressed and strongly ribbed on the flattened sides, and bearing at their apex 3—4 leaves. Leaves 9—12 or more inches long. Scapes numerous, shorter than the leaves. Flowers 3—4 inches across the lateral sepals; sepals spreading, elliptic-oblong, acute, pale green spotted with reddish carmine; petals similar but shorter, ivory-white; lip three-lobed, the side lobes oblong, incurved, whitish streaked with red on the inner side; the intermediate lobe ovate, acute, reflexed, bright yellow spotted with red; plate of disk

ovate at apex passing into a broad keel below. Column clavate, hairy on the anterior face, white spotted with red.

Lycaste Deppei, Lindl. in *Bot. Reg.* 1843, misc. p. 15. Rehb. in *Walp. Ann.* VI. p. 602. *Maxillaria Deppei*, Lodd. *Bot. Cab.* t. 1612 (1830). *Bot. Mag.* t. 3395. Lindl. *Gen. et Sp. Orch.* p. 147.

var.—punctatissima.

Sepals longer and narrower than in the type, yellow-green densely spotted with reddish carmine, the white petals and yellow lip also spotted with red-carmine, the spots on the petals more dispersed, and those on the lip larger than on the sepals.

L. Deppei punctatissima, Rehb. in *Gard. Chron.* XVI. (1881), p. 717. Williams' *Orch. Alb.* VI. t. 262.

A very old denizen of British gardens, it having been introduced by Messrs. Loddiges in 1828 through Deppe, who collected it near Xalapa in Mexico. It flowered in Earl Fitzwilliam's collection at Wentworth, near Sheffield, in 1834, on which occasion it was figured in the *Botanical Magazine*, but it seems to have been very rare for some time afterwards. The variety, a very remarkable one, was introduced by the late Mr. B. S. Williams, of Holloway; the only plant we have seen of it is in the collection of Sir Trevor Lawrence, Bart., at Burford Lodge.

L. fulvescens.

Pseudo-bulbs variable in size, the largest 4—5 inches long and $1\frac{1}{2}$ —2 inches broad, diphyllous. Leaves 15—20 inches long. Scapes as long again as the pseudo-bulbs. Flowers large and drooping; sepals and petals lanceolate, acuminate, fulvous-brown, much paler at the base, the sepals nearly 3 inches long, the lateral two sub-falcate, the petals much smaller; lip oblong, obtuse, three-lobed, orange-brown, the front lobe fringed at the margin; plate of disk grooved, thickened and emarginate at the apex. Column semi-terete, whitish.

Lycaste fulvescens, Hook. in *Bot. Mag.* t. 4193 (1845). Lindl. *Orch. Lind.* No. 108, p. 21 (1846). Rehb. in *Walp. Ann.* VI. p. 605.

Discovered by Linden in 1842 on the eastern Cordillera of New Granada at 6,000 feet elevation, near Ocaña, and subsequently gathered by Schlim and Wagener in the same region; it occurs on the Cordillera from Ocaña southwards as far as Bogota. It was first cultivated in this country by the Rev. John Clowes, of Broughton Hall, Manchester, in whose collection it flowered in 1845. The peculiar drooping habit of the flowers and their unusual colouration well distinguish this species among *Lycastes*.

L. gigantea.

Pseudo-bulbs 4—5 inches long and $1\frac{1}{2}$ inch broad, di-triphyllous. Leaves 20—30 inches long with rather long foot-stalks. Scapes stoutish, shorter than the leaves. Flowers large with the segments turned more or less forwards; sepals lanceolate, acute, 5 inches long, olive-green, the lateral two sub-falcate; the petals similar but smaller; lip oblong, maroon-chocolate bordered with orange-yellow, three-lobed, the side lobes narrow, erect, the intermediate lobe reflexed; plate of disk somewhat saddle-shaped, much thickened, and emarginate at the apex. Column triquetral, bent, whitish.

Lycaste gigantea, Lindl. in *Bot. Reg.* 1843, misc. p. 15; and 1845, t. 34. *Bot. Mag.* t. 5616. Rehb. in Walp. Ann. VI. p. 604. Williams' *Orch. Alb.* IX. t. 408.

Originally discovered by Hartweg in 1842 in Ecuador at a place called Quebrada de las Juntas, near Guayaquil, and sent by him to the Horticultural Society of London, in whose garden at Chiswick it flowered in 1845; it had, however, previously flowered in Belgium, whither it had been introduced from La Guayra, probably through Linden.* It was subsequently gathered by Wagener on the Cordillera of Venezuela, by Purdie in Santa Martha, and by other collectors on the eastern Cordillera of Colombia as far south as Bogota, always at a considerable elevation. Its nearest affinity is *Lycaste fulvescens*, with which it is in some localities found associated and with which it agrees in its elongated sepals and petals, the latter of which are more spreading in these species than in any other *Lycaste* in cultivation.

L. lanipes.

Pseudo-bulbs sub-cylindric, elongated, 5—6 inches long, di-triphyllous. Leaves 20—25 inches long, the petiole about one-third the length of the blade. Scapes 3—4 inches long. Flowers 4 inches across vertically; sepals oblong-lanceolate, greenish white; petals similar but shorter, ivory-white; lip ivory-white, oblong, slightly constricted at the middle, reflexed at the apex, the margins of the basal half entire, of the apical half fimbriated; plate of disk dilated at the apex and with 3—5 parallel raised lines. Column semi-terete, arched.

Lycaste lanipes, Lindl. in *Bot. Reg.* 1843, misc. p. 15. Rehb. in Walp. Ann. VI. p. 606. L. Cobbiana, Hort.

* The plants must have been shipped at La Guayra, not gathered there. La Guayra is the port of Caracas, and is more than 1,200 miles distant from Guayaquil in Ecuador. As *Lycaste gigantea* is known to be dispersed over the Cordilleras of Colombia for many hundreds of miles, Lindley's statement in the *Botanical Register* respecting its Ecuadorean habitat may be assumed to be correct.

Discovered by Hartweg at Paccha, on the Peruvian Andes near Loxa, in 1842, and sent by him to the Horticultural Society of London. Ten years later it was collected by Warszewicz in the same locality, and it has been occasionally imported since. It is well distinguished by its elongated pseudo-bulbs, its narrow leaves, and the keeled plate of the labellum.

L. lasioglossa.

Pseudo-bulbs 4—5 inches long and $1\frac{1}{2}$ —2 inches broad, di-triphyllous. Leaves variable in size and form, from elliptic to oblong-lanceolate, 15—24 inches long. Scapes 6—8 inches long, stoutish. Flowers 4—5 inches across vertically; sepals spreading and equidistant, lanceolate-oblong, acute, reddish brown, yellow at the tip, hairy at the base; petals oblong, concave, reflexed at the apex, bright yellow; lip yellow, three-lobed, the side lobes narrow, stained with red on the inner side; the terminal lobe oblong, obtuse, clothed with long white hairs on the upper surface; plate of disk tongue-shaped. Column terete, light yellow above, hairy below the stigma.

Lycaste lasioglossa, Rehb. in Gard. Chron. 1872, p. 215. *Bot. Mag.* t. 6251.
Lindenia, VII. t. 316.

Introduced by us from Guatemala in 1871. Although its large flowers are of somewhat homely colours, it is one of the most interesting species of the genus, its shaggy lip being quite singular in that respect, and imitating the Paphinias; it also suggested the specific name which is derived from *λάσιος*, "hairy or rough," and *γλῶσσα*, "a tongue," in orchidology, the labellum.

L. leucantha.

Pseudo-bulbs 2—3 inches long, di-triphyllous. Leaves 20—25 inches long. Scapes about one-third as long as the leaves. Flowers 3—4 inches across the lateral sepals; sepals oblong, sub-acute, brownish green; petals similar but shorter, reflexed at the apex, yellowish white; lip three-lobed, the side lobes roundish oblong, erect, light yellow; the intermediate lobe ovate-oblong, obtuse, denticulate at the margin, gently reflexed, cream-white; plate of disk narrow, grooved. Column semi-terete, bent, yellowish white.

Lycaste leucantha, Klotzsch in Allgem. Gartenz. 1850, p. 402. Lindl. in Paxt. Fl. Gard. II. p. 37, with fig. Rehb. in Walp. Ann. VI. p. 603. Saunders' *Ref. Bot.* II. t. 102.

Discovered by Warszewicz in Costa Rica in 1849, and occasionally imported since from that country. The colours of its flowers are pallid and unattractive.

L. Linguella.

"Pseudo-bulbs narrowly ovoid, 3 inches long. Leaves 12—15 inches long. Scapes about one-third as long as the leaves; bracts sheathing, green, obovate-oblong, an inch long. Flowers 3 inches across from the tip of the upper to that of the lateral sepals, pale yellowish green; dorsal sepal obovate-oblong, obtusely apiculate; the lateral two larger and falcately curved; petals smaller, broadly obovate, concave; lip whitish, three-lobed, the lateral lobes narrow, the terminal lobe broadly ovate, obtuse, recurved; plate of disk a semi-cylindric tube protruded in front. Column semi-terete, pubescent towards the base."—*Botanical Magazine*.

Lycaste Linguella, Rehb. in Gard. Chron. 1871, p. 738. *Bot. Mag.* t. 6303.

Introduced by us from the Andes of Peru in 1871 through Pearce. It is more remarkable for the unusual development of the fleshy plate of the labellum than for any other character, but which thoroughly distinguishes it from every other species yet introduced.

L. Macrobulbon.

Pseudo-bulbs somewhat pear-shaped, 3 inches long. Leaves 15—20 inches long. Scapes slender, scarcely half as long as the leaves. Flowers fragrant, 3 inches across the lateral sepals; sepals ovate-oblong, acute, greenish yellow; petals similar but smaller, and reflexed at the tip, bright yellow; lip bright yellow, sometimes with some red spots on the terminal lobe, oblong, obtuse, obscurely three-lobed, the side lobes turned inwards, the front lobe reflexed; plate of disk narrow, with a shallow groove, acute at the apex. Column triquetral, bent, yellow with some red spots at the base.

Lycaste Macrobulbon, Lindl. in Paxt. Fl. Gard. I. p. 126 (1851). Rehb. in Walp. Ann. I. p. 601. *Maxillaria Macrobulbon*, Hook. *Bot. Mag.* t. 4228 (1846).

Introduced to the Royal Gardens at Kew in 1844 by Purdie, who collected it on the Sierra Nevada of Santa Martha in northern Colombia; it was shortly afterwards imported by M. Linden from the same region. It has been recently re-imported and exhibited at the Royal Horticultural Society's meetings under various names, with which it is not desirable to burden the synonymy. It is one of the handsomest of the yellow Lycastes, easily distinguished from *L. aromatica* and *L. cruenta* by its larger pseudo-bulbs and its differently-shaped lip, the plate of which is long, narrow and pointed, not thickened and truncate at the apex.

L. plana.

Pseudo-bulbs $2\frac{1}{2}$ — $3\frac{1}{2}$ inches long, di-triphyllous. Leaves 18—24 inches long. Scapes about as long again as the pseudo-bulbs. Flowers 4 inches across the lateral sepals; sepals oblong, acute, olive-green tinged with brown, pale green at the reflexed apex; petals elliptic-oblong, reflexed at the apex, white, the central area sometimes spotted with rose-carmine; lip oblong, obtuse, three-lobed, the side lobes erect, whitish at the base, mottled with rose-carmine at the apex; the intermediate lobe with denticulate margin, ivory-white with a few crimson spots near the lateral margins, rarely wholly crimson; plate of disk tongue-shaped, narrowed towards the base. Column semi-terete, pubescent, white.

Lycaste plana, Lindl. in *Bot. Reg.* 1842, p. 85; 1843, t. 35; and misc. p. 15. Williams' *Orch. Alb. V.* t. 230. *L. macrophylla*, Lindl. in *Bot. Reg.* 1843, misc. p. 14. Rehb. in Walp. *Ann.* VI. p. 602. *Maxillaria macrophylla*, Pöppig et Endl. nov. Gen. et Sp. I. t. 64. ex Lindl. in *Bot. Reg.* 1838, misc. p. 92.

sub-var.—*Mr. Measures'* (Williams' *Orch. Alb. VII.* t. 306), sepals olive-brown, green at the apex; petals densely spotted with carmine-purple with a narrow white border; lip similarly spotted except the apical area.

Originally discovered by the German botanist, Pöppig, always growing on the ground in thickets near Cuchero, in the trans-Andean parts of Upper Peru (now Bolivia), and subsequently gathered on the Peruvian Andes, where it appears to have a considerable range. It was first imported by Messrs. Loddiges, in whose nursery it flowered in 1842. The sub-variety, which differs from the species in colour only, is a very distinct and rare one; the only plant of it known to us is in the collection of Mr. R. H. Measures, at The Woodlands, Streatham.

L. Schilleriana.

Pseudo-bulbs 4—5 inches long, diphyllous. Leaves 20—25 or more inches long. Scapes about a foot long. Sepals ligulate acuminate, 3 inches long, pale olive-green; petals oblong, acute, half as long as the sepals, ivory-white; lip as long as the petals and nearly equal to them, three-lobed, the side lobes narrowly oblong, erect, yellowish; the intermediate lobe oblong, obtuse, minutely denticulate, ivory-white; plate of disk as long as the side lobes, narrow, grooved. Column semi-terete, hairy below the stigma.

Lycaste Schilleriana, Rehb. in *Bonpl.* III. p. 215 (1855). Id. in Walp. *Ann.* VI. p. 604. Saunders' *Ref. Bot.* II. t. 130. Regel's *Gartenfl.* 1890, t. 1321, var. *Lehmanni*.

The precise habitat of this species is not certainly known. It first became known to horticulture through a plant that flowered in Consul Schiller's collection at Hamburg in 1854, and this plant had

been acquired at an English sale by Mr. G. Ure Skinner. This was the only one known for many years till about 1880, when specimens were sent by various correspondents to the late Professor Reichenbach for identification, and which were supposed to have been imported from New Granada, a supposition since confirmed by plants being received from that country from various orchid collectors. The flowers of *Lycaste Schilleriana* are among the largest in the genus, but they are of dull and unattractive colours.*

L. Skinneri.

Pseudo-bulbs $2\frac{1}{2}$ —3 inches long, di-triphyllous. Leaves 15—20 or more inches long. Scapes from one-third to one-half as long as the leaves. Flowers the handsomest and largest in the genus, 5—6 inches across the lateral sepals; sepals oval-oblong, sub-acute, reflexed at the tip, the dorsal sepal with a small green apiculus, delicate light rose more or less suffused with white; petals similar but much smaller and more deeply coloured; lip ovate in outline, distinctly three-lobed, rose and crimson-carmine of many shades, often mottled and spotted in various ways with white, rarely wholly white; the side lobes roundish, oblong, erect; the terminal lobe ovate, obtuse, reflexed; plate of disk tongue-shaped, hairy. Column triquetral, hairy below the stigma, white stained with crimson.

Lycaste Skinneri, Lindl. in Bot. Reg. 1843, misc. p. 15. *Bot. Mag.* t. 4445. Van Houtte's *Fl. des Serres*, IV. t. 303. *Paxt. Mag. Bot.* XI. p. 1. Linden's *Pesc.* t. 39. *Fl. and Pomol.* 1861, p. 65. *Fl. Mag.* t. 192. Jennings' *Orch.* t. 9. *The Garden*, XXV. (1884), t. 440. *Maxillaria Skinneri*, Lindl. in Bot. Reg. 1842, misc. No. 13. *Batem. Orch. Mex. et Guat.* t. 35.

sub-vars.—*alba* (Linden's *Pesc.* t. 39, fig. 2. Jennings' *Orch.* t. 9, fig. 2. *Fl. Mag.* n.s. t. 35, fig. 1. Williams' *Orch. Alb. V.* t. 234. *Lindenia*, IV. t. 153), flowers white, with the crest of the lip light yellow; *armeniaca* (Sander's *Reichenbachia*, s. 2, t. 18), sepals white, petals and lip suffused with apricot-yellow; *bella*, sepals white tinted with rose-carmine towards the base, petals rose-carmine mottled with white, lip dark crimson margined with white; *delicatissima* (Warner's *Sel. Orch. I.* t. 10, fig. 1), sepals and petals white tinted with light rose, lip white sparingly spotted with rose; *Mr. Young's*, sepals and petals faintly tinted with light rose, lip rose-carmine darker at the lateral margins; *nigro-rubra* (*Fl. Mag.* n.s. t. 35, fig. 2. *Reginae*, Williams' *Orch. Alb. VI.* t. 283), sepals tinted with rose-carmine, petals purplish crimson, lip maroon-crimson; *picturata* (Warner's *Sel. Orch. I.* t. 10, fig. 2), sepals and petals light rose, lip white stained with crimson at the base, the front lobe spotted with crimson; *purpurata* (Warner's *Sel. Orch. I.* t. 10,

* The variety *Lehmanni* as figured in the *Gartenflora* appears to be an improvement in this respect.

fig. 3), sepals and petals white faintly tinted with white rose, lip crimson-purple; *superba* (*Fl. Mag.* t. 24), sepals white with a faint flush of light rose, petals dark carmine, lip white with yellow crest.



Lycaste Skinneri.

Unquestionably the finest of the discoveries of Mr. G. Ure Skinner in Guatemala, who brought it to England in great numbers in 1841.* It flowered for the first time in this country in the

* In *Pescatorca*, sub. t. 39, the merit of introducing *Lycaste Skinneri* into European gardens is claimed by M. Linden. Mr. Bateman's first announcement of the species appeared in the *Botanical Register* of 1842; *Pescatorca* was published at Brussels in 1860. The claim of prior discovery and introduction by Linden was thence brought forward too late, and on that ground alone cannot be seriously entertained,

collection of the Rev. John Clowes, at Broughton Hall, Manchester, in the following year, and shortly afterwards in other places, when its great merit as a garden plant became generally recognised. Judging from the numerous importations that have been made from Guatemala and the adjoining State of Honduras, it must exist in immense quantities in those countries. Like most orchids that have been introduced in large numbers, the flowers of *Lycaste Skinneri* have proved to be variable in colour, especially in the labellum; the sub-varieties described above are among the most distinct that have been noticed, of which the pure white form (*alba*) has always been in high repute.

Lycaste Skinneri is one of the easiest of orchids to cultivate, requiring only a temperature that does not sink below 10° C. (50° F.). It flowers in the late autumn and winter months, continuing a long time in perfection.

L. tetragona.

Pseudo-bulbs ovoid, elongated, acutely four-angled, 3—4 inches long, monophyllous. Leaves 12—18 inches long. Scapes as long as the pseudo-bulbs, 3—4 flowered; cauline bracts reduced to small ovate, acute scale-like appendages; floral bracts similar but larger. Flowers with a peculiar fragrance, not fully expanding; sepals and petals light yellow-green streaked with red-brown, broadly ovate, acute, the petals narrower and the lateral sepals broader than the dorsal sepal; lip fleshy, three-lobed; the side lobes sub-quadrate, incurved; the intermediate lobe oblong, obtuse, saccate at the base; all the lobes whitish, sometimes yellowish green beneath, deep maroon-violet on the inner side; plate of disk narrow, grooved, protruded in front, evanescent below. Column terete, greenish yellow.

Lycaste tetragona, Lindl. in Bot. Reg. 1843, misc. No. 64. Rehb. in Walp. Ann. VI. p. 602. *Maxillaria tetragona*, Lindl. in Bot. Reg. t. 1428 (1831). Bot. Mag. t. 3146.

An aberrant species both geographically and structurally. Its habitat is in southern Brazil, more than one thousand miles away from its nearest congeners in a geographical sense, *Lycaste plana* and *L. Linguella* of the Andes of Bolivia and southern Peru. Its pseudo-bulbs are distinctly four-angled, and its flowers, unlike those of all other *Lycastes*, are not solitary, but are borne in threes and fours on one peduncle; these also differ from the Andean species in the sepals and petals being nearly equal, and in their differently-shaped lip. *L. tetragona* was originally introduced in 1827

by Mr. Mutford, of Exeter, who presented a plant to the Royal Gardens at Kew, where it flowered in the summer of 1829; it was shortly afterwards received from Rio de Janeiro by the Horticultural Society of London. It is one of the most distinct of *Lycastes*, but not generally cultivated; our description was taken from a plant that flowered in our houses in the summer of 1890.

L. *xytriophora*.

Pseudo-bulbs 3—4 inches long, much compressed, mono-diphyllous. Leaves 12—15 or more inches long. Scapes 4—5 inches long, the bract at the base of the ovary large in proportion to the size of the flower. Flowers 3—4 inches in diameter; sepals oblong, obtuse, with a horny apiculus on the under side, light greenish brown; petals oblong, obtuse, slightly reflexed at the apex, the basal half yellowish green, the apical half white; lip much smaller than the other segments, oblong-ligulate, white sometimes stained with rose-pink on the inner side, three-lobed, the side lobes incurved, the front lobe thickened along the middle, reflexed, undulate at the margin; plate of disk very narrow, grooved, yellow spotted with red. Column triquetral, hairy below the stigma.

Lycaste xytriophora,* Rehb. in Saunders' *Ref. Bot.* II. t. 131 (1882).

The origin of the species is uncertain. In the letterpress accompanying the plate in the *Refugium Botanicum*, Reichenbach expresses his belief that Wallis collected it in the neighbourhood of Loxa, in northern Peru, for M. Linden in 1867. The late Mr. Wilson Saunders states, however, that he obtained his plants from Costa Rica, statements not easy to be reconciled, as these two localities are many hundreds of miles apart. It has recently reappeared in several collections, but the origin of the plants has not been divulged.

HYBRID LYCASTES.

The genus *Lycaste* offers so indifferent a field, from a horticultural standpoint, for the operations of the hybridist, that very little has been done in the cross-fertilisation of different species. One of the greatest impediments to the crossing of *Lycastes*, when the object of the hybridist is the obtaining of forms that shall satisfy the

* The specific name is obscure; probably *ξύστρον*, "an instrument for scraping, planing, or polishing," in fanciful reference to the shape of the plate on the labellum, was the word selected; if so, the name should be "*xystrophora*."

requirements of the florist, occurs in the fact that the *facile princeps* of the genus *Lycaste Skinneri*, which would be used in every cross, does not usually flower at a season when any other species is in bloom. The few hybrid *Lycastes* of supposed natural origin or raised artificially do not appear to have excited much interest. Our knowledge of the forms here described is derived solely from the notices of them in the places quoted.

Lycaste hybrida.

A hybrid raised artificially from *Lycaste Deppei* and *L. Skinneri* by Mr. W. Marshall, of Auchinraith, Bexley. The flowers are nearly as large as those of *L. Skinneri*; sepals and petals creamy white with a faint tinge of green and thickly dotted with purple on the basal half; lip yellow densely spotted with crimson on the basal half, pure yellow on the recurved front lobe; the tongue-shaped plate of the disk orange-yellow.

Lycaste hybrida, Gard. Chron. X. (1878), p. 535, inedit.

L. Schoenbrunnensis.

A hybrid that flowered in the autumn of 1892 in the collection of the Emperor of Austria, at Schönbrunn, near Vienna. *Lycaste Skinneri* is one parent and *L. Schilleriana* is supposed to be the other. The sepals are $2\frac{1}{2}$ inches long, rose-pink with a distinctly glaucous surface; the petals yellowish white at the base and suffused with light pink above; the lip has a light yellow ground, the crest and side lobes densely spotted and freckled with light purple-crimson. The column is white, except at the base which together with its foot is very deep purple-crimson.

Lycaste Schoenbrunnensis, Orchid Review, vol. I. p. 51.

L. Smeeana.

A supposed natural hybrid between *Lycaste Deppei* and *L. Skinneri* that appeared in the collection of Mr. A. H. Smece at The Grange, Hackbridge. The flowers have nearly the shape of those of *L. Deppei*, but larger; the colour is white except the lip, of which the side lobes have a purple margin and the whole surface is spotted and striped with purple.

Lycaste Smeeana, Rehb. in Gard. Chron. XX. (1883), p. 198.

L. sulphurea.

A supposed natural hybrid between *Lycaste Deppei* and *L. cruenta* that appeared in the nursery of Mr. William Bull at Chelsea. The flowers

are smaller than those of *L. cruenta* with the sepals more acute; they are pale sulphur-yellow with some red blotches on the sepals, a large brown-purple blotch at the base of the petals and a few spots above it; the lip has a purple blotch between the side lobes.

Lycaste sulphurea, Rehb. in Gard. Chron. XVIII. (1882), p. 218.

ANGULOA.

Ruiz et Pav. Prod. Fl. Peruv. p. 118, t. 26 (1794). Benth. et Hook. Gen. Plant. III. p. 549 (1883).

In *Anguloa* we have a small group of species highly prized by horticulturists on account of their large and handsome flowers that appear in the summer months. In its botanical aspect the genus *Anguloa* is a link in the chain of affinities connecting *Lycaste* with *Stanhopea*; to the first named it is indeed very closely allied but clearly separated from it by the very different form of the labellum.

The most obvious floral characters of *Anguloa* are seen in the fleshy sepals and petals that are connivent, the sepals overlapping the petals, so that instead of spreading they form together a hollow globe, within which the lip and column are almost concealed. The lip is smaller than the other segments and three-lobed, the lateral lobes being much larger than the terminal one which is reduced to a small funnel-like body, two-lipped and hairy at its mouth.*

In their vegetation the *Anguloas* are robust plants with large dark green pseudo-bulbs that are, at first, enclosed by alternate, imbricating leafy scales that pass upwards into true leaves. The leaves are large, plicate, prominently nerved, and of broadly lanceolate form. The scapes are produced from the base of the pseudo-bulbs, and are clothed with large, lax, pointed sheaths, of which the uppermost, the bract sheathing the ovary, is the largest.

The *Anguloas* occur on the Andes of South America at 5,000—7,000 feet elevation from northern Colombia southwards to about 10° south latitude in Peru, growing chiefly on damp moss-covered rocks and often in shady woods. Three species only are recognised by botanists, viz., *Anguloa Clowesii*, *A. Ruckeri* and *A. uniflora*, all the various forms or species so-called by horticulturists being reducible to one or other of these. The typical forms of these three species were all introduced into European gardens about the same time through M. Linden, the cost of whose mission to Venezuela and

* There is a slight deviation from this structure in *Anguloa uniflora*.

Colombia (1841—43) was partly defrayed by a few English gentlemen deeply interested in orchid culture, including Mr. Barker of Birmingham, Mr. Rucker of Wandsworth, the Rev. John Clowes of Manchester, and others.* The genus was founded by the Spanish botanists Ruiz and Pavon on *Anguloa unijlora*, and was dedicated by them to Don Francisco de Angulo, at that time Director-General of mines in Peru.†

Cultural Note.—The Anguloas are among the most tractable of orchids to cultivate, exacting no extra vigilance or care at the cultivator's hands. The plants should be potted in a compost of two-thirds fibrous peat and one-third of chopped sphagnum moss, to which some cultivators add a little silver sand to assist drainage. This compost should be placed on a drainage of clean broken crocks filling from one-half to two-thirds of the depth of the pot, and from which it should be separated by a layer of moss to prevent the drainage being choked by the filtering through of the compost; the best time for potting is when new roots begin to appear from the base of the pseudo-bulbs. The temperature should be intermediate, that is to say, a range of about 12°—15° C. (55°—60° F.) during the resting season, allowed to sink about 3° C. (5° F.) lower at night, and raised to 15°—18° C. (60°—65° F.) during the growing season with such increments by sun-heat as weather and circumstances permit. After potting, water should at first be moderately applied, gradually increasing the supply as the new growths gain strength, and again in diminished quantity after the pseudo-bulbs and leaves are mature. The young growths should be shaded from direct sunlight, but as maturity is approached they should receive all the light available. The leaves are somewhat liable to be infested with red spider, which may be got rid of by sponging.

Anguloa Clowesii.

Pseudo-bulbs cylindric-oblong, 5—6 inches long, leafless when old. Leaves broadly obovate-lanceolate, acute, 18—24 inches long. Scapes one-flowered, stoutish, erect, as long again as the pseudo-bulbs. Flowers sub-globose, of a uniform citron-yellow, and of a peculiar odour which has not been inaptly compared with that of a chemist's shop; sepals and petals elliptic-oblong, concave, the lateral sepals slightly oblique, shorter and broader, and the petals narrower than the dorsal sepal; lip concave, almost like a boat, articulated with the foot of the

* Lindley in Bot. Reg. 1844, sub. t. 63.

† Owing to the brief diagnosis of the genus given by these authors, and the obscure manner in which it is worded, Anguloa remained for half a century a botanical puzzle till the first flowers expanded in the orchid houses of the gentlemen through whose enterprise all the species were introduced.

column, three-lobed, the side lobes large, triangular, erect; the middle lobe reduced to a small, fleshy, two-lipped hairy funnel of which the upper lip is emarginate and the lower one acute and reflexed. Column very thick, bent, terete above, concave with two rounded processes below the stigma.

Anguloa Clowesii, Lindl. in *Bot. Reg.* 1844, misc. No. 29, and t. 63. Id. 1846, sub. t. 41. *Bot. Mag.* t. 4313. Linden's *Pesc.* t. 17. Warner's *Sel. Orch. I.* t. 33. Rchb. in *Walp. Ann.* VI. p. 599. *Lindenia*, IV. t. 191.

sub-var.—*eburnea*.

Flowers ivory-white; in every other respect conforming to the type.

A. Clowesii eburnea, supra. *A. eburnea*, Williams' *Orch. Alb.* III. t. 133.

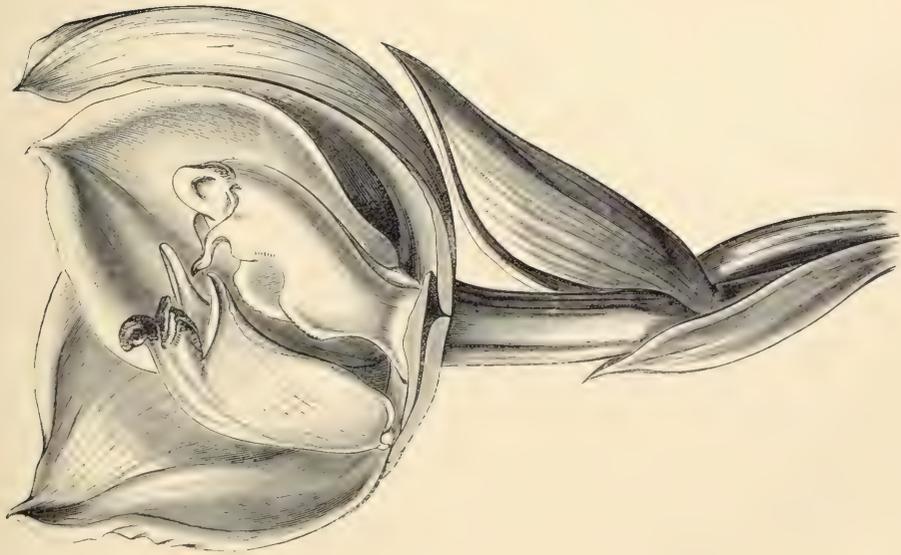
According to his own statement published in *Pescatorea*, M. Linden first detected this orchid near the village of Jaji in the province of Merida in 1842; it was shortly afterwards gathered by Schlim near Ocaña, and a little later still further north by Purdie who sent it to the Royal Gardens at Kew. Its range is now known to extend along both slopes of the eastern Cordillera of New Granada from Santa Martha to Bogota, it being in some localities very abundant. It flowered for the first time in this country in the collection of the Rev. John Clowes, at Broughton Hall, near Manchester, in the summer of 1844. Of the origin and introduction of the variety, a very beautiful and rare one, we find no record; our knowledge of it is derived from a plant in the collection of Sir Trevor Lawrence, Bart., at Burford Lodge.

A. *Ruckeri*.

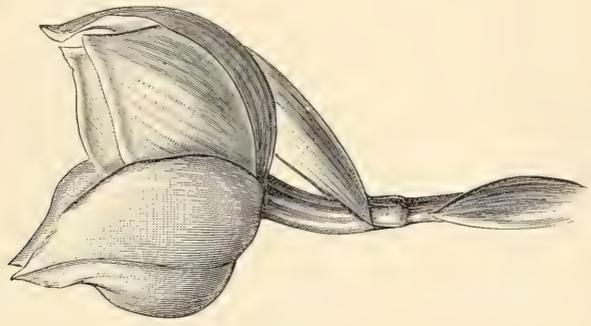
Pseudo-bulbs, leaves, and inflorescence as in *Anguloa Clowesii*, but somewhat smaller. Flowers greenish brown externally, yellow densely spotted with red on the inside; sepals and petals elliptic-oblong; the lateral sepals slightly oblique, shorter and broader and the petals narrower than the dorsal sepal; lip three-lobed, the side lobes erect, oblong, rounded at the apex, the intermediate lobe as in *A. Clowesii*. Column short, thick, terete above, swollen below the stigma on each side of the deep furrow that extends thence to the base.

Anguloa Ruckeri, Lindl. in *Bot. Reg.* 1846, t. 41. Rchb. in *Walp. Ann.* VI. p. 600. *Bot. Mag.* t. 5384 (*sanguinea*). Warner's *Sel. Orch. II.* t. 10. Regel's *Gartenfl.* 1854, t. 106. *Lindenia*, II. t. 53.

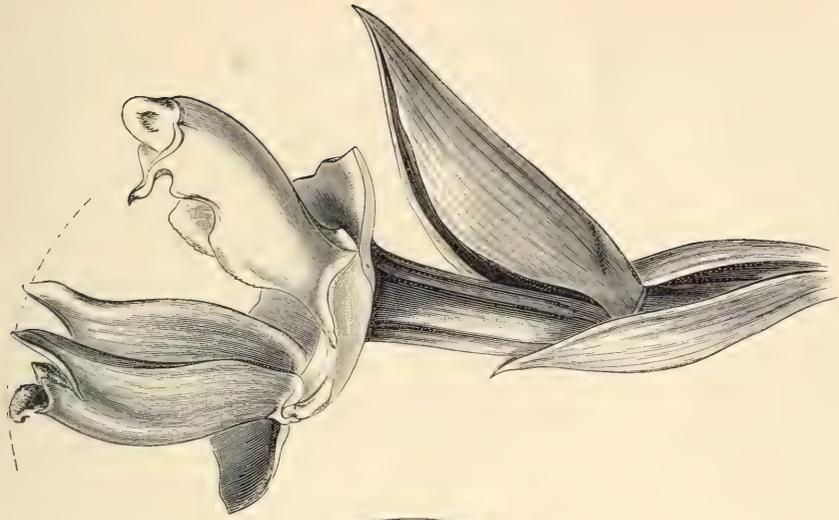
sub-vars.—*albiflora*, flowers white, sepals and petals of wax-like texture and aspect; *sanguinea* (*Gard. Chron.* 1854, p. 271. *Belg. hort.* III. t. 31. *Illus. hort.* s. 3, t. 427. Williams' *Orch. Alb. I.* t. 19), sepals and petals deep sanguineous red on the inside, lip and column yellowish white, the former spotted with crimson.



2



1



3

Anguloa Clowesii.

1, Flower reduced. 2, Flower natural size, with one sepal and one petal removed. 3, Flower with all the sepals removed.

The original form was introduced about the same time as *Anguloa Clowesii*, and through the same agency; it flowered for the first time in the collection of Mr. Rucker, at West Hill, Wandsworth, in the summer of 1846. It continued to be the rarest of the Anguloas in British gardens till the actual habitat of the species was discovered by Blunt while collecting orchids for Messrs. Low and Co. about the year 1870, who found it on the slopes of the eastern Cordillera between Pamplona and Bucaramanga; as it occurs nowhere else so far as at present known, its range is thence the most restricted of all the Anguloas. The sub-variety *albiflora* recently appeared in the collection of Mr. Charles Dorman, at Laurie Park, Sydenham; *sanguinea* was imported many years ago by Messrs. Rollisson, of Tooting.

As distinguished from *Anguloa Clowesii*, *A. Ruckeri* has smaller pseudo-bulbs and leaves; the scapes are a little shorter and the flowers differently coloured; the lip is shorter, the side lobes of which are rounded and not acute; the column is shorter and more deeply grooved below the stigma.

A. uniflora.

Pseudo-bulbs ovoid-oblong, angulate, 4—6 inches long. Leaves broadly lanceolate, acute, 18—24 inches long. Scapes 6—8 inches long. Flowers more open than in *Anguloa Clowesii* and *A. Ruckeri*, cream-white sometimes tinted and spotted with rose-pink on the inside; sepals ovate, acute, concave; petals smaller, elliptic-oblong, acute; lip three-lobed, the lateral lobes sub-rotund, rolled inwards into a tube; the terminal lobe very small, linear, reflexed, having at its base a bipartite thickened plate. Column clavate with two narrowly oblong auricles at the apex.

Anguloa uniflora, Ruiz et Pav. Fl. Peruv. Syst. p. 228. Id. Prod. Fl. Peruv. p. 118. t. 26 (1794). Lindl. Gen. et Sp. Orch. p. 160. Id. Bot. Reg. 1844. t. 60. Bot. Mag. t. 4807. Regel's *Gartenfl.* 1883, t. 1137. *Lindenia*, VII. t. 310 (Preyerani).

This is the type species of Ruiz and Pavon, who discovered it at Muña (about lat. 10° S.) during their mission to Peru, 1777—88, and where some years ago it was found by our collector, Walter Davis, associated with *Cypripedium caudatum*, growing among the scrub and low bushes, generally in partial shade. It first became known to horticulture in 1844, when a plant which had been collected by Linden in New Granada two years previously flowered in Mr. Barker's collection at Springfield, Birmingham. Ten years later it was

gathered on the slopes of Quindiu, in the central Cordillera of New Granada, thus proving its geographical range to be greater than either of the other species. Variation in the colour of the flowers has been observed, and some of the sub-varieties have received distinguishing names, but none of them appear to be sufficiently distinct to require separate notice here.

HYBRID ANGULOA.

The only hybrid *Anguloa* known to us, a very beautiful and interesting one, is that described below, which was obtained by Seden in our nursery from *Anguloa Ruckeri* and *A. Clowesii*, the first named being the pollen parent. A hybrid of similar origin was raised some years ago by Mr. J. C. Bowring, of Forest Farm, Windsor, but the plant is said to have died shortly after flowering. From the description of the flower by Reichenbach published in the *Gardeners' Chronicle* of 1881, part II., p. 38, it would seem that the colour of the sepals and petals of Mr. Bowring's plant was somewhat different from that of the same organs in our hybrid. By a curious coincidence, when our hybrid was in flower for the first time in May, 1888, an imported *Anguloa* flowered in the collection of Mr. R. H. Measures, at The Woodlands, Streatham, which, at first supposed to be a new species, proved to be identical with the artificially-raised hybrid, thus affording further proof of the existence of natural hybrids among orchids.

Anguloa intermedia.

Flowers nearly of the same shape and size as those of *Anguloa Ruckeri*. Sepals and petals yellowish white with a faint flush of rose-purple externally; cream-white on the inside densely spotted with rose-purple, the spots on the petals darker and larger than those on the sepals; lip coloured like the petals, except the disk which is paler and the small two-lipped terminal lobe which is yellow spotted with red.

Anguloa intermedia, Rolfe. in Gard. Chron. III. s. 3 (1888), p. 798.

SUB-TRIBE STANHOPIEÆ.

Stems usually pseudo-bulbous, bearing one or few leaves that are mostly broad and are either plicate or prominently ribbed. Flowers fleshy, of large size and irregular shape, borne in loose racemes, seldom solitary.

CORYANTHES.

Hook. in Bot. Mag. 3102 (1832). Lindl. Fol. Orch. 1852. Benth. et Hook. Gen. Plant. III. p. 549 (1883).

The group of genera forming the sub-tribe STANHOPIEÆ of Bentham is characterised in a remarkable degree by the singular shape of their flowers. So unusual and even grotesque is their aspect and structure that there is nothing to be found, not only in the great Orchidean family itself, but even throughout the Vegetable Kingdom with which they can be aptly compared. In no case is this strangeness more conspicuous than in *Coryanthes*, the first of the group that claims our attention. Although some of the species of *Coryanthes* have been known to science for upwards of three-quarters of a century, and most of these have from time to time been in cultivation for nearly so long a period, they are but rarely seen in the orchid collections of the present day.* Curious and interesting in the highest degree as are their flowers, which are among the largest and most extraordinary in form of all orchids, and not devoid of handsome colouration, they are of comparatively short duration; the plants too are somewhat refractory to the cultivator's care, besides taking up space that often can ill be spared.

Upwards of a dozen species of *Coryanthes* have been introduced into European gardens, and as some of these are quite recent discoveries, the extent of the genus is not accurately known.† They

* So scarce have plants of *Coryanthes* become in the orchid collections of this country that up to the time of these sheets passing through the press we have failed to obtain fresh specimens for examination and description. To avoid the reproach which we should have justly incurred by leaving this remarkable genus unnoticed, we have been obliged to draw upon previously published matter.

† Among the recently introduced species *Coryanthes Bungeorhii* (Lindenia, VI. t. 244) and *C. macrocorys* (Id. VIII. t. 342), neither of which we have seen in a fresh state, are evidently not inferior to their predecessors in beauty and interest.

are all natives of tropical America and are dispersed over the vast territory that stretches from Santa Catherina in southern Brazil to Mexico.

The essential characters of the genus will be well understood from the description of the two species that follow, and from the accompanying woodcut.

In their vegetation there is little to distinguish the *Coryanthes* from the *Stanhopeas*. They have long, strongly ribbed pseudo-bulbs, bearing thin prominently nerved leaves that vary in size in the different species.

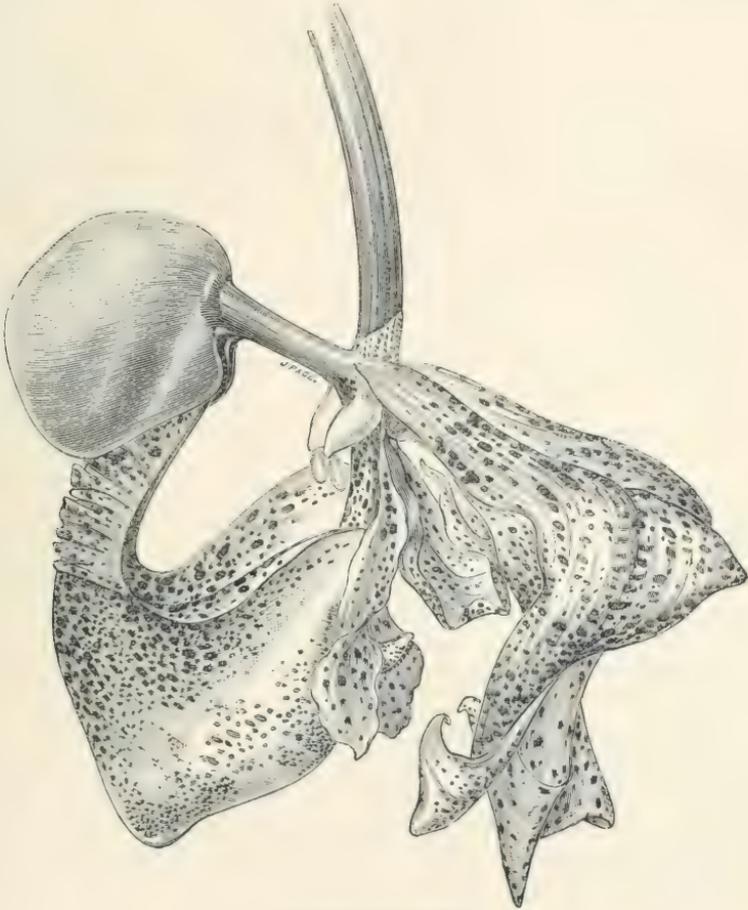
The genus was founded by Sir W. J. Hooker on *Coryanthes maculata*, joining with it *C. speciosa* and *C. macrantha*, which he had previously referred to *Gongora*. The name is formed from *κόρυς*, "a helmet," and *άνθος*, "a flower," in reference to the helmet-like appendage (epichile) of the labellum.

Cultural Note.—The cultural treatment of the *Coryanthes* is essentially the same as that of the *Stanhopeas*, except that having their home in the hot damp river valleys or near the low-lying sea-shore, they require the highest temperature available in orchid culture. The plants may be established on a block of wood or in a teak basket, either of which can be suspended near the glass where they can receive the greatest amount of light throughout the year. From their known habits and environment in their native country, it follows too that direct sunlight even in summer is beneficial provided an adequate supply of moisture can be maintained; and in the resting season the roots should never be allowed to become dry.

Coryanthes macrantha.

Pseudo-bulbs and leaves as in *Stanhopea*. "The scapes are produced from the base of the pseudo-bulbs on which two or three flowers are developed. Each flower is placed at the end of a long stiff cylindrical furrowed ovary, and when expanded measures something more than 6 inches from the tip of one sepal to that of the opposite one. The sepals are yellow spotted irregularly with dull purple, and are of a most delicate texture; the upper sepal falls back from the tip of the ovary, is narrow and not above half the length of the lateral two, which, instead of applying themselves to the lip as is usually the case, turn directly away from it, placing themselves at an acute angle with the upper sepal, and after a while collapsing at their sides till they look something like bats' wings half at rest. The petals hang nearly parallel with the column; they are narrowly lanceolate, much curved at the edge, and of the same colour and texture as the sepals. The lip is as fleshy and solid in its texture as the sepals and petals are delicate; it is seated on a deep purple stalk nearly an inch long and forming an obtuse angle with the column; this stalk terminates in

a hemispherical, greenish purple cup (hypochile), and contracting at its front edge extends forward into a kind of second stalk (mesochile) of vivid blood colour, the sides of which are thinner than the centre, turned back and marked with four or five deep sharp-edged plaits; these plaited edges again expand and form a second cup (epichile)



Coryanthes macrantha.

thinning away very much at the edges, of a broadly conical figure; this second cup is yellow streaked and spotted with light crimson, and seems intended to catch a watery secretion which drips into it from two succulent horns originating in the base of the column and hanging over the centre of the cup."—Lindley in *Bot. Reg.*, sub. t. 1841.

Coryanthes macrantha, Hook. in *Bot. Mag.* t. 3102 (1831). Lindl. *Gen. et Sp. Orch.* p. 159. Id. *Fol. Orch. Coryanthes*, No. 3. Id. *Bot. Reg.* t. 1841. *Pact. Mag. Bot.* V. p. 31. Linden's *Pesc.* t. 30. *Gongora macrantha*, Hook. *Bot. Misc.* II. p. 151, t. 80.

From the same source as the foregoing description we derive the following account of the origin of this wonderful plant:—"It was first figured by Sir William Hooker from a specimen in spirits, sent to him from Caracas by Mr. Lockhart. When the plant blossomed in Trinidad, where it is not uncommon in a wild state, the flowers appeared so extraordinary to those who saw them, that the visitors to the Botanic Garden supposed them to be artificial." It flowered for the first time in England in 1836, in our Chelsea nursery, at that time possessed by our predecessor Mr. Knight; and in the following year at Chatsworth, where Sir Joseph Paxton states "the flowers were the wonder and surprise of all who were favoured with an opportunity of seeing them."

We have given the popular description by Dr. Lindley of the flower of this remarkable species in preference to a purely technical one, in the belief that such would be more acceptable to many of our readers, and especially to those who are observant of the extraordinary structure as well as of the surprising beauty of many orchid flowers. Complex as the structure of a *Coryanthes* flower appears on superficial inspection, a closer examination reveals the fact that in its seemingly anomalous and strange form there is all the essential structure of an ordinary orchid flower; the bi-lateral symmetry is only in part disguised, and the flower is really as normal as regards its parts as that of a *Cattleya* or an *Odontoglossum*. But, it will be asked: What is the design of this unusual structure, and what is its use in the economy of the plant? Such an inquiry as this can only be satisfactorily answered after a patient watching of the flower from its first expansion and its surroundings in its native country till it begins to fade, or at least till the purpose has been accomplished for which the flower was created. Fortunately in this case the desired observation has been made, and we thence gladly extract from the Journal of the Linnean Society the following account of the fertilisation of the flowers of *Coryanthes macrantha* by Dr. Crüger, formerly Director of the Botanic Garden at Trinidad.*

"Large humble-bees, noisy and quarrelsome, are attracted at first by the smell of the flower; but the smell probably only gives notice to the insects; the substance they really come for is the interior lining of the labellum which they gnaw off with great industry. They may be seen in great numbers disputing with each other for a place on the edge of the hypochile. Partly by the contest, partly perhaps intoxicated by the matter they are indulging in, they tumble down into the "bucket" (epichile) half-full of the fluid secreted by the horn-like organs at the base of the column. They then crawl along the anterior

* Vol. VIII. pp. 129, 130 (1865).

inner side of the bucket where there is a passage for them. If one is early on the look-out, as these Hymenopters are early risers, one can see on every flower how fecundation is performed. The humble-bee in forcing its way out of its involuntary bath has to exert itself considerably, as the mouth of the epichile and the face of the column fit together exactly, and are very stiff and elastic. The first bee that is immersed will have the gland of the pollen masses glued to its back. The insect then generally gets through the passage and comes out with this peculiar appendage, to return nearly immediately to its feast, when it is generally precipitated a second time into the bucket, passing out through the same aperture, and so inserting the pollen masses into the stigma while it forces its way out, and thereby impregnating either the same or some other flower. I have often seen this, and sometimes there are so many of these humble-bees assembled, that there is a continual procession of them through the passage specified."

Further interesting details of the structure of *Coryanthes* flowers and the various contrivances by which their fertilisation is effected are given in the *Gardeners' Chronicle*, vol. XXI. (1884), p. 482; XXIII. (1885), p. 144; and XXIV. (1885), p. 103.

C. *maculata*.

Pseudo-bulbs clustered, 3—5 inches long, ovoid, tapering upwards, diphyllous. Leaves lanceolate, 12—15 inches long. Scapes subpendulous, as long as the leaves, 3—5 flowered; bracts ovate-lanceolate, about one-third as long as the stalked ovaries. Flowers similar in shape and structure to those of *Coryanthes macrantha* but smaller and differently coloured: sepals and petals of membranous texture, pale ochreous yellow, at first spreading, but soon after expansion becoming flaccid and reflexed; dorsal sepal lanceolate, acute, lateral two $2\frac{1}{2}$ inches long, much broader, broadly ovate, obtuse; petals narrowly oblong, twisted; stalk of labellum $\frac{1}{2}$ inch long, whitish with some purple spots, the helmet-shaped hypochile prolonged into a short channelled mesochile, connecting it with the "bucket" or epichile which is of somewhat conical shape and yellow spotted with purple. Column semi-terete, winged, with two horn-like appendages at the base.

Coryanthes maculata, Hook. in *Bot. Mag.* t. 3102 (1831). Lindl. *Gen. et Sp. Orch.* p. 159. Id. *Bot. Reg.* t. 1793. Id. *Fol. Orch. Coryanthes*, No. 2. *Bot. Mag.* t. 3747 (Parkeri). Williams' *Orch. Alb. III.* t. 98. C. Albertinæ, Karsten, *Auswahl*, t. 1. Van Houtte's *Fl. des Serres*, VIII. t. 755.

A very handsome species, scarcely less curious and interesting than the preceding. It is a native of British Guiana, where it was first detected by Mr. Ankers, by whom it was communicated to Mr. Parker, of Liverpool. It flowered for the first time in this country in the Botanic Garden of that city in June, 1831. It was

subsequently found by the German naturalist and traveller, Karsten, near St. Esteban at the foot of the Cumbre de Valencia in Venezuela, and introduced by him into European gardens under the name of *Coryanthes Albertinæ*.

Dr. Lindley remarked of this species that "it is not uncommon in the woods of Demerara, hanging from the branches of trees and suspending in the air the singular lips of its flowers like fairy baskets for the use of the birds and insects that inhabit the surrounding foliage." When the flowers first expand in the glass-houses of this country (and doubtless in their native forests) the horn-like appendages at the base of the column constantly distil water into the bucket-like epichile of the labellum, but the quantity sensibly diminishes with the age of the flower.

The species is variable in the colour of its flowers, a circumstance noticed shortly after its introduction. In the variety figured as *Parkeri* the hypochile of the lip is a dingy brown-purple; in *punctata* and *Albertinæ* the sepals and petals are spotted as well as the labellum, and in the last-named the "bucket" or epichile is sanguineous-red.

STANHOPEA.

Frost in Bot. Mag. sub. t. 2948 (1829). Lindl. Fol. Orch. 1852. Rehb. Xen. Orch. 1. p. 111. Benth. et Hook. Gen. Plant. III. p. 549.

In Stanhopea we have a very natural genus of orchids scarcely less remarkable for the structure and unusual aspect of the flowers than *Coryanthes*. Like *Coryanthes* the flowers are large with membranaceous sepals and petals of comparatively simple form, while the labellum is fleshy and of complex structure, the most obvious parts of which will be easily recognised from the figure introduced into the text; for so curious are the different parts of the lip of a Stanhopea, that a clear description of them without such help is well-nigh impossible.

Over twenty species of Stanhopea have been published, nearly all of them from garden specimens, for owing to the fleshy texture of the labellum, from which the specific characters are almost wholly

derived, their determination in herbaria is extremely difficult. The Stanhopeas are all natives of tropical America, but the information respecting their origin has been so vaguely and even carelessly given by the importers of them, that the precise habitats of not more than half of them are accurately known. By far the greater number of the species have been introduced from Southern Mexico and Central America; two or three are known to inhabit the Andes of Northern Peru, and three or four more occur on the Cordilleras of Colombia and Venezuela. *Stanhopea insignis* and *S. eburnea* are said to be of Brazilian origin, but this requires confirmation.

The following are the most obvious floral characters of Stanhopea:—



Column and lip of *Stanhopea Wardii*. (1) hypochile, (2) mesochile, (3) epichile.

The *sepals* and *petals* are spreading, of membranous texture and soon fading; the lateral sepals are larger and the petals smaller than the dorsal sepal.

The *labellum* is a remarkable organ of peculiar aspect, in which the tripartite structure common to the ORCHIDÆE is strongly marked; the three parts are thus usually distinguished:—(1) *hypochile*, the basal portion which is affixed to the base of the column; this is always saccate or hollowed out from above, sometimes globose in outline, sometimes elongated into the form of a boat; (2) *mesochile*, the middle portion consisting of two horn-like bodies either bent round and parallel with the sides of the epichile or bent upwards at a considerable angle to it; (3) *epichile*, the apical portion—this is polymorphous, being cordate, ovate, sub-rhomboidal or even oblong. Both mesochile and epichile are of wax-like appearance, usually white or colourless, but sometimes spotted.

The *column* is greatly elongated, arching over the labellum and

almost meeting it at its apex; the wings are membranous and dilated beyond the middle.*

The most noticeable deviations from this general structure occur in (1) *Stanhopea ecornuta*, discovered by Warscewicz in Central America and now rarely seen in cultivation; it differs from all other Stanhopeas in the lip consisting of the hypochile only and in its much abbreviated and thickened column; (2) *S. eburnea*, in which the horn-like appendages spring from the base and not from the middle of the lip, and in other details as described under that species.

In their vegetation the Stanhopeas not only closely resemble the Coryanthes, but possess a remarkable uniformity *inter se*, so much so that when not in flower many experienced cultivators are unable to distinguish one species from another. The following description is applicable to all the species here noticed.



Front view of lip of *Stanhopea Wardii*.

The *pseudo-bulbs* are clustered, of ovoid shape, 2—3 inches long, clothed at the base with ragged brown scales, strongly ribbed and monophyllous.

* It is certain that the remarkable structure we have sketched above is all-important in the economy of the plant and its perpetuation, but why so complex a mechanism has become necessary to its existence and the modifications it has undergone in the lapse of ages before attaining its present form are still among the secrets of Nature. The powerful odour exhaled by the flowers of most of the species, and which are all of short duration, is doubtless an incentive to the larger insects to visit the flowers and to make their way into the hypochile where honey would be likely to be secreted or with the object of gnawing the interior lining which they are said to devour with great avidity, and the forms of the mesochile and epichile are among the contrivances to induce the insect to leave the flower through the opening between the apex of the latter and that of the column, in which case the pollinia would be removed while pressing its way through. For effecting fertilisation, this hypothesis demands the alighting of an insect already loaded with pollinia on another unfertilized flower, and when passing through the apical opening the pollinia would be deposited on the stigma.

The *leaves* are broadly lanceolate or elliptic-lanceolate, prominently nerved beneath, 12—15 or more inches long, narrowed below into a channelled foot-stalk.

The *scapes* are stoutish, pendulous, usually bearing 2—3 flowers, but in a few species 5—7 flowers. The bracts are large, membranous, more or less inflated, and as long as or shorter than the ovaries.

The genus was proposed by Mr. John Frost, of Kew, for *Stanhopea insignis*, which flowered in the Royal Gardens in October, 1829, and was communicated by him to Dr. (afterwards Sir William) Hooker, by whom it was described in the *Botanical Magazine*, t. 2948. It was named in compliment to Earl Stanhope, at that time President of the Medico-Botanical Society of London.

Cultural Note.—The Stanhopes require the temperature of the tropical or East Indian house as it is usually called by most cultivators. On account of the flowers being produced on scapes that are quite pendulous, shallow teak baskets are best, so constructed as to admit of the scapes making their way through the bottom and sides, and sufficiently large to afford space for the compost and drainage. The compost should consist of one part fibrous peat and two parts sphagnum moss, some cultivators using sphagnum only, and for drainage long pieces of charcoal laid across the bottom bars of the basket; others prefer clean broken crocks in rather large pieces, and placed so as to allow an easy egress of the flower scapes. During the growing season the supply of water must be constant, but in winter, if the plants are suspended in a house in which a greater or less degree of humidity is always maintained, the Stanhopes require but little water directly applied. While in flower they may be removed to a cooler and drier house. Red spider and thrip sometimes attack the young leaves, from which they may be removed by sponging with clean tepid water.

Stanhopea Bucephalus.

Pseudo-bulbs and leaves as described above. Scapes 3—5 or more flowered. Flowers powerfully fragrant, tawny orange-yellow with sanguineous spots scattered irregularly over the whole flower, the column whitish and more densely spotted than the other parts; dorsal sepal oblong, acute; lateral sepals much larger, ovate-oblong, acute, 3 inches long; petals similar to the dorsal sepal, but smaller; lip clawed, hypochile cymbiform, narrow at the base, thickened in front; mesochile horse-shoe shaped, the arms bent forwards like the prongs of a hay-fork; epichile broadly ovate or sub-rotund, concave, terminating in a recurved cusp. Column very narrow, winged upwards.

Stanhopea Bucephalus, Lindl. Gen. et Sp. Orch. p. 157 (1832). Id. in *Bot. Beg.* 1843, sub. t. 44, and 1845, t. 24. Id. *Fol. Orch. Stanhopea*, No. 3. *Bot. Mag.* t. 5278. *Rchb. Xen. Orch. I.* p. 121. *S. grandiflora*, *Rchb.* in *Walp. Ann.* VI. p. 587 (1863), not of Lindl. *Anguloa grandiflora*, H. B. K. *Nov. Gen. et Sp.* I. p. 345 (1815).

This is a handsome species which Dr. Lindley identified as the *Anguloa grandiflora* of Humboldt and Bonpland, and which was discovered by them growing on the trunks of old trees in shady woods near Cuença, in Ecuador, in the beginning of the present century. It was re-discovered on the ascent from Guayaquil to Cuença, at an elevation of 6,000 feet in 1842 by Hartweg, who sent it to the Horticultural Society of London, in whose garden at Chiswick it flowered in the following year.

Stanhopea Bucephalus is occasionally confused with *S. Wardii*, which it much resembles in the colour of its flowers, but from which it is chiefly distinguished by the much narrower hypochile of the lip, in which the maroon spots so conspicuous in *S. Wardii* are absent; also by the more attenuated horns of the mesochile and more slender column; it appears to have now become comparatively rare in cultivation. The specific name is fanciful, literally "ox-head," but probably the name of the celebrated charger of Alexander the Great was intended.*

S. *Devoniensis*.

Peduncles 2—3 flowered. Flowers fragrant, 4 inches in diameter; sepals broadly ovate, obtuse, light fawn-yellow irregularly spotted with brownish crimson except on the apical area; petals oblong-lanceolate, acute, light fawn-yellow with fewer but larger and darker brown-crimson spots; hypochile of lip saccate, sub-globose, the bottom of the sac almost flat and sub-quadrate, the basal side dark maroon-purple, the remainder white spotted with purple; lobes of the mesochile curved like a bullock's horn, and nearly parallel with the sides of the epichile, ivory-white; epichile cordate with the margins upturned at the almost truncate apex, ivory-white with a few purple spots at the basal end. Column with narrow wings, white spotted with purple except at the apex.

Stanhopea Devoniensis, Lindl. *Scrt. Orch.* t. 1 (1839). Id. in *Bot. Reg.* 1843, sub. t. 44. Id. *Fol. Orch. Stanhopea*, No. 13. Van Houtte's *Fl. des Serres*, X, t. 974. *Rehb. Xen. Orch.* I. p. 119. Id. in *Walp. Ann.* VI. p. 586.

The origin of this fine species is virtually unknown; one hypothesis assumes Peru, another Mexico or Guatemala, without any direct evidence being adduced in support of either; we have recently had indirect evidence of its being of Mexican origin, which is supported by its

* This celebrated horse died in North-west India after the battle with King Porus, and after carrying Alexander through all his campaigns. It had been purchased by his father Philip for thirteen talents, and no one was able to break it in except the youthful Alexander.

nearest affinities being undoubtedly Mexican. It somewhat resembles *Stanhopea tigrina* in colour, but is distinguished from that species by the differently-shaped epichile of the labellum and by the very narrowly-winged column. It flowered for the first time in this country at Chatsworth in 1837, and is named in compliment to the then Duke of Devonshire.

S. eburnea.

Scapes usually two-flowered. Flowers ivory-white with some purple spots on the lip; sepals oblong-lanceolate, acute, $2\frac{1}{2}$ inches long; petals similar but narrower; lip narrowly oblong in outline, the hypochile boat-shaped, with two horn-like auricles at the base; the epichile ovate-oblong, sub-acute. Column arching, as long as the lip, with two rounded membranous wings above the middle.

Stanhopea eburnea, Lindl. in *Bot. Reg.* t. 1529 (1832), and 1843, sub. t. 44. Id. *Gen. et Sp. Orch.* p. 158. Id. *Fol. Orch. Stanhopea*, No. 19. *Bot. Mag.* t. 3359. *Rehb. Xen. Orch. I.* p. 117. Id. in *Walp. Ann.* VI. p. 582. *Ceratochilus grandiflorus*, Lodd. *Bot. Cab.* t. 1414.

An anomalous species first cultivated by Messrs. Loddiges in 1824, to whom it had been sent from Trinidad by Sir Ralph Woodford; it was thence the first *Stanhopea* that was introduced into British gardens. A quarter of a century later it was gathered in Surinam by Wullschlägel, and in Venezuela by Wagener who sent living plants to Europe; its habitat is therefore along the northern littoral of South America. It flowered in Mr. Bateman's collection at Knypersley, near Congleton, in 1832, on which occasion it was figured in the *Botanical Register*; and in the following year it was communicated to Sir William Hooker by Messrs. Shepherd, of Liverpool.* From that time to the present it has occasionally appeared in cultivation; our description was taken from a plant that flowered in our houses in 1889, whose origin we are unable to trace. *Stanhopea eburnea* is well distinguished by the horn-like appendages springing from the base of the lip and not from the middle, and by its long boat-shaped hypochile as seen in profile.

S. ecornuta.

Scapes short and stoutish, usually two-flowered. Flowers about 3 inches across vertically; sepals and petals cream-white, the latter spotted with purple at the base, all pointing in one direction; the sepals oblong, obtuse, concave; the petals sub-quadrate, much smaller; lip

* In both cases erroneously stated to be of Brazilian origin.

calceolate, ventricose at the base and beneath, thickened in front into three rounded protuberances, yellow deepening to dark orange at the base and on the inside.* Column semi-terete with two fleshy rounded wings, yellow.

Stanhopea ecornuta, Lemaire in Van Houtte's *Fl. des Serres*, II. pl. 181 (1846). Lindl. in Paxt. *Fl. Gard.* I. No. 54, icon. xyl. Id. *Fol. Orch. Stanhopea*, No. 20. Rehb. in *Bot. Zeit.* X. p. 836 (1852). Id. *Xen. Orch. I.* p. 124, t. 43. Id. in Walp. *Ann.* VI. p. 583. *Stanhopeastrum ecornutum*, Rehb. in *Bot. Zeit.* X. p. 927 (1852).

An aberrant species differing from every other *Stanhopea* in its much simplified labellum, which consists of the hypochile only; in its shorter column with thickened wings; and in the fleshy texture of the sepals, which when first expanded assume a different position. It was at first regarded by Lindley as a monstrous state of some other species, a view that was dispelled by the constancy of the plants that subsequently flowered. A new genus was proposed for it by Reichenbach under the name of *Stanhopeastrum*, but this he soon after abandoned and restored it to *Stanhopea*, of which it is the most archaic form that has yet been discovered.

Stanhopea ecornuta, so called from the absence of the horns of the labellum, was discovered by Warszewicz in the forests around San Toma in Guatemala, in 1845; it was introduced into European gardens in the following year through him by Van Houtte of Ghent.

S. graveolens.

Scapes usually two-flowered. Flowers powerfully odorous; sepals and petals at first greenish white passing into straw-yellow; the sepals ovate-oblong, acute, concave and spreading; the petals much narrower, ovate-lanceolate, reflexed, undulate at the margin; hypochile of lip saccate approaching cymbiform, deep apricot-yellow; horns of mesochile curved outwards and inwards, much attenuated at the apex, ivory-white; epichile ovate, acute, concave, ivory-white sometimes dotted with purple. Column broad, winged to near the base, the wings terminating in points that extend a little beyond the apex of the anther.

Stanhopea graveolens, Lindl. in *Bot. Reg.* 1840, misc. No. 125; and 1845, sub. t. 65. Id. *Fol. Orch. Stanhopea*, No. 8. Van Houtte's *Fl. des Serres*, Aug. 1846, pl. I. and II. Rehb. *Xen. Orch. I.* p. 122.

This was cultivated by Dean Herbert in 1840, who had acquired by purchase a plant whose origin was unknown. A few years later the species appeared in several collections, both British and Continental, the plants being supposed to have been imported from

* Four small gibbositities, two at the base and two at the apex, indicate the rudiments of the aborted horns.

Guatemala. The odour of the flowers is disagreeably powerful, communicating itself to the fingers when touched.

Very near *Stanhopea graveolens* is the scentless *S. inodora*, a native of Mexico, which we have not seen in cultivation.

S. insignis.

Scapes usually two-flowered. Flowers fragrant; sepals and petals more or less reflexed, dull pale yellow dotted with purple except on the apical area; the dorsal sepal ovate-lanceolate, the lateral two much broader, ovate-oblong; the petals broadly linear, acute; hypochile of lip sub-globose or sub-hemispheric (longer than broad), much thickened and contracted in front, deep purple beneath, whitish and much spotted with purple above; mesochile horse-shoe shaped, the arms bent inwards, attenuated, and almost meeting at their extremities, ivory-white sometimes sparingly spotted with purple; epichile cordate, sub-acute, deeply channelled along the middle, white more or less spotted with purple. Column as long as the lip, slightly arched, with two broad, rounded, membranous wings above the middle, white stained and spotted with purple.

Stanhopea insignis, Frost and Hook. in *Bot. Mag.* t. 2948 (1829). Lodd. *Bot. Cab.* t. 1985. Lindl. *Gen. et Sp. Orch.* p. 157. Id. in *Bot. Reg.* t. 1837; and 1843, sub. t. 44. Id. *Fol. Orch. Stanhopea*, No. 1. *Rehdb. Xen. Orch.* I. p. 118. Id. in *Walp. Ann.* VI. p. 585.

The species on which the genus was founded and one of the first *Stanhopeas* cultivated in British gardens, it having been introduced to the Royal Gardens at Kew some time prior to 1829, in which year it flowered for the first time; in the following year it flowered in the collection of Mr. Cattley at Barnet, and a little later in the garden of Earl Fitzwilliam, at Wentworth, near Sheffield, it being at that time a very rare plant. It was originally found by Humboldt and Bonpland on the trunks of old trees in shady woods near Cuença in Ecuador, in the beginning of the present century.* *Stanhopea insignis* is well distinguished by its purple globose hypochile and heart-shaped epichile.

S. Martiana.

Flowers as large as *Stanhopea insignis*; sepals broadly ovate, obtuse, pale straw-yellow or white sparingly spotted with crimson-purple; petals oblong, sub-acute, with larger spots than the sepals; hypochile of lip hemispheric, dark purple on the inside; horns of mesochile

* Lindl. in *Bot. Reg.* sub. t. 1837. The assertion that Loddiges imported it from Brazil is erroneous.

long, broad at the base, tapering into slender cirri at the apex; epichile narrowly oblong, tridentate at the apex, both mesochile and epichile ivory-white. Column wingless, white spotted with purple.

Stanhopea Martiana, Batem. in *Bot. Reg.* 1840, misc. No. 109. Id. *Orch. Mex. et Guat.* t. 27. Lindl. in *Bot. Reg.* 1844. t. 44. Id. *Fol. Orch. Stanhopea*, No. 12. *Rehb. Xen. Orch.* I. p. 119. Id. in *Walp. Ann.* VI. p. 586. Van Houtte's *Fl. des Serres*, XX. t. 2112.

Discovered by Karwinsky in Mexico, in 1837, and communicated by him to Mr. Bateman, in whose collection at Knypersley it flowered in May, 1840; it was shortly afterwards sent to Mr. Richard Harrison, of Liverpool, by Galeotti. As the botanical collections of these two explorers were made chiefly in the neighbourhood of Oaxaca, the richest orchid district in Mexico, the habitat of the plant may be assumed to be in that district. The species is dedicated to the late Professor Martius, of Munich, one of the earliest botanical explorers of the Amazon region of Brazil; it is well distinguished by the cirri-like apices of the mesochile, the long narrow epichile and the downy and almost wingless column.

S. oculata.

Scape 5—7 flowered. Flowers 5 inches across vertically, very odoriferous, and very variable in colour; sepals broadly ovate, acute, concave, the lateral two broader than the dorsal one, sometimes pale yellow with numerous ocellated red spots, sometimes with few spots and more rarely wholly white; petals ligulate, much smaller, thinner in texture, and with the spots more scattered than on the sepals or entirely absent; lip narrowly oblong in outline; the hypochile boat-shaped, the basal half light orange-yellow with two blackish lateral spots, the anterior half white spotted with red but sometimes destitute of spots; horns of mesochile first erect and then slightly bent inwards and forwards, much acuminate; epichile cordate, acute, concave, both mesochile and epichile ivory-white, the latter sometimes spotted with purple. Column sub-terete, bent, with two rounded wings above the middle, greenish or white spotted with red but sometimes without spots.

Stanhopea oculata, Lindl. *Gen. et Sp. Orch.* p. 153 (1832). Id. in *Bot. Reg.* t. 1800; and 1843, sub. t. 44. Id. *Fol. Orch. Stanhopea*, No. 4. *Rehb. Xen. Orch.* I. p. 120. *Regel's Gartenfl.* IV. t. 89 (crocea). *Bot. Mag.* t. 5300. *Lindenia*, VI. t. 256. *Ceratochilus oculatus*, Lodd. *Bot. Cab.* t. 1764.

A very handsome species, first imported in 1829 by Messrs. Loddiges from Xalapa in Mexico through Deppe. It flowered in their nursery in June, 1831, and three years later in Mr. Bateman's collection at Knypersley. It was shortly afterwards sent from Guatemala by Mr. G. Ure Skinner to Mr. Harris, of Kingsbury,

and to other correspondents. It is one of the best known of Stanhopeas and also one of the most variable in the colour and spotting of its flowers. As a species it is distinguished by its long narrow lip, of which the horns of the mesochile are short, broad, and at a considerable angle to the epichile.

Mr. Skinner in a communication to Mr. Harris respecting the habitat of *Stanhopea oculata* in Guatemala stated that he found it growing on the same tree as *Oncidium leucochilum* in the higher temperatures, and recommended for its culture in Europe that it should be kept in a temperature not colder than 13° C. (55° F.) nor warmer than 21° C. (70° F.), that it should be well watered from June to September, and from October till May only slightly watered every evening at sunset to resemble the dews of its native home—not, it must be recollected, so heavy as people represent them in Europe, the region being high and very different from a coast climate. The seasons are the same as in England, the coldest weather being from December to February when the thermometer sometimes sinks to 3°—5° C. (36°—42° F.) at sunrise.*

S. *Platyceras*.

Scapes stoutish, usually two-flowered. Flowers nearly as large as those of *Stanhopea tigrina*; sepals and petals nankeen-yellow spotted with red-purple, many of the spots ocellated, the sepals broadly ovate-lanceolate, sub-acute; the petals linear-lanceolate, acute; hypochile of lip broadly cymbiform, produced near its front end into a fleshy oblong process, maroon-purple, paler and spotted at the basal end; horns of mesochile broadly sickle-shaped; epichile shortly clawed, ovate, acute; both mesochile and epichile whitish more or less spotted with red-purple. Column long and slender, slightly arching, narrowly winged beyond the middle, whitish dotted with purple.

Stanhopea Platyceras, Rehb. in Gard. Chron. 1868, p. 27. Saunder's *Ref. Bot.* II. t. 108 (1878). *The Garden*, XXXIII. (1888), t. 652.

A very handsome species introduced by Messrs. Low and Co. from New Granada, and which flowered for the first time in this country in the collection of Mr. John Day at Tottenham, in 1867, and subsequently in that of Mr. Wilson Saunders at Highfield, Reigate, and in other places; its precise habitat has not been divulged. The specific name, from *πλατύς*, "broad," and *κέρας*, "a horn," refers to the unusually broad horns of the mesochile, and which with the curved and broad boat-like hypochile well distinguishes the species. Mr. James O'Brien, of Harrow, kindly sent us materials for description.

* Bot. Reg. 1840, misc. p. 44.

S. tigrina.

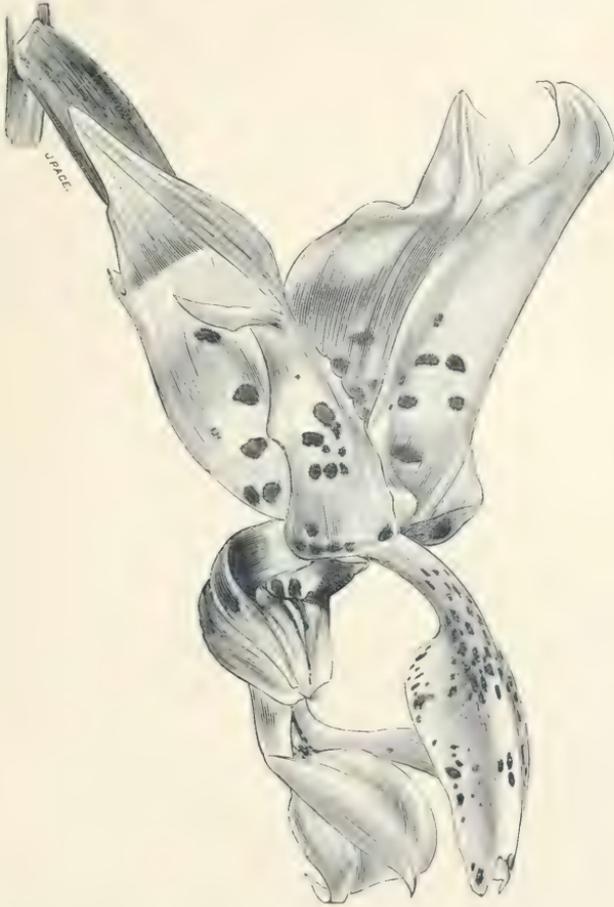
Scapes 3—4 flowered; flowers 6—7 inches across the lateral sepals. Sepals broadly ovate, obtuse, deep sanguineous red with a few pale yellow spots and blotches near the base, and a larger pale yellow area at the apex; the dorsal sepal narrower and more obtuse than the lateral two which are concave; petals linear-oblong, with revolute margins, dark vinous red at the base, the middle area blotched with vinous red and pale yellow, the apical area wholly yellow or sparingly spotted; lip broadly oval in outline; the hypochile deeply concave, in shape like the stern half of a boat, orange-yellow blotched with maroon-purple at the sides; the mesochile two sickle-like horns, bent round towards the apex of the epichile and nearly parallel with its sides, ivory-white spotted with purple to beyond the middle; the epichile sub-rhomboidal, three-toothed at the apex, ivory-white spotted with purple. Column gently curved, compressed, with two rounded wings, yellowish spotted with red.

Stanhopea tigrina, Batem. *Orch. Mex. et Guat.* t. 7. Lindl. in *Bot. Reg.* 1839, t. 1; and 1843, sub. t. 44. Id. *Fol. Orch. Stanhopea*, No. 11. *Bot. Mag.* t. 4197. Van Houtte's *Fl. des Serres*, VII. t. 713. Rehb. *Xen. Orch. I.* p. 120. *Lindenia*, II. t. 51. *Gard. Chron.* IV. s. 3 (1888), p. 418, icon. xyl.

This very remarkable *Stanhopea*, the largest and in some respects the handsomest of the genus, seems to have been known to the Jesuit, Hernandez, who wrote on the Natural History of Mexico in the seventeenth century and who mentions it under the name of *Coatzontz Cozoahitl*, doubtless the vernacular name of the plant at that epoch; but his description is too vague to render the identification with *Stanhopea tigrina* certain, although highly probable. The plant appears to have been overlooked by the Mexican botanists La Llave and Lexarza, the latter of whom published his *Orchidaceum Opusculum* in 1825, in which he describes fifty species of Mexican orchids; but owing to the terse and quaint mode of description employed, it must be admitted that several of them cannot now with certainty be identified.

Stanhopea tigrina was first figured and described by Mr. Bateman in his *Orchidacea of Mexico and Guatemala* shortly after its introduction into British gardens by Messrs. Low and Co., of Clapton, through their collector Henchman, who gathered it in 1835 at a considerable elevation on the mountains in the neighbourhood of Xalapa; it flowered for the first time in this country in Mr. Bateman's collection at Knypersley in May, 1837. It was shortly afterwards detected by Hartweg and also by Galeotti growing upon oaks in thick forests covering the Cordillera near Vera Cruz at 3,000—4,000 feet elevation.

It has since been gathered in Guatemala, and one of our collectors affirms with confidence that he gathered this same species on the eastern Cordillera of New Granada at some distance north of Bogota; its geographical range is therefore considerable. The flowers are somewhat variable in colour, and some of the sub-varieties have received distinctive names, as *lutescens*, *nigro-violacea*, etc.



Stanhopea Wardii.

S. *Wardii*.

Scapes robust, 12—15 inches long, pale glaucous green spotted with dull crimson, 5—7 flowered. Flowers large and fragrant; sepals and petals golden yellow sometimes spotted with red-purple, the sepals elliptic-oblong, acute, concave; the petals much narrower, ligulate, acute;

hypochile of lip cymbiform, gibbous in front beneath the mesochile, saccate at the base where it is orange with two maroon spots, or wholly maroon, the front part orange-yellow but sometimes whitish; horns of mesochile narrowly falcate and bent over the epichile, light yellow or ivory-white; epichile cordate, acute, incurved at the margins, pale yellow spotted with red. Column nearly straight with two rounded wings, and coloured like the epichile of the lip.

Stanhopea Wardii, Lindl. Sert. Orch. t. 20 (1839). Id. in Bot. Reg. 1843, sub. t. 44. Id. Fcl. Orch. *Stanhopea*, No. 6. Rchb. Xen. Orch. I, p. 122. Id. in Walp. Ann. VI. p. 588. Knowles and Westc. *Fl. Cab. II.* pl. 90. *Bot. Mag.* t. 5287. *Lindenia*, VII. t. 315. *S. aurea*, Lodd. in Bot. Reg. 1841, misc. No. 31.

One of the best known of the *Stanhopeas*; it was originally introduced from La Guayra, the port of Caracas, by Messrs. Loddiges in 1828 through their correspondent Mr. Ward, after whom it was named; and shortly afterwards by Messrs. Low from the same locality. It was subsequently found in Guatemala and sent from that country to Messrs. Loddiges and to the Royal Gardens at Kew. It is easily recognised by the dark velvety maroon colour of the cavity of the hypochile.

HOULLETTIA.

A. Brongn. in Ann. Sc. Nat. s. 2, vol. XV. p. 37 (1841). Benth. et Hook. Gen. Plant. III. p. 550.

Houlletia includes about six species which occur in two parts of the South American continent widely remote from each other, viz., the Andean region of northern Colombia and the province of Rio de Janeiro in southern Brazil; in the last-named region, however, the genus is represented, so far as at present known, by a single species, that on which it was founded; and the others are found within a limited area in northern Colombia. *Houlletia* therefore affords another instance of the ORCHIDÆE of northern Colombia and southern Brazil being connected by the closest affinities and at the same time separated by an immense geographical space.*

Botanically *Houlletia* has *Stanhopea* for one of its nearest affinities, but from which it is clearly distinct in its floral characters; the

* Thus, *Cattleya*, *Cypripedium*, *Miltonia*, *Rodriguezia*, *Ionopsis*, and several others. But it must be remembered that the intervening region has thus far been very imperfectly explored; in fact, the greater part of it except along the banks of the navigable rivers is practically unknown botanically.

bilateral symmetry of the flowers is also much less disguised than in Stanhopea. The most obvious floral characters are:—

The *sepals* and *petals* are similar, sub-equal, and more or less spreading. (Not unequal and reflexed as in Stanhopea.)

The *lip* is distinctly articulated at the middle; it has horn-like processes as in Stanhopea, but they are produced from the basal half (hypochile) and turned backwards.

In their vegetation the Houlettias agree with the Stanhopeas in having prominently ribbed, monophyllous, small pseudo-bulbs, but the footstalks of the leaves are much longer in proportion to the blade. The scapes are erect and are 5—10 or more flowered.

The genus commemorates the name of M. Houlet, the discoverer of the type species in Brazil, who after his return to France was appointed Curator or *Chef des cultures* of the Jardin des Plantes at Paris.

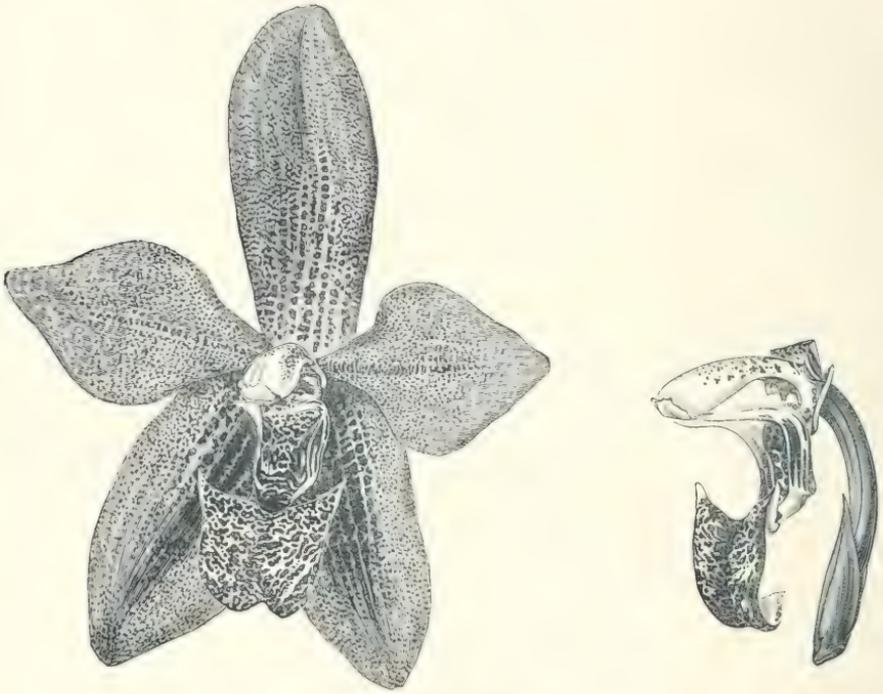
Cultural Note.—The cultural treatment of the Houlettias is the same as that of the Stanhopeas, except that they may be grown in a lower temperature such as is maintained in an intermediate house.

Houletia Brocklehurstiana.

Pseudo-bulbs ovate-oblong, 3—4 inches long, strongly ribbed and furrowed when old, monophyllous. Leaves with a long sub-terete foot-stalk, 12—15 inches long; the blade lanceolate-oblong, acuminate, plaited, 18—24 inches long. Scapes stoutish, erect, 18—24 inches high, dull purple mottled with pale green, racemose along the distal half, 7—10 flowered; bracts narrowly lanceolate, acuminate, half as long as the stalked ovaries. Flowers 3 inches in diameter; sepals and petals light red-brown striated with pale yellow and spotted with darker red-brown on the basal half, the lateral sepals with a dark sanguineous stain on the inner side; dorsal sepal and petals ovate-oblong, sub-acute and concave; lateral sepals broader, elliptic-oblong, keeled behind towards their tip; lip shorter than the other segments, jointed at the middle, the hypochile white densely spotted with blackish warts, transversely oblong at the base, then narrowly oblong, produced laterally at its junction with the epichile into two ascending curved horns that are whitish streaked with red-purple; the epichile broadly trowel-shaped, reflexed at the apex and prolonged at the lateral angles into short cusps; it is covered with blackish purple warty asperities and light orange reticulations. Column clavate, triquetral, concave below the stigma, light tawny yellow spotted with red.

Houletia Brocklehurstiana, Lindl. *Sert. Orch.* t. 41 (1839). Id. in *Bot. Reg.* 1841, misc. No. 99. *Bot. Mag.* t. 4072. *Pact. Mag. Bot.* IX. p. 49. *Regel's Gartenfl.* 1853, t. 229. *Linden's Pesc.* t. 36. *Rehb. in Walp. Ann.* VI. p. 615. *Lindenia*, V. t. 214. *Williams' Orch. Alb.* VIII. t. 337.

This is the handsomest and best known of the Houlettias. It was introduced from Rio de Janeiro by Mr. Wanklyn, of Manchester, by whom it was communicated to Mr. Brocklehurst, of The Firs, near Macclesfield, at that time the possessor of one of the best orchid collections in England, and in which this orchid flowered for the first time in 1841. On the flowers being sent to Dr. Lindley for identification he doubtfully referred the species to *Maxillaria*, but immediately afterwards removed it to *Houletia* on the publication



Houletia Brocklehurstiana.

of that genus by the eminent French botanist, Adolphe Brongniart, in the *Annales des Sciences Naturelles*. A short time previous to its introduction into this country, this orchid had been discovered growing on trees at Corcovado, near Rio de Janeiro, by Houlet, a French gardener, who had accompanied M. Guillemain on a mission to Brazil, and who brought living specimens to the Jardin des Plantes at Paris, where on its flowering it was constituted a new genus by M. Brongniart, but who singularly enough omitted to give it a specific

name. As *Houlletia Brocklehurstiana* is the only *Houlletia* that has been found in the neighbourhood of Rio de Janeiro, there can be but little doubt that it is Brongniart's type species.

It was next detected on the Organ Mountains by Gardner, whose herbarium specimen is still preserved at Kew; after him by William Lobb, who sent plants to our Exeter firm in 1842. From that time to the present it has probably never been absent from British collections, where its stately habit and sombre aspect afford a very distinct feature when the plant is in flower. The numerous illustrations quoted above attest the high favour in which this orchid has been held by horticulturists; they also show considerable variability in the colour of the flowers.

H. chrysantha.

Pseudo-bulbs, leaves and inflorescence as in *Houlletia Brocklehurstiana* except that the leaves are smaller and the scapes shorter and fewer-flowered. Flowers $2\frac{1}{2}$ inches in diameter, light yellow spotted with sanguineous red; sepals and petals similar and sub-equal, broadly oval, obtuse, more or less incurved; hypochile of lip with two dolabriform, obliquely incurved auricles each with an acute tooth at the front angle; epichile broadly cuneate at base, sub-rhomboidal, rounded at the apex and with a horn-like appendage at each of the lateral angles.

Houlletia chrysantha, André in *Illus. hort.* XVIII. p. 138, t. 71 (1871).

A distinct species, especially as regards the structure of the labellum, discovered by Gustav Wallis in the Colombian province of Antioquia, and introduced by him to M. Linden's horticultural establishment at Brussels, where it flowered for the first time in Europe in 1871. Our materials for description were derived from the collection of the late Mr. Neville Wyatt, at Lake House, Cheltenham.

H. odoratissima.

Pseudo-bulbs, leaves and inflorescence nearly as in *Houlletia Brocklehurstiana*. Flowers fragrant, nearly 3 inches in diameter, bright chocolate-red except parts of the lip which are white; sepals oval-oblong, obtuse, concave, the lateral two broader than the dorsal one; petals much smaller, linear-spathulate, acute; hypochile of lip sub-quadrate with two slender horn-like appendages that are bent backwards;

epichile hastate, produced at the lateral angles into two short horns. Column triquetral, bent, slender at the base, dilated upwards.

Houlletia odoratissima, Lindl. in Paxt. Fl. Gard. III. p. 172 (1853). Linden's *Pesc.* t. 3. Rehb. in Walp. Ann. VI. p. 616. Gard. Chron. XXII. (1884), p. 38 (xanthina); and XXIV. (1885), p. 777. icon. xyl. Godefroy's *Orchidophile*, 1887, p. 273. *Lindenia*, VII. t. 324.

var.—antioquiensis.

Scapes longer and more robust. Flowers larger with broader segments; sepals and petals rich chocolate-brown shaded with maroon towards the base; epichile of lip and apex of column light yellow.

H. odoratissima antioquiensis, André in *Illus. hort.* XVII. p. 59. t. 12 (1870). Williams' *Orch. Alb.* VII. t. 316. *Rev. de l'Hort. Belge*, 1890, p. 121.

Originally discovered by Schlim in 1849, in the province of Soto, on the east side of the river Magdalena, on the banks of streams where its powerful odour betrayed its presence, and two years later it was collected by him in the *Weinmannia* forests near Ocaña, and introduced to M. Linden's horticultural establishment at Brussels. It flowered for the first time in Europe in M. Pescatore's collection at St. Cloud, near Paris, in 1852.

The variety, a very distinct one, is a geographical form from the opposite or western side of the Magdalena; it was discovered by Gustav Wallis in 1868, in the province of Antioquia, and introduced by him to M. Linden's establishment.

H. picta.*

Pseudo-bulbs, leaves and inflorescence as in the type species. "Flowers $3\frac{1}{2}$ inches in diameter; perianth spreading, the basal half tessellated with yellow and cinnamon-brown, the apical half wholly cinnamon-brown; sepals narrowly oblong, obtuse; petals rather smaller, narrowed towards the base; hypochile of lip somewhat trapeziform, the sides produced backwards into long ascending spines, the disk yellow blotched with red-purple; epichile broadly hastate, the posterior angles produced into short recurved horns, reflexed and deeply channelled at the apex, light yellow with some short transverse red bars. Column yellow blotched with brown on the back."—*Botanical Magazine*.

Houlletia picta, Rehb. in Regel's *Gartenfl.* 1855, p. 2. Id. in Walp. Ann. VI. p. 616. *Bot. Mag.* t. 6305.

"Discovered by Schlim in New Granada, along with other very similar species of the genus, collected up to an elevation of 4,000—6,000 feet. It first flowered in the celebrated orchid garden of Consul Schiller at Hamburg, and later at Farnham Castle, from whence the specimen figured in the *Botanical Magazine* was obtained. It differs very slightly from the type species."†

* Not seen by us.

† *Bot. Mag.* sub. t. 6305.



Houletia odoratissima.
(From the *Gardener's Chronicle*.)

MOOREA.

Rolfe in Gard. Chron. VIII. s. 3 (1890), p. 7.

This is a new genus founded by Mr. Rolfe, of the Kew Herbarium, on a species acquired by Mr. F. W. Moore at a sale of orchids, and which upon flowering in the Glasnevin Botanic Garden was found to conform to no known genus. It is of too much interest to be passed over unnoticed, and we have therefore transcribed the published description of the author. Following Mr. Rolfe we have placed Moorea next to Houlletia, from which it differs "in the lip being without a claw and articulated with the base or foot of the column, and by its epichile not being articulate with the hypochile."

The new genus worthily commemorates the name of Mr. F. W. Moore, Curator of the Royal Botanic Garden at Glasnevin, near Dublin, in recognition of "his large series of very valuable contributions to the Kew Herbarium, extending over a long period," and we may on our part add—his constant and untiring kindness in supplying us with specimens of rare and little known orchids for description in this work.

Moorea irrorata.

"Pseudo-bulbs ovoid-oblong, $2\frac{1}{2}$ inches long, diphyllous. Leaves petiolate, plicate, lanceolate, shortly acuminate, $1\frac{1}{2}$ to 2 feet long, $4\frac{1}{2}$ inches broad. Scapes basal, stout, erect, $1\frac{3}{4}$ feet high; raceme thirteen-flowered with about six sheathing striate bracts below; the flowering bracts ovate-elliptic, acute, pale green, $\frac{3}{4}$ —1 inch long. Flowers 2 inches in diameter; sepals and petals spreading, sub-equal, elliptic-oblong, acute, reddish brown with nearly white base, the lateral sepals carinate, the petals a little narrower. Lip articulated to the short foot of the column, straw-yellow with radiating dark purple lines, deeply three-lobed, the side lobes broadly rounded; the front lobe narrowly linear, acute; crest basal with a pair of free spreading arms forming a crescent, bright yellow with numerous dark spots. Column somewhat elongate, sub-clavate, cream-white; wings obsolete."—Rolfe in Gard. Chron. VIII. s. 3 (1890), p. 7.

Moorea irrorata, Rolfe in Gard. Chron. loc. cit.; and XI. s. 3 (1892), p. 489, with figs. Bot. Mag. t. 7262.

Nothing has been divulged respecting the origin of this orchid. "It was probably imported by Messrs. Shuttleworth and Co. from the Andes of New Granada or Peru, these gentlemen having sent

a flowering raceme together with a leaf to Kew, in December, 1889, a few months before others were received from Mr. Moore, though the fact was not known until later."* The specific name



Moorea irrorata.

(From the *Gardeners' Chronicle*.)

is given in allusion to the bright reddish brown colour, which forms a broad zone round the paler centre.

* *Bot. Mag.* sub. t. 7262,

PERISTERIA.

Hook. in Bot. Mag. t. 3116 (1831). Benth. et Hook. Gen. Plant. III. p. 550 (1883).

In *Peristeria* the flowers appear more regular in outline than in the Stanhopeids described in the preceding pages. This is owing to the sepals and petals being more or less connate at the base; they are also very fleshy and convex on the outer side, imparting to the flower an almost globose form. Moreover, the labellum is of simpler structure; this organ, like the other segments, is of fleshy texture, three-lobed, continuous with the column and articulated at the middle. The column itself is short, thick and mostly wingless; the pollinia are sessile or sub-sessile, and furrowed on one side.

The species that conform to these characters are about eight in number, of which three or four are but very imperfectly known. Those here noticed are all more or less robust plants with large pseudo-bulbs and long plaited leaves; in this respect the type species *Peristeria elata* is one of the largest pseudo-bulbous orchids in cultivation.

The generic name is formed from the Greek word *περίστερα*, "a dove," selected for the reason given under *Peristeria elata*.

Peristeria cerina.

Pseudo-bulbs ovoid-oblong, 3 inches long, bearing at their apex 3—4 oblong-lanceolate leaves, 7—10 inches long, narrowed below into a short channelled petiole. Scapes short and pendulous, sheathed at the base by brownish, ovate, imbricating scales; raceme dense, 7—10 flowered. Flowers about an inch in diameter, light citron-yellow; sepals and petals of wax-like texture, broadly ovate, sub-acute, concave within, the petals a little smaller than the sepals; lip three-lobed, the side lobes ovate, acute, the intermediate lobe ovate, emarginate, abruptly inflexed and with crisped margin. Column thick, semi-terete.

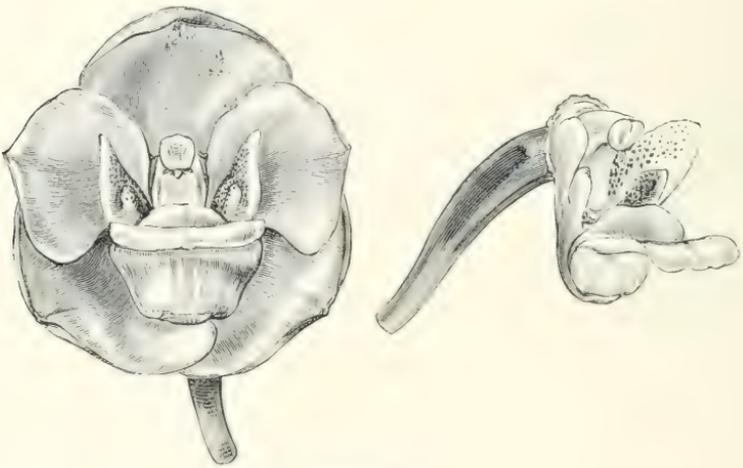
Peristeria cerina, Lindl. in *Bot. Reg.* t. 1953 (1837). Rehb. in Walp. Ann. VI. p. 607.

Introduced from Central America in 1837 by our predecessor Mr. Knight, of the Royal Exotic Nursery, the precise habitat not being recorded. It is one of the least attractive of the *Peristerias*, more resembling *Peristeria pendula* than the type species *P. elata*; the flowers have a strong odour of the bruised foliage of Juniper. Our description was taken in the Royal Gardens at Kew.

P. elata.

Pseudo-bulbs sub-conic or broadly ovate, 6 inches long, and 3—4 inches broad near the base. Leaves lanceolate-cuneate, acute, 24—30 or more inches long, prominently nerved beneath. Scapes 4—5 feet high, with an ovate, acuminate, keeled bract at each joint and a similar smaller one at the base of each ovary; raceme 10—15 or more flowered. Flowers fleshy, globose, $2\frac{1}{2}$ inches in diameter, very fragrant; sepals and petals French-white, concave within, the dorsal sepal broadly ovate, obtuse, the lateral two sub-orbicular; the petals obovate-oblong, obtuse, smaller than the sepals; lip three-lobed, the side lobes ascending, oblong, obtuse, with a lobule on the anterior side above the middle, white spotted with purple; the front lobe sub-quadrate, retuse, almost truncate, with a fleshy orbicular crest. Column terete above, concave below the stigma, anther beaked.

Peristeria elata, Hook. in *Bot. Mag.* t. 3116 (1831). Lindl. *Gen. et Sp. Orch.* p. 160. Rchb. in *Walp. Ann.* VI. p. 607. Jennings' *Orch.* t. 44. Williams' *Orch. Alb.* VII. t. 327.



Peristeria elata.

This stately orchid has long been known as the Dove Plant from the fancied resemblance of the column and its beaked anther, combined with the ascending side lobes of the lip to the figure of a Dove; characters which also obtained for it from the Spanish settlers in Central America the name of El Espiritu Santo or Holy Ghost plant. It is a native of Panama, whence it was first communicated in 1826 by Mr. Barnard, a Peruvian merchant, to Mr. Harrison, of Liverpool, in whose stove it flowered for the first time in this country in 1831. Like *Phaius grandifolius*, *Dendrobium nobile* and other

popular kinds, it is one of the few orchidaceous plants generally cultivated in the stove without being especially associated with other orchids, its stately habit and curious, fragrant flowers rendering it popular among amateurs who possess the needful accommodation for its culture.

Cultural Note.—*Peristeria elata* is usually potted early in spring in a compost of two-thirds well-rotted turfy loam, and one-third fibrous peat with the addition of some thoroughly decomposed cow manure. Ample drainage should be secured by broken crocks to about half the depth of the pot, and the compost filled in above this to within an inch of the rim. The pseudo-bulbs should be placed on the surface of the compost which should then be covered with sphagnum moss. When growth commences the plants should receive a liberal supply of water which should be continued till the large new pseudo-bulbs are mature; the supply may then be diminished to so much as is sufficient to prevent the pseudo-bulbs from shrinking during the winter months. As much air and light as is safely practicable should be afforded at all seasons, shading being used only during the earliest stages of growth and on hot bright days to prevent the foliage being scorched.

P. pendula.

Pseudo-bulbs sub-conic, compressed, elongated, 4—6 inches long. Leaves 3—4 from the apex of the pseudo-bulbs, lanceolate, acute, 12—15 inches long. Scapes stoutish, pendulous, 5—7 inches long, bearing a dense cluster of fragrant flowers of wax-like texture; bracts small, scale-like, brownish red. Flowers globose, 2 inches in diameter, French-white spotted with purple; sepals and petals broadly oval-oblong, obtuse, concave on the inner side, the dorsal sepal a little longer than the other segments; hypochile of lip oblong with two quadrate basal lobes between which are two erect fleshy plates; epichile or front lobe tongue-shaped, deeply grooved along the centre, reflexed at the apex. Column very broad, semi-terete, concave below the stigma, and with two incurved oblong wings.

Peristeria pendula, Hook. in *Bot. Mag.* t. 3479 (1836). Lindl. in *Bot. Reg.* 1843, misc. No. 99. Rehb. in *Walp. Ann.* VI. p. 607.

Originally imported from Demerara by Mr. John Allcard, in whose stove at Stratford Green it flowered for the first time in this country in January, 1836. It was afterwards detected by the brothers Schomburgk during their exploration of British Guiana, who state that it is generally dispersed over the whole region, flowering in November and December. Although inferior to the Dove Plant as a horticultural subject, it is a remarkable species worthy of a place in large collections.

ACINETA.

Lindl. in Bot. Reg. 1843, misc. p. 67. Benth. et Hook. Gen. Plant. III. p. 551.

The technical distinction between *Peristeria* and *Acineta* rests chiefly on the characters of the labellum and pollinary apparatus; in the first-named organ there is no articulation at the middle, and the pollinia are not sessile but have a narrow stipes or caudicle. Besides these the flowers are somewhat differently shaped on account of the looser arrangement of the sepals. In addition to the species here described, three or four others are known to science, making up the number to about seven or eight, all natives of tropical America from Southern Mexico to Colombia.

The jointless immovable condition of the front lobe of the labellum suggested the generic name which is derived from ἀκίνητος, "immovable."

Cultural Note.—Like the *Peristerias* the *Acinetas* are robust plants with large pseudo-bulbs, large plaited leaves and with a stout, many-flowered inflorescence that is more or less pendulous. They require a high temperature, such as is maintained in the East Indian house, and on account of their pendulous inflorescence they should be suspended near the roof when in flower. In other respects their cultural treatment is the same as for *Peristeria* and allied genera.

Acineta Barkeri.

Pseudo-bulbs pyriform or sub-conic, 4—6 inches, strongly ribbed and angulate, di-triphyllous. Leaves broadly lanceolate, acute, plaited, 20—25 inches long. Racemes pendent, 12—15 inches long, 10—15 flowered; bracts sheathing, ovate, acute greenish brown. Flowers fragrant, sub-globose, 1½ inch in diameter, bright yellow with a sanguineous spot on the lip, and a few red spots at the base of the petals; sepals oblong, acute, concave, the lateral two a little broader than the dorsal one; petals sub-similar, oval; lip with a channelled fleshy claw, three-lobed, the side lobes large, incurved, broadly halberd-shaped, and with a large fleshy disk between them: the intermediate lobe much smaller, narrowly oblong, retuse, concave, keeled beneath. Column semi-terete, pubescent, with a very narrow wing on each side of the stigma.

Acineta Barkeri, Lindl. in Bot. Reg. 1843, misc. p. 68. Paxt. *Mag. Bot.* XIV. p. 145. Rehb. in Walp. *Ann.* VI. p. 611. *Peristeria Barkeri*, Batem. *Orch. Mex. et Guat.* t. 8. *Bot. Mag.* t. 4203.

Originally discovered by Ross in a dark ravine in the neighbourhood of Xalapa in Mexico, in 1837, and sent by him to Mr. Barker,

in whose garden at Springfield, near Birmingham, it flowered in the following year. It was a great favourite with the orchid amateurs of that period, and it is still occasionally seen.

A. *densa*.

Pseudo-bulbs narrowly fusiform or sub-conic, 3—4 inches long, bearing at their apex 3—4 oblanceolate, acute, plaited leaves, 12—18 inches long. Racemes 2—3 feet long, pendulous, many-flowered; bracts oblong, acute, brownish. Flowers fragrant, not fully expanding; sepals light yellow, concave, oval-oblong, obtuse, the lateral two a little longer than the dorsal one; petals similar to the dorsal sepal but smaller, light yellow spotted with red, the spots aggregated towards the base; lip very fleshy, yellow densely spotted and blotched with red-brown; the claw nearly quadrate, concave with a conical protuberance on the front side; the side lobes oblong-rotund, erect, concave; the intermediate lobe much smaller, oblong, slightly incurved; disk a fleshy plate with a raised median line, tridentate in front. Column stoutish, pubescent with two rounded wings.

Acineta densa, Lindl. in Paxt. Fl. I. p. 91, with fig. *Fl. Mag.* 1861. t. 16. Rehb. in Walp. Ann. VI. p. 610. *Bot. Mag.* t. 7143. A. Warscewiczii, Klotzsch, Allg. Gartenz. 1852, p. 145.

A native of Turrialba, in Costa Rica, where it was discovered in 1849 by Warscewicz, from whom it was obtained by Mr. G. Ure Skinner for the Horticultural Society of London and for some of the most prominent orchid amateurs of that period including Bishop Sumner, in whose collection at Farnham Castle it seems to have flowered for the first time in this country, but not till several years after its introduction. It flowered simultaneously in the Royal Gardens at Kew and Glasnevin in the autumn of 1889, whence we obtained materials for description. As a species it is comparable with *Acineta Barkeri*, to which it is superior in its larger, more open and brighter coloured flowers; but it is, unfortunately, a shy bloomer and it has now become quite rare in the orchid collections of this country.

A. *Humboldtii*.

Pseudo-bulbs ovoid, angulate, 3—4 inches long, di-triphyllous. Leaves lanceolate, acute, 10—15 inches long, 1—2 inches broad, narrowed below into a channelled foot-stalk, strongly nerved beneath. Scapes stoutish, as long as the leaves, quite pendulous, 5—7 or more flowered; bracts ovate, acute, sheathing, half as long as the ovaries. Flowers not fully expanding, faintly but pleasantly fragrant; 2—2½ inches in diameter; sometimes reddish brown, sometimes light tawny yellow, but always spotted with red or brown-purple; dorsal sepal broadly

oblong, concave; the lateral sepals larger, obliquely ovate, obtuse, connate and gibbous at the base; petals much smaller than the sepals, oval, almost sub-rhomboid; lip somewhat boat-shaped, deeply three-lobed, the side lobes large, sub-rotund, incurved, with a projecting lobule on the inner side; the intermediate lobe ovate, obtuse, with a two-lobed blackish purple crest near its base. Column short and thick with narrow rounded wings, whitish and pubescent above, concave and spotted with red below the stigma.

Acineta Humboldtii, Lindl. in *Bot. Reg.* 1843, misc. p. 67. Van Houtte's *Fl. des Serres*, X. t. 992. *A. superba*, Rehb. in *Walp. Ann.* VI. p. 609.* *Peristeria Humboldtii*, Lindl. in *Bot. Reg.* 1843, t. 18. *Bot. Mag.* t. 4156 (*fulva*). *Anguloa superba*, H. B. K. *Nov. Gen. et Sp.* I. p. 343, t. 93. Lindl. *Gen. et Sp. Orch.* p. 160.

The botanical history of this fine orchid may be thus summarised:—

According to Dr. Lindley it was discovered by the great traveller Humboldt and his companion Bonpland growing on trees in the temperate parts of Tumbez near Zaruma in Peru (now Ecuador), and in a valley called Catacocha; it was also found by them cultivated in a garden at Loxa at 6,000—7,000 feet elevation. The description and figure of the plant in Humboldt and Kunth's *Nova Genera et Species Plantarum* caused a desire, even in the early days of orchid culture, to see it in European gardens, and the surprise was great when Dr. Lindley announced that the plant figured in the *Botanical Register* as *Peristeria Humboldtii* was without doubt the *Anguloa superba* of Humboldt, in whose figure, however, the raceme is made to grow erect instead of pendulous. The first living plant seen in England was imported by Mr. Wilmore, of Oldford, near Birmingham, not, however, from Ecuador, but from Porto Cabello in Venezuela, many hundreds of miles distant, and it flowered in his garden in March, 1842, and was figured in the *Botanical Register* as *Peristeria Humboldtii*. Subsequently the late Professor Reichenbach saw or possessed specimens of this species gathered by Wagener in Caracas, and by Schlim near Ocaña; and it is probable that the plants cultivated of late years originated in that region. Although there is nothing improbable in the same species of orchid occurring in localities 1,000 miles apart, it is a curious circumstance that the Ecuadorian origin of *Acineta Humboldtii* does not appear to have been confirmed by its re-discovery in that country.

* *Superba* is the oldest specific name of this plant, but we prefer following the far more convenient usage of adopting the oldest name under the right genus. Lindley, doubtless, rejected *superba* on account of its indefinite meaning, and also from a desire to honour the discoverer of this orchid.

MORMODES.

Lindl. Nat. Syst. Bot. Ed. II. 446, ex Bot. Reg. XXII. t. 1861 (1836). Benth. et Hook. Gen. Plant. III. p. 552 (1883).

Mormodes is one of a group of genera characterised by fleshy stems and strange-looking flowers.* Dr. Lindley long ago graphically remarked of this group of orchids, "that we find among them the most astonishing deviations from ordinary structure and the most startling variations from what appears to be the rule in other parts of the organic world." All this still holds good but in a modified sense, for many of the deviations in form and structure occurring in Mormodes, *Catasetum* and *Cynoches* that were inexplicable puzzles to Lindley and his contemporaries have since been shown to be not mere "freaks" or "sports" of nature, but necessary conditions of the plant's organisation, probably evolved from a simpler state in the course of a long series of ages.

The most striking floral peculiarities in Mormodes are seen in the column and lip, especially in the first-named organ, which is twisted one-quarter round so as to cause the anther to face sideways; the beak of the column, or rather the small hinge by which the anther case is articulated with the column is so sensitive that when the beak is touched ever so lightly, the whole of the pollinary apparatus is released and tossed upwards with a jerk to some distance. The labellum too is a remarkable organ, and although a polymorphous one it always has the same relative position to the column, that is, it is bent upwards and inwards and arches more or less over it.

That this curious contrivance serves an important end in the perpetuation of the plant is shown conclusively by Darwin in his *Fertilisation of Orchids*.† Space does not permit us to reproduce here the lucid explanation given by that eminent naturalist of the various parts of the flower and the means by which fertilisation is effected; we must therefore refer the reader to the place quoted, and which will be found to be not the least interesting part of that remarkable work.

* The group of genera alluded to in the text includes *Catasetum*. This very extraordinary genus was for a long time the puzzle and astonishment of botanists on account of its unisexual and dimorphous flowers, circumstances at first not even suspected in an orchid. The true characters of *Catasetum* have since been gradually brought to light as new species were introduced and their flowers studied. Nevertheless, very much yet remains to be investigated, for even the extent of the genus is practically unknown, and the sexual states of not more than a dozen of the whole number of species have been studied. Moreover, the species introduced from time to time into European gardens have hitherto proved intractable and short-lived under cultivation. For these reasons we are not yet prepared to deal with the genus for this work.

† Chap. VI. pp. 249—265.

In their vegetation the Mormodes so closely resemble the *Catseta* as to be scarcely distinguishable from them when not in flower. To avoid needless repetition, the general statement here given applies to all the species described in the following pages.

The *stems* are pseudo-bulbous, usually fusiform, more or less compressed and sheathed by the broad membraneous leaf bases.

The *leaves*, 5—7 or more to each pseudo-bulb, are narrowly lanceolate but sometimes broader, acuminate, plaited and prominently nerved on the under side.

The *scapes* are stoutish and racemed; the raceme is lax in the large-flowered and dense in the small-flowered species.

The number of species at present known exceeds a dozen, which are confined to a comparatively small portion of tropical America, extending from southern Mexico to northern Colombia. The generic name is derived from the Greek word *μορμὸς*, "a phantom or any frightful-looking object," in allusion to the strange appearance of the flowers.

Cultural Note.—Nearly all the species of Mormodes here noticed have been introduced from mountainous regions at a considerable elevation, and it has thence been found that they may be safely cultivated under nearly the same conditions as the *Cattleyas* of the *labiata* group. As the Mormodes are deciduous plants and have a decided season of rest followed by a season of active growth, they require all the light obtainable in our climate to mature their pseudo-bulbs. The compost should consist of the usual proportion of peat and sphagnum with ample drainage and water freely given during the growing season.

Mormodes Buccinator.

Pseudo-bulbs 5—7 or more inches long. Leaves 8—12 inches long. Scapes longer than the leaves; racemes more or less lax, 7—10 flowered; bracts small, acuminate. Flowers the most polymorphous and the most variable in colour yet seen in the genus; in the typical form the sepals and petals are pale green and the lip white; in other forms the colour varies from buff to pale straw-yellow, sometimes striped and spotted in different ways; sepals and petals narrowly oblong, acute, the sepals reflexed, the petals bent forward over the column; lip obovate, with the sides rolled back and almost meeting at their edges. Column semi-terete with the usual oblique twist.

Mormodes Buccinator, Lindl. in Bot. Reg. 1840, misc. No. 9; and 1841, misc. No. 191. Rehb. in Walp. Ann. VI. p. 578. Rehb. in Gard. Chron. XIV. (1880), p. 358 (major). Rolfe in Gard. Chron. VI. s. 3 (1889), p. 731. *M. lentiginosum*, Bot. Mag. t. 4455. *M. flaveolum*, *M. vitellinum*, *M. Wagerianum*, *M. brachystachium*, *M. leucochilum* and *M. marmorea*, Klotzsch, ex. Rehb. in Walp. Ann. VI. loc. cit.

This remarkable *Mormodes* was first communicated to Dr. Lindley by Mr. Wilmore, of Oldford, near Birmingham, in 1840, without, it appears, giving any indication of its origin. We next read of its being imported by Messrs. Loddiges from La Guayra, the port of Caracas, and according to Reichenbach it was afterwards gathered by Schlim, Wagener and Warscewicz in north-west Venezuela. It is occasionally imported from that region, and it is one of the species of *Mormodes* most frequently seen in British collections.

The specific name *Buccinator*, "a trumpeter," refers to the curious trumpet-like labellum.

M. Cartonii.

Pseudo-bulbs 5—7 inches long. Leaves 12—15 inches long. Scapes half as long as the leaves, densely racemed above the middle. Flowers with a faintly pleasant fragrance, $1\frac{1}{2}$ inch across, yellow sometimes striped and spotted with red; sepals and petals nearly uniform, lanceolate, acute, spreading; lip irregularly oblong, obliquely twisted into half a circle, the acute apex meeting the awl-shaped point of the anther, the column being similarly twisted and bent.

Mormodes Cartonii, Hook. in *Bot. Mag.* t. 4214 (1846). Lindl. in *Paxt. Fl. Gard.* III. sub. t. 93 (1857). *Gard. Chron.* 1871, p. 447, with fig.

Discovered by Purdie, in 1842, on the Sierra Nevada of Santa Martha in northern Colombia, and sent by him to the Royal Gardens at Kew. It flowered for the first time in this country in 1845, in Syon House Gardens, and is named after Mr. Carton, at that time gardener to the Duke of Northumberland. It is closely allied to the preceding species, from which it is chiefly distinguished by its longer and more slender pseudo-bulbs and leaves, its denser racemes of smaller and differently coloured flowers, and especially by its narrower and more acute lip and awl-shaped appendage of the anther.*

M. Colossus.

"Pseudo-bulbs 6—12 inches long. Leaves elliptic-ovate, acute, plaited. Scape 2—2 $\frac{1}{2}$ feet long, racemose along the distal half;

* It is also very near *Mormodes igneum*, a native of the same region, introduced by Warscewicz and figured in Paxton's *Flower Garden*, a species we have not seen. Of these three plants (*M. Buccinator*, *M. Cartonii*, and *M. igneum*) Dr. Lindley remarked that it is not improbable that they are one and the same species, for beyond colour there is not much to distinguish them, and it is no doubt that species which travellers report to have seen growing in the temperate parts of the snow-capped mountain ridges of Santa Martha, especially on the branches of an *Erythrina* (*Paxt. Fl. Gard.* loc. cit.). This is doubtless true as regards *M. Buccinator* and *M. igneum*, but *M. Cartonii* is certainly distinct from the first-named species.

cauline bracts short, triangular, appressed; floral bracts lanceolate, shorter than the pedicels. Flowers among the largest in the genus, 5—6 inches across the lateral sepals; sepals and petals narrowly lanceolate, acuminate with recurved margins, the basal half light rose with darker parallel nerves, the apical half bright yellow; lip shortly clawed, ovate-cordate, acuminate, incurved, the margins revolute and almost meeting at the back, bright yellow with some red dots towards the base and tip."—*Botanical Magazine*.

Mormodes Colossus, Rehb. in Bot. Zeit. 1852, p. 636. Id. in Walp. Ann. VI. p. 581. Bot. Mag. t. 5840.

Introduced by Warszewicz about the year 1850 from the mountains of Central America at an elevation of 6,000—7,000 feet, and subsequently imported by ourselves from the same region. It has now become very rare in the orchid collections of Europe, if it has not entirely disappeared from them.

M. Greenii.

"Pseudo-bulbs 3—4 inches long. Leaves 12—18 inches long. Racemes large, pendulous, many-flowered. Flowers 2½ inches in diameter, whitish externally; sepals and petals ovate, sub-acute, concave, light yellow entirely covered with oblong dark red spots; lip curved upwards, gradually dilated from a linear fleshy base to a saccate, incurved, orbicular apex, irregularly toothed on the margin; base of lip dark purple, inner surface yellow with red streaks, outer surface spotted like the sepals and petals except on the dilated apex which is dull lilac. Column short and curved, anther acuminate."—*Botanical Magazine*.

Mormodes Greenii, Hook. f. in Bot. Mag. t. 5802 (1869).*

One of the finest species in the genus; the flowers are not only large and handsomely coloured, but they also exhale a powerful aromatic odour. Its origin is not known with certainty, although probably Colombian. The first recorded instance of its flowering in this country was in the collection of the late Mr. Wilson Saunders at Hillfield, Reigate, in 1869, and after whose gardener, Charles Green, it is named.

M. luxatum.

Pseudo-bulbs 6—8 inches long. Leaves 15—20 inches long. Scapes longer than the leaves, stoutish, glaucous, 9—12 or more flowered; bracts short, broadly subulate. Flowers 3—3½ inches in diameter,

* In the *Gardeners' Chronicle*, 1869, p. 1205, the late Professor Reichenbach reduced this species to his *Mormodes uncia* described in the same volume at p. 892, and which he states is a Mexican species that had been introduced by ourselves, but of which we possess no record. Reichenbach's short Latin diagnosis of *M. uncia* is so greatly at variance with *M. Greenii* that we are unable to accept them as one and the same species.

strongly fragrant; sepals and petals yellowish green sometimes spotted with purple; the sepals ovate, sub-acuminate; the petals much broader, oval-oblong, acute, concave; lip shortly clawed, and twisted in the same manner as the column, obscurely three-lobed, sub-orbicular, concave, almost hemispheric, with an apiculus on the anterior edge; deeper in colour than the sepals and petals, and with a brown-purple streak on the inner side. Column triquetral with the characteristic twist of the genus.

Mormodes luxatum, Lindl. in *Bot. Reg.* 1842, misc. No. 66; and 1843, t. 33. *Rehb.* in Walp. *Ann.* VI. p. 577. *Id.* in *Gard. Chron.* X. (1878), p. 396. *Rev. hort.* 1889, p. 132, with plate. Rolfe in *Gard. Chron.* VI. s. 3 (1889), p. 186. *Catasetum luxatum*, Benth. in *Gen. Plant.* III. p. 552.

sub-var.—*eburneum* (*Gard. Chron.* XVIII. (1882), p. 144, with fig.), flowers ivory-white with a brown-purple stripe on the lip.

The original *Mormodes luxatum* is more acceptable for the delightful fragrance than for the colour of its flowers which is dull lemon-yellow; in the sub-variety the colour is much purer, rendering the flowers quite handsome. The typical form was discovered by Ross in 1839 near Valladolid, in Mexico, while collecting orchids for Mr. George Barker, of Birmingham, in whose collection at Springfield it flowered in 1842. The sub-variety seems to have first appeared in the collection of Sir Trevor Lawrence, Bart., who mentions it in the *Gardeners' Chronicle* of 1878 as "a stately plant, delicate in the pure ivory tint and scent of its flowers, and quaint in its twisted shell-shaped lip."*

M. Ocañæ.

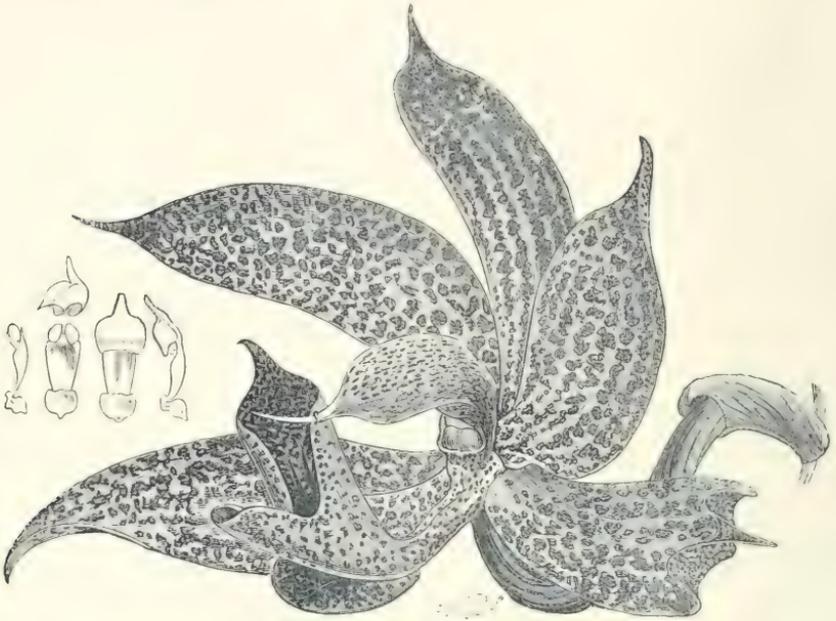
"Pseudo-bulbs 3—4 inches long. Leaves about a foot long. Scapes robust, about as long as the leaves, 6—10 flowered; bracts oblong, obtuse, boat-shaped, $\frac{1}{2}$ inch long. Flowers about 3 inches in diameter when spread out, uniformly of a dark orange-yellow closely speckled with red-brown spots; sepals and petals similar, lanceolate, acuminate, concave; lip with a long claw, the blade three-lobed, the lateral lobes short, oblong, rounded at the tip; the mid-lobe sub-quadrate, abruptly beaked, all the lobes with incurved margins."—*Botanical Magazine*.

Mormodes Ocañæ, Lindl. et *Rehb.* MSS. in Walp. *Ann.* VI. p. 581 (1863). *Rehb.* in *Gard. Chron.* XII. (1879), pp. 582 and 816, with figs. *Bot. Mag.* t. 6496.

Originally discovered by Schlim on the eastern Cordillera of Colombia, near Ocaña, at 4,000—5,000 feet elevation, from whose dried specimen it was described by Reichenbach in Walper's *Annales Botanices*. It was re-discovered by Kalbreyer while collecting orchids for us in that region, and who sent us the first living plants received

* Vol. X. p. 396.

in Europe, one of which flowered magnificently in our houses in October, 1879, and was figured in the *Botanical Magazine* and *Gardeners' Chronicle*.



Mormodes Oeagne.

(From the *Gardeners' Chronicle*.)

M. pardinum.

Pseudo-bulbs 5—6 inches long. Leaves 12—15 or more inches long. Scapes as long as the leaves, arching, the raceme dense and many-flowered; bracts small, ovate, acuminate. Flowers with a faint odour of Turkish rhubarb, sub-secund, light tawny yellow densely spotted with chocolate-red; sepals and petals similar and sub-equal, ovate, acuminate, incurved; lip a little smaller than the other segments, three-lobed; all the lobes acuminate, the intermediate one the largest.

Mormodes pardinum, Batem. *Orch. Mex. et Guat.* t. 14. Lindl. in *Bot. Reg.* XXIV. misc. No. 176; and XXIX. sub. t. 33. *Bot. Mag.* t. 3990. Rchb. in *Walp. Ann.* VI. p. 582. Knowles and Weste. *Fl. Cal.* t. 113. Williams' *Orch. Alb.* VII. t. 330.

sub-var.—*unicolor* (*Bot. Mag.* t. 3879), flowers bright lemon-yellow wholly destitute of spots.

A native of the Mexican province of Oaxaca, originally discovered in 1836 by Karwinsky, and communicated by him to Mr. Bateman, in whose collection at Knypersley it flowered in July, 1838. It was shortly afterwards collected for Mr. Barker by Ross, in whose consignment the variety *unicolor* first appeared. It is one of the best known *Mormodes* in British collections.

CYCNOCHES.

Lindl. Gen. et Sp. Orch. p. 154 (1832). Benth. et Hook. Gen. Plant. III. p. 552 (1883).

Still more curious than *Mormodes* is the genus *Cycnoches* or "Swan's-neck" orchids as the name implies, which like *Catasetum* have unisexual flowers, but which in some species are so strangely dimorphic that before their true character was understood the plants that produced them were referred to different species; and when both kinds appeared on the same plant, which was and is still a comparatively rare occurrence in the cultivated state, such was regarded as a "sport" or "inexplicable puzzle."* Our knowledge of the genus is still very imperfect, but what is known of it is well summarised by Mr. Rolfe in recent articles published in the *Gardeners' Chronicle* and elsewhere which the reader will find well worth perusal.† In these articles it will be seen that the author has succeeded in solving the phenomena of dimorphism, which until recently seemed an almost inextricable puzzle. He has shown that *Cycnoches*, like the allied genus *Catasetum*, has dicecious flowers. In the male the ovary is abortive and slender; the column is long and slender with perfect pollinia and no stigma; while in the female the ovary is stout and perfectly developed, the column is short and stout, without pollinia but with a perfect stigma situated between a pair of fleshy wings. The perianth is also dimorphic, but strange to say, this character does not apply to all the species. The genus thence comprises two very distinct groups—*EUCYCNOCHES*, so called because it includes the original species of genus, and in which the perianth scarcely differs in the two sexes; and *HETERANTHÆ*, in which it is very dissimilar especially in the lip. The former contains *Cycnoches chlorochilon*, *C. Haagei*, *C. Loddigesii*, *C. ventricosum* and *C. versicolor*; the latter *C. aureum*, *C. Egertonianum*, *C. glanduliferum*, *C. maculatum*, *C. pentadactylon*, *C. peruvianum*, *C. Rossianum* and *C. Warscewiczii*.

The floral characters of *Cycnoches* will be further understood from the descriptions that follow. In their vegetative organs the species so

* A good illustration of a monoecious plant of *Cycnoches* is given in the second series of the *Floral Magazine*, plate 381, and reproduced in Pfitzer's *Grundzüge*.

† Vol. VI. s. 3 (1889), p. 188; X. (1891), p. 69; and XI. s. 3 (1892), p. 204; also *Garden and Forest*, 1892, p. 88. So few species of *Cycnoches* are cultivated in the orchid collections of this country that materials for examination are seldom forthcoming, and from this cause we have been unable to deal with this extraordinary genus so fully or so satisfactorily as we could wish. The species described in the text are well deserving the attention of cultivators.

closely resemble *Mormodes* and *Catasetum*, and differ so little *inter se* that the description of them under *C. chlorochilon*, the best known species, will serve for all. Like *Mormodes*, too, the *Cycnoches* are all natives of tropical America, but evidently more dispersed. Unfortunately scarcely anything has been communicated respecting their station and environment in their native countries, but experience has shown that the cultural treatment best suited for them is similar to that formulated under *Mormodes*.

Cycnoches aureum.

Male flowers: Racemes pendulous, rather dense, 9—12 flowered. Flowers 2—3 inches in diameter, of a uniform clear yellow; sepals and petals similar and sub-equal, broadly lanceolate, acute; the sepals spreading, the petals much reflexed beyond the middle; lip clawed with an ovate, acute blade, "the edge of which is broken up into short curved processes forked at the point," the two lowermost larger than the others and turned backwards. Column slender with the characteristic curve of the genus.

Cycnoches aureum, Lindl. in Paxt. *Fl. Gard.* III. t. 75 (1853).

Introduced in 1852 from Central America by Mr. G. Ure Skinner, but long since lost to cultivation. It is, without doubt, a very handsome species well worth re-introduction.

C. chlorochilon.

Stems cylindrical, tapering upwards, 4—7 or more inches long, sheathed by the persistent bases of the fallen leaves. Leaves 5—8 to each stem, lanceolate, acute, plaited, strongly nerved beneath. Scapes stoutish, 1—3 or more flowered. Flowers inverted, variable in size, the largest 6 inches across vertically; sepals and petals yellowish green, the dorsal sepal lanceolate-oblong, acute, curved, the lateral two much broader; the petals similar to the dorsal sepal and sub-falcate; lip obovate or elliptic oblong, acute, with a ventricose disk below which is a dark green depression, and near the base a triangular, erect callus. Column curved like a swan's neck in both sexes; in the male flower slender, dilated below the anther; in the female flower thicker and shorter with a triangular fleshy wing on each side of the stigma.

Cycnoches chlorochilon, Klotzsch in Allgem. Gartenz. 1833, p. 225. Lindl. *Sert. Orch.* t. 16. Rehb. in Walp. Ann. VI. p. 560. Williams' *Orch. Alb.* VI. t. 263. Gard. Chron. III. s. 3. (1888), p. 145, icon. xyl. *Illus. hort.* XXXV. t. 65. Sander's *Reichenbachia*, I. s. 3. t. 39. Rolfe in Gard. Chron. X. s. 3 (1891), pp. 69 and 394.

Originally discovered by Moritz, a German naturalist settled in Venezuela, who sent specimens from Maracaybo to the Berlin Museum in 1836, from which the species was described two years later by Professor Klotzsch in Otto and Dietrich's *Allgemeine Garten-*

zeitung. About the same time it was imported from Demerara by Messrs. Loddiges, in whose nursery it flowered for the first time in England, and on which occasion the excellent figure in Lindley's *Sertum Orchidaceum* was drawn.

Cycnoches chlorochilon is the best known species of the genus in cultivation, its large fragrant flowers securing for it a place in many orchid collections. But although it has been in European gardens for more than half a century, the appearance of female flowers does not seem to have been recorded or even observed till quite recently. In July, 1891, M. Houzeau de Lehaie, of Hyon, near Mons, sent to Kew a male and a female flower gathered from distinct plants that had been received from Caracas, the Venezuelan habitat of the species; the difference between the two forms is thus pointed out by Mr. Rolfe:—

“The male is the form so long known in gardens with slender column and pollinia normally developed; the female is distinctly larger and more fleshy than the male and with broader sepals and petals; the ovary is more than twice as thick as the pedicel of the male flower and more strongly grooved; the column is scarcely half as long, but it is at least four times as thick; there are, of course, no pollinia but a well-developed stigma with a pair of large fleshy incurved wings on either side. The colour of the flowers is identical in the two sexes.”*

C. Egertonianum.

Male flowers: Racemes pendulous, 12—15 inches long, many-flowered. Flowers about $1\frac{1}{2}$ inch in diameter; sepals and petals lanceolate, acute, the petals a little broader than the sepals, lurid purple, greenish at the back; lip with a narrow excavated claw and circular blade broken up into about ten clavate purple processes and two longer and broader green ones that are nearly parallel with each other. Column very slender, purple; anther green. *Female flowers*: Solitary or in pairs on a short, sub-erect raceme, dull olive-green, rather larger and more fleshy, but otherwise similar to the male flowers except in the lip which is cordate acute, entire, and in the sexual organs.

Cycnoches Egertonianum, Batem. Orch. Mex. et Guat. sub. t. 40 (1843), in part. Lindl. Bot. Reg. 1843, misc. p. 77, with fig. Rolfe in Gard. Chron. XI. s. 3 (1892), p. 204.

The earliest authentic notice of this curious species being in cultivation occurs in the miscellaneous matter of the *Botanical Register* of 1843, where a figure of a raceme with both male and female flowers—an extremely rare occurrence in *Cycnoches*—is given. The plant that produced it was in the collection of the late Mr. R. S. Holford,

* Gard. Chron. X. s. 3 (1891), p. 69.

at Westonbirt, in Gloucestershire, which had been acquired from Messrs. Rollisson, of Tooting. Dr. Lindley mistook the phenomenon for a sport of a different species, *Cynoches ventricosum*, which Mr. Bateman had figured in his *Orchidaceae of Mexico and Guatemala* under the name of *C. Egertonianum*, whence arose an indescribable confusion and many "sensational" things were written concerning it, as the sexual dimorphism of *Cynoches* was then unknown.

We are indebted to Sir Trevor Lawrence, Bart., for the raceme of male flowers described above and which were very richly coloured. The species was dedicated to Sir Philip Egerton, a zealous patron of horticulture and the possessor of an excellent collection of orchids.

C. Loddigesii.

Stems and leaves as in *Cynoches chlorochilon*. Racemes pendulous, as long or longer than the stems, 5—7 or more flowered. Male flowers large and fragrant; sepals and petals greenish brown obscurely spotted with brown, the dorsal sepal linear-oblong, acute; the lateral sepals and petals broadly lanceolate, acute, sub-falcate; lip narrowly oblong, sub-acuminate, fleshy, and convex, the basal half whitish, the apical half yellow, the whole surface sparingly spotted with red. Column long, slender, incurved, dark purple; the anther yellow-green spotted with purple.

Cynoches Loddigesii, Lindl. Gen. et Sp. Orch. p. 154 (1832). Id. in *Bot. Reg.* t. 1742. *Bot. Mag.* t. 4215. Rehb. in *Walp. Ann.* VI. p. 559.

The above description is that of the male flowers; the female flowers we have not seen, but they appeared soon after the introduction of the species in the collection of Mr. Wilmore at Oldfield, near Birmingham, who sent one to Dr. Lindley for identification; this flower had "broad petals, a short column hooded and dilated at the apex, and a broad roundish lip gibbous at the base, and with its stalk much shorter than the column; it was, however, destitute of scent, while *Cynoches Loddigesii* has a delicious odour of vanilla." At first Lindley assumed it to be a new species and named it *C. cucullatum*, but shortly afterwards a *Cynoches* in the garden of the Horticultural Society produced from opposite sides of the same stem two racemes, one with the fragrant flowers of *C. Loddigesii* and the other with the scentless flowers of *C. cucullatum*.*

Cynoches Loddigesii was originally discovered in 1834 by Mr. John Henry Lance in the forests of Surinam, and was sent by him to

* *Bot. Reg.* sub. t. 1951.

Messrs. Loddiges, in whose nursery it flowered imperfectly shortly afterwards, but more perfectly in the Horticultural Society's Gardens at Chiswick and other places two years later. It is the type or species on which the genus was founded; it has now become very rare if not entirely lost to cultivation.

C. maculatum.

Stems and leaves characteristic of the genus. Racemes of male flowers 15—18 inches long, deflexed, 5—7 or more flowered. Flowers patent, 3—4 inches in diameter; sepals and petals similar and sub-equal, lanceolate, acute, undulate, light yellow-green much spotted with red-purple; lip white, clawed, the claw grooved, the blade lanceolate acute, with the margins incurved and with 5—6 round fleshy, finger-like bristles spotted with purple below the middle. Column slender, curved, greenish yellow spotted with red.

Cyanoches maculatum, Lindl. in *Bot. Reg.* 1840, misc. No. 8. *Id. Sert. Orch.* t. 33. Rehb. in *Walp. Ann.* VI. p. 561. *Illus. hort.* 1873, t. 143.

Discovered by Ross in Mexico, and sent by him to Mr. Barker, of Birmingham, in whose collection it flowered in 1839. The male flowers only are known. Like the preceding species it appears at present to be lost to cultivation.

C. pentadactylon.

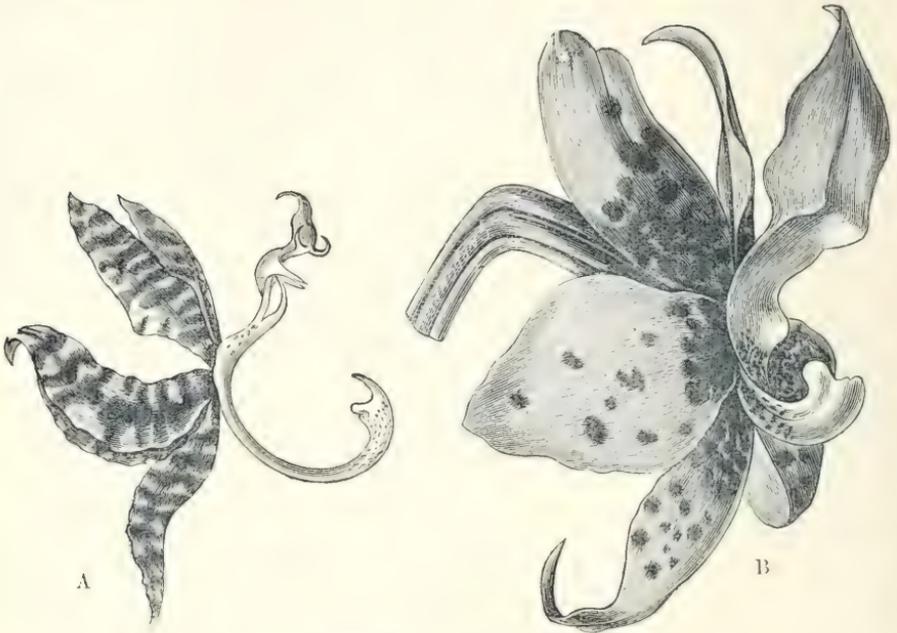
Racemes of male flowers pendulous, many-flowered; of female, erect, few-flowered. Flowers greenish yellow sometimes white, barred and blotched with chocolate-brown, parts of the lip white spotted with red; the column purple below the anther. The male and female flowers are shown in the accompanying woodcut. These convey a far clearer idea of the difference between the two sexes in this species than can be done by a description which in the absence of materials we are unable to give.* The five curious finger-like appendages of the lip of the male flower suggested the specific name.

Cyanoches pentadactylon, Lindl. in *Bot. Reg.* 1843, misc. No. 26; and t. 22. *Id.* in *Pact. Fl. Gard.* III. sub. t. 75. Rehb. in *Walp. Ann.* VI. p. 561. Rolfe in *Gard. Chron.* VI. s. 3 (1889), p. 188, with figs.

Introduced by our Exeter firm in 1841 through William Lobb, who detected it in the neighbourhood of Rio de Janeiro, and shortly afterwards re-imported from that city by Messrs Loddiges. We find

* While these sheets were being printed a fine male plant of *Cyanoches pentadactylon* was exhibited at one of the Royal Horticultural Society's meetings by Mr. W. H. Mann, of Bexley, who kindly sent us a flower; we thought it best, however, to leave the text as it is.

no record of the appearance of female flowers till a plant in the collection of Mr. Gotto, at The Lodge, Hampstead Heath, produced a raceme of each kind in the summer of 1889; flowers from each was sent to Kew for identification and which are here represented. *Cycnoches pentadactylon* is a very handsome species, well worthy of the attention of amateurs of orchids.



Cycnoches pentadactylon. A, male; B, female flower.
(From the *Gardeners' Chronicle*.)

C. *versicolor*.

Male flowers: Racemes pendulous, many-flowered; bracts ovate, sheathing, $\frac{1}{2}$ inch long, tawny yellow. Flowers 2—2 $\frac{1}{2}$ inches in diameter; sepals and petals reflexed and of a peculiar colour difficult to describe, a kind of deep tawny green with a velvety gloss and with close-set longitudinal brown lines; the sepals narrowly oblong; the petals broader, elliptic-oblong, acute; lip fleshy, ovate, acute, with two erect teeth in the centre between which is a deep groove, cream-white with some red spots in front of the teeth. Column green spotted with brown.

Cycnoches versicolor, Rehb. in Gard. Chron. IV. s. 3 (1888), p. 596.

A remarkable species of Brazilian origin. Reichenbach named it from materials sent to him by Sir Trevor Lawrence in 1888, to whom also our obligations are due. The colour of the male flowers is most peculiar; the female flowers we have not seen.

SUB-TRIBE MAXILLARIÆ.

Rhizome bearing either mono-diphyllous pseudo-bulbs or produced into ascending stems with closely distichous, often equitant, leaf-sheaths with more or less developed laminae. Leaves usually coriaceous or fleshy without prominent ribs. Scapes almost always one-flowered. The column produced into a foot.*

STENIA.

Lindl. in Bot. Reg. sub. t. 1991 (1837). Benth. et Hook. Gen. Plant. III. p. 553 (1833).

A small genus of which three species are now known, occurring in three widely separated localities in South America, but that described below is the only one occasionally met with in cultivation. Botanically the genus connects the STANHOPIÆE with the MAXILLARIÆE; the character which chiefly separates *Stenia* from *Maxillaria* is the mode of attachment of the labellum to the column, this organ being in *Stenia* continuous with the foot of the column, not articulated on it; the fleshy basal part of the labellum, saccate in *Stenia pallida*, indicates the affinity with *Stanhopea*.

The genus was founded by Dr. Lindley on *Stenia pallida*, a Demerara plant introduced by Mr. George Barker, of Birmingham, in 1836. The narrow elongated pollen masses suggested the specific name which is derived from the Greek word στενός, "narrow."

Stenia fimbriata.

Pseudo-bulbs none. Leaves 4—5 to each growth, linear or narrowly oblanceolate, acute, 7—10 inches long. Peduncles slender, sub-erect, about 2 inches long, one-flowered; bracts subulate, acute, much shorter than the ovary. Flowers 2 inches in diameter, light yellow with some purple spots on the basal half of the lip; sepals and petals all directed upwards, linear-oblong, acute, slightly undulate at the margin; the petals a little broader than the sepals, apiculate with denticulate margin and of thinner texture; lip broadly oblong, the basal half fleshy and turned upwards on each side towards the column; the

* Mr. Bentham has grouped nine genera under this sub-tribe, all of them of American origin, of which the type genus *Maxillaria* is by far the largest and most important. Of those genera not coming within the scope of this work, *Ornithidium* includes a few species that occasionally find their way into private collections, notably the type species *O. coccineum* (Salisb.), and *O. Sophronitis* (Rehb.).

apical half semi-transparent, spreading and with fimbriate margin. Column semi-terete with very narrow wings.

Stenia fimbriata, Rehb. in Gard. Chron. 1868, p. 1313. *Chondrorrhyncha fimbriata*, Rehb. in Saunders' *Ref. Bot. II.* t. 107 (1872).

A native of the eastern Cordillera of New Granada at a considerable elevation. It was first detected by Schlim about the year 1847 near Ocaña, and it was afterwards gathered by Blunt, Roezl and other collectors of orchids in that region. It was introduced into European gardens by M. Linden, of Brussels, in 1863, through Gustav Wallis.

Cultural Note.—This plant was first cultivated in England by the late Mr. Wilson Saunders, at Hillfield, Reigate, who placed it in a cool damp shady house, where it grew freely and produced its flowers very regularly when potted in peat and sphagnum, and carefully drained.*

SCHLIMIA.

Planchon in Lind. Catal. 1852, ex Lindl. in Paxt. Fl. Gard. III. p. 115, fig. 287. Benth. et Hook. Gen. Plant. III. p. 553.

Schlimia includes three closely allied Colombian species of which *S. trifida* is the best known. The genus is chiefly distinguished by its peculiarly-shaped flowers which approach somewhat those of a Stanhopea, and thus like *Stenia* it is a connecting link between Stanhopea and Maxillaria. It commemorates Louis Schlim, a relative of M. Linden and a collector of orchids for him in Colombia, and who discovered and introduced the type species *S. jasminodora* in 1850—51.

Schlimia trifida.

Pseudo-bulbs sub-fusiform, about an inch long, monophyllous. Leaves shortly petiolate, elliptic-oblong, acute, 4—6 inches long. Scapes drooping, dull purple, bearing a one-sided (usually inverted) four-flowered raceme. Flowers 2 inches across vertically, very fragrant, white with some purple spots on the dorsal sepal which is oblong, obtuse; the lateral sepals produced into a large helmet-shaped sac; petals linear, acute, reflexed towards their apex; lip shorter than the other segments, tripartite, the hypochile sub-pandurate with an orange-yellow blotch, the epichile lanceolate. Column semi-terete with two sub-quadrate fleshy wings.

Schlimia trifida, Rehb. in Gard. Chron. VI. (1876), p. 706. Id. VII. (1877), p. 141, with figs.

The origin of this curious and interesting plant is involved in

* *Ref. Bot. II.* sub. t. 107.

obscurity. It first appeared in 1874 in a collection of Colombian orchids supposed to have been made by the unfortunate Brückmüller and offered at Stevens' sale rooms in May of that year. It flowered for the first time in Sir Trevor Lawrence's collection and was exhibited at the Royal Horticultural Society's meeting in January,



Schlimia trifida.

(From the *Gardeners' Chronicle*.)

1877.* The plant has the aspect of a small *Stanhopea*; the flowers are of very remarkable structure, very fragrant, and appear as if modelled out of wax, and being inverted the saccate lateral sepals have the resemblance of an ancient Greek helmet.

* A plant subsequently flowered in our houses from which the above description was taken, but we find no record of the species being in cultivation since, which is the more remarkable when the enormous quantity of Colombian orchids that have been imported is considered, a fact that would imply its being a rare plant in its native country.

SCUTICARIA.

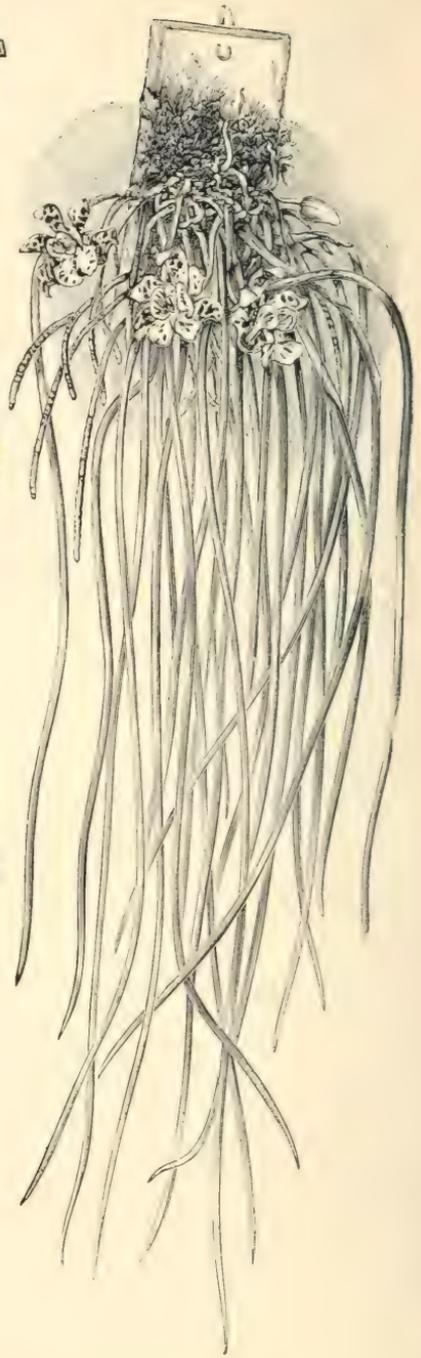
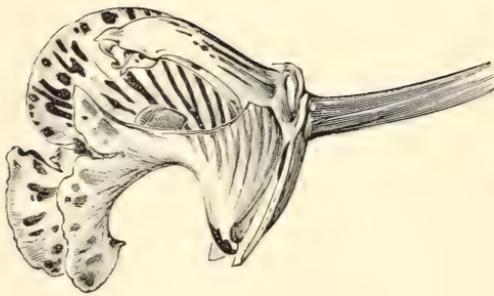
Lindl. in Bot. Reg. 1843, misc. p. 14. Benth. et Hook. Gen. Plant. III, p. 554.

Scuticaria includes two species: *S. Steelei* originally referred to *Maxillaria* on the assumption that the pollen masses were not stipitate (without caudicles) which is not the case, and thence removed from that genus by Dr. Lindley and made the type of a new one; and *S. Hadwenii* previously brought under *Bifrenaria* on account of its stipitate pollinia, but manifestly very closely allied to *S. Steelei*, although its geographical station is very remote from the home of that species. The most obvious characteristic of these species is their peculiar habit, derived chiefly from the long terete fleshy leaves furrowed on one side and continuous with the short stems; the floral characters are nearly those of *Maxillaria*, but the peduncles are 2—3 flowered.

Cultural Note.—The habit of the plants and their geographical stations suggest their cultural treatment, but it is to be regretted that not a scrap of information is forthcoming respecting their environment *in situ* beyond the brief statement of the brothers Schomburgk respecting the Demerara species that it grows on the trunks of trees. *Scuticaria Hadwenii* may be grown in an intermediate temperature, either in a pot or on a block. *S. Steelei* requires the highest temperature available. The plant should be attached to a block of wood, with some live sphagnum about its roots which should be renewed as it becomes decayed; it should be freely syringed during the growing season. It is a well-known fact that orchids with terete fleshy leaves, like those of the Scuticarias, are much exposed to direct sunlight in their native countries, and hence, in the glass-houses of Europe, they should be placed in the lightest position possible.

Scuticaria Hadwenii.

Stems very short, knotty, ash-brown, swollen at the base. Leaves 9—18 inches long. Peduncles stoutish, 4—5 inches long, 1—2 flowered, sheathed at the base by brownish, acute, scale-like bracts, the ovary long and terete. Flowers $2\frac{1}{2}$ —3 inches in diameter; sepals and petals spreading, fleshy, oblong, acute, chestnut-brown, paler towards the apex, sometimes broken up into blotches on a yellow-green ground; lip broadly obovate or sub-orbicular, concave, downy within, pale yellow blotched and spotted with light brown in the centre, the marginal area white spotted with light rose; crest an oblong plate three-toothed in front,



Scuticaria Steelei.

swollen at the base. Column semi-terete, much spotted with purple, white at the apex.

Scuticaria Hadwenii, Benth. in Journ. Linn. Soc. XVIII. p. 323 (1831). Roife in Gard. Chron. I. s. 3 (1887), p. 733. *Bifrenaria Hadwenii*, Lindl. in Paxt. Fl. Gard. I. p. 67 (1851). *Bot. Mag.* t. 4629. Van Houtte's *Fl. des Serres*, VII. t. 731. Rehb. in Walp. Ann. VI. p. 550.

Introduced from Rio de Janeiro by Mr. Isaac Hadwen, of Liverpool, in whose garden it flowered in June, 1851, and by whom it was communicated to the Royal Gardens at Kew and to other collections. It was shortly afterwards brought from southern Brazil by the late Mr. Miers, of Hammersmith, and has since been occasionally imported with other Brazilian orchids. As a horticultural plant it is less showy than *Scuticaria Steelei*, from which it is easily distinguished by its much shorter leaves and differently-shaped labellum.

S. *Steelei*.

Stems as thick as an ordinary writing pencil, 1—2 inches long, invested with greyish, lacerated, membranous sheaths. Leaves quite pendulous, tapering towards the apex 1—4 feet long. Peduncles 1—3 flowered. Flowers nearly 3 inches in diameter, light yellow spotted with red-brown, the fleshy crest of the lip orange-yellow; sepals and petals oblong, sub-acute, the lateral sepals the broadest, connate at their base, and forming with the base of the lip an obtuse *mentum* or chin; lip sub-orbicular when spread out, three-lobed, the side lobes turned upwards; the front lobe spreading, with a sinus in the anterior margin; crest an oblong fleshy plate, traversed longitudinally by five raised lines. Column semi-terete; bent.

Scuticaria Steelei, Lindl. in Bot. Reg. 1843, misc. p. 14 (*Steelei*). Rehb. in Walp. Ann. VI. p. 551. Williams' *Orch. Alb.* II. t. 55. *Maxillaria Steelii*, *Bot. Mag.* t. 3573. *Bot. Reg.* t. 1986. Schomb. Reisen. III. p. 909.

The handsomest of the *Scuticarias* as regards its flowers and the most singular in its excessively elongated leaves. It was introduced from Demerara in 1836 by Mr. Matthew Steele, by whom it was communicated to Mr. Moss, of Otterspool, near Liverpool, in whose garden it flowered for the first time in this country in the following year. It was detected by the brothers Schomburgk during their exploration of British Guiana, 1840—44, "on the banks of the rivers Essequibo and Demerara on the trunks of trees, flowering in June and July."

MAXILLARIA.

Ruiz et Pavon, Fl. Peruv. Prod. p. 116, t. 25 (1794). Lindl. Bot. Reg. 1843, misc. p. 10. Benth. et Hook. Gen. Plant. III. p. 553.

The genus *Maxillaria* was founded by the Spanish botanists Ruiz and Pavon on a group of epiphytal orchids, which they discovered on the Andes of Peru during their mission to that country, 1777—88. Owing to the terse but imperfect manner in which the genus was defined by these authors it became afterwards, as Mr. Bentham remarked, "a kind of receptacle for a great variety of American VANDEÆ," until the confusion became so great that Dr. Lindley undertook a revision of the genus, the results of which he published in the *Botanical Register* of 1843. Out of the aggregation of species that had been brought under *Maxillaria* up to that time he formed a number of new genera as *Lycaste*, *Paphinia*, *Colax*, *Warrea*, *Scuticaria*, etc., retaining under *Maxillaria* those species that conform to the characters described below. Thus restricted, *Maxillaria* is still an extensive genus, including, perhaps, over a hundred species, but forming a very natural group.

The lateral *sepals* are adnate to the foot of the column, forming with it a more or less prominent *mentum* or chin. The dorsal sepal is similar, and usually at a right angle to the lateral two.*

The *petals* are similar, but smaller and parallel with the column.

The *lip* is attached to the foot of the column by a very short claw, it is turned towards the column, three-lobed, concave, and with an oblong plate between the side lobes.

The *column* is wingless, often slightly curved, semi-terete, concave below the stigma.

The *pollinia* are four in two pairs, compressed, and almost sessile on a crescent-shaped gland.

It will be observed that some of these floral characters, especially the attachment of the lateral sepals and lip to the foot of the column, are found in allied genera, but from these the true *Maxillarias* can always be distinguished by their vegetative organs.

The *pseudo-bulbs* are more or less flattened, with one or more sheathing, acuminate brown spathes on each of the ancipitous sides.

The *leaves* are variable in size and shape but always persistent, leathery in texture and usually dark green.

* This arrangement of the sepals, especially when the lateral two take a horizontal position, which they almost always do, gives the flowers a one-sided aspect.

The *scapes* are always one-flowered, and clothed with 4—6 or more sheathing bracts that are at first green and foliaceous, but become brown and scarious before the flower fades.

Two sectional divisions of the Maxillarias have been made in reference to the habit of the plants.

1. *ACAULES*, in which the rhizome is short and inconspicuous, and in which therefore the pseudo-bulbs are clustered as in *grandiflora*, *Parkeri*, *picta*, *Sanderiana*, *venusta*, etc.

2. *CAULESCENTES*, in which the rhizome is produced beyond the pseudo-bulbs, and the plant assumes a scandent habit as *tenuifolia*, *variabilis*, etc.

The generic name is derived from *maxillæ*, "the jaws of an insect," from the fancied resemblance of the column and lip of some of the species to those organs.

The geographical limits of the Maxillarias cannot be very clearly stated owing to the immense area in tropical America that still remains botanically unexplored. In general terms they may be said to be dispersed over tropical America from southern Brazil to Mexico and the West Indies, being most numerous probably on the Cordilleras of the Andes where they ascend to 5,000 feet or more.

Cultural Note.—In a large genus like Maxillaria, in which much diversity of station occurs among the species, some living in the hot valleys of Brazil and Guiana, others in the West India islands, and others again ascending the Andes to several thousand feet, the geographical position of a species is the best indication of the temperature in which it should be cultivated in the glass-houses of Europe. In other respects the general cultural routine may be thus formulated:—The plants should be potted when new roots begin to appear, in a compost of two-thirds fibrous peat and one-third sphagnum moss placed on a drainage of clean broken crocks that fill the pots up to about two-thirds of their depth. After potting, water should be carefully applied till the plants root freely, when a larger quantity should be given regularly till the new growths are mature. As the Maxillarias are usually found growing more or less in shade, they should not be exposed to direct sunlight during the hottest season; they should receive at all times as much ventilation as external circumstances admit. For *Maxillaria Sanderiana* a teak basket such as that represented in the figure at page 160, and which can be suspended near the glass, is the best.

SYNOPSIS OF SPECIES AND VARIETIES.

Maxillaria acutipetala.

Pseudo-bulbs ovoid, $1\frac{1}{2}$ —2 inches long, prominently ribbed and furrowed, diphyllous. Leaves broadly linear, acute, 7—10 or more inches long. Scapes 5—6 inches long, sheathed by three oblong, obtuse bracts. Flowers $2\frac{1}{2}$ inches across the lateral sepals; sepals and petals light orange-yellow, paler and spotted with dark sanguineous purple behind; the sepals linear-oblong, obtuse; the petals similar but narrower, shorter and very acute; lip shorter than the other segments, three-lobed, the side lobes narrow, erect, pale yellow streaked longitudinally with red; the front lobe oblong, obtuse, crisped and reflexed, cream-white spotted with red. Column semi-terete, yellow streaked with red.

Maxillaria acutipetala, Hook. in *Bot. Mag.* t. 3966 (1843). Lindl. in *Bot. Reg.* 1343, misc. No. 36.

Introduced to the Royal Gardens at Kew more than fifty years ago from Central America by Mr. Barclay, a gardener attached to Her Majesty's surveying ship, *Sulphur*. It much resembles *Maxillaria picta* on superficial view, but the flowers are larger, of brighter colours, and have a differently-shaped labellum; it flowers in the winter months. Mr. F. W. Moore, of Glasnevin, kindly sent us materials for description.

M. crocea.

Pseudo-bulbs oblong, compressed, about an inch long, monophyllous. Leaves narrowly ligulate, sub-acute, 5—7 inches long. Scapes 4—5 inches long; bracts subulate, $\frac{1}{2}$ inch long. Flower orange-yellow; sepals linear, acute, an inch long; petals similar but shorter and bent forwards; lip short and fleshy, reflexed, crisped at the margin, brownish red. Column semi-terete, coloured like the lip.

Maxillaria crocea, Lindl. in *Bot. Reg.* t. 1799 (1836). Rehb. in *Walp. Ann.* VI. p. 522.

Introduced from Rio de Janeiro in 1833 by Captain Sutton, of the Royal Packet Service, and presented by him to Sir Charles Lemon, Bart., in whose garden at Carclew it flowered in the following year. It is very near *Maxillaria punctata*, but much more attractive.

M. fucata.

Pseudo-bulbs clustered, narrowly ovate-oblong, $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long, compressed with acute edges. Leaves lanceolate, 12—15 inches long, narrowed below into a conduplicate petiole one-third the length of

the blade. Scapes about 6 inches long; bracts broadly ovate, acute, prominently keeled. Flowers $2\frac{1}{2}$ inches in diameter, of rather coriaceous texture; sepals white at the base, brick-red in the middle, tawny yellow spotted with red-brown at the apex; the dorsal sepal ovate-oblong, sub-apiculate, strongly keeled behind, the lateral two much larger, broadly ovate, obtuse; petals oblong, apiculate, reflexed at the apex, white at the base with some brick-red lines, the apical area yellow; lip sub-orbicular, obscurely lobed, thickened at the apex, red-brown at the base, sulphur-yellow at the apex; plate of disk grooved bright yellow. Column triquetral, bent, whitish.

Maxillaria fucata, Rehb. in Gard. Chron. XXVI. (1886), p. 616. Gard. Chron. IV. s. 3 (1888), p. 577, with fig. (*errore fuscata*).



Maxillaria fucata.
(From the *Gardeners' Chronicle*.)

sub-var.—Hübschii.

Flowers identical in size and structure; sepals and petals French-white with an irregular purple apical spot; lip light yellow in front, reddish brown at the lateral margins. Column white, streaked with red-brown below the stigma.

M. fucata Hübschii, supra. *M. Hübschii*, Rehb. in Gard. Chron. III. s. 3 (1888), p. 136.

A most remarkable *Maxillaria* as regards the colour of its flowers, in cultivation at Burford Lodge, whence were derived the materials for description. The variety, a very attractive one, is an albino form and was introduced by Messrs. Sander and Co. through the collector whose name it bears. No locality has been divulged, but as it is said to have been found while the collector was in search of *Maxillaria Sanderiana*, both species and variety are probably of Ecuadorean origin.

M. grandiflora.

Pseudo-bulbs broadly oval-oblong, much compressed, $1\frac{1}{2}$ —3 inches long, monophyllous. Leaves ligulate, acute, 12—15 inches long, $1\frac{1}{2}$ —2 inches broad, cuneate-conduplicate at base, strongly keeled beneath. Scapes stoutish, 4—5 inches long; bracts boat-shaped, acute, keeled. Flowers among the largest in the genus; sepals and petals ovate-oblong, sub-acute, milk-white; the sepals 2 inches long, the dorsal one keeled behind, the petals much smaller and reflexed at the apex; lip broadly oval, obscurely three-lobed, the side lobes incurved, vinous purple, striated; the intermediate lobe reflexed, thickened and crisped at the margin, light buff-yellow; plate of disk grooved, thickened and free at the apex. Column thick, terete, and white above; yellow spotted with red in front.

Maxillaria grandiflora, Lindl. Gen. et Sp. Orch. p. 147 (1832). Rchb. in Walp. Ann. VI. p. 516. *Illus. hort.* XXII. t. 14 (1870). *Fl. Mag.* n.s. pl. 322. *M. eburnea*, Lindl. *Sert. Orch.* t. 40, No. 2. *M. Lehmanni*, Rchb. in Gard. Chron. XXV. (1886), p. 648. *Dendrobium grandiflorum*, H. B. K. Nov. Gen. I. t. 88.

var.—*Amesiana*.

Flowers larger than the usual forms; the petals streaked longitudinally on the basal half with rose-pink; the margin of the side lobes of the lip streaked with broad and short red lines.

M. grandiflora Amesiana, Hort.

The botanical history of this fine *Maxillaria* is most obscure, and even its precise habitat is known only to the orchid collectors who sent it to Europe.

It is unquestionably the *Dendrobium grandiflorum* of Humboldt and Kunth as figured by them in their *Nova Genera et Species*. Its habitat is there stated to be—

In radicibus Andium Paraguayensium prope rupem El Pupito, villam La Erre et planitiem montanam Sacondonvensium alt 1060 hexap. (6,000—7,000 feet).

As no such mountains as the Andes of Paraguay are known in modern geography, and the other places mentioned are not found

on any map to which we have access, the habitat given by Humboldt is virtually valueless although quoted by Lindley in his *Genera and Species of Orchidaceous Plants*, where the plant was first referred to *Maxillaria*.

It was next dealt with by Reichenbach in Walper's *Annales Botanices* in 1863; he gives no description of the plant but only the following brief quotation, apparently from a Lindenian source. "An epiphyte with oval flattened pseudo-bulbs, petals white as snow with a powdery yellow lip. Forests of Jaji in the province of Merida 5,000—6,000 feet elevation, Ocaña at 6,000 feet." But this evidently refers to *Maxillaria venusta* which comes from that region and which has occasionally been confused with *M. grandiflora*. The next notice of it occurs in *L'Illustration horticole* of 1870, at that time edited by M. André, who described the plant from living specimens which had been sent by Wallis to M. Linden's horticultural establishment in 1867 from Peru (probably Ecuador is meant), its station being at an altitude of 5,000—6,500 feet. If we assume the word *Paraguayensium* of Humboldt and Kunth to be a clerical error for *Peruvianorum*, the habitat given by them can to a great extent be reconciled with that given by André. The *M. eburnea* of Lindley was gathered near Mount Meracævi, about 30 miles N.N.E. from Cimeralda, but this locality is as obscure as that given by Humboldt.

M. Houtteana.

Pseudo-bulbs narrowly oblong, compressed, $1\frac{1}{2}$ —2 inches long, monophyllous. Leaves linear-ligulate, acute, 4—6 inches long. Scapes short; sepals and petals ligulate, acute, cinnamon-brown with a narrow yellow margin, brownish green behind, the petals a little narrower and shorter than the sepals; lip oblong, acute, not lobed, gently reflexed towards the apex, gamboge-yellow spotted with red-purple. Column semi-terete, red spotted with yellow in front.

Maxillaria Houtteana, Rehb. in *Hamburg Gartenzeit*, XIV. p. 212 (1858). Regel's *Gartenfl.* 1858, p. 286.

Our knowledge of this species is derived from a plant in the Royal Gardens at Kew, where the above description was taken. It was originally introduced from Guatemala by the late Louis Van Houtte, in whose nursery at Ghent it flowered in 1849. It is a dwarf species remarkably distinct in the colour of its flowers.

M. lepidota.

Pseudo-bulbs narrowly ovoid, 1—1½ inch long, monophyllous. Leaves linear-lanceolate, 9—12 inches long, conduplicate at the base. Scapes much shorter than the leaves. Sepals linear from a lanceolate base, tail-like, 2½ inches long, the broader basal portion yellow, the tails brown; petals similar but shorter, wholly yellow; lip oblong, acute, the lateral margins incurved; the apical half concave, reflexed, yellow spotted with blackish purple; plate of disk grooved, pubescent. Column yellow.

Maxillaria lepidota, Lindl. Ann. Nat. Hist. XV. (1845), p. 38, ex Rehb. in Walp. Ann. VI. p. 525. Rehb. in Gard. Chron. IX. (1878), p. 168.

Originally discovered by Hartweg in southern Colombia, near Popayan, in 1841—42, and gathered by Spruce on the Andes of Ecuador in 1858, but not introduced into British gardens till 1877, when it was received by Messrs. Low and Co., of Clapton, and Mr. Bull, of Chelsea, from their respective correspondents. This and the next species to be described are remarkable among the cultivated *Maxillarias* for their long tail-like sepals, a character expressed by the specific names.

M. longisepala.*

“Pseudo-bulbs tufted, ovate or ovate-oblong, sub-compressed, 1—1¼ inch long. Leaves narrowly ligulate, acute, 6—9 inches long. Scapes 6 inches long; bracts lanceolate, acute, reddish brown. Sepals nearly 4 inches long, very narrow, acuminate, pale purple-brown faintly striated with a darker shade; petals similar but a little shorter; lip ovate-oblong, obtuse or sub-apiculate, the margin a little reflexed, light yellowish green with radiating lines of dark reddish brown on the margin. Column pale green.”—R. A. Rolfe in Gard. Chron. VIII. s. 3 (1890), p. 94.

Maxillaria longisepala, Rolfe in Gard. Chron. loc. cit. *Lindenia*, VI. t. 248.

“A new and elegant species sent from Venezuela by Bungeoth to M. Linden, L'Horticulture Internationale of Brussels, in 1890.”

M. luteo-alba.

Pseudo-bulbs broadly ovate-oblong, much compressed, about 2 inches long, monophyllous. Leaves broadly ligulate, 15—20 inches long, cuneate below and passing into a short folded petiole. Peduncles about 6 inches high; bracts slightly inflated. Flowers large and fragrant; sepals linear-oblong, acute, 3 inches long, white at the base, the remainder tawny yellow, reddish purple behind; petals similar but narrower, shorter and more acute; lip three-lobed, the side lobes oblong, erect, whitish obliquely streaked with dark purple on the inner side; the intermediate

* Not seen by us.

lobe oblong, emarginate, reflexed, white; plate of disk yellow. Column short, terete and white above, purplish below the stigma.

Maxillaria luteo-alba, Lindl. Orch. Lind. p. 20, No. 106 (1846). Rehb. in Bonpl. II. p. 18. Id. in Walp. Ann. VI. p. 516. *Fl. Mag.* pl. 559 (*luteo-grandiflora*). Williams' *Orch. Alb.* III. t. 106.

var.—Turneri.

Pseudo-bulbs smaller. Leaves shorter, narrower, more leathery and of a darker green. Flowers a little smaller in all their parts; the front lobe of the lip less distinctly emarginate.

M. luteo-alba Turneri, supra. *M. Turneri*, Hort.

A handsome species discovered by Linden in 1842 on the Cordillera of Venezuela, near Merida, at 5,000—7,000 feet elevation, and subsequently gathered in the same region by Schlim, Wagener and other collectors. We find no record of its first introduction into British gardens.

M. marginata.

Pseudo-bulbs ovoid or ovate-oblong, $1\frac{1}{2}$ —2 inches long, mono-diphyllous. Leaves linear-lanceolate, acute, 5—8 inches long. Peduncles 3—4 inches long, the ovary mottled with dull green and crimson. Flowers about $1\frac{1}{2}$ inch across vertically; sepals bent forward, linear-oblong, acute, light orange-yellow with a narrow dark red margin and a median red line behind; petals similar but much smaller; lip three-lobed, the side lobes oblong, erect, streaked obliquely with red-purple; the front lobe oblong, acute, reflexed, light yellow; plate of disk fleshy, thickened in front.

Maxillaria marginata, Fenzl. in Van Houtte's *Fl. des Serres*, X. p. 112 (1854). Rehb. in Walp. Ann. VI. p. 520. Rolfe in *Gard. Chron.* V. s. 3 (1889), p. 770. *Cymbidium marginatum*, Lindl. in *Bot. Reg.* XVIII. (1832), t. 1530.

Introduced from Rio de Janeiro to the garden of the Horticultural Society of London at Chiswick, where it flowered in November, 1830; a few years later it was gathered by Gardner at Rio Compaïdo in southern Brazil. Not being a very showy plant it seems to have been generally neglected by horticulturists. We received flowers from Burford Lodge and Glasnevin.

M. nigrescens.

Pseudo-bulbs ovoid, compressed, 1—2 inches long, monophyllous. Leaves linear-lanceolate, 10—12 inches long, sub-acute, conduplicate at base, very coriaceous. Peduncles drooping, 2—3 inches long. Sepals broadly linear, 2 inches long, port-wine colour; petals similar but shorter and darker in colour; lip oblong with incurved margins and reflexed triangular apex, blackish purple, paler at the apex. Column arching, terete above, concave below the stigma, vinous purple.

Maxillaria nigrescens, Lindl. Orch. Lind. p. 20, No. 105 (1846). Rehb. in Walp. Ann. VI. p. 518.

One of the Lindenian discoveries on the Cordillera of Merida in 1842; it was collected some years later near Hato Arribo by Wagener, who introduced it to the Botanic Garden at Hamburg. The dark and lurid colour of its flowers secures for it a place in many collections.

M. Parkeri.

Pseudo-bulbs ovoid, much compressed, $1\frac{1}{2}$ —2 inches long, monophyllous. Leaves linear-lanceolate, acute, 10—15 inches long conduplicate at the base. Peduncles about 3 inches long, sheathed by alternate, imbricating, slightly inflated bracts that are striated with dull crimson. Flowers $3\frac{1}{2}$ inches across the lateral sepals; sepals oblong, light tawny yellow, the dorsal one apiculate and with a median sunk line; petals lanceolate, acute, reflexed at the apex, cream-white with 7—9 purple lines on the basal half; lip three-lobed, the side lobes oblong, incurved, streaked longitudinally with purple; the terminal lobe narrowly oblong, reflexed, tawny yellow passing into white at the denticulate margin; plate of disk downy, thickened in front. Column semi-terete, dark purple; anther white.

Maxillaria Parkeri, Hook. *Bot. Mag.* t. 2729. Lindl. *Gen. et Sp. Orch.* p. 146.

An attractive species originally discovered in Demerara by Mr. C. S. Parker, who sent it to the Liverpool Botanic Garden, where it flowered in 1827. It has since been occasionally imported.

M. picta.

Pseudo-bulbs ovoid, 2—3 inches long, compressed, mono-diphylous. Leaves narrowly ligulate, acute, 9—15 inches long. Peduncles half as long as the leaves. Sepals and petals linear-oblong, acute, more or less incurved; the sepals light tawny yellow on the inside, whitish spotted with purple behind; the petals coloured like the sepals with the addition of a red streak at the base; lip oblong, white marked with purple on the side lobes which are narrow and erect, the front lobe reflexed, acute; plate of disk oblong, downy. Column terete, blackish purple.

Maxillaria picta, Hook. in *Bot. Mag.* t. 3154 (1832). Lindl. *Gen. et Sp. Orch.* p. 146. *Bot. Reg.* t. 1802.

Originally sent to Mrs. Arnold Harrison, of Liverpool, in 1831 by her relative Mr. William Harrison, who had gathered it on the Organ Mountains, near Rio Janeiro, and shortly afterwards imported by Messrs. Loddiges, of Hackney. Like many of the older introductions from Brazil which were once generally cultivated, it has of late years receded in public favour.

M. porphyrostele.*

"Pseudo-bulbs orbicular-ovoid, compressed, diphyllous. Leaves linear, 5—7 inches long, narrowed at the base. Scapes much shorter than the leaves. Flowers about $1\frac{1}{4}$ inch broad, light golden yellow with a purple median stripe towards the base of the petals; sepals incurved, the dorsal one linear-oblong, the lateral two more lanceolate and much broader at the base; petals shorter and narrower than the sepals, ascending and incurved; lip three-lobed, the lateral lobes ear-shaped, erect with incurved margins; the mid-lobe orbicular-oblong with rounded tip, nearly flat with a tubercular callus at the base. Column slender, purple."—*Botanical Magazine*.

Maxillaria porphyrostele, Rehb. in Gard. Chron. 1873, p. 978. *Bot. Mag.* t. 6477.

Introduced from the Brazilian province of Rio Grande do Sul by Mr. William Bull, of Chelsea, in whose nursery it flowered in 1873. It is nearly allied to the preceding species, *Maxillaria picta*, differing chiefly in the pseudo-bulbs, bracts and colour of the flowers, which are as in *M. picta* very copiously produced. The specific name refers to the purple column.

M. præstans.

Pseudo-bulbs broadly ovoid, compressed, $1\frac{1}{2}$ —2 inches long, monophyllous. Leaves linear-oblong, 7—9 inches long, emarginate, narrowed and conduplicate at the base. Peduncles slightly ancipitous, the cauline sheaths brown, the larger floral bract inflated and green. Sepals and petals narrowly oblong, acute, tawny yellow dotted with red-brown at the base, the sepals 2 inches long, the dorsal one strongly keeled at the back; the petals shorter and nearly parallel with the dorsal sepal; lip oblong, three-lobed, the side lobes small, rounded, erect, densely spotted with vinous red; the intermediate lobe ovate-oblong, reflexed, brownish yellow with numerous reddish warts; plate of disk grooved, whitish. Column semi-terete, yellow dotted with red.

Maxillaria præstans, Rehb. in Gard. Chron. XXIII. (1885), p. 566. *M. Kimballiana*, Hort.

A handsome species first sent to Messrs. Low and Co., of Clapton, in 1883—84 from Guatemala by Mr. F. C. Lehmann, now German Consul in the States of Colombia. Its precise habitat has not been divulged.

M. punctata.

Pseudo-bulbs ovoid, about an inch long, monophyllous. Leaves linear-lanceolate, acute, 7—10 inches long, narrowed and conduplicate at the base. Scapes pale green, 3—4 inches long. Flowers about $2\frac{1}{2}$ inches

* Not seen by us.

across the lateral sepals, light yellow, paler at the back with here and there a sanguineous spot; sepals linear, acute; petals similar but narrower and more acute; lip obscurely lobed, as long as the column, reflexed at the apex, yellow with red longitudinal lines. Column slender, semi-terete, pale yellow, red at the apex.

Maxillaria punctata, Lodd. Bot. Cab. XX. t. 1914 (1833). Gard. Chron. II. s. 3 (1887), p. 787.

A small-flowered but very floriferous species imported from Brazil some time prior to 1833, in which year it was figured in Loddiges' *Botanical Cabinet*. It is in cultivation at Kew and Glasnevin.

M. rufescens.

Pseudo-bulbs ovate, sub-tetragonous, 2 inches long, monophyllous. Leaves ligulate-oblong, acute, 6—8 inches long. Peduncles ascending, 1—2 inches long, purplish with a dark red-brown sheathing bract at the base and a similar larger one at the base of the ovary. Sepals ligulate, sub-acute, reddish brown; petals similar but narrower and shorter, light yellow; lip three-lobed, yellow spotted with red, the side lobes roundish, erect; the intermediate lobe oblong, gently reflexed, the thickened plate between the side lobes buff-yellow. Column triquetral, reddish brown.

Maxillaria rufescens, Lindl. in *Bot. Reg.* XXI. sub. t. 1802; and XXII. t. 1848 (1836). Saunders' *Ref. Bot.* II. pl. 79 and 133. *M. fucata*, Hort. (not of Rehb.).

Originally imported from Trinidad by Messrs. Low and Co. upwards of sixty years ago; it also occurs in Cuba where it was collected by Wright, and in Caracas where it was found by Wagener.* It flowered for the first time in this country at Chatsworth in 1834. The species appears to be variable in the size and colour of its flowers.

M. Sanderiana.

Pseudo-bulbs ovoid, compressed with acute edges, 2 inches long, monophyllous. Leaves petiolate, narrowly oblong, acute, 7—12 inches long. Scapes decumbent, sometimes ascending, 5—6 inches long; bracts ovate-lanceolate, acuminate, 1½ inch long. Flowers 5—6 inches across the lateral sepals; sepals ovate-oblong, apiculate, the lateral two broader at the base than the dorsal one which is keeled behind, French-white, the dorsal one spotted with sanguineous red at the base only, the lateral two heavily blotched and spotted with sanguineous red to beyond the middle; petals erect, similar to the lateral sepals and coloured like them but smaller; lip fleshy, ovate, three-lobed, ivory-white with some deep sanguineous stains on the side lobes

* *Fide* Reichenbach in Saunders' *Refugium Botanicum*, II. sub. pl. 133.



Maxillaria Sanderiana.

which are rounded and incurved; margin of intermediate lobe revolute and crisped; plate of disk tongue-shaped. Column trigonal, deep sanguineous red above, white spotted with red-purple below the stigma.

Maxillaria Sanderiana, Rehb. in Sander's *Reichenbachia*, I. t. 25 (no date).

Unquestionably the finest of all known Maxillarias. It was discovered by Edward Klaboch on the Andes of Ecuador at an altitude of 4,000 feet and introduced through him by Messrs. Sander and Co. in 1883 or 1884. It flowered for the first time in this country in the collection of Baron Schroeder, at The Dell, and was exhibited by him at the Orchid Conference at South Kensington in May, 1885.

M. setigera.

Pseudo-bulbs sub-orbicular or roundish ovate, compressed, 1—1½ inch long, monophyllous. Leaves shortly petiolate, elliptic-oblong, sub-acute, 6—10 inches long. Peduncles 3—4 inches long, sheathed by alternate and distichous, slightly inflated bracts that are greenish spotted with red. Flowers fragrant; sepals linear, apiculate, 2—2½ inches long, the basal part milk-white, the remainder light yellow; petals similar but smaller and bent forwards; lip three-lobed, the side lobes oblong, involute, white streaked with purple on the inner side; the front lobe oblong with denticulate margin, reflexed, white with a bright yellow oblong, hairy disk. Column triquetral, bent, white above, purple below the stigma.

Maxillaria setigera, Lindl. in Bot. Reg. 1845, misc. No. 38. Rehb. in Walp. Ann. VI. p. 517. *M. leptosepala*, Hook. in Bot. Mag. t. 4435 (1849). *M. callichroma*, Rehb. in Walp. Ann. VI. p. 518.

Introduced from Caracas by Mr. George Barker, of Birmingham, in whose collection it flowered in 1844. Two years later it was sent by Purdie from northern Colombia to the Royal Gardens at Kew where it flowered in 1849, on which occasion it was figured and described in the *Botanical Magazine* under the name of *Maxillaria leptosepala*, the name by which it is still best known in gardens, Sir William Hooker having evidently overlooked Dr. Lindley's original description in the *Botanical Register* published four years previously. In its long attenuated sepals and petals it approaches *M. lepidota* and *M. longisepala*, but in every other character it is quite distinct. The specific name *setigera*, "bristle bearing," refers to the bristle-like points of the sepals and petals.

M. tenuifolia.

Rhizome ascending, sheathed by pale brown imbricating scales,

Pseudo-bulbs produced from the rhizome at intervals of about an inch, ovoid, compressed, smooth, about an inch long, monophyllous. Leaves linear, acuminate, 12—15 inches long, with a sunk median line on the face, dark green. Peduncles about 2 inches long including the obscurely six-furrowed ovary. Flowers $1\frac{1}{2}$ —2 inches across the lateral sepals; sepals ovate-lanceolate with revolute margins, dark red speckled with yellow; petals similar but shorter, erect and parallel with the column; lip oblong, obtuse, reflexed at the apex, concave and deep sanguineous red to beyond the middle, the apical area yellow with leopard-like red-purple spots; plate of disk oblong, pubescent. Column clavate, pale yellow above, spotted with red in front.

Maxillaria tenuifolia, Lindl. in *Bot. Reg.* 1837, sub. t. 1986; and 1839, t. 8. Rchb. in Walp. Ann. VI. p. 832. Rolfe in Gard. Chron. I. s. 3 (1887), p. 702.

sub-var.—*Burford Lodge*, flowers yellow spotted with red, the spots on the petals and lip larger and deeper than those on the sepals.

An attractive species with sedge-like foliage and richly-coloured flowers that was originally discovered by Hartweg in 1837 in the vicinity of Vera Cruz and sent by him to the Horticultural Society of London, in whose garden at Chiswick it flowered for the first time in 1839. It is the most generally cultivated of the scandent *Maxillarias*.

M. variabilis.

Rhizome ascending, covered with brown sheathing scales. Pseudo-bulbs about the size of a filbert, monophyllous. Leaves linear, variable in length, 2—4 or more inches long. Peduncles (including ovary) about $1\frac{1}{2}$ inch long. Flowers an inch across the lateral sepals, variable in colour, the form recognised as the type deep sanguineous purple; sepals oblong, apiculate; petals similar, reflexed at the apex; lip oblong, obtuse, obscurely lobed, the side margins incurved to beyond the middle. Column triquetral.

Maxillaria variabilis, Batem. in *Bot. Reg.* sub. t. 1986 (1837). Rchb. in Walp. Ann. VI. p. 536. *M. Henchmanni*, Hook. in *Bot. Mag.* t. 3614. *M. atropurpurea*, Hort.

sub-var.—*lutea*, flowers buff-yellow, the lip and column blotched with deep purple.

A native of Mexico that was in cultivation in several European gardens in 1837 and perhaps earlier: it appears to have been first imported by Messrs. Low and Co. through Henchmann. It is one of the scandent *Maxillarias* cultivated in the Royal Gardens at Kew, whence we derived materials for description.

M. venusta.

Pseudo-bulbs oval-oblong, much compressed, 2—3 inches long, monophyllous. Leaves oblong-lanceolate, acute, 12—15 inches long, narrowed below into a short foot-stalk. Scapes nodding, 6—12 inches long; bracts lanceolate, acute, sheathing, $1\frac{1}{2}$ inch long. Flowers 5—6 inches across the lateral sepals; sepals and petals lanceolate, acuminate, white, the former spreading, the latter much shorter and nearly parallel with the column; lip much shorter and more fleshy than the other segments, the upper surface buff-yellow, the lower one cream-white with a few red spots, three-lobed; the side lobes roundish oblong; the intermediate lobe ovate, obtuse, reflexed, downy; plate of disk oblong, nearly flat. Column clavate, triquetral, whitish.

Maxillaria venusta, Lindl. ex Rehb. in Bonpl. 1854, p. 277. Walp. Ann. VI. p. 514. Linden's *Pesc.* t. 38. *Bot. Mag.* t. 5296. M. Anatomorum, Rehb. Xen. Orch. I. p. 188, t. 67. M. Kalbreyeri, Rehb. in Gard. Chron. XXIII. (1885), p. 239.

Originally discovered by Linden in 1842 on the Cordillera of Venezuela in the province of Merida, but not introduced till 1851, when it was re-discovered by Schlim on the eastern Cordillera of New Granada, near Ocaña, and sent by him to M. Linden's horticultural establishment at Brussels, where it flowered for the first time in Europe in 1854. *Maxillaria venusta* is well known as one of the most beautiful of the genus, easily recognised by its long, acuminate, milk-white sepals and petals.

SUB-TRIBE ONCIDIÆ.

*Rhizome very short, usually terminating in mono-diphyllous pseudo-bulbs with a few distichous leaves or leaf-sheaths under them in the axils of which the scapes or peduncles arise, but in a few genera the pseudo-bulbs are wanting. Flowers often showy; the column not produced into a foot; the pollinia with a distinct stipes (caudicle).**

* The sub-tribe ONCIDIÆ is one of the most extensive and, in a horticultural sense, one of the most important in the Order. Mr. Bentham has included in it thirty-six genera, all of them American, which are distributed into five series, chiefly in reference to the characters of the labellum and its attachment to the column. Of these series the fourth comprises a large number of species familiar to orchid growers as *Odontoglossa*, *Oncids*, *Miltonias* and *Brassias*. On account of the horticultural importance of many of the included genera, more space is devoted in this work to this sub-tribe than to any other.

COMPARETTIA.

Pöppig et Endl. Nov. Gen. et Sp. I. p. 42, t. 73 (1835). Benth. et Hook. Gen. Plant. III. p. 558.

A small genus including four or five species, natives of tropical America. The chief character that distinguishes *Comparettia* from other genera is the slender spur which is a remarkable structure; it is not a simple organ but consists of three spurs, two of which are produced from the labellum and one from the united base of the lateral sepals within which the two spurs of the labellum are hidden and not discoverable till the sepaline spur is cut open. In all the species it is more or less divergent from the ovary.

The *Comparettias* are dwarf plants with short stems, leathery leaves few in number, and lax racemes of handsomely-coloured flowers. The genus commemorates Andreas Comparetti, Professor of Botany at Padua and one of the most eminent vegetable physiologists of his time.

Cultural Note.—A latticed stage placed not more than 18—24 inches from the glass in the coolest part of the intermediate house is a suitable position for the *Comparettias*, and on this the pots or baskets in which the plants are grown may be placed, but many cultivators prefer small pans suspended from the roof. Fibrous peat mixed with a little sphagnum is the best compost for them, and which should be kept constantly moist, the quantity of moisture being, of course, regulated according to the season. A light shading on hot bright days must also be used.

Comparettia coccinea.

Stems fusiform, slightly elongated, 1—2 inches long, di-triphyllous. Leaves narrowly lanceolate, acute, 2—3 inches long, leathery, purplish beneath. Scapes nodding, as long again as the leaves, 5—7 flowered; bracts small, scale-like. Flowers an inch across vertically; sepals and petals ovate, acute, light yellow bordered with orange-red, the lateral sepals connate and concealed by the lip; lip three-lobed, the basilar lobes auriculate with two raised lines between them; the intermediate lobe broad, spreading, sub-quadrate or transversely oblong, deeply emarginate, bright scarlet; spur slender, longer than the blade, yellowish. Column whitish, rostellum beaked.

Comparettia coccinea, Lindl. in *Bot. Reg.* 1838, t. 68. Rehb. in Walp. *Ann.* VI. p. 688. *Illus. hort.* 1866, pl. 472.

This is probably a rare species, for although introduced more than half a century ago it is now but seldom seen in the orchid

collections of Europe. It was first imported from Brazil by Messrs. Loddiges in 1837, but it seems to have been subsequently lost. About the year 1865 it was re-introduced from the neighbourhood of Rio de Janeiro by M. Ambroise Verschaffelt, of Ghent, through his correspondent M. Pinel.

C. falcata.

"Pseudo-bulbs clustered, small, oblong, more or less sheathed with scales, monophyllous. Leaves oblong-lanceolate, acute, $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long. Scapes slender, purplish, 7—9 inches, pendent, loosely racemose towards the extremity, 4—7 (or more) flowered; bracts distant, small and scale-like. Flowers about an inch in diameter, purplish red, almost crimson; dorsal sepal and petals free, concave; lateral sepals connate, placed immediately under the labellum and spurred; lip broadly obovate, emarginate with an elevation on the claw, bicalcarate at the base, the two spurs enclosed by the larger sepaline spur which is about as long as the blade of the labellum."—*Botanical Magazine*.

Comparettia falcata, Pöppig et Endl. Nov. Gen. et Sp. I. p. 42 (1835). *Bot. Mag.* t. 4980. Rehb. in Walp. Ann. VI. p. 688. *Lindenia*, IV. t. 163. Williams' *Orch. Alb.* VIII. t. 359. *C. rosea*, Lindl. in Bot. Reg. 1840, misc. No. 186. *Paxt. Mag. Bot.* X. p. 1. Van Houtte's *Fl. des Serres*, II. t. 6 (1846).

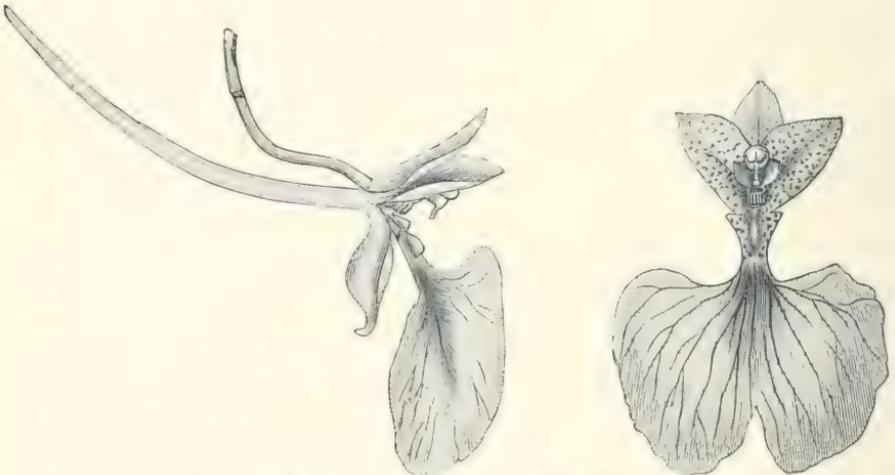
Comparettia falcata, the type species of the genus, was discovered by Pöppig some time prior to 1835 in Ecuador, between Cassapi and Pampayaco (not found on modern maps). The earliest notice of it as a horticultural plant occurs in 1840, when a *Comparettia* was cultivated by Messrs. Loddiges, who informed Dr. Lindley that they had imported it from the Spanish Main. This was named *C. rosea* by Dr. Lindley and was afterwards figured under that name in Paxton's *Magazine of Botany*, but rightly reduced to a synonym of *C. falcata* by Reichenbach in his synopsis of the genus in Walper's *Annales Botanices*. It was next found by Linden in the Venezuelan province of Merida, and subsequently imported by him from that region through his relative Louis Schlim. It has since been gathered in Guatemala, Cuba, Santa Martha, Ecuador and other places, thus proving the species to be very widely dispersed.

The region inhabited by *Comparettia falcata* may be thus briefly sketched. In latitude it occurs from 2 S. to 16 N., that is, from Central Ecuador to Guatemala. Its lowest vertical limit in Guatemala is about 3,200 feet elevation, gradually increasing to 4,000 feet at the equator, the highest corresponding limits being estimated at 4,500 and 5,700 feet. The climate of this region is rather changeable,

not only with respect to the temperature but also with respect to the periodical rainfall and the hygrometric condition of the atmosphere. The mean temperature of the entire region is about 18° C. (64° F.), but the difference between the annual maximum mean and the annual minimum mean of the warmest and coldest month is inconsiderable; it is only 1.5° — 2° C. (2° — 3° F.) in Colombia and Ecuador, but in Guatemala it is 6.5° — 7.5° C. (12° — 14° F.). The quantity of moisture in the atmosphere varies somewhat according to the season, but there is sufficient ground to conclude that during the wet season it is probably of uniform proportion over the entire zone.

Comparettia falcata is very particular as to the tree on which it grows; in Guatemala it is found on oaks and oranges with but few exceptions; in other places it selects the Guava tree (a species of Inga). The woods in which it appears are usually of a thinly set copse-wood character or in park-like savannahs. The plants vary with locality; in Guatemala they are small, producing short wiry scapes with only three to five flowers but intensely coloured; in some parts of Colombia they are much longer and produce strong panicles of twenty-five to forty flowers.

Rodriguezias (Burlingtonias), *Trichocentrums* and *Ionopses* grow under much the same conditions as this plant.*



Comparettia Macroplectron, side and front view of flower.
(From the *Gardeners' Chronicle*.)

C. *Macroplectron*.

Stems about an inch long, sheathed by rigid scales, usually monophyllous, but sometimes diphyllous, in which case the leaves are unequal. Leaves linear-lanceolate, acute, 3—5 inches long. Scapes slender, sub-

* F. C. Lehmann in *Gard. Chron.* XX. (1883), p. 24.

pendulous, 18—24 inches long, dull crimson, racemose, rarely paniculate along the distal half, 10—15 flowered. Flowers nearly 2 inches across vertically; dorsal sepal oblong, whitish, apiculate, sometimes spotted with purple, keeled behind; the lateral two connate into a boat-shaped body at the base of which depends the slender spur nearly two inches long; petals similar and equal to the dorsal sepal; lip broadly clawed with two small triangular auricles at the base from which two slender spurs extend into the sepaline spur to about half its length; the blade sub-orbicular, deeply emarginate, the auricles and claw white dotted with rose-purple, the blade light rose reticulated with purple. Column white.

Comparettia Macroplectron, Rchb. in Gard. Chron. X. (1878), p. 524. Id. XI. (1879), p. 398; XVIII. (1882), p. 616; and XXIV. (1885), p. 365, icon. xyl. Williams' *Orch. Alb. II.* t. 65. *The Garden*, XXX. (1883), t. 385.

The largest-flowered species yet introduced but less brilliant in colour than the others; it is also distinguished from them by its much larger spur. It was originally discovered by Señor Triana, a Colombian botanist, and introduced by Messrs. Low and Co. in 1878.

C. speciosa.

Stems very short, sub-cylindric, sheathed with pale membranous, acute scales. Leaves oblong-lanceolate, acute, 4—6 inches long. Scapes two—three times as long as the leaves, terminating in a lax 7—10 flowered raceme; bracts small, subulate, acute. Flowers $1\frac{1}{2}$ inch across vertically, bright orange-scarlet; dorsal sepal and petals ovate, acuminate; the lateral sepals connate into a boat-like body, very acute at the apex; lip shortly clawed with two basal auricles and a sub-quadrate, emarginate blade; sepaline spur slender, longer than the stalked ovaries, obscurely pubescent. Column short with two small green wings; anther white and beaked.

Comparettia speciosa, Rchb. in Gard. Chron. X. (1878), p. 524. Williams' *Orch. Alb. V.* t. 233.

Discovered on the eastern Cordillera of Ecuador in 1877 by Edward Klaboch, by whom it was introduced into European gardens. It is chiefly distinguishable from *Comparettia fulcata* by its larger flowers of a different colour, and especially by its elongated spur.

TRICHOCENTRUM.

Pöppig et Endl. Nov. Gen. et Sp. II. p. 11, t. 115 (1835). Benth. et Hook. Gen. Plant. III. p. 559.

Trichocentrum is botanically distinguished from *Comparettia* chiefly by the following characters:—

The floral spur is simple, that is to say, it is produced from the

labellum only, and is parallel with the ovary (not divergent). The lip is adnate to the base of the column, not continuous with it. The inflorescence is much shorter and fewer-flowered.

About a dozen species are known to science, which admit of a division into two sections according to their habit—one with flat and horizontal leaves, as *Trichocentrum albo-purpureum*, *T. maculatum*, etc.; and the other with equitant, vertical leaves, as *T. triquetrum*. The Trichocentra are dispersed over tropical America from Mexico to Brazil; they are dwarf stemless plants with tufted leathery leaves that affix themselves to the branches and trunks of trees, some occurring on the Cordilleras of the Andes growing under conditions described in page 166, others along the hot damp valleys of Guiana and northern Brazil.

The genus was founded by Pöppig and Endlicher on *Trichocentrum pulchrum*, a species detected by the first-named botanist near Pampayaco in Peru (Ecuador?), but which has not been introduced into European gardens. The generic name is derived from *θρίξ τριχός*, "a hair," and *κέντρον*, "a spur," probably in reference to the slender spur of several of the species, but as Dr. Lindley remarked, the applicability of the name is not apparent nor is it explained by the author.*

Cultural Note.—Affixed to blocks of wood or placed in shallow pans and suspended near the glass is the most suitable arrangement for all the species of *Trichocentrum* yet introduced. The temperature is suggested by the geographical station of the species; for those inhabiting the Cordilleras of the Andes an intermediate temperature is sufficient, while those from the hot valleys of Guiana and Brazil should be placed in the East Indian house.

Trichocentrum albo-purpureum.

Leaves oblong or oblong-lanceolate, acute, 3—5 inches long, coriaceous, almost fleshy. Peduncles very short, bi-bracteate, 1—2 flowered. Flowers $1\frac{1}{2}$ —2 inches in diameter; sepals and petals similar, elliptic-oblong, obscurely keeled behind, tawny brown with greenish tips, the sepals acute, the petals obtuse; lip with a short broad claw, sub-quadrate, two-lobed at the apex; white with a large purple spot on each side of the crest which consists of four thin keels, in front of which is a buff-yellow spot; spur slender, cylindrical, whitish. Column short, produced above into two falcate horns.

Trichocentrum albo-purpureum, Rehb. in Gard. Chron, 1866, p. 219, icon. xyl. *Bot. Mag.* t. 5688. Williams' *Orch. Alb. IV.* t. 204. *Lindenia*, II. t. 85.

* Bot. Reg. sub. 1951.

One of the finest species in the genus and that which is most generally cultivated. It was introduced by M. Linden, it is believed, from the Rio Negro region in northern Brazil; it flowered for the first time in this country in the collection of the late Mr. Wilson Saunders, at Hillfield, Reigate, in 1866.

T. fuscum.

Leaves shortly petiolate, oblong, acute, 3—4 inches long. Peduncles very short, 1—2 flowered. Flowers a little more than an inch across vertically; sepals and petals similar, ovate, acute, purplish green; lip broadly oblong, dilated and two-lobed at the apical end, bilamellate and prolonged into a slender spur at the base, white with a rose-purple blotch on each side of the lamellæ. Column short with two obovate, denticulate wings.

Trichocentrum fuscum, Lindl. in *Bot. Reg.* t. 1951 (1837). *Bot. Mag.* t. 3969. Rehb. in *Walp. Ann.* VI. p. 545.

Introduced from Mexico in 1835 by Mr. Knight, our predecessor at the Royal Exotic Nursery, where it flowered in July of the following year.

T. maculatum.

Leaves linear or lanceolate-oblong, acute, 2—3 inches long. Peduncles as long as the leaves, 1—2 flowered. Flowers $1\frac{1}{2}$ inch across vertically; sepals and petals broadly oval-oblong, obtuse, white with the central area densely spotted with rose; lip obovate, two-lobed in front, the apical area coloured like the sepals and petals, the basal area with two longitudinal shallow keels, bright yellow dotted with red; spur slender, as long as the pedicel and ovary, pale green. Column wings spreading, denticulate, yellow spotted with red.

Trichocentrum maculatum, Lindl. *Orch. Lind.* p. 24 (1846). Rehb. in *Walp. Ann.* VI. p. 545.

Originally discovered by Linden in 1842 growing on old trees at an elevation of 4,500 feet on the Sierra Nevada of Santa Martha in northern Colombia, and subsequently gathered by Schlim and Wagener near Ocaña, whence it has since been occasionally imported. It is a handsome species that has appeared within the last few years at the Royal Horticultural Society's meetings under various names which are here purposely suppressed to avoid a burdensome unauthoritative synonymy.

T. Pfavii.

Leaves ligulate-cuneate, sub-acute, 3—4 inches long. Peduncles shorter than the leaves, 1—2 flowered. Flowers about $1\frac{1}{2}$ inch across vertically;

sepals and petals similar and sub-equal, spathulate, obtuse, white with a large brown blotch near the base; lip broadly clawed, the claw auriculate and with two short keels; the blade fan-shaped, two-lobed, dentate, white with a large red spot at the base; spur conic, very short. Column wings roundish oblong, spotted with brown at the margin.

Trichocentrum Pfavii, Rehb. in Gard. Chron. XVI. (1881), p. 70. Id. XVII. (1882), p. 117, icon. xyl.

One of the discoveries, in Central America, of the Swiss orchid collector Richard Pfau, who has communicated to the horticultural press some useful notes on the climate of that region and the conditions under which orchids grow there. *Trichocentrum Pfavii* was introduced in 1881 by Messrs. Sander and Co.

R. triquetrum.*

"Leaves vertical, equitant, 6 inches long, $\frac{1}{2}$ inch wide at the base, gradually tapering to an acute apex. Peduncles axillary, about an inch long, with several conduplicate lanceolate-linear acute bracts, about $\frac{1}{2}$ inch long. Pedicel and ovary $1\frac{1}{4}$ inch long, triquetrous. Sepals ovate-lanceolate, acute, pale straw-yellow, the lateral two prolonged behind and adnate to the spur of the lip; petals sub-orbicular, pale straw-yellow; lip reniformly orbicular, straw-yellow irregularly variegated and almost suffused on the disk with orange; base with two converging keels; spur slender, $1\frac{1}{4}$ inch long, tapering to the acute apex. Column stout, wings small and rounded."—R. A. Rolfe in Gard. Chron. IX. s. 3 (1891), p. 701.

Trichocentrum triquetrum, Rolfe in Gard. Chron. loc. cit. *Lindenia*, VII. t. 311.

A very distinct species and an interesting addition to the genus recently introduced from Peru by Messrs. Charlesworth, Shuttleworth and Co., of Heaton, Bradford.

RODRIGUEZIA.

Ruiz et Pav. Prod. Fl. Peruv. et Chili, p. 115, t. 25 (1794). Rehb. in Walp. Ann. VI. p. 690 (1863). Benth. et Hook. Gen. Plant. III. p. 559 (1883).

A well-established genus including about twenty species that are dispersed over tropical America from southern Brazil to Mexico and also the West India Islands. The essential characters of *Rodriguezia* are seen in the lateral sepals, labellum and column; the lateral sepals are connate, and in those species formerly included in Lindley's *Burlingtonia* they are joined in a very curious way, sometimes forming a boat-shaped body of singular appearance that is

* Not seen by us.

almost concealed by the labellum; the labellum is large and prominent as in the allied genera *Comparettia* and *Trichocentrum*, but the spur is very short, often reduced to a simple gibbosity projecting between the bases of the lateral sepals; the column is longer and more slender than in those genera.

Mr. Bentham followed Reichenbach in uniting Lindley's *Burlingtonia* with Ruiz and Pavon's *Rodriguezia*, assigning the following conclusive reason for doing so:—

“*Rodriguezia* was originally confounded by Lindley with Robert Brown's *Gomezia* which has no spur, and when he afterwards separated the spurred species he unfortunately overlooked the fact that these were the true *Rodriguezias* of Ruiz and Pavon, and gave them the new name of *Burlingtonia*.”*

The *Rodriguezias* are dwarf epiphytes usually with short monophyllous pseudo-bulbs springing from a rhizome that is sometimes much elongated, and from which in several species is produced a dense plexus of thread-like white roots that form a conspicuous feature of the plant.

The genus was dedicated by its founders to Emanuel Rodriguez, a Spanish physician and botanist of the last century.

Cultural Note.—Being of dwarf habit the *Rodriguezias* may be grown in pans or baskets suspended near the glass in an intermediate house. For those species of which the roots are developed as above described, most cultivators use sphagnum moss only, placed beneath the pseudo-bulbs on an ample drainage of broken crocks. A moist atmosphere almost to saturation during the growing season is indispensable.

Rodriguezia Batemanii.

Pseudo-bulbs ovoid, compressed and furrowed when old, monophyllous. Leaves oblong-ligulate, acute, 3—4 inches long. Racemes as long as the leaves, sub-pendulous, few-flowered; bracts triangular, acute, keeled, almost as long as the ovaries; dorsal sepal and petals whitish, the former oblong, acute, arched; the latter broader, obovate-oblong, streaked with rose-purple; the connate lateral sepals nearly equal to the dorsal one; lip broadly oblong, dilated and emarginate at the apical end, with two keels extending from the base to beyond the middle, white streaked with rose-purple; spur conic, very short.

Rodriguezia Batemanii, Pöpp. et Endl. *Nov. Gen. et Sp.* I. t. 70 (1835). Rehb. in *Gard. Chron.* 1866, p. 1042. Sanders' *Ref. Bot.* II. t. 128. *Burlingtonia rubescens*, Lindl. in *Bot. Reg. sub. t.* 1927 (1837).

* *Journ. Linn. Soc.* XVIII. p. 326.

A very pretty species originally discovered by the German botanist Pöppig in 1830 on the Andes of Peru, near Maynas,* growing on calabash trees (*Crescentia Cujete*), and which after his return to Europe he dedicated to Mr. Bateman, who had paid him a visit at Leipzig where he had been appointed Professor of Botany. Nothing more was seen or heard of it till 1866, when it was re-discovered by Wallis near Moyabamba, it was supposed, and who sent it to M. Linden's horticultural establishment at Brussels. It was first cultivated in England by Bishop Sumner at Farnham Castle, and Mr. Wilson Saunders at Hillfield, Reigate.

R. candida.

Pseudo-bulbs about the size of a walnut, slightly compressed, monophyllous. Leaves oblong-lanceolate, acute, 4—6 inches long. Racemes as long as the leaves, pendulous, 4—7 flowered. Flowers fragrant, of semi-transparent texture, 2—3 inches across vertically, white with a bright yellow longitudinal bar on the lip that is sometimes rayed; the dorsal sepal obovate-oblong, emarginate; the lateral two much smaller, connate to two-thirds of their length and embracing the spur of the lip at their base; petals obovate, obtuse; lip with a channelled claw and obcordate, emarginate blade, multi-lamellate on the disk, the lateral lamellæ divergent. Column clavate, toothed at the apex.

Rodriguezia candida, Rehb. in Walp. Ann. VI. p. 695 (1863). Benth. Gen. Plant. III. p. 559. Burlingtonia candida, Lindl. in Bot. Reg. t. 1927 (1837). Id. Paxt. Fl. Gard. p. 158. Fl. Mag. t. 548. Williams' Orch. Alb. I. t. 18.

Introduced from Demerara by Mr. Bateman, in whose collection at Knypersley it flowered for the first time in April, 1835. It was afterwards detected by the brothers Schomburgk during their exploration of British Guiana on the sand hills and in the light forests near the river Demerara growing upon the branches of shrubs. Ever since its first introduction it has been generally recognised by amateurs of orchids as one of the most beautiful of Rodrigueziæ or Burlingtonias as it is better known in gardens.

R. decora.

Rhizome scandent, slender, jointed at intervals of about an inch. Pseudo-bulbs produced from the rhizome at intervals of 5—9 inches, ovoid, compressed, about an inch long with a linear-oblong, acute leaf springing from the base on one side and a larger apical one about 6 inches long. Scapes from the axils of the basal leaves, slender,

* This name seems to have disappeared from modern maps.

erect, 12—15 inches high, terminating in a 10—15 flowered raceme; bracts small, membranous, sheathing. Flowers $1\frac{1}{2}$ inch long; sepals and petals white spotted with brown, the dorsal sepal elliptic-oblong, the lateral two narrowly oblong, connate to beyond the middle, all apiculate; petals elliptic-oblong, much broader than the sepals; lip with a broad claw on which are five raised lines, and a sub-orbicular two-lobed white blade. Column terete, prolonged into two erect, purple, hairy horns and two smaller and shorter smooth pale ones.

Rodriguezia decora, Rehb. in Walp. Ann. VI. p. 692 (1863). Benth. Gen. Plant. III. p. 559. *Burlingtonia decora*, Lemaire, Jard. Fleur. II. t. 188 (1851). Van Houtte's *Fl. des Serres*, VII. t. 716. Lindl. in Paxt. Fl. Gard. III. p. 100, icon. xyl. *Bot. Mag.* t. 4834.

var.—picta.

Pseudo-bulbs less compressed; leaves shorter and more acute; sepals and petals blotched with sanguineous purple.

R. decora picta, Benth. Gen. Plant. III. p. 559. *Burlingtonia decora picta*, *Bot. Mag.* t. 5419.

This species is well distinguished among *Rodriguezias* by its scandent habit, its curiously-shaped but very pretty flowers, and especially by the horn-like prolongations of the column.* It was first introduced from the province of São Paulo in southern Brazil by M. de Jonghe through his collector Libon; it flowered for the first time in Europe in M. Jacob Makoy's nursery at Liège in May, 1851. The variety was received from southern Brazil by Mr. Bateman in 1863.

R. granadensis.

Leaves lanceolate, acute, 3—4 inches long, in tufts of threes and fours, the uppermost pair enclosing a small monophyllous pseudo-bulb about the size of a filbert. Racemes pendulous, longer than the leaves, 5—7 flowered. Flowers an inch in diameter, white with a yellow blotch on the disk of the lip; dorsal sepal and petals sub-equal, ovate, acute; lateral sepals much narrower and connate into a boat-shaped body; lip clawed, obovate, emarginate. Column narrowly winged.

Rodriguezia granadensis, Rehb. in Walp. Ann. VI. p. 695 (1863). *Burlingtonia granadensis*, Lindl. Orch. Lind. p. 24 (1846).

Discovered by Linden in 1842 near Pamplona on the eastern Cordillera of New Granada, but not introduced till many years afterwards. It was detected by one of our own collectors in 1887 near Mantanza growing on the small twigs of shrubs and low trees

* Very near *Rodriguezia decora* and quite agreeing with it in its scandent habit is *R. rigida*, figured in Lindley's *Sertum Orchidaceum*, t. 36, and Paxton's *Magazine of Botany*, VIII. p. 193. It was cultivated by Messrs. Loddiges more than half a century ago, but we find no mention of it since.

overhanging the river Surito, a confluent of the Magdalena. It is a pretty dwarf species well worthy of cultivation.*

R. pubescens.

Leaves narrowly ligulate, acute, 5—7, very leathery. Racemes pendulous, longer than the leaves, 10—15 flowered. Flowers nearly $1\frac{1}{2}$ inches in diameter, white with a yellow blotch at the base of the lip; dorsal sepal oblong-lanceolate, acute; lateral sepals much narrower, connate and with a small gibbosity at the base; petals obovate-oblong, obtuse; lip obovate, two-lobed in front, auricled at the base, the auricles minute, hastate, erect; the disk with three unequal raised lines. Column downy; wings minute.

Rodriguezia pubescens, Rehb. in Bot. Zeit. X. p. 771 (1852). Id. in Walp. Ann. VI. p. 694. *Lindenia*, VII. t. 306. Gard. Chron. XI. s. 3 (1892), p. 426, icon. xyl. R. Lindenii, Coigniaux in Linden's Journ. des Orch. III. pp. 10, 12, fig. 1. *Burlingtonia pubescens*, Lindl. in Paxt. Fl. Gard. I. p. 158 (1850—51).

The following, by Dr. Lindley in Paxton's *Flower Garden*, loc. cit., is the earliest notice we find of this species:—

“This beautiful *Rodriguezia* was exhibited at a meeting of the Horticultural Society some years ago when it received a silver medal. It had been sent to Mr. John Knowles, of Manchester, from Pernambuco, where it appears to be very rare. It is not now, however, introduced for the first time, for we have in our possession a dried specimen communicated by the late Mr. George Loddiges in 1846, at which time we named it *pubescens* in allusion to the down on the column which is not found in the other drooping, white-flowered species.”

Quite recently *Rodriguezia pubescens* has been re-introduced by L'Horticulture Internationale of Brussels, and by Messrs. Sander and Co. of St. Albans. It is one of the most chaste and attractive species of the genus.

R. secunda.

Pseudo-bulbs oval-oblong, compressed, $1\frac{1}{2}$ —2 inches long, monodiphyllous. Leaves linear-lanceolate or linear-oblong, acute, 5—9 inches long, more or less conduplicate, very leathery. Scapes as long as the longest leaves, pale green tinged with dull crimson, racemose along the distal half, nodding or arched, many-flowered. Flowers distichous and secund (all turned in one direction whence the specific name), on pale rose-pink pedicels sheathed at the base by a small lanceolate, acute bract; sepals and petals of a uniform rose-pink, the upper sepal oval-oblong, concave on the inner side; the lateral sepals connate into a boat-shaped body, gibbous at the base, attenuated at the apex;

* Very near *Rodriguezia granadensis*, if not a variety of it, is *R. Caloptectron* (Rehb.), figured in the *Gartenflora* of 1892, t. 1372.

petals similar to the upper sepal but broader; lip obovate-oblong, emarginate with a furrowed callosity at the base, deeper in colour than the other segments. Column terete, short, white.

Rodriguezia secunda, H. B. K. Nov. Gen. et Sp. I. p. 387, t. 92 (1815). *Bot. Reg.* t. 930 (1825). *Bot. Mag.* t. 3524 (1836). Williams' *Orch. Alb.* VIII. t. 351. *R. lanceolata*, Lodd. *Bot. Cab.* t. 676 (not of Ruiz. et Pav.).

Comparatively few orchids have been longer known in British gardens or were more generally cultivated during the second quarter of the present century than *Rodriguezia secunda*, but like others that were popular during that period, it has receded before the more showy kinds since imported from the same region over which it is spread, although it is still met with in many collections. It was originally introduced from Trinidad about the year 1818, but it had been discovered many years previously by Humboldt and Bonpland in the neighbourhood of Carthagenia in northern Colombia growing on the trunks of *Crescentia Cujete* (The Calabash Tree). It was afterwards brought from Demerara by Capt. Bispham, of the Liverpool merchant service, and cultivated by Mr. Parker of that city. The brothers Schomburgk during their exploration of British Guiana, 1840—44, found it generally dispersed over the whole country; they also noted a variety with darker flowers growing on the banks of the Demerara river and which they called *sanguinea*.* It is also very common around Para in Brazil, the Mango trees being full of it, and it is almost the only orchid found within the city itself.† The geographical range of *Rodriguezia secunda* is thence a very extensive one. It is variable in habit and colour, the latter ranging from sanguineous red to pale rose.

R. venusta.

Rhizome elongated. Leaves linear-ligulate, acute, conduplicate at the base, obliquely emarginate, 6—9 or more inches long, produced in tufts of threes and fours, between the upper pair of which the small oblong, monophyllous pseudo-bulb is seated. Racemes pendulous, 5—9 flowered. Flowers $1\frac{1}{2}$ inch long, pure white with an oblong yellow blotch on the lip and very fragrant; upper sepal broadly ovate, acute, concave and bent forwards; lateral sepals narrowly oblong, connate into a boat-like organ, very acute at the apex and enclosing the spur of the lip; lip clawed, broadly obovate, with a deep sinus in the apical margin, in

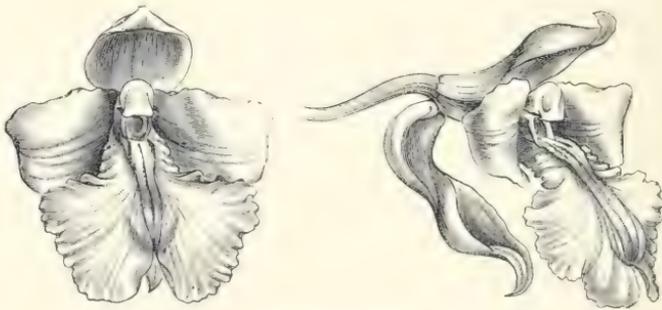
* Reisen in Britisch-Guiana, III. p. 312.

† E. S. Rand in lit.

which is a small triangular lobule; the disk with two wavy keels that are orange-red along the edge. Column with a horn-like auricle on each side of the stigma and two small purple teeth above them.

Rodriguezia venusta, Rehb. in Walp. Ann. VI. p. 194. *Burlingtonia venusta*, Lindl. in Bot. Reg. sub. t. 1927 (1837). Id. *Sert. Orch.* t. 2. *Illus. hort.* 1858, t. 188. *B. fragrans*, Lindl. in Bot. Reg. sub. t. 1927. Williams' *Orch. Alb.* VIII. t. 363.

This beautiful species was discovered in the early part of the present century by the French traveller and naturalist, Descourtilz, growing on the topmost branches of *Cedrela* trees, near Bananal, in the Brazilian province of Minas Geraes. The drawings which he subsequently published led Dr. Lindley to conclude that he had detected two species of *Rodriguezia*, one with drooping the other



Rodriguezia venusta.

with erect racemes, to which therefore that excellent orchidologist gave separate names with a brief diagnosis of each in the *Botanical Register*, sub. t. 1927, published in 1837, distinguishing that with pendulous racemes as *venusta*, and that with erect racemes as *fragrans*. Nothing, however, appears to have occurred since to verify this conclusion; no tangible difference is observable in the plants cultivated under the names of *Rodriguezia fragrans* and *R. venusta*.

The date of the first introduction of *Rodriguezia venusta* is uncertain. In 1856 it was sent to M. Ambroise Verschaffel's horticultural establishment at Ghent by his Brazilian correspondent M. Pinel; and this is the earliest authentic date we find respecting it, but it was then known to have been in cultivation many years previously.

TRICHOPILIA.

Lindl. Nat. Syst. Bot. ed. II. p. 446, and Bot. Reg. sub. t. 1863 (1836). Rehb. Xen. Orch. II. p. 98 (1865). Benth. et Hook. Gen. Plant. III. p. 559.

Trichopilia includes about fifteen species; two of them, *T. lava* and *T. fragrans*, were constituted a separate genus by Lindley under the name of *Pilumna*,* but as they possess no definable characters by which they may be technically distinguished from the older genus *Trichopilia*, they were referred to it both by Reichenbach and by Bentham. Reichenbach also added *Helcia sanguinolenta*,† an orchid discovered by Hartweg on the Ecuadorean Andes, and to which Lindley had given separate generic rank in the erroneous belief, derived from an examination of the dried specimen of the discoverer and therefore perfectly excusable, that the column and lip were attached in a manner different from *Trichopilia* which is not the case. Mr. Bentham followed Reichenbach in including Lindley's *Helcia* in *Trichopilia*, and he also referred another so-called monotypic form to the same genus, Reichenbach's *Oliveriana*,‡ detected by Wallis near Medellin in New Granada, not known in cultivation, but which appears to possess all the essential characters of *Trichopilia*.

The genus as now circumscribed is well distinguished by the following floral characters:—

The *sepals* and *petals* are nearly equal and similar, narrow in proportion to their length and in a few species, spirally twisted.

The *lip* is large, more or less funnel-shaped (obscurely so in *Trichopilia sanguinolenta* and *T. hymenantha*), and projecting forwards mostly at a right angle to the other segments; the short *unguis* or claw and the small basal lobes are adnate to the column.

The *column* terminates in a curious hood-like appendage that is more or less toothed (ciliate-dentate) but sometimes lobed.

In their vegetation the *Trichopilias* are dwarf plants with an inconspicuous rhizome, so that the pseudo-bulbs are usually more or less crowded.

The pseudo-bulbs are often elongated and nearly flat; they are always monophyllous. The leaves are but a few inches long, leathery in texture and dark green. The peduncles are usually pendulous and few-flowered, rarely erect.

The geographical area over which the species are dispersed is,

* Bot. Reg. 1844, misc. No. 74.

† Xen. Orch. II. p. 106.

‡ Linnæa, XLI. p. III.

comparatively speaking, limited. They occur on the Andes of South America at a moderate elevation, from the equator northwards to Caracas, and crossing the isthmus they spread through Costa Rica into southern Mexico. Three or four of the most admired species have their home on the volcano of Chiriqui and the not very distant peak of Turialba, and this is the greatest aggregation of the species known. The genus was founded by Lindley on the Mexican species *Trichopilia tortilis*, the very curious appendage at the apex of the column suggesting the generic name which is derived from $\theta\rho\iota\zeta$, $\tau\rho\iota\chi\acute{o}\varsigma$, "a hair," and $\pi\acute{\iota}\lambda\iota\omicron\nu$, "a cap." This remarkable structure is shown in the annexed figure of the column of the type species.



Cultural Note.—The *Trichopilias* may be grown in pots or in teak baskets, many cultivators preferring the latter on account of the facility with which they can be suspended near the glass, where the plants can receive as much light as possible in the short and dull days of our changeable climate. A mixture of peat and sphagnum with good drainage is the best compost for them, and on this the pseudo-bulbs should be placed, not inserted in it. For the Central American and Mexican species, a temperature that can be raised to 21° C. (70° F.) during the growing season is the most suitable. *Trichopilia fragrans* and its varieties may be grown in the *Odontoglossum* house.

Trichopilia coccinea.

Pseudo-bulbs narrowly oblong, compressed, 2—3 inches long. Leaves ligulate, acute, 6—9 inches long. Peduncles deflexed, as long as the pseudo-bulbs, sheathed at the base by closely imbricating bracts, one-flowered. Sepals and petals linear-lanceolate, acute, 2½ inches long, more or less twisted, brownish green; lip 3 inches long, four-lobed, the basal lobes rolled over the column into the form of a wide-mouthed funnel, white externally, deep carmine-crimson within; the two front lobes nearly flat, sub-orbicular, rose-carmine striated, paler, sometimes white at the margin.

Trichopilia coccinea, Lindl. in Paxt. *Fl. Gard.* II. p. 80, pl. 54 (1851—2).
Morren in Belg. hort. 1874, p. 91.

var.—*crispa.*

Peduncles two-flowered; the sepals and petals sometimes tinted with dull rose-carmine, the margin of the lip irregularly but somewhat strongly crisped.

T. coccinea crispa, Morren in Belg. hort. 1874, p. 92 (in part). *T. crispa*, Lindl. in Gard. Chron. 1857, p. 342. *T. gloxiniaeflora*, Klotzsch.

One of the handsomest of the genus and occasionally confused with *Trichopilia marginata*, from which it differs in its longer, narrower and more compressed pseudo-bulbs; in its longer and narrower leaves; in its twisted sepals and petals that are differently coloured; and in its narrower and curved funnel-shaped lip, the front lobes of which are not depressed. It was discovered in Central America by Warszewicz in 1849 and introduced by him into European gardens shortly afterwards. The variety which differs from the type only in the characters described above was first cultivated by Mr. Rucker, of West Hill, Wandsworth; it appears to be more rare than the typical form.

Trichopilia coccinea, Lindl.; *T. crispa*, Lindl.; *T. gloxiniflora*, Klotzsch; *T. marginata*, Henfrey; and *T. lepida*, Veitch, represent a series of forms in which more definite characters are wanting to differentiate them specifically. In their vegetation there is a greater divergence than in the structure of their flowers, especially in *T. coccinea* and *T. marginata*, as pointed out above; for garden use therefore these may be conveniently retained as distinct. Adopting Lindley's suggestion,* we have reduced *T. crispa* to a variety of *T. coccinea*, and following Reichenbach we have made *T. gloxiniflora* a synonym of the former.† *T. lepida* is manifestly a variety of *T. marginata* with which Warner's *T. crispa marginata* is synonymous. It only remains to be noted that all these forms have a common origin and have been imported mixed together.

T. fragrans.

Pseudo-bulbs oblong, much compressed with acute edges, 3—5 inches long. Leaves oblong or oblong-lanceolate, acute, 7—10 inches long, almost sessile on the apex of the pseudo-bulbs. Peduncles erect or sub-erect, 2—4 flowered; pedicels (including ovary) 2—3 inches long; bracts ovate-oblong, sub-acute, sheathing. Flowers very fragrant, pure white with a circular yellow spot near the base of the lip, the sepals and petals sometimes with a slight tinge of green; sepals and petals nearly uniform, linear-lanceolate, acuminate, 2—2½ inches long with undulated margins; lip clawed, the claw adnate to the base of the column and then convolute over it; the blade large, expanded, broadly oblong, obscurely four-lobed. Column terete with two rounded entire wings in front and with a fimbriated hood at the apex.

* Gard. Chron. 1857, p. 342.

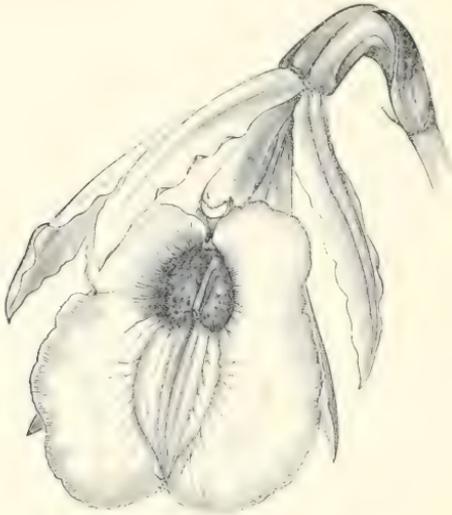
† Xen. Orch. II. p. 102. The late Professor Morren, of Liège, adopted this view in his synopsis of *Trichopilia* published in the *Belgique horticole* of 1874, but unfortunately mixed up *T. marginata* with *T. coccinea*,

Trichopilia fragrans, Rehb. in Hamb. Gartenz. 1859, p. 229. Id. Xen. Orch. II. p. 100. Jennings' *Orch.* t. 38. Saunders' *Ref. Bot. II.* t. 127. *T. Backhouseana*, Rehb. in Gard. Chron. V. (1876), p. 816. *T. Lehmanni*, Regel's *Gartenfl.* 1888, t. 1276. *Pilumna fragrans*, Lindl. in Bot. Reg. 1844, misc. No. 74. *Bot. Mag.* t. 5035.*

var.—*nobilis*.

Pseudo-bulbs shorter and thicker; leaves shorter and broader. Flowers a little larger with the sepals and petals always pure white, the blade of the lip a little broader with the yellow spot enlarged.

T. fragrans nobilis, *Illus. hort.* 1872, t. 94. *T. fragrans*, *Fl. Mag.* N.S. t. 21. *T. candida*, Lindl. Orch. Lind. No. 640. *Pilumna nobilis*, Rehb. in Linnæa, XXII. p. 843. Williams' *Orch. Alb. III.* t. 128.



Trichopilia fragrans.

Trichopilia fragrans was originally discovered by Hartweg about the year 1841 near Popayan in southern Colombia, and a brief description of the flower from his herbarium specimen was published by Lindley in the *Botanical Register* of 1844. In the meantime a *Trichopilia* had been detected on the Sierra Nevada of Merida in western Venezuela by Linden who named it *T. candida*, a name which Lindley adopted in his enumeration of the orchids discovered by Linden, but Linden's plant was afterwards referred to

* Reichenbach in Xen. Orch. II. p. 100, refers this to his *Trichopilia Wageri*. There is, however, but little to distinguish it from *T. fragrans*, except the shorter and narrower anterior lobes of the labellum and the smaller orange-yellow spot at its base. As *T. fragrans* is widely dispersed over the Colombian Andes, *T. Wageri*, as represented in the *Botanical Magazine*, appears to be nothing more than a geographical form of it.

T. fragrans by Reichenbach* and later by André to the *T. nobilis* of that author which he rightly reduced to a variety of *T. fragrans* on the occasion of its being figured in the *Illustration horticole*.† But so many intermediate forms have appeared in recent importations that the marks of distinction between *T. fragrans* and the variety *nobilis* observable in the earliest introduced plants have practically vanished. The *T. Lehmanni* of Regel was gathered by Mr. Lehmann on the western Cordillera of Colombia; no definite specific character is discoverable in the figure in the *Gartenflora* by which it may be separated from *T. fragrans*.

The date of the first introduction of *Trichopilia fragrans* into European gardens is uncertain. The plant figured as *T. fragrans* in the *Botanical Magazine* was cultivated by Lady Dorothy Nevill at Dangstein in 1857, and this is the earliest mention we find of its being in cultivation in this country. A few years later it was imported from New Granada in considerable quantities by Messrs. Low and Co., M. Linden, and ourselves.

T. Galeottiana.

Pseudo-bulbs narrowly oblong, much compressed with acute edges, $3\frac{1}{2}$ —5 inches long. Leaves elliptic-oblong, sub-acuminate, 5—7 or more inches long, leathery, dark green. Peduncles procumbent, as long as the pseudo-bulbs, 1—2 flowered. Sepals and petals similar, narrowly lanceolate, apiculate, obscurely keeled behind, pale turmeric-yellow; lip sub-orbicular, cuneate, adnate to the column at the base, then convolute over it, the blade four-lobed, light yellow with a darker yellow disk that is sometimes spotted with red. Column terete, greenish, denticulate at the apex.

Trichopilia Galeottiana, A. Rich. in *Ann. Sc. Nat.* 1845, p. 26. *Rchb. Xen. Orch.* II. p. 103. *Id.* in *Gard. Chron.* 1865, p. 770. *Morren in Belg. hort.* 1874, p. 96. *T. picta*, Lemaire in *Illus. hort.* 1859, t. 225. *T. Turialvæ*, Batem. in *Bot. Mag.* t. 5550 (not of *Rchb.*).

Discovered some time prior to 1845 by Galeotti, an Italian botanical explorer, near Teotaleingo in Mexico growing on oaks at an elevation of 3,000 feet. It was introduced into European gardens by M. Ambroise Verschaffelt, of Ghent, in 1859 through his collector Ghiesbreght who gathered it in the district of Chiapu. A few years later it became generally distributed among the orchid collections of this country, and was described by Mr. Bateman in the *Botanical*

* *Walp. Ann.* VI. p. 680.

† *Vol. XIX.* (1872), p. 96.

Magazine as *T. Turialvæ* in the erroneous belief that it was the species so named by Reichenbach that had been discovered by Wendland in Central America. It is well distinguished among *Trichopilias* by its light yellow flowers.

T. *hymenantha*.

Pseudo-bulbs none. Leaves in tufts of 4—5, linear, acuminate, 5—10 inches long, fleshy, sub-terete, channelled on the face. Peduncles slender, pendulous and racemed, 4—6 or more flowered; bracts ovate, acute, as long as the slender ovaries. Flowers nearly 2 inches in diameter; sepals and petals similar and sub-equal, linear-lanceolate, acuminate, light straw-yellow, but sometimes white; lip broadly oval, abruptly acuminate, concave at the base, fringed at the margin, white sparingly spotted with deep claret-red and covered with crystal dots. Column slender, terete, hooded at the apex, the hood with denticulate margin.

Trichopilia hymenantha, Rehb. *Xen. Orch.* I. p. 15, t. 7 (1854); and II. p. 98. *Bot. Mag.* t. 5949. Morren in Belg. hort. 1874, p. 101.

Very little is recorded of this *Trichopilia*. It was first discovered by Schlim in the eastern Cordillera of New Granada near Ocaña, and was probably introduced by him. Reichenbach states that it was in the collection of Consul Schiller at Hamburg in 1853, whence he obtained the materials for the description and figures in the *Xenia Orchidacea*. We find no further mention of it till it was figured and described in the *Botanical Magazine* of 1872, from a plant that flowered in our houses in the autumn of the preceding year.

Trichopilia hymenantha is readily distinguished among its congeners by the absence of pseudo-bulbs, by its long narrow fleshy leaves and by its nearly flat labellum. Notwithstanding the little favour accorded to it by cultivators, it is one of the most delicate of *Trichopilias* in the texture and colour of its flowers.

T. *laxa*.

Pseudo-bulbs oval-oblong, much compressed, 2—3 inches long. Leaves broadly lanceolate-oblong, acute, 8—12 inches long. Peduncles sub-pendulous, pale green mottled with dull crimson, racemose, 5—9 flowered; bracts spathaceous, broadly ovate, obtuse. Flowers about 3 inches in diameter; sepals and petals similar, linear-lanceolate, pale rose with a greenish median band; lip white, obcordate, cuneate, obscurely three-lobed, the basal lobes rolled over the column. Column triquetral, with a fimbriate hood at the apex.

Trichopilia laxa, Rehb. in Hamb. Gartenz. 1858, p. 229. Id. *Xen. Orch.* II. p. 100. Morren in Belg. hort. 1874, p. 101. *Pilumna laxa*, Lindl. in *Bot. Reg.* 1844, misc. No. 74; and 1846, t. 57.

This is one of the least interesting of the *Trichopilias* in a horticultural sense on account of the absence of attractive colours in its flowers. It was originally discovered by Hartweg at the same time and in the same locality as *Trichopilia fragrans*, viz., near Popayan in southern Colombia about the year 1841.

T. marginata.

Pseudo-bulbs broadly oblong, $1\frac{1}{2}$ —2 inches long. Leaves oblong, sub-acute, 6 inches long, very leathery. Peduncles short, sheathed by imbricating bracts, 2—3 flowered. Flowers with a curved pedicel and ovary, 2 inches long; sepals and petals linear lanceolate, acute, $2\frac{1}{2}$ inches long, reddish crimson with white margins; lip funnel-shaped, obscurely four-lobed, the front lobes deflexed, rose-carmine, darker and striated towards the base, white externally. Column white, the apical hood three-lobed and denticulate.

Trichopilia marginata, Henfrey in Gard. Mag. July, 1851, with fig. Rehb. Xen. Orch. II. p. 102. *T. coccinea*, Hook. in Bot. Mag. t. 4857. Van Houtte's *Fl. des Serres*, XIV. t. 1490. Warner's *Sel. Orch. I.* t. 5 (*crispa marginata*). De Puydt, *Les Orch.* t. 43 (idem).

var.—*lepida*.

Flowers somewhat larger than the typical form; the white margin of the sepals and petals broader and interrupted with rose-pink spots; the margin of the lip similarly spotted and more crisped than in the commoner form.

T. marginata lepida, supra. *T. lepida*, Veitch ex Williams' *Orch. Alb. V.* t. 197. *Fl. Mag.* n.s. t. 98.

One of the handsomest species of the genus and one that has been most generally cultivated since its first introduction. It has been occasionally confused with *Trichopilia coccinea* and its variety *crispa* from which it is fairly distinguishable by the characters pointed out under that species. It was discovered by Warszewicz in 1849 on the volcano of Chiriqui in Central America and introduced by him into European gardens shortly afterwards. The variety *lepida* appeared amongst an importation of the species by ourselves in 1873; it is a very rare form.

T. rostrata.

Pseudo-bulbs narrowly oblong, much compressed, 4—6 inches long. Leaves linear-oblong acute, as long as the pseudo-bulbs, conduplicate at the base. Peduncles short, sub-erect, 2—3 flowered; bracts ovate-oblong, much shorter than the ovaries, pale green dotted with brown. Sepals and petals linear-ligulate, acute, $1\frac{1}{2}$ inch long, twisted, obscurely keeled behind, light yellow-green; lip broadly oblong, emarginate, three-lobed, the side

lobes rolled over the column into a tube but reflexed at their apex, the intermediate lobe spreading, white with some yellow markings on the disk and some orange spots and markings within the tube. Column prolonged at the apex into a fringed hood.

Trichopilia rostrata, Rehb. in Gard. Chron. 1872, p. 798. Saunders' *Ref. Bot. II.* t. 100.

Discovered in New Granada by one of Messrs. Low's collectors in 1866 and introduced by that firm a few years afterwards. It is now but rarely seen.

T. sanguinolenta.

Pseudo-bulbs ovate-oblong, compressed, 1—2 inches long. Leaves linear-oblong, acute, 4—6 or more inches long, narrowed below into a short channelled petiole. Peduncles ascending, about 3 inches long, sheathed at each joint by a brownish acute bract $\frac{3}{4}$ inch long, one- rarely two-flowered. Sepals and petals oblong, sub-acute, more than an inch long, light olive-green barred and spotted with chestnut-brown, the spots on the petals ocellated; lip oblong, two-lobed at the apex, the lobes slightly divergent, crisped and denticulate at the margin which is also incurved, with two erect basal auricles adnate to the column between which are two short protuberances; the auricles and crest yellow, the blade white spotted and marked in various ways with red-purple, the apical area white. Column terete, terminating in a fimbriated hood.

Trichopilia sanguinolenta, Rehb. Xen. Orch. II. p. 106, t. 131 (1865). Morren in Belg. hort. (1874), p. 102. Benth. in Journ. Linn. Soc. XVIII. p. 326. *Bot. Mag.* t. 7281. *Helcia sanguinolenta*, Lindl. in Bot. Reg. 1845, misc. No. 27. Id. in Paxt. Fl. Gard. II. p. 97, icon. xyl. Rehb. in Walp. Ann. VI. p. 682. *Illus. hort.* 1870, t. 31.

For the discovery of this curious and interesting orchid science and horticulture are indebted to the energy of Theodor Hartweg, who detected it near Paccho on the Ecuadorean Andes in 1841. He sent it with other orchids from the same region to the Horticultural Society of London in whose garden at Chiswick it flowered two or three years afterwards, but it seems to have been subsequently lost. It was re-introduced about the year 1869 by M. Linden through his collector Gustav Wallis. It is best known in gardens under the name of *Helcia sanguinolenta*, but it is now become very rare.

T. suavis.

Pseudo-bulbs ovoid, much compressed, almost discoid, the largest $3\frac{1}{2}$ inches long and $2\frac{1}{2}$ inches broad. Leaves elliptic-oblong, acute, the largest a foot long and 4 inches broad, the smallest less than one-third as large. Peduncles pendent, 2—5 flowered; bracts small, ovate,

membraneous, striated. Flowers fragrant and the largest in the genus; sepals and petals lanceolate, acuminate, undulate, cream-white sometimes spotted with pale rose; lip broadly obovate-cuneate with crisped and crenulate margin, obscurely three-lobed, the basal half white, convolute over the column into the form of a wide-mouthed funnel, the apical half spreading, more or less spotted and blotched with rose-pink, and with some orange spots and markings on the disk. Column terete with a fringed four-lobed hood.

Trichopilia suavis, Lindl. in Paxt. *Fl. Gard. I.* pp. 44, 53, t. 11 (1850). *Bot. Mag.* t. 4654. Van Houtte's *Fl. des Serres, VIII.* t. 761. Warner's *Sel. Orch. III.* t. 8. Rehb. *Xen. Orch. II.* p. 103. De Puydt, *Les Orch.* t. 44. *Belg. hort.* 1874, p. 89 (Lamarchei).



Trichopilia suavis.

sub-var.—*alba* (Williams' *Orch. Alb. I.* t. 14. *Lindenia, I.* t. 2), flowers wholly white except the yellow spot on the disk of the lip which is paler than in the spotted forms.

The origin of *Trichopilia suavis* appears to have been but vaguely known till the late M. Morren of Liège published the following particulars of its habitat in the *Belgique horticole* of 1874:—

“It was discovered in 1848 by Warscewicz in Costa Rica, on the Cordillera, at an altitude of 5,000—8,000 feet. He met with the finest specimens on the volcano of Chiriqui, at an altitude of 8,000 feet, in a region where the thermometer ranged from 10°—15° C. (50°—60° F.). Warscewicz found the plants growing on oaks, and on *Cupania glabra* at from 20 to 40 feet above the ground, never lower down; if the trees to which they affix themselves are thrown down by any accident or fall from old age, the *Trichopilias* upon them languish and die. On Chiriqui at this altitude there is a dry season lasting from November till April, when there is neither rain nor dew and the wind is often very violent; but throughout the remainder of the year both rains and dews are copious and frequent.”

Trichopilia suavis flowered for the first time in this country in 1851 simultaneously in the collections of Mrs. Lawrence at Ealing and Mr. R. S. Holford at Westonbirt and in the nursery of Messrs. Loddiges at Hackney.

T. tortilis.

Pseudo-bulbs clustered, ovoid, compressed, pale green, $1\frac{1}{2}$ — $2\frac{1}{2}$ inches long. Leaves elliptic-lanceolate, acute, 5—7 inches long. Peduncles procumbent, shorter than the leaves with an appressed sheathing bract at each joint. Sepals and petals linear-oblong, $2\frac{1}{2}$ inches long, spirally twisted, dull pale rose with a broad margin of light yellow green; lip white blotched and spotted with light red-brown, broadly oblong when spread out, four-lobed, the basal lobes rolled over the column, the anterior lobes spreading with crisped and undulate margin. Column terete with a three-lobed fimbriated hood at the apex.

Trichopilia tortilis, Lindl. in *Bot. Reg. XXII.* t. 1863 (1836). *Bot. Mag.* t. 3739. Rehb. Xen. Orch. II. p. 101. Knowles and Westc. *Fl. Cab. III.* t. 101. Morren in *Belg. hort.* 1874, p. 91. Williams' *Orch. Alb. VIII.* t. 349.

Trichopilia tortilis is the species on which the genus was founded by Dr. Lindley in 1836; it had been introduced the year before by Mr. Barker, of Birmingham, and shortly afterwards it was sent by Mr. Parkinson, Her Majesty's Consul in Mexico, to the Woburn collection, where it flowered in 1839. Several localities in southern Mexico are recorded in which it was gathered by Ehrenberg, Galeotti and other botanical explorers of that region.

COCHLIODA.

Lindl. Fol. Orch. 1853. Benth. et Hook. Gen. Plant. III. p. 531 (1883).

Lindley founded the genus *Cochlioda* on a Peruvian species discovered by Matthews in 1838,* but which he did not publish till 1853. He had, however, previous to the last named date described another species that had been discovered by Hartweg as *Odontoglossum roseum*,† but which conforms to Matthews' type in all its essential characters. When, some years later, Reichenbach compiled a synopsis of the ORCHIDEE for Walper's *Annales Botanices* he referred one of the true *Cochliodas* (*C. sanguinea*) also *Ada aurantiaca* and one or two more species to his own genus *Mesospinidium* which he had proposed some time before for a small-flowered, paniculate *Odontoglossum*. To these he subsequently added Lindley's *Odontoglossum roseum* and another Peruvian species here described as *Cochlioda vulcanica*; hence it happened that three of the four species described in the following pages became known in gardens under genera to which they did not belong.

Cochlioda as defined by Mr. Bentham in the *Genera Plantarum* is a very natural genus including about half a dozen species, all inhabiting the Andes of northern Peru and Ecuador at a considerable altitude. The essential characters of the genus are seen chiefly in the labellum which is adnate to the column, in two or three species almost to its apex, whence the *Cochliodas* have been likened to an *Epidendrum* with the habit of an *Odontoglossum*, the pollinary apparatus too being almost like that of the latter genus. The species are also distinguished by their bright rose or rose-scarlet flowers which render them very ornamental in contrast with the white, yellow and brown of the allied genera *Odontoglossum* and *Oncidium*.

Cultural Note.—As the *Cochliodas* occur on the Andes of South America at 5,000—10,000 feet elevation they live under the same or nearly the same climatic conditions as the *Odontoglossum* indigenous to the same vertical range; their cultural treatment should therefore be the same as that for *Odontoglossum* which is fully detailed under that genus.

Cochlioda Noezliana.

Pseudo-bulbs ovoid-oblong, much compressed, $1\frac{1}{2}$ —2 inches long, mono diphyllous. Leaves linear-oblong, acute, 4—6 inches long. Peduncles

* *Cochlioda densiflora*, not in cultivation.

† In Bentham's *Plant. Hartweg*, p. 151 (1844).

nodding, or pendulous, nearly as long again as the leaves, racemose, sometimes paniculate, many-flowered. Flowers about an inch in diameter, orange-scarlet, the disk of the lip yellow; dorsal sepal and petals oval-oblong, acute, the lateral sepals similar but narrower and longer; lip three-lobed, the lateral lobes oblong, obtuse, the intermediate lobe bluntly obovate; crest consisting of four short tooth-like plates, bright yellow. Column triquetral, darker in colour than the other parts of the flower.

Cochlioda Noezliana, Rolfe in *Lindenia*, V. t. 266 (1891). *Odontoglossum Noezlium*, Hort. Linden.

A very handsome species introduced in 1891 by Messrs. Linden, L'Horticulture Internationale of Brussels, from South America through its discoverer, M. John Noezli. It was also introduced into British gardens about the same time by Messrs. Charlesworth, Shuttleworth and Co., who inform us that their plants were collected in northern Peru, near the locality in which *Cochlioda vulcanica* is found.

C. rosea.

Pseudo-bulbs broadly ovate, much compressed, about 2 inches long, diphyllous. Leaves narrowly ligulate, acute, 6—8 inches long. Racemes as long as the leaves, elegantly curved; bracts awl-shaped, half as long as the pedicel and ovary. Flowers scarcely an inch in diameter; sepals and petals elliptic-oblong, acute, spreading, bright rose-carmine; lip as long as the petals, three-lobed, the lobes lighter in colour than the petals, the lateral two rounded, the intermediate longer, narrowly oblong, reflexed; crest consisting of four slightly divergent white rounded plates, of which the middle two are the longest. Column white, three-toothed at the apex.

Cochlioda rosea, Benth. in Journ. Linn. Soc. XVIII. p. 327 (1881). *Odontoglossum roseum*, Lindl. in Benth. Pl. Hartweg, p. 151 (1844). Id. Fol. Orch. Odont. No. 65. *Bot. Mag.* t. 6084. *Batem. Monogr. Odont.* t. 22. *Rehb. in Walp. Ann. IV.* p. 348. *Illus. hort.* XVIII. t. 66. *Mesospinidium roseum*, *Rehb. in Gard. Chron.* 1872, p. 392, sub. *M. vulcanicum*.

Discovered by Hartweg on the Peruvian Andes near Loxa during his exploration of the region in 1840—41 for the Horticultural Society of London, but not introduced till 1865, when plants were sent to M. Linden's horticultural establishment at Ghent by Gustav Wallis. It was shortly afterwards introduced by Messrs. Backhouse, of York, into British gardens, in which it is often met with under the name of *Odontoglossum roseum* to which genus it was originally referred by Lindley.

C. sanguinea.

Pseudo-bulbs oval-oblong, compressed, 1½—2 inches long, sometimes mottled with brown in transverse lines, diphyllous. Leaves linear, acute,

7—9 inches long. Peduncles drooping, 15—20 inches long, usually racemed but sometimes branched near the base; raceme or panicle lax, many-flowered. Flowers about an inch in diameter when spread out; sepals and petals oval-oblong, apiculate, rose-pink; the dorsal sepal concave, the lateral two longer, narrower and connate to beyond the middle; lip paler in colour than the other segments, clawed, the claw adnate to the column; the blade reflexed, ovate, acute, at the base of which are two raised triangular white plates that are adnate to the column behind. Column short, terete, white.

Cochlioda sanguinea, Benth. et Hook. Gen. Plant. III. p. 560 (1833). *Mesospidium sanguineum*, Rehb. in Walp. Ann. VI. p. 858. *Bot. Mag.* t. 5627.

The late Professor Jameson, of Quito, originally discovered this species on the Ecuadorean Andes near that city, and in 1851 it was gathered by Warscewicz in the same locality. It does not appear to have been introduced into British gardens till 1866, in the autumn of which year a plant was exhibited at one of the Royal Horticultural Society's meetings by Messrs. Backhouse, of York, who had imported it from Ecuador.

Although scarcely so bright and so elegant as the other species here described, it is well worth a place in every collection of cool orchids.

C. *vulcanica*.

Pseudo-bulbs ovoid, compressed and ancipitous, $1\frac{1}{2}$ —2 inches long, diphyllous. Leaves linear-ligulate, sub-acute, 4—6 inches long. Peduncles sub-erect, as long again as the leaves, racemed from below the middle, 10—15 or more flowered; bracts ovate-lanceolate, half as long as the ovary. Flowers about $1\frac{1}{2}$ inch across vertically, bright rose-carmine except the crest on the lip and the anther which are white; dorsal sepal and petals narrowly oval-oblong, acute, the lateral sepals longer and narrower; lip three-lobed, the lateral lobes rotund, the intermediate lobe obovate, emarginate, denticulate; crest consisting of four short ridges. Column terete above.

Cochlioda vulcanica, Benth. et Hook. Gen. Plant. III. p. 560 (1833). *Mesospidium vulcanicum*, Rehb. in Gard. Chron. 1872, p. 393. *Bot. Mag.* t. 6001. *Lindenia*, IV. t. 154.

A very handsome species discovered many years ago by Dr. Spruce, the German botanist, who explored parts of northern Brazil and Ecuador. He detected it in the last named country on the volcanic mountain of Tunguragua, at an elevation of 10,000—11,000 feet growing among the erupted *scoriae* from the crater, a circumstance which suggested the specific name. It was first introduced into British gardens about the year 1872.

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A MANUAL

OF

ORCHIDACEOUS PLANTS

CULTIVATED UNDER GLASS IN GREAT BRITAIN.

PART X.

GENERAL REVIEW OF THE ORCHIDEÆ.

JAMES VEITCH & SONS,

ROYAL EXOTIC NURSERY, 544, KING'S ROAD, CHELSEA, S.W.

1894.

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1 MAY
1894

GENERAL REVIEW

OF THE

ORCHIDEÆ.

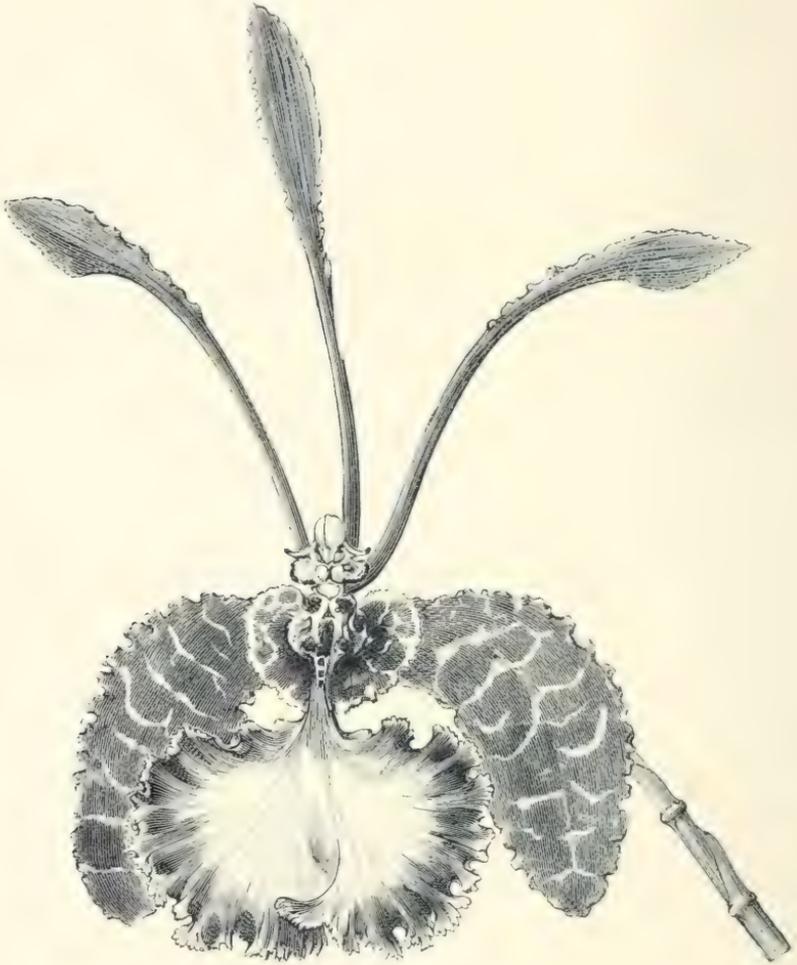
MORPHOLOGY OF ORCHID FLOWERS.

“There is no order of plants,” writes Dr. Lindley, “the structure of whose flowers is so anomalous as regards the relation borne by the parts of reproduction, or so singular in respect to the form of the floral envelope. Unlike other endogenous plants, the calyx and corolla are not similar to each other in form, texture and colour (as in the Lily, Crocus, Narcissus, Squill, Amaryllis, etc.); neither have they any similitude to the changes of outline that are met with in such irregular flowers as are produced in other families of the Vegetable Kingdom. On the contrary, by an excessive development and singular conformation of one of the petals called the labellum or lip, by irregularities either of form, size, or direction of the other sepals and petals, by the peculiar adhesion of those parts to each other, and by the occasional suppression of a portion of them, flowers are produced so unusual and so grotesque in form that it is no longer with the Vegetable Kingdom that they can be compared, but we are forced to seek resemblances in the animal world.”*

Besides the well-known instances of mimicry that occur among our native orchids, as the Bee Orchis, *Ophrys apifera*; the Fly Orchis, *Ophrys muscifera*; the Man Orchis, *Aceras anthropophora*; the Frog Orchis, *Habenaria viridis*; the Bird's Nest Orchis, *Neottia Nidus-avis*, etc., still more striking and conspicuous examples are afforded by species of tropical orchids of which the following are figured in this work:

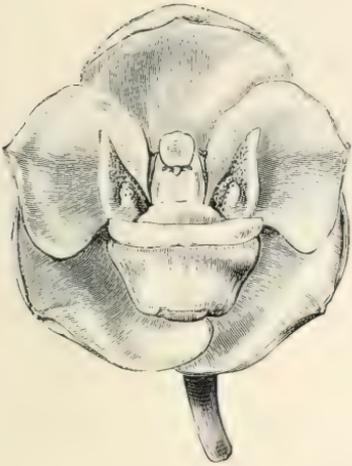
* English Cyclopædia, IV., p. 3.

the Butterfly Orchids, *Oncidium Papilio* and *On. Kramerianum*; the Dove Plant, *Peristeria elata*; the Swan Orchid, *Cyanoche pentadactylon*; the Lion's Tongue Orchid, *Masdevallia leontoglossa*; the Moth Orchid, *Phalænopsis* (several species); and with these may be mentioned on account of their unusual and strange forms *Cryptophoranthus atro*



Butterfly Orchid,
Oncidium Kramerianum.

purpureum, the Window Orchid; *Restrepia antennifera*, *Bulbophyllum barbigerum*, *Cirrhopedalum Thouarsii*, *Odontoglossum cirrosum*, *Oncidium chrysodipterum*, *Coelogyne pandurata*, *Ornithocephalus grandiflorus*, *Stanhopea Wardii*, *Coryanthes macrantha*, *Mormodes Ocanne*, *Grammangis Ellisii*, and very many others.



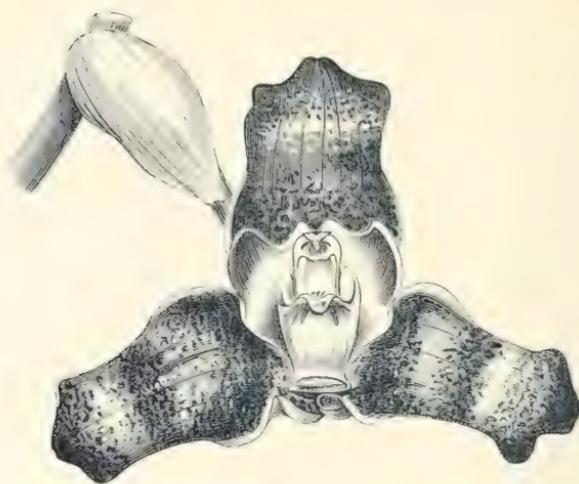
Dove Plant.
Peristeria elata.



Window Orchid.
Cryptophoranthus atropurpureum.
(*Masdevallia fenestralis.*)



Moth Orchid.
Phalaenopsis Sanderiana alba.



Grammangis Ellisi.

But notwithstanding this apparently endless and irreconcilable variety in form, a general plan of floral structure pervades the whole family of orchids that clearly distinguishes it from every other Natural Order of plants. The floral organs like those of all endogenous plants are constructed upon a trimerous (tripartite) type, that is to say—all the parts are in threes or a simple multiple of three;* but owing to the suppression of some, the confluence of others, and various other modifications especially of the sexual organs, the tripartite type, except in the two series of perianth segments, is greatly disguised, but as will be presently pointed out it is almost always present. Irregular as the flowers appear on superficial view, there may always be detected in them a bilateral symmetry, that is to say—all normally developed orchid flowers may, in one direction only, be divided in a monosymmetrical manner or into two equal parts that resemble each other in every particular.† Into whatever form, amidst the almost infinite variety of changes that runs through the whole family, an orchid flower has been moulded, and whatever modification an individual organ may have undergone, the following characters are presented to the naked eye throughout and may be generally recognised without difficulty.

* The anthers only of the theoretical type of orchid flowers are a multiple of three (3×2), but the rudiments of all the six are generally present, as will be shown further on.

† Zygomorphy of the German botanists.

The *flowers* are solitary or produced in racemes or in some modification of the raceme.

In the raceme and its modifications, the *pedicel* is usually very short, the greater part of the length between the base of the footstalk and the base of the column being taken up by the ovary.

The *ovary* is from its position inferior; it is more or less twisted* and one-celled with parietal placentation. But in the South American *Cypripedes* (*Selenipedia*), *Apostasia* and *Neuwiedia*, it is trilocular with axile placentation.

The *perianth* consists of six segments, of which the three outer ones, the *sepals*, are nearly similar and equal, free, or the two lower ones connate (*Cypripedium*) or all three coherent (*Masdevallia*), often less brightly coloured than the three inner ones, of which two, the *petals*, are similar and equal not only to each other but often to the sepals, while the third inner segment, the *labellum*, is very dissimilar, usually much larger and often produced at its base into a spur of variable length; but of whatever form it may always be reduced to a three-lobed type.

The stamens and style are consolidated into a gynostemium or central *column*, at the apex of which the anther or pollinary apparatus is seated. The peculiar structure of the column will be described under Homologies and Fertilisation.

The pollen-grains are grouped in innumerable numbers into 2, 4, 6 or 8 granular or waxy masses of pyriform, discoid or sub-globose shape called *pollinia* that are stalked in a different manner in the different tribes and are lodged in a chamber called the *clinandrium*; this chamber is two-celled, one-celled by absorption of the septum (dividing wall) or even four-celled by more or less perfect secondary septa. The pollinia are usually accompanied by a strap-shaped appendage to which the general name of *caudicle* has been applied, but which for reasons to be hereafter given can only be retained in a restricted sense.

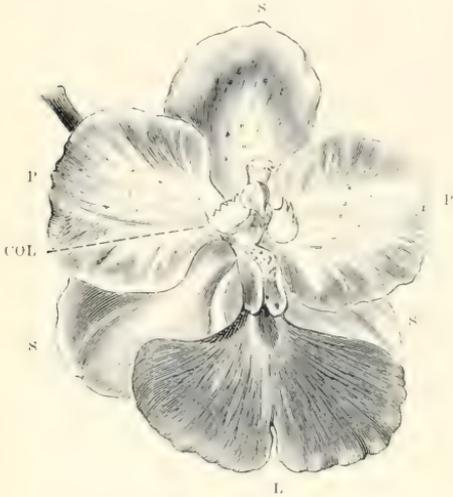
The greatest apparent deviation from the general arrangement of the reproductive organs occurs in *Cypripedium* which is fully described under that genus.†

As this work may be used by many who have never given any attention to Botany and to whom its terminology may to some extent be unintelligible, it seems to be a convenient course to illustrate by a few examples the various parts of an orchid flower in a manner by which the reader will distinguish them at a glance and be enabled to comprehend with ease the general morphology.

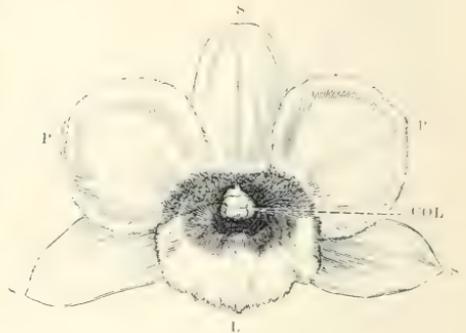
* In many cases the ovary before the expansion of the flower gradually describes an angle of 180°—that is, it turns half way round, whence the flower is inverted.

† *Cypripedium*, page 4. See also Floral Conformation of the genus *Cypripedium*, by Dr. Maxwell T. Masters, in Journ. Linn. Soc., vol. XXII., p. 401.

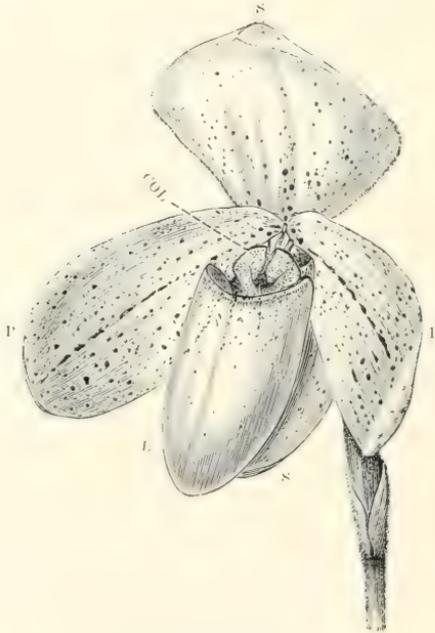
The flowers illustrated have been purposely selected from among the best known epiphytal species in cultivation. In every case s



Odontoglossum citrosimum.

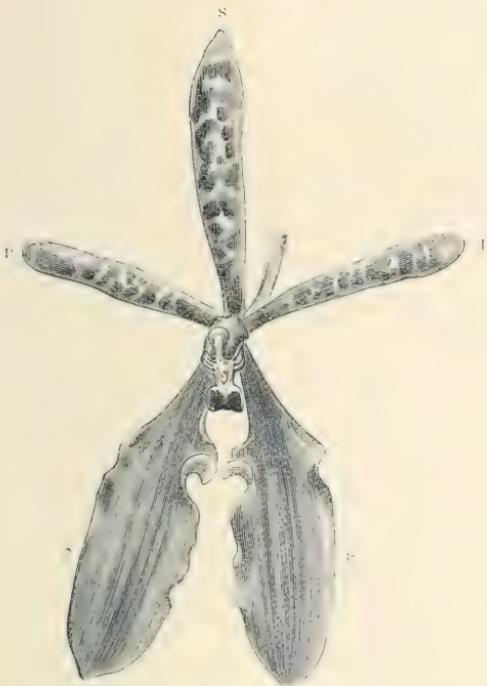


Dendrobium Farmeri.



Cypripedium concolor.

denotes the sepals, P the petals, L the labellum, COL the column, AN the anther, and ST the stigma.



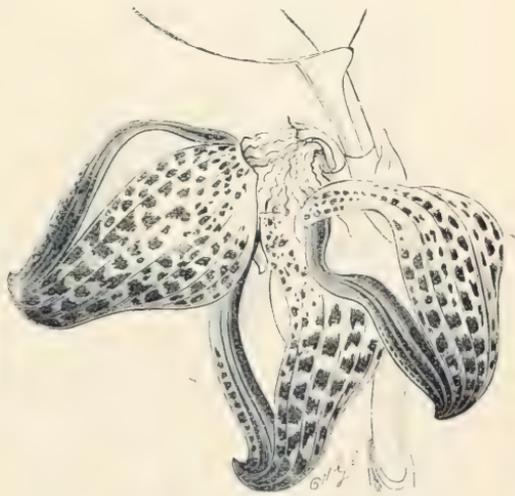
Renanthera coccinea.
With dissimilar dorsal sepal.



Masdevallia leontoglossa.
With sepals united into a tube at their base and
extended into long tails where free.



Restrepia antennifera.
With thread-like upper sepal and petals and broad
coherent lateral sepals.



Cryptophoranthus dayanum.
With sepals coherent at base and apex.

The sepals or outermost series of perianth segments are generally uniform, but numerous deviations from the equality and similarity of the three occur. The most usual deviation is seen in the upper or dorsal sepal, which is often of a different size and shape from the lateral two as in *Renanthera* (type species), *Restrepia*, *Cirrhopetalum*, and many *Oncids*. In *Masdevallia* the three sepals are united at their bases into a tube and prolonged into slender tails at the free end. In *Rodriguezia* the two lateral sepals form a boat-like body of very curious structure. In *Cryptophoranthus* the two lateral sepals are not only joined together but they cohere to the upper one both at the base and apex, so that the flower never opens, and in *Comparettia* they are produced at their base into a long spur. In *Oncidium Papilio* and the closely allied *On. Kramerianum* the two lateral sepals are not only of very different shape from the upper one but they are more brightly coloured than the petals, an unusual occurrence in *Oncidium*. In *Cypripedium* the two lateral sepals are always joined together into a single blade which, in the Indo-Malayan species, is usually smaller than the upper one. Other deviations are described under the several genera in which they occur.

The equality of the two petals is constant, but great diversity occurs in the part they take in the general aspect of the flower, of which, combined with the labellum, they are often the most conspicuous ornament. But in *Masdevallia*, *Cryptophoranthus*, *Cirrhopetalum* and other genera they are reduced to small insignificant bodies that in *Masdevallia* are often quite concealed within the sepaline tube, while in *Cypripedium Sauleianum*, *C. caulatum*, *C. caricinum* and others they are enormously elongated into ribbon-like tails many inches in length. In the *Pilifere* sub-section of *Cœlogyne* the narrow linear petals are quite a subordinate feature of the flower, but in many of the *Cyrtochiloid* *Oncids* they are the most conspicuous parts and much larger than the labellum. The fringed petals of *Dendrobium Harveyanum* are a remarkable exception in that genus, in which these organs are always entire.

The labellum is by far the most important of the perianth segments and it is also the most polymorphous; but into whatever form it has been moulded (and so far as our observations have extended, in no two genera is it exactly alike and it varies also considerably in every large genus), its structure is always such as to secure the greatest efficiency in the part it performs as an aid to the fertilisation of the flower. Throughout the *Synopses of the Genera and Species*, a large number of illustrations of this wonderful organ is given, so that only some typical forms need here be noted. The labellum is usually attached to the column by a short claw or *unguis* which is sometimes so delicately hinged on it that the blade vibrates on the slightest force being imparted to it, for instance, by a breath of air. A



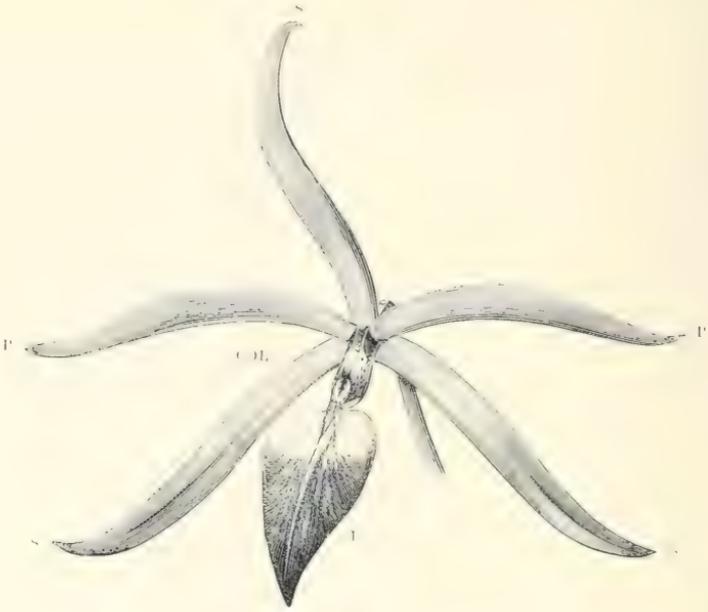
Rodriguezia venusta.
With lower sepals connate into a boat-like body.



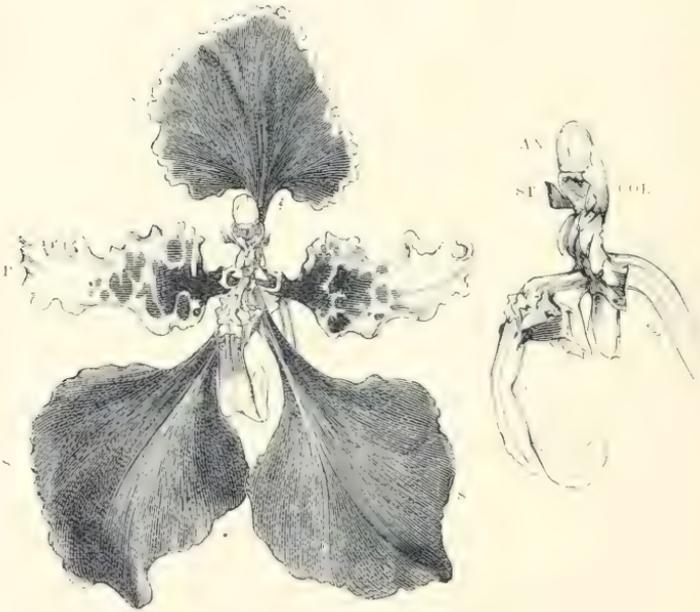
Masdevallia amabilis.
Petals, lip and column concealed within the sepaline tube s.



Cypripedium carolinum.
With ribbon-like petals.

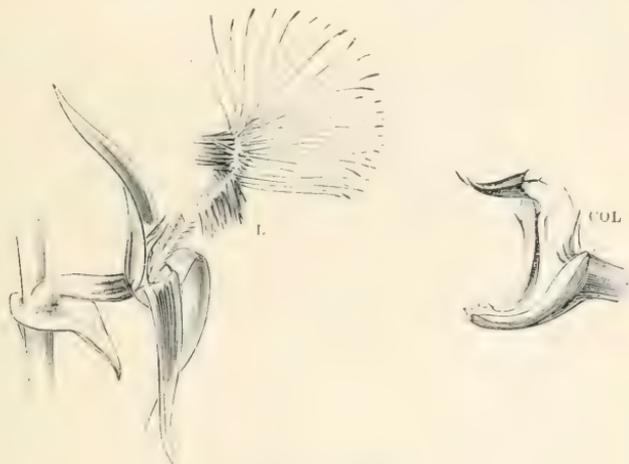


Epidendrum Brassavola.
With similar sepals and petals.



Oncidium chrysodipterum.
With crisped petals and small recurved lip.

remarkable case of this oscillatory motion is afforded by the labellum of *Bulbophyllum barbigerum*; the blade of the lip is also motile in *Cirrhopetalum*, *Arachnanthe*, etc. In *Epidendrum* the claw is more



Bulbophyllum barbigerum.
With motile labellum and pedate column.



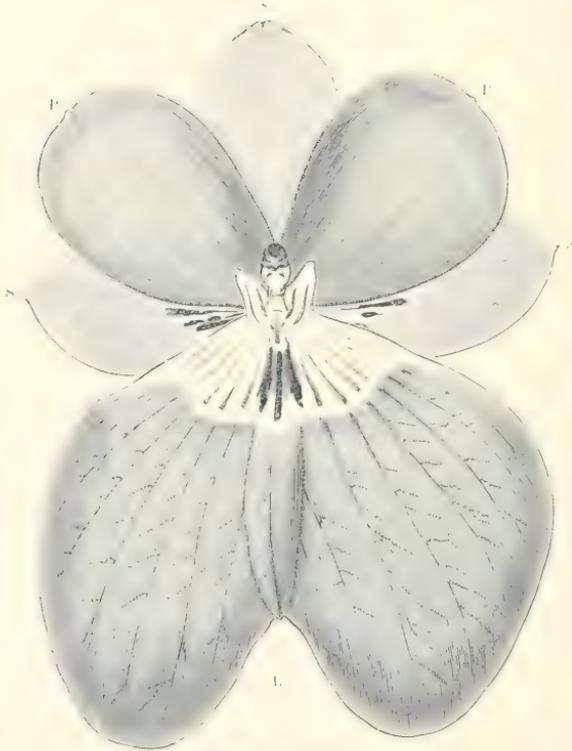
Epidendrum Pseudepidendrum.
With claw of labellum adnate to the column.

or less adnate to the column; in *Odontoglossum* it is simply parallel with it, while in *Oncidium* and many other genera it is at right angles to it.* In *Isochilus*, *Apostasia* and a few other genera we find the

*The relative position of the lip and column affords an important character in distinguishing many of the genera.



Complex labellum of *Stanhopea Wardii*.
1, hypochile; 2, mesochile; 3, epichile.



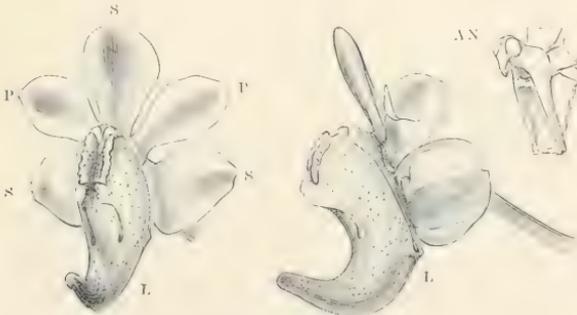
Miltonia vexillaria.
With large flat labellum.

labellum in its simplest form and similar to the petals; in *Coryanthes* and *Stanhopea* on the other hand it is of very complex structure. In many *Masdevallias* it is concealed within the sepaline tube, and in many other species both of that and allied genera it is an inconspicuous part



Spurred labellum of *Comparettia Macroplectron*.

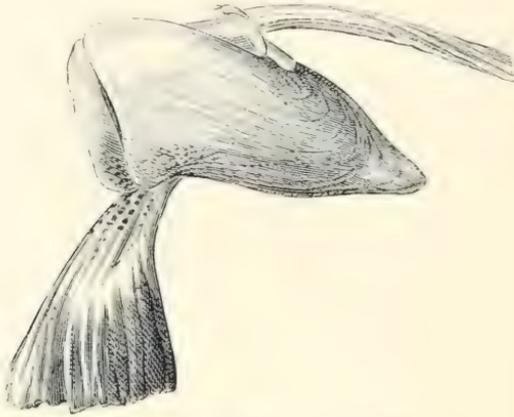
of the flower, while in many *Oncids*, and especially in *Miltonia*, as *M. vexillaria*, *M. Roezlii* and others, it is dilated into a blade as large as, or larger than all the other segments taken together. In many genera it is prolonged into a slender spur, which in *Angraecum sesquipedale*,



Aërides suavisimum.
With ram's horn-like labellum.

A. Ellisi, *A. caulatum* and others attains an inordinate length; in other genera the spur is more open and takes the form of a funnel, as in *Vanda teres*, *Dendrobium formosum*, *D. longicornu*, or of curved horn-like shape as in *Aërides*. Other remarkable forms of

the labellum occur in *Saccolabium*, in which the basal part is always hollowed out and extends downwards like a small sac; in *Cypripedium* where it appears like a large slipper-like bag and also in several species of *Catasetum*. In nearly all the *Cattleyas* and *Lælias* and also in other genera the basal part of the blade of the labellum is rolled over the column into a tube, while the front part



Funnel-shaped labellum of *Vanda teres*.

or intermediate lobe is often crisped and fringed in a very curious manner. In *Dendrobium Brymerianum*, *Lælia Digbyana* and *Epidendrum* (*Nanodes*) *Meduse* the blade is conspicuously fimbriated, in the first-named species very elaborately so, and in these and other genera it is often the most richly coloured of all the floral segments. On the labellum is often developed a fleshy excrescence or callus which in some *Oncids*



Saccate labellum of *Saccolabium bellinum*.

is of very complex form; in other genera it is reduced to small tubercles or simple keels or raised lines which, in some species of *Odontoglossum* and throughout *Cœlogyne* and *Thunia*, are beautifully fringed. In *Zygopetalum* the crest of the lip is very thick and often curiously furrowed.



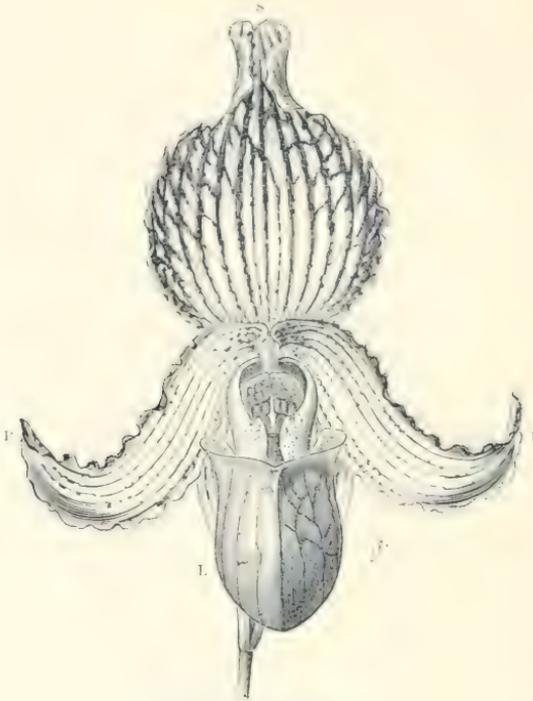
Dendrobium Brymerianum,
 Labellum with branched fimbriation.



Dendrobium Devonianum.
 With fimbriated labellum.



Epidendrum xanthinum.
 L. quadripartite labellum with fimbriate lobes.

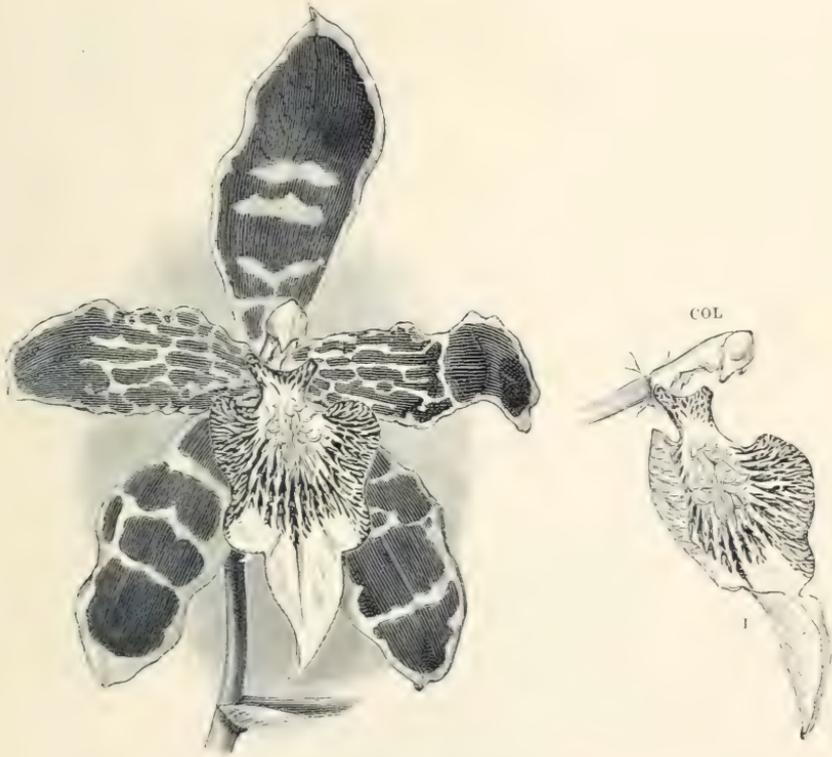


Cypripedium Fairianum.
With helmet-shaped labellum.



Cattleya Bowringiana.
With labellum convolute over the column.

The column also varies considerably in form, but except in *Cypripedium* the deviations from the general type arise chiefly from the enlargement or diminution of the various parts. In *Miltonia* the column is very short and the wings much reduced; in *Oncidium* it is also short but much swollen below the stigmatic hollow, and furnished with an ear-like appendage on each side of it, characters that chiefly distinguish *Oncidium* from the allied genera; in *Odontoglossum* it is much longer, more slender, and not swollen



Odontoglossum Harryanum.

With fringed crest.

below the stigma as in *Oncidium*, wingless in most of the Mexican species, but in others more usually winged, the wings often much lacerated, and some species as *Odontoglossum cirrosium* and *Od. odoratum* prolonged into tendril-like cirri. Prolongation of the column at its apex occurs in *Odontoglossum citrosimum*, many *Oncids*, and throughout *Trichopilia*; and in other genera the appendage takes the form of a hood; whence the column is said to be hooded or *cucullate*. In *Rodriguezia decora* the apical prolongation takes the form of two

hairy horns of a bright purple colour, and in *Catasetum* it is extended into an acuminate point and produced below the stigma into two bristle-like appendages that are extremely sensitive. In most species



Hooded column of
Trichopilia tortilis.



Wingless column of
Odontoglossum cordatum.



Column and lip of
Odontoglossum cirrosium.

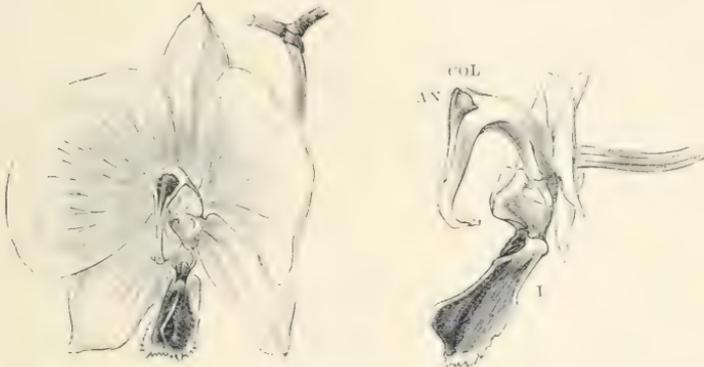
of *Zygopetalum*, especially those included in the sections *Huntleya* and *Bollea*, the column is excessively broad and thick, equalling in breadth the fleshy crest of the labellum; in strong contrast to this



Zygopetalum maxillare.
With thick column and fleshy grooved crest.

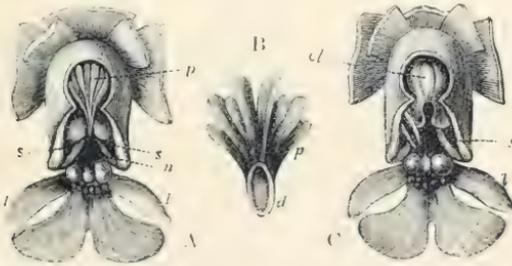
the long slender bent column of the male flowers of *Cycroches* has a striking resemblance to a swan's neck. Other parts of the column are also subject to modification; the anther is often beaked so that

the column appears to terminate in a process that very much resembles the head and beak of a bird, as in *Phalænopsis*, *Aërides*, *Peristeria*, etc. Sometimes it is the rostellum or modified stigma that is beaked or elongated in a remarkable way, as in *Ornithocephalus grandiflorus*,



Phalænopsis Lowii.
With beaked anther.

and many other instances might be quoted to show the almost endless change that pervades nearly every organ of an orchid flower. The column is often concealed by other parts of the flower, by the sepaline tube in *Masdevallia*, by the convolute labellum in many *Cattleyas*



Calanthe Masuca.

A, flower viewed from above with the anther case removed, showing the eight pollen masses in their proper position.

B, pollen masses attached to the viscid disk, seen from the under side.

C, flower in same position as in A, but with the disk and pollen masses removed, showing the now divided rostellum and the empty clinandrium.

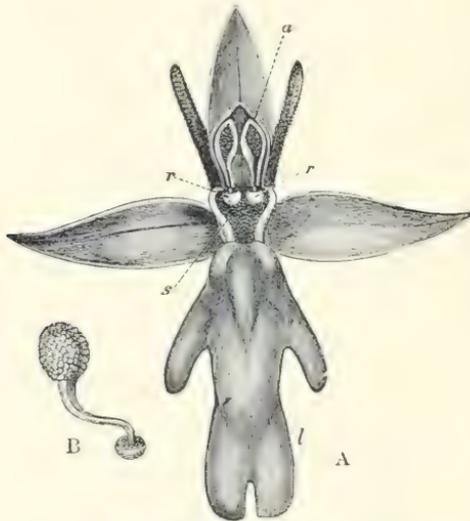
p, pollen masses; *s s*, the two stigmas; *n*, mouth of spur or nectary; *l*, labellum; *d*, viscid disk
cl, clinandrium with pollen masses removed.

(From Darwin's *Fertilisation of Orchids*.)

and *Lælias*; also in *Phaius*, *Thunia*, *Trichopilia*, etc. In many genera the column is more or less produced beyond the point of union with the ovary into a kind of foot as in *Dendrobium*, *Bulbophyllum*, *Aërides*, *Phalænopsis*, *Maxillaria*, etc.; it then greatly influences the form and

aspect of the flower; the lateral sepals are usually adnate to this prolongation, by which their shape is much modified as in many *Dendrobes*, and these with the base of the labellum often form a *mentum* or chin-like projection very conspicuous in *Bifrenaria*, and quite different in structure from the single funnel or spur-like projection of the labellum alone.

The pollinia are 2, 4, 6 or 8; when in fours they are sometimes in two series of two each, and when there are eight they are almost always in two series of four each, of which those in one series are sometimes much smaller than those in the other; this is always the case in hybrids between *Cattleya* and *Lælia*. Partial exceptions to the seriate arrangement



Ophrys muscifera (Fly Orchis enlarged).

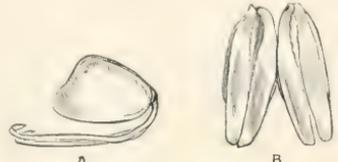
a, anther; r r, rostellum; s, stigma; l, labellum.

B, one of the two pollinia with caudicle and viscid disk.

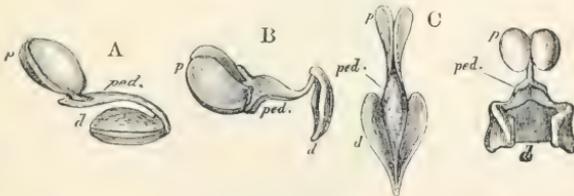
(From Darwin's *Fertilisation of Orchids*.)

occur in *Sophranitis violacea*, *Calanthe Masuca* (see Fig.) and a few others. The presence of six pollinia is a somewhat rare occurrence; *Hexadesmia*, *Leptotes* and *Tetramicra* are among the best known instances. When in pairs, as throughout the Tribe VANDEÆ, the pollinia are sub-globose or pyriform in shape, but when lying in series as in *Cattleya* and many other genera in the Tribe EPIDENDREÆ they are usually more or less compressed into a discoid or lenticular shape. In most of our native orchids as *Ophrys*, *Orchis*, *Habenaria*, etc., as well as in exotic genera included in the Tribe OPHRYDEÆ as *Disa*, etc., and also in *Calanthe*, *Eria* and a few other tropical genera belonging to the EPIDENDREÆ, the pollen masses are prolonged downwards into a tail-like point that is

firmly attached to a part of the rostellum (the modified stigma) called by Darwin the *viscid disk*; this prolongation is now recognised as the true caudicle of the pollinia.* In *Cattleya* and in some allied genera the pollinia are furnished with a ribbon-like tail formed of a bundle of light elastic threads, and like the pollen masses themselves is included in the anther cell (clinandrium), but is distinct from them. This part of the pollinary apparatus varies in size and form in the different genera, being sometimes so much reduced as to make its presence difficult to ascertain, while there are instances where it exceeds in bulk the pollinia themselves. For this organ, which is quite distinct from the true caudicle of the OPHRYDEE, Mr. Bentham proposed the name *appendicula*. Different both in origin and substance from the *caudicle* of the OPHRYDEE and the *appendicula* of the EPIDENDREÆ is the strap-like organ which supports the pollinia of the VANDEE, and connects them with the removable disk or so-called gland of the rostellum, and is itself connected with the pollinia by elastic extensible ligaments for which Mr. Darwin has retained the name *caudicle*. This strap-like appendage is really a double organ, each pollinium being provided with its own appendage, but in most of the genera the two are coherent; in the section LITROSTACHYS of *Angræcum* and in a few other species they are distinct. This structure also varies much in size and shape in the different genera, being very thin and elongated



Pollinia of *Cattleya labiata*.
A, side; B, front view.



Pollinia of VANDEE.

d, viscid disk; *ped.*, pedicel (stipes); *p*, pollen masses.

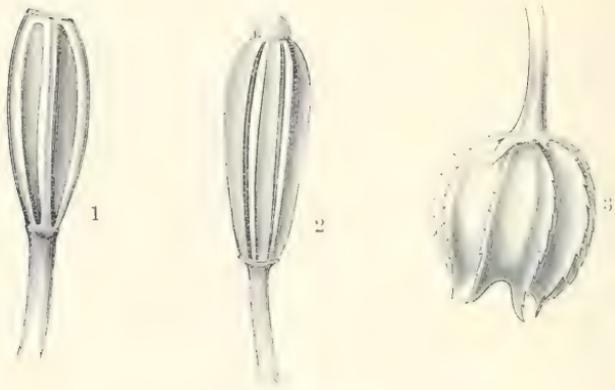
A, of *Odontoglossum grande* after partial depression. B, of *Brassia maculata*.
C, of *Stanhopea saccata* after depression. D, of *Sarcanthus teretifolius*.

(From Darwin's *Fertilisation of Orchids*.)

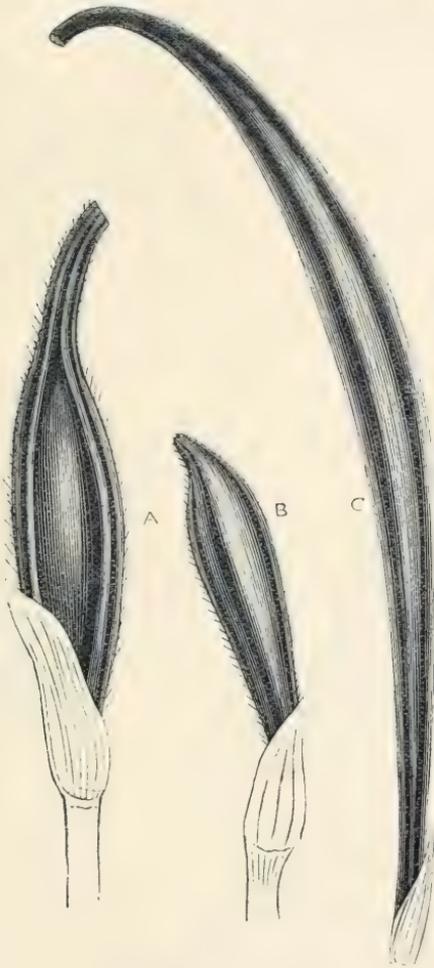
in some of the Phalænopses and *Lycastes*, much reduced or almost absent in *Maxillaria* and *Zygopetalum*, short and strong in some of the true *Vandas*, thickened in *Catasetum*, etc. In most of the genera in which it is more or less elongated, it assumes various shapes and changes of position after removal from the clinandrium. Darwin called this organ the pedicel of the rostellum,† but as Bentham afterwards

* See Fig. of *Ophrys muscifera*, B.

† *Fertilisation of Orchids*, p. 181.

Capsules of *Masdevallia*.1, *Veitchiana*. 2, *maculata*. 3, *Chimera*Capsules of *Dendrobium*.A, *formosum*; B, *aureum*; C, *Rhodostoma* x.
From the *Gardeners' Chronicle*.)

pointed out, although this term is an appropriate one it had already been taken up for a totally different organ, and is universally applied to the footstalk of a flower; he therefore proposed the name



Capsules of *Cypripedium*.

A, *hirsutissimum*; B, *Drurii*; C, *caudatum*.

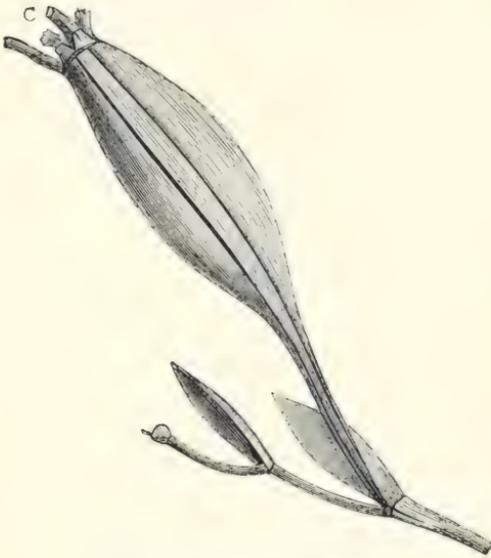
(From the *Gardeners' Chronicle*.)

stipes as being "equally appropriate and without the same inconvenience, for it is generally used as the support of any organ."*

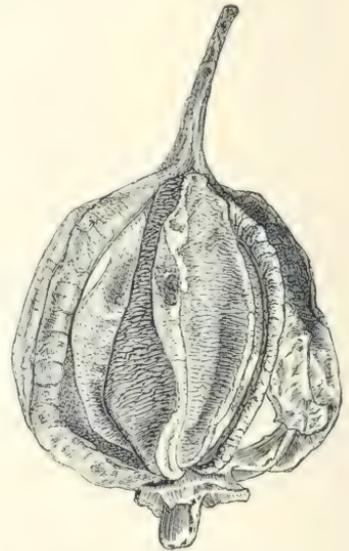
There are three stigmas in every orchid flower, although apparently

* Journ. Linn. Soc. XVIII. p. 286. Through inadvertence arising from long usage of the Lindleyan terminology, the terms applied to the parts of the pollinary apparatus in the text have not been strictly adhered to in the Synopses of the Genera and Species.

but one on superficial inspection; this will be explained in the next section, which is devoted to the homologies of orchid flowers, but without that assistance the presence of all three is easily detected in *Cypripedium*, in which the stigmatic plate is divided into three equal parts by lines diverging from each other at an angle of 120° ; each of these parts represents a stigma and is capable of performing the proper functions of that organ. In the other tribes the lower two of the three are confluent and form the cavity in front of the labellum, in which the pollinia are deposited when the flower is fertilised. The third or upper one is modified into a remarkable organ called the *rostellum*, of which nothing like or analogous to it exists in the flower of any other family of plants. Like the other



Capsule of *Odontoglossum maxillare*.
(From the *Gardeners' Chronicle*.)



Capsule of *Peristeria pendula*,
after dehiscence.
(From the *Gardeners' Chronicle*.)

parts of an orchid flower the *rostellum* presents "a marvellous amount of diversity of structure in the several tribes."

The capsule or fruit which contains the seed varies greatly in size and form, not only in the different genera, but also in the same genus when it is an extensive one as *Dendrobium*, *Masdevallia* and *Odontoglossum*. The accompanying illustrations will convey an accurate idea of the various forms of some of the capsules.

The surprising diversity in the form and aspect of orchid flowers described in the foregoing pages is still further exemplified in our native orchids, and especially in many Australian and South African genera as *Caladina*, *Corysanthes*, *Dipodium*, *Thelymitra*, *Holothrix*, *Satyrion*, *Pterygodium*, etc., etc.

HOMOLOGIES OF ORCHID FLOWERS.

The perusal of the foregoing outlines of the morphology of orchid flowers may seem somewhat tedious to many readers, and in that case, the following details of their homologies will doubtless seem not less so, but those who desire to comprehend the marvellous structure of orchid flowers and the wonderful contrivances that are to be found in them to secure the end for which they have been created, will not only find the attention required not excessive, but also that when the subject is once fairly grasped, the perusal combined with the examination of fresh specimens will result in pleasure far exceeding that afforded by a cursory view of the most gorgeous or most striking of many remarkable productions in this strange family of plants.

It has already been remarked that notwithstanding the apparently endless and irreconcilable variety of form into which orchid flowers have developed, *a general plan of floral structure pervades the whole family*; this general plan must have had its foundation in some more primitive form than is at present known, and from it all the numerous existing forms are supposed to have been derived. The making out of the structure of this ancestral form or ideal type as it is sometimes called, has exercised the sagacity of many botanists, but the merit of clearly unfolding the homologies of orchid flowers and of interpreting rightly the meaning and functions of the various parts, especially of those that are only now seen in a rudimentary condition, is mainly due to our own distinguished countrymen Dr. Robert Brown* and Mr. Charles Darwin.† To the last-named naturalist we owe the lucid explanation of them in his classical work on the *Fertilisation of Orchids*, and from the chapter especially devoted to the homologies of orchid flowers, the following account of them has been solely derived. We could have wished to have given the eminent naturalist's elucidation of these homologies *in extenso*, but as many details are adduced which our space precludes

* Observations on the Organs and Modes of Fecundation in Orchidæ, 1831, one of the most important papers ever read before the Linnean Society.

† On the Various Contrivances by which British and Foreign Orchids are fertilised by insects (John Murray, 1862), a work that should be read and re-read by every amateur of orchids.

us from reproducing, we are constrained to give all the salient facts in an abbreviated form without, we trust, obscuring their import. In doing so we wish to express our obligations to Mr. Francis Darwin and to the publisher Mr. John Murray, for the kind manner in which they have allowed us to use the diagram from the *Fertilisation of Orchids*, and also other illustrations from the same work which are duly noted in their respective places.

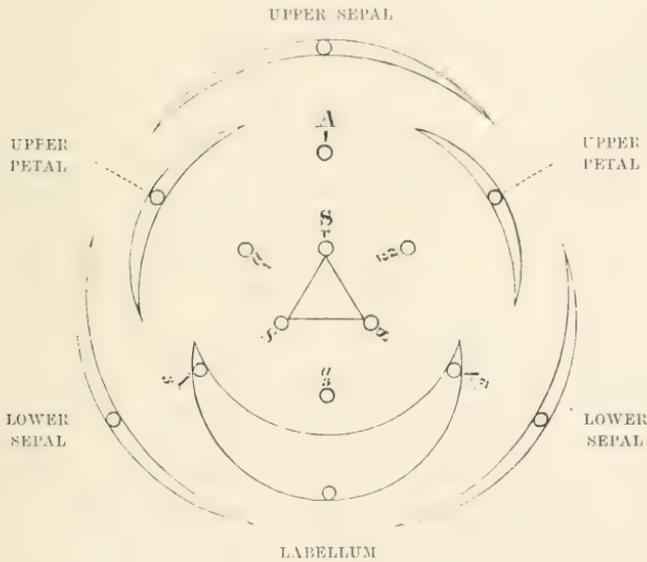
No group of organic beings, Mr. Darwin observes, can be well understood till their homologies have been made out, and in no case is this more applicable than to orchids. The importance of the science of homology rests on its giving us the key-note of the possible amount of difference in plan within any group; it allows us to class under proper heads the most diversified organs; it shows us gradations which would otherwise have been overlooked; it explains many monstrosities; it leads to the detection of obscure and hidden parts or mere vestiges, and shows us the meaning of rudiments. Thus guided, the naturalist sees that all homologous points or organs, however much diversified, are modifications of one and the same ancestral organ; in tracing existing gradations a clue is gained as far as that is possible, in tracing the probable course of modifications during a long line of generations.

The mode of investigation pursued in order to make out these homologies is either by tracing their embryological development when that is possible; or by the discovery of organs in a rudimentary condition; or by tracing through a long series of beings, a close gradation from one part to another until the two parts or organs employed for widely different functions and most unlike each other can be joined by a succession of short links. Applying these methods of investigation to orchid flowers and guided by the general structure of monocotyledonous plants, Dr. Robert Brown first propounded the hypothesis that an orchid flower properly consists of three sepals, three petals, six anthers in two circles or whorls of three each, and of three pistils, one of which is modified into the rostellum. These fifteen organs are arranged as usual alternately three within three in five whorls.

The relative position of all these organs is shown in the following diagram, with the exception of A2, A3, which should stand outside the crescent representing the labellum, a little nearer the triangle.

The little circles show the position of the spiral vessels (fibro-vascular bundles); s s, stigmas; sr, stigma modified into the rostellum, A1, fertile anther of the outer whorl; A2, A3, anthers of the same whorl; a1, a2, rudimentary anthers of the inner whorl (fertile in *Cypripedium*) generally forming the clinandrium; a3, third anther of the same whorl, when present, forming the front of the column.

This view of the theoretical type of an orchid flower was accepted by Dr. Lindley and adopted by Mr. Darwin after further investigation. Both Dr. Brown and Mr. Darwin relied chiefly on the course of the fibro-vascular bundles, spiral vessels as they were then sometimes called while in a rudimentary state. Mr. Darwin traced these upwards from the ovary through the parts of the flower; the result of his dissection is given in the diagram below. The fifteen little circles represent so many groups of fibro-vascular bundles (spiral vessels) in every case traced down to the six large ovarium groups; they alternate in five whorls, and in order to guide the eye, the three central groups running to the three pistils are connected by a triangle. The explanation of



these fifteen groups given by Mr. Darwin is that an orchid flower consists of fifteen organs in a much modified and confluent condition; the three sepals and petals are simple organs, but the labellum and column are compound; the labellum is formed of one petal and two petaloid stamens of the outer whorl completely confluent (see *infra*). The column is formed of three pistils and generally of four stamens all completely confluent; of the three pistils, the two lower ones are coalescent and the upper one is modified into the rostellum; the six stamens are in two whorls of three each, of which one alone of the outer whorl indicated by A1 in the diagram is fertile; but in *Cypripedium* and *Apostasia* two stamens of the inner whorl *a1* and *a2* are fertile, while in *Neuwiedia* and the anomalous *Cypripedium caudatum Lindenii*

all three are fertile.* Although in no true orchid except those mentioned are the two anthers of the inner whorl fully developed, their rudiments are generally present and are often utilised; for they generally form the membranous sides of the clinandrium or cup on the summit of the column which includes and protects the pollen masses; these rudiments thus aid their fertile brother anther.† But more recent and exhaustive investigations of the anatomy of the column of orchids undertaken by M. Philippe Van Tieghem, the results of which are published in vol. XXI. of the *Mémoires* of the French Institute, prove conclusively that Mr. Darwin's view of the stamens concealed in the labellum must be modified. M. Van Tieghem has shown that the rudiments of the stamens marked A2, A3 are situated not in the labellum but in the column like those of the inner whorl. The circles A2, A3 in the diagram indicate only branches of the fibro-vascular bundle entering the labellum.

Such is the view of the ancestral type or general pattern of an orchid flower entertained by one of the most profound naturalists of our time, and as modified by M. Van Tieghem's researches, generally accepted by men of science. No single species now exists exhibiting this full pattern, nor can we be sure that any such pattern ever did exist; but this in no wise weakens the foundation on which the hypothesis rests, nor do the comparatively few exceptional cases in which the course of the fibro-vascular bundles are found to deviate from the general plan, as in the great genus *Habenaria*. The strength of the hypothesis of this ideal type rests on its competence to account for in the most conclusive manner the general structure of all the orchid flowers we see, notwithstanding the endless variety of forms into which they have been moulded. We conclude our notice of this most interesting subject in Mr. Darwin's own words.

“It is interesting to look at one of the magnificent exotic species, or indeed at one of our humblest forms, and observe how profoundly it has been modified as compared with all ordinary flowers—with its usually great labellum taking the place of one petal—with its singular pollen masses—with its column formed of seven (nine) cohering organs, of which three alone perform their proper functions, namely, one anther and two generally confluent stigmas—with the third stigma incapable of fertilisation and modified into the wonderful rostellum—with three (five) of the anthers no longer capable of producing pollen, but serving either to protect the pollen of the fertile anther, or to strengthen the column, or existing as mere rudiments, or entirely suppressed. What an amount of modification, change of function, cohesion and abortion do we here see!

* The genus *Neuwiedia* is the nearest approach to the ancestral form at present known.

† *Fertilisation of Orchids*, p. 298.

“Can we, in truth, feel satisfied by saying that each orchid was created exactly as we now see it on a certain ‘Ideal type’; that the Omnipotent Creator having fixed on one plan for the whole order did not please to depart from this plan; that He, therefore, made the same organ to perform diverse functions—often of trifling importance compared with their proper function—converted other organs into mere purposeless rudiments, and arranged all as if they had to stand separate and then made them cohere? Is it not a more simple and intelligible view that all orchids owe what they have in common to descent from some monocotyledonous plant, which, like so many other plants of the same division, possessed fifteen organs arranged alternately three within three in five whorls; and that the now wonderfully changed structure of the flower is due to a long course of slow modification, each modification having been preserved which was useful to each plant during the incessant changes to which the organic and inorganic world has been exposed?” *

TERATOLOGY OF ORCHIDS,

BY DR. MAXWELL T. MASTERS.

No account of orchid structure would be complete if it did not include some mention of the deviations from the ordinary conformation of the flower. These are frequently met with in the wild state, but much more commonly under cultivation. Roughly speaking, they are all included as malformations or “monstrosities.” Some, indeed, are so, but others are really illustrations of a simpler and more regular disposition of the parts of the flower than that which is generally met with.

The literature of the subject is voluminous and scattered,† so that a volume, and that a large one, might be written on the teratology of orchids. All that I shall attempt to do in the following notes is to give a general sketch of the subject, and to show what are the changes that are most commonly met with. Restless florists ever on the look out, as they should be, for new developments, may

* *Idem*, pp. 305—307.

† The general subject illustrated from many examples taken from the ORCHIDACEÆ is dealt with in my *Vegetable Teratology*, published by the Ray Society in 1869, and especially in the German edition of that work, prepared by Dr. Danmer (Leipsig, Haessel, 1886). See also Masters on the Floral Conformation of the genus *Cypripedium*, in the *Journal of the Linnean Society*, vol. xxii. (1887), p. 402; *Orchids, Single and Double*, in the *Gardeners' Chronicle*, May 5th, 1885, p. 597. An extensive series of drawings of malformed orchids by Mr. Hansen is preserved in the Natural History Museum, South Kensington.

possibly glean some hints as to the most promising directions in which to prosecute their labours, and the students of orchid structure may be interested in observing that these protean aberrations are really consistent with law and order. Of course a knowledge of the normal conformation is the first essential to an understanding of the abnormal condition, but if the reader has paid attention to the numerous illustrations given in the foregoing pages with the accompanying description, and which should be supplemented by studying and comparing every orchid flower that comes in his way, he will experience no difficulty whatever in comprehending what follows.

As already pointed out, an orchid flower consists of fifteen parts, viz., three sepals and three petals alternating with them, but one petal is generally so very different in appearance from the other two as to be called by a separate name, the labellum or lip; the sepals and petals collectively constitute the perianth. In the centre of the flower surrounded by the perianth is the column which is typically a combination of six stamens and three styles, but in the adult state only some of these parts are visible. Of the six stamens, of which traces may be usually seen in the anatomy of the flower and especially in the development and distribution of the vessels, five are arrested in their development, come to nothing or are represented by mere rudiments. One only reaches maturity in all the tribes except *Cypripedium*. In that genus four of the stamens are abortive and two are fully developed, and in the little known genus *Neuwiedia* three are abortive and three are developed.

The relative positions of these fifteen parts are indicated in the diagram in page 35. Bearing these in mind it is in general easy to group the deviations that are met with into certain principal categories; thus the parts of the flower taken collectively may be altered:—

I. In number, either by arrest of growth (defect), or by excess (increase). The defect or the excess may be in one series or whorl, or in more than one.

II. The change may show itself in the union, or in the disunion of parts. In the former case the union is generally congenital, and the term *concrecence* or inseparation is made use of to imply that the so-called union is really due to the lack of separation rather than to the union of previously isolated parts. The union or the disunion may of course take place between members of the same or of different floral whorls.

III. Another very frequent change is due to irregular or disproportionate growth; of this, in a normal orchid flower, the labellum is a notable example.

IV. Substitution or replacement of one part by another, commonly called metamorphosis.

V. Displacements. In considering deviations of this kind the change in the position of the flower that occurs in the course of development

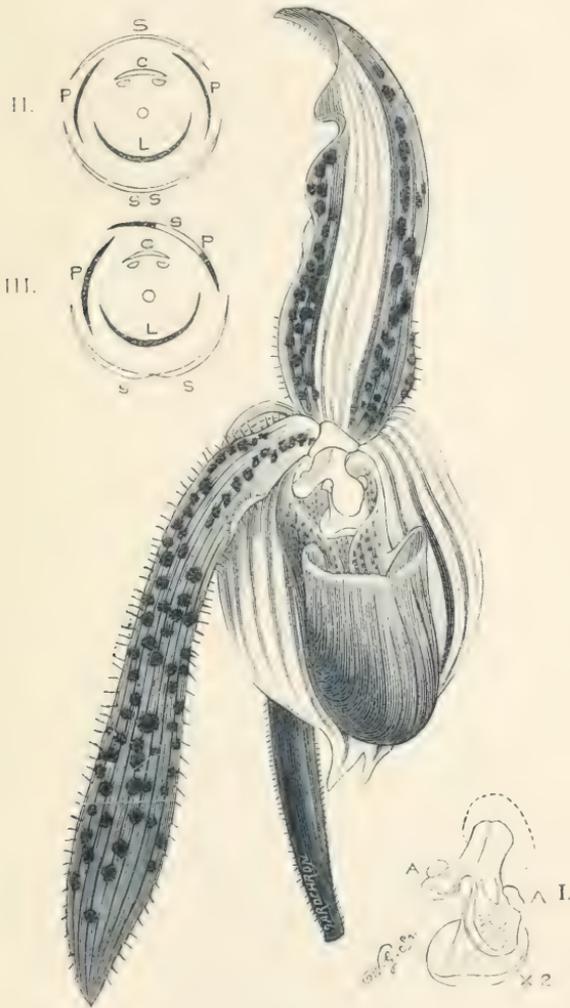


Fig. 1. Malformed flower of *Cypripedium X Morganii*, nat. size.

Fig. I., the column, twice nat. size; AA, the anthers. Fig. II., diagram showing the relative position of the parts of the flower in their natural condition. Fig. III., diagram of the malformed flower. s, sepals; P, petals; L, lip; c, column; o, ovary.

(From the *Gardeners Chronicle*.)

must not be overlooked. In the first instance, the flower is so placed that the lip is uppermost and the single perfect stamen at the lower

part of the flower; but in course of growth the ovary becomes twisted, so that in the adult condition we generally find the lip occupying the lower part of the flower. In some cases, *Disa*, *Satyrium*, etc., the twist does not take place, and the lip remains at the upper part.*

Displacement of one or more of the several members of the flower is very common; thus we find sepals taking the place of petals, and petals of sepals, and it is noteworthy that when an organ is so changed in position it is frequently changed in form and appearance also. A petal occupying the position of a sepal for instance will become like the sepal in form and colour, and is only to be distinguished by following the course of its development and the arrangement of its vascular bundles. A passage from the ordinary whorled to a spiral disposition of the floral parts is also not uncommon.

The woodcut, Fig. 1, illustrates displacement of parts in a flower of *Cypripedium* × *Morganii*, in which the connate lateral sepals, one petal, the lip and the column were normal. The peculiarity occurred in the upper segment of the flower, which took the position of the upper sepal, but which in appearance was partly sepal, partly petal. It was not possible to trace its erratic course during development, but it may be assumed that the upper sepal was not developed and that the upper segment was a lateral petal displaced, assuming in part the guise of a sepal as well as its position.

Other changes might be mentioned, but these are sufficient for the present purpose. It must, however, be carefully borne in mind that these changes rarely, if ever, occur separately but almost always in combination with others, and that an alteration in one part of a flower entails a corresponding change often of an opposite character as if by way of compensation.

After these general indications, applicable to the flower as a whole, I may now briefly advert to some of the principal or most frequent deviations met with in the several parts or whorls of the flower considered separately.

Outer row of perianth segments—Calyx. The changes that occur in the calyx (sepals) are usually of no great moment. Alterations of relative size are not infrequent, and a not uncommon change in some species of *Oncidium* is the reduction of the sepal to a mere thread, owing to the development of the midrib and to the concurrent arrest or suppression of the lateral portions of the segment. (This occurs normally in *On. abortivum* and *On. heteranthum*.) Theoretically the three outer segments should be distinct and separate, but we sometimes

* Mr. Douglas, of Ilford, Essex, not long since sent to the writer a very curious two-flowered inflorescence of *Cypripedium caudatum*, in which one flower had the lip uppermost, while in the other it occupied its normal position; the position of the other segments being correspondingly altered.

find them more or less united in *Masdevallia*, *Cypripedium*, *Cryptophranthus*, many *Oncids*, etc. On the other hand it is not uncommon, especially in *Cypripedium*, to find the sepals separate.

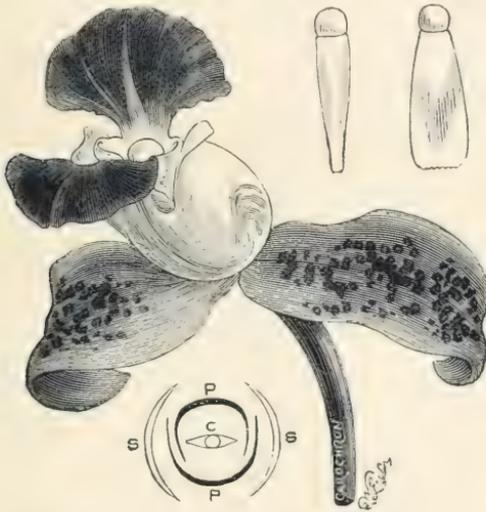


Fig. 2. Malformed flower of *Cattleya guttata*, with diagram. s, sepals; P, petals; c, column, straight with a terminal anther.

(From the *Gardeners' Chronicle*.)

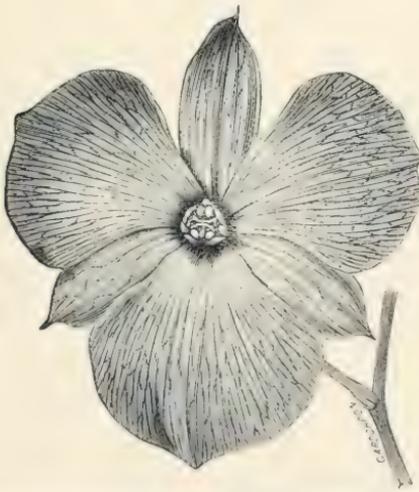


Fig. 3. Regular peloria of *Dendrobium Phalaenopsis*. The lip is scarcely different from the lateral petals either in colour or form.

(From the *Gardeners' Chronicle*.)

Inner row of perianth segments—Corolla, Petals. In this part of the flower we meet with changes of a very interesting character. The

lateral segments are subject to the same changes as to union and disunion (dialysis) and reduction as the sepals.

One very common change affecting the perianth as a whole may here be mentioned, and that is, a reduction in the number of parts in each whorl, so that instead of there being three sepals in one whorl alternating with three petals in the next, there are but two sepals,



Fig. 4. Regular peloria in *Lælia pumila*. In the left hand flower the lip scarcely differs from the lateral petals.
(From the *Gardeners' Chronicle*.)

and these are crossed at right angles by a pair of petals. An illustration of this in *Cattleya guttata* is shown in Fig. 2. (This change is almost normal in the two lowermost flowers of *Grammatophyllum Fenzlianum* var. *Measuresianum*.)

The lip with its gorgeous colouring and singular form attracts the attention of the cultivator, whilst its position, its structure, its infinite

variations furnish the botanist, whether he be physiologist or morphologist, or both, with endless opportunities for study and unlimited sources of wonder and admiration. So far as appearance goes the lip is in general the main feature of the flower, being usually different from the other five segments, causing the flower to be irregular or "zygomorphic" in its construction; but in some few instances the lip is scarcely, if at all, different from the other segments* and the flower is then regular or "actinomorphic."

We may take such flowers to represent an approach to the primitive, unmodified type of orchid structure. In the cases mentioned the regularity of the lip is the normal or usual state of things, but where it occurs, as it often does, in flowers that are habitually irregular, then we have the condition known as regular peloria.* In *Dendrobium*, *Phalenopsis*, *Lælias* and *Cattleyas*, for instance, the prominently large lip is occasionally replaced by one of approximately the same dimensions and form as in the other perianth segments, while in other instances the spur or the prominent ridges and teeth of the lip are altogether deficient (see Figs. 3 and 4). Such changes are of interest in some instances as bridging over the interval between two supposed genera; thus a flower of *Cypripedium caudatum* with a flat lip and other changes afforded evidence that *Uropedium* can hardly be separated as a genus from *Selenipedium* (see Fig. 7).† In such flowers the tendency is towards a greater simplicity of structure, or in other words, specialisation has not been carried so far as usual. Hence cases of regular peloria are considered as instances of reversion to a primordial or ancestral state. Not infrequently the lip is altogether wanting.‡

The opposite condition to regular peloria occurs when the characters proper to the lip are manifested also in the other two petals. Here the irregularity is intensified instead of diminished; the case thus becomes one of "irregular" peloria. A familiar illustration occurs in the variety of *Dendrobium nobile* known as *Cooksonianum* (see Fig. 5), and cases of "trilabella" as Reichenbach called them are not uncommon in *Lælia purpurata*, *Calanthe vestita*, *Odontoglossum odoratum* var.

* Besides those mentioned in the text other instances are afforded by *Dendrobium normale*, the genera *Thelymitra*, *Thelasis*, *Neuwiedia*. An orchid with perfectly regular flowers is figured by Lindley in the *Botanical Register* of 1838, t. 60, under the name of *Paxtonia rosea*, but Reichenbach and following him Bentham refer it to *Spathoglottis plicata* as a peloriate form of that species. One thing is certain, it has never been seen in a living state since it was first sent from Manila by Cuming to Messrs. Loddiges in 1837.—M. T. M.

† Another evidence, and a strong one too, of the same tendency was obtained by fertilising *Cypripedium longifolium*, Rehb., with the pollen of *Uropedium Lindenii*, Lindl. (*C. caudatum* Lindenii, Veitch); the resulting progeny proved to be structurally identical with *Cypripedium grande*, previously obtained from *C. longifolium*, fertilised with the pollen of *C. caudatum*. The only discernible difference between the two is that the pouch of the labellum of the first-named hybrid is longer than that of *C. grande*.—A. H. K.

‡ Almost normally so in the lowermost, often the two lowermost flowers in the raceme of *Grammatophyllum Fenzlianum* var. *Measuresianum*.—A. H. K.

gloriosum, and even *Cypripedium*s sometimes manifest this change, especially the hybrid *C. Sedenii*. (See also the figure of *Cattleya guttata* at p. 41).

A strange effect is produced in *Cypripedium* by the appearance of three pouch-like petals instead of one. These productions are usually marvelled at when seen, and frequently handed over to the botanist for post-mortem examination,* but few or no attempts are made to perpetuate them. It would doubtless be a long and tedious business to do so, but so is often the production of hybrids or seedlings. The fixation of a regular peloria of *Laelia purpurata* would result in the production of a flower

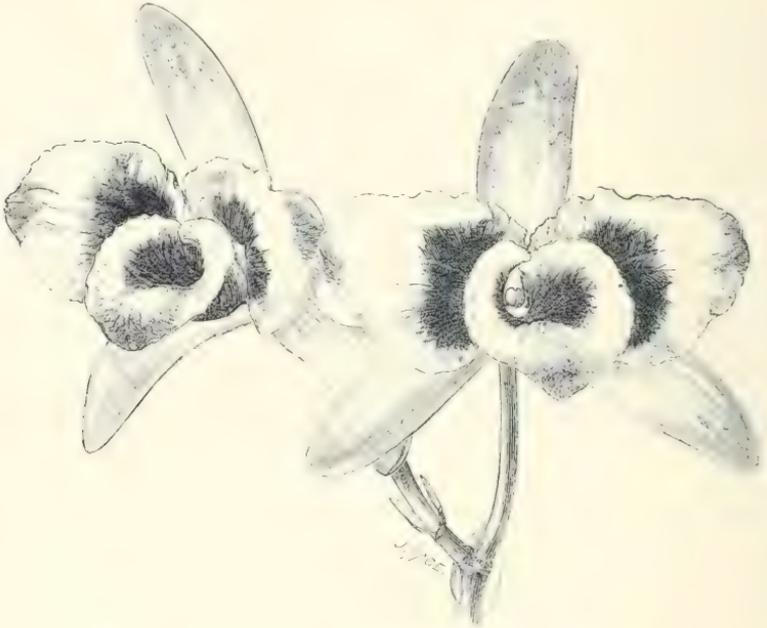


Fig. 5. Irregular peloria in *Dendrobium nobile* var. *Cooksoni* inum.

not unlike Kæmpfer's Iris, not with a single bloom but a panicle of them!—not with a comparatively evanescent flower, but with a cluster lasting weeks in beauty! Surely it is worth while to make the attempt to secure such a form.

Androecium—Column, Stamens, Style. It has been previously pointed out that the column consists of a welding together into one mass of six (potential) stamens and three styles (see page 36), and that of the six stamens only one is usually visible, or two in *Cypripedium*. The proof of this assertion, which to the ordinary looker-on seems

* Many pages of the MANUAL would be required to chronicle my own obligations to orchid growers in this matter for the last quarter of a century.—M. T. M.

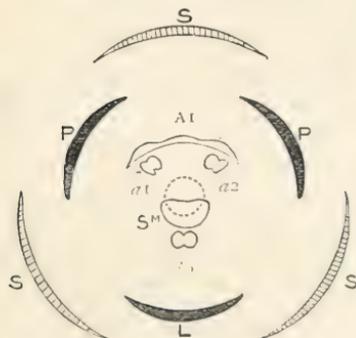


Fig. 6. *Cypripedium caudatum* intermediate form, diagram of flower.

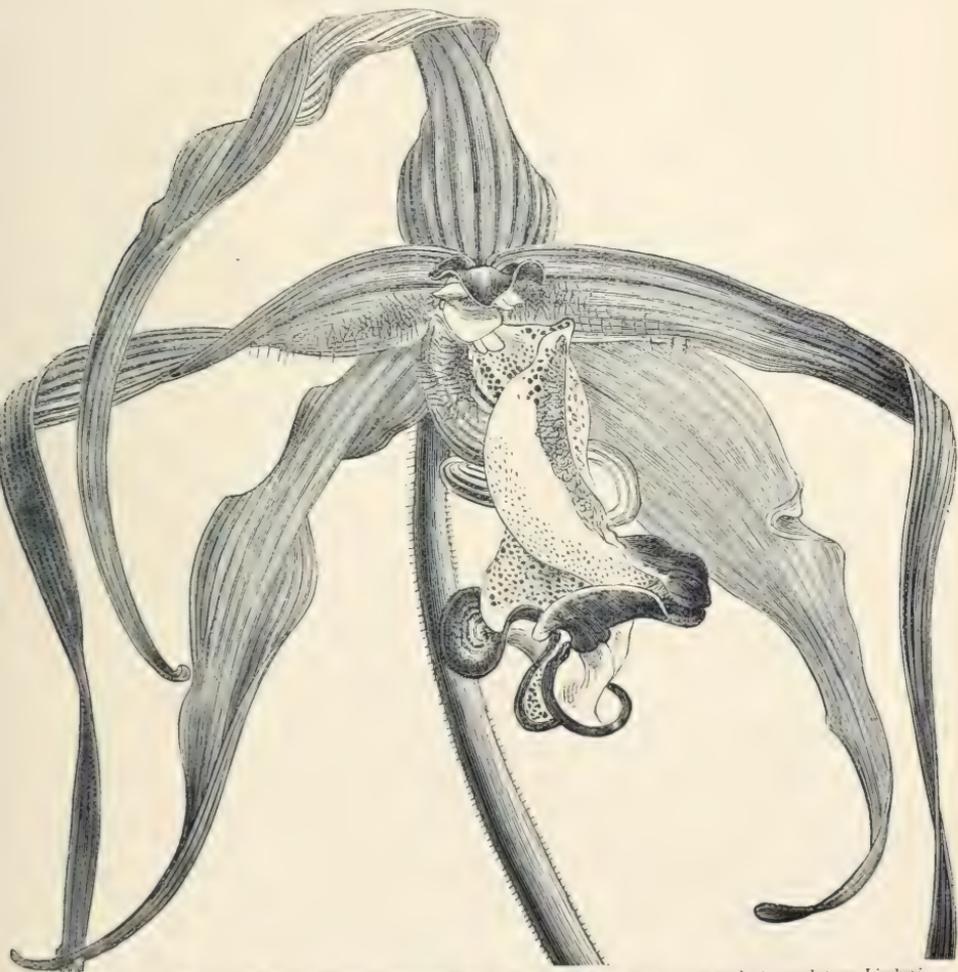


Fig. 7. Flower of *Cypripedium caudatum* intermediate between the normal form and *C. caudatum* Lindeni (*Cypripedium Lindeni*), with part of the lateral petals removed. The lip was curiously contorted and a third stamen was present, the position of which is indicated in the diagram at a3.

(From the *Gardeners' Chronicle*.)

audaciously unsupported, is derived mainly from facts and phenomena hardly capable of appreciation except by expert microscopists. Teratology, however, affords much more conspicuous evidence in the same direction, and when cautiously utilised in combination with other evidence yields a body of testimony to whose validity no exception can as a whole be taken. The presence of six stamens in an orchid flower may seem incredible to the ordinary observer, who sees therein only one; the others being potential, rudimentary, undeveloped, concealed. But the monstrous flowers in which the botanist delights often show plainly two or three, and not infrequently all six of the stamens, the potential being then replaced by the actual. Is it not a perversion of language to call a flower in which such a revelation occurs a "monstrosity"? It would occupy too much space to enter into details, but in my *Vegetable Teratology*, pp. 383—388, a whole series of such cases is given showing the occasional presence of two, three up to six stamens and three styles, and a similar case of where all six stamens were present in a form of *Cypripedium Sedenii* is figured by me in the *Gardeners' Chronicle*. *

It should be added that these stamens are rarely perfect, generally they are more or less petaloid and imperfect; nevertheless, I once saw a flower of *Odontoglossum crispum* with all six stamens perfect, and I experienced a satisfaction in its inspection as keen as that felt by the decipherer of a cuneiform inscription!

Before leaving the consideration of the column, it is well to point out that it is sometimes found detached from the lip in those genera where normally it is adherent to it, and that it undergoes changes in form and curvature in association with alterations in the perianth; thus in the peloric forms it is usually straight with the anther at the summit as shown in Fig. 2. The significance of these changes in connection with fertilisation can here only be mentioned.

Double-flowered Orchids.—Under the general term "double" as used loosely by florists, several distinct conditions are implied. Flowers, and those of orchids included, may become double by the mere increase in number of their perianth segments without other material change. I have seen this in our common wild orchids as well as in *Odontoglossum crispum* and others under cultivation.

A more common form of doubling, so far as orchids are concerned, arises from the appearance of two or more of the cryptic stamens above referred to in the guise of petals, just as happens in the case of an ordinary double rose. Florists have not as yet sought to perpetuate and develop these double forms, but as previously stated there appears to be no insuperable obstacle to overcome if they were

* XXVI. (1886), p. 596. As this sheet is passing through the press I have received a *Cypripedium* from Sir Trevor Lawrence, Bart., with three stamens thus arranged $\begin{matrix} \alpha & \alpha \\ & \alpha \end{matrix}$

disposed to do so. A plant of *Epidendrum vitellinum* is known to produce such flowers every year. In it the lip is regular, and the three outer as well as the three inner stamens are represented by petals (see Fig. 8).

Synanthy.—When two cells or two buds are in close proximity and more or less pressed upon by surrounding parts, it is not surprising that the cells or buds so situate should adhere one to the other. This indeed is the origin of some but not all of those Siamese twin-like flowers which are so common in plants generally, and which are by no means infrequent among orchids. The union takes place at a very early state of the flower's existence, when in fact they are in the embryonic condition. Their growth is rapid, disproportionate



Fig. 8. Regular peloriate and semi-double flower of *Epidendrum vitellinum*.
(From the *Gardeners' Chronicle*.)

to that of the surrounding tissue, hence the union and the compression. Under such circumstances it is to be expected that there will be more or less obliteration of some of the parts of the compressed flowers. The parts placed in the middle, subject on the one side to the growth-force of the developing buds, and on the other to the resistance offered by comparatively unyielding parts, are likely to be squeezed out of existence, and so indeed they are, and a "synanthic" flower made up of two or three in combination, rarely if ever contains the full quota of parts. Again, it is reasonable to expect in such a case that the parts or some of them will be displaced and thrown out of position, and so they often are. It is not always easy to determine at first sight how many flowers are concerned in the composite and which parts are present and which suppressed, but the botanist by

microscopic inspection of the vessels of the flower can generally succeed in unravelling the mystery.

Proliferations.—One other class of malformations remains to be spoken of, though it is by no means common in orchids. The central axis of an orchid flower (indeed of any other flower), that part from which all the other parts spring, is in reality the direct continuation of the stem or of a branch. Usually it is not prolonged beyond the flower, neither does it branch within the confines of the perianth; but, by exception, both these things happen, and when this is the case botanists speak of the occurrence as one of proliferation. It may be central, it may be lateral. The prolonged branch may give origin to scales or to leaves only, or it may produce flowers of greater or less degree of perfection. Rose growers know how common such deviations are in certain seasons. Orchid growers, if I may judge from the rarity of specimens that have come under my observation, scarcely ever see them in the flowers they cultivate. The instances I have seen, and they are but few, have been mostly among our wild orchises; but for one remarkable case in *Cattleya intermedia*, figured in the *Gardeners' Chronicle*, I am indebted to M. Lucien Linden.*

Causes.—The exciting causes that bring about the malformations above referred to are mostly unknown, but two things are suggestive of their origin—One is, that hybrids, and especially first crosses, are very liable to produce malformed flowers. While *Cypripedium* × *Sedenii* was still reckoned as a new plant, and derivatives from it were few in number, then, if I may judge from my own experience which has been very considerable, malformations in this hybrid were very common. Of late years I have not met with so many in this particular section; the plant and its offspring have become more fixed in their habit.† Again, newly imported orchids are very apt to produce misshapen flowers. Soon after the introduction of *Cypripedium Lawrenceanum* from Borneo, a wealth of malformed flowers poured in upon me owing to the kindness of friends and correspondents; now I rarely see a malformed flower of that particular species, and conclude that after the disturbance caused by its removal from its old habitat and its growth under different conditions, it has at length been enabled to adapt itself to the new circumstances and to settle down comfortably in its new home.

I speak of these two illustrations as specially suggestive, owing to the large numbers of malformed specimens of each that have passed through my hands, but I do not wish to lay disproportionate stress upon them because there are very numerous other hybrids and very numerous new

* Vol. II. s. 3 (1887), pp. 12—13.

† I do not think that this is so, but that on the contrary the malformed flowers occur so frequently that we cease to notice them. They can be found on almost every flower spike of *C. Sedenii* towards the end of the season.—H. J. V.

importations which, so far as I know, have not been affected in this way by their changed conditions.—*Cœlum non animum mutaverunt.*

The botanist who has these flowers put upon his study table is rarely able to do more than offer more or less plausible suggestions as to the causes that have produced them such as his knowledge of the ways of life of plants in general may afford. But the cultivator is in a very different position; he knows the circumstances under which the plants have been grown, he has watched them, it may be from infancy to maturity, he has regulated and controlled their natural dispositions, given or withheld as it seemed best to him, heat, air, light, water, pushed them on or rested them to suit his convenience. It is to him, therefore, as to a practical physiologist, that we must look for the determination of the why and the wherefore of these formations. It is to the botanist that we must look for the interpretation of their structure and for the indication of their significance as regards the construction, the purpose, the descent, and the filiation of the great order to which they belong.

VEGETATIVE STRUCTURE.

Although a considerable diversity of habit exists among epiphytal orchids, much of which has resulted from external circumstances as climate, locality, environment *in situ*, and even from the nature of the substratum, trees, rocks, etc., on which they grow in a wild state, the vegetative organs, the stems, leaves and inflorescence, whether considered conjointly or separately are reducible to a comparatively few types, some of which are repeated in many genera while others are more restricted. As a detailed description of their vegetative organs is given under all the most horticulturally important genera, only some of the most obvious generalisations with especial reference to the Tribes EPIDENDRÆE, VANDEÆ and CYPRIPEDIÆ are here noticed.

The vegetative organs of orchids in their morphological aspect have been studied by Professor Pfitzer, of Heidelberg, who has published the result of his observations in an elaborate work entitled *Grundzüge einer vergleichenden Morphologie der Orchideen* (Outlines of a comparative Morphology of Orchids). In this work the author attempts to construct a comparative classification of orchids from the characters afforded by their vegetative organs. A large number of species included in many genera have been minutely examined and compared, and their morphological characters accurately noted and described; but as a far larger

number of species yet remain to be so minutely studied, we quite concur with Mr. Hemsley that Professor Pfitzer's classification is necessarily incomplete, seeing how many tropical species of orchids are only known from imperfect specimens preserved in herbaria.* Nor is it quite clear what practical end would accrue to systematic botany from a classification founded on a more complete examination even if it were attempted, since the characters afforded by the vegetative organs can have but a subordinate value in the systematic arrangement of the ORCHIDÆ or any other family of phanerogamic plants. The highest division in which these characters have been made available by Mr. Bentham in his revision of the ORCHIDÆ for the *Genera Plantarum* are his sub-tribes,† their systematic value being in an inverse ratio to the rank of the group or division in which they are used, and thence greatest as distinguishing marks in the species and their varieties.

Nevertheless, the primary divisions of Professor Pfitzer's classification of the ORCHIDÆ as founded on the vegetative organs are very natural ones and the best of their kind that have been proposed, and moreover not devoid of practical value to the cultivator. On these grounds alone they are worthy of attention, and we thence bring them before the reader with examples selected from each division restricted chiefly to epiphytal species and the CYPRIPEDIÆ.

These primary divisions are—

I.—MONOPODIAL ORCHIDS. Those which grow continuously in one direction only. Their stems lengthen indefinitely season after season, and bear aerial (adventitious) roots often along their whole length. The inflorescence is always lateral and is produced from the axils of the leaves or opposite to them.

II.—SYMPODIAL ORCHIDS. Those in which the growth of the main axis, stem or pseudo-bulb soon ceases, usually at the end of one season's growth, and a lateral growth is produced in the following season.

The Sympodial Orchids admit of a division into two groups—

A.—Those bearing a lateral inflorescence.

B.—Those bearing a terminal inflorescence.

The monopodial orchids form a comparatively small division; they include Bentham's sub-tribe SARCANTHÆ, and some species in other sub-tribes not often seen in cultivation in other than botanic gardens except *Vanilla*. Well-known examples of monopodial orchids are afforded by *Vanda*, *Aërides*, *Angræcum*, *Arachnanthe*, *Rhynchostylis*, *Saccolabium*,

* Gard. Chron. XVII. (1882), p. 341.

† See the sub-tribal characters of *Pleurothallæ*, *Bleticæ*, *Eulophiæ*, *Sarcantheæ*, etc.

Phalænopsis and allied genera. In all these genera the leaves are distichously arranged, that is to say, they are in two rows one opposite the other, the leaves of one row alternating with those of the other.



Rhynchosstylis retusa.

A monopodial orchid with lateral racemose inflorescence.

In some species the internodes are very short and the leaves much crowded; they are nearly always much longer than broad, embracing the stem at their base, notched or unequally lobed at their apex; usually flat (dorsiventral or bi-facial) with a sunk median line on

the upper face and a corresponding keel, more or less defined on the under one, but sometimes the leaves are conduplicate, folded from the base to the apex. In a few species the leaves are of the "centric" type, much resembling the stem from which they spring, being terete, dull in colour and usually sharp pointed as in *Vanda teres*, *Aërides Vandarum*, *Angræcum Scottianum*, the genus *Luisia*, throughout, many species of *Sarcanthus*, etc. The leaves of monopodial orchids are nearly always leathery in texture and persistent several years under cultivation; deciduous species occur in *Phalænopsis* (*P. Lowii*), *Sarcochilus* (*S. luniferus*) and one or two others.

The inflorescence is racemose, or less frequently some modification of the raceme, chiefly the panicle. In *Rhynchostylis* and in many species of *Aërides*, *Saccolabium*, *Sarcochilus* the raceme is very dense and many-flowered. In *Arachnanthe*, *Vanda*, *Stauroopsis*, etc., it is often short, lax and few-flowered. In *Arachnanthe Lowii* the floral axes extend several feet in length and bear in the aggregate several hundreds of flowers; in some species of *Angræcum* (e.g., *A. pertusum*, *A. citratum*) the flowers are secund, all facing one way, and their perianth segments being nearly in the same plane, the inflorescence has a strikingly formal appearance. The finest instances of the paniculate inflorescence are sometimes seen in *Phalænopsis Schilleriana*, *P. Stuartiana*, *Aërides crispum*, and *A. multiflorum*.

The sympodial orchids constitute by far the largest division; all the terrestrial kinds both tropical and temperate, all the pseudo-bulbous species, and all whose stems are matured in one season are included in it. In these orchids new growth generally begins with the development of leaf-like scales which gradually pass into true leaves, so that it sometimes happens that between the first pair of leaf scales and the true leaves many intermediate forms occur. In pseudo-bulbous species with few leaves, the pseudo-bulbs are often formed between the first pair of true leaves, and one or two more leaves are produced from the apex of the pseudo-bulb, as in *Odontoglossum*, *Oncidium*, *Miltonia*, etc. In other species the vegetative axes are often prolonged into leafy stems of varying length and thickness. In both cases the old pseudo-bulbs and the old stems persist for some time after they have become effete, the terminal ones alone being floriferous.*

The group of sympodial orchids with lateral inflorescence is a very

* The stems of some of the evergreen *Dendrobies* in the sub-section *CALOSTACHYÆ* (*Dendrobium Farmeri*, *D. densiflorum*, etc.) are an exception; these produce their handsome thyrsoid racemes three or four years in succession.

extensive one, and comprises many of the finest epiphytal kinds in cultivation. Among the included genera are *Dendrobium*, *Calanthe*, the whole of the sub-tribes *ONCIDIÆ* (*Odontoglossum*, *Miltonia*, *Trichopilia*, etc.), *STANHOPIÆ* (*Coryanthes*, *Peristeria*, *Houlletia*), *CYRTOPODIÆ* (*Zygopetalum*, *Lycaste*, *Anguloa*); also a series of genera both in the *EPIDENDRÆ* and *VANDÆ* with fleshy or pseudo-bulbous stems composed of several internodes but producing a tuft of leaves



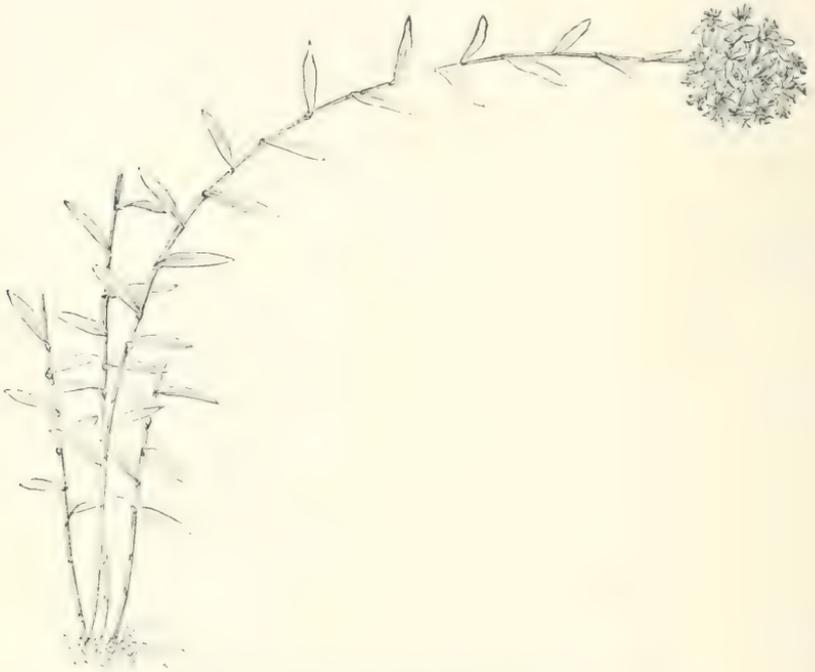
Bulbophyllum barbigerum.

A sympodial orchid with lateral inflorescence.

at the upper end only, but below only scales; after the fall of the latter the stem appears ringed (*Phaius*, *Chysis*, *Cyrtopodium*, *Mormodes*, *Cynoches*, etc.). *Cymbidium* and *Cyperorchis* are also placed in this group, but it is well known to cultivators that the stems of all the cultivated species continue to grow for more than one season, but eventually cease when the new growths have reached the flowering stage.

The group with terminal inflorescence is a still more extensive one, for it includes all the terrestrial kinds, of which there are several large genera spread over an immense geographical area, as *Habenaria* and *Cypripedium* (including *Selenipedium*). Among the epiphytal orchids included in this group, *Cattleya*, *Lælia*, *Schomburgkia*, *Sophronitis*, *Diacrium*, *Epidendrum*, *Cœlogyne*, are the most important from a horticultural standpoint, and of subterrestrial genera, *Masdevallia*, *Restrepia*, *Cryptophoranthus*, *Sobralia*, *Thunia*, etc.

Rhizome.—All the epiphytal species in both groups of sympodial orchids are provided with a rhizome from which are produced the



Epidendrum xanthinum. Sympodial orchid with terminal inflorescence.

stems, the pseudo-bulbs and the roots. The extent of the development of the rhizome greatly influences the habit of the plant; in a large number of genera, *Odontoglossum*, *Dendrobium*, *Masdevallia*, etc., the rhizome is for the most part very short, and the plants consequently have a tufted habit; in *Cattleya*, *Lælia*, the *Aulizeum* *Epidendra*, and some others, it is very strong and of ligneous texture, varying in thickness from that of a goose-quill to that of a man's little finger; in many *Bulbophyllums*, *Cirrhopetalums*, some of the *Rodriguezias*, *Cœlogynes*, and others, the rhizome is greatly elongated and the

pseudo-bulbs are placed at a considerable distance from each other, whence these plants have a straggling habit; when thus prolonged, it is usually clothed with brown scarios scales; in the caulescent Maxillarias (*M. tenuifolia*, etc.) and in species included in many other genera (*Orontoglossum cordatum*, *Oncidium flexuosum*, etc.) it is scandent; and many intermediate forms exist. In *Bulbophyllum Beccari* the rhizome is enormously developed, encircling the trees to which it is attached like the coils of a serpent; in *Oncidium zebrinum* it is scandent and often excessively elongated, the intervals between the pseudo-bulbs being sometimes as much as from 6 to 8 inches; but these are extreme cases among the cultivated ORCHIDÆ.

Roots.—The normal roots of orchids are cylindric, often thread-like, branching, and of great length; in most Cypripedes they are furnished with numerous root hairs. The aërial roots of epiphytal orchids consist of a central axis, surrounded with a covering of loose light tissue, technically called the *velamen*, the cells of which when dry are filled with air only; this spongy covering, with its thin epidermis, absorbs moisture with great rapidity; both the primary roots and their branches terminate in a greenish or greenish brown sheath, the *calyptra*, which protects an organ of very great importance and delicacy, the “punctum vegetationis” or growing point, and the formative tissue which surrounds it. Generally, the roots of epiphytal orchids are pendent, but in some species of *Cymbidium* under cultivation, the secondary roots grow upwards; and in *Grammatophyllum* the secondary roots with their rootlets form a dense plexus of considerable thickness, which dies off at the end of the growing season. The white thread-like much-branched roots of several of the Rodriguezias, of *Oncidium sphacelatum* and others grow into a dense tangle which forms a distinct feature of these plants.

It may here be noticed that the roots of most species of the monopodial genus *Phalænopsis* become much flattened as they creep over surfaces in their immediate neighbourhood, and to which they cling with great tenacity. And in those *Aërides*, *Vandas*, etc., whose leaves are of the “centric” type (*A. cylindricum*, *Vanda teres*, etc.) the roots assist the plants to climb to the tops of high trees in quest of more air and light than they can obtain in the dense jungle of an Indian forest.*

Leaves.—Among the sympodial orchids occurs well-nigh every form of leaf known in the ORCHIDÆ. As the leaves of all the genera and their included species treated on in this work are described in their respective places, a few of the most obvious characteristics need

* Two of our native orchids, *Epipogon aphyllus* and *Corallorhiza innata*, both unfortunately fast becoming extinct in this country, have neither roots nor leaves, but are saprophytes, living on the organic matter in the soil under trees. Another British species, the “Bird’s Nest Orchis,” *Ncottia Nidus-avis*, plentiful in some localities, is also a saprophyte; it is a plant with brown stems clothed with scales.

only here be noticed. The distichous arrangement is universal throughout the epiphytal species and *Cypripedium*, although sometimes more or less disguised, especially when the leaves are few in number. The leaves are usually much longer than broad; in those species in which the vegetative axes are more or less lengthened they are sessile or embrace the stem at their base and pointed at the apex (the fasciculate *Dendrobis*, *Eupidendra*, *Thunia*, etc.). When the axis is thickened or reduced to the pseudo-bulbous form, the leaves are fewer in number and usually of much larger size. Those leaves that are persistent for several years are of very leathery texture, sessile or very



Loosely racemed inflorescence of *Oncidium longipes*.

shortly petiolate and usually obtuse at the apex (*Cattleya*, *Lælia*, many of the Calostachyate *Dendrobis*, the stemless *Oncids*, etc.); those that are deciduous or fall off at the end of a season's growth are of herbaceous texture, distinctly petiolate, the petiole being winged or folded, are more or less plaited, and have prominent veins that are either parallel or symmetrically curved on both sides of the midrib. In *Peristeria*, *Coryanthes*, *Anguloa*, many *Lycastes*, *Houlletia*, etc., the plicate leaves are conspicuously large. Leaves of the "centric" type, which are sometimes fleshy and sometimes greatly elongated, occur in *Brassavola*, *Scuticaria*, *Tetramiera* (*Leptotes*), the Strongyle *Dendrobis* (as *D. teretifolium*), also in *Oncidium Jonesianum*, *On. Cebolleta*, etc.

Inflorescence.—Every form of inflorescence that occurs in the ORCHIDEE is also found among the sympodial species. The flowers are solitary throughout *Lycaste*, *Maxillaria*, *Anguloa*, in many *Masdevallias*, *Restrepia*, the section *Huntleya*, *Bollea* and *Warscewiczella*, of *Zygopetalum* and others, on terete smooth peduncles with two or more bracts; in many *Cypripedes* on terete hairy uni-bibracteate peduncles. They are in short few-flowered racemes in many genera and sections of genera; in long many-flowered racemes in *Cymbidium*, *Grammatophyllum*, many *Odontoglots*; in dense spikes in *Arpophyllum*, *Coelia*, *Oberonia*; in trailing panicles several feet long in many species of *Oncidium*; and every conceivable intermediate form. In *Megaclinium* (a genus rarely represented in amateurs' collections) the floral axis is flattened into a broad plate; it is also flattened towards the upper end in *Oncidium Papilio*, and in *Phalenopsis Cornu Cervi*. In *Oncidium heteranthum*, *On. abortivum* and probably others, flowers of different forms occur in the same inflorescence;* in *Catasetum* and *Cynoches* the flowers are mostly unisexual, the flowers of each sex differing in form and usually produced in different racemes. Many orchid flowers are scentless, but the great majority are more or less odoriferous, the fragrance exhaled by very many being of the most agreeable kind, while in others as *Masdevallia Gargantua*, *M. velifera*, many *Bulbophyls*, and especially *B. Beccarii*, the fœtor is most repulsive.

MINUTE STRUCTURE.

In an article published in the *Gardeners' Chronicle* of May 9th, 1885, Dr. Masters called attention to the relation that subsists between the minute structure of the vegetative organs of plants, especially of the leaves, and their functions, as indicated by Stahl and others, and gave some illustrations selected from some well-known orchids in cultivation. These illustrations, which are transverse sections of the leaves magnified forty diameters, bear strong evidence of the minute structure being indicative of the conditions under which the plant grows. Admitting the partial and incomplete nature of the examination, it was sufficient to enable the observer to state the general conditions as to light and shade and supply of water the plants required, and these conclusions were found on consultation with practical cultivators to be near approximations of the truth in

* See p. 40. The two (rarely three or four) lowermost flowers in the racemes of *Arachmanthe Lowii* are different in form and colour from the others.

all cases. It is thence evident that could a sufficiently comprehensive knowledge of the minute structure of the vegetative organs of orchids be brought within the reach of orchid growers generally, its influence for good in the cultural treatment of the plants would be of an enduring kind. Dr. Masters remarks that:—

“In the leaves of orchids we have the component structures apparently arranged with reference to the conditions under which the plant grows naturally. Some grow in full sunshine, and are constructed accordingly. Some thrive in diffused light. Some bear a long period of drought uninjured; others could not endure the privation of water even for a few hours. Some are so constructed as to adapt themselves to varied conditions with little trouble, and these, of course, are the plants the gardener finds it easy to cultivate. In others the adjustment is so delicate that they cannot suffer any change without inconvenience; these are the plants the gardener has a difficulty in keeping alive, and which even in their native countries are dying out, elbowed out by their more robust and less exacting brethren on the principle of the survival of the fittest.”

If then, the conditions noted in the foregoing quotation are made manifest in the leaves of orchids by their minute structure, and we have every reason to believe that this structure is a part of the result of their “environment” and that it enables them to perform their important functions to the best advantage of the plant, it must be worth while to ascertain what that structure is, in order to obtain reliable data for cultural treatment. Confessedly imperfect as were the investigations of Dr. Masters up to the date of publication (and so far as we know, very little has been done by others in the same direction since), their import and their intrinsic value to cultivators when they shall have been more elaborately worked out is, however, so evident that we have been induced to continue the examination with the view of adding something more to our knowledge of the subject, and with the hope of inducing others who may have leisure at their disposal to take it up more comprehensively.

The sections of leaves, stems and roots that are here illustrated were made for us by Mr. N. E. Brown, of the Kew Herbarium. For three other illustrations we are indebted to the kindness of the proprietors of the *Gardeners' Chronicle*, and all bear ample testimony to the accuracy and care with which they have been executed.

The technical description and terminology of the various tissues of plants must be sought for in text books devoted to the subject; * we can only here offer so much explanation as will render the illustrations intelligible to the general reader.

All complete vegetable structures consist of cells for the most part indistinguishable by the naked eye. Each living cell in what is conveniently regarded as its normal state at the epoch of commencement of growth consists of (1) a transparent colourless membrane called the cell-wall which encloses (2) the protoplasm, "the physical basis of life" as it has been aptly termed by Professor Huxley, which forms a layer closely lining the cell-wall, (3) a denser rounded mass of the protoplasm called the nucleus, which is either embedded in the layer of protoplasm lining the cell wall, or is suspended in the middle of the cell by fine threads of protoplasm, the intervening space (4), the vacuole, being filled with a colourless fluid, the cell-sap. Cells so constructed are more or less of spherical form and may be seen in the young shoots of all plants, in some of which they are found more favourable for observation than in others, as in the pith of a young growing shoot of the elder, the hairs on the stamens of *Tradescantia*, etc.; but in most cases a high magnifying power is necessary for the several parts above described to be clearly made out, though in the footstalk of a rhubarb leaf they are so large as to be readily seen by the naked eye. Such it is usual to regard as the fundamental form of vegetable structure, from which all subsequent developments originate. In all the most highly organised plants, although the cells have an independent existence for a time, there are always a large number of them in close contact and firmly united, forming a cellular tissue, a number which increases as growth progresses till in the full-grown plant, even when of only moderate dimensions, the number of cells in the aggregate exceeds the power of ordinary calculation. Nevertheless, even in the higher plants isolated cells occur during temporary states of existence as pollen grains, fern spores, the antherozoids of mosses, etc. The actual forms and sizes of the cells are as varied as the structures of which they form the constituent parts; they are subject to regular changes like the whole plant which they build up. Only those cells are in a living state which contain protoplasm; they alone can grow and give rise to new cells; cells devoid of protoplasm may, however, be of service to the plant as supports and protection to the growing parts, or as conduits and store places.

Every new growth begins with a change in the protoplasm by virtue

* Among the best are Sachs' *Lehrbuch der Botanik*, English translation by Dr. Sydney H. Vines; the latter author's recently published *Student's Text Book of Botany*; and De Bary's *Comparative Anatomy of the Vegetative Organs of Phanerogams and Ferns*, translated by F. O. Bower and Dr. H. Scott.

of the vital force with which it is endowed, a power that can no more be accounted for or explained than the states of consciousness that enables us to distinguish a sound from an odour, a colour from a flavour, or any other ultimate fact of Nature. There is a continuous movement of the particles, and although extremely slow and imperceptible to our limited powers of vision, such a movement is inseparable from the idea of life. This movement results, in all the higher forms of vegetation, in a division of the mother cell into two others more or less like itself, and these again divide in like manner. As division and sub-division proceed, a differentiation also takes place in the cell contents; chlorophyll granules are formed in some, starch-grains, resin, crystals of various kinds, etc., occur in others; as well as a modification in form according as each fulfils its own definite part in the economy of the plant.

The numerous and densely crowded cells form the "fundamental tissue" from which in course of time, and in accordance with varying requirements, different layers of tissue develop differently, so that the adult plant consists of differentiated tissues. In general, the whole mass of tissue is definitely bounded on the outside by an *Epidermal layer* or outer skin consisting of one layer of cells. This surrounds and encloses a rind or "cortex" of several layers, whilst the centre is occupied by a mass of cells, some of which remain unchanged while others are gradually converted into long strands. These strings of tissue, the *fibro-vascular bundles*, usually follow in their longitudinal course the direction of the most vigorous growth which immediately precedes their differentiation. Not only the cortical layers, but also the vascular bundles and the fundamental tissues are more less differentiated, the sub-epidermal into layers of a different nature; the bundles also exhibit differentiation, and generally in a still higher degree. In this manner arise in the higher plants *Systems of Tissues*.

In two or more years' old stems of the Dicotyledonous division of flowering plants, also of the Gymnospermous Orders (Conifers, Cycads, etc.), the component tissues are arranged in concentric rings as is shown in the wood of our common trees and shrubs which consists chiefly of fibro-vascular bundles so strongly developed by the continuous formation of tissues of which they are composed, that they finally almost replace the intermediate fundamental tissue; in the leaves, the fibro-vascular bundles (veins) are netted (reticulated) or otherwise more or less irregularly disposed. On the other hand, in the Monocotyledonous Division, that to which the ORCHIDÆ belong, the fibro-vascular bundles of more than one year's old stems as in *Vanda*, *Cattleya*, *Dendrobium*, etc., and also in the pseudo-bulbous species, are isolated and separated from each other by fundamental tissue; and in the leaves they are either parallel to each other or symmetrically placed on each side of the midrib.

In the fundamental tissue, if the cells are arranged more or less distinctly in rows, and bounded by flat or curved walls, and are not much longer than broad, the tissue is called *parenchyma* or parenchymatous tissue; of such is the soft tissue of the leaves, etc. But if the cells are pointed at their ends, much longer than broad and dovetailing into one another, it is called *prosenchymatous*; of such are the ligneous cells of the stems and rhizomes of all monopodial orchids, also of *Cattleya*, *Lælia*, *Epidendrum*, and many others. The differentiated tissues of the vascular bundles may be ranged under two groups called the bast and wood portion (technically the "phloëm" and "xylem"); they are separated by *cambium* when there is any. The bast consists generally of thin-walled cells and tubes for the conveyance of nutriment; the xylem or wood portion has generally thickened cell-walls which become hard and ligneous for the purpose of support. The cambium consists of cells capable of further development; it has the power of forming new cells, and of furnishing the material for the production of new permanent tissue either of bast or of wood in addition to that already in existence.

The general structure of the leaves of orchids may be thus sketched. There is a central spongy mass, the "mesophyll," consisting of cells not always arranged in the same way nor of the same size and form, but generally in easily recognisable layers. A few are empty or filled with air; some are filled with water; some contain food in the shape of starch grains; some are provided with green colouring matter, or *chlorophyll* as it is called, to which leaves owe their colour, and in no small degree their vitality; some are charged with red or purple-coloured fluid; some give shelter to crystals of various forms. This central mass is traversed longitudinally by the fibro-vascular bundles or veins, including sundry thinner and more delicate vessels of various modifications which play a part in the transmission of nutritive juices from one part to another. The whole is protected on each side by a skin or *epidermis* which, besides being a protective organ, allows of the passage in and out of the leaf of air and vapour by means of minute pores or apertures (the *stomata*) which are generally most numerous on the under surface and which open or close according to the dryness or moisture of the atmosphere.*

The illustrations of minute structures of the leaves, stems and roots of some well-known orchids here given should now be intelligible to the general reader, and some obvious relations between the structure and functions may be pointed out.

Leaves.—In every figure the same numerals indicate the same tissue or structure, viz., 1, the upper, 2 the lower epidermis; 3, the parenchyma or cellular tissue of the leaf, sometimes called the

* Gard. Chron. XXIII. (1885), p. 607.

mesophyll; 4, the fibro-vascular bundle of the midrib; 5, smaller bundles parallel with the midrib (veins); 6 (where present), still smaller bundles (veinlets). The epidermis is always covered by a structureless *cuticle* developed from the cell-walls and forming an unbroken layer over the whole leaf and resisting too rapid evaporation of the fluids within. Fig. 1 illustrates a transverse section of a leaf of

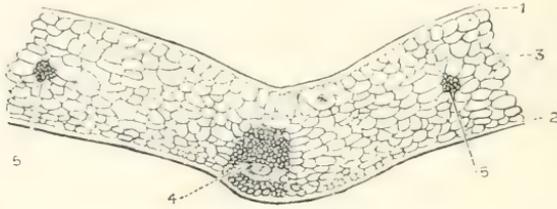


Fig. 1. Transverse section of leaf of *Dendrobium nobile* at midrib, enlarged 30 diameters.

1, upper, 2, lower epidermis; 3, parenchyma or soft tissue containing chlorophyll granules; 4, fibro-vascular bundle of the midrib; 5, two smaller bundles.

Dendrobium nobile enlarged 30 diameters. Immediately underlying the upper epidermis is a layer of almost circular colourless cells filled with air or water; a similar layer of smaller and more closely packed cells underlies the lower epidermis; the cellular tissue between them consists chiefly of egg-shaped cells filled with granules of green colouring matter, the chlorophyll, not shown in the figure; they are less closely packed than

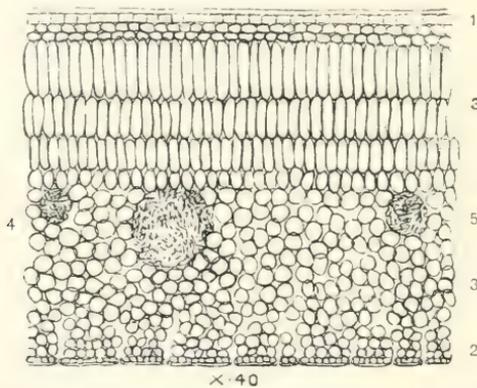


Fig. 2. Transverse section of fragment of leaf of *Dendrobium Jenkinsii*, X 40. The numerals as in Fig. 1. 3a, palisade cells.

(From the *Gardeners' Chronicle*.)

the others, and have interspaces here and there between them which communicate with the outer air by means of minute pores or stomata in the epidermis, also not shown in the figure. In the centre is the midrib, and on each side of it a smaller fibro-vascular bundle which contribute to the strengthening of the leaf, passage of fluids, etc. The

leaf of *Dendrobium nobile* is thin, and its means for the storage of water is limited, presumably therefore needing diffused rather than direct sunlight, as under the influence of the latter, evaporation would be too rapid.

Fig. 2 shows a similar section of a leaf of *Dendrobium Jenkinsii*. The leaves of this species are small and thick, with three layers of cells called from their peculiar appearance *palisade* cells (3a in figure), underlying the hypodermal water cells, and which are always full of deep-coloured chlorophyll granules, their numbers, size and intense coloration being always in direct relation to the amount of light. When these palisade cells are well developed it is a sure sign that in their

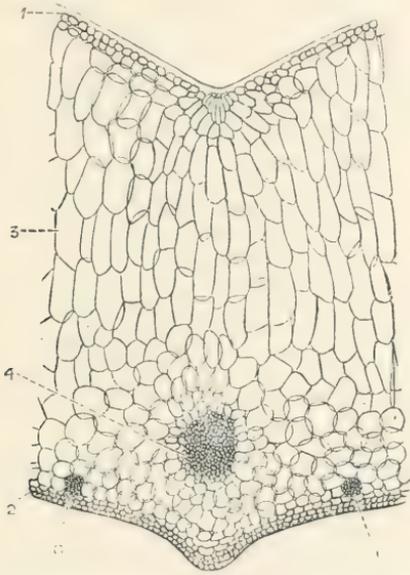


Fig. 3. Transverse section of leaf of *Cattleya intermedia* across the mid-rib, X 30 diameters. 1, upper, 2, lower epidermis; 3, fundamental tissue of soft thin-walled cells containing chlorophyll granules; 4, fibro-vascular bundle of midrib; 6, smaller bundles.

native country the plants are exposed to bright sunshine; whilst on the other hand their abundant supply of chlorophyll enables them to endure adverse conditions better than less richly endowed plants can do.

Fig. 3 shows a transverse section of a leaf of *Cattleya intermedia* at the midrib. The cells of the upper part of the fundamental tissue are much elongated, approaching the palisade form and are filled with chlorophyll granules. The general structure compared with that of the *labiate* *Cattleyas* is simpler, thus affording another distinctive mark between the two-leaved and usually long-stemmed and the one-leaved short-stemmed *Cattleyas*. It is a remarkable fact too, that similar

sections of a leaf and stem of another two-leaved *Cattleya*, *C. velutina*, proved to be nearly identical in structure with those of *C. intermedia*.

Fig. 4, *Cattleya Mossie*. Here the minute structure is more elaborate,

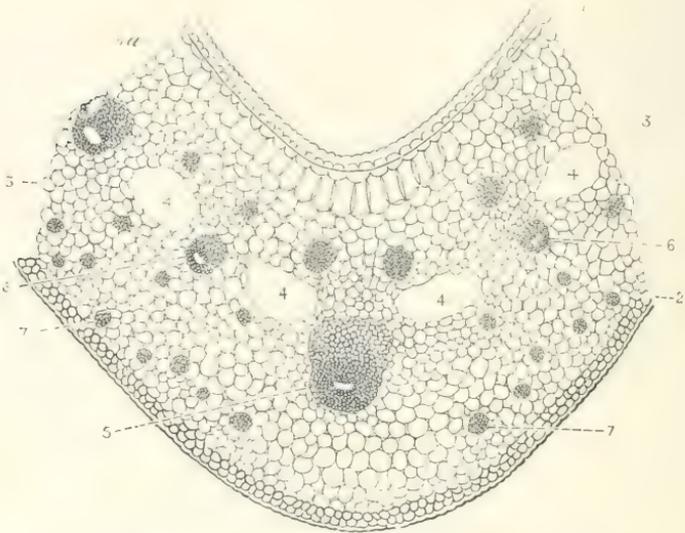


Fig. 4. Transverse section of leaf of *Cattleya Mossie* at the midrib.

1, upper, 2, lower epidermis; 3, parenchyma or soft tissue of the leaf sometimes called the mesophyll, containing chlorophyll granules (not shown in figure); the layer immediately under the upper epidermis indicated by 3a and called the hypoderm, consists of colourless cells containing water; 4, air cavities; 5, fibro-vascular bundle of midrib shown diagrammatically, the upper club-shaped portion consists of thick woody cells which serve to protect the more delicate tissue beneath; 6, smaller bundles (veins), running parallel with the midrib; 7, still smaller bundles (veinlets).

presumably indicative of the more changeable climatic conditions under which the plant grows. The leaf is thick and fleshy, the epidermal cells small and closely packed; the hypoderm or water cells are large; the

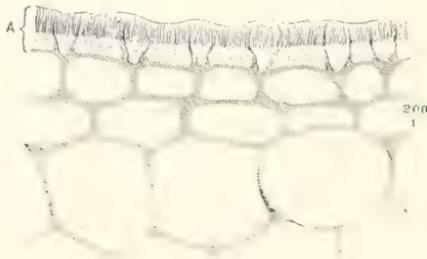


Fig. 5. Fragment of epidermis and underlying cells of *Cattleya Mossie* magnified 200 diameters; the outer surface of the epidermal cells is developed into a thick cuticular layer (A) covering the whole surface and which has a peculiar striated structure in the external half. This thick cuticle impedes excessive evaporation.

air cavities are also large and nearly equidistant from both surfaces; the fibro-vascular bundles are numerous and somewhat similarly grouped on each side of the principal or midrib-bundle. This structure may be

connected with the occurrence of a heavy rain-fall, which we know to be the case in its native home, and also exposure to direct sunlight. Fig. 5 is a fragment of the upper epidermis and underlying cells magnified 200 diameters to show the structure more clearly.

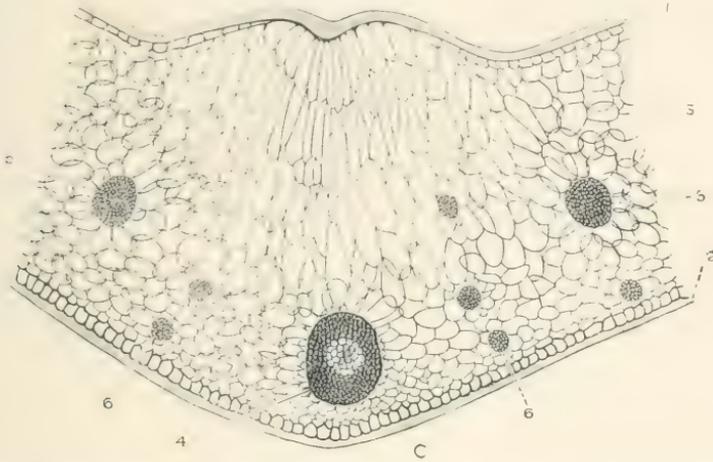


Fig. 6. Transverse section of leaf of *Lelia purpurata* across the midrib, enlarged 40 diameters.

1, upper, 2, lower epidermis, both with thickened cuticle; 3, parenchyma or soft tissue (mesophyll), containing chlorophyll granules (not shown in figure); 4, large vascular bundle of the midrib; 5, two smaller vascular bundles parallel with the midrib; 6, smaller vascular bundles (veinlets).

Fig. 6, *Lelia purpurata*. The thickened cuticle and elongated cells filled with chlorophyll imply a greater exposure to direct sun-light, and

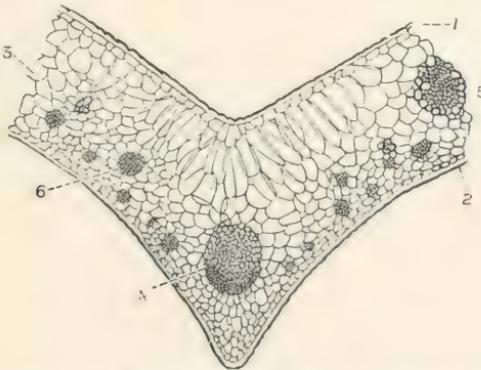


Fig. 7. Transverse section of leaf of *Odontoglossum crispum* at midrib, enlarged 50 diameters.

The numerals as before.

the smaller hypoderm, or water cells a shorter duration of the rainy season than in the case of *Cattleya Mossie*, the other circumstances remaining much the same.

Leaves of VANDEE.—Fig. 7, *Odontoglossum crispum*. Here the cuticular covering is thin, the capacity for resisting evaporation and the storage capabilities as regards water relatively small, and the fibro-vascular bundles numerous; circumstances that seem to point to the cultural

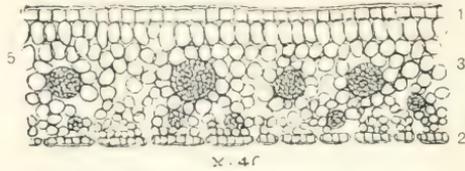


Fig. 8. Transverse section of leaf of *Bifrenaria Harrisonia*, X 40. The numerals as in Fig. 1. (From the *Gardeners' Chronicle*.)

treatment experience has proved to be the best, viz., diffused light and abundance of moisture. Fig. 8, *Bifrenaria Harrisonia*. The structure is essentially the same, and needs no detailed explanation further than to note the numerous small fibro-vascular bundles immediately above the lower epidermis; the leaf has thus a very stringy appearance when torn.

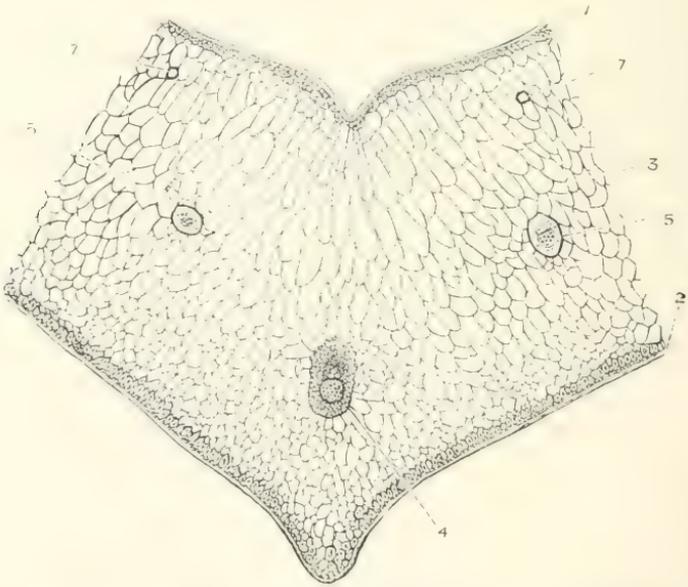


Fig. 9. Transverse section of leaf of *Vanda tricolor* at midrib, X 40 diameters. Nos. 1—5 as before; 7, bast-like fibres.

This structure indicates no necessity for direct solar exposure. *Lycaste Skinneri* has a similar but not an identical structure. Fig. 9, *Vanda tricolor*. Like most monopodial orchids, it comes from a locality where the temperature is always high and its fluctuations at a minimum, and

where the hygrometric conditions of the atmosphere are for the greater part of the year the most intense. Its leaf structure is thence adapted to these conditions; a thick cuticle and closely packed epidermal cells

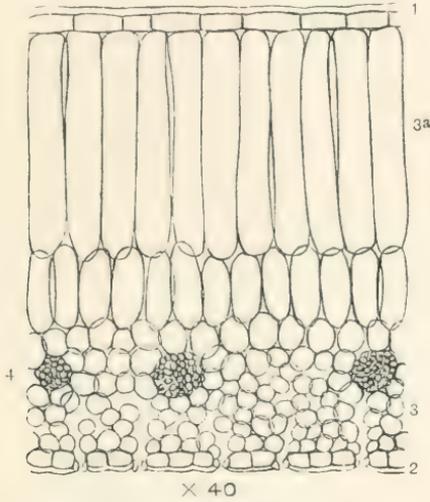


Fig. 10. Fragment of transverse section of leaf of *Cypripedium niveum*. 3a, elongated water cells; the other numerals as before.

(From the *Gardeners' Chronicle*.)

and numerous underlying elongated cells approaching the palisade form implying more or less exposure to a vertical sun, and also ample

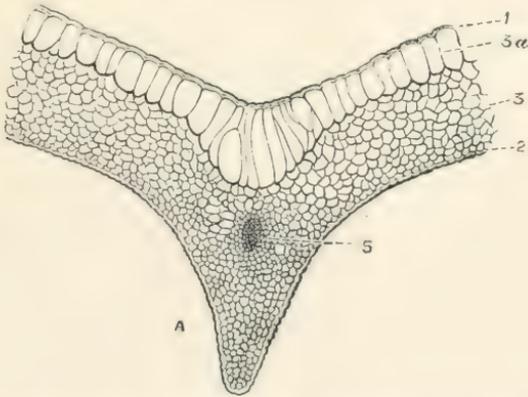


Fig. 11. Transverse section of leaf of *Cypripedium insigne* at the midrib, X 25. The numerals as before.

storage for water. The appearance of isolated bast-like fibre near the upper epidermis is significant of high development.

Cypripedium.—Fig. 10, *Cypripedium niveum*. The layer of long vertical prism-like cells underlying the epidermis might be mistaken

for palisade structure, but they contain no chlorophyll, and are colourless and filled with water. Beneath them is the chlorophyll layer of ovoid or globular closely packed cells, in the midst of which are the fibro-vascular bundles; the cells beneath these contain a purplish colouring fluid. Fig. 11, *C. insigne* closely resembles *C. niveum*, except that the cells of the mesophyll tissue are more uniform, and the lowermost contain no colouring fluid. Shade and a copious supply of water are the cultural indications to be derived from this structure.

Stems.—Transverse sections of the stems of orchids show generally the normal monocotyledonous structure. There is a well-marked epidermis consisting in stems of more than one year's duration of closely packed cells, covered by a hard cuticle more or less thickened; underlying the epidermis is a belt of corky tissue enclosing the central mass of parenchyma, the cells of which are soft and thin-walled; and in the last-named tissue are imbedded the fibro-vascular bundles more or less

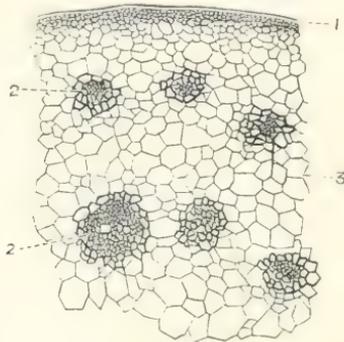


Fig. 12. A fragment of transverse section of stem of *Dendrobium nobile*, enlarged 30 diameters.
1, epidermis; 2, fibro-vascular bundles; 3, fundamental tissue.

isolated as shown in diagram of transverse section of stem of *Laelia purpurata* (Fig. 13A). In addition to these there is in some cases a layer of corky tissue developed between the epidermis and the fundamental tissue as shown in Figs. 14 and 15. Like the fibro-vascular bundles of the leaves those of the stem always consist of at least two elements, one of thin-walled cells called the bast or phloem, and the other, the xylem, of more or less elongated, thick-walled (prosenchymatous) cells that become hard and ligneous. The bundles of the stems are much more closely packed and usually of larger size than those of the leaves, and fill up a great part of the central mass that is surrounded by the corky tissue and impart to old stems their hard and ligneous texture. In the pseudo-bulbous and swollen stems of many orchids occur many cells rich in mucilage and others which are especially adapted for the retention of water and as storage for reserve material to be utilised by new growths.

The general structure of the stems of orchids will be readily understood from the annexed sections made from four species well known in cultivation. The development of a stem of a monopodial orchid is shown by transverse sections of the stem of *Vanda tricolor* (Figs. 14 and 15) at three successive periods of growth, and to give a clearer idea of the form of the individual cells fragmentary sections both transverse and longitudinal are given of the stem of *Cattleya intermedia* enlarged 200 diameters (Fig. 16).

Roots.—The general structure of the roots of orchids is described under the vegetative organs. As regards the minute structure the main

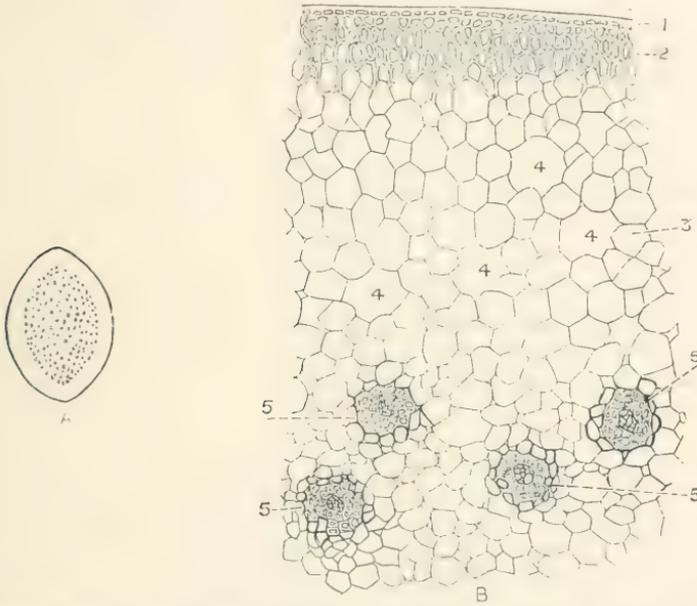


Fig. 13. Transverse section of stem of *Leelia purpurata*. A, enlarged 2 diameters. B, a fragment of the same enlarged 40 diameters.

1, epidermis; 2, hypodermal layers of thick-walled cells; 3, fundamental tissue; 4, air cavities in the fundamental tissue; 5, fibro-vascular bundles or woody fibres of the stem.

features are the same as those of other monocotyledonous plants. There is (1) an epidermis, not always well defined, and beneath this (2) a band of cortical tissue, which is much more developed in some genera than in others, and in aërial more than in terrestrial roots; in the former it consists of comparatively large thin-walled cells filled with water, and often with a fine spiral thread coiled within them. Underlying the cortical tissue is a layer of thick-walled cells (3) called the endodermis enclosing (4) the fundamental tissue of the root; and lastly there is (5) the axial cylinder consisting of bast and wood with ligneous

parenchyma and parenchymatous tissue composed of thin-walled cells. The details of the minute structure of the roots of orchids are well shown

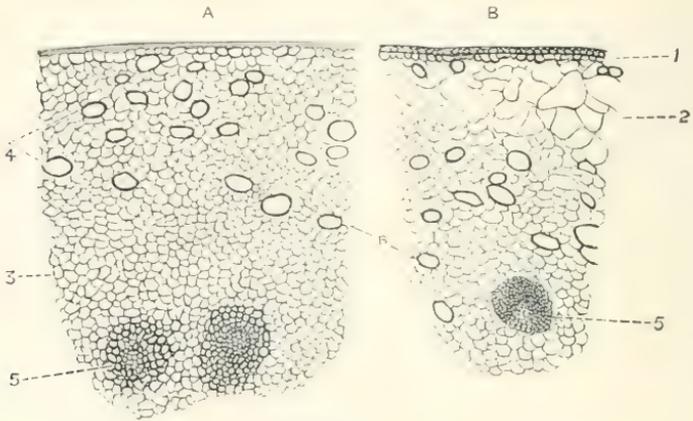


Fig. 14. Fragments of transverse sections of the young stem of *Vanda tricolor*.

A, near the apex, with one layer of epidermal cells only. B, $1\frac{1}{2}$ inch below A, showing epidermis with two layers of cells and the commencement of the formation of corky tissue.

1, epidermis; 2, corky tissue developing from fundamental tissue; 3, fundamental tissue 4 and B, bast-like cells; 5, fibro-vascular bundles.

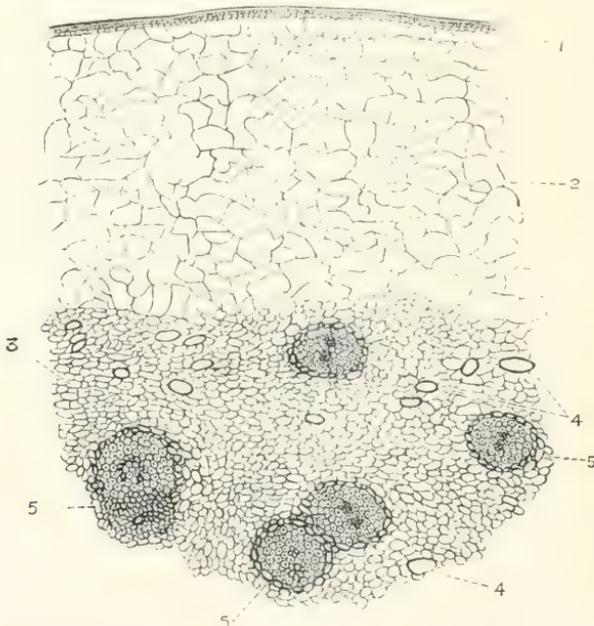


Fig. 15. Fragment of transverse section of older portion of stem of *Vanda tricolor* with (2) corky tissue well developed. 4, isolated bast-like cells.

in the accompanying sections selected from genera in different Tribes, and which may be regarded as fairly representative types of each.

The presence of chlorophyll in the aerial roots of orchids is noteworthy, and shows that the roots in these cases perform to some

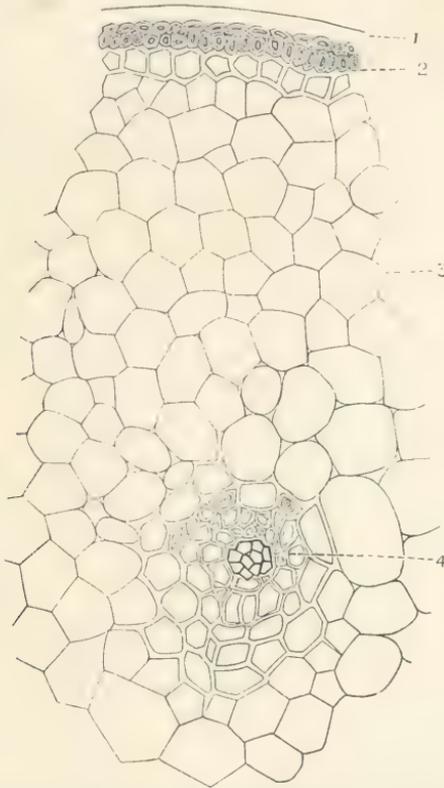


Fig. 16. Fragment of transverse section of stem of *Cattleya intermedia*, enlarged 200 diameters. 1, epidermis of one layer of thick-walled cells overlain by thickened cuticle; 2, hypodermis of large thick-walled cells; 3, fundamental tissue of soft thin-walled cells; 4, a vascular bundle.

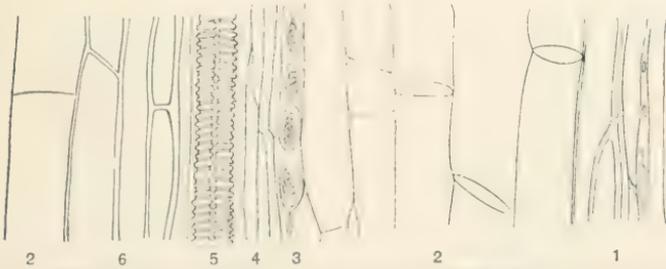


Fig. 17. Longitudinal section of a fragment of stem of *Cattleya intermedia*, from epidermis through a fibro-vascular bundle, X 200. 1, cuticle epidermal and hypodermal cells; 2, fundamental tissue of soft thin-walled cells; 3, a row of short thick-walled cells with granular protoplasmic contents; 4, woody fibre; 5, two contiguous spiral vessels; 6, parenchyma.

extent the same functions as the leaves. Ordinary roots contain no chlorophyll.

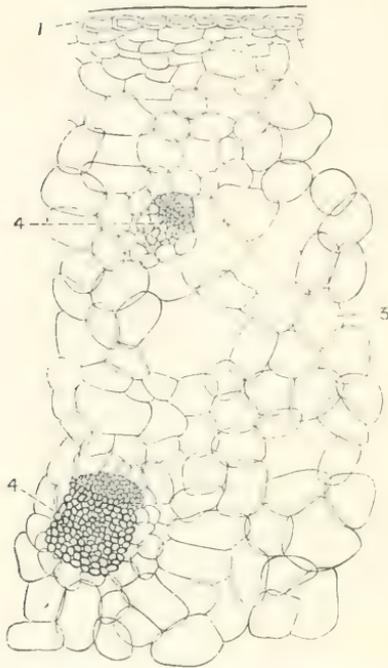


Fig. 18. Transverse section of fragment of pseudo-bulb of *Odontoglossum crispum*, enlarged 50 diameters. 1, epidermis; 3, fundamental tissue; 4, fibro-vascular bundles.

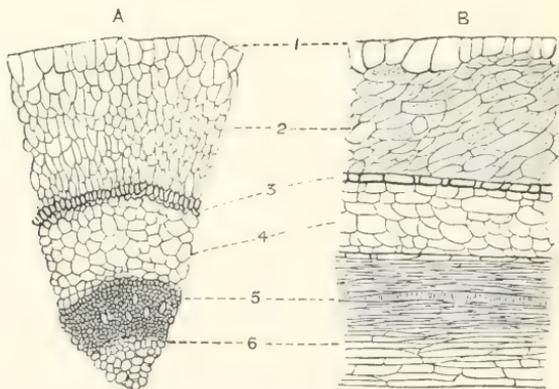


Fig. 19. A, transverse, B, longitudinal horizontally-placed section of root of *Dendrobium nobile*, from the circumference to the centre, enlarged 30 diameters.

1, epidermis; 2, cortical tissue of thin-walled cells; 3, endodermis; 4, fundamental or cellular tissue; 5, axial cylinder; 6, central pith.

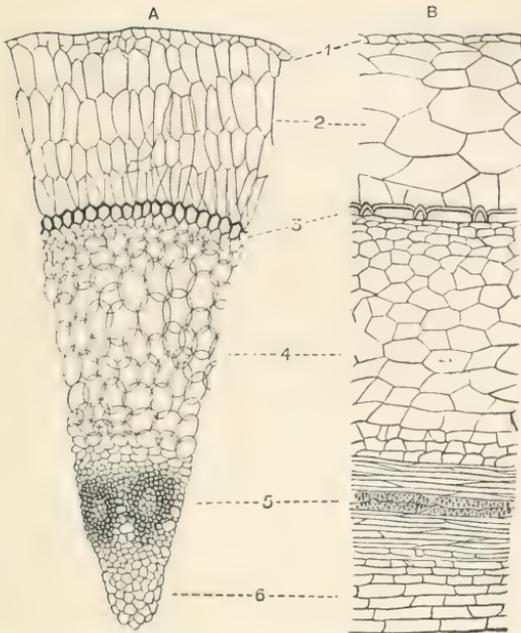


Fig. 20. A, transverse, B, longitudinal section of root of *Cattleya intermedia*, from the circumference to the centre, shown in a horizontal position, enlarged 30 diameters. The numerals as in Fig. 19.

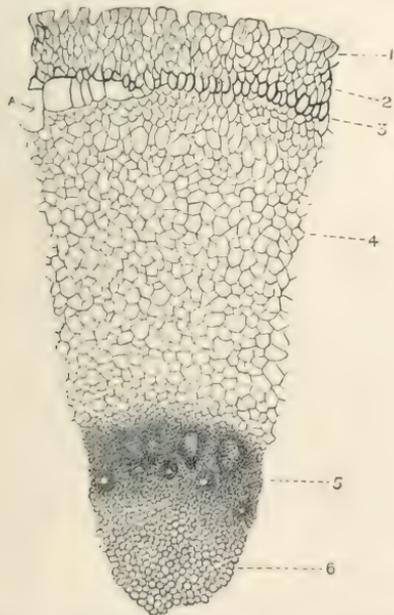


Fig. 21. A similar transverse section of root of *Vanda tricolor*, enlarged 25 diameters, showing development of corky tissue at A.

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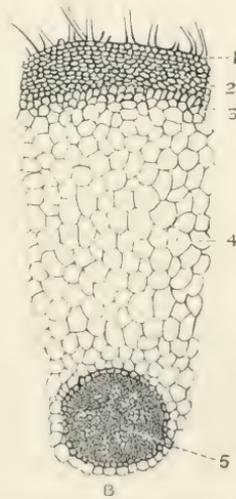


Fig. 22. Fragment of transverse section of root of *Cypripedium insigne*, from the circumference to the centre, enlarged 25 diameters.

1, epidermis with root hairs; 2, cortical tissue; 3, endodermis; 4, fundamental or soft tissue of root; 5, axial cylinder of vascular bundles surrounding a central pith.

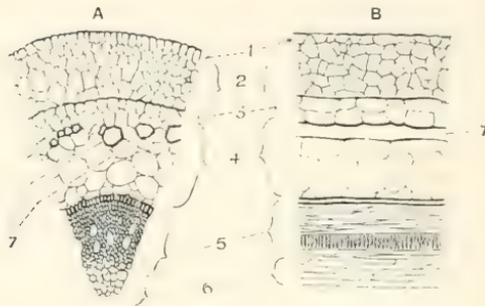


Fig. 23. A, transverse, B, longitudinal section of root of *Odontoglossum crispum* horizontally placed. 1, epidermis; 2, cortical tissue of thin-walled cells; 3, endodermis, consisting of a layer of cells with thickened walls surrounding; 4, the fundamental tissue of the root; 5, vascular bundles of the axial cylinder, forming the hard-wood tissue of the root; 6, the pith; 7, bast cells.

FERTILISATION.

One great inducement to the cultivation of epiphytal orchids is the length of time the flowers of most of the species continue in perfection after expansion. It is generally known that with some exceptions to be presently noticed, the cause of this duration is owing to their never becoming fertilised unless by some external agency; they thence retain their attractiveness day after day awaiting the event for which they were created, but which under the circumstances of their environment rarely takes place unless artificially effected by the hand of the hybridist, or if, perchance, a bee attracted by the scent or colour of the flowers, enters the house in quest of honey, and alighting on the labellum makes its way to the nectary, removes the pollinia from one flower and deposits them on the stigma of another. The annexed figure represents a bee caught in our *Cattleya* house a few years ago, when



a goodly number of plants of *Cattleya Mossiae* were in bloom and also several plants of *Odontoglossum citrosimum*; the pollinia on the head of the insect are those of the *Odontoglossum*; on the thorax between the wings are those of the *Cattleya*.*

* A plant of *Cattleya Mossiae* in a garden near Halifax is reported in the *Gardeners' Chronicle* of 1855, p. 614, to have borne three capsules whose fertilisation was ascribed to some bees that were observed flying about in the greenhouse in which the plant was suspended. The flowers of *Cattleya Mossiae*, as is well known, are delightfully fragrant, and honey is excreted from the base of the column.

To make a slight digression—It may be here stated that the duration of some orchid flowers is very remarkable; *Grammatophyllum multiflorum* retains its flowers with scarcely any perceptible change of colour for nearly one-third of the year; the flowers of some of the recently introduced Dendrobes with elongated spathulate petals (*D. Stratiotes*, *D. Strebloceras*), to which may be added *D. Dearei* and a few other eastern Malaysian species, continue in perfection for upwards of three months; many Cypripedes persist from six to eight weeks according to the season of the year, while the leathery flowers of some Vandas, Cymbidiums, and of other genera last nearly as long; the wax-like flowers of *Aërides* and *Saccolabium* generally retain their beauty from three to four weeks; and in the cooler atmosphere of the *Odontoglossum* house the *Odontoglots*, *Oncids* and brilliant *Masdevallias* lose none of their gorgeous tints for as long a period. The duration of orchid flowers, apart from the absence of any fertilising agent is, however, influenced by the texture of their perianth segments; the delicate sepals and petals of the labiate *Cattleyas*, *Thunia*, *Sobralia*, *Pleione*, some of the *Phalænopses*, etc., succumb to the damp and heat of their environment sooner than those endowed with firmer texture. But whether the duration of the flowers be longer or shorter, the essential cause is the same, and this we now proceed to consider.

The evidence of the incapacity of most orchid flowers for self-fertilisation afforded by the common observation of their failure to do so under the artificial circumstances in which they are placed in this country, is rendered conclusive by an examination of their structure and of the various contrivances by which their fertilisation is effected. These contrivances, as Mr. Darwin has most eloquently and distinctly proved, “are as varied and almost as perfect as many of the most beautiful adaptations in the animal kingdom,”* but they have for their main object not the fertilisation of each flower by its own, but by the pollen of another flower. The agency by which this is effected is provided by the INSECT WORLD, and it has been abundantly demonstrated from direct observation that the flowers of the greater number of species of our native orchids are fertilised by the insects visiting them, and the process by which this is accomplished has been accurately described not only by Mr. Darwin but also by others who have followed in his footsteps.†

* *Fertilisation of Orchids*, p. 1.

† The earliest observer of the fertilisation of orchid flowers by insects was Christopher Konrad Sprengel. This remarkable man, the son of a clergyman, was born at Brandenburg in 1750. From 1774 to 1780 he was employed as a teacher in Berlin when he obtained the appointment of Head Master of the school at Spandau. During his residence at

The elaborate and interesting account which Mr. Darwin has given of his own observations and of the experiments he made to satisfy himself of the correctness of those observations and the conclusions which he drew from them are given in his oft quoted delightful work on *Fertilisation of Orchids*. He also proved that the fertilisation of many epiphytal orchids must depend on a similar agency, and he has described several interesting experiments which he made with flowers grown in the glass-houses of this country. Although we may safely conclude from these experiments and from their failure to set capsules under cultivation that a vast majority of the epiphytal orchids, especially those with large and showy flowers, in order to perpetuate themselves by seed must be fertilised by the aid of some external agent, it by no means follows that in a wild state all or even a considerable percentage of them are so fertilised. Actual observation in their native homes can alone determine the facts, and this has yet to be undertaken. Almost the only reliable information at hand has been supplied by Mr. H. O. Forbes, whose observations were limited to one small locality and to a comparatively few species. These observations, however, tend to show that a larger number of orchids are self-fertilising than was previously suspected, and of those for which insect aid is necessary a large proportion of the flowers remain sterile.*

Mr. Forbes' observations were carried on at Kosala, in West Java. Of the species with large flowers which possessed no visible means of self-fertilisation, a plant of *Cymbidium stapelioides* bore but one capsule, *Dendrobium crumenatum* had one capsule for every sixty flowers, and *Calanthe veratrifolia* also about one to every sixty flowers; Vandas also had but very few capsules. On the other hand fifteen species are named that are habitually self-fertilising, including *Phaius Blumei*, a geographical form of the widely dispersed *P. grandifolius*. From this very restricted range of observations and connecting with it the number of British orchids ascertained by Darwin to be self-fertilising, Mr. Forbes was led to conclude that the flowers of terrestrial orchids are more liable to self-

Spandau he devoted all his spare time to botanical pursuits, watching the wild flowers of the district at all seasons and in all weathers with unremitting patience and perseverance. In 1793 he published his curious and valuable work entitled *Das entdeckte Geheimniss der Natur* (The discovered Secret of Nature), containing the result of his labours. The little attention given to this work by men of science and the public generally seems to have greatly embittered him, for after its publication he abandoned botanical pursuits altogether, and returned to his former philological studies. He died in 1816.

* Journ. Linn. Soc. XXI. p. 538.

fertilisation than epiphytal ones, and that a large number of the latter never set capsules; but from such incomplete data it is evident that no just conclusion can be arrived at.

The number of self-fertilising orchids is, however, considerable, and additions to the list are frequently being discovered, but the total number of known cases is still an almost infinitesimal fraction of the whole number of species contained in the great Orchidean family. Mr. Darwin mentions ten species in *Fertilisation of Orchids*, Mr. Forbes adds those cited above and a few others; the late Mr. Fitzgerald, the author of the excellent monograph of Australian Orchids, and other observers have added to the list; and lastly, Mr. H. N. Ridley, in some notes published in the Journal of the Linnean Society* gives four others which he had himself examined, including *Trichopilia fragrans*, which although frequently is not constantly self-fertilising. Mr. Ridley also expresses his belief that among the small green-flowered orchids of the tropics many more instances may be found. In the four species to which his notes are chiefly confined, Mr. Ridley traces the cause of self-fertilisation, or Cleistogamy as it is technically called, and proceeds to describe four common methods by which this is effected; to these methods we shall again refer.

The epiphytal orchids observed in our houses to be cleistogamic or self-fertilising fall under two categories—those that are habitually so, and those that are not constantly self-fertilising. In the first category are *Chysis aurea*, Lindl., probably the first observed instance of cleistogamy among epiphytal orchids; *Dendrobium chryseum*, Rolfe, one of the subjects of Mr. Ridley's notes; an Australian form of *Phaius grandifolius*, figured in the *Botanical Magazine*, t. 6032, under the name of *P. Blumei Bernaysii* (thus in a measure confirming Mr. Forbes' observations on the Java form of the same species, but we have never observed the typical *P. grandifolius* to be cleistogamic); to these must be added *Lælia virens*, Lindl., *Acanthephippium Curtisii*, Rchb., an inferior variety of *Dendrobium Brymerianum* from Upper Burnah, and *Cypripedium* (Selenipedium) *Schlimii*, Batem.† In the second category—those observed to be occasionally cleistogamic are *D. cretaceum*, Lindl., *D. aqueum*, Lindl., *D. crepidatum*, Lindl.; and among hybrids, *Epidendrum* × *Obrienianum* and *Calanthe* × *Gigas* have set capsules apparently without any external aid. In the case of *Cypripedium Schlimii* and *Epidendrum* × *Obrienianum* seedlings have been raised from the capsules so produced, and the resulting progenies have conformed strictly to the parent plants.‡

* Vol. XXIV. p. 389.

† On the self-fertilisation of this species, see *Cypripedium*, p. 68.

‡ *Epidendrum variegatum*, occasionally seen in orchid collections, has been observed by Mr. Hart, Superintendent of the Botanic Garden, Trinidad, to be cleistogamic in a wild state. In a communication to the *Gardeners' Chronicle* (XXVI., 1886, p. 11), he shows how self-fertilisation is effected in this species.

Of the known causes that occasion self-fertilisation Mr. Ridley describes four of the commonest. 1, by the breaking up of the pollen masses and the falling of the dust either directly upon the stigma or into the lip, whence it comes into contact with the stigma. This can happen only in the case of orchids with pulverulent pollen as in *Cypripedium Schlimii* and the terrestrial kinds as *Ophrys*, *Neottia*, *Thelymitra*, etc. 2, by the falling of the pollen masses as a whole from the clinandrium into the stigma. This happens in the case of *Phaius grandifolius Bernaysii* and probably others. 3, by the falling forward of the pollinia from the clinandrium or anther cap, the caudicle and gland remaining attached to the column. Our native Bee Orchis, *Ophrys apifera*, is a well-known instance of this. 4, by the flooding of the stigma. The pollen masses remain in the anther cap while the stigma exudes so great a quantity of stigmatic fluid that it eventually reaches the edge of the pollinia which immediately emit pollen tubes. This is the case with *Chysis aurea*, *Laelia virens*, *Dendrobium aqueum* and probably others mentioned above; it seems to be the commonest method of self-fertilisation.

We cannot conclude our notes on the self-fertilising of orchids more appropriately than by quoting Mr. Darwin's own words.

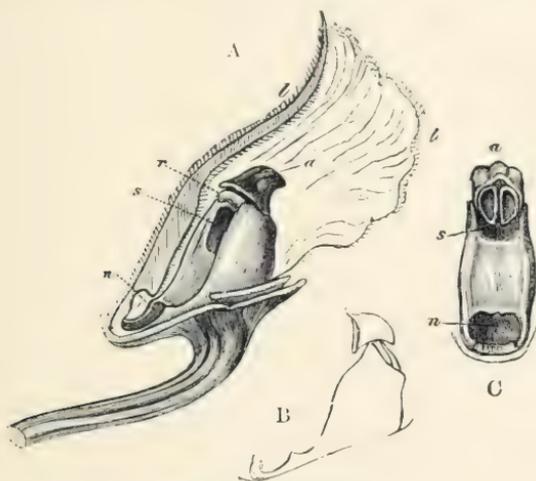
"Considering how precious the pollen of orchids evidently is and what care has been bestowed on its organisation and on the accessory parts; considering that the anther always stands close behind or above the stigma, self-fertilisation would have been an incomparably safer process than the transportal of the pollen from flower to flower. It is an astonishing fact that self-fertilisation should not have been an habitual occurrence. It apparently demonstrates to us that there must be something injurious in the process. Nature thus tells us in the most emphatic manner that she abhors perpetual self-fertilisation." *

Reverting again to the manifold and wonderful contrivances to be found in orchid flowers which subserve their fertilisation, we have in the Synopses of the Genera and Species occasionally noted peculiar structures which could have been designed for no other end.† From the many instances so lucidly described by Mr. Darwin we select one, *Dendrobium chrysanthum*, which, as he has pointed out, is interesting from being apparently contrived to effect its own fertilisation if an insect should accidentally fail to remove the pollen masses. By the kindness of the proprietors and publishers of *Fertilisation of Orchids* we are enabled to reproduce the original figure of this species showing how this is effected.

* *Fertilisation of Orchids*, p. 359.

† *Coryanthes macrantha*, p. 106; *Oncidium hians*, p. 44; also *Stanhopea*, *Mormodes*, etc.

"The rostellum has an upper and a small lower surface composed of membrane; and between these a thick mass of milky white matter is included, which can be very easily forced out. This white matter is less viscid than usual; when exposed to the air, a film forms over it in less than half a minute, and it soon sets into a waxy or cheesy substance. Beneath the rostellum the large concave but shallow viscid stigmatic surface is seated. The produced anterior lip of the anther (see Fig. A) almost entirely covers the upper surface of the rostellum. The filament of the anther is of considerable length but is hidden in the side view A behind the middle of the anther; in Fig. B it is seen after it has sprung forward; it is elastic and presses the anther firmly down on the inclined surface of the clinandrium which lies behind the rostellum. When the flower is expanded the four pollinia united



Dendrobium chrysanthum.

A. Lateral view of flower with the anther in its proper position before the ejection of the pollinia. All the perianth segments are removed except the labellum which is longitudinally bisected.

B. Outline of column viewed laterally after the anther has ejected the pollinia.

C. Front view of the column showing the empty cells of the anther after it has ejected its pollinia. The anther is represented hanging too low and covering more of the stigma than it really does.

a, anther; r, rostellum; s, stigma; l, labellum; n, nectary.

into a single mass lie quite loose in the clinandrium and under the anther case. The labellum embraces the column, leaving a tubular passage in its front; the middle portion is thickened as shown in Fig. A; the thickened portion extends up as far as the top of the stigma. The lower part of the labellum is developed into a saucer-like nectary which secretes honey.

"If an insect found its way into one of these flowers, the labellum which is elastic would yield, and the projecting lip of the anther would protect the rostellum from being disturbed; but when the insect retreats, the lip of the anther will be lifted up and the viscid matter

of the rostellum will be forced into the anther, gluing the pollen masses to the insect which will transport it to another flower. If this action be imitated artificially, by inserting the point of a pencil for instance, then owing to the inclination of the base of the clinandrium and to the length and elasticity of the filament, when the anther is lifted up it is always shot over the rostellum and remains hanging there, with its lower empty surface suspended over the summit of the stigma (Fig. C). The filament now stretches across the space which was originally covered by the anther (*see* Fig. B). If after having cut off all the perianth segments, the flower be laid under the microscope, and the lip of the anther be raised by a needle without disturbing the rostellum, the anther may be seen to assume, with a spring, the position represented sideways in Fig. B, and frontways in Fig. C. By this springing action, the anther scoops the pollen mass out of the concave clinandrium and pitches it up in the air with exactly the right force so as to fall down on the middle of the viscid stigma where it sticks.

“Under nature, however, the action cannot be as thus described, for the labellum hangs downwards, and to understand what follows the drawing should be placed in an almost reversed position (nearly upside down). If an insect failed to remove the pollinia by means of the viscid matter from the rostellum, the pollinia would first be jerked downwards on to the protuberant surface of the labellum placed immediately beneath the stigma. But it must be remembered that the labellum is elastic, and that at the same instant that the insect in the act of leaving the flower lifted up the lid of the anther and so caused the pollen masses to be shot out, the labellum would rebound back and striking the pollen masses would pitch them upwards so as to hit the sticky stigma.

“This view of the use of the elastic filament, seeing how complicated the action must be, may appear fanciful; but we have seen so many and such curious adaptations that one cannot believe the strong elasticity of the filament and the thickening of the middle of the labellum to be useless points of structure. If the action be as above described, it might be an advantage to the plant that its pollen masses should not be wasted if they failed to adhere to an insect by means of the viscid matter from the rostellum.”* This contrivance is not common to all the species of *Dendrobium*.

The time that elapses from the pollination of the flower to the fertilisation of the ovules and thence to the maturing of the seed capsules varies considerably in the different genera and even in species belonging to the same genus. It was one of the discoveries

* *Fertilisation of Orchids*, pp. 172—177. In the text Mr. Darwin uses the words pollinium and pollen mass as if this species had but one, but it really has four like all other species of *Dendrobium*.

of Robert Brown that at the time of the expansion of an orchid flower the ovules are only in a rudimentary state, consisting merely of minute papillæ projecting from the pulpy surface of the placenta.* The application of the pollen to the stigma must have a twofold effect before the seeds can be perfected, first as a stimulant to induce the maturity of the ovules, secondly to fertilise them by means of the pollen tubes. It thence frequently happens, at least where artificial means are employed, that the application of alien pollen, the pollen of a different species and especially of a species belonging to a different genus may bring about the first but fail to effect the second, a circumstance that hybridists would always do well to bear in mind. Under the artificial circumstances in which tropical orchids are placed in the glass-houses of this country the period for both processes extends over several months, which is known to be much longer than is required in their native countries.

The chief causes of this prolongation is the deficiency of direct sunlight, especially in the winter when the sky is not only obscured by clouds often for several days in succession, but with the diminished altitude of the sun there is a corresponding diminution of intensity and potentiality in his rays. The capsules neither can nor do attain the perfection natural to them in their native countries, and it is more than probable that they yield but a fractional part of the quantity of good seed.

In the absence of direct observation, the time required by species of epiphytal orchids to mature their capsules in their native home can only be approximately surmised from the times ascertained for the same species cultivated in the glass-houses of Europe. The earliest recorded observations of these times were made by Dr. Hildebrandt, in the Botanic Garden at Bonn, during the spring of 1863, and the results of his observations were published in Mohl and Schlechtendal's *Botanische Zeitung*, Nos. 44 and 45 of the same year. From these results we glean the following interesting facts:—

The first species selected was *Dendrobium nobile*, on account of its numerous large flowers supplying favourable subjects for accurate observation. A large number of these were pollinated in the first and second weeks in January, and one of them was examined by making transverse and longitudinal sections of the ovary at intervals of every two days. Some flowers were fertilised with their own pollen, and others with the pollen of a different flower, but no

* Observations on the Organs and Modes of Fecundation, p. 14.

discernible difference was observed in the result. The unfertilised flowers of *Dendrobium nobile* continue in perfection from twenty to thirty days according to external circumstances; the perianth of the fertilised flowers began to fade in two days after pollination; the upper part of the column began to thicken and gradually to become hemispherical in shape. Before the expiration of twenty days numerous pollen tubes began to descend into the ovary and to take a position alongside the placentas in six strong bundles, one on each side of the three placentas; the ovary itself thickened and lengthened from day to day with a corresponding development of the placentas. After the twentieth day each placenta divided into two ridges, each of which had produced numerous outgrowths in the form of minute papillæ, but as yet without a trace of a true ovule. At the end of two months, however, the placentas were covered with numerous ovules in different stages of development, the pollen tubes still lying fresh on each side of the placentas; the capsule had attained nearly its full size, but was still succulent and green. In from four to five weeks more the ovules were fully developed, and quite filled up the cavity of the ovary; the embryo-sac and its nucleus were distinctly discernible. Another ovary examined on April 22nd showed that although the ovules had considerably lengthened and the embryo-sac and its nucleus were enlarged, no pollen-tubes had yet made their way through the micropyles of the ovules. By the 12th of May the formation of the embryo had begun, the ovules had reached the size of the ripe seed and many of them had divided into two and three cells; only a few decomposed remains of the pollen-tubes were found. This proved that the period between pollination of the flower and the fertilisation of the ovary of *Dendrobium nobile* is about four months. In another fortnight nearly all the ovules were furnished with embryos, and the capsules subsequently ripened.

Similar investigations carried on simultaneously with those made of the fructification of *Dendrobium nobile* showed that in *Phaius grandifolius* the period from pollination to the fertilisation of the ovule is about two months, and in *Cypripedium insigne* about four months.* And in the case of some of the hardy terrestrial orchids the remarkable fact was elicited that their fructification is effected in a very much shorter time; thus, the period from pollination to the fertilisation of the ovules of *Listera ovata* (Tway-blade), *Neottia Nidus-avis*, and *Orchis pyramidalis* is only eight or nine days, and of *Gymnadenia conopsea*, *Orchis Morio* and *O. maculata* about a fortnight. The great difference in the periods of fertilisation between our native species and the epiphytal orchids is ascribed by Dr. Hildebrandt chiefly to climatic causes.

Dr. Hildebrandt's investigations were directed chiefly towards the

* The capsule of *Cypripedium insigne* is not ripe till several months afterwards.

ascertainment of the time that elapsed from the pollination of the flower to the fertilisation of the ovule, the remaining time necessary to complete the maturation of the capsule seems to have been regarded by him as a matter of subordinate interest, important as it is from a cultural point of view; this epoch is by no means easy to determine precisely, for although the dehiscence of the capsule may be selected as the epoch of maturity, experience has long since shown that under the artificial conditions in which cultivated plants are placed, the seeds are often in a fit state to germinate some time before the capsule dehisces. In our houses the time required for maturing the capsules of the *Cattleyas* of the *labiata* race ranges from eleven to thirteen months; for *Laelia purpurata* it is about nine months; for *Phalænopsis Schilleriana* six months, *Cypripedium Spicerianum* eleven to twelve months, *C. insigne* ten months, *Odontoglossum maculatum*, *Dendrobium aureum*, *Anguloa Clowesii*, *Chysis bractescens* and *Bijrenaria Harrisonie* each about twelve months, *Masdevallias* about four months, and *Calanthes* of the *VESTITE* section from three to four months. These periods are, however, only approximate; the time required for the ripening of the capsules is considerably influenced by the state of the weather and other external circumstances, especially by the amount of direct sunlight; in the warmer and drier climate of Paris the periods are somewhat shorter.

With the object of determining more accurately, if possible, the processes that take place from the pollination of the flower to the maturation of the capsules, a series of investigations were made in our houses in 1885-87. The subject selected for this end was the well-known *Cattleya labiata* var. *Mossie*, Lindl., because we could command a large number of plants for the purpose; and because also the column and its parts are among the largest to be found in the *ORCHIDEE*, the probability of obtaining useful results would thence be the greater. These results were formulated in a paper read before the Linnean Society in February, 1888, and from it we select the most salient points; to enable the reader to obtain a clear comprehension of these the following structural details are necessary.

The annexed figure (1) represents a front view of the column and ovary of *Cattleya labiata* var. *Mossie* a few days after the expansion



Fig. 1.

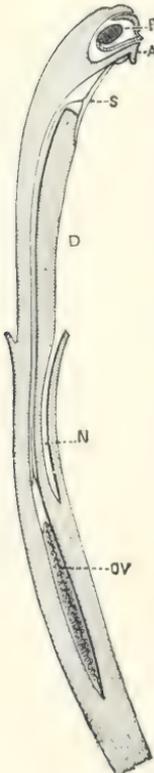


Fig. 2.

of the flower. From the apex or top of the anther *A* to the base of the ovary it is nearly three inches long, although shown upright in the figure it slightly arches forward from below the stigma *s* to the apex; the part so bent is thence parallel with the labellum, which is in fact appressed to it and enfolds it with its side lobes, a circumstance that immensely facilitates the pollination of the stigma by insect agency. The stigmatic cavity is separated from the anther by a tongue-shaped rostellum *R*; the stigmatic surface is coated with a thick layer of transparent viscid matter which holds the pollinia when applied to it with extraordinary tenacity. The pollinia are four in number; each pollinia or pollen-mass is a waxy flattened disk nearly the shape of an artist's pallet; the pollinia are attached to semi-transparent ribbon-like appendiculæ, which are also covered with pollen grains. The ovary is cylindric and is traversed longitudinally by three equidistant sunk lines. Figure 2 represents a longitudinal section of the column and ovary, twice natural size, in which the position of the pollinia, rostellum and stigma are shown by the letters *P*, *A* and *s* respectively; *D* is the duct or canal leading from the stigma to the ovary and down which the pollen tubes pass; this canal in transverse section has the form of a W-shaped curve extending through the central part of the column where it is thickest; it is filled throughout with conducting tissue of very loose consistency, and formed of greatly elongated cells overlapping at their ends. The narrow slit at *N* is the nectary that penetrates into the ovary and in which honey is freely secreted; *ov* is the immature ovary; the parts of the ovary are shown more distinctly in fig. 3 of a transverse section twelve times enlarged. Each placenta at this early stage consists of two thickened plates; the papillæ that ultimately develop into ovules are placed along the projecting angles of these plates. The W-shaped duct along which the pollen tubes pass in their passage from the stigma to the ovary is shown in fig. 4, a section of the column made just below the stigma, and like the preceding figure twelve times enlarged.

On the 1st of June, 1885, forty-five flowers of *Cattleya Mossie* were selected for pollination; these flowers were divided into three sets of fifteen each, of which one set was fertilised with their own pollen, a second set with pollen of different flowers but of the same variety, the third set with the pollen of flowers of a different species, *Lælia purpurata*, the whole of the pollinia being applied

in every case. The object of so varying the circumstances was to ascertain whether the fertilisation of the ovules and subsequent ripening

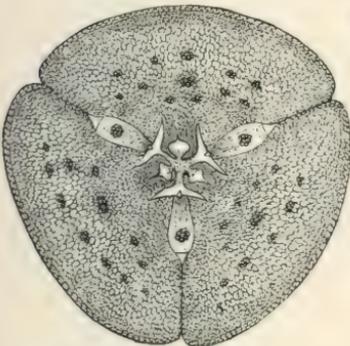


Fig. 3. Transverse section of ovary of *Cattleya Mossie*.

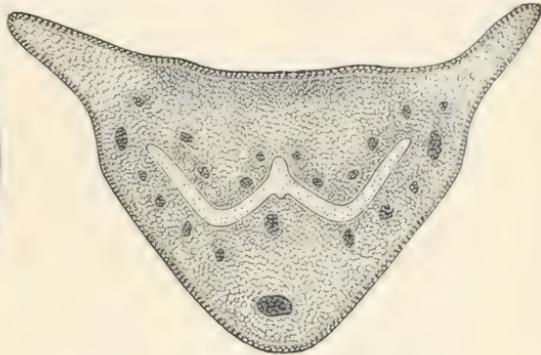


Fig. 4. Transverse section of column. Both twelve times enlarged.

of the seed would be in any way differently influenced or affected thereby. It may here be stated that in the sequel no essential differences were observable. Two days after the operation, the floral segments had already become flaccid and showed signs of rapidly withering. Under the usual cultural treatment the flowers of *Cattleya Mossie* retain their freshness for upwards of three weeks and even longer in cloudy weather; hence the effect of pollination on the floral segments becomes perceptible in a few hours. The pollinia were found to be in course of disintegration, forming with the viscid secretion from the stigma a gelatinous

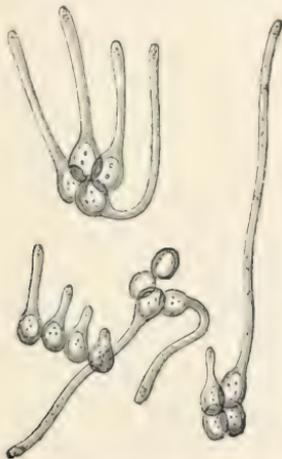


Fig. 5. Groups of pollen granules and tubes. Enlarged 250 times.

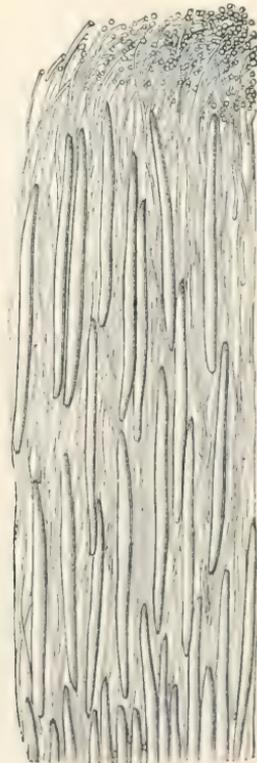


Fig. 6

mass that quite filled up the stigmatic cavity. On examination under the microscope the pollinia were found to be breaking up into groups, generally of four granules, from some of which short tubes had already protruded. Four of these groups as seen under the highest power at our disposal (that is, magnified 250 times) are shown in Fig. 5. After a further interval of six days the floral segments had become quite withered, the epidermis of the column had become dull purple along the ridge, the tubes emitted from the pollen granules had increased immensely in numbers, and the foremost could be traced as far as the base of the column. Fig. 6 represents roughly the state of affairs at this epoch; the pollen-tubes as observed under a magnifying power of about 75 diameters are here seen passing downwards in vast numbers among the elongated cells of the conducting tissues.

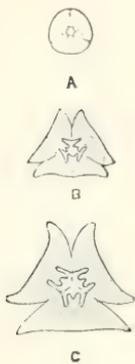


Fig. 7.

The changes that take place in the ovary during the first month after the pollination of the flower are shown in Fig. 7 by transverse sections natural size in three different and successive stages of development, A at time of pollination, B a fortnight later. The change of form that had taken place in this short interval is very striking; the outline had changed from the circular to the triangular; the simple sunk lines of the earlier stage had widened into wedge-shaped clefts, dividing the whole into three well-marked carpellary lobes; each lobe had attained an almost triangular form by the enlargement of the placenta, and by the thickening of the walls of the ovary itself; C shows the further development at the end of the month; the placenta and rudimentary ovules had then begun to show a more definite form although no signs of impregnation of the latter could be detected. On the day section C was made, the pollen-tubes were found to have entered the ovary, and were pushing downwards along the sides of the placentas and among the ovules.

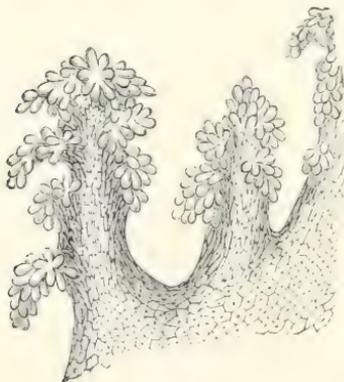


Fig. 8.

The condition of the rudimentary ovules themselves at this date is shown in Fig. 8, which is an enlarged view of a minute section; they were as the figure shows grouped in clusters of no very definite form and outline; each ovule has the appearance of a single cell, but so minute are they at this stage that no differentiation of parts could be made out under the low microscopic power to which we were restricted, although a faint reticulation was observable in some of the most advanced.

At the end of fifty-five days after pollination the pollen-tubes had penetrated the ovary in countless numbers, and had completely choked up the canal leading from the stigmatic chamber to it, but no actual impregnation of the ovules could be detected; the tubes lay alongside the placentas and among the ovules, and had reached as far as the bottom of the ovary. Twenty days later the ovules were not only enlarged but were also undergoing a change in form, and at the end of three months after pollination it became possible to understand with tolerable certainty the process by which the impregnation of the ovules is effected, and to get an idea of the space of time required for its accomplishment.

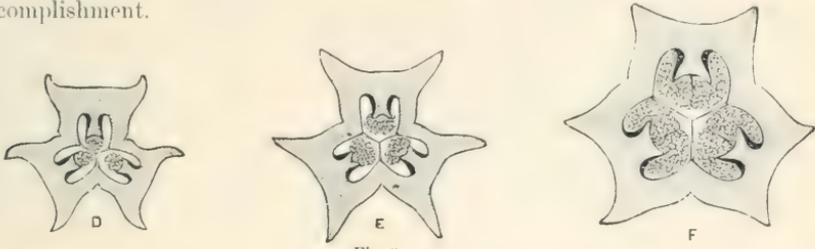


Fig. 9.

This will be best seen by reference to Fig. 9. D E and F represent two-thirds natural size three transverse sections of the ovary, D fifty-five, E seventy-two, and F ninety days after the pollination of the flower; these with the preceding sections form a series showing the development of the ovary at five different stages after the pollination of the flower. The development of the rudimentary ovules are also represented at the corresponding periods at A B C D and E in the next figure. This series simply shows the development of the rudiment to the perfectly anatropous ovule; it is at this stage that impregnation takes place.

The pollen-tubes push down into the ovary in countless numbers, and make their way along the placentas and among the protuberances of those that bear the groups of ovules in the manner shown in Fig. 11. The form of the perfect ovule may be regarded as nearly cylindric, being slightly contracted at the apex. The development of the impregnated ovule to the mature seed is shown in the annexed series in Fig. 12, all about 100 times enlarged. F is the perfect ovule, G is an intermediate form between F and H, H one month older than F, and I with nucleus *n* one month older than H. A group of such at this stage is represented in Fig. 13. The impregnated ovules had thence attained their mature form and size five months after the pollination of the

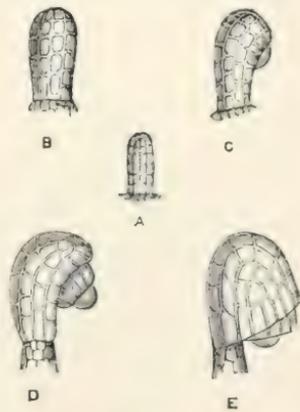


Fig. 10.

flower. At this period the days were getting short and cold, and artificial heat alone had to be depended on to maintain the plants in health, in consequence of which the investigations were stayed, it being previously known from experience that the seeds would not be ripe for some months to come. In fact the capsules that remained on the plants used during these investigations did not mature their seed and

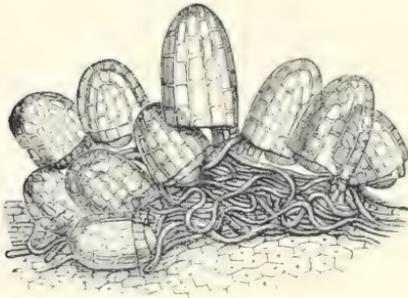


Fig. 11. A group of ovules and pollen-tubes ninety days after pollination, X 150.

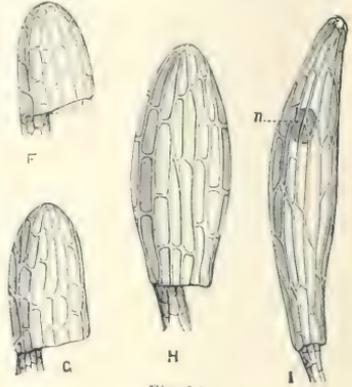


Fig. 12.

dehiscence till the end of May, or nearly twelve months after pollination. A number of seeds were examined with the aid of the microscope; about one-half were found to be plump, the other half consisted of mere dust and shrivelled ovules.

From the foregoing observations the following general statements may be deduced.

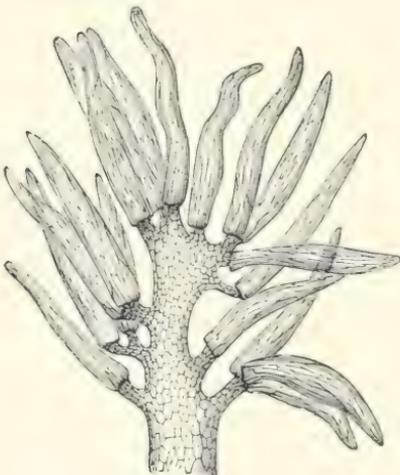


Fig. 13. A group of ovules five months after pollination, X 70.

The impregnation of the ovules of *Cattleya Mossie* under glass in the climate of London takes place from seventy-five to ninety days after the pollination of the flower, the length of time being doubtless influenced by the state of the weather during the interval and especially by the amount of direct sunlight the plants receive; the more direct sunlight the shorter the interval and *vice versa*.

A proportion of the ovules only are fertilised, but how great that proportion is, it is not possible to determine with certainty; it is never probably much less than one-half; it probably varies from a little less to a little more than one-half. It is certain also that of the seeds which are apparently mature and good, a greater or less proportion of them fail to germinate under artificial conditions.

HYBRIDISATION.

The removal of the pollinia from one flower and the placing of them on the stigma of another is so simple a process that it is somewhat surprising so many years should have elapsed after the flowering of the first hybrid raised by hand* before the practice was generally taken up by the cultivators of orchids. But in fact, apart from the difficulty that always has been and perhaps to a great extent always will be experienced in raising seedlings, the prominent place attained by hybridisation in orchid culture was not anticipated for a long series of years, and so long as artificially raised orchids were restricted in numbers their scientific import was far from being fully recognised by the best orchid authorities. But now that the field of operations has become so greatly enlarged and progenies have been obtained from a great number of pairs of species distributed over many genera, the importance of the results whether viewed from a scientific or horticultural standpoint is more fully realised. These results in their horticultural bearing will be summarised in a subsequent section, our attention is here confined to a consideration of them in their scientific aspect.

One of the most interesting circumstances connected with artificial hybridisation is the means it has afforded of tracing the life history of many epiphytal orchids. The accompanying figures illustrate different states of development of four species selected from four different genera. They may be accepted as representative types of those four genera; for although among the numerous crosses effected between different species of the same genus, deviations in the shape and size of the different organs have been observed, in no case have the deviations been so great as to affect the general statement, especially in the earlier stages of growth.

The time that elapses from the sowing of the seed to the appearance of the first scale-like leaf or cotyledon and the first rootlet varies considerably in the different genera and also according to the season of the year; it is thence highly probable that in a wild state, especially in the case of those tropical orchids that live in a more equable

* This was *Calanthe* × *Domini* which flowered in October, 1856.

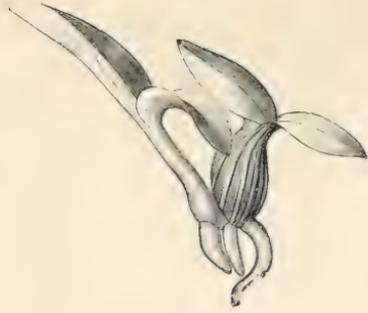
temperature during the whole year, these periods are not only shorter but more uniform among different genera. The progress of development during the earliest stages of growth is also exceedingly difficult to trace without the aid of the microscope on account of the minuteness of the seed and the indistinctness of the first indications of growth. The first development of the cotyledon from the spindle-shaped seed discernible by the naked eye has the appearance of a thalloid body of irregular form but nearly always of the same contour in the same genus, and of a bright green colour indicating that the cells of the epidermis and underlying tissue are rich in chlorophyll. In *Cattleya* this thalloid body is at first a thickened disk, with an out-growth on the upper side which ultimately develops into the first pair of scale-like leaves; in *Dendrobium* it has a fusiform shape with a sharply pointed out-growth at one end, the rudiment of the first leaf; in *Phalænopsis* it is prismatic with the angles much rounded; and in *Cypripedium* it is nearly flask-shaped. The subsequent development will be better understood by reference to the figures than from verbal description.

The period from the germination of the seed to the first flowering of the plant varies more in some genera than in others; thus, in *Cattleya* and *Lælia* (which are as regards hybridisation one genus, excluding some Mexican species referred to *Lælia*) the shortest recorded period is six years. *Lælia* × *caloglossa* raised by Dominy from *Cattleya labiata* and *Lælia crispa* was nineteen years before it flowered, but this is undoubtedly an extreme case. The periods in ten recorded instances ranged from seven to ten years, while those of some of the older hybrids were a little longer. In *Dendrobium* the period is usually four or five years; in *Phalænopsis* from four to six years; in *Cypripedium* from four to six years with a few cases of shorter duration, but five years is recorded for more crosses than any other period. The shortest periods occur in the *Calanthes* of the *VESTITÆ* section; these usually flower from three to four years from the seed. Seedling *Epidendra* and *Masdevallias* flower in about four years. It is a remarkable fact that the period of terrestrial orchids from the germination of the seed to the first flowering of the plant, like the fertilisation of their ovules is much shorter than in the epiphytal species; thus *Disa* × *Veitchii* raised by Seden from *D. grandiflora* and *D. racemosa* flowered in twenty-one months from the sowing of the seed; and with *D.* × *Premier* raised by Mr. Watson at Kew from *D.* × *Veitchii* and *D. tripetaloides* the period was still shorter.

The fact that most orchid flowers if fertilised at all must, in the wild state, be fertilised by insect agency being once recognised, it follows that where two allied species grow together or in close proximity to each other, the pollen of the one is liable to be deposited on the stigma of the other, and crosses may thence be



1 Seeds.



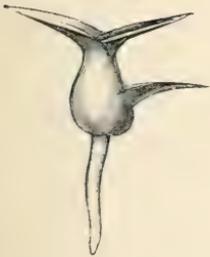
5 Seedling, 18 months.



2 Seedling, 4 months.



3 Seedling, 7 months.



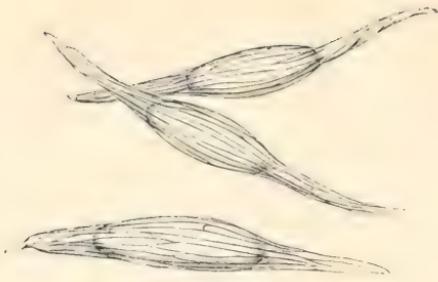
4 Seedling, 12 months.



6 Seedling, 2 years.

Development of *Dendrobium* from the seed to two-years old plant.

1 and 2 greatly enlarged, 3 to 6 natural size.



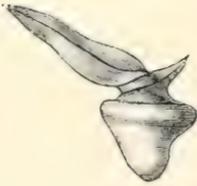
1 Seeds.



2 Seedling, 6 months.



5 Seedling, 16 months.



3 Seedling, 9 months.



4 Seedling, 12 months.



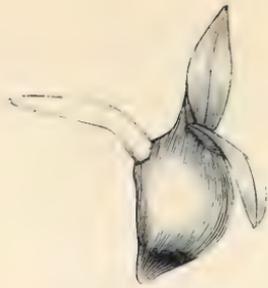
6 Seedling, 2 years.

Development of *Cattleya* from the seed to two-years old plant.

1 and 2 greatly enlarged, 3 to 6 natural size.



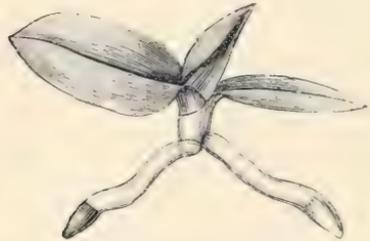
1 Seeds.



7 Seedling, 22 months.



2 Seedlings, 4 months.



6 Seedling, 2 1/2 years.



3 Seedling, 9 months



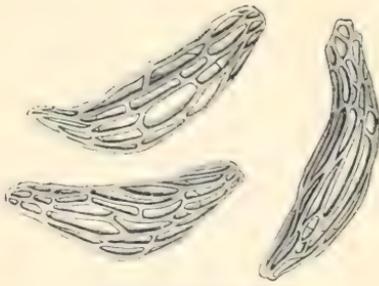
7 Seedling, 3 years.



4 Seedling, 15 months.

Development of Phalaenopsis from the seed to three-years old plant.

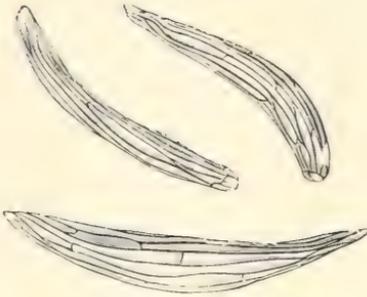
1 to 3 greatly enlarged, 4 to 7 natural size.



1 Eucypripedium Seeds.



5 Seedling, 12 months.



2 Selenipedium Seeds.



6 Seedling, 16 months.



3 Seedling, 6 months.



4 Seedling, 9 months.



7 Seedling, 2 years.

Development of *Cypripedium* from the seed to two-years old plant.

1 to 3 greatly enlarged, 4 to 7 natural size.

effected. This hypothesis and the structural evidence afforded by intermediate forms that have appeared among importations of geographically combined species have suggested that such forms are of hybrid origin. Direct proof of the existence of natural hybrids has now been afforded by identical forms artificially raised from the same pair of species as those from which the supposed wild hybrids were derived.

The first hybrid so obtained was from *Phalænopsis Aphrodite* fertilised with the pollen of *P. rosea*, the resulting progeny was identical with the *P. intermedia* of Lindley. This Phalænopsis first appeared as a solitary plant in a consignment of *P. Aphrodite*, sent to us by Thomas Lobb from the Philippine Islands in 1852. On its flowering in the following year, Lindley suggested that it might be a natural hybrid between that species and *P. rosea*;* this hypothesis was verified by Seden's hybrid which flowered for the first time in 1886. The shrewdness of Lindley's suggestion is greatly enhanced by the fact that at the time it was made no artificial hybrids were in existence, and wild ones do not appear to have been previously suspected. The significance of Seden's hybrid was two-fold, it was not only the first proof of the existence of wild hybrids but the first artificially raised hybrid in a genus proverbially difficult to cultivate.

When the late Professor Reichenbach published a description of a *Masdevallia* gathered by our collector Walter Davis on the lofty Andes of Peru, under the name of *M. splendida*,† and later a second form imported with it which he named *M. Parlatoresana*,‡ he suggested that both might be wild hybrids from *M. Veitchiana* and *M. Barleana* which occur together in that region, one being derived from the reverse cross of the other. An experiment was made in our houses by crossing the two supposed parent species both ways; progenies were raised from both crosses which on flowering proved identical with *M. splendida* and its variety *M. Parlatoresana*, for variety it proved to be, intermediate forms connecting the two occurring in both progenies.

The next proof obtained was a very remarkable one, for it was an artificially raised hybrid between *Odontoglossum Pescatorei* and *Od. triumphans*, the first hybrid *Odontoglossum* raised by us, and so far as we know the first to flower in England. It proved, however, to be identical with the *Od. excellens* of Reichenbach, who supposed that plant to be a natural hybrid between *Od. Pescatorei* and *Od. tripudians*; the hypothesis of the second parent was shown by the artificially raised hybrid to be false.

* Paxton's *Flower Garden*, III. p. 163.

† Gard. Chron. IX. (1878), p. 493.

‡ Id. XI. (1879), p. 172.

Another interesting hybrid obtained from *Dendrobium Wardianum* and *D. crassinode* flowered in our houses shortly afterwards. It proved to be identical with the *D. melanophthalmum* of Reichenbach, who recognised that plant as a wild hybrid between the same pair of species. And lastly, a hybrid raised by us from *Anguloa Clowesii* fertilised with the pollen of *A. Ruckeri* flowered contemporaneously with an imported *Anguloa* in the collection of Mr. R. H. Measures, of The Woodlands, Streatham, the two being absolutely identical.

The existence of wild hybrids in five genera has thus been proved by the raising artificially of identical forms from the same pairs of species as those from which the supposed wild hybrids have been derived. Of these five genera, *Odontoglossum* demands especial notice on account of the extent in which hybridity is known to prevail among the species inhabiting the Cordilleras of Colombia and Mexico, and to a less extent, owing to wider dispersion, among those occurring on the Andes of Peru. The Columbian species among which hybridity is most prevalent are *Odontoglossum crispum*, *Od. odoratum*, *Od. luteo-purpureum*, *Od. Lindleyanum*, *Od. Pescatorei* and *Od. triumphans*, most of them, particularly the three first-named, remarkably polymorphous, so that even where no traces of hybridity are discernible each species includes a multiplicity of forms between the extremes of which a rather wide difference exists. From these six species and their numerous varieties have arisen at least five extensive groups of hybrids that may be distinguished from each other and thus designated: *crispo-odoratum*, *crispo-Lindleyanum*, *crispo-luteopurpureum*, *odorato-luteopurpureum* and *triumphante-Pescatorei*, including in each group also the reverse cross which it is perfectly logical to assume has taken place. In these groups but more especially in the first-named and somewhat hypothetically in the others, we have not only hybrids from crosses between the species and their varieties both ways, but also from crosses between the species and the progenies and from the progenies *inter se*, the result being a gradation of forms differing so little from each other as to be "confluent in series."*

Another group of wild hybrids belonging to the allied genus *Oncidium* has originated on the Organ Mountains of Brazil, where several species commonly known in gardens as the *crispum* group are aggregated, and which were at first regarded as species, but which after careful examination and comparison have been conclusively shown to be hybrids.† Among these are *Oncidium pectorale*, Lindl.; *On. Gardneri*, Lindl.; *On. prestantis*, Rehb.; *On. pretextum*, Morren; and others whose parentage can be satisfactorily traced.

* Among Mexican *Odontoglossum* several undoubted wild hybrids between *Odontoglossum maculatum* and *Od. Rossii* have been imported with those species, and a few others of which the last-named and *Od. cordatum* are the supposed parents.

† *Orchid Review*, vol. I. p. 298.

Undoubted natural hybrids have also appeared among importations of *Lycaste*, *Cattleya* and *Lælia*, and even hybrids between *Cattleya* and *Lælia*, an admonition by Nature herself against placing too much stress upon any single character for separating genera in the ORCHIDÆ.*

Bigeneric hybrids have been obtained artificially by fertilising a species of one genus with the pollen of a species of another. The first bigeneric hybrid so obtained was raised by Dominy from *Phaius grandifolius* fertilised with the pollen of a variety of *Calanthe vestita*. Seden obtained a progeny many years afterwards from the first-named species fertilised with the pollen of another variety of *Calanthe vestita*, which on flowering proved to be structurally identical with Dominy's hybrid. *Phaius grandifolius* has also been crossed with *Calanthe* × *Veitchii* by several operators with more fertile results than the previous crosses; and lastly it has been crossed with *Calanthe Masuca*, from which a single plant only was raised. By these crosses a group of *Phaiocalanthes* has been brought into existence. Dominy also raised three distinct hybrids from *Hæmaria discolor* crossed with an *Anæctochilus*, a *Dossinia* and a *Macodes*; the resulting progenies were called respectively *Anæctochilus Dominii*, *Goodyera Dominii* and *G. Veitchii*, which would be regarded as a very curious nomenclature were it not that *Hæmaria discolor* has been for many years cultivated under the name of *Goodyera discolor*, and both the *Dossinia* and the *Macodes* were, in Dominy's time, cultivated as *Anæctochili*. These hybrids are probably now lost, but the fact of their former existence is suggestive of a doubt whether the characters relied on to separate the genera from which they were derived are of sufficient value to justify the retention of all of them. †

Progenies have also been obtained from *Cattleya intermedia*, *C. Loddigesii* and *Lælia elegans*, each crossed with *Sophronitis grandiflora*, whence has originated a series of *Sophracattleyas*. It is worthy of remark that in these three cases all the species concerned are natives of a comparatively small geographical area in southern Brazil; but another bigeneric hybrid in which the *Sophronitis* participated had

* Thus *Lælia elegans* supposed to have been derived from *Lælia purpurata* and *Cattleya guttata*, and *L. Schilleriana* from *L. purpurata* and *C. intermedia*, have been imported in considerable numbers. *L. amanda* and *L. porphyritis* are rare forms with unequal pollinia and are doubtless of hybrid origin with a *Cattleya* and *Lælia* for parents in each case, and quite recently two other such natural hybrids (*L. Gottiana* and *L. albanensis*) have been imported from Bahia.

† *Anæctochilus*, an Indo-Malayan genus of about eight species, is connected with the *Goodyeras* of Europe and North America by a series of genera, all more or less remarkable for their beautiful foliage. Of these *Herpysma*, *Dossinia*, *Macodes* and *Hylophila* are monotypic.

for its second parent *Epidendrum radicans*, a native of Guatemala, several thousands of miles distant from the home of *Sophronitis grandiflora*. And lastly, two remarkable progenies have been obtained by crossing *Zygopetalum Mackayi* and *Z. marillare* each with *Colax jugosus*, which bear the name of *Zygocolax*. The number of bigeneric hybrids known to us, omitting Dominy's three from genera in the tribe NEOTTIEÆ, is nine, in the parentage of which seven genera are concerned counting *Cattleya* and *Lælia* as one.

Hybrids between *Cattleya* and *Lælia* have been raised by several operators, and exceed in number those between species of *Cattleya* and those between species of *Lælia* taken together, a fact so significant as to seriously question the retention of *Lælia* as a distinct genus except for certain Mexican species* with a distinct habit of growth, and which have hitherto resisted all attempts to hybridise them either with *Cattleya* or with the Brazilian *Lælias*.

One undoubted wild generic hybrid has been introduced from Guatemala, of which *Epidendrum aurantiacum* and *Cattleya Skinneri* are the parents. This was sent to us many years ago, a single plant only, by Mr. G. Ure Skinner and which was named *Cattleya guatemalensis*; the plant was afterwards lost. Another plant has recently reappeared in the collection of the Right Hon. Joseph Chamberlain at Highbury, near Birmingham, and which should bear the name of *Epicattleya guatemalensis*. The Aulizeum *Epidendra* come so near *Cattleya* structurally that the occurrence of a cross proving fertile between a species of the one and a species of the other locally associated is not surprising.† To this may with almost equal confidence be added *Cattleya Lindleyana* (Hort.), *Lælia Lindleyana* (nobis), a curious and extremely rare orchid that has been introduced from Santa Catherina in southern Brazil. Mr. Rolfe suspects that it may be a generic hybrid between *C. intermedia* and *Brassavola tuberculata*, both of which grow wild in the province of Santa Catherina.‡

The facts we have stated respecting generic hybrids naturally suggest the question, How will these bigeneric crosses affect the stability of the genera as at present circumscribed?§ Glancing over the whole range

* *Lælia anceps*, *L. albida*, *L. autumnalis*, *L. furfuracea*, *L. rubescens*, *L. superbiens*.

† This hybrid might be adduced in support of Reichenbach's proposal to merge *Cattleya* into *Epidendrum* (Xen. Orch. II. p. 26), but one bigeneric hybrid does not combine the two genera from which it sprung any more than one swallow makes a summer.

‡ Gard. Chron. V. s. 3 (1889), p. 437.

§ Hybridisation of Orchids, by H. J. Veitch, in Journ. Royal Hort. Soc. vol. VII. p. 34.

of hybridising operations and the results obtained from them, we may safely reply that thus far the stability of the genera (as established by Bentham) is scarcely affected, for the dozen or so of genera concerned in the parentage of these hybrids, both wild and artificially raised, falls far short of the number of those in which experiments have been made but which quite failed to produce results. Moreover, the progenies derived from these bigeneric crosses are extremely restricted; in more than one case a single plant only has been raised. The genera concerned can thence scarcely be said thus far to be affected by these crosses, but the systematic place of some of them seems to call for revision—thus *Calanthe* placed by Bentham in the sub-tribe CŒLOGYNÆ next to *Pholidota* has a much closer affinity with *Phaius*, and should be placed next to it in the sub-tribe BLETIÆ. *Colax* merged by Bentham into *Lycaste* should be restored and placed next to *Zygopetalum*, and *Sophronitis* should precede *Tetramicra* (*Leptotes*).

A special nomenclature that shall designate, so far as regards the genera, the origin of these hybrids is manifestly a most convenient one both for scientific and for garden use. We have therefore unhesitatingly adopted the course initiated many years ago by Dr. Maxwell T. Masters in naming a hybrid raised by Mr. Veitch Senior, at Exeter, from *Lapageria rosea* and *Philesia buxifolia*, *Philageria* × *Veitchii*, that is—by compounding in the most feasible way the names of the two genera concerned.

The hybrid raised artificially between any two species is not always exactly intermediate between them so far as can be discerned by the sum total of morphological or naked-eye characters. There is often a greater or less divergence towards one parent, especially in those cases in which a species has shown a very marked potency to hybridise with other species.

A few instances of such may be easily selected. Among *Dendrobis* *D. nobile* has strongly impressed its general features on every hybrid in which it has participated in the parentage whether as pollen or seed parent. Among *Cypripedes* the influence of *C. Spicerianum* is as strongly marked as *D. nobile* among *Dendrobis*. *C. Sehlimii* has in like manner greatly preponderated throughout the large group of hybrids known as the *Sedenii* group, of which it is one of the original parents. *Cypripedium Fairieanum* has proved a potent agent in hybridisation, but it has hitherto been used chiefly, if not solely, as the pollen parent. The characters of *C. villosum*, *C. insigne* and *C. venustum* have also much preponderated in the flowers of the progenies of which these species are the pollen parents.

Cattleya labiata and its Colombian varieties have been crossed with

nearly all the other species of *Cattleya* and with most of the Brazilian *Lælias*, with the almost universal result that the flowers of the progenies have deviated but little from the *labiata* type, but their colours are often much modified by the other parent.

Many instances can be cited in which the pollen parent has greatly influenced the characters of the flower, and the seed parent the vegetative organs of the progeny. On the other hand the opposite has occurred, so that it is at present impossible to deduce any general law respecting the relative potency as regards sex of the parents of those hybrids which diverge from the precise intermediate form.

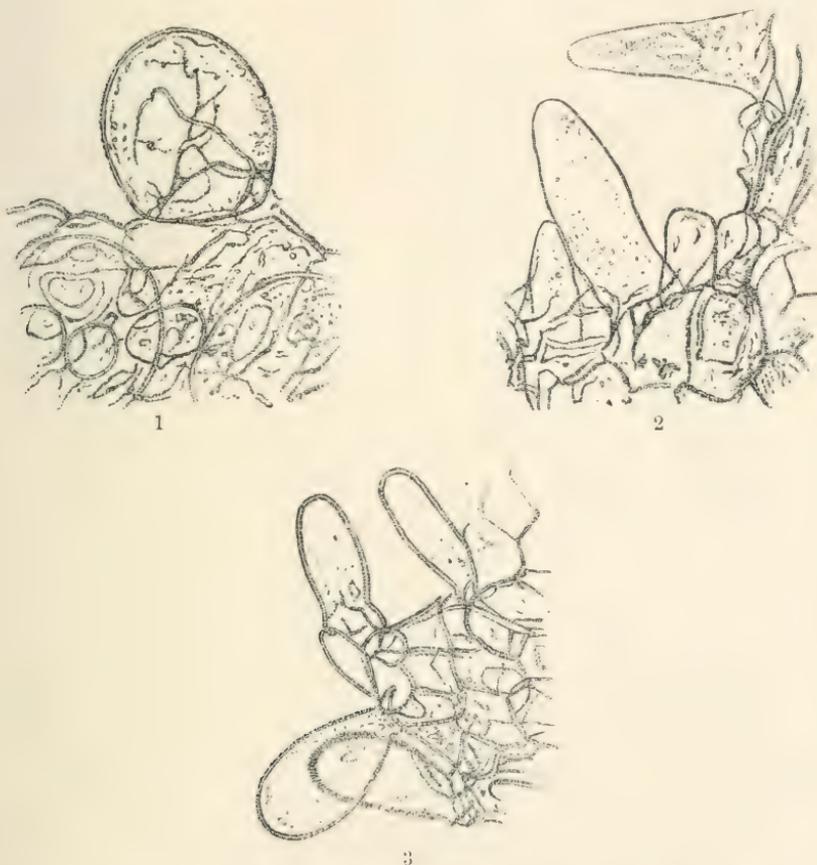
The reverse cross of any two species does not always produce identical forms with the first cross, although generally sufficiently near to be ranked as varieties only. There are, however, some very remarkable exceptions. *Cypripedium* × *Aphrodite* raised by us from *C. Lawrenceanum* ♂ and *C. niveum* ♀ is very distinct in form and colour from *C.* × *Antigonē* raised from the reverse cross of the same pair of species.

When the minute structure of the tissues of hybrids and their parents are examined and compared, we learn from an exceedingly interesting series of investigations undertaken by Dr. J. M. Macfarlane in the laboratory of the Edinburgh Botanic Garden, that from a large number of hybrid plants together with their parents so examined and compared, the structural blending of the parents in the cells and cell contents in all the organs of the hybrid is nearly equal. The blending of the appearances presented by the parents is seen in a remarkable manner in all the minute anatomical details, in the size, outline, amount of thickening and localisation of growth of the cell-wall, in the structure of the epidermal out-growths, hairs, papillæ, etc., and also in the number of the stomata of the leaves. In the hybrids all these are as a rule, so far as the investigations have been carried, intermediate between those of the parents.*

The hybrid orchids examined by Dr. Macfarlane were, up to date of publication, confined to two raised by ourselves, viz., *Cypripedium* × *Lecanum* and *Masdevallia* × *Chelsoni*. An instructive instance is afforded by the flower of the last-named hybrid of the perfect structural blending of the two parents in the hybrid. *Masdevallia* × *Chelsoni* was raised from *M. anabilis* and *M. Veitchiana*, the cross being effected both ways and progenies obtained from both crosses. The brilliant coloration of the flowers of both the hybrid and its parents is, in part, owing to the crimson papillæ which are scattered in great numbers

* Gard. Chron. VII. s. 3 (1890), p. 543, and in Transactions of the Royal Society of Edinburgh, vol. XXXVII. p. 203.

over the surface of the sepals. When examined under the microscope the papillæ of *M. amabilis* are seen to be cone-shaped, those of *M. Veitchiana* are spheroidal, but those of the hybrid are club-shaped and exactly intermediate between those of the two parents. This is



Sections of epidermis from lateral sepals of—1, *Masdevallia Veitchiana*, bearing spheroidal hairs; 2, *M. amabilis*, bearing cone-shaped hairs; 3, *M. X Chelsoni*, bearing club-shaped hairs. All X 450.

well shown in the accompanying illustrations which are copied from the plates in Dr. Macfarlane's paper, in the Transactions of the Royal Society of Edinburgh.

GEOGRAPHICAL DISTRIBUTION—CLIMATOLOGY.

The geographical distribution of the most important genera, in a horticultural sense, is fully sketched under each genus and further illustrated by maps on which the habitats of the species, so far as they have been ascertained, are indicated. It is only necessary to note here some general facts relating to the region over which the epiphytal orchids are spread and the climatic phenomena of that region. With the epiphytal orchids are associated some terrestrial and sub-terrestrial genera whose habitats lie within this region, as the *Cypripedia* (section *SELENIPEDIA* and sub-section *CORIACEÆ*), *Phaius*, *Thunia*, *Spathoglottis*, *Calanthe* and others. Its geographical limits may be broadly stated to be the 30th parallel of north and the 35th parallel of south latitude; the region of epiphytal orchids is thence a broad zone, having for its breadth a little more than one-third of the entire distance between the poles and, roughly speaking, including about three-sevenths of the land area of the globe. Beyond this zone the epiphytal orchids have spread only into two localities remote from each other, very sparingly indeed and as outlying members of the genera to which they belong, northwards into Japan and southwards into New Zealand. These two localities, together with some of the islands of the Pacific Ocean on which orchids included in tropical genera are found, are not shown on the maps illustrating the climate of the region.

But while the geographical limits of epiphytal and other orchids belonging to tropical types are those defined above, a very important modification has to be made with respect to the actual area over which they are spread. While the temperature of the whole region except on the summits of the higher mountain ranges is sufficiently high to maintain epiphytal life, there are extensive tracts within it where owing to physical causes the other equally essential condition, that of humidity, is either altogether absent, or is present in insufficient quantity, or for too short a period to enable epiphytal orchids to live.

Thus in the eastern section there are—in Asia, the Arabian deserts, the arid plains of Persia and north-west India, the table-land of the Deccan and Mysore; the greater part of the Australian continent; and

in Africa, the Sahara and Kalahari deserts north and south of the equatorial zone. In the western section there are—the arid region of northern Mexico in North America; the almost treeless regions known as the savannahs of Venezuela and Guiana, the Campos of Brazil and the Pampas of Bolivia and Argentina. Besides these larger tracts, there are many other places where, owing to local causes, the tropical rains are either intercepted or so greatly reduced in quantity that orchid life cannot exist. In all these tracts the atmosphere is not only almost always dry, but the daily thermometric range is also too great to admit of any but the scantiest vegetation to exist and that of certain types only.

The aggregate area of these dry and arid tracts is probably not less than one-half of the whole region, which reduces the actual area over which the tropical orchids are spread to about one-fourth of the land surface of the globe.

The general climatic phenomena of the region are dependent on the vertical position of the sun in respect to the earth; but the sun does not remain vertical over the same parallel of latitude owing to the obliquity of the earth's axis to the plane of the ecliptic, the great circle that traces the annual course of the sun in the heavens; the limits of the sun's annual excursion on each side of the equator are indicated by the tropics, which are nearly $23\frac{1}{2}$ degrees north and south of it. The sun is thence north of the equator one half of the year and south of it the other half. Now where the sun is vertical its heating power is greatest, and there accordingly the aërial currents known as the trade winds originate, evaporation is most rapid and the precipitation of rain the greatest. The heated air as it ascends is accompanied by the vapour raised by evaporation and which is lighter than the ascending air; both expand as they ascend and both part with a portion of the heat with which they were first charged until the vapour is sufficiently chilled to be precipitated first as cloud, then as rain. The parallel over which the sun is vertical with a narrow space on each side of it is known as "the region of calms." Of course this belt shifts with the annual course of the sun, and is thence at and near the equator twice in the year; and hence it is that the equatorial climate is more equable than in other parts of the region; the variations in temperature, both annual and diurnal, are least and the rainfall is most regular and continuous.

“When the sun is south of the equator the earth’s surface north of it is no longer under the same influence but under that of the atmospheric currents flowing in from north or north-east to supply the place of the ascending heated air. The moving air owing to the great extent of land surface in the northern hemisphere is, at first, but slightly charged with moisture, and as it travels from north to south becomes warmer; it is comparatively a dry wind and consequently its capacity to contain vapour is continually augmenting. Similarly when the sun is north of the equator, the like phenomena occur on the south of it, but not equally so owing to the greater extent of ocean surface in the southern hemisphere. It is plain from these considerations that each place between the tropics must have its dry and wet season; dry when the sun is on the opposite side of the equator, and wet when the sun is overhead.”*

The trade winds and the general phenomena just described were confined to the ocean are regular and constant, but on the continents they are subject to much variation, owing to the configuration of the land, the trend and height of the mountain ranges, and to many local causes; but generally speaking within the region under review the variations are periodical or seasonal.

The most extensive of these periodical changes are the monsoons which take the place of the regular trade winds in the Indo-Malayan region. The south-west monsoon loaded with vapour raised from the Indian Ocean when it meets the western Ghauts of India precipitates so much rain along the coast districts stretching from Bombay to the extreme south of India that some localities within it are the wettest spots known; similar phenomena occurs along the mountains of Aracan and Lower Burmah; and again along the lower Himalayan zone owing to the enormous amount of vapour ascending from the Bay of Bengal being drifted towards the mountains, and which being condensed by contact with the higher and colder zone is precipitated into the lower valleys, the precipitation increasing in amount in proceeding eastwards to the Khasia Hills and Manipur where it attains its maximum.

In the western hemisphere similar phenomena occur but on a smaller scale. Thus, in southern Mexico and Guatemala south-easterly winds prevail during the wet season from December to April, and north-westerly winds during the remainder of the year. The vapour raised in the south Atlantic Ocean during the sun’s excursion between the equator and the southern tropic is carried by the south-east trade wind towards the Brazilian coast from Cape St. Roque to the Rio de la Plata and thence across the continent to the Andes. A large amount of this vapour is precipitated on and in the neighbourhood of the coast

* Tyndall, “Heat a Mode of Motion,” p. 212.

A Map shewing
 THE ANNUAL AVERAGE RAINFALL
 AND
 THE MEAN ANNUAL TEMPERATURE
 of the region of
EPIPHYTAL ORCHIDS
 (WESTERN)

REFERENCE
 Rainfall

- Under 10 inches
- 10 to 30 "
- 30 " 60 "
- 60 " 100 "
- Over 100 "



Mean annual isotherms
 (centigrade)

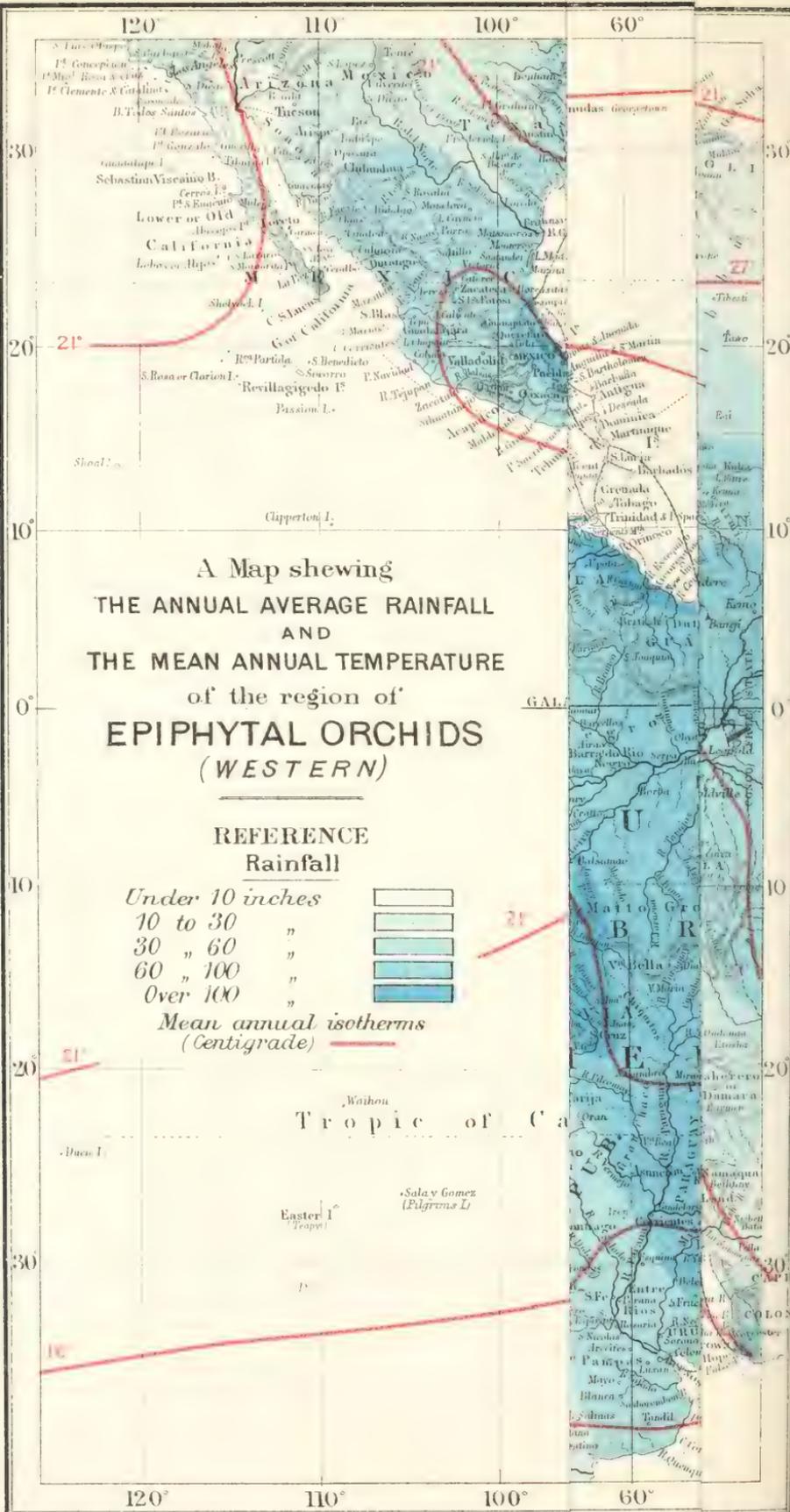
Tropic of Capricorn



A T L A N T I C

Tropic de Capricorn
 Ingham's I.
 Ingham's I. (Dress-Bank)

10° Long. W. of Gr. 0° Long. E. of Gr. 10°



A Map shewing
THE ANNUAL AVERAGE RAINFALL
AND
THE MEAN ANNUAL TEMPERATURE
 of the region of
EPIPHYTAL ORCHIDS
 (WESTERN)

REFERENCE

Rainfall

<i>Under 10 inches</i>	
<i>10 to 30 "</i>	
<i>30 " 60 "</i>	
<i>60 " 100 "</i>	
<i>Over 100 "</i>	

Mean annual isotherms
(Centigrade)

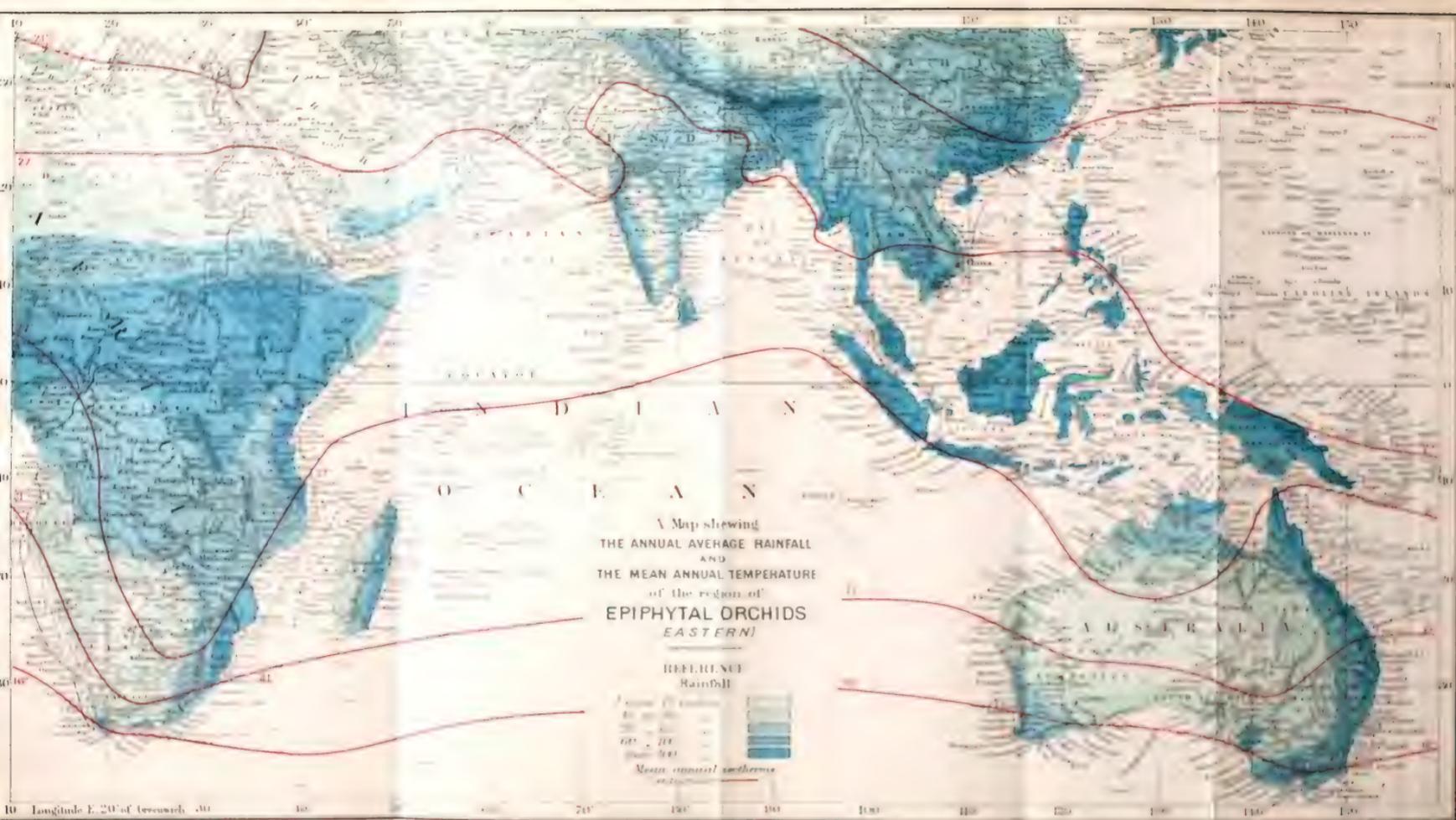
21°

27°

Tropic of Capricorn

Easter I.
(Teape)

Sala y Gomez
(Elgueros I.)



range, the Serra do Mar. Similarly the enormous evaporation from the north Atlantic is constantly drifted towards the Cordilleras of Venezuela and Colombia by which it is arrested and condensed, the rains on the upper slopes of these mountains being continuous nearly throughout the year.

The distribution of orchid life over the region under review will now be clearly understood. Within what is often called the equatorial zone, a space extending to about twelve degrees on each side of the equator, and which includes nearly the whole of the Malaysian Archipelago and a great part of the continents of Africa and South America the climatic conditions are such that epiphytal and other tropical orchids are generally distributed, even in Africa, of whose tropical vegetation much yet remains to be investigated. It is within this zone that monopodial orchids attain their greatest development; in Malaysia are found gigantic Staurospes and Grammatophyllums; in Africa giant *Angraecums* cling to massive Baobab and Iron-wood trees; and of sympodial orchids gigantic *Eulophias* and *Lissochili* occur in certain places in the Congo and other regions of equatorial Africa in such quantities as to supply a feature in the landscape. Beyond this zone, both on the northern and southern sides, the distribution of orchid life is much more irregular, being immensely influenced by local causes, especially by the direction of the trade and periodical winds by which the evaporation of the ocean is carried into certain localities more than in others, and also by the height and trend of the mountain ranges.

A few well-known instances need only here be noted. In the eastern section—the mountains of Aracan and Moulmein which receive the south-west monsoon on their western slopes are the richest Dendrobe and Vanda districts known. The Khasia Hills and the lower Himalayan zone upon which, as already stated, is precipitated much of the enormous evaporation raised in the Bay of Bengal is also an exceptionally rich Dendrobium region, and is besides the home of the finest *Cælogynes* and *Cymbidiums* yet discovered. In the western section—the Cordilleras of Venezuela and Colombia are aggregated most of the finest *Odontoglots*, *Cattleyas* of the *labiata* type, *Miltonias*, *Lycastes*, *Masdevallias*, and numerous others highly valued by cultivators, caused by the constant action of the north-east trade wind in rendering the climate peculiarly suited to orchid life. And from the action of the south-east trade wind, the coast range of Brazil with the country in its immediate vicinity is the home of many of the most beautiful *Cattleyas*, *Lælias*, *Oncids*, *Zygopetalums*, *Sophronites* and other orchids prized for their large and brilliant flowers.

On the mountain ranges of great altitude as the Himalaya in the eastern and the Andes of Colombia and Peru in the western section, the vertical range of orchids is considerable. On the Andes they ascend to elevations where the average annual temperature is less than in the lower and median latitudes of the temperate zone, some even ascending to the immediate vicinity of perpetual snow as *Epidendrum frigidum*, *Oncidium cucullatum* var. *nubigenum*, *Odontoglossum densiflorum*, and others. It must not, however, be inferred that such orchids are hardy, that is to say—that they can be cultivated in the open air in this or any other country equally remote from the equator. Those epiphytal orchids that occur at the highest altitudes, as the species just mentioned, some of the *Odontoglossum* of Colombia, the *Masdevallias* and *Epidendras* of Peru, etc., are never subjected to such extremes of temperature as is sometimes experienced in the south of France, in Italy, and the middle and southern States of North America, and under which they would perish. Apart from physical obstacles as the Himalaya in Asia, the Sahara in Africa, the arid tracts of northern Mexico and the Pampas of Argentina which prevent the spread of such orchids beyond their present sphere, climate alone would prove fatal to them.

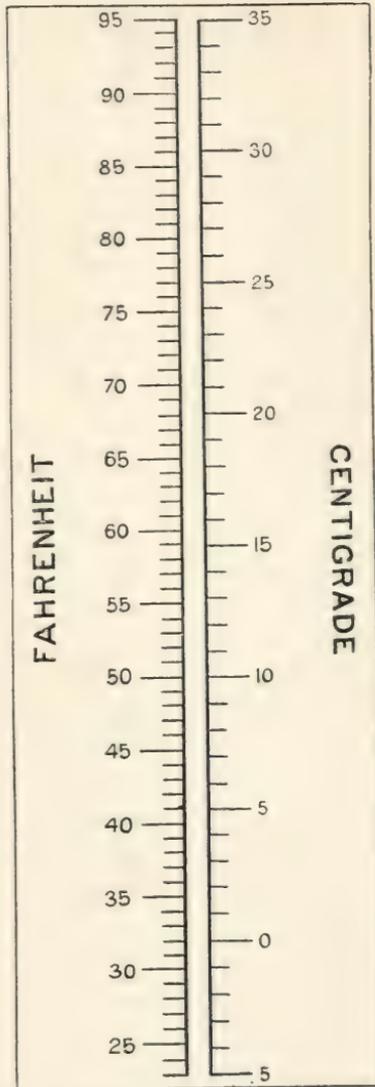
But little explanation is needed of the accompanying maps which have been prepared especially for this work by Mr. Edward Stanford, of Charing Cross. The red lines called isothermal lines, or simply isotherms, mark the limits of areas of equal temperatures expressed in degrees Centigrade for reasons to be presently stated; these are the annual mean temperatures at sea-level. The annual mean temperature of places above sea-level, especially on mountain ranges, may be approximately found by deducting one degree Centigrade for every 600 feet of altitude from the given mean. The gradations of blue colour indicate the annual average rainfall according to the references on the maps.

The following considerations should have weight in favour of the adoption of the Centigrade thermometric scale in horticultural practice in the place of the Fahrenheit scale.

The temperature of crystallisation or the freezing point as it is familiarly called, if the water be kept under the same pressure is constant; the normal pressure of the atmosphere at sea-level when the barometric column is 30 inches is about fifteen pounds to the square inch. The temperature of condensation from the state of steam, in common parlance the boiling point, is also constant as long as the pressure remains the same. There are hence two invariable standard points of temperature. On the thermometric scale the space between the freezing and boiling points was divided by Celsius into 100 equal parts whence this scale has obtained the name of

the Centigrade; it is now generally in use on the Continent and almost universally in scientific investigations. On Fahrenheit's thermometer, the instrument in common use in this country, the freezing point is marked 32° on an old assumption that the greatest terrestrial cold was zero, an assumption that has long since been proved in various ways and places to be fallacious; the boiling point is 212° , the interval between the two being 180° , so that 5° Centigrade is equal to 9° Fahrenheit. The annexed diagram shows the comparative value of the degree in each scale.

The division of the interval between the two invariable points into 100 parts is itself so suggestive and simple both in theory and practice as to require no justification. On the other hand, as already shown, the placing of the freezing point at 32° is quite arbitrary, and the division of the interval between the freezing and boiling points into 180 units is equally arbitrary, and so far as the number itself is concerned, is supported by no data derivable from ascertained thermal laws. Practically the Fahrenheit degree is too small to be appreciated by the most attentive of orchid cultivators, but to whom the Centigrade degree becomes an appreciable quantity, and consequently 5° , 10° , 15° C., etc., are recognisable conditions of temperature apparent to the senses. But such temperatures as are expressed by 40° , 50° , 60° F., etc., are complex notions rendered so by the circumstance that they do not themselves represent the number of units above an invariable point, but must be reduced to it by deducting the arbitrary number 32.



CLASSIFICATION.

In the early part of the century the ORCHIDÆÆ were studied by several eminent botanists, including Oloff Swartz, one of the immediate successors of Linnæus in the Chair of Botany at Upsal, L. C. Richard, Dupetit-Thouars, Dr. Robert Brown, C. L. Blume and others, all of whom have left special treatises on them.* It was especially the observations of Robert Brown backed by the excellent drawings of Francis Bauer which induced Lindley to devote himself to the order of which he became the great master. It was Robert Brown too, as Mr. Bentham justly observes,† who first established the principles of the classification of the ORCHIDÆÆ on a solid basis, and on this basis as materials came to hand Lindley worked out, chiefly in the *Botanical Register* which he edited for many years, the systematic arrangement of the species which has supplied the foundation of every subsequent classification. The results of his labours are summarised in his *Genera and Species of Orchidaceous Plants*, the first portion of which appeared in 1830, the remaining parts being afterwards published at greater or less intervals, the concluding one being issued in 1840. Between 1852 and 1859 Lindley revised and re-systematised many of the genera, incorporating in them the accumulated fresh material, consisting of a vast number of new orchids of every description that had been discovered in the interval. These revised genera were published from time to time under the name of *Folia Orchidacea*.

Dr. Lindley's system is thus summarised in the introduction to his *Genera and Species of Orchidaceous Plants*.

I.—Anther one only. (MONANDRÆÆ).

A.—Pollen masses waxy.

Tribe 1.—MALAXIDÆÆ. No caudicle or separable stigmatic gland.

Tribe 2.—EPIDENDRÆÆ. A distinct caudicle but no separable stigmatic gland.

Tribe 3.—VANDEÆÆ. A distinct caudicle united to a deciduous stigmatic gland.

* See Literature of the ORCHIDÆÆ, *infra*.

† Journ. Linn. Soc. XVIII. p. 282.

B.—Pollen masses powdery, granular or sectile.

Tribe 4.—OPHRYDEÆ. Anther terminal, erect (adnate to the top of the column).

Tribe 5.—ARETHUSEÆ. Anther terminal, operculate (over the rostellum).

Tribe 6.—NEOTTIEÆ. Anther dorsal (behind the rostellum).

II.—Anthers two or three (Abnormal Tribes). (DIANDRÆ).

Tribe 7.—CYPRIPEDIEÆ. Ovary one or three-celled.

Tribe 8.*—APOSTASIEÆ. Ovary three-celled.

The *Genera and Species* and the *Folia Orchidacea* remained the authoritative systematic treatises on the ORCHIDEÆ till the subject was taken in hand by Bentham for the *Genera Plantarum*, although Reichenbach had compiled a synopsis of the Order with the exception of the Tribe CYPRIPEDIEÆ in Walper's *Annales Botanices Systematicæ* published during the years 1861—66. This synopsis was worked out mainly on the lines laid down by Lindley, the whole of whose *Folia Orchidacea* was incorporated in it, together with much fresh material that had been placed within the author's reach. It proved for the time a valuable source of reference for botanists.

Bentham also elaborated the ORCHIDEÆ on the Lindleyan system with a few modifications of the Tribal divisions founded chiefly upon the characters of the appendage of the pollinia to which Lindley applied the common name of caudicle, but as already pointed out, he applied it to three very different parts of the pollinary apparatus.† As the distinction set up by Lindley between the Tribes MALAXIDEE and EPIDENDREE cannot be maintained Bentham has merged the first-named into EPIDENDREE. He has also merged ARETHUSEÆ into NEOTTIEÆ on the ground that “the separation has proved to be purely artificial without even the advantage of a constantly definite, distinctive character.‡ And lastly the small anomalous Tribes CYPRIPEDIEÆ and APOSTASIEÆ are consolidated into a single one.

Mr. Bentham's Tribal divisions therefore stand thus:—

Tribe 1.—EPIDENDREE, including Lindley's MALAXIDEE.

Tribe 2.—VANDEE, co-extensive with Lindley's VANDEE.

Tribe 3.—NEOTTIEÆ, including Lindley's ARETHUSEÆ.

Tribe 4.—OPHRYDEÆ, co-extensive with Lindley's OPHRYDEÆ.

Tribe 5.—CYPRIPEDIEÆ, enlarged by the addition of the anomalous genera *Apostasia* and *Neuwiedia*.

* Subsequently added.

† See page 29.

‡ Journ. Linn. Soc. XVIII. p. 286.

The first four Tribes are sub-divided into twenty-seven sub-tribes, often in reference to the vegetative characters of the included genera. These characters are stated under each sub-tribe that comes within the scope of this work and need not be repeated here.

The number of genera diagnosed by Mr. Bentham is 334, the authorship of which is thus analysed by Mr. Hemsley.

Leaving out Swartz, Ruiz and Pavon, Kunth, Dupetit-Thouars and others who between them established a considerable number of genera, the remaining genera retained by Bentham were founded by the following authors, Lindley, 114; Blume, 50; Robert Brown, 41; Reichenbach, 20. The last number does not include about half-a-dozen genera which Bentham had not seen and to which he was consequently unable to assign places in his classification. Bentham himself proposed only four new genera though he raised some of Lindley's sections of *Epidendrum* to the rank of genera. How far Lindley has left his mark on the genera of orchids may be gathered from the above analysis from which it may be seen that he established as many genera as Blume, Brown and Reichenbach together, or a little more than one-third of the total number retained by Bentham. The total number of names of proposed genera of orchids is about 770, or more than double the number adopted.*

Since the publication of the ORCHIDÆ in the *Genera Plantarum* a new classification has been worked out by Professor Pfitzer, of Heidelberg, in Engler and Prandl's *Natürlichen Pflanzenfamilien*. As this classification is not likely to supersede Bentham's, at least in Great Britain and America, we need only note a few of the changes proposed as indications of the tendency of the whole.

The number of genera is raised to 410 chiefly by adopting a large number proposed by Reichenbach whose herbarium types are now buried somewhere in Vienna; by adopting some proposed by other authors which Bentham had reduced to older genera or made sectional of them; and by a few proposed by himself. The fundamental divisions are those of Lindley but reversed, viz.—I., DIANDRÆ, with two or three fertile anthers, and II., MONANDRÆ, with only one, and more prominence is given to these divisions than by Lindley, notwithstanding the immense disparity between them as regards the number of included species. In the DIANDRÆ, *Cypripedium* is changed to *Cypripedilum* evidently for etymological reasons; it is also restricted to the terrestrial species of the temperate zone. *Selenipedium* changed to *Selenipedilum* is retained only for two curious species figured in Reichenbach's *Xenia Orchidacea*, I. pl. 2 under

* Gard. Chron. XX. (1883), p. 175.

the names of *S. Chica* and *S. palmifolium*; all the other species both Indian and South American are brought under a new genus which he calls Paphiopedilum. In the MONANDRE a group of species hitherto referred to Masdevallia including *M. pulvinaris*, *M. Oethodes*, *M. gibberosa* and others distinguished by the boat-shaped united lower sepals and free upper sepal and also by some characters of the inflorescence, are constituted a new genus under the name of Scaphosepalum. This genus will doubtless be generally accepted as it frees Masdevallia from an anomalous group of species that diverge too far from the type. Calanthe as circumscribed by Bentham is split up into four genera, the terrestrial species alone (section VERATRIFOLLE nobis) being retained under Calanthe; Lindley's Limatodes is restored in *C. rosea*; Reichenbach's Preptanthe is adopted for *C. vestita* and its allies, and a new genus called Calanthodium is created for the reception of *C. labrosa*. Don's Pleione is separated from Cœlogyne, *C. Gardneriana*, Lindl., made sectional by Lindley as NEOGYNE is raised to generic rank under that name. All Bentham's sections of Zygopetalum, as Huntleya, Bollea, Pescatorea, etc., are restored to generic rank. *Vanda Cathcartii*, Lindl., is referred to Reichenbach's Esmeralda in preference to Blume's older genus Arachnanthe. A new genus Vandopsis is created for *Vanda Batemanni*, Lindl. But to continue the enumeration of the changes proposed by Dr. Pfitzer would more than weary the reader.

In this work, which is confined to cultivated species and hybrids belonging to the Tribes EPIDENDREÆ, VANDEÆ and CYPRIPEDIÆ, the sub-tribal divisions as defined by Bentham are strictly followed. Bentham's genera also are adopted with the exception of a few which he had reduced to others, but which we have restored for reasons given under each.

The number of species of orchids has been variously estimated from 5,000 to 10,000, the enormous disparity arising from the different views respecting the limitation of species entertained by different botanists. The lowest estimate is that of Mr. Bentham, with whom British botanists are generally in accord, while the higher estimate is accepted by those who incline to the practice of the late Professor Reichenbach. The limitation of species recognised in this work is that of the eminent French naturalist, and quoted by Professor Duncan in his address to the Linnean Society at the anniversary meeting in 1884. Lamarch defined a species as—

“A collection of similar individuals which were produced by other and similar individuals. This definition is exact, for every living thing *nearly* resembles that which produced it. That the species is constant

is not true; it is not distinguishable by invariable characters. Species only have a constancy relational to the duration of the circumstances under which the individuals have lived."

If we accept this definition of the species, it is evident that plant forms of similar origin and structurally resembling each other may be brought under one species if safeguarded by the precaution not to allow too great expansion in application. On the other hand there is a tendency among some continental botanists and also among horticulturists both British and foreign to adopt as specific every deviation from a certain type; the number of species of orchids may thence be indefinitely multiplied.

The affinities of the ORCHIDÆ are remote. Bentham places them between BURMANIACEÆ with which they agree in the structure of the seed, a family of over fifty species dispersed over the hotter regions of the globe in both hemispheres, not one of which is probably in cultivation in other than botanic gardens, and SCITAMINEÆ, a much larger family, also tropical and including genera with a habit by no means unlike that of many orchids. The Irids have often been likened to orchids on account of the remarkable and gorgeous colours of the perianth segments of many species.

A RETROSPECT OF ORCHID CULTURE.

The earliest attempts to cultivate epiphytal orchids in this country were crude and unsatisfactory. Such would naturally be the case in the almost total absence of any certain knowledge of their nature and habits in their native homes; and moreover the glass-houses into which they were introduced were of very imperfect construction both as regards heating and ventilation. It was therefore not to be wondered at that under these circumstances, orchid culture at its commencement should have been disappointing.*

One of the first tropical orchids that became established in British hot-houses seems to have been the *Vanilla* which was known to Miller, the second edition of whose *Dictionary of Gardening* was published in 1768;† it is uncertain which species was cultivated by Miller, probably more than one. Miller also enumerates several species of *Epidendrum*, some of which must have been known to him in a living state, for he says:—"The plants cannot by any art yet known be cultivated in the ground, though could they be brought to thrive, many of them produce very fine flowers of uncommon form." Three species sent from America, which he planted with care in pots and placed in a stove, produced flowers; but the plants soon after perished.

In 1778, Dr. John Fothergill brought home from China among other plants introduced for the first time *Phaius grandifolius* and *Cymbidium ensifolium*;‡ the first-named flowered shortly afterwards in the stove of his niece Mrs. Hird, at Apperley-Bridge, Yorkshire. In 1787, *Epidendrum cochleatum* flowered for the first time in this country in the Royal Gardens at Kew, and *E. fragrans* in the following year. The last-named species was also brought from the

* Much of what follows is reproduced from a paper read before the Royal Horticultural Society, June 11th, 1889, by H. J. Veitch, on *Orchid Culture Past and Present*, and subsequently published in the *Journal of the Society*.

† A dried specimen of *Bletia verecunda* was sent to Peter Collinson in 1731 from Providence Island, one of the Bahamas; but the tuber appearing to have life in it, he sent it to the garden of a gentleman named Wager, where it was placed in a hot-bed and grew and flowered in the following summer. This was probably the first tropical orchid cultivated in England.—*W. E. Hemsley* in *Gard. Chron.* l. s. 3 (1887), p. 381.

‡ *Bot. Mag.* sub. t. 1924.

West Indies in 1789 by Commodore Gardner, and presented by him to the Apothecaries' Garden at Chelsea, where it was cultivated by Mr. Fairbairn, the Curator, in pots of earth composed of rotten wood and decayed leaves, plunged into the tan bed of a pit.* In 1794, fifteen species of epiphytal orchids are recorded as being cultivated in the Royal Gardens at Kew, most of which had been brought from the West Indies by Admiral Bligh and other officers employed in that region. They included *Ornithidium coccineum*, *Oncidium altissimum*, *On. carthaginense*, *Lycaste Barringtoniæ*, *Epidendrum ciliare*, *Isochilus linearis*, etc., all of which at that time were referred to *Epidendrum*. They were cultivated in the stove in very great heat with fragments of half-rotten bark at their roots. Before the end of the century ten more species were added to the list, but none of them of any interest horticulturally.

As a consequence of the political circumstances of the times, the first epiphytal orchids received in England were brought from the West Indies, chiefly from Jamaica, by naval officers and by captains in the merchant service who gave no certain information respecting the habits of the plants and their environment in their native country beyond the bare fact that nearly all of them grew upon trees. They were thence believed to be parasites like our Mistletoe, a belief that became so firmly rooted that it prevailed for many years even after their true nature had been ascertained. The prevalence of this belief was prejudicial to the progress of orchid culture, for it induced attempts at cultivation that were necessarily futile. The editor of the *Botanical Register* under *Epidendrum nutans*, tab. 17 (1815), quaintly remarks that "the cultivation of tropical parasites was long regarded as hopeless; it appeared a vain attempt to find substitutes for the various trees each species might affect within the limits of a hot-house."

Nevertheless epiphytal orchids continued to be imported, and even in those days when a voyage to or from the West Indies occupied two months, their extraordinary tenacity of life after removal from the trees on which they were found growing was observed. Of the treatment the plants received we can only here and there catch a glimpse from the occasional notes that appeared from time to time in

the *Botanical Magazine*, which had been founded by William Curtis in 1787, and from the earlier volumes of the *Botanical Register*, founded by Sydenham Edwards in 1815. From the foregoing extracts and from others of a like kind we gather that the first introduced epiphytal orchids were generally potted in mould formed of decayed wood and leaves, but sometimes in a mixture of loam and peat, and that the pots were kept constantly plunged in the tan bed of the stove. That they should soon succumb to such treatment seems to orchid growers of the present day a very natural consequence; nevertheless it was persisted in for many years.

The first fifteen years of the present century were overshadowed by the Napoleonic wars which retarded every art that can only flourish in times of peace. But yet, in the very throes of that tremendous struggle, the Horticultural Society of London was founded and obtained its charter of incorporation in 1809. From that epoch horticulture may be said to have entered into public life and to have received an impetus it never could have had from the isolated efforts of private individuals. Orchids, till then regarded more as curiosities than as subjects to be seriously taken in hand culturally, began to attract more notice; Messrs. Loddiges began to cultivate them for sale in their Hackney nursery about the year 1812, and they continued to be the principal commercial cultivators of them in Europe till the breaking up of their establishment in 1852. During this long period, the number of orchids introduced for the first time into cultivation by Messrs. Loddiges was very considerable and the influence obtained by the firm as authorities on orchid culture proportionately great, of which the contemporary botanical and horticultural literature affords ample evidence. About the year 1812 or a little later Dr. Roxburgh sent from India the first *Vanda*, the first *Aërides*, and the first *Dendrobium* that were seen alive in England. In that year too Messrs. Loddiges received a plant of *Oncidium bifolium* from a gentleman who brought it from Monte Video, and who informed them that it was hung up in the cabin without earth and continued to flower during a great part of the voyage home;* a statement that was then regarded as a traveller's tale and beyond the limits of credulity.

* Bot. Mag. sub. t. 1491.

The "air plants" as the *Vandas*, *Aërides* and *Saccolabiums* were then called, were a puzzle to the horticulturists of the second and third decade of the present century, and how profound was the prevailing ignorance of their true character may be judged from the following extract from the *Botanical Register* for 1817 under tab. 220, *Aërides* (*Sarcanthus*) *paniculatum*:—"Air plants possess the faculty of growing when suspended so as to be cut off from all sustenance but that derived immediately from the atmosphere. Plants of other genera of this tribe, and even of a different tribe are endowed with a like faculty; in none, however, can such insulation be considered as the state of existence which suits them best, but merely as one they are enabled to endure, as a carp is known to do, that of being suspended out of water in a damp cellar."

To keep alive an air plant for any length of time and to flower it was regarded as a feat of extraordinary interest. The first who seems to have accomplished it was Mr. Fairbairn, the gardener at Claremont, who flowered *Aërides odoratum* in 1813. How he succeeded may be related in his own words:—"I put the plant when first received into a basket with old tan and moss and hung it up in the pine house where it was exposed to the summer sun and to the fire-heat in winter. A tub of water was placed near it into which I could plunge the basket six or seven times a day, or as often as I passed it."* Some years later the same excellent gardener flowered *Renanthera coccinea* for the first time in this country.†

Towards the end of the second decade of this century Sir Joseph Banks had devised one of the most successful modes of treating epiphytal orchids then known and which he practised in his hot-house at Isleworth:—"He placed the plants separately in light cylindrical wicker baskets or cages of suitable width, of which the frame-work was of long slender twigs wattled together at the bottom, the upper portion being left open that the plant might extend its growth in any direction and yet be kept steady in its station, the ends of the twigs having been tied together by the twine that suspended the whole from the wood-work of the stove. A thin layer of vegetable mould was strewed on the floor of the basket on which the rootstock was placed and then covered slightly over with a sufficiency of moss to shade it and preserve a due degree of

* *Trans. Hort. Soc. Lond.* vol. VII. p. 499.

† *See* p. 130.

moisture.”* This was the first rude forerunner of our modern orchid basket and the first instance we find recorded of moss being used for surfacing. About this time we find Dean Herbert experimenting in orchid culture. In a letter to the secretary of the Horticultural Society of London, and published in the Transactions of the Society for the year 1820, he writes:—“I found no difficulty in establishing *Epidendra* on the stems of a tree by cutting a notch in the bark and inserting the plant like a graft and tying moss about it to support it till the young roots had attached themselves to the bark, but for want of sufficient moisture they did not make much progress. I have since adopted the following method of irrigating them—by placing above them a pot of water with a hole at the bottom through which a string passes nearly as large as the aperture, by means of which the water is gradually and continually conducted to the upper part of the parasitical plant.” From the context it appears, however, that the idea of supplying water to orchids in this manner had been communicated to him by Dr. Wallich, Director of the Botanic Garden at Calcutta, and who had used a similar contrivance there.

Loddiges at this time made their compost of rotten wood and moss with a small quantity of sand. Their orchid stove was heated by brick flues to as high a temperature as could be obtained by that means, and by a tan bed in the middle kept constantly moist by watering and from which a steamy evaporation was rising at all times without any ventilation from without. In 1825, they had in their stoves eighty-four species included in about thirty genera. Their method was imitated by probably all cultivators of orchids at that epoch, and into such hot steamy places orchids were consigned as soon as received, and into which, it was occasionally remarked, it was as dangerous to health and comfort to enter as it was into



Orchid basket used by Sir Joseph Banks in 1817. The plant is *Sarcophyllis paniculatus*.
(Copied from the Botanical Register.)

* Bot. Reg. III. sub. t. 220.

the damp close jungle in which *all* tropical orchids were then supposed to have their home.

About this period 1823—25 a change in the method of treating epiphytal orchids was made in the Royal Gardens at Kew. A portion of the end of the propagating house was set aside for them, and a bed was formed consisting of loose turfy soil interspersed with small portions of stems of trees on which plants were placed where many of them grew freely for a time, most of them rooting into the soil and clinging to the pieces of wood.* The only result obtained by this mode of treatment was, that the plants lived on a little longer than they had previously done. During the period 1824—27, Mr. Lockhart, Curator of the Botanic Garden, Trinidad, sent to the Royal Garden many of the orchids indigenous to the island including *Stanhopea insignis*, *Oncidium Papilio*, *Catasetum tridentatum*, *Ionopsis pallidiflora*, and others, some of them being sent growing on portions of branches as cut from the trees, and which being accompanied by instructions from Mr. Lockhart as to how they should be treated, eventually led to some improvement in orchid culture in England.

The want of success that attended the preservation of the plants for any length of time was supposed to be due to some peculiar difficulty in their cultivation, and it was resolved that an attempt should be made in the garden of the Horticultural Society to overcome it. A stove was accordingly set apart for their exclusive culture, and when subsequently Mr. (afterwards Dr.) John Lindley was appointed assistant secretary to the Society, the chief direction of it fell into his hands. "All the earliest experiments were unsuccessful, the plants were lost as quickly as they were received, and when a single specimen was preserved out of an entire collection, some success was thought to have been attained." This led Lindley to inquire more closely into the conditions under which orchids grew in their native countries, and which, if accurately ascertained, would, he believed, supply data for a more successful cultivation of them. The results of his inquiry and the inferences he drew from them are summarised in a paper which he read before the Society in May, 1830. It is evident from this paper that the information

* John Smith (primus), Curator of the Royal Gardens at Kew, in Gard. Chron. XXIII. (1885), p. 144.

he obtained was far too restricted, and held good only for a limited area; hence from such imperfect premises the conclusions could scarcely be otherwise than fallacious.

For example—The Society's collectors in Brazil informed him that "they *exclusively* occupy damp woods and rich valleys among vegetation of a most luxuriant description, by which they are embowered." The word "exclusively" was unfortunate, for we now know that most of the finest of the Brazilian *Cattleyas* and *Lælias* occur at considerable elevations and often in exposed situations. Dr. Wallich, to whom we owe the first introduction of many fine Indian *Dendrobes*, told him that "In Nepal, the thicker the forest, the more shady the trees, the richer and blacker the natural soil, the more profuse are the orchids. There they flourish by the sides of dripping springs, in deep shady recesses in inconceivable quantity, and with an astonishing degree of luxuriance." Dr. Lindley then proceeds to say that high temperature and excessive humidity are essential to the well-being of these plants. The hottest countries if dry and the dampest if cool are destitute of them, while there is no instance of a country both hot and damp in which they do not swarm, citing in illustration of this, the Malay Archipelago, the estuaries of the Ganges and Irawaddy, Sierra Leone, Madagascar, and the West Indies. He omits, doubtless quite unintentionally, all mention of the higher slopes leading to the *Tierra fria* of Mexico, both on the Atlantic and Pacific slopes, and also the higher zone of the Andean Cordilleras from Venezuela to Upper Peru, the region of the *Odontoglots*, *Masdevallias*, *Cattleyas*, etc., where the climate is both *cool* and *damp*, a region which Humboldt and Bonpland had proclaimed to the world many years before to be rich in epiphytal orchids of the most remarkable forms and of the most exquisite colours. At the same time it should be borne in mind that Griffith had not yet ascended the Khasia Hills, nor Sir J. D. Hooker and Cathcart the Sikkim Himalayas, nor Parish and Benson the mountains of Moulmein and Lower Burmah; the so-called temperate orchids of the Eastern hemisphere were unknown to Dr. Lindley at the date of reading the paper we have quoted.

From the data thus adduced Lindley framed his cultural recommendations, the most essential conditions of which were deep shade and excessive humidity, to which he added good drainage that appears previously to have been generally neglected, but making no mention of ventilation. So predominant had Lindley's influence become in all matters pertaining to orchids, whether as the chief botanical authority on them, or from the position he held in the Society, that the unhealthy *régime* of cultural treatment approved by him

became, as it were, the only orthodox one and was generally persisted in, in all its essential points, for a long series of years, so that when Mr. Bateman, about the year 1837, formulated a course of treatment for tropical orchids in the introduction to his *Orchidaceæ of Mexico and Guatemala* it differed but little from Dr. Lindley's recommendations except an important direction to give the plants a season of rest by reducing the temperature in winter and to attend to the condition of the atmosphere of the house. It is, however, only just to the memory of Dr. Lindley to add that when later, as more correct information came to hand respecting the habitats of orchids and their environment *in situ* he never hesitated to give cultivators a friendly warning—thus in the *Botanical Register* for 1835 under tab. 1699 (*Oncidium ampliatum*) we find the following remarks:—

“It is well known that the most considerable part of the epiphytal ORCHIDÆ is found in the greatest vigour in damp sultry woods of tropical countries; and accordingly we endeavour in our artificial cultivation to form an atmosphere for them as nearly as possible that which they would naturally breathe in such stations. That this is attended with very great success is obvious from such plants as the one now figured (*Oncidium ampliatum*), and from the numerous splendid specimens which are from time to time appearing in the collections of Earl Fitzwilliam, Lord Grey of Groby, the Messrs. Harrison, Bateman, Huntley, Loddiges, Knight and the Horticultural Society.

“But it is sufficiently evident that although this kind of treatment is admirably suited to a considerable number, there are others which grow most unwillingly, or scarcely survive under such circumstances. For instance *Dendrobium speciosum* languishes in situations where the Stanhopeas are in their greatest splendour; and the Chinese Bletias almost perish by the side of Eulophia and Zygopetalum. This arises from the great difference in their respective constitutions, which are each adapted to distinct conditions of life, and our failure arises from our mistaking a general principle for a universal law. If a great majority of the epiphytal ORCHIDÆ swarm in damp tropical forests, there is a considerable minority which live in an entirely different climate. Thus in the genus *Oncidium*, *On. nubigenum* is only found on the cool mountains of Peru (Ecuador) at the height of 13—14,000 feet; it will therefore require a treatment altogether distinct from many others of the genus. *Dendrobium moniliforme* again occurs only in Japan as far north as 37° or 38° or the parallel of Lisbon and is periodically subject to a very low temperature.”

And during his long editorship of the *Gardeners' Chronicle* Lindley

constantly published such items of information as came to hand that he believed would afford useful hints to cultivators.

The splendid specimens alluded to by Lindley were chiefly Brazilian *Maxillarias*, West Indian *Epidendra*, *Cataseta* and *Mormodes* from the hot valleys of Guiana and Central America, *Saccolabiums* and *Dendrobies* from the Indian jungle and the like; not the grand *Cattleyas*, elegant *Odontoglots* and brilliant *Masdevellias* that form the most conspicuous ornaments of the collections of our time, for such of these as were then imported were doomed to certain destruction in the hot steamy, unventilated stoves to which they were consigned on their arrival in England, and to the temperature of which they were as great strangers as to our severest winter frosts. And thus perished within a few months most of the earliest introduced *Cattleyas*, *Lælias*, *Odontoglots* and *Oncids*, but not without a protest from men who had seen them and other orchids growing in the temperate and cool alpine regions within the tropics. So early as 1835, Allen Cunningham reported to Dr. Lindley how different were the conditions under which Australian orchids grew in their native country from those to which they were subjected in the hot-houses of England, and that they should soon perish in them seemed to him but a very natural consequence.* Then followed Mr. G. Ure Skinner who gathered many orchids on the Cordilleras of Guatemala, Gibson who collected them on the Khasia Hills for the Duke of Devonshire, Gardner on the Organ Mountains, William Lobb on the Peruvian Andes, and Motley on the mountains of Java. These, one and all, gave monitory warnings against the folly of subjecting orchids which naturally grew in a temperate climate, to the stifling heat of an Indian jungle. In fact, it was high time such warnings should be given, for as private collections were being formed and multiplied and high prices were being paid for the choice kinds, epiphytal orchids were being poured into the country in a continually increasing stream, only too often to tantalise the purchasers with a transitory sight of their lovely flowers and curious forms, and then to languish and die. For more than half a century England was, as Sir Joseph Hooker once observed, "the grave of tropical orchids."

But a change of system was at length approaching, not brought about so much by the remonstrance of travellers like those just

* Bot. Reg. 1835, sub. t. 1699.

mentioned as by the intelligence and sagacity of a few practical gardeners on whom had been laid the responsibility of cultivating the costly collections of their employers. One of the first of these was Joseph Cooper, gardener to Earl Fitzwilliam at Wentworth, near Rotherham, Yorkshire. Dr. (afterwards Sir William) Hooker who visited the orchid house at Wentworth in 1835 was surprised at the degree of success with which the plants were cultivated there, and adds:—"I must confess that the sight of this collection, whether the vigorous growth and beauty of the foliage, or the number of splendid species blossoming at one time be considered, far exceeded my warmest anticipations." *Cooper's chief deviations from the established practice consisted in growing the orchids in a lower mean temperature and the admission of fresh air into the house.

Contemporary with Cooper and residing at a comparatively short distance from him was a far more eminent horticulturist and of whom it is not too much to say that through him was brought about in the course of time a greater improvement in orchid culture than was ever effected by any single man. This was Joseph Paxton, gardener to the Duke of Devonshire at Chatsworth. The Chatsworth collection began to be formed about the year 1833, and three years later it contained upwards of 300 species. In 1837 the Duke of Devonshire sent Gibson on a mission to the Khasia Hills which resulted in the addition of a large number of species from that region, many of them introduced for the first time into European gardens. The collection was also being constantly increased from various sources so that within ten years from its first formation it became the largest private collection in the country. With so large a range of subjects for observation and experiment and with the ample resources of Chatsworth at his command, Paxton gradually put into practice a more rational method of culture which eventually led to the cultural system now followed, although years elapsed before his example and teaching had any marked influence.

In 1834 Paxton commenced the publication of his *Magazine of Botany* which he continued to edit until December, 1849, when it was discontinued in the form in which he had founded it, but was followed for a short period by a similar serial edited by Dr. Lindley and called Paxton's *Flower Garden*, throughout which orchids occupy a prominent

* Bot. Mag. sub. t. 3395.

place. In the earlier volumes of the *Magazine* Paxton published various articles relating to the Chatsworth and other collections of orchids, and in them may be traced the steps by which he, in the first place, emancipated himself from the prevailing erroneous methods of treatment and afterwards gradually substituted more scientific and consequently more successful ones. Evidence of these were afforded to Dr. Lindley who visited Chatsworth in 1838 and who thus recorded his impressions:—"The success with which epiphytes are cultivated by Mr. Paxton is wonderful, and the climate in which this is effected, instead of being so hot and damp that the plants can only be seen with as much peril as if one had to visit them in an Indian jungle, is as mild and delightful as that of Madeira."* Then follows an account of the cultural treatment adopted at Chatsworth by Paxton of which the salient points need only be noted here; they were—separate houses or compartments of houses for orchids from different climates—a lower average temperature than was usually maintained by the cultivators of orchids at that time—a more efficient ventilation by which a larger volume of fresh air was admitted into the houses, especially during the growing season—the maintaining of a moist atmosphere by occasionally watering the paths and stages of the house—an improved method of potting with especial regard to efficient drainage and greater attention to root development.



Orchid baskets used by Loddiges about 1840.

(Copied from Paxton's *Magazine of Botany*.)

The example of Paxton and the frequent occurrence of failures in the collections under their charge were not lost upon many intelligent gardeners who had opportunities of becoming acquainted with Paxton or had access to his writings. Among the earliest of these was Donald Beaton, a man of remarkable industry and keen perception, and characterised by Sir William Hooker as "one of the ablest and most scientific gardeners of this country,"† and during

* Bot. Reg. XXIV. (1838) sub. t. 5 ex. Sertum Orchidaceum.

† Bot. Mag. sub. t. 3804.

the latter period of his life a regular contributor to the *Cottage Gardener* (now *Journal of Horticulture*). From the circumstances under which he was placed while gardener successively to Mr. Gordon at Hatfield, Mr. Harris at Kilburn, and Sir William Middleton at Shrubland Park, the two last named being amateurs of orchids, more than perhaps from choice, he paid much attention to these plants, and from his various contributions to the botanical and horticultural publications of his time it is instructive to trace the changes he successively made in his modes of treatment, changes that were impressed upon him by the force of accurate observation and reflection; how at first he adopted the erroneous practices then prevalent respecting orchid culture, but which he stigmatised as "hideous," "frightful" when, after a few years' experience, he had become one of the best cultivators of orchids of his time.



Miltonia Clowesii on a block of wood at Messrs. Loddiges in 1842.

(Copied from Paxton's *Magazine of Botany*.)

In 1836, while in the service of Mr. Gordon, he contributed some notes on orchids to Paxton's *Magazine of Botany*,* from which we extract the

* Vol. II. p. 263.

following passages, which are quite characteristic of his style :—"I never did nor never could purchase any of these plants, consequently I only in the first instance received the smallest bit of most of my plants, and I have succeeded far beyond my expectations. The last two winters I removed my larger plants from my regular orchid-house for wintering, and kept my smallest plants in a regular heat of from 70 to 80 degrees (F.), and had a good crop of cucumbers to the bargain. I never water them overhead in the winter, but the house is kept moist." He does not inform us how long he kept his plants alive under that treatment, but *experientia docet*, and no gardener was more apt to avail himself of the teachings of experience than Beaton, for five years later—when he was with Mr. Harris at Kilburn—we find him writing to Sir William Hooker on the treatment of some orchids that had been gathered in the high mountainous districts of Michoacan in Mexico by Galeotti, including *Lælia autumnalis*, *L. albida*, *L. glauca*, *Cattleya citrina*, *Oncidium leucochilum* and other well-known kinds, which he kept in a winter temperature of 40° to 45° F. (4° to 7° C.); he was thence one of the first who ventured to grow orchids in so low a temperature. He was apparently surprised at his own success, for he adds with remarkable foresight—"You will thus see how desirable it is for the extension of the cultivation of this family that we should procure all the species that are to be found in the higher altitudes in Mexico and other places, to enable amateurs of limited means to cultivate a few beautiful plants of ORCHIDÆ; for hitherto this fine tribe of plants has only been enjoyed by the wealthier classes."* From that time Beaton insisted upon more attention being paid than hitherto to the climatic conditions under which orchids grow, especially at high altitudes within the tropics, and the consequent necessity of adapting their cultural treatment accordingly.

About this time a pamphlet *On the Management of Orchidaceous Plants* was printed for private circulation by Mr. J. C. Lyons,† an amateur living at Ladiston, in Ireland. It contained a general essay on the cultivation of orchids and a calendar of operations, probably the first ever issued in a complete form. The cultural directions were mainly those followed by most growers at that period, but the author recommends a distinction being made between those orchids that grow naturally in shade in damp hot places, and those that grow in an elevated situation in a drier atmosphere and in direct sunlight. His chief deviation from the ordinary practice of his time was the admission of steam from

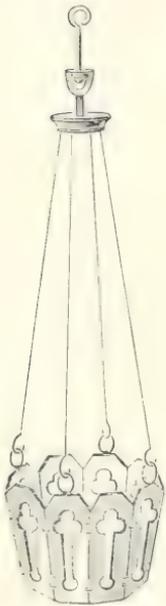
* Bot. Mag. sub. t. 3804 (1841).

† His name is preserved in *Schomburgkia Lyonsii*.

the boiler into the house every evening during summer, and by syringing the plants in imitation of a gentle shower "not driven against them with an upsetting force." His chief novelty was the use of slate baskets, the construction of which is shown in the accompanying woodcut copied from the *Gardeners' Chronicle*.

Contemporary with Beaton and prominent among the cultivators of orchids during the fifth decade of the century were Thomas Appleby, gardener to Mr. Brocklehurst, of The Fence, near Macclesfield; James Brewster, gardener to Mrs. Wray at Oakfield, Cheltenham; and a little later than these, George Gordon, Superintendent of the Horticultural Society's Garden at Chiswick; John Mylam, gardener to Mr. Sigismund Rucker at West Hill, Wandsworth; and the late Mr. B. S. Williams, of Holloway, at that time gardener to Mr. Charles B. Warner, of The Woodlands, Hoddesdon. The results of their experience which they communicated from time to time to the horticultural press together with the fine specimens of cultural skill they exhibited at the Horticultural Society's Shows at Chiswick and other places had a marked influence on the orchid culture of that and the following decade (1850—60), and did much to hasten the end of the unhealthy régime that had so long held sway.

Long, however, before this period a revolution had been slowly but surely effected, which had an enormous influence on the cultivation of plants under glass, and contributed in no small degree to the improvement in orchid culture that subsequently followed. This was the heating of glass-houses by means of hot-water pipes, which were first used for this purpose on a small scale by Mr. Anthony Bacon, of Aberaman in Glamorganshire, and afterwards by the same gentleman at Elcot, near Newbury. The inventor of the process is said to have been a Mr. Atkinson. The change from the system of heating by means of the brick flue with the tan bed to that of heating by hot water was nothing less than the substitution of an almost perfect control over the heating power with a great diminution of the labour of attending to the fires, for a very imperfect control with unremitting attention day and night; and added to this was



Orchid basket of slate used by Mr. J. C. Lyons.

the admission of fresh warmed air in lieu of no ventilation at all, to say nothing of the smoke and noxious vapours that were constantly escaping through the cracks and fissures of the flues.

With better appliances and with a more copious record of experience gained by different cultivators, and especially with the aid of more accurate information respecting the habitats and climate in which the species naturally occur, the cultivation of epiphytal orchids could scarcely fail to make some progress, but the progress was slow and along certain lines only, so that looking back upon the state of orchid culture forty years ago and upon what we are now accustomed to see daily, one can scarcely suppress a feeling of astonishment that its history should present to us the phase it does. During the decade 1840—50 the existence of the beautiful *Lælias*, *Odontoglots*, *Oncids* and other orchids inhabiting the highlands of Mexico and Guatemala had become well known from the discoveries of Skinner, Karwinsky, Galeotti and others; and the mission of Linden to Colombia in 1842—3 revealed to science and to horticulture the surprising wealth of *Cattleyas* and *Odontoglots* inhabiting the Cordilleras of that region, the existence of which had been foreshadowed in the beginning of the century in the works of Humboldt and Bonpland. These plants which are now found to be among the easiest of orchids to cultivate were, during the period under review, brought to Europe in considerable numbers but only to perish under the barbarous treatment in the hot-houses to which they were consigned.

Nevertheless epiphytal orchids in increasing numbers continued to arrive both from the east and west. Communications to the horticultural press respecting them became more frequent and more copious, and courses of cultural treatment were formulated for them by well-known cultivators. One of the most elaborate of these was communicated by Gordon and published in the *Journal of the Horticultural Society* for 1849, and which may thence be assumed to be the method of culture approved by the Council of the Society at that epoch. The system advocated in that paper was undoubtedly in advance of its time and was, as Gordon himself admits, at variance in some points with the methods commonly followed. Some of the fundamental principles of orchid culture enunciated by Gordon were vitiated by assumptions that became

very prevalent at that time but were not then known to be fallacious; for instance—he held that the climates (temperatures) in which orchids grow naturally should be imitated as closely as possible in the glass-houses in which they were cultivated—thence leaving out of consideration other phenomena attendant on climate and on account of which it is impossible to imitate artificially, and in very many cases even approximately, the climate of a tropical region in the glass-houses of a country situated in so high a latitude as ours. He also accepted the common belief of that period and which was only dispelled after a long series of losses and disaster, that *the supply of fresh air required by orchids is but small*, and he accordingly recommended that the houses in which they were cultivated should be ventilated at the top only.

In 1851 appeared a series of articles in the *Gardeners' Chronicle* by Mr. B. S. Williams entitled "Orchids for the Million," adopting a popular phrase of the period but which was not destined to be realised in the sense intended by the author. These articles with some additions and alterations subsequently formed the first edition of *The Orchid Grower's Manual* which with the following editions obtained a large circulation and exercised a considerable influence on orchid culture for many years afterwards. The cultural details recommended by the author and put into practice by him at Hoddesdon approach more nearly the cultural routine followed at the present time than any course of treatment that had previously been formulated. They mark with tolerable distinctness the degree of progress attained in orchid culture at the epoch of publication and show the gradual transition that was being made towards the more successful methods of the present time. With the view of bringing this clearly before the reader we have put in a condensed form the fundamental principles of orchid culture enunciated by Mr. Williams in 1851. From the papers we are quoting it is clear that the author shared in the prevalent belief that the temperatures (climates as they were then called) in which orchids grew naturally should be imitated in practice, the possibility of imitating those climates in all their bearings not having been then realised, and he accordingly gives somewhat higher temperatures than those now generally maintained. To the following directions, however, few exceptions can be taken by cultivators.

Orchids must have a period of rest in a dry and comparatively cool atmosphere, and during growth a high temperature and moist atmosphere should be maintained.

A moist atmosphere may be maintained by "damping down," that is to say, by sprinkling water over the stages, walls, and paths of the houses.

Water should be applied according to the season of the year, withheld in winter, given copiously during active growth, a gradual increase in quantity after growth commences and a gradual decrease when the season's growth approaches completion.

Pots according to the size of the plants should be used with an ample drainage of broken crocks and charcoal. The compost should consist of fibrous peat and sphagnum moss.

For *Aërides*, *Vandas*, *Phalænopsis*, *Saccolabium*s and other Indian orchids, and also *Angræcum*s, blocks of the wood of the apple, pear, plum or even of cork if obtainable are best; or baskets made of hazel or maple wood.

Hot-water pipes should be used for heating the houses. Fresh air should be admitted by ventilators near the ground close to the hot-water pipes, and egress allowed by ventilators at the top.

The plants should have as much light as possible. Shading should be used on hot bright days and at such times as when there is risk of injury to the foliage.

And yet so deeply rooted was the notion that all orchids *must* be cultivated in a hot and damp atmosphere that the admonitions and teachings of the orchid growers we have named seem to have had but little effect generally. Cattleyas, *Odontogloss*ts and other orchids from the temperate region of the Central and South American Cordilleras were in most collections placed in the East Indian house, to the heat and close atmosphere of which they soon succumbed. To such an extent were the losses felt that Lindley in a remarkable article published in the *Gardeners' Chronicle* towards the end of 1859 pronounced their treatment "a deplorable failure," and which Mr. Bateman a few years later characterised as "incredible folly."* But the spell which had held orchid culture in thralldom for more than thirty years was at length broken; the wisdom of the advice vainly tendered so long ago by Paxton, Beaton and others began to be recognised and put into practice. Separate houses or compartments of houses better constructed and better ventilated, in which warm, intermediate, and

* Monograph of *Odontoglossum*, Intr. p. 1.

cool temperatures were maintained, were in use for most orchid collections at the beginning of the seventh decade. With the simultaneous dispatch of Weir by the Royal Horticultural Society, of Blunt by Messrs. Low and Co. of Clapton, and of Schlim by M. Linden of Brussels, was inaugurated a new era in orchid culture.

We have now arrived at an epoch within the memory of most living cultivators and which may not be inaptly regarded as the commencement of the period of modern orchid culture. In the body of this work we have given the routine of cultural treatment mainly adopted by the most successful cultivators of the present time. With improved means and appliances and with a more accurate knowledge of the physical conditions under which they grow in their native country, the cultivation of very many of the finest epiphytal orchids from the tropical regions of both the Old and the New World has become as assured as that of the most ordinary stove and greenhouse plants. Added to this the greatly increased facilities of importation, combined with more rapid transport, have resulted in bringing them within the reach of a much larger circle of amateurs.

Still much remains to be accomplished, but past achievements should encourage future efforts, and there is surely no reason to despair; let us rather keep in view the defects that remain and try to discover a remedy for them. To cite instances:—Not many can yet boast of growing successfully for half-a-dozen consecutive years such orchids as *Cattleya citrina*, *Laelia albida*, *L. majalis*, *L. furfuracea*, *L. autumnalis*, *Epidendrum vitellinum*, *B. nemoralis* and others from the Mexican highlands. The great genus *Oncidium* is known to include more than three hundred species, of which number more than one-half have at one time or another been introduced into European gardens, but scarcely one-sixth of these have yet proved amenable to the most assiduous care that has been bestowed upon them. *Oncidium Jonesianum*, one of the most admired of the genus and eagerly sought after by all amateurs, was imported for the first time in considerable numbers in 1878, but in less than five years afterwards scarcely a single plant remained alive in Europe. The fasciculate *Dendrobies* afford another instance of a group of orchids that often prove provokingly disappointing to the cultivator; of the

included species, *Dendrobium Bensoniae*, *D. Wardianum*, *D. crassinode*, *D. Devonianum*, *D. lituiflorum*, *D. MacCarthiae* and many others are notoriously short-lived in the orchid houses of Europe. Several fine Dendrobies of the *Formosae* (nigro-hirsute) group even when imported in large masses gradually decline after their first flowering till they die outright. The Australian Dendrobies too, a most curious and interesting group, have never, with two or three exceptions, been successfully cultivated; but the climate of Australia with all its attendant phenomena is now as well known as that of Wales or Cornwall, and the conditions under which the plants grow are clearly understood; better results than hitherto should thence be looked for. A few more instances must not be passed over—a lovely section of Epidendra, known in gardens as Barkerias, have thus far baffled the efforts of the most experienced cultivators; the noble group of Zygotepala belonging to the sections HUNTLEYA, BOLLEA and WARSCEWICZELLA refuse to thrive in our houses; and lastly such remarkable orchids as *Chysis bractescens*, *Cattleya superba*, *Colax jugosus*, *Grammatogis Ellisii*, *Diacrium bicornutum* and others that could be named are still regarded as difficult plants to cultivate, in which category must also be included that wonderful series of orchids with unisexual flowers referred to Catasetum and Cycnoches, and the scarcely less strange but closely allied genus Mormodes.

There is thence a wide field still open for the exercise of cultural skill, and a long list of species remain to be rendered tractable to cultivation. It is, however, satisfactory to note that much is being accomplished in the desired direction and that the records in the horticultural press of the successful treatment of plants hitherto refractory, are becoming more frequent from year to year.

ORCHID AMATEURS OF THE PAST.

Our retrospect of orchid culture would be imperfect without some notice of the most prominent amateurs of orchids who formed collections chiefly between 1825 and 1850, for prior to the first-named date epiphytal orchids were regarded as little else than curiosities for Botanic Gardens and beyond the sphere of the cultivator of ordinary plants. We introduce this notice with the object of preserving from oblivion the honourable mention made of disinterested but withal enthusiastic ladies and gentlemen in contemporary botanical and horticultural publications which are now but rarely consulted except by botanists, for through them a large number of beautiful plants were brought for the first time within the cognisance of science and horticulture, and which contributed more than any cause that we know of to promote orchid culture in this country.

One of the earliest and most eminent of these was Mr. William Cattley, of Barnet, to whom the noble genus *Cattleya* is dedicated. He was not only a cultivator but an introducer of exotic plants, and through his correspondents abroad he was enabled to enrich the stoves and greenhouses of this country with several beautiful species previously unknown. At his death in 1832 his collection passed into the hands of Mr. Knight, of Chelsea. Contemporary with Mr. Cattley and surviving him were Mrs. Arnold Harrison and Mr. Richard Harrison, of Liverpool, whose collections of orchids, consisted chiefly of South American species which were sent to them by their brother Mr. William Harrison, a merchant residing at Rio de Janeiro, through whom many fine Brazilian orchids were received for the first time in England. The name of the lady is kept in remembrance by *Bifrenaria Harrisoniæ*, and that of Mr. W. Harrison by *Oncidium Harrisonianum*. Mr. Bateman states that Mr. Richard Harrison was the first to commence the practice of growing "specimens," and his residence at Aigburth became a sort of Mecca to which the faithful orchid grower made his annual pilgrimage.* His collection was dispersed in 1842.

We may here mention two other ladies of Liverpool who "taking

* Orch. Mex. et Guat. Introduction.

advantage of the commercial facilities of the town and by its intercourse with the New World have introduced from thence its most beautiful productions.”* One was Mrs. Moss, of Otterspool, whose name is commemorated in the popular *Cattleya Mossiæ*. The other was Mrs. Horsfall, after whom was named the beautiful *Ipomœa Horsfalliæ* by Sir William Hooker.

During the period 1830—40 was formed the celebrated collection of Earl Fitzwilliam at Wentworth Woodhouse, near Rotherham, already referred to.† The genus *Miltonia* commemorates the great services rendered to Natural History by that nobleman. Also the still more celebrated one at Chatsworth, for many years superintended by Mr. (afterwards Sir Joseph) Paxton. *Cymbidium Devonianum*, *Dendrobium Devonianum*, *Galeandra Devoniana* will carry the memory of the Duke of Devonshire who formed it, far into the future. On a more modest scale than these was that of the Rev. J. T. Huntley in Huntingdonshire, whose name is preserved in the section HUNTLEYA of *Zygopetalum*. One of the motives for taking up the cultivation of orchids was peculiarly his own and is thus expressed by Mr. Bateman—“he liked the plants because those fiends, the hybridisers, could not touch them.”‡

In friendly correspondence with Mr. Huntley and, in fact, with most orchid cultivators of note of that period was Mr. Bateman himself, the most accomplished amateur of his time, the patriarch of “Orchid Worthies” and still providentially with us, but who has long since given up the cultivation of his favourites. It was his intention to have written a short sketch of his career as a cultivator of orchids for this work, but the infirmities of age have rendered its fulfilment impossible; the loss of his personal narrative will be deplored by every lover of orchids, whilst the cause of it cannot fail to awaken the warmest sympathy. In a letter to Mr. Veitch, dated Friday (March 9th, 1894), he writes:—

“I gladly undertook to send you some of my *acta* as an orchid grower, but alas, I find it cannot be done. A year ago I found myself compelled to give up writing for a Protestant newspaper on account of pains in the head caused thereby, and I now find a similar

* Bot. Mag. sub. 3669 (1839).

† See p. 118.

‡ Orchid Conference, Journ. of Royal Hort. Soc. p. 49. It is needless to conjecture what his views would have been had he been spared so long as his friend Mr. Bateman.

obstruction when I attempt to write for you. I thought it would have been a much easier task, but I am painfully deceived, for although I tried every day to squeeze something out of my brain nothing came except the little MS. sent herewith."

We insert the contents of the little MS. with feelings of unfeigned respect; to this short narrative there must ever be attached an exceptional interest as the latest production of the venerable amateur who has watched the progress of orchid culture through the greater part of the century.

Early Struggles.—"I was devoted to orchids long before I knew what an orchid was, indeed, the word itself was quite strange to me when I heard my mother apply it to a beautiful plant with spotted leaves and speckled flowers which I had gathered in a country lane and regarded with great admiration. 'That,' she said, 'is an orchis' (*O. mascula*). I must have been then about eight years old, but I was more than eighteen when, the scene being shifted to Oxford, I stepped into a nursery situated where Keble College now stands and kept by the veteran Fairbairn, who had been gardener to Prince Leopold and Sir Joseph Banks.* This sealed my fate! Presently Mr. Fairbairn drew my attention to a curious plant with a few leathery leaves and several stout roots feeling their way amongst a number of small pieces of wood to which it was expected they would become permanently attached. 'Here,' he said, 'is a piece of the famous Chinese air-plant (*Renanthera coccinea*) which flowered under my care when gardener to H.R.H. Prince Leopold, at Bushey Park; would you like to see a drawing of it?' 'As you please.' It was certainly a vision of beauty that Mr. Fairbairn, opening a volume of the *Botanical Magazine*, t. 2997—2998, shewed me, for here was a perfect portrait of the Chinese air-plant, full size and correctly coloured. Of course I fell in love at first sight, and as Mr. F. only asked a guinea for his plant (high prices were not yet in vogue), it soon changed hands and travelled with me to Knypersley when the Christmas holidays began. I had caught my orchid, but how to treat it I knew not."

This was the beginning of the collection afterwards formed by Mr. Bateman at Knypersley Hall, in Cheshire, which he enriched by sending a collector at his own expense to Demerara in 1833, but although the mission fell short of expectation, the success was sufficient to encourage others to embark in similar adventures. He was soon afterwards more than compensated for the disappointment by Mr. George Ure Skinner, a merchant trading with Guatemala, at

* See p. 112.

that time an unworked mine in Natural History, and where there was believed to be a rich store of orchids. Having heard of Mr. Skinner through the specimens of birds and insects which he presented to the Natural History Museum at Manchester, Mr. Bateman wrote to him in March, 1834, and explained by means of sketches of some orchids what kind of plants he wished to see introduced from that country into England. Mr. Skinner responded to the appeal in a manner that far exceeded the expectation of the writer, and in less than ten years all the finest orchids of Guatemala were in cultivation in British gardens, most of which flowered for the first time in Mr. Bateman's stove at Knypersley. The many new and beautiful orchids thus brought to light, together with the energy displayed by that gentleman both in practice and by his publications to promote orchid culture, secured for him a very prominent position among the orchid authorities of this country. So early as 1837 Sir William Hooker dedicated to him the volume of the *Botanical Magazine* for that year which Mr. Bateman fancifully designated the ANNUS MIRABILIS of Orchidology.

It was in 1837 that Gibson brought to Chatsworth the rich collection he gathered on the Khasia Hills. In that same year Mr. Skinner sent to England the finest of the Guatemalan orchids; Cuming sent home his first consignment from the Philippine Islands including the first *Phalænopsis* received alive in England, a single plant of *P. Aphrodite*. The brothers Schomburgk made their first contribution from British Guiana; and lastly a Frenchman named Deschamps brought from Vera Cruz a large consignment of Mexican orchids, nearly the whole of which was disposed of in England. Probably not less than 300 species were seen in England for the first time in that memorable year. The Orchidomania which had been rapidly spreading became greatly intensified by such an unusual addition of new forms. "From that time houses for their accommodation were raised in every direction; pots for their exclusive use were sold in the shops of London; their blossoms were imitated by the most fashionable manufacturers of artificial flowers; and the most munificent prizes were offered by horticultural societies for the finest specimens."*

Probably no one contributed more to bring about this great change in the aspect of orchid culture than Mr. George Ure Skinner, pre-eminently one of the "Orchid Worthies" of England, by whose untiring energy and disinterestedness the most beautiful orchids

* Batem. Orch. Mex. et Guat. Introduction.

of Central America became denizens for the first time of the glass-houses of Great Britain. The following particulars extracted chiefly from an address delivered before the Royal Horticultural Society in February 1867, by Mr. Bateman, will be read with interest:—

“From the moment he received the letter (*supra*) he laboured incessantly to drag from their hiding places the forest treasures of Guatemala and transfer them to the shores of his native land. In pursuit of this object there was scarcely a sacrifice he did not make, or a danger or hardship he did not brave. In sickness or in health, amid the calls of business or the perils of war, whether detained in quarantine on the shores of the Atlantic, or shipwrecked on the rocks of the Pacific, he never suffered an opportunity to escape him of adding to the long array of his botanical discoveries.”

“Never shall I forget my delight,” says Mr. Bateman, “on opening the first box of orchids he sent me, all carefully packed and in the best possible condition. Though gathered at random every plant was new. Masses of *Epidendrum Skinneri* (the first to flower and thence named after him) divers other Epidendra, *Oncidium Cavendishianum*, *On. leucochilum*, and *Odontoglossum bictonense*, the first Odontoglot that ever reached England alive.”

His subsequent discoveries and introductions are noted in their respective places in the Synopsis of Genera and Species that follow; it is sufficient to mention here *Cattleya Skinneri* and *Lycaste Skinneri* which alone will keep his name in memory so long as orchids continue to be cultivated. And among his other discoveries, *Schomburgkia Tibicinis*, *Epidendrum enemidophorum*, *E. Stamfordianum* and *Odontoglossum grande* have an exceptional botanical interest in addition to their great horticultural merit.

Mr. Skinner also made many valuable contributions to ornithology, and the collections of birds in this country were enriched by him with many rare and beautiful specimens, including several species of humming birds.

After the dispersion of Mr. Bateman's collection, Mr. Skinner greatly assisted the Polish collector Von Warscewicz, who brought to Europe many beautiful orchids previously unknown,* for such was his enthusiasm for orchids that either personally or through his agents he continued to search for new species to the end of his life. His later collections were entrusted to his friend, the late James Veitch of Chelsea. He died at Aspinwall, on the isthmus of Panama, January 9th, 1867.

While Mr. Bateman was cultivating orchids at Knypersley, two

* Warscewicz's most interesting discoveries were made in 1848—9, during a very difficult and dangerous journey on foot with Indians along the mountain route from Chiapas in Mexico to Panama.

other collections in that part of England obtained considerable celebrity among orchid amateurs. One belonged to the Rev. John Clowes at Broughton Hall, Manchester; the house in which his collection was cultivated was of somewhat novel construction, the most prominent feature of it being a raised central gallery from which the plants placed on the shelves of a sloping stage on each side could be viewed from above.* His collection was left by will to the Royal Gardens at Kew, whither it was removed on the death of Mr. Clowes in 1846. The fine *Anguloa* from South America worthily commemorates his name. The second collection was that of Mr. Thomas Brocklehurst at The Fence, near Macclesfield, mentioned in the previous article; † his name is kept in memory by the type



Orchid baskets used by the Rev. John Clowes,
(Copied from Paxton's *Magazine of Botany*.)

species of *Houlletia*. Contemporary with these was another collection that had been formed by Sir Charles Lemon, at Carclew in Cornwall, and which appears to have been an extensive one for that period. Several fine orchids were communicated from it to Dr. Lindley for figuring and description in the *Botanical Register*.

Far superior to these collections in the number of species and varieties cultivated and in the length of time it was maintained in efficiency was that of another distinguished "Orchid Worthy," Mr. Sigismund Rucker at West Hill, Wandsworth, which had its commencement towards the end of the fourth decade and which was not finally dispersed till the death of that gentleman in 1875. The

* A plan of this house is given by Mr. Bateman in the Introduction to the *Orchidaceae of Mexico and Guatemala*.

† See p. 122.

house in which Mr. Rucker's orchids were first cultivated seems to have been better constructed than the orchid houses generally of that period, being more roomy and susceptible of better ventilation;* a circumstance which doubtless contributed much to the great success attained by Mr. Rucker in that early period of orchid culture, and whose specimens when exhibited rarely failed to secure the highest



Vanda Roxburghi as cultivated by Mr. Sigismund Rucker in 1840.
(Copied from Paxton's *Magazine of Botany*.)

awards at the various horticultural exhibitions in and around London. *Anguloa Ruckeri*, *Dendrobium Ruckeri* and other species were dedicated to him.

At the time Mr. Rucker began to cultivate orchids Mr. George Barker, of Springfield, near Birmingham, possessed one of the best

* A plan of Mr. Rucker's first orchid house is given in the Introduction to Mr. Bateman's *Orchidaceæ of Mexico and Guatemala*.

collections of them in the Midlands which he greatly enriched by sending Ross, one of his gardeners, on a special mission to Mexico to collect the best orchids of that country. Ross started on his mission in 1837, the *annus mirabilis* of orchidology, but his collection did not reach England till the following year. It included the beautiful *Odontoglossum Rossi*,* *Acineta Barkeri* and many others noted in their respective places in the following pages. Mr. Barker subsequently



Lycaste Skinneri in Mrs. Wray's collection at Oakfield, Cheltenham, in 1845.

(Copied from Paxton's *Magazine of Botany*.)

joined with Mr. Rucker, the Rev. John Clowes and a few others in contributing to the expenses of Linden's mission to Colombia in 1842—3. His name is commemorated by Lindley's genus *Barkeria*, now made sectional under *Epidendrum*. After his death in 1845 his collection passed into the hands of Mr. Blandy, of Reading. During Ross' mission to Mexico and for a short time after his

* This is probably the *Odontoglossum apterum* of the Mexican botanists La Llave and Lexarza.

return many species of the ORCHIDÆ and CACTÆE of Mexico were sent to the collections of the Duke of Bedford at Woburn Abbey and Mr. Harris, of Kingsbury, by Her Majesty's Consul-General, Mr. John Parkinson.

Before the fifth decade of the century was far advanced two lady amateurs had acquired a high reputation in the horticultural world an account of their extensive collections of exotic plants, especially of orchids which were regarded at the time as among the best cultivated in the country. These were Mrs. Wray, of Oakfield, Cheltenham, to whom Sir William Hooker dedicated the 67th volume of the *Botanical Magazine* (1841), and Mrs. Lawrence, of Ealing Park, to whom he dedicated the volume of the following year. In one of the earliest numbers of the *Gardeners' Chronicle** a description with figures is given of the orchid house at Ealing Park, of which Dr. Lindley observed that it was precisely that which theory would have suggested for such a purpose. Like that of Mr. Rucker's at Wandsworth, it seems to have been an improvement on the houses generally used for orchid culture at that epoch, and in it were grown the many fine specimens that afterwards obtained the highest awards at the shows of the Horticultural Society at Chiswick, and of the Royal Botanic Society at Regent's Park. The influence of Mrs. Lawrence in promoting horticulture was, however, far more reaching in its effects after her death than during her lifetime, for her love of plants was inherited in a still higher degree by her son, Sir Trevor Lawrence, Bart., the respected President of the Royal Horticultural Society.

In friendly competition with these and other amateurs of that time at the shows of the Horticultural Society at Chiswick and the Royal Botanic Society at Regent's Park was Mr. Charles B. Warner, of Hoddesdon, who exhibited many fine specimens of cultural skill in orchids from his collection, which was under the charge of the late B. S. Williams. In the enumeration of the species cultivated at Hoddesdon† we miss the grand *Cattleyas* of the *labiata* group, the finest of the *Odontoglots* from the Cordilleras of Colombia and Peru, and the brilliant *Masdevallias* from the same region; but

* No. 3, vol. I. p. 26 (1841), and reproduced in vol. IX. ser. 3 (1891), p. 8.

† Gard. Chron. 1851, *passim*.

the last-named genus was scarcely known to horticulturists at that time; we find, however, Stanhopeas, Coryanthes and Cycnoches well represented, an evidence of these interesting genera being appreciated by the amateurs of orchids of that period. Among other collections formed at this period, and which afterwards acquired a high reputation for their extent and the success with which they were cultivated, should be mentioned that of Mr. Robert Hanbury at Stamford Hill, subsequently removed to The Poles, near Ware; and that of Mr. J. D. Llewelyn at Penllergare, Swansea, the latter still maintained in a high state of efficiency by his son, Sir J. T. D. Llewelyn, Bart.

Mr. Rucker's collection of orchids at West Hill, Wandsworth, has been mentioned above as having been maintained in efficiency for the long series of upwards of forty years, a somewhat rare fact in the early history of orchid culture. During that long period the successive improvements introduced were adopted till the modern methods of cultural treatment became fully applied. This collection thence historically connects the present state of orchid culture with that of the past. While the West Hill collection was still in its infancy another was being formed by one of the worthiest of the "Orchid Worthies," and which was maintained for as long a period and in like manner passed through the various phases of orchid culture described in the preceding pages. The collection we allude to was that of the late Mr. John Day at Tottenham, and with a short notice of this and the owner we may appropriately conclude our retrospect.

In Mr. John Day orchidology had one of its most ardent votaries, for although he had among his earlier contemporaries Mrs. Wray of Cheltenham, Mrs. Lawrence of Ealing, and Mr. Rucker of Wandsworth and other familiar names, he soon acquired a distinguished position among the amateurs of that period, all of whom he long survived and at length remained well nigh the sole connecting link between the older pioneers in orchid culture and the amateur growers of the present time. Mr. Day first acquired a love of orchids from occasional visits to the nurseries of Messrs. Loddiges at Hackney, from whom he purchased the first batch of plants that formed the nucleus of his collection at Tottenham. From that time he followed up his favourite pursuit with all the ardour of an enthusiast, constantly acquiring novelties till his collection became one of the

richest and most famous in Europe. In this collection many of the most admired orchids flowered for the first time in this country and among them were *Odontoglossum crispum*, *Aërides crassifolium*, *Angreecum Ellisii*, *Cattleya Walkeriana*, *Lælia elegans Wolstenholmie*, named after Mr. Day's sister, *Cypripedium Stonei* and its wonderful variety *platytenium*, of which he acquired the only plant that has ever been imported. Mr. Day's love of orchids led him to travel to their native homes with the object of better understanding their habits and environment *in situ*; the districts selected for this purpose were northern and southern India, Ceylon, Jamaica and Brazil, all of which with the exception of the first named he visited within the last ten years of his life; in fact, no amateur of his time possessed a greater practical knowledge of orchids than Mr. Day, whose name will be perpetuated into the far future by *Cælogyne Dayana*, *Cypripedium Dayanum*, *Lælia pumila Dayana*, *Cryptophoranthus Dayanus* and others.

SOME RESULTS OF THE HYBRIDISATION OF ORCHIDS.

The most striking development in the orchid culture of the present time is seen in the raising of hybrids and *métis* or mixed forms not immediately derived from two recognised species. To such an extent is muling being carried on, not only in the establishments of professional growers but also in the collections of amateurs, that among Cypripedes, at least, the progenies so obtained have become as varied in colour and form as those of many of our most familiar florists' flowers. In *Cattleya*, *Lælia*, *Calanthe*, *Dendrobium*, *Masdevallia* and *Phaius* hybrid forms are now very numerous; in other less popular genera the progress of muling has been much slower, so that in none of them does the number of hybrids raised artificially at present (1894) exceed half-a-dozen, while in some of them it is restricted to one or two. Nevertheless scarcely a year passes without a new genus being added to the list of those in which hybrids

have been obtained, and not only so but even bigeneric hybrids or hybrids between species of different genera are on the increase.

The hybridisation of orchids in its scientific aspect has been already touched upon.* Its history and progress may now be traced and some of the most important results enumerated.

One of the first, probably *the* first to attempt to raise orchids from seed produced by the cross fertilisation of different species was Dean Herbert, who has obtained an enduring name in science for his masterly systematic arrangement of the AMARYLLIDEE, and in horticulture for having been the first to raise hybrid Narcissi and other hybrids in the genera included in the family of plants he so long and so assiduously studied. In a paper "On Hybridisation among Vegetables" published in the Journal of the Horticultural Society of London for 1847† occurs the following remarkable passage:—

"Cross-breeding among orchidaceous plants would perhaps lead to very startling results; but unfortunately they are not easily raised from seed. I have however raised *Bletia*, *Cattleya*, *Herminium monorchis* and *Ophrys aranifera* from seed; and if I were not during the greater part of the year absent from the place where my plants are deposited I think I could succeed in obtaining crosses in that Order. I had well-formed pods last spring of *Orchis* by pollen of *Ophrys* as well as of other species of *Orchis* which had been forced; and if I had remained on the spot I think I should have obtained some cross-bred orchidaceous seed. An intelligent gardener may do much for science by attempts of this kind if he keeps accurate notes of what he attempts and does not jump at immature conclusions."

Two years later an article "On Growing Orchids from Seeds" was contributed to the *Gardeners' Chronicle* by the late Dr. Moore, Curator of the Royal Botanic Garden at Glasnevin.‡ In this article he states that within the five years previous to its publication, seedlings of the following species were raised in the orchid house at Glasnevin, namely, *Epidendrum elongatum*, *E. crassifolium*, *Cattleya Forlesii* and *Phaius* (*Thunia*) *albus*, the seeds of which all vegetated freely. He gives no information respecting the fertilisation of the plants from which these orchids were raised, but it may be inferred from the tenor of the article that they were not hybrids but had been

* See page 89.

† Vol. II. p. 104.

‡ Gard. Chron. 1849, p. 549.

obtained from flowers fertilised with their own or with the pollen of other flowers of the same species.* Dr. Moore especially dwelt on the difficulty in preserving the young seedlings alive during the first year of their existence.

A little later, Robert Gallier, Gardener to Mr. Tildesley at West Bromwich in Staffordshire, communicated to the *Gardeners' Chronicle* an account of his attempt to raise orchids from seed.† In this communication he states that he crossed *Dendrobium nobile* with *D. chrysanthum* which produced a pod of seeds; he sowed these in three ways (on three different substrata), but only obtained five plants, and these he succeeded in keeping alive only for a few weeks. This is the earliest recorded instance we find of hybridisation among orchids being effected by a *bonâ fide* gardener; the evidence is, however, entirely his own and moreover the cross was an isolated one with very imperfect results, nor does it seem to have been followed by any further trial or experiment by the same operator.

At that period (1850—60) there was a prevalent notion among horticulturists that muling among orchids was an impossibility. To Dean Herbert and Dr. Moore, who were well acquainted with the structure of orchid flowers, their fertilisation by hand presented no difficulty; to horticulturists and gardeners it was quite different. Not only had they, in common with many others, not the slightest suspicion of the fertilisation of orchids by insect agency, but, moreover, very few of them possessed even an elementary knowledge of botany. They could, it is true, distinguish accurately the stamens and pistils of many flowers familiar to them, and they were aware of the functions of those organs, but the confluence of those organs into the solid column of an orchid flower was to them a profound mystery. It was unfortunate too that Dean Herbert's injunction to keep accurate notes of what was attempted was not followed in the early days of orchid hybridisation, whence the uncertainty that still hangs over the parentage of some of the earlier acquisitions.

Gallier's futile attempt detracts nothing from the credit due to Dominy as the first successful hybridiser of orchids who took up the

* Gard. Chron. 1849, p. 661.

† Dr. Lindley in Gard. Chron. 1858, p. 4, states that *Prescottia plantaginea*, a terrestrial orchid related to our native *Spiranthes* and *Neottias*, was raised abundantly from seed in 1822 in the garden of the Horticultural Society at Chiswick.

subject in our Exeter nursery about the year 1853. The possibility of muling orchids was suggested to him by Mr. John Harris, a surgeon of Exeter, who pointed out to him the reproductive organs seated in the column, and showed that the application of the pollinia to the stigmatic surface was analogous to the dusting of the stigma of other flowers with pollen.

This simple fact being once fairly grasped, the work of hybridisation proceeded apace, and from that time to the present experiments have been carried on uninterruptedly in our horticultural establishments. The flowers of showy species of *Cattleya*, *Lælia*, *Calanthe*, etc., were fertilised with the pollinia of other species, and even the flowers of supposed different but of course allied genera were also operated upon in the same way. Capsules were produced in abundance which in due course proved their maturity by dehiscing and thus the desired seed was at hand. Then arose a great difficulty, a difficulty which still exists, namely, to discover the most suitable method of raising seedlings. The seeds of orchids are minute chaffy bodies of extreme lightness; so minute are they that an ordinary pocket lens is powerless to enable one to know whether the seeds are likely to contain a germ or are mere lifeless dust. When growing wild it is evident that the contents of the mature capsules after dehiscence are more or less scattered by the wind, perhaps wafted to great distances until they settle on the branches of trees, on shelving rocks or other suitable substrata where the seeds can germinate and the seedlings firmly affix themselves. Following or at least believing that we were following Nature, so far as the altered circumstances of artificial cultivation allowed, every method or available means that could be thought of was brought into request to secure the germination of the seed. It was sown upon blocks of wood, pieces of tree-fern stems, strips of cork, upon the moss that surfaced the pots of the growing plants, in fact, in any situation which seemed to promise favourable results. Among the most cogent causes of failure in the raising of seedling orchids there can be no doubt that the greatest are the altered conditions of climate, especially the deficiency of sunlight, and the artificial treatment to which the plants are necessarily subject in the glass-houses of Europe. The capsules neither can nor do attain the perfection natural to them in their native countries, and it is more than probable that, independently of the capsules

grown in our houses being the production of cross-breeding, they do not yield a fractional part of the quantity of good seed they would do in their native land; and so with their progeny—the tender seedlings are brought into growth under circumstances so different from what they would have been in the native home of the parent plants, that it is not at all surprising that multitudes of them perish in their earliest infancy. The capsules are not only less perfect in our houses than they would be in a state of nature, but they also require a longer time to arrive at maturity, a circumstance that must tell against the progeny.*

Such are some of the difficulties the raisers of orchids from seed have to contend against; we will here enumerate the most remarkable results only, as all or nearly all the hybrids known to be in cultivation up to the date of publication of the different parts of this work are described in their respective places. We commence with those raised in our own houses.

Dominy began to hybridise orchids at our Exeter nursery in 1853, and continued his operations for some time after removing to Chelsea in 1864. Seden began at Chelsea in 1866, and has worked uninterruptedly from that time to the present. Our experience therefore extends over a period of forty years, during which the field of operations has been greatly enlarged, especially of late years, our experiments being made upon many hundreds of crosses, not only between allied species but also between species of different genera.

Among the results obtained by Dominy at Exeter *Calanthe Domini* raised from *C. Masuca* and *C. furcata*,† the last named being the pollen parent, will always be regarded with interest as being the first hybrid orchid raised by hand that flowered. It flowered for the first time in October, 1856, on which occasion the inflorescence was shown by the late Mr. James Veitch to Dr. Lindley, who exclaimed on seeing it, "You will drive the botanists mad," an expression quite characteristic of the rigid systematists who lived prior to the publication of Darwin's *Fertilisation of Orchids*, and to

H. J. Veitch on the Hybridisation of Orchids read at the Orchid Conference at South Kensington in May, 1885, and published in the Journal of the Royal Horticultural Society.

† A white-flowered species somewhat resembling *Calanthe veratrifolia*, a native of the Philippines and Java. It was introduced from the first-named locality by Cuming about the year 1840, but it has long since disappeared from cultivation.

whom, as Mr. Bateman has oft repeated, all hybrid productions were an abomination. The first hybrid *Cattleya* that flowered was named *C. hybrida*, a plant now lost, but which was soon followed by the flowering of *C. × Brabantia*. The first hybrid *Cypripedium* to flower was *C. × Harrisianum*, which justly commemorates the name of Mr. Harris who first pointed out to Dominy the feasibility of muling orchids. Among other noteworthy acquisitions raised at Exeter were *Lælia × exoniensis*, Dominy's *chef d'œuvre* from a cultivator's point of view, and *Calanthe × Veitchii*, long since recognised as one of the handsomest and most useful winter-flowering orchids, and in recent times a potent agent in the parentage of many new and beautiful *Calanthes* that have been raised artificially. Mention must also be made of *Cattleya × Dominiana*, *Lælia × Pilcheriana*, a true *Lælia*, and *Phaiocalanthe irrorata*, a generic hybrid which has a special interest of its own in its scientific bearing and in its being the forerunner of similar crosses by Seden and others already noticed.* Among Dominy's later acquisitions which flowered for the first time at Chelsea is *Cypripedium × Dominianum*, the first hybrid *Selenipedium* ever raised; the very distinct *C. × veillarium*, the forerunner of a group of handsome *Cypripedes* in which the rare and beautiful *C. Fairieanum* has participated in the parentage, *Lælia × caloglossa* and *L. × Veitchiana*. For fifteen years, as the editor of the *Orchid Review* justly observes, his record was unbroken, but at length others attracted by his success entered the field. Before recording the acquisitions of operators not connected with the Veitchian establishment we will pass in review the most important additions to the list of hybrids made by Seden, Dominy's successor.

The first that flowered was *Cypripedium Sedenii*. This was a remarkable cross in many respects; it was in fact raised from two crosses, *C. Schlimii × C. longifolium* and the same two *vice versâ*. It will be observed that in this case one of the parents, *C. longifolium*, is much more robust in habit and growth than the other parent, *C. Schlimii*. No perceptible difference was observed between the plants raised from the two separate crosses; they agree in habit, foliage, structure and colour of flower, in fact in every particular.

* See p. 93.

It was also a great horticultural acquisition, for while the robust parent has flowers that cannot be called attractive, and the other parent is a difficult subject for the cultivator to deal with, the offspring has a most robust constitution, is remarkably floriferous with well-shaped flowers of a pleasing shade of pink, and it has been utilised for further experiments with the result that our gardens have been enriched by a race of hybrids of the greatest possible value from a decorative standpoint.* This group of hybrids which we have called the *Sedenii* group includes, among others, the following forms subsequently raised by Seden, namely, *C. × albo-purpureum*, *C. × Schroederæ* the finest of all of them for size and colour, *C. × cardinale*, *C. × Sedenii candidulum*, *C. × leucorhodum*, *C. × Brysa*, *C. × Perseus* and *C. × Phædra*. Scarcely less remarkable for distinctness and beauty among the numerous hybrid *Cypripedes* obtained by the same raiser are the following in the coriaceous section:—*C. × ceanthum*, *C. × selligerum*, *C. × Morganicæ*, *C. × microchilum*, *C. × Aphrodite*, *C. × Leeantum superbum*, *C. × Niobe*, *C. × H. Ballantine*, *C. × T. B. Haywood*, all well-known forms but of which the following remarks will not appear superfluous:—*C. × ceanthum* was the first secondary hybrid *Cypripede* raised, that is to say, a hybrid of which one parent is itself a hybrid, and in the progeny occurred the variability in colour since frequently observed among secondary hybrids. *C. × Morganicæ* is remarkable for its striking resemblance to the largest of all known *Cypripedes*, *C. Stonei platytænium*, and a still closer resemblance to it is seen in *C. × Morganicæ Langleyense*, of which *C. Stonei platytænium* is the pollen parent; *C. × Aphrodite* and *C. × microchilum* were the first hybrids in which *C. niveum* participated, while *C. × Niobe* and *C. × H. Ballantine* have each of them the rare and beautiful *C. Fairieanum* for one parent, and their flowers are among the most elaborately pencilled and veined yet obtained.

Passing to the popular genera *Lælia* and *Cattleya*—The first *Lælia* to flower raised by Seden was *L. × flammea*, a secondary hybrid from *L. × cinnabarina* crossed with *L. × Pilcheri*, for many years quite unique in colour but now approached in that respect by his later acquisitions *L. × Hippolyta* and *L. × Latona*. This was

* *Orchid Review*, I. p. 37.

followed by *L. × Sedenii*, a brilliant and distinct form from *Cattleya superba × Lælia elegans*, of which a single plant only was saved. Then succeeded *Cattleya × Mastersoniae* from *C. Loddigesii × C. labiata*, and *C. × Chamberlainiana* from *C. guttata Leopoldii × C. labiata Dowiana*, both of which are among the most beautiful *Cattleyas* yet raised from the crossing of *labiata* forms with other species. *Lælia × triophthalma*, *L. × bella* and *L. × calistoglossa* are still among the most admired of those hybrids with a *Lælio-Cattleya* parentage, but the first place in this category must be given to *Læliocattleya × Digbyana-Mossiae*, the parentage of which is expressed by the name; it is undoubtedly one of the most beautiful and distinct not only of all hybrids but of all orchids; it is also a most interesting cross from a scientific standpoint, as proving the propriety of removing the first named or pollen parent from *Brassavola* to *Lælia*. Among later acquisitions with a *Lælio-Cattleya* parentage, *L. × Ascania*, *L. × Pallas*, *L. × Victoria*, *L. × eximia* and *L. × Proserpine* will long retain a place in orchid collections.

The remarkable generic hybrids raised in our nursery have been already mentioned.* More interesting hybrids than those obtained from the genera grouped around *Epidendrum*, and in which *Sophronitis grandiflora* has participated in the parentage, or more far-reaching in their probable relation to hybrids that may be obtained in the near future have never been raised. The first of these was *Sophracattleya Batemaniana*, of which *Cattleya intermedia* is the pollen parent; it is named after the veteran orchidist to signalise his renunciation of his former abhorrence of hybrids.† This was followed by an equally beautiful form of which *Cattleya Loddigesii* is the second parent and is called *Sophracattleya Calypso*, and still more recently by *Sophracattleya Veitchii*, of which *Lælia elegans* is the seed parent,‡ and *Epiphronitis Veitchii*, of which *Epidendrum radicans* is the pollen parent.

Seden's first acquisition in *Dendrobium* was the sweet-scented *D. × Endocharis* which flowered for the first time in 1875; this was followed by *D. × Rhodostoma*, the most distinct and one of the handsomest of hybrid *Dendrobes*. He subsequently raised *D. ×*

* See p. 91. † Journ. of Royal Hort. Soc. Orch. Conf. p. 49.

‡ *Lælia elegans* is a *Lælio-Cattleya*, half *Cattleya* and half *Lælia*; it is therefore inexpedient to burden the nomenclature with a new compound to express so slight a technical difference.

splendidissimum from the same parentage as *D. × Ainsworthii*, of which therefore it is strictly but a fine variety, and this was afterwards followed by its variety *grandiflorum*, the *facile princeps* of the group of hybrids obtained from *D. nobile* and *D. aureum*. Later additions were made in *D. × euosmum*, a secondary hybrid, and which like most secondary hybrids proved a variable progeny, *D. × Schneiderianum*, previously raised from the same parentage by Holmes, *D. × Virginia*, *D. × Euryalus*, *D. × Cordelia*, and *D. × Aspasia* subsequently obtained by Mr. Winn, of Birmingham, from the same pair of species (*D. Wardianum × D. aureum*).

Among the finest *Calanthes* raised by Seden are *C. × Sedenii*, a secondary hybrid with *C. × Veitchii* for one parent; the very distinct *C. × lentiginosa* also a secondary hybrid raised from *C. × Veitchii* and *C. labrosa*, the sub-variety *carminata* of this hybrid is one of the darkest-coloured *Calanthes* of the VESTITE section yet obtained; and *C. × Gigus*, one of the most robust forms in the section. Quite distinct from all these and bearing a strong analogy to Dominy's bigeneric hybrid *Phaiocalanthe irrorata* but far superior to it is *Phaiocalanthe Sedeniana*, but still unfortunately very rare, so few plants being obtainable from generic crosses; and lastly *Phaiocalanthe insperata* from *Phaius grandifolius* and *Calanthe masuca*, and thence the first *Phaiocalanthe* in which a species of the VERATRIFOLLE has participated in the parentage, the more remarkable since all attempts to cross species of the VESTITE section of *Calanthe* with species of the VERATRIFOLLE have hitherto failed.

Of the genera in which Seden was the first operator to obtain artificially raised hybrids, *Chysis* was the earliest. In this restricted genus two were raised, *Chysis × Chelsonii* and *C. × Sedenii*. Nearly contemporary with the first flowering of *Chysis × Chelsonii* was that of *Zygopetalum × Sedenii*, followed some years later by the generic hybrids *Zygocolac leopardinus* and *Z. Veitchii*. In *Epidendrum*, *E. × O'Brienianum* was the first hybrid raised, and more recently the beautiful *E. × Endresio-Wallisii*. The first hybrid *Masdevallia* raised artificially was *M. × Chelsonii* which flowered in 1880, followed later by *M. × Gairiana*, *M. × glaphyrantha*, *M. × Ellisiana*, and *M. × caudata-Estrada*, all beautiful additions to the genus, and also the progeny from *M. Veitchiana × M. Barleana* already mentioned.*

See p. 91.

Very beautiful and distinct hybrids were subsequently obtained in *Phalænopsis* and named respectively *Rcthschildiana*, *Harriette*, *F. L. Ames*, *John Seden* and *Vesta*; and in other genera *Cymbidium* × *eburneo-Lowianum* and *Phaius* × *amabilis*.

One of the most interesting and, in a horticultural sense, one of the most useful of our latest acquisitions is *Disa* × *Veitchii* raised from *D. grandiflora* fertilised with the pollen of *D. racemosa*. In this hybrid we have the handsomest garden plant yet raised artificially in the Tribe OPHRYDEÆ which we have not brought within the scope of this work. The genus *Disa* has been further enriched by two hybrids which have been raised in the Royal Gardens at Kew, one from *D. tripetaloides* ♂ and *D. grandiflora* ♀ called *D. × kewensis*; the other from *D. × Veitchii* ♂ and *D. tripetaloides* ♀ called *D. × Premier*.

We will now proceed to enumerate the most noteworthy results obtained by other operators, but our review of them must necessarily be a restricted one, especially of those that have flowered since the issue of the various parts of this work in which a description of them would otherwise have been inserted. Of a very large proportion of these we know nothing beyond the notices of them that have appeared from time to time in the periodical press, and of such we can only mention those that have been distinguished by some award or by a consensus of opinion respecting their merit. Another large contingent consists of progenies that have been derived from the same or reverse crosses as others that preceded them, and they must therefore, in the case of true hybrids, bear so near a resemblance to the older forms as to be synonymous with, or simply varieties of them. All such are purposely omitted where observed; and also all secondary hybrids in which the variability of the progenies is much greater. And lastly, there is another category of hybrids and *métis* whose origin is unknown or doubtful, and for which it is not easy to find a place in a systematic treatise on orchids.

Before Dominy had terminated his labours as an hybridist, and even before the first efforts of Seden had borne fruit, two handsome *Cypripedes* had been raised by Cross, Gardener to Lady Ashburton at Melchet Court in Hampshire: *Cypripedium* × *Ashburtoniæ* from *C. barbatum* × *C. insigne* flowered in 1871; *C. × Crossii* from *C.*

insigne × *C. venustum* flowered two years later. Both hybrids are quite intermediate in character.

In the spring of 1874 *Dendrobium* × *Ainsworthii* flowered for the first time in Dr. Ainsworth's collection at Lower Broughton, near Manchester. It was obtained by Mitchell, Dr. Ainsworth's gardener, from *D. aureum* × *D. nobile*. Plants from the same cross were, however, raised by West about the same time at the Fairfield Nursery, near Manchester. Mitchell subsequently raised *Cattleya* × *Mitchelli* from *C. guttata Leopoldi* × *C. labiata Trianae*; the plant is said to have been thirteen years old when it flowered for the first time; also *Cypripedium* × *Ainsworthii*, a secondary hybrid with *C.* × *Sedenii* for one parent.

Two more hybrids shortly afterwards appeared in Manchester but raised by another operator, these were *Cypripedium* × *Swanianum* and *Dendrobium* × *Leechianum*, obtained by Swan, Gardener to Mr. Leech, of Fallowfield; the last named from the reverse cross of that which produced *D.* × *Ainsworthii*, and so closely resembling it that it can only be regarded as a variety of it.

Between 1876 and 1887 appeared a series of hybrid Cypripedes raised by the late Mr. J. C. Bowring, of Forest Farm, Windsor, of which *Cypripedium* × *concinnum* and *C.* × *gemmiferum* are EUCYPRIPEDIA and *C.* × *conchiferum* and *C.* × *stenophyllum* are SELENIPEDIA. He subsequently raised several others, some of them from the same pairs of species as previously obtained by other operators. In the same epoch was brought to light a batch of seedlings whose origin is not certainly known, raised by Mr. Robert Warner, of Broomfield, near Chelmsford. From their marked resemblance to each other and all possessing characters of *C. venustum* they may be assumed to have resulted from one cross in which *C. venustum* participated; they were named by Reichenbach *C.* × *discolor*, *C.* × *chloroneurum*, *C.* × *politum*, *C.* × *Meirax* and *C.* × *melanophthalmum*. Later from the same source appeared another batch from a different parentage and named *C.* × *Williamsianum*, *C.* × *Amesianum* and *C.* × *Measuresianum*. *C.* × *villosum* and *C. venustum* participated in the parentage of all these; in *C.* × *Williamsianum* *C. villosum* participated, mediately probably through *C.* × *Harrisianum*. Following close upon Mr. Bowring's earlier productions have appeared a long series of Cypripedes raised by Mr. D. O. Drewett, of Riding-Mill-on-Tyne, of which fifteen or more

have been named and published. Some of the later announcements have been derived from new crosses and are described as distinct and handsome additions to the genus; of such are *C. × pavoninum*, *C. × Beatrice*, *C. × Alice*, *C. × Constance* and *C. × Juno*. Here may be mentioned a series of Cypripedes which appeared contemporaneously with many of Mr. Drewett's productions, and which had their origin in one of the richest collections of Cypripedes ever brought together, that of Mr. R. H. Measures, at The Woodlands, Streatham. Among the best acquisitions made in The Woodlands collection are *C. × basileum*, *C. × Cymatodes*, *C. × Venus*, *C. × Cytherea*, *C. × Hera*, *C. Fairieano-Lawrenceanum*, besides several very beautiful secondary hybrids. Another large group of hybrid Cypripedes has originated in the collection of Mr. R. I. Measures, at Cambridge Lodge, Camberwell.* Very noteworthy are *C. × Apollo*, *C. × Bellina*, *C. × Diana*, † *C. × Flora*, *C. × Hisa*, all primary hybrids, and in addition several secondary hybrids and many others obtained from the same or the reverse cross as some previously raised by other operators, and being identical the first names have been properly retained for them.

In enumerating the foregoing long list of Cypripedes we have somewhat outstripped the chronological order of events; we will therefore record some meritorious acquisitions by operators who have since been removed from the scene of their labours. The first of these was Mr. Fraser, of Dencleugh, near Aberdeen, who raised the brilliant *Masdevallia × Fraseri*, *Cypripedium × Fraseri*, and a fine variety of *C. × Ashburtonie* called *calospilum* from the same pair of species as Cross' type. Next followed Mr. Goss, of Torquay, who obtained *Calanthe × Sandhurstiana* from the same parentage as *C. × Veitchii*, and which must be regarded as a highly-coloured variety of it. And lastly Dr. Harris, of Lamberhurst, Kent, who raised some highly interesting hybrids in *Lælia* and *Cattleya*, especially *C. × citrino-intermedia*, the first hybrid in which *C. citrina* has been successfully used, and so far as we know the only one. Dr. Harris also raised *C. × Harrisii*, *C. × Miss Harris*, *Lælia × Novelty*, subsequently

* This is a most interesting collection, particularly rich in *Masdevallias* and other *Pleurothallids*.

† A variety of *C. × Eyermanianum* previously raised by Messrs. Sander and Co. from the same pair of species (*C. barbatum* and *C. Spicerianum*).

obtained by Seden from the same parentage, and three or four Cypripedes from the same crosses as others that preceded them and which they resembled in every particular.

In the meantime two fine series of progenies from *Calanthe* and *Dendrobium* were maturing in the houses of Sir Trevor Lawrence at Burford, Dorking; the first of these to flower were the *Calanthes* of the VESTITÆ section, to which *C.* × *porphyrea* from *C. labrosa* and *C. vestita* must be assigned the first place for distinctness and beauty of coloration. A fine progeny has also been obtained from *C. rosea* (*Limatodes rosea*, Lindl.) and *C.* × *Veitchii*, which like most progenies with a hybrid parentage proved a variable one as regards the colour of the flowers; among the seedlings the forms named *Burfordiensis*, *versicolor*, *Victoria Regina* and *Veitchii lactea* are very attractive, and in addition to these one named *sanguinaria*, whose parentage was omitted to be recorded, is very distinct, the whole forming a group of orchids of the highest horticultural merit for winter decoration. This group was followed by the flowering of a scarcely less interesting progeny of secondary hybrids between *Dendrobium* × *Ainsworthii* and *D. Findlayanum*, of which the most distinct forms are named *D. chrysodiscus* and *D. melanodiscus*, the latter being from the reverse cross of the former. To this group were subsequently added *D.* × *Chrysostele*, raised from *D. Wardianum* and *D. Linawianum*, and *D. Juno* and *D. xanthocentrum* from the reverse cross. Some beautiful hybrid Cypripedes have also originated at Burford, including *C.* × *Ileanum*, *C.* × *Laurebel*, *C.* × *Morganice Burfordiense*, from the same pair of species as Seden's hybrid; *C.* × *concolawre*, and several secondary hybrids.

On the banks of the Tyne has originated another series of hybrids in which the field of operations has been more extended and the results consequently much more varied than in the series noted above. These hybrids were obtained by Mr. Norman C. Cookson, of Oakwood, Wylam-on-Tyne, and include among Cypripedes, *Cypripedium* × *Io*, *C.* × *Godseffianum*, *C.* × *plunerum*, *C.* × *Alcides*, *C.* × *Doris*, *C.* × *nitidissimum*, *C.* × *Sandero-superbiens*, *C.* × *aurosum*, many secondary hybrids of considerable horticultural merit; and also some of the finest acquisitions by other operators have been raised at Oakwood from the same pairs of species and have very properly received the same name; of such are *C.* × *Calypso*, *C.* × *Morganice*,

C. × Niobe, *C. × cardinale*, *C. Ashburtoniae expansum*, *Dendrobium × Ainsworthii*, *Calanthe × Sedenii* and others. In other genera Mr. Cookson has also raised some remarkably fine hybrids including *Calanthe × Cooksonii*, *Cattleya × William Murray*, *Iæliocattleya × Phœbe*, *L. × Normanii*, *Dendrobium × Venus*, *D. × Cassiope*, *D. × Bryan*, *D. × Owenianum*, *D. × Sybil*, *Masdevallia × Courtauldiana*, *Phaius × Cooksonii*, the last named of exceptional interest from its being the first hybrid *Phaius*, of which the beautiful Madagascar species, *P. tuberosus*, is one parent. The total number of hybrids raised by Mr. Cookson is probably greater than those obtained in any other private collection.

The genus *Masdevallia* has received especial attention from Captain Hincks, of Terrace House, Richmond, Yorkshire, who had added to it the following beautiful hybrids, *M. × Hincksiana*, *M. × Stella*, *M. × Cassiope*, *M. × Rushtonii* and *M. × Veitchiano-Estradæ*. Further additions to the genus have been made by Sir Trevor Lawrence, Mr. D. O. Drewett, Mr. W. Thompson and Messrs. Sander and Co. Here may be noted three hybrids of great merit obtained by three different operators who appear to have desisted from further efforts. The first of these is *Zygopetalum × Clayii* obtained many years ago by Colonel Clay, of Wallasy, near Birkenhead; the second *Dendrobium × Schneiderianum* raised by Holmes, Gardener to Mr. C. Moseley, of Grange Thorpe, Manchester; and lastly *Cypripedium × Lathamianum* by Mr. Latham, of the Botanic Garden, Birmingham.

Mr. Winn, of Selly Hill, Birmingham, has added to the list of hybrid orchids *Calanthe × Aurora*, *Cymbidium × Winnianum*, the second hybrid obtained in the genus, *Dendrobium × Aspasia*, previously raised by Seden from the same parentage, *D. × Nestor*, *Cypripedium × Edith Winn*, *C. × Sylva* and some secondary hybrids in *Cypripedium*. Captain Vipan, of Wansford, Northampton, has obtained *Cypripedium × Vipanii*, *C. × Sanderiano-superbiens* and *C. × Berenice*, the last named being the first hybrid known to us between racemose species of *EUCYPRIPEDIUM* (*philippinense × Lowii*) that has flowered. In Baron Schroeder's magnificent collection has been raised *Epidendrum × Delliense*, *Cattleya × Baroness Schroeder* and *Lælia × vitellina*, all new and distinct crosses; in this collection is *Calanthe × Baron Schroeder*, the finest hybrid *Calanthe* yet raised. Sir William Marriott has raised *Lælia Marriottiana* from *L. flava* and *Cattleya Skinneri* in his

collection at the Down House, Blandford, probably the first in which these two species have participated in the parentage, and *L. × Canhamiana*. In that of Mr. W. E. Brymer, at Ilington House, Dorchester, *Læliocattleya × Brymeriana*, a hybrid of complex descent, and *Dendrobium × Benita*. In that of Mr. Ingram, Elstead House, Godalming, *Læliocattleya × Ingramii*, *Cypripedium × L'Unique*, *C. × Adonis* and several secondary hybrids in *Cypripedium*. Mr. Hollington, of Forty Hill, Enfield, has obtained *Cypripedium × Aylingii*, *C. × Muriel Hollington* and *C. × Evenor*, all handsome forms of which *C. niveum* is one parent. The late Mr. Tautz, of Dibdin House, Ealing, raised two good forms in *C. × Cowleyanum* and *C. × Dibdin*. Mr. Vanner, of Camden Wood, Chislehurst, has obtained *Dendrobium × Tannerianum*, a *Cypripede* in the *Selenipedium* section, closely resembling *C. × leucorhodum*, and also a seedling between two varieties of *Masdevallia Ohimæra*, the first recorded instance in the *Saccolabiæte* *Masdevallias*, but the cross having been effected between two varieties of one species the result is not a hybrid in the accepted sense of the word. Mr. Statter, of Stand Hall, Manchester, has raised *Cypripedium × Daviesianum*, several secondary hybrids in the same genus, and *Læliocattleya Clive*. Mr. C. Richman, of Springfield, Trowbridge, exhibited at one of the meetings of the Royal Horticultural Society in May, 1893, a distinct hybrid *Cypripede* raised from *C. bellatulum × C. barbatum* and named *C. × Charles Richman*. And there are probably other amateur operators who have raised seedling orchids, but of which we have failed to acquire any cognisance.

Turning to the hybrids obtained by professional growers, by far the greater number of these have either originated in the establishment of Messrs. Sander and Co. at St. Albans, or have been acquired by that firm from the raisers. Their group includes a large number of *Cypripedes*, several of them secondary hybrids, also several hybrids in *Cattleya*, *Lælia*, *Dendrobium*, *Calanthe* and *Masdevallia*. Messrs. B. S. Williams and Son, of Holloway, have raised or acquired from other raisers a *Læliocattleya*, some *Calanthes* of the *vestita* group, and several *Cypripedes*. Messrs. Low, of Clapton, have exhibited one *Læliocattleya*, one *Cypripedium* of known and one of unknown parentage. Messrs. Seeger and Tropp, of Dulwich, have exhibited three or four secondary hybrid *Cypripedes*. Mr. Bull, of Chelsea, is credited with one hybrid *Cypripedium*; Mr. Lewis, of Southgate,

with two *Cattleyas* and one *Cypripede*; and Messrs. Heath, of Cheltenham, with one *Cypripede*. Messrs. Backhouse, of York, have raised one hybrid *Cattleya*; and Mr. Cypher, of Cheltenham, two handsome *Dendrobes*, of which one is a secondary hybrid.*

The hybrid orchids that have originated on the continent of Europe and in the United States of America are few indeed compared with British-raised seedlings. The first continental hybrids appeared in the horticultural establishment of M. Bleu at Paris, who has raised *Cattleya* × *calummata*, *Cypripedium* × *javanico-superbiens* and *Miltonia* × *Bleuana*, the last-named from *M. vexillaria*; *M. Roezlii*, the first hybrid obtained in the genus but which was shortly afterwards raised by Seden from the same pair of species; and many others. In Paris were also raised two hybrid *Cypripedes* by M. Bauer, of The Muette, viz., *C.* × *Carrierei* and *C.* × *Laforceadei*. Other hybrids have been raised in France by M. Page, M. Paul Darblay, M. Godefroy and Madame Block.

A small group of hybrids are announced from Vienna, raised by M. Horn, who has charge of Baron Nathaniel Rothschild's collection at the Hohe Warte; his best acquisitions are *Cypripedium* × *Hornianum*, *C.* × *Pandora* and *Laelia* × *Horniana*. And in the Emperor of Austria's collection at Schönbrunn has been raised *Lycaste* × *Schoenbrunnensis*.

In Belgium a considerable number of hybrid or *métis* (mixed) *Cypripedes* have been published in the horticultural press, but in many cases the parentage has either been imperfectly rendered or only conjectured; others are manifestly from the same or reverse crosses of older hybrids; the largest number of these were raised in the horticultural establishments of M. Vuylsteke and M. Vervaet at Ghent, and of M. Linden at Brussels; the others chiefly in the amateur collections of M. Hye-Leysen and the late M. Moens.

In America the hybridisation of orchids is quite in its infancy and thus far some of the results of two operators only have been announced, if we except a *Cypripede* of unknown origin in Mr. Kimball's collection at Rochester, New York. Mr. H. Graves, of Orange, New Jersey, is the most prominent amongst amateurs; he has raised *Cypripedium* × *Edwardii* from *C. superbiens* and *C.*

* This enumeration only holds good to date of going to press.

Fairieanum, presumably a distinct acquisition, *C. × calloso-Argus* and several other Cypripedes, some of which are from the same pairs of species as older hybrids, also *Phaiu × hybridus* previously raised by Mr. Drewitt, of Riding-Mill-on-Tyne. Messrs. Pitcher and Manda, of Short Hills Nursery, New Jersey, have obtained several Cypripedes, of which *C. Constableanum* from *C. Dayanum* and *C. × Fairieanum* adds one more to the *vexillarium* group, many other Cypripedes most of them secondary hybrids, and *Dendrobium × Roeblingianum*, of which *D. Ruckeri*, a species now but seldom seen, is one parent.

LITERATURE.

The literature of the ORCHIDÆ is very copious. Besides the works especially devoted to the subject there is a large amount dispersed through botanical works that have been compiled in Latin, English, French, German and other European languages since the time of Linnæus. Of the larger works devoted exclusively to orchids there are many of the highest excellence both as regards illustrations of particular species and the accompanying letterpress. Others are of a more popular kind exclusively devoted to showy species in cultivation and generally devoid of analytic figures showing generic or specific characters. Many of the treatises on the ORCHIDÆ forming part of the Floras of different countries, or other works of large scope have been compiled by botanists of eminence and are among the most valuable contributions to Orchidology extant; and scarcely less so are most of the papers on orchid subjects read before the Linnæan Society and published in the Society's Journal. The subjoined list of published works arranged in chronological order includes, so far as we have been able to ascertain, all the most important from the earliest production of Linnæus to those of the present time. On account of the great amount of orchid literature scattered through botanical and other periodicals since 1830 the list is far from being complete.

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