

The Orchids of Micronesia

Rudolf Schlechter

A translation into English of

Die Orchidaceen von Mikronesien

from

***Beiträge zur Flora von Mikronesien I (1915) and
Beiträge zur Flora von Mikronesien und Polynesien II (1921)***

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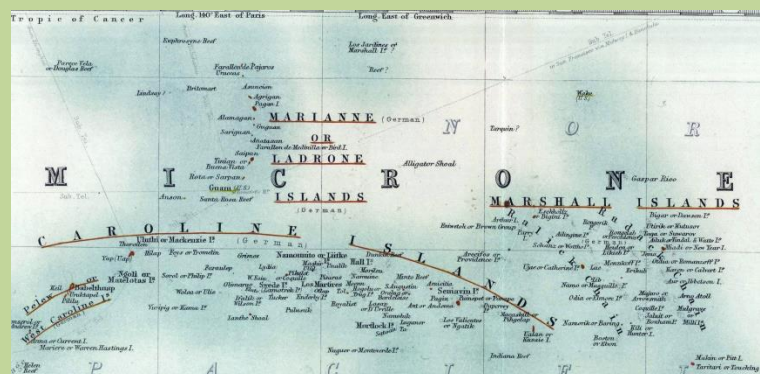
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with locality listing and index.

H J Katz & J T Simmons



**Rudolf Schlechter
(1872-1925)**



**Micronesia [Northern Mariana Islands, Federated States
of Micronesia and Palau, Marshall Islands]**



The Australian Orchid Foundation

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1915

THE ORCHIDS OF MICRONESIA

by

RUDOLF SCHLECHTER

PREFACE

When G. Volken published his 'Flora of the Carolines' in 1901, only seven orchids from that area were known, comprising about the sum-total of the family in the whole of Micronesia. However, since during the past few years the Berlin Botanical Museum has recieved a series of new, interesting forms from there, I have felt obliged here to present a list of all orchids now known from that area.

A comparison of the orchids listed here, with those of the surrounding areas indicates that the Papuasian element is predominant. Only a single genus, without closely related species in New Guinea, occurs, viz. Cheirostylis, represented by one species and which leans more towards those of the Philippines. Noteworthy also, is the presence of a Sarcochilus species of the affinity of S. phyllorhizus F.v.M., this group up to the present, being known only in the Celebes, the Moluccas, the Kei Islands and in northern Australia, respectively the Torres Strait Islands.

I have also included here those plants which, on account of very sparse material, could not be determined as species, but thereby I hope to draw them to the attention of future collectors, since they include several very interesting species.

R. Schlechter
(circa 1914)

Habenaria Willd.Haberaria sp. nov.?

Caroline Is. : Yap, in the shade in woodlands of the Bennigsen Mountains, alt. c. 120m (G. Volkens no. 292, fruiting in Jan. 1900).

The plant does not belong to the affinity of H. muricata Vid., as assumed by Prof. Volkens, but clearly to section Peristylis and close to H. papuana Krzl.

Galeola Lour.Galeola sp.

Caroline Is. : Ponape, found during clearing of the forest (Dr. Schnee, in the year 1909, in fruit only).

Clearly a species of the affinity of G. cassythoides F.v.M. and G. gracilis Schltr., apparently a new species.

Dr. Schnee reports that the longest fruit measured 28cm.

Nervilia Gaud. [Comm. ex Gaud.]Nervilia Aragoana Gaud. in Freyc. Voyag. Bot. (1826), p. 442. t. 35.

Marianas Is. : Terrestrial on Guam Island (Gaudichaud).

A widely distributed plant which has been identified from the hinterlands of India, through the Sunda Islands, Moluccas, Philippines, New Guinea and New Caledonia to Samoa.

Nervilia ? ovata Gaud. Freyc. Voyag. Bot. (1826), p. 442.

Marianas Is. : Rota [I.], on rocks (Gaudichaud).

This species has not re-appeared since Gaudichaud's time. There is no information on the flowers.

Cheirostylis Griff. [Bl.]Cheirostylis Raymundi Schltr. sp. nov.

Terrestris, pusilla, 14—20 cm alta.

Rhizoma cauliformis. Radices crassiusculae, villosae. Caulis teres, tertia parte inferiore foliatus, glaber, supra vaginulis paucis distantibus obsessus, glanduloso-puberulus. Folia erecto-patentia, lamina ovata, acuminata, glabra, petiolo basi dilatata caulem amplectente. Racemus brevis, dense 3—5-florus. Bractee lanceolatae, acuminatae, ovario breviter pedicellato paulo breviores. Flores erecto-patentes, in genere inter majores. Sepala oblonga obtusa, extus glanduloso-pilosa, dimidio inferiore connata. Petala subfalcato-ligulata, obtusa, glabra, sepalo intermedio intus arcte agglutinata. Labellum e basi ovata concava in unguem linearem productum, antice in laminam bipartitam superne papillosam expansum, partitionibus oblique oblongis, obtusis, margine exteriori grosse 6-lobulato-dentatis, supra basin appendicibus 4 flexuosis instructum, sepala distincte superans. Columna brevis, glabra, brachiis lineari-subfalcatis, obtusis, rostellum brachiis aequilongis. Ovarium breviter pedicellatum, clavatum, glanduloso-pilosum.

A small plant 14 - 20cm tall, with decumbent roots. The leaves are 3.0 - 4.0cm long, 2.0 - 2.5cm broad, the petiole, which is much broadened towards the base, is 2.0cm long. Within the genus, the flowers are large and clearly white; the sepals and petals c. 9.0mm long, the labellum with the front lobe 1.3cm long, the latter accounting for c. 5.0mm. The ovary with short pedicel is 7.0mm long.

Palau Islands : Koror, near Eimilik on old wall structures (Father Raymundus, no. 160, flowering in the year 1907).

The species is most closely related to C. philippinensis Ames from the Philippines, but from which it is readily distinguished by the larger flowers and the shape of the lip.

Zeuxine Lindl.

Zeuxine Fritzii Schltr. sp. nov.

Terrestris, erecta. Caulis erectus, dimidio inferiore foliatus, glaber, dimidio superiore vaginulis paucis obsessus, minute glanduloso-puberulus. Folia erecto-patentia, glabra, lamina oblique lanceolata, acuminata, petiolo basi dilatata caulem vaginante. Spica dense multiflora, elongata; bracteis ovato-lanceolatis acuminatis, ovario vulgo brevioribus. Flores in genere inter minores, illis Z. elongatae Bth. similes. Sepala ovata, obtusa, extus glanduloso-puberula, lateralia obliqua. Petala oblique obovato-spathulata, obtusa, glabra, sepalo intermedio aequilongo intus arcte agglutinata. Labellum e basi ovata concava in unguem brevem sensim constrictum, apice in lobum transversum bicurvam expansum, cruribus divergentibus oblique oblongis, obtusissimis, supra basin intus squamis 2 reversis donatum. Columna brevis, antice bicostata, glabra. Ovarium sessile cylindricum, glanduloso-puberulum.

The entire plant is c. 35 - 40cm tall and very similar in habit to Z. Erimae Schltr. Leaf lamina 3.0 - 6.5cm long, 1.5 - 2.5cm broad below the middle, petiole c. 1.5 - 2.5cm long. Flower spike c. 12cm long.

Flowers small, similar to those of Z. elongata Benth. Sepals and petals 3.0mm long; the labellum about the same length as the sepals, the spread-out front lobe 2.0mm broad. Ovary equitant, c. 7.0mm long.

Marianas Is. : Saipan [I.] (Fritz, in the year 1903).

Z. elongata Benth. can probably be considered as the most closely related species, yet in habit it is more similar to Z. Erimae Schltr. from New Guinea, but from which it is well distinguished by the shape of the front lobe of the lip. Unfortunately, the material to hand is incomplete, since with the exception of two leaves, the entire lower part of the plant is missing.

Hetaeria Lindl. [Bl.]

Hetaeria sp.

Palau Is. : Koror, in the grassland (Father Raymundus, no. 181, flowering

in the year 1907).

This can be considered as a species of the affinity of H. oblongifolia Bl. and H. Erimae Schltr., but the material to hand is so far decomposed that the species can neither be defined with certainty, nor described.

Corymbis Bl.[Thou.]

Corymbis ? sp.

Marianas Is. : Without locality details (Fritz, in the year 1902).

Since the two specimens to hand are devoid of inflorescences, it cannot be ascertained with certainty whether a Corymbis or a Tropidia species is present. I am more inclined to the former. The species is very small and consequently is most closely related to C. minor Schltr.

Coelogyne Lindl.

Coelogyne sp.

Marianas Is. : Without locality details (Fritz, without flowers in year 1902).

Undoubtedly, this is a species of section Speciosae, being in habit most reminiscent of C. aureo-picta Rolfe, of unknown origin. Since the plant decidedly has most attractive flowers, it is desirable that better material should soon become available. Apparently it originates from the island of Saipan.

Microstylis R. [Nutt.]

Microstylis sp.

Caroline Is. : Yap [I.], in a moist depression shaded by trees in the Machabal district, alt. c. 150m (G. Volken no. 174, in fruit in Dec. 1899). This plant is listed by Volken as 'M. Wallichii Lindl.', but I consider it more closely related to, or even identical with, M. latifolia (Rees) J.J.Sm.

Microstylis sp.

Caroline Is. : Truk Is., Tol forest, above 200m, widely distributed (Kraemer, no. 4).

It is fairly certain that this is an undescribed species. Unfortunately, the material is without flowers.

Microstylis sp.

Palau Is. : Koror (Father Raymundus, in the year 1907).

Likewise an undescribed species. The solitary specimen has a conspicuous, long-stemmed capsule, but no flowers.

Appendicula Bl.

Appendicula reflexa Bl., Bijdr. (1825), p. [301].

Palau Is. : Koror, in the scrub (Father Raymundus, no. 242, flowering in the year 1907).

Native name : 'Blubeou'.

This species is widely distributed within the whole Malayan region, as far as New Guinea.

This specimen is somewhat sparse, but there is no doubt that it represents this widely-distributed species.

Spathoglottis Bl.

Spathoglottis carolinensis Schltr. sp. nov.

Terrestris, erecta. Pseudobulbus depresso-globosus, parvulus, vaginis foliorum omnino obtectus. Radices, filiformes, flexuosae villosulae. Folia fere 3—5 erecta, lanceolata, acuminata, plicata, glabra, basi sensim in petiolum longum attenuata. Scapus basilaris, erectus, usque ad 75 cm altus, teres, glaber, vaginulis paucis distantibus obsessus. Racemus abbreviatus, dense multiflorus, sensim paulo elongatus, bracteis reflexis, late ovalibus breviter acuminatis, ovario graciliter pedicellato 2—3-plo brevioribus. Flores speciosi, illis *S. plicatae* Bl. similes et fere aequimagni. Sepala oblonga, apiculata, glabra, lateralia paulo obliqua. Petala late et oblique ovalia, obtusa cum apiculo minutissimo, glabra, sepalis aequilonga. Labellum e basi trilobum, lobis lateralibus (expansis) angulum rectum formantibus, oblongo-ligulatis, antice truncatis, intermedio porrecto e ungue angusto supra basin utrinque angulo triangulari pilosulo instructo, antice in laminam perlate reniformem emarginatam expanso, supra basin callis 2 triangularibus obtusis glabris ornato. Columna leviter curvata, glabra, apicem versus paulo dilatata. Ovarium graciliter pedicellatum, glabrum.

The entire plant is up to 75cm tall. Leaves with petiole 40 - 75cm long, when fully developed up to 6.0cm broad, the stem up to 75cm tall. Flowers large, pale on the outside, inside dark rose-red. Sepals and petals 2.2cm long, the petals clearly broader than the sepals. Labellum 2.0cm long, 2.0cm broad between the tips of the spread-out side lobes, the middle lobe 4.5cm long, 1.5cm broad in front, the column 1.2cm long. Ovary with pedicel, 3.0cm long.

Caroline Is. : Yap [I.], on grassy slopes of the western hills (G. Volkens no. 146, flowering in the year 1899).

Palau Is. : Koror (Father Raymundus, flowering in the year 1907).

I have often commented that, of late, species have often been listed under *S. plicata* Bl., even though they are specifically separate. This is such a case.

Spathoglottis micronesiaca Schltr. sp. nov.

Terrestris, erecta. Pseudobulbus subglobosus, vaginis foliorum omnino obtectus, 1,5—2 cm altus. Radices filiformes, flexuosa, villosulae. Folia erecta, anguste lanceolata, acuminata,

basi in petiolum satis longum angustata, plicata, glabra. Scapus teres, vaginulis paucis distantibus obsessus, apicem versus brevissime et dense tomentosulus. Racemus dense multiflorus, brevis, sensim elongatus. Bractee ellipticae apiculatae, patulae, ovario pedicellato plus duplo breviores. Flores albi, illis *S. tomentosae* Ldl. similes. Sepala oblonga, subapiculata, extus minute et dense tomentosula. Petala oblique elliptica minute apiculata, glabra, sepalis paululo latiora. Labellum e basi trilobum, lobis lateralibus (expansis) angulum rectum formantibus, ligulatis, apice subfalcato recurvulis, obtusissimis, intermedio porrecto, e ungue angusto supra basin utrinque brevissime auriculato et minute puberulo, antice in laminam obovatam, retusam cum apiculo subinconspicuo dilatato, basi callo didymo cordato-triangulo **glabro ornato**. **Columna leviter curvata glabra**, apicem versus paulo dilatata. **Ovarium graciliter pedicellatum, brevissime et dense tomentosulum.**

A species externally similar in appearance to *S. tomentosa* Lindl., and up to 65cm tall. Leaves 55 - 70cm long, 2.0 - 4.0cm broad at the centre. Stem up to 65cm long. Raceme up to 10.0cm long. Flowers of medium size. Sepals and petals c. 1.7cm long, the latter slightly broader than the sepals. Lip equal to the sepals in length, 1.8cm broad between the tips of the spread-out side lobes, the middle lobe 1.3cm long, 4.5mm broad at the apex. The column 1.1cm long. Ovary with pedicel, 2.2 - 2.4cm long. Caroline Is. : Yap [I.], on grassy mountain slopes (G. Volken, no.144, flowering in Dec. 1899).

Palau Is. : Koror (Father Raymundus, flowering in the year 1907).

On superficial contemplation one might readily consider this plant to be the Philippine *S. tomentosa* Lindl., as decided by Volken, but from which it differs considerably in the shape of the lip; *S. tomentosa* Lindl. having side lobes conspicuously widened in front, whilst the middle lobe in front is of a very broad, reniform shape.

According to Volken, the flowers are always white with the centre of the labellum being sulphur-yellow.

Dendrobium Sw.

Dendrobium palawense Schltr. sp. nov.

Pseudobulbi et folia nondum nota.

Pedunculus vaginis paucis alte amplexantibus obsessus, glaber. Racemus subaxe 5-7-florus; bracteis lanceolatis, acutis, ovario pedicellato plus duplo brevioribus. Flores magni, illis *D. macrocarpi* A. Rich. similes, erecto-patentes. Sepala lanceolata, acuminata, extus sparsim appendicibus setiformibus donata, carinata, lateralia obliqua, basi margine anteriore dilatata cum pede columnae mentum late conicum obtusum formantia. Petala oblique obovato-spathulata, apiculata, glabra. Labellum basi breviter unguiculatum 3-lobatum, glabrum, basi callo angusto tricotato antice obtuse tridentato basi in margines unguis decurrente ornato, lobis lateralibus erectis, oblique rhombo-quadratis cum angulis obtusis, intermedio late reniformi-cuneato, antice emarginato cum apiculo minuto recurvulo, lateralibus bene latiore. Columna brevis, clinandrii lobis lateralibus triangulis, acutis, dorsali incurvulo obtuso. Ovarium densissime appendicibus piliformibus reversis obtectum, cum pedicello sparsim muriculato clavatum.

Pseudobulbs and leaves so far not described. The inflorescences inclusive of the flowers are 26cm long, of which 10.0cm alone represent the raceme. The flowers are very similar to those of D. macrocarpum A.Rich. The sepals are 2.8cm long, the petals slightly shorter, the strongly bent labellum is c. 2.0cm long, the middle lobe taking up 1.2cm of this, being 2.0cm broad in front, whilst the whole lip is 2.4cm broad between the margins of the spread-out side lobes. Ovary with pedicel c. 3.6cm long.

Palau Is. : Koror, in the scrub (Father Raymundus no. 136, flowering in the year 1907).

Native name : 'Sachal chainein'.

The species is closely related to D. macrophyllum A.Rich. and to those species grouped around it, but differs, however, in the narrow lip-callus and in the shape of the middle lobe of the labellum.

Unfortunately, to date, only two inflorescences of this species of the section *Latouria* are present.

Dendrobium Kraemeri Schltr. sp. nov.

Epiphyticum, habitu *D. purpurei* Roxb.

Caulis cylindraceus carnosus, mox longitudinaliter sulcatus, foliatus, vaginis foliorum arctissime amplexantibus obtectus. Folia erecto-patentia, oblongo-ligulata, obtusa. Racemi dense 10—20-flori subsessiles, cylindracei; bracteis patentibus lanceolatis, acuminatis, glabris, ovario duplo brevioribus. Flores illis *D. purpurei* Roxb. similes et fere aequimagni. Sepala anguste elliptica, acuminata, glabra, lateralia obliqua, basi margine anteriore dilatata, cum pede columnae mentum oblongum obtusum formantia. Petala oblique lanceolato-elliptica, acuta, dimidio superiore margine ciliolato-subdenticulata, sepalis paululo breviora. Labellum e basi ligulata dimidio superiore paulo dilatato lanceolato-ellipticum, acuminatum, apicem versus margine minutissime ciliolatum, medio lamella obtusa semilunata transversa donatum, sexta parte basali tantum marginibus pedi columnae adnatum. Columna brevis, lobis lateralibus rhombeis, truncatis, dorsali subulato. Anthera rotundato-cucullata, antice truncata, glabra. Ovarium obscure trigonum, glabrum, pedicellatum.

A plant with the habit of D. purpureum Roxb., with 0.7 – 1.2cm thick stems, leaves c. 8.0cm long, 1.7cm broad. Racemes 2.5 – 3.5cm long. Flowers fairly small, clearly reddish. Sepals c. 6.5mm long, the lateral ones forming a c. 8.0mm long mentum. Petals slightly shorter than the sepals.

Labellum c. 1.2cm long. Ovary with pedicel c. 1.1cm long

Palau Is. : Koror, on trees (Father Raymundus, no. 37, flowering in the year 1907; Prof. Dr. Kraemer, without number, in the year 1910).

Without doubt the species is closely related to D. purpureum Wight from the Moluccas and to D. Wolterianum Schltr., from New Guinea, but is readily distinguished by the lip. It belongs to the section *Pedilonum*.

Dendrobium sp. nov.

Caroline Is. : Truk Is., Uman, on trees (Prof. Dr. Kraemer, no. 59, in the year 1910).

This species is definitely a novelty belonging to the section *Grastidium*, which could be related to *D. cyrtosepalum* Schltr. from New Guinea.

Unfortunately, there was insufficient material for a description.

Bulbophyllum Thou.

Bulbophyllum Volkensii Schltr. sp. nov.

Epiphyticum, decumbens, pusillum.

Rhizoma cauliforme, ramosum, radicans. Radices filiformes, flexuosae glabrae. Pseudobulbi depressi, minutissimi, unifoliati. Folium obovato-ellipticum, obtusum, carnosum. Pedunculi valde abbreviati, uniflori, in rhizomate sparsi, vaginis obtekti. Bractea ovato-cucullata ovarium sessile vulgo paulo superans. Flores minutissimi, albi, illis *B. clandestini* Griff. simillimi glabri. Sepala lanceolata elongato-acuminata, lateralia obliqua, basi margine anteriore paulo dilatata. Petala oblique oblongo-ligulata, obtusiuscula, glabra. Labellum lanceolato-linguiforme, medio fere paulo constrictum, obtusiusculum. Columna perbrevis, brachiis breviusculis subulatis, pede incurvulo. Ovarium sessile cylindricum, glabrum.

A long decumbent, branched, very small plant. The barely visible pseudobulbs are placed at intervals of 3.0 - 4.0cm. The leaves are 2.0 - 3.0cm long and c. 1.0cm broad. The almost equitant, single-flowered inflorescences appear on the rhizome between the internodes. The diminutive white flowers can easily be overlooked. The sepals are 5.0mm long; the petals c. 2.0mm. The labellum is barely longer than the petals. The equitant ovary is 1.0mm long.

Caroline Is. : Yap [I.], on trees, especially mangroves, such as *Bruguiera* (G. Volkens no. 483, flowering in March 1900).

Palau Is. : Without locality information (Prof. Dr. Kraemer, in the year 1910). The species belongs to the section *Oxysepalum*, and by its decumbent habit, is easily distinguished from the closely related *B. clandestinum* Griff. The diminutive white flowers are so difficult to see so that even Prof. Volkens missed them.

Bulbophyllum sp.

Caroline Is. : Yap [I.], on horizontal, robust tree limbs, in the valley of the creek behind the Mission, rare (G. Volkens no. 528, sterile in May 1900). Since there were no flowers to hand, one cannot even approximately state to which section the plant belongs. It grows as vigorously as several [section] *Dialeipanth* species.

Luisia Gaud.

Luisia teretifolia Gaud. in Freyc. Voy. Bot. (1826), p. 427, t. 37.

Marianas Is. : Gaum [I.] (Gaudichaud).

Native name : 'Cebollo halom-tano'.

Apparently, the plant currently known from various parts of the monsoon region as 'L. teretifolia' is specifically different from this Type.

Vandopsis Pfitz.

Vandopsis Wārocqueana (Rolfe) Schltr. in K. Schum. et Lauterb., Nachtrag (1905), p. 225.

Palau Is. : Koror (Father Raymundus nos 134, 290a, flowering in the year 1907).

The material to hand, unfortunately, is already very decomposed, however this clearly is the species having a wide distribution in New Guinea.

Robiquetia Gaud.

Robiquetia lutea (Volkens) Schltr. comb. nov.

S. luteum Volkens in Engl. Bot. Jahrb. XXXI. (1901), p. 461.

Caroline Is. : Yap [I.], on trees in the shade, especially in cultivated areas (G. Volkens no. 199, flowering and fruiting in Dec. 1899; no. 350, flowering in the year 1900).

Truk I. : (Prof. Dr. Kraemer no. 5, flowering and fruiting in the year 1910).

A very characteristic species, which clearly belongs to the affinity of the Papuanian R. Mooreana (Rolfe) J.J.Sm.

Sarcochilus R.Br.

Sarcochilus ? sp.

Palau Is. : Koror, on old trees (Father Raymundus no. 291, sterile in the year 1907).

To all appearances this is one of the peculiar Sarcochilus species from the affinity of S. phyllorhizus F.v.M. However, since the flowers are lacking, it is quite possible that the plant also represents one of the large Taeniophyllum species, which recently have become known in New Guinea.

Taeniophyllum Bl.

Taeniophyllum marianense Schltr. nom. nov.

T. fasciola Safford in Contr. U. St. Nat. Herb. IX. (1905), p. 381 (nec Rchb.f.).

Vanilla fasciola Gaud. in Freyc. Voy. Bot. (1826), p. 427.

Marianas Is. : Guam [I.] (Gaudichaud).

Native Name : 'Kamuke nanofe'.

This species should be given a new name, since it definitely is not identical with T. fasciola (Forst.f.) Rchb.f. from Tahiti. It apparently has not been collected again since Gaudichaud's time.

1921

THE ORCHIDS OF MICRONESIA

by

RUDOLF SCHLECHTER

PREFACE

When, in 1914, in volume 52 of this journal, I published my compilation of the orchids of Micronesia, I would not have considered it possible that an update would have been needed so soon. At the time, it was my opinion that our knowledge of the orchids of the region was far from being complete, since of several species only vestigial parts were to hand, which did not suffice to establish the species, but I would never have considered it possible that this archipelago possessed such a wealth of species, as is now apparent.

At the time, shortly after I had given the manuscript of my work to the printers, C. Ledermann, who was then in New Guinea, received the assignment to collect for several months in Micronesia before returning to Europe at the conclusion of the Sepik Expedition. The results of this stay, lasting about five months, were quite surprising, since it became apparent that we knew only a small fraction of the plants present in these islands. Because of the time at his disposal, Ledermann had to restrict his botanical collection to a few islands and therefore investigated mainly the larger ones, such as Ponape in the Carolines and Babelthaob and Koror in the Palau Group. Unfortunately, he could not visit the Truk Islands, nor Olol [Oroluk] in the eastern Carolines, nor the whole of the western Carolines, nor in particular the Marianas Islands, with Rota and Saipan. A collection, especially from Guam and Rota, would have been particularly important, since that is where Gaudichaud's plants originated and which were in part, very inferior and incomplete specimens, but which nevertheless must constitute the basis of our knowledge of the Micronesian flora.

At the beginning of 1914, at about the same time as my first compilation was published, Oakes Ames in the 'Philippine Journal of Science' Vol. IX, pp. 11 - 16, under the heading of 'The Orchids of Guam', published a list of the orchids of this island, including eight new species. It became apparent that none of these was identical with the species I had previously described from the other islands.

How much the Ledermann collections have increased the knowledge of the orchids of this region, is clearly apparent from my first compilation containing

23 species from 18 different genera, whilst now already 68 species from 37 genera are known.

The region, whose orchid flora will be discussed here, encompasses the Marianas, the Palau Islands, the Carolines, Marshall Islands and Gilbert Islands. To the south, it does not extend beyond the equator, but to the north as far as 21° N. The latitude lies between 134° and 173° E. This very expansive region, according to the latest findings, takes in a land area of only 3405 km^2 , distributed as follows: Marianas 1140 km^2 , Marianas plus the Carolines 1450 km^2 [2450], Marshall Islands 385 km^2 and Gilbert Islands 430 km^2 . The sum of all the islands form a land complex about the size of Mallorca in the Balearic Islands.

The Marianas are mainly of volcanic origin, the northern part being older than the southern part. The larger and more elevated of the Palau Islands; viz. Babelthaob, Koror and Malakae consist mainly of augite [= pyroxene] and enstatites, the smaller ones mainly of coral limestone. Hans Meyer in 'Das Deutsche Kolonialreich II' p. 343 [The German Colonial Empire] gives the following characteristics : Only four of the Carolines are elevated islands consisting not solely of coral limestone, these are Kussaie, Ponape, Truk and Yap; the remainder however, is a collection of coral islands, mainly flat atolls surrounding lagoons, or simple small islands without inland lakes which rise only significantly above sea level and are all very similar in appearance. Only in the west do several, such as Fais, have larger elevations. Of the four larger Caroline Islands, two, viz. Kussaie and Ponape are apparently of pure volcanic origin; on Truk amphibolite slate has been established, but in general the island is of a basaltic nature. Yap has older crystalline, as well as volcanic, material.

The Marshall and the Gilbert Islands consist only of low coral islands, usually atolls with a central lagoon.

The history of the botanical exploration of Micronesia will be given here briefly. W.E. Safford in his 'The Useful Plants of the Island of Guam'* has compiled this at length for Guam, but the whole of Micronesia is very closely related and I will use much of his data and comments.

Apart from the older reports of several navigators, the history of the botanical exploration of the region begins only in February 1792, when the two corvettes 'Atrevida' and 'Descubierta' under the command of Allessandro Malaspina, reached Guam. Two members of this expedition were Louis Née and
* (Contributions from the U.S. National Herbarium, Vol. IV, 1905.)

Thaddaeus Haenke. From 12 - 24 February these two botanists investigated the flora of the island with much zeal, after which the corvettes continued their journey to the Philippines. Many of the plants collected by Née were described in 1802 at Madrid, those of Haenke, however, not until 1825 - 1830 by Presl in 'Reliquiae Haenkeanae'.

During the short stay of the 'Rurik' of the Romanzoff Expedition under the direction of O.v. Kotzebue in November 1817, Friedrich Eschscholtz and Adalbert von Chamisso also collected there. Some of the new discoveries were described by von Chamisso and von Schlechtendal in *Linnaea*, 1826 - 1836. The same expedition, already in January and February 1817, had been active in the Radak Group of the Marshall Islands, where both botanists were able to collect plants.

Of significant importance for the knowledge of the flora of the region has been the visit by Charles Gaudichaud-Beaupré who came to Guam, Rota and Tinian in March 1819 on the frigate 'Uranie' under the command of Louis de Freycinet. Since the botanical yield of this journey was comprehensively compiled by Gaudichaud himself and gives a good description of the vegetation of Guam and Rota, it can rightly be regarded as having laid the foundation for our knowledge of the flora of the region.

Likewise of importance was the visit of the 'Coquille' under the command of Captain Duperry, when the Second Officer Dumont d'Urville collected many plants. The island of Ualan (Kusaie) was reached in May 1824 and other islands in the Carolines were also visited. Unfortunately, the planned compilation of the flora of Ualan, as envisaged by Dumont d'Urville, never resulted, which is all the more regrettable since newer collections from this island (Kusaie) do not exist at all.

Dumont d'Urville visited Micronesia on two further occasions, first as commandant of the 'Astrolabe' when he was accompanied by the apothecary Lesson, touching the island of Guam in 1828; both Dumont d'Urville as well as Lesson appear to have had a most interesting yield.

Towards the end of 1838, Dumont d'Urville visited our region for the last time in command of 'L'Astrolabe' and 'La Zélée' being accompanied by the botanists Hombron and Jacquinot. After visiting the Carolines they reached Guam at the beginning of January 1839, where D'Urville again assisted in collecting.

Baron Carl v. Huegel is reported to have visited the Carolines and the Marianas at the beginning of the 30's of the last century, but nothing appears to be known of the plants he collected there.

At the end of the 30's a long rest period occurred in the exploration of the flora of Micronesia. Only when the territory was purchased by Germany from Spain in 1899, and the Americans took over Guam, did an intensive collecting activity start. It should be mentioned further that Ernst Betche during the start of the 80's, spent six weeks in the Marshall Islands and made a collection of 56 pot plants, also that in 1895 Steinbach published an article on the Marshall Islands, in which the plants in cultivation in the archipelago were discussed. The systematic botanical exploration of the region started with the journey of George Volken in 1899, who accompanied the Commission entrusted with the incorporation of individual parts of the region. He temporarily also visited the Marshall Islands, the larger Carolines, the Palau Islands and the Marianas, but collected mainly on Yap, where because of poor further travel possibilities he had to spend seven months up to the end of 1900. In 1901 he published the results of this stay in the form of a comprehensive description of the vegetative conditions of the island of Yap, including a compilation of its flora.

Resulting from the many personal connections he made there, he was able to interest many business people, missionaries and civil servants to continue his collections. Thus we owe thanks to him for sending many small, but important collections from Micronesia to the Botanical Museum at Dahlem in the ensuing years, thus from the District Supervisor Fritz of the island of Saipan, the Medical Doctor Schnee on Ponape and the Marshall Islands, Medical Doctor Schwabe from the Marshall Islands, Father Raymundus on the island of Koror, Charley Gibbon on the Marianas and the Vice-Governor Dr. Kersting, mostly from Ponape. (Of particular interest was Father Ramundus' collection of 360 specimens). A further small collection was made by the Staff Medical Officer Dr. Kraemer in the Truk Islands, during his journey to New Guinea and Micronesia in 1910; this also included many novelties.

In the meantime the Americans on Guam also commenced a very intensive exploration of the flora, since they realised that a knowledge of its distribution was vital to the systematic, economic evaluation of the products of the land. Already in 1905, W.E. Safford who had spent a long time on the island studying the flora in detail, was able to publish his extensive studies on the economic plants of Guam, in which the flora is comprehensively dealt with. Of late a

whole series of botanists has been active there, which has added considerably to the knowledge of the flora of the island, thus chiefly by H.L.W. Costenoble, R.C. MacGregor and by the leader of the Guam Experimental Station, J.B. Thompson.

When in 1913 the German Sepik Expedition was drawing to a close, it was suggested in Berlin that C. Ledermann, the botanist of this expedition, should go to Micronesia for several months to investigate the flora there. Thanks to the co-operation of the Geographical Commission for the Colonies, this request was granted and the necessary funds made available. Ledermann arrived in Ponape in November 1913 and developed a most active collection programme. Towards the end of the year he then went to the Marianas, where the main island of Babelthaob presented an ideal collecting area, since so much of the original vegetation was still present. He stayed there until March 1914 and then returned to Europe. In the period of only five months, he managed to collect about 1000 specimens. How important this collection was for our knowledge of the flora of Micronesia is obvious from the publications, since the majority of the described species are derived from these.

As I mentioned above already, we now know of 69 species of orchids, divided between 37 genera. For the dispersion of the family within the region, only the Carolines, the Palau Islands and the Marianas appear to be of importance, since neither in the Marshall Islands, nor in the Gilbert Islands, in English possession, are any representatives of the family known. Since these island groups consist of only low coral islands or atolls, it is unlikely that they shelter orchids.

To facilitate an overview of the distribution of the family in Micronesia, I include a table which clearly shows the individual genera and the number of species of each genus, which can be regarded as endemic.

SURVEY OF THE GENERA OF THE ORCHIDACEAE IN MICRONESIA

| No. | Genera | No. species | Endemic | Caroline Is. | Palau Is. | Marianas | Marshall Is. | Gilbert Is. |
|-----|-----------------------|-------------|---------|--------------|-----------|----------|--------------|-------------|
| 1. | Habenaria | 2 | 2 | 2 | . | . | . | . |
| 2. | Galeola | 1 | . | 1 | . | . | . | . |
| 3. | Nervilia | 2 | 1 | . | 1 | 1 | . | . |
| 4. | Didymoplexis | 1 | 1 | . | 1 | . | . | . |
| 5. | Moerenhoutia | 2 | 2 | 1 | 1 | . | . | . |
| 6. | Cheirostylis | 1 | 1 | . | 1 | . | . | . |
| 7. | Zeuxine | 1 | 1 | . | 1 | 1 | . | . |
| 8. | Hetaeria | 1 | 1 | . | 1 | . | . | . |
| 9. | Vrydagzenia | 1 | 1 | 1 | 1 | . | . | . |
| 10. | Corymbis | 1 | 1 | . | 1 | 1 | . | . |
| 11. | Coelogyne | 2 | 2 | . | . | 2 | . | . |
| 12. | Microstylis | 5 | 5 | 1 | 5 | . | . | . |
| 13. | Oberonia | 2 | 2 | . | 2 | . | . | . |
| 14. | Liparis | 1 | 1 | 1 | . | . | . | . |
| 15. | Dendrobium | 12 | 11 | 5 | 5 | . | . | . |
| 16. | Pseuderia | 1 | 1 | 1 | 1 | . | . | . |
| 17. | Mediocalcar | 1 | 1 | 1 | . | . | . | . |
| 18. | Agrostophyllum | 1 | 1 | . | 1 | 1 | . | . |
| 19. | Aglossorhyncha | 1 | 1 | . | 1 | . | . | . |
| 20. | Appendicula | 1 | . | . | 1 | 2 | . | . |
| 21. | Phaius | 1 | . | 1 | . | 1 | . | . |
| 22. | Calanthe | 1 | . | . | . | [1] | . | . |
| 23. | Spathoglottis | 2 | 2 | 2 | 2 | 2 | . | . |
| 24. | Bulbophyllum | 6 | 5 | 3 | 2 | . | . | . |
| 25. | Phreatia | 3 | 3 | 2 | . | . | . | . |
| 26. | Rhynchophreatia | 1 | 1 | . | 1 | . | . | . |
| 27. | Eulophia | 2 | 1 | . | 1 | 1 | . | . |
| 28. | Acriopsis | 1 | . | . | 1 | . | . | . |
| 29. | Chilochista | 1 | 1 | . | 1 | . | . | . |
| 30. | Thrixspermum | 1 | 1 | 1 | . | . | . | . |
| 31. | Luisia | 1 | . | . | . | 1 | . | . |
| 32. | Vandopsis | 1 | 1 | . | 1 | . | . | . |
| 33. | Trichoglottis | 1 | 1 | . | 1 | . | . | . |

| No. | Genera | No. species | Endemic | Caroline Is. | Palau Is. | Marianas | Marshall Is. | Gilbert Is. |
|--------|-----------------------|-------------|---------|--------------|-----------|----------|--------------|-------------|
| 34. | Robiquetia | 1 | 1 | 1 | . | . | . | . |
| 35. | Saccolobium | 1 | 1 | . | . | 1 | . | . |
| 36. | Sarcanthus | 1 | 1 | . | 1 | . | . | . |
| 37. | Taeniophyllum | 3 | 3 | 1 | 2 | 1 | . | . |
| 38. | Genus uncertain | 1 | 1 | . | . | 1 | . | . |
| Totals | | 69 | 59 | 25 | 37 | 18 | 0 | 0 |
| | | [17] | | | | | | |

From this survey we can see that of the 69 Orchidaceae in the region, no less than 59, i.e. 85.3% are endemic and that to date 25 species have been established in the Carolines, 37 in the Palau Islands and 18 [17] in the Marianas. There is no doubt that further exploration, particularly of the Carolines and Marianas will produce a whole series of species, some of which are already known from the Palau Islands, where Ledermann was very active in collecting. Just from these two groups [of islands] one can expect most of the new species. The northern Marianas, for example, have not been explored botanically and of many of the larger islands such as Saipan, we know so far very little botanically. With the continuing opening up of the individual islands for cultivation, there is the danger that the little vegetation originally present in Micronesia in the non-coral islands will disappear soon, and so it is time for botanical science to rescue what is still available. The descriptions by Volken indicate that genuine primary forests are hardly present any more, but the islands surely were originally covered in a dense primary forest. It is probable that already many species of the former primary flora have disappeared completely.

In considering the individual Types of the Orchidaceae closer, one gains the impression of dealing almost exclusively with Papuan Types. Hardly a single one of the endemic species is so divergent that it could not just as well be considered as purely Papuan. For most of them, the closest relatives have been found in New Guinea. No genus has been found that was not already

known in Papuasias. The few non-endemic species are those with a wide distribution in the eastern part of the Malay Peninsula, the Philippines and in Papuasias. These are the only ones which could indicate an influence on the flora from the west, such as for the endemic Cheirostylis and Chilochista species, but for the latter, it should be pointed out that close relatives have been found on the Kei Islands, the islands of the Torres Strait and in northern Australia.

Prof. Hans Meyer in his publication 'Das Deutsche Kolonialreich' [The German Colonial Empire] Vol. II, p. 376 and pp. 382 - 383 points out that the Marianas, the island of Yap and the Palau Islands, appear to form part of the Asiatic continental shelf. However, the composition of the flora does not appear to afford a proof of this, on the contrary, the relationships between the Palau Islands and the western part of Micronesia, as well as to Papuasias, are so close that a separation does not appear warranted to me. The same would appear to be valid for the Marianas, at least so far as we can judge from the collections to hand.

I should like to make a few comments about several particularly interesting types of the Micronesian orchid flora.

Cheirostylis Raymundi Schltr. deserves special attention as one of the few endemic types, which have a leaning towards the western species.

Pseuderia micronesiaca Schltr. is the species of the genus which has penetrated furthest to the north, which undoubtedly has its centre of development in Papuasias, does not extend to the east further than New Guinea, but to the west has been verified as far away as the Moluccas.

I have been very surprised by the appearance of one species each of the genera Mediocalcar and Aglossorhyncha, the former on the Palau Islands, the latter on Ponape. Both genera are typical Papuasian, particularly Aglossorhyncha, of which to date, no species was known outside of New Guinea. Both can be regarded as proof of the close and old relationship between Papuasias and Micronesia. The same can hold for the only non-Papuasian Rhynchophreatia, (R. palawensis Schltr.).

Vandopsis Raymundi Schltr., likewise, is a very close relative of a species group of the genus, which is not found to the west of Papuasias, and which therefore clearly indicates the influence of Papuasian elements on the flora.

Didymoplexis palawensis Schltr. and the Galeola species which, unfortunately,

is to hand only as a fruiting specimen, are clearly closely related with species from New Guinea, they are, to date, the two sole known leafless saprophytic orchids of the region.

We know 25 species of chlorophyll-containing terrestrial orchids, usually found in shady humus-rich locations in the scrub forests. A few appear only at more open locations, such as Liparis guamensis Ames, the two Spathoglottis species and Eulophia MacGregorii Ames. The other 43 species are epiphytes, of which several, however, are found under favourable circumstances on rocks, e.g. the small, leafless Taeniophyllum petrophilum Schltr. Four of the epiphytes are characterised in being leafless, with the roots then taking over the function of the leaves, such as for Chilochista and the three Taeniophyllum species.

One genus alone, Dendrobium, has produced more than 10 species, to date we definitely know of 12. In numbers Bulbophyllum then follows with six, Microstylis with five, Phreatia and Taeniophyllum, each with three, whilst Habenaria, Nervilia, Moerenhoutia, Coelogyne, Oberonia, Spathoglottis and Eulophia each have two species. The remainder, i.e. no less than 25 genera, so far are represented each by only one species, hence are monotypic for the region.

KEY FOR DETERMINING THE GENERA OF ORCHIDS OF MICRONESIA

A. Pollen masses granular.

- I. Pollinia with caudicles at the base, i.e. those parts facing the point of attachment. 1. Habenaria
- II. Pollinia with appendages or caudicles at the apex, i.e. those parts facing away from the point of attachment.
 - a. Anther prostrate, rostellum short, bent forwards.
 1. Rhizome short, consisting of carnose bunched roots. Saprophyte, scandent far upwards. .. 2. Galeola
 2. Rhizome a multi-articulate, roundish or longish bulb.
 - +. Terrestrial non-saprophytes. Sepals and petals free. 3. Nervilia
 - ++. Pallid saprophytes. Petals and sepals adnate forming a bilipped tube. 4. Didymoplexis
 - b. Anther erect. Rostellum directed almost vertically upwards, usually fairly long.
 1. Herb with soft leaves and stems.
 - +. Stigma singular. 5. Moerenhoutia
 - ++. Two stigmas, one each on the front sides of the column.
 - *. Apex of the column next to the rostellum with one dactylose appendage on each side. 6. Cheirostylis
 - **.. Apex of the column without dactylose appendages.
 - x. Lip non-spurred.
 - |. Lip inferne. 7. Zeuxine
 - ||. Flowers resupinate, hence the lip superne. 8. Hetaeria
 - xx. Lip with spur. 9. Vrydagzenia
 2. Erect shrubs with stiff stemlets and folded, thin but rigid leaves..... 10. Corymbis

B. Pollen masses of a wax-like or cartilaginous nature.

- I. Plants of sympodial structure.
 - a. Inflorescences appearing at the apex of the pseudobulbs or in the axils of the upper parts of the extended stemlets.
 1. Leaves convolute in bud. 11. Coelogyne
 2. Leaves duplicative in bud.

+. Leaves not articulate.

*. Flowers resupinate with flat,
erect lip.

x. Leaves folded, herbaceous..... 12. Microstylis

xx. Leaves carnose, ensiform,
equitant..... 13. Oberonia

**. Flowers not resupinate, lip
genuflexed downwards..... 14. Liparis

++. Leaves articulate.

*. Pollinia 4, tightly compacted in
pairs, into a longish or roundish
body.

x. Flowers with distinct mentum... 15. Dendrobium

xx. Flowers without mentum..... 16. Pseuderia

**. Pollinia 4-8, joined at the base by
the viscid mass, not tightly
compressed.

x. Sepals formed into an urceolate
tube..... 17. Mediocalcar

xx. Sepals free.

|. Rostellum slightly
protruding, column without
foot.

§. Pollinia 8..... 18. Agrostophyllum

§§. Pollinia 4..... 19. Aglossorhyncha

||. Rostellum extended, erect,
column with distinct foot.. 20. Appendicula

b. Inflorescence appearing beside the base of the
stem or pseudobulbs.

1. Pollinia without viscid disc or directly
equitant to the latter.

+. Leaves folded.

*. Flowers with spur.

x. Column slender, almost
completely free..... 21. Phaius

xx. Column short, adnate to the
base of the lip as far as the
apex..... 22. Calanthe

**. Flowers without spur..... 23. Spathoglottis

++. Leaves leathery or carnose, not folded. 24. Bulbophyllum

2. Pollinia equitant on the viscid disc by means of a separate, distinct caudicle.

+ . Pollinia 8.

- *. Rostellum short. Lip concave at the base, without callus..... 25. Phreatia

- **. Rostellum large. Lip with a humped callus..... 26. Rhynchophreatia

++ . Pollinia 2.

- *. Leaves folded. Lip free of column. Terrestrial herbs..... 27. Eulophia

- **. Leaves leathery, not folded. Lip adnate at the base of the column in a tubular manner. Epiphyte with slender, branched panicle..... 28. Acriopsis

II. Plant of monopodial structure.

a. Column extended at the base to a distinct foot.

1. Anther laterally with two protruding subulate excrescences. Plant completely without stems or leaves..... 29. Chilochista

2. Anther without lateral excrescences. Plant leaved, with distinct stem formation..... 30. Thrixspermum

b. Column completely without foot.

1. Lip without distinct pouch formation.

- + . Lip flat with straight axis. Plant with subulate leaves and equitant inflorescences..... 31. Luisia

- ++ . Lip genuflexed forwards, with right-angled bent axis. Plant with flat leaves and long-stemmed, branched inflorescences..... 32. Vandopsis

2. Lip with distinct pouch or spur formation.

- + . Plant leaved, with distinct stem and terete roots.

- *. Inflorescences equitant, not extended, few-flowered..... 33. Trichoglottis

- **. Inflorescences stemmed, multi-flowered, extended.

- x. Inside of spur without longitudinal lamella or keel.

- |. Lip with tubular or cylindrical spur and

- |. distinct front lobe. Plant
with long stem and long
pedicelled, pendent inflor-
escences or panicles..... 34. Robiquetia
- ||. Lip with short spur, hump-
shaped on the outside and
barely protruding front lobe.
Short-stemmed plant with
short-pedicelled inflor-
escences..... 35. Saccolabium
- xx. Spur divided inside into two
segments, by a longitudinal
lamella or keel..... 36. Sarcanthus
- ++. Plant without stems or leaves, with
compressed, flat roots..... 37. Taeniophyllum

1. Habenaria Willd.

The Habenaria species are terrestrial orchids with the habit of our Orchis species, however, they are usually more slender and often appreciably taller and mostly with green or white, less often yellow, and in a few instances, red flowers. They can always be recognised by the stigma being located on special, sometimes however, very short appendages, which either embrace the mouth of the spur, or are simply extended towards the front.

In Micronesia we know, to date, only two species of the genus which is distributed in all tropical regions and now encompasses towards 900 species. Both species belong to the Peristylis group [section], of which numerous species have been found in India through China, the Malay Archipelago and Papuasias to Polynesia. We can expect that the region harbours further species from the same section, as well as from the Salaccenses group [section], which has been confirmed in all adjacent regions, but whose representatives, being residents of shady places, can easily be overlooked in the forests.

Of the two species so far known in Micronesia, unfortunately only one can be established specifically, the other clearly is a close relative of H. papuana Krzl., from New Guinea, but is present in fruit only, so that it cannot be determined until further material becomes available.

Key for Determining the Species

A. Plant 80-90cm tall, with 15-18 leaves.

Inflorescence dense, multi-flowered, 25-35cm long....1. H. carolinensis Schltr.

B. Plant barely 50cm tall, with c. 8 leaves.

Inflorescence fairly lax, up to 20cm long.....2. H. species

Habenaria carolinensis Schltr. sp. nov.

Herba terrestris, erecta, 80---

90 cm alta. Caulis strictus vel substrictus, teres, glaber, usque super medium subdense 15-18-foliatus, supra vaginis acuminatis, sensim in bracteis abeuntibus, pluribus obsessus. Folia erecto-patentia oblonga vel oblongo-lanceolata, acuta, glabra, basin versus leviter angustata. Racemus dense multiflorus, usque ad 35 cm longus, cylindraceus, elongatus; bracteis anguste lanceolatis, acuminatis, inferioribus ovarium plus minusve superantibus, superioribus sensim paulo brevioribus. Flores illis H. goodyeroides Don similes, glabri, sive collectoris albescenti-virescentes, erecto-patentes. Sepala oblonga, obtusa, minute apiculata, lateralia obliqua, intermedio paululo longiora. Petala oblique rhombico-ovata, obtusa, sepalo intermedio fere aequilonga, basi margine anteriore cum labelli margine breviter connata. Labellum pallide flavum alte trilobum, supra basin ante ostium calcaris incrassatione transversa donatum, lobis lateralibus divergentibus, ligulato-

falcatis, obtusis, intermedio quam laterales paululo brevior, anguste triangulo, obtuso, calcare leviter incurvulo, clavato, obtuso, ovario fere 4-plo brevior. Gynostegium perbreve; anthera oblongoidea, parvula, canalibus perbrevibus, adscendentibus; processibus stigmatiferis crassiusculis, labelli margine adnatis, quam anthera fere aequilongis. Ovarium anguste cylindraceum, tortum, apicem versus attenuatum, glabrum.

A 80-90cm tall herb. Leaves up to 16cm long, at about the middle up to 2.5cm broad, the lower ones shorter, the upper ones gradually becoming smaller. Inflorescence up to 35cm long, c. 2.3cm in diameter. Flowers whitish green with a pallid yellow lip. Dorsal sepal 3.0mm long, the laterals slightly longer. The labellum 3.0mm long, when spread-out 4.5mm broad between the apices of the side lobes, with 2.75mm long side lobes and a 1.35mm long middle lobe. Spur 3.75-4.0mm long. Ovary equitant, c. 1.4cm long.

Caroline Is. : In dense bush forest on Monte Santo near Paue, on Ponape [I.], alt. c. 700m (C. Ledermann no. 13760, flowering in Dec. 1913).

This species represents a very characteristic Type of the section *Peristylus*, which in the shape and size of the flowers approximates to the species of the affinity of *H. goodyeroides* Don, but which in habit and other floral characteristics is more reminiscent of the affinity of *H. papuana* Krzl., and which is distinguished by very robust growth and the dense inflorescence.

Habenaria species, Schltr. in Engl. Bot. Jahrb. LII. (1914) p. 5.

Caroline Is. : In the woodland of the Bennigsen Mountains, alt. c. 120m, (G. Volkens no. 292, in fruit in Jan. 1900).

As already mentioned, this plant clearly belongs to the affinity of *H. papuana* Krzl., it can however, only be determined when further flower specimens are received. The plant is appreciably less tall than *H. carolinensis* Schltr. and has a more lax inflorescence.

2. *Galeola* Lour.

The *Galeola* species are very conspicuous and of peculiar growth, especially those of the section *Eu-Galeola* under consideration here. These are pallid, usually yellowish or brown, chlorophyll-free saprophytes, which climb to a height of often several metres amongst shrubs and up tree trunks to then develop their multi-branched, often metre-long inflorescence. In the case of several species, including those occurring in our region, the pallid sheaths of the peduncle are spread out into a leaf-like lobe which, however, does not carry any chlorophyll. These species are reminiscent of the slender forms of the genus *Vanilla*, to which *Galeola* doubtless is related. A very good characteristic of these *Galeola*

species is the long, thin fruit which bursts open in the shape of a broad thin flap and which contains numerous, small, broad-winged seeds.

The genus has been confirmed in about 15 species from India through China, the Malay Archipelago and Papuasia, as far as north-west Australia.

The only species within our region.....1. G. species

Galeola species, Schltr. in Engl. Bot. Jahrb. LII. (1914) p. 6.

Caroline Is. : Ponape [I.], found in forest clearings (Dr. Schnee, fruiting in Jan. 1909).

Without doubt, the plant from which now a second specimen sheet of the same collector has been found, is most closely related to G. vanilloides Schltr. from New Guinea. The ripe fruit to hand are 20cm long, but Dr. Schnee writes that they attain a length of up to 28cm, whilst the diameter was only c. 5.0cm. The wings of the seed are characterised, in that the body of the wing itself is split right up to the seed and that both apices are mucronate.

3. Nervilia Gaud. [Commers ex Gaud.]

This represents a very characteristic genus, easily recognised by any novice, with the leaves and inflorescences seeming to appear separately out of the ground, the latter always prior to the leaves. From the globular bulb, the size of a small potato, initially the flower-shoot develops, being surrounded by one or a few, green sheaths and which carries one or more, usually pendent, generally greenish yellow flowers, red in the case of a few species, together with a white lip. In some species it is often only a span's width, with others a foot tall. With the short-shooted, single-flowered species, however, it extends considerably during the development of the fruit and then not seldom attains a foot in length. The leaf appears out of the ground, always only one to a shoot, after the flower has withered or during development of the fruit. It is always distinctly petiolate and usually has a reniform, slightly flabellate, folded, less often flat lamina, which stands either upright or lies on the ground and frequently is slightly brown-spotted uppermost, often red-coloured underneath.

To date we know about 60 species of the genus, extending from the tropic regions of the Old World, then going northwards to Japan. Erroneously, the genus has been united for a long time with Pogonia, an American genus, but with which it does not even have a connection.

Key for Determining the Species

A. Peduncle single-flowered.....1. N. palawensis Schltr.

B. Peduncle single-flowered, inflorescence

turning in one direction.....2. *N. Aragoana* Gaud.

Nervilia palawensis Schltr. sp. nov.

Herba, terrestris, parvula, usque ad 10 cm alta. Tuber globosum. Folium singulum petiolatum, lamina reniformi, profundius cordata, obscure 5-7-angulata, breviter acuminata, utrinque glabra, petiolo brevi, sulcato, glabro. Scapus erectus, uniflorus, vaginis paucis arcte et alte amplexantibus omnino obtectus. Flos pedicellatus, mox nutans, illo *N. punctatae* Bl. similis, sed paulo major. Bractea pedicellum fere aequans. Sepala lanceolato-ligulata, acuta, glabra, lateralia paulo obliqua. Petala sepalis lateralibus similia sed paulo angustiora, acuta, glabra, sepalis subaequilonga. Labelum circuitu oblongum, dimidio anteriore trilobum, superne sparsim et minute papillosum, costis 2 obscuris longitudinalibus in medio labelli confluentibus, dense et minute papilloso e basi usque infra apicem labelli decurrentibus donatum, basi quadrato-oblonga rotundatum, lobis lateralibus brevibus falcato-ovatis, obtusis, intermedio multo majore elliptico, obtuso. Cofumna mediocris, semiteres, medio leviter angustata. facie papilloso-puberula. Ovarium graciliter pedicellatum, clavatum, glabrum.

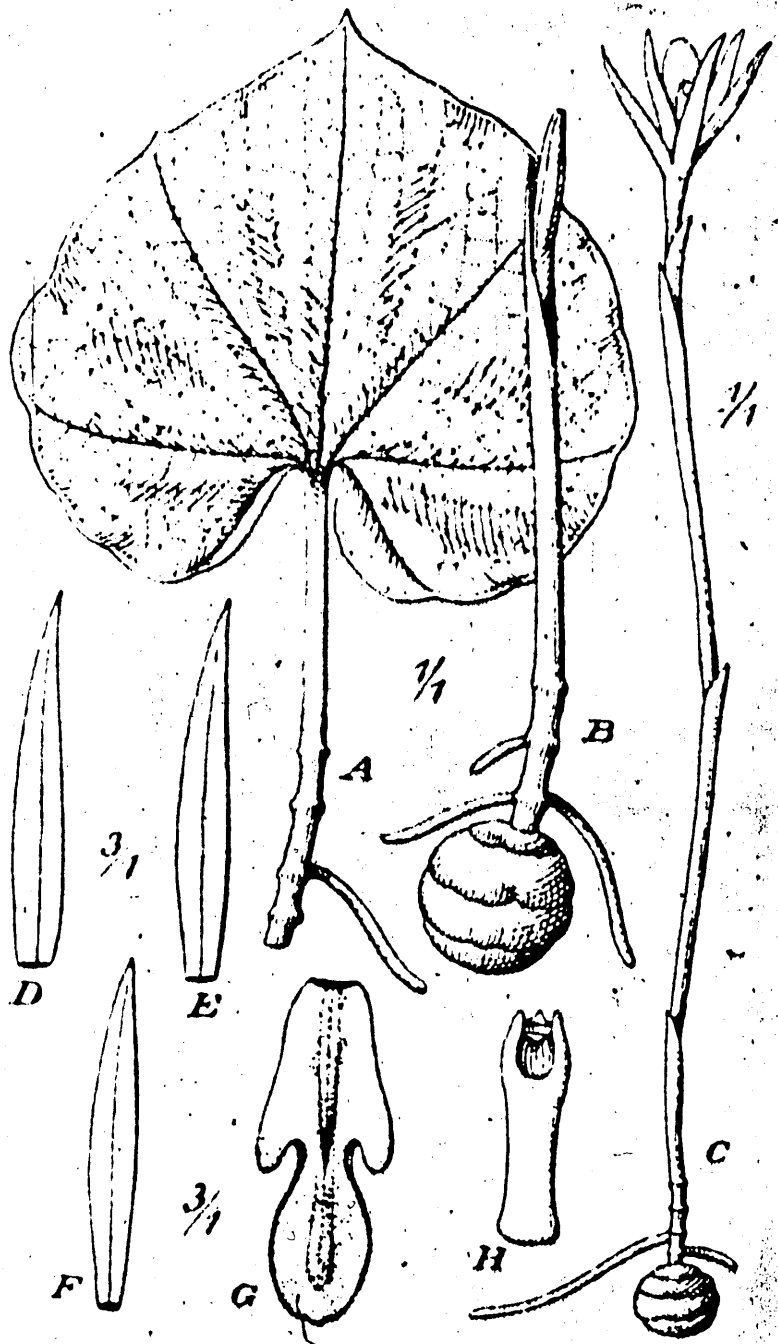


Fig. 1. *Nervilia palawensis* Schltr. A Blattsproß, B Knolle mit jungem Blütensproß, C Vollentwickelter Blütensproß mit Knolle, D Mittleres Sepalum, E Seitliches Sepalum, F Petalum, G Labellum, ausgebreitet, H Säule von vorn.

Herb up to 10.0cm tall. Leaf a matt-grey with green dots, short-stemmed, with a 3.0-4.0cm long, 4.0-5.8cm broad lamina and a 2.0-3.5cm long stem. Inflorescence at the time of flowering, 5.0-8.0cm long. Flower about middle-sized within the genus, with c. 1.5cm long, brown-green, dark red marked sepals and almost equally long, white, blue-pink-red marked petals. Lip 1.0cm long, at the base 4.0mm, at the centre 5.0mm broad, with 1.75mm long side lobes and 7.0mm long, 3.5mm broad middle lobe. Column 7.0mm long. Ovary 6.0mm long, with c. 1.0cm long pedicel.

Palau Is. : In dense intermediate forest, near Ngatgip, on Babelthaob [I.], alt. c. 100m (C. Ledermann no. 14539, flowering in March 1914).

This delightful small plant belongs to the affinity of N. punctata (Bl.) Schltr., but is distinguished from it and the other relatives by the shape of the lip, which is papillose above.

Nervilia Aragoana Gaud. in Freyc. Voy. Bot. (1826) p. 422, t. 35.

Pogonia flabelliformis Lindl. in Wall. Cat. (1832) no. 7400.

Pogonia Nervilia Bl., Mus. Bot. Lugd. Bat. I (1849) p. 32.

Pogonia gracilis Bl. Orch. Arch. Ind. (1858) p. 129, t. 57.

Marianas Is. : On the island of Guam (C. Gaudichaud, flowering in March 1819).

According to W.E. Safford the plant is known by the natives of Guam as 'Seyai-hagon' or 'Sedyaihagon', also 'Maisa-ulu' and is often utilised by them in the water-deficient, northern parts of the island to quench thirst, with its succulent, mucilage-containing, white bulbs.

The species is readily distinguished from N. palawensis Schltr. by the racemes of the c. 5 to 10-flowered inflorescences and yellow-green flowers with a white lip. In the manner which the species is delimited today, it belongs to the most widely distributed species of the tropical orchids. Specimens from eastern India, Formosa, the Liukiu Islands, the Philippines, various parts of Malaysia, Papuasias, northern Australia, New Caledonia and the Samoan Islands have been included with it, but it is likely here that several species have been grouped together.

4. Didymoplexis Falc. [Griff.]

Being small, rarely more than a 10.0cm tall saprophyte, growing in dense shade in the primary forest or under shrubs, the pallid, usually whitish Didymoplexis species, can easily be overlooked. That also explains why to date, we know only 12 species of the genus, which most likely, is far more numerous. In habit, these little plants are best compared with the well-known Gentianacean genus of Cotylanthera, in whose company individual species are at times found.

The species of the genus are usually easily recognised by the sepals and petals being adnate to form a companulate tube, clearly five-lobed above.

The species known to date are distributed over an area coinciding with that of Nervilia.

The only species within the region.....1. D. fimbriata Schltr.

Didymoplexis fimbriata Schltr. sp. nov.

Herba pusilla, saprophytica, erecta.

Rhizoma nondum notum. Caulis substrictus vel leviter flexuosus, teres, vaginulis paucis, brevibus, squamiformibus, arcte appressis obsessus, glaber. Racemus brevis, 3—6-florus, erectus; bracteis deltoideis vel ovatis, obtusiusculis, ovario multo brevioribus. Flores erecti, fide collectoris roseo-albi. Sepala et petala ligulata, in tubum oblique cylindraceo-campanulatum, breviter bilabiatum alte connata, 3-nervia, sepali intermedii et petalorum apicibus liberis (labium superum formantibus) ovalibus obtusis, sepalorum lateralium apicibus liberis (labium inferum formantibus) falcato-ovatis, obtuse apiculatis. Labellum obovato-cuneatum, basin versus sensim in unguem linearem angustato, antice obscure trilobato-rotundato, fimbriato, in medio fere unguis incrassatione vel callo transverso, dense verruculoso ornato, nervis 3 medianis e callo usque in apicem sparsim carunculatis. Columna semiteres, glabra; stigmatibus subquadrato. Ovarium sub anthesi breviter pedicellatum, glabrum, cylindraceum, post anthesin pedicello mox elongato elevatum. Capsula oblongoidea glabra, perianthio emarcido coronata.

A saprophytic, leafless, brown-reddish, 9.0–15.0cm tall herb. Flowers reddish white, erect. Dorsal sepal c. 7.0mm long, the lateral ones and the petals c. 7.0mm long. Lip 6.0mm long, below the apex c. 2.75mm broad. Column 5.5mm long. Ovary with pedicel at the time of flowering, 9.0mm long. Fruit when ripe 1.7cm long, 5.0mm in diameter, on a c. 4.8cm long pedicel.

Palau Is. : Saprophyte in dense intermediate forest near Ngatkip, on Babelthaob [I.], alt. c. 100m (C. Ledermann no. 14572, flowering in March 1914).

The species is most closely related to D. papuana Schltr., but readily distinguished by the lip, which is narrower towards the base, deeply serrated in front, with sparse tubercles on the upper side, and by the broader column.

5. Moerenhoutia Bl.

I have repeatedly indicated that the Papuan-Polynesian plants, which previously were always placed in Platylepis, probably must be kept separate from the African-Lemurian, true species of this genus. The presence of several of these species in Ledermann's collection, prompts me to broach this subject again.

A comparison of the Lemurian-African Types, with the Papuasian-Polynesian ones, shows that the former, with their more slender crest-less or wingless column, lip structure without the characteristic tall keels, should be kept separate generically. I have, for a long time, surmised that the Papuasian-Polynesian species should be included in Blume's genus Moerenhoutia. A study of Moerenhoutia plantaginea Bl., of which Blume had only partially developed flowers to examine, confirms this supposition.

The genus Moerenhoutia, one of the few orchid genera previously considered endemic to Polynesia, therefore is no longer to be regarded as such, but now contains 10 species, which indicate that the centre of development of the family lies not in Polynesia, but in Papuasiasia.

Those species to be included in Moerenhoutia are, apart from the two described below, as follows :-

- Moerenhoutia Commelynae (Rchb.f.) Schltr. (Platylepis Commelynae Rchb.f.)
Moerenhoutia constricta (J.J.Sm.) Schltr. (Goodyera constricta J.J.Sm.)
Moerenhoutia grandiflora Schltr. (Goodyera grandiflora Schltr.)
Moerenhoutia heteromorpha (Rchb.f.) Schltr. (Platylepis heteromorpha Rchb.f.)
Moerenhoutia lamellata Schltr. (Platylepis lamellata Schltr.)
Moerenhoutia Morrisonii Schltr. (Platylepis Morrisonii Schltr.)
Moerenhoutia plantaginea Bl. and Moerenhoutia zeuxinoides Schltr.
(Platylepis zeuxinoides Schltr.)

In habit the Moerenhoutia species are reminiscent of the genus Goodyera, but on closer examination, are always readily distinguished by the labellum being markedly constricted in approximately the lower third or quarter and the column having two winged or lamella-like crests, at the sides in front.

Key to Determine the Species

- A. Inflorescence fairly dense, up to 15cm long;
flowers white; sepals longer than 1.0cm.....1. M. leucantha Schltr.
B. Inflorescence lax, c. 30cm long; flowers
grey-green with brownish white petals.
Sepals 8.0mm long.....2. M. laxa Schltr.

Moerenhoutia leucantha Schltr. sp. nov. Herba terrestris, 40—60 cm alta. Rhizoma cauliforme, radicans, adscendens. Radices flexuosae, tomentoso-villosae. Caulis teres, glaber, laxe 4—6-foliatus. Folia erecto-patentia, petiolata, lamina oblique elliptica vel elliptico-lanceolata, acuminata, basi cuneato-rotundata, glabra, petiolo canaliculato, basi dilatata vaginante, glabro. Inflorescentia erecta, pedunculo stricto vel substricto, vaginis paucis acuminatis, dissitis obsessis, praesertim apicem versus glanduloso-

pubescente, 12—23 cm longo, racemo ipso subdense multifloro, 5—15 cm longo; bracteis erecto-patentibus, lanceolatis, acuminatis, ovarium fere aequantibus. Flores erecto-patentes vel suberecti, fide collectoris albi, in genere satis magni. Sepala oblongo-lanceolata, obtusiuscula, 3-nervia, basin versus sparsim glanduloso-puberula, lateralia obliqua, dimidio inferiore antice paululo dilatata. Petala sepalo intermedio margine inferiore agglutinata, glabra, oblique ligulata, obtusa, supra medium paululo dilatata, fere aequilonga. Labellum e basi semigloboso-concava in laminam oblongam, concavam, supra medium leviter constrictam, obtusam productum, intus supra basin fasciculis 2 verrucarum semiglobosis donatum, carina mediana mox in lamellas 2 divisa e basi usque in medium labelli fere decurrente ornatum, glabrum. Columna mediocris, glabra, antice manifeste bilamelata, rostello satis alto, segmentis subulatis. Ovarium sessile, subcylindricum, glanduloso-puberulum.

A 40–60cm tall terrestrial herb. Leaves 7.0–11.0cm long, 2.7–4.4cm broad, with a 2.5–5.0cm long petiole. Flower white. Sepals and petals 1.05–1.1cm long. Lip 9.5mm long, 3.5mm broad. Column with rostellum 7.0mm tall. Ovary up to 1.0cm long.

Caroline Is. : In dense scrub forest on Monte Sante, near Paue, on Ponape [I.], alt. c. 709m (C. Ledermann nos 13676, 13762, flowering in Dec. 1913).

The species has a certain similarity to M. constricta J.J.Sm. and M. lamellata Schltr. from New Guinea, but has larger flowers and a differently shaped labellum. In habit, it is also reminiscent of M. grandiflora Schltr. and M. Morrisonii Schltr.

Var. glabrata Schltr. var. nov.

Differt a forma typica ovario glabro, apice ad basin sepalorum tantum anulo pilorum circumdato.

Caroline Is. : In low scrub forest near Patapat, on the island of Ponape, alt. c. 100–200m (C. Ledermann no. 13171, flowering in Oct. 1913).

I consider it appropriate that the plant, distinguished by larger flowers, should be separated as a variety. In general it is decidedly more robust than the Type.

Moerenhoutia laxa Schltr. sp. nov.

Herba terrestris, usque ad 70 cm alta. Rhizoma cauliforme, adscendens, radicans; radicibus flexuosis, dense et breviter pilosulis. Caulis teres, glaber, 4–6-foliatus, erectus. Folia erecto-patentia, oblique ovato- vel elliptico-lanceolata, acuta vel acuminata, basi cuneato-rotundata, glabra, petiolo canaliculato, basi dilatata vaginante. Inflorescentia erecta, stricta, pedunculo incluso usque ad 50 cm longa, pe-

dunculo tereti, paucivaginulato, glanduloso-pilosulo, racemo laxe multifloro, c. 30 cm longo; bracteis elliptico-lanceolatis, acuminatis, ovario paulo brevioribus. Flores in genere mediocres, erecto-patentes, cinerascienti-viriduli, petalis brunnescenti-albidis, glabri. Sepala oblongo-lanceolata vel oblongo-ligulata, obtusiuscula, glabra, 3-nervia, lateralia obliqua. Petala sepalo intermedio margine interiore agglutinata, anguste et oblique ligulata, glabra, supra medium margine posteriore paulo dilatata. Labellum circuitu oblongum, e basi semigloboso-vesiculosa constrictum et in laminam naviculari-concavam ovali-quadratam dilatatum, deinde 4-ta parte apicali in laminam decurvulam late ovatam, obtusam exeunte, intus supra basin fasciculis 2 papillarum subulatarum donatum, carinis vel lamellis 2 parallelis, e basi usque supra medium decurrentibus ornatum, glabrum. Columna mediocris, antice alte bilamellata, rostello bifido, satis magno, erecto. Ovarium cylindraceo-fusiforme, glabrum.

A terrestrial, 50-70cm tall herb. Leaves 6.5-9.5cm long, 2.8-4.2cm broad on a 2.0-3.5cm long petiole. Inflorescence c. 30cm long. Flowers grey-green with brownish white petals. Sepals and petals 8.0mm long. Lip when spread out 6.3 mm long, 3.5mm broad in the middle, with front lobes 2.0mm broad. Column, inclusive of rostellum, 6.5mm long. Ovary 8.0-8.5mm long.

Palau Is. : In dense intermediate forest near Ngatkip, on Babelthaob [I.], alt. c. 100m (C. Ledermann no. 14513, flowering in March 1913 [1914]); on a large rock, in dense intermediate forest near Ngarsul, on Babelthaob [I.], alt. c. 200 up to 300m (C. Ledermann no. 1440, with young buds in Feb. 1914 [1914]). [Ed. The last mentioned number is probably 14440.]

This species is readily distinguished from M. leucantha Schltr., by the more lax inflorescence, smaller flowers, and in the shape of the labellum.

The specimens of no. 14440 are present with very young flower buds, but agree so well with those of no. 14513, that their identity is not in doubt.

6. Cheirostylis Griff. [Bl.]

In habit, the species of this genus usually have a certain similarity to the small Goodyera species, but in floral structure are closer to Zeuxine, from which they differ in the special, wing-like tubercules of the column and the fairly deeply lacerated front lobules of the labellum. Frequently, many of the species belonging here, some of which could be described as semi-saprophytic, are characterised by having more-or-less swollen, individual, rhizome internodes, so that the whole takes on a chain-like appearance.

The genus contains at present, about 20 species, which are dispersed from West Africa, where some aberrant species occur, through tropical Asia, the Malay

Archipelago and the Philippines to Papuasias and north-eastern Australia. The furthest south-eastern representative of the genus, C. ovata (Bail.) Schltr. (Gastrodia ovata Bail.) from Queensland is interesting. Many species occur as epiphytes, or grow on mossy rocks.

Sole species in the region..... 1. C. Raymundi Schltr.

Cheirostylis Raymundi Schltr. in Englers Bot. Jahrb. LII. (1914) p. 6.

Palau Is. : On old walls near Eimilik, on Korror [I.] (Father Raymundus no. 160, flowering in the year 1907).

As explained earlier, the species is closely related to C. philippinensis Ames, but shows certain connections westwards. The genus in general, appears to have its centre of development more towards the west, so that the few forms appearing in Micronesia, Papuasias and north-eastern Australia should be considered as radiants of the western centre of development, located probably in the hinterlands of India and eastern Malaysia.

7. Zeuxine Lindl.

The Zeuxine species are more-or-less slender herbs, typical representatives of which assume the habit of the Physurinae. The decumbent, stem-like rhizome, which develops separate roots at the nodes, gradually changes to a round, carnosous, short, erect stem, which carries several petiolate leaves with a more-or-less elliptical-oblique lamina. The stemmed inflorescence is always erect and in most cases carries fairly numerous, somewhat small flowers, in a lax, seldom denser manner. The colouring of the flowers, usually is somewhat rather unattractive, being grey-green or yellow-green and often is improved when the lip of the labellum is a lustrous white or yellow.

The area of distribution of the genus, which could include about 50 species, is similar to that of Cheirostylis. Here also, we find peculiar plant-geographically isolated West African species. Towards the east the genus extends to Polynesia, where its eastern boundary appears to lie in the Samoan Islands.

Sole species in the region.....1. Z. Fritzii Schltr.

Zeuxine Fritzii Schltr. in Englers Bot. Jahrb. LII. (1914) p. 7.

Palau Is. : In intermediate forest, near Ngarsul, on Babelthaob [I.], alt. c. 300m (C. Ledermann, nos 14313, 14423, flowering in Feb. 1914).

Marianas Is. : On the island of Saipan (District Superintendent Fritz, in the year 1903).

In habit the plant is very reminiscent of Z. Erimae Schltr., from New Guinea, but differs considerably in the shape of the lip-lamina and in this respect it approaches Z. elongata Benth.

The colour of the flowers is given by Ledermann as yellowish white and white, with the labellum being sulphur-yellow.

8. Hetaeria Bl.

The differences between Hetaeria and Zeuxine are not always as easy to establish as originally thought. In general, the species are easily recognised by the resupinate flowers with non-articulated lip and the short, often almost globular gynostemium, with the two carnose swellings, each carrying a stigma at the apex. The critical species which narrow the boundaries between the two genera, do not appear to occur in Micronesia.

Within the genus, the species are not easy to distinguish, especially those of the affinity of the Type of the genus, H. obliqua Bl.

We know of about 25 species belonging to the genus, but for several of these the generic affiliation is still doubtful. The area of distribution of the genus coincides almost exactly with that of Zeuxine.

Sole species in the region.....1. H. Raymundi Schltr.

Hetaeria Raymundi Schltr. sp. nov.

Herba terrestris, erecta, 40—70 cm alta. Rhizoma cauliforme, adscendens, radicans; radicibus flexuosis, villulis. Caulis erectus, teres, glaber, bene (7—9-)foliatus. Folia erecto-patentia, petiolata, oblique oblonga vel elliptica, acuminata, basi cuneata vel rotundato-cuneata, glabra, petiolo canaliculato, basi dilatata amplexante. Inflorescentia gracilis, erecta, stricta, pedunculo vaginis 3—4 disitis, arcte et alte amplexantibus, acuminatis obsessa, tereti, glanduloso-puberulo, quam racemus vulgo conspicue longiore, racemo dense multifloro, angusto, elongato; bracteis erecto-patentibus, lanceolatis, acuminatis, inferioribus nunc ovarium excedentibus, superioribus sensim paulo minoribus. Flores suberecti, inversi, illis H. obliquae Bl. similes, et fere aequimagni, lide collectoris albidis, labello sulphureo. Sepala ovalia, obtusa, 3-nervia, extus breviter glanduloso-puberula, lateralia obliqua. Petala sepalo intermedio margine interiore agglutinata, oblique ligulata, obtusiuscula, leviter curvata, basin versus sensim paululo angustata, supra medium margine anteriore sensim leviter dilatata, sepalis fere aequilonga, glabra. Labellum superum, circuitu cucullato-ovatum, intus supra basin nervis 4 (intermedio excepto) verrucis paucis (4-seriatis) ornatum, dimidio anteriore marginibus

incurvum, obtusiusculum, glabrum. Columna brevis generis, rostellii segmentis pro genere satis magnis, toris stigmatiferis crassiusculis. Ovarium sessile, fusiformi-cylindraceum, glanduloso-puberulum.

A 40-60cm tall terrestrial herb. Leaves 6.0-9.0cm long, 2.0-3.5cm broad on a 2.5-3.5cm long petiole. Inflorescence with peduncle up to 35cm tall, the raceme up to 15cm long; at flowering time, 7.0-8.0mm in diameter. Sepals and petals 4.0mm long, the labellum slightly shorter. Ovary 7.0mm long.

Palau Is. : In grassland on the island of Koror (Father Raymundus, in year 1907); in dense scrub forest, near Ngarsul, on the island of Babelthaob, alt. c. 50-100m (C. Ledermann no. 14312, flowering in Feb. 1914).

Differs from the related H. Erimae Schltr. from New Guinea in the broader petals, which are clearly narrowed towards the base and broadened towards the front, past the centre, in the shape of the labellum, and in the tubercles arranged in four rows on the four lateral veins above the base of the lip.

9. Vrydagzenia Bl.

Morphologically the Vrydagzenia species belong to the most interesting of the Physurinae. They are easily recognised by the flowers always standing in a compressed raceme and normally having a distinct, usually fairly thick spur, with two short lobes at the apex, and inside on the rear wall, two downwards-directed, drum-stick shaped tubercles. In habit they are usually short, rarely taller than a span's width, often with dark green leaves, embellished at the centre with a white longitudinal stripe.

The number of species so far known is about 27, which are distributed over an area extending from the hinterlands of India, through Malaysia, South China, the Philippines and Papuasias to the Samoan Islands in the Pacific Ocean.

Sole species in the region.....1. V. micronesiaca Schltr.

Vrydagzenia micronesiaca Schltr. sp. nov.

Herba parvula, erecta, vix ultra spithamea. Rhizoma cauliforme, adscendens, radicans; radicibus flexuosis, dense pilosulis. Caulis erectus, teres, glaber, bene (6-8-)foliatus, strictus vel substrictus. Folia erecto-patentia, petiolata, glabra, oblonga vel lanceolato-oblonga, acuta, basi cuneato-rotundata, petiolo canaliculato, basi dilatata amplectente. Racemus dense multiflorus, breviter pedunculatus; bracteis lanceolatis, acuminatis, margine glanduloso-ciliatis, inferioribus flores paulo excedentibus vel aequantibus, superioribus sensim brevioribus. Flores suberecti, illis V. albostratae Schltr. similes. Sepala anguste-oblonga,

apice incrassato obtusa, praesertim basin versus sparsim pilis retrorsis glanduloso-pilosula, lateralia obliqua, dimidio inferiore paulo dilalata. Petala quam sepala distincte breviora, sepalo intermedio margine interiore leviter agglutinata, oblique oblonga, apice incrassato obtusa, tertia parte inferiore margine anteriore subito paulo (subunguiculato-)angustata, glabra. Labellum oblongum, obtusum, medio leviter calloso-incrassatum, marginibus dimidio anteriore incurvulis, supra basin leviter constrictum, calcare oblongoideo-conico, apice obtuso leviter exciso, ovarii dimidium vix attingente, intus dorso appendicibus 2 stipitatis, apice obovoideo-clavatis ornatum. Columna perbrevis, crassiuscula generis, rostello toris stigmatiferis subbreviore. Ovarium fusiformi-cylindraceum, pilis retrorsis glanduloso-pilosulum.

A 10.0-15.0cm tall, erect herb. Leaves green, with a white longitudinal stripe in the centre, 3.5-4.5cm long, 1.2-1.7cm broad, on a 1.0-1.5cm petiole. Inflorescence at flowering time, usually somewhat shorter, less often somewhat longer than the leaves, with a 1.0cm long peduncle and a 1.5-3.0cm long, 1.0cm broad, dense raceme. Sepals 4.0mm long, petals c. 2.5mm long. Labellum 2.5mm long, with a 2.5-3.0mm long spur. The column barely 1.5mm long, ovary 6.0mm long.

Caroline Is. : In dense scrub forest, on Monte Santo, near Paue, on the island of Ponape, alt. c. 700m (C. Ledermann nos 13692, 13777, 13840b, flowering in Dec. 1913).

Palau Is. : On the island of Babelthaob (C. Ledermann nos 14443b, 14574a, flowering in Feb. up to March 1914).

The species probably is most closely related to V. albostriata Schltr., a species occurring in Papuasias, both in New Guinea and the Bismarck Archipelago. It differs, however, in having broader leaves and broader flowers with a shorter, thicker spur.

Ledermann states that the colour of V. micronesiaca Schltr. is whitish.

10. Corymbis Bl. [Thou.]

There are probably few orchid genera, which in their habit and on the initial total impression are so often considered as not belonging to the family, as the Corymbis species. The stiff, erect, ligneous, slender stems, with their folded, fairly thin, but nevertheless sturdy, spirally arranged leaves and the deeply lacerated flowers, with conspicuous narrow segments, arranged in short, axial inflorescences, give the impression of being anything else but an orchid. The position of the genus is also a fairly isolated one. Together with a few other similarly shaped ones, they constitute the group of Tropidiinae, located at the end of the Polychondreae.

The genus currently consists of 15 species, but it can be anticipated that the number will be increased after a more conclusive study, since previously, many species differing considerably in habit, have been united under the one name. It has been confirmed in the tropical regions of both the Old, as well as the New World.

Sole species in the region.....1. C. Ledermannii Schltr.

Corymbis Ledermannii Schltr. sp. nov.

Frutex erectus, 1—1,5 cm altus.

Rhizoma valde abbreviatum; radicibus filiformibus, elongatis, flexuosis, glabris. Caules erecti, simplices, c. 8-foliati, tereti, mox lignescentes, rigiduli, glabri. Folia erecto-patentia, oblongo-elliptica, acuminata, basi cuneata, glabra, subtus nervis 7 prominulis ornata. Inflorescentiae axillares, more generis pluriramosae, ramis distichis, alternantibus, erecto-patentibus 4—5-floris; bracteis ovatis, obtusiusculis, ovario pedicellato pluries brevioribus. Flores in genere inter minores, fide collectoris pallide flavi, suberecti, glabri. Sepala linearia, subacuta, dimidio superiore leviter dilatata, lateralia obliqua, intermedio dimidio superiore paulo latiora. Petala sepalis lateralibus valde similia, margine undulata, nervo medio extus incrassata, basi sepalo intermedio breviter sed distincte marginibus adnata. Labellum e ungue ligulato, canaliculato in laminam suborbicularem, antice excisam cum apiculo interjuncto, margine undulato-plicatam dilatatum, nervis 2 parallelis, carinato-incrassatis e basi labelli usque in basin laminae decurrentibus ornatum. Columna gracilis, teretiuscula, apicem versus dilatata, dorso sparsim et breviter sed distincte granuloso-puberula; rostellum triangulo, alte bifido. Ovarium subsessile, obtuse triquetrum, glabrum.

A 1.0–1.5m tall, terrestrial shrub. Leaves 20–24cm long, 5.0–7.0cm broad at the centre. Inflorescences with a 2.0cm long peduncle, up to 8.0cm long, 4.0–5.0cm broad. Flowers a pallid yellow. Sepals and petals 1.5–1.6cm long. Labellum 1.5cm long, with a 9.5mm long claw and a 5.5mm wide, as well as long, lamina. Column 1.2cm long, the ovary 9.0mm long.

Palau Is. : In scrub forest on limestone rocks, on the island of Koror, alt. c. 10–100m (C. Ledermann no. 14151, flowering in Feb. 1914); at the inner boundary of the mangrove formation, near Ngarsul, on Babelthaob [I.] (C. Ledermann no. 14349, with young buds in Feb. 1914).

Marianas Is. : Without locality details (District Superintendent Fritz, in the year 1902).

According to Ledermann, the natives of the Palau Islands know it as 'Koletening'.

The species is closely related to C. minor Schltr. from New Guinea, but has broader leaves and is distinguished by the column having short, thick hairs on

its back; furthermore the shape of the petals and that of the labellum is somewhat different.

11. Coelogyne Lindl.

The species of this genus, belong to the most beautiful orchids of tropical Asia and Malaysia. They are easily recognised by the ovate to longish, usually grooved pseudobulbs, carrying 1 to 2 leaves, between which the terminal inflorescence arises. The appreciably large flowers, which usually are white or greenish to brownish white, on the lip nearly always have yellow to sepia-brown markings and white or yellow crests or ridges. Frequently, the flowers of the inflorescence develop at certain time intervals, in such a manner that the new flower opens only when the previous one withers. It is characteristic for many species, that the usually large bracts are discarded before the flower opens.

To date the genus contains over 130 species, which are distributed from the west of India, through South China, the whole of Malaysia and Papuasias to Polynesia (Samoa).

Key for Determining the Species

- A. Pseudobulbs c. 8.0cm long; leaves
40cm long, 7.0cm broad.....1. C. guamensis Ames
- B. Pseudobulbs c. 3.0cm long; leaves up to
20cm long, up to 4.5cm broad.....2. C. species

Coelogyne guamensis Ames in Philipp. Journ. Sci. IX. (1914) p. 11.

Marianas Is. : In moist locations, on Guam [I.] (J.B. Thompson's collector no. 195, flowering in Jan. 1912).

This species, of which I have not seen any material, is reported by O. Ames as belonging to section Speciosae. The peduncle is 25cm long, few-flowered. The flowers, with 4.0cm long sepals and a 3.5cm long labellum with two crests and almost a circular front lobe, indicate that we are concerned with a most attractive species, which perhaps belongs to the affinity of C. Rumphii Lindl. It is probably the largest-flowered orchid of Micronesia.

Coelogyne species Schltr. in Englers Bot. Jahrb. LII. (1914) p. 11.

Marianas Is. : Without locality details (District Superintendent Fritz, without flowers in the year 1902).

This species appears to differ from C. guamensis Ames, since the pseudobulbs are appreciably smaller and shorter than for the latter. Flowers or rudiments of such and inflorescences, unfortunately, are not to hand.

12. Microstylis Nutt.

Those species we are concerned with, belonging to the polymorphic genus Microstylis, all have a marked similarity in habit. The carnose, short stem, often swollen in the manner of a pseudobulb, has a row of about up to ten distichous, oblique-erect leaves, whose lamina of a thin, herb-like nature, is more-or-less elliptically acuminate and folded and narrowed below, into a broad, very short petiole, surrounding the stem. From the apex of the stem, a slender, always multi-flowered inflorescence arises, usually with a dense, seldom lax, raceme of diminutive, usually yellow, more seldom reddish, resupinate flowers, i.e. with the labellum directed upwards.

The genus, which, with the exception of the Arctic regions, is distributed over the entire globe and already contains c. 150 species. The American and African species of the genus belong, however, nearly all to groups closely defined in habit, whilst those from tropical-Asia, Papuasia and Polynesia, at least in habit, have much similarity.

Key to Determination of the Species

- A. Lip undivided or simply 2 to 3 lobed.
 - I. Lip markedly concave, trilobed at the apex,
at the base with a fairly large callus..... 1. M. Volkensii Schltr.
 - II. Lip fairly flat, undivided or bilobed in
front, without a distinct callus at the base.
 - a. Lip undivided, column-arms fairly long.....2. M. palawensis Schltr.
 - b. Lip bilobed in front, column-arms very
short..... 3. M. calcarea Schltr.
- B. Lip separated in front into 6 to 10
teeth or segments.
 - I. Floral segments barely or slightly longer
than the diminutive, hardly 2.0mm broad
flowers..... 4. M. Kerstingiana Schltr.
 - II. Floral segments often much longer than the
more than 6.0mm broad flowers..... 5. M. setipes Schltr.

Microstylis Volkensii Schltr. sp. nov.

Herba fere pedalis, terrestris, erecta.

Rhizoma valde abbreviatum; radicibus filiformibus elongatis, flexuosis, dense et tenuissime pilosulis. Caulis brevis, crassiusculus, cylindraceus, 4—6-foliatus. Folia erecto-patentia, oblique elliptica, acuminata, basi valde oblique cuneata sensim in petiolum latum basi vaginantem transeuntia,

glabra. Inflorescentia erecta, stricta, pedunculo evaginato, angulato, folia fere aequante, racemo dense multifloro, anguste cylindraceo, erecto, pedunculo paulo brevior; bracteis lanceolatis, acuminatis, mox deflexis, longitudine flores fere aequantibus. Flores parvuli, erecto-patentes, fide collectoris rubescenti-viriduli, labello flavo, glabri, illis *M. latifoliae* (Sm.) J. J. Sm. similes, inversi. Sepalum intermedium deflexum, oblongo-ovatum, obtusum, lateralia erecta, oblique oblonga, obtusa. Petala deflexa, oblique linearia, obtusa, sepalo intermedio fere aequilonga. Labellum erectum, superum, e ungue brevi quadrato columnae basi adnato in laminam circuitu suborbicularem, antice trilobam, basi subcordatam, basi medio subcucullato-concavam, basi callo brevi, crasso, quadrato, retuso ornatam dilatatum, lobis lateralibus brevibus, semiorbicularibus, intermedio oblongo-ligulato, obtuso, paululo longiore. Columna cylindracea, pro genere satis longa, glabra. Ovarium pedicellatum, clavatum, glabrum, leviter 6-costatum.

A 30-38cm tall terrestrial herb. Leaves 11-15cm long, 3.5-5.5cm broad on 3.0-8.0cm long petioles. Stem 6.0-10.0cm long, up to 1.0cm in diameter. Inflorescence stiff, erect, with a 13-16cm long peduncle and 9.0-12.0cm long, barely 1.0cm broad raceme. Flowers reddish green with a yellow lip. Dorsal sepal 2.5mm long, the lateral ones 3.0mm long. Petals 3.0mm long. Labellum with its short, broad claw, a little over 2.0mm long, c. 1.75mm broad at the middle. Ovary with pedicel 4.0mm long.

Palau Is. : In dense intermediate tall forest, near Ngatkip, on Babelthaob [I.], alt. c. 100m (C. Ledermann no. 14571, flowering in March 1914).

Caroline Is. : In a damp depression with shady, woody shrubs, in the district of Mashabal, on the island of Yap, alt. c. 150m (G. Volkens no. 174, in fruit in Dec. 1899).

Externally, the species has much similarity with the widely distributed *M. latifolia* (Sm.) J.J.Sm., but differing from it in the shape of the lip-lamina with a longer, more linguiform middle lobe.

The specimens collected by Volkens have already passed to the fruit stage, but I do not doubt that they belong here.

Microstylis palawensis Schltr. sp. nov.

Herba terrestris, erecta, 12-20 cm alta. Rhizoma valde abbreviatum; radicibus filiformibus, flexuosis, minute et dense pilosulis. Caulis brevis, carnosus, cylindraceus, c. 4-foliatus. Folia erecto-patentia, petiolata, lamina oblique elliptica vel lanceolato-elliptica, acuta, basi oblique cuneata, petiolo canaliculato, basi dilatata vaginante. Scapus erectus, angulatus, strictus, racemo dense multifloro, an-

gusto; bracteis reflexis, lanceolato-linearibus, acuminatis, inferioribus quam flores sublongioribus, superioribus sensim paulo minoribus. Flores erecto-patentes, glabri, inversi, fide collectoris pallide brunnescenti-flavidi. Sepala ovata, obtusa, trinervia, patentia, lateralia erecta, obliqua. Petala oblique oblongo-ovalia, obtusiuscula, uninervia. Labellum erectum, superum, circuitu late ovatum, apice triangulum, obtusiusculum, basi sagittato-auriculatum, auriculis falcato-ovatis, subacutis, superne nudum. Columna brevis, more sectionis brachiis parallelis, antheram bene excedentibus, dorso egibbosa. Ovarium pedicellatum, clavatum, glabrum.

A 12-20cm tall terrestrial herb. The stemlets are swollen in a pseudobulb-like manner and are up to 3.5cm long. Leaves up to 6.0cm long, below the middle, up to 2.5cm broad, often smaller, on a 1.5-2.0cm long petiole. Peduncle with raceme, up to 17cm long, the latter up to 12cm long, usually appreciably shorter. Flowers resupinate, according to the collector, matt brown-yellow, but definitely also with dark blue-green, little column-arms. Sepals c. 3.0mm long. Petals a little shorter than the sepals. Lip and sepals almost of equal length, above the base 2.0mm broad. Column with the definite dark blue-green, little arms 1.5mm long. Ovary with pedicel c. 2.0mm long.

Palau Is.: In dense intermediate forest, near Ngarsul, on Babelthaob [I.], alt. c. 200-300m (C. Ledermann no. 14416, flowering and fruiting in Feb. 1914).

This represents an interesting species of the section *Oistochilus*, previously restricted in distribution to the narrow concept of *Papuasia* and the *Moluccas*, and characterised by its small dimensions. It is, however, possible that the dimensions of the flowers may prove to have been reported as too small, since I had to make my analysis from an almost withered bud, yet I do not consider that the difference could have been appreciable.

J.J. Smith recently expressed the opinion that it would be desirable to unite section *Oistochilus* with section *Pseudoliparis*. The above plant has again convinced me against that.

Microstylis calcaria Schltr. sp. nov.

Herba terrestris, usque ad 45 cm alta. Rhizoma valde abbreviatum; radicibus filiformibus, flexuosis, dense pilosulis. Caulis erectus, cylindraceus, carnosus, 3-8-foliatus. Folia erecto-patentia, petiolata, oblique elliptica, vel elliptico-ovata, acuta vel acuminata, basi oblique cuneata, petiolo canaliculato, basi dilatata vaginante. Scapus erectus, strictus vel substrictus, angulatus, racemo dense multifloro, elongato; bracteis deflexis, linearibus, acutis, inferioribus flores longitudine excedentibus, superioribus sensim brevioribus. Flores in genere inter minores, erecto-patentes, glabri, inversi, fide collectoris, rosei, labello

albido. Sepala ovata, obtusa, trinervia, lateralia obliqua, intermedio bene latiora. Petala oblique oblongo-ligulata, obtusa, sepalis subaequilonga. Labellum circuitu late ovatum, apice breviter bilobulatum cum apiculo minuto interjecto, basi sagittato-auriculatum, medio fovea oblonga, antice incrassatione lunata obscura terminata donatum, auriculis basilaribus oblique triangulis, obtusiusculis, brevibus. Columna brevis, crassiuscula. Ovarium pedicellatum, clavatum, glabrum.

A terrestrial 15-45cm tall herb. The stemlets are fairly thick-carnose, up to 7.0cm long, and up to 7.0mm in diameter. Leaves up to 8.0cm long, up to 3.5cm broad on a 2.5-3.75cm long petiole. Peduncle erect, angular, inclusive of the raceme, up to 37cm long, the latter up to 20cm long. According to the collector, the flowers are carmine-red, with a white lip. Sepals and petals c. 3.0mm long. Labellum as long as the sepals, 2.75mm broad, above the base. Ovary with pedicel almost 5.0mm long.

Palau Is. : In scrub forest, on limestone rock without soil on Koror I., alt. c. 10-100m (C. Ledermann no. 14103, flowering in Feb. 1914).

Old peduncles of Ledermann's specimens, show that at least when the fruit is ripe, the plant can attain a height of over 40cm. The inflorescences of the specimen to hand, on the other hand, indicate a height of only c. 25cm, inclusive of the stem.

The species belongs to the section *Hololobos*, which is only poorly represented in Papuasias, and which appears to have its centre of development further to the west. The species is well characterised by the shape of the labellum.

Apparently those flower-less specimens collected by Kraemer on the Truk Islands, also belong here.

Microstylis Kerstingiana Schltr. sp. nov.

Herba terrestis, erecta, 20 — 30 cm alta. Rhizoma valde abbreviatum; radicibus filiformibus, flexuosis, dense pilosulis. Caulis cylindraceus, carnosus, brevis, c. 5-foliatus. Folia erecto-patentia, oblique elliptica, cuneata, petiolo canaliculato, basi dilatata vaginante. Scapus erectus, folia multo superans, angulatus, racemo basi laxe apicem versus dense multifloro, angusto, elongato; bracteis deflexis, linearibus, acutis, inferioribus flores longitudine subexcedentibus, superioribus sensim paulo minoribus. Flores in sectione inter minores, erecto-patentes, glabri, inversi. Sepalum intermedium oblongum, obtusum, lateralia oblique ovalia, obtusa, paulo breviora. Petala lineari-ligulata, obtusa, uninervia, sepalo intermedio subaequilonga. Labellum circuitu ovale, basi alte sagittatum, supra medium 3-lobatum, fovea mediana oblonga, marginibus ob-

scure incrassata, auriculis basilaribus oblique oblongis, valde obtusis, quam lamina ipsa labelli paulo brevioribus, lobis lateralibus angulo exteriori brevi, obtusiusculo, dentibus 2 ligulato-linearibus, obtusis, auctis, lobo intermedio in lobulos 2 oblique oblongo-ligulatos, obtusos usque ad medium fere bipartito, segmenta loborum lateralium paululo excedente. Columna brevis sectionis. Ovarium pedicellatum, subclavatum, glabrum.

A 20-30cm tall terrestrial herb. The stemlets are fairly thick, c. 3.0cm and 5.0-6.0mm in diameter. The peduncle is stiffly erect, up to 24cm long, of which the raceme occupies 23cm. The flowers are small and a pallid yellow. The dorsal sepal is 3.0mm long, the lateral ones 2.0mm long. The petals are about as long as the dorsal sepal. The labellum exceeds the lateral sepals somewhat in length, has over 2.0mm long basal auricles and is 2.0mm broad at the base. Ovary with pedicel c. 4.0mm long.

Palau Is. : In dense tall forest, near Ngatkip, on Babelthaob [I.], alt. c. 100m (C. Ledermann no. 14490, flowering in Mar. 1914).

In section Pleiodon, this species is well characterised by the conspicuous, long, blunt lip-auricles, also by the smaller, likewise blunt teeth of the lateral lobes.

I have dedicated this plant to the then Vice-Governor of Micronesia, Privy Councillor Dr. H. Kersting, without whose active assistance, Ledermann's journey to Micronesia would not have been so successful, and who drew Ledermann's attention, in particular, to the value of the botanical investigation of the island of Babelthaob.

Microstylis setipes Schltr. sp. nov.

Herba erecta, terrestris, 35-50 cm alta. Rhizoma valde abbreviatum; radicibus filiformibus, flexuosis, dense et breviter pilosulis. Caulis brevis, cylindraceus, 4-5-foliatus, crassus. Folia erecto-patentia, oblique ovata vel ovato-elliptica, acuta vel acuminata, basi rotundato-cuneata, petiolo canaliculato, basi dilatata amplexante. Scapus erectus, gracilis, angulatus, racemo laxo pluri- vel multifloro; bracteis linearibus, acutis, reflexis, ovario longipedicellato multo brevioribus. Flores in sectione inter majores, glabri, illis *M. pedicellaris* Rehb. f., similes sed paulo majores, erecto-patentes, inversi. Sepalum intermedium anguste oblongum, obtusiusculum, 3-nerve, lateralia oblique oblonga, obtusa, 3-nervia, erecta. Petala deflexo-patentia, oblique linearia, obtusa, 4-nervia. Labellum erectum, superum, circuitu ovale, superne nudum, basi sagittato-auriculatum, supra medium 3-lobum, auriculis basilaribus oblique ovatis, obtusis, lobis lateralibus dente exteriori magno, triangulo acutissimo, dentibus 3 subulatis, falcatis, lobo intermedio subaequilongis auctis, lobo inter-

medio oblongo, alte bipartito, partitionibus lanceolato-falcatis, acutis. Columna brevis sectionis. Ovarium gracillime pedicellatum, glabrum, pedicello setiformi.

A 30-60cm tall terrestrial herb. The stemlets are carnose, up to 6.0cm long, 5.0mm in diameter. Leaves 6.0-12.5cm long, 3.5-5.0cm broad on a 3.0-4.5cm long petiole. Peduncle without raceme, up to 20cm long, angular. Raceme up to 30cm long, developing only slowly. Flowers red-brown or glassy-whitish, with rose-red stripes, over 6.0mm broad. Dorsal sepal 5.0mm long, the lateral ones 4.0mm long. Petals c. 4.5mm long. Lip 3.5mm long, from base to apex, 5.0mm broad across the middle between the tips of the outermost teeth of the lateral lobes, with 2.0mm long basal auricles. Ovary with the very slender pedicel, 2.3-2.5cm long.

Palau Is. : In dense intermediate forest, near Ngatkip, on Babelthaob [I.], alt. c. 100m (C. Ledermann no. 14534, flowering in Mar. 1914); in dense intermediate forest, near Ngarsul, on Babelthaob [I.], alt. c. 200-300m (C. Ledermann no. 14432, flowering in Feb. 1914); on the island of Koror (Father Raymundus no. 27, in fruit in the year 1907).

This species is easily distinguished from others in the region, by the long, hair-thin pedicels. It is related to M. pedicellaris Rchb.f., M. wariana Schltr., M. pectinata J.J.Sm. and M. trichopodon Schltr. from New Guinea, the Moluccas and Celebes, but well characterised specifically by the labellum.

13. Oberonia Lindl.

The species of the genus Oberonia, always are small epiphytes, with ensiform or knife-like, equitant, carnose, compressed leaves, and diminutive flowers in a narrow raceme, often reminiscent of the shape of a mouse's tail. Frequently, the flowers are barely as large as a pinhead, but they are always close together in large numbers (often hundreds) on the raceme.

One is hardly aiming too high, if the number of species of the genus now known, is given as 150. These are distributed from East Africa, through the Lemurian Islands [Madagascar Group], the whole of India, Malaysia, Papuasias to the Samoan Islands; just a few species, e.g. O. japonica Maxim. in Japan, O. palmicola F.v.M. in eastern Australia and O. neo-caledonica Schltr., as well as O. Vieillardii (Rchb.f.) Schltr. in New Caledonia, are found outside the tropical belt.

Key for Determination of the Species.

A. Inflorescence not distinctly with pedicel;

the rachis, bracts and flowers short

and sparingly hirsute.....1. O. palawensis Schltr.

B. Inflorescence distinctly with pedicel;

rachis, bracts and flowers glabrous.....2. O. species

Oberonia palawensis Schltr. sp. nov.

Epiphytica, parvula, c. 12—20 cm longa, suberecta vel subpatula. Rhizoma valde abbreviatum; radicibus filiformibus, flexuosis, tenuibus, glabris. Caulis leviter flexuosus, 5—6-foliatus, basibus foliorum omnino obtectus. Folia erecto-patentia, equitantia, ensiformi-ligulata, subacuta vel obtusiuscula. Racemus subsessilis, pro sectione angustissimus, elongatus, erectus, folia superiora multo excedens, dense permultiflora, rhachi minute muriculato-pilosula; bracteis lanceolatis, acuminatis, minute papilloso-puberulis, ovarium fere aequantibus. Flores in sectione minuti, flavidi, extus minute papilloso-puberuli, patentes. Sepala ovata, subacuta, lateralia obliqua. Petala oblique oblongo-ligulata, obtusa, margine subirregularia, glabra. Labellum circuitus panduratum, sepala dimidio fere superans, e basi reniformi-cordata medio constrictum, dimidio superiore sursum conspicue dilatatum, bilobum, lobis leviter divergentibus semioblongis, antice inaequaliter laceratis. Columna generis. Ovarium cylindraceum, papilloso-puberulum, sepalis paulo longius.

A 12–20cm tall epiphyte, with bunched stemlets. Leaves 2.5–6.0cm long, 6.0–8.0cm broad at about the middle. Raceme 6.0–12.0cm long, very thin, barely 3.0mm in diameter on withering. Flowers yellowish, protruding, sepals and petals barely attaining 1.0mm in length. The ovary hardly longer than 1.0mm.

Palau Is. : On trees in a park-like, cultivated native area, near Ngatkip, on Babelthaob [I.], alt. c. 50m (C. Ledermann no. 14475, in bud in Mar. 1914).

A most characteristic species of my section Adenorhachis, which is probably best placed next to the Papuasian representative of the group, but which is distinguished by the conspicuously thin, long raceme.

The specimens are not yet in flower, but the buds are already so far developed, that I can hardly imagine they would alter much.

Oberonia species nov. of the affinity of O. podostachys Schltr.

Palau Is. : On trees in a park-like, cultivated native area, near Ngatkip, on Babelthaob [I.], alt. c. 50m (C. Ledermann no. 14474, in fruit in Mar. 1914).

Here we clearly have a new species of the section Podostachys.

Unfortunately, there are no flowers present, hence it is not fitting to describe the species of the group, in which the flowers are particularly characteristic. The specimens were collected together with those of O. palawensis Schltr.

14. Liparis L. C. Rich.

Of the large genus Liparis, which in Papuasia is represented by about 70 species, and which grow partly as epiphytes or terrestrially, we know in Micronesia to date only a sole terrestrial species. This one is reminiscent in habit of certain Habenaria species and is probably a resident of open country, but I consider a more precise exploration of the region will also reveal several epiphytic types of the genus.

The number of species distributed throughout the world, with the exception of the Arctic and Antarctic regions, given as 250, can hardly be an exaggeration.

Sole species in the region..... 1. L. guamensis Ames

Liparis guamensis Ames in Philipp. Journ. Sci. IX. (1914) p. 11.

Caroline Is. : On Ponape Island (C. Ledermann no. 13619, in the year 1913).

Marianas Is. : On hills, south-west of Piti, alt. c. 300m, on the island of Guam (R. C. MacGregor no. 633, flowering in Oct. 1911).

I have not seen the Type of the species and hence, I identify Ledermann's plant with a certain reservation, as Ames' species. Unfortunately, the description is very short and the relationship is not stated.

Ledermann's plant that I have to hand is a relative of L. habenarina F.v.M. and L. kenejiae Schltr. It agrees as far as the short description goes, more-or-less with L. guamensis Ames.

The colour of Ames' specimen is given as pallid yellow and brown, whilst Ledermann's plant appears to have brown-yellow sepals and a brown-violet labellum.

15. Dendrobium Sw.

There is hardly another orchid genus in the Old World, which shows such a large variety in habit and floral structure, as the genus Dendrobium in its present delimitation. Furthermore, the Micronesian species belong to many different types. Currently, we know of 11 species of the genus here, which are representatives of six different groups [sections]. All the species in the region are epiphytes. In general, the representatives of the genus are recognised by the flowers which appear at the apex or laterally, but never at the base of the pseudobulbs or stemlets, and which by extension of the column-foot, form a definite mentum, together with the descending lateral sepals. The four pollinia, located in the anther, are appressed in pairs, without a viscid-disc and caudicles.

We know already of 900-1000 different species of Dendrobium, but none of

them extend further afield to the west than the western borders of India and Ceylon, whilst the genus has penetrated to the east as far as Polynesia, where the extreme representatives are to be found on the Society Islands. It is interesting that a whole series of species occur in Australia, quite far to the south, outside the tropical zone, and that one is found even in New Zealand. To the north, the limit of distribution is reached in southern Japan and on the southern tip of Korea.

Key for Determining the Species

- A. Pseudobulbs heteroblastic, i.e. formed by a single internode.
 - I. Pedicel markedly extended; sepals and petals very long-acuminate.
 - a. Flowering and non-flowering pseudobulbs of very different structure, the former fairly short, the latter extended upwards like stems and long-acuminate..... 1.D. elongaticolle Schltr.
 - b. Pseudobulbs uniform..... 2.D. flavicolle Schltr.
 - II. Pedicel fairly short; sepals and petals not extended.
 - a. Front lobe of labellum with undulate margin and short-crenate. 3.D. Kerstingianum Schltr.
 - b. Front lobe of labellum lacerated at the margin into numerous, filament-shaped, twisted segments.
 - 1. Isthmus of the front lobe of the labellum, about double the length of the lamina..... 4.D. Amesianum Schltr.
 - 2. Isthmus of front lobe of the labellum, barely longer than the lamina..... 4.D. scopa Lindl.
- B. Pseudobulbs or stemlets formed of several or numerous internodes.
 - I. Leaves without a distinct sheath; directly equitant to the pseudobulbs.
 - a. Pseudobulbs single-leaved; inflorescence short; flowers completely glabrous..... 5.D. brachyanthum Schltr.

- b. Pseudobulbs \pm 4-leaved; inflorescence long-stemmed; flowers outside with hair-shaped soft

bristles..... 7. D. palawense Schltr.

II. Leaves equitant to the pseudobulbs or stemlets by means of a distinct sheath.

- a. Pseudobulbs or stemlets carnose, hence with longitudinal grooves when dried.

1. Pseudobulbs short, with short, erect 2-flowered inflorescences; leaves few, only at the apex of the pseudobulbs..... 8. D. violaceo-miniatum Schltr.

2. Pseudobulbs or stemlets extended, uniformly leaved; inflorescence appearing as lateral, densely multi-flowered racemes..... 9. D. Kraemeri Schltr.

- b. Stemlets wiry, rigid, lignate, therefore smooth when dried.

1. Leaves longish; middle lobe of labellum barely longer than the lateral ones..... 10. D. ponapense Schltr.

2. Leaves lanceolate or lanceolate-lanceiform; middle lobe of the labellum far overtops the lateral ones,

+.Middle lobe of labellum almost circular in plan, with short, bluntish mucro..... 11. D. carolinense Schltr.

++.Middle lobe of labellum triangular-lanceolate, pointed..... 12. D. guamense Ames

Dendrobium elongaticolle Schltr. sp. nov. **Epiphyticum, erectum, gracile.**

Rhizoma decumbens, breve, dense pseudobulbis, obsessum; radicibus filiformibus, flexuosis, glabris. Pseudobulbi dimorphi, sterilia anguste ovoidea vel subcylindracea, in collem vix vel breviter angustata, fertilia e basi ovoidea in collem perlongum gracillimum, apicem versus compressum attenuata, flavescentia, unifoliata. Folium erectum, ligulatum, inaequaliter, breviter et obtusiuscule bilobulatum, basin versus sensim breviter angustatum, coriaceum, in pseudobulbis sterilibus quam in fertilibus multo longius. Flores ad apices pseudobulborum fertilium erecti vel suberecti, in sectione mediocres, tenui, fide collectoris pallidiflavi, e spatha compressa obtusa, pedunculum uniflorem, perbreve omnino obtegente; bractea more sectionis, brevi, deltoidea. Sepala e basi lanceolata elongato-atenuata subfiliformia, lateralia obliqua, basi margine anteriore conspicue dilatata cum pede columnae mentum oblique triquetrum, obtusum formantia. Petala sepalo intermedio similia, sed basi sublinearia, obliqua, quam sepala paulo breviora. Labellum sepalis multo brevius, alte trilobum, basi late obovatum, carinis 2 crenato-undulatis, parallelis, e basi labelli usque in basin laminae lobi intermedii decurrentibus ornatum, carina breviora grapuloso-papillosa in lobo intermedio interposita auctum, lobis lateralibus oblique semioblongis, obtusis, brevibus, intermedio e isthmo lineari subito in laminam reniformem, obtuse apiculatam, praesertim basi crenato-undulatam expanso. Columna brevis, pede angusto, longius producto. Ovarium longissime pedicellatum glabrum.

A 35-45cm tall epiphyte. Sterile pseudobulbs 4.0-8.0cm long, below the middle 6.0-10.0mm in diameter, the fertile ones up to 42cm long, at the base 6.0-10.0mm in diameter, 1.75-2.0mm at the top. Leaves of the sterile pseudobulbs 10-18cm long, those of the fertile ones 2.5-5.0cm long, in the middle 9.0-12.0mm broad. Flowers pale yellow. Sepals 4.0cm long, the petals slightly shorter. Labellum 1.2cm long, 6.5mm broad between the tips of the side lobes. Claw of the middle lobe 3.25mm long. Lip-lamina 3.0mm long, 4.0mm broad. Column very short, with a 6.0mm long foot. Ovary with pedicel 4.3cm long.

Palau Is. : In scrub forest and on trees in park-like cultivated land, on the island of Koror, alt. c. 20-100m (C. Ledermann nos 14053, 14156, flowering and fruiting in Feb. 1914); in dense intermediate forest, near Nyatkip, on Babelthaob [I.], alt. c. 100m (C. Ledermann no. 14576, flowering in Mar. 1914).

This and the species following, belong to the section *Diplocaulobium*.

D. elongaticolle Schltr. is characterised by the heteromorphology of the pseudobulbs. It would appear that this species always produces 1-2 sterile pseudobulbs, followed by a fertile pseudobulb. In the flowers it is reminiscent of D. fililobum F.v.M. from Samoa. Ledermann gives the colour once as yellowish, another time as pale pink, with yellow apices. Apparently the flowers take on

a rose-red colour when they start to wither on the second day.

Dendrobium flavicolle Schltr. sp. nov. Epiphyticum, erectum, 20—25 cm altum. Rhizoma valde abbreviatum; radicibus filiformibus, flexuosis, glabris. Pseudobulbi valde approximati, anguste cylindracei, apicem versus sensim angustati et leviter compressi, unifoliati. Folium erectum, ligulatum, obtusiusculum, coriaceum. Flores erecti vel suberecti, in sectione mediocres, tenues, fide collectoris virescentes, e spatha compressa obtusiuscula; pedunculo perbrevis; bractea parvula, deltoidea. Sepala e basi lanceolata, subfiliformi-elongata, lateralia obliqua, basi margine anteriore dilatata cum pede columnae mentum oblique triangulum, obtusum formantia. Petala sepalo intermedio similia, sed basin versus sublinearia, obliqua, quam sepala paululo breviora. Labellum sepalis multo brevius, alte trilobum, basi obovato-cuneatum, curvatum, carinis 2 parallelis, leviter crenulato-undulatis e basi usque in apicem unguis lobi intermedii decurrentibus ornatum, lobis lateralibus oblique ovato-triangulis, obtusiusculis, brevibus, intermedio e isthmo late ligulato in laminam suborbiculari-reniformem, obtuse apiculatam, margine subcrenulatam dilatato. Columna brevis, pede angusto, apice leviter incurvulo, satis longo. Ovarium gracillime pedicellatum, glabrum.

A 20–25cm tall epiphyte. Pseudobulbs 11–17cm long, above the base 5.0–7.0cm in diameter, 2.0–2.5cm at the middle. According to the collector, the flowers are a 'pallid green', very delicate. Sepals c. 3.0cm long, the petals slightly shorter. Lip 1.0cm long, below the middle 3.5mm broad; the front lobe with a 2.5mm long isthmus and 2.75mm long, 3.25mm broad lamina. Column very short, with a 4.5mm long foot. Ovary with very slender pedicel 5.5cm long.

Caroline Is. : In low scrub forest, near Patapat, on the island of Ponape, alt. c. 200–300m (C. Ledermann nos 13406, 13448a, flowering in Nov. 1913).

This species is distinguished from D. elongaticolle Schltr., by the uniform pseudobulbs, smaller flowers and the shape of the labellum. In habit it is reminiscent of D. longicolle Schltr., but is less robust and has narrower leaves.

Dendrobium Kerstingianum Schltr. sp. nov. Epiphyticum, patulum, parum ramosum, usque ad 40 cm longum. Rhizoma cauliforme rigidum, vaginis arcte et alte amplexantibus omnino obsessum; radicibus filiformibus, flexuosis, glabris. Pseudobulbi distantes, oblongi vel anguste oblongi, unifoliati, valde compressi. Folium erectum vel suberectum, lanceolatum vel oblongo-lanceolatum, acutum, basi breviter contractum, coriaceum, glabrum. Inflorescentiae more sectionis ad apices pseudobulborum fasciculatae, brevissimae, succedaneae, vagina circumdatae, uniflorae; pedunculo brevissimo;

bractea parvula. Flores in sectione inter minores, albidii, extus sparsim et minutissime furfuracei, caeterum glabri. Sepala oblonga, obtusiuscula, lateralia valde obliqua, basi margine anteriore dilatata cum pede columnae mentum semioblongum obtusum formantia. Petala oblongo-ligulata, obtusiuscula, quam sepala subaequilonga. Labellum curvatum e basi cuneata medio trilobum, carinis 2 in lobo intermedio leviter curvatis et undulatis, caeterum parallelis, e basi usque infra apicem lobii intermedii decurrentibus ornatum, lobis lateralibus brevibus, oblique oblongo-triangularibus, obtusis, intermedio e isthmo oblongo-quadrato antice marginibus leviter crenulato in laminam parvulam, suborbicularem, alte bilobulatam, marginibus undulatam dilatato. Columna brevis, clinandrio alte trifido, lobis lanceolatis acutis, lateralibus subfalcatis, erectis, pede satis longo. Ovarium breviter pedicellatum, clavatum, minute papilloso-furfuraceum.

A pendulous, 25-40cm long epiphyte. Pseudobulbs spaced 5.0-9.0cm, 3.5-4.5cm long, at about the middle 7.0-11.0mm broad. Leaves 6.0-12.0cm long, 1.5-3.0cm broad, below the middle. Flowers whitish. Sepals 5.0mm long, the lateral ones forming a 3.5mm long mentum. Petals 4.0mm long. Labellum 7.5mm long, 4.5mm broad, between the apices of the lateral lobes. Middle lobe 3.75mm long, with a 2.5mm long isthmus, barely 2.0mm broad above the middle. Ovary with short pedicel, 6.0mm long.

Palau Is. : In dense intermediate forest, near Ngarsul, on Babelthaob [I.], alt. c. 200-300m (C. Ledermann no. 14329, flowering and fruiting in Feb. 1914).

On account of its small whitish flowers, this is a fairly insignificant species of the section [Desmotrichum]. It appears to me to be most closely related to *D. Pemae* Schltr., but from which it differs in the shape of the petals, the narrower labellum with only two keels, and in the column.

Dendrobium Amesianum Schltr. sp. nov.

Epiphyticum, erectum, parum ramosum, 40-50 cm altum. Rhizoma erectum, cauliforme, pseudobulbis distanter obsessum, vaginis mox caducis primum omnino obtectum; radicibus filiformibus, flexuosis, glabris. Pseudobulbi cylindracei, mox irregulariter sulcati, unifoliati. Folium erectum, oblongum, obtusum, basi breviter contractum, coriaceum. Inflorescentiae more generis ad apicem pseudobulborum fasciculatae, abbreviatae, uniflorae, succedaneae, vagina circumdatae; pedunculo brevissimo; bractea parvula. Flores in sectione mediocres, glabri, fide collectoris albidii, rubro-striati et guttulati. Sepala oblonga, subacuta, 5-nervia, lateralia obliqua, basi margine anteriore ampliata cum pede columnae mentum oblique triangulum, obtusum formantia. Petala oblique linearia vel ligulato-linearia, acuta, 3-nervia, sepalis subaequilonga. Labellum curvatum, e basi angustiore oblongum, infra medium

3-lobum, carinis 2 bene altis, parallelis, margine undulato-crenulatis, e basi labelli usque in basin laminae lobi intermediarii decurrentibus ornatum, linea tenui verrucosa in dimidio anteriore usque in apicem interposita, lobis lateralibus oblique et anguste oblongis, obtusis, margine subcrenulatis, brevibus, intermedio e isthmo lineari subito in laminam transversam, apiculatam, lateribus in filas numerosas flexuosas solutam dilatato. Columna brevis, clinandrii lobis lateralibus oblique semiquadratis, denticulatis, dorsali subulato aequilongo, pede mediocri. Ovarium pedicellatum, clavatum, glabrum.

A 40-50cm tall epiphyte. Pseudobulbs spaced 6.0-13.0cm, 3.0-4.5cm long, 0.4-1.6mm in diameter. Leaves 6.0-13.0cm long, near the middle 2.5-5.0cm broad. Flowers 'pallid yellow' or 'greenish white', with red stripes and small spots. Sepals 1.0cm long, the lateral ones forming a 3.5mm long mentum. Petals hardly shorter than the sepals. Lip 1.1cm long, 4.0mm broad between the tips of the lateral lobes, the middle lobe 6.0mm long, with a 4.0mm long isthmus. The front lobules 1.4mm broad, between the tips of the outspread filament-shaped segments. Column 3.5mm tall, with a 3.5mm long foot. Ovary with pedicel 8.0-9.0mm long.

Caroline Is. : In low scrub forest, near Patapat, on the island of Ponape, alt. c. 400-600m (C. Ledermann nos 13378, 13460, flowering in Oct. up to Nov. 1913); on cultivated land, similar to a mixed forest, near Nanpomal, on Ponape [I.], alt. c. 10-20m (C. Ledermann no. 13416, flowering in Oct. 1913).

A precise comparison of this plant with D. scopa Lindl., from the Philippines, indicates that it should be separated as a species. The flowers are smaller and clearly of a slightly different colour, the lateral lobes of the labellum are shorter, the keels taller and spread out, hence are broader than the narrow isthmus. In the case of D. scopa Lindl., the latter is about half as long as the lamina of the front lobe, for our species twice the length. Spread out, the front lobe measures, in this case, 1.4cm in breadth and 2.0mm in length between the apices of the filament-shaped segments; for D. scopa Lindl., 1.5cm in breadth and almost 5.0mm in length.

Dendrobium scopa Lindl., Bot. Reg. (1842) Misc. p. 55.

Desmotrichum scopa Kränzl. in Engl. Pflanzenr. IV. 50. II. B. 21 (1910) p. 349.

Marianas Is. : Epiphytic on tree-trunks, on the island of Guam (J.B. Thompson's collector no. 307, flowering in Feb. 1912).

The origin of this species is given by Oakes Ames as the Marianas. I have not seen the material from the Marianas.

I have already fully discussed the differences between D. scopa Lindl. and

D. Amesianum Schltr.

Kränzlin united D. thysanochilum Schltr. from New Guinea and D. scopa Lindl., but the two species are specifically completely different, mainly already in that D. thysanochilum Schltr. has three keels at the base of the labellum; but also in the shape of the lip.

Dendrobium brachyanthum Schltr. sp. nov. Epiphyticum, patulum, c. 35—50 cm longum. Rhizoma abbreviatum; radicibus filiformibus, flexuosis, glabris. Caules vel potius pseudobulbi e basi attenuata sensim cylindraceo-vel subclavato-incrassati, mox longitudinaliter plurisulcati, unifoliati. Folium lanceolato-ligulatum vel ligulato-lanceolatum, apice ipso obtusiusculum, basi breviter contractum, coriaceum. Inflorescentiae ad nodos pseudobulborum natae, pro sectione breves, pauci-2—5-florae; pedunculo quam rachis brevior; bracteis ovatis vel ovato-delloideis, ovario multo brevioribus. Flores illis *D. pachystele* Schltr. valde similes, carnosii, glabri, tunc collectoris albi. Sepala late ovata, intermedium obtusiusculum, lateralia valde obliqua, acuta, dorso nervo medio carinata, basi margine anteriore dilatata cum pede columnae mentum falcato-oblongoideum obtusum formantia. Petala subfalcata, oblique oblongo-ligulata, acuta, 3-nervia, sepalis paululo breviora. Labellum carnosum, genuflexo-curvedum, erectum, circuitus late rhombeo-spathulatum, apiculatum, costis callo tricostrato obtuso supra basin oriente usque ad medium decurrente antice truncato ornatum, obscure trilobatum. Columna brevis, clinandrii lobis lateralibus truncatis, abbreviatis, vix crenulatis, dorsali lineari, laterales conspicue excedente. Ovarium subclavatum, glabrum.

A 35–50cm long epiphyte, hanging down obliquely from the [tree] limbs. The pseudobulbs are 13–24cm long, and at the middle, 4.0–6.0mm in diameter. Leaves 16–25cm long; just below the middle, 1.7–3.5cm broad. Inflorescences 2 to 5-flowered, up to 5.5cm long, of which the peduncle is 2.5cm long. Flowers thick-carnose, white. Sepals 1.0cm long, the lateral ones forming a 7.0–8.0mm long mentum. Petals 9.0mm long. Labellum c. 4.2cm long; at the middle when spread-out, 4.2cm broad. Column 4.0mm tall, with a 8.0mm long foot. Ovary with pedicel 1.0cm long.

Palau Is. : In dense intermediate forest, near Ngatkip, on Babelthaob [I.], alt. c. 100m (C. Ledermann no. 14550, flowering in Mar. 1914); in dense intermediate forest, near Ngarsul, on Babelthaob [I.], alt. c. 200–300m (C. Ledermann no. 14361, flowering in Feb. 1914).

The species is very closely related to D. pachystele Schltr., from New Guinea and initially I was doubtful whether it could be regarded as a separate species. I did decide to separate it, since the flowers are slightly smaller,

the petals narrower and, furthermore, since the mentum is clearly longer and the callus of the lip does not reach the base. The lip itself appears to me to be broader, with a longer, narrower basal segment.

Dendrobium palawense Schltr. in Engl. Bot. Jahrb. LII. (1915) p. 10.

Palau Is. : In scrub forest, on the island of Koror (Father Raymundus no. 136, flowering in the year 1909).

Like the preceding one, a representative of the section *Latouria*, but quite different. Whilst D. brachyanthum Schltr. is a most insignificant plant, this one has the largest flowers within the genus in Micronesia.

As mentioned earlier, it is most closely related to D. macrophyllum A.Rich., but outwardly already conspicuous in that the sepals are covered only very sparsely with soft bristles. Furthermore, the lip callus is very narrow and the middle lobe a different shape. The flowers clearly are whitish, the labellum with red marked side lobes. Unfortunately, the specimen lacks both pseudobulbs and leaves.

According to Father Raymundus, the natives know the plant as 'sachal chainein'.

Dendrobium violaceo-miniatum Schltr. sp. nov.

Epiphyticum caespitosum, humile. Rhizoma valde abbreviatum, perdense pseudobulbis obsessum; radicibus filiformibus, elongatis, tenuibus, flexuosis, glabris. Pseudobulbi parvuli, oblique fusiformes, apice vulgo bifoliati, vaginis pluribus mox in fibros solutis primum obtekti. Folia erecto-patentia, linearia, acuta, basin versus sensim paulo angustata, glabra. Racemi apicales, abbreviati, biflori, subsessiles; bracteis ovatis, acuminatis, ovario pedicellato multo brevioribus. Flores erecti, in sectione inter minores, fide collectoris violacei, labello miniatum. Sepala oblonga, valde acuminata, 3-nervia, glabra, lateralia obliqua, basi margine anteriore valde producta cum pede columnae mentum calcariforme obtusum formantia. Petala oblique lineari-ligulata, acuminata, uninervia, glabra, sepalis subaequilonga. Labellum ligulatum, 5-nervium, apice obscure trilobato-acuminatum, glabrum, ecallosum. Columna brevis, clinandrii lobis lateralibus oblique semioblongis apiculatis, dorsali subulato subaequilongis. Ovarium acute triquetrum, pedicellatum, glabrum. Capsula ellipsoideo-clavata, triptera.

A low 3.0-5.0cm tall, caespitose epiphyte. Pseudobulbs 7.0-12.0mm long, below the middle 2.0-2.5mm in diameter. Leaves 2.0-3.5cm long, 2.0-3.5mm broad. Flowers fairly small, shorter than the leaves, violet with brick-red lip, paler towards the lower part. Sepals 7.0mm long, the lateral ones forming a longish spur-like mentum. Petals 6.0mm long. Lip 1.05cm long, below the apex 2.25mm broad, downwards concave in a groove-like manner and becoming

slightly narrower. Column barely 1.75mm long, with a 1.0mm long foot. Ovary with pedicel, 1.2cm long.

Caroline Is. : In low scrub forest, near Patapat, on Ponape [I.], alt. c. 200 up to 300m (C. Ledermann nos 13415, 13459b, flowering and fruiting in Nov. 1913).

It is suprising that we here have a species of *Oxyglossum* growing at such a low altitude, since in Papuasias, where the group has its centre of development, the species are typical mist-forest epiphytes.

The species is related to *D. lapeyrousioides* Schltr. [*lapeyrouseoides*], but is readily distinguished by the smaller, differently coloured flowers, with a short spur and by the smooth labellum.

Dendrobium Kraemeri Schltr. in Engl. Bot. Jahrb. LII. (1914) p. 10.

Palau Is. : Without locality details (Prof. Kraemer, in year 1910); on trees, on the island of Koror (Father Raymundus no. 37, flowering in year 1907); in park-like cultivated land of the natives, on the island of Koror, alt. c. 20-30m (C. Ledermann nos 14054, 14148a, flowering in Feb. 1914); in scrub forest strips, in a rocky land fault, on the island of Koror, alt. c. 50-100m (C. Ledermann no. 14277, flowering in Feb. 1914); in dense intermediate forest, near Ngarsul, on the island of Babelthaob, alt. c. 200-300m (C. Ledermann no. 14425, fruiting in Feb. 1914).

Ample material is now available of this species, from section *Pedilonum*. It belongs to the affinity of *D. capituliflorum* Rolfe, but according to Ledermann it has stems up to one metre in length, with longer, not quite so dense inflorescences. The colour of the flowers is white, or pink-white with green apices and the lip-lamina is yellow in front.

According to Father Raymundus, it is known by the natives of Koror as 'chatburek'.

Dendrobium ponapense Schltr. sp. nov.

Epiphyticum, verosimiliter pendulum vel patulum et ultrametrale. Caules simplices, elongati, perdense foliati, teretes, vaginis foliorum striato-multinervatis, arctissime amplexantibus omnino obiecti. Folia erecto-patentia, oblonga, oblique obtusa, coriacea, glabra. Racemi more sectionis biflori, sessiles, e spatha brevi semioblonga, laterales; bracteis minutis, deltoideis. Flores in sectione mediocres, glabri, erecto-patentes. Sepala lanceolato-ligulata, obtusiuscula, glabra, lateralia obliqua, basi margine anteriore dilatata cum pede columnae mentum triangulum obtusum formantia. Petala oblique ligulata; obtusiuscula, subfalcata, glabra, sepalis subaequilonga. Labellum circuitu late obovatum, basi cuneatum, supra medium trilobum, curvatum, intus e basi usque ad

basin lobi intermedii incrassatione lineari basi apiceque muriculata ornato, praesertim medio **superne transversim ruguloso, lobis lateralibus oblique lanceolatis, obtusiusculis, margine interiore subcrenulatis, intermedio ovato, subacuto, margine undulato, basi et medio appendicibus subulatis brevibus muricato, lobos laterales vix excedente.** Columna brevis, lobis lateralibus clinandrii obtusatis, subdenticulatis, dorsali triangulo, laterales excedente, Ovarium breviter pedicellatum, subclavatum, glabrum.

An epiphyte, which probably hangs down obliquely, being over one metre in length, with unbranched, closely leaved, 5.0-6.0mm thick stems. Leaves 6.0-9.0 cm long, at about the middle, 2.0-2.7cm broad. Flowers fairly small, somewhat carnose. Sepals 4.5cm long, the lateral ones slightly shorter, slightly falcate and forming a c. 3.0mm long mentum. Petals 1.4cm long. Lip 6.5mm long, 5.0mm broad between the apices of the side lobes. Front lobe c. 2.5mm long. Column short, with a 3.0mm long foot. Ovary with pedicel c. 7.0mm long.

Caroline Is. : On the island of Ponape (without locality details) (C. Ledermann no. 13144, in the year 1913).

The specimen, unfortunately, does not have the original label with the exact details of origin, habit and flower colour. It belongs clearly to the affinity of D. pruinosum Teysm. et Binnend. from Ambon. It is easily distinguished by the broader leaves, from the two species following, which likewise, belong to section Grastidium.

It is quite possible that the flowerless specimen, cited by me in 'Engl. Bot. Jahrb. LII (1914) p. 11' and collected by Kraemer in the Truk Islands, could belong here.

Dendrobium carolinense Schltr. sp. nov.

Epiphyticum, verosimiliter patulum, 50—70 cm longum. Caules simplices, paulo compressi, dense foliati, vaginis foliorum arcte amplexantibus, striato-multinerviis omnino obtecti, rigiduli. Folia erecto-patentia ligulata vel lanceolato-ligulata, obtuse et inaequaliter bilobulata, coriacea, glabra. Inflorescentiae laterales, more sectionis e spatha brevi, semioblonga, compressa, sessiles, biflorae. Flores erecto-patentes, in sectione mediocres, glabri, albidi vel roseo-albidi, labello purpureo vel vinoso. Sepala anguste ligulata, subacuta, lateralia basi margine anteriore dilatata cum pede columnae mentum semi-oblongo-triangulum, obtusum formantia. Petala oblique linearia, subacuta, subfalcata, sepalis subaequilonga. Labellum curvatum, circuitu ovale, supra medium trilobum, basi rotundatum, superne dimidio inferiore sparsim et perbreviter muriculatum, carina basi et apice muriculata e basi usque in medium decurrente ornatum, lobis lateralibus leviter divergentibus, falcato-

oblongis, obtusis, margine interiore subdenticulatis, intermedio suborbiculari apiculato, margine leviter undulato-crenulato, basi et medio processibus subulatis barbato, lobos laterales fere 3-plo superante. Columna brevis, clinandrii lobis lateralibus oblique truncatis, subdenticulatis, brevibus, dorsali subulato-triangulo brevi, laterales vix excedente. Ovarium breviter pedicellatum, subclavatum, glabrum.

An apparently obliquely pendent, 40–76cm long epiphyte. Leaves 5.5–8.5cm long, 1.0–1.4cm broad below the middle. Flowers appearing in pairs laterally, whitish to reddish whitish, with a wine-red to dark-red labellum. Sepals 2.2cm long, the lateral ones forming a c. 5.0mm long mentum. Petals 1.9cm long. Labellum 7.0mm long, 5.0mm broad between the apices of the side lobes, and with a 2.75mm long front lobe. Column short, with a 5.0mm long foot. Ovary with pedicel 4.0cm long.

Caroline Is. : On cultivated land similar to mixed forest near Nampomal, on Ponape [I.], alt. c. 20–60m (C. Ledermann nos 13145, 13531, flowering in Dec. 1913); in low scrub forest, near Patapat, on Ponape [I.], alt. c. 300–600m (C. Ledermann nos 13353, 13408a, 13462, 13927a, flowering in Nov. 1913).

A most characteristic species of the section *Grastidium*, where it is best placed in the affinity of *D. vernicosum* Schltr. Amongst the species of the region, it probably stands closest to *D. guamense* Ames, but has a very different labellum.

Clearly the plant is very common on Ponape.

Dendrobium guamense Ames in Philipp. Journ. Sci. IX. (1914) p. 14.

Marianas Is. : On the island of Guam (J.B. Thompson's collector no. 450, flowering in July 1912); at the same place (H.L.W. Costenoble).

According to the description, this species, which is unknown to me, could be most closely related to *D. carolinense* Schltr. It is however, quite different in the shape of the lip, since the middle lobe is described as lanceolate and pointed, whilst in the case of *D. carolinense* Schltr., it is almost circular. Furthermore, the flowers must be much shorter, since the sepals are stated to be 1.4cm long, the petals 1.2cm in length.

16. *Pseuderia* Schltr.

The *Pseuderia* species, biologically are particularly interesting orchids, since they clearly start life as terrestrials. As the stems develop, they climb up tree trunks, and after developing adventitious roots and when the plant has achieved a firm hold on the bark, the basal parts developed in the ground, die off and it becomes a typical epiphyte. It would appear, however, that

certain species remain terrestrial.

The genus is noteworthy in the short branches, which carry flowers and are leafless.

So far, 14 species of the genus are known; they are distributed from the Moluccas to over the whole of Papuasias. The flowers usually are yellowish, at times with the labellum flushed reddish or violet.

Sole species in the region..... 1. P. micronesiaca Schltr.

Pseuderia micronesiaca Schltr. sp. nov.

Epiphytica, patula, bene ramosa.

Caulis et rami teretes, bene foliati, vaginis foliorum arcte amplexantibus omnino obiecti. Folia erecto-patentia, anguste lanceolata vel ligulato-lanceolata, acuta, basin versus sensim paululo angustata, glabra. Inflorescentiae breves, laxae pauciflorae, quam folia multo breviora, pedunculo brevi, vaginis paucis arcte amplexantibus obiecto; bracteis erecto-patentibus, distichis, oblongis, breviter et obtuse bilobulatis, ovario duplo vel subduplo brevioribus. Flores in genere mediocres, pallidiflavi vel albidii, fuscomaculati, labello albido, erecto-patentes. Sepala ligulato-oblonga, apiculata, glabra, lateralia falcata, basi mentum perbreve formantia. Petala subfalcato-ligulata, obtusa, glabra, sepalis paululo breviora. Labellum oblongum, subacuminatum, margine dimidio anteriore subdenticulato-irregulare, costis 2 mox confluentibus e basi usque in medium ornatum, superne praecipue dimidio superiore minute papilloso-puberulum, leviter curvatum. Columna levissimè curvata, semiteres, glabra, pro genere gracilis. Ovarium anguste cylindricum, glabrum.

An epiphyte 1.0-1.5m long, forming broad bushes. Leaves 9.0-13.0cm long, 1.3-2.0cm broad below the middle. Inflorescences with a short stiff peduncle and the flowers 2.5-3.3cm long. Flowers yellowish or whitish with brown-red spots and a white lip. Sepals 9.0mm long, the lateral ones bent in a falcate manner and forming a very short, blunt mentum. Petals 7.0mm long. Lip slightly bent, when spread out 7.0mm long and 2.25mm broad, at about the middle. The column 5.0mm long. Ovary slender, 7.0mm long. Fruit short-stemmed, cylindrical, glabrous, 6-edged, 3.6cm long, c. 5.0mm in diameter.

Caroline Is. : In low scrub forest, near Patapat, on Ponape [I.], alt. c. 400 up to 600m (C. Ledermann no. 13389, in fruit in Nov. 1913); in compact scrub forest, near Paue, on Ponape [I.], alt. c. 700-800m (C. Ledermann nos 13812, 13845a, in bud and flower in Dec. 1913).

Palau Is. : In dense intermediate forest, near Ngatkip, on the island of Babelthaob, alt. c. 100m (C. Ledermann no. 14520, flowering in Mar. 1914).

The species is most closely related to P. frutex Schltr., from New Guinea, but differs from it, as well as from the other species of the genus, in the

narrow labellum and slender column. Conspicuous also, are the bilobed bracts which are short and blunt at the apex.

17. Mediocalcar J.J. Sm.

The Mediocalcar species form the very natural genus Glomerinae, which anyone can recognise, who has seen one of its species. At the apex of the 1 to 2-leaved pseudobulbs, very characteristic pea-sized flowers appear singly or in pairs. These are characterised in having lustrous, blood-red or coral-red sepals, with a white, yellow or green tip and growing far upwards, usually as an oblique-ovate tube, inflated like a pouch at the base. The genus derives its name therefore, from the manner in which the lip-lamina is hollowed-out, like a pouch.

The genus is an apt example of the orchid wealth brought to light by the exploration of Papuasias; established only in 1900, it already contains over 30, mostly Papuasian species. So far only a few are known outside of New Guinea, thus one species from Ambon as the most western representative and one from Samoa as the eastern salient.

Sole species in the region.....

1. M. ponapense Schltr.

Mediocalcar ponapense Schltr. sp. nov. **Epiphyticum, decumbens, spithamaceum.** Rhizoma decumbens, radicans; radicibus filiformibus, flexuosis, tenuibus, tenuissime pilosis Pseudobulbi semirhomboideo-conici vel ovati, unifoliati, basi dilatata cum rhizomate connati, breves. Folium erectopatens, ligulatum, oblique obtusiusculum, basin versus sensim paulo angustatum, glabrum, coriaceum. Inflorescentiae apicales, geminatae, uniflorae; pedunculo gracili, glabro; bractea parvula, deltoidea. Flores graciliter pedicellati, glabri, lide collectoris lacte sanguinei, apicibus citrinis. Sepala usque supra medium in tubum oblique ovoideo-urceolarem, antice ventricosum connata, carnosae, apicibus liberis oblongo-lanceolata, acuta. Petala oblique linearia, acuta, 3-nervia. Labellum erectum, quam sepala paulo brevius, ungue brevi, e basi quadrata late cuneatum, lamina late ovali, longius acuminatum, in saccum a facie subquadratum, obtusissimum labelli ungue paulo breviorum productum. Columna pro genere brevis, semiteres, juxta stigma paulo dilatata, pede brevi. Ovarium pedicellatum graciliter cylindricum, glabrum.

A decumbent epiphyte, about a span's width tall. Pseudobulbs spaced 2.5-4.0 cm apart, 1.0-1.3cm tall, up to 1.0cm broad at the base. Leaves 7.0-12.0cm long, 1.2-2.1cm broad. Peduncle of single-flowered inflorescence up to 2.0cm long. Flowers blood-red with lemon-yellow apices. Sepals 1.0cm long, the lateral ones

markedly broadened in the lower half, and inflated in a pouch-like manner. Petals 9.0mm long. Labellum 9.0mm long, with a 3.0mm long claw and an almost 4.0mm broad lamina. Column barely 4.0mm long, with a very short foot. Ovary with pedicel 1.5–1.7cm long. The ripe capsule c. 3.0cm long, barely 4.0mm in diameter.

Caroline Is. : In low scrub forest, on the 'Tal' [probably Mount Tol], near Patapat, on Ponape [I.], alt. c. 400–600m (C. Ledermann no. 13359, flowering in Nov. 1913); in dense scrub forest on Monte Santo, near Paue, on Ponape [I.], alt. c. 700m (C. Ledermann no. 13712, flowering and fruiting in Dec. 1913).

In habit, the species is reminiscent of M. stenopetalum Schltr., from New Guinea, but has shorter pseudobulbs and slightly broader leaves; furthermore, the petals are slightly broader and triveined; the shape of the labellum varies considerably. By virtue of the markedly acuminate labellum-lamina, the species is very well characterised, within the whole section Eumediocalcar.

18. Agrostophyllum Bl.

The already extensive genus is represented here by only a single species in the section Appendiculopsis. The species of this group form small, often branched, at times long pendulous bushes, with very compact, distichous small leaves and white-yellow flowers, with a white lip-lamina, grouped in a small capitulum. I consider it possible, however, that a more precise exploration of the region will present us with further representatives of section Euagrostophyllum, in which the species will be characterised by large, less numerous leaves and much larger, mostly multi-flowered heads.

The area of distribution of the genus, which now contains 70 species, spreads from the Lemurian Islands through India, the Malay Archipelago and the Philippines, as well as Papuasias, as far as the Samoan Islands. The centre of development could lie in New Guinea, where already 44 species have been described. Until 1900, only 13 species from there were recorded.

Sole species in the region..... 1. A. palawense Schltr.

Agrostophyllum palawense Schltr. sp. nov.

Epiphyticum, usque ad 40 cm longum, ramosum, verosimiliter plus minusve patulum. Rhizoma decumbens, radicans, perdense vaginis imbricantibus, mox in fibros solutis obtectum; radicibus filiformibus, flexuosis, glabris. Caules simplices vel parum ramosi, leviter compressi, dense multifoliati, vaginis foliorum imbricantibus apice truncato latere utrinque triangulis omnino obtekti. Folia parvula, patentia, oblonga, apice obtusissimo excisa, basi truncato-obtusissima, glabra. In-

florescentia capitiformis, sessilis, e spicis pluribus, abbreviatis, unifloris composita; pedunculis spicarum brevibus, paucivaginulatis; bractea ovata, ovario sessili brevior. Flores in genere inter minores, extus sparsim furfuracei, albi. Sepala late oblonga, breviter acuminata vel subapiculata, lateralia extus nervo mediano carinato-incrassata, basi margine anteriore valde dilatata cum basi labelli mentum semioblongoideum, obtusum formantia. Petala oblique linearia, obtusiuscula, uninervia. Labelli hypochilio anguste oblongo, dimidio superiore paulo dilatato, lobis lateribus parvulis triangulis, obtusis, carina excisa conjunctis, epichilio quadrato-suborbicuri, apiculato. Columna brevis, basin versus sensim paulo angustata. Ovarium sessile, cylindraceum, sparsim furfuraceum.

An epiphyte, forming a dense, up to 40cm long bush. The little single or slightly branched stems, are up to 3.0mm in diameter. Leaves 1.0-1.2cm long, at the base 6.0-7.0mm broad. The small flower heads are up to 1.3cm in diameter. Flowers small, whitish. Sepals 4.0mm long, the lateral ones bent almost in a falcate manner and forming a short, blunt mentum. The petals slightly shorter than the sepals. Labellum 2.75mm long, with a c. 1.25mm broad and equally long epichile. Column 2.5mm long. Ovary equitant, 4.0mm long.

Palau Is.: On trees, in park-like cultivated land, near Ngatkip, on Babelthaob [I.], alt. c. 50m (C. Ledermann no. 14468, flowering in Mar. 1914).

Outwardly, the species is very similar to A. costatum J.J.Sm. and initially, I wanted to consider it as such. A closer investigation, however, indicated that it would be more useful to regard it as specific. To start with, the flowers are smaller, the petals also narrower and the labellum likewise narrower, with a differently-shaped, not so deeply lacerated hypochile between the lateral lobes, and with a square-round, non-reniform shaped epichile. The shape of the column appears, to me also, to be appreciably different.

19. Aglossorhyncha Schltr.

The discovery of a species of this genus in Micronesia is plant-geographically interesting, since the pronounced Papuan nature of the flora of the region is thereby indicated.

In general, the species of the genus are much alike and characterised especially by the stemlets being uniformly leaved above and few-branched, with narrow-longish to linear, leathery leaves and sulphur- or lemon-yellow flowers located between two fairly large bracts, and appearing singly at the apices of the branches.

The genus contains nine Papuan species, inclusive of the one described below.

Sole species in the region..... 1. A. micronesiaca Schltr.

Aglossorhyncha micronesiaca Schltr. sp. nov.

Epiphytica, erecta vel suberecta, usque supra 20 cm alta. Rhizoma decumbens, radicans, vaginis arcte amplexentibus obsessum; radicibus filiformibus, flexuosis, glabris. Caules simplices vel parum ramosi, teretiusculi, dimidio inferiore vaginati, dimidio superiore bene foliati, vaginis foliorum arcte amplexentibus, striato-nervosis omnino obtekti. Folia erecto-patentia, lineari-ligulata, acuta vel mucronulata, basi breviter contracta, carnosio-coriacea, glabra. Flores ad apices ramosum singuli, sessiles, vagina satis magna primum protecti, fide collectoris sulphurei, labello albo, glabri, carnosi, subnutanti-incurvi. Sepala oblonga, obtusa, lateralia obliqua, apiculata, latiora. Petala oblique et anguste oblonga, obtusa, 5-nervia. Labellum cymbiformi-incurvum, circuitu late oblongum, infra medium levissime constrictum, dimidio superiore paululo dilatatum, marginibus incurvis, apice apiculatum, intus nervis c. 5 obscure incrassatis, basi squama brevi, truncata, transversa donatum. Columna pro genere brevis, apicem versus paululo dilatata, clinandrio 4-lobato, lobis quadrato-rotundatis, inaequaliter denticulatis, posterioribus quam anteriores paulo longioribus; rostello perlato, retuso; stigmate amplo. Ovarium sessile cylindraceum, glabrum.

A bushy, up to 20cm tall epiphyte. The single or few-branched stemlets are up to 2.0mm in diameter. Leaves 2.0-4.7cm long, 2.0-6.0mm broad. Flowers equitant; according to the collector, canary-yellow, with a white lip, surrounded by a sheath, which distinctly overtops the ovary. The bract about as long as the ovary. Sepals 6.0mm long, petals the same length as the sepals. Lip 6.0mm long, 3.5mm broad at the middle. Column 5.25mm long. Ovary equitant, 4.5cm long [Ed. probably 4.5mm].

Palau Is. : In dense intermediate forest, near Ngatkip, on the island of Babelthaob, alt. c. 100m (C. Ledermann no. 14568, flowering in Mar. 1914).

The appearance of a species of this genus in Micronesia and, furthermore, at such a low altitude, deserves especial notice.

The species is most closely related to A. lucida Schltr., but is distinguished by the smaller flowers, broader labellum with five slightly swollen veins, and by the shorter column. I have not observed the small transverse scale at the base of the lip in any other species; it appears to be a characteristic of the Micronesian species.

20. Appendicula Bl.

The Appendicula species being considered here, are somewhat reminiscent of

those of the section *Appendiculopsis* of *Agrostophyllum*, but the leaves are softer and a deeper green, furthermore, the diminutive, greenish flowers, usually with a white lip, appear in short racemes, laterally on the stem. A very characteristic feature of the genus, furthermore, is the horse-shoe shaped concave growth at the base, inside the labellum. It is possible, even probable, that the region may house species of the section *Chaunodesme*, with longer, mostly lanceolate leaves and terminal, longer, frequently pendent racemes of slightly larger flowers.

The genus to date, contains about 90 species, which are spread from India, over the whole Malayan Archipelago, inclusive of the Philippines and South China, through Papuasia, northern Australia and New Caledonia, as far as to Samoa.

Sole species in the region..... 1. *A. reflexa* Bl.

Appendicula reflexa Bl., Bijdr. (1825) p. 301.

Podochilus reflexus Schltr., in Bull. Herb. Boiss. (1900) N. 21, p. 31.

Palau Is. : In scrub forest, on the island of Koror (Father Raymundus no. 242, flowering in year 1907); in compact intermediate forest, near Ngatkip, on the island of Babelthaob, alt. c. 100m (C. Ledermann no. 14564, flowering in Mar. 1914).

As in my previous compilation of the orchids of Micronesia, I have placed the plant with this species, as it agrees with the current interpretation of the species. Whether the latter will later on be split into several species, is a decision for the future.

According to Ledermann, the flowers are greenish white in colour. I assume, however, that also with this form, as with the one in New Guinea, the lip may also be pure white.

21. *Phaius* Lour.

The *Phaius* species amongst the orchids, even for non-botanists, are easily recognised in Micronesia by the large folded leaves, between which the tall inflorescence, bearing a lax raceme of large flowers, rises in the manner of a sceptre. For the Micronesian species, the flowers are white with a pale yellow lip. The others are many-coloured, brown with red and golden-yellow markings. The species usually are terrestrial and are found in the forest, as well as in open country between grasses.

The genus consists of about 50 species, with a most interesting distribution. The most western ones occur in West Africa, whilst the genus otherwise is lacking on that continent, but in Madagascar, a whole series of very interesting species re-appears. From India onwards, representatives of the genus are then

distributed towards the east, over the whole monsoon area, to the north as far as Japan, to the south to eastern Australia and to the east as far as Samoa and Tahiti.

Sole species in the region.....1. P. amboinensis Bl.

Phaius amboinensis Bl., Mus. Bot. Lugd. Bat. II (1856) p. 180.

Phaius Zollingeri Rchb.f., Xen. Orch. II (1856) p. 201, t. 76.

Bletia amboinensis Herb. Zipp., ex. J.J.Sm. Orch. Jav. (1905) p. 198.

Caroline Is. : In low scrub forest, on 'Tal' [probably Mount Tol], near Patapat, on the island of Ponape, alt. c. 100-200m (C. Ledermann no. 13172, flowering in Oct. 1913); in scrub forest, near Paue, on Ponape [I.], alt. c. 700m (C. Ledermann no. 13671, flowering in Dec. 1913).

Amongst the terrestrial orchids of the region, this fairly widely distributed plant probably is the most splendid one, having snow-white flowers with a sulphur-yellow lip. The material agrees fairly well with that from New Guinea, except that for the pressed flowers I have not been able to establish any keels on the lip. The whole plant is c. 1.0-1.2m tall.

22. Calanthe R.Br.

In growth, the species of this genus have much similarity with Phaius; they are, likewise, terrestrial forest-dwellers, with large folded leaves. Their inflorescences, however, are appreciably more slender, with generally a considerably more compact raceme. The always smaller flowers are usually white, violet-red or yellow to orange and often with a narrow spur. The main difference between the two genera is that with Calanthe, the short column is adnate for its whole length with the base of the lip, whereas with Phaius, it is slender and almost completely free.

The genus, comprising about 200 species, has a similar distribution to that of Phaius, but in Africa is not restricted to the western parts, being distributed there uniformly. An aberrant species, perhaps better regarded as a separate genus, has been found in Central America and in western India.

Sole species in the region..... 1. C. triplicata (Willem.) Ames

Calanthe triplicata (Willem.) Ames in Philipp. Journ. Sci. II (1907) p. 326.

Orchis triplicata Willem. in Usteri Ann. Bot. VI. (1796) pars 18, p. 52.

Limodorum veratrifolium Willd., Spec. Plan. IV. (1805) p. 122.

Calanthe veratrifolia R.Br. in Bot. Reg. (1821) sub t. 573.

Marianas Is. : On the island of Guam (MacGregor no. 575; H.L.W. Costenoble no. 1164, flowering in July 1906).

We are in no way sure of the delimitation of the species. It would appear that what today is generally understood under 'C. veratrifolia' is a collective term for a number of closely related species, whose more precise determination is still lacking. The Type of the species must, in any case, be the Ambon plant, since the species was established on 'Flos triplicatus' of the 'Herbarium Amboinense'. The flowers of the species are snow-white.

23. Spathoglottis Bl.

In habit, the species of this genus could be compared with those of Calanthe, since they are likewise terrestrial orchids, with large, plicate leaves. The leaves, however, are always narrower and more robust on account of the stronger vein-structure, and are not as soft as those of the true Calanthe species. The usually pale violet-rose-red flowers are located on the peduncle in a lax manner and open only singly, or only a few at a time, so that the raceme often only sports one to two, less often three, open flowers. The flower itself is well characterised by the spread-out, 'T'-shaped labellum, and the slender, slightly bent column.

The species of the genus are not always easy to distinguish and therefore are often confused.

The genus, which generally has a similar distribution to that of Agrostophyllum, is divided into about 45 species.

The boundaries of its distribution are the Liukiu Islands towards the north, northern Australia in the south, also New Caledonia.

Key for Determining the Species

- A. The outside of the flowers, especially the ovary and pedicel with dense, very short, soft hairs..... 1. S. micronesiaca Schltr.
- B. Flowers completely glabrous..... 2. S. carolinensis Schltr.

Spathoglottis micronesiaca Schltr. in Englers Bot. Jahrb. LII. (1914) p. 9.

Spathoglottis tomentosa Volken in Englers Bot. Jahrb. XXXI (1901) p. 461 (non Lell.) [non Lindl.]

Caroline Is. : On grassy mountain slopes, on the island of Yap (G. Volken no. 144, flowering in Dec. 1899).

Palau Is. : On the island of Koror (Father Raymundus, in the year 1907); in grass on red clay ground, on the island of Koror (Ch. Gibbon no. 1111, flowering in Aug. 1912); in prairie-like grassland, on the island of Koror, 20-30m (C.

Ledermann no. 14043, flowering in Feb. 1914).

As I mentioned earlier, the species belongs to the affinity of S. tomentosa Lindl., but is well distinguished specifically. All colour references agree with white; Volkens adds that the base of the middle lobe of the labellum is sulphur-yellow.

C. Gibbon gives the indigenous name on Koror as 'buheal a beab', Ledermann for the same locality, as 'kelebenyelabeab'.

Spathoglottis carolinensis Schltr. in Englers Bot. Jahrb. LII. (1914) p. 8.

Spathoglottis plicata Volkens, in Englers Bot. Jahrb. XXXI. (1901) p. 461 (non Pl.)

Caroline Is. : On grassy slopes of the western hills, on the island of Yap (G. Volkens no. 146, flowering in Dec. 1899).

Palau Is. : On the island of Koror (Father Raymundus, in the year 1907).

The plant is specifically, completely different from S. plicata Bl., hence Volkens determination is incorrect. Already the shape of the lip, with the broad front lobe and its relatively short claw, readily separate the two species.

The flowers are pale pink-red, with darker petals, the lip with brown side lobes, dark pink-red front lobe and yellow callus.

24. Bulbophyllum Thou.

Apart from Dendrobium, there is no genus in tropical Asia, Papuasias and the regions of the South Seas which has achieved such a diversity as Bulbophyllum. The species in Papuasias and Micronesia all have either closely packed or further separated, single-leaved pseudobulbs, located on the short or extended rhizomes, with the several or multi-flowered inflorescences appearing from the rhizome at the base of the former. The flowers usually are small and unattractive, often pallid or darkly coloured, and usually characterised by the petals being smaller than the sepals. In the case of the Micronesian species, as generally for the genus, with the exception of certain Papuan forms, the usually, but not always, very small, carnoselip is attached by a small, thin band so loosely at the apex of the extended column-foot, that it swings to-and-fro with the slightest movement.

It is difficult to state precisely the extent of the genus, but it would appear to number not less than 1000. From New Guinea alone, about 400 different species of the genus are known.

The area of distribution of the genus includes the whole tropical belt, both of the Old and New Worlds, with only a few species extending to the north and south, viz. to Japan and Korea, several Australian species, relatively many in New Caledonia and two species in New Zealand.

Key for Determining the Micronesian Species

- A. Inflorescences multi-flowered with a wiry peduncle, clearly over-topping the pseudo-bulbs and leaves.
 - I. Sepals up to 1.5cm long..... 1. B. guamense Ames
 - II. Sepals 2.5cm long..... 2. B. micronesiacum Schltr.
- B. Inflorescences short, single flowered.
 - I. Lateral sepals adherent; pseudo-bulbs widely spaced on the filament-shaped rhizome and distinctly developed..... 3. B. Gibbonianum Schltr.
 - II. Lateral sepals free; rhizome fairly thick; pseudobulbs reduced.
 - a. Pseudobulbs fairly close, the underside of the labellum with dense papillae..... 4. B. ponapense Schltr.
 - b. Pseudobulbs at intervals, lip completely glabrous.
 - 1. Rhizome rooting in all directions, with decumbent more-or-less spreading branches..... 5. B. Volkensii Schltr.
 - 2. Rhizome rooting only at the base, plant in free-hanging bunches..... 5. B. productum [profusum] Ames

Bulbophyllum guamense Ames in Philipp. Journ. Sci. IX (1914) p. 13.

Marianas Is. : On trees at the Upi Road, on the island of Guam (R.C.MacGregor no. 495, flowering in Oct. 1911; H.L.W. Costenoble no. 1176, flowering in Sept. 1906; J.B. Thompson's collector no. 233, flowering in Mar. 1912).

Unfortunately, I have not seen the material of this species and the original description is insufficient to ascertain to which affinity the plant belongs. According to several characters stated, above all the shape of the petals, I suspect that it could be a species of the section *Dialeipanthé*. In this case the species would have to be related to B. micronesiacum Schltr., however, it has appreciably shorter sepals and could then readily be distinguished from the species described below.

Bulbophyllum micronesiacum Schltr. sp. nov.

Epiphyticum, usque ad 45 cm

altum. Rhizoma repens, radicans, laxe pseudobulbis obsessum, flexuosum;

radicibus filiformibus, flexuosis, glabris. Pseudobulbi ovoidei vel cylindraceo-ovoides, unifoliati, obtusanguli. Folia erecta, oblique oblonga, vel oblongo-ligulata, obtusiuscula, basi sensim in petiolum brevem angustata, coriacea. Scapi juxta basin pseudobulborum nati, erecti, gracillimi, rigiduli, folia multo superantes, pedunculo vaginulis paucis brevibus dissitis arctissime amplexantibus obsessis, racemo disticho, subdense 8–15-floro, sensim evoluto, rhachi incrassata flexuosa: bracteis late ovatis, complicatis, breviter acuminatis, ovario pedicellato subduplo brevioribus. Flores in sectione mediocres, succedanei, glabri, erecto-patentes. Sepala anguste lanceolata, acuminata, lateralia obliqua, basi margine anteriore ampliata cum pede columnae mentum oblique triangulum obtusum formantia. Petala parvula, oblique quadrato-ovalia, 3-cuspidata, cuspidibus lateralibus oblique triangularibus, brevibus, margine interiore nunc denticulatis, intermedio pluries longiore subulato. Labellum anguste lanceolato-ligulatum, antice subulatum, superne ruguloso-verruculosum, bicostatum, supra basin margine utrinque in lobum parvulum erectum, oblique oblongo-quadratum, apice inaequaliter denticulatum productum. Columna brevis, crassiuscula, stolidis oblique triangularibus, brevibus, pede satis longo, apice incurvulo. Ovarium pedicellatum, clavatum.

A decumbent, up to 45cm tall epiphyte. Pseudobulbs spaced 2.5–4.0cm apart, 1.5–2.3cm tall, 7.0–10.0mm in diameter above the base. The leaves 18–26cm long, 2.0–3.7cm broad, with an up to 4.0cm long petiole. Inflorescence, up to 45cm long, with the raceme up to 5.0cm long. Flowers yellowish white, with wine-red stripes and a dark carmine-red lip, having a yellow apex. Sepals c. 2.4cm long, the lateral ones forming a c. 5.0mm long mentum. Petals with the middle extension barely 3.5mm long. Lip c. 2.0cm long, c. 2.0mm broad at the middle. Column short and fairly thick. Ovary with pedicel 1.5cm long.

Caroline Is. : In low scrub forest, on the slopes of [Mount] Tol, near Patapat, on the island of Ponape, alt. c. 400–600m (C. Ledermann no. 13356, flowering in Nov. 1913; in dense scrub forest, near Paue, on the island of Ponape, alt. c. 700–800m (C. Ledermann nos 13750, 13834a, 13841, flowering and fruiting in Dec. 1913); behind the mission station, on the island of Yap, rare (G. Volken no. 528, sterile in May 1890).

Palau Is. : In dense intermediate forest, near Ngatkip, on the island of Babelthaob, alt. c. 100m (C. Ledermann, flowering and fruiting in Mar. 1914).

Initially, I considered the species identical to B. guamense Ames, but a comparison with its description showed that we were dealing with a different plant, since the flowers are much larger and one cannot envisage that Ames would not have described the clearly developed side lobes of the lip. The plant belongs to section *Dialeipanthæ*, which particularly in Papuasias, is highly

developed, and to which B. guamense Ames should probably also be added. Under the section name 'Intervallatae' in 1896 the first species of this group was described, and now, particularly through the exploration of Papuasias, it already numbers about 25 species.

Bulbophyllum Gibbonianum Schltr. sp. nov. Epiphyticum, longe repens, usque supra 1 m longum, 3 cm tantum altum. Rhizoma filiforme, flexuosum, laxè pseudobulbis obsessum, radicans; radicibus filiformibus, flexuosis, glabris. Pseudobulbi ovoidei vel anguste ovoidei, unifoliati. Folia sub-erecta, oblonga vel oblongo-lanceolata, obtusiuscula, textura pro genere tenuiora, basi breviter contracta. Inflorescentiae juxta basin pseudobulborum vel ex axillis vaginarum rhizomatis singulis natae, erectae, uniflorae, flore incluso altitudine vix pseudobulbum superantes; pedunculo paucivaginulato, brevi; bractea ovata, ovario pedicellato bene brevior. Flos incurvus, illo *B. membranacei* Teysm. et Binn. similis, fide collectoris purpureo-brunneus, labello fusco. Sepalum intermedium oblongum, apiculatum, lateralia oblique oblonga, apiculata, usque ad apicem in laminam navicularem, oblongam conglutinata sed non connata, obliqua. Petala obovato-oblonga, breviter acuminata, obliqua, quam sepala conspicue breviora. Labellum curvatum, carnosulum, circuitu lanceolatum, obtusum, superne papillosum, dimidio inferiore obtuse bicostatum. Columna brevis, stelidiis magnis, oblique oblongis, oblique apiculatis, antheram excedentibus. Ovarium pedicellatum, glabrum, subclavatum.

A widely decumbent epiphyte, with branched rhizome. Pseudobulbs spaced 2.0-4.5cm apart, seldom over 0.5cm tall, up to 5.0mm in diameter, at the base. Leaves 2.0-4.5cm long, 1.0-1.5cm broad, below the middle. Inflorescences with the individual flower seldom overtopping the leaves. Flower red-brown with a brown-yellow lip. Sepals 4.25mm long. Petals barely 2.0mm long. Labellum c. 3.0mm long. Ovary with pedicel c. 4.0mm long.

Palau Is. : In dense intermediate forest, near Nyatkip, on the island of Babelthaob, alt. c. 100m (C. Ledermann no. 14549, flowering in Mar. 1914).

It is conspicuous that the species of this affinity are very similar. This species is closely related to B. nuruanum Schltr., from New Guinea, but is distinguished by the generally broader, thicker pseudobulbs, broader leaves and by the narrower labellum, covered with papillae almost to the apex. Furthermore, the stelidia of the column are appreciably larger in the Micronesian plant.

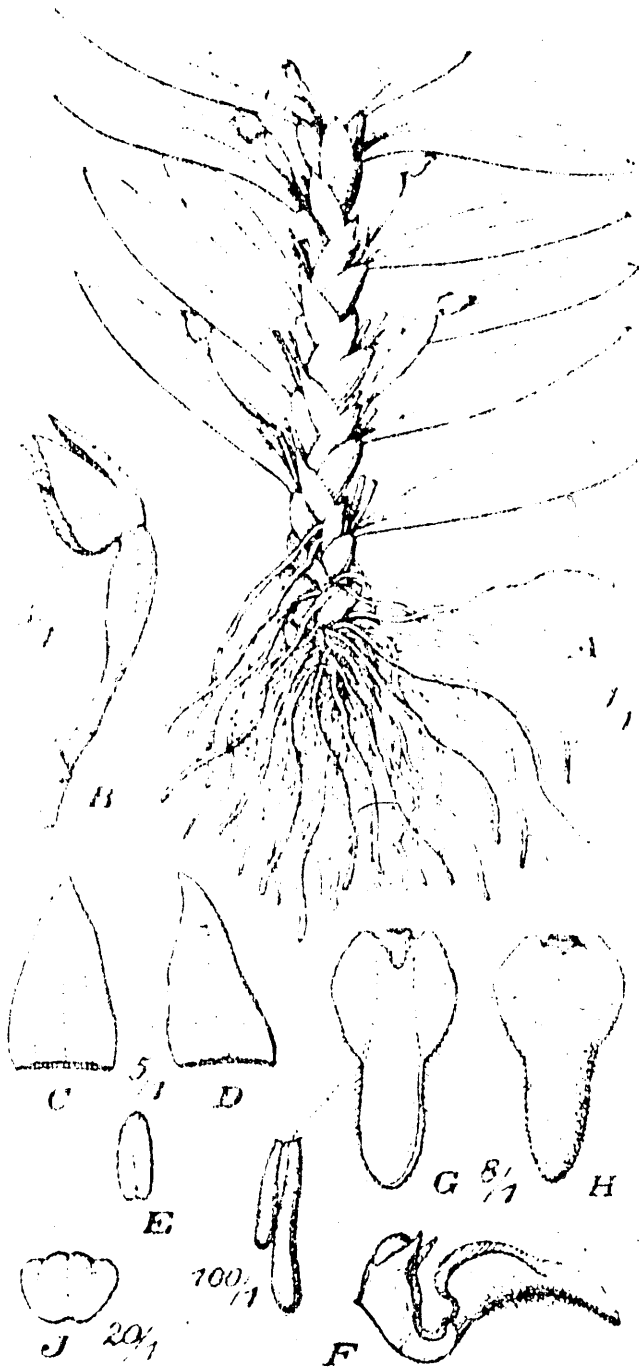
Bulbophyllum ponapense Schltr. sp. nov.

Fig. 2. *Bulbophyllum ponapense* Schltr.
 A Habitusbild. B Blüte. C Mittleres Sepalum.
 D Seitliches Sepalum. E Petalum. F Säule
 mit der Lippe von der Seite. G Lippe von
 oben. H Lippe von unten. J Anthere von
 oben.

1. *B. ponapense* Schltr. n. sp.
 — Epiphyticum, patulum vel sub-
 erectum, usque ad 8 cm altum.
 Rhizoma caulisforme, vaginis bre-
 vibus omnino absconditum, basi
 tantum radicans; radicibus filifo-
 rimis, tenuibus, glabris, flexuosis.
 Pseudobulbi cylindracei, unifoliati,
 vaginis rhizomatibus plus minusve
 obtekti, parvuli. Folia oblongo-
 ligulata, obtusa, basi sensim sub-
 petiolato-angustata, subcoriacea.
 Inflorescentiae juxta basin pseudo-
 bulborum singulae natae, erectae,
 uniliorae; pedunculo brevi, pauci-
 vaginulato; bractea ovali, breviter
 acuminata, ovario pedicellato multo
 brevior. Flos parvulus, erecto-
 patens vel suberectus, pallidus,
 rubro-striatus. Sepala oblongo-
 ovata, breviter acuminata, glabra,
 lateralia basi margine anteriore

paulo dilatata cum pede columnae mentum breve obtusum formantia.
 Petala oblique oblonga, obtusa, extus apicem versus minute papillosa, quam
 sepala multo minora. **Labellum carnosulum, curvatum, circuitu anguste**
ovatum, basi subcordato-retusum, obtusum, subtus dense papillis brevibus
subulatis obtektum, parvulum. Columna brevis, stolidiis brevibus oblongo-
 triangulis, apiculatis, antheram paulo superantibus. Ovarium pedicellatum,
 glabrum, subclavatum. — Fig. 2.

An up to 8.0cm long epiphyte, growing in a compact manner. Pseudobulbs up to 3.0mm long. Leaves 2.0-3.0mm long, c. 3.0-5.0mm broad. Stem of the inflorescence barely exceeding a length of 5.0mm. Flowers small, pallid, with wine-red stripes. Sepals 4.5mm long, the lateral ones oblique, forming a blunt mentum. Petals barely reaching a length of 1.0mm. Lip carnose, 1.75mm long. Column short, with short stelidia. Ovary with pedicel 6.0-7.0mm long.

Caroline Is. : In low scrub forest, on the slopes of the Tol Mountain, on the island of Ponape, alt. c. 10-600m (C. Ledermann nos 13447, 13517, flowering in Nov. 1913).

A characteristic species of the section *Fruticicola* which, especially in New Guinea, is widespread. It is well characterised in the almost exclusively Papuan group, by the petals being papillose on the outside towards the apex.

Bulbophyllum Volkensii Schltr. in Englers Bot. Jahrb. LII. (1914) p. 11.

Caroline Is. : On trees, especially such as mangrove and Bruguiera, on the island of Yap (G. Volkens no. 583, flowering in Mar. 1900).

Palau Is. : Without detailed information on location (Prof. Kraemer, in year 1910); in dense intermediate forest, on the island of Babelthaob, alt. c. 100m (C. Ledermann no. 14463, flowering in Mar. 1914); on trees in parklike cultivated land of the natives, alt. c. 20-30m (C. Ledermann no. 14057, flowering in Feb. 1914).

The species belongs to section *Oxysepalum*, where it is closely related to B. profusum Ames, from the Philippines, but from which it is readily distinguished by the rhizome, with multiple roots.

Bulbophyllum profusum Ames in Philipp. Journ. Sci. VII. (1912) p. 128.

Marianas Is. : On tree trunks, on the Upi Road, on the island of Guam (MacGregor no. 565, flowering in Oct. 1911).

I have not seen any specimen of this species from the region, however, there is material of the species from the Philippines, where it was originally described. The species is distinguished already externally from B. Volkensii Schltr. in having adventitious roots only at the base of the rhizome, also it is appreciably more compact in growth.

25. Phreatia Lindl.

The occurrence of the genus Phreatia in the region was to be expected and I would not be surprised if, due to the expanding exploration, the number were to increase appreciably.

The Phreatia species are small epiphytic orchids which, in general, are reminiscent of certain Bulbophyllum species, but which rarely form definite

pseudobulbs. The inflorescences usually develop in the axils of the lower leaves of the shoot, which carries short, distichous, closely-set leaves. The inflorescences themselves generally are fairly slender-stemmed racemes, usually with diminutive snow-white flowers having the special characteristic, worth mentioning, that they are very mucous on being cut.

The genus, until very recently, contained barely a dozen species, but with the exploration of Papuasias and the islands of the South Seas, it has now increased to about 130 species. Their area of distribution extends from the western boundaries of India to the Pacific Islands (Tahiti).

Key to Determine the Species from Micronesia

- A. Lip, at the base, without definite pouch formation.
 - I. Leaves at most 5.0mm broad..... 1. P. Thompsonii Ames
 - II. Leaves 1.0-1.7cm broad..... 2. P. carolinensis Schltr.
- B. Lip, at the base, forming a definite, upwards-extending pouch..... 3. P. ponapensis Schltr.

Phreatia Thompsonii Ames, in Philipp. Journ. Sci. IX. (1914) p. 15.

Caroline Is. : In cultivated land, similar to mixed forest, near Nanpomal, on Ponape [I.], alt. c. 10-20m (C. Ledermann no. 13149, flowering and fruiting in Oct. 1913); in low scrub forest, on [Mount] Tol, on Ponape [I.], alt. c. 100-200m (C. Ledermann no. 13261, flowering in Nov. 1913); in Kalan shrub forest, near Nankiop, on Ponape [I.], alt. c. 300-400m (C. Ledermann no. 13845, flowering in Dec. 1913).

Marianas Is. : On the island of Guam, without locality information (H.L.W. Costenoble no. 1174, flowering in May 1906; R.C. MacGregor no. 378, flowering in Oct. 1911); near Mukfuk (J.B. Thompson, flowering in Jan. 1912).

The material collected by MacGregor, as well as the description, tally so well with specimens collected by Ledermann on the Carolines, that there can be little doubt of them all belonging to P. Thompsonii Ames. The lip of the species is most characteristic and is reminiscent of some species from Papuasias, but from which P. Thompsonii Ames, already in habit, is well distinguished. Furthermore, within this affinity, the species is characterised by the fairly long leaves and fairly strongly acuminate sepals.

Phreatia carolinensis Schltr. sp. nov.

Epiphytica, erecta, c. 15 cm alta.

Rhizoma subnullum, valde abbreviatum; radicibus filiformibus, flexuosis, glabris. Caulis subnullus, 7-9-foliatus. Folia erecto-patentia, ligulata, apice oblique obtusata, vagina satis magna inclusa usque ad 12 cm longa,

1—1,7 cm lata. Inflorescentiae in axillis vaginarum foliorum natae, erecto-patentes, graciles, folia vulgo paulo superantes, arcuatae, pedunculo plurivaginulato, racemo dense multifloro, elongato; bracteis lanceolatis, acuminatis, ovarium vulgo plus minusve superantibus. Flores minuti, inversi, glabri, erecto-patentes. Sepala late ovata, obtusa, uninervia, lateralia obliqua, basi margine anteriore ampliata cum pede columnae mentum obtusum breve formantia. Petala oblique latiovata, valde obtusa, uninervia, quam sepala paulo breviora. Labellum late rhombeum, valde obtusum, basi incrassationibus 2 obscuris oblongis donatum. Columna brevis, rostello late triangulo, bidentato, clinandrii dorsum subsuperante. Ovarium pedicellatum, clavatum glabrum.

An erect epiphyte, c. 15cm tall, without definite pseudobulbs. Leaves with sheath, 8.0–12.0cm long, 1.0–1.7cm broad. Inflorescences with raceme up to 15 cm long, of this the stem 10.0cm long, the raceme c. 7.0mm in diameter. Flowers very small, pure white. Sepals barely longer than 0.5mm. Petals and labellum still shorter than the sepals, the labellum about as broad as long. Ovary with pedicel c. 1.0mm long.

Caroline Is. : In low scrub forest, on the slopes of [Mount] Tol, on Ponape [I.], alt. c. 400–600m (C. Ledermann no. 13396, in bud in Nov. 1913); in dense scrub forest, near the Lager [Camp] Paue, on Ponape [I.], alt. c. 400–600m (C. Ledermann no. 13842, flowering in Dec. 1913).

This species appears to me to be related closest to P. oxyantheroides Schltr., from New Mecklenburg, differing from it only in relatively smaller leaves, broader petals and in a blunter labellum. A distinguishing factor between the two species is that the specimens of P. carolinensis Schltr. dry to a blackish colour, whilst those of P. oxyantheroides Schltr. take on a pale greenish grey colour.

Phreatia ponapensis Schltr. sp. nov.

Epiphytica, erecta, 20—27 cm alta. Rhizoma valde abbreviatum; radicibus filiformibus, flexuosis, glabris. Pseudobulbi subglobosi vel ovoidei, unifoliati, vaginis 1—2 vulgo foliiferis omnino primum oblecti. Folia suberecta vel erecto-patentia, ligulata vel oblongo-ligulata, obtusa, basin versus sensim angustata, coriacea, glabra. Inflorescentiae juxta basin pseudobulborum singulatim natae, graciliores, erectae, folia manifeste superantes, pedunculo plurivaginulato, folia fere aequante, racemo dense multifloro, erecto, bracteis ellipticis vel elliptico-lanceolatis, acuminatis, ovarium superantibus. Flores in sectione parvuli, inversi, erecto-patentes. Sepala ovata, obtusiuscula, uninervia, lateralia obliqua, basi margine anteriore dilatata cum pede columnae mentum semi-

oblongum, obtusum formantia. Petala quam sepala paulo minora, oblique ovata, obtusiuscula, uninervia, basin versus margine anteriore paulo dilatata. Labellum e ungue brevi cuneato perlate rhomboideum, obtuse et breviter acuminatum, basi i. e. ungue papillis brevibus medio excepto obtectum, sacco adscendente oblongoideo, obtuso, labello ipso 3—4-plo brevior. Columna brevis, rostello elato, bifido, clinandrii dorsum manifeste superante. Ovarium pedicellatum, clavatum, glabrum.

A 20–27cm tall epiphyte, with pseudobulbs up to 1.0cm tall, and up to 8.0mm in diameter below the middle. Leaves 11–19cm long, 1.2–1.9cm broad. Inflorescences erect, up to 27cm long. Stem about as long as the leaves, or slightly shorter. Raceme 8.0–10.0cm long, c. 8.0mm in diameter. Flowers snow-white. Sepals barely 2.5mm long, the lateral ones oblique, forming a short, blunt mentum. Petals 1.75mm long. Lip 2.25mm long, with a 1.0mm broad lamina, the claw barely 1.0mm long, somewhat broadened in front. The pouch obliquely erect overtopping the claw by barely half its length. Column very short with a 1.0mm long foot. Ovary with short pedicel 2.0mm long.

Caroline Is. : In dense scrub forest, on Monte Santo, near the Lager [Camp] Paue, on the island of Ponape, alt. c. 600–800m (C. Ledermann nos 13727, 13835, flowering in Dec. 1913).

A small-flowered species of the section *Saccophreatia*. In the shape of the labellum, it is reminiscent mainly of *P. saccifera* Schltr. from New Guinea, but the lip-lamina in this case is rounder and the thicker lip-pouch is more erect; in addition the teeth of the rostellum are closer together and shorter.

26. *Rhynchophreatia* Schltr. gen. nov.

I mentioned already elsewhere, that it could perhaps be more natural to consider the two sections *Diplostypus* and *Rhynchophreatia* I set up in the genus *Phreatia*, as a separate genus, differing from *Phreatia* in the long rostellum, reminiscent of *Oxyanthera* and in the presence of a carnose, backwards-directed callus at the base of the labellum. Since with *Phreatia* the base of the lip otherwise is hollow, it appears to me that the presence of a callus, as already emphasised by J.J. Smith, represents an important character.

The genus includes the following seven species:—

Rhynchophreatia sphaerocarpa Schltr. (*Phreatia sphaerocarpa* Schltr.)

Rhynchophreatia wariana Schltr. (*Phreatia wariana* Schltr.)

Rhynchophreatia phreatioides (J.J.Sm.) Schltr. (*Thelasis phreatioides* J.J.Sm.)

Rhynchophreatia mamberamensis (J.J.Sm.) Schltr. (*Thelasis mamberamensis* J.J.Sm.)

Rhynchophreatia gautierensis (J.J.Sm.) Schltr. (*Thelasis gautierensis* J.J.Sm.)

Rhynchophreatia angustifolia (J.J.Sm.) Schltr. (Thelasis angustifolia J.J.Sm.)

and Rhynchophreatia palawensis Schltr. described below. Rhynchophreatia

differs generically from Oxyanthera, which J.J.Smith, in my opinion, incorrectly unites with Thelasis, in the definite, although short column-foot.

Rhynchophreatia sphaerocarpa Schltr. on account of the divided caudicle of the pollinia, should be considered as an individual section Diplostypus separate from the first Rhynchophreatia species, so long as this character proves to be permanent.

Sole species in the region..... 1. R. palawensis Schltr.

Rhynchophreatia palawensis Schltr. sp. nov. **Epiphytica, erecta, usque ad**

30 cm alta. Rhizoma vix ullum; radicibus filiformibus, elongatis, flexuosis, glabris. Folia erecto-patentia, 5—8, ligulata, obtusiuscula, apice obliqua, basin (i. e. vaginam) versus sensim paululo angustata, glabra, textura exsiccatione papyracea. Inflorescentiae pergraciles, erecto-patentes, folia vulgo paulo superantia, pedunculo plus minusve flexuoso laxe vaginulis paucis acuminatis, dissitis donato, racemo dense multifloro; bracteis erecto-patentibus, lanceolatis, acuminatis, inferioribus florem aequantibus vel paulo superantibus, superioribus sensim paulo brevioribus. Flores in genere mediocres, erecto-patentes, inversi, glabri. Sepala ovato-triangularia, obtusiuscula, uninervia, lateralibus obliqua, basin versus margine anteriore sensim paulo ampliata cum pede columnae mentum perbreve, valde obtusum formantia. Petala oblique ovato-oblonga, subacuta, uninervia, quam sepala paululo breviora. Labellum circuitu ovatum, obtusiuscule acuminatum, basi callo retrorso semiorbiculari, brevi ornatum. Columna brevis, rostello magno lanceolato, erecto, pede pro genere satis longo, incurvulo. Stigma angustum, transversum. Ovarium pedicellatum, clavatum, glabrum.

A stemless epiphyte, up to 30cm tall. Leaves together with the up to 8.0cm long, slightly carinose sheath, [overall] up to 30cm long, up to 2.3cm broad at the middle. The inflorescences usually overtop the leaves, with a slender, up to c. 20cm long peduncle and up to 10.0cm long, carrying a fairly dense raceme, c. 3.0mm in diameter, when in flower. According to the collector the flowers are white. Sepals barely 2.0mm long, the lateral ones oblique and forming, together with the column-foot, a very short and blunt mentum. Petals somewhat shorter than the sepals. Labellum almost as long as the sepals, barely exceeding a breadth of 1.0mm below the middle. Column short, but with a conspicuously large rostellum, exceeding even the column in length and with a distinct column-foot bent-in at the apex, and at least equal in length to the column. Ovary with pedicel c. 2.0mm long.

Palau Is. : In dense scrub forest, on limestone rocks, on the island of Koror, alt. c. 10-100m (C. Ledermann no. 14059, flowering in Feb. 1914).

The plant is more reminiscent in habit of Oxyanthera than anything else in the genus, but is recognised immediately as Rhynchophreatia by the very distinct column-foot. From the Philippines I know of an apparently undescribed plant which previously has always been identified as Oxyanthera micrantha Brongn. and which could be closely related to this species, but in all other respects the plant differs in its dimensions and in the slender and lax habit.

27. Eulophia R.Br.

The Eulophia species are terrestrial orchids with fairly large leaves reminiscent of Spathoglottis, or at times Calanthe and with inflorescences appearing at the base, with the greenish, yellowish or reddish flowers arranged in racemes. They are easily distinguished from Calanthe and Spathoglottis species by the column having a distinct foot. In addition the two cartilaginous pollinia are attached to a distinct caudicle, which in turn is attached to a usually half-moon or oblique-oval-shaped viscid disc.

The genus plays a minor role in Asia, whilst in Africa it has undergone a quite noticeable development, and there belongs to the most important genera in the family. In addition the Asiatic species show a wider distribution than the African ones, which often appear very locally. How the broader distribution of certain species occurring in the Alang (Imperata) growth areas can be explained, is so far not understood. It is at least conspicuous, that this distribution completely matches that of other families, even there where otherwise a more local distribution is characteristic.

Key for Determining the Species in Micronesia

- A. Lip undivided, blunt in front..... 1. E. Macgregorii Ames
- B. Lip clearly trilobed, with the front-
middle lobe deeply emarginate..... 2. E. emarginata Bl.

Eulophia Macgregorii Ames in Philipp. Journ. Sci. IX. (1914) p. 12.

Marianas Is. : On hills, south-east of Piti, on the island of Guam, alt. c. 300m (R.C. MacGregor no. 631, flowering in Oct. 1911).

Ames, quite correctly, compared the species with E. squalida Lindl. and I almost consider that in the long run, it will not prove to be kept separate from it, at least in the way E. squalida Lindl. is considered today. Since I have not seen material of the plant from Guam, I can only judge from the description.

The colour of the flowers is given as dark pink-yellow. In the case of

E. squalista Lell. [Ed. probably means E. squalida Lindl.], flowers of this colour occur together with those having brownish sepals and petals and a red lip.

Eulophia emarginata Bl. Orch. Flor. Jav. (1858) p. 152.

Eulophia Dahliana Kränzl. in Notizbl. Bot. G. Berl. II. (1898) p. 105.

Eulophia guamensis Ames, in Philipp. Journ. Sci. IX. (1914) p. 12.

Palau Is. : In dense intermediate forest, near Ngarsul, on the island of Babelthaob, alt. c. 200-300m (C. Ledermann nos 14338, 14421, flowering in Feb. 1914).

Marianas Is. : On the island of Saipan (Höfer no. 39, flowering in Feb. 1913); in bushes on hills, near Piti, on the island of Guam (R.C. MacGregor no. 376, flowering in Oct. 1911).

I have the Type of Ames' species in front of me and do not consider that it should be separated from E. emarginata Bl., as it is generally regarded today. Until we have further material from the different districts, it is hardly worth while separating off further sub-species, since in fact this plant leans very little towards variation.

The colour of the flowers is greenish, with a white or yellow, red-marked labellum.

28. Acriopsis Reinw.

From the Palau Islands we have a specimen with fruits which doubtless belongs to this genus, hence we must include it here. The genus belongs to the pleuranthous orchids, i.e. their inflorescences develop at the base of the here longish, short pseudobulbs, which are 2 to 3-leaved at the apex. They are very slender and form a multi-branched, lax, over a foot long panicle. The small flowers of the species probably under consideration are suffused with pale violet, over a whitish base. The genus, furthermore, is characterised in having the base of the labellum adnate to the column, whilst the anther is overtopped by the fairly large cap-shaped clinandrium.

The genus, of which previously only 6 to 7 species were known, forms together with Thecostele a separate group whose distribution appears to reach from the hinterlands of India, over the Malayan Archipelago and the Philippines, only to eastern Papuasias.

Sole species in the region.....1. A. javanica Reinw. (?)

Acriopsis javanica Reinw. (?) in Flora Litt. II. p. 4.

Palau Is. : On the island of Babelthaob (C. Ledermann, without number, in Feb. 1914).

I give this species name to the fruiting specimen with some reservation, but at least there is no doubt that it belongs to this closely related 'form-circle'. Whether the species should be treated separately, can only be ascertained when complete specimens with good floral material are available. The only thing different to the accepted A. javanica Reinw., which attracts my attention, is the longer shape of the pseudobulbs. Since the perianth of the flowers is already strongly withered, it cannot be established whether the plant should be specifically separated from A. javanica Reinw.

29. Chilochista Lindl.

When about a year ago, I published my discussion of the orchids of Japan and China [Orchideologiae Sino-Japonicae Prodrum, Feddes Repertor. (1919) Bd. 4, Beiheft, pp. 1-319], I took the opportunity of indicating that the genus Chilochista should probably better be maintained separate from Sarcochilus. Now I am considering a plant which differs in certain respects from the typical Chilochista species, but nevertheless is still best placed in this genus, on account of the peculiar anther of this genus, with its protruding, subulate tubercles and alike to Chilochista with four pollinia, appressed in pairs, forming a small globule. I am now of the opinion that the characteristic, particularly stressed by J.J. Smith, viz. the petals following the column-foot, partially downwards, are only of specific importance. The Taeniophyllum habit of flat band-shaped roots, the anther and the pollinia appear to me to characterise the genus well.

Currently there are 9 species in the genus, which occur distributed from Ceylon, India via China, the Malayan Archipelago and northern Australia to the Viti Islands [Fiji Is.]. It is possible that some of the Australian Sarcochilus species belong here.

Sole species in the region..... 1. C. Loheri Schltr.

Chilochista Loheri Schltr. sp. nov.

Epiphytica, acaulis, aphylla. Radices flexuosi, elongati, taeniiformi-applanati, glabri. Caulis in gemmam vaginam ovatis acuminatis parvulis obtegitur reductus. Inflorescentiae erectae vel erecto-patentes, gracillimae, elatae, pedunculo vaginulis parvulis dissitis donato, racemo laxo pluri-vel multifloro, elongato; bracteis deltoideis, acutis, ovario pedicellato multo brevioribus. Flores parvuli, erecto-patentes, viridi flavi, seriatim evoluti, fugaces. Sepala oblonga, obtusa, 5-nervia, glabra, lateralia obliqua. Petala sepalis subaequimagna, oblique oblonga, obtusa, 5-nervia, glabra. Labellum saccato-concavum, 3-lobum, in sacco papillosum; lobis

lateralibus erectis, amplis, oblique obovatis, truncato-obtusissimis, intermedio deflexo, parvulo, ovato, valde obtuso, superne omnino papilloso-pulvinato. Columna brevis, clinandrio dorso elato, pede gracili, satis longo, canaliculato, rostello amplo decurvo. Anthera reniformi-cucullata, latere utrinque in appendicem divaricantem subulatam producta. Pollinia 4, oblique rotundata, 2-nis compressa, stipite gracili. Ovarium breviter pedicellatum, glabrum.

An epiphyte without stem or leaves. Roots band-shaped, twisted, up to 30cm long, 6.0-9.0mm broad. Inflorescences up to 50cm long, inclusive of the up to 25cm long raceme. Flowers develop in sequence on the raceme and are greenish yellow. Sepals c. 5.5mm long, petals barely smaller than the sepals. Lip short with a barely 2.0mm deep, semi-globular pouch, 2.5mm tall side lobes and very small reclinate middle lobes. Column 4.5mm tall with a 2.25mm long foot. Ovary with short pedicel 4.5mm long.

Palau Is. : On trees on the island of Angaur (Loher); on the island of Koror (Father Raymundus, sterile in the year 1907).

An interesting species of the affinity of C. phyllorhiza (F.v.M.) Schltr. (Sarcochilus phyllorhizus F.v.M.), C. Taeniophyllum (J.J.Sm.) Schltr. (Sarcochilus Taeniophyllum J.J.Sm.) and C. Treubii (J.J.Sm.) Schltr. (Sarcochilus Treubii J.J.Sm.). It appears to be most closely related to C. Treubii (J.J.Sm.) Schltr., but is distinguished specifically by the labellum.

30. Thrixspermum Lour.

For a long time the genus Thrixspermum was considered identical with Sarcochilus until H.N. Ridley, J.J. Smith and I showed that it must be regarded as a separate genus, distinguished from Sarcochilus in habit, as well as biologically and in floral characters.

The Thrixspermum species, with few exceptions, are epiphytes whose flowers develop either singly or at least at certain time intervals on the usually distichous or, more seldom, spiral inflorescences and always last for only a single day. These flowers are very delicate in texture, usually pallid yellowish or white, the lip usually with red, brown or orange-yellow spots, less frequently rose-red. The inflorescence is characteristic for many species, including the sole representative known from Micronesia, in the distinct, distichous, laterally compressed bracts, with the somewhat carnose, compressed rachis, which is remiscient of a distichous saw, having large, blunt teeth.

We already know about 60 species of the genus, distributed over a large area from Ceylon and the western boundaries of India via China, the Malayan Archipelago, Papuasias and northern Australia as far as the Samoan Islands; none

of the species appears to cross the tropical belt, whilst Sarcochilus species advance northwards to Japan and southwards even to New Zealand.

Sole species in the region..... 1. T. arachnitiforme Schltr.

Thrixspermum arachnitiforme Schltr. sp. nov. Epiphyticum, habitu *T. arachnites* (Bl.) Rchb. f. persimile. Radices filiformes, flexuosi, glabri. Caulis mediocris, 3—12 cm longus, dense foliatus, vaginis foliorum persistentibus omnino obtectus. Folia subpatentia, ligulata vel oblongo-ligulata oblique obtusiuscula, leviter carnosula, glabra. Inflorescentiae erecto-patentes, pedunculo graciliore, racemo disticho, subdense pluri- vel multifloro, serri-formi; bracteis equitantibus, falcato-oblongis, obtusis vel obtusiusculis, ovario pedicellato fere aequilongis. Flores succedanei, illis *T. arachnites* (Bl.) Rchb. f. similes, fide collectoris flavidis. Sepala anguste lanceolata, lineari-elongata, glabra, lateralia obliqua. Petala sepalis similia, tamen angustiora, glabra. Labellum carnosulum, e basi semioblongoideo-saccata trilobum, intus basi carinula brevi subulata papillosa, infra medium ligula brevi, depressa retusa lineari ornatum, lobis lateralibus erectis, brevibus, oblique semiorbicularibus, obtusissimis, intermedio triangulo-lanceolato antice incrassato, obtusiusculo, laterales multo (fere 5-plo) superante. Columna brevis, crassiuscula, pede brevi sulcato. Ovarium breviter pedicellatum, glabrum.

An epiphyte usually hanging down obliquely with unbranched, 5.0–12.0cm long stemlets. Leaves 7.5–11.0cm long, 1.3–2.0cm broad at about the centre. Inflorescences 9.0–22.0cm long, inclusive of the 7.0–15.0cm long peduncle. Bracts 5.0–8.0mm long. Flowers pale yellow. Sepals 2.0cm long, petals 1.8cm long. Lip 1.0cm long, when spread out under pressure 8.0mm broad below the middle. Front lobe 5.0mm long. Ovary with pedicel 7.0–8.0mm long.

Caroline Is. : In a Kelau shrub forest, alt. c. 100m, on Leperei [I.] (C. Ledermann no. 13547, flowering in Dec. 1913).

The plant has much similarity with T. arachnites (Bl.) Rchb.f. from the Sunda Islands, but differs from it in the shape of the lip with very short semi-circular, entire side lobes, and in the longer middle lobe.

31. Luisia Gaud.

Amongst the monopodial orchids, the species of the genus Luisia are always easy to recognise by the stemlets, with terete, subulate c. 10–25cm long leaves and by the flowers grouped in very short, cluster-like, few-flowered, slightly reclinate inflorescences and having a weakly concave labellum at the base. The flowers themselves, usually are fairly insignificant, with greenish sepals, the

petals often slightly longer and usually with a dark violet-brown lip.

The number of species in the genus is difficult to judge, but it should be about 40, which are distributed over the whole monsoon area. Starting in Ceylon, the area of distribution spreads over the whole of India, through China up to Japan, further via the Malayan Archipelago and the Philippines through Papuasias, northern Australia and New Caledonia, as far as Samoa.

Sole species in the region.....1. L. teretifolia Gaud.

Luisia teretifolia Gaud. in Freyc. Voy. Bot. (1826) p. 427, t. 37.

Marianas Is. : On the island of Guam (C. Gaudichaud, flowering in Mar. 1819); at the same place (MacGregor no. 360, without flowers).

It is essential that the botanists active in Guam collect good and adequate floral material of this plant, so that the species which initially was described from there, can be definitely confirmed. Many of the plants from other regions described previously as 'L. teretifolia', clearly are specifically different.

According to Gaudichaud the natives from Guam call the plant 'Kamuku loca', whilst Safford gives the local name of 'Cebollo halom tano', but which is used for many orchids.

32. Vandopsis Pfitz.

The species of the genus Vandopsis are robust epiphytes, usually with fairly thick, distinctly developed, closely-leaved and medium large or large, usually branched inflorescences, with brown-marked or speckled flowers on a yellowish or reddish base. They are of a fairly thick, carnosate nature with a carnosate, concave, genuflexed lip, with different kinds of swellings inside. Whilst the Arachnis species, on account of their narrow, usually falcate bent sepals and petals have squarrose flowers, the flowers of Vandopsis with short, broad perigynous segments are usually of a rounder shape.

I am not in agreement with the delimitation of the two genera as given by J.J. Smith, mine would appear to be a more natural one.

The genus now numbers about 44 species whose area of distribution starting in eastern China, extends through the Malayan Islands and Papuasias to the Viti [Fiji] Islands.

Sole species in the region..... 1. V. Raymundi Schltr.

Vandopsis Raymundi Schltr. sp. nov.

Epiphytica, valida, usque ad 2 m longa. Radices filiformes, flexuosae, glabrae. Caulis simplex, erectus, vel

adscendens, densifolius, vaginis foliorum arcte amplexantibus, rugulosis, striato-nervosis omnino obtectus. Folia erecto-patentia, oblongo-ligulata, inaequaliter et obtuse bilobulata, carnosocoriacea, lucida. Inflorescentiae erecto-patentes, pauci- vel pluri-ramosae, paniculatae, folia aequantes vel paulo superantes, dense multiflorae, pedunculo paucivaginulato, tereti, crassiusculo, quam panicula ipsa vulgo brevior; bracteis patulis, ovalibus vel suborbicularibus, apiculatis, ovarium longitudine fere aequantibus. Flores erecto-patentes, illis *V. Warocqueanae* (Rolfe) Schltr. fere aequimaqui et similes, fide collectoris flavidi vel flavido-virescentes, labello albo roseo-maculato, carnosuli. Sepala obovato-elliptica, obtusa, basin versus sparsim furfuracea, lateralia obliqua. Petala late et oblique obovata, obtusissima, sepalis subaequilonga sed paulo latiora. Labellum geniflexum, carnosum, trilobum, supra basin incrassatione depressa bilobulata obscura instructum, lobo medio longitudinaliter obtusicarinatum, basi gibbo obscuro auctum, lobis lateralibus erectis quadrato-oblongis, apice truncato crenulatis, lobo intermedio antico, porrecto, ligulato, apice leviter dilatato obtusissimo subcrenulato. Columna brevis, crassa. Anthera quadrato-cucullata, obtuse apiculata. Pollina obovoideo-ellipsoidea, stipite lineari viscidio rotundato parvulo affixa. Ovarium cylindraceum brevissime furfuraceum.

A robust, up to 2.0m long epiphyte with an unbranched stem 1.0-1.2cm in diameter. Leaves 17-32cm long, 2.6-3.2cm broad. Inflorescences 20-28cm long, inclusive of the 9.0cm long peduncle. Flowers yellowish or yellow-greenish, with white, pink-spotted lip. Sepals 9.0mm long. Petals 8.5mm long, 6.25mm broad at the middle. Lip about as long as the sepals, with 2.5mm tall side lobes and 7.0mm long, 2.25mm broad front lobe. Column 3.0mm tall. Ovary 6.0mm long.

Palau Is. : On the island of Koror (Father Raymundus nos 134, 290a, flowering in year 1907); on limestone rocks, on the island of Koror, alt. c. 10-100m (C. Ledermann no. 14066, flowering in Feb. 1914); on *Terminalia catappa*, on the inner boundary of the mangrove formation, near Airei, on the island of Babelthaob (C. Ledermann no. 14283, flowering in Feb. 1914).

Now that we have better, or rather, very good material of the plant, I have been able to establish that it does not belong to *V. Warocqueana* (Rolfe) Schltr., as I indicated earlier, but should rather be regarded as a separate species, differing specifically from *V. Warocqueana* (Rolfe) Schltr. in smaller leaves, differently shaped calli on the lip and in the narrow, somewhat broadened in front, almost toothed, front lobe of the labellum.

The genus is distinguished in its characteristic species, by the flowers appearing laterally in much shortened 1 to 3-flowered, almost equitant inflorescences on the always clearly extended, pendulous, closely distichous-leaved stemlets. Thus the whole plant often is reminiscent of certain species of the section *Grastidium* of *Dendrobium*, but, of course with the differences that we here are concerned with a monopodial plant, rather than a sympodial one in the case of *Dendrobium*. The flowers make the genus reminiscent partly of *Pomatocalpa*, partly of *Sarcanthus*, but the lip on the inside usually has a quite distinct hairiness and the column usually has two, small horn-like or conical excrescences at the apex, next to the anther.

The area of distribution of the genus, which numbers about 35 species, is predominately Malayan-Philippine and to the east, does not extend past Papuasias.

Sole species in the region..... 1. *T. Ledermannii* Schltr.

Trichoglottis Ledermannii Schltr. sp. nov. Epiphytica, patula, usque ad 60 cm longa. Radices filiformes, flexuosae, glabrae. Caules simplices vel parum ramosi, dense foliati, vaginis foliorum arcte amplexantibus, striato-nervosis omnino obtekti. Folia erecto-patentia, ligulata vel ligulato-lanceolata, oblique acuta, basi cuneata, carnosocoriacea. Inflorescentiae sessiles, 2---3-florae; bracteis deltoideis, ovario pedicellato multo brevioribus. Flores in genere mediocres, fide collectoris albi brunneo-roseo-striati, labello niveo, carnosuli. Sepala patentia intermedium obovato-oblongum, apiculatum, lateralia oblique latiovata, obtusa. Petala oblique oblongo-ligulata, obtusa, sepalis paulo breviora sed manifeste angustiora. Labellum illo *T. celebicae* Rolfe simile, lobis lateralibus parvulis erectis, quadrato-rotundatis, intermedio multo majore alte tripartito, partitionibus lateralibus oblique dolabroformi-oblongis, obtusis, margine irregularibus, intermedio ovato-oblongo, obtuso, incrassato, laterales paululo superante, calcare oblongoideo, obtuso, intus dorso ligula obtusa donato. Columna brevis, crassa, apice ligibha. Ovarium breviter pedicellatum, cylindraceum, glabrum.

A 40-60cm long, pendulous epiphyte. Leaves 6.5-8.0cm long, 1.0-1.4cm broad. The flowers, located opposite the leaves, in two's or three's are small, somewhat carnosose, white with brown-red stripes and a pure white lip. Sepals 6.0mm long, the laterals oblique and broader than the dorsal one. Petals shorter than the sepals. Lip 4.5mm long, when spread-out 5.0mm broad between the apices of the lateral segments of the front lobe, and with a 3.0mm long blunt spur. Column very short. Ovary with pedicel, 5.0mm long.

Palau Is. : On a limestone rock in dense scrub forest, on the island of Koror, alt. c. 10-100m (C. Ledermann no. 13063, flowering in Feb. 1914).

The species is closely related to T. celebica Rolfe and T. sororia Schltr., but is distinguished by a relatively long spur and by the shape of the labellum, where the middle segment of the front lobe is much broader than for the two other species.

34. Robiquetia Gaud.

Previously one used usually to designate the Robiquetia species as Saccolabia, until the separation and thereby necessary stricter delimitation of Saccolabium called for a restoration of this old genus. Most species have yellow, brown-spotted, others yellow, very few rose-red to white flowers, with the sepals and petals inclined together in a campanulate manner and with a labellum free of excrescences, and usually with an introrse, blunt spur. With most of the species, the flowers are arranged in drooping racemes, less often in few-branched panicles.

The genus numbers about 15, usually Malayan-Papuan species. One species, the most easterly one, occurs in the Viti [Fiji] Islands.

Sole species in the region..... 1. R. lutea (Volkens) Schltr.

Robiquetia lutea (Volkens) Schltr. in Englers Bot. Jahrb. LII. (1914) p. 12.

Saccolabium luteum Volkens, in Englers Bot. Jahrb. XXXI. (1901) p. 461.

Caroline Is. : On trees, in shade, particularly on cultivated land, on the island of Yap (G. Volkens no. 199, flowering and fruiting in Dec. 1899); in the same place (G. Volkens no. 350, flowering in Jan. 1900); (?) on Truk Island (Dr. Kraemer no. 5).

A small-flowered species of the genus with fairly small flowers, according to Volkens sulphur-yellow in all segments.

Apart from Ledermann's specimens from Babelthaob (Palau Is.), under no. 14570, there is a fruiting specimen of a more robust growth, broader leaves and longer inflorescences. Lacking the flowers it is difficult to decide with certainty whether it belongs here. Furthermore, without flowers, it is not quite definite whether Kraemer's specimen, mentioned above, also belongs here.

35. Saccolabium Bl.

The American orchidologist Oakes Ames has described a plant from Guam [I.] as Saccolabium, but I harbour certain doubts of it belonging to the genus, in the way it has recently been delimited. I return later briefly to the species.

The true Saccolabium species are short-stemmed epiphytes with somewhat

carnose leaves and small, pallid flowers in short racemes, usually with a somewhat thickened rachis. The flowers are usually very delicate and do not last long. They are characterised by the labellum being reminiscent of certain Sarcochilus species in the short erect side lobes, markedly reduced front lobe and the very short hump-shaped or conically oblique spur.

The genus to-date consists of barely more than ten Malayan-Philippine species.

Sole species in the region..... 1. S. guamense Ames

Saccolabium guamense Ames, in Philipp. Journ. Sci. IX. (1914) p. 15.

Marianas Is. : On the island of Guam (J.B. Thompson's collector, flowering in Jan. 1912).

The plant is described as an epiphyte with up to 6.0cm long stemlets and up to 10.0cm long, 2.0cm broad leaves. The flowers are distributed on the c. 3.0cm long racemes, almost to the ground, with very few in the raceme itself. The sepals and petals are fairly delicate, 4.0mm long. The pouch-like labellum is swollen in front in an uneven manner.

Hopefully, it may soon be possible to determine the placing of the plant; I have not seen it yet.

36. Sarcanthus Lell.[Lindl.]

In Micronesia, I would with certainty have expected various species of the large genus Sarcanthus. However, we know of only one plant belonging there, but due to the lack of floral material, it cannot yet be determined.

In habit, the species of the genus are fairly variable, usually they are slender epiphytes with extended stemlets and narrow leaves. The small flowers are found either in racemes or in long, often slender-stemmed erect panicles and frequently have a fairly bright colouring. Usually both the sepals and petals have a yellowish base colour with pretty brown-red stripes, whilst the white or pale rose-red lip has red markings or spots. A characteristic of the genus is the trilobed labellum, having a keel or lamella in the spur, which divides it into two segments.

The number of species known to date is not over-estimated with 100. These are distributed over an area from Ceylon and the western boundaries of India through the whole monsoon area to the east as far as the Polynesian Islands.

Sole species in the region.....1. S. species

Sarcanthus species nov.

Palau Is. : In dense intermediate forest, near Ngatkip, on the island of Babelthaob, alt. c. 100m (C. Ledermann no. 14509, fruiting in Mar. 1914).

Unfortunately, flowers of the plant are lacking to-date, but it appears with certainty to represent a new Sarcanthus species. According to Ledermann it is an approximately one meter long epiphyte. The leaves are not close together and are 12-16cm long and 1.2-1.5cm broad. The leaves are not very close together appear to reach a length of 20-30cm and carry only a few (2 to 3) downwards inclined branches, with fairly numerous close-standing, small flowers. The longish fruits are about 2.0cm long, with a diameter of 4.0mm.

It is to be hoped that floral material of the plant will soon be available for a determination of the species.

37. Taeniophyllum Bl.

The Taeniophyllum species are biologically exceedingly interesting, small, often diminutive epiphytes. They form flat, long roots, more-or-less appressed to the bark, usually green above, which completely take over the function of the leaves. The growth-axis is restricted to a small bud covered with short scales; neither stemlets nor leaves being produced. The inflorescences appear laterally and usually are distichous, short or longer-stemmed racemes with diminutive flowers. The flowers are somewhat frail, usually with simple sepals and petals inclined in a campanulate or tubular manner and usually with a simple undivided lip with a blunt spur which seldom exceeds the ovary in length.

Until recently, only a few species of the genus were known, but now there are already over 120 quite different species. The area of distribution coincides almost completely with that of Luisia, but it goes further to the east with one species being found on Tahiti.

Key for Determining the Species of Micronesia

- A. Sepals and petals distinctly adnate
adnate at the base.
 - I. Peduncle very slender, hair-thin, smooth
like the bracts..... 1. T. palawense Schltr.
 - II. Peduncle short, somewhat carnose,
uneven like the bracts with short
excrecences..... 2. T. marianense Schltr.
- B. Sepals and petals completely
independent..... 3. T. petrophilum Schltr.

Taeniophyllum palawense Schltr. sp. nov. Epiphyticum, parvulum, gracile. Radices filiformes, applanatae, lineari-elongatae, flexuosae. Caulis in gemmam parvulam squamis arcte obiectam reductus. Racemi gracillimi, erecti, pedunculo capillari, vaginulis paucis, dissitis obsesso, racemo subdense multifloro, disticho, sensim evoluto, rhachi fractiflexo; bracteis ovatis, ovario pedicellato multoties brevioribus. Flores in genere inter minimos, glabri,

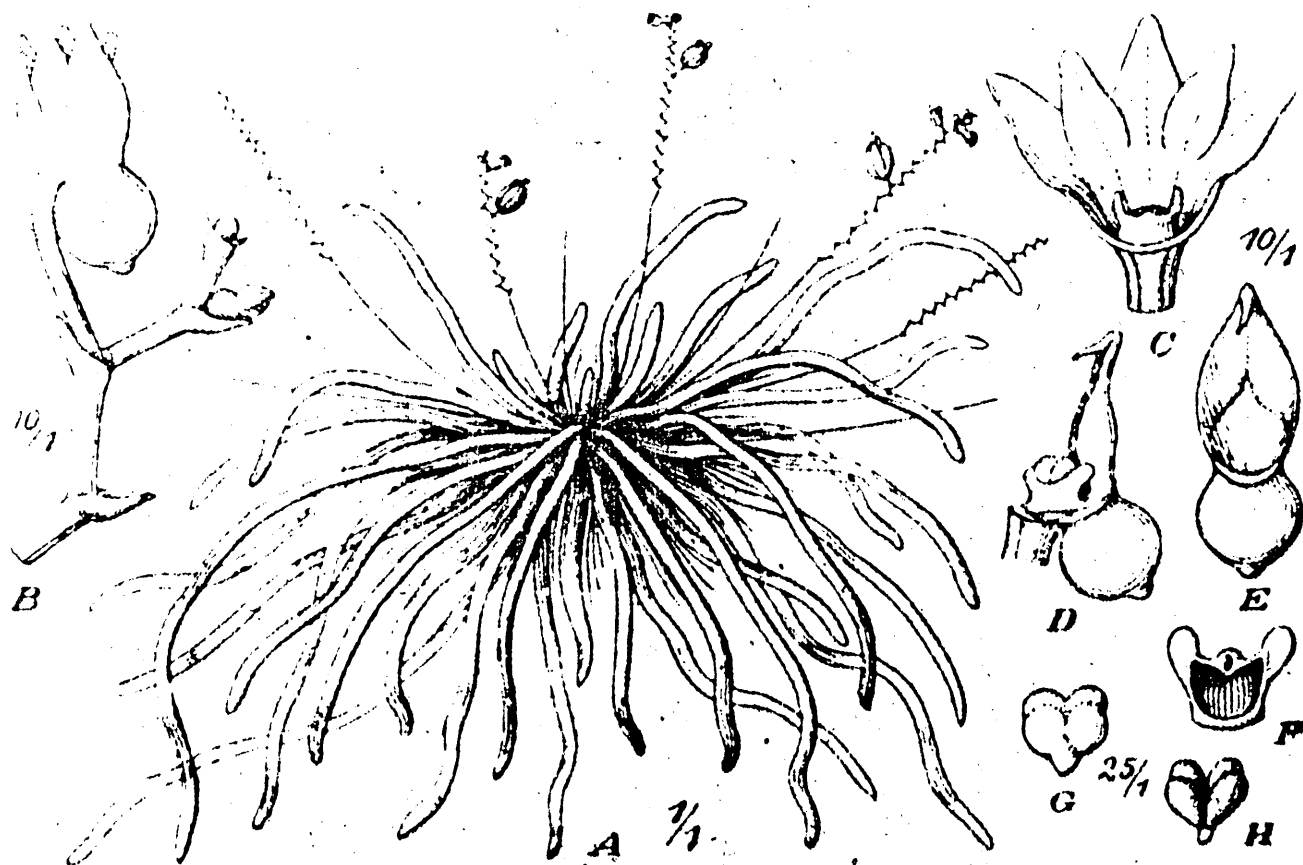


Fig. 3. *Taeniophyllum palawense* Schltr. A Habitusbild, B Spitze der Rhachis mit Blüte, C Sepalen, Petalen und Säule von innen, ausgebreitet, D Säule und Lippe von der Seite, E Lippe von oben, F Säule von vorn, G Anthere von vorn, H Pollinien.

fide collectoris pallidiflavi. Sepala oblonga, dimidio inferiore cum petalis connata, dimidio superiore libero ovata, obtusiuscula, lateralia obliqua. Petala sepalis similia, dimidio superiore libero oblique ovata, obtusiuscula, sepalis subaequilonga. Labellum elliptico-ovatum, breviter et obtusiuscule acuminatum, integrum, dimidio superiore incrassatum, infra apicem superne gibbo conico parvulo retrorso ornatum, calcare ellipsoideo, obtuse apiculato, quam lamina labelli paulo brevior. Columna brevis, crassiuscula, apice breviter bilobulata, rostello brevi. Anthera reniformi-cucullata, obtusa, glabra. Ovarium pedicellatum, clavatum, glabrum. — Fig. 3.

A short, stemless and leafless epiphyte. Roots up to 14cm long, 1.5–2.0mm broad. Inflorescences up to 6.0cm long, with a hair-thin, up to 3.0cm long peduncle, with an exceptionally delicate, thin rachis bent in a zig-zag manner. Flowers very small, pallid yellow. Sepals c. 1.25mm long, the petals almost as

long. The lip slightly shorter than the sepals and having an ellipsoid spur which is somewhat shorter than the lip-lamina. Ovary with pedicel c. 1.5mm long.

Palau Is. : In dense intermediate forest, near Ngarsul, on the island of Babelthaob, alt. c. 200-300m (C. Ledermann nos 14332, 14492a, flowering and fruiting in Feb. 1914).

Distinguished from all other species of the section *Sepalocodon* by the racemes having a hair-thin peduncle.

Taeniophyllum marianense Schltr. in Englers Bot. Jahrb. LII. (1914) p. 13.

Vanilla fasciola Gaud. in Freyc. Voy. Bot. (1826) p. 127.

Taeniophyllum fasciola Safford in Contr. U. St. Nat. Herb. IX. (1905) p. 384 (nec Rchb. f.).

Marianas Is. : On the island of Guam (C. Gaudichaud, in Mar. 1819); in the same place (Costenoble no. 1175, in May 1906).

The species needs further explanation. It was first identified erroneously by Gaudichaud as Epidendrum fasciola Forst., a plant from Tahiti. Safford then equally erroneously listed it as Taeniophyllum fasciola and gives a description which has not been compiled from material derived from Guam, but purely from the literature. Apparently the plant cited and described by Ames in 'Philipp. Journ. Sci. IX: p. 46' as Taeniophyllum species is identical with the one collected by Gaudichaud there and could thus be regarded as the Type of the species. At any rate it is desirable that botanists and collectors on Guam direct particular attention towards this plant.

Taeniophyllum petrophilum Schltr. sp. nov. **Epiphyticum, parvulum, aphyllum.**

Radices flexuosae, applanatae, lineari-elongatae. Caulis in gemmam parvulam, squamis arcte obtectam reductus. Racemi erecti vel suberecti, breviter pedunculati, distichi, sensim evoluti, sublaxe multiflori vel pluriflori, rhachi plus minus flexuosa; bracteis ovato-triangularis, acutis, ovario paulo brevioribus. Flores illis *T. obtusi* Bl. similes, fide collectoris pallidiflavi, glabri. Sepala libera anguste oblonga, obtusa, extus nervo medio obtuse carinata, carinula nunc sparsim vel obscure verruculosa; lateralia obliqua. Petala sepalis subaequilonga, anguste oblonga, obtusa. Labellum circuitu late rhombico-rotundatum, obtusum, antice margine incrassatum, sepalis subaequilongum, calcare oblongoideo-cylindraco, obtuso, quam limbus labelli subaequilongo. Columna brevis, crassiuscula, rostello brevi. Ovarium subsessile, glabrum.

A small epiphyte without stems or leaves. Roots up to 24cm long, 2.0-2.75mm broad. Inflorescences, inclusive of the short peduncle, up to 4.0cm long. Rachis more-or-less angled and downwards bent. Flowers very similar to those

of T. obtusum Bl., pale yellow. Sepals 2.5mm long, the lateral ones oblique, petals 2.0mm long. Lip c. 2.0mm long, when spread out c. 1.75mm broad, with an almost 2.0mm long spur. Ovary c. 2.5mm long.

Caroline Is. : On chunks of rock in cultivated land of the natives, similar to mixed forest, near Mutok, on the island of Ponape, alt. c. 10-20m (C. Ledermann no. 13994, in Jan. 1914).

Palau Is. : On chunks of rock and Ficus stems in park-like cultivated land of the natives, near Ngarsul, on the island of Babelthaob, alt. c. 10 up to 20m (C. Ledermann no. 14322, flowering in Feb. 1914); on Calophyllum [trees], in park-like cultivated land of the natives, on the island of Koror, alt. c. 20-30m (C. Ledermann no. 14056, in Feb. 1914).

Both in habit and flowers the species has a fair similarity with T. obtusum Bl., but it has a longer spur and a more elliptical lip-lamina. The species is noteworthy, according to Ledermann, in occurring as an epiphyte on chunks of rock; to date, no other species of the genus with this preference have become known.

So far Unclarified Orchids from Micronesia

Nervilia? ovata Gaud. in Freyc. Voy. Bot. (1826) p. 422.

Marianas Is. : On rocks, on the island of Rota (C. Gaudichaud, flowering in Jan. 1819).

The original description is as follows :

•*N. fibrosa*; caulibus simplicibus, articulatis, foliatis, erectis bracteisque pubescentibus, foliis ovato-oblongis, acutis, membranaceis; floribus coactaneis. •

Further remarks are :

•Les tiges radicifères de cette espèce sont articulées, mais contournées en spire et figurant assez bien le bulbe déroulé de l'espèce précédente; ce qui semblerait démontrer que, dans ces plantes, la forme de racines est relative aux milieux dans les quelles elles se développent. •

From the description and comments it is clear that the plant cannot belong to Nervilia, whilst on the other hand the hairiness of the stem and of the bracts indicates its affiliation to Physurinae. According to the description that the stemlet is clearly articulated at the base, I would surmise that we are dealing with a Cheirostylis species. This can be resolved only by studying the Type in the Paris Herbarium.



I.

LOCALITIES : SCHLECHTER R. 'Die Orchidaceen von Mikronesien'

APPENDIX I.

Englers Bot. Jahrb. (1914), Vol. 52, pp. 5-13.

& (1921), Vol. 56, pp. 434-501.

| | ^o N | ^o E |
|--|----------------|----------------|
| <u>Caroline Islands</u> | | |
| Fais Island | 9.48 | 140.31 |
| Kussaie, (Kusaie) Island : now Kosrae I. | 5.20 | 162.58 |
| *Leperei (Island) | | |
| Olol Island : now Ulul I. | 8.35 | 140.39 |
| Palau Islands | | |
| Angaur Island | 6.53 | 134.08 |
| Babelthaob Island : now Babelthuap I. | | |
| Airei, village : now Airai | 7.21 | 134.34 |
| Ngarsul, village : now Garashiyoo | 7.26 | 134.35 |
| Ngatkip, (Nyatkip), village | | |
| Koror, (Korrer), Island and Town | | |
| Eimilik, village | 7.24 | 134.31 |
| Malakae Island : now Malakal I. | 7.20 | 134.27 |
| Ualan Island : see Kussaie I. | | |
| Ponape Island | | |
| Monte Santo, (Sante), mountain : now Tolocolme Pk. | 6.51 | 158.14 |
| Mutok, village : now Mutokko | 6.48 | 158.16 |
| Nankiop, village | 6.55 | 158.13 |
| *Nanpomal, (Nampomal), village | | |
| *Patapat, village : near Monte Santo | | |
| *Paue, Paue Lager (camp) : near Monte Santo | | |
| Tol Berg, mountain : see Monte Santo | | |
| Truk, (Truck), Island | | |
| Uman, village (islet) | 7.18 | 151.53 |
| Yap Island | | |
| *Bennigsen Mountains | | |
| *Mashabel, (Machabel), district | | |
| <u>Marianas, (Mariana), Islands</u> | | |
| Guam Island | | |
| *Mukfuk, village | | |
| Piti, village | 13.28 | 144.41 |
| Upi Road, (village) | 13.35 | 144.56 |
| Rota Island | | |
| Saipan Island | | |
| Tinian Island | | |
| <u>Marshall Islands</u> | | |
| Radak Islands Group : now Ratak Chain | | |

NOTE : * Indicates not ascertained.

All co-ordinates taken from Gazetteer no. 6, Hydrographic Office,
United States Navy Department.

THE ORCHIDS OF MICRONESIA (1921)

- Acriopsis* Reinw. 54
 javanica Reinw. 54, 55
 § *Adenorachis* 22
Aglossorhyncha Schltr. 38
 lucida Schltr. 39
 micronesiaca Schltr. 39
Agrostophyllum Bl. 37, 40, 42
 costatum J.J.Sm. 38
 palawense Schltr. 37
Appendicula Bl. 39
 reflexa Bl. 40
 § *Appendiculopsis* 37, 40
Arachnis Bl. 58

Bletia R. et P. 41
 amboinensis Zipp. 41
Bulbophyllum Thou. 43, 48
 Gibbonianum Schltr. 44, 46
 guamense Ames 44, 45, 46
 micronesiacum Schltr. 44
 nuruanum Schltr. 46
 ponapense Schltr. 44, 47
 profusum Ames 44, 48
 Volkensii Schltr. 44, 48

Calanthe R.Br. 41, 42, 53
 triplicata (Willem.) Ames 41
 veratrifolia R.Br. 41, 42
Cheirostylis Bl. 9, 10, 66
 ovata (Bail.) Schltr. 10
 philippinensis Ames 10
 Raymundi Schltr. 10
Chilochista Lindl. 55
 Loheri Schltr. 55
 phyllorhiza (F.v.M.) Schltr. 56
 Taeniophyllum (J.J.Sm.) Schltr. 56
 Treubii (J.J.Sm.) Schltr. 56
Coelogyne Lindl. 15
 guamensis Ames 15
 Rumphii Lindl. 15
 sp. 15
Corymbis Thou. 13
 Ledermannii Schltr. 14
 minor Schltr. 14

Dendrobium Sw. 23, 43, 60
 Amesianum 24, 28, 30
 brachyanthum Schltr. 24, 30, 31
 capituliflorum Rolfe 32
 carolinense Schltr. 25, 33, 34
 elongaticolle Schltr. 24, 26, 27
 fililobum F.v.M. 26
 flavicolle Schltr. 24, 27
 guamense Ames 25, 34
 Kerstingianum Schltr. 24, 27
 Kraemeri Schltr. 25, 32
 lapeyrouseoides Schltr. 32
 longicolle Schltr. 27
 macrophyllum A. Rich. 31
 pachystele Schltr. 30
 palawense Schltr. 25, 31
 Pemae Schltr. 28
 ponapense Schltr. 25, 32
 pruinsum Teysm. et Binnend. 33
 scopa Lindl. 24, 29, 30
 thysanochilum Schltr. 30
 vernicosum Schltr. 34
 violaceo-miniatum Schltr. 25, 31
 § *Desmotrichum* 28
Desmotrichum Bl. 29
 scopa Krzl. 29
 § *Dialeipanthus* 44, 45
Didymoplexis Griff. 5
 fimbriata Schltr. 6
 papuana Schltr. 6

III.

§ Diplocaulobium 26

§ Diplostypus 51

Epidendrum L. 65

fasciola Forst. 65

§ Eu-Agrostophyllum 37

§ Eu-Galeola 2

Eulophia R.Br. 53

Dahliana Krzl. 54

emarginata Bl. 53, 54

guamensis Ames 54

MacGregorii Ames 53

squalida Lindl. 53, 54

§ Eu-Mediocalcar 37

Flos Rumph. 42

triplicatus Rumph. 42

§ Fruticicola 48

Galeola Lour. 2

sp. 2, 3

vanilloides Schltr. 3

Gastrodia R.Br. 10

ovata Bail. 10

Glomerinae 36

Goodyera R.Br. 7, 9

constricta J.J.Sm. 7, 8

grandiflora Schltr. 7

§ Grastidium 33

Habenaria Willd. 1, 23

carolinensis Schltr. 1

goodyeroides Don. 2

papuana Krzl. 1, 2

sp. 1, 2

Hetaeria Bl. 11

Erimae Schltr. 12

obliqua Bl. 11

Raymundi Schltr. 11

§ Holobos 19

§ Intervallatae 46

§ Latouria 31

Limodorum L.C.Rich. 41

veratrifolium Willd. 41

Liparis L.C.Rich. 23

guamensis Ames 23

habenarina F.v.M. 23

kenejiae Schltr. 23

Luisia Gaud. 57, 63

teretifolia Gaud. 58

Mediocalcar J.J.Sm. 36

ponapense Schltr. 36

stenopetalum Schltr. 37

Microstylis Nutt. 16

calcareia Schltr. 16, 18

Kerstingiana Schltr. 16, 19

latifolia (Sm.) J.J.Sm. 17

palawensis Schltr. 16, 17

pectinata J.J.Sm. 21

pedicellaris Rchb.f. 21

setipes Schltr. 16, 20

trichopodon Schltr. 21

wariana Schltr. 21

Volkensii Schltr. 16

Moerenhoutia Bl. 6, 7

Commelynae (Rchb.f.) Schltr. 7

constricta (J.J.Sm.) Schltr. 7, 8

grandiflora Schltr. 7, 8

heteromorpha (Rchb.f.) Schltr. 7

lamellata Schltr. 7, 8

laxa Schltr. 7, 8

leucantha Schltr. 7, 8, 9

var. glabrata Schltr. 8

Morrisonii Schltr. 7, 8

plantaginea Bl. 7

zeuxinoides Schltr. 7

Nervilia Commers ex Gaud. 3, 66

IV.

Nervilia Commers ex Gaud. 3, 66
 Aragoana Gaud. 4, 5
 ovata Gaud. 66
 palawensis Schltr. 3, 4, 5
 punctata (Bl.) Schltr. 5

Oberonia Lindl. 21
 japonica Maxim. 21
 neo-caledonica Schltr. 21
 palawensis Schltr. 22
 palmicola F.v.M. 21
 podostachys Schltr. 22
 sp. 22
 Vieillardii (Rchb.f.) Schltr. 21

§ *Oistochilus* 18

Orchis L. 1
 triplicata Willem. 41
Oxyanthera Brongn. 51, 52, 53
 micrantha Brongn. 53

§ *Oxyglossum* 32

§ *Oxysepalum* 48

§ *Pedilonum* 32

§ *Peristylis* 1, 2

Phaius Lour. 40, 41
 amboinensis Bl. 41
 Zollingeri Rchb.f. 41

Phreatia Lindl. 48, 51
 carolinensis Schltr. 49, 50
 oxyantheroides Schltr. 50
 ponapensis Schltr. 49, 50
 saccifera Schltr. 51
 sphaerocarpa Schltr. 51
 Thompsonii Ames 49
 wariana Schltr. 51

Physurinae 10, 12, 66

Platylepis L.C.Rich. 6
 Commelynae Rchb.f. 7
 heteromorpha Rchb.f. 7
 lamellata Schltr. 7
 Morrisonii Schltr. 7

Platylepis L.C.Rich. 6
 zeuxinoides Schltr. 7

§ *Pleiodon* 20

Podochilus Bl. 40
 reflexus Schltr. 40

§ *Podostachys* 22

Pogonia Juss. 3
 flabelliformis Lindl. 5
 gracilis Bl. 5
 Nervilia Bl. 5

Polychondreae 13

Pomatocalpa Breda 60

Pseuderia Schltr. 34
 frutex Schltr. 35
 micronesiaca Schltr. 35

§ *Rhynchophreatia* 51

Rhynchophreatia Schltr. 51
 angustifolia (J.J.Sm.) Schltr. 52
 gautierensis (J.J.Sm.) Schltr. 51
 mamberamensis (J.J.Sm.) Schltr. 51
 palawensis Schltr. 52
 phreatioides (J.J.Sm.) Schltr. 51
 sphaerocarpa Schltr. 51, 52
 wariana Schltr. 51

Robiquetia Gaud. 61
 lutea (Volkens) Schltr. 61

Saccolabium Bl. 61
 luteum Volkens 61

§ *Saccophreatia* 51

§ *Salaccenses* 1

Sarcanthus Lindl. 60, 62, 63
 sp. 62

Sarcochilus R.Br. 55, 56, 57, 62
 guamense Ames 62
 phyllorhizus F.v.M. 56
 Taeniophyllum J.J.Sm. 56
 Treubii J.J.Sm. 56

§ *Sepalocodon* 65

Spathoglottis Bl. 42, 53
 carolinensis Schltr.
 micronesiaca Schltr. 42
 plicata Bl. 43
 plicata Volkens 43
 tomentosa Volkens 42, 43

§ Speciosae 15

Taeniophyllum Bl. 55, 63, 65
 fasciola Safford 65
 marianense Schltr. 63, 65
 obtusum Bl. 66
 palawense Schltr. 63, 63
 petrophilum Schltr. 63, 65

Thecostele 54

Thelasis Bl. 52

 angustifolia J.J.Sm. 52
 gautierensis J.J.Sm. 51
 mamberamensis J.J.Sm. 51
 phreatioides J.J.Sm. 51

Thrixspermum Lour. 56

 arachnites (Bl.) Rchb.f. 57
 arachnitiforme Schltr. 57

V.

Trichoglottis Bl. 59

 celebica Rolfe 61
 Ledermannii Schltr. 60
 sororia Schltr. 61

Tropidiinae 13

Vandopsis Pfitz. 58

 Raymundi Schltr. 58
 Warocqueana (Rolfe) Schltr. 59

Vanilla Sw. 2

 fasciola Gaud. 65

Vrydagzenia Bl. 12

 albostriata Schltr. 13
 micronesiaca Schltr. 12, 13

Zeuxine Lindl. 9, 10, 11

 elongata Benth. 11
 Erimae Schltr. 11
 Fritzii Schltr. 10

