Flora of Koh Chang.

Contributions to the knowledge of the vegetation in the Gulf of Siam.

By

Johs. Schmidt.

Part I.

(Johs. Schmidt: Introductory. — F. Kränzlin: Orchidaceae, Apostasiaceae.)

With Map (plate I).

Introductory

by Johs. Schmidt.

With the present contribution I am beginning the publication of a systematic list containing the plants collected by me during the stay of the Danish Expedition in Siam (1896—1900).

These contributions will be published gradually as the material will be examined and named by various specialists, who have kindly undertaken to work up my collections.

The collections have all been made in the island Koh Chang (see Map) and adjacent smaller islands, thus originating in a small, fairly accessible area, of which the natural bounds are given by its position in the sea. On account of this and as catalogues of the plants growing in a certain locality have not hitherto been published from anywhere in Siam, as far as I am aware, I

1) The authors in question are alone responsible for the content of their papers with the exception of the words that I have to insert about the occurrence of the plants in their natural localities.
hope this list will be of some interest, although it cannot claim to be complete as it is only the results of my collections during my stay in the island in three winter-months.

These contributions to which the present is an introduction only will deal with the systematic relations of the concerning plants and their geographic distribution. As I intend to publish later on a more detailed description of the vegetation of Koh Chang from a biological and ecological point of view where particulars will be given about the general climatic and geographic facts, I here confine myself to the most necessary informations.

The expenses of the Expedition were paid by the Danish Government and the "Carlsbergfondet" and we undertook our voyage under the auspices and with the sanction of the Botanical and Zoological Museums of the University of Copenhagen both of which contributed to our outfit and supplied the funds on which we travelled.

On October 1st 1899 we started from Copenhagen onboard the Danish steamer "Siam" bound for China. During the sea-voyages out- and home-ward the time was occupied by collecting and studying the zooplankton and phytoplankton of the seas, we passed through. After a short stay in Singapore, Bangkok was reached in the middle of December. About a week later we left that city onboard H. S. M. "Chamroen" for our destination, the inner part of the east-coast of the Gulf of Siam. By the kindness of the Royal Siamese Government and our excellent coun-tryman Admiral A. de Richelieu some very valuable support was granted us from the Siamese Navy. Thus we got residence on the Naval Stations at Lem Dan (Koh Chang) and Lem Ngob (Siamese mainland), and also men to assist us during our dredgings or inland trips. Until the end of March I lived at Lem Dan and spent the time collecting plants and studying the flora of Koh Chang, for which purpose I undertook numerous excursions by land to the hills or visited by boat the different coasts of the island.
At the end of March we left Siam in the Danish steamer "Cathay" for Copenhagen, where we arrived on June 1st 1900. Our collections have all been placed in the Botanical and Zoological Museums of the University of Copenhagen.

The island Koh Chang (Elephant Island) is situated in the northeasterly part of the Gulf of Siam about 80 miles from the boundary between Siam and Cambodia. A strait, 21/2 - 10 miles broad, separates the island from the Siamese mainland. The area of Koh Chang is about 70 square miles and it is the largest Siamese island in the Bay. Consequent to its position in 12° lat. N. the climate of Koh Chang is entirely tropical, the year being divided in a rainy and a dry season, the former during the blowing of the damp south-west monsoon (generally from May to August) the latter in the other months where the dry north-easterly winds are prevalent. The heat is most extreme in spring, in March, April and May before the south-west monsoon sets in and after the cessation of the north-east. The coolest season is the autumn - and winter-months. At Bangkok the annual average temperature is 26.5° C. (80.1° F.), Decembers 24° C. (75.2° F.) and Aprils 28.8° C. (83.3° F.). The annual rainfall amounts to 1670 mm (65.7 inches) of which about 4/5 during the months from May to October.

The times of tides in the Gulf of Siam are very irregular and the rise also varies along the shores from 4 to 9 feet. In the Inner Gulf the principal of the two tides occurs in the south-west monsoon at night, but in the north-east this gradually alters and the high tide will be found in the daytime.

Koh Chang is a mountainous island and ranges of peaks separated by valleys occupy its whole area especially running in the direction from NW to SE and growing in height and importance as they go south. The highest point is found in the southern

1) The more exact position is given by the following indications: Northernmost point in 12° 10' lat. N., southernmost in 11° 57' lat. N., westmost in 102° 14' long. E., eastmost in 102° 25' long. E.

2) Bangkok (13° 8' lat. N., 100° 31' long. E.) is the nearest place, from where some meteorological facts are present. During my stay in Koh Chang I made some measurements of temperatures and the degree of moisture, which later will be published.
part of the island (*Table Peak*), north of *Klong Sarlakpet*, and rises nearly to 2,450 feet.

The hills of Koh Chang consist of a rather small-grained eruptive rock, most commonly light-brown or red in colour, more seldom greenish.

A narrow strip of plain surrounds the hills of Koh Chang; its soil is a very compact, reddish clay the presence of which is due to the denudation of the hills.

Whereas no lakes or ponds of any importance are found in Koh Chang, a great number of small rivers and rivulets intersect the island taking their rise from the hills in the interior. Their water usually streams very quickly and they are often broken by waterfalls. Most comnonly these waterfalls are small; some more important ones are found near the east-coast in *Klong Munsé* and a little more southward in *Klong Majun*, near the west-coast in *Klong Prao*. In the dry season the rivers contain but little water; but during the south-west monsoon they swell and fill up their stony beds. When the rivers have reached the plains near the coast, their course becomes more quiet, their breadth increases and some of them are navigable for small crafts for some distance from the sea (*Klong Prao*, *Klong Sarlakpet*, the latter debouching in the great bay at the south-end of the island).

Especially in the more exposed west-coast of Koh Chang the steep rocks go right down to the sea, but in most other places the shores are low and flat, their soil consisting of coral-sand¹) or stony gravel. Where rivers debouch and assume the proportions of more important estuaries, the ground is covered with a black mud and occupied by a luxuriant mangrove-vegetation.

The hills of Koh Chang are all covered with the densest jungle from the feet to their highest top. As the vegetation on the whole, this jungle has been but little influenced by the scarce Siamese and Chinese population scattered along the coasts, where *klongs* debouch.

Villages of some importance are situated at the mouths of *Klong Munsé* (east-coast) and *Klong Sarlakpet* (south-end); besides which some few people live at *Klong Son* (north-end), *Klong Prao* (west-coast), *Ao Saran* (south-end) and a few other places.

¹) The sand here is often much more large-grained than on our northern shores consisting of big coral-fragments. In some places however common quartzy small-grained sand can be found.
In the rains a little rice is cultivated in the plains; further some few vegetables, pine-apples, bananas, mangos and other fruit trees; and here and there one finds a small pepper plantation, but on the whole the cultivated area of Koh Chang is quite minimal.

I am indebted to Admiral de Richelieu for kind information about the geographic Siamese names within the explored area.

Notice. In Map and following lists of localities a few Siamese words are often used:
Koh: island,
Klong: river, canal, creek,
Lom: headland,
Ao: bay,
Noi: little, small,
Jai: great, large.
Orchidaceae and Apostasiaceae

by F. Kränzlin — Gross Lichterfelde.

Orchidaceae.

Oberonia Lindl.


The specimens bear ripe capsules without any trace of flowers, but the whole habit agrees exactly with *O. iridifolia* Lindl.

Klong Munsë and Koh Kahdat, epiphytic near the sea.

**Area**: From the Northern Himalaya to the Tavoy district and Moulmein.


Klong Majum. 700 ft. above the sea, epiphytic in the jungle.

**Area**: Widely distributed from the Mascarene Islds. to Ceylon and farther to Malacca, Malay- and Sunda Islds.

Loddonipsis Sw.


Without flowers, leaves and flower-buds showing the characteristic forms of *D. anceps* Sw.

Klong Munsë, epiphytic in the jungle.

**Area**: From Sikkim to the Sunda Islds.


Without flowers. The stem and leaves are quite different from those of the last number. I am not quite sure if it may be *D. Serra* Lindl. certainly it is not identical with *D. anceps* Sw.

Klong Munsë, epiphytic in the jungle.

I have seen no stem and leaves, but the flowers are almost identical with the flowers of the plant *Bot. Mag.* t. 5504.

Klong Son, epiphytic in the jungle.

*Area:* Moulmein, Tenasserim.


Klong Munsé, epiphytic in the jungle. Flowers white, labellum yellow.

*Area:* From Sikkim to Burma.


The splendid specimens I had at hand agree in every respect with Reichenbach's plate.

Klong Sarakpot, epiphytic in the jungle.

*Area:* Arakan and Burma.

8. *D. Schmidtianum* Krzl. n. sp. (Virgatae).

Caulebus approximatis curvis ad 20 cm. altis et basi tenui in quarta parte inferiore fusiformibus supra attenuatis foliosisque, quo crassissimi 8—10 mm. dian., foliis oblongis lanceolatis acutis basi laxe vaginantibus lamina 8—10 cm. longa, 1—1,5 cm. lata seco gracili subtextuoso, floribus succedantem set magnis et bracteis glos-

meratis griseis scariosis orientibus quam ovarium tenue 1,5 m. longum multo brevioribus. Sepalo dorsali petalisque lanceolatibus acutis, sepali lateralibus antice oblongi postice in pseudocalcar aquiliorum omnino apertum rectum conicum v. extensorii: apice elongati, labello et basi angusta dilatato cuneiato antice retuso margine leviter crenulato (si navis lobis lateribus obtriangulis antice crenulatis), lobo intermedio minuto angusto triangulo acuminato, disco omnino nudo; gynostemio brevissimo. — Flores pulchri nivei, sicci diaphiapi, a sepalorum apicibus ad illum pseudocalcaris 3,2—3,5 cm. longi, la-

bellum 2,5 cm. longum inter lobos laterales expansum 1,3 cm. latum.

In beauty and size the flowers of this plant are much like those of *D. crumenatum* Sw. but they differ by the lip, the middle-lobe of which is reduced to a very small triangle. In size and foliage the plant agrees very well with a big specimen of *D. podagruia* Hook. f. (D. angulatum Wall.) a plant widely spread over all the Indo-Malayan islands.

Lem Dan and Koh Kaldat, epiphytic, near the sea.

*D. sp.*

There is another species of aporoid *Dendrobiums* without flowers collected in the jungle and labelled N. 467 that I am quite unable to determine.
Bolbophyllum Thouars.

9. B. tridentatum Krzl. n. sp.

Rhizomate longe prorepente 2 mm. crasso, bulbis 5—8 cm. inter se distantibus obtuse tetragonis conicis 1.5—2 cm. altis basi fere 1.5 cm. crassis monophyllis, foliis oblongis lanceolatis ad 8 cm. longis 1—2 cm. latis acutis coriaceis apice v. non biapiculatis, scapus nutansibus quam folia bene brevioribus basi vaginatis eutem crudis, racemis subcapitatis pauci—plurifloris nutansibus, bracteis parvis oblongis acutis quam flores bene brevioribus 2—3 mm. longis. Sepalae dorsali oblongo obtuso concavo, sepalis lateribus ovatis oblongis plus duplo longioribus basi connatis subobliquis acuminatis apice ipso obtusi, petalis minutis subquadraatis v. brevissime ovatis supra triapiculatis v. tridentatis, apiculis brevibus subulatis, mediano vix longiore, labello lobis lateribus falcatis acutis pellucidis incurvis, labello ipso crasso carnoso ovato medio sulcato supra et infra dense papilloso; gymnostemii dentibus lateribus latissimis denticulo 1 laterali instructis integrisve. — Flores rutinuli, sepala lateralia 6 mm. longa, dorsalis 3 mm., labello 1.5—2 mm. longum.

The plant belongs to the group of mostly very indifferent looking species which are more or less similar to B. neilgherrense Wight and B. Careyanum Spreng. All have long creeping rhizomes, rather distant monophylls bulbs, nodding more or less capitating spikes and most of them or all reddish flowers. The chief character of this species consists in the three-pointed petals, a peculiarity not observed in any other species of the group. The lip in its shape does not differ very much from that of the allied species, but here the side-lobes are reduced to a thin transparent border whilst the middle-loba consists of the strong fleshy body so common in Bolbophyllum.

Jungle near Klong Majum alt. 200 ft., epiphytic.

Eria Lindl.

10. E. semi-cernata Krzl. n. sp.

Bulbis nummiformibus plananatis orbicularibus 8—10 mm. diam. margine subrevolutis supra reticulatis, folis sub anthesi nullis, nulli non visis, floribus semper unicis brevi-pedicellatis, bracteae ovata eucallata acuta quam ovarium longiore, flore mutante. Sepala dorsali obovata-oblongo brevi-acutato, sepalis lateribus in unum basi gibbosum connatis apicem versus liberis acutis cum dorsali conglutinatis non connatis, petalis obovatis obtusis, tota superflue minute crystallino-glandulosa, labello simplice ovato acuto basi plicato ibique umbonato; gynostemio perbrevi. — Flores extus et intus glabri, intense rubri, sepala 5—6 mm. longa, labello 2 mm. longum.

This curious little thing is the sixth species of the Porpax-group and is closely allied to E. ustulata Par. & Rehb. f. The differences are however considerable enough to keep the plant distinct from E. ustulata. The flowers of the latter are pubescent on the outside, those of our species are quite glabrous, the upper sepal is triangular and acuminate in E. ustul-
lata, in *E. semiconnata* oblong or obovate, the petals of this species are broadly obovate, those of *E. ustulata* according to Reichenbach lanceolate. At last the colour is somewhat different though not much.

On rocks in the jungle throughout the island, ascending to 2000 ft.

11. **E. Nummularia** Krzd. n. sp.

Bulbis crebris approximatis sessu tangentibus orbicularibus margine repandis depressis radiatim jugosis 8–10 mm. diam., floribus plerumque solitariis, bracteis ovatis acutis ovarium subglobosum semiaequantibus. Sepalis per duas tertias longitudinis in tubum connatis, lateribus basi bullatis omnibus antice longe oblonsis acutis apice reflexis, petalis acuqungis obovati-oblongis antice rotundatis ulrinque hyalini-papillosis, labello brevi oblongo obtuso, linea elevata per totum discum decorante. -- Flores inversi extus et intus glaberrimi rubri, sepala circ. 4 mm. longa, petala acuqunga antice 2 mm. lata, labelllum 1,5 mm. longum. — Januario.

The little plant resembles very much the latter, but 1. the flowers are not resupinate, 2. the sepals are not united except the third part below the top, 3. the petals are cuneate or obovate, 4. the lip has an elevated line running from the base to the apex but not a tubercle at the base; at last the dimensions of all these parts are still a little smaller than in *E. semiconnata*. For the other characters both species agree very much especially in the smallness of the flower. Also in this species leaves are missing.

On rocks in the jungle near Klong Munsé alt. 700 ft.


*Area*: From tropical Himalaya eastward to Bhotan and southward to Tenasserim.


Without flowers, *but surely very near to E. velutinae* Loddig, if not identical.

Klong Munsé. Epiphytic in the jungle.

**Agrostophyllum** Bl.


Lein Dan near the sea and Klong Majum alt. 700 ft., epiphytic.

*Area*: Khasia-hills to Moulmein and Tenasserim.
Calanthe R. Br.
   var. obtusa Par. & Rehb. f.
   Klön Majum, on rocks; flowers red.

Eulophia R. Br.
   Klön Munse (common in the plains); Koh Chick. Terrestrial, in grassy spots.
   Area: Bengal, Assam, Malacca to Singapore, Nicobar-Islands, Ceylon.

Cymbidium Sw.
   Lør Dan and Koh Kandalat, epiphytic, near the sea.
   Area: Himalaya, eastward to East Nepal, southward to Tenasserim and Andaman Islands.
   C. sp. indetem.
   Without flowers.

Luiria Gaudich.
   Without flowers but with all other characters of this species.
   Klön 2fjum, epiphytic in the jungle.
   Area: Western Himalaya. Silhet & Khasia-hills, Tenasserim.

Sarcochilus R. Br.
   Without flowers, but the plant resembles in every respect the plate in the Icones Plantarum especially in the roughness of the flower stalk.
   Klön Prau, epiphytic, near the sea.
   Area: Perak, Malacca.

Renanthera Lour.
   Klön Majum, on rocks in the jungle, alt. 700 ft.
   Area: Cochin China. Tenasserim, Tavoy-District.
Saccolabium Bl.


Lem Dan. Epiphytic, near the sea. Flowers orange with red spots.
Area: Tropical Himalaya, Bhotan, Tenasserim, Ceylon.

22. S. peperomioides Krzl. n. sp.

Caulé longe repente radicibus longissimis cortici affixo, folioso, foliis dorsiventralibus saepius paulum reflexis carnosis crassus oblongis obtusae acutatis 2—2,5 cm. inter se distantibus ad 8 cm. longis, 2,3—2,8 cm. latissimis, racemis brevis 1—v. (rarum) 2—floris, bracteis minulissimis. Sepalo dorsali late obovato-oblongo apice rotundato, lateralibus oblongis infra brevi-auriculatis, labello semi-auriculatis, petalis minoribus subimmissis omnibus obtusis, labello compresso basi utrinque dentato, lobulis lateralis erectis apice recurvus, lobo intermedio elongato oblongo acuto v. acuminato, callo crasso supra subtalo inter lobulos laterales, toto disco pilosulo, calcari cum labello continuo ipsi subaequilongo extenctoriformi levisimine ascendentem; gynostemio brevissimo, rostellò antice bifido; antheram et poliniam non vidi. — Flores inter minores generis, sepala petaloquae 8 mm. longae, labellum cum calcaris fere 8 mm. longum.

The stem is very long and attached to the bark of trees by roots of a considerable length; the habit of the plant resembles that of some peperomoid plants, from where I borrowed the name. The species which we may consider to be the nearest to it is perhaps Saccolabium bipunctatum Par. & Rchb. f. (referred to Cleisostoma by Sir Jos. Hooker) a very imperfectly known species from Tenasserim; it has the same habit, the same manner of growth, the same very short inflorescences of 1 or rarely 2 flowers and even some very slight resemblance in the flower, but no character is identical in both species.

Klong Sarlakpet, epiphytic on Bruguieria gymnorrhiza in the mangrove.

Vanda? Aerides? Sarcauthus?

There are still 2 specimens of big Vanda-like plants without any trace of flowers.

Podochilus Bl.

23. Podochilus sp.

Without flowers, Pod. lucenseceti Bl. similar.
Klong Munsé, on rocks and epiphytic in the jungle.

Stereosandra Bl.

24. S. pendula Krzl. n. sp.

Tuberidio 3 cm. longo, 1 cm. crasso; caule tenui fragili ad 30 cm. alto basi squamato ceterum aphylllo pallide roseo, racemo
paucifloro, bracteis linearibus pedicello superantibus, floribus pendulis. Sepalis ovalis acuminatis lateralibus basi manifeste excavatis et gibbosis, petalis subconformibus, labello similis et basi concava late triangulo acuminato anteae complicate, tuberculis basilaribus globosis; gynostemium cum anthera dimidium sepalis dorsalis acuante, anthera longa complectata basi dibrachiata, pollinis elongatis. — Flores albi violaceo-punctati, sepala 7 mm. longa, petala et labelllum vix breviora.

Differs from Ster. javanica Bl. by its smaller flowers and the more prominent gibbosity of the lateral sepals and the lip. The tubercles at the base of the latter are very conspicuous. The flowers are white with violet spots, whilst in St. javanica they are whitish with violet tips of the sepals and petals. It is a very similar species.

Klong Son, terrestrial among withered leaves. Flowers white with violet spots, ovary with violet elevated lines. stem and leaves pale reddish.

Area: The genus Stereosandra, as far we can judge for the moment, is confined to the islands of the indo-malayan archipelago. Stereosandra javanica Bl. has only been found in Java.

Anoectochilus Bl.

25. A. Redward:ii Bl. 9 Orch. Archip. Ind. 48, t. 12 fig. 2.
Without flowers. The habit and the reticulations of the leaves agree exceedingly well with Blumes plate.


Hetaeria Bl.

With nearly destroyed flowers, but otherwise easy to recognize. 
Jungre near Klong Munse and Koh Kahdat, terrestrial.
Area: Java.

Cheirostylis Bl.

27. C. montana Bl. Bijdr. 413, fig. 16.
Klong Majum, alt. 700 ft., on rocks in the jungle.
Area: Java.

Didymoplexis Griff.

Klong Son, alt. 1000 ft., terrestrial in the jungle. Flowers white, labellum yellow, stem and leaves reddish, the latter very small.

Area: Lower Bengal, from Himalaya to Calcutta. Malacca, Perak.

Cyripedium L.

29. C. Schmidtianum Krzl. n. sp.

Sepal puberulo tenui, bractea lanceolata carinata acuta dimidium ovarii aequante. Sepalo dorsali latissime ohovato explanato apice brevi acutato utrinque 9—11 nervio in nervis extus puberulo, sepali late distansibus in phyllum mulloties et inusitate parvum ovatum acuminatum coalescit, petalis late linearibus acutis arctissime deflexis, papillis minulis valde distansibus 3 v. 4 in margine superiore minute finbriatis, labello petalis acuillongo marginibus ostii satis distantibus grosse papillositis, sacco ampio supra utrinque in lobulum acutum acuto; gynostemio gracili, staminodio antice profunde lunato medio sulcato (fere bipartito), dente in ima parte sulci paulum prosiliente (non proprii umbonato). — Sepal dorsale 4,5 cm. altum et latum, sep. inferius 2,2 cm. longum, 8 mm. latum, petala 5,5 cm. longa, 1,2 cm. lata, labellum 5,5 cm. longum, supra 2,5 cm. latum; de colore nihil constat.

It is not without hesitation, that I found a new species of Cyripedium of which I am quite unable to give any particular about the colours. The characters which make me believe that the species must be a new one are the extreme smallness of the lower sepal and the strictly deflexed petals. The first character is never observed in such a degree and the position of the petals is in similar manner only to be seen in Cyp. Fairianum and Cyp. Dayanum but in neither the petals are so directly deflexed as in this species and both species are out of the question by numerous other characters. My material consists in 3 flowers preserved in alcohol and I am quite sure that I have seen all parts in their natural position and not injured by pressure.

Klong Son, alt. 1000 ft.; on rocks.

Apostasiaceae.

Apostasia.


Area: Borneo, Forests of Labuan.