

# Flora of Koh Chang.

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

By

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## Part VIII.

(**E. Östrup**: Marine Diatoms. — **C. H. Ostenfeld**: Gymnospermae, Pandanaceae, Smilacaceae, Commelynaceae, Amaryllidaceae, Taccaceae, Dioscoreaceae. — **V. A. Poulsen**: Eriocaulaceae. — **Johs. Schmidt**: Combretaceae. — **Carl Mez**: Myrsinaceae. — **H. Hallier**: Convolvulaceae. — **C. B. Clarke**: Verbenaceae, Labiatae.)

### Marine Diatoms<sup>1)</sup>

by **E. Östrup** — Copenhagen.

With Plate 1 and 2.

The following list of marine Diatoms has resulted from the examination of 74 samples collected by the Danish expedition to Siam (1899—1900).

The localities of these samples are:

Koh Kahdat	in the text	abbreviated to	K Kt	42 samples.
Lem Ngob	" "	" "	LN	9 "
Koh Kam	" "	" "	KKm	3 "
Koh Mesan	" "	" "	KMn	2 "
Between Koh Mesan and Cap Liant	" "	" "	K Mn—C Lt	4 "
Between Koh Mesan and Koh Chuen	" "	" "	K Mn—K Cn	1 "

<sup>1)</sup> When in the following list the genera have been arranged as in F. Schütt: Bacillariaceae (Engler & Prantl: Nat. Pflanzenfam. I, 1896, p. 55 ff.), this has been made according to the wish of the editor of „Flora of Koh Chang“. As to the Marine Plankton Diatoms see the paper by C. H. Ostenfeld in „Flora of Koh Chang“, Part VII, reprinted from Bot. Tidsskr. Vol. 25, 1902.

Koh Chang	in the text abbreviated to	K Cg	1	sample.
Between Koh Chang				
and Koh Lom	" "	" " K Cg—K Lm	1	"
Koh Chuen	" "	" " K Cn	1	"
Koh Chick	" "	" " K Ck	1	"
Koh Sakait	" "	" " K S	1	"
Koh Chang Noi	" "	" " K Cg N	1	"
Tung Kaben	" "	" " T K	1	"
Without habitat				
(sine loco)	" "	" " s. l.	6	"
			Total 74 samples.	

## Bacillariaceae.

### A. *Centricae*.

### Coscinodiscaeae.

#### *Melosira* Ag.

#### *Podosira* Ehb.

1. **M. Montagnei** Ktz. V. H. Syn. tab. LXXXIV, figs. 11—12.

K Cg, K Km, K Kt, K Mn—CLt, s. l. (12 samples).

Area: Atlantic coasts of Europe, Mediterranean, West India, Samarang.

#### *Paralia* Heib.

2. **P. sulcata** (Ehb.) Cl. var. **coronata** (Ehr.) Grun. V. H. Syn. t. XCI, fig. 17.

K Km, K Kt, K Mn—CLt, LN (10 samples).

Area: the main species ubiquitous. The var. *coronata*: Java, Tahiti.

#### *Hyalodiscus* Ehb.

3. **H. stelliger** Bail. V. H. Syn. tab. LXXXIV, fig. 1.

K Km, K Kt, K Mn—CLt (3 samples).

Area: The coasts of Europe, Delaware, Sierra Leone, China, Bengal, Java, Tahiti.

#### *Cyclotella* Ktz.

4. **C. striata** W. Sm. var. **Stylorum** Bright. forma *minuta* V. H. Syn. tab. XCIII, fig. 5.

KKt, TK, s. l. (5 samples).

Area: Labuan, Bengal, Sierra Leone.  
forma *minuta*: Sierra Leone.

5. **C. transsylvanica** Pant. var. **disseminato-punctata** Pant. Pant. Ung. III, tab. XXXV, fig. 511. Tab. nostr. I, fig. 2.

Diam. 0.016 mm.

Valve circular. Marginal striæ 7 in 0.01 mm. Inframarginal puncta so arranged that they form sectors separated by structureless interstices on the elevated part of the valve; on the depressed part they are more irregularly dispersed.

LN (2 samples; only two specimens met with).

Area: Köpez (fossil).

### Coscinodiscus Ehb.

6. **C. cocconeiformis** A. S. var. **tenuior** A. S. A. S. Atl. tab. LVIII, fig. 27.

Found only in a sample from KKm.

Area: Leton Bank (A. S.).

7. **C. denarius** A. S. A. S. Atl. tab. LVII, figs. 19—21.

KKm, KCn, KMn—CLt (6 samples).

Area: Campeachy Bank, Sansego, Madagascar, Antarctic Ocean.

8. **C. excentricus** Ehb. V. H. Syn. tab. CXXX, fig. 4.

KKt (5 samples).

Area: ubiquitous.

9. **C. lineatus** Ehb. V. H. Syn. tab. CXXXI, fig. 3.

Found only in a sample from LN.

Area: ubiquitous.

10. **C. minor** Ehb. A. S. Atl. tab. LVIII, figs. 39—40.

KMn—CLt (1 sample).

Area: ubiquitous.

11. **C. nitidus** Greg. var. **sparsa** Ratt. A. S. Atl. tab. LVIII, fig. 17.

KKm, KKt, KMn—CLt, LN (5 samples).

Area: the main species: ubiquitous.

var. *sparsa*: Campeachy Bank.

12. **C. nodulifer** Janisch. A. S. Atl. tab. LIX, figs. 21—23.

KKm, KKt, KCn, KMn—CLt, LN (17 samples).

Area: dispersed, especially in the southern Seas.

13. **C. subconceavus** Grun. A. S. Atl. tab. LIX, figs. 12—13.  
 K Km, K Kt, TK, s. l. (4 samples).  
 Area: Simbirsk (foss.), Java.

### Actinodisceae.

#### Schuettia de Toni.

14. **S. annulata** (Wall.) de Toni var. **minor** Grun. V. H. Syn. tab. CXXIV fig. 13.

Solitary in two samples from K Kt and L N.

Area: Mer du Sud (Grunow in V. H. Syn. l. c.).

#### Actinoptychus Ehb.

15. **A. vulgaris** Schum. var. **australis** Grun. V. H. Syn. tab. CXXI. fig. 8.

Solitary in a sample from K Kt.

Area: Northern Australia.

— — var. **tropica** Brun. Le Diat. 1893, tab. XXIV, fig. 4.

Area: Indian Ocean.

16. **A. moronensis** (Grev.) Cl. var. **guttata** Øst. n. var. Tab. nostr. I. fig. 1, cfr. Grev. Trans. Micr. XIV, N. S., tab. XI, fig. 14.

Diameter 0,069 mm.

This form must surely be considered a variety of *A. moron.*, of which it partakes the very peculiar radiating structure of the processiferous sectors. On the other hand the sectors without processes do not possess the deltoid depression mentioned and figured by Greville, but are spotted on a ground of decussate striæ.

K Kt (only one specimen met with).

Area: *A. moron.* Moravian Tegel, where it becomes somewhat larger (up to 0,26 mm.) and sometimes is more flattened and slightly hexagonal (Cleve Mor. Tegel P. 172). Moron deposit (Greville l. c.).

### Eupodisceae.

#### Actinocyclus Ehb.

17. **A. australis** Grun. V. H. Syn. tab. CVXV, fig. 7.

Solitary in a sample from TK.

Area: Pacific.

18. **A. moniliformis** Ralfs. Hantzsch Ost. Archip. tab. VI A, fig. 9.

Solitary in a sample from K Kt.

Among the many figures of *A. monilif.* quoted by Rattray (Actinoc. P. 182) only the above by Hantzsch corresponds exactly to the form met with by me.

Area: ubiquitous.

19. *A. crassus* V. H. Syn. tab. CXXIV, figs. 6 & 8.

KKm. KKt, LN (4 samples).

Area: England, Ireland, Belgium, Denmark.

NB. Rattray (Actinoc. p. 154) gives this species under *A. subcrassus* Ratt., as he means that W. Smith's *A. (Eupodiscus) crassus* (W. Sm. Syn. I, tab. IV, fig. 41) cannot be identical with the species figured by van Heurck l. c. and referred by him to *A. (Eupodiscus) crassus* W. Sm. In his *Traité des Diat.* p. 524—25 van Heurck however points out that the form figured by him agrees with original specimens of *A. (Eupodiscus) crassus* signed by W. Smith himself. *A. (Eupodiscus) crassus* W. Sm. is referred by Rattray (l. c. p. 173) to the widely distributed *Act. Ehrenbergii* Ralfs.

20. *A. subocellatus* (Grun.) Ratt. A. S. Atl. tab. LVII, fig. 31.

Solitary in a sample from KKt.

Resembles with regard to the striation more *Coscinodiscus curvatus* Grun. var. *latius striata* Ratt. A. S. l. c. fig. 30, but the pseudonodule are very evident.

Area: Bolivian Guano. Cape of Good Hope, Kerguelen Island, Table Bay, dredgings off Vancouver Island and off Heard Island.

Probably it is the same form that Cleve (Ind. Ocean & Mal. Archip. p. 32) quotes from Java sub *A. Coscinodiscus curvatus* Grun.

21. *A. subtilis* Ralfs forma *subtilissima*. Cfr. V. H. Syn. tab. CXXIV, fig. 7.

Surface convex, diam. c. 0,13 mm., rows towards the centrum 16 in 0,01 mm.

KKt (17 samples).

Area: the main species ubiquitous.

Dr. Henri Van Heurck, who has been kind enough to compare the present form with typical *A. subt.* from his rich collections, says that it differs: „1) par sa forme notablement plus bombé, 2) par sa grande minceur et sa fragilité, 3) par sa striation infiniment plus fine. Ce serait donc une forma subtilissima ou une espèce nouvelle très proche du subtilissima que j'en ferais“; but Dr. Van Heurck adds „n'ayant vu qu'une seule valve, je ne voudrais pas porter un jugement absolu, avant de faire cela il faudrait voir et comparer un certain nombre de valves“.

• According to Rattray (Actin. p. 188) the size of the typical species is 0,0498 mm.—0,0757 mm.; the present form is nearly twice as large, but Dr. H. Van Heurck has sent me some photographic copies of an *Actinoc. subt.* from Sandwich Islands which had the same size; further Dr. Van Heurck tells me that he has specimens from the same place which are „encore notablement plus grandes“.

### Auliscus Ehb.

22. **A. caelatus** Bail. var. **latecostata** A. S. Leud. Fortm. Ceyl. t. VII, fig. 66.

KKt, KCn, KMn—CLt (4 samples).

Area: Campeachy Bay, Bass Strait, Yokohama, Holothurians Java.

23. **A. reticulatus** Grev. A. S. Atl. tab. XXX, fig. 4.

Solitary in a sample from KKt.

Area: Peru, Holothurians California, Zanzibar, Amboina, Bass Strait.

*Heliopelta* sp. A fragment only which could not be determined, met with in one sample from K Km.

## Chaetocereae.

### Bacteriastrum Shad.

24. **B. varians** L. V. H. Syn. tab. LXXX, figs. 3—5.

K Km, KM—CLt, KS, TK (5 samples).

Occurs generally only as fragments.

Area: Mediterranean, Red Sea, Guli of Aden. Indian Sea, Malay Archipelago, South China Sea (C. H. Ostenfeld: Marine Plankton Diatoms in „Flora of Koh Chang“ Part VII. p. 232, reprinted from Bot. Tidsskr. Vol. 25, Aug. 1902).

### Chaetoceras Ehb.

25. **C. diversum** Cl. Leud. Fortm. la Mal. tab. VI, fig. 1 (*Ch. rude* L. F.).

Solitary in a sample from K Km.

Area: Atlantic Ocean, Mediterranean, Indian Ocean, Malay Archipelago (Ostenfeld l. c. p. 235 (17)).

26. **C. laeve** Leud. Fortm. L. F. la Mal. tab. VI, fig. 2.

Solitary in a sample from KKt.

Area: Sea of Java (Ostenfeld l. c. p. 237 (19)).

27. **C. Lorenzianum** Grun. Grun. Wien. Aka. 1863, tab. XIV, fig. 13.

Occurs as fragments in two samples from KKt.

Area: Atlantic from North Sea southwards, Mediterranean, Red Sea, Gulf of Aden, Malay Archipelago, Hongkong (Ostenfeld l. c. p. 237 (19)).

## Biddulphiaeae.

### Triceratium Ehb.

28. **T. bicornis** Cl. A. S. Atl. tab. LXXVIII, figs. 24—25.

KKm, KKt (4 samples).

Area: St. Bartholomew, California, Madagascar, Java.

29. **T. circulare** Grun. forma **IV—appendiculata** V. H. Syn. tab. CVIII, fig. 10.  
 K Kt (3 samples).  
 Area: Barbadoes.
30. **T. dubium** Bright. A. S. Atl. tab. LXXXVIII, figs. 34—35.  
 K Cn, K Kt, K Mn—CLt (22 samples).  
 Area: Campeachy Bay, Madagascar, Algoa Bay, Malay Archipelago, Sandwich Islands.
31. **T. orbiculatum** Shad. Jan & Rabh. Hond. tab, II, fig. 5.  
 Only found in a sample without habitat.  
 Area: Honduras, Port Natal, Malay Archipelago.
32. **T. punctatum** Bright. forma **trigona minuta** V. H. Syn. tab. CIX, fig. 10.  
 K Kt (3 samples).  
 Area: Seychelles.
33. **T. scitulium** Bright. A. S. Atl. tab. LXXXIII, fig. 11.  
 K Km, K Mn—CLt (2 samples).  
 Area: Gulf of Mexico, Campeachy Bay, Malay Archipelago.  
 — — forma **quadrata** A. S. Atl. tab. LXXXIV, figs 5—6.  
 K Km (2 samples).  
 Area: Campeachy Bay; Singapore.
34. **T. Shadboltianum** Grev. A. S. Atl. tab. LXXX, figs. 18—19.  
 Found only in a sample from K Kt.  
 Area: Samoa, Tahiti.  
 This species is (Ind. Oc. & Malay Archip. p. 32) referred by Cleve to *Tric. orbiculatum* Shadb.
35. **T. (Amphitetras) parvulum** Jan. & Rabh. Jan & Rabh. Hond. tab. I, fig. 4.  
 K Kt (2 samples).  
 Area: Honduras.
36. **Triceratium** sp. Tab. nostr. I, fig. 4.  
 Triangular with a single prominent central spine. Distance between the angles 0,047 mm., striæ counted along the margin 14 in 0,01 mm. radiated and composed of puncta.  
 Solitary in a sample labelled: „Off Tung Kaben“.

I think this form is nearly allied to *Triceratium* (*Odontella discigera* var.?) *Californicum* Grun. in V. H. Syn. tab. CVIII, fig. 11 (from Dépôt de Santa Monica).

### Biddulphia Gray.

37. **B. aurita** Lyngbye. V. H. Syn. tab. CXCVIII, fig. 4.

KKt (2 samples).

Area: Atlantic coasts of America and Europe, Arctic Ocean, Madagascar, Java.

38. **B. membranacea** Cl. Leud. Fortm. Afr. occ. tab. VII, fig. 1 & 4.

KCn, KKt (3 samples).

Area: Ile St. Thome (Leud. Fortm.), Honolulu, Ceylon, Malay Archipelago.

39. **B. minutissima** Grev. Grev. South. Pacif. tab. VI, fig. 14.

Solitary in a sample from KKt.

Area: Zanzibar. In a dredging off the island of Arran (Greville).

40. **B. pulchella** Gray. V. H. Syn. tab. CXCVII, figs. 1—3.

KKm, KKt, KMn—CLt (17 samples).

Area: probably ubiquitous.

41. **B. reticulata** Roper. V. H. Syn. tab. CII, figs. 1—2. A. S. Atl. Tab. LXXVIII, fig. 22.

KKt, KMn—CLt (6 samples).

Area: Ceylon, Natal, Honduras, Madagascar, Malay Archipelago, Tahiti, Samoa, Hawaii.

— — forma **trigona**. V. H. l. c. fig. 3.

Only found in a sample without habitat.

Area: Madagascar, Java.

42. **B. Tuomeyi** (Bail.) Roper. V. H. Syn. tab. CXCVIII, figs. 1—2.

KKm, KKt, KMn—CLt (5 samples).

Area: Campeachy Bay, Campeachy Bank, Mediterranean, Mazatlan, Val paraiso, Nankoori, Madagascar, King Mill Island, Malay Archipelago.

### Isthmia Ag.

43. **I. nervosa** Ktz. W. Sm. Syn. tab. XLVII.

Solitary in a sample from KKt.

Area: Sct. Francisco, Honduras, Europe, Arctic Ocean, Madagascar, Kerguelen.



**Hemiaulus** Ehb.

44. **H. Heibergii** Cl. Cl. Diat. Java. tab. I, fig. 4.

KKm, KKt (2 samples).

Area: Japan, China, Indian Ocean, Arafura, Malay Archipelago, Tropical Atlantic.

**Terpsinoë** Ehb.

45. **T. americana** Ralfs. A. S. Atl. tab. CC, fig. 9.

Solitary in a sample from KCg.

Area: Venice, Florida, Neuse River, Cape of Good Hope, Yokohama, Australia, Samoa.

**Rutilaroideae.****Rutilaria** Grev.

46. **R. recens** Cl. Cl. New. Diat. tab. IV, fig. 57 a & b. V. H. Syn. tab. CV, fig. 9. Tab. nostr. I, fig. 5.

KKm, KMn—CLt, KS (5 samples).

Area: Galepagos.

As it may be seen of my figure compared with those quoted above by Cleve and Van Heurck the present form is somewhat more elegant. Cleve (l. c. p. 19) figures and mentions some „strongly marked puncta“, which are not very conspicuous in Van Heurck's figure and that I have not seen in my specimens. Van Heurck thinks that the somewhat unsymmetrical sculpture shown in his figure „ferait croire à une Euodiée“. Cleve whose figures do not show any unsymmetrical sculpture however points out that his *Rutilaria recens* is „very allied to the genus *Cymatosira* Grun., of which the only known species *C. Lorenziana* Grun. has also marginal bristles“. As my form do not possess „strongly marked puncta“, i. e. the character which should entitle its affinity to *Rutilaria*, and as it does not show an unsymmetrical sculpture, I am most inclined to think it allied to *Cymatosira* Grun.

**B. Pennatae.****Tabellarieae.****Rhabdonema** Ktz.

47. **R. adriaticum** Ktz. V. H. Syn. tab. LIV, figs. 11—13.

Common in the samples (25) from KKt.

Area: ubiquitous.

**Striatella** Ag.

48. **S. hyalina** (Jan. & Rabenh.) Rabenh. Jan. & Rabenh. Hondur. tab. II, fig. 13.

KKt (1 sample).

Area: Honduras.

49. **S. delicatula** (Ktz.) Grun. var. **gibbosa** Östr. n. var. Tab. nostr. I, fig. 13.

L. 0,01 mm., b. 0,004 mm. Striae very fine. Valve gibbous in the middle.

Found only in two samples from KKt., but this very small hyaline form may easily be overlooked.

Area: the main species: probably widely distributed.

**Climacosira** Grun.

50. **C. mirifica** (W. Sm.) Grun. Jan. & Rab. Hond. tab. II, fig. 19.

KKt (6 samples).

Area: Brezil, West Indies, Red Sea, Mauritius, Madagascar, Malay Archipelago, Samoa, Tahiti, Hawaii.

**Grammatophora** Ehb.

51. **G. marina** (Lyngb.) Ktz. var. **undulata** Ehb. Perag. Diat. de Fr. tab. LXXXVII, fig. 24.

KKm, KKt (6 samples).

Area: the coasts of Europe and America, Madagascar, Ceylon, East Indian Archipelago, Tahiti.

The present form corresponds exactly to the above figures by Peragallo but is more closely striate (20—22 str. in 0,01 mm.).

52. **G. oceanica** Ehb. var. **macilenta** W. Sm. Perag. Diat. de Fr. tab. LXXXVII, figs. 15—17.

KKm, KKt, KMn—CLt, LN (14 samples).

Area: the main species: Europe, Cape Horn, Borneo, Ceylon.

var. *macilenta*: in aquis marinis ad oras Europae passim (de Toni).  
Madagascar, Java, Samoa, Tahiti, Hawaii.

**Denticula** Ktz.

53. **D. subtilis** Grun. V. H. Syn. tab. XLIX, figs. 10—12.

LN (1 sample).

Area: England.

## Meridioneae.

### Opephora Petit.

54. **O. pacifica** (Grun.) Petit. Grun. Wien. Akad. 1862. tab. V, fig. 19.  
Solitary in a sample from Kkt.  
Area: in mari pacifico boreali (Grun.), Labuan (Cleve), Samoa, Hawaii.

### Trachysphenia Petit.

55. **T. australis** H. L. Sm. var.? **Aucklandica** Grun. V. H. Syn. tab. XXXVII, fig. 1.  
Solitary in a sample from Kkt.  
Area: Royal Sound, Kerguelens Land, Borneo, Labuan, Port Jackson.

### Licmophora Ag.

56. **L. flabellata** (Carm.) Ag. V. H. Syn. tab. XLVI, figs. 2—3.  
Kkt, KMn—CLt (3 samples).  
Area: the coasts of Europe, Ceylon, Malay Archipelago, Hawaii.  
In a sample from KMn—CLt I have found a *Licmophora*, in shape and striation agreeing with *L. Aurivillii* Cl. (Ind. Oc. & Mal. Archip. p. 58, fig. 2 but only 0,13 mm. long (*L. Aurivillii* is 0,8 mm. long).
57. **L. gracilis** (Ehb.) Grun. V. H. Syn. tab. XLVI, fig. 13.  
Kkt (2 samples).  
Area: Europe.
58. **L. Jürgensi** Ag. var. **intermedia** Grun. V. H. Syn. tab. XLVI, fig. 9.  
Found only in a sample without habitat.  
Area: Europe, Guadeloupe.
59. **L. Remulus** Grun. V. H. Syn. tab. XLVI, fig. 4.  
Found only in a sample from LN.  
Area: Adriatic, Honduras, Mauritius.

### Climacosphenia Ehb.

60. **C. elongata** Bail. Perag. Diat. de Fr. tab. LXXXVI, figs. 3—4.  
Hantzsch Ost. Arch. tab. V, fig. 1 (*C. indica*).  
Kkt, LN (25 samples).  
Area: widely distributed, as far as I know, along the coast of the Southern Seas.

De Toni (Syll. p. 739—741) gives four species of this genus, but Grunow certainly is right when he says (Novara Exp. p. 5): „Die Unter-

scheidung aller Climacosphenia-Arten ist überhaupt höchst prekär\*. In settling the above „area“ I therefore paid for the localities of all the four species. The area of *C. elongata* Bail. is given by de Toni (l. c. p. 740) thus: „in mari rubro frequens in primis ad Laurencias et in mari atlantico ad oras Americae borealis et Brasiliae: ad algas ex insulis Canariensibus et ex insula Guadelupa“.

### **Euphyllodium** Shadbolt.

61. ***E. spathulatum*** Shadbolt. Tab. nostr. 1, figs. 3a—c.

L. up to 0,1 mm., max. breadth up to 0,05 mm. The ribs counted at the median line, above 6, in the middle 4,4, below 3 in 0,01 mm. Between the ribs square alveoli 6 in 0,01 mm. The frustule cuneiform.

KKt (22 samples), KCG—KLM (1 sample), s.l. (2 samples).

Area: Mediterranean, Adriatic, the coasts of England and America borealis, Ile San Thome, Madagascar, Funafuti, Malay Archipelago, Ceylon, Nankoori, Samoa, Hawaii.

I think that *E. spathulatum* is identical with *Podocystis australica* Witt (de Toni p. 602) and *P. africana* Leud. Fortm. (L. F. Afr. occid. p. 31, tab. VI, fig. 2). According to de Toni both *P. africana* and *P. australica* are small forms, their maximal length being 0,04 mm. The present form is larger, and thus it agrees well with the figure by Grunow in Wien. Akad. 1862, tab. X, fig. 13 which (measured on the figure) shows the dimensions L. c. 0,1 mm., B. 0,05 mm. The form from Nankoori (Grun. Novara Exp. tab. 1 A, fig. 9) is still somewhat larger and by Leud. Fortm. (l. c. p. 31) the dimensions of *E. spath.* are given as L. 0,16 mm., B. 0,09 mm. and of *P. africana* as L. 0,29 mm., B. 0,11 mm. However must be added, that the figures of Leud. Fortm. shows less dimensions.

## **Fragilarieae.**

### **Plagiogramma** Grev.

62. ***P. Atomus*** Grev. Grev. South Pacific. tab. XIII, fig. 9. A. S. Atl. tab. CCXI, fig. 20.

KKt (2 samples).

Area: Woodlark Islands, Ceylon, Java.

63. ***P. decussatum*** Grev. A. S. Atl. tab. LXXVI, figs. 28—29.

Found only in a sample from KKt.

Area: Virginian Islands, St. Helena, Sharks Bay, Madagascar, Zanzibar, Labuan, Ceylon, Java.

64. ***P. Gregorianum*** Grev. A. S. Atl. tab. CCIX, fig. 35.

KKt; LN (5 samples).

Area: Greenland, Europe, Honduras, Ceylon, Samoa.

65. **P. labuense** Cl. Cl. Vega Exp. tab. XXXVII, fig. 62.

Solitary in a sample from K Kt.

Area: Borneo.

66. **P. polygibbum** Cl. & Grove. Leud. Fortm. Ceylon tab. IX, fig. 90.

Solitary in a sample from K Kt.

Area: Macassar Street, Ceylon, Malay Archipelago.

67. **P. pulchellum** Grev. Grev. Mic. Journ. 1859, tab. X, figs. 4—6.

K Kt, K Km, K Mn—CLt (4 samples).

Area: Nassau, New Providence, Jamaica, Californian Guano, Borneo, Ceylon.

68. **P. Robertsianum** Grev. Trans. Mic. Soc. XI, N. S., tab. I, fig. 1—2.

L. 0,03 mm., b. 0,0072 mm. Striæ more than 20 in 0,01 mm. very delicate. I am not able to see any longitudinal striation.

Solitary in a sample from K Kt.

Area: Port Stephen, New South Wales.

This *Plagiogramma* of which I have seen but a single specimen agrees in its whole habit well with the above quoted figure by Greville, but it is much more closely striate. As I have not been able to see any longitudinal striation, I dare not refer it to *P. interruptum* (Grev.) Ralfs var. *adriatica* Grun. (Cl. Vega Exp. tab. XXXVII, fig. 61), the species to which it comes nearest by its more delicate striation but from which it differs by its breadth.

Area for *P. int. adriat.*: Adriatic, Borneo.

69. **P. pygmæum** Grev. Grev. Mic. Journ. 1859, tab. X, fig. 11.

K Kt (4 samples).

Area: Nassau, New Providence, Cap of good Hope, Red Sea, Ceylon.

70. **P. Seychellarum** Grun. Cl. Vega Exp. tab. XXXVII, fig. 59.

K Km (1 sample).

Area: Seychelles, Labuan, Borneo.

71. **P. sumatrense** Leud. Fortm. Leud. Fortm. la Mal. tab. II, fig. 12.

Solitary in a sample from K Kt.

Area: Sumatra.

72. **P. tenuistriatum** Cl. Cl. Vega Exp. tab. XXXVII, fig. 63.

Solitary in a sample from K Kt.

•Area: Borneo.

73. **P. tessellatum** Grev. Grev. Mic. Jour. 1859, tab. X, fig. 7.

K Kt, K Mn—CLt (4 samples).

Area: Borneo, between Aden and Bab el Mandeb, Californian Guano.

**Raphoneis** Ehb.

74. **R. ampiceros** Ehb. Cl. Vega Exp. tab. XXVII, fig. 52 a. V. H. Syn. tab. XXXVI, fig. 20 (var. *rhombrica*).

KKm, KKt (6 samples).

Area: on the coasts of Europe, Rio Grande, „in Virginia et Marylandia“ (Ehb. sec. de Toni), Borneo.

— — var. **cruciata** Cl. Jan. & Rabh. Hond. tab. I, fig. 5. V. H. Syn. tab. CXVI, fig. 16.

KKt, LN (11 samples).

Area: Honduras, Seychelles, Java, Samoa.

75. **R. bilineata** Cl. & Grun. Cl. Vega Exp. tab. XXXVII, fig. 55 b. KKt (9 samples).

Area: Borneo, Ceylon, Java.

The specimens examined by me are often rather small and comparatively broad (L. 0,015 mm., b. 0,008 mm.) and the apices less protracted. It thus gets a certain resemblance to *Gephyria* sp. in *Castracane* (Chall. Exp. tab. XXV, fig. 19) and to *Gephyria Castracanei* Leud. Fortm. (la Mal. tab. II, fig. 8).

In a sample labelled „Off Koh Kam“ I found a *Raphoneis*, of which I have (tab. I, fig. 6) given a figure. Probably it is *R. bilineata* Cl. & Grun. var. *contracta* Grun. (enfr. Cl. Vega Exp. p. 499).

76. **R. marginulata** Cl. & Grun. Cl. Vega Exp. tab. XXXVII, fig. 57. KKt, LN (2 samples).

Area: Seychelles, Borneo.

**Dimerogramma** Ralfs.

77. **Dimerogramma fulvum** Greg. Perag. Diat de Fr. tab. LXXX, figs. 17—18.

KKt (1 sample).

Area: on the coasts of Europe, Mediterranean, Adriatic.

**Glyphodesmis** Grev.

78. **G. siamensis** Östr. n. sp. Tab. nostr. I, fig. 9.

L. 0,059 mm., b. 0,013 mm. Costæ 6,5 in 0,01 mm. alternating with double rows of puncta. Valve lanceolate, the pseudoraphe in the middle extended to a lancetlike area, on the apices a blank oval elevated spot.

Solitary in a sample from LN.

I suppose this form to be a *Glyphodesmis* in spite of its double row of puncta; perhaps it is allied to *Glyph. eximia* Grev. (Micr. Jour. II, tab. IV, fig. 9).

**G. siamensis** forma **minor**. Tab. nostr. I, fig. 8.

L. 0,023 mm., b. 0,01 mm. Costæ 7 in 0,01 mm.

Solitary in a sample from Kkt.

**Synedra** Ehb.

79. **S. affinis** Ktz. var. Cnfr. V. H. Syn. tab. XLI, fig. 15 B.

The present variant has the same shape as the figure by V. Heurck quoted above, but only 11—12 striæ in 0,01 mm.

KKm, Kkt, KCg (3 samples).

Area: the main species probably ubiquitous.

80. **S. cuneata** Grun. Perag. Diat. de Fr. tab. LXXVIII, figs. 1—2.

KMn—CLt, s. l. (2 samples).

Area: Banyuls, Honduras, Ceylon, Java.

81. **S. formosa** Hantzsch. Hantzsch Ost. tab. V, fig. 3.

Kkt, KCg—KL, LN (11 samples).

Area: Madagascar, East India Archipelago.

82. **S. fulgens** Grey. V. H. Syn. tab. XLIII, figs. 1—2.

Kkt (2 samples).

Area: Europe, Borneo.

— — var. **gigantea** Lob. Perag. Diat. de Fr. tab. LXXIX, fig. 6.

Found only in a sample from Kkt.

Area: Adriatic.

83. **S. Hennedyana** Greg. V. H. Syn. tab. XLII, fig. 3.

Kkt, KMn—CLt (6 samples).

Area: the coast of Europe, Ceylon, Malay Archipelago, Hawaii.

84. **S. lævigata** Grun. Grun. New Diat. Hond. tab. I, fig. 3.

KKm, Kkt, KCg (14 samples).

— — var. **hyalina** Grun. Grun. l. c. fig. 5.

Scattered among the main species.

Area: Honduras, Mauritius, Samoa, Ceylon.

NB. In a sample from KCg I have found a *Synedra*, probably a variety of *S. lævigata*, in its outline agreeing with *Syn. affinis gracilis* V. H. Syn. tab. XLI, fig. 15 B. L. 0,2 mm., b. 0,005 mm., in the middle a little broader. Apices slightly capitate. Striæ very fine.

85. **S. superba** (Ktz.) Grun. Perag. Diat. de Fr. tab. LXXIX, fig. 7.

Found only in a sample from LN.

Area: Europe.

86. *S. undulata* Bail. V. H. Syn. tab. XLII, fig. 2.

Found only in a sample from K Kt.

Area: the coasts of N. America, Europe, Red Sea, Ceylon, Hawaii.

#### **Thalassiothrix** Cl. & Gr.

87. *Th. Frauenfeldi* Grun. V. H. Syn. tab. XXXVII, figs. 11—12.

Only found in a sample from TK.

Area: Atlantic Ocean, Mediterranean, Red Sea, Indian Ocean, Malay Archipelago, China Sea, Pacific Ocean (Ostenfeld).

#### **Asterionella** Hass.

88. *A. notata* Grun. V. H. Syn. tab. LII, fig. 3.

K Kt, s. l. (3 samples).

Area: Honduras, Barbadoes, Adriatic.

### **Achnantheoideae.**

#### **Achnanthes** Bory.

89. *A. angustata* Grev. Cl. Vega Exp. tab. XXXV, fig. 2.

KCN, K Kt, LN (6 samples).

Area: Californian guano, Ceylon, Samoa.

Occurs sometimes somewhat smaller.

90. *A. brevipes* Ag. var. *intermedia* Ktz. = *A. subsessilis* Ktz.

Perag. Diat. de Fr. tab. I, figs. 19—21.

Found only in a sample from LN.

Area: in algis marinis passim (de Toni).

91. *A. javanica* Grun. var. *rhombica* Grun. Tab. nostr. I, figs. 15 & 16.

K Kt, LN, s. l. (4 samples).

Area: Java, China, Madagascar.

As certainly belonging to *A. jav.* var. *rhomb.* I refer my fig. 15 in shape agreeing with the figure by Petit in Diat. prov. de Madagascar fig. 8. My fig. 16 (Epitheca) shows two longitudinal lines and a blank spot at each end of the valve on the same side of pseudoraphe. In *Achn. Bengalensis* Grun. such spots are characteristic according to Cl. Syn. II, p. 196, but here the fact is that „at each end of the valve is a small blank spot on both sides of the area“. I have seen a similar valve in connection with a hypotheca showing a conspicuous bifid stauros in the same slide from which my figure is drawn. I suppose that this valve, in spite of the longitudinal lines being remoted from the margin is an epitheca of *A. javanica* which then possess similar „blank spots“, though



only one at each end of the valve and both situated on the same side of pseudoraphe.

Area of *A. Bengal*: Bengal.

92. *A. mammalis* Castr. Cl. Syn. II, tab. III, figs. 13—14. Tab. nostr. I, fig. 14.

LX (2 samples).

Area: Galapagos, Madagascar, Macassar Strait, Malay Archipelago.

I have figured a hypotheca of this species being somewhat irregular in its outline because this hypotheca makes it still more probable that Greville's *Stauroneis obesa* Trans. Bot. Soc. V, VIII, tab. III, fig. 12 is identical with *A. mam.* Cast. (cnfr. Cl. Syn. II, p. 187).

93. *A. longipes* Ag. forma **minor decussata** Perag. Diat. de Fr. tab. I, figs. 7—9.

K Kt. KM—CLt (7 samples).

Area: the main species: the coasts of Europe, Canarian Islands, Java, St. Paul Islands. f. *min. decuss.*: Nice (Peragallo).

### Cyclophora Castr.

94. *C. siamensis* Östr. n. sp. Tab. nostr. I, fig. 12.

L. 0,075 mm., b. greatest 0,007 mm., at the constriction 0,0065 mm. Striae not seen. Epitheca linear with slightly capitate apices. Hypotheca like epitheca but contracted in the middle. Terminal nodi very small, situated out in apices.

The present form reminds a good deal *Cycl.* n. sp. in V. H.'s *Traité des Diat.* p. 237, fig. 35, especially in the fact that the terminal nodi are situated out in the apices; further it do not possess a perforation in the central part like *Cyc. tenuis* Cast. in Perag.'s *Diat. de Fr.* tab. I, figs. 27—32, the species to which it is nearest in size.

Area: *C. tenuis* Cast.: Banyuls, Philippines. *C.* sp. in V. H. *Traité*: Labuan.

### Cocconeis Ehb.

95. *C. apiculata* A. S. A. S. Atl. tab. CXCVIII, figs. 31—32.

K Kt. LX (2 samples).

According to the description of the figure by A. S. quoted above *C. apic.* A. S. is regarded by Grove as identical with *C. robusta* Leud.-Fortm. Ceylon I, fig. 1, which figure however P. T. Cleve — with doubt — refers to *Achnanthes Lorenziana* Grun. (Cl. Syn. II, p. 186—187).

Area: *C. apiculata*: Cape of Good Hope. *C. robusta*: Ceylon.

96. *C. dirupta* Greg. var. **Fulgur** Brun. Brun Esp. nouv. tab. XVIII, fig. 3.

Found only in a sample from K Km.

Area: Mogador, Cabenda, Magelhans Strait.

**C. dirupta** Greg. var. **Sigma** Pant. A. S. Atl. tab. CXCVI, fig. 11.

Found only in a sample from KMn.

Area: Ceylon.

97. **C. gibbocalyx** Brun. Brun Esp. nouv. tab. XVIII, fig. 4 a.

Solitary in a sample from Kkt. Only epitheca met with.

Area: West Indies, Zanzibar, Mauritius, Manilla, Indian Ocean, Galapagos, Madagascar.

98. **C. heteroidea** Hantzsch. Hantzsch Ost. Arch. tab. VI A, fig. 10. A. S. Atl. tab. CXCVI, figs. 31—37.

Kkt (16 samples).

Area: West Indies, Colon, Honduras, Seychelles, Madagascar, Mauritius, Nicobar Islands, Singapore, Java, Japan, China, Sandwich Islands, Samoa.

In two samples (Kkt & KMn—CLt) I found a *Cocconeis* identical with a species from Hokkaido in A. S. Atl. tab. CXCIV, fig. 19, which probably is to be regarded as nearly allied to *C. heteroidea* Hantzsch var. *curvirotonda* Temp. & Brun.

99. **C. insignis** Janisch. A. S. Atl. tab. CXCVII, fig. 3.

Solitary in a sample without habitat.

Area: Gazelle Expedition.

100. **C. pellucida** Hantzsch. Hantzsch Ost. Arch. tab. VI, fig. 11.

Kkt (1 sample).

Area: Behring Island, Madagascar, Nicobar Island, Singapore, Java, Sumatra, Samoa, Tahiti, Hawaii, Pacific Ocean, New Zealand.

101. **C. pinnata** Greg. Perag. Diat. d. Fr. tab. II, fig. 12.

Found only in a sample from KM—CLt.

Area: Arctic Ocean, North Sea, Mediterranean, Adriatic, Madagascar, Seychelles, Island of Rhea.

102. **C. pseudomarginata** Greg. V. H. Syn. tab. XXIX, figs. 20—21

Kkt, KM—CLt, LN, s. l. (7 samples).

Area: Seems to be ubiquitous.

— — var. **intermedia** Grun. A. S. Atl. tab. CXCIV, fig. 1.

Found only in a sample without habitat.

Area: dispersed among the main species.

103. **C. qvarnerensis** Grun. A. S. Atl. tab. CXCII, figs. 20—21

Found only in a sample from Kkt.

Area: Arctic Ocean, North Sea, Mediterranean, Adriatic.

104. **C. Scutellum** Ehb. var. **parva** Grun. Perag. Diat. de Fr. tab. IV, fig. 3.

KKt, LN, s. l. (15 samples).

Area: the main species: ubiquitous. var. *parva*: Baltic, East Cape, Adriatic (Cleve), North Sea, Belgium, North coast of France, Gulf of Gascony, Rousillon.

105. **C. (Orthoncis) aspera** Perag. Perag. Diat. d. Fr. p. 29, tab. V, fig. 13.

KKm, KKt (5 samples).

The striae along the raphe mentioned and figured by Peragallo l. c. are not so conspicuous in my specimens as in the figure by Peragallo quoted above; but otherwise, i. e. as to the striae and the character of raphe, they agree well with this figure.

Area: Villefranche („très rare“ Perag.), Madagascar, Samoa.

106. **C. (Orthon.) binotata** Grun. Perag. Diat. de Fr. tab. V, fig. 2.

KKm, KKt, KMn—CLt, KCg—KKm, LN, s. l. (22 samples).

Area: the coasts of Europe, West Indies, Madeira, Red Sea, Nicobar Islands, Island of Rhea, Madagascar, Cape of good Hope, Malay Archipelago, Australia, Tahiti.

107. **C. (Orthon.) Clevei** Grun. V. H. Syn. tab. XXVIII, fig. 4.

Found only in a sample from KKt.

Area: Barbadoes, Seychelles, Mauritius, Madagascar, Indian Ocean, Samoa.

108. **C. (Orthon.) fimbriata** Btw. Perag. Diat. de Fr., tab. V, figs. 3—4.

KKm, KKt, KM—CLt, LN (15 samples).

Area: Honduras, Brazil, Mediterranean, Adriatic, Madagascar, Sumbava, Japan, China, Australia, Samoa, Tahiti, Hawaii.

109. **C. (Orthon.) Horwathiana** Grun. A. S. Atlas tab. CLXXXVIII, fig. 41.

KKt (2 samples).

Area: Honduras, Villefranche, Red Sea, Madagascar, Java, Bali Sound, Samoa, Tahiti.

## Naviculoideae.

### Navicula Bory.

#### *Pinnulariaceae.*

110. **N. (Pinnularia) bistriata** Leud.-Fortm. Perag. Diat. de Fr. tab. XI, fig. 14.

Solitary in a sample from KKt.

Area: Mediterranean, Ceylon, Labuan.

111. **N. balatonis** Pant. Pant. Bac. d. Balatonsees tab. III. fig. 64.  
Tab. nostr. I, fig. 7.

L. 0,043 mm., B. 0,004 mm. Striæ 10 in 0,01 mm.

Solitary in a sample from LN.

Area: Balaton See.

Differs by the somewhat more linear apical area and by a proportionally less breadth from the species figured by Pant.

112 **N. (Pinn.) Farcimen** Östr. n. sp. Tab. nostr. I, fig. 10.

L. 0,039 mm., b. 0,009 mm. Striæ 11 in 0,01 mm. Valve linear with rounded apices. Striæ in the middle slightly radiant toward the apices at a right angle to the apical axis. Apical area narrow in the middle widened into a little circular area. Terminal nodi situated on the apices. Raphe rectilinear.

KKt, LN (2 samples).

In spite of its more open striation I think this species must be referred to the section *parallelistriatæ* of Cleve; then it is nearest to *P. sublinearis* Grun. or *Pinn. leptosoma* Grun., what the small terminal nodi also seem to suggest. In the sample from KKt occurs a shorter and comparatively broader form. L. 0.027 mm., b. 0.01 mm.

113. **N. (Pinn.) quadratarea** A. S. var. **Söderlundi** Cl. Perag. Diat. de Fr. tab. XI, fig. 10.

Solitary in a sample from KM—CLt.

Area: Davis Strait, Banyuls, Balearic Islands, Tahiti.

114. **N. retusa** Bréb. var. **subretusa** V. H. Cnfr. A. S. Atl. tab. XLVI, fig. 75 & Perag. Diat. de Fr. tab. XIII, figs. 7—8.

KKt, LN, s.l. (9 samples).

In its outline the form found by me agrees well with the figures quoted above; however as I have not been able to see any transversal striation of the ribs, I dared not refer it to *Nav. cancellata* Donk. With Peragallo's *Nav. retusa* Bréb. (Perag. l. c. fig. 11) characteristic by its broad apical area it has nothing to do.

Area: *N. cancellata* ubiquitous, the var. *retusa* seems to be a northern form; *subretusa*: Belgium.

115. **N. (Caloneis) blanda** A. S. A. S. N. S. D. tab. II, fig. 27. Perag. Diat. de Fr. tab. XIV, fig. 3.

KKm, KKt, s.l. (3 samples).

Area: North Sea, Black Sea, Manche Chaussy, Seychelles, Labuan, Billiton, Tahiti.

116. **N. (Calon.) Powellii** Lewis. Perag. Diat. de Fr. tab. XIV, fig. 6.

KKt (2 samples).

Area: Quincy Mass., Long Island Sound, Baleares.

**N. (Calon.) Powellii** var. **Vidovichi** Grun. Grun. Wien. Akad. 1863, tab. XIII, fig. 4.

Solitary in a sample without habitat.

Area: S. America, Adriatic, Sumatra.

— — var. **Bartholomei** Cl. A. S. Atl. tab. CLX, fig. 9.

Found only in a sample from K Kt.

Area: West Indies. Porto Seguro, Bahia.

117. **N. (Calon.) siamensis** Östr. n. sp. Tab. nostr. I. fig. 11.

L. 0,04 mm., B. 0,016 mm. Striæ 7,4 in 0,01 mm.

Linear elliptic with cuneate apices. Apical area broad, not dilated in the middle. Striæ divided in two nearly equal parts by a hyaline line parallel to the margin.

Only found in a sample from K Kt.

This species surely is near to the form from Campeachy Bay figured in A. S. Atlas tab. CCXII, fig. 16 (from Campeachy Bay) which is referred by Cleve to *Nav. (Calon.) sectilis* A. S.

In tab. nostr. II, fig. 19 I have figured a fragment of a form, which certainly must also be referred to the form circle of *Nav. (Calon.) Powellii*. L. 0,09 mm, b. 0,024 mm, striæ 7,4 in 0,01 mm. on the middle somewhat shortened and thus forming a central area in which two lunulæ are present.

Found in a sample from K Kt.

118. **N. (Calon.) disticha** A. S. Tab. nostr. II, fig. 17. Cnfr. A. S. Atl. tab. CCXII, fig. 13.

L. 0,043 mm., b. 0,01 mm. Striæ 9—10 in 0,01 mm. not punctate.

Solitary in a sample from K Kt.

Area: Zanzibar (Gründler in A. S. Atl.).

This form is near to *N. (Cal.) blanda* A. S., about which Cleve says (Syn. I, p. 62) that the striæ are „not distinctly punctate“. As A. S. however in the text of his Atlas tab. CCXII says about *Nav. blanda*, that he has always found his striæ punctate and just for that purpose separated *N. disticha* from *N. blanda*, I thought it most correct to refer the present form to *N. disticha* A. S.

### *Radiosæ.*

119. **N. crucifera** Grun. var.? **capitata** Östr. Tab. nostr. II, fig. 18.

L. 0,031 mm., b. 0,012 mm. Striæ 10 in 0,01 mm. finely transversely lineated.

Valve elliptical with almost parallel margins, rostrate-capitate. Striæ in the middle slightly radiant, at the ends transversal, wanting in the apices. Apical area narrow, in the middle extended to a rhombical central area.

K Kt (2 samples).

With great hesitation I refer this species to *Nav. crucif.* Grun., from which it differs by its form and its closer striation. Perhaps it ought to be considered a separate species.

120. *N. digito-radiata* Greg. var., cnfr. V. H. Syn. tab. VII, fig. 6.

L. 0,026 mm., b. 0,01 mm. Striæ 11 in 0,01 mm. finely transversely lined.

KKt (1 sample).

In outline and habit this form exactly agrees with V. H.'s figure quoted above of *N. Reinhardtii* Grun., but as the striæ are finely transversely lineate I think to refer it to *N. dig. rad.*

Area: *N. digit.*: Arctic Sea. Europe, Caspi Sea. *N. Reinh.*: Europe, Trinidad.

121. *N. (Alloioneis) mediterranea* Brun & Cl. var.? *scaligera* Perag. Perag. Diat. de Fr. tab. XI, fig. 20.

Solitary in a sample from TK.

Area: Neapel (Perag.).

This present form differs from Peragallo's species in being a little more closely striated. 5 striæ in 0,01 mm.

122. *N. peregrina* Ehb. var. *Menisculus* Schum. V. H. Syn. tab. VIII, figs. 23—24.

LN (1 sample).

Area: Europe, Baltic, Argentina.

123. *N. Zostereti* Grun. A. S. Atl. tab. XLVII, figs. 42—44.

KKm, KKt, KMn, TK (14 samples), Samoa.

Area: Arctic Ocean, Brazil, Adriatic, Madagascar, Bab el Mandeb, Ceylon, Labuan, Java, China, Japan, Sandwich Islands, Samoa.

### *Didymæ.*

124. *N. (Diploneis) Bombus* Ehb. A. S. N. S. D. tab. I, fig. 1.

KKt LN (3 samples).

Area: probably ubiquitous.

In a sample from KKt I have found it but only 0,024 mm. long.

125. *N. (Dipl.) chersonnensis* Grun. Perag. Diat. de Fr. tab. XIX, fig. 9.

KCn, KKt, KMn—CLt, LN (12 samples).

Area: very widely distributed (Cleve).

126. *N. (Dipl.) Crabro* Ehb. Perag. Diat. de Fr. tab. XV, fig. 1.

KCn, KKt (3 samples).

**N. (Dipl.) Crabro** var. **multicostata** Grun. A. S. Atl. tab. XI, figs. 15—16.  
K Kt (4 samples).

— — var. **separabilis** A. S. A. S. Atl. tab. XI, figs. 5—6.

K Kt, K Cg N, K Mn—CLt (14 samples).

Area: *Nav. Crabro* and its numerous variants probably are spread everywhere; however — cnfr. Cleve: Syn. I, p. 100—102 — they seem to prefer the warmer Seas.

127. **N. (Dipl.) Entomon** (Ehr.) A. S. A. S. Atl. tab. XIII, fig. 38.

K Kt. s. l. (2 samples).

Area: probably ubiquitous.

128. **N. (Dipl.) Gemmatula** Grun. var. **Grunowi** Cl. A. S. Atl. tab. XII, fig. 61 (*N. lacrimans*).

K Kt, LN (2 samples).

Area: Campeachy Bay, Baleares, Re dSea, Mauritius, Tamatava, Sumatra, Yokohama, Samoa.

129. **N. (Dipl.) interrupta** Ktz. V. H. Syn. tab. IX, figs. 7—8. A. S. Atl. tab. XII, figs. 9 & 11.

LN, K Kt (2 samples).

Area: ubiquitous.

130. **N. (Dipl.) vacillans** A. S. forma *a*. A. S. Atl. tab. VIII, fig. 61.

K Kt (1 sample).

Area: California, Campeachy Bay, Cape Horn, Cape of good Hope, Rodriguez, Ceylon, Japan, Sandwich Islands.

— — var. ? **minuta** Grun. V. H. Syn. tab. IX, fig. 9.

K Km (1 sample).

Area: Belgium.

131. **N. (Dipl.) Weissflogi** A. S. A. S. Atl. tab. XII, figs. 26—32.

K Km, K Kt, K Cg N, K Mn—CLt (11 samples).

Area: seems to be widely distributed, especially in the warmer Seas.

132. **N. (Dipl.) splendida** Greg. Perag. Diat. de Fr. tab. XVIII, fig. 16.

Found only in a sample from K Kt.

Area: ubiquitous.

— — var. **Puella** A. S. A. S. Atl. tab. LXIX, fig. 15.

Found only in a sample from K Kt.

Area: California, Campeachy Bay, North Sea, Sorrento.

*Ellipticæ.*

133. **N. (Diploneis) advena** A. S. var. **parca**. A. S. Atl. tab. VIII, figs. 20—22.

Found only in a sample from K Kt.

Area: Campeachy Bay, North Sea. Creswell, Samoa.

134. **N. (Dipl.) aestiva** Donk. forma  $\alpha$ . Perag. Diat. de Fr. tab. XX, fig. 12.

K Kt (1 sample).

Area: Normandie, Colon, Singapore, Manilla.

— — — forma  $\beta$ . Perag. l. c. fig. 13.

K Kt (1 sample).

Area: West coast of Sweden, Normandie, Sumatra.

135. **N. (Dipl.) Cynthia** A. S. A. S. Atl. tab. VIII, fig. 41.

LN (1 sample).

Area: coasts of Ireland, West Indies, Red Sea.

The present form is rather small (L. 0.036), but does not belong to Cleve's forma *minuta* (Cl. Syn. I, p. 82).

136. **N. (Dipl.) fusca** Greg. Perag. Diat. de Fr. tab. XX, fig. 6.

Found only in a sample from K Kt.

Area: North Sea; Balearic Islands, Sumatra, Java.

137. **N. (Dipl.) litoralis** Donk. var. **subtilis** A. S. Perag. Diat. de Fr. tab. XX, fig. 11.

Found only in a sample from K Kt.

Area: Arctic Ocean, Arctic America, West Indies, Adriatic, Port Jackson, Java, Tahiti.

138. **N. (Dipl.) major** Cl. V. H. Syn. Suppl. B, fig. 23.

K Kt (4 samples).

Area: Colon, Europe, Madagascar, Macassar, Sumatra, China, Japan, Australia.

139. **N. (Dipl.) nitescens** Greg. A. S. Atl. tab. VII, figs. 33 & 38 and tab. VIII, fig. 14.

K Km, K Kt, LN (6 samples).

Area: Campeachy Bay, Colon, Europe, Seychelles, Madagascar, Java, Sumbava, Singapore, Australia, Sandwich Islands, Samoa, Tahiti.

140. **N. (Dipl.) notabilis** Grev. forma **genuina**. A. S. Atl. tab. VIII, figs. 46—47.

— — — forma **expleta**. A. S. l. c. fig. 49.



KKt, LN (7 samples).

Area: Brazil, West Indies, Europe, Red Sea, Madagascar, Cape of good Hope, Java, Borneo, Sandwich Islands, Samoa.

141. **N. (Dipl.) Papula** A. S. A. S. Atl. tab. VII, fig. 45.

KKt (2 samples).

Area: Campeachy Bay, Samoa.

142. **N. (Dipl.) ocellata** Öst. n. sp. Tab. nostr. II, fig. 20.

L. 0,037 mm., b. 0,0175 mm. Costæ 7,5 in 0.01 mm. not alternating with puncta.

Valve elliptic with flattened apices. Lateral areas rather large, with a row of puncta, which are only conspicuous in the middle.

Solitary in a sample from LN.

As I have not been able to see alveoli between the costæ I dared not determine this species as a variant of *N. (Dipl.) notabilis*, which it is always nearest in its whole habit.

143. **N. (Dipl.) Smithi** Bréb. A. S. Atl. tab. VII, fig. 17. Perag. Diat. de Fr. tab. XX, fig. 4.

KKt (2 samples).

Area: Arctic Sea, Campeachy Bay, Colon, Europe, Seychelles, Madagascar, Java, Tasmania, New Zealand, Samoa.

144. **N. (Dipl.) suborbicularis** Greg. A. S. Atl. tab. VIII, fig. 2.

KKt (4 samples).

Area: probably ubiquitous.

In a sample from KKt I found a *Nav. (Diploneis)* agreeing with A. S. Atl. tab. VII, fig. 15 (from Campeachy Bay), about which Cleve (Syn. I, p. 96) says that it „seems to belong to *Diploneis borealis* Grun.“.

### *Lyratae.*

145. **N. abrupta** Greg. V. H. Syn. tab. X, fig. 4.

KKt, (4 samples).

Area: ubiquitous.

In one of the samples from KKt I found a form more particularly agreeing with *Nav. spectabilis* Greg., var. *Rattrayi* Pant., which is considered by Peragallo (Diat. de Fr. p. 132, tab. 21, fig. 38) a variant of *Nav. abrupta* Greg.

146. **N. clavata** Greg. A. S. N. S. D. tab. I, fig. 33.

KKt, K CgN (3 samples).

Area: ubiquitous.

— — var. **indica** Grev. Jan. Gaz. Exp. tab. XV, fig. 15.

Found only in a sample without habitat.

Area: Honduras, Manilla, Cebu, Macassar, Ceylon, Sumbava (Cleve).

147. *N. forcipata* Grev. var. *nummularia* Grev. A. S. Atl. tab. LXX, fig. 38. Perag. Diat. de Fr. tab. XXI, fig. 31.

LN (2 samples).

Area: Californian Guano, Florida, Adriatic, Bab el Mandeb, Madagascar, Cape of good Hope, Java.

— — var. *suborbicularis* Grun. Perag. Diat. de Fr. tab. XXI, fig. 32.

KKt (2 samples).

Area: Spitzbergen, North Sea, Baleares, Seychelles, Java, Zulu Sea, Galapagos.

148. *N. Lyra* Ehb.

Among the numerous variants of this form I have found:

*N. Lyra* Ehb. forma *typica*. Perag. Diat. de Fr. tab. XXII, fig. 3. A. S. Atl. tab. II, fig. 25.

— — var. *dilatata* A. S. A. S. Atl. l. c. fig. 26.

— — var. *elliptica* A. S. V. H. Syn. tab. X, fig. 2. A. S. tab. III, fig. 12.

— — var. *intermedia* Perag. Perag. Diat. de Fr., tab. XXIII, fig. 11.

— — var. *producta* Pant. Perag. l. c. tab. XXII, fig. 13.

— — var. *subcarinata* Grun. A. S. l. c. tab. II, fig. 5.

— — var. *spec.?* A. S. Atl. tab. III, fig. 12 (from Java).

KKm, KKt, KCgN. LN (18 samples).

Area: *Nav. Lyra*: with varieties widely distributed, the var. *subcarinata*: Indian Sea, Samoa, Tahiti.

149. *N. spectabilis* Greg. var. *emarginata* Cl. Jan. Gaz. Exp. tab. XV, fig. 22.

KKt (1 sample).

Area: Campeachy Bay, Sierra Leone, Japan.

150. *N. mediopartita* Grove var. Tab. nostr. II, fig. 21. Cnfr. A. S. Atl. tab. CCIV, fig. 16.

L. 0.045 mm., b. 0.019 mm. Striæ 22 in 0.01 mm.

Valve lanceolate with somewhat protracted apices. Two lines forming a lyrate figure and nearly parallel to the margin are present. Marginal part conspicuously striated; on the inner part between the lines and raphe the striæ are closer and more difficult to see. Narrow transapical area.

KKt (2 samples).

Area: *N. mediop.*: Oamaru (Grunow).

According to Cleve (Description of plates) this form perhaps ought to be referred to *Nav. fallax* Cl. or to *Mastogloia*. I must add that the present form has no resemblance to the figure of *Nav. fallax* Cl. (Syn. I, tab. V, fig. 24) and that I have seen no loculi in it.

151. **N. (Pseudoamphiprora) decora** Grev. = **Stauroneis decora** Grev. Tab. nostr. II, fig. 22. Cnfr. Grev. Tran. Micr. Soc. Edin. VIII, tab. III, fig. 11.

L. 0,067 mm., b. 0,0126 mm. Striæ at least 25 in 0,01 mm., conspicuous only at the margin outside the longitudinal lines.

KKt (2 samples).

Area: New Caledonia.

The present form is shorter and proportionally more slender than Greville's. Cleve supposes that *Stauron. decor.* Grev. probably must be referred to *Pseudoamphiprora*, a subgenus in its systematic position between *N. Lyrata* and *Caloneis* (Cl. Syn. I, p. 70 & 72).

### *Hennedyæ.*

152. **N. Hennedyi** W. Sm. var. **furcata** Perag. Perag. Diat. de Fr. tab. XXIV, fig. 17.

— — var. **nebulosa** Greg. Perag. l. c. tab. XXV, fig. 11.

KKt (3 samples).

Area: the main species ubiquitous.

var. *furcata*: Banyuls, Naple (Perag).

var. *nebulosa*: Cape Horn, Florida, Europe, Morocco, Madagascar, Ceylon, Galapagos.

### *Perstriatæ.*

153. **N. brasiliensis** Grun. A. S. Atl. tab. VI, figs. 23—25.

KKt, LN, TK (6 samples).

Area. Eastern Coast of America, Bab el Mandeb, Zanzibar, Madagascar, the Seas S. and E. of Asia, New Caledonia, Samoa, Sandwich Islands.

154. **N. sublyrata** Grun. Cl. Vega Exp. tab. XXXV, fig. 17.

Solitary in a sample from KKt.

Area: North America, Labuan.

### *Johnsoniæ.*

155. **N. Scopulorum** Bréb. Perag. Diat. de Fr. tab. VIII, fig. 29.

KKm, TK (2 samples).

Area: Arctic Oceans, Brazil, Europe, Sumatra, Borneo, Japan.

NB. Somewhat unsymmetrical as figured in the figure by Peragallo quoted above. In a few specimens I have seen a narrow stauros caused by the wanting of striæ in the middle.

*Nav. Scopulorum* Bréb. in *craticular state* = *Climaconeis Lorenzii* Grun. (Wien. Akad. 1862, tab. VIII, fig. 7) I have met with in a sample from TK. It has hitherto been found in Honduras, Adriatic, Java, Queensland and New Caledonia.

### *Seriantes.*

156. *N. bipunctata* Grun.? Tab. nostr. II, fig. 30. Cnfr. V. H. Syn. tab. XIII, fig. 7.

L. 0.044 mm., b. 0.0072 mm. Striæ very fine.

Valve linear with slightly undulate margins, attenuated towards the rounded apices. Striæ at a right angle to sagittal axis, apical area narrow, in the middle a stauros by want of striæ. Central pores very evident.

Found only in a sample from LN.

Owing to the very conspicuous central pores and the slightly undulate outline I have referred this form to *N. bipunctata* Grun., which it resembles in its whole habit; however I have not been able to recognize the longitudinal striation of the figure quoted above.

Area: no locality has been given.

### *Lineares.*

157. *N. (Caloneis) Liber* W. Sm. var. *linearis* Grun. A. S. Atl. tab. L, figs. 38 & 40.

KKm, KKt, KMn—CLt, LN (8 samples).

Area: seems to be widely distributed.

— — var. *bicuneata* Grun. A. S. l. c., figs. 22—24.

KKt 2 (samples).

Area: Colon, Porto Seguro, North Sea, Seychelles, Sumatra, Samoa.

In a sample from LN I found a form agreeing with A. S. Atl. tab. L, fig. 36 (from Sorrento), which is referred by A. S. with doubt to *Nav. maxima* = *Nav. (Calon.) Liber* W. Sm. *genuina* Cleve.

158. *N. (Caloneis!) egena* A. S. A. S. Atl. tab. CCXII, fig. 1.

Solitary in a sample without habitat.

Area: Campeachy Bay.

### *Schizonema.*

159. *N. (Schizonema) Smithii* Ag. V. H. Syn. tab. XV, fig. 33.

KKt, LN (2 samples).

Area: Europe, Black Sea, Caspian Sea, East Cape, Tasmania.

*Stauroneis* Ehb.

160. *N. (Stauroneis) africana* Cl. Cl. New r. Diat. tab. III, fig. 15.

Solitary in a sample from K Kt.

Area: South Africa, Ceylon.

161. *N. (Staur.) anceps* Ehb. var. *hyalina* Br. & Perag. Hérib. Diat. d'Auv. tab. III, fig. 19.

Solitary in a sample from K Kt.

Area: Europe (fossil). Australia.

*Libellus* Cl.

162. *N. (Libellus) hamulifera* Grun. Cl. Syn. I, tab. III, figs. 17 & 19.

K Km, K Kt (2 samples).

Area: Barbadoes, Mediterranean, Adriatic, Black Sea, Ceylon, Java.

*Dictyoneis* Cl.

163. *N. (Dictyoneis) marginata* Lewis var. *intermedia* Cl. A. S. Atl. tab. CLX, figs. 34—35.

Found only in a sample from K Mn—CLt.

Area: Madagascar, Japan, Malay Archipelago.

*Trachyneis* Cl.

164. *N. (Trachyneis) aspera* Ehb.

Of the numerous variants of this form I have found:

var. *contermina* A. S. A. S. Atl. tab. XLVIII, figs. 17—18.

Proportionately broad (L. 0,032 mm., B. 0,011 mm.), stauros not reaching the margin.

var. *genuina* Cl. V. H. Syn. tab. X, fig. 13.

var. *pulchella* W. Sm. A. S. l. c. fig. 6.

var. *vulgaris* Cl. A. S. l. c. fig. 5.

Among the variants stated above the var. *pulchella* is most common.

K Km, K Kt, K Mn—CLt (15 samples).

Area: var. *contermina*: Japan, Cape Horn.

var. *genuina*: North Sea, Singapore, Amboina, Sydney, Samoa, Tahiti, Hawaii, Pacific Ocean.

var. *pulchella*: North Sea, Philippines, Samoa, Sandwich Islands, Malay Archipelago.

var. *vulgaris*: Arctic America, North Sea, Madagascar, Cape of good Hope, New Zealand, Samoa, New Caledonia, Malay Archipelago, Galapagos.

165. **N. (Trachyn.) velata** A. S. A. S. Atl. tab. XLVIII, fig. 36.

KKm, Kkt, KMn—CLt (7 samples).

Area: Cape Horn, Cape of good Hope, Madagascar, Mauritius, Ceylon, King Georges Sound, Sumatra, Java, China, Japan, Sandwich Islands, New Caledonia.

In a sample from KCgN I have found a *Nav. (Trachyneis)* exactly corresponding to the „fragliche Form“ from North Celebes figured by A. S. in Atl. tab. XLVIII, fig. 31.

### *Cymatoneis* Cl.

166. **C. sulcata** Grev. A. S. Atl. tab. CCXII, fig. 44.

Found only in a sample from Kkt.

Area: Widely spread in warmer Seas.

### *Van Heurckia* Bréb.

167. **V. H. siamensis** Östr. n. sp. Tab. nostr. II, fig. 26.

L. 0,074 mm., b. 0,009 mm.

Valve linear elliptical with rounded apices. Raphe strongly asymmetric, enclosed between two silicious ribs, terminating in a outwards reflexed point. Striæ very fine, parallel. I am not able to see any longitudinal striation.

KKm, TK (2 samples).

This species surely is near to *Van Heurckia vulgaris* Thw. var. *asymmetrica* Cl. (Cl. Syn. I, p. 122, tab. V, fig. 29), but as it is characteristic by its shape, the very asymmetrical raphe and the exceedingly fine sculpture, I preferred to regard it as a separate species.

Area of *V. H. vulg.* var. *asymmetrica* Cl., which is recorded as „brackish“: Sierra Leone, Cameroon, Tasmania, Newark, N. Yers. fossil (Champlain epoch).

168. **N. subglabra** Östr. n. sp. Tab. nostr. II, figs. 23 & 24.

L. 0,059 mm., b. 0,016 mm. (fig. 23). L. 0,056 mm., b. 0,013 mm. (fig. 24). Striæ inconspicuous. Valve rhombic-lanceolate. Central pores distant, terminal nodi distant from the apices.

With Zeiss Apoch. no. 2 and oblique illumination I think I have seen a striation at a right angle to the apical axis; with moderate power the valve gets a chagreen-like appearance. In its central part the valve shows like a tendency to a cicatrice-like figure, which is very conspicuous in other specimens, as I have figured it in my fig. 24. The latter form is somewhat smaller but otherwise on the whole agreeing with the former, so that I have no doubt that they belong to the same species, perhaps as *hypotheca* and *epitheca*. Moreover they occur both in the same sample — from TK — and only in this.

I am uncertain as to the systematic position of this species.

### Pleurosigma

169. **P. australe** Grun. Perag. Diat de Fr. tab. XXXII, figs. 7—8.

Found only in a sample from K Km.

Area: Baleares, Between Aden and Bab el Mandeb, Sumatra, Java, Ceylon, Labuan.

170. **P. diminutum** Grun. Perag. Pleuros. tab. VI, fig. 31.

Found only in a sample from TK.

Area: Baleares, Adriatic.

171. **P. elongatum** W. Sm. W. Sm. Syn. tab. XX, fig. 199.

K Km, K Kt (3 samples).

Area: Arctic Oceans, Atlantic coasts of America, Europe, Caspian Sea, Java, Sumatra, China, Tahiti.

172. **P. formosum** W. Sm. W. Sm. Syn. tab. XX, fig. 195.

K Kt, K Mn—CLt, LN (10 samples).

Area: Arctic Oceans, West Indies, Europe, Red Sea, Madagascar, Java, China, Ceylon, Labuan, Tahiti, Hawaii, Pacific Ocean, Galapagos.

173. **P. Grovei** Cl. Perag. Pleuros. tab. VIII, fig. 1.

Solitary in a sample from TK.

Area: Malay Archipelago.

I have only found one moreover not complete specimen which differed from the typical form in being proportionately broader and in its more open striation. L. 0,43 mm., b. 0,051 mm., transversal striæ 7,4 in 0,01 mm., longitudinal striæ 11,1 in 0,01 mm.

174. **P. naviculaceum** Bréb. Cast. Chall. Exp. tab. XXIX, fig. 14  
(*P. japonicum* Cast.).

K Km (2 samples).

Area: North Sea, Mediterranean, Ceylon, Labuan, Java.

175. **P. Normanni** Ralfs. V. H. Syn. tab. XVIII, fig. 9.

Found only in a sample from K Km.

Area: Arctic Oceans, Atlantic coasts of America, Europe, Madagascar, Red Sea, Java, Sumatra.

176. **P. Nubecula** W. Sm. var. **intermedia** W. Sm. Perag. Pleuros. tab. V, figs. 27—28.

K Kt, K Cg—K Lm (8 samples).

• Area: North Sea, Mediterranean, Port Jackson, Rio Grande.

— — — var. **subrecta** Cl. Perag. Pleuros. tab. V, fig. 30.

K Kt (3 samples).

Area: Arctic Oceans, Baleares.

177. **P. obscurum** W. Sm. W. Sm. Syn. tab. XX, fig. 206.

Found only in a sample from LN.

Area: England, Baleares, Ceylon, Java.

178. **P. rigidum** W. Sm. W. Sm. Syn. tab. XX, fig. 198.

KKm, KKt, KMn—CLt (3 samples).

Area: Magelhaens Strait, West Indies, Colon, Europe, Red Sea, Madagascar, Borneo, Samoa, Tahiti.

179. **P. scalproides** Rabh. var. **eximia** Thw. V. H. Syn. tab. XXI, fig. 2.

Solitary in a sample from LN.

Area: Europe, the coasts of America, Demerara, Bengal.

180. **P. speciosum** W. Sm. W. Sm. Syn. tab. XX, fig. 197.

KKt (2 samples).

Area: Barbadoes, Europe, Red Sea, China, Java, Sumatra, Labuan, Port Jackson.

— — — var. **mediterranea** Grun. Perag. Pleuros. tab. II, fig. 5.

Found only in a sample from KKt.

Area: Mediterranean, Seychelles, Java.

— — — var. **pulchra** Grun. Perag. Pleuros. tab. I, fig. 8.

KKt (2 samples).

Area: North Sea, Red Sea, Java, Sumatra.

### **Scoliopleura** Grun.

181. **S. siamensis** Östr. n. sp. Tab. nostr. II, fig. 27.

L. 0,036 mm., b. 0,0075 mm.

Valve linear with somewhat cuneate apices. Striæ very fine at right angles to apical axis. In the middle a very slight stauros. Central pores approximated. Terminal nodi inconspicuous. Raphe towards the apices turned in contrary direction, no longitudinal lines visible.

Solitary in a sample from KKm.

### **Tropidoneis** Cl.

182. **T. elegans** W. Sm. Perag. Diat. d. Fr. tab. XLI, figs. 2—3.

KKm (2 samples).

Area: North Sea, Europe, Mediterranean, Adriatic. Between Aden and Bab el Mandeb.



183. **T. lepidoptera** Grun. Perag. Diat. de Fr. tab. XXXIX, figs. 8—9.  
KKm, Kkt, Kcg—Klm (7 samples).

Area: Colon, Barbadoes, Cape Horn, Europe, Madagascar, Macassar, King  
Georges Sound, Sumatra, Port Jackson, Ceylon, Samoa, Galapagos.

184. **T. maxima** Greg. var. **subalata** Cl. Perag. Diat. de Fr. tab. XL,  
fig. 6.

Found only in a sample from Kkt.

Area: Villefranche, Macassar Strait.

### **Amphiprora** Ehb.

185. **A. gigantea** Grun. var. **sulcata** O'M. Perag. Diat. de France.  
tab. XXXVIII, fig. 3.

Found only in a sample from Kkm.

Area: Jamaica, Le Croisic, Banyuls, Baleares, Seychelles, Cape of good  
Hope, Sumatra.

### **Rhoicosigma** Grun.

186. **R. compactum** Grev. Perag. Pleuros. tab. X, figs. 5 & 7—8.  
KKm, Kkt, Km—Cl (5 samples).

Area: Honduras, West Indies, Europe, Red Sea, Port Jackson, Philippines  
Java, Sumatra, Samoa, Tahiti, Galapagos.

### **Mastogloia** Thw.

187. **M. affinis** Cl. Cl. Le Diat. I, tab. XXIII, fig. 19.

Found only in a sample from Kkt.

Area: Galapagos.

188. **M. affirmata** Leud. Fortm. A. S. Atl. tab. CLXXXVIII, fig. 19.  
Kkt (3 samples).

Area: Rodriguez, Ceylon, Philippines, Java.

189. **M. angulata** Lewis. A. S. Atlas tab. CLXXXVII, figs. 9—11.  
Perag. Diat. de Fr. tab. V, fig. 16.

Kkt (3 samples).

Area: Honduras, Atlantic coasts of N. America, Mediterranean, Adriatic,  
Black Sea, Red Sea, Billiton, Australia.

• 190. **M. apiculata** W. Sm. A. S. Atl. tab. CLXXXV, fig. 43, 2<sup>nd</sup> fig.  
& tab. CLXXXVII, fig. 40.

Found only in a sample from Kkt.

Area: Europe, China, Borneo.

191. **M. bahamensis** Cl. A. S. Atl. tab. CLXXXVIII, fig. 20.  
KKm, KKt, KMn—CLt (6 samples).  
Area: Bahama.
192. **M. baltica** Grun. V. H. Syn. tab. IV, fig. 24.  
KKm, KKt (3 samples).  
Area: Baltic, South Africa.
193. **M. Brauni** Grun. V. H. Syn. tab. IV, figs. 21—22.  
Found only in a sample from KCg.  
Area: Pensacola, Cape May, Spitsbergen, Europe, Black Sea, Caspian Sea, Red Sea.
194. **M. chersonensis** A. S. A. S. Atl. tab. CLXXXVI, figs. 31—32.  
KKt (2 samples).  
Area: Adriatic.
195. **M. Citrus** Cl. A. S. Atl. tab. CLXXXVII, figs. 16—19.  
KKt, KCn, KCg—KLn (9 samples).  
Area: Vera Cruz, Jamaica, Adriatic, Labuan, Sandwich Islands.
196. **M. erythræa** Grun. Perag. Diat. de Fr. tab. VI, fig. 18.  
KKt, KMn (2 samples).  
Area: Honduras, Bahama, Mediterranean, Adria, Black Sea, Red Sea.  
— — — var. **interrupta** Hantzsch. Hantzsch Ost. Arch. tab. VI A, fig. 5.  
KKt, s.l. (2 samples).  
Area: East Indies, Nicobar.
197. **M. exigua** Lewis. Perag. Diat. de Fr. tab. VI, fig. 29 (fig. dextra).  
KKt (2 samples).  
Area: Behrings Island, Europe, Atlantic Coast of America, Samoa.
198. **M. inæqualis** Cl. Cl. Syn. II, tab. II, fig. 15.  
KKt, LN (6 samples).  
Area: Rodriguez, Java, Australia.  
Abundant in a sample from LN.
199. **M. Jelenecki** Grun. var.? Tab. nostr. II, fig. 25. Cnfr. A. S. Atl. tab. CLXXXVII, figs. 48—49 and Cl. Syn. II, tab. II, fig. 18 (var. *marina*).  
L. 0,062 mm., b. 0,0175 mm. Striæ c. 25 in 0,01 mm., loculi 3—4 in 0,01 mm., those near apices larger than the other.  
Found only in a sample from KKm.

Area: the main species: West Indies, Brazil, Mediterranean, Seychelles, Madagascar, Java, Sumbava, Manilla, China.

var *marina*: Honduras, Manilla, Java, Philippines.

200. **M. Kjellmani** Cl. Cl. Vega Exp. tab. XXXV, fig. 6.

Found only in a sample from K Km.

Area: Labuan.

201. **M. labuensis** Cl. Cl. Vega Exp. tab. XXXV, fig. 5.

K Kt (14 samples).

Area: Philippines, Labuan, Billiton.

*M. labuensis* surely is very closely related to *M. apiculata*.

202. **M. lemniscata** Leud. Fortm. A. S. Atl. tab. CLXXXVI, figs. 14—15.

K Km, K Kt, L N (5 samples).

Area: Colon, Ceylon, Sumbava, Manilla, Java, Macassar, Japan, Carpentaria Bay.

203. **M. Mac Donaldi** Grev. Perag. Diat. de Fr. tab. VI, fig. 14.

K Km, K Kt, K Mn—CLt (5 samples).

Area: Mediterranean, Adriatic, Philippines, Java, Australia.

204. **M. marginulata** Grun. A. S. Atl. tab. CLXXXVI, fig. 30.

K Kt (2 samples).

Area: Chile, Honduras, Adriatic, Java, Samoa, Tahiti, New Zealand.

205. **M. pusilla** Grun. Perag. Diat. de Fr. tab. VI, fig. 36.

K Kt, s l. (3 samples).

Area: Adriatic, Caspian Sea.

206. **M. quinquecostata** Grun. A. S. Atl. tab. CLXXXVI, figs. 1—7 & tab. CLXXXVII, fig. 1.

K Km, K Kt, K Mn—CLt, K Cg—K Lm, T K (12 samples).

Area: Mediterranean, Adriatic, Cape of good Hope, Sumbava, Madagascar, Ceylon, Labuan, Nicobar, Java, Samoa, Tahiti.

— — var. **elongata** Leud. Fortm. A. S. Atl. tab. CLXXXVI, fig. 12.

Found only in a sample from K Kt.

Area: Madagascar, Ceylon.

207. **M. quadrinotata** sp. nov. Tab. nostr. II, fig. 33.

L. 0,018 mm., b. 0,007 mm. Striæ 18—20 in 0,01 mm.

Valve elliptical with very slightly cuneate apices. Striæ parallel composed of punctae, apical area narrow. In the middle a stauros owing to the want of striæ. In every quarter of the valve two

marginal loculi, which are difficult to see, as this small form is very hyaline. The specimens in which I could not see the four pair of loculi otherwise agree in shape and structure with those where the loculi are visible.

KKt, LN, TK, KCg—KSm (4 samples).

208. **M. rhombica** Cl. Cl. Vega Exp. tab. XXXV, fig. 9.

Found only in a sample from KCn.

Area: Labuan.

209. **M. Smithi** Thw. var. **amphicephala** Grun. A. S. Atl. tab. CLXXXV, figs. 13—14 = *M. capitata* Grev. Cnfr. Cl. Syn. II, p. 152.

KKm.

Area: England, Baltic, Scotland, Morocco, Calcutta (*M. capitata* of Greville).

210. **M. parvula** Östr. n. sp. Tab. nostr. II, fig. 35.

L. 0,021 mm., b. 0,009 mm. Striæ 20 in 0,01 mm., loculi 5—6 in 0,01 mm. Valve elliptical with short rostrate apices. Apical area narrow but present.

KKt (2 samples).

This small species reminds somewhat of *M. Smithi* Thw. var. *conifera* Brun. (Perag. Diat. de Fr. tab. VI, fig. 41), but owing to the narrow central area it ought to be considered a separate species.

211. **M. sp.** Tab. nostr. II, fig. 36. Cnfr. A. S. Atl. tab. CLXXXVII, fig. 41.

L. 0,061 mm., b. 0,02 mm. Striæ 16—17 in 0,01 mm. towards the apices slightly curved, loculi 10—11 in 0,01 mm. Raphe slightly undulated, narrow transapical area.

KKt (1 sample).

The form figured by A. S. (from Baltschick) is referred to *M. elegans* Lewis in the description of plates, but the present form does not agree with any of the figures referred by Cl. Syn. II, P. 154 to *Mast. elegans*.

212. **M. sp.** Tab. nostr. II, fig. 32.

L. 0,066 mm., b. 0,028 mm. Striæ 8—9 in 0,01 mm., loculi 4 in 0,01 mm.?

Valve lanceolate with somewhat rostrate apices. Median line straight. Apical area very narrow. Striæ composed of punctae forming decussate lines. Loculi difficult to see. In one specimen I have seen them near the apex, to which they reach.

KKt, s.l. (2 samples).

I think this species is nearest to *M. asperula* Grun. (Cl. Le Diat. I, tab. IX, fig. 12), but I have preferred not to state it as a separate species, as I have only seen specimens either without or with incomplete loculiferous rim.

Area of *M. asp.*: Baleares, Seychelles, Java, Cebu.

## Gomphoneminae.

### Rhoicosphenia Grun.

213. *R. tenuissima* Östr. n. sp. Tab. nostr. II, fig. 28.

L. 0,02—0,03 mm., b. 0,002 mm. Striæ at least 25 in 0,01 mm.

Valve clavate. In the middle a structureless area seems to be present, which with lower enlargement resembles a stauros. In epitheca the striæ are conspicuous, but in hypotheca I have not been able to see any striation.

KKt (1 sample).

This small species is exceedingly delicate and hyaline and therefore it is easily overlooked.

## Cymbellinae.

### Amphora Ehb.

214. *Amphora acuta* Greg. Perag. Diat. de Fr. tab. XLIX, fig. 26.

Found only in a sample from KKt.

Area: Arctic Ocean, Europe, Mediterranean, Morocco, Cape Horn, Magellan's Strait, Ceylon, China.

— — var. *arcuata* A. S. Perag. l. c., fig. 28.

KKm, KKt, KMn—CLt (3 samples).

Area: Gulf of Mexico, Mediterranean, Seychelles, Macassar, Mazatlan, Samoa.

215. *A. angusta* (Greg.) Cl. Perag. Diat. de Fr. tab. L, fig. 37.

KKt (7 samples).

Area: Arctic Ocean, Europe, America.

— — var. *ventricosa* Greg. Perag. l. c. fig. 39.

KKt (2 samples).

Area: Arctic Ocean, Europe, Bab el Mandeb, Monterey.

216. *A. bigibba* Grun. A. S. Atl. tab. XXV, figs. 66 and 74—76.

KKt, KMn—CLt (6 samples).

Area: the coasts of America, Baleares, Adria, Cape of good Hope, Japan, Celebes, Ceylon, Java, Galapagos.

217. *A. costata* W. Sm. A. S. Atl. tab. XXV, fig. 30.

Found only in a sample from KKt.

• Area: New Haven, Pensacola, Colon, Porto Seguro, Campeachy Bay, North Sea, Mediterranean, Adriatic, Galapagos.

218. *A. crassa* Greg. A. S. tab. XXVIII, figs. 31—32.  
 KKt (4 samples).  
 Area: Arctic Oceans, Cape Horn, Mediterranean, Aden, Sumatra, Java, Ceylon, China.
219. *A. egregia* (Ehr.?) A. S. A. S. Atl. tab. XXVIII, fig. 18.  
 Found only in a sample from KKt.  
 Area: Campeachy Bay, West Indies, Cape Horn, Mediterranean, Madagascar, Seychelles, Ceylon, Malay Archipelago, China, Samoa, Galapagos.
220. *A. exigua* Greg. Perag. Diat. de Fr. tab. L, figs. 30—31.  
 KKt (5 samples).  
 Area: Arctic America, West Indies, Europe, Sandwich Islands, Tahiti.
221. *A. gigantea* Grun. var. *fusca* Cl. Perag. Diat. d. Fr. tab. XLV, fig. 8.  
 Found only in a sample from KKt.  
 Area: Gulf of Mexico, Bahia, Mediterranean, Red Sea, Ceylon, Malay Archipelago, Galapagos.
222. *A. Græffei* (Grun.) Cl. A. S. Atl. tab. XXV, fig. 40.  
 KKt (2 samples).  
 Area: Mediterranean, Zanzibar, Malay Archipelago, China, Samoa, Galapagos.
223. *A. Gründleri* Grun. A. S. Atl. tab. XXVIII, fig. 26.  
 KKt, s.l. (2 samples).  
 Area: Campeachy Bay, Gulf of Mexico, Mediterranean, Ceylon, Malay Archipelago, Manilla, Galapagos.
224. *A. lævis* Greg. var. *lævissima* Greg. A. S. Atl. tab. XXVI, figs. 13—14.  
 KKt (5 samples).  
 Area: Kara, Finmark, Scotland, England, Mediterranean.
225. *A. obtusiuscula* Grun. A. S. Atl. tab. XXV, fig. 7.  
 KKt (3 samples).  
 Area: Samoa.
- The present specimens exactly agree with the figure by A. S. quoted above. I am sure I have seen the fine lines and further I have been able to see the very fine transversal striæ (at least 25 in 0,01 mm.), so that I am sure that this species really is an *Amphora* (compare Cl. Syn. II, p. 141).
226. *A. obtusa* Greg. A. S. Atl. tab. XL, figs. 5—7.  
 KKt, K Cn, KMn—CLt (14 samples).  
 Area: America, Europe, Red Sea, Madagascar, Malay Archipelago, the Eastern coasts of Asia.

227. **A. Oculus** A. S. var. **Farcimen** A. S. A. S. Atl. tab. XXVII, fig. 56.

Found only in a sample from K Kt.

Area: Campeachy Bay, Seychelles, Samoa, Galapagos.

228. **A. ostrearea** Bréb. **typica**. Temp. & Brun. Jap. tab. IX, fig. 16  
A. Petiti.

Found only in a sample from K Kt.

Area: Europe, Sumatra, Billiton, Labuan, Japan, China.

— — var. **vitrea** Cl. A. S. tab. XXVI, fig. 25.

K Kt (4 samples).

Area: Arctic Oceans, West Indies, Labuan, Japan, New Caledonia.

In a sample from K Km I found a small *Amphora* measuring l. 0,028 mm., b. 0,003 mm., striæ 15 in 0,01 mm. In its shape it exactly agrees with the species figured by A. S. Atl. tab. XXVI, fig. 16 which Cleve (Syn. II, p. 129) regards as identical with *Amph. ostrearea* Bréb. var. *vitrea* Cl.

229. **A. proboscidea** (Greg.?) Cl. Cl. Syn. II, tab. III, figs. 19—21.

Solitary in a sample from L N.

Area: Portoseguro, Bahia, Java, Bali Sound.

The form found by me is more capitate than figured by Cleve and resembles in that respect *A. Kittoni* L. Fortm. L. Fortm. Ceylon tab. I, fig. 7.

230. **A. Proteus** Greg. A. S. Atl. tab. XXVII, fig. 3.

K Km, K Kt, s. l. (6 samples).

Area: probably ubiquitous.

231. **A. rhombica** Kitton. Perag. Diat. de Fr. tab. L, fig. 4.

Found only in a sample from K Kt.

Area: Colon, Mediterranean, Island of Rhea, Sumbava, Sumatra, Macassar, China, Java.

232. **A. spectabilis** Greg. A. S. Atl. tab. XL, figs. 18—19.

K Kt (2 samples).

Area: Davis Strait, West Indies, North Sea, Mediterranean, Seychelles, Madagascar, Ceylon, Borneo, Macassar, Java, China, Samoa.

233. **A. Terroris** Ehr. A. S. Atl. tab. XXV, figs. 17—19, 33, 34—36.

K Kt (3 samples).

Area: probably ubiquitous.

In two samples from K Kt I found a form agreeing with *A. monilifera* Greg.? in A. S. Atl. Tab. XXV, fig. 32 (from Java). As to this form Cleve (Syn. II, p. 122) says that it „probably is a frustule of *A. costata* or *Terroris* in the state of division“.

234. **A. turgida** Greg. A. S. Atl. tab. XXV, figs. 24—25.

KKm, KKt, LN, s.l. (9 samples).

Area: Europe, Red Sea, Java, Madagascar, Macassar, Labuan, New Zealand.

### **Epithemia** Bréb.

235. **E. Musculus** Ktz. Perag. Diat. de Fr. tab. LXXVII, fig. 6—10.

KKm. KKt, KMn—CLt, LN, s.l. (10 samples).

— — var. **gibberula** Ktz. Perag. l. c. figs. 18—22.

Mixed with the main species.

Area: the main species: Europe (de Toni), Rio Grande, Java, Samoa.

var. *gibberula*: America, Europe, Java.

## **Nitzschieae.**

### **Bacillaria** Gmel.

236. **B. paradoxa** Gmel. V. H. Syn. tab. LXI, fig. 6 = *Nitzschia paradoxa* Grun.

KKt (2 samples).

Area: Cape Horn, Europe, Madagascar, Java.

### **Nitzschia** Hassal.

#### *Panduriformes* Grun.

237. **N. constricta** (Greg.) Grun. var. **bombiformis** Grun. V.H. Syn. tab. LVIII, fig. 9.

L. 0,042 mm., b. 0,016 mm., at the constriction 0,012 mm. Striæ 11 in 0,01 mm.

Solitary in a sample without habitat.

The present form probably is identical with Grunow's „kleine etwas weniger eingeschnürte Form bei Yokohama“ (Cl. & Grun. Arc. Diat. p. 71).

238. **N. panduriformis** Greg. V. H. Syn. tab. LVIII, fig. 1. Perag. Diat. de Fr. tab. LXX, fig. 5.

KKm, KKt, Kcn, KMn—CLt, LN (12 samples).

— — var. **minor** Grun. V. H. l. c. fig. 4.

Mixed with the main species.

Area: Cape Horn, Europe, East Indies, Malay Archipelago, Samoa, Tahiti, Hawaii.

**N. panduriformis** Greg. var. **interrupta** Östr. n. var. Tab. nostr. II, fig. 29.

L. 0,038 mm., b. 0,018 mm., at the constriction 0,014 mm. Carinal puncta 11 in 0,01 mm. Striæ 22 in 0,01 mm.



The longitudinal plication is not of equal height through its whole length but lower near the apices and in the middle so that two lateral elevated spots arise giving this form a very characteristic appearance. The decussate striation is only conspicuous on the elevated parts.

K Kt, K CgN, K Mn—CLt (3 samples).

*Apiculatæ* Grun.

239. *N. marginulata* Grun. V. H. Syn. tab. LVIII, fig. 13.

KKm, K Kt (2 samples).

Area: Kara, Europe, Between Aden and Bab el Mandeb, Malay Archipelago, Borneo, Samoa.

— — var. *didyma* Grun. V. H. l. c. fig. 14. Perag. Diat. de Fr. tab. LXX, fig. 16.

K Kt, K Mn K Mn—CLt (4 samples).

The specimens met with have a length of c. 0.04 mm. and are very finely striated: I therefore suppose, that they belong to Grunow's forma *minuta* (Cl. & Grun. Arct. Diat. p. 73).

Area: var. *didyma*: widely distributed.

forma *minuta*: Tonga Islands, Samoa, Antilles (Grunow l. c.).

*Pseudo-Tryblionella* Grun.

240. *N. acuta* Cl. Cl. West Ind. tab. III, fig. 20.

Found only in a sample without habitat.

Area: Antilles, Tonga Islands, Samoa.

The present form is a little more rounded at the apices than shown in Cleve's figure.

241. *N. alata* Leud. Fortm. Leud. Fortm. La Mal. tab. II, fig. 11.

KKm (2 samples).

Area: Java.

*Bilobatæ* Grun.

242. *N. bilobata* W. Sm. var. *minor* Grun. V. H. Syn. tab. LX, fig. 2.

LN (1 sample).

Area: Brazil, Europe, Society Islands.

243. *N. Jelinecki* Grun. Perag. Diat. de Fr. tab. LIX, fig. 19.

K Kt, s. l. (2 samples).

Area: East India, Malay Archipelago.

In two samples (K Kt & s. l.) I found a *Nitzschia*, exactly agreeing with *N. formica* Hantzsch (H. Ost. Archip. tab. VI A, fig. 8).

In Cl. & Grun. Arc. Diat. p. 74 Grunow points out that the figure

of *N. formica* Htz. shows a narrow smooth longitudinal line and that it perhaps is therefore not identical with *N. Jelen*. Grun., which has a longitudinal plication. The specimens examined by me have a sharp plication along which the striæ pass, but with moderate magnifying power the striation along the plication is not always easy to see, it therefore is possible that this striation has escaped the attention of Hantzsch.

Area for *N. formica*: East Indian Archipelago.

### *Vivaces* Grun.

244. *N. fluminensis* Grun. V. H. Syn. tab. LXII, figs. 3—4.

KKm, KKt, KMn—CLt (4 samples).

Area: Campeachy Bay, Mediterranean, Adriatic, Ceylon, Borneo, Malay Archipelago.

### *Spathulatæ* Grun.

245. *N. distans* Greg. V. H. Syn. tab. LXII, fig. 10.

K Cn s.l. (2 samples).

Area: Europe, Bali Sound, Pacific Ocean.

— — var. *tumescens* Grun. V. H. l. c. fig. 17.

KKm, KKt (3 samples).

Area: Campeachy Bay, Mediterranean.

246. *N. angularis* W. Sm. Perag. Diat. de Fr. tab. LXXIII, fig. 6.

KKm, KKt, KMn—CLt (4 samples).

Area: ubiquitous.

### *Sigmoideæ* Grun.

247. *N. macilenta* W. Sm. V. H. Syn. tab. LXIV, figs. 6—7.

KKm, TK (2 samples).

Area: Europe, Ceylon.

### *Sigmata* Grun.

248. *N. Sigma* W. Sm. var. *rigida* (Ktz.) Grun. V. H. Syn. tab. LXVI, fig. 5.

KKm, KKt (3 samples).

Area: the main species ubiquitous.

var. *rigida*: cum specie passim (de Toni).

In a sample from KKt I found a small form belonging to the form-circle of *N. Sigma* with L. 0,048 mm., b. 0,006 mm., carinal puncta 10 in 0,01 mm. Striæ not visible. I consider it a dwarf-form of *N. Sigma* var. *rigida*, as it is too broad to be referred to var. *rigidula*.

*Obtusæ* Grun.

249. **N. Vidovichi** Grun. V. H. Syn. tab. LXVII, fig. 7.

Found only in two samples without habitat.

Area: Villefranche, Adria, Java.

*Lanceolatæ* Grun.

250. **N. Palea** (Ktz.) W. Sm. var. **minuta** Bleisch. V. H. Syn. tab. LXIX, fig. 23.

LN (1 sample).

Area: the main species: Europe, Abyssinia, Japan, Central Asia.

*Nitzschiella* Rabenh.

251. **N. longissima** (Bréb.) Ralfs. Cnfr. V. H. Syn. tab. LXX, fig. 2 & Clev. Westind. tab. III, fig. 21 (*N. longissima* var.? *curvirostris*).

KKt (4 samples).

In the specimens examined by me  $4\frac{1}{2}$ —5 carinal puncta are present in 0,01 mm., the central one of those being remote from the two nearest, a fact which however looks to be intimated in the figure by V. H. quoted above. The more spaced carinal puncta seem to give this form a position nearer to Cleve's var. *curvirostris*. In my specimens the horns are turned in opposite directions, but like H. Peragallo (Diat. de France p. 293) I hardly think this character has any systematic value.

Area: *N. longissima*: West Indies, Europe, Madagascar, Labuan, Java, Samoa.

var. *curvirostris*: St. Bartholomew, Java.

252. **N. Lorenziana** Grun. V. H. Syn. tab. LXX, fig. 12.

L. 0,25 mm.

KKt, TK (2 samples).

Area: Adriatic.

— — var.? **incurva** Grun. V. H. l. c. fig. 14.

Found only in a sample from KKt.

Area: Adriatic.

— — var. **fossilis** Brun. Brun & Temp. Japan tab. I, fig. 10.

KKt, s. l. (2 samples).

Area: Calcaire de Yedo (Brun l. c. p. 46).

253. **N. diversecostata** Brun. Cl. Diat. II, tab. V, fig. 11.

KKt (2 samples).

Area: „Moris Creek sondage“ (Brun l. c., p. 78).

**Hantzschia** Grun.

254. **H. marina** (Donk.) Grun. var. **leptocephala** Öst. n. var. Tab. nostr. II, fig. 31.

L. 0,04 mm., b. 0,0045 mm. Carinal puncta 5,5 in 0,01 mm. Striæ 11 in 0,01 mm.

Solitary in a sample from LN (only one specimen met with).

Area of the main species: Davis Strait, Europe.

**Homoeocladia** Ag.

255. **H. sigmoidea** W. Sm. Syn. tab. LV, fig. 349.

LN.

Area: Europe, Morocco.

**Surirelloideae.****Surirella** Turp.

256. **S. Comis** A. S. A. S. Atl. tab. IV, fig. 3.

Found only in a sample from KMn—CLt.

Area: Campeachy Bay, Puerto Cabello, Java, Samoa.

257. **S. eximia** Grev. A. S. Atl. tab. IV, fig. 13.

KKt. LN (4 samples).

Area: the coasts of France, Java.

258. **S. fastuosa** Ehr. A. S. Atl. tab. V, figs. 7 & 10.

KKt. K Cn, KMn—CLt, TK (11 samples).

— — var. **cuneata** Witt. Perag. l. c. tab. LVIII, fig. 3.

Found only in a sample without habitat.

— — var. **robusta** A. S. A. S. l. c. tab. CCVI, fig. 3.

Found only in a sample without habitat.

— — var. Perag. Diat. de Fr. tab. LIX, fig. 2 (from Banyuls).

Found only in a sample from KMn—CLt.

Area of the main species: Gulf of Mexico, Campeachy Bay, Europe, Yokohama, Java, Madagascar, Tahiti, Hawaii.

var. **cuneata**: Trégurie (Peragallo).

var. **robusta**: Sumbava (A. S. Atl.).

259. **S. Gemma** Ehr. V. H. Syn. tab. LXXIV, figs. 1—3.

KMn—CLt, TK, s. l. (3 samples).

Area: Rio Grande, Europe, Java.

260. **S. Kittoniana** Leud. Fortm. A. S. Atl. tab. CCV, fig. 17.

Found only in a sample from KKt.

Area: Samoa.

261. **S. recedens** A. S. A. S. Atl. tab. XIX, fig. 3.

KKm, KKt K Cn, KMn, s.l. (7 samples).

Area: Brazil.

262. **S. reniformis** Grun. Perag. Diat. de Fr. tab. LXV, fig. 5.

KKt, s.l. (3 samples)-

Area: Honduras, Languedoc, Banyuls, Madagascar, San Thome, Malay Archipelago, Samoa.

This form, taken by Per'agallo (l. c. p. 255) as a separate species, is identical with Grunow's *Plagiodiscus nervatus*. It is very near to *Sur. Gemma* and like V. Heurck (Traité p. 374) I am most inclined to regard it as an abnormal form of *S. Gemma* only differing in its outer appearance.

In a sample from TK I found a *Surirella*, identical with a „fragliche Form“ from the Gazelle-Expedition cnfr. A. S. Atl. tab. LVI, fig. 6 and Jan Gaz. Exp. tab. XXI, fig. 23.

## Campylodiscus Ehb.

### *Rhaphideæ* Deby.

263. **C. biangulatus** Grev. A. S. Atl. tab. CCVIII, fig. 15 & tab. XVIII, fig. 4 (*C. Lorenzianus* Gr.)

KKt, K Cn (2 samples).

Area: Adriatic, Red Sea, Sumbava, Java, Manilla, Australia.

264. **C. birostratus** Deby? A. S. Atl. tab. XIV, fig. 23.

Solitary in a sample without habitat.

Area: Campeachy Bay.

Of this species I have only seen one specimen, somewhat smaller than the figure by A. S. and with somewhat more distant rays.

265. **C. crebrecostratus** Grev. = **C. Heufleri** Grun. A. S. Atl. tab. XIV, fig. 26.

Solitary in a sample without habitat.

Area: Porto Seguro, Red Sea, Madagascar, Malay Archipelago, Sansiego, Samoa, Sandwich Islands, Philippines, Port Jackson.

266. **C. Grevillei** Leud. Fortm. Leud. Fortm. Ceyl. tab. V, figs. 54—56.

KKm, KKt, KMn—CLt s.l. (12 samples).

Area: Madagascar, Ceylon, Sandwich Islands.

267. **C. Ralfsii** W. Sm. A. S. Atl. tab. XIV, fig. 2.

KKm, KKt (2 samples).

Area: Europe, India.

268. **C. samoensis** Grun. A. S. Atl. tab. XV, figs. 18—20.

KKt, KMn—CLt (8 samples).

Area: Bahia, Madagascar, Puerto Cabello, Samoa, Malay Archipelago, Tahiti.

In a sample from KMn—CLt I found a *Campylodiscus* agreeing with *C. Castracani* Jan. (Gaz. Exp. tab. XIX, fig. 15), which by Deby (Camp. p. 26) is identified with *C. incertus* A. S. = *C. Samoensis* Grun.

269. **C. Browneanus** Grev. var. **Phalangium** (A. S.) Deby. A. S. Atl. tab. LIII, fig. 17.

KKt, KMn—CLt (2 samples).

Area: Campeachy Bay.

270. **C. Daemelianus** Grun. A. S. Atl. tab. LIV, fig. 2.

Found only in a sample from KKm.

Area: Madagascar, Malay Archipelago.

271. **C. humilis** Grev. Grev. Trans. Bot. Soc. VIII, tab. III, fig. 1.

KKm, s.l. (2 samples).

Area: Woodlark Island.

272. **C. latus** Shadb. A. S. Atl. tab. XVIII, fig. 26 (*C. ambiguus* Grev.).

Found only in a sample without habitat.

Area: the coasts of America, Europe, East India.

273. **C. Wallichianus** Grev. var. **Normaniana** Grun. A. S. Atl. tab. XIV, fig. 14 (*C. Normanianus* Grun.).

Area: West Indies, Zanzibar, Java.

### *Striatæ* Deby.

274. **C. Thuretî** Bréb. Perag. Diat. de Fr. tab. LVII, fig. 8.

KKt, TK, s.l. (4 samples).

Area: Europe, Malay Archipelago.

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In a sample from KKt I found a form (Tab. nostr. II, fig. 34) which, if it really is a Diatom — and not only a spore — must probably be referred to *Xanthiopyxis* Ehr. The propositions are: L. c. 0,06 mm, b. c. 0,03 mm., everywhere provided with close radiant spines. Only one specimen met with. It reminds somewhat of *Podosira* (*Xanthiopyxis*?) *spinoradiata* Brun. (Temp. & Brun Japon tab. IV, fig. 10), found in „Calcaire de Yedo et de Jackson's Paddock (très rare)“.

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The present material examined by me has proved to be rather rich both in individuals and in species but on the whole it is rather uniform. Only seldom a single species is predominant in the samples such as *Cocconeis binotata*, *Grammatophora oceanica*, *Mastogloia inæqualis*, *Synedra affinis*, but I have not been able to point out any difference dependent on variation of the depths which range from one to ten fathoms.

The genera which characterize the material in its entirety are *Cocconeis* and *Mastogloia*, which occur in numerous samples and also often in a great number.

The following species are especially predominant: *Actinocyclus subtilis* var., *Biddulphia pulchella*, *Climacosphenia elongata*, *Cocconeis binotata*, *Cocconeis fimbriata*, *Euphyllodium spathulatum*, *Grammatophora oceanica*, *Mastogloia quinquecostata*, *Nav. (Dipl.) Crabro* and variants, *Navicula Lyra*, *Nav. (Trachyneis) aspera* and variants, *Rhabdonema adriaticum*, *Rhaphoneis amphiceros* and variants, *Synedra lævigata* and *Triceratium dubium*. Freshwater forms occur quite singly especially in samples from Lem Ngob (from the mangrove). Plankton forms are rare and occur only as fragments. I have not met with *Achnanthes* <sup>3</sup>*baccata* (compare Flora of Koh Chang, part VII, p. (40—41) 258—259). Nearly all the species met with by me are recorded from the Tropics and more particularly from the Malay Archipelago, which previously has been well examined by eminent diatomologists<sup>1)</sup>.

The marine Diatoms of Siam have a tropical character but do not occupy a peculiar position among the other East-Indian marine Diatoms such as it might also be anticipated.

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<sup>1)</sup> I have first been acquainted with the treatise of C. Mereschowsky: On Polynesian Diatoms, St. Pétersbourg 1902, when my manuscript was already in press; I have therefore only been able to make use of it in noting the geographical distribution of the species stated in my treatise.

Cycadaceae, Taxaceae, Gnetaceae,  
Pandanaeae, Smilaceae, Commelinaceae,  
Amaryllidaceae, Taccaceae, Dioscoreaceae

by C. H. Ostenfeld — Copenhagen.

Cycadaceae.

*Cycas* L.

1. *C. circinalis* L., Sp. pl. 1658; Hook. f., Fl. Brit. India, V, p. 656; *C. sphaerica* Roxb., Fl. India, III, p. 747.

Male cone, female carpophylls with ripe seeds and a young plant were brought home, preserved in alcohol.

Koh Kahdat, sandy seashore, plentiful (No. 548).

Area (after Warburg, Monsunia I): India, Ceylon, Nicobar Islands, Burma, Sumatra, Java, South China.

Taxaceae.

*Podocarpus* L'Hérit.

1. *P. Wallichianus* C. Presl., Botan. Bemerk., p. 110, 1844; R. Pilger, Taxaceae in Engler: Das Pflanzenreich, Heft 18, 1903, p. 59; *P. latifolia* Wallich, Plantae As. rarior., 1830, p. 26, tab. 30 (non *P. latifolia* (Thunb.) R. Br.); Hook. f., Fl. Brit. India, V, p. 649.

A young plant about 50 cm. high has been collected. The leaves are 10—11 cm. long and 2—2,5 cm. broad; R. Pilger l. c. quotes 3—4 cm. broad, but perhaps the leaves are broader in the grown-up plants.

There have also been collected sterile branches of a plant which I consider as a unusually broad-leaved *P. Wallichianus*. The leaves are broadly ovate, 11—13 cm. long and 5—6 cm. broad, long acuminate. The branches resemble closely branches of *Agathis*, but the buds and their scales are acute as in *Podocarpus*, sect. *Nageia*, while *Agathis* has obtuse bud-scales and rounded buds.

Very common in the jungle near Lem Dan and Klong Munsé (No. 399).

Area: East India, Burma.



## Gnetaceae.

## Gnetum L.

1. *G. neglectum* Blume, Rumphia, IV, p. 6, pl. 175, fig. 2; Karsten in Ann. Jard. Buitenzorg, XI, p. 205; non Hook. f., Fl. Brit. India, V, p. 642; (?) *G. macrostochyum* Hook. f., Fl. Brit. India, V, p. 642.

Although the collected specimens are sterile, I think that my determination shall be right.

Koh Kahdat, sandy seashore.

Area (according to Warburg, Monsunia I): Arracan, Tenasserim, Malay Peninsula, Sumatra, Borneo, Java.

## Pandanaaceae.

## Pandanus L.

1. *P. tectorius* Soland., Prim. fl. ins. pacif. ined. 350; Parkinson, Journ. of a Voy. to the South Sea in H. M. S. The Endeavour, 1773; Warburg, Pandanaaceae, in Engler, Das Pflanzenreich, Heft 3, 1900, p. 46; *P. odoratissimus* L. fil., Suppl., 1791, p. 424; Williams, Liste des plantes connues du Siam, Bull. Herb. Boiss., 2. sér., IV, 1904, p. 220; *P. fasciculatus* Lam. Encyclop.; Hook. f., Fl. Brit. India, VI, p. 485.

*a. sinensis* Warb., l. c. p. 48.

Very common throughout the area explored, on seashores (No. 101).

Area: Seychelles and Mascarenes Islands, India, Polynesia, South Asia to China, Australia. — Cultivated in the Tropics.

Note. In the collections from Koh Chang some sterile shoots of *Pandanaaceae* occur, but I have not been able to determine them.

## Smilacaeae.

## Heterosmilax Kunth.

1. *H. indica* A. DC., Monogr. Phanerog., vol. I, Smilacaeae, p. 43; Hook. f., Fl. Brit. India, VI, p. 314.

Dr. Schmidt has brought home a specimen of a plant which undoubtedly must be taken as a *Heterosmilax*; unfortunately the specimen has no flowers nor fruits, but the leaves and the umbel-peduncles with their receptacles and bracteoles agree well with specimens of *H. indica* in the Copenhagen-Museum, collected by the late Dr. Voigt in „India orientalis“ (o: Serampore or Calcutta). The leaves of Dr. Schmidt's plant are 9—17 cm. long, 4—8 cm. broad, ovate-oblong, acuminate-cuspidate from the rounded-obtuse or subcordate base; the sheathing part of the petiole is very short and narrow.

Koh Kahdat, jungle, a liane (No. 553).

Area: Assam and the Khasia Hills.

## Commelinaceae.

### Polia Thumb.

1. *P. thyrsoiflora* (Blume) Hasskarl, *Plantae Junghuhnianae*, p. 150, 1853; Clarke, *Commelinaceae* in A. & C. De Candolle, *Monogr. Phanerog.*, vol. III, p. 124; Hook. f., *Fl. British India*, VI, p. 367; *Tradescantia th.* Blume in Roemer & Schultes, *Syst. Veg.* VII, 2, 1830, p. 1157; *Lamprocarpus th.* Blume, *ibidem*, p. 1726.

The specimen collected was beginning to flower and no fruit is developed, but I think that the short and dense inflorescence and the large and broad bracts and bracteoles are sufficient to distinguish it from the allied *P. aclisia* Hassk.

Klong Sarlakpet in the jungle (No. 847).

Area: Java, Philippine Islands, South Andamans.

## Amaryllidaceae.

### Curculigo Gärtn.

1. *C. latifolia* Dryand. in Ait. *Hort. Kew.*, Ed. 2, II, p. 253; Hook. f., *Fl. Brit. India*, VI, p. 280; *C. sumatrana* Roxb., *Fl. Ind.*, II, p. 146; Wight, *Icones* tab. 2042.

The specimens collected belong to the first mentioned form in Hooker f., *l. c.*

Common in the jungle near Lem Dan (No. 511).

Area: Andaman Islands, Burma, Malay Peninsula, Malay Archipelago.

### Crinum L.

2. *C. asiaticum* L., *Sp. pl.* 419; Baker, *Handb. of Amaryllid.* p. 75; *Botan. Magazine*, tab. 1073; Hook. f., *Fl. Brit. India*, VI, p. 280. *C. toxicanum* Roxb., Wight, *Icones* tab. 2021—2.

Koh Kahdat, sandy seashore (No. 569).

Area: India, Ceylon.

## Taccaceae.

### Tacca Forst.

1. *T. pinnatifida* Forst., *Plant. Esculent.*, No. 28; *Char. Gen.* p. 69, tab. 35; Hook. f., *Fl. Brit. India*, VI, p. 287; Curtis, *Botan. Magazine*, tab. 7299, 7300, 1893; *T. pinnatifolia* Gärtn., *De Fruct.*, I, p. 43, tab. 14.

Only a scape with mature fruits was brought home, but the species is recognisable by the ribbed seeds, the unilocular fruit, the long filiform bracts and the numerous involucreal leaves.

Koh Kahdat, sandy seashore (No. 572 a).

Area: Madagascar and both coasts of tropical Africa (acc. to Bot. Magazine), The Concans, coasts of India, Ceylon, Malay Peninsula, Malay and Pacific Islands, North Australia. Commonly cultivated in the Tropics of the Eastern Hemisphere.

Note. The *T. viridis* Hemsley (Hook. f., Icones Pl., 2515—16, 1897) is nearly allied to the above species, and by the scarce material a distinction between these two species is hardly possible.

2. ***T. lancifolia*** Zoll. & Mor., in Moritzi, System. Verzeichniss der von H. Zollinger in den Jahren 1842—44 auf Java gesammelten Pflanzen, etc., Solothurn 1845—46, p. 91; *T. integrifolia* Schnitzlein, Iconographia, vol. I, 1843—46, pl. 58, figs. 1, 7—15, non Ker-Gawl.; *T. laevis* Wallich herb., non Roxb.

— — var. ***breviscapa*** nov. var.

Rhizoma subterranea erecta, brevis; petiola foliorum laevia, infra in vaginas dilatata, 10 (8—12) cm. longa; folia lanceolata vel elliptici-lanceolata, longe acuminata, 20 (15—30) cm. longa, 5 (3—7) cm. lata, laevia, petiolo subduplo breviora; scapus floriferus petiolis duplo vel triplo brevior, 5—10 cm. longus, laevis; involucri folia 4, ovato-lanceolata, acuminata, subaequalia, exteriora 2—2,5 cm. longa, 0,7—0,8 cm. lata, 9—10-nervata; flores 3—5 in umbrella, petiolis brevibus (c. 1,0 cm. in statu fructifero); cirri longi numerosi; perianthium, stamina et stylus fere ut in *T. lancifolia* (Schnitzlein, l. c.); fructus (submaturus) sicco-baccatus, 2 cm. longus, perianthio persistenti coronatus, 6-alatus; semina numerosissima, oblique ovata, curvata, striata, 0,25—0,30 cm. longa, 0,15 cm. lata.

Dr. Schmidt has brought home 4 dried specimens and some umbels in alcohol of a *Tacca* which is allied to *T. lancifolia* Zoll. & Mor. in Java, but differs by the shorter stalked leaves, the very short scape etc.; the umbels preserved in alcohol and the three dried specimens have not full-developed flowers, only young buds; but there is one specimen with nearly ripe fruit. The form of the leaves and of the involucre leaves are about as in a javanese specimen of *T. lancifolia*, and consequently I think it better to consider the Siamese plant a variety, until we know the entire-leaved species of *Tacca* better. It seems to me, that they form a line from *T. cristata* Jack, *T. integrifolia* Ker. Gawl., *T. laevis* Roxb. to *T. lancifolia* Zoll. & Mor., the length of the scape and the differentiation of the involucre leaves varying very much; therefore other characters are necessary for distinction.

The Indian plant figured by Schnitzlein (l. c.) from a specimen sent by Wallich belongs beyond doubt to *T. lancifolia*; I have also seen a specimen from Wallich's herbarium which is like javanese *T. lancifolia*, only being a little larger.

• Jungle near Klong Son, end of February (No. 641).

Area (of *P. lancifolia*): Java, India (Wallich).

## Dioscoreaceae.

### Dioscorea L.

1. **D. daemonia** Roxb., Fl. India, III, p. 805; Wight, Icones, tab. 811; Hook. f., Fl. Brit. India, VI, p. 289.

Only the male racemes, the roots and old leaves were brought home, but the roots were cultivated in the Botanical Gardens of Copenhagen and have given rise to new shoots and 3-foliolate leaves.

On rocks in the jungle near Klong Munsé (No. 469), opposite Koh Sarlak on the E. coast (No. 721).

Area: India, Burma, Malay Peninsula, Malay Islands, Tonkin.

## Eriocaulaceae

by **V. A. Poulsen** — Copenhagen.

### Eriocaulon L.

#### **E. quinquangulare** L.

Ricefields near Lem Dan, plentiful (No. 250).

Area: India, Ceylon.

## Combretaceae

by **Johs. Schmidt.**

### **Terminalia** L.

#### 1. **T. Katappa** L.

Common throughout the area explored on sandy seashores. Often cultivated around villages (No. 792).

Area: Madagascar, Malay Archipelago, New Guinea, Pacific Islands; commonly cultivated in tropical countries.

#### 2. **T. sp.**

Klong Son; edge of the jungle; a tall tree (No. 657).

### **Calycopteris** Lamk.

#### 3. **C. floribunda** Lamk.

Dry plains near Lem Dan and dry places in the jungle near Klong Munsé. A large scandent shrub. Flowering in January and February. Swarms of insects are often seen around flowering specimens (No. 141, 383, 408, 448).

Area: India, in tropical parts of the Western Peninsula, also found from Assam to Singapore.

### **Quisqualis** L.

#### 4. **Q. indica** L.

Jungle near Klong Son; flowering in March (No. 684).

Area: Indo China, Malay Archipelago, Philippines, Western Tropical Africa, often cultivated in tropical countries.

### **Lumnitzera** Willd.

#### 5. **L. coccinea** W. & Arn.

Very common throughout the area explored with the Mangroves. Flowering in January, February, March; a small tree or a shrub with red flowers (No. 80).

Area: Malay Peninsula, Malay Archipelago, Northern Australia, Pacific Islands.

#### 6. **L. racemosa** Willd.

A shrub with white flowers, far less common than the preceding species. like this on the shores with the Mangroves; Koh Kong and Lem Ngob (No. 356).

Area: Coasts of both Peninsulae, Malay Archipelago, E. Africa, Madagascar, N. Australia.

## Myrsinaceae

by Carl Mez — Halle.

### *Ardisia* Sw.

1. *A. Helferiana* Kurz.

Jungle near Lem Dan. A shrub with black fruit in February (No. 109, 797).

Area: Tenasserim, Manipore.

2. *A. crispa* (Thbg.) A. DC.

Lem Dan, Klong Munsé, Klong Majum, in the jungle. A small tree with flowers (white or reddish) in January—February (No. 95, 594 c, 839).

Area: From the Sikkim-Himalaya to the Chinese Prov. Sze-Chuan, island of Yesso, Philippines, Sumatra, Borneo.

— — var. *angusta* Clarke.

Jungle near Klong Munsé. A small tree with flowers (white or reddish) in February (No. 494 a).

Area: Malacca.

3. *A. colorata* Roxb.

Jungle near Klong Munsé. With black fruit in February (No. 843).

Area: From East-Bengal to Singapore; Java; Nilghiri Hills.

4. *A. rigida* Kurz.

Jungle near Klong Munsé. A shrub or a small tree (No. 60, 403).

Area: Tenasserim, Siam — a very rare species.

### *Maesa* Forsk.

5. *M. ramentacea* Wall.

Lem Dan, Klong Prao, Klong Son, in dry plains. A small tree or a shrub with small white flowers in January—March (No. 205, 708, 829).

Area: From East-Bengal to the Chinese Prov. Yun-Nan, the Andamanes and Nicobares, Sumatra, Java and Borneo.

### *Aegiceras* Gärtn.

6. *Ae. corniculatum* (L.) Blanco.<sup>1)</sup>

Common with the Mangroves all over the explored area.

Area: From the Malabar Coast and Ceylon to the Chinese Prov. Kwang-Tung, the Philippines, the Malay Archipelago and tropical Australia.

<sup>1)</sup> Determined by Johs. Schmidt.

## Convolvulaceae

by **H. Hallier** — Hamburg.

### **Merremia** Dennst.

1. **M. umbellata** Hallier f. var. **orientalis** Hallier f. in Bull. soc. r. bot. Belg. XXXVI (1896), p. 270.

Koh Lom, on rocks near the Sea (No. 718 g).

Area: Ostafrika (Massailand), Ostindien von Nepal bis Khasia und Burma, Ceylon, Tonkin, Hongkong, Kwangtung, Ostküste von Malacca, Manila, malaiischer Archipel von Sumatra bis Neuguinea, Australien (Rockingham Bay).

### **Ipomoea** Linn.

2. **I. (§ Leiocalyx) reptans** Poir.; Hallier f. in Bull. soc. r. bot. Belg. XXXVII, 1 (1898), p. 97.

Naval station opposite Koh Kong in a pool, rice-field near Lem Dan (No. 327, 840).

Area: Sehr gemein in allen tropischen Gegenden der alten Welt, Australiens und Oceaniens; Südafrika; Cuba.

3. **I. (§ Leiocalyx) pes caprae** Sweet var. **emarginata** Hallier f. in Bull. soc. r. bot. Belg. XXXII, 1 (1898), p. 98 and in Jahrb. Hamb. wiss. Anstalten XII, 3. Beih. (1899), p. 48.

Common throughout the area explored in sandy (also in rocky) coasts (No. 45).

Area: Sehr gemein am sandigen Strande fast aller tropischen und subtropischen Gegenden.

4. **I. (§ Leiocalyx) littoralis** Boiss. (von Bl.); Hallier f. in Jahrb. Hamb. wiss. Anst. XII, 3. Beiheft (18) p. 47.

Rayong, sandy seashore.

Area: Sandiger Meeresstrand in Westindien, Florida, Texas, Mexico, Nicaragua, Costarica, Columbien, Ecuador, Französisch Guiana, Brasilien, Azoren, von Senegal bis nach Angola, Mittelmeerküsten, Mauritius, Ostküste der Halbinsel Malacca, Formosa, Kwangtung, Liu-kiu-Archipelag, trop. Australien.

5. **I. (Eriospermum) glaberrima** Boj.

Koh Lom, on rocks near the Sea (No. 718 d).

Area: Mexico, Venezuela, Westindien (St. Domingo, St. Lucia, Portorico, Guadeloupe etc.), Ostafrika und Insel Sansibar, Comoren, Madagascar, Mauritius, Seychellen, Vorder- und Hinterindien, Ceylon, Aldabra-Inseln, Andamanen, Philippinen, Karolineninsel Yap, Marshallinseln (Jaluit), malaiischer Archipel bis zu den Salomonsinseln, Ostküste von Australien, Oceanien bis nach Neucaledonien.



## Verbenaceae

by **C. B. Clarke** — Kew.

### *Lantana* L.

1. **L. Camara** Linn., Sp. Pl. ed. 1, p. 627, ed. 2, p. 874; Schauer in DC. Prodr. v. 11, p. 598; Miq. Fl. Nederl. Ind. v. 2, p. 904 in Obs.; Hook. f. Fl. Brit. Ind. v. 4, p. 562 in nota; Hemsl. in Journ. Linn. Soc. v. 26 (1890), p. 251. *L. aculeata* Linn. Sp. Pl. ed. 1, p. 627, ed. 2, p. 874.

Klong Sarlakpet; a shrub (No. 738).

Area: Native of Tropical America; occurs as a weed in India, China, Malaya.

### *Stachytarpheta* Vahl.

2. **S. indica** Vahl, Enum. v. 1 [1805], p. 206; Schauer in DC. Prodr. v. 11, p. 564 (*Stachytarpha*); Miq. Fl. Nederl. Ind. v. 2, p. 907 (*Stachytarpha*); Hook. f. Fl. Brit. Ind. v. 4, p. 564; Hemsl. in Journ. Linn. Soc. v. 26 [1890], p. 251.

*S. Jamaicensis*, Vahl Enum. v. 1 [1805], p. 206; Hook. Bot. Mag. t. 1860.

*S. Bogoriensis*, Moritzi, Verz. Zoll. Pfl. p. 52.

*Verbena Indica*, Linn. Sp. Pl. ed. 2, p. 27.

Lem Ngob, edge of dry jungle (No. 33).

Area: Scattered in India, China, Malaya, but perhaps indigenous only in the warm parts of America.

### *Callicarpa* Linn.

3. **C. longifolia** Lamk., Encycl. v. 1 [1783], p. 563, Illustr. t. 69; Schauer in DC. Prodr. v. 11, p. 645; Miq. Fl. Ind. Bat. v. 2, p. 887; Hook. f. Fl. Brit. Ind. v. 4, p. 570; Hemsl. in Journ. Linn. Soc. v. 26 [1890], p. 253.

Plains near Klong Prao, Klong Sarlakpet on rocks in the jungle; a shrub with lilac flowers and white fruits (No. 717, 861).

Area: India, China, Malaya, Trop. Australia.

4. **C. cana** Linn., Mant. [1771], p. 198; Blume Bijd. p. 817; Schauer in DC. Prodr. v. 11, p. 643; Miq. Fl. Nederl. Ind. v. 2, p. 885; Hook. f. Fl. Brit. Ind. v. 4, p. 568; Hemsl. in Journ. Linn. Soc. v. 26 [1890], p. 252.

*C. Americana*, Lour. Fl. Cochinch. p. 70, non Linn.

*C. Sumatrana*, Miq. Fl. Ind. Bat. v, 2, p. 886.

Lem Ngoh, edge of dry jungle; a shrub with lilac flowers and black fruits (No. 5).

Area: India; extending thence to the Philippines and North Australia.

### Tectona Linn.

5. **T. grandis**, Linn. f. Suppl. [1781], p. 151; Schauer in DC. Prodr. v. 11, p. 629; Moritzi Verz. Zoll. Pfl. p. 53; Miq. Fl. Nederl. Ind. v. 2, p. 901; Hook. f. Fl. Brit. Ind. v. 4, p. 570; Brandis Forest Fl. p. 354, t. 44.

Occasionally cultivated.

Area: South India. From Northeast India and Burma extended throughout Malaya.

### Premna Linn.

6. **P. integrifolia** Linn. Mant. [1771], p. 252, syn. Burm. excl.; Wight Ic. Pl. Ind. Or. t. 1469; Moritzi Verz. Zoll. Pfl. p. 52; Miq. Fl. Nederl. Ind. v. 2, p. 894; Hook. f. Fl. Brit. Ind. v. 4, p. 574; Hemsl. in Journ. Linn. Soc. v. 26 [1890], p. 255.

*P. serratifolia*, Linn. Mant. [1771], p. 253; Schauer in DC. Prodr. v. 11, p. 632.

Koh Lom, a shrub on rocks near the Sea (No. 716).

Area: India, China, Malaya, Tropical Africa.

7. **P. obtusifolia** R. Brown Prodr. [1810], p. 512; Schauer in DC. Prodr. v. 11, p. 637.

Littoral forest near Lem Dan (No. 180), plains near Lem Dan (No. 621).

Area: Timor, Tenimber, Tropical Australia.

### Vitex Linn.

8. **V. vestita** Schauer in DC. Prodr. v. 11 [1847], p. 692; Miq. Fl. Nederl. Ind. v. 2, p. 864; Hook. f. Fl. Brit. Ind. v. 4, p. 587.

Wallich List n. 1750.

Wallich's List of bare names was not printed; a few lithographed copies were made. The plants were (largely) sorted by hand and eye only, so that the number of mixed species in the type set (omitting the issued duplicates) is large and of mixed genera considerable; on these facts, botanists now hesitate to accept Wallich's List as "published species".

Jungle near Klong Munsé, river-side; yellow flowers and black fruits (No. 294, 434).

Area: Malaya (from Penang to Borneo).

9. **V. pubescens** Vahl Symb. v. 3 [1794], p. 85; Blume Bijd. p. 812; Moritzi Verz. Zoll. Pfl. p. 53; Miq. Fl. Nederl. Ind. v. 2, p. 861; Schauer in DC. Prodr. v. 11, p. 685; Hook. f. Brit. Ind. v. 4, p. 585.

*V. arborea*, Roxb. Fl. Ind. v. 3, p. 73; Wight Ic. Pl. Ind. Or. t. 1465.

*Pistacia Vitex*, Linn. Fl. Zeyl. p. 195.

Lem Dan (No. 428).

Area: Throughout India and Malaya.

10. **V. trifolia** Linn. Sp. Pl. ed. 1, p. 638, ed. 2, p. 890; Schauer in DC. Prodr. v. 11, p. 683; Hook. f. Fl. Brit. Ind. v. 4, p. 583.

Area: Southeast Asia, to Japan and Trop. Australia.

var.  $\beta$  **unifoliata** Schauer in DC. Prodr. v. 11, p. 683; Miq. Fl. Nederl. Ind. v. 2, p. 859; Hemsl. in Journ. Linn. Soc. v. 26 [1890] p. 258.

**V. ovata** Thunb. Fl. Jap. p. 257; Hook. et Arn. Beechey Voy. pp. 206, 268, t. 47.

Rayong, Cape Liant on sandy seashores.

Area: From Mauritius to the Sandwich Isles.

### **Clerodendron** Linn.

11. **C. inerme** Gaertn. Fruct. v. 1 [1788], p. 271, t. 57, fig. 1; Miq. Fl. Nederl. Ind. v. 2, p. 868; Schauer in DC. Prodr. v. 11, p. 660; Hook. f. Fl. Brit. Ind. v. 4, p. 589; Hemsl. in Journ. Linn. Soc. v. 26 [1890], p. 261.

Koh Kahdat, sandy seashore, a shrub with white flowers (No. 321, 552 d).

Area: India, Malaya, Polynesia, near the sea.

12. **C. Siphonanthus**, Aiton Hort. Kew ed. 2, v. 4 [1812], p. 65; Wight Illustr. Ind. Bot. t. 173; Miq. Fl. Nederl. Ind. v. 2, p. 883; Schauer in DC. Prodr. v. 11, p. 670; Hook. f. Fl. Brit. Ind. v. 4, p. 595; Hemsl. in Journ. Linn. Soc. v. 26 [1890] p. 262.

Open grassy places near Lem Dan, a shrub (No. 16, 260).

Area: India, Malaya.

13. **C. villosum** Blume Bijd. [1825], p. 811.

Syn. Rheede excl.; Schauer in DC. Prodr. v. 11, p. 667; Miq. Fl. Nederl. Ind. v. 2, p. 877; Hook. f. Fl. Brit. Ind. v. 4, p. 595.

*C. velutinum*, Moritzi, Verz. Zoll. Pfl. p. 53. — Wallich List n. 1797.

Lem Ngob, Lem Dan in dry jungle, a shrub (No. 12, 217).

Area: Malaya (Malacca to the Philippines).

14. **C. Schmidtii**, C. B. Clarke sp. nova.

Rami teretes pubescentes. Petioli 5 cm. longi, pilis simplicibus brevibus densius vestiti. Folii lamina 18 cm. longa, 5—6 cm. lata,

oblonga, breviter acuminata, basi auriculis rotundatis cordata; margines integri; nervi primarii 10 pares; facies superior vix rugosula, praeter nervum centralem glabrata; facies inferior in nervis breviter villosa. Pedunculus terminalis 5 cm. longus, florens arcte deflexus. Panicula 14 cm. longa, 5 cm. lata, oblonga, composita, 80-flora. Calyx 6 mm. longus, glaber, rubescens, lobis lanceolatis alte lobatus. Corollae tubus 1 cm. longus, linearis; lobi 5 mm. longi [albi]. Fructus 1 cm. in diam., glaber, niger. — Sp. eximia. Cl. nutanti proxima.

Klong Sarlakpet; Klong Munsé, a small tree or a shrub with black fruit (No. 740, 475).

15. **C. hastato-oblongum** C. B. Clarke sp. nova.

Petiolii 8 cm. longi. Folia lamina basi truncata hastata. Panicula subglobosa, 6—7 cm. in diam., 12—16 flora. Calycis lobi ovati acuti. Ceteroquin ut *C. Schmidtii*, hujusque forsan var. umbrosa, foliis tenuioribus, pedunculo gracillimo.

Jungle near Klong Son, a shrub (No. 692 a).

### Congea Roxb.

16. **C. velutina** Wight Ic. Pl. Ind. Or. [1850], t. 1479, 3 vel 1566; Hook. f. Fl. Brit. Ind. v. 4, p. 603.

Common in the jungle near Lem Dan, especially along riverbanks, a liane (No. 433).

Area: Malay Peninsula.

### Sphenodesma Jacq.

17. **S. microstylis** C. B. Clarke in Hook. f. Fl. Brit. Ind. v. 4 [1885], p. 600.

*Brachynema ferruginea*, Griff. Notul. v. 4, p. 176.

Plains near Lem Dan, a shrub (No. 474, 862).

Area: Malay Peninsula, Siam.

18. **S. Jackiana** Schauer in DC. Prodr. v. 11 [1847], p. 622; Miq. Fl. Nederl. Ind. v. 2, g. 909; Wight Ic. Pl. Ind. Or. t. 1477;

*S. pentandra*, Jack in Malay. ms. v. 1, p. 19, in Hook. Brit. Misc. v. 1, p. 285; C. B. Clarke in Hook. f. Fl. Brit. Ind. v. 4, p. 602 pro parte.

*Congea Jackiana* Wallich in Hook. Bot. Misc. v. 1, p. 285 in Obs. — Wallichs List n. 1735.

Folia (imo inter inflorescentiam) usque ad 17 cm. longa, 9 cm. lata, breviter acutata chartacea, micantia, fere glabrata. Calyx glaber tubuloso-campanulatus, dentibus 10, nempe 5 lanceolatis subreflexis, 5 lato-triangularibus acutis erectis (ut recte cl. Schauer).

Koh Chick, in the jungle (No. 862).

Area: Malaya — Cultivated in Saharunpore, Hongkong &c.

*Sph. Wallichiana* Schauer in DC. Prodr. v. 11, p. 622, i. e. *S. pentandra*, Wight Ic. Pl. Ind. Or. t. 1475, i. e. *Roscoea pentandra*, Roxb. Fl. Ind. v. 3, p. 54, a Sylhet plant, differs much in the size, shape and texture of the leaves, in the calyx-teeth 5 only, subtruncate; and appears specifically distinct enough from *Sphenodesma Jackiana*. But there are intermediate sub-species or varieties, of which *Sph. acuminata* Wight Ic. Pl. Ind. Or. t. 1476 is one; and in the Flora of British India, the whole series was united in one broad species as had been previously done in the Kew Herbarium. At all events, the Koh Chang example is typical *Sphenodesma Jackiana* Schauer.

### Avicennia Linn.

19. *A. officinalis* Linn. Sp. Pl. ed. 1, p. 110; Schauer in DC. Prodr. v. 11, p. 700; Hook. f. Fl. Brit. Ind. v. 4, p. 604; Hemsl. in Journ. Linn. Soc. v. 26 [1890], p. 265.

*A. tomentosa*, R. Brown Prodr. p. 518; Wall. Pl. As. Rar. v. 3, p. 44, t. 271.

*Bontia germinans*, Linn. Sp. Pl. ed. 2, p. 891.

Very common with the Mangroves throughout the area explored (No. 38).

Area: E. Africa, Tropical and subtropical seashores of Asia, Australia, Polynesia. New Zealand.

## Labiatae.

by **C. B. Clarke** — Kew.

### *Dysophylla* Lour.

1. **D. Auricularia** Blume Bijdr. [1825], p. 826; Wight Ic. Pl. Ind. Or. t. 1445; Benth. in DC. Prodr. v. 12, p. 156; Moritzi Verz. Pfl. Zoll. p. 55; Hook. f. Fl. Brit. Ind. v. 4, p. 638; Hemsl. in Journ. Linn. Soc. v. 26 [1890], p. 276.

*Pogostemon auricularia*, Hassk. Cat. h. Bogor. p. 131; Miq. Fl. Nederl. Ind. v. 2, p. 964.

*Mentha Auricularia* Linn. Mant. [1767], p. 81.

Klong Sarlakpet, Lem Dan in muddy ricefields (No. 261, 626, 864).

Area: Common throughout India; extending to China, Malaya and the Philippines.

### *Anisochilus* Wall.

2. **A. sp. (A. dysophylloidi** Benth. proxima).

Klong Prao, on rocks in the jungle (No. 706 c).

Area:

### *Ocimum* Linn.

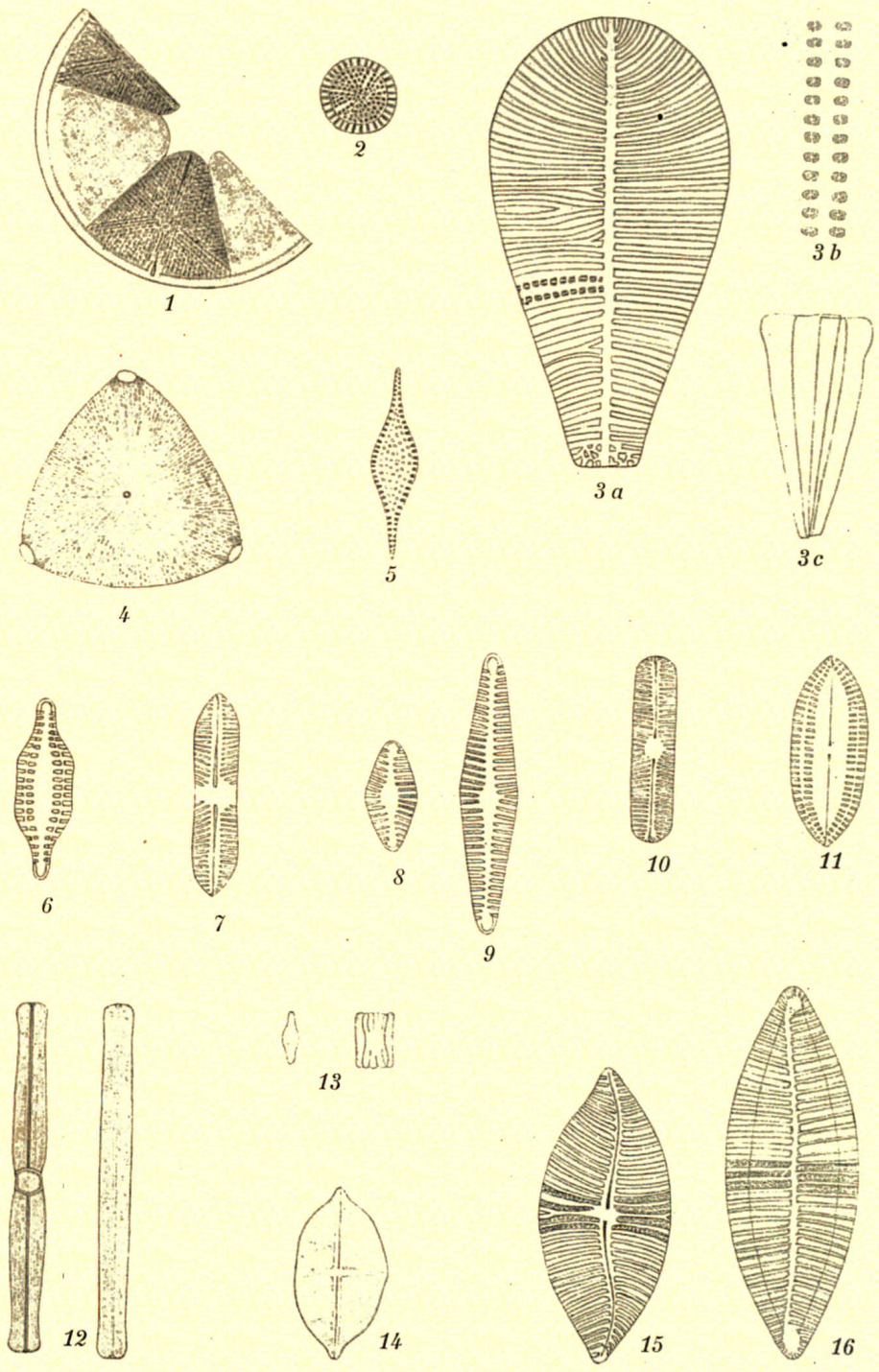
3. **O. Basilicum** Linn. Mant. [1767], p. 85; Benth. in DC. Prodr. v. 12, p. 38; Moritzi Verz. Zoll. Pfl. p. 55; Miq. Fl. Nederl. Ind. v. 2, p. 939; Hook. f. Fl. Brit. Ind. v. 4, p. 609; Boiss. Fl. Orient v. 4, p. 539; Hemsl. in Journ. Linn. Soc. v. 26 [1890] p. 266.

Lem Dan near the village, where it is occasionally cultivated (No. 281).

Area: From Cabul to China, Polynesia, Australia.

This is a sacred plant, cultivated at temples and monasteries. It varies a good deal in habit; the Koh Chang plant is the glabrate form of *Bentham*.







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All figures have been enlarged 660 times.



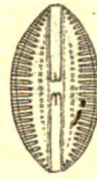
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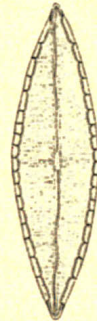
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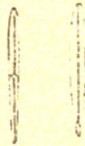
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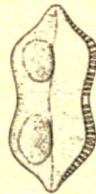
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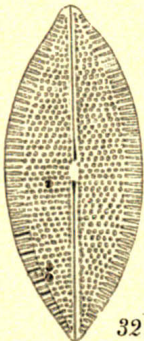
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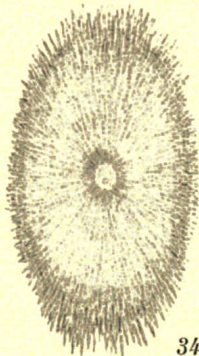
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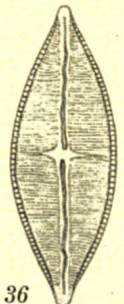
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