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DIATOMS

FROM

THE WEST INDIAN ARCHIPELAGO

BY

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WITH 5 PLATES.

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P. A. NORSTEDT & SÖNER
KONGL. BOTRYCKERIET





During my travels in the West Indian Archipelago, 1868—69, I made some collections of diatoms among the Virgin Islands (Tortola) and also on the shores of St. Bartholomew. An examination of these gatherings yielded a considerable number of forms, of which I give here an enumeration, that may serve as a contribution to the history of the geographical distribution of these small organisms. In working out the following pages I am greatly indebted to Mr. A. GRUNOW of Vienna, who kindly assisted me in several cases of uncertainty about the correctness of the determinations and also allowed me to publish his descriptions and delineations of several new and interesting species, found near Campeche Bay and probably to be found also in the West Indies.

1. *Navicula Pandura* BRÉB. (A. Schm. Atl. Pl. 11 fig. 1. Nordsee Diat. Pl. 2 fig. 3) Virgin Ids, not rare. St. Bartholomew.
2. *N. multicostata* GRUN. (A. SCHM. Atl. Pl. 11 fig. 14—20) Virgin Ids. common. Mr. GRUNOW informs me that he finds it probable that these two forms are mere varieties of *N. Crabro* E.
3. *N. exempta* A. SCHM. (Atl. Pl. 11 fig. 28—29) Virgin Ids. rare.
4. *N. splendida* GREG. (A. Schm. Atl. Pl. 13 fig. 34) Virgin Ids. rare.
5. *N. diplosticta* GRUN. (A. Schm. Atl. Pl. 13 fig. 25—30) Virgin Ids. rare.
6. *N. muscæformis* GRUN. (A. Schm. Atl. Pl. 13 fig. 42, 47) Virgin Ids. rare.
7. *N. gemmatula* GRUN. (A. Schm. Atl. Pl. 13 fig. 19) Virgin Ids. rare.
8. *N. lacrimans* A. SCHM. (Alt. Pl. 12 fig. 61) Virgin Ids. rare.

9. *N. gemmata* GREV. (Ed. N. Ph. Journ. [N. S.] X. 1859 pag. 30. Pl. 4 fig. 7. *N. spectabilis* GRUN. *N. Grunowii* RABH.) Virgin Ids. rare.
10. *N. Apis* (DONK?) A. SCHM. (Atl. Pl. 12 fig. 22, 23, 24) Virgin Ids. common.
11. *N. Entomon* (EKB.?) A. SCHM. (Nordsee Diat. Pl. 1 fig. 14) Virgin Ids, very common.
12. *N. didyma* KÜTZ. (A. SCHM. Nordsee Diat. Pl. 1 fig. 7) St. Bartholomew.
13. *N. Weissflogii* A. SCHM. (Atl. Pl. 12 fig. 27—32) Virgin Ids, St. Bartholomew, not rare.
14. *N. interrupta* KÜTZ. (A. SCHM. Atl. Pl. 12 fig. 10—11). Virgin Ids. common.
15. *N. suborbicularis* GREG. (A. SCHM. Atl. Pl. 8 fig. 1—6) Virgin Ids. frequent.
16. *N. littoralis* DONK. (A. SCHM. Atl. Pl. 8 fig. 23—25) Virgin Ids.
17. *N. advena* A. SCHM. (Atl. Pl. 8 fig. 29) Virgin Ids.
18. *N. nitescens* GREG? (A. SCHM. Atl. Pl. 8 fig. 15) Virgin Ids.
19. *N. notabilis* GREV. (Trans. Micr. Soc. XI pag. 18 fig. 9) Virgin Ids. common.
20. *N. Lyra* EHB. (incl. *N. Gregoryana* GREV. — A. SCHM. Atl. Pl. 2 fig. 5, 24, 25, 26) Virgin Ids. very common.
Var. *approximata* GREV. (*N. appr.*: Ed. N. Phil. Journ. X [N. S.] 1859 pag. 28 Pl. 4 fig. 4) St. Bartholomew. — Fig. 1. $\frac{800}{1}$ — This form seems to connect *N. Lyra* with *N. Couperi* Bail. (Smiths. Contrib. II 1852 pag. 39), which differs by a slight constriction in the middle. It seems to be very near also to *N. Kittoniana* A. SCHM. Atl. Pl. 2 fig. 10.
25. *N. irrorata* GREV. (Ed. N. Phil. Journ. X [N. S.] 1859 pag. 27 Pl. 4 fig. 1. — A. SCHM. Atl. Pl. 2 fig. 22) Virgin Ids. not rare.
26. *N. indica* GREV. (Micr. Journ. II pag. 95 Pl. 9 fig. 13) Virgin Ids. rare. I have also found on the Virgin Ids. the variety, delineated in A. SCHM. Atl. Pl. 2 fig. 17 and called there *N. caribæa* (A. SCHM. nec Cl.)
27. *N. prætexta* EKB. (GREGORY Diat. of Clyde pag. 481 Pl. 9 fig. 11. A. SCHM. Atl. Pl. 3 fig. 31—34) Virgin Ids. rare.
28. *N. Henedyi* SM. Virgin Ids. common.

29. *N. abrupta* GREG. (A. SCHM. Atl. Pl. 3 fig. 2) Virgin Ids.
30. *N. californica* GREV. var.? (*N. polysticta* SCHM. Atl. Pl. 3 fig. 16, 27) St. Bartholomew. — The *N. polysticta* GREV. is a quite different form or *N. Baileyana* GRUN.
31. *N. carinifera* GRUN. v. minor (A. SCHM. Atl. Pl. 2 fig. 2) St. Bartholomew. Only one specimen.
32. *N. triundulata* GRUN. (Micr. Journ. 1877 Pl. 195 fig. 10) St. Bartholomew. Only one specimen.
33. *N. virginea* CL. N. Sp.? Virgin Ids. not rare. This form varies somewhat as to the outline, being often a little constricted in the middle. Apices produced. Median pores approximate. The striation is very fine, in balsamslides visible only in oblique light. The striæ are parallel and not interrupted. This form seems to be closely allied to *N. Janischiana* RABH. (Hond. pag. 10 Pl. 2 fig. 15) if not its variety. There are some points of discrepancy; the West Indian form being not so constricted in the middle and having more approximate median pores. — Fig. 2. $\frac{800}{1}$.
34. *N. caribæa* CL. (A. SCHM. Atl. Pl. 6 fig. 10, 11, 12, not Pl. 2 fig. 17) Virgin Ids. not rare. Striæ 7—8 in 0,01 m.m. Length 0,062—0,068 m.m. Br. 0,034—0,026 m.m.
35. *N. brasiliensis* GRUN. (A. SCHM. Atl. Pl. 6 fig. 23—25) Virgin Ids. common. St. Bartholomew, rare.
36. *N. (rectangulata* GREG. var?) *Regula* GRUN. & CL. N. Sp. S. V. rectangular, with parallel margins. Striæ coarse, radiate, reaching to the median line, abbreviate in the middle, about 7 in 0,01 m.m. Median pores somewhat distant, median lines almost straight. The endpores have a somewhat curious appearance. L: 0,0884 m.m. Br: 0,0136 m.m. Fig. 3. $\frac{800}{1}$.
Virgin Ids. rare. Mr. GRUNOW has found the same form in a gathering from Campeche Bay.
37. *N. cruciformis* DONK. (B. D. Pl. 10 fig. 4. A. SCHM. Nordsecdiat. Pl. 2 fig. 25) Virgin Ids, only one specimen. L. 0,085 m.m. B. 0,0153 m.m. Striæ 9—10 in 0,01 m.m.
38. *N. Powellii* LEWIS (*N. Widowichii* Grun. Verh. 1863 B. XIII Pl. 4 fig. 4) Virgin Ids. not rare. — L. 0,038 m.m. B. 0,017 m.m. Striæ 8—9 in 0,01 m.m.

39. *N. St. Thomæ* CL. N. Sp. Two times and a half longer than broad, ends produced. Outline undulate. Striæ very coarse, radiate, 5—6 or 0,01 m.m., marginal, leaving a broad area around the median line. L. 0,061 m.m. Br. 0,0255 m.m. Fig. 4. $\frac{800}{1}$. — Of this form, according to Mr. GRUNOW allied to his *N. Botteriana*, only one specimen from Virgin Ids has been seen.
40. *N. (distant var.) pennata* (*N. pennata* A. SCHM. Atl. Pl. 48 fig. 41—43). St. Bartholomew.
41. *N. longa* GREG. (??) A. SCHM. (Atl. Pl. 47 fig. 6) Virgin Ids. rare.
42. *N. directa* W. SM. (A. SCHM. Atl. Pl. 47 fig. 5) St. Bartholomew.
43. *N. sp.* A. SCHM. (Atl. Pl. 48 fig. 30) Virgin Ids. rare.
44. *N. (?) Bartholomei*. CL. N. Sp. This beautiful form may perhaps be *N. Perryana* KITTON (Trans. Micr. Soc. 1873), of which no figure has been published and with which the identification consequently is impossible. It belongs to the same section as *N. Jamaicensis*, *N. strangulata* etc., which are to be broken out as a separate genus from Navicula. Mr. A. SCHMIDT calls this group Pseudodiplo-neis (Nordseediat. pag. 87). Most of these forms are more allied to Mastogloia than to Navicula. The *N. Bartholomei* is strongly constricted in the middle; its ends are cuneate as on allied forms. Sculpture: large and strong parallel costæ, reaching neither the margin nor the median line, abbreviate around the central nodule. The margin has a row of small granules. L. 0,075 m.m. Fig. 5. $\frac{800}{1}$.
- Another to the same section belonging species is *N. formicina* GRUN. in litt., of which he gives the following description: »Valve composed of two rhombic halves, connected by a very narrow isthmus, which is slightly enlarged in the middle. Striæ parallel, not reaching the median line and wanting in the middle of the valve, very delicately punctate. 6 in 0,01 m.m. L. 0,057 m.m. B. of the lobes; 0,012 m.m., of the isthmus: 0,004—0,005 m.m. — Hab. Campeche Bay (communic. by Dr. GRÜNDLER). — Fig. 6. $\frac{800}{1}$.
45. *N. aspera* E. (*Stauroneis pulchella* W. SM.) Virgin Ids. common.
46. *N. Goesii* CL. N. Sp. Elliptic, with produced and subcapitate ends. Striæ distinct, 14 on 0,01 m. m., parallel,

only near the ends a little radiate, reaching the median line, composed of elongated granules, which form longitudinal, somewhat wavy lines, crossing the striæ at right angles. L. 0,07 m.m. B. 0,024 m.m. — St. Bartholomew. — Fig. 7. $\frac{800}{1}$. — This form is named in honour of Dr. A. GOËS, who has largely contributed to the natural history of the West Indies.

47. *N. lobata* SCHWARTZ (Rab. Alg. Eur. No. 2481). This exceedingly small form was found on algæ, collected on the shores of St. Thomas. L. 0,025 m.m. Fig. 8. $\frac{800}{1}$. It has before been found near Vera Cruz.
48. *N?* *Strangulata* GREV. (T. M. S. [N. S.] XIV pag. 126 Pl. 12 fig. 24) Virgin Ids. St. Bartholomew, not rare.
49. *Mastogloia Ielineckiana* GRUN. (Verh. 1863. Pl. 5 fig. 12) Virgin Ids., St. Bartholomew, several specimens. L. 0,085 m.m. B. 0,034 m.m. Striæ 12 on 0,01 m.m.

Brebissonia (?) *Weissflogii* GRUN. IN LITT. Mr. GRUNOW has found in the celebrated Campeche Bay gathering a very interesting form, which probably may be found in the West Indies. With the kind permission of the author I can here publish its description as well as a delineation. Mr. GRUNOW describes the species as follows: »Valve broad, rhombic lanceolate, with obtuse ends. Central nodule linear oblong, slightly constricted in the middle; terminal nodules somewhat distant from the ends of the valve. Striæ radiating, punctate, 12,5—15 in 0,01 m.m., reaching the narrow median line. L. 0,085 m.m. B. 0,03 m.m. Hab. Campeche Bay (communicated by Mr. WEISSFLOG). Fig. 9 $\frac{800}{1}$.

50. *Alloioncis* (?) *Grundleri* CL. & GRUN. N. Sp. Broadly linear oblong, with cuneate apices; median line very eccentric, somewhat arcuate; central nodule transversely dilated. Striæ transverse, composed of distinct puncta and reaching the median line, 11 in 0,01 m. m., leaving only a small area around the central nodule. — L. 0,075 m.m.—0,098 m.m.; B. 0,028 m.m. Fig. 10. $\frac{800}{1}$. Virgin Ids., very rare. Campeche Bay (GRUNOW). The single West Indian specimen, which I have in my collection, agrees perfectly with a delineation of the form from Campeche Bay, kindly sent to me by Mr. GRUNOW.

The name *Alloioncis* was proposed by SCHUMANN (Die Diat. d. H. Tatra 1867 pag. 73) and characterized as follows:

»*Navicula*, ab altera lineæ longitudinalis parte pinnulis longis, ab altera parte pinnulis brevibus prædita, sectione transversa rhomboidea.»

51. *Alloioneis* (*Navicula*?) *Antillarum* CL. & GR. N. Sp. Elliptic oblong of about the same outline as *Nav. aspera*. Median line a little eccentric and curved. Striæ composed of large distinct puncta, arranged in somewhat irregularly decussating oblique lines. The striæ reach in the one half of the valve very closely to the median line, leaving only a small area around the nodule, but they disappear on the other half at some distance from the median line, being consequently on this side surrounded by a long not striate area. L. 0,12 m.m. Fig. 11. $\frac{800}{1}$. — St. Bartholomew (rare). Golf of Mexico (A. GRUNOW).

Mr. GRUNOW has kindly allowed me to publish his descriptions and delineations of two interesting species from the East Indies, allied to the two last species.

»*Navicula* (*Alloioneis*?) *Kurzii* GRUN. N. Sp. Valve broad, lanceolate. Median line eccentric, curved, surrounded by an eccentric blank space, which is irregularly enlarged in the middle and becomes narrower toward the ends. The rest of the valve is covered with granules, like those on *Navicula aspera*, forming decussating oblique lines and more narrow transverse ones, 10—11 in 0,01 m.m.. The transverse lines reach as far as to the median line, if seen under a mighty power, but in the smooth part of the valve they are not set with granules, and therefore scarcely visible. — L. 0,09—0,105 m.m. B. 0,036 m.m. Hab. Mangroove Svamps, Elephant Point, East Indies. Coll. by KURZ. — Fig. 12 *a*. Valve $\frac{200}{1}$. *b*. Entire frustule $\frac{450}{1}$. The fig. shows partly the upper, and partly the under surface. *c*. Granules, seen with centric illumination $\frac{3040}{1}$. *d*. Granules, seen with oblique illumination $\frac{3040}{1}$. The longitudinal lines are also visible on *Navicula aspera*, but not distinctly.»

»*Navicula* (*Alloioneis*?) *curvinervia* GRUN. N. Sp. Valve oblong or lanceolate, with obtuse ends. Median line eccentric. Striæ slightly radiating, not reaching the median line, interrupted by two sharp, longitudinal bends of the valve, smooth (under a very high power and favourable illumination delicately punctate), 8—9 in 0,01 m.m. — L. 0,068—0,115 m.m. Br. 0,022—0,028 m.m. Fig. 13. $\frac{200}{1}$.

Hab. Mangroove Swamps, Elephant Point, East Indies.

Coll. by KURZ.

»I have seen two entire frustules. In one of them the two median lines are parallel, and this will indicate an affinity to the *Cymbellæ*, but in the other frustule the two median lines are curved in opposite directions. This is a very puzzling fact, the valves of both frustules having no essential difference.»

52. *Pleurosigma formosum* W. SM. Virgin Ids. very common.

53. *Pl. delicatulum* W. SM. St. Bartholomew.

54. *Pl. intermedium* W. SM. St. Bartholomew.

55. *Pl. strigosum* W. SM. St. Bartholomew.

56. *Pl. æstuarii* (BRÉB) W. SM. St. Bartholomew.

57. *Pl. balticum* (EHB.) W. SM. Virgin Ids., St. Bartholomew.

58. *Donkinia carinata* (DONK.) RALFS. Virgin Ids. rare.

59. *Rhoicosigma Reichardtii* GRUN. (Mier. Journ. 1877 pag. 181 Pl. 195 Fig. 19) Virgin Ids. rare.

60. *Rh. compactum* (GREV.) GRUN. Virgin Ids., St. Bartholomew; rare.

61. *Rh. Antillarum* CL. N. Sp. Median line sigmoid, very elevated on the one half of the valve, where it forms a crest, impressed on the other half. Striæ distinct, transverse, 14—15 in 0,01 m.m. L. 0,425 m.m. Fig. 14 $\frac{200}{1}$. — Virgin Ids. rare.

62. *Amphora obtusa* GREG. (A. SCHM. Atl. Pl. 40 fig. 4—7. — *Anhiprora maxima* RAB. & JAN. Hond. pag. 3 Pl. 2 fig. 4. — *Toxonidea insignis* O. WITT. Mus. Godeff. H. 1 pag. 70 Pl. 8 fig. 9) Virgin Ids., St. Bartholomew; not rare.

63. *A. Clevei* GRUN. (A. SCHM. Atl. Pl. 25 fig. 46—48) Virgin Ids. only a single specimen. L. 0,055 m.m. Br. 0,034 m.m. Striæ 10 in 0,01 m.m.

64. *A. turgida* GREG. (A. SCHM. Atl. Pl. 25 fig. 31) Virgin Ids.

65. *A. exornata* JANISCH (A. SCHM. Atl. Pl. 39 fig. 26) Virgin Ids. rare.

66. *A. Porcellus* KITTON (A. SCHM. Atl. Pl. 39 fig. 15—17) Virgin Ids. not rare.

67. *A. Cingulata* CL. (A. SCHM. Atl. Pl. 26 fig. 17). The fig. in SCHM. Atl. does not perfectly agree with the West Indian specimens. Striæ are about 15 in 0,01 m. m.

- L. 0,085—0,102 m.m. — Fig. 15. $\frac{800}{1}$ — Virgin Ids. not rare, St. Bartholomew.
68. *A. bigibba* GRUN. (A, SCHM. Atl. Pl. 25 fig. 69—75) Virgin Ids. St. Bartholomew.
69. *Cocconeis (Orhoneis) punctatissima* GREV. (Micr. Journ. V pag. 8 Pl. 3 fig. 1) Virgin Ids. not rare.
70. *C. (Orhoneis) ovata* GRUN. Virgin Ids. rare.
71. *C. (Orhoneis) cribrosa* GRUN. St. Thomas.
72. *C. (Campyloneis) Grevillei* W. SM. Virgin Ids. rare.
73. *C. Scutellum* EHB. Virgin Ids. common.
74. *Achnanthes longipes* AG. forma minor. St. Bartholomew.
75. *Glyphodesmis eximia* GREV. (Micr. Journ. II pag. 235 Pl. 10 fig. 7—10) Virgin Ids. not rare.
76. *Plagiogramma obesum* GREV. (Micr. Journ. VII pag. 211 Pl. 10 fig. 10—13) Virgin Ids., not rare.
77. *Pl. decussatum* GREV. (T. M. S. XIV pag. 1 Pl. 1 fig. 122) Virgin Ids. rare.
- Pl. (decussatum* var.?) *Antillarum* CL. N. var. Broadest in the middle, gradually tapering towards the rounded ends. Interior septa 4, 2 near the ends, 2 in the middle. Sculpture: puncta arranged in transverse and longitudinal rows, crossing each other at right angles; transverse rows: 8 in 0,01 m.m. L. 0,07—0,08. — Fig. 16. $\frac{800}{1}$. Virgin Ids. rare.
78. *Pl. caribæum* CL. N. Sp. Outline resembling that of *P. lyratum* GREV. Interior septa 4, 2 near the ends, 2 in the middle. The two central septa are connected with the end-septa by a strong median rib and by two other following the margins of the valve. Sculpture: distinct puncta or granules arranged in parallel transverse rows, 8—9 in 0,01 m.m. L. 0,012 to 0,088 m.m. — Fig. 17 $\frac{800}{1}$ — Virgin Ids. many specimens.
79. *Pl. attenuatum* CL. N. Sp. Small, gradually tapering from the middle to the apices. Septa 2 central and 2 near the ends. The two central septa form in the middle a rounded, quadrangular annulus. Sculpture: small puncta arranged in parallel, not interrupted transverse lines, 10 on 0,01 m.m. L. 0,05 m.m. — Fig. 18. $\frac{800}{1}$. — St. Bartholomew, only a single valve.
80. *Pl. inæquale* GREV. (Micr. Journ. Vol. VII pag. 210 fig. 10) Virgin Ids.

81. *Synedra superba* KÜTZ. Virgin Ids. St. Bartholomew, not rare.
82. *S. fulgens* W. SM. St. Bartholomew.
83. *S. Frauenfeldii* GRUN. (Verh. 1862 Pl. 4 fig. 26. Micr. Journ. 1877 pag. 167 Pl. 193 fig. 11) Virgin Ids., frequent.
84. *S. undulata* (BAIL) GREG. Virgin Ids. very rare.
85. *S. Henedyi* GREG. Virgin Ids. rare.
86. *S. nitzschoides* GRUN. (Verh. 1862 Pl. 8 fig. 18) St. Bartholomew, rare.
87. *Doryophora ampiceros* KÜTZ. St. Bartholomew.
88. *Fragilaria pacifica* GRUN. (Verh. 1863 Pl. 5 fig. 6) Virgin Ids. rare.
89. *Dimerogramma Surirella* (EHB.) GRUN. (*Zygoceros Surirella* EHB.? *Zyg. Sur.* Roper Micr. Journ. II pag. 76 Pl. 6 fig. 14. *Raphoneis Rhombus* GRUN. Verh. 1862 Pl. 4 fig. 36) St. Bartholomew.
90. *D. ventricosum* (RAB.) GRUN. (*Denticella ventricosa* RAB & JAN. Hond. Pag. 8 Pl. 2 fig. 11) Virgin Ids. rare. The West Indian form has, as the form observed by GRUNOW, an area, which is broadest in the middle of the frustule.
91. *Surirella fastuosa* EHB. This most variable species is of frequent occurrence in the West Indies.
 v. *lepida* A. SCHM. (*S. lepida* Atl. Pl. 4 fig. 4—5) Virgin Ids.
 v. *cuneata* O. W. (*S. cuneata* A. SCHM. Atl. Pl. 4 fig. 1) Virgin Ids. rare.
 v. *recedens* (*S. recedens* A. SCHM. Atl. Pl. 14 fig. 2, 3, 4) St. Bartholomew, frequent. Scarcely distinct species.
92. *S. patens* A. SCHM. (Atl. Pl. 4 fig. 16—17 Pl. 56 fig. 10—11) Virgin Ids. rare.
93. *S. eximia* GREV. (A. SCHM. Atl. Pl. 14 fig. 13 — probably also *S. mexicana* SCHM. Atl. Pl. 4 fig. 10—12) Virgin Ids. — several specimens.
94. *S. Gemma* EHB. var. St. Bartholomew; only one specimen.
95. *Campylodiscus limbatus* BRÉB. (Diat. of Clyde pag. 504 Pl. 11 fig. 55) Virgin Ids. rare.
96. *C. Thuretii* BRÉB. St. Bartholomew, a very small form.
97. *C. ambiguus* GREV. (A. SCHM. Atl. Pl. 18 fig. 24—26 *C. latus* Shadb.) Virgin Ids. St. Bartholomew, rare.

98. *C. ecclesianus* GREV. (*C. Fenestratus* GREV., *C. Rabenhorstianus* JANISCH) Virgin Ids. St. Bartholomew, frequent. This is a very variable species. One specimen from St. Bartholomew approaches very nearly to *C. bimarginatus* GREV. (A. SCHM. Atl. Pl. 16 fig. 7).
99. *C. intermedius* GRUN. (A. SCHM. Atl. Pl. 18 fig. 9) Virgin Ids. rare.
100. *C. incertus* A. SCHM. (Atl. Pl. 15 fig. 13, 14, 15) Virgin Ids., St. Bartholomew.
101. *C. Hodgsonii* W. SM. (A. SCHM. Atl. Pl. 53 fig. 5) Virgin Ids. rare.
102. *Podocystis adriatica* KÜTZ. (*Pod. americana* BAIL.) Virgin Ids.
103. *Plagiodiscus Martensianus* GRUN. (Mier. Journ. 1877 Pl. 194 fig. 8) Virgin Ids. very rare — only one specimen.
104. *Nitzschia Sigma* (KÜTZ.) W. SM. Virgin Ids., St. Bartholomew.
105. *N. (Sigma var.?) valida* CL. & GRUN. Slender, almost straight, but also sometimes more or less sigmoid, with cuneate ends. Puncta about 4 in 0,01 m. m. Stria sharp, finely punctate, 18 in 0,01 m. m. Virgin Ids. very rare. GRUNOW has found the same form in a gathering from Campeche Bay. L. 0,27—0,3 m.m. — Fig. 19. $\frac{440}{1}$.
106. *N. angularis* W. SM. Virgin Ids. St. Bartholomew.
107. *N. socialis* GREG. (*N. fluminensis* GRUN?) St. Bartholomew.
108. *N. plana* W. SM. St. Thomas.
109. *N. panduriformis* GREG. (Diat. of Clyde pag. 529 Pl. 14 fig. 102) St. Bartholomew, not rare.
110. *N. lata* O. WITT (Journal d. Mus. Godeffr. H. 1 pag. 66 Pl. 8 fig. 6. LAGERSTEDT Bih. t. K. Sv. Vet. Akad. Handl. III N:o 15 fig. 2 a) — Virgin Ids., St. Bartholomew. The West Indian form agrees exactly with Mr. LAGERSTEDT's beautiful delineation.
111. *N. Jelineckii* GRUN. (Verh. 1863 Pl. 5 fig. 4 — *N. Formica* Hantzsch. Ost. Arch. Diat. pag. 21 fig. 8. — *N. decora* KITTON Mier. Journ. 1873 pag. 206 Pl. 38 fig. 6) Virgin Ids. not rare.

112. *N. (Jelineckii* var.?) *acuta* CL. N. Sp. This form resembles very much the *N. Jelineckii*, but its ends are cuneate and pointed, not rounded. The ends are connected by a very sharp and visible keel. The striae are very visible, 11 in 0,01 m.m. (The *N. Jelineckii* has 14 in 0,01 m.m.) Fig. 20. $\frac{800}{1}$. — Virgin Ids. not rare.
113. *N. longissima* (Kütz), *N. birostrata* W. SM. (B. D. Pl. 14 fig. 119) — St. Bartholomew, very rare.
114. *N. (longissima* var.?) *ventricosa* KITTON (Micr. Journ. 1873 Pl. 38 fig. 5) St. Bartholomew, rare.
115. *N. (longissima* var.?) *curvirostris* CL. N. Sp. Valve lanceolate, with the ends produced in long horns, curved in the same direction. Puncta distinct 5 in 0,01 m.m. L. 0,35 m.m. — Fig. 21. $\frac{800}{1}$ — St. Bartholomew, only one specimen. The striae are probably very fine. I could not see them on a specimen, mounted in balsam. — In Rab. Alg. Eur. No. 2481 has Mr. SCHWARZ given a delineation of a similar form from Vera Cruz.

Some very interesting forms of the genus *Nitzschia* occur in the caribbean province near Campeche Bay. Mr. KITTON (Micr. Journ. 1874, 218) regards them as belonging to a new genus, called *Perrya*. With the kind permission of Mr. GRUNOW I can here publish their diagnoses, given by Mr. GRUNOW.

»*Nitzschia (Perrya) Weissflogii* GRUNOW. Valves resembling a long and very narrow boat with very sharp keel, smooth or covered with minute irregularly scattered granules, which form coherent longitudinal rows only on the keel and near the margins of the valve. The keel is besides marked by a row of transverse short bars, which (as in all other *Nitzschia*) lie in the interior side of the valve and are fastened to each side of the valve. Length: 0,155—0,32 m.m. (and perhaps more). Campeche Bay.

var. α subglabra valves almost smooth, fig. 22. $\frac{900}{1}$ α upper side β lower side.

var. β sparsa valves covered with irregularly scattered minute granules, fig. 23. $\frac{900}{1}$ α upper side, β lower side.

var. γ interrupta. Keel-bars lengthened, and interrupted two or three times, fig. 236. $\frac{900}{1}$. I have seen only a fragment of this interesting form, which seems to be very great. It is a connecting member between *N. Weissflogii* and *N. pulcherrima*»

»*Nitzschia (Perrya) Grundleri* Grunow. Resembles *N. Weissflogii*, but the valve seems to be more eccentric, and is covered with parallel transverse punctate striæ (12—14 in 0,01 m.m.). The valves, which are more or less constricted in *N. Weissflogii*, are straight in *N. Grundleri*. Length 0,21—0,27 m.m. Hab. Campeche Bay (communicated by Dr. GRÜNDLER) — fig. 24 $\frac{800}{1}$ α upper side, β lower side. — This beautiful diatom belongs also to the subgenus (or genus?) *Perrya* Kitton, but it approaches the other *Nitzschia* with very sharp keel by the more eccentric shape of the valve.»

116. *Tryblionella punctata* W. SM. St. Thomas. A small form of this species.
117. *Tr. Lanceola* GRUN. N. Sp. Lanceolate, costæ strong, pervious, 10 in 0,01 m.m. L. 0,05 m.m. — St. Thomas. — Fig. 25. $\frac{800}{1}$.
118. *Tr. peruana* (EHB.) (*Tr. circumscuta* BAIL, *Tr. Scutellum* W. SM.). — St. Bartholomew, rare.
119. *Denticula* (?) *Antillarum* CL. & GRUN. Lanceolate. with acute ends. Costæ 7—12. Spaces between the costæ with irregularly scattered puncta. L. 0,05—0,063 m.m. This small, interesting diatom is not very rare in the St. Bartholomew gathering. I have also found it in brackish mud from Santos, Brazil. — Fig. 26 *a* and *b*. $\frac{800}{1}$.
120. *Grammatophora macilenta* W. SM. St. Bartholomew.
121. *Gr. (macilenta var?) caribæa* CL. N. Sp. F. V.: Linear, with distinctly gibbous centre and ends. S. V.: with straight septa. Striæ fine, (according to GRUNOW) 28 in 0,01 m.m. and distinctly punctate. — Virgin Ids. common. Fig. 27. $\frac{800}{1}$. *a* Side view, *b* Fr. view.
122. *Gr. gibberula* KÜTZ. St. Bartholomew, frequent.
123. *Gr. undulata* EHB. (Grun. Verh. 1862 Pl. 4 fig. 16 *a. b.*) Virgin Ids. rare, St. Bartholomew, not rare.
124. *Rhabdonema adriaticum* KÜTZ. Virgin Ids. St. Bartholomew.
125. *Climacosira mirifica* (W. SM.) GRUN. Virgin Ids., St. Bartholomew, rare.
126. *Climacosphenia elongata* BAIL. Virgin Ids., St. Bartholomew, not rare.
127. *Licmophora argentescens* AG., v. *splendida* (*L. splendida* W. SM.) St. Bartholomew.

128. *Podosphenia angustata* GRUN. (Verh. 1862 pag. 347 Pl. 6 fig. 20) St. Bartholomew, frequent.
129. *P. ovata* W. SM. (Syn. Pl. 24 fig. 226) St. Bartholomew, rare.
130. *Isthmia enervis* EHB. St. Bartholomew.
131. *Biddulphia Baileyi* SM. (Syn. Pl. 62 fig. 322) St. Bartholomew, rare.
132. *B. turgida* EHB. (*B. granulata* ROPER. T. Micr. Soc. VII pag. 13. Pl. 1 fig. 10--11, Pl. 2 fig. 12) St. Bartholomew, rare.
133. *B. longicruris* GREV. (Micr. Journ. VII pag. 163 Pl. 7 fig. 10) St. Bartholomew, rare.
134. *B. Tuomeyi* ROPER. (T. Micr. Soc. VII Pl. 1 fig. 1—2. *B. tridentata* EHB. M. G. 1856 Pl. 18 fig. 52, Pl. 21 fig. 24). Virgin Ids., not rare.
135. *B. aurita* (EHB.) BRÉB. Virgin Ids. St. Bartholomew.
136. *B. (aurita var.?) Roperiana* GREV. (Micr. Journ. VII pag. 163 Pl. 8 fig. 11—13) Virgin Ids., not rare.
137. *B. pulchella* GRAY. Virgin Ids. St. Bartholomew, abundant.
138. *Cerataulus lævis* (EHB.) Puerto Rico, Arecibo River; St. Martin, in fresh water.
139. *C. Smithii* RALFS. (*Eupodiscus radiatus* W. SM. B. Diat. II pag. 24 Pl. 30 fig. 255) St. Bartholomew.
140. *C (?) Reichardtii* GRUN. (Verh. 1863 pag. 158 Pl. 13 fig. 22) Virgin Ids., very rare, only one specimen observed.
141. *Biddulphia (? Terpsinoë?) birostrata* GRUN. (Verh. 1863 pag. 158 Pl. 13 fig. 23). Virgin Ids., St. Bartholomew, rare. I have seen many specimens of this little form in a gathering from the Balearic Islets, also some specimens in Monterey Stone. GRUNOW found this diatom on *Macrocystis* from Peru. The outline varies greatly. The ends are not always cuneate, as on the fig. given by GRUNOW, but often rounded. The valves are perfectly plane, and in consequence the frontview has parallel margins. This diatom is nearly related to *Plagiogramma* and *Terpsinoë*.
142. *Triceratium armatum* ROPER. (Micr. Journ. II, pag. 283. BTW. Micr. Journ. IV pag. 274 fig. 9) Virgin Ids., rare.
143. *T. Favus* EHB. Virgin Ids., St. Bartholomew.
144. *T. Pentacrinus* WALLICH. (Micr. Journ. VI pag. 249 Pl. 12 fig. 10—14. *Amphipentas alternans* JAN. & RABH. Hond. Pl. 1 fig. 1 *Amphitetras ornata* SHADB. Micr

- Journ. II pag. 16 Pl. 1 fig. 10. *Amphitetras arisata* JAN. & RAB. Hond. Pl. 1 fig. 2) Virgin Ids., abundant.
145. *T. punctatum* BTW. (Micr. Journ. IV pag. 275 Pl. 17 fig. 18. PRITCH. VI fig. 20. *Tricer. sculptum* SHADB. Trans Micr. Soc. pag. 15 Pl. 1 fig. 4. *Tric. reticulum* [EHB.?] BTW. M. J. I pag. 251 Pl. 4 fig. 17) Virgin Ids., St. Bartholomew, abundant.

The frontview has exactly the same appearance as *Tr. reticulum* BITW. the sideview resembles *T. sculptum* of Shadb. *T. punctatum* is said to occur in arctic regions. I have never found it in the many arctic gatherings, which I have examined. The puncta are on the West Indian form often arranged so that they form 3 circlets in the middle of the valve, just as on the figure of *T. sculptum* SHADB. This species is widely distributed. I have seen it, but rarely, from the western coasts of Sweden, from the Mediterranean (Balearic Islets), Honolulu, Java etc.

146. *T. obtusum* EHB. (M. G. Pl. 18 fig. 48—49) St. Bartholomew, rare.

This species occurs very abundantly in the well known Campeche Bay gathering. I have found it very frequently in shellsand from the Gallopagos Ids. The surface of the valve is plane or a little elevated in the middle and on the margins, but the angles never project in horns. The outline is very variable; the sides are sometimes straight, sometimes more or less convex, resembling *T. disciforme* GREV. (*T. M. S. III* Pl. 9 fig. 11) but probably not the same. I have seen both in the Gallopagos and Campeche Bay gatherings specimens with a perfectly circular outline, resembling *Coscinodiscus mosianus* GREV. (Trans. micr. Soc. XIII Pl. 4 fig. 22). It seems therefore that *Triceratium* is not more strongly defined from *Coscinodiscus*, than from *Biddulphia*.

147. *T. Campechianum* GRUN. in litt. Virgin Ids., very rare.

The only specimen of this beautiful species, which I found in the gatherings from Virgin Ids., agrees perfectly with specimens from Campeche Bay, kindly sent me by Dr. GRÜNDLER. The fig. 28 $\frac{320}{1}$ is copied from a photograph of a specimen from Campeche Bay.

148. *T. Antillarum* CL. N.Sp. Small, 4-angular to 5-gonal, with produced angles. Sculpture: small, pearly granules, 7—8 in 0,01 m.m., arranged in straight, radiating lines. The

middle of the valve seems to be elevated and the angles obliquely projecting. Diam. 0,053 m.m. Fig. 29. 80° .

Virgin Ids. St. Bartholomew, rare.

149. *T. cruciatum* RAB. & JAN. (*Amphitetras cr.* RAB. & JAN. Hond. pag. 4 Pl. 1 fig. 5) Virgin Ids., not rare.

150. *T. dubium* BTW. (Mier. Journ. VII pag. 180 Pl. 9 fig. 12. *T. bullosum* O. WITT Mus. Godeffr. II. 1. pag. 97 Pl. 8 fig. 4) Virgin Ids., not rare.

151. *Tricratium* (or *Biddulphia*) *bicorne* CL. N. Sp. Sideview with two more elongated and protracted angles and with two more blunt. Margins striate. Sculpture large and somewhat irregular hexagonal cells. Connecting membrane finely punctate, with puncta arranged in lines, about 8 in 0,01 m. m. — Distance between angles 0,059 m. m. Fig. 30 80° .

St. Bartholomew. I have found this species in a gathering from Java and from California.

152. *Tr. alternans* BAIL. (W. Sm. B. D. I pag. 26 Pl. 5. fig. 45, Pl. 30 fig. 45. *T. variable* BTW. Mier. Journ. IV pag. 275 Pl. 17 fig. 19) St. Bartholomew, abundant.

153. *T. Tabellarium* BTW. (M. J. IV pag. 275 Pl. 17 fig. 15. *T. venulosum* GREV. T. Mier. Soc. XII pag. 90 Pl. 13 fig. 21. *T. brevinervium* GREV. L. c. Pl. 9 fig. 26) Virgin Ids. rare. The only specimen found is represented by the fig. 31 50° . It agrees very well with *T. brevinervium*. Distance between angles 0,0425 m. m. I have seen several specimens in gatherings from Gallopagos Ids. and from Campeche Bay, which seem to prove that *T. Tabellarium venulosum* and *brevinervium* are not specifically distinct.

154. *T. undulatum* BTW. (Mier. Journ. VI pag. 154 Pl. 8 fig. 1—5 and 8) St. Bartholomew, several specimens agreeing with the fig. 8 of Btw.

155. *T. orbiculatum* SHADB.? (Grun. Mier. Journ. 1877 Pl. 196 fig. 2 b.) St. Bartholomew, rare.

156. *Eupodiscus* (*Pseudoauliscus*) *radiatus* BAIL. (Smiths. Contrib. II 1852, 39) Virgin Ids., St. Bartholomew.

This species, of which I have never seen a good figure, resembles *Auliscus Peruvianus* (A. SCHM. Atl. Pl. 32 fig. 29) but the processes are 4 and closer to the margin. The cellulae are larger and there are no marginal dots.

157. *E. Argus* EHB. St. Bartholomew, one perfect specimen and several fragments.
158. *Actinoptychus splendens* SHADB. Virgin Ids., St. Bartholomew.
159. *A. undulatus* KÜTZ. St. Bartholomew.
160. *Asteromphalus flabellatus* BRÉB. GREV. St. Bartholomew.
161. *Actinocyclus tenellus* BRÉB. (*Eupodiscus minutus* HANTZSCH) Virgin Ids.
162. *Auliscus sculptus* W. SM. Bartholomew.
163. *A. (sculptus* var.?) *cælatus* BAIL. Virgin Ids., St. Bartholomew.
164. *A. macræanus* GREV.? (A. SCHM. Atl. Pl. 31 fig. 5) Virgin Ids.
- I have seen only some few specimens, diam. 0,05 m. m., which agree with the fig. published in A. SCHM. Atl. This form is most likely only a variety of *A. pruinus* BAIL or *A. punctatus* BAIL (SCHM. Atl.)
165. *Paralia sulcata* (EHB.) (*Orthosira marina* W. SM.) Virgin Ids. abundant.
166. *Pyxidicula cruciata* EHB. (GREG. Diat. of Clyde pag. 498 Pl. 10 fig. 42) — Virgin Ids., St. Bartholomew; rare.
167. *Endietya oceanica* (EHB.) RALFS. (Pritch. Pl. 5 fig. 70—? *Dictyopyxis brevis* GREV. T. M. Soc. X pag. 22 Pl. 2 fig. 2) — Virgin Ids., St. Bartholomew; rare.
168. *Cresswellia Turris* GREG. (Diat. of Clyde pag. 538 Pl. 14 fig. 109) — St. Bartholomew.
169. *Hyalodiscus maculatus* (W. SM.) CL. (*Podosira? maculata* SM. B. Diat. II pag. 54 Pl. 49 fig. 328. LAGERSTEDT Bihang till K. Vet. Akad. Handlingar III N:o 15 fig. 1 a. *Hyalodiscus stelliger* BAIL. according to H. L. SMITH). Virgin Ids.; abundant.
170. *Skeletonema costatum* (GREG.) CL. (*Melosira costata* GREV. T. Micr. Soc. XIV pag. 77 Pl. 8 fig. 3—6) St. Bartholomew, not rare.
171. *Coscinodiscus Oculus Iridis* EHB. St. Bartholomew.
172. *C. radiatus* EHB. Virgin Ids. St. Bartholomew.
173. *C. lineatus* EHB. St. Bartholomew.
174. *C. excentricus* EHB. Virgin Ids.
175. *C. Normannii* GREG. (GREV. Micr. Journ. VII pag. 80 Pl. 6 fig. 3) Virgin Ids., rare.

175. *C. nitidus* GREG. (Diat. of Clyde pag. 499 Pl. 10 fig. 45)
Virgin Ids., abundant.
176. *Heterostephania Rothii* EHB. (M. G. 35 A. 13 B. fig. 4. 5.
PRITCH Pl. 5 fig. 85) Virgin Ids.
177. *Hemidiscus cuneiformis* WALLICH. (PRITCH. Pl. 6 fig. 14;
perhaps also *Euodia gibba* BAIL. in PRITCH. Pl. 8 fig. 22)
Virgin Ids., several specimens.

Neither of the two fig. in Pritch. agrees perfectly well with the West Indian form, which has the same outline as *Goniothecium Anaulus* EHB. (M. G. Pl. 33, 18 fig. 4) but smaller cellulation. I have not seen the nodule, characterizing the genus *Hemidiscus*, nor the row of apiculi on the ventral margin. — I have seen specimens of the same appearance as the West Indian in gatherings from Balearic Islets, Campeche Bay, Gallogagos Ids. and in a fossil state from Moron deposit near Sevilla.

Just as this paper was written Mr. FRED. HABIRSHAW of New York kindly sent me a beautiful slide with diatoms from Barbados. An examination of this slide yielded some additional forms, marked with *. The slide contained following forms.

- Navicula Weissflogii* A. SCHM.
- * *Libellus Grevillei* (AG.) CL. = *Schizonema* GREV. SM. *Navicula Libellus* GREG.
- Pleurosigma balticum* (EHB.) W. SM.
- * *P. marinum* DONK.
- P. strigosum* W. SM.
- P. intermedium* W. SM.
- * *P. obscurum* W. SM.
- * *Amphitrite* (*Amphiprora* GREG.) *complexa* (GREG.) Diat. of Clyde Pl. 4 fig. 62.
- * *Amphora ostrearia* BRÉB. (II. L. SMITH Lens II 72 Pl. 1 fig. 16.)
- A. bigibba* GRUN.
- * *A. decussata* GRUN. (Mier. Journ. 1877 Pl. 195 fig. 9)
- * *Cocconcis* (*Orthoneis*) *binotata* GRUN. var. 'Atlantica' (Grun. Nov. 15 Pl. 1 fig. 11).
- * *Asterionella Bleakeleyi* GRUN. (Mier. Journ. 1877 Pl. 193 fig. 2).

Synedra fulgens W. SM.

S. superba KÜTZ

S. undulata (BAIL) GREG.

Surirella fastuosa EHB. var.

Sur. Gemma EHB.

Campylodiscus Thuretii BRÉB.

Podocystis Adriatica KÜTZ.

* *Nitzschia quarnerensis* GRUN. (Verh. 1862 T. 18 fig. 5, 6).

This form seems to be only a variety of *N. distans* and *N. spathulata*.

* *N. Græffei* GRUN. MPT. N. Sp. Broad with cuncate and rounded ends, almost parallel sides, a little constricted in the middle. Striæ strong, 10 on 0,01 m. m., composed of puncta. Marginal puncta 5 on 0,01 m. m. L. 0,127—0,14 m. m. Fig. 32. $\frac{800}{1}$.

GRUNOW, who has sent me a fig. of the species, found it in a gathering from Samoa. I have seen it among diatoms from Port Jackson.

N. longissima (KÜTZ).

N. ventricosa KITTON.

N. Sigma (KÜTZ.) W. SM.

* *Tryblionella granulata* GRUN. Mpt. It is a very small form, of oval shape, with large granules arranged in transverse lines.

* *Grammatophora peruana* EHB.

* *Gr. pusilla* GREV.

* *Striatella unipunctata* (AG.).

Climacosphenia elongata BAIL.

* *Podosphenia Ehrenbergii* W. SM.

P. ovata W. SM.

P. angustata GRUN.

Liemophora argentescens (AG.).

Isthmia enervis EHB.

* *Biddulphia membranacea* CL. N. Sp. S.V. elliptic with rounded ends. F. V. rectangular. Valve very large and membranaceous. Sculpture: very small cellules, arranged in lines, crossing each other in three directions. The lines are about 8 in 0,01 m.m., parallel on the middle of the valve, but somewhat radiant near the ends. The connecting membrane is covered by elongated puncta, arranged in lines, somewhat coarser than those of the valve.

L. 0,26, Br. 0,085 m.m. This species is remarkable for its size, the membranaceous quality of its valves and the sculpture, resembling that of a Pleurosigma.

I have found this species in a gathering from Honolulu and recently in the slide, sent by Mr. HABIRSHAW.

B. Tuomeyi ROPER.

Triceratium Pentacrinus WALLICH.

Tr. dubium BTW.

Tr. bicornis CL.

Tr. orbiculatum SHADB.

**Rhizosolenia styliformis* BTW. Only a fragment.

**Asterolampra Marylandica* EHB. (*A. impar.* SHADB. T. M. Soc. pag. 17 Pl. 1 fig. 14).

Pyxidicula cruciata EHB.

**Actinocyclus* (?) *tenuissimus* CL. N. Sp. Valve circular with a row of marginal puncta. Nodule marginal distinct. Sculpture very delicate, small cellulae arranged in lines, radiating from the centre. Diam. 0,04 m.m. to 0,08 m.m. Fig. 34. $\frac{800}{1}$.

Hemidiscus cuneiformis WALLICH.

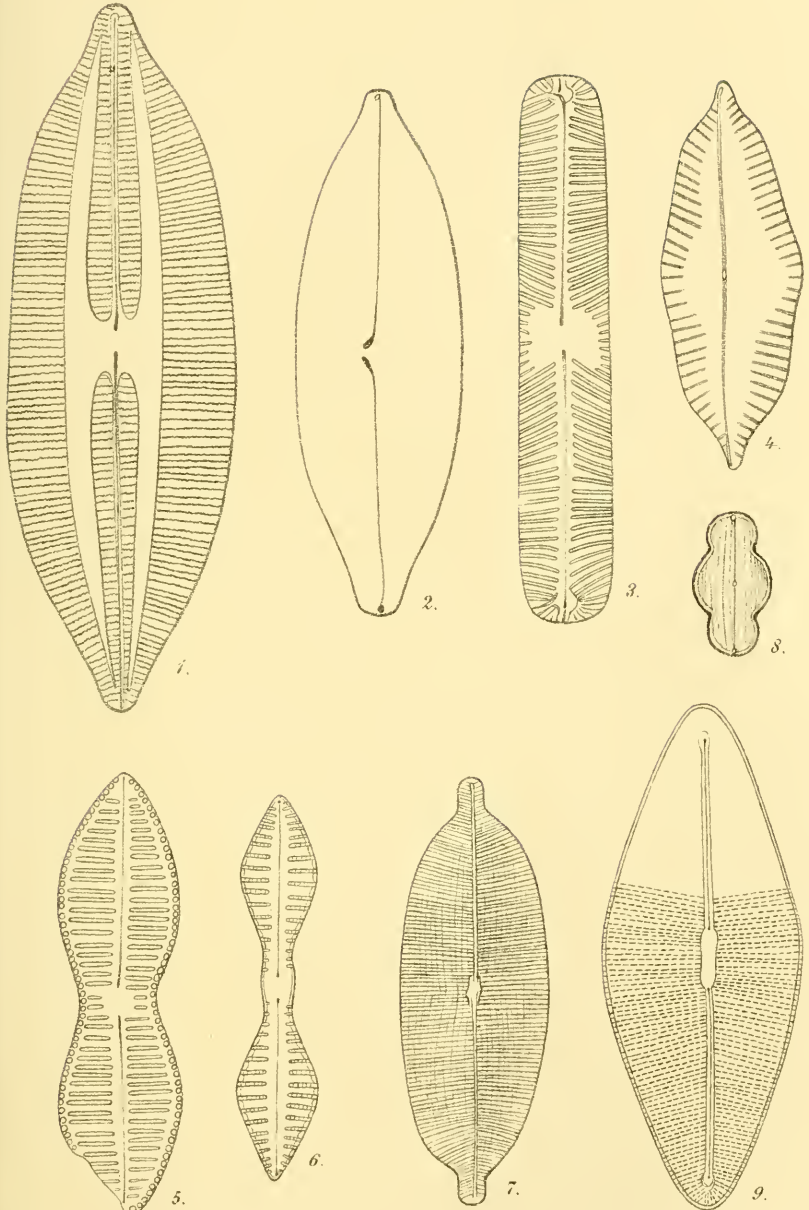
There are consequently 196 different species of marine diatomaceae known from the West Indian archipelago. This number will probably be increased by a closer examination of gatherings from different localities.

The diatomaceous flora of the West Indies has a very strong resemblance to that of Honduras, known by the investigations of RABENHORST & JANISCH and GRUNOW. Very interesting is the total absence of any species of the genus Aulacodiscus, which formerly lived in the West Indies and of which so many forms have been found in a fossil state on the Id. of Barbados. On the Pacific coasts of California, Central America, Peru etc., the genus Aulacodiscus occurs abundantly.



Description of plates.

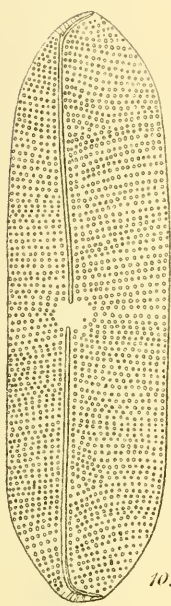
- Fig. 1. *Navicula Lyra* v. *approximata* GREV. $8\frac{0}{1}^0$.
 » 2. *N. virginea* CL. $8\frac{0}{1}^0$.
 » 3. *N. (rectangulata* GREG. var?) *Regula* CL. & GRUN. $8\frac{0}{1}^0$.
 » 4. *N. St. Thomæ* CL. $8\frac{0}{1}^0$.
 » 5. *N. Bartholomei* CL. $8\frac{0}{1}^0$.
 » 6. *N. formicina* GRUN. $9\frac{0}{1}^0$. Delin. by GRUNOW.
 » 7. *N. Goëssii* CL. $8\frac{0}{1}^0$.
 » 8. *N. lobata* SCHWARTZ. $8\frac{0}{1}^0$.
 » 9. *Brebissonia Weissflogii* GRUN. $9\frac{0}{1}^0$. Delin. by GRUNOW.
 » 10. *Alloioncis* (?) *Gründleri* CL. & GRUN. $8\frac{0}{1}^0$.
 » 11. *Al.* (?) *Antillarum* CL. & GRUN. $8\frac{0}{1}^0$.
 » 12. *Al.* (?) *Kurzii* GRUN. a. $9\frac{0}{1}^0$, b. $4\frac{5}{1}^0$, c. d. $3\frac{0}{1}4^0$. Del. by GRUNOW
 » 13. *Al.* (?) *curvinervia* GRUN. $9\frac{0}{1}^0$. Del. by GRUNOW.
 » 14. *Rhoicosigma Antillarum* CL. $2\frac{0}{1}^0$.
 » 15. *Amphora cingulata*. CL. $8\frac{0}{1}^0$.
 » 16. *Plagiogramma Antillarum* CL. $8\frac{0}{1}^0$.
 » 17. *Pl. caribæum* CL. $8\frac{0}{1}^0$.
 » 18. *Pl. attenuatum* CL. $8\frac{0}{1}^0$.
 » 19. *Nitzschia* (*Sigma* var.?) *valida* CL. & GRUN. $4\frac{1}{1}^0$.
 » 20. *N. acuta* CL. $8\frac{0}{1}^0$.
 » 21. *N. curvirostris* CL. $8\frac{0}{1}^0$.
 » 22. *N. Weissflogii* GRUN. $9\frac{0}{1}^0$. Delin. by GRUNOW.
 » 23. *N. Weissflogii* var. $9\frac{0}{1}^0$. Delin. by GRUNOW.
 » 23 b. *N. Weissflogii* var. $9\frac{0}{1}^0$. Delin. by GRUNOW.
 » 24. *N. Gründleri* GRUN. $9\frac{0}{1}^0$. Delin. by GRUNOW.
 » 25. *Tryblionella Lanceola* GRUN. $8\frac{0}{1}^0$.
 » 26. *Denticula Antillarum* CL. & GRUN. $8\frac{0}{1}^0$.
 » 27. *Grammatophora caribæa* CL. $5\frac{0}{1}^0$.
 » 28. *Triceratium Campechianum* GRUN. $3\frac{2}{1}^0$.
 » 29. *T. Antillarum* CL. $8\frac{0}{1}^0$.
 » 30. *T.?* *bicorne* CL. $3\frac{0}{1}^0$.
 » 31. *T. Tabellarium* BTW. $5\frac{0}{1}^0$.
 » 32. *Nitzschia Græffei* GRUN. $8\frac{0}{1}^0$.
 » 33. *Biddulphia membranacea* CL. a. b. $2\frac{5}{1}^0$, c. $8\frac{0}{1}^0$, fragment of the valve.
 » 34. *Actinocyclus* (?) *Tenuissimus* CL. $8\frac{0}{1}^0$.
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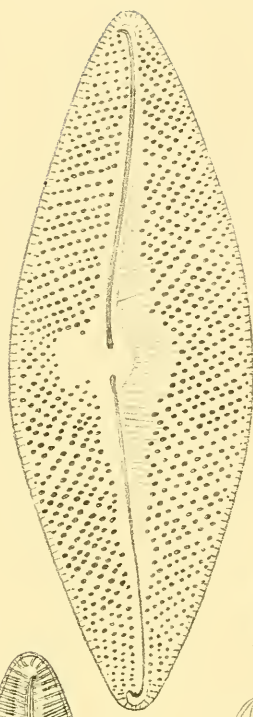
Del. Cleve & Grunow.

Central-Tryckeriet, Stockholm.

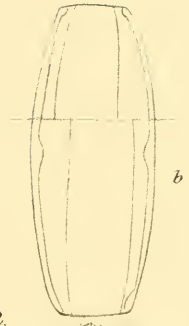
1 Navicula Lyra var 2 N virginea Cl. 3 N Regula Cl & Grun. 4 N. St Thomæ Cl 5 N Bartholomei Cl. 6 N formicina Grun. 7 N Goesii Cl 8 N lobata Schwartz. 9 Brebissonia Weissflogii Grun



10.

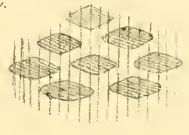


a.

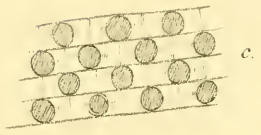


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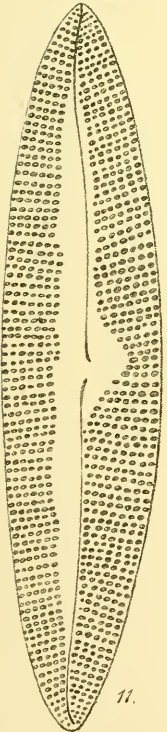
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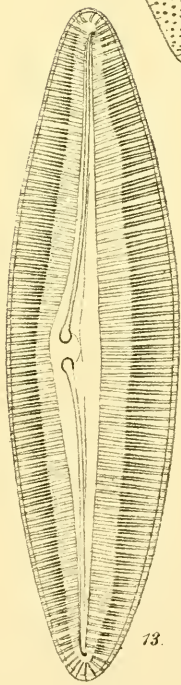
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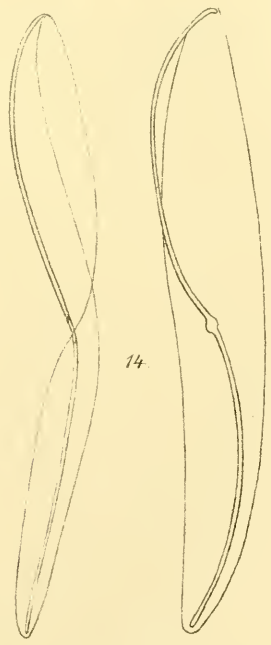
c.



11.



13.

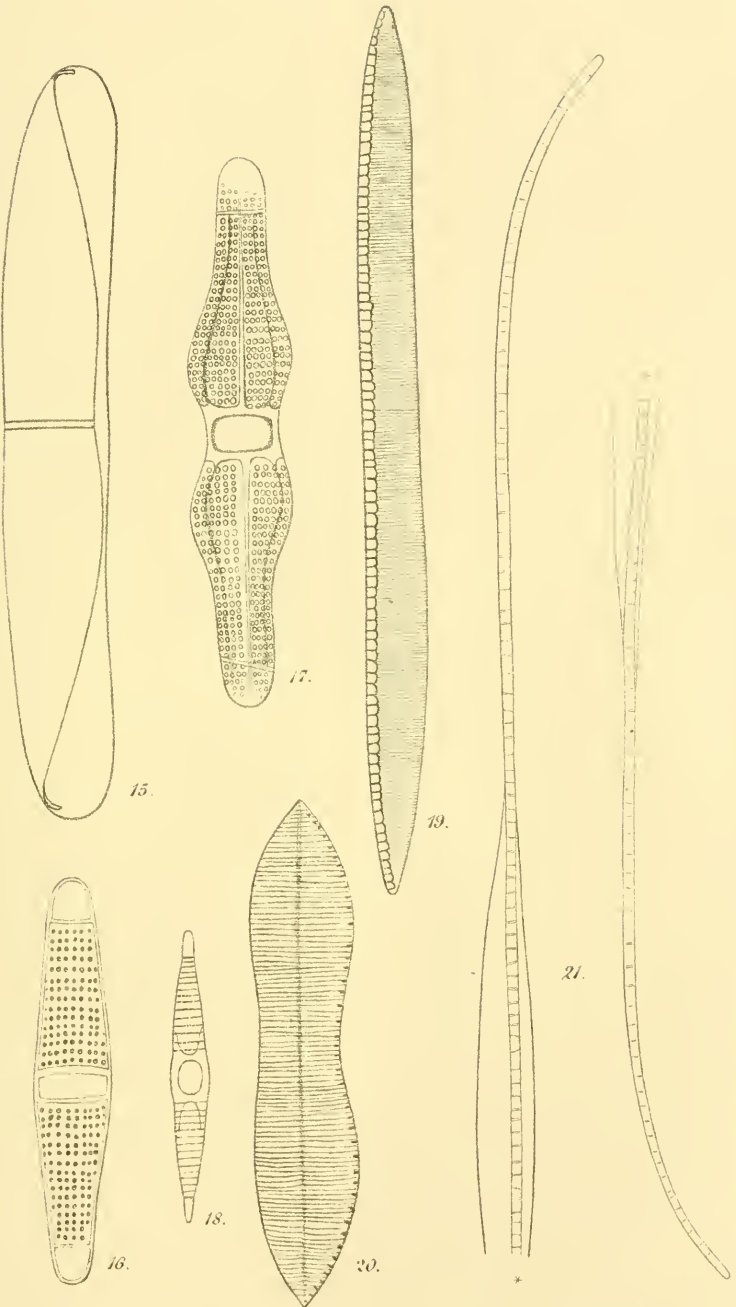


14.

Del. Cleve & Grunow.

Central-Tryckeriet, Stockholm.

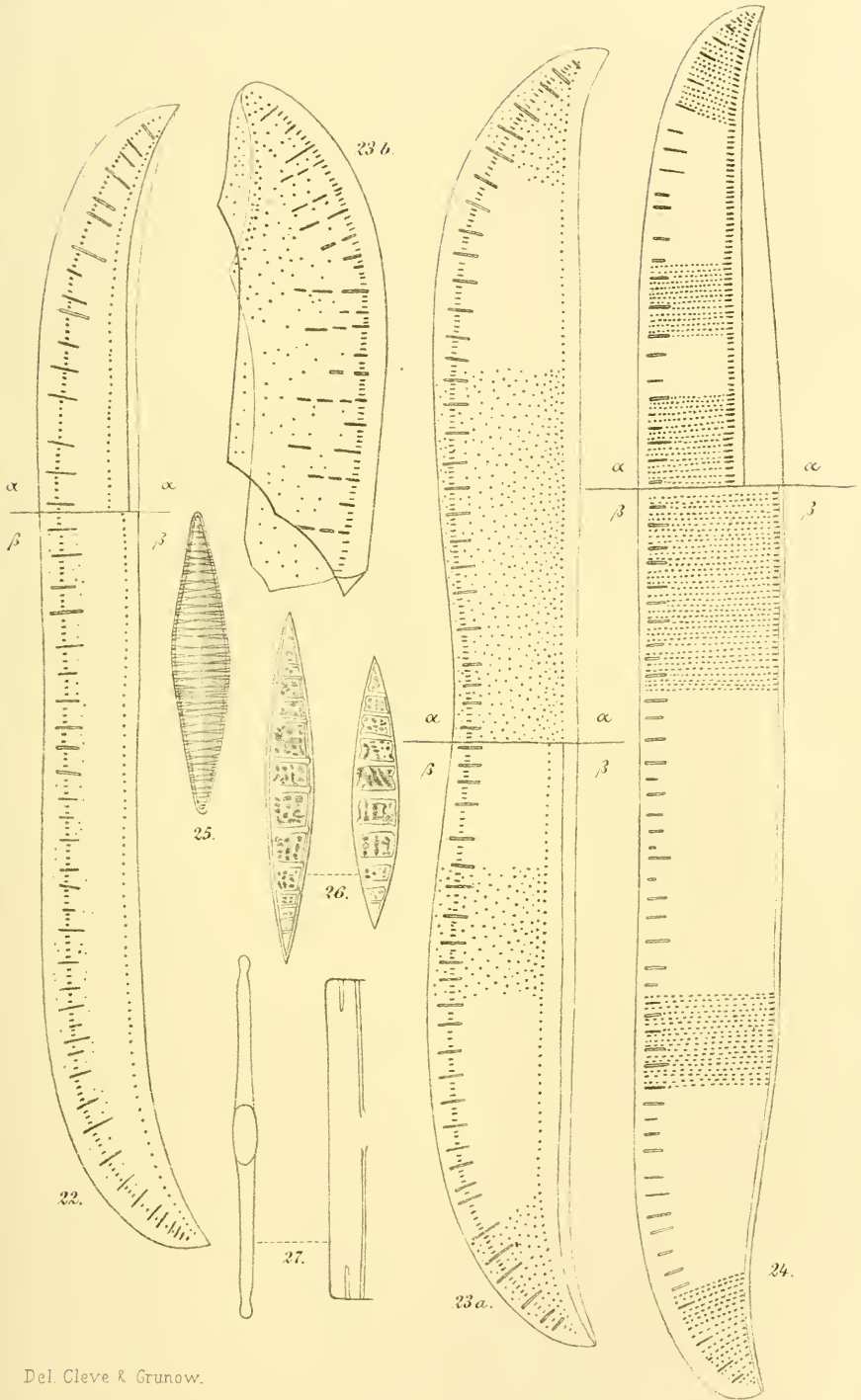
10 *Alloioneis Grundleri* Cl & Grun. 11 *A. Anthilarum* Cl & Grun 12 *A. Kurzii* Grun. 13 *A. curvinervia* Grun. 14 *Rhoicosigma Anthilarum* Cl



Del Cleve.

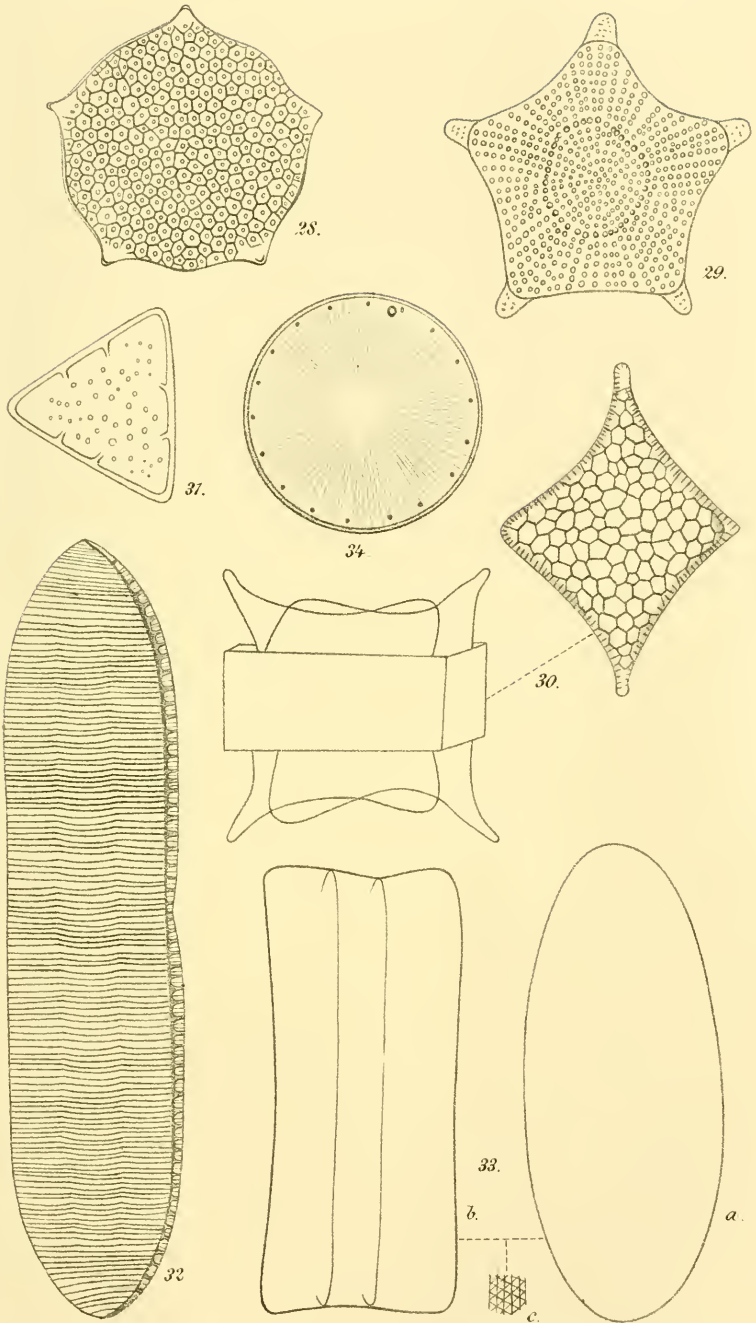
Central tryckeriet Stockholm

15 Amphora cingulata Cl. 16 Plagiogramma Antillarum Cl. 17 P. caribaeum Cl. 18 P. attenuatum Cl
19 Nitzschia valida Cl. & Grun. 20 N. acuta Cl. 21 N. curvirostris Cl



Del. Cleve & Grunow.

22 N Weissflogii Grun v subglabra 23 N Weissflogii v. sparsa . 23b N Weissflogii v. interrupta .
 24 N Grundleri Grun. 25 Tryblionella Lanceola Grun. 26 Denticula Antillarum Cl. & Grun.
 27 Grammaophora caribæa Cl



Taf. 5. Cleve

Central-Tricoperid, Stockholm

28 *Triceratum Campechianum* Grun. 29 *T. Antillarum* Cl. 30 *T. bicorne* Cl. 31 *T. tabellarium* Btw
32 *Nitzschia Græffei* Grun. 33 *Biddulphia membranacea* Cl. 34 *Actinocyclus tenuissimus* Cl.

