Prepared in cooperation with the Alfred Wegener Institute

Stuart R. Stidolph Diatom Atlas

By S.R. Stidolph, F.A.S. Sterrenburg, K.E.L. Smith, and A. Kraberg

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Abbreviations

LM	Light Microscope
SEM	Scanning Electron Microscope
USGS	U.S. Geological Survey

Stuart R. Stidolph Diatom Atlas

By S.R. Stidolph,[1] F.A.S. Sterrenburg,[2] K.E.L. Smith,[3] and A. Kraberg[4]

Abstract

Diatoms are microscopic algae that are found throughout the world in aquatic environments. They are the focus of many scientific endeavors because they play an important role in geochemical cycling and biologic communities; they are indicator organisms due to their sensitivity to environmental changes; and their silica frustule preserves well in the sediment providing a fossil record for examining environmental change. Scientific studies involving diatom identification benefit from accessible, reference materials of diatom taxa, including regional and comprehensive diatom floras. The “Stuart R. Stidolph Diatom Atlas” is a digital atlas of light microscopy images taken of diatom flora from coastal regions throughout the world. The Atlas will be an essential reference on coastal diatoms, and will be of interest to aquatic biologists, coastal ecologists, oceanographers, and geologists from all over the globe.

Introduction

The "Stuart R. Stidolph Diatom Atlas" contains images of modern diatom taxa photographed and identified by Stuart R. Stidolph by the means of light microscopy. The diatom species examined originated from marine and littoral habitats within tropical to subtropical climates, and include specimens collected from the Azores, Singapore, Australia, Java [Indonesia], Hong Kong, New Hebrides [Vanuatu], Bay of Campeche [Mexico], Cape Verde Islands, Samoa, the Philippines, and the

Galapagos Islands. The atlas is a significant resource to diatomists because many of the images presented here have never before been published, and the geographic locations investigated have limited photographic records of diatom flora. The goals of the atlas as presented here are to provide access to this exceptional resource to aid diatomists around the globe in researching the taxonomy, distribution, and ecological significance of this important group of algae.

The atlas contains 1,002 images on 54 plates, documenting 413 species from 87 genera. Numerous taxa were compared with the original type material and published descriptions. The identification notes are given in the plate text and complete references can be found within the References Cited. The species are listed in alphabetical order within the Register of Taxa, using the updated taxonomic name, where appropriate. Please research synonomy if looking for images of a particular species or genus.

In an effort to provide universal access to the images and plates within the Stuart R. Stidolph collection, additional partners are presenting images and plates in additional formats. Please visit the following Web sites for access to these resources.

PLANKTON*NET (*http://planktonnet.awi.de*) is an online database system for taxonomic and biogeographic information for all types of plankton and holds image collections from locations around the world. The Stidolph collection has been integrated into PLANKTON*NET as individual images so that they can be searched and compared jointly with the existing PLANKTON*NET content.

The Alfred Wegener Institute (*http://www.awi.de*) is providing a duplicate copy of the atlas plates and text in order to increase access and awareness of this vital work.

Methods

This collection of light microscopy (LM) images of marine diatoms, made in the 1980s and 1990s, epitomizes the craftsmanship of the analog era of photomicrography. In the form presented here,

it has become a peer-reviewed work, to which reference can be made in publications. The following notes supply the general information required for interpretation of the images.

Photographic Technique

All images were made with the following objectives: 20x/NA/0.70 and dry 40x/NA 0.95 planapochromatic, 90x/NA 1.4 apochromatic or a 60x/N.A. 1.4 planapochromatic oil immersion, combined with a 3.3x or 6.7x NFK photo eyepiece and enlarged to the magnification specified for the image in question. The film used was Kodak 2415 document film, developed in a slightly modified version of Kodak D19.

Magnifications

The legends mention magnifications for the various images. From these data, the optical combination used can be derived as follows:

90 x 6.7 = x2000	40 x 3.3 = x750
60 x 6.7 = x2000	20 x 6.7 = x500
40 x 6.7 = x1000	20 x 3.3 = x250

We have added scale bars to the plates representing 30 microns at 1000x and the correspondingly scaled value for the other magnifications.

Identifications

Wherever possible Stidolph's identifications were based on the illustrations supplied by the original author. If original data were unavailable, the reference source in closest agreement with the specimens was used.

In some cases, the identification was given by the maker of the slide, deposited in the collection mentioned. When Stidolph doubted this, a note was added. Where possible, we have verified this and commented accordingly. The references given by Stidolph are in a separate table, see further.

The identifications given have been updated, where *Lyrella* species were orignally assigned to the genus *Navicula*, for instance. We have added the current names and noted inconsistencies or questions in nomenclature. The authorship of the species in question was not given in the original text of the atlas and has also been added.

Materials

The materials are specified in the legends for the plates. Some specimens and slides represented are in the possession of S.R. Stidolph, although they will eventually be deposited in the Stidolph collection herbarium of the National Institute of Water and Atmospheric Research (NIWA), Christchurch, New Zealand. Specimens made from slides by other scientists are deposited in the collections specified.

The materials typically represent marine (sub)tropical habitats, the diatoms illustrated are typically inhabitants of the benthic or epipelic habitat.

Plates

Plate 1: MARINE DIATOMS FROM THE AZORES

Source of Material

South East coast of Faial, Caldeira Inferno. 38° 31' N; 28° 38' W.
An open crater of small volcano, shallow and sandy. Gathered from *Pinna* (molluscs) and stones. Date: June 1st, 1981.
Sample received from Hans van den Heuvel, Leiden on March 17th, 1988.

NOTE:
Material also deposited in Rijksherbarium Leiden, the Netherlands. Aliquot sample and slide also in collection Sterrenburg, Nr. 249

Plate One:

1 *Mastogloia amoena* Brun 1895. See Brun (1895, pl. 16, fig. 53). This specimen could not be distinguished from the very similar *M. peragalli* because the partectal ring was not visible.

2 *Mastogloia amoena* var. *turgida* Brun 1895. See Brun (1895, pl. 16, fig. 50). This specimen could not be distinguished from the very similar *M. peragalli* because the partectal ring was not visible.

3 *Mastogloia splendida* (Gregory) Peragallo 1888. See Stephens and Gibson (1979, p. 508, figs. 42, 44).

4 *Mastogloia fimbriata* (Brightwell) Cleve 1895. See Foged (1975, pl. 14, figs. 1-2). Two different focus settings.

5 *Mastogloia fimbriata* (Brightwell) Cleve 1895. See Stephens and Gibson (1979, p. 505, figs. 27-28). Two different focus settings.

6 *Mastogloia pseudolatecostata* Yohn and Gibson 1982. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 77, figs. 5-7). Two different focus settings.

7 *Mastogloia binotata* (Grunow) Cleve 1895. See Foged (1975, pl. 12, figs. 6-7). Two different focus settings.

8 *Cocconeiopsis* sp. indet.

9 *Mastogloia binotata* (Grunow) Cleve 1895. See Stephens and Gibson (1979, p. 501, figs. 2-4).

10 *Mastogloia fimbriata* (Brightwell) Cleve 1895. See Stephens and Gibson (1979, p. 505, figs. 27-28).

11 *Mastogloia ovulum* Hustedt 1933 (partectal ring absent). See Hustedt (1933, p. 474, fig. 892).

12-15 *Rhaphoneis amphiceros* (Ehrenberg) Ehrenberg 1844. See Hendey (1964, pl. 26, figs. 1-4).

16 *Rhaphoneis amphiceros* (Ehrenberg) Ehrenberg 1844. A highly variable species, but the specimen shown here is a good match for Ross (1981, pl. 1, fig. 2) since it lacks the lateral expansion of the hyaline axial area near the apices, which is characteristic of *Delphineas surirella*.

17-18 *Rhaphoneis nitida* (Gregory) Grunow 1867. See Peragallo and Peragallo (1897-1908, pl. 83, fig. 31) and Andrews (1975, p. 217, pl. 3, figs. 52-53). This also looks very similar to a rapheless valve of *Cocconeis disculoides* (see fig. 37 on this plate) and differentiation would require SEM.

19 *Cocconeis britannica* Naegeli in Kützing 1849. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 39, fig. 21).

20 *Cocconeis pseudomarginata* Gregory 1857. See Hendey (1964, pl. 28, fig. 20).

21 *Cocconeis pseudomarginata* Gregory 1857. Same specimen as fig. 20 but different focus setting.

22 *Delphineis surirella* (Ehrenberg) Grunow in Cleve and Möller 1878.
This specimen is an exact match of Hendey (1964, pl. 26, fig. 13), given as *Rhaphoneis surirella*. It also appears to match Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 22, fig. 10), which is identified as *Delphineis surirelloides*. Perhaps LM is insufficient in this group of taxa.

23 *Delphineis minutissima* (?) (Hustedt) Simonsen 1987. See Hustedt in Simonsen (1987, pl. 374, fig. 13). Absence of pseudoraphe appears to eliminate small *Cocconeis* rapheless valve.

24 *Rhaphoneis amphiceros* form (?). Similar specimen in Foged (1975, pl. 9, fig. 2).

25 *Cocconeis britannica* Naegeli in Kützing 1849. See Witkowski , Lange-Bertalot, and Metzeltin (2000, pl. 39, fig. 21).

26 *Cocconeis britannica* Naegeli ex Kützing 1849. See Hustedt (1933, p. 333, fig. 786).

27 *Cocconeis scutellum* Ehrenberg 1838. This specimen is a good match for Schmidt's Atlas (1874-1959, pl. 190, fig. 17), given as “Typus”.

28 *Cocconeis ornata* Gregory 1857. See Hustedt (1933, p. 339, fig. 793).

29 *Achanathes lacus-vulcani* Lange-Bertalot and Krammer 1989. See Hustedt in Simonsen (1987,pl. 595, figs 4-6), given as *C. thienenammii*. *C. thienenammii* was transferred to *Achnanthes* and given the new name of *Achnanthes lacus-vulcani*, due to the name *A. thienenammii* being preoccupied (Lange-Bertalot and Krammer 1989).

30 *Cocconeis capensis* (Cholnoky) Witkowski in Witkowski, Lange-Bertalot and

Metzeltin 2000. See Cholnoky (1963, p. 42, pl. 1, fig. 7), given as *Cocconeis clandestina* var. *capensis*.

31 *Cocconeis placentula* Ehrenberg 1838. See Hustedt (1933, p. 347, fig. 802b) and Patrick and Reimer (1966, p. 284, pl. 15, fig. 7).

32 *Cocconeis britannica* Naegeli in Kützing 1849. See Van Heurck (1880-1885, pl. 30, fig. 1) and Hustedt (1933, fig. 786).

33 *Cocconeis placentula* Ehrenberg 1838. See Foged (1987, pl. 8, fig. 4).

34 *Cocconeis californica* var. (?). See Riaux-Gobin and Compère (1996, p. 95, figs. 10-18). Possible variation of *C. californica*. The reference shows this species to be extremely variable with regards valve ornamentation.

35 *Cocconeis californica* Grunow in Van Heurck 1880. See Riaux-Gobin and Compère (1996, p. 95, figs. 10-18)

36 *Cocconeis peltoides* Hustedt 1939. See Hustedt in Simonsen (1987, pl. 376, figs. 3-4, 9-10).

37 *Amphicocconeis disculoides* (Hustedt) De Stefano and Marino 2002. See Hendey (1964, pl. 28, fig. 21), given as *Cocconeis disculoides*. See also De Stefano and Marino (2002).

38 *Amphicocconeis disculoides* (?) (Hustedt) De Stefano and Marino 2002. See Hendey (1964, pl. 28, fig. 21), given as *Cocconeis disculoides*. See also De Stefano and Marino (2002).

Magnifications: fig. 1: x2000; fig. 2: x1500; all others: x1000
Scale Bar: scale bar is 30 microns for figures at x1000; 20 microns for fig. 2; 15 microns for fig. 1

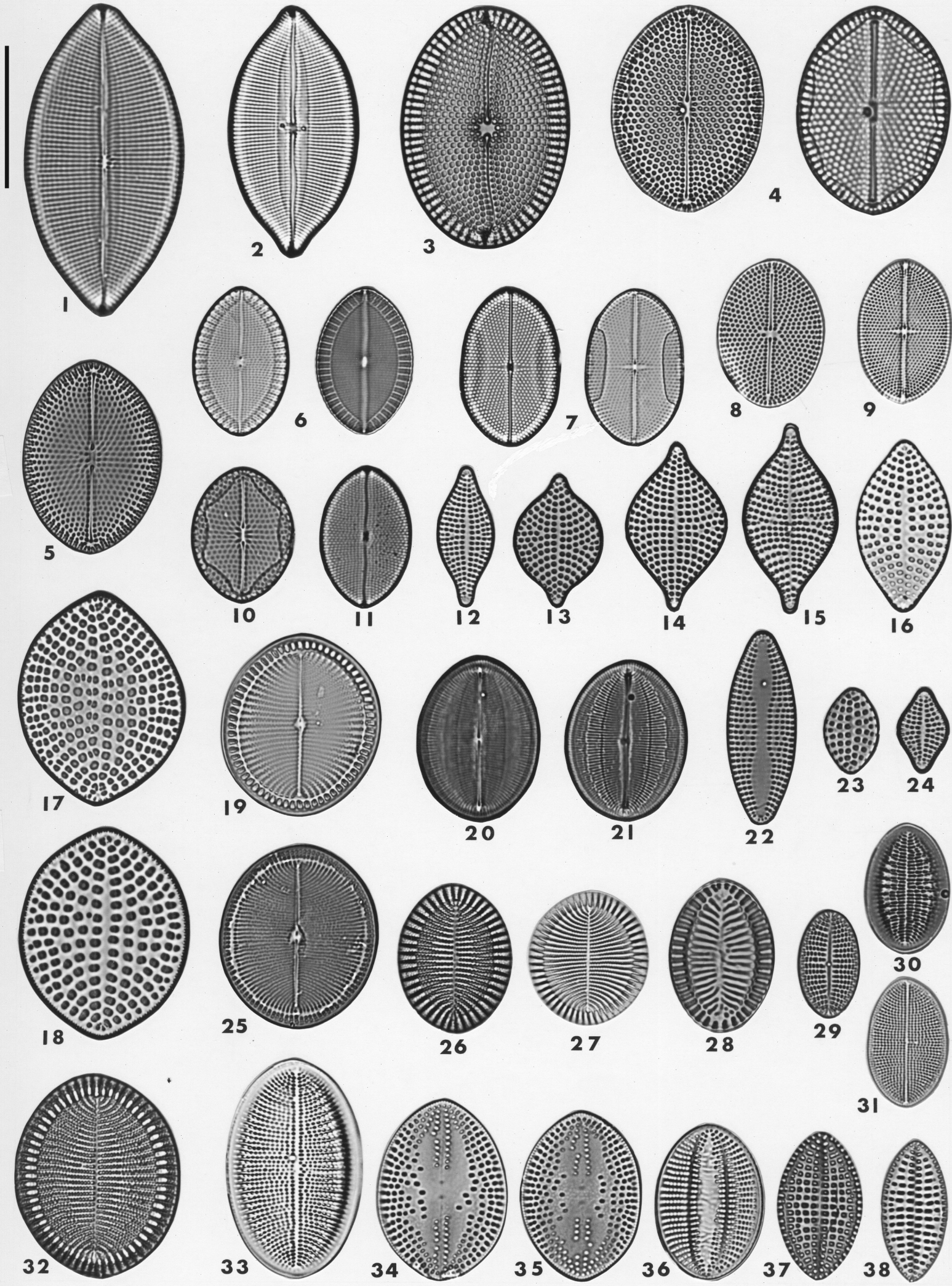
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Plate 2: MARINE DIATOMS FROM THE AZORES

Source of Material

South East coast of Faial, Caldeira Inferno. 38° 31' N; 28° 38' W.
An open crater of small volcano, shallow and sandy. Gathered from *Pinna* (molluscs) and stones. Date: June 1st, 1981.
Sample received from Hans van den Heuvel, Leiden on March 17th, 1988.

NOTE:
Material also deposited in Rijksherbarium Leiden, the Netherlands. Aliquot sample and slide also in collection Sterrenburg, Nr. 249

Plate Two:

39 *Amphora obtusa* var. *oceanica* (Castracane) Cleve 1895. See Peragallo and Peragallo (1897-1908, pl. 48, fig. 4).

40 *Amphora obtusa* Gregory 1857. See Schoeman and Archibald (1987, figs. 1-12).

41-42 *Amphora obtusa* Gregory 1857. See Schmidt's Atlas (1874-1959, pl. 40, fig. 16) also Schoeman and Archibald (1987, figs 1-12).

43 *Halamphora cymbifera* (Gregory) Levkov 2009. Schoeman and Archibald (1987, figs. 15-18), given as *Amphora cymbifera*.

44 *Amphora bistriata* Leuduger-Fortmorel 1879 . See Peragallo and Peragallo (1897-1908, pl. 49, fig. 3).

45 *Amphora praelata* Hendey 1973. See Schoeman and Archibald (1987, figs. 39-41).

46 *Amphora spectabilis* Gregory 1857. See Hendey (1964, pl. 38, fig.8) and also Hendey (1970, pl. 3, fig. 28).

47 *Amphora ocellata* Ehrenberg 1838. See Hendey (1964, pl. 38, fig. 14). *A. ocellata* is a taxonomic synonym to *Amphora ovalis* (Kützing) Kützing.

48 *Amphora crassa* Gregory 1857 (whole frustule). See Schoeman, Archibald, and Sims (1986, pl. 1, figs. 3a, 6a).

49-50 *Amphora crassa* Gregory 1857. See Schoeman, Archibald, and Sims (1986, pl. 2, figs. 7a-c).

51 *Diploneis mirabilis* König 1959. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 93, fig. 1-8).

52 *Lyrella impercepta* (Hustedt) Moreno in Moreno, Licea, and Santoyo 1996. See Hustedt (1964, fig. 1530), given as *Navicula impercepta*.

53-54 *Amphora cingulata* Cleve in A. Schmidt et al. 1875. See Peragallo and Peragallo (1897-1908, pl. 49, fig. 6).

55 *Amphora cingulata* (?) Cleve in A. Schmidt et al. 1875. See Peragallo and Peragallo (1897-1908, pl. 49, fig. 6). Identity is uncertain.

56 *Amphora* sp. indet. See Marine Diatoms of the Cape Verde Islands (in this volume, pl. 17, fig. 121). This specimen may be *Amphora crassa*.

57 *Parlibellus delognei* (Van Heurck) Cox 1988. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 104, fig. 1-5). Also, a very good match for *Parlibellus crucicula* as seen in Hustedt (1962, figs. 1436a-c), given as *Navicula crucicula*.

58 *Parlibellus delognei* (Van Heurck) Cox 1988. Enlargement of specimen in fig. 57.

59 *Navicula digitoradiata* (Gregory) Ralfs in Pritchard 1861. See Hendey (1964, pl.29, fig. 9); also Krammer and Lange-Bertalot (1985, pl. 22, fig. 17).

60 *Navicula palpebralis* Brebisson in litt., W. Smith 1853. See Hendey (1964, pl. 34, figs. 14).

61 *Navicula palpebralis* Brebisson in litt., W. Smith 1853. See Hendey (1964, pl. 34, fig. 16).

62 *Diploneis papula* (Schmidt in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 7, figs 45-47), given as *Navicula papula*; also Peragallo and Peragallo (1897-1908 pl. 19, fig. 24).

63-64 *Navicula applicita* Hustedt 1964. See Hustedt (1964, p. 386, figs. 1473a-b).

Magnifications: fig. 58: x1500; all others: x1000
Scale Bar: scale bar is 30 microns for figures at x1000; 20 microns for fig. 58

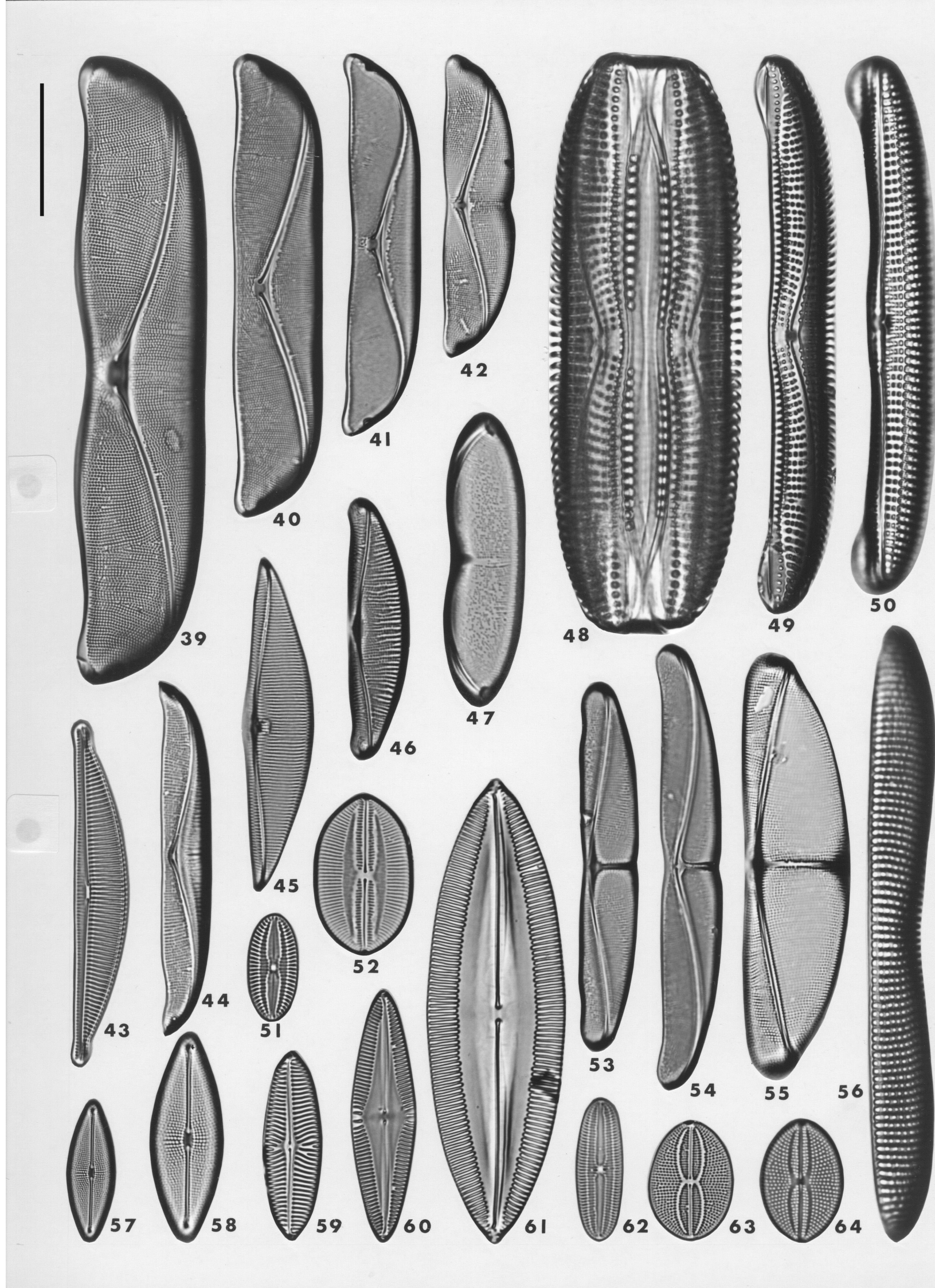
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Plate 3: MARINE DIATOMS FROM THE AZORES

Source of Material

South East coast of Faial, Caldeira Inferno. 38° 31' N; 28° 38' W.
An open crater of small volcano, shallow and sandy. Gathered from *Pinna* (molluscs) and stones. Date: June 1st, 1981.
Sample received from Hans van den Heuvel, Leiden on March 17th, 1988.

NOTE:
Material also deposited in Rijksherbarium Leiden, the Netherlands. Aliquot sample and slide also in collection Sterrenburg, Nr. 249

Plate Three:

65 *Diploneis bombus* Cleve-Euler in Backman and Cleve-Euler Backman 1922. See Hendey (1964, pl. 32, fig. 2).

66-67 *Diploneis crabro* (Ehrenberg) Ehrenberg 1854. See Desikachary and Prema (1987, pl. 286, figs. 7, 9).

68-69 *Diploneis bombus* Cleve-Euler in Backman and Cleve-Euler Backman 1922. See Schmidt's Atlas (1874-1959, pl. 69, figs 28-29) and Hustedt (1937, fig. 1086a-c).

70 *Diploneis fusca* (Gregory) Cleve 1894. For range of valve shapes, see Schmidt's Atlas (1874-1959, pl. 7, figs. 1-4) and Hendey (1964, pl. 32, fig. 4).

71 *Diploneis graeffii* (Grunow in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 7, fig. 6) and Hustedt (1937, fig. 1078).

72 *Diploneis vacillans* var. *renitens* (Schmidt in Schmidt et al.) Cleve 1894. See Hendey 1970, pl. 5, fig. 47).

73-74 *Diploneis chersonensis* (Grunow) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 174, fig. 16) and Foged (1987, pl. 15, figs. 6-7)

75 *Diploneis bombus* Cleve-Euler in Backman and Cleve-Euler Backman 1922. See Hustedt (1937, fig. 1086c).

76 *Diploneis exemta* (Schmidt in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 69, fig.13).

77 *Achnanthes citronella* (A. Mann) Hustedt in Schmidt et al. 1937. See Foged (1975, pl. 9, fig. 13).

78 *Diploneis coffaeiformis* (Schmidt) Cleve 1894. See Hustedt (1937, fig. 1025).

79 *Achnanthes marginalis* Hendey 1958 (upper valve). See Hendey (1958, pl. 1, fig. 3).

80 *Achnanthes brevipes* Agardh 1824. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 45, fig. 5-6).

81 *Diploneis vetula* (Schmidt in Schmidt et al.) Cleve 1894. See Hustedt (1937, fig. 1070) and Hendey (1964, pl. 32, fig. 6).

82 *Diploneis nitescens* (Gregory) Cleve 1894. See Gregory (1857, pl. 9, fig. 16) also Hustedt (1937, fig. 1047). Note double areolar rows near margin.

83 *Diploneis gemmata* (Greville) Cleve 1894. See Hustedt (1937, fig. 1050a) and Williams (1988, pl. 45, figs. 2-3).

84 *Diploneis graeffi* (Grunow in Schmidt et al.) Cleve 1894. See Hustedt (1937, fig. 1078).

85 *Navicula superimposita* Schmidt 1874. Appears to be a fair match to Peragallo and Peragallo (1897-1908, pl. XIII, fig. 23) and Schmidt's Atlas (1874-1959, pl. 46, fig. 61), but generic assignment is not clear.

86-87 *Navicula longa* (Gregory) Ralfs in Pritchard 1861. See Schmidt's Atlas (1874-1959, pl. 47, fig. 6), Van Heurck (1880-1885, pl. 25, fig. 716) and Hendey (1970, pl. 5, fig. 51).

Magnification: all figures: x1000
Scale Bar: scale bar is 30 microns at x1000

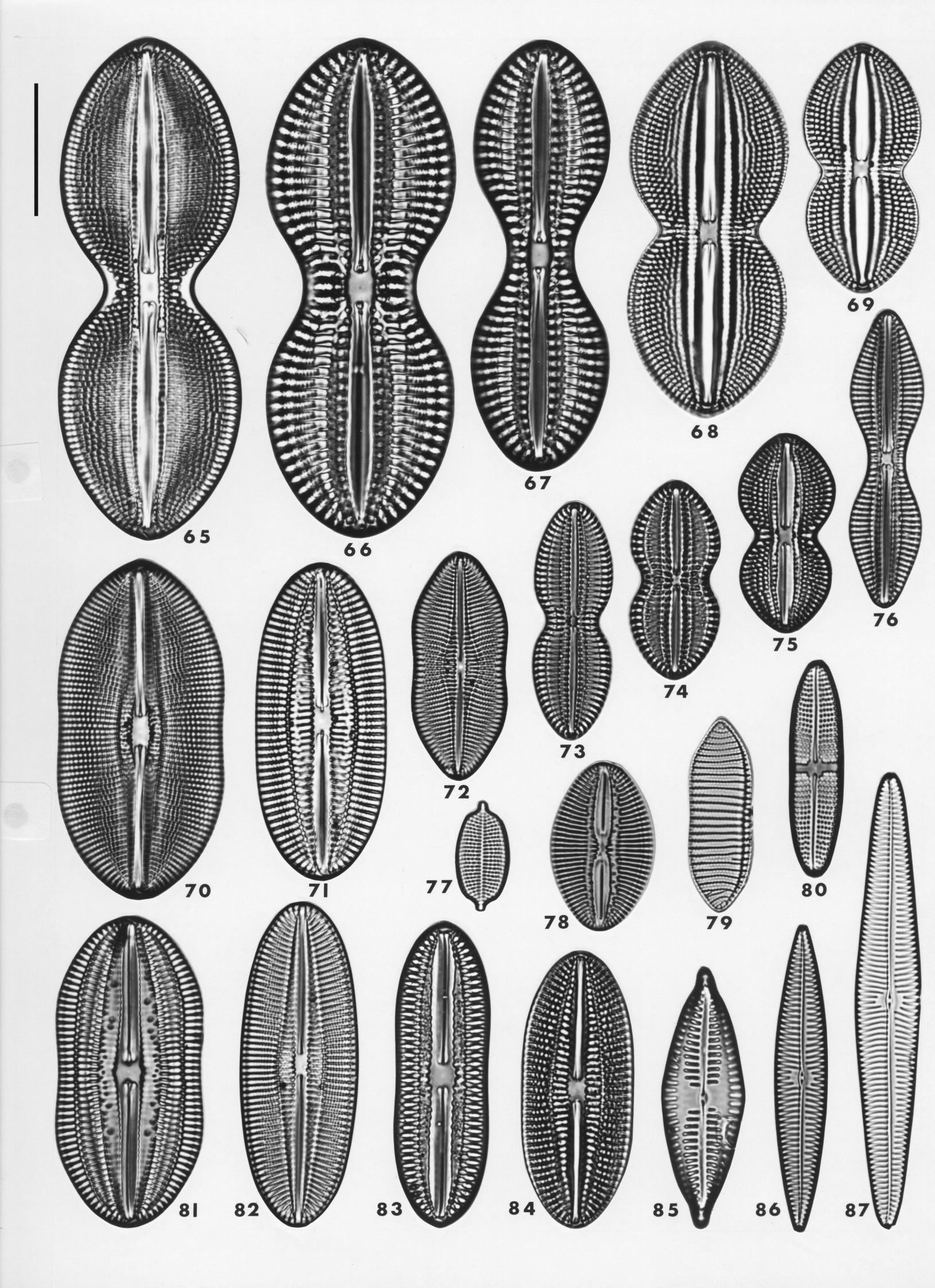
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Plate 4: MARINE DIATOMS FROM THE AZORES

Source of Material

South East coast of Faial, Caldeira Inferno. 38° 31' N; 28° 38' W.
An open crater of small volcano, shallow and sandy. Gathered from *Pinna* (molluscs) and stones. Date: June 1st, 1981.
Sample received from Hans van den Heuvel, Leiden on March 17th, 1988.

NOTE:
Material also deposited in Rijksherbarium Leiden, the Netherlands. Aliquot sample and slide also in collection Sterrenburg, Nr. 249

Plate Four:

88 *Actinocyclus* sp. indet.

89 *Endictya oceanica* Ehrenberg 1845. See Peragallo and Peragallo (1897-1908, pl. 119, fig. 1) and Hendey (1958, p. 41, pl. 6, fig. 5).

90 *Roperia tesselata* (Roper) Grunow in Pelletan 1889. See Fryxell, Sims and Watkins (1986, p. 24, figs 25, 32) and Desikachary (1989, pl. 699, figs 1-3).

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91 *Azpeitia apiculata* P.A. Sims in Sims, Fryxell and Baldauf 1989. See Sims, Fryxell and Baldauf (1989, p. 294, pl. 3, figs. 1-2).

*92 *Actinocyclus octonarius* var. *sparsus* (Gregory) Hendey 1954. See Navarro (1982a, fig. 25) and Desikachary and Prema (1987, pl. 226, fig. 3).

*93 *Actinocyclus crassus* (W. Smith) Ralfs in Pritchard 1861. See Van Heurck (1880-1885, pl. 124, figs 6 and 8).

94 *Actinocyclus tenuissimus* Cleve 1878. See Navarro (1982a, fig. 29) and Foged (1987, pl. 3, fig. 7).

95 *Azpeitia apiculata* P.A. Sims in Sims, Fryxell and Baldauf 1989. See Sims, Fryxell and Baldauf (1989, p. 294, pl. 3, figs. 1-2).

96-97 *Actinocyclus radiatus* J.Rattray. See Desikachary and Prema (1987, pl. 225, fig. 2).

98 *Ehrenbergiulva hauckii* (Grunow in Van Heurck) Witkowski, Lange-Bertalot and Metzeltin in Witkowski and Lange-Bertalot 2004, formerly *Coscinodiscus hauckii*. See Grunow in Van Heurck (1880-1885, pl. 94, fig. 29) and Hustedt (1928, fig. 200a-b). The illustration in Witkowski, Lange-Bertalot and Metzeltin (2000, pl. 2, fig. 11) shows no structure.

99 *Ehrenbergiulva granulosa* (Grunow in Cleve and Grunow) Witkowski, Lange-Bertalot and Metzeltin in Witkowski and Lange-Bertalot 2004. See Witkowski, Lange-Bertalot and Metzeltin (2000, pl. 2, fig. 12-18), formerly *Coscinodiscus*

granulosus.

100 *Thalassiosira eccentrica* (Ehrenberg) Cleve 1903. See Fryxell and Hasle (1972, p. 300, figs. 3b, 9-10) and Desikachary (1989, pl. 745, figs. 1-2, 4).

101 *Cymbella tumida* (Brébisson in Kützing) van Heurck 1880. See Schmidt's Atlas (1874-1959, pl. 376, fig. 5).

102 *Hemidiscus cuneiformis* Wallich 1860. See Hendey (1964, pl. 22, fig. 9).

103 *Thalassiosira symmetrica* Fryxell and Hasle 1972. See Fryxell and Hasle (1972, p. 312, figs. 39, 40a-b).

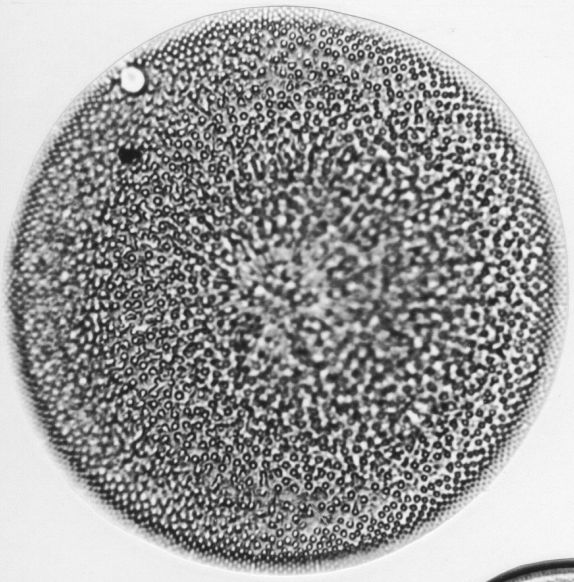
104-05 *Psammodiscus nitidus* (Gregory) Round and Mann 1980. See Hustedt (1928, fig. 221) also Round and Mann (1980, p. 369, figs 1a-d).

*106 *Nitzschia subpacifica* Hasle 1965. See Hasle (1972, p. 173, fig. 1)
NOTE: Both *N. pacifica* and *N. subpacifica* are discussed on p. 173, 182 and 184. However, the figure given shows *N. subpacifica,* but not *N. pacifica*. The former seems the most likely candidate of many similar *Nitzschia* species as its range extends into the Atlantic Ocean to 51° North.

107 *Hemidiscus cuneiformis* Wallich 1860. See Schmidt's Atlas (1874-1959, pl.437, figs. 1-2).

* These are provisional identifications only.

Magnifications: fig. 93: x1500; fig. 98: x2000; fig. 107: x750; all others: x1000
Scale Bar: scale bar is 40 microns for fig. 107; 30 microns for figures at x1000; 20 microns for fig. 93; 15 microns for fig. 98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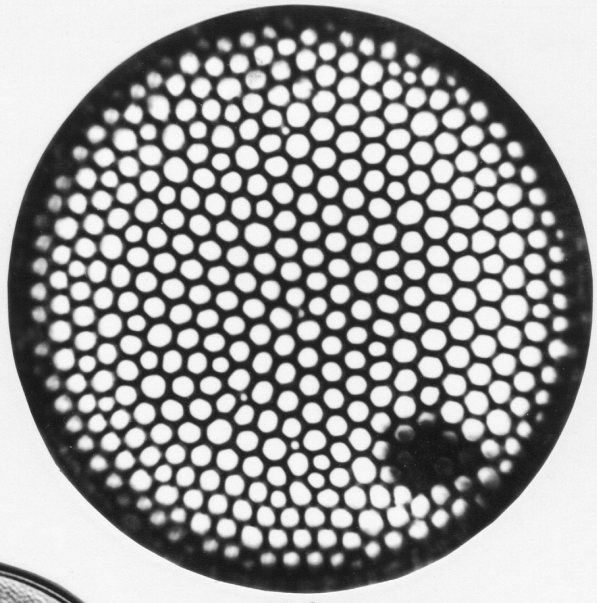
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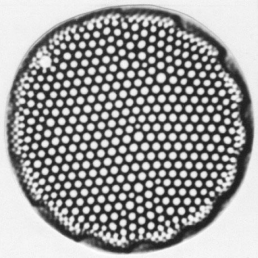
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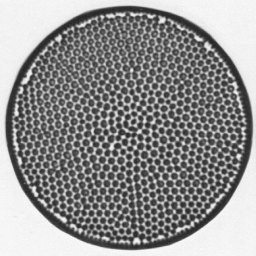
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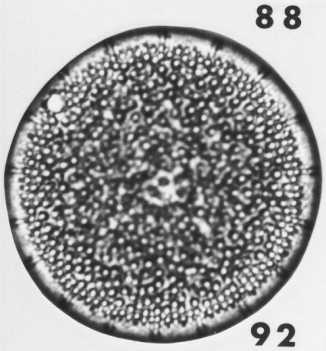
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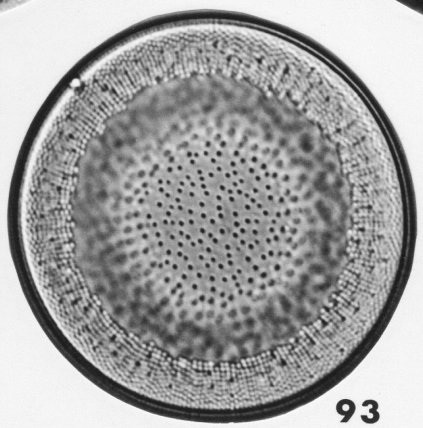
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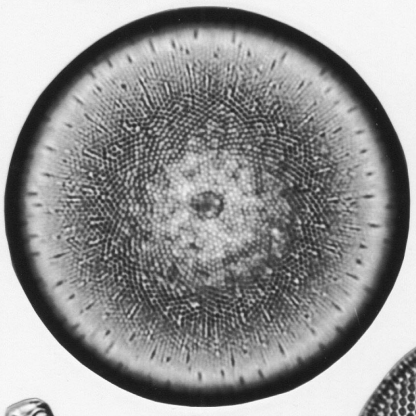
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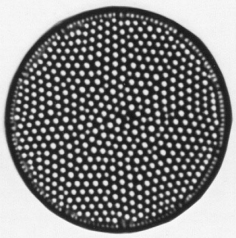
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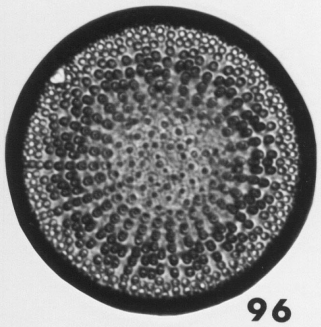
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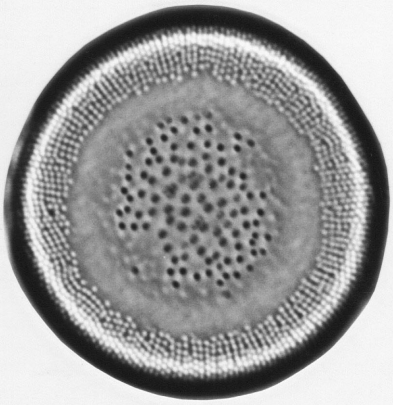
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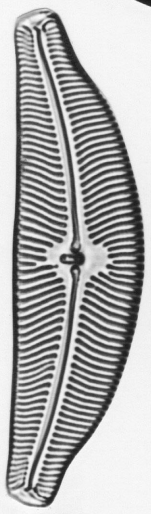
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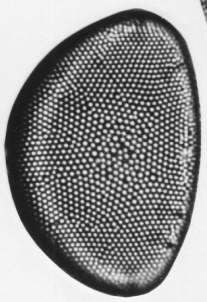
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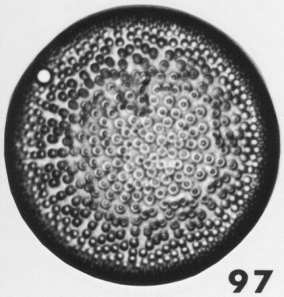
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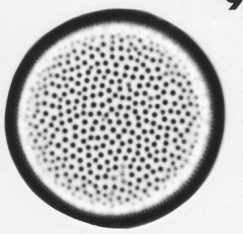
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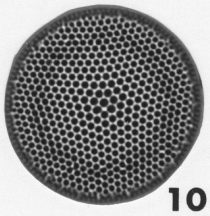
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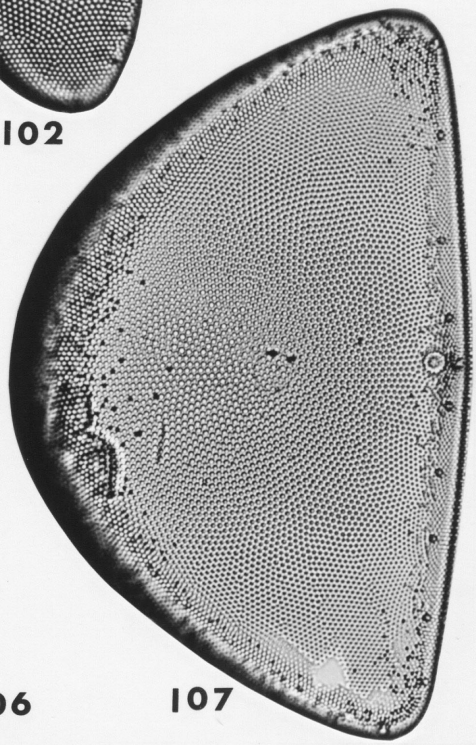
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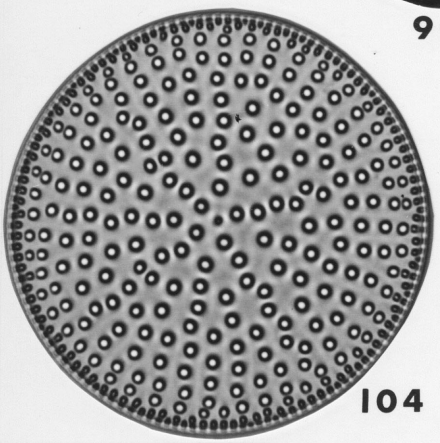
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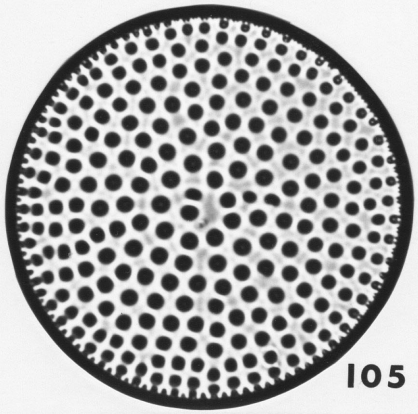
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Plate 5: MARINE DIATOMS FROM THE AZORES

Source of Material

South East coast of Faial, Caldeira Inferno. 38° 31' N; 28° 38' W.
An open crater of small volcano, shallow and sandy. Gathered from *Pinna* (molluscs) and stones. Date: June 1st, 1981.
Sample received from Hans van den Heuvel, Leiden on March 17th, 1988.

NOTE:
Material also deposited in Rijksherbarium Leiden, the Netherlands. Aliquot sample and slide also in collection Sterrenburg, Nr. 249

Plate Five:

108-12 *Amphitetras subrotundata* Janisch in Schmidt et al. 1886. See Brightwell (1859, pl. 9, fig. 14) as *A. Antediluviana*, also Schmidt's Atlas (1874-1959, pl. 99, fig. 24).

113-15 *Stictodiscus parallelus* fo. *hexagona* (Castracane) Kolbe 1955 . See Desikachary (1989, pl. 716, figs. 1-4, also pl. 715, figs. 3, 4 and 6).

116-17 *Triceratium pentacrinus* fo. *quadrata* Forti in Tempère and Peragallo 1909. See Desikachary (1989, pl. 787, fig. 3). Generic assignment of this species may require further investigation. Ehrenberg (1841) originally described it as *Amphipentas tetracrinus* and there appears to be significant diversity in forms. See Schmidt's Atlas (1874-1959, pl. 98, figs. 9-13, 18).

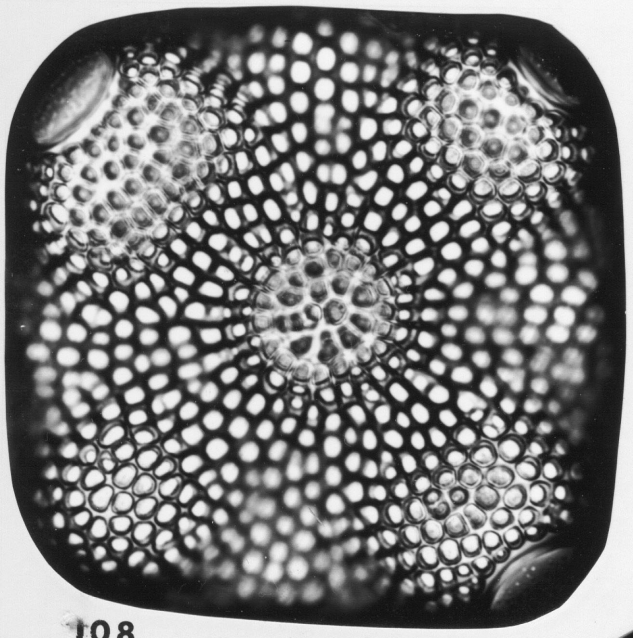
118 *Biddulphia biddulphiana* (J.E. Smith) Boyer 1900. See Desikachary and Prema (1987, pl. 246, fig. 5).

119 *Triceratium finnmarchicum* Grunow in Cleve and Grunow 1880. Specimen appears to match Cleve and Grunow (1880, pl. 7, fig. 126), but generic assignment is uncertain.

120 *Triceratium arcticum* fo. *quadrata* Grunow in Tempère and Peragallo 1908. Specimen appears to match Desikachary (1989, pl. 802, fig. 4), but generic assignment is uncertain.

121 *Campylodiscus* sp. indet.

Magnifications: fig. 115: x500; fig. 118: x750; all others: x1000
Scale Bar: scale bar is 60 microns for fig. 115; 40 microns for fig. 118; 30 microns for all figures at x1000



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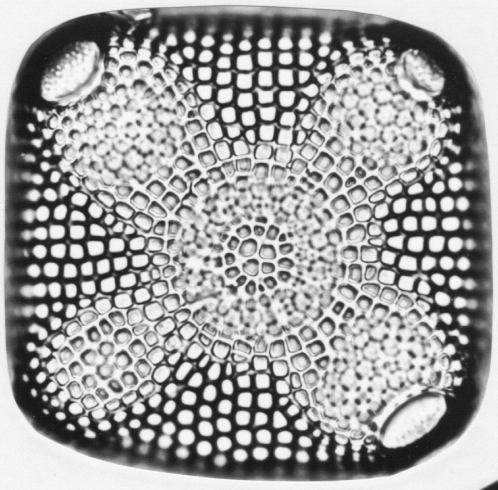

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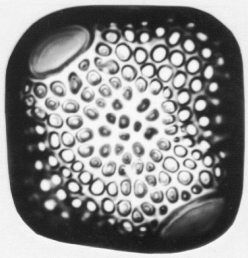

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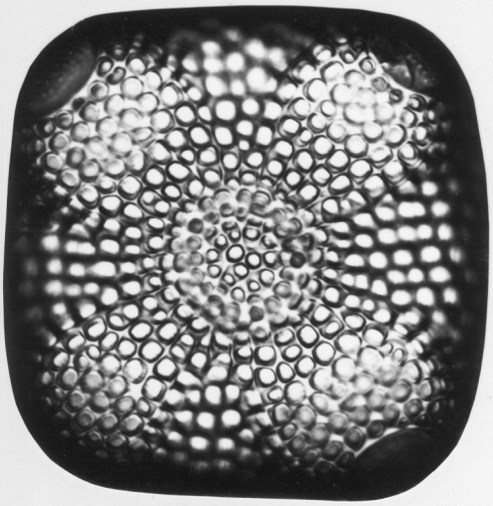

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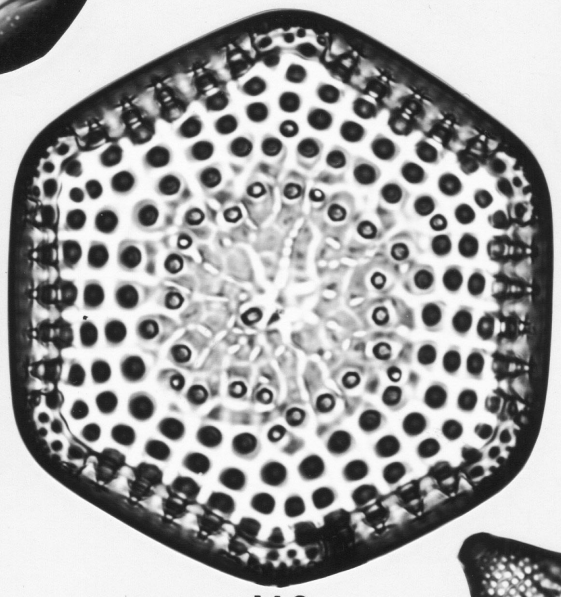

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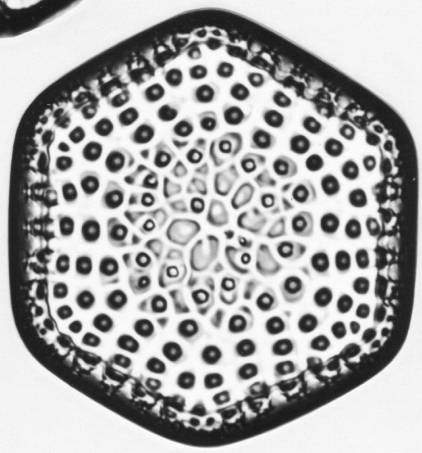

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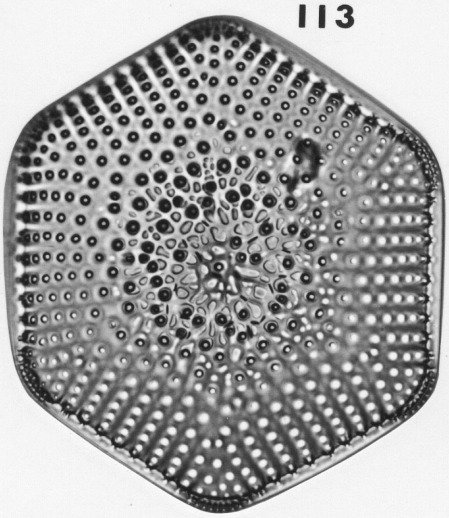

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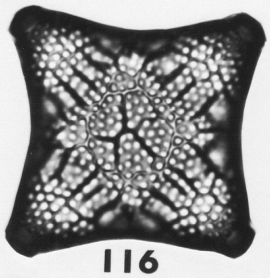

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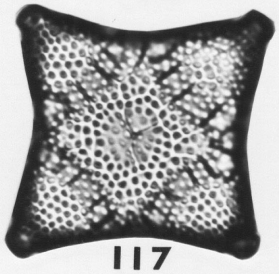

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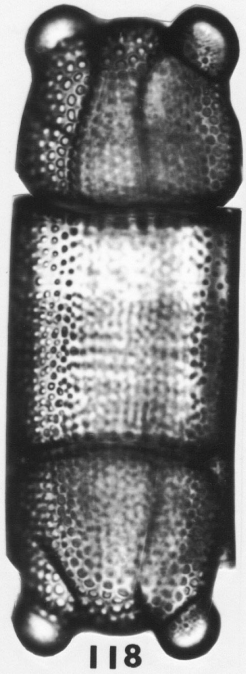

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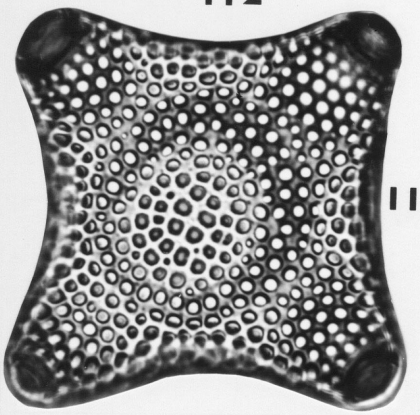

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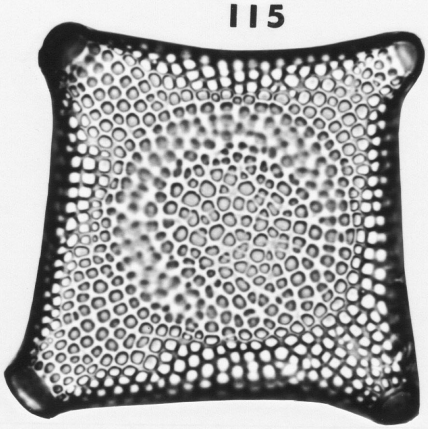

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Plate 6: MARINE DIATOMS FROM THE AZORES

Source of Material

South East coast of Faial, Caldeira Inferno. 38° 31' N; 28° 38' W.
An open crater of small volcano, shallow and sandy. Gathered from *Pinna* (molluscs) and stones. Date: June 1st, 1981.
Sample received from Hans van den Heuvel, Leiden on March 17th, 1988.

NOTE:
Material also deposited in Rijksherbarium Leiden, the Netherlands. Aliquot sample and slide also in collection Sterrenburg, Nr. 249

Plate Six:

122-26 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985, pl. 2 and 5). The huge variation in specimens of *S. fastuosa* is well covered in Paddock (1985). These specimens are all from the same small sample and are provisionally assigned to this species, with some doubts in the case of fig. 125.

127 *Actinoptychus asiaticus* Tempère and Brun in Brun and Tempère 1889. See Schmidt's Atlas (1874-1949, pl. 155, fig. 5; pl. 156, fig. 10).

128 *Actinoptychus adriaticus* Grunow 1863. Peragallo and Peragallo (1897-1908, pl. 111, fig. 5) and Hustedt (1929, fig. 267).

129-31 *Actinoptychus asiaticus* Tempère and Brun in Brun and Tempère 1889. See Schmidt's Atlas (1874-1959, pl. 155, fig. 5; pl. 156, fig. 10).

132 *Campylodiscus thurettii* Brébisson 1854. See Foged (1979, pl. 46, fig. 4).

133 *Campylodiscus ralfsii* W. Smith 1853. See Peragallo and Peragallo (1897-1908, pl. 56, fig. 4).

134 *Podocystis adriatica* (Kützing) Ralfs 1861. See Hendey (1964, pl. 27, fig. 4).

135 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985, figs. 1-8). Refer to figs. 122-26 on this plate for additional data.

136 *Campylodiscus thurettii* Brébisson 1854. See Peragallo and Peragallo 1897-1908, pl. 57, fig. 4).

137-38 *Trachyneis aspera* var. (?) (Ehrenberg) Cleve 1894. See Giffen (1963, pl. 6, fig. 107). These distinctly cuneate specimens do not appear to fit the wide range of forms of this species.

Magnification: fig. 136: x750; all others: x1000
Scale Bar: scale bar is 40 microns for fig. 136; 30 microns for all figures at x1000

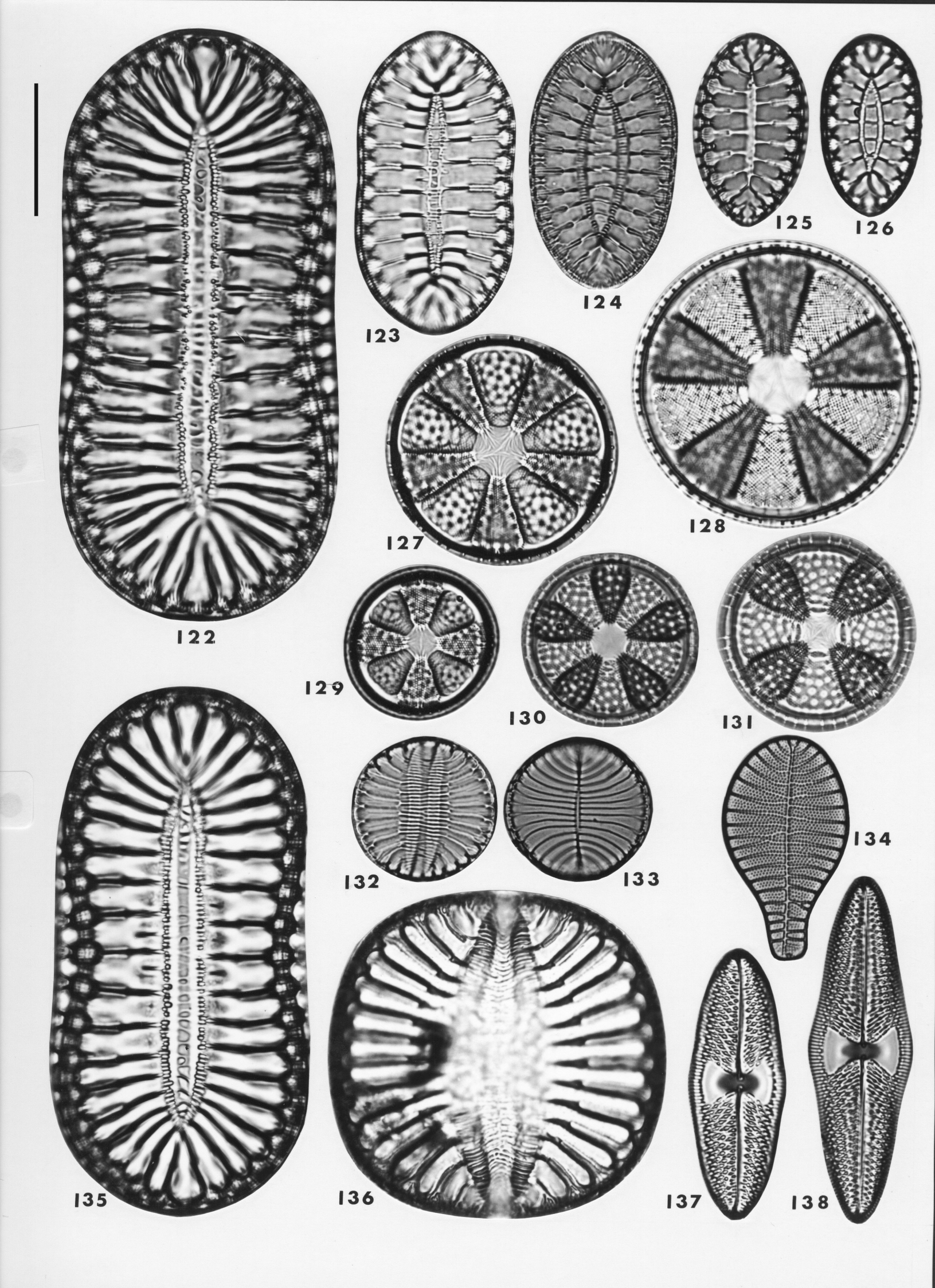
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Plate 7: MARINE DIATOMS FROM THE AZORES

Source of Material

South East coast of Faial, Caldeira Inferno. 38° 31' N; 28° 38' W.
An open crater of small volcano, shallow and sandy. Gathered from *Pinna* (molluscs) and stones. Date: June 1st, 1981.
Sample received from Hans van den Heuvel, Leiden on March 17th, 1988.

NOTE:
Material also deposited in Rijksherbarium Leiden, the Netherlands. Aliquot sample and slide also in collection Sterrenburg, Nr. 249

Plate Seven:

139-40 *Triceratium arcticum* Brightwell 1853. See Brightwell (1853, pl. 4, fig. 11), Peragallo and Peragallo (1897-1908, pl. 104, fig. 1), Desikachary (1989, pl. 794, fig. 3 and pl.795, figs 1-3. See also Foged (1985, pl. 1, fig. 8) incorrectly identified as *T. repletum*.

141-42 *Triceratium junctum* Schmidt in Schmidt et al. 1886. See Schmidt's Atlas (1874-1959, pl. 98, figs. 1-3) and Desikachary (1989, pl. 781, fig. 22).

143 *Lyrella atlantica* (Schmidt) Mann in Round, Crawford and Mann 1990. See Schmidt's Atlas (1874-1959, pl. 2, fig. 33) and Hustedt (1964, fig. 1555b), given as *Navicula lyra* var. *atlantica*.

144 *Fallacia forcipata* (Greville) Stickle and Mann 1990. See Hendey (1964, pl. 33, fig. 8), as *Navicula forcipata*.

145 *Nitzschia panduriformis* var. *lata*. See Peragallo and Peragallo (1897-1908, pl. 70, fig. 1).

146-47 *Rhabdonema adriaticum* Kützing 1844. See W. Smith (1853-1856, pl. 38, fig. 305) and Foged (1984, pl. 25, fig. 2).

148-49 *Rhabdonema adriaticum* Kützing 1844. See Hustedt (1931, fig. 552c).

150 *Grammatophora gibberula* Kützing 1844. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 16, fig. 11); also a good match for *Grammatophora marina* in Foged (1984, pl. 24, fig. 9).

151 *Grammatophora angulosa* Ehrenberg 1840. See Hustedt (1931, fig. 564c).

152 *Climacosphenia elongata* J.W. Bailey 1954. See Grunow (1862, pl. 6, fig. 22b) and Peragallo and Peragallo (1897-1908, pl. 86, figs. 2, 4).

Magnifications: fig.152: x750, all others: x1000
Scale Bar: scale bar is 40 microns for fig. 152; 30 microns for all figures at x1000

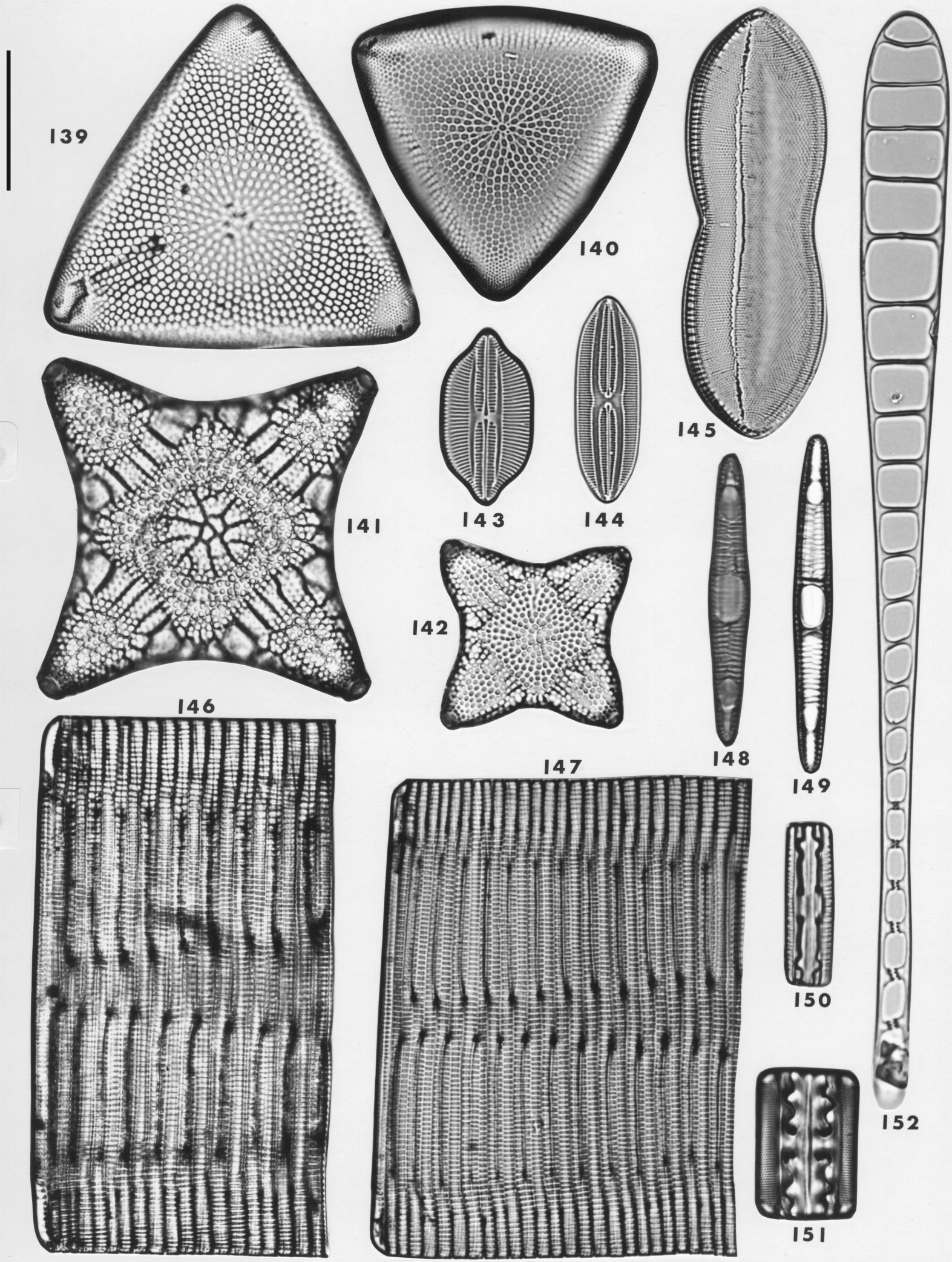
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Plate 8. MARINE DIATOMS FROM THE AZORES

Source of Material

South East coast of Faial, Caldeira Inferno. 38° 31' N; 28° 38' W.
An open crater of small volcano, shallow and sandy. Gathered from *Pinna* (molluscs) and stones. Date: June 1st, 1981.
Sample received from Hans van den Heuvel, Leiden on March 17th, 1988.

NOTE:
Material also deposited in Rijksherbarium Leiden, the Netherlands. Aliquot sample and slide also in collection Sterrenburg, Nr. 249

Plate Eight:

153 *Tabularia gaillonii* (Bory de Saint-Vincent) Ehrenberg 1830. See Peragallo and Peragallo (1897-1908, pl. 80, fig. 7) and Patrick and Reimer (1966, p. 148, pl. 6, fig. 16), as *Synedra gailloni*.

154 *Nitzschia macilenta* Gregory in Greville 1859. See Schmidt's Atlas (1974-1959, pl. 352, fig. 1).

155 *Alveus marinus* (Grunow) Kaczmarska and Fryxell 1996. See Kaczmarska and Fryxell (1996, fig. 1-19).

156 *Synedra fulgens* (Greville) W. Smith 1853. See Hustedt 1932, p.228, fig.717 d

157 *Synedra baculus* Gregory 1857. See Gregory (1857, p. 83, pl. 1, fig. 54) and Van Heurck (1880-81, pl. 42, fig. 9).

158 *Synedra formosa* Hantzsch in Rabenhorst 1863. See Hustedt (1932, p. 233, fig. 720).

159 *Synedra superba* Kützing 1844. See Desikachary (1989, pl. 738, figs. 8, 10) and W. Smith (1853-1856, pl. 12, fig. 102a). Could also be *Synedra gaillonii* (see fig. 153, on this plate). These species may require further evaluation using SEM.

160 *Hyalosynedra* (?) sp indet.

161 *Caloneis consimilis* (Schmidt) Cleve 1894. See Peragallo and Peragallo (1897-1908, pl. 9, figs. 1-2).

162 *Caloneis liber* (W. Smith) Cleve 1894. See Hendey (1964, pl. 29, fig. 2).

163 *Caloneis liber* var. *umbilicata* (Grunow in Schmidt et al.) Cleve 1894. See Peragallo and Peragallo (1897-1908, pl. 9, fig. 16).

164 *Lyrella* sp indet.

165 *Lyrella praetexta* Ehrenberg 1840. See Hustedt (1964, fig. 1488a-b), as *Navicula praexta*.

166 *Pleurosigma diverse-striatum* Meister 1935. See Sterrenburg (2002). *P. naviculaceum*, a later synonym of *P. inflatum* Shadbolt, has a smaller raphe curvature and its structure is finer.

167 *Lyrella hennedyi* (W. Smith) Stickle and Mann in Round, Crawford and Mann 1990. See Hendey (1964, pl. 33, fig. 14), as *Navicula hennedyi*.

168 *Navicula perplexa* Peragallo and Peragallo 1897. See Peragallo and Peragallo (1897-1908, pl. 23, fig. 13) and Hendey (1964, pl. 33, fig. 13).

169 *Lyrella sandriana* (Grunow) Mann in Round, Crawford and Mann 1990. See Hustedt (1964, fig. 1481), as *Navicula sandriana*.

170 *Navicula (Lyrella) clavata* var. *impressa* Peragallo and Peragallo 1897 (No formal transfer to *Lyrella* can be found for this variety). According to VanLandingham (1968b, p. 2468) this equates to *N. clavata* Gregory (1856, p. 46, pl. 5, fig. 17), but the illustration in Peragallo and Peragallo (1897-1908, pl. 24, figs. 11- 13) looks sufficiently distinct from Gregory's to retain the var. *impressa*, which shows the impression opposite the central area at the inner edge of the striations.

Magnifications: figs. 153, 155: x2000; figs. 154, 156, 158: x750; all others: x1000
Scale Bar: scale bar is 40 microns for the figures shown at x750; 30 microns at x1000; 15 microns at x2000

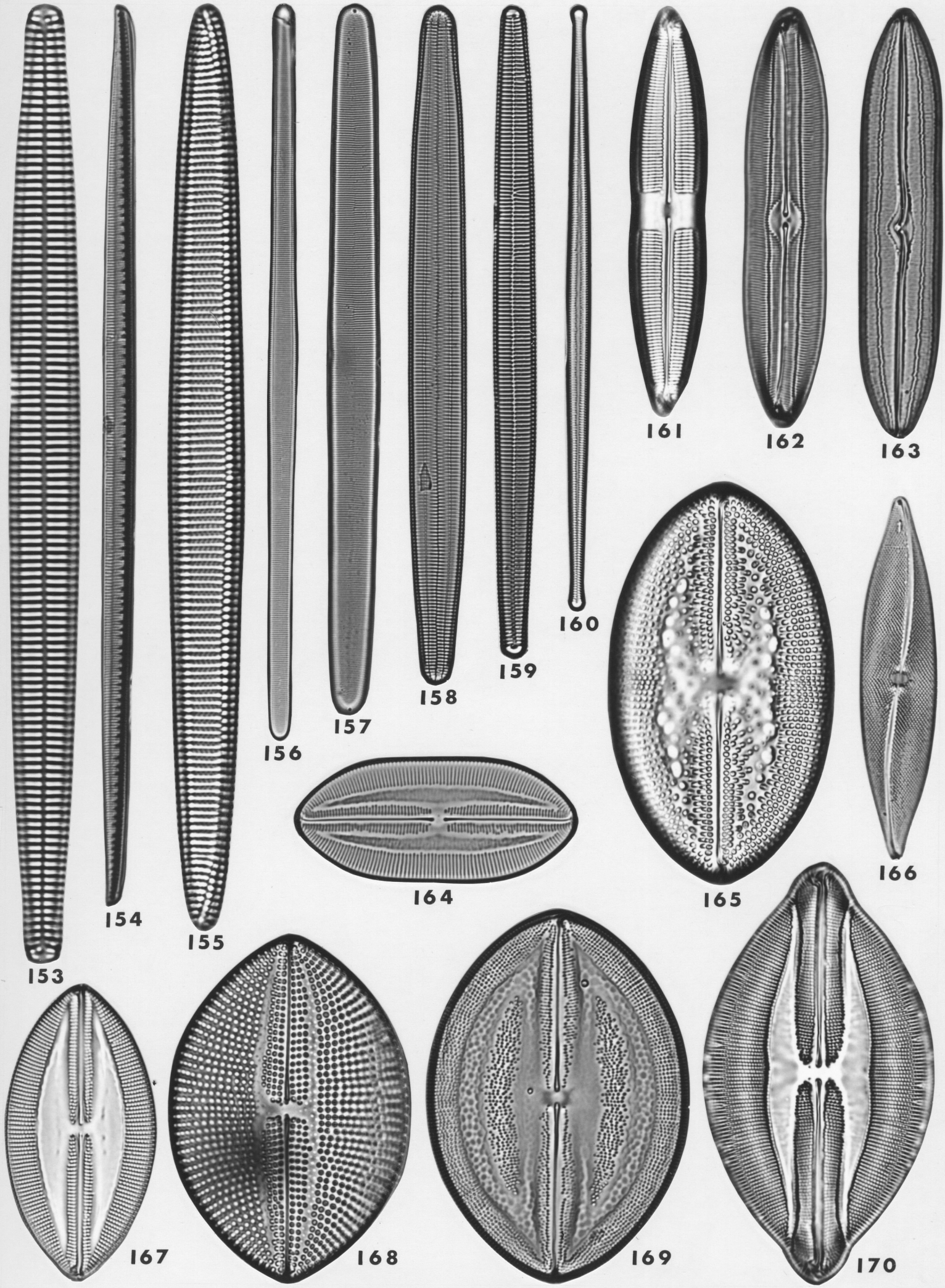
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Plate 9. MARINE DIATOMS FROM THE BAY OF CAMPECHE

Source of Material

Material from the Bay of Campeche marine sediment ("Meerschlamm"), a strew mount by J.D. Möller, slide number HC 3226 held at the National Institute of Water and Atmospheric Research (NIWA), Greta Point, Wellington, New Zealand. Slide HC 1474 ("Campeche Bay") prepared by M. Harrison, also held at NIWA.

Plate Nine:

1 *Lyrella approximata* (Greville) Mann in Round, Crawford and Mann 1990. See Hustedt (1927-1966, fig. 1490a), as *Navicula approximata*.

2-4 *Triceratium campechianum* Grunow in Cleve 1878, interior valve. See Schmidt's Atlas (1874-1959, pl. 78, figs. 18-20) as *T. decangulatum* on a selected slide HC 814, which is probably an invalid name. There is a considerable difference in valve morphology between the original figure of *Triceratium campechianum* Grunow in Cleve (1878, pl. 5, fig. 28) and those in Schmidt's Atlas (1874-1959). Schmidt's drawings agree exactly with the specimens pictured here.

5 *Stictodiscus parallelus* (Ehrenberg) Cleve-Euler 1941. See Schmidt's Atlas (1874-1959, pl. 447, fig. 1).

6 *Triceratium pentacrinus* (Ehrenberg) Wallich 1858. See Schmidt's Atlas (1874-1959, pl. 98, fig. 13).

7 *Nitzschia nicobarica* (Grunow) Grunow 1880. See Grunow (1880, pl. 12, fig. 2).

8 *Nitzschia gruendleri* Grunow in Cleve 1878. See Grunow in Cleve (1878, pl. 4, fig. 24).

9 *Stictodiscus parallelus* (Ehrenberg) Cleve-Euler 1941. See Schmidt's Atlas (1874-1959, pl. 75, fig. 12) given as *Triceratium parallelum* fo. *trigona*. (= *Triceratium parallelum*, slide HC 813).

10-11 *Auliscus clevei* Grunow in Schmidt et al. 1875. See Schmidt's Atlas (1874-1959, pl. 31, figs. 1-4).

12-13 *Cocconeis grata* Schmidt in Schmidt et al. 1894. See Hustedt (1933, fig. 795).

Magnifications: all figures x1000
Scale Bar: scale bar is 30 microns for the figures shown at x1000

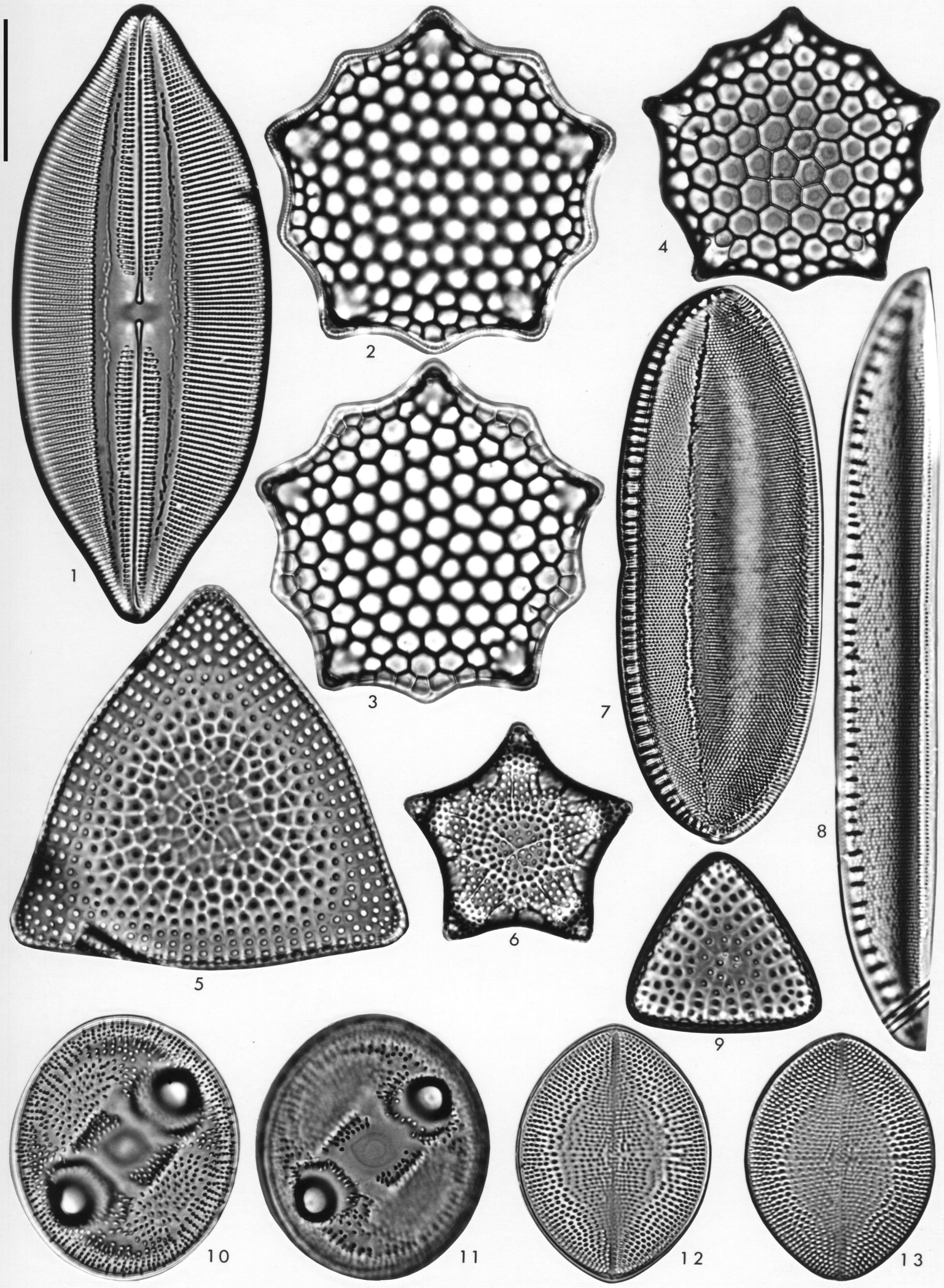
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Plate 10. MARINE DIATOMS FROM THE BAY OF CAMPECHE

Source of Material

Material from the Bay of Campeche marine sediment ("Meerschlamm"), a strew mount by J.D. Möller, slide number HC 3226 held at the National Institute of Water and Atmospheric Research (NIWA), Greta Point, Wellington, New Zealand. Slide HC 1474 ("Campeche Bay") prepared by M. Harrison, also held at NIWA.

Plate Ten:

14 *Lyrella spectabilis* (Gregory) Mann in Round, Crawford and Mann 1990. See Hustedt (1964, fig. 1534), as *Navicula spectabilis*.

15 *Navicula (Lyrella) hennedyi* fo. *granulata* Grunow in Schmidt et al. 1874 (No formal transfer to *Lyrella* can be found for this form). See Hustedt (1964, fig. 1518).

16 *Lyrella lyroides* (Hendey) Mann in Round, Crawford and Mann 1990. See Hustedt (1964, fig. 1547), given as *Navicula lyroides*.

17 *Lyrella hennedyi* (W. Smith) Stickle and Mann in Round, Crawford and Mann 1990. See Hustedt (1964, fig. 1516b), as *Navicula hennedyi*.

18 *Navicula schaarschmidtii* Pantocsek 1886. See Hustedt (1964, fig. 1477).

19 *Trachyneis schmidtiana* (Grunow 1876) Peragallo et Peragallo 1898. See Schmidt's Atlas (1874-1959, pl. 48, fig. 19).

20 *Glyphodesmis tumida* Boyer 1920. See Boyer (1920, p. 68, pl. 2, fig. 2).

21 *Plagiogramma validum* Greville 1859. See Schmidt's Atlas (1874-1959, pl. 210, fig. 1).

22 *Plagiogramma validum* var. *tumidulum* Grunow in A. Schmidt 1897. See Schmidt's Atlas (1874-1959. pl. 210, figs. 2-3).

23 *Plagiogramma wallichianum* Greville 1865. See Schmidt's Atlas (1874-1959, pl. 209, fig. 20).

24 *Diploneis lacrimans* (Schmidt in Schmidt et al.) Hustedt 1937. See Schmidt's Atlas (1874-1959, pl. 12, figs. 59-60).

25-26 *Diploneis gemmata* (Greville) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 8, fig. 38) and also a selected *D. gemmata* specimen on slide HC 1335.

27 *Diploneis serratula* (Grunow in Schmidt et al.) Hustedt 1937. See Schmidt's Atlas

(1874-1959, pl. 7, figs. 42-43).

28 *Diploneis nitescens* (Gregory) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 7, fig. 38).

29 *Parlibellus takoradiensis* Hendey 1958. See Hendey (1958, p. 67, pl. 1, fig. 8) and also Schmidt's Atlas (1874-1959, pl. 397, fig. 42) given as *Navicula weissflogii* Grunow, a specific epithet already occupied. NOTE: *N. weissflogii* was transferred to *Parlibellus* by Cox (1988), without taking into account this synonomy. A formal decision on authorship is lacking.

30 *Hemidiscus cuneiformis* Wallich 1860. See Schmidt's Atlas (1874-1959, pl. 436, fig. 1).

31 *Nitzschia praelonga* Cleve in Cleve and Grunow 1880. See Cleve (1881, pl. 4, fig. 48). In light microscope, this specimen shows some resemblance to *Bacillaria* sp.

Magnifications: figs. 14-29: x 1000; fig. 30: x 750, fig. 31: x 500
Scale Bar: scale bar is 30 microns for the figures shown at x1000; 40 microns at x750; 60 microns at x500

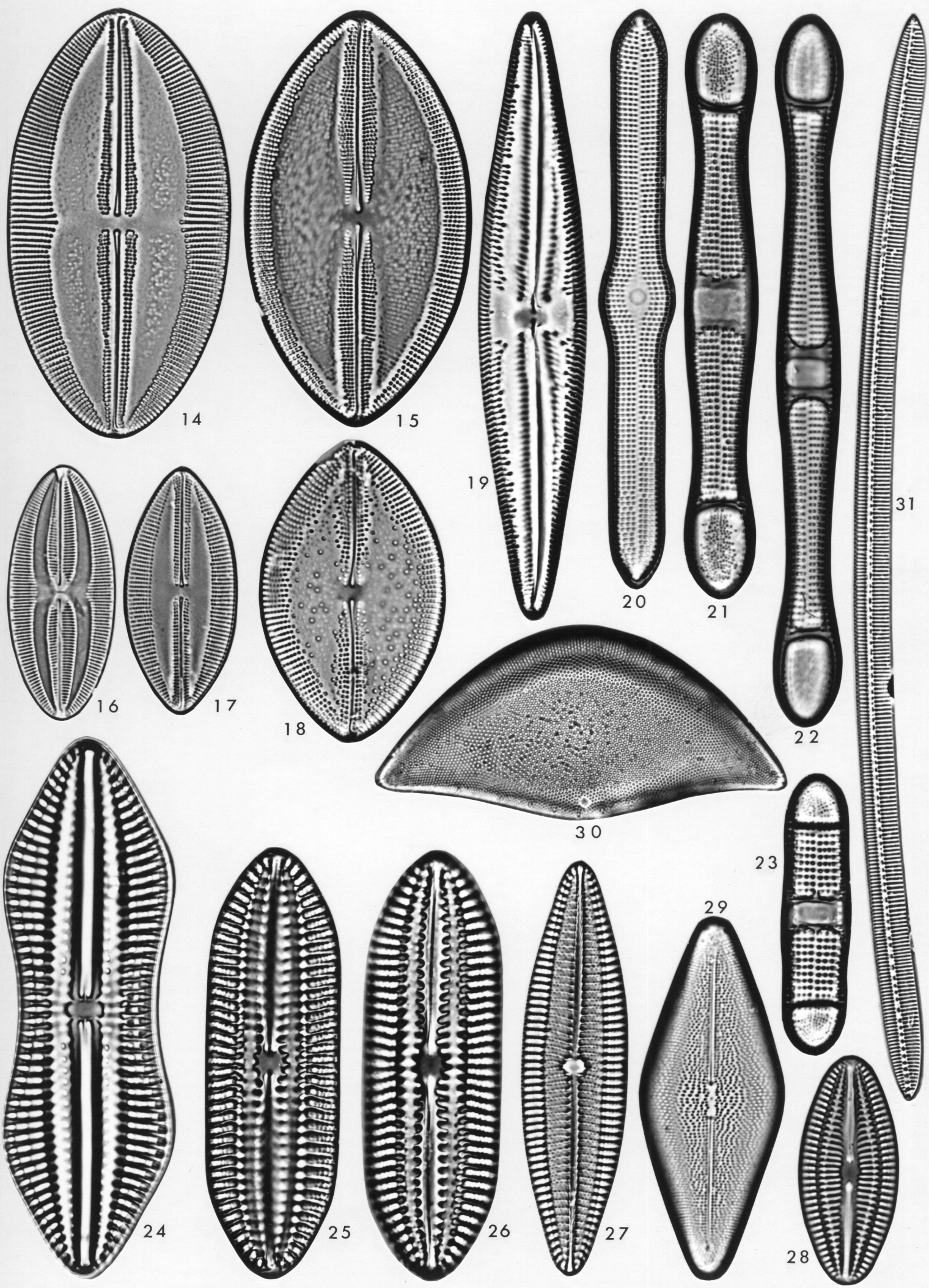
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Plate 11. MARINE DIATOMS FROM THE BAY OF CAMPECHE

Source of Material

Material from the Bay of Campeche marine sediment ("Meerschlamm"), a strew mount by J.D. Möller, slide number HC 3226 held at the National Institute of Water and Atmospheric Research (NIWA), Greta Point, Wellington, New Zealand. Slide HC 1474 ("Campeche Bay") prepared by M. Harrison, also held at NIWA.

Plate Eleven:

32 *Campylodiscus iyengarii* Subrahmanyan 1946. See Desikachary and Prema (1987, pl. 253, fig. 1; pl. 352, fig. 4).

33 *Azpeitia nodulifer* (Schmidt) Fryxell and Sims in Fryxell, Sims, and Watkins 1986. See Fryxell, Sims and Watkins (1986, fig. 30 (4A)).

34 *Mastogloia rhombus* (Petit) Cleve and Grove, 1891. See Schmidt's Atlas (1874-1959, pl. 187, fig. 33); also Hustedt (1933, fig. 905).

35 *Stictodiscus harrisonianus* (Norman and Greville in Greville) Castracane 1886. See Schmidt's Atlas (1874-1959, pl. 75, fig. 16) given as *Triceratium harrisonianum*. See also Desikachary (1989, pl. 713, figs. 3-4).

36 *Cocconeis grata* Schmidt in Schmidt et al. 1894. See Cleve (1894-1895, pl. 2, fig. 31) and Hustedt (1933, fig. 795).

37 *Cocconeis distans* (?) Gregory 1857. See Schmidt's Atlas (1874-1959, pl. 193, fig. 30).

38 *Actinocyclus normanii* (?) (Gregory in Greville) Hustedt 1957. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 4, fig. 7).

39 *Navicula (Parlibellus?) gründleri* (Cleve and Grunow in Cleve) Cleve 1895. See Cleve (1878, pl. 7, fig. 10) given as *Alloioneis gründleri*. See Schmidt's Atlas (1874-1959, pl. 370, fig. 2). This species likely belongs in the genus *Parlibellus*, but has not yet been transferred.

40-41 *Stictodiscus parallelus* (Ehrenberg) Cleve-Euler 1941. See Schmidt's Atlas (1874-1959, pl.75, fig. 12), given as *Triceratium parallelum* fo. *trigona*.

42-43 *Actinocyclus normanii* (?) (Gregory in Greville) Hustedt 1957. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 4, fig. 7).

44 *Stictodiscus nankoorensis* (Grunow) Pantocsek 1889. See Desikachary (1989, pl. 712, fig. 4).

45 *Azpeitia nodulifer* (Schmidt) Fryxell and Sims in Fryxell, Sims and Watkins 1986. See Desikachary and Prema (1987, pl. 324, fig. 6).

46 *Stephanopyxis campechiana* Grunow in Schmidt et al. 1881. See Schmidt's Atlas (1874-1959, pl. 65, fig. 20) and also slide HC 1855.

47 *Azpeitia nodulifer* (Schmidt) Fryxell and Sims in Fryxell, Sims and Watkins 1986. See Fryxell, Sims, and Watkins (1986, p. 69, figs. 3-4).

48 *Diploneis fusca* var. *pelagi* (Schmidt in Schmidt et al.) Cleve 1894. See Hustedt (1937, fig. 1055), and also Ricard (1977, pl. 4, fig. 2).

49 *Diploneis bombus* (Ehrenberg) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 69, Figs. 28-29). A very small specimen matching Hustedt (1927-1966, fig. 1086c).

50 *Diploneis weissflogii* (Schmidt) Cleve 1894. See Hustedt (1937, fig. 1085).

51 *Diploneis bombus* (Ehrenberg) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 69, figs. 28-29).

52 *Navicula (Lyrella) spectabilis* var. *punctata* Desikachary and Prema in Desikachary 1989 (No formal transfer to *Lyrella* can be found for this variety). See Desikachary (1989, pl. 649, fig. 3).

53 *Lyrella spectabilis* (Gregory) Mann in Round, Crawford and Mann 1990. See Desikachary (1989, pl. 648, fig. 9).

54 *Amphora crassa* Gregory 1857. See Schoeman, Archibald and Sims (1986, pl. 2, figs. 8-9).

Magnifications: figs. 32, 46: x750; fig. 35: x500; all others: x1000
Scale Bar: scale bar is 40 microns for the figures shown at x750; 60 microns at x500; 30 microns at x1000

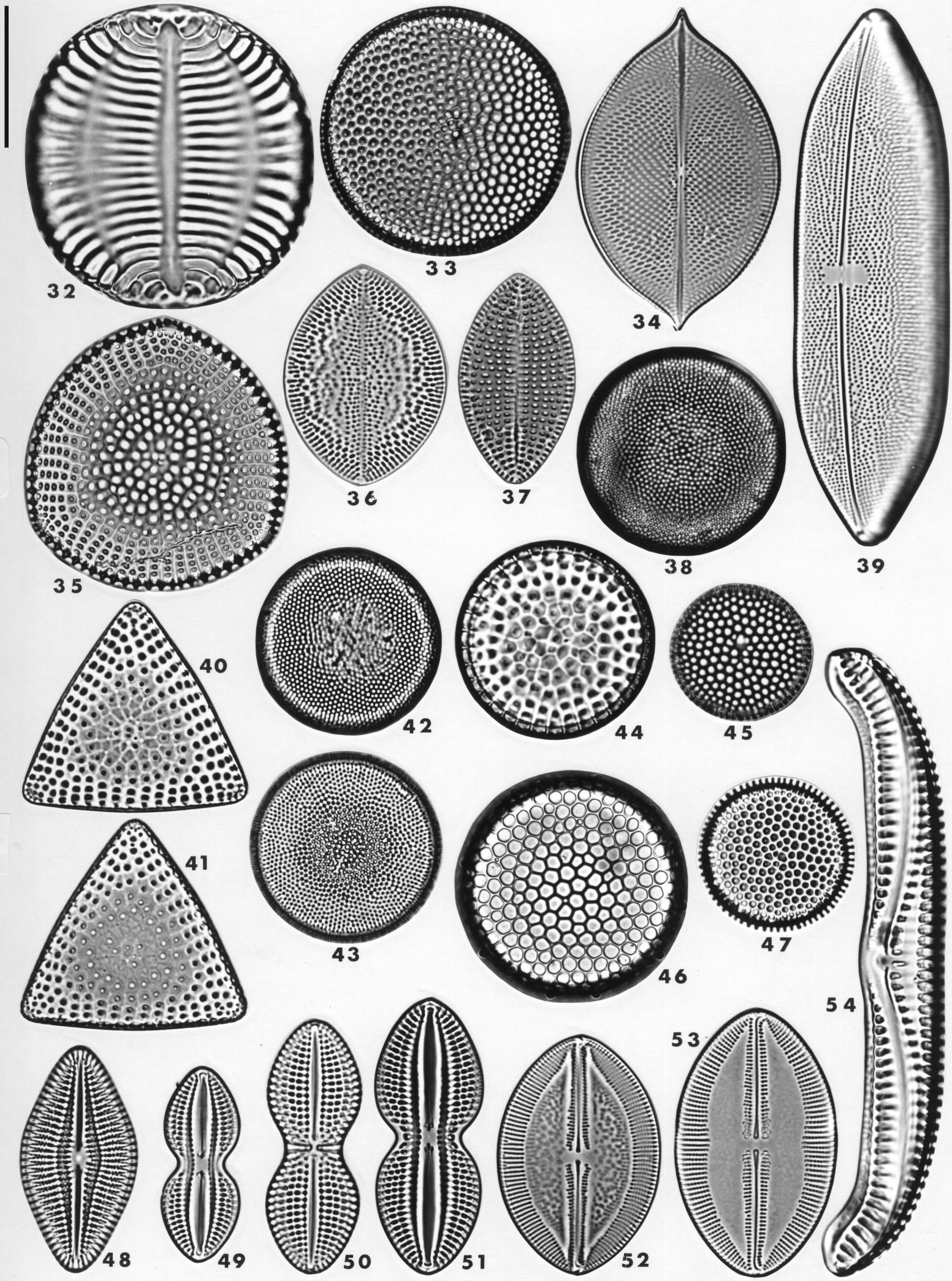
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Plate 12. MARINE DIATOMS FROM THE BAY OF CAMPECHE

Source of Material

Material from the Bay of Campeche marine sediment ("Meerschlamm"), a strew mount by J.D. Möller, slide number HC 3226 held at the National Institute of Water and Atmospheric Research (NIWA), Greta Point, Wellington, New Zealand. Slide HC 1474 ("Campeche Bay") prepared by M. Harrison, also held at NIWA.

Plate Twelve:

55 *Diploneis pandura (*Brébisson) F.W. Mills 1934. See Desikachary and Prema (1987, pl. 286, fig. 1). See also Hustedt (1937, fig. 1034) of a specimen given as *D. crabro* var. *pandura,* and in this atlas (pl. 20, fig. 26).

56 *Diploneis pandura* (Brébisson) F.W. Mills 1934. See Hustedt (1937, fig. 1028).

57-58 *Diploneis crabro* (Ehrenberg) Ehrenberg 1854. See Desikachary and Prema (1987, pl. 286, fig. 9).

59 *Diploneis gemmatula* (Grunow in Schmidt et al.) Cleve 1894. See Hustedt (1937, fig. 1038).

60 *Lyrella spectabilis* (Gregory) Mann in Round, Crawford and Mann 1990. See Desikachary (1989, pl. 648, fig. 8).

61 *Amphora schmidtii* Grunow in Schmidt et al. 1875. See Schmidt's Atlas (1874-1959, pl. 28, fig. 3), of a specimen from the Bay of Campeche.

62 *Amphora proteus* sensu Payne, non Gregory. See Schoeman and Archibald (1986, p. 435, figs. 84-86).

63 *Amphora gründleri* Grunow in Schmidt et al. 1875. See Schmidt's Atlas (1874-1959, pl. 28, fig. 27).

64 *Amphora grevilleana* Gregory 1857. See Schoeman, Archibald and Sims (1986, figs. 22a-c, 23-24).

65 *Amphora egregia* Ehrenberg 1861. See Schmidt's Atlas (1874-1959, pl. 28, fig. 15), of a specimen from the Bay of Campeche.

66 *Plagiogramma spinosom* Cleve 1881. See Cleve (1881, pl. 4, fig. 55); also Schmidt's Atlas (1874-1959, pl. 211, figs. 26, 28).

67 *Amphora robusta* Gregory 1857. See Schoeman and Archibald (1986, figs. 87-89).

Magnifications: fig. 55: x750; all others: x1000.
Scale Bar: scale bar is 40 microns for fig. 55; 30 microns for all figures at x1000

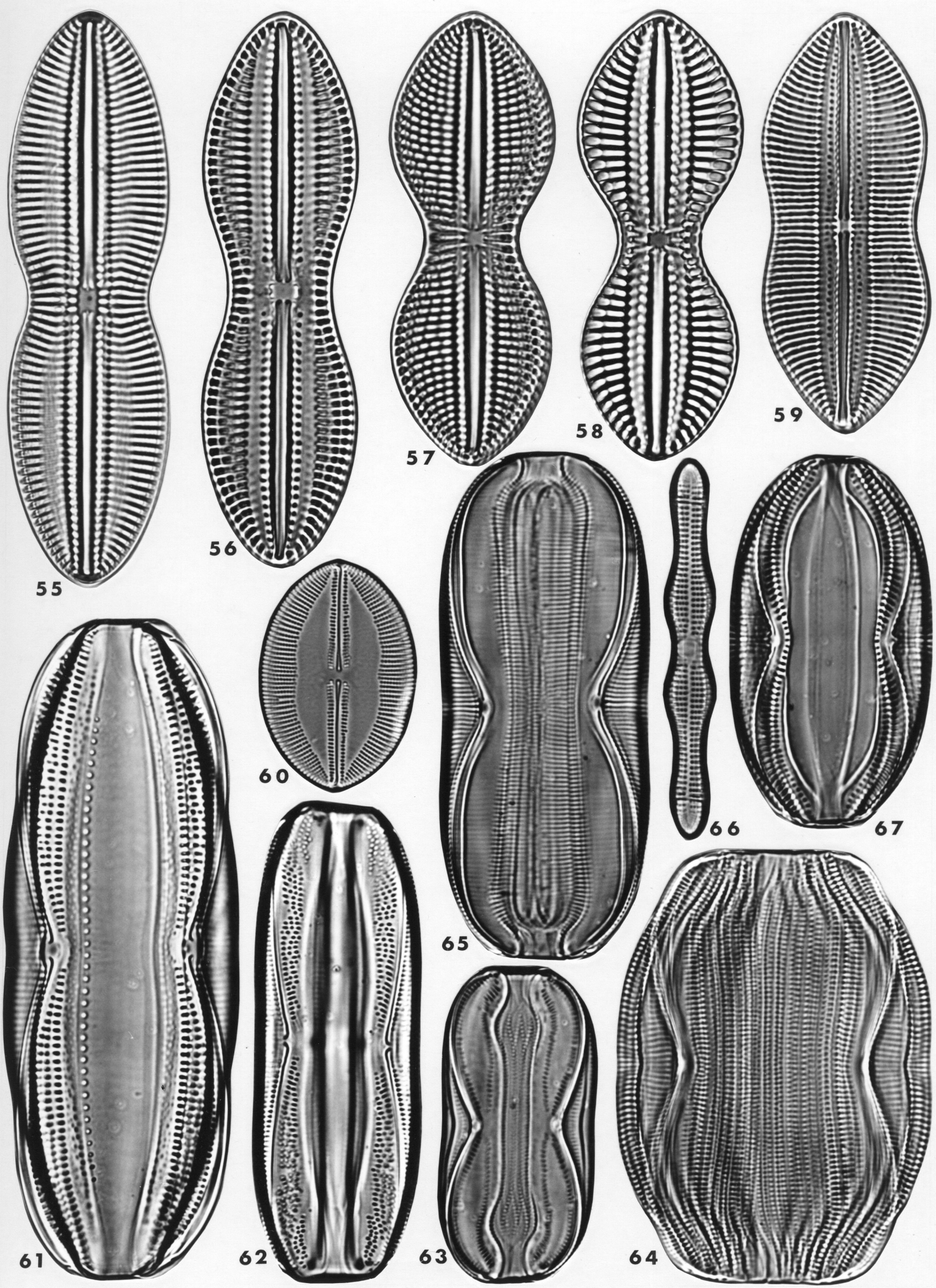
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Plate 13. MARINE DIATOMS FROM THE BAY OF CAMPECHE

Source of Material

Material from the Bay of Campeche marine sediment ("Meerschlamm"), a strew mount by J.D. Möller, slide number HC 3226 held at the National Institute of Water and Atmospheric Research (NIWA), Greta Point, Wellington, New Zealand. Slide HC 1474 ("Campeche Bay") prepared by M. Harrison, also held at NIWA.

Plate Thirteen:

68 *Surirella fastuosa* var. *cuneata* Deby in Mills 1935. See Desikachary (1989, pl. 723, fig. 7).

69-70 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985) for variations.

71 *Hemidiscus cuneiformis* Wallich 1860. See Hendey (1964, pl. 22, fig. 9).

72 *Tryblionella jelineckii* (Grunow) Mann in Round, Crawford and Mann 1990. See Grunow (1863, pl. 14, fig. 4) and Hendey (1958, pl. 1, fig. 4), given as *Nitzschia jelineckii*.

73 *Nitzschia punctata* var. *coarcata* (Grunow) Hustedt 1921. See Peragallo and Peragallo (1897-1908, pl. 69, fig. 26).

74 *Biddulphia spinosa* (J.W. Bailey) Boyer 1900. See Brightwell (1856, pl. 17, fig. 9) given as *T. armatum* Roper. See also Desikachary (1989, pl. 792, figs. 4-5). *B. spinosa* is taxonomic synonym to *Triceratium spinosum*.

75 *Lyrella approximata* (Greville) Mann in Round, Crawford and Mann 1990. See Hustedt (1964, fig. 1490a), given as *Navicula approximata*.

76 *Lyrella hennedyi* (W. Smith) Stickle and Mann in Round, Crawford and Mann 1990. See Hustedt (1964, fig. 1516b), given as *Navicula hennedyi*. See also in this volume (pl. 10, fig. 17).

77 *Lyrella praetexta* (Ehrenberg) Mann in Round, Crawford and Mann 1990. See Hustedt (1964, fig. 1488b) and Hendey (1964, pl. 33, fig. 1), given as *Navicula praetexta*.

78 *Plagiogramma validum* Greville 1859. See Schmidt's Atlas (1874-1959, pl. 209, figs. 57-58).

79 *Triceratium trinitus* (?) Brun in Schmidt et al. 1891. See Schmidt's Atlas (1874-1959, pl. 372, fig. 1a). A provisional identification only. Identification is very doubtful as no specimen in valve view could be found

80 *Navicula (Parlibellus?) gründleri* (Cleve and Grunow in Cleve) Cleve 1895. See Schmidt's Atlas (1874-1959, pl. 370, fig. 2). This valve is tilted by 90° with the raphe on the right. Central area and especially dichotomous row of puncta match *N. gründleri* in Hustedt (1927-1966, fig. 1733). This species likely belongs to the genus *Parlibellus*, but has not yet been tranferred.

81 *Plagiogramma tessellatum* Greville 1859. See Schmidt's Atlas (1874-1959, pl. 209, figs. 44, 48-49).

82-83 *Diploneis nitescens* (Gregory) Cleve 1894. See Hustedt (1937, fig. 1047).

84 *Caloneis probabilis* (Schmidt in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 50, fig. 46).

Magnifications: fig. 84: x750; all others: x1000.
Scale Bar: scale bar is 40 microns for fig. 84; 30 microns for all figures at x1000

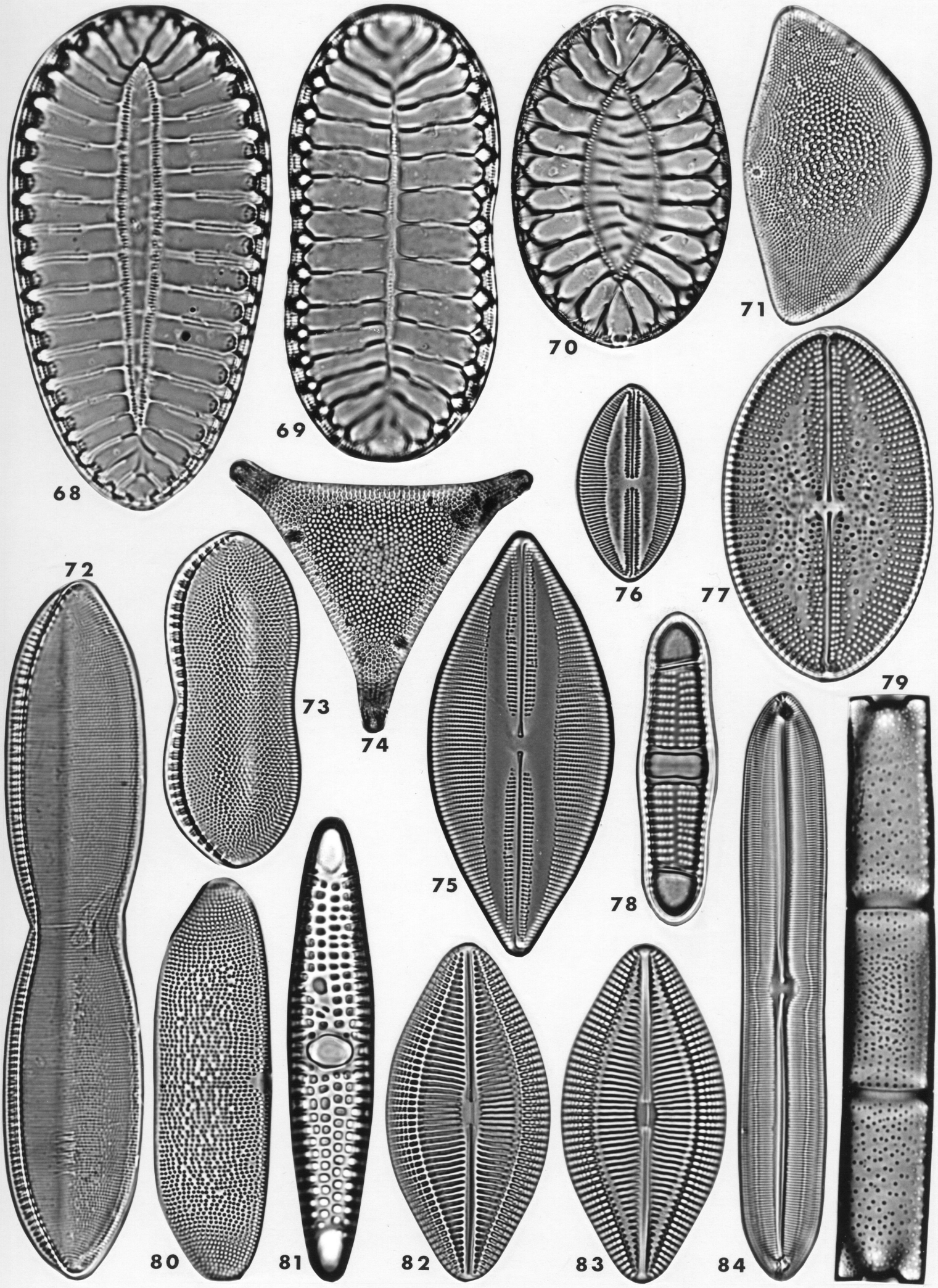
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Plate 14. MARINE DIATOMS FROM THE CAPE VERDE ISLANDS

Source of Material

Material from the Cape Verde Islands, northwest coast of Sao Vincente (16º 54′ N; 25º 02′ W) on calcarous algae, Bryozoans. Depth was 35-40 meters. Sample taken with a 1.2 meter Agassiz trawl. Date: June 21st, 1982.

The above description was received with the sample from Hans van den Heuvel, Leiden on March 17th, 1988.

Plate Fourteen:

1-2 *Lyrella robertsiana* (Greville) Mann in Round, Crawford and Mann 1990. See Hustedt (1927-1966, fig. 1544a-c). Exterior of valve; fig. 1 in high focus, fig. 2 in low focus.

3 *Lyrella approximata* (Greville) Mann in Round, Crawford and Mann 1990. See Hendey (1970, pl. 2, fig. 13).

4 *Dictyoneis jamaicensis* (Greville) Cleve 1890 . See Cleve (1894-1895, pl. 5, fig. 32) and Greville in Williams (1988, pl. 45, figs. 9-10).

5 *Oestrupia powellii* var. *egyptiaca* (Greville) Heiden in Schmidt et al. 1906, of a specimen from the selected slide HC 3746. See Greville in Williams (1988, pl. 44, figs. 11-12) given as *Navicula egyptiaca*.

6-7 *Triceratium reticulum* Ehrenberg 1974. See Desikachary (1989, pl. 803, fig. 2), given as *Trigonium reticulum* (Ehrenberg) Simonsen.

8-9 *Surirella fastuosa* Deby in Mills 1935. See Paddock (1985) for variations.

10 *Diploneis cynthia* (Schmidt in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 8, fig. 41).

11 *Diploneis vacillans* (Schmidt in Schmidt et al.) Cleve 1894. See Foged (1978, pl. 24, fig. 9) given as *D. vacillans* var. *renitens*.

12 *Diploneis papula* var. *constricta* Hustedt, 1937. See Hustedt (1937, fig. 1071d). Also Foged (1985, pl. 17, fig. 10) and Foged (1985, pl. 10, fig. 1).

13 *Diploneis fusca* (Gregory) Cleve 1894, of a specimen from selected slide HC 3739. See Schmidt's Atlas (1874-1959, pl. 7, fig. 4); also Gregory (1857, pl. 9, fig. 15) given as *Navicula smithii* var. *fusca*.

14-15 *Diploneis diplosticta* (Grunow in Schmidt et al.) Hustedt, 1937 . Schmidt's Atlas (1874-1959, pl. 13, figs. 25-30).

16 *Diploneis mediterranea* (Grunow in Schmidt et al.) Cleve 1894. See Hustedt (1937, fig. 1014a).

17 *Oestrupia delecta* (A. Mann) Stidolph comb. nov. The specimen figured here corresponds to the illustration of "Navicula delecta" A. Mann (1925, pl. 24, fig. 5). "Navicula delecta" Meister (1937, pl. 10, fig. 4) is a different species and is therefore a heterotypic synonym. The species shown here does not belong to the genus *Navicula* sensu stricto, but to *Oestrupia* and is here formally renamed *Oestrupia delecta* (A. Mann) Stidolph, with *Navicula delecta* A. Mann (1925, pl. 24, fig. 5) as the basionym.

18 *Diploneis sp. indet.*. This species matches Schmidt's Atlas (1874-1959, pl. 13, figs. 4, 6), identified as "Navicula" (*Diploneis*) *gemina*. According to VanLandingham (1968b, p. 2561) this equates to *Diploneis bombus*, but there are major structural differences. This also applies to *D. didyma* (Witkowski, Lange-Bertalot, and Metzeltin, 2000, pl. 87, fig. 17-19).

19 *Diploneis chinensis* Cleve 1894. See Cleve (1894-1895, pl. 1, fig. 25).

20-21 *Surirella fastuosa* Deby in Mills 1935. See Paddock (1985, pl. 5, fig. 33).

22 *Diploneis lineata* (Donkin) Cleve 1894. See Schmidt's Atlas (1874-1959, pl.7, fig. 44); also Van Heurck (1896, p. 195, pl. 26, fig. 737).

23 *Diploneis prisca* (Schmidt in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 12, figs. 67-68).

24 *Diploneis subcincta* (Schmidt) Cleve 1894. See Hustedt (1937, fig. 1072b).

25 *Campylodiscus imperialis* Greville 1860. See Greville (1860, pl. 1, fig. 3); also Schmidt's Atlas (1874-1959, pl. 53, figs. 5, 7).

Magnifications: figs. 1-2: x750; fig. 25: x500; all others: x1000
Scale Bar: scale bar is 40 microns for the figs. 1-2; 60 microns for fig. 25; 30 microns for all figures at x1000

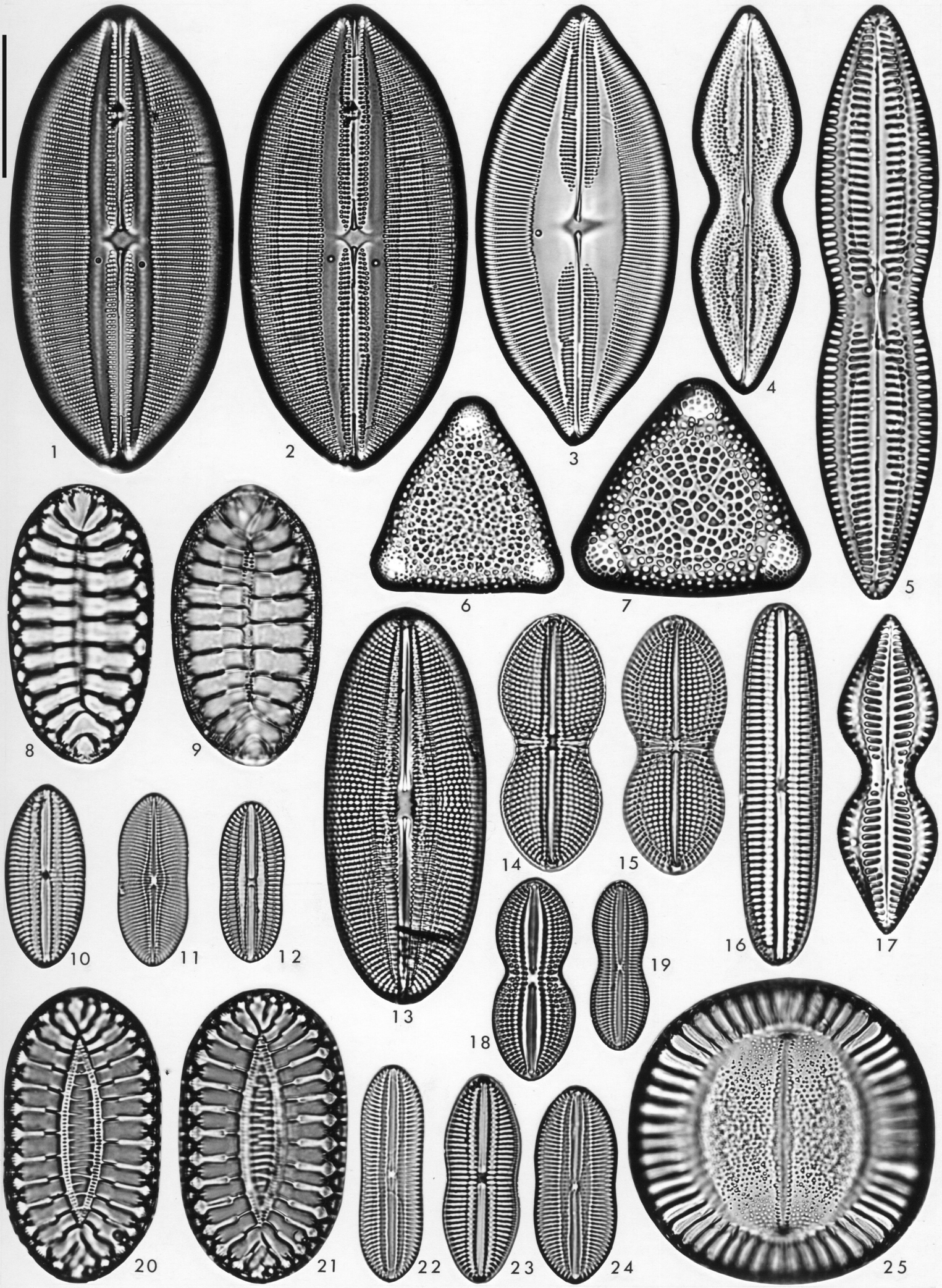
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Plate 15. MARINE DIATOMS FROM THE CAPE VERDE ISLANDS

Source of Material

Material from the Cape Verde Islands, northwest coast of Sao Vincente (16º 54′ N; 25º 02′ W) on calcarous algae, Bryozoans. Depth was 35-40 meters. Sample taken with a 1.2 meter Agassiz trawl. Date: June 21st, 1982.

The above description was received with the sample from Hans van den Heuvel, Leiden on March 17th, 1988.

Plate Fifteen:

26-29 *Psammodiscus nitidus* (Gregory) Round and Mann 1980.

30 *Rhaphoneis* sp. indet.

31 *Azpeitia neocrenulata* (VanLandingham) G. Fryxell and T.P. Watkins in Fryxell, Sims, and Watkins 1986. See Fryxell, Sims, and Watkins (1986, p. 13, fig. XXX, 2a-b).

32 *Coscinodiscus hauckii* var. *mesoleia* (Cleve) Hustedt 1928 . See Hustedt (1928, fig. 200b). See also in this volume (pl. 34, fig. 98) taken with 90x oil objective to properly show the puncta formation. *Coscinodiscus hauckii* was transferred to the genus *Ehrenburgiulva* by Witkowski, Lange-Bertalot, and Metzeltin in Witkowski and Lange-Bertalot (2004), but this variety has yet to be transferred.

33 *Roperia tesselata* (Roper) Grunow in Pelletan 1889. See Foged (1975, pl. 6, fig. 5) and also Hendey (1964, pl. 22, fig. 3).

34 *Stictodiscus californicus* var. *nankoorensis* Grunow 1867. See Schmidt's Atlas (1874-1959, pl. 74, fig. 3).

35-36 *Cyclostephanos dubius* (Hustedt) Round in Theriot et al. 1987. See Hickel and Hakansson (1987, p. 39, figs. 15-16).

37-38 *Diploneis coffaeiformis* (Schmidt) Cleve 1894. See Hustedt (1937, fig. 1025), given as *Navicula coffaeiformis*.

39 *Fallacia forcipata* (Greville) Stickle and Mann in Round, Crawford and Mann 1990. See Van Heurck (1896, pl. 4, fig. 163), given as *Navicula forcipata*.

40-41 *Lyrella hennedyi* (W. Smith) Stickle and Mann in Round, Crawford and Mann 1990. See Hustedt (1964, fig. 1516), given as *Navicula hennedyi*.

42-43 *Lyrella impercepta* (Hustedt) Moreno in Moreno, Licea and Santoyo 1996.

See Hustedt (1964, fig. 1530), given as *Navicula impercepta*. See also Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 99, fig. 3).

44 *Cocconeis scutellum* Ehrenberg 1838. See Schmidt's Atlas (1874-1959, pl. 190, fig. 10) also Hendey (1964, pl. 27, fig. 8).

45 *Cocconeis pinnata* Gregory in Greville 1859. See Schmidt's Atlas (1874-1959, pl. 190, fig. 4) and Foged (1975, pl. 11, fig. 16).

46 *Cocconeis* sp. indet. This specimen is a good match for Schmidt's Atlas (1874-1959, pl. 190, fig. 11), where identification is uncertain.

47 *Rhaphoneis amphiceros* (?) (Ehrenberg) Ehrenberg 1844. See Foged (1987, pl. 5, fig. 8). Very irregular striation suggests an abnormal form.

48 *Cocconeis pseudomarginata* (?) Gregory 1857. This matches the figures so identified in Schmidt's Atlas (1874-1959, pl. 194, fig. 20). See also John (1983, pl. 35, fig. 6), but identification not certain.

49-50 *Mastogloia jelineckiana* Grunow 1867. See Schmidt's Atlas (1874-1959, pl. 187, fig. 49) and also Hustedt (1933, fig. 977).

51 *Nitzschia corpulenta* Hendey 1958. See Hendey (1958, p. 78, pl. 1, fig. 5); also Archibald (1983, pl. 19, figs. 367-371).

52 *Glyphodesmis tumida* Boyer 1920. Boyer (1920, p. 68, pl. 2, fig. 2).

53 *Dimeregramma marinum* (Gregory) Ralfs in Pritchard 1861. See Foged (1984, pl. 26, fig. 11).

54 *Cocconeis apiculata* (Greville) Schmidt in Schmidt et al. 1895. See Schmidt's Atlas, (1874-1959, pl. 198, fig. 37); also Desikachary and Prema (1987, pl. 299, fig. 5).

55 *Cymbella turgidula* Grunow in Schmidt et al. 1875. See Krammer and Lange-Bertalot (1985, pl. 6, fig. 4).

56 *Cymbella tumida* (Brébisson in Kützing) Van Heurck 1880. See Germain (1981, pl. 106, fig. 2).

57 *Navicula digitoradiata* (Gregory) Ralfs in Pritchard 1861. See Krammer and Lange-Bertalot (1985, pl. 22, fig. 17).

58 *Pinnularia bistriata* (Leuduger-Fortmorel) Cleve 1895. See Foged (1984 pl. 51, fig. 1).

59-60 *Lyrella* sp. indet. Fig. 59 is oblique brightfield illumination.

61 *Amphora ostrearia* Brébisson in Kützing 1849. See Peragallo and Peragallo (1897-1908, pl. 49, fig. 14), given as *A. ostrearia* var. *vitrea*. See also John (1983, pl. 62, fig. 10).

62-63 *Auricula amphitritis* Castracane 1873. See Peragallo and Peragallo (1897-1908, pl. 42, figs. 6-7).

64-65 *Diploneis vacillans* (Schmidt in Schmidt et al.) Cleve 1894. See Hustedt (1937, fig. 1060b) and Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 91, fig. 10).

66-67 *Diploneis mediterranea* (Grunow in Schmidt et al.) Cleve 1894. See Hustedt (1937, fig.1014a).

68 *Rhopalodia vermicularis* O. Müller 1895. See Schmidt's Atlas (1874-1959, pl. 265, fig. 7).

Magnifications: figs. 62-63: x750; all others x1000
Scale Bar: scale bar is 40 microns for the figures shown at x750; 30 microns at x1000

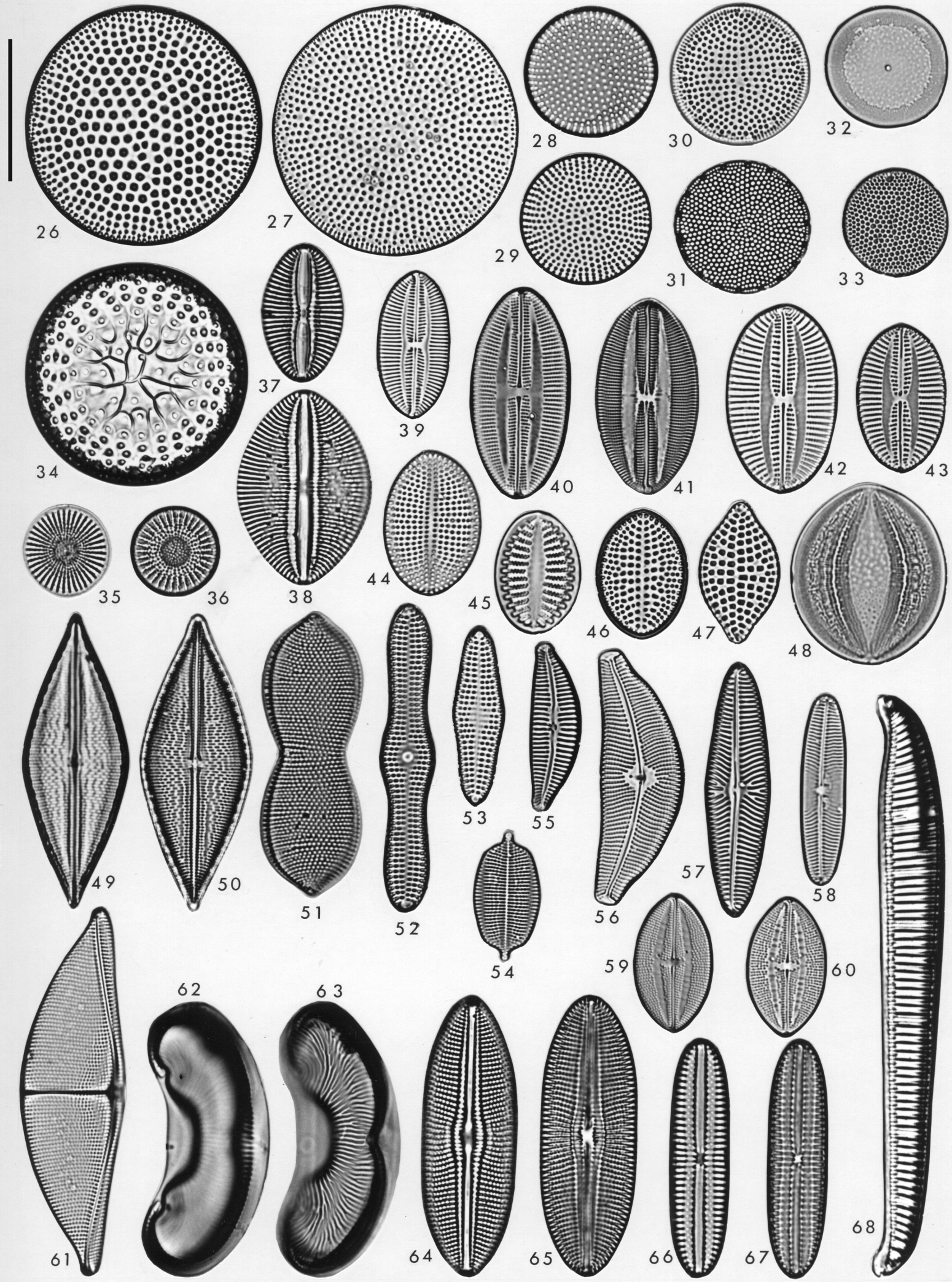
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Plate 16. MARINE DIATOMS FROM THE CAPE VERDE ISLANDS

Source of Material

Material from the Cape Verde Islands. N.W. coast of Sao Vincente 16º 54′ N; 25º 02′ W. On calcarous algae, Bryozoans. Depth 35-40m. Sample taken with a 1.2m Agassiz trawl. Date: June 21st, 1982.

The above description was received with the sample from Hans van den Heuvel, Leiden on March 17th, 1988.

Plate Sixteen:

69-71 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985) for variations.

72-73 *Lyrella venusta* (Janisch in Cleve) Mann in Round, Crawford and Mann 1990. See A. Mann (1925, pl. 27, fig. 4), given as *Navicula vanusta*.

74 *Achnanthes longipes* (?) Agardh 1824. See John (1983, pl. 32, fig. 1). Resembles *A. longipes* in the double row of areolae, but very small.

75 *Navicula palpebralis* var. *angulosa* (Gregory) Van Heurck 1885. See Gregory (1856, pl. 5, fig. 8) given as *N. angulosa*.

76 *Navicula palpebralis* Brebisson in litt., W. Smith 1853. See Hendey (1964, pl. 34, fig. 13).

77 *Navicula nicobarica*. Grunow 1863 See Grunow (1863, pl. 14, fig. 8) also Hustedt (1964, fig. 1457) and Foged (1975, pl. 20, fig. 6).

78 *Navicula carinifera* Grunow in Schmidt et al. 1874. See Schmidt's Atlas (1874-1959, pl. 2, fig. 1) and Hendey (1964, pl. 31, fig. 11).

79 *Navicula (Lyrella) hennedyi* var. *californica* (Greville) Cleve 1895 (No formal transfer to *Lyrella* can be found for this variety). See Hustedt (1964, fig. 1520).

80 *Caloneis* sp. indet.

81 *Luticola* sp. indet. See Hendey (1951, pl. 10, fig. 8) and also Hustedt (1966, fig. 1592a) for specimens identified as *Navicula mutica*. This is the same specimen as depicted on pl. 18 (in this volume, fig. 143-44).

82 *Plagiogramma pulchellum* var. *pygmaea* (Greville) Peragallo and Peragallo 1901. Sensu Foged (1975, pl. 8, fig. 1).

83 *Opephora schwartzii* (Grunow) Petit in Pelletan 1889. See Hendey (1964, pl. 36, fig. 9)

84 *Caloneis linearis* (Grunow) Boyer 1927. See Hendey (1964, pl. 29, fig. 3).

85 *Mastogloia jelineckii* var. *marina* (Janisch and Rabenhorst) Cleve 1895. See Cleve (1894-1895, pl. 2, fig. 18).

86 *Dictyoneis jamaicensis* (Greville) Cleve 1890 . See Greville (1866, pl. 12, fig. 23), Peragallo and Peragallo (1897-1908, pl. 7, fig. 1) and also Hustedt (1933, fig. 1008)

87 *Oestrupia powellii* var. *egyptiaca* (Greville) Heiden in Schmidt et al. 1906. See Greville in Williams (1988, pl. 44, figs. 11-12) given as *Navicula egyptiaca*.

88 *Caloneis consimilis* (Schmidt) Cleve 1894. See Peragallo and Peragallo (1897-1908, pl. 2, figs. 1-2) and Cleve-Euler (1955, figs. 1125a-b).

89 *Nitzschia fluminensis* Grunow 1862. See Lange-Bertalot and Krammer (1987, pl. 12, figs. 7-9).

90 *Nitzschia fluminensis* Grunow 1862. See Grunow (1862, pl. 12, fig. 35).

91-92 *Navicula directa* var. *remota* (Grunow) Cleve 1895. See Hendey (1964, pl. 30, fig. 22).

93 *Climacosphenia elongata* Mereschkowsky 1902. See Grunow (1862, pl. 6, fig. 22b).

94 *Toxarium undulatum* Bailey 1854. See Gregory (1857, pl. 6, fig. 107) and also Hustedt (1932, fig. 714b), formerly *Synedra undulata*.

95 *Toxarium hennedyanum* (Gregory) Pelletan 1889. See Gregory (1857, pl. 6, fig. 108); also Hustedt 1932, fig. 713b), formerly *Synedra hennedyana*.

Magnifications: fig. 94: x750; all others: x1000
Scale Bar: scale bar is 40 microns for fig. 94; 30 microns for all figures at x1000

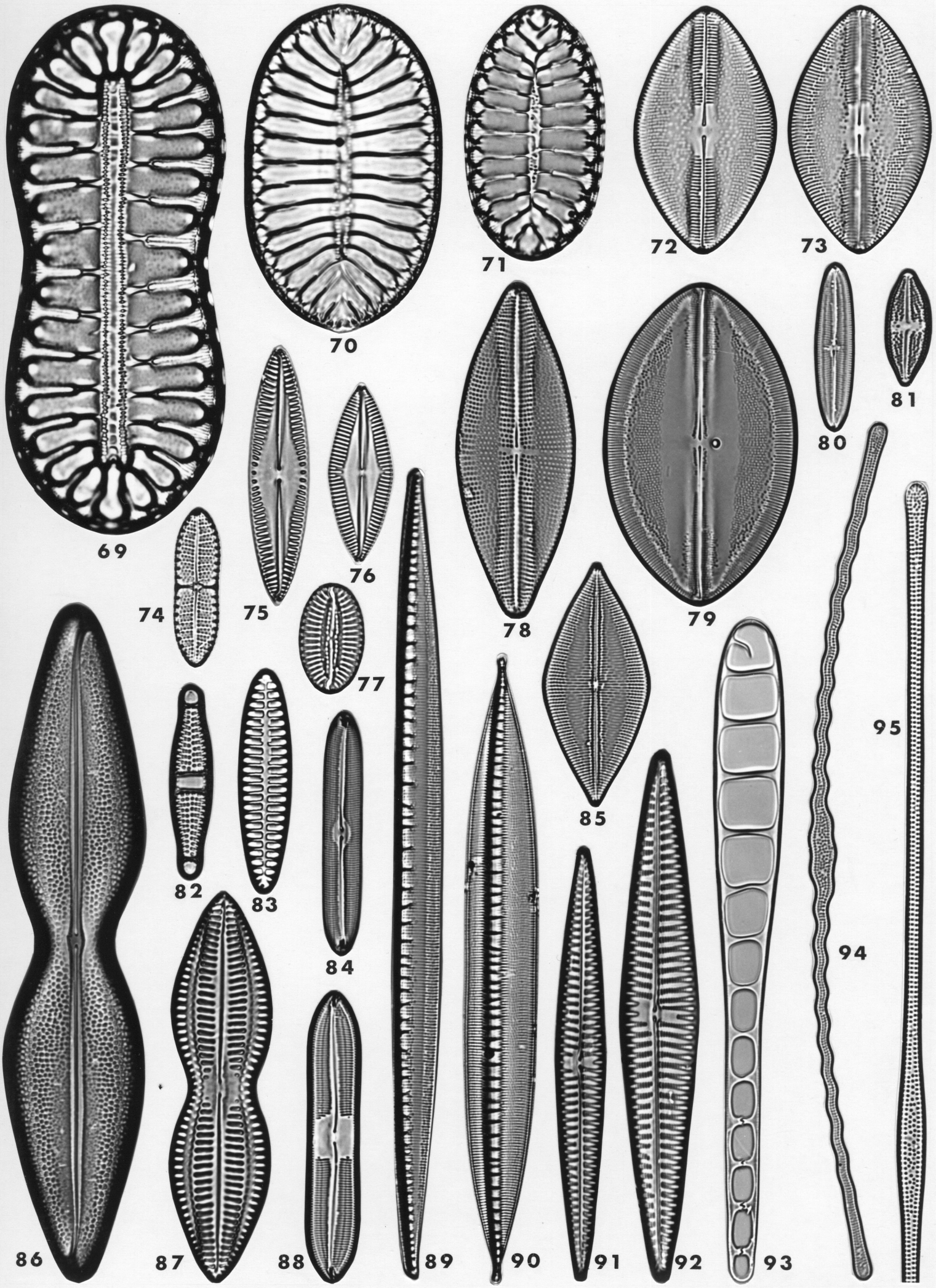
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Plate 17. MARINE DIATOMS FROM THE CAPE VERDE ISLANDS

Source of Material

Material from the Cape Verde Islands, northwest coast of Sao Vincente (16º54′ N; 25º02′ W) on calcarous algae, Bryozoans. Depth was 35-40 meters. Sample taken with a 1.2 meter Agassiz trawl. Date: June 21st, 1982.

The above description was received with the sample from Hans van den Heuvel, Leiden on March 17th, 1988.

Plate Seventeen:

96 *Biddulphia tuomeyi* (J.W. Bailey) Roper 1859. See Schmidt's Atlas (1874-1959, pl. 118, fig. 4).

97 *Actinoptychus senarius* (Ehrenberg) Ehrenberg 1843. See Hendey (1964, pl. 23, fig. 2).

98 *Coscinodiscus hauckii* var. *mesoleia* (Cleve) Hustedt 1928. See Hustedt (1928, fig. 200b). See also an enlargement in this volume (pl. 32, fig, 32) showing details.

99 *Diploneis bomboides* (Schmidt) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 13, fig. 36).

100 *Diploneis bombus* (Ehrenberg) Cleve-Euler in Backman and Cleve-Euler Backman 1922. See Hendey (1951, p. 58, pl. 8, fig. 7).

101 *Diploneis suspecta* (A. Schmidt) Hendey 1958. See Schmidt's Atlas (1874-1959, pl. 11, figs. 12-13 and figs. 26-27); also Hendey (1958, p. 70, pl. 5, fig. 10).

102 *Diploneis* sp. indet.

103 *Diploneis vacillans* (Schmidt in Schmidt et al.) Cleve 1894. See Foged (1978, pl. 24, fig. 9) given as *D. vacillans* var. *renitens,* and also this volume (pl. 31, fig. 11).

104 *Diploneis* sp. indet.

105 *Diploneis* sp. indet.

106-08 *Diploneis mediterranea* (Grunow in Schmidt et al.) Cleve 1894. See Hustedt (1937, fig. 1014a).

109-10 *Amphora* aff. *egregia* Ehrenberg 1861. See Schoeman, Archibald and Sims (1986, p.14, pl. 2, figs. 8-9).

111 *Amphora grevilleana* (?) Gregory 1857. This shows a resemblance to Schmidt's Atlas (1874-1959, pl. 25, fig. 45), but identification is uncertain.

112 *Amphora gründleri* Grunow in Schmidt et al. 1875. See Schmidt's Atlas (1874-1959, pl. 28, fig. 26).

113 *Rhopalodia contorta* Hustedt 1937. Specimen is a good match for Simonsen (1987, pl. 352, fig. 1 and 4).

114 *Amphora coffeaeformis* (Agardh) Kützing 1844. See Archibald and Schoeman (1983, figs. 1-24).

115 *Amphora* sp. indet.

116 *Amphora* sp. indet. Foged (1987, pl. 24, fig. 8) describes a very similar specimen, identified as *A. crassa*, but Gregory's (1857, pl. 1, fig. 35) specimen of *A. crassa* is quite different. Figures in the literature of mooted *A. crassa* show such major differences that they cannot belong to the same species.

117 *Amphora bigibba* var. *interrupta* (Grunow in Schmidt et al.) Cleve 1895. See Schmidt's Atlas (1874-1959, pl. 25, fig. 65) given as *A. binodis* var. *interrupta*; see also Ricard (1977, pl. 6, fig. 16).

118 *Amphora bigibba* Grunow in Schmidt et al. 1875, a frustule. See Schmidt's Atlas (1874-1959, pl. 25, fig. 73).

119 *Seminavis* sp. indet. This will be taxonomically dealt with in the future (A. Witkowski pers. comm., 2012).

120 *Seminavis* sp. indet.

121 *Amphora* sp. indet. See Marine Diatoms from the Azores (in this volume, pl. 2, fig. 56). Possibly a detached segment of *A. crassa*. See Gregory (1857, pl. 14, fig. 94c).

122 *Amphora obtusa* Gregory 1857. See Gregory (1857, p. 72, pl. 1, fig. 34) and Schmidt's Atlas (1874-1959, pl. 40, figs. 6, 16-17). Although the identification of this specimen is doubtful and the specimen is not well resolved, it appears identical to specimen collected from the Azores (in this volume, pl. 2, fig. 44) where it is given as *A. bistriata* in Peragallo and Peragallo (1897-1908, pl. 49, fig. 3).

123 *Amphora spectabilis* Gregory 1857. See Hendey (1964, pl. 38, fig. 8); also Ricard (1977, pl. 6, fig. 11) and Schoeman and Archibald (1987, pl. 5, figs. 19-20).

124 *Amphora* aff. *egregia* Ehrenberg 1861. See Schoeman, Archibald and Sims (1986, pl. 2, fig. 8).

125 *Amphora cingulata* Cleve in A. Schmidt et al. 1875. See Peragallo and Peragallo (1897-1908, pl. 49, fig. 6).

126 *Amphora* sp. indet.

127 *Amphora obtusa* Gregory 1857. See Ricard (1977, pl. 6, fig. 10), Schoeman and Archibald (1986, p. 126, pl. 2, figs. 5-6), and also Peragallo and Peragallo (1897-1908, pl. 48, fig. 4) given as *A. obtusa* var. *oceanica*.

128 *Grammatophora oceanica* var. *macilenta* (W. Smith) Grunow 1862. See John (1983, pl. 18, figs. 2, 7) and Foged (1985, pl. 3, fig. 11).

129 *Grammatophora* sp. indet.

130 *Nitzschia jelineckii* Grunow 1863. See Grunow (1863, pl. 14, fig. 4) and Hendey (1958, pl. 1, fig. 4).

Magnifications: fig. 98: x2000; all others: x1000
Scale Bar: scale bar is 15 microns for fig. 98; 30 microns for all figures at x1000

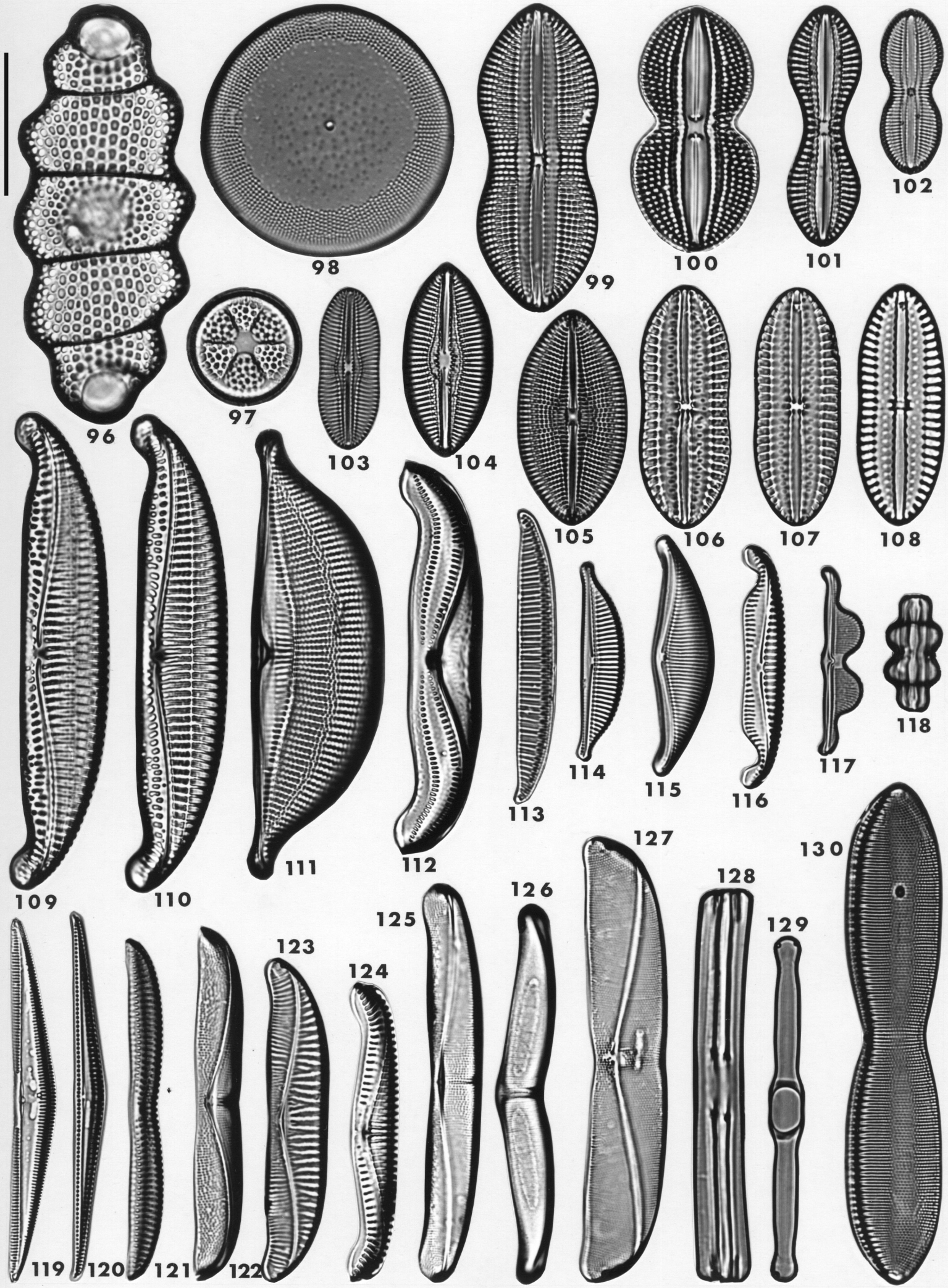
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Plate 18. MARINE DIATOMS FROM THE CAPE VERDE ISLANDS

Source of Material

Material from the Cape Verde Islands, northwest coast of Sao Vincente (16º54′ N; 25º02′ W) on calcarous algae, Bryozoans. Depth was 35-40 meters. Sample taken with a 1.2 meter Agassiz trawl. Date: June 21st, 1982.

The above description was received with the sample from Hans van den Heuvel, Leiden on March 17th, 1988.

Plate Eighteen:

131 *Cymbella (Encyclonema) grossestriata* var. *obtusiuscula* Otto Müller 1905. See Schmidt's Atlas (1874-1959, pl. 373, fig. 6). *Cymbella grossestriata* has been transferred to *Encyclonema* by Round, Crawford and Mann (1990), however this variety has yet to be transferred.

132 *Cymbella (Encyclonema) grossestriata* var. *obtusiuscula* Otto Müller 1905. See Schmidt's Atlas (1874-1959, pl. 373, fig. 7). *Cymbella grossestriata* has been transferred to *Encyclonema* by Round, Crawford and Mann (1990), however this variety has yet to be transferred.

133 *Cymbella tumida* (Brébisson in Kützing) Van Heurck 1880. See Schmidt's Atlas (1874-1959, pl. 376, fig. 5)

134 *Diploneis fusca* (Gregory) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 7, figs. 1-4) and Hendey (1964, pl. 32, fig. 4). See also Marine Diatoms from Indonesia (in this volume, pl. 33, fig. 27)

135 *Diploneis graeffii* (Grunow in Schmidt et al.) Cleve 1894. See Foged (1984, pl. 43, fig. 6). Also Schmidt's Atlas (1874-1959, pl. 7, fig. 5).

136 *Diploneis mediterranea* (Grunow in Schmidt et al.) Cleve 1894. See Hustedt (1937, fig. 1014e).

137 *Navicula digitoradiata* (?) (Gregory) Ralfs in Pritchard 1861. This is a good match for Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 114, fig. 6). See also Hendey (1964, pl. 29, fig. 9).

138 *Navicula protracta* fo. *elliptica* (?) Hustedt 1957. Sensu Germain (1981, pl. 83, fig. 7) in reference to Hustedt (1957, p. 283), but identification is uncertain.

139 *Navicula nicobarica* Hustedt 1957. See Grunow (1863, pl. 14, fig. 8); Hustedt (1964, fig. 1457) and Foged (1975, pl. 20, fig. 6). Same specimen as fig. 77 (pl. 33, in this

volume), enlarged to show details.

140-41 *Cocconeis dirupta* Gregory 1857. See Schmidt's Atlas (1874-1959, pl. 191, fig. 55).

142 *Diploneis nitescens* (Gregory) Cleve 1894. Identification is uncertain.

143-44 *Luticola* sp indet. See Hendey (1951, pl. 10, fig. 8); also Hustedt (1966, fig. 1592a), given as *Navicula mutica*. This is the same specimen as depicted on pl. 16 (in this volume, fig. 81).

145 *Cocconeis pseudomarginata* Gregory 1857. See Hendey (1964, pl. 28, fig. 20).

146 *Cocconeis pseudomarginata* Gregory 1857. See John (1983, pl. 35, fig. 7).

147 *Cocconeis heteroidea* Hantzsch in Rabenhorst 1863. John (1983, pl. 34, fig. 1).

148 *Cocconeis pinnata* Gregory in Greville 1859. See Schmidt's Atlas (1874-1959, pl. 190, fig. 4) and Foged (1975, pl. 11, fig. 16).

149 *Cocconeis grunowii* Pantocsek 1889. See Schmidt's Atlas (1874-1959, pl. 194, fig. 20).

150 *Cocconeis distans* Gregory 1855. See Schmidt's Atlas (1874-1959, pl. 193, figs. 29-30)

151 *Epithemia zebra* var. *porcellus* (Kützing) Grunow 1862. See Schmidt's Atlas (1874-1959, pl. 252, fig. 16). See also Foged (1980, pl. 38, fig. 17).

Magnifications: figs. 131-132, 138-139, 143-144: x2000; all others: x1000
Scale Bar: scale bar is 30 microns for figures shown at x1000; 15 microns at x2000

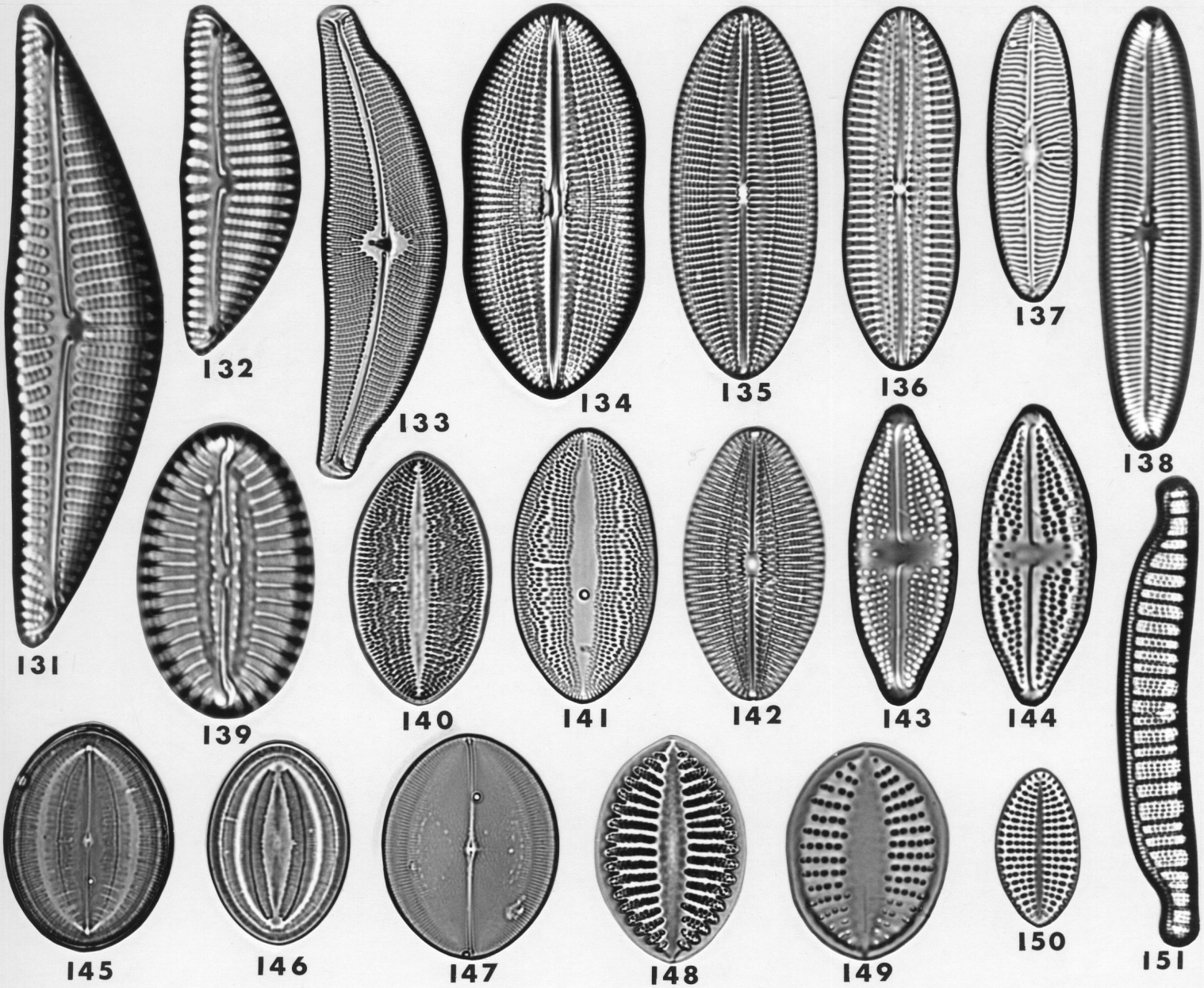
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Plate 19: MARINE DIATOMS FROM COOKTOWN, N.E. AUSTRALIA

Source of Material

From the Morris Watt Collection, Otago Museum, New Zealand

Slide No. 338, catalogue No. 90
Slide No. 339, catalogue No. 91
Slide No. 340, catalogue No. 92

Plate Nineteen:

1 *Tropidoneis vitrea* (W. Smith) Cleve 1894. See Hendey (1964, pl. 36, fig. 3).

2 *Caloneis robusta* Grunow in Cleve 1878. See Schmidt's Atlas (1874-1959, pl. 50, figs. 1-2), given as *Navicula robusta*.

3 *Caloneis robusta* Grunow in Cleve 1878. Same reference as for fig. 2.

4 *Tryblionella graeffii* (Grunow in Cleve) Mann in Round, Crawford and Mann 1990. See Lange-Bertalot and Krammer (1987, pl. 23, fig. 1), identified as *Nitzschia graeffi*.

5 *Trachyneis aspera* (Ehrenberg) Cleve 1894. See Foged (1975, pl. 24, fig. 9).

6 *Trachyneis aspera* (Ehrenberg) Cleve 1894. See Desikachary (1989, pl. 759, fig. 1).

7 *Diploneis chersonensis* (Grunow) Cleve 1894. See Hendey (1970, pl. 5, fig. 48).

8 *Diploneis smithii* (?) (Brébisson in W. Smith) P.T. Cleve 1894. See Hendey (1970, pl. 5, fig. 46). Identity is uncertain.

9 *Triceratium scitulum* Brightwell. See Desikachary (1989, pl. 776, figs. 2, 6 and 8).

10 *Triceratium scitulum* Brightwell. See Desikachary (1989, pl.790, figs. 1-3).

11-14 *Amphora gründleri* Grunow in Schmidt et al. 1875. See Schmidt's Atlas (1874-1959, pl. 28, fig. 27).

15 *Diploneis smithii* (?) (Brébisson in W. Smith) P.T. Cleve 1894. See Hendey (1970, pl. 5, fig. 46). Identity is uncertain.

Magnifications: figs. 1-4, 6-15: x750; fig. 5: x1000
Scale Bar: scale bar is 40 microns for figures shown at x750; 30 microns for fig. 5 at x1000

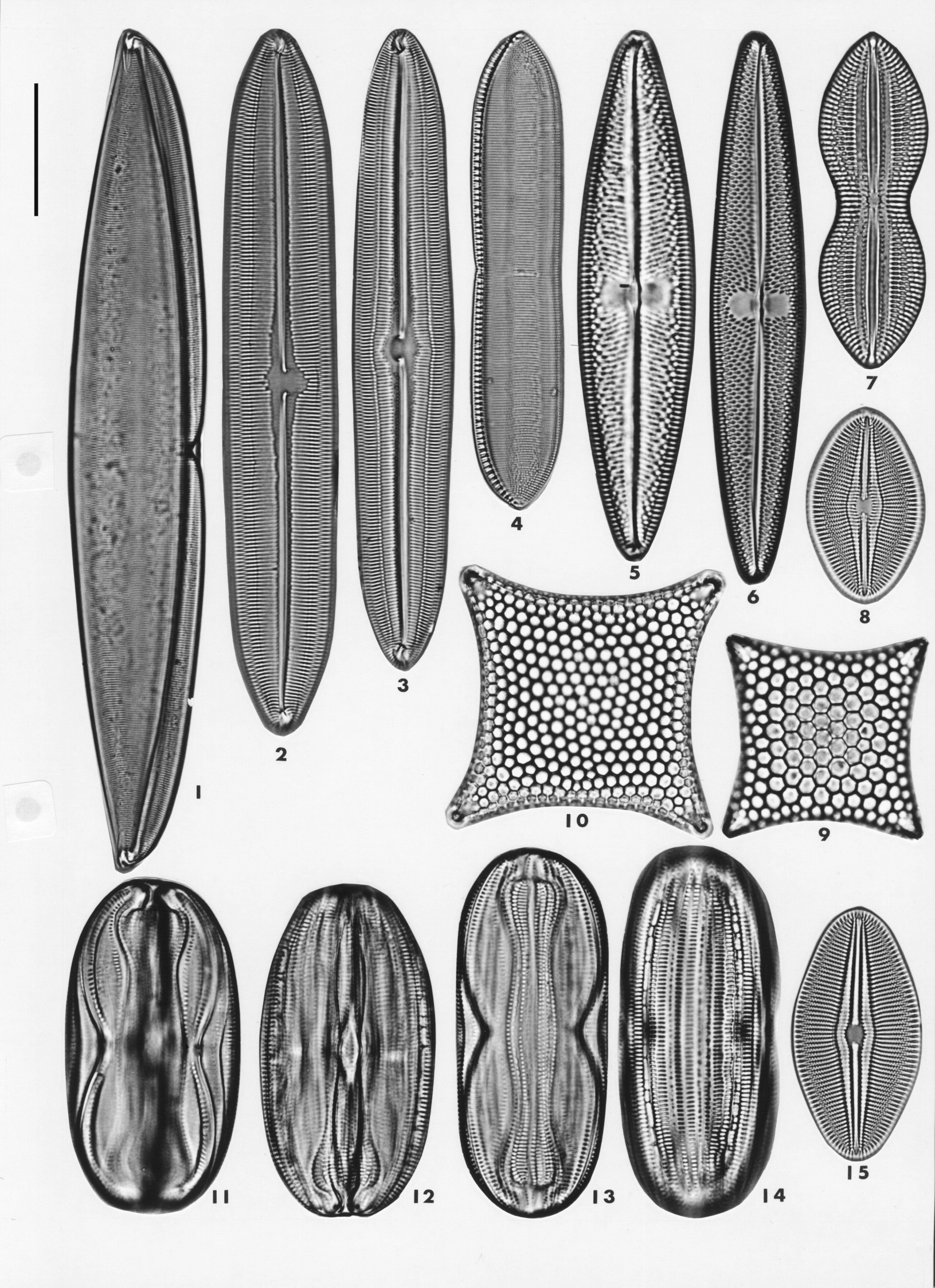
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Plate 20: MARINE DIATOMS FROM COOKTOWN, N.E. AUSTRALIA

Source of Material

From the Morris Watt Collection, Otago Museum, New Zealand

Slide No. 338, catalogue No. 90
Slide No. 339, catalogue No. 91
Slide No. 340, catalogue No. 92

Plate Twenty:

16-18 *Navicula (Lyrella) lyra* var. *elliptica* fo. *bullata* (Norman) Cleve 1895 (No formal transfer to *Lyrella* could be found for this variety). See Norman (1861,pl. 2, fig. 7), showing a specimen from Western Australia named as *N. bullata*.

19 *Lyrella lyra* (Ehrenberg) Karajeva 1978. See Desikachary (1989, pl. 632, fig. 3), given as *Navicula lyra*.

20 *Actinocyclus decussatus* A. Mann 1925. See A. Mann (1925, pl. 2, fig. 2).

21 *Biddulphia pulchella* Gray 1821. See Hendey (1964, pl. 25, fig. 1). *B. pulchella* is a taxonomic synonym to *Biddulphia biddulphiana* (J.E. Smith) Boyer.

22 *Coscinodiscus radiatus* Ehrenberg 1840. See Hendey (1964, pl. 22, fig. 7).

23 *Cestodiscus denarius* (Schmidt) Strelnikova and Fourtanier in Strelnikova, Fourtanier, Kociolek and Barron 2001. See Streknikova, Fourtanier, Strelnikova, Kociolek, and Barron (2001, p. 84, figs. 73-83). Also see Peragallo and Peragallo (1897-1908, pl. 115, fig. 3) and Schmidt's Atlas (1874-1959, pl.57, figs 20 and 21), given as *Coscinodiscus denarius*.

24 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985) for variations of form.

25 *Thalassiosira nanolineata* (A. Mann) Fryxell and Hasle 1977 . See Fryxell and Hasle (1977, p. 32, pl. 15, fig. 76) of a specimen from Campeche Bay.

26 *Thalassiosira* sp. indet.

Magnifications: figs. 16-21, 24, 26 x: 750; figs. 22, 23, 25: x1000
Scale Bar: scale bar is 40 microns for the figures shown at x750; 30 microns at x1000

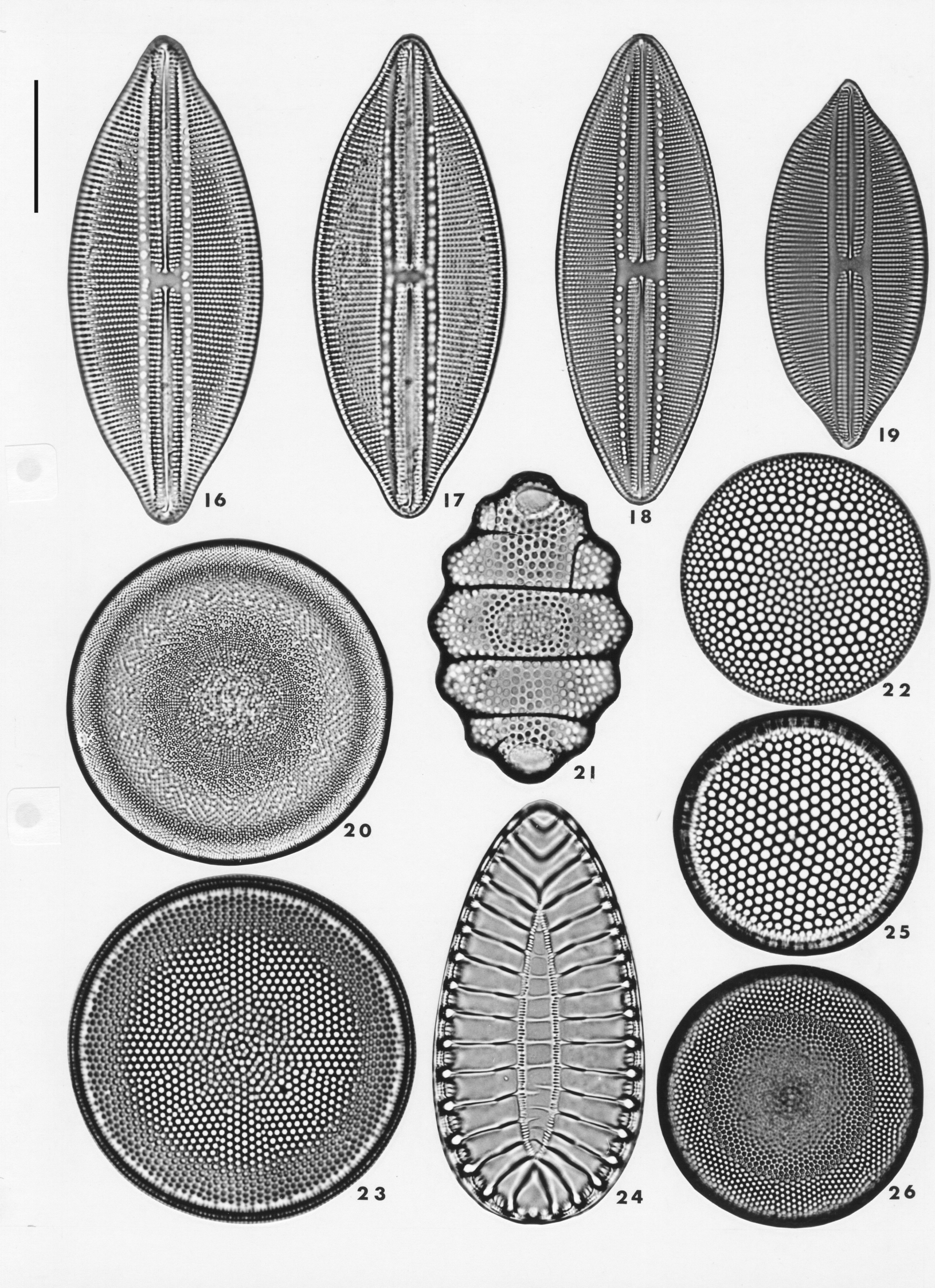
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Plate 21. MARINE DIATOMS FROM THE GALAPAGOS ISLANDS

Source of Material

Galapagos Islands, Santa Cruz. A very sparse sample collected by J.A. Broadhead August 16th, 1986.

Galapagos Islands, Santa Cruz. Sample 1, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; skimming of thin surface film resulting from rising tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 2, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from thick silty mud covered in greenish algal slime on flat rock ledges at low tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 3, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from greenish-brown slime on mooring rope. Collected by Tui de Roy August 9th, 1991.

Sample #1 one bottle - very sparse.

Sample #2 four bottles - one unbleached (HCL rinsed); one heavy fraction; one sieved under 38µm and one sieved over 38µm.

Sample #3 four bottles - same sequence as for sample #2.

These samples are kept in the private collection of Stuart R. Stidolph and will eventually be deposited in the collections of NIWA, Wellington, New Zealand.

Plate Twenty-one:

1 *Actinocyclus ralfsii* (W. Smith) Ralfs in Pritchard 1861. See Peragallo and Peragallo (1897-1908, pl. 113, fig. 1), which agrees well with this specimen.

2 *Actinocyclus ehrenbergii* Ralfs in Pritchard 1861. See Peragallo and Peragallo (1897-1908, pl. 114, fig. 1).

3 *Actinoptychus adriaticus* Grunow 1863. See Hendey (1971, p. 376) where he noted that all the Galapagos specimens had 6 sectors.

4 *Azpeitia neocrenulata* (VanLandingham) G. Fryxell and T.P. Watkins in Fryxell, Sims and Watkins 1986. See Fryxell, Sims, and Watkins (1986, p. 18, fig. 30, 2A).

5-6 *Azpeitia nodulifer* (Schmidt) G. Fryxell and P.A. Sims in Fryxell, Sims, and Watkins 1986. See Fryxell, Sims, and Watkins (1986, p. 19, fig. 30, 3-4).

7 *Biddulphiopsis membranacea* (Cleve) von Stosch and Simonsen 1984. See Stosch and Simonsen (1984, p. 15, pl. 9).

8 *Achnanthes manifera* Brun 1895. See Brun (1895, pl. 16, fig. 87); also Schmidt's Atlas (1874-1959, pl. 415, fig. 18) and Hustedt (1955, p. 18, pl. 6, fig. 8).

9 *Achnanthes longipes* Agardh 1824. See Hendey (1951, p. 42, pl. 1, fig. 4). Also a good match for *A. yaquinensis*, described by McIntire and Reimer (1974). Also see Toyoda, Nagumo, and Tanaka (2005) for additional SEM study of *A. yaquinensis*. Differences between these species and others may require SEM.

10 *Achnanthes kuwaitensis* Hendey 1958. See Hendey (1958, p. 55, pl. 6, figs. 8-10) and Hendey (1970, p. 129, pl. 6, figs. 63-64).

11 *Achnanthes* sp. indet.

12 *Achnanthes citronella* (A. Mann) Hustedt in Schmidt et al. 1937. See Schmidt's Atlas, (1874-1959, pl. 415, fig. 5) and Foged (1975, p. 7, pl. 9, fig. 13). Meister (1935, p. 98, pl. 6, fig. 53) gives a similar specimen from Nagasaki as *Cocconeis citronella*. However, Meister's identification appears not to agree with the original description and the figures given by A. Mann (1925, p. 61, pl. 13, figs. 3-6) as a doubtful new species, *Cocconeis citronella*. According to VanLandingham (1968b, p.773), *Cocconeis citronella* A. Mann is a synonym of *Achnanthes citronella* A. Mann (1925) Hustedt comb. nov. 1937 in Schmidt’s Atlas (1874-1959, pl.415, figs. 3-8).

13 *Odontella aurita* (Lyngbye) Agardh 1832. See Schmidt's Atlas (1874-1959, pl. 122, fig. 4) and also W. Smith (1856, p. 49, pl. 45, fig. 319), given as *Biddulphia aurita*.

14 *Campylodiscus fastuosus* Ehrenberg 1845. See Hendey (1951, p. 78, pl. 17, fig. 2) and Hendey (1971, p. 408).

15 *Campylodiscus ralfsii* W. Smith 1853. See Peragallo and Peragallo (1897-1908, pl. 56, fig. 4) and also Hendey (1970, p. 161, pl. 5, fig. 53).

16 *Campylodiscus samoensis* Grunow in A. Schmidt et al. 1875. See Peragallo and Peragallo (1897-1908, pl. 54, fig. 7). VanLandingham (1968b, p. 666) gives this as *C. incertus*.

17 *Amphora* sp. indet. This is a good match for Schmidt's Atlas (1874-1959, pl. 27, fig. 59), for which Schmidt says “forms still to be identified”.

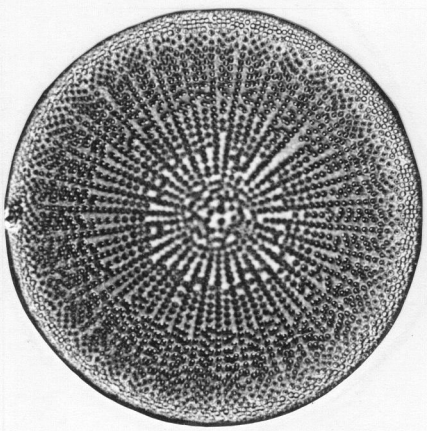
18 *Amphora bigibba* Grunow in Schmidt et al. 1875. See Ricard (1977, pl. 6, fig. 16) whose specimen of 6 x 30µm agrees well with this specimen of 5.0 x 33.75µm

19-20 *Amphora hustedtii* Z. Levkov 2009. See Meister (1937, p. 264, pl. 8, figs. 2-4). Meister's

species was renamed in VanLandingham (1968a, p. 166) as *A. triconfusa* VanLandingham nom. nov. but this is not a formal emendation and therefore Meister's name stands. Ricard (1975, p. 202, pl. 2, fig. 15a-b) described *A. quinquegibba* as a new species but it is a synonym of *A. hustedtii* Meister. What appears to be the same species is shown as *Undatella lineata* in Paddock and Sims (1980, p. 169, figs. 10-34).

21 *Amphora gigantea* var. *nodosa* Tempère and Peragallo 1914. See Peragallo and Peragallo (1897-1908, pl. 45, fig. 2) given as a questionable identification but which is close to this specimen.

Magnifications: fig. 1: x500; fig. 7: x750; figs. 8, 12: x2000; all others: x1000.
Scale Bar: scale bar is 60 microns for fig. 1; 40 microns for fig. 7; 15 microns for all figures at x2000; 30 microns at x1000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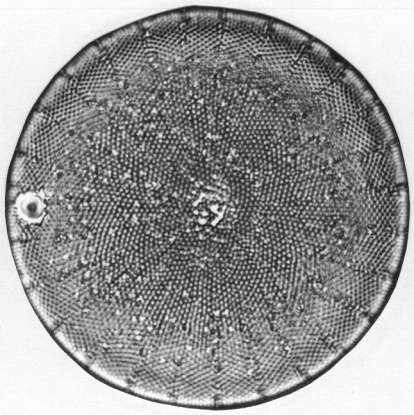
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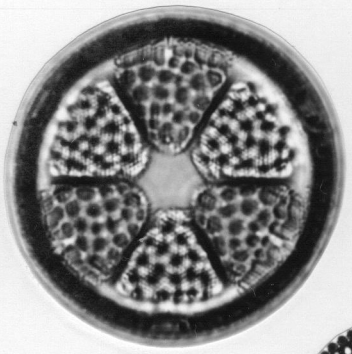
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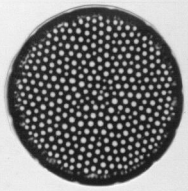
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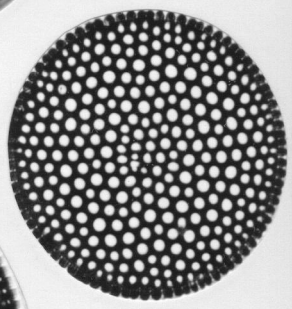
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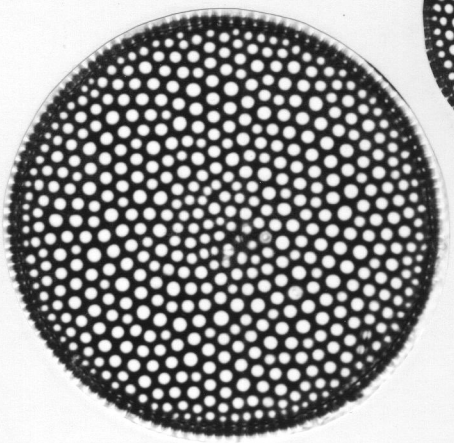
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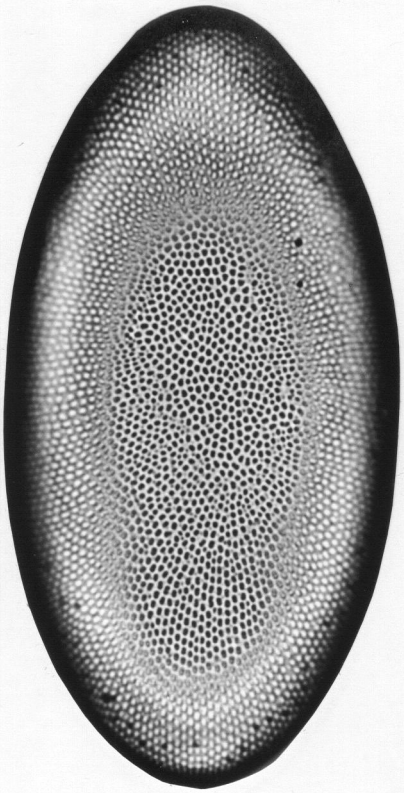
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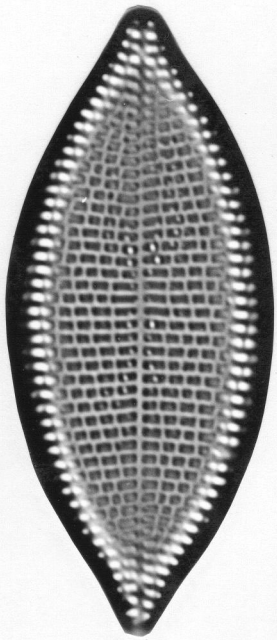
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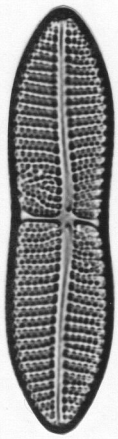
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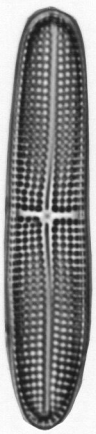
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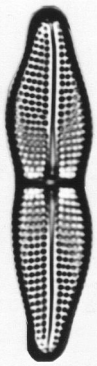
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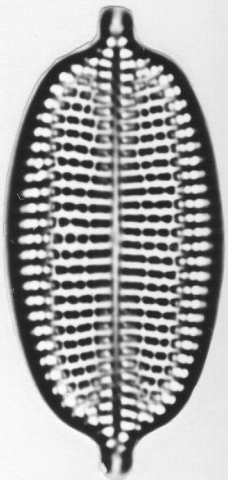
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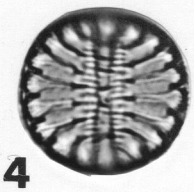
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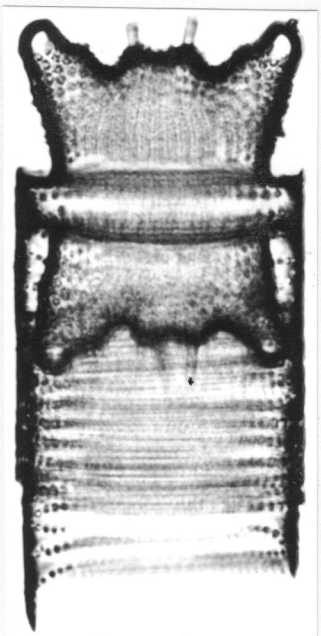
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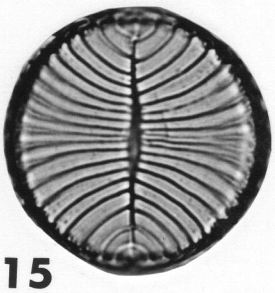
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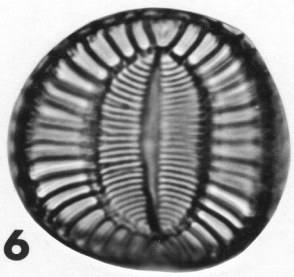
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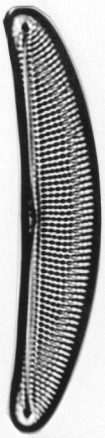
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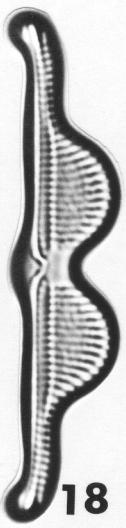
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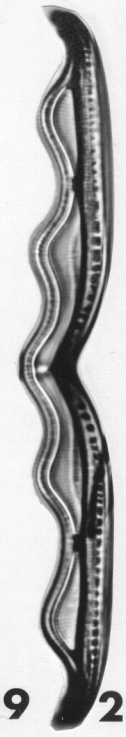
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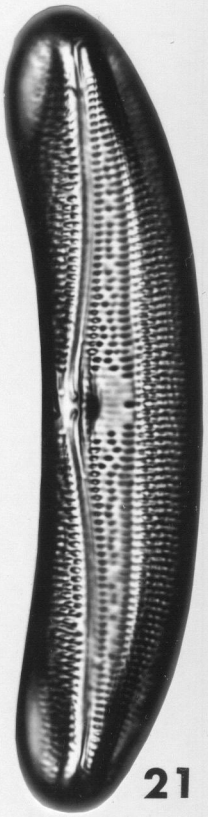
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Plate 22. MARINE DIATOMS FROM THE GALAPAGOS ISLANDS

Source of Material

Galapagos Islands, Santa Cruz. A very sparse sample collected by J.A. Broadhead August 16th, 1986.

Galapagos Islands, Santa Cruz. Sample 1, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; skimming of thin surface film resulting from rising tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 2, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from thick silty mud covered in greenish algal slime on flat rock ledges at low tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 3, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from greenish-brown slime on mooring rope. Collected by Tui de Roy August 9th, 1991.

Sample #1 one bottle - very sparse.

Sample #2 four bottles - one unbleached (HCL rinsed); one heavy fraction; one sieved under 38μm and one sieved over 38μm.

Sample #3 four bottles - same sequence as for sample #2.

These samples are kept in the private collection of Stuart R. Stidolph and will eventually be deposited in the collections of NIWA, Wellington, New Zealand.

<u>Plate Twenty-two</u>:

22 *Cocconeis apiculata* (Greville) Schmidt in Schmidt 1895. See Williams (1988, p. 47, pl. 54, figs. 2-3) given as *Stauroneis apiculata*. The specimen in this figure here is of a whole frustule. Figure 22a is the raphe valve and figure 22b is the rapheless valve. NOTE: this species will be transferred to the genus *Schizostauron* (A. Witkowski, written commun., 2012).

23 *Cocconeis latecostata* Hustedt 1955. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 33, fig. 10).

24 *Amphicocconeis debesi* (Hustedt) De Stefano in De Stefano et al. 2006. See Hustedt (1933, fig. 798) and Cleve-Euler (1953, pl. fig. 491A b. The latter is given on p. 240 of her plate keys as *Cocconeis distans* var. *debesi* which is copied from Hustedt's drawings. VanLandingham (1968b, p. 782) cites Hustedt (1933,

fig. 798) as a nom. nov. The figure of the rapheless valve agrees well with the specimen figured here.

25 *Cocconeis dirupta* var. *flexella* (Janisch and Rabenhorst) Grunow in Van Heurck 1880. See Peragallo and Peragallo (1897-1908, pl. 3, figs. 28-29), Hustedt (1933, figs. 809d-i), and Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 39, fig. 7).

26 *Cocconeis placentula* var. *lineata* (Ehrenberg) Van Heurck 1885. See Schmidt's Atlas (1874-1959, pl. 192, fig. 35e) which closely agrees with this figure. See also Van Heurck (1880-1885, pl. 30, fig. 32; 1896, p. 288, pl. 8, fig. 342).

27 *Cocconeis* sp. indet. See Schmidt's Atlas (1874-1959, pl. 191, fig. 38) of an uncertain species recorded by Kinker from Santa Monica.

28 *Cocconeis pseudomarginata* Gregory 1857. See Sar, Romero, and Sunesen (2003, p. 94, fig. 42) which agrees well with the specimen shown here.

29 *Mastogloia binotata* (?) (Grunow) Cleve 1895. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 75, fig. 15-17). This appears to be a valve of *Mastogloia* where the partectal ring is missing.

30 *Cocconeis dirupta* var. *flexella* (Janisch and Rabenhorst) Grunow in Van Heurck See Peragallo and Peragallo (1897-1908, pl. 3, figs. 28-29) and Hustedt (1933, figs. 809d-i).

31 *Cocconeis scutellum* Ehrenberg 1838. See Peragallo and Peragallo (1897-1908, pl. 4, fig. 2) given as *C. scutellum* var. *adjuncta*. See also John (1983, p. 82, pl. 36, fig. 2) and Lange-Bertalot and Krammer (1989, pl. 1, fig. 2) which agrees well with this figure.

32 *Cocconeis scutellum* Ehrenberg 1838. See Hendey (1951, p. 44, pl. 10, fig. 9). Also Van Heurck (1896, p. 286-287, fig. 65a) and Sar et al. (2003, p. 95, figs. 44-46).

33-34 *Cocconeis* sp. indet. See Schmidt's Atlas (1874-1959, pl. 191, fig. 38) of an uncertain species recorded by Kinker from Santa Monica.

35 *Cocconeis scutellum* Ehrenberg 1838. References as for fig. 32

36 *Cocconeis heteroidea* var. *curvirotunda* (Tempère and Brun in Brun and Tempère) Cleve 1895. See Schmidt's Atlas (1874-1959, pl. 195, fig. 19) given as *C. curvirotunda* var. *bifrons*. See also John (1983, p. 78, pl. 34, fig. 1) which also agrees well with the specimen shown here.

Magnifications: figs. 22a-b, 26: x1500; all others: x2000
Scale Bar: scale bar is 20 microns at x1500; 15 microns at x2000

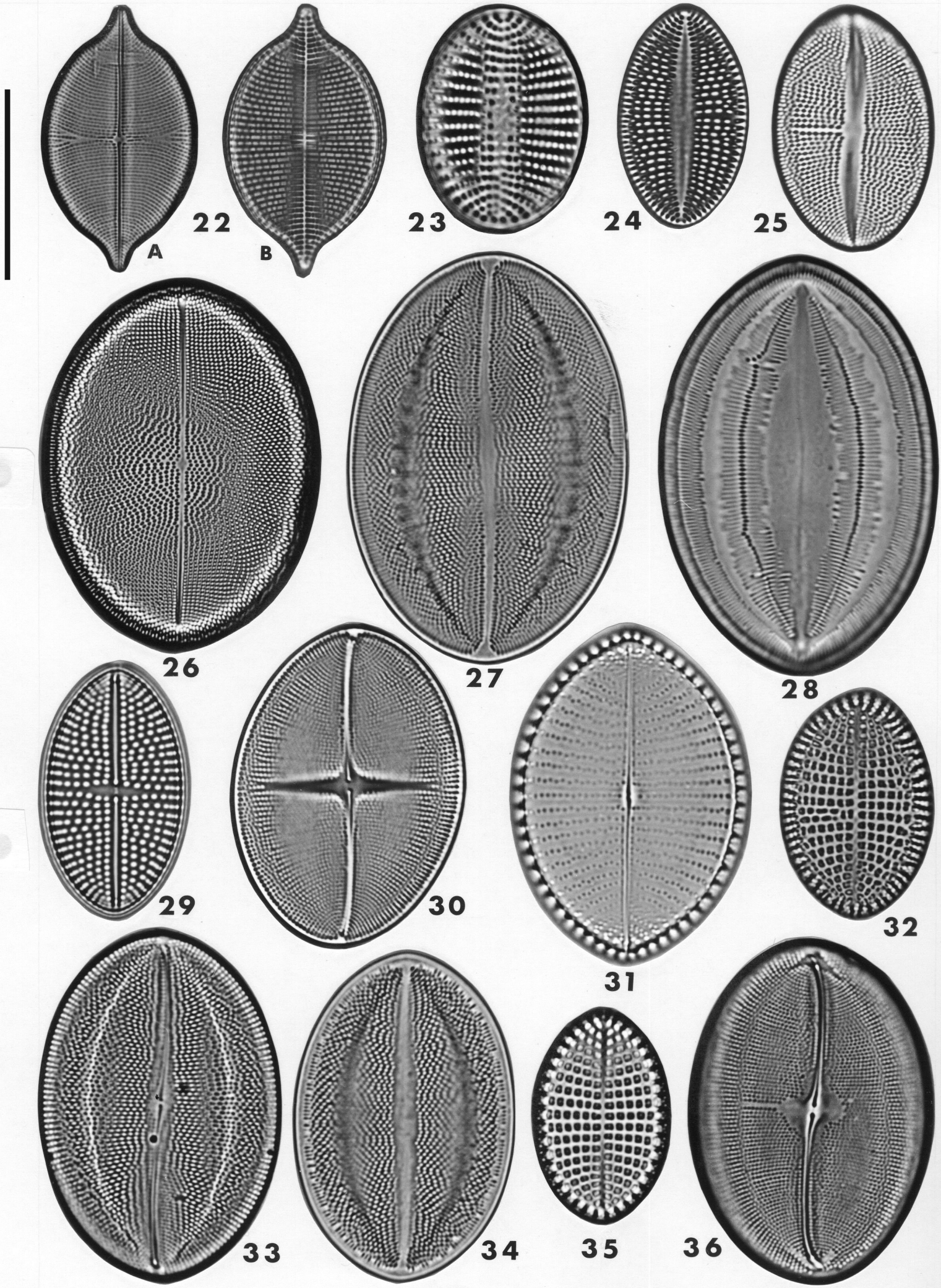
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Plate 23. MARINE DIATOMS FROM THE GALAPAGOS ISLANDS

Source of Material

Galapagos Islands, Santa Cruz. A very sparse sample collected by J.A. Broadhead August 16th, 1986.

Galapagos Islands, Santa Cruz. Sample 1, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; skimming of thin surface film resulting from rising tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 2, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from thick silty mud covered in greenish algal slime on flat rock ledges at low tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 3, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from greenish-brown slime on mooring rope. Collected by Tui de Roy August 9th, 1991.

Sample #1 one bottle - very sparse.

Sample #2 four bottles - one unbleached (HCL rinsed); one heavy fraction; one sieved under 38µm and one sieved over 38µm.

Sample #3 four bottles - same sequence as for sample #2.

These samples are kept in the private collection of Stuart R. Stidolph and will eventually be deposited in the collections of NIWA, Wellington, New Zealand.

<u>Plate Twenty-three</u>:

37 *Caloneis westii* (W. Smith) Hendey 1964. See Hendey (1964, p. 230, pl. 44, fig. 10) for range of forms.

38 *Caloneis probabilis* (?) (Schmidt in Schmidt et al.) Cleve 1894. See Foged (1984, pl. 44, fig. 1) and Schmidt's Atlas (1874-1959, pl. 50, fig. 46).

39 *Caloneis liber* var. *bicuneata* (Grunow) Cleve 1894. See Van Heurck (1896, p. 222, pl. 35, fig. 910) given as *Navicula liber* var. *bicuneata*.

40-41 *Dimeregramma marinum* (Gregory) Ralfs in Pritchard 1861. See Peragallo and Peragallo (1897-1908, pl. 82, fig. 10) and Hustedt (1931, fig. 642). Fig. 41 is of three frustules united.

42 *Glyphodesmis williamsonii* fo. *lanceolata* (Peragallo and Peragallo) Hustedt 1931.

See Hustedt (1931, fig. 646d).

43 *Dimeregramma* (?) sp. indet. However, this specimen may also be a species of the genus *Glyphodesmis*.

44 *Diploneis litoralis* (Donkin) Cleve 1894. See Hendey (1964, pl. 32, fig. 9) also Foged (1984, pl. 41, fig. 5) and Hustedt (1937, fig. 1062a).

45-46 *Diploneis crabro* (Ehrenberg) Ehrenberg 1854. See Foged (1984, pl. 43, fig. 1).

47 *Diploneis* sp. indet.

48 *Diploneis smithii* (Brébisson in W. Smith) Cleve 1894. See Hustedt (1937, fig. 1051) and Hendey (1964, p. 225, pl. 32, fig. 10).

49 *Diploneis litoralis* (Donkin) Cleve 1894. Same specimen as fig. 44 but taken with 60x N.A. 1.4 objective.

50 *Diploneis papula* (Schmidt in Schmidt et al.) Cleve 1894. See Peragallo and Peragallo (1897-1908, pl. 19, fig. 24) and Hustedt (1937, fig. 1071a-c).

51-52 *Diploneis caffra* (Giffen) A. Witkowski, H. Lange-Bertalot and D. Metzeltin. See Witkowski, Lange-Bertalot, and Metzeltin (2000, fig. 14-17).

53-54 *Diploneis gemmatula* (Grunow in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 13, figs. 20-21) and Hustedt (1937, fig. 1038).

55 *Diploneis chersonensis* (Grunow in Schmidt et al.) Cleve in Schmidt et al. 1892. See Hendey (1971, p. 400) for note on variations of Galapagos specimens. See also Foged (1984, pl. 53, fig. 5); Hendey (1964, pl. 32, fig. 8); Hendey (1970, pl. 5, fig. 48) which is in closest agreement with the specimen shown here; and Hustedt (1937, fig. 1088).

56 *Diploneis splendida* (Gregory) Cleve 1894. See Peragallo and Peragallo (1897-1908, pl. 18, fig. 17). See also Hustedt (1937, fig. 1089d) and Hendey (1964, p. 227).

57 *Diploneis splendida* (Gregory) Cleve 1894. Same specimen as fig. 56 but taken with 60x objective of N.A. 1.4.

Magnifications: figs. 47-52, 57: x2000; all others: x1000
Scale Bar: scale bar is 30 microns for figures shown at x1000; 15 microns at x2000

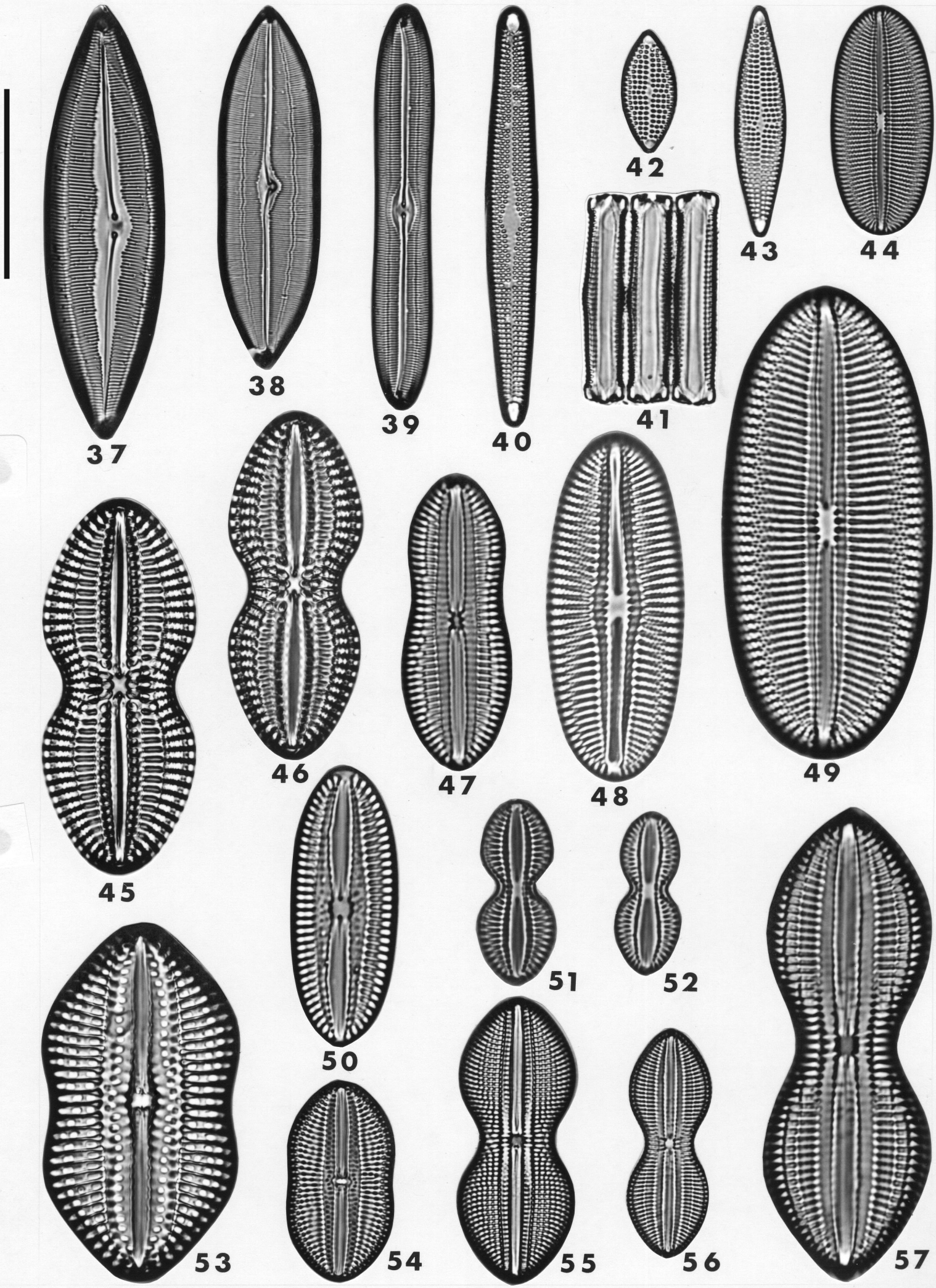
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Plate 24. MARINE DIATOMS FROM THE GALAPAGOS ISLANDS

Source of Material

Galapagos Islands, Santa Cruz. A very sparse sample collected by J.A. Broadhead August 16th, 1986.

Galapagos Islands, Santa Cruz. Sample 1, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; skimming of thin surface film resulting from rising tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 2, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from thick silty mud covered in greenish algal slime on flat rock ledges at low tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 3, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from greenish-brown slime on mooring rope. Collected by Tui de Roy August 9th, 1991.

Sample #1 one bottle - very sparse.

Sample #2 four bottles - one unbleached (HCL rinsed); one heavy fraction; one sieved under 38µm and one sieved over 38µm.

Sample #3 four bottles - same sequence as for sample #2.

These samples are kept in the private collection of Stuart R. Stidolph and will eventually be deposited in the collections of NIWA, Wellington, New Zealand.

Plate Twenty-four:

58 *Eunotogramma frauenfeldii* (Grunow) Grunow in Van Heurck 1883. See Grunow in Van Heurck (1880-1885, pl. 126, fig. 14) and also Hendey (1971, p. 385, figs. 16-18).

59 *Entomoneis centrospinosa* Osada and Kobayasi 1990. See Osada and Kobayasi (1990, p. 388, figs. 1-3). Although no spines could be detected on the specimen shown at x900 it is otherwise identical to the type.

60 *Frustulia asymmetrica* (A. Cleve) Hustedt 1954. See Hustedt (1954, p. 269, pl. 6, fig. 1) as a comb.nov. (Cleve) Hustedt.

61 *Frustulia interposita* (Lewis) De Toni 1891. See Hendey (1958, p. 59, pl. 6, fig. 3).

62 *Licmophora ehrenbergii* var. (?). The specimen depicted appears to be similar to

L. ehrenbergii, but the striae are strongly tilted in relation to the midline. This appears to be exceptional in the genus, where the striae are perpendicular to the midline and might warrant a separate specific status.

63 *Licmophora ehrenbergii* (Kützing) Grunow 1867. See Hustedt (1931, fig. 593b) and Honeywill (1998, p. 231, figs. 3b-c). Many separated valvocopulae with septa were seen in the material studied here and agree with fig. 3c of Honeywill.

64 *Grammatophora hamulifera* Kützing 1844. Agrees exactly with Hustedt (1931, fig. 566) although given by Hendey (1971, p. 389) as *G. angulosa* Ehr. See also Foged (1975, pl. 7, fig. 4).

65 *Grammatophora oceanica* Ehrenberg 1840. See Peragallo and Peragallo (1897-1908, pl. 87, fig. 14). See also Hendey (1951, p. 38, pl. 12, fig. 10); John (1983, pl. 18, fig. 4) and Foged (1987, pl. 5, fig. 11).

66-67 *Navicula nicobarica* Grunow 1863. See Grunow (1863, pl. 14, fig. 8), also Hustedt (1964, fig. 1457) and Foged (1975, pl. 20, fig. 6).

68 *Navicula pseudocomoides* Hendey 1964. See Hendey (1964, p. 192, pl. 30, fig. 2) given as nom. nov. See also Houpt (1987, p. 48, figs. 1-2).

69 *Amphora decussata* Grunow 1867. See Peragallo and Peragallo (1897-1908, pl. 49, fig. 24). See also Hendey (1964, p. 266, pl. 37, fig. 9) and Foged (1975, pl. 25, fig. 9).

70 *Amphora rhombica* var. *intermedia* Cleve 1895. See Meister (1935, pl. 6, fig. 51) also Ricard (1977, pl. 6, fig. 18) and Foged (1987, pl. 24, fig. 5).

71 *Amphora* sp. indet. Fig. 71a is in upper focus and fig. 71b is same specimen in lower focus.

72 *Amphora obtusa* Gregory 1857. See Schoeman and Archibald (1987, figs. 1-12).

73 *Amphora angusta* var. *ventricosa* (Gregory) Cleve 1895. See Peragallo and Peragallo (1897-1908, pl. 50, fig. 39). The identification given here is a good match for the figure in Peragallo and Peragallo (1897-1908), which lacks detail, however an exact match is presented in Witkowski, Lange-Bertalot and Metzeltin (2000, pl. 164, figs. 21-25) where it is ranked as “Seminavis spec. 164/5”.

Magnifications: figs. 58-59, 61-63, 65, 71: x1000; figs. 69-70, 72: x1500;
figs 60, 64, 66-68, 73: x2000
Scale Bar: scale bar is 30 microns for the figures shown at x1000; 20 microns at x1500;
15 microns at x2000

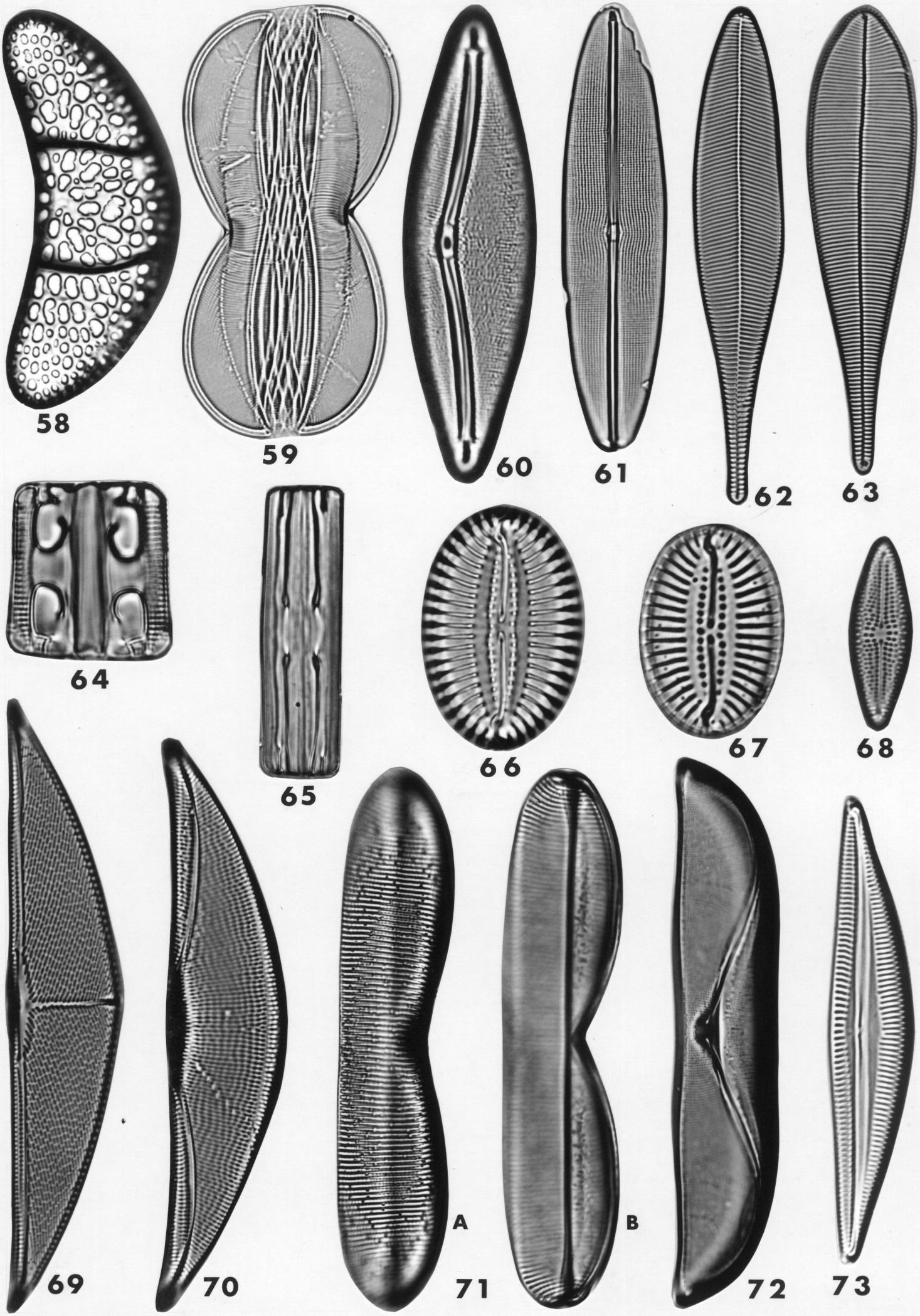
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Plate 25. MARINE DIATOMS FROM THE GALAPAGOS ISLANDS

Source of Material

Galapagos Islands, Santa Cruz. A very sparse sample collected by J.A. Broadhead August 16th, 1986.

Galapagos Islands, Santa Cruz. Sample 1, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; skimming of thin surface film resulting from rising tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 2, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from thick silty mud covered in greenish algal slime on flat rock ledges at low tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 3, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from greenish-brown slime on mooring rope. Collected by Tui de Roy August 9th, 1991.

Sample #1 one bottle - very sparse.

Sample #2 four bottles - one unbleached (HCL rinsed); one heavy fraction; one sieved under 38µm and one sieved over 38µm.

Sample #3 four bottles - same sequence as for sample #2.

These samples are kept in the private collection of Stuart R. Stidolph and will eventually be deposited in the collections of NIWA, Wellington, New Zealand.

Plate Twenty-five:

74-75 *Mastogloia paradoxa* Grunow in Cleve 1895. See Hustedt (1933, fig. 953); also Foged (1975, p. 32, pl. 15, figs. 3-4); Paddock and Kemp (1990, p. 96, fig. 101 showing partectal ducts, and p. 98, fig.110). “A” is in upper focus and “B” is in lower focus in respect of both specimen pairs.

76 *Mastogloia exilis* Hustedt 1933. See Paddock and Kemp (1990, p. 82, fig. 21a-b).

77 *Nitzschia panduriformis* var. *lata* (Witt) Cleve and Möller 1878. See Peragallo and Peragallo (1897-1908, pl. 70, fig. 1).

78 *Mastogloia gieskesii* Cholnoky 1963. See Kemp and Paddock (1990, p. 315, figs. 25-26, 34-35). "A" is in upper focus and "B" is same specimen in lower focus.

79 *Mastogloia fimbriata* (Brightwell) Grunow 1863. See Brightwell (1859, p. 179, pl. 9, fig. 3) given as *Cocconeis fimbriata*. See also Hustedt (1933, fig. 884).

80 *Mastogloia fimbriata* (Brightwell) Grunow 1863. Another specimen showing partectal ducts.

81 *Nitzschia corpulenta* Hendey 1958. See Hendey (1958, p. 78, pl. 1, fig. 5).

82 *Nitzschia brittoni* Hagelstein 1939. See Hagelstein (1939, p. 393, pl. 7, fig. 14) and Hustedt (1955, p. 46, pl. 15, figs. 7-8). Also Lange-Bertalot and Krammer (1987, pl. 25, Figs. 18, 18A).

83 *Nitzschia panduriformis* var. *pustulata* Voigt in Meister 1937. See Meister (1937, p. 270, pl. 11, fig. 9).

84 *Nitzschia longa* Grunow in Cleve and Grunow 1880. See Peragallo and Peragallo (1897-1908, pl. 72, fig. 5). The measurements of 7.5 x 162.5 µm agree well with those of Hendey (1971, p. 406). In this aspect, the valve also matches *Bacillaria paxillifer*, but there is a missing central stria (on the left), which occurs in several *Nitszchia* spp. but not in *Bacillaria*. No reliably identified photomicrograph of *N. longa* showing a resolution matching that of fig. 84 has been found in the literature.

85 *Nitzschia insignis* var. *marginifera* Grunow in Cleve and Grunow 1880. See Grunow in Cleve and Grunow (1880, pl. 6, fig. 105).

86-87 *Nitzschia longissima* fo. *costata* Hustedt in Schmidt et al. 1921. See Foged (1978, p. 107, pl. 46, fig. 9) and Hustedt in Simonsen (1987, p. 59, pl. 78, figs. 1-6 and pl. 79, fig. 1); also Ricard (1977, pl. 4, fig. 15) gives this species as *N. ventricosa* Palmer.

88 *Nitzschia panduriformis* var. *lata* (Witt) Cleve and Möller 1878. See Peragallo and Peragallo (1897-1908, pl. 70, fig. 1).

89 *Nitzschia panduriformis* var. *peralbata* Peragallo and Peragallo 1899. See Peragallo and Peragallo (1897-1908, pl. 70, fig. 2).

90 *Nitzschia insignis* var. *adriatica* (Grunow in Cleve and Grunow) Grunow in Van Heurck 1881. See Peragallo and Peragallo (1897-1908, pl. 75, fig. 11).

91 *Nitzschia costata* Pantocsek 1892. See Meister (1937, p. 270, pl. 11, figs. 5-6).

92 *Nitzschia vidovichii* (Grunow) Grunow in Van Heurck 1881. See Grunow in Van Heurck (1880-1885, pl. 67, fig. 7). Also Peragallo and Peragallo (1897-1908, pl. 72, fig. 13); Foged (1975, pl. 28, fig. 9) and Lange-Bertalot and Krammer (1987, pl. 10, fig. 2) which is the best illustration.

93 *Nitzschia angularis* W. Smith 1853. See Van Heurck (1880-1885, pl. 62, figs. 11-14) and

also Peragallo and Peragallo (1897-1908, pl. 73, fig. 6).

Magnifications: fig. 87: x750; figs. 77, 79-80, 84-86, 90-93: x1000; all others: x2000
Scale Bar: scale bar is 40 microns for fig. 87; 30 microns for all figures at x1000; 15 microns at x2000

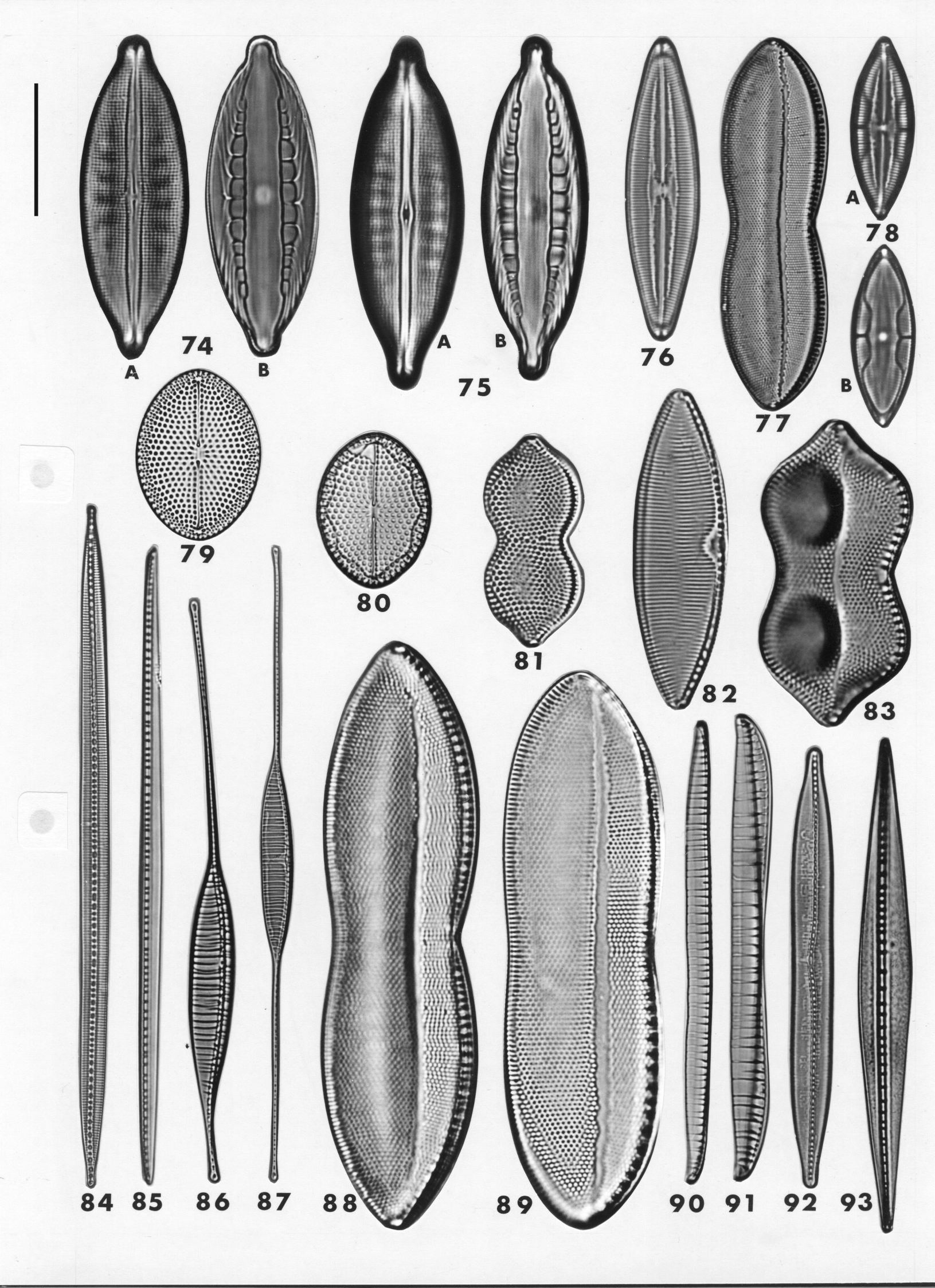
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Plate 26. MARINE DIATOMS FROM THE GALAPAGOS ISLANDS

Source of Material

Galapagos Islands, Santa Cruz. A very sparse sample collected by J.A. Broadhead August 16th, 1986.

Galapagos Islands, Santa Cruz. Sample 1, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; skimming of thin surface film resulting from rising tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 2, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from thick silty mud covered in greenish algal slime on flat rock ledges at low tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 3, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from greenish-brown slime on mooring rope. Collected by Tui de Roy August 9th, 1991.

Sample #1 one bottle - very sparse.

Sample #2 four bottles - one unbleached (HCL rinsed); one heavy fraction; one sieved under 38µm and one sieved over 38µm.

Sample #3 four bottles - same sequence as for sample #2.

These samples are kept in the private collection of Stuart R. Stidolph and will eventually be deposited in the collections of NIWA, Wellington, New Zealand.

Plate Twenty-six:

94-97 *Lyrella lyra* (Ehrenberg) Karajeva 1978 . The specimen in fig. 94 agrees exactly with that of Hendey (1964, pl. 33, fig. 2). Figure 96 represents the var. *atlantica*.

98 *Navicula (Lyrella) hennedyi* var. *granulata* Grunow in Schmidt et al. 1874 (No formal transfer to *Lyrella* could be found for this variety). See Hendey (1970, pl.2, figs. 14-16).

99-100 *Diploneis notabilis* (Greville) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 8, figs. 46-47) and also Williams (1988, p. 41, pl. 46, fig. 4) given as *Navicula notabilis.*

101-102 *Navicula (Lyrella) hennedyi* var. *granulata* Grunow in Schmidt et al. 1874 (No formal transfer to *Lyrella* could be found for this variety). See Hendey (1970, pl. 2, figs. 14-16).

103 *Navicula rudis* Cleve 1881. The specimens agree well with Hustedt (1964, fig. 1468) and also Ricard (1977, pl. 3, fig. 10)

104 *Navicula cryptocephaloides* Hustedt 1937. See Gasse (1986, p. 91, pl. 22, figs. 3-4); also Hustedt in Simonsen (1987, p. 198, pl. 307, figs. 8-15) from Java. The specimens are more narrow in valve outline and more narrowly rostrate than the figures given by Hustedt.

105 *Proschkinia complanatula* (Hustedt) Mann in Round, Crawford and Mann. See Hustedt in Simonsen (1987, p. 479, pl. 735, figs. 9-10), given as *Navicula complanatula*, which agree exactly with this specimen.

106-107 *Navicula* sp. indet. The specimens agree well with *Navicula tripunctata* sensu Patrick and Reimer (1966, pl. 49, fig. 3) and Cox (1979, p. 137, figs. 7-9), but this is a freshwater to slightly brackish water species. Since the species requires a major influx of freshwater, which is not the case for the Galapagos, it places the identity in question.

108 *Plagiodiscus nervatus* Grunow 1867. See Hendey (1970, p. 160, pl. 4, fig. 39).

109 *Rhabdonema adriaticum* Kützing 1844. See Smith (1856, p. 35, pl. 38, fig. 305).

110 *Trachyneis aspera* (Ehrenberg) Cleve 1894. See Hendey (1964, p. 236, pl. 29, fig. 13), given as *Navicula aspera*.

111 *Opephora* sp. indet. This matches *Opephora pacifica* in Witkowski, Lange-Bertalot and Metzeltin (2000, pl. 25, fig. 21), but differs markedly from the other figures there identified as this species. The specimen in Hendey (1964, p. 159, pl. 36, fig. 9) identified as *O. schwartzii* looks similar, but his fig. 8 of the same plate with the same identification, also differs markedly.

112 *Plagiogramma staurophorum* (Gregory) Heiberg 1863. See Gregory (1857, p. 24, pl. 2, fig. 37) given as *Denticula staurophorum*. See also Hustedt (1931, fig. 635).

113 *Fragilariopsis doliolus* (Wallich) Medlin and Sims 1993. See Peragallo and Peragallo (1897-1908, pl. 82, fig. 27). Also Hendey (1971, p. 390) and Foged (1975, pl. 8, fig. 18), identified as *Pseudoeunotia doliolus*.

114 *Podocystis adriatica* (Kützing) Ralfs in Pritchard 1861. See Hendey (1971, p. 390) and Ricard (1977, pl. 1, fig. 2) whose specimen given as *P. americana* Bailey and measuring 20 x 33µm most closely resembles this valve of 20 x 30µm. Hendey's specimens from the Galapagos ranged from 30-32 x 46-50µm.

115 *Oestrupia powellii* var. *galapagensis* (Cleve) Mills 1934. See Cleve (1881, pl. 3, fig. 30).

116 *Trigonium alternans* (Bailey) Mann 1907. See Van Heurck (1896, p. 475, pl. 21, fig. 644).

117 *Triceratium dubium* Brightwell 1859. See Brightwell (1859, p. 180, pl. 9, fig. 12). Figure 117a and 117b are different specimens and they are focused at the inner and outer surfaces respectively.

118 *Rhopalodia musculus* (Kützing) Otto Müller 1900. Appears to be a good match for Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 214, fig. 11).

Magnifications: figs. 103, 105, 108, 113, 114: x2000; fig. 104: x1500; all others: x1000
Scale Bar: scale bar is 30 microns for figures at x1000; 20 microns for fig. 104;
15 microns at x2000

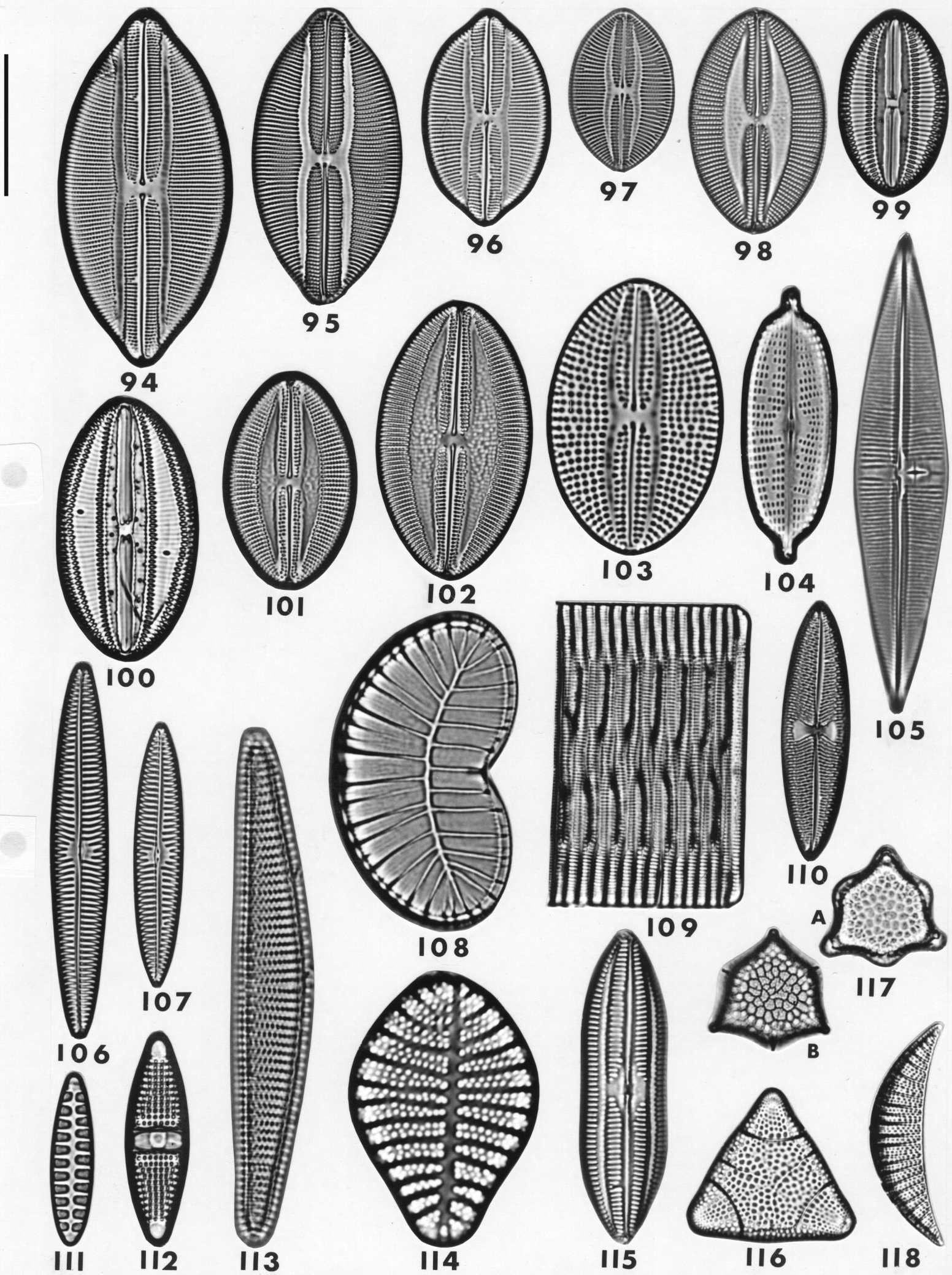
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Plate 27. MARINE DIATOMS FROM THE GALAPAGOS ISLANDS

Source of Material

Galapagos Islands, Santa Cruz. A very sparse sample collected by J.A. Broadhead August 16th, 1986.

Galapagos Islands, Santa Cruz. Sample 1, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; skimming of thin surface film resulting from rising tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 2, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from thick silty mud covered in greenish algal slime on flat rock ledges at low tide. Collected by Tui de Roy August 9th, 1991.

Galapagos Islands, Santa Cruz. Sample 3, from Academy Bay (Puerto Ayora), south coast of Santa Cruz; from greenish-brown slime on mooring rope. Collected by Tui de Roy August 9th, 1991.

Sample #1 one bottle - very sparse.

Sample #2 four bottles - one unbleached (HCL rinsed); one heavy fraction; one sieved under 38µm and one sieved over 38µm.

Sample #3 four bottles - same sequence as for sample #2.

These samples are kept in the private collection of Stuart R. Stidolph and will eventually be deposited in the collections of NIWA, Wellington, New Zealand.

Plate Twenty-seven:

119 *Trigonium graeffeanum* (Witt) Hendey 1971. See Schmidt's Atlas (1874-1959, pl. 79, fig. 1) and Hendey (1971, p. 382, fig. 29).

120-123 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Hendey (1971, p. 407, fig. 30) which equates to figs. 122 and 123. See also Paddock (1985, p. 418, pl. 1, figs. 1-7 and pl. 2, figs. 1-19) for variety of forms.

124 *Paralia sulcata* (Ehrenberg) Cleve 1873. See Van Heurck (1880-1885, pl. 91, figs 17, 24) and Hendey (1964, p. 73, pl. 23, fig. 5).

125 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Hendey (1971, p. 407, fig. 30) and also Paddock (1985, p. 418, pl. 1, figs. 1-7; pl. 2, figs. 1-19) for variety of forms.

126 *Thalassiosira decipiens* (Grunow) E. Jørgensen 1905. A somewhat doubtful

identification, but its small size of 25µm agrees well with that in the reference. See Hasle (1979, p. 85, pl. 5, fig. 29a).

127 *Pseudoamphiprora* (?) sp. indet. Identification is uncertain.

128 *Hyalosynedra laevigata* (Grunow) Williams and Round 1986. See Hustedt (1932, figs. 706a-c), given as *Synedra laevigata*. Fig. 128b is an enlargement of specimen in fig. 128a showing striation details.

129-31 *Synedra formosa* Hantzsch in Rabenhorst 1863. See Peragallo and Peragallo (1897-1908, pl.78, fig. 6). Fig. 129 is of multiple frustules in girdle view.

132 *Stictodesmis australis* Greville 1863. See Greville (1863, p. 535, pl. 13, figs. 1-4); also Greville in Williams (1988, pl. 55, figs. 5-7) and the specimen from Muntok, Singapore, pl. 17, fig. 32) in this atlas. The Galapagos specimens lack the spatulate apices of *S. australis*. However, in other respects they appear similar.

Magnifications: figs 120, 129, 130, 131: x750; fig. 119: x500; figs 126, 127, 128b, 132: x2000; all others: x1000
Scale Bar: scale bar is 60 microns for figures at x500; 40 microns at x750; 30 microns at x1000; 15 microns at x2000

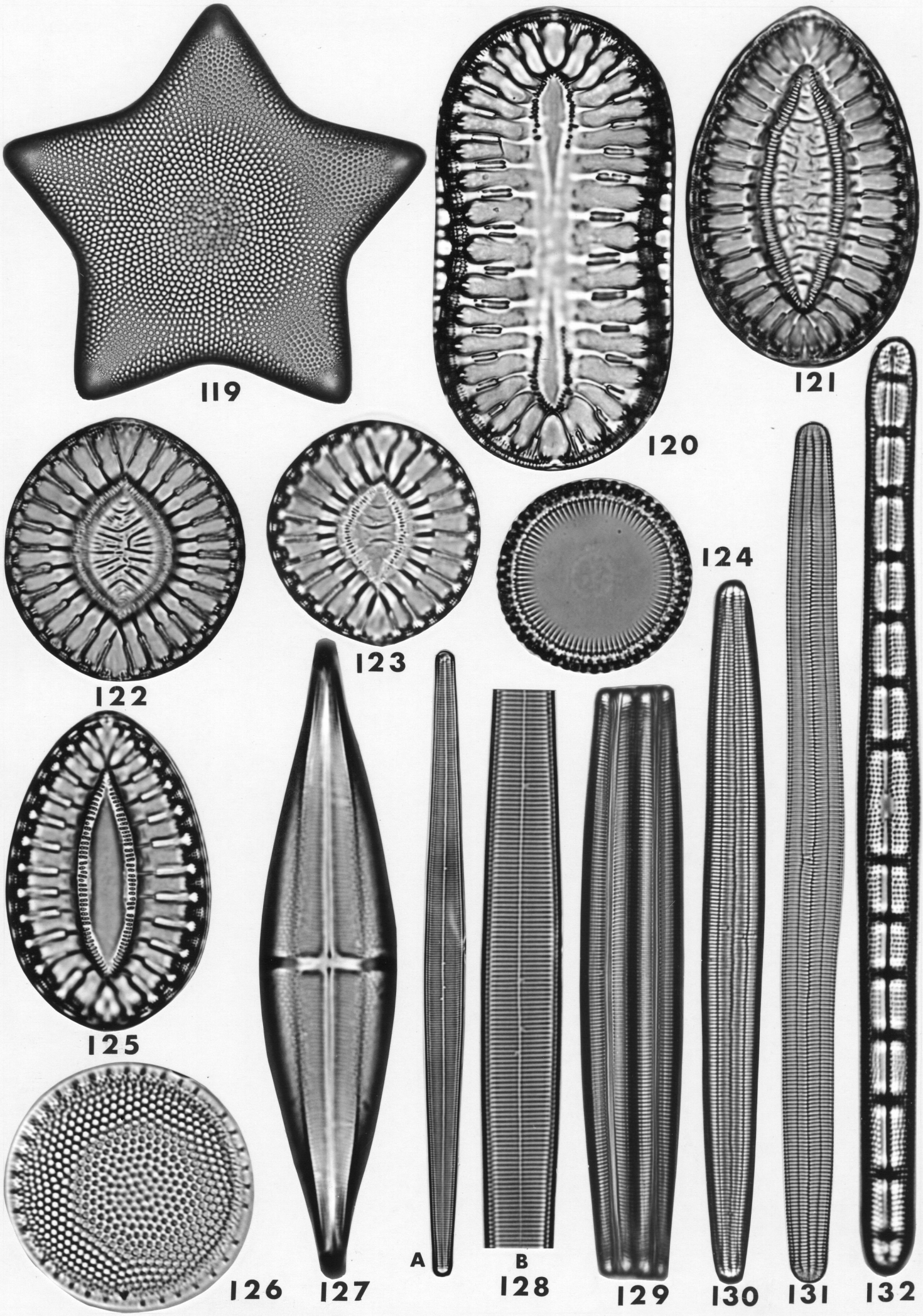
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Plate 28. MARINE DIATOMS FROM ABERDEEN BAY, HONG KONG

Source of Material

From the Morris Watt Collection, Otago Museum, New Zealand

Slide No. 336, catalogue No.88
Slide No. 337, catalogue No.89

Plate Twenty-eight:

1 *Diploneis splendida* (Gregory) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 13, figs. 31-34).

2 *Diploneis novaeseelandiae* (Schmidt in Schmidt et al.) Hustedt 1937. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 94, fig. 11).

3-4 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985, pl. 7, fig. A6) given as *S. cuneata*.

5 *Rhabdonema punctatum* (Harvey and Bailey) Stodder 1880. See Desikachary and Prema (1987, pl. 385, fig. 2).

6 *Caloneis robusta* Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 50, figs. 1-2) given as *Navicula robusta.*

7 *Trachyneis antillarum* (Cleve and Grunow) Cleve 1894. See Desikachary (1989, pl. 757, fig. 1) of a specimen from Singapore.

8 *Trachyneis debyi* (Leuduger-Fortmorel) Cleve 1894. See Desikachary (1989, pl. 762, fig. 11).

9 *Navicula brasiliensis* Grunow 1863. See Cleve-Euler (1953, p. 110, fig. 718) and also Hendey (1958, p. 64, pl. 1, fig. 1).

10 *Actinocyclus octonarius* var. *tenellus* (Brébisson) Hendey 1954. See Villareal and Fryxell (1983, p. 453, figs. 1-14).

11 *Campylodiscus echeneis* Ehrenberg in Kützing 1844. See Hendey (1964, pl. 40, fig. 14) and Laws (1988, pl. 35, fig. 1).

12 *Planktoniella blanda* (A. Schmidt) Syvertsen and Hasle in Hasle and Syvertsen 1993. See Schmidt's Atlas (1874-1959, pl. 59, figs. 36-37) given as *Coscinodiscus blandus*. Also Hasle and Syvertsen (1993, p. 304, fig. 25) as comb. nov.

Magnifications: figs. 1 and 12: x1000; figs. 2-10: x750; fig. 11: x375
Scale Bar: scale bar is 80 microns for figures at x375; 40 microns at x750: 30 microns at x1000

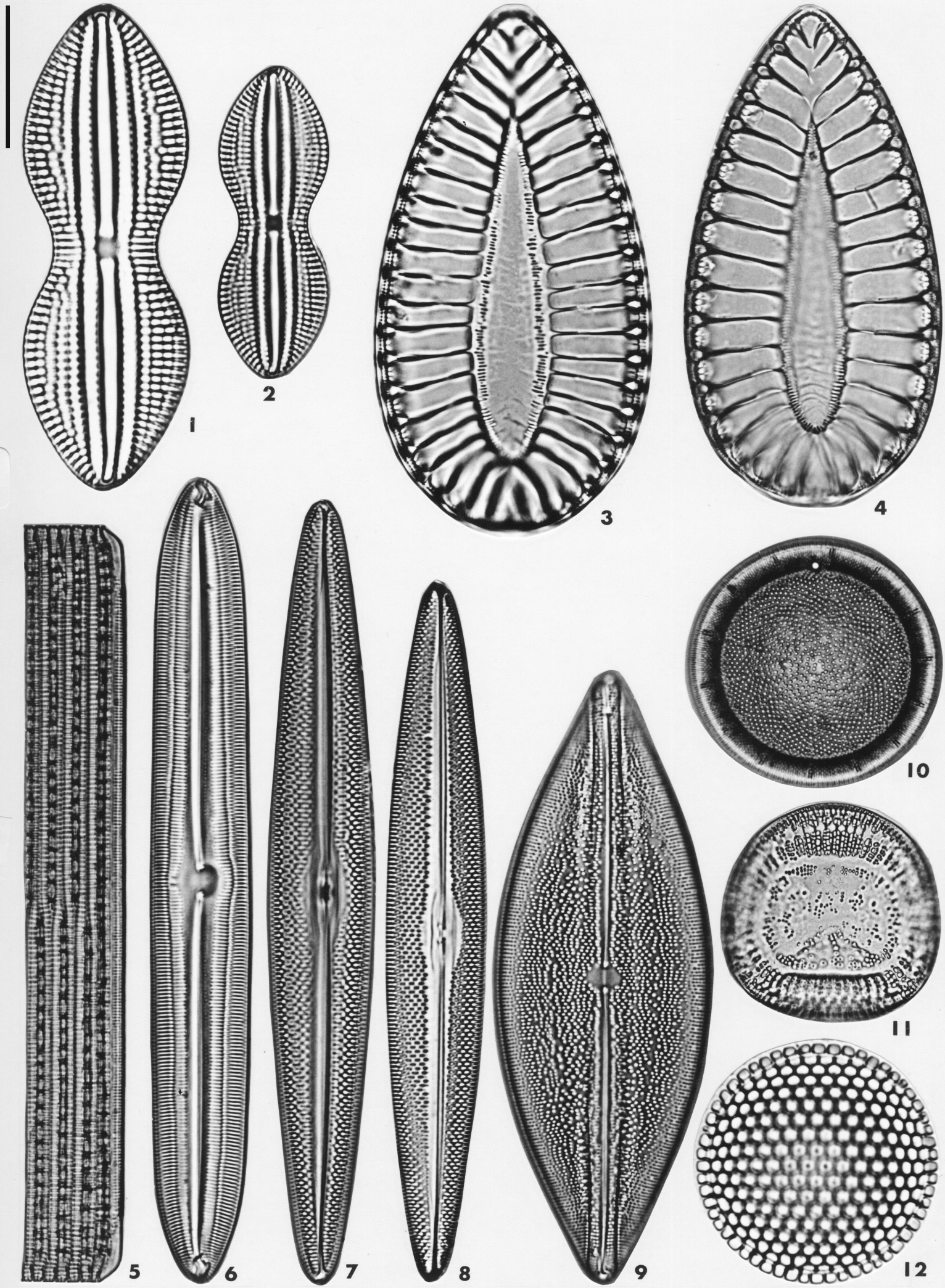
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Plate 29. MARINE DIATOMS FROM ABERDEEN BAY, HONG KONG

Source of Material

From the Morris Watt Collection, Otago Museum, New Zealand

Slide No. 336, catalogue No.88
Slide No. 337, catalogue No.89

Plate Twenty-nine:

13 *Coscinodiscus perforatus* var. *cellulosa* Grunow 1884. See van der Werff and Huls (1957, C.A 1c. 15). Provisional identification. The interpretations in the literature vary greatly, but the reference cited above is in close agreement.

14 *Coscinodiscus oculus-iridis* (Ehrenberg) Ehrenberg 1854. See Peragallo and Peragallo (1897-1908, pl. 118, fig. 2).

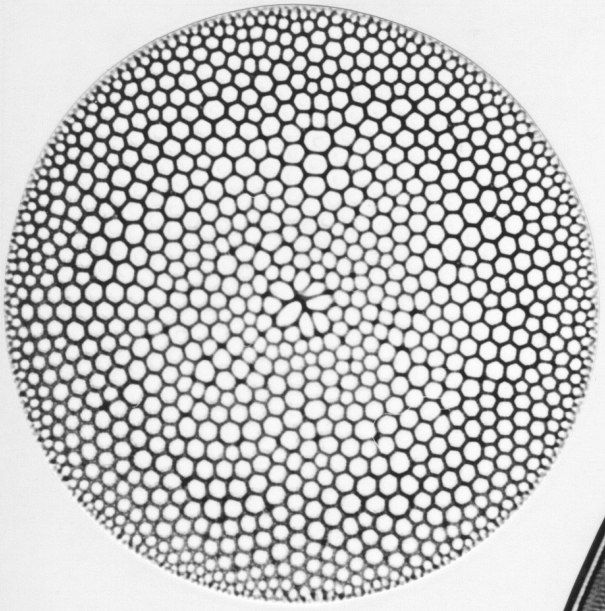
15 *Navicula (Lyrella) hennedyi* var. *granulata* Grunow in Schmidt et al. 1874 (No formal transfer to *Lyrella* can be found for this variety). See Hendey (1970, pl. 2, fig. 14).

16 *Schuettia annulata* (Wallich) De Toni 1894. See Hendey (1958, p. 43, pl. 3, fig. 3) and also Desikachary (1989, pl. 755, figs. 1-4).

17 *Navicula brasiliensis* Grunow 1863. See Cleve-Euler (1953, p. 110, fig. 718) and also Hendey (1958, p. 64, pl. 1, fig. 1).

18 *Triceratium shadboltianum* (?) Greville 1862. See Desikachary (1989, pl. 791, fig. 1). A very doubtful identification. Although Desikachary (1989, pl. 791, fig. 1) is very similar to fig. 18, the references to *T. shadboltianum* in earlier works are quite different. However, the figures 2 and 6 that Desikachary (1989) gives certainly agree with the earlier references to *T. shadboltianum*.

Magnifications: fig.14: x500; all others: x750
Scale Bar: scale bar is 60 microns for fig. 14; 40 microns for all figures at x750



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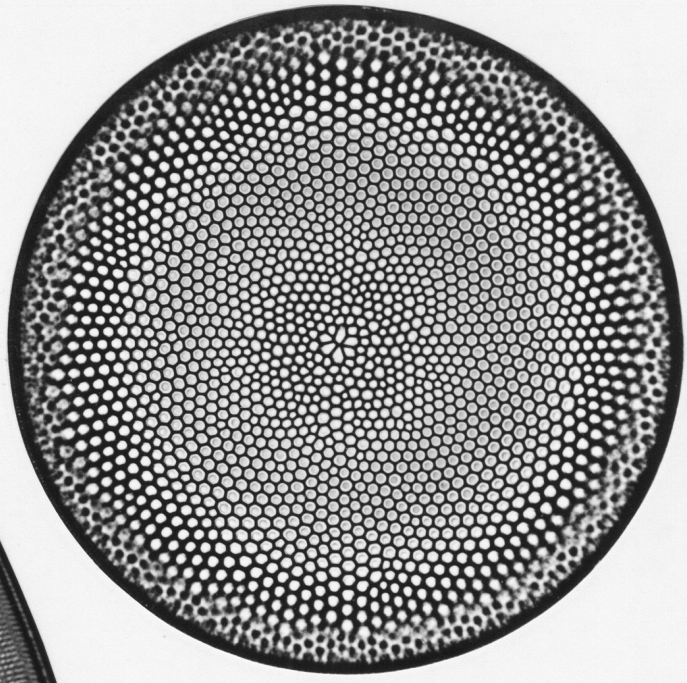

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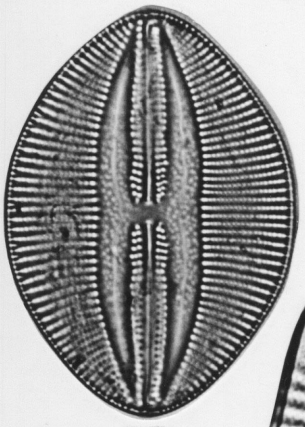

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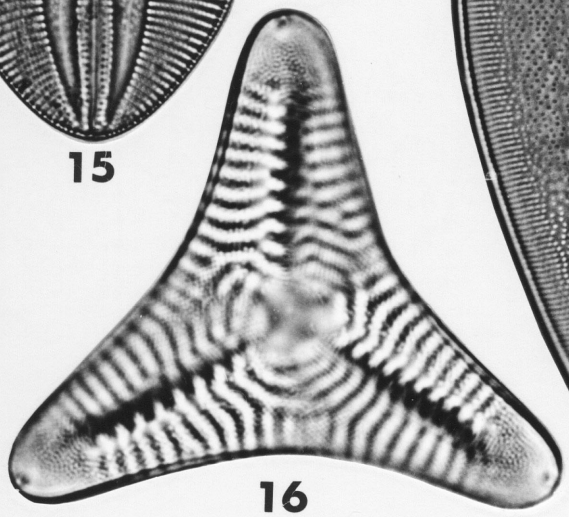

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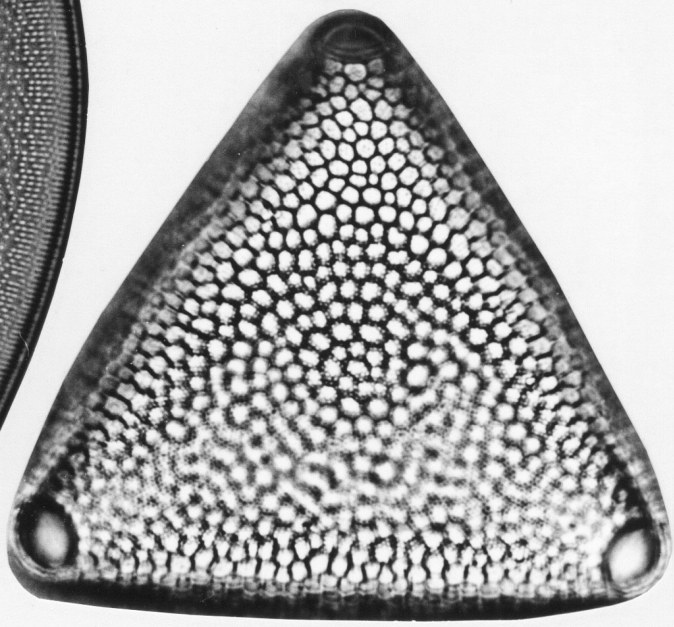

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Plate 30: MARINE DIATOMS FROM SAMARANG, JAVA

Source of Material

From the Morris Watt Collection, Otago Museum, New Zealand

Slide No. 330, catalogue No. 84
Slide No. 331, catalogue No. 85

Slides are labeled as “Samarang, Java” which is a variant spelling of Semarang.

Plate Thirty:

1 *Actinoptychus senarius* (Ehrenberg) Ehrenberg 1843. See Van Heurck (1896, p. 496, pl. 22, fig. 648), given as *A. undulatus*.

2 *Coscinodiscus asteromphalus* Ehrenberg 1844. See Desikachary and Prema (1987, pl. 267, figs. 1-4).

3 *Navicula (Lyrella) spectabilis* var. *controversa* (Schmidt in Schmidt et al.) Cleve 1895 (No formal transfer to *Lyrella* could be found for this variety). See Schmidt's Atlas (1874-1959, pl. 3, fig. 5). A provisional identification. The specimen of fig. 3 is somewhat similar to *N. hennedyi* var. *californica* given by Hustedt (1964, fig. 1520, righthand figure of two).

4 *Coscinodiscus* sp. indet.

5 *Navicula (Lyrella) durandii* var. *rhomboidea* (Castracane) Schmidt in Schmidt et al. 1888 (No formal transfer to *Lyrella* could be found for this variety). See Schmidt's Atlas (1874-1959, pl. 129, fig. 2) of a specimen from the Bay of Campeche.

6-7 *Coscinodiscus jonesianus* var. *commutata* (Grunow) Hustedt 1928. See Hustedt (1928, fig. 240).

Magnifications: fig. 4: x375; all others: x750
Scale Bar: scale bar is 80 microns for fig. 4; 40 microns for all figures at x750

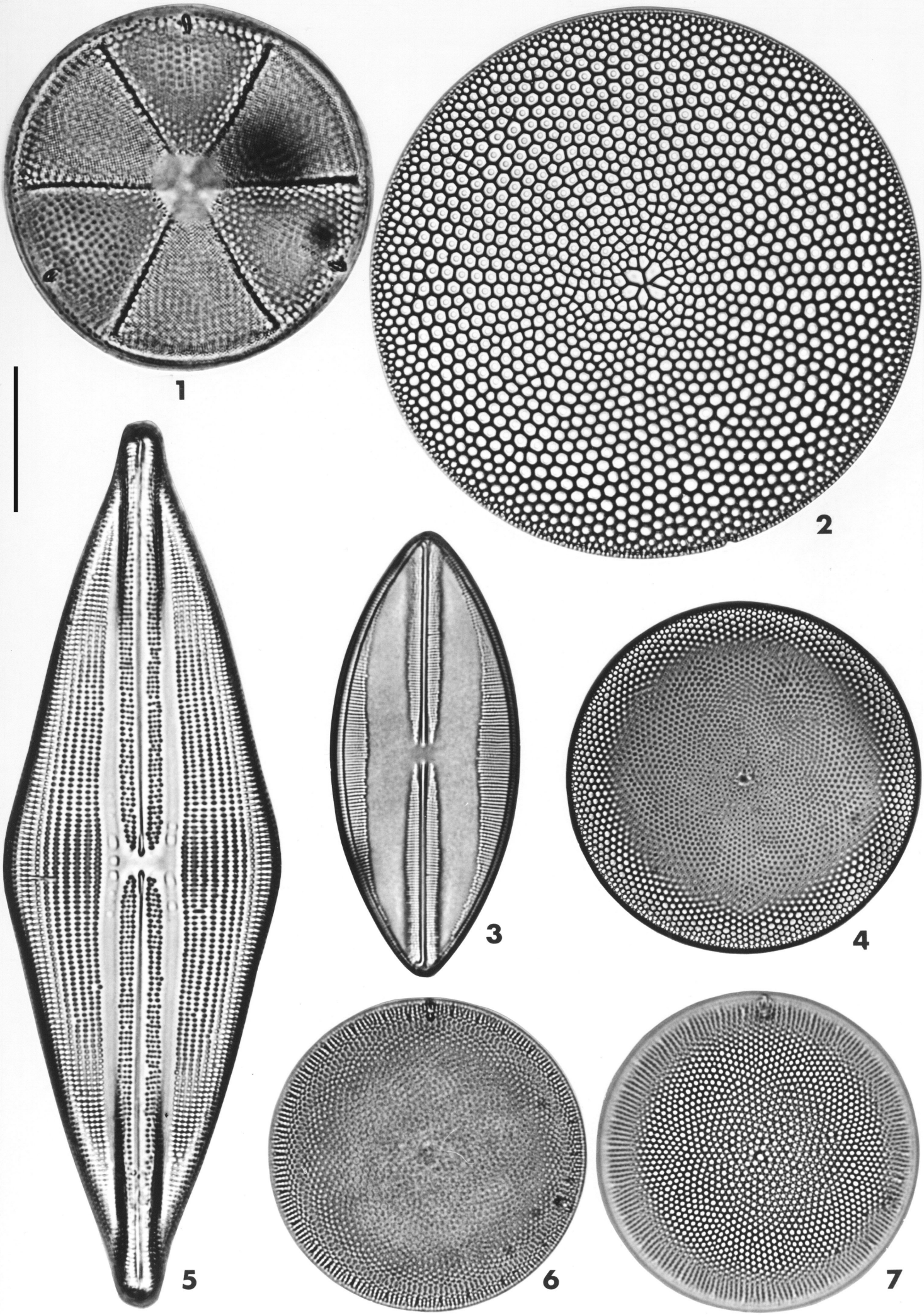
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Plate 31: MARINE DIATOMS FROM SAMARANG, JAVA

Source of Material

From the Morris Watt Collection, Otago Museum, New Zealand

Slide No. 330, catalogue No. 84
Slide No. 331, catalogue No. 85

Slides are labeled as "Samarang, Java" which is a variant spelling of Semarang.

Plate Thirty-one:

8 *Navicula brasiliensis* Grunow 1863. See Cleve-Euler (1953, p. 110, fig. 718) and also Hendey (1958, p. 64, pl. 1, fig. 1).

9 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985) for variety of forms.

10 *Campylodiscus daemelianus* Grunow in Schmidt 1874. See Peragallo and Peragallo (1897-1908, pl. 52, fig. 6).

11 *Arachnoidiscus* sp. indet.

12 *Pinnulariosigma raeana* (Castracane) Desikachary, Raja Rao and Sridharan in Desikachary 1989. See Desikachary (1989, p. 5, pl. 670, fig. 1 and pl. 671, fig. 6).

13 *Lyrella lyra* (Ehrenberg) Karajeva 1978. Appears to be a fair match for Desikachary (1989, pl. 633, fig. 9) or Hustedt (1927-1966, fig. 1551d) assigned to forms of *Navicula lyra*.

14 *Trachyneis debyi* (Leuduger-Fortmorel) Cleve 1894. See Desikachary (1989, pl. 762, fig. 11).

15 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985) for variety of forms.

16 *Triceratium favus* Ehrenberg 1840. See Hendey (1964, pl. 25, fig. 4).

17 *Triceratium scitulum* Brightwell 1853. See Desikachary (1989, pl. 790, figs. 1-3).

Magnifications: fig. 10: x375; all others: x750
Scale Bar: scale bar is 80 microns for fig. 10; 40 microns for all figures at x750

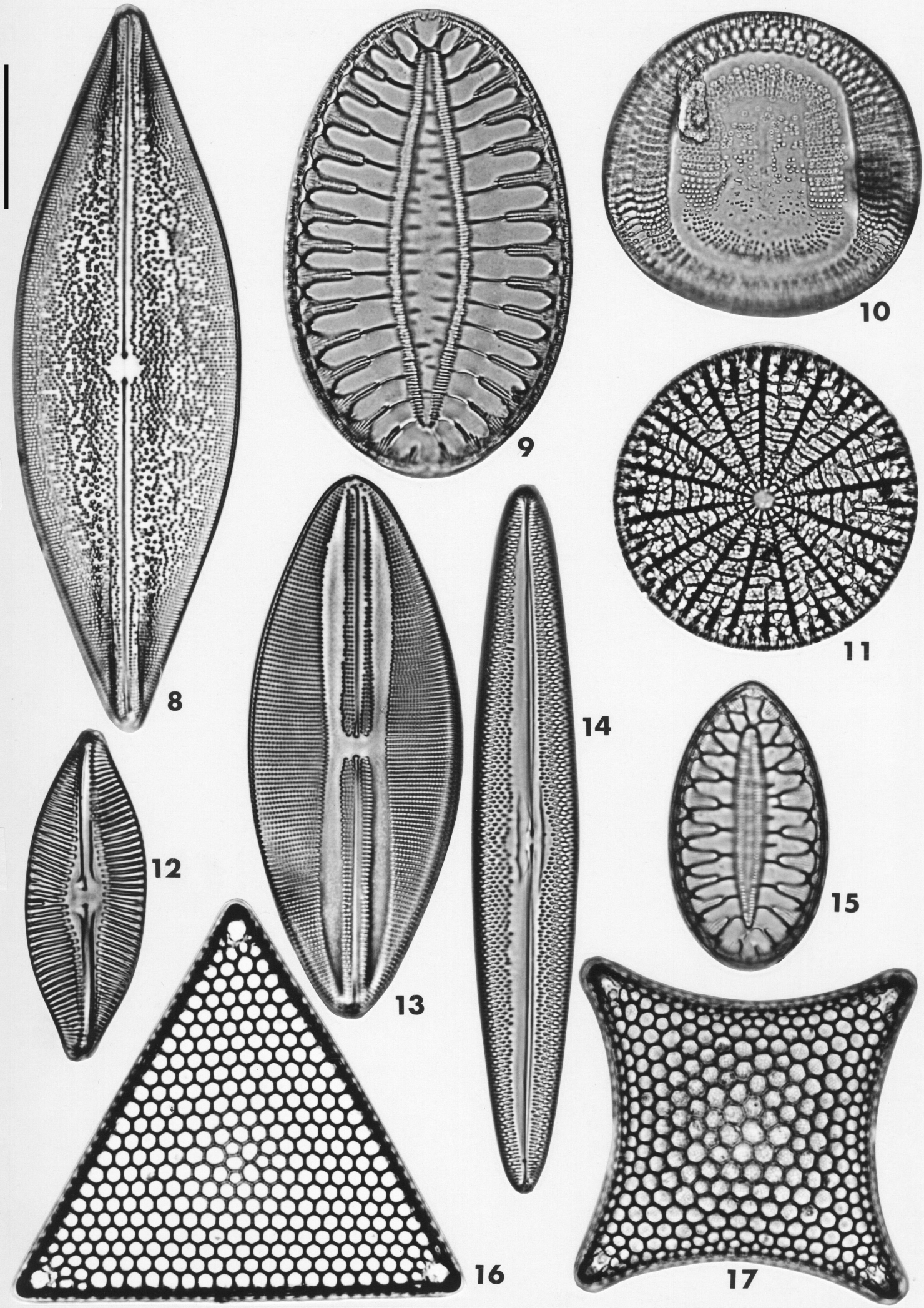
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Plate 32: MARINE DIATOMS FROM INDONESIA

Source of Material

Slide HC 2951, recent marine strew from algae, Sumatra. mounted by Thum on slide No.2501.

Slide HC 2963 and HC 2988, recent marine strew from Holothuria, Painan, Sumatra. Mounted by Thum on slides No.2493 and 2703.

Slide HC 3810, selected recent marine species from Samarang, Java.

The slides are held in the Healey Collection at the National Institute for Water and Atmospheric Research (NIWA) Greta Point, Wellington, N.Z.

NOTE: the data given for the figures of these two plates do not specify which slide was used for the figure. The slide HC 1082 used for figs 9 and 10 is from a sample “Hongkong, mud”.

Plate Thirty-two:

1 *Campylodiscus daemelianus* in Schmidt 1874. See Peragallo and Peragallo (1897-1908, pl. 52, fig. 6).

2 *Surirella fastuosa* var. *opulenta* (Grunow) Schmidt in Schmidt et al. 1875. See Desikachary (1989, pl.724, fig. 4). Also, see Schmidt’s Atlas (1874-1959, pl. 20, fig. 1)

3 *Campyloneis horologium* (Williamson) Nizamuddin 1982. See Schmidt's Atlas (1874-1959, pl. 51, fig.7 and pl. 207, figs. 24-25) of specimens from Sumbawa, Java, given as *Campylodiscus horologium*.

4-5 *Mastogloia fimbriata* (Brightwell) Cleve 1895. See Desikachary and Prema (1987, pl. 297, fig. 5).

6-7 *Mastogloia fimbriata* (Brightwell) Cleve 1895. See Desikachary and Prema (1987, pl. 297, fig. 3).

8 *Diploneis crabro* var. *gloriosa* (Brun) Cleve 1894. See Ricard (1977, pl. 4, fig. 4).

9-10 *Navicula brasiliensis* Grunow 1863 (from slide HC 1082). See Desikachary (1989, pl. 623, fig. 2) and also Hendey (1958, p. 64, pl. 1, fig. 1). Grunow (1863, pl. 14, fig. 10) is rather lacking in detail. Schmidt's Atlas (1874-1959, pl. 6, figs 19-21, 23-25 and 31-33) bear little resemblance to the specimen from slide HC 1082 represented here in figs. 9-10. However, the figure in Desikachary (1989) is in close agreement.

11 *Diploneis smithii* (Brébisson in W. Smith) Cleve 1894 . See Hendey (1970, pl. 5,

fig. 46).

12 *Navicula (Lyrella) lyra* var. *elliptica* fo. *bullata* (Norman) Cleve 1895 (No formal transfer to *Lyrella* could be found for this variety). See Norman (1861, pl. 2, fig. 7).

13 *Synedra superba* Kützing 1844. See Desikachary (1989, pl. 738, figs. 8, 10).

14 *Synedra superba* Kützing 1844. Complete frustules.

15 *Rhabdonema adriaticum* (Harvey and Bailey) Stodder 1880. See Foged (1984, pl. 25, fig. 2) and also Desikachary (1989, pl. 691, fig. 3).

16 *Rhabdonema punctatum* (Harvey and Bailey) Stodder 1880. See Desikachary and Prema (1987, pl. 385, fig. 2).

17 *Rhabdonema punctatum* (Harvey and Bailey) Stodder 1880. See Desikachary and Prema (1987, pl. 385, fig. 3).

18 *Navicula zanzibarica* var. *zebuana* Castracane 1889. See Schmidt's Atlas, (1874-1959, pl. 120, fig. 4), Hustedt (1964, fig. 1542c) and Williams (1988, pl. 48, fig. 1).

19 *Lyrella barbitos* (Schmidt) Mann in Round, Crawford and Mann 1990. See Desikachary (1989, pl. 622, figs. 2, 4) and Hustedt (1964, fig.1539a-b), given as *Navicula barbitos*.

Magnifications: figs. 1-3, 9-10, 12, 18-19 x500; figs. 13-17 x750; all others x1000
Scale Bar: scale bar is 60 microns for the figures shown at x500; 40 microns at x750; 30 microns at x1000

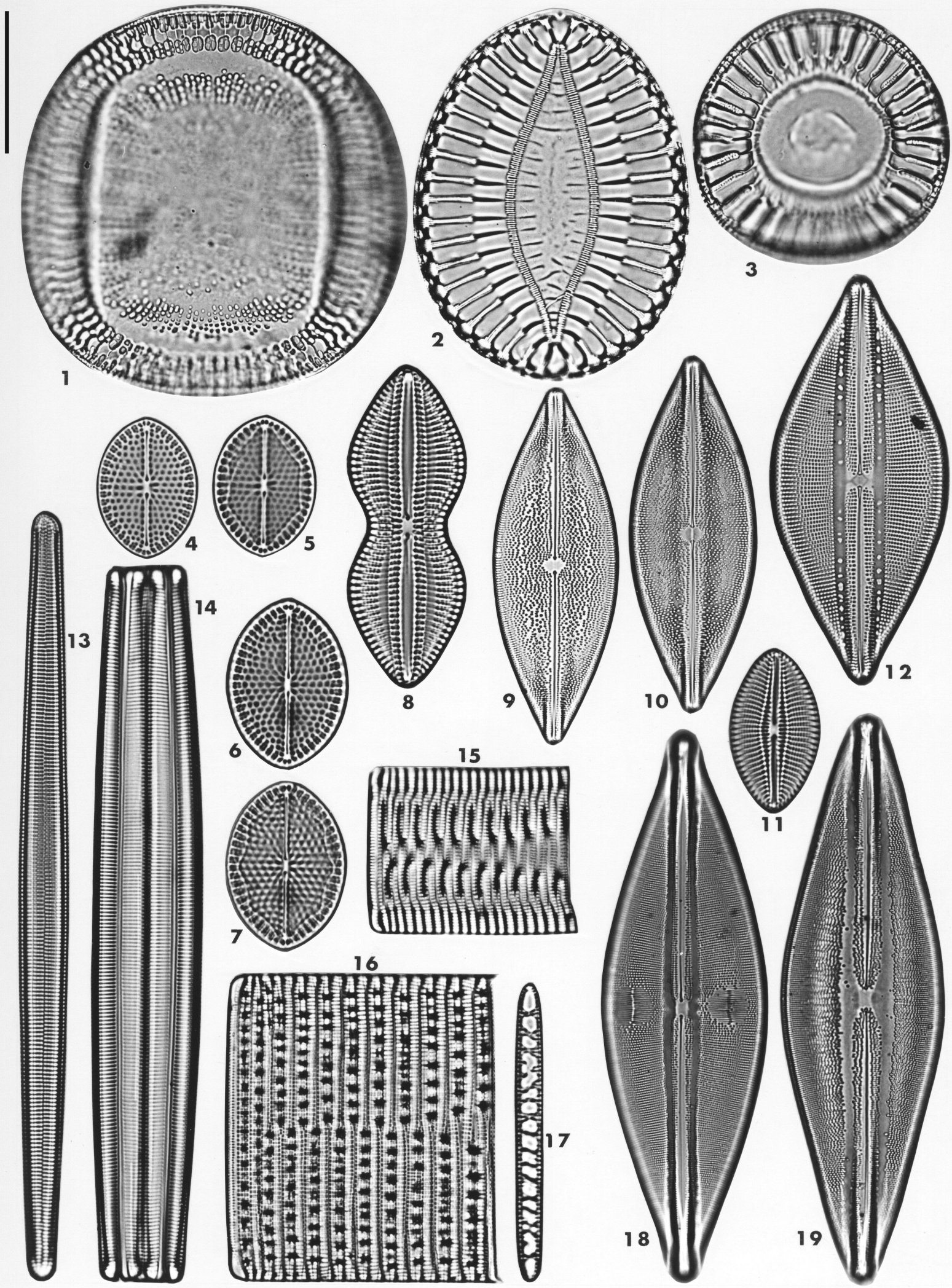
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Plate 33: MARINE DIATOMS FROM INDONESIA

Source of Material

Slide HC 2951, recent marine strew from algae, Sumatra. mounted by Thum on slide No.2501.

Slide HC 2963 and HC 2988, recent marine strew from Holothuria, Painan, Sumatra. Mounted by Thum on slides No.2493 and 2703.

Slide HC 3810, selected recent marine species from Samarang, Java.

The slides are held in the Healey Collection at the National Institute for Water and Atmospheric Research (NIWA) Greta Point, Wellington, N.Z.

NOTE: the data given for the figures of these two plates do not specify which slide was used for the figure. The slide HC 1082 used for figs 9 and 10 is from a sample "Hongkong, mud".

Plate Thirty-three:

20, 22 *Lyrella lyra* (Ehrenberg) Karajeva 1978. The complex of forms, variations and species around *Lyrella lyra* appears to require further clarification, the identification of fig. 22 is provisional only.

21 *Navicula* (*Lyrella) lyra* var. *intermedia* Peragallo and Peragallo 1897 (No formal transfer to *Lyrella* can be found for this variety). See Schmidt's Atlas (1874-1959, pl. 257, fig. 2) of a specimen from Java, given as *Navicula lyra* var. *intermedia*.

23 *Mastogloia splendida* (Gregory) Pergallo 1888. See Hendey (1964, pl. 37, fig. 2).

24, 28 *Lyrella praetexta* (Ehrenberg) Mann in Round, Crawford and Mann 1990. See Hendey (1964, pl. 33, fig. 1), given as *Navicula praetexta*.

25 *Oestrupia powellii* var. *vidovichii* (Grunow) Heiden in Schmidt et al. 1906. See Schmidt's Atlas (1874-1959, pl. 264, fig. 8).

26 *Caloneis maxima* (Gregory) F.W. Mills. See Gregory (1856, pl. 5, fig. 2) given as *Navicula maxima*, which is near a perfect match for this specimen. See also Schmidt's Atlas (1874-1959, pl. 50, figs. 19-21).

27 *Diploneis fusca* (Gregory) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 7, figs. 1-4) and also Marine Diatoms from the Cape Verde Islands (in this volume pl. 18, fig. 134).

29 *Petroneis monilifera* (Cleve) Stickle and Mann in Round, Crawford and Mann 1990. See Hustedt (1966, fig. 1699a) and Hendey (1964, pl. 31, fig. 4), given as *Navicula monilifera*.

30 *Fallacia forcipata* var. (?). See Peragallo and Peragallo (1897-1908, pl. 21, fig. 28) and Tynni (1975, pl. 4, fig. 87), which agrees well with this figure and identified as a *Navicula forcipata*.

31-32 *Diploneis exemta* (Schmidt in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 11, figs. 28-29) and also Peragallo and Peragallo (1897-1908, pl. 15, fig. 17).

33 *Lyrella atlantica* (Schmidt) Mann in Round, Crawford and Mann 1990. See Schmidt's Atlas (1874-1959, pl. 2, fig. 33) and Hustedt (1964, fig. 1555), given as *Navicula lyra* var. *atlantica*.

34 *Trachyneis aspera* (Ehrenberg) Cleve 1894. See Hendey (1964, pl. 29, fig. 13).

35 *Navicula pennata* var. *maxima* Cleve 1895. See Peragallo and Peragallo (1897-1908, pl. 11, fig. 24).

Magnifications: figs. 24, 27, 28, 34: x750; all others: x1000
Scale Bar: scale bar is 40 microns for the figures shown at x750; 30 microns at x1000

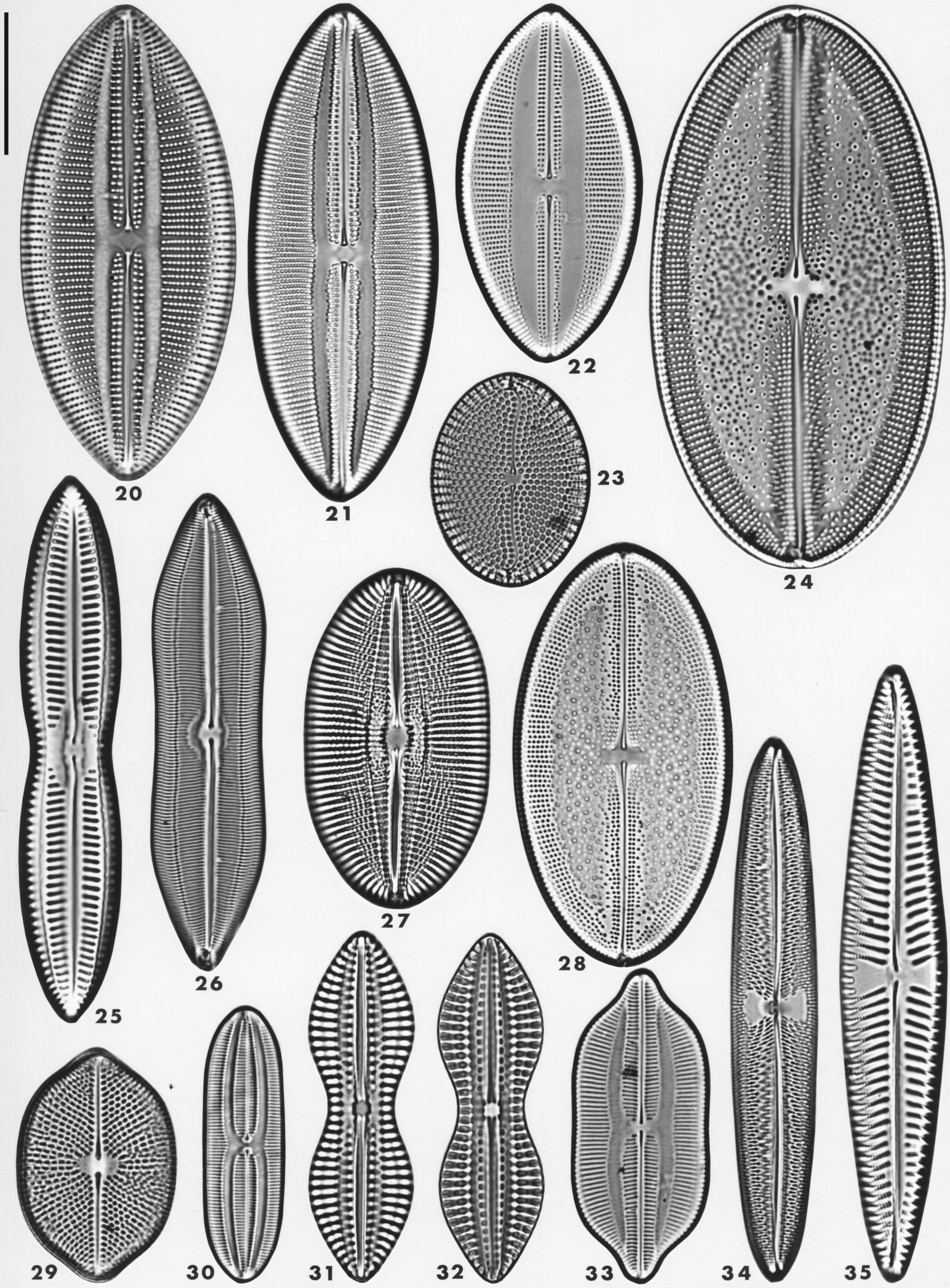
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Plate 34. MARINE DIATOMS FROM ALBANY, KING GEORGE SOUND, AUSTRALIA

Source of Material

Slide No. 164, cat. No. 61 and Slide No. 165, cat. No. 62
from the Morris Watt Collection, Otago Museum, New Zealand.

Slide HC 1007 from the Healey Collection, NIWA, Wellington, N.Z.

Plate Thirty-four:

1 *Triceratium robertsianum* Greville 1863. See Desikachary (1989, pl. 784, fig. 3) of a specimen from King George Sound.

2 *Coscinodiscus radiatus* Ehrenberg 1840. See Hendey (1964, pl. 22, fig. 7).

3-4 *Mastogloia fimbriata* (Brightwell) Cleve 1895. See Foged (1975, pl. 14, figs. 1-2); also Stephens and Gibson (1979, figs. 25-32, LM and SEM).

5-6 *Mastogloia horvathiana* Grunow 1860 . See Foged (1975, pl. 13, figs. 6-7). Matches illustration in Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 85, fig. 1).

7-8 *Mastogloia fimbriata* (Brightwell) Cleve 1895. See Hendey (1970, pl. 1, fig. 11).

9-10 *Campyloneis grevillei* (W. Smith) Grunow and Eulenstein in Grunow 1867. See John (1983, pl. 32, fig. 12).

11 *Amphora spectabilis* Gregory 1857. Schoeman and Archibald (1987, pl. 5, fig. 18).

12 *Grammatophora serpentina* (Ralfs) Ehrenberg 1844. See W. Smith (1856, pl. 42, fig. 315).

13 *Grammatophora marina* (Lyngbye) Kützing 1844. See Foged (1985, pl. 3, fig. 9). Matches illustration in Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 85, fig. 1).

14 *Nitzschia spectabilis* (?) (Ehrenberg) Ralfs in Pritchard 1861. See Smith (1853, pl. 14, fig. 116). Provisional identification although the specimen agrees well with Smith's (1853) original figure of a specimen from a brackish habitat.

15 *Nitzschia* sp. indet.

16 *Triceratium pentacrinus* Hassall 1845. See Desikachary (1989, pl. 786, fig. 1) of a specimen from King George Sound.

17 *Diploneis crabro* var. *limitanea* (Schmidt in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 11, fig. 23), identified as *Navicula limitanea*.

18 *Diploneis chersonensis* (Grunow in Schmidt et al.) Cleve in Schmidt et al. 1892. See Schmidt's Atlas (1874-1959, pl. 12, fig. 25) given as *Navicula apis*; also Schmidt's Atlas (1874-1959, pl. 174, fig. 14) as *Navicula chersonensis*.

19 *Amphora complexa* Gregory 1857. See Gregory (1857, p. 51, pl. 5, fig. 91).

20 *Triceratium pentacrinus* fo. *quadrata* Forti in Tempère and Peragallo 1909. See Desikachary (1989, pl. 787, fig. 3).

Magnifications: all figures x750
Scale Bar: scale bar is 40 microns for the figures shown at x750

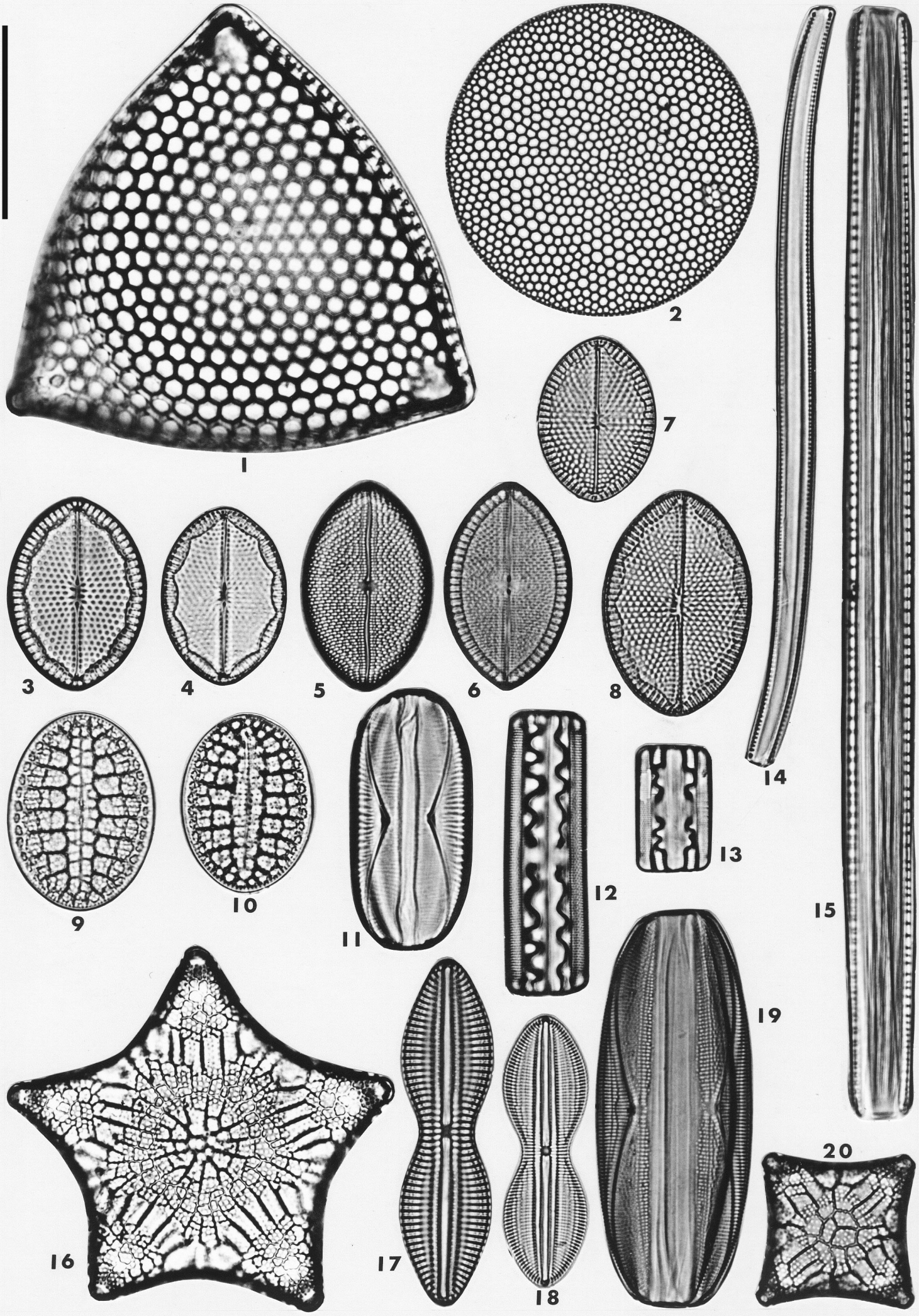
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Plate 35. MARINE DIATOMS FROM ALBANY, KING GEORGE SOUND, AUSTRALIA

Source of Material

Slide No. 164, cat. No. 61 and Slide No. 165, cat. No. 62
from the Morris Watt Collection, Otago Museum, New Zealand.

Slide HC 1007 from the Healey Collection, NIWA, Wellington, N.Z.

Plate Thirty-five:

21 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Hendey (1964, pl. 40, fig. 4) and also Paddock (1985, pl. 2, figs. 12-13) for a variety of forms.

22 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Schmidt's Atlas (1874-1959, pl. 5, fig. 8) of a specimen of *S. fastuosa* from the Bay of Campeche and Paddock (1985) for further varieties.

23 *Oestrupia zanardiniana* (Grunow) Schrader 1971. See Grunow (1860, pl. 3, fig. 12).

24 *Caloneis liber* var. *umbilicata* (Grunow in Schmidt et al.) Cleve 1894. See Peragallo and Peragallo (1897-1908, pl. 9, fig. 16).

25-26 *Mastogloia horvathiana* Grunow 1860. See Foged (1975, pl. 13, figs. 6-7).

27-28 *Diploneis chersonensis* (Grunow in Schmidt et al.) Cleve in Schmidt et al. 1892. See Hendey (1964, pl. 32, figs. 7-8).

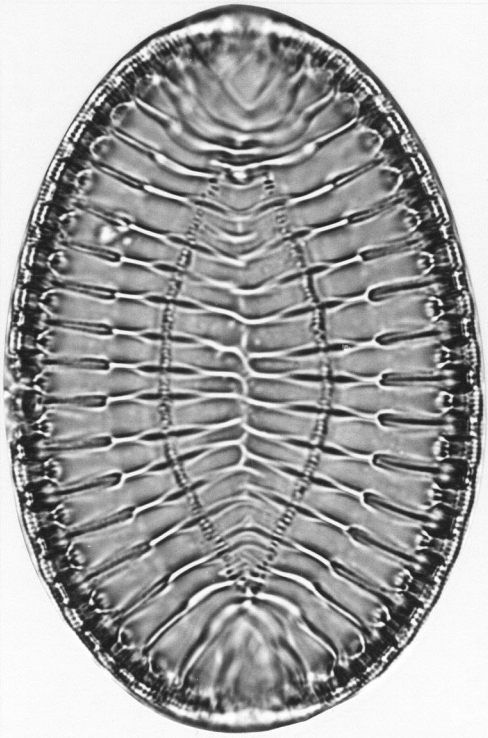
29-30 *Actinocyclus ingens* Rattray 1890. See Desikachary and Prema (1987, pl. 269, fig. 3) with reference to *A. ingens* var. *indica*. The only references to *A. ingens* appear to be Rattray (1890) and De Toni (1894). According to the description by Desikachary and Prema (1987, p. 5), the only difference between *A. ingens* and *A. ingens* var. *indica* is in the larger areolae of the latter. Whether the separation is justified appears doubtful.

31 *Grammatophora serpentina* (Ralfs) Ehrenberg 1844. See W. Smith (1856, pl. 42, fig. 315); and also Hendey (1964, pl. 37, fig. 19).

32-33 *Trachyneis velata* (Schmidt in Schmidt et al.) Cleve 1894. See Desikachary (1989, pl. 761, figs. 5, 9) of a specimen from King George Sound.

34 *Trachyneis aspera* (Ehrenberg; Ehrenberg) Cleve 1894. See Hendey (1964, pl. 29, fig. 13) and also Ricard (1977, pl. 4, fig. 7).

Magnifications: all figures x1000
Scale Bar: scale bar is 30 microns for the figures at x1000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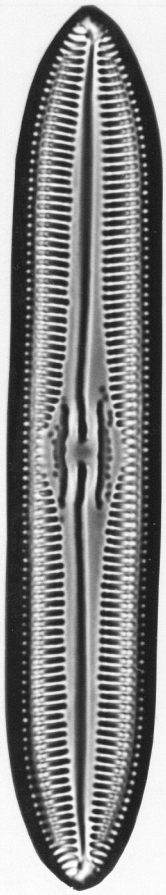
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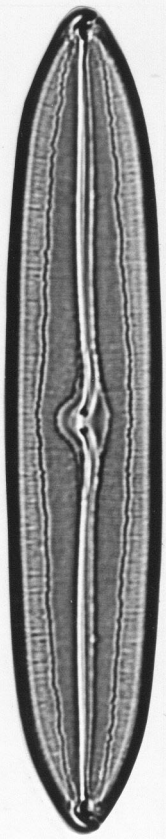
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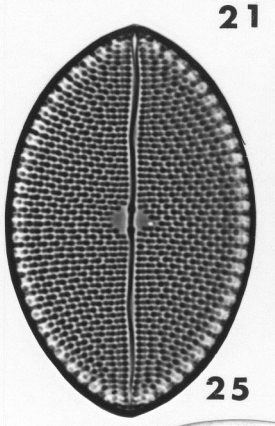
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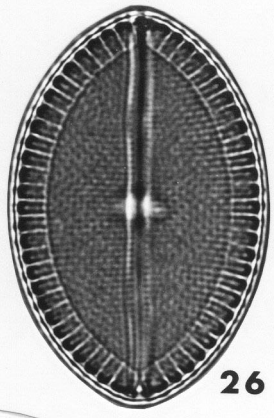
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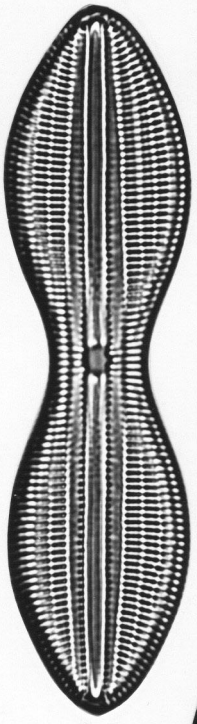
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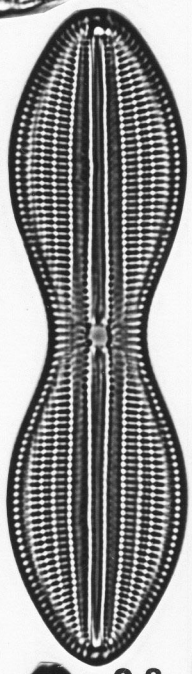
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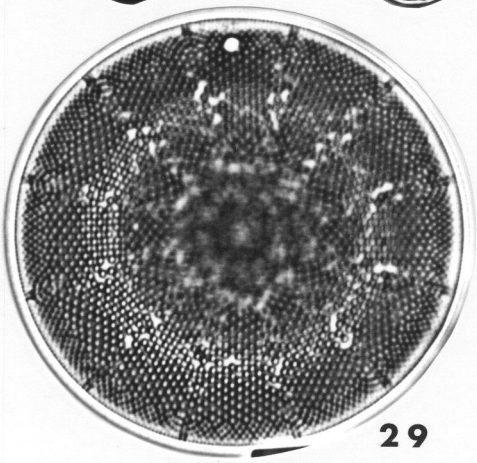
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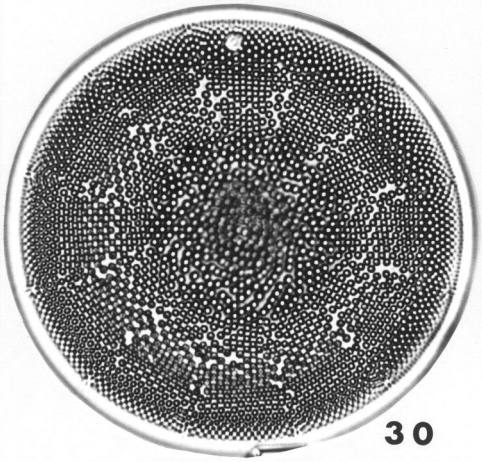
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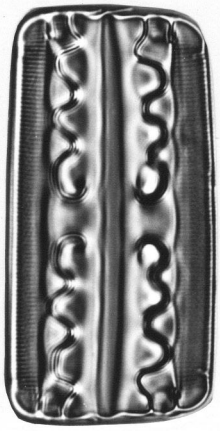
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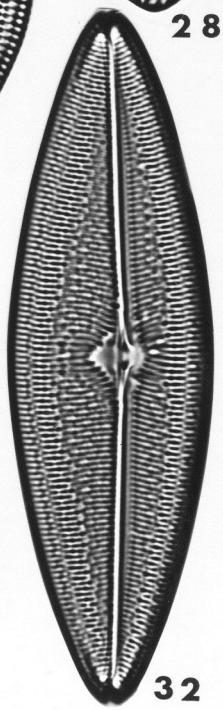
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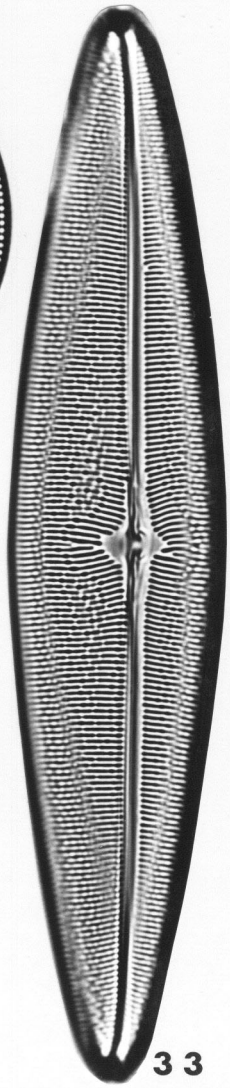
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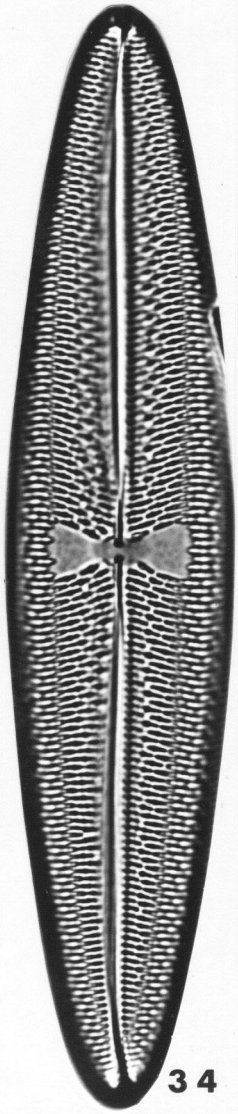
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Plate 36. MARINE DIATOMS FROM ALBANY, KING GEORGE SOUND, AUSTRALIA

Source of Material

Slide No. 164, cat. No. 61 and Slide No. 165, cat. No. 62
from the Morris Watt Collection, Otago Museum, New Zealand.

Slide HC 1007 from the Healey Collection, NIWA, Wellington, N.Z.

Plate Thirty-six:

35, 38 *Auliscus sculptus* (W. Smith) Brightwell 1860. See Hendey (1964, pl. 23, fig. 4).

36 *Coscinodiscus radiatus* Ehrenberg 1840. See Hendey (1964, pl. 22, fig. 7).

37 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985) for variety of forms.

39 *Biddulphia tuomeyi* (J.W. Bailey) Roper 1859. See Van Heurck (1880-1885, pl. 98, figs. 2-3); also Foged (1975, pl. 1, fig. 6).

40 *Triceratium broeckii* Leuduger-Fortmorel 1879. See Desikachary (1989, pl. 763, figs. 2, 5 and 6) of specimens from King George Sound.

41 *Campyloneis grevillei* (W. Smith) Grunow and Eulenstein in Grunow 1867. See John (1983, pl. 32, fig. 13).

42 *Rhabdonema adriaticum* Kützing 1844. See Desikachary (1989, pl. 691, fig. 3).

43 *Mastogloia horvathiana* Grunow 1860. See Foged (1975, pl. 13, figs. 6-7).

Magnifications: fig. 40: x500; figs. 37-39, 42: x750; all others: x1000
Scale Bar: scale bar is 60 microns for fig. 40; 40 microns for all figures at x750; 30 microns at x1000

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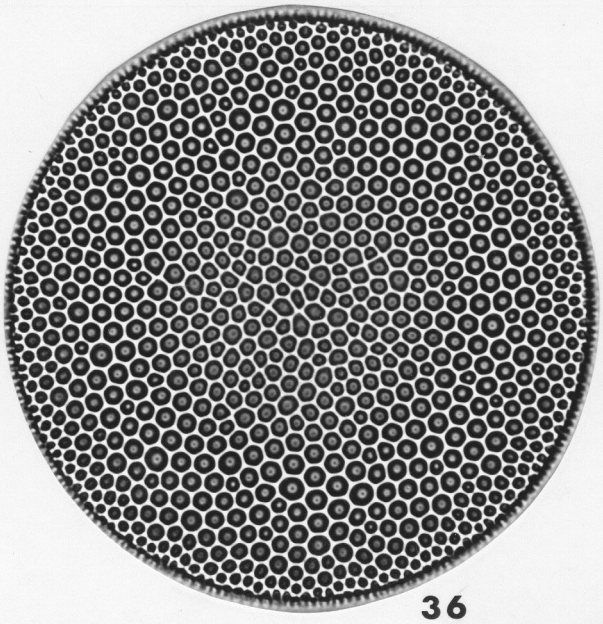

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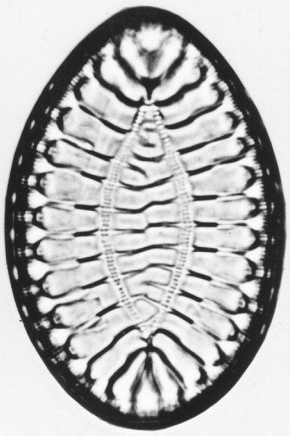

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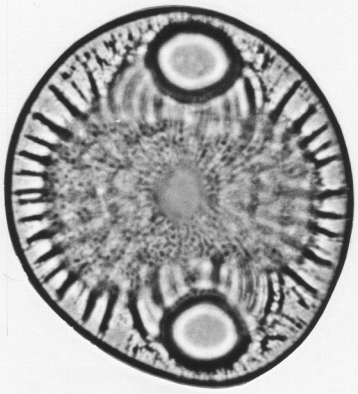

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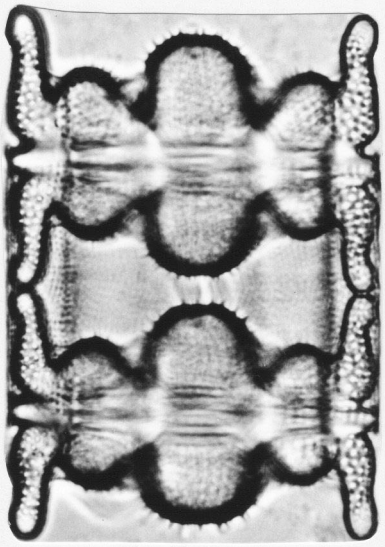

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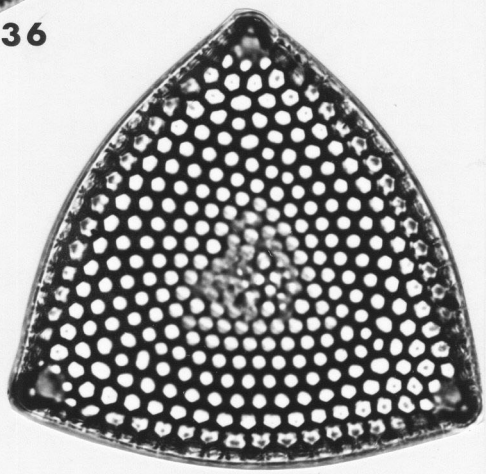

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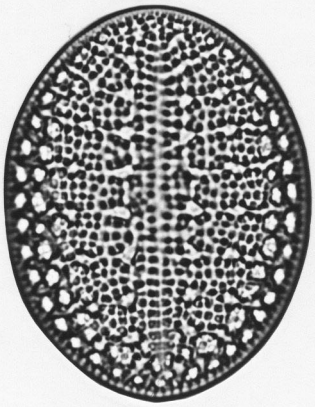

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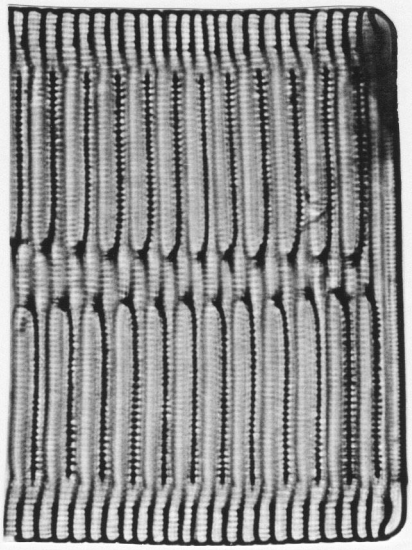

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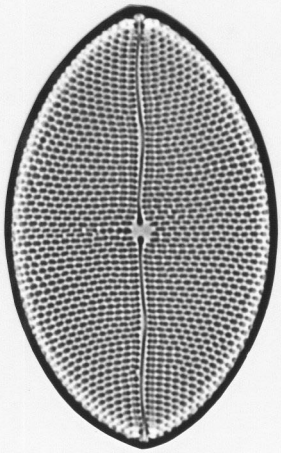

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Plate 37. MARINE DIATOMS FROM THE NEW HEBRIDES

Source of Material

Ambrym Island - HC 1959. Figs. 1-3, 24-25, 36-37
New Hebrides - HC 2018. Figs. 5-6, 13-14, 26-27, 29-30
Paama Island - HC 759, HC 1967, HC 1970, HC 1971, HC 1989, HC 3011.
Figs. 4, 7-12, 15-23, 28, 31-35, 38-39

These slides are held in the Healey Collection at the National Institute for Water and Atmospheric Research (NIWA), Greta Point, Wellington, N.Z.

Plate Thirty-seven:

1 *Trigonium graeffeanum* (Witt) Hendey 1971. See Schmidt's Atlas (1874-1959, pl. 79, fig. 1 of a specimen from Funafuti, Ellice Islands, given as *Amphitetras graeffeanum*; also Hendey (1971, p. 382, fig. 29).

2 *Trigonium arcticum* var. *kerguelense* (Grunow in Cleve and Grunow) Desikachary and Sreelatha in Desikachary and Devi 1986. See Desikachary (1989, pl. 797, fig. 5).

3 *Trigonium arcticum* var. (?). See Desikachary (1989, pl. 797, fig. 5). Identity uncertain, quite possibly a different variety than specimen in Desikachary (1989).

4 *Mastogloia splendida* (Gregory) H. Peragallo 1888. See Stephens and Gibson (1979, figs. 41-46).

5-6 *Actinocyclus octonaris* var. *tenellus* (Brébisson) Hendey 1954 . See Villareal and Fryxell (1983, p. 453, figs. 1-14).

7 *Hydrosilicon mitra* Brun 1891. See Van Heurck (1896, p. 366, fig. 118).

8-9 *Campyloneis grevillei* (W. Smith) Grunow 1867. See Van Heurck (1880-1885, pl. 28, figs. 10-11) and also Hendey (1964, pl. 27, figs. 9-11).

10 *Grammatophora oceanica* Ehrenberg 1840. See HC 1109 specimen given as *G. subtilissima*. Also John (1983, pl. 18, fig. 6) and Foged (1985, pl. 10, fig. 9).

11 *Grammatophora oceanica* var. *subtilissima* (J.W. Bailey) De Toni 1894. See Hustedt (1931, fig. 575) and also Foged (1975, pl. 7, fig. 3).

12 *Diploneis cynthia* (Schmidt in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 8, fig. 41).

13-14 *Diploneis nitescens* (Gregory) Cleve 1894. See Gregory (1857, pl. 9, fig. 16) and Hustedt (1937, fig. 1047).

15-16 *Rhabdonema punctatum* (Harvey and Bailey) Stodder 1880. See Desikachary and Prema (1987, pl. 385, fig. 3).

17 *Rhabdonema arcuatum* (Lyngbye; Agardh) Kützing 1844. See Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 13, fig. 2).

18-19 *Actinocyclus decussatus* Mann 1925. See Mann (1925, pl. 2, figs. 1-2). See also in this volume (pl. 39, figs. 1-2).

Magnifications: figs. 1-3, 5-6, 17-19: x500; all others: x1000
Scale Bar: scale bar is 60 microns for the figures at x500; 30 microns at x1000

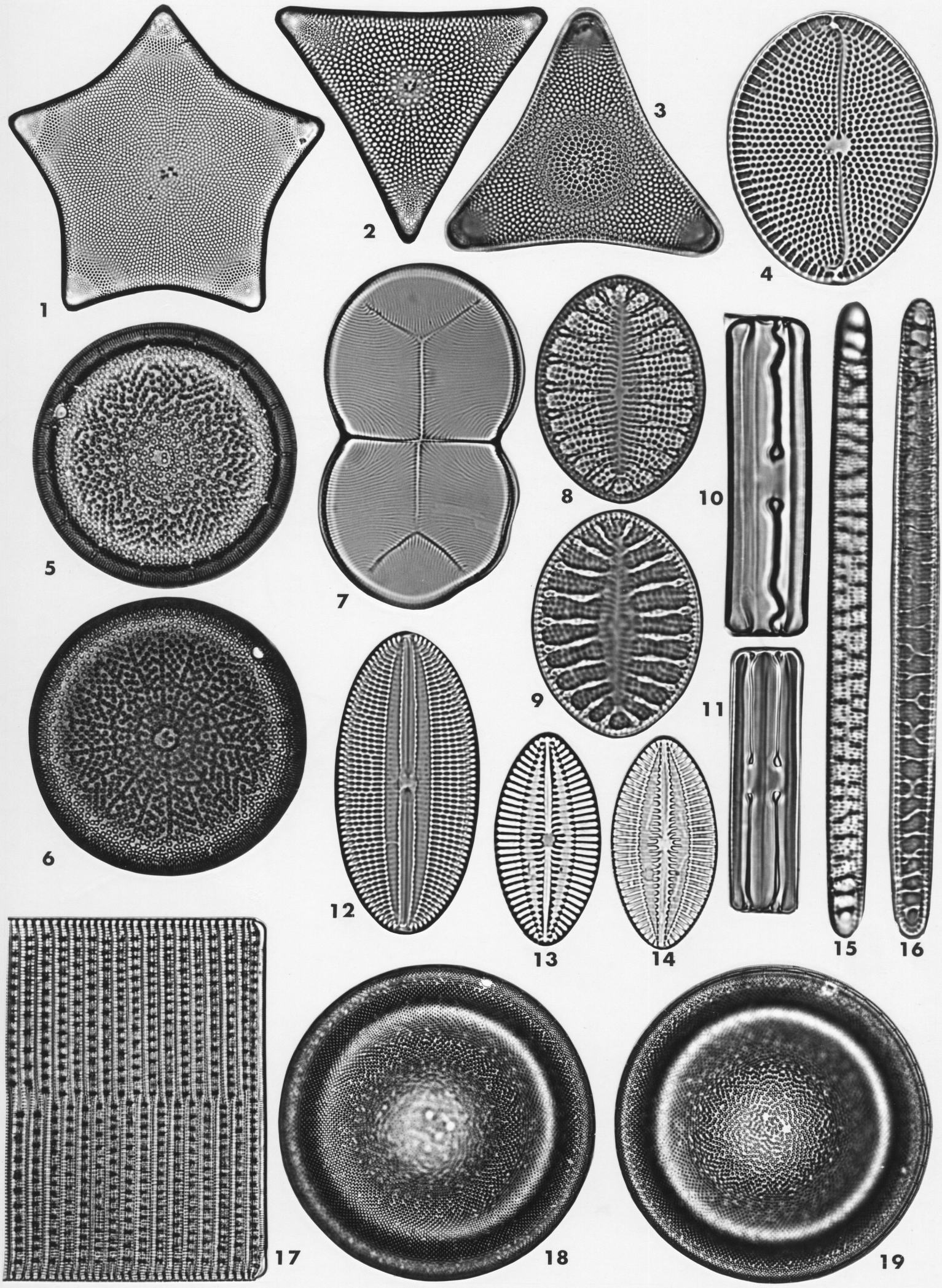
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Plate 38. MARINE DIATOMS FROM THE NEW HEBRIDES

Source of Material

Ambrym Island - HC 1959. Figs. 1-3, 24-25, 36-37
New Hebrides - HC 2018. Figs. 5-6, 13-14, 26-27, 29-30
Paama Island - HC 759, HC 1967, HC 1970, HC 1971, HC 1989, HC 3011.
Figs. 4, 7-12, 15-23, 28, 31-35, 38-39

These slides are held in the Healey Collection at the National Institute for Water and Atmospheric Research (NIWA), Greta Point, Wellington, N.Z.

Plate Thirty-eight:

20-22 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985) for variety of forms. The morphologial variations are considerable and the view of Paddock (1985) has been followed in combining these examples as *Surirella fastuosa*.

23 *Campylodiscus stellatus* Greville 1859. See Greville (1859, pl. 7, fig. 3); also Greville in Williams (1988, p. 22, pl. 27, figs. 5-6).

24 *Podosira maxima* (Kützing) Grunow 1879 . See Grunow (1879, pl. 21, fig. 2).

25 *Azpeitia nodulifer* (Schmidt) G. Fryxell and P.A. Sims in Fryxell, Sims and Watkins (1986). See Fryxell, Sims and Watkins (1986, fig. 30, 4a-b) and also Desikachary and Prema (1987, pl. 324, fig. 6).

26-27 *Actinocyclus crassus* (W. Smith) Ralfs in Pritchard 1861. See Peragallo and Peragallo (1897-1908, pl. 114, fig. 3).

28-29 *Actinocyclus pruinosus* Castracane 1886. Represented by selected specimens on slides HC 24, HC 1122 and HC 2018 from the New Hebrides. A very doubtful species. The only reference appears to be Castracane (1886, p. 144, pl. 4, fig. 2) from the Challenger Expedition.

30 *Aulacodiscus orientalis* Greville 1864. See Williams (1988, pl. 17, figs. 1-3).

31-32 *Mastogloia fimbriata* (Brightwell) Cleve 1895. See Desikachary and Prema (1987, pl. 297, fig. 3).

33 *Mastogloia horvathiana* Grunow 1860. Partectal ring absent, but a good match for Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 82, fig. 15).

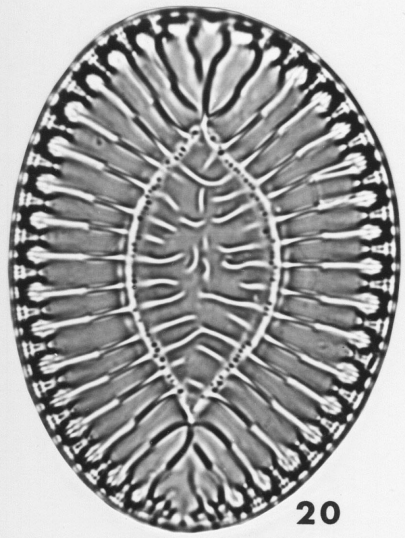
34-35 *Mastogloia quinquecostata* Grunow 1860. See Grunow (1860, pl. 7, fig. 8b); also Hendey (1970, pl. 1, fig. 5) and Kemp and Paddock (1990, fig. 20d).

36-37 *Podosira argus* Grunow 1878. Fig. 37 shows central area details. See Peragallo and Peragallo (1897-1908, pl. 119, fig. 22).

38 *Rhapalodia gibberula* var. *baltica* Otto Müller 1900. See Schmidt's Atlas (1874-1959, pl. 253, figs. 34, 36).

39 *Cocconeis pellucida* Greville 1863. See Schmidt's Atlas (1874-1959, pl. 195, fig. 3).

Magnifications: figs. 23-27: x500; figs. 21-22, 28-30, 38-39: x750; all others: x1000
Scale Bar: scale bar is 60 microns for the figures at x500; 40 microns at x750;
30 microns at x1000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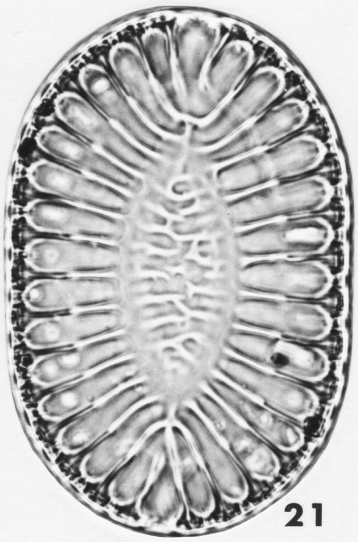
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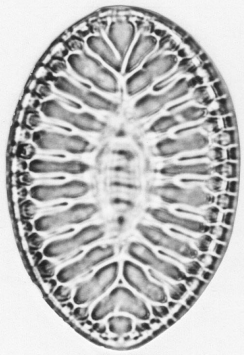
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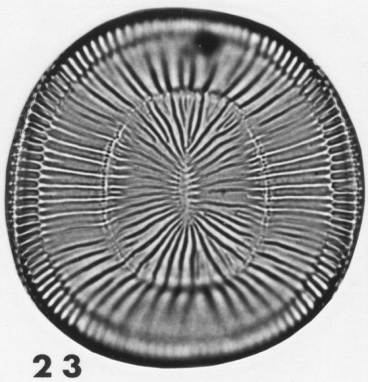
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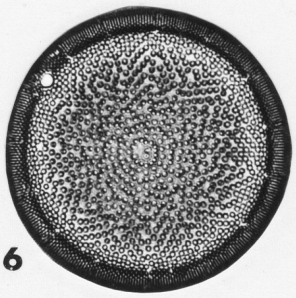
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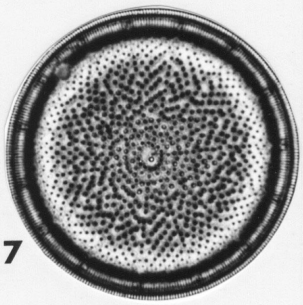
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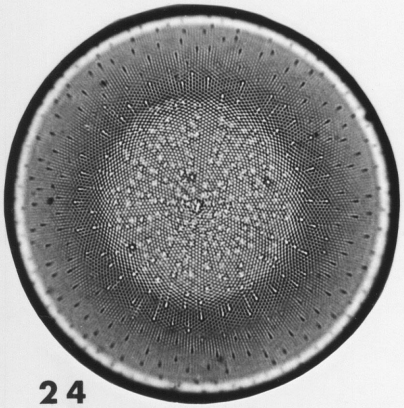
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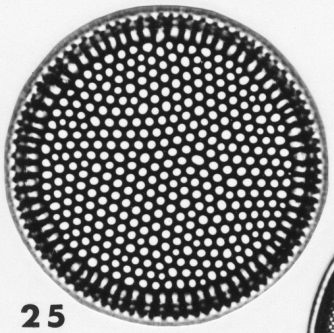
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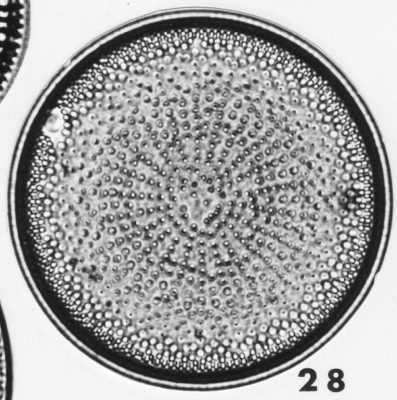
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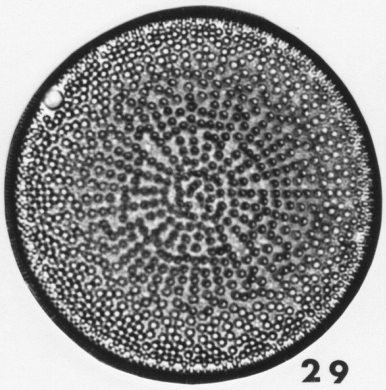
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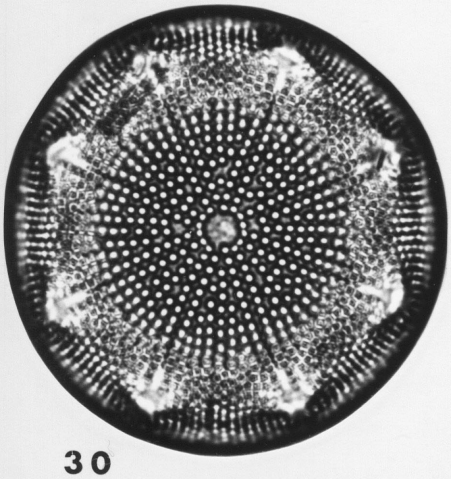
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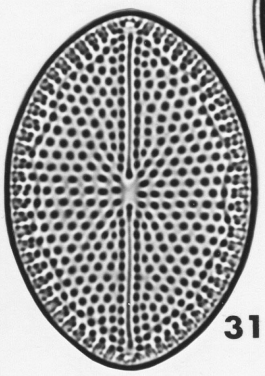
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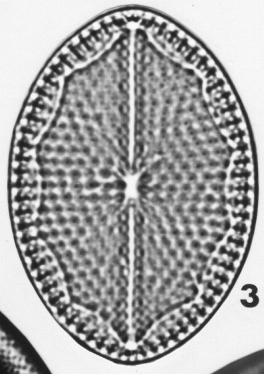
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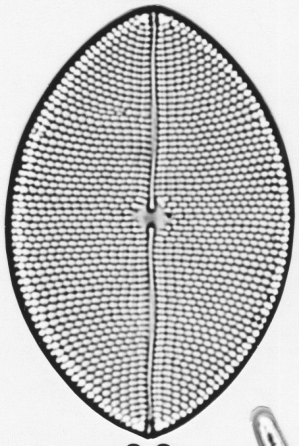
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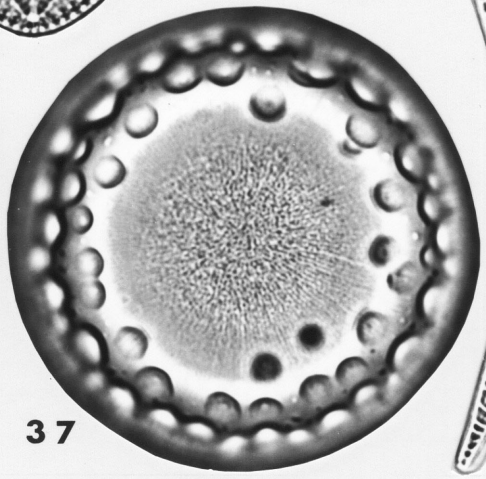
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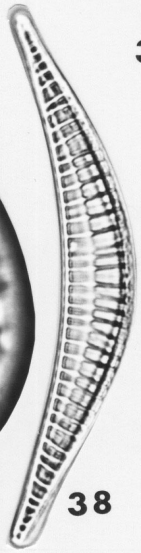
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Plate 39. MARINE DIATOMS FROM THE PHILIPPINE ISLANDS

Source of Material

This slide is held in the Healey Collection at the National Institute for Water and Atmospheric Research (NIWA), Greta Point, Wellington, N.Z.

HC 2032 - Cebu, Philippines. Selected diatoms from shell washings mounted by W.A. Firth.

Plate Thirty-nine:

1-2 *Actinocyclus decussatus* A. Mann 1925. See A. Mann (1925, pl. 2, figs 1-2). The figures represent a specimen given as *A. moniliformis* on W. A. Firth's slide HC 1989 from Paama Island.

3-4 *Actinocyclus octonarius* var. *tenellus* (Brébisson) Hendey 1954. See Villareal and Fryxell (1983, p. 453, figs. 1-14). According to W.A. Firth, slide HC 2018 from the New Hebrides, represent *A. pruinosus* Castracane.

5-6 *Actinocyclus octonarius* var. *tenellus* (Brébisson) Hendey 1954. See Villareal and Fryxell (1983, figs 1-14).

7-8 *Actinoptychus speciosus* Meister 1935. See Meister (1935, p. 91, pl. 2, figs. 11-12) of a specimen from Honduras.

9-12 *Stictodiscus manilensis* (non *S .californicus* Greville). See slide HC-805, no further data available. The slide HC-805 in the Healey Collection is labeled: 0805 *Stictodiscus manilensis*, select R.M., Manila. This is an orthographically incorrect derivation from the geographic name Manila. VanLandingham (1978, p. 3780) cites *S. manilensis* as *S. californicus* but slide HC-805 definitely does not contain that species. *S. manilensis* is therefore to be considered a "manuscript name" without formal status. The specimen shown appears to be compatible with *Psammodiscus nitidus* (Gregory) Round and Mann 1980.

13-14 *Cyclotella baltica* (Grunow) Håkansson 2002. See Håkansson (2002, p. 104, fig. 373).

15-17 *Cestodiscus denarius* (Schmidt) Strelnikova and Fourtanier in Strelnikova, Fourtanier, Kociolek and Barron 2001. Same specimen at high, low and mid focus. Specimens are in close agreement with Schmidt's Atlas (1874-1959, pl. 57, fig. 22) of a specimen from the Bay of Campeche given as *Coscinodiscus denarius*. See also Streknikova, Fourtanier, Strelnikova, Kociolek, and Barron (2001, p. 84, figs. 73-83).

18-19 *Thalassiosira* sp. indet. Same specimen at different focus. Looks similar to *T. eccentrica*, however identity is uncertain and may require SEM to properly identify.

20-21 *Thalassiosira* sp. indet. Same specimen at different focus. Identity is uncertain and may require SEM to properly identify.

22-23 *Thalassiosira* sp. indet. Same specimen at different focus. Identity is uncertain and may require SEM to properly identify. Specimen appears similar to *Actinocyclus normanii* (Gregory in Greville) Hustedt, however pseudonodulus was not present.

24-25 *Coscinodiscus obscurus* Schmidt in Schmidt et al. 1878. Appears to be a good match for Schmidt's Atlas (1874-1959, pl. 61, figs. 17-18). See also Cleve-Euler (1951, fig. 99a).

26-27 *Coscinodiscus cinctus* Kützing 1844. See Hustedt (1928, fig. 197).

28-29 *Ehrenbergiulva granulosa* (formerly *Coscinodiscus granulosus*) (Grunow in Cleve and Grunow) Witkowski, Lange-Bertalot and Metzeltin in Witkowski and Lange-Bertalot 2004. See Witkowski, Lange-Bertalot and Metzeltin (2000, pl. 2, fig. 12-18).

All magnifications: all figures: x750
Scale Bar: scale bar is 40 microns for all figures

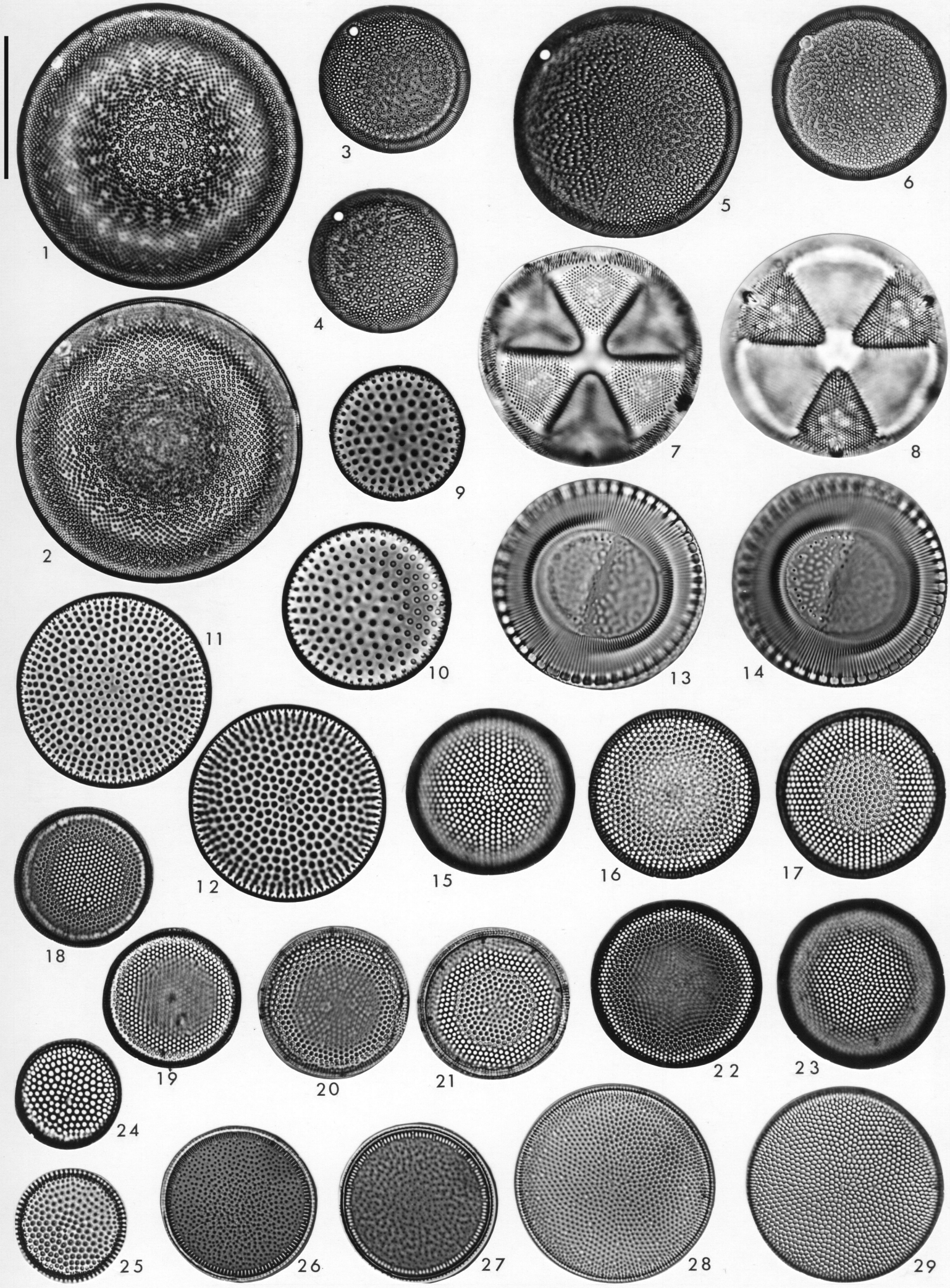
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Plate 40. MARINE DIATOMS FROM THE PHILIPPINE ISLANDS

Source of Material

These slides are held in the Healey Collection at the National Institute for Water and Atmospheric Research (NIWA), Greta Point, Wellington, N.Z.

HC 1986 - Manila, Philippines. A single specimen given as *Surirella macraeana*, mounted by W.A. Firth. Figs. 30-31.
HC 2032 - Cebu, Philippines. Selected diatoms from shell washings mounted by W.A. Firth. Figs. 32-52.

Plate Forty:

*30-31 *Surirella macraeana* Greville 1862. See Greville in Williams (1988, pl. 56, fig. 7) and Paddock (1985, pl. 8, fig. 1-3). It is assigned to the *S. fastuosa* complex together with the others shown below.

*32-34 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. Figs 32 and 34 are the same specimen at different levels of focus.

*35-36 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843.

*37 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985, pl. 2, fig. 18 and pl. 7, fig. E-3).

*38-39 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985, pl. 6, fig. 46 of a specimen from the Philippines, and Paddock (1985, pl. 8, figs. 1-3).

40-41 *Grammatophora probata* A. Mann 1925. See A. Mann (1925, p. 79, pl. 16, fig. 7).

42 *Plagiogramma* sp. indet. This specimen may be *P. appendiculatum* or *P. occasum* (Witkowksi pers. commun., 2012).

43 *Plagiogramma decussatum* Greville 1866. See Greville (1866, p. 1, pl. 1, fig. 2) and also Schmidt's Atlas (1874-1959, pl. 209, figs. 28-30) of a specimen from Cebu, Philippines.

44 *Plagiogramma costatum* Greville 1863. See Schmidt's Atlas (1874-1959, pl. 209, fig. 5) of a specimen from Cebu, Philippines.

45 *Grammatophora undulata* Ehrenberg 1840. See Navarro (1982b, figs. 36-37).

46, 48 *Psammodictyon panduriforme* (Gregory) Mann in Round, Crawford and Mann

1990. See Schmidt's Atlas (1874-1959, pl. 331, figs. 19-20), given as *Nitzschia panduriformis*.

47 *Nitzschia jelineckii* Grunow 1863. See Grunow (1863, pl. 14, fig. 4).

49 *Psammodictyon panduriforme* (Gregory) Mann in Round, Crawford and Mann 1990. See Schmidt's Atlas (1874-1959, pl. 331, fig. 21), given as *Nitzschia panduriformis*.

50-51 *Trachyneis aspera* (Ehrenberg) Cleve 1894. See Hendey (1964, pl. 29, fig. 13).

52 *Trachyneis* sp. indet. No figure was found in the literature with such a fine structure and interrupted striae and this may be an undescribed species.

* The huge variation in specimens of *Surirella fastuosa* is well covered in Paddock (1985).

Magnifications: figs. 30-31: x500; fig. 44: x1000; all others: x750
Scale Bar: scale bar is 60 microns for the figures at x500; 30 microns for fig. 44; 40 microns at x750

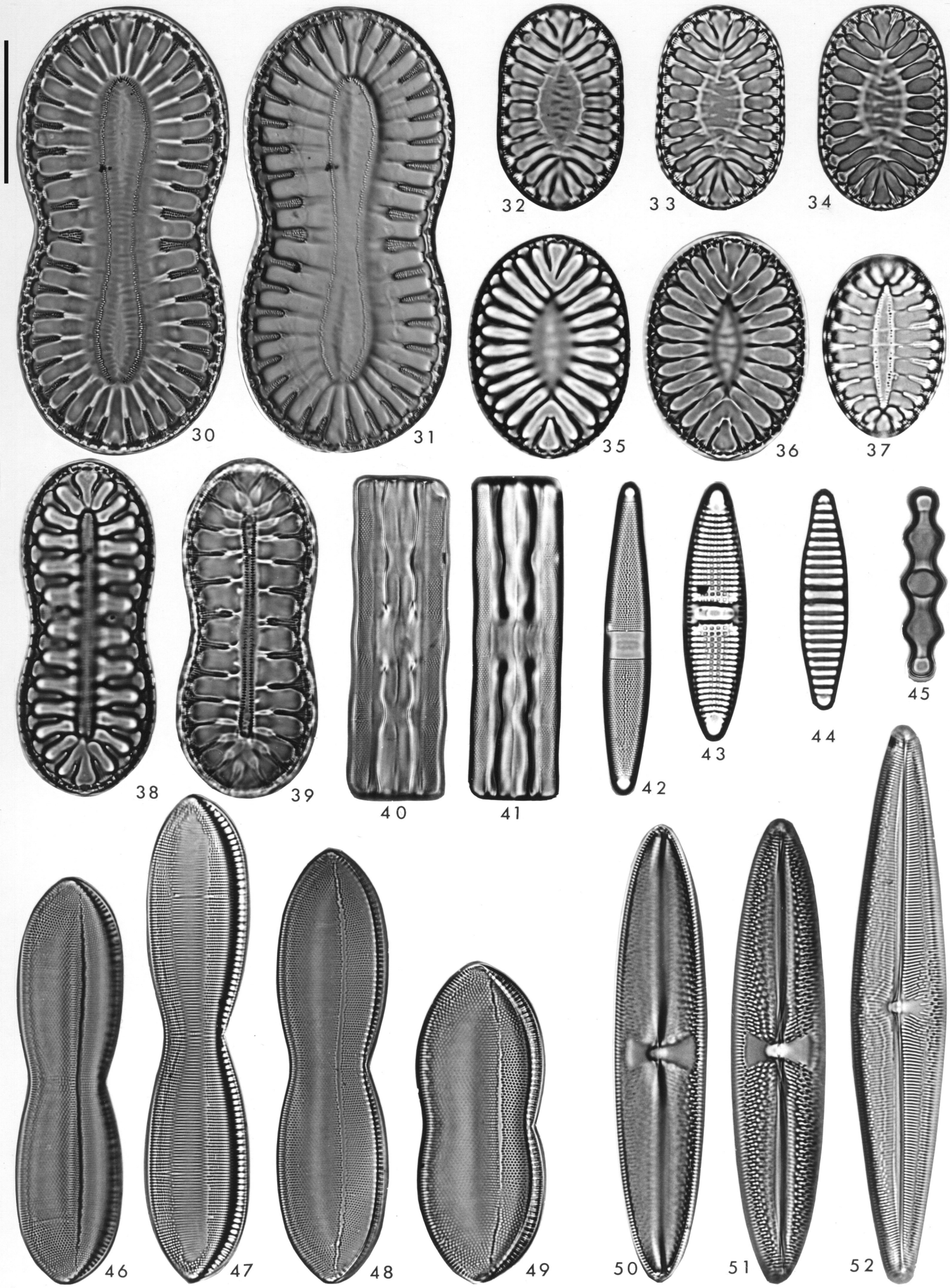
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Plate 41. MARINE DIATOMS FROM THE PHILIPPINE ISLANDS

Source of Material

These slides are held in the Healey Collection at the National Institute for Water and Atmospheric Research (NIWA), Greta Point, Wellington, N.Z.

HC 2000 - Manila, Philippines. A single specimen given as *Triceratium latum*, mounted by W.A. Firth. Figs. 53-54.
HC 2032 - Cebu, Philippines. Selected diatoms from shell washings mounted by W.A. Firth. Figs. 55-82.

Plate Forty-one:

53-54 *Trigonium subofficiosum* Hustedt in Schmidt et al. 1959. See Hustedt in Simonsen (1987, p. 465, pl. 700, figs. 1-2) a specimen from the Bay of Campeche. The latter figures are identical to the figures presented here, representing a specimen named incorrectly as *Trigonium latum*, in a select mount by W. A. Firth from a Manila sample on slide HC 2000. The original drawing in Greville (1865, pl. 9, fig. 20) of *T. latum* is quite different from the HC 2000 specimen.

55-56 *Triceratium favus* Ehrenberg 1840. See Foged (1975, pl. 2, fig. 1).

57 *Triceratium favus* Ehrenberg 1840. See Desikachary (1989, pl. 769, fig. 8).

58 *Triceratium favus* Ehrenberg 1840. See Desikachary (1989, pl. 767, fig. 3).

59-60 *Porpeia quadriceps* J.W. Bailey in litt. Ralfs in Pritchard 1861. See Greville (1865, p. 52, pl. 6, figs. 18-19). This species was also recorded by A. Mann (1925, p. 140) from the Philippines.

61-62 *Amphora acuta* Gregory 1857. See Schoeman and Archibald (1986, pl. 1, fig. 2-5).

63 *Amphora proteus* var. *oculata* Gregory 1857. See Schmidt's Atlas (1874-1959, pl. 27, fig. 45), Peragallo and Peragallo (1897-1908, pl. 44, fig. 22) and Schoeman and Archibald (1986, p. 433, figs. 70-76).

64 *Diploneis nitescens* (Gregory) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 7, fig. 28).

65 *Diploneis* aff. *cynthia* (Schmidt in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 8, fig. 41).

66-67 *Navicula (Lyrella) clavata* var. *indica* (Greville) Cleve 1895 (No formal transfer to *Lyrella* can be found for this variety). See Greville in Williams (1988, pl. 45, figs. 4-6).

68-69 *Mastogloia angulata* Lewis 1861. See Foged (1975, pl. 12, figs. 2-3 and pl. 13, figs. 1-2).

70 *Lyrella impercepta* (Hustedt) Moreno in Moreno, Licea and Santoyo 1996. See Hustedt (1964, fig. 1530) and also Foged (1975, pl. 23, fig. 4), identified as *Navicula impercepta*.

71 *Lyrella perplexoides* (Hustedt) Mann in Round, Crawford and Mann 1990. See Hustedt in Simonsen (1987, pl. 736, figs. 6-7), identified as *Navicula perplexiodes* which agrees very well with this figure.

72-73 *Diploneis hustedtii* (?) Meister 1935. See Meister (1935, pl. 3, fig. 22).

74-75 *Diploneis suborbicularis* (Gregory) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 8, Figs. 3 and 5). See also Hendey (1951, pl. 7, fig. 11).

76-77 *Lyrella impercepta* (Hustedt) Moreno in Moreno, Licea and Santoyo 1996. See Hustedt (1964, fig. 1530) and also Foged (1975, pl. 23, fig. 4), identified as *Navicula impercepta*.

78-82 *Diploneis nitescens* (Gregory) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 7, fig. 28). Figures 79-80 shown here are of same specimen at different focus.

Magnifications: figs. 53-54: x500; all others: x750
Scale Bar: scale bar is 60 microns for the figures at x500; 40 microns at x750

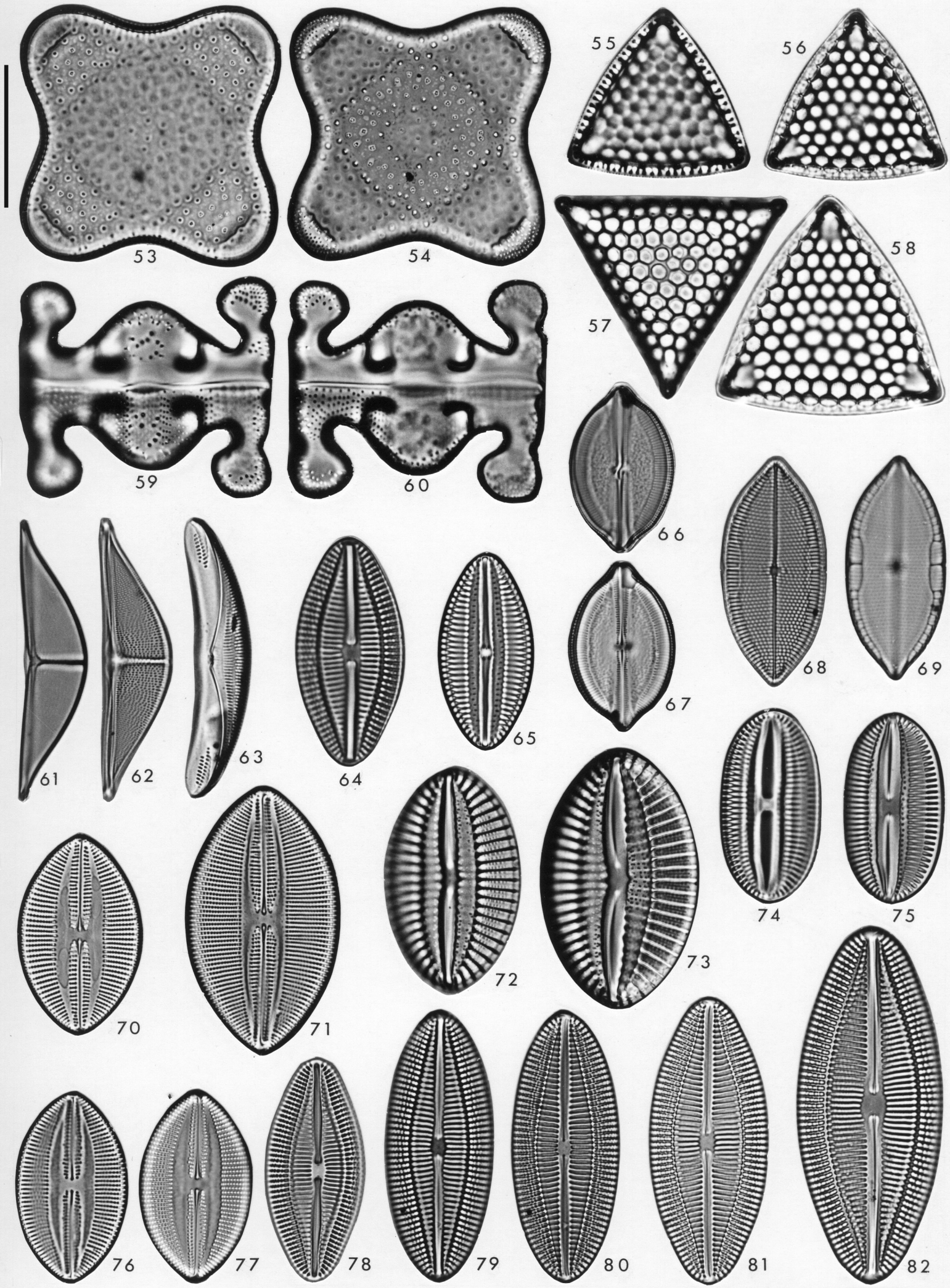
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Plate 42. MARINE DIATOMS FROM THE PHILIPPINE ISLANDS

Source of Material

These slides are held in the Healey Collection at the National Institute for Water and Atmospheric Research (NIWA), Greta Point, Wellington, N.Z.

HC 2009 - Philippine Is. A single specimen given as *Navicula bullata*, mounted by W.A. Firth. Fig. 83.
HC 1887 - Philippine Islands. Two selected specimens given as *Navicula crabro* var. *limitata*, mounted by W.A. Firth. Figs. 102-105.
HC 2032 - Cebu, Philippines. Selected diatoms from shell washings mounted by W.A. Firth. Figs. 84-101 and 106-109.

Plate Forty-two:

83 *Lyrella spectabilis* (Gregory) Mann in Round, Crawford and Mann 1990. See Gregory (1857, p. 9, pl. 1, fig. 10), given as *Navicula spectabilis*. Slide HC 2009 of a specimen selected by W.A. Firth from the Philippines and given as *N. bullata*.

84 *Lyrella lyra* (Ehrenberg) Karajeva 1978. See Hendey (1964, pl. 33, fig. 2) and Hendey (1970, pl. 2, fig. 22), given as *Navicula lyra*.

85 *Lyrella robertsiana* (Greville) Mann in Round, Crawford and Mann 1990. See Hendey (1970, pl. 3, fig. 24) and Ricard (1977, pl. 3, fig. 1), given as *Navicula robertsiana*.

86-87 *Lyrella spectabilis* (Gregory) Mann in Round, Crawford and Mann 1990. See Gregory (1857, p. 9, pl. 1, fig. 10), given as *Navicula spectabilis*.

88-89 *Diploneis smithii* (Brébisson in W. Smith) P.T. Cleve 1894. See Hustedt (1937, figs. 1051 and 1052).

90-91 *Diploneis smithii* (Brébisson in W. Smith) P.T. Cleve 1894. See Hendey (1970, pl. 5, fig. 46).

92-94 *Navicula (Lyrella) hennedyi* var. *granulata* Grunow in Schmidt et al. 1874 (No formal transfer to Lyrella can be found for this variety). See Hendey (1970, pl. 2, fig. 14). The specimen given by Desikachary (1989, pl. 649, fig. 3) as *N. spectabilis* var. *punctata*, var. nov. is probably a synonym of *N. hennedyi* var. *granulata*.

95 *Diploneis* aff. *smithii* (Brébisson in W. Smith) P.T. Cleve 1894. See Hustedt (1937, figs. 1051 and 1052).

96 *Diploneis chersonensis* (Grunow in Schmidt et al.) Cleve in Schmidt et al. 1892. See Foged (1987, pl. 15, fig. 7) and slide HC 1418 of a specimen from Apia, Samoa.

97-98 *Diploneis crabro* (Ehrenberg) Ehrenberg 1854. See Schmidt's Atlas (1874-1959, pl. 11, figs. 16-20).

99 *Diploneis crabro* var. *pandura* (Brébisson) Cleve 1894. See Hustedt (1937, fig. 1034) given as *D. pandura*.

100-01 *Diploneis diplosticta* (Grunow in Schmidt et al.) Hustedt, 1937. See Schmidt's Atlas (1874-1959, pl. 13, fig. 28).

102-03 *Diploneis crabro* var. *pandura* (Brébisson) Cleve 1894. See slide HC 1887 of a specimen given as *Navicula crabro* var. *limitanea*.

104-05 *Diploneis crabro* var. *pandura* (Brébisson) Cleve 1894. See slide HC 1887 and also Hustedt (1937, fig. 1034).

106 *Diploneis suborbicularis* (Gregory) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 8, figs. 1-2).

107 *Diploneis diplosticta* (Grunow in Schmidt et al.) Hustedt, 1937. See Schmidt's Atlas (1874-1959, pl. 13, fig. 28).

108-109 *Diploneis crabro* var. *limitanea* (Schmidt in Schmidt et al.) Cleve 1894. See Schmidt's Atlas (1874-1959, pl. 11, fig. 23), given as *Navicula limitanea*.

All magnifications: all figures: x750
Scale Bar: scale bar is 40 microns for all figures

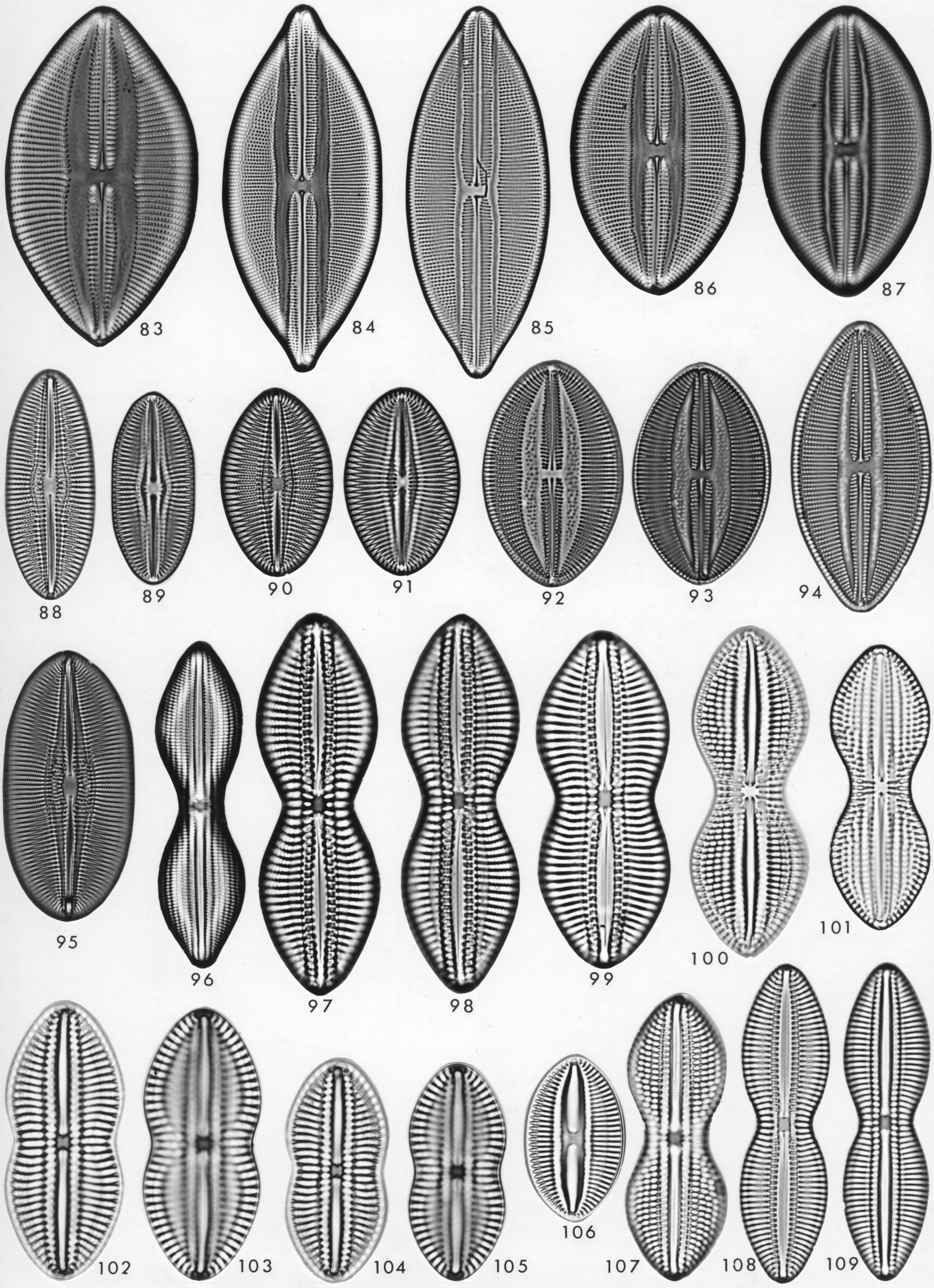
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Plate 43. MARINE DIATOMS FROM THE PHILIPPINE ISLANDS

Source of Material

These slides are held in the Healey Collection at the National Institute for Water and Atmospheric Research (NIWA), Greta Point, Wellington, N.Z.

HC 2032 - Cebu, Philippines. Selected diatoms from shell washings mounted by W.A. Firth. Figs. 110-113, 116 and 118.
All other figures slide source was not noted.

Plate Forty-three:

110-11 *Coscinodiscus radiatus* Ehrenberg 1840. See Hasle and Sims (1986, figs. 37-38).

112 *Plagiodiscus martensianus* Grunow and Eulenstein in Grunow 1867. See Foged (1975, pl. 30, fig. 1) and also Desikachary (1989, pl. 672, figs. 1-11).

113-114 *Thalassiosira* sp. indet. Appears a good match for *T. simonsenii* in Hasle and Fryxell (1977, p. 23, pl. 7, figs. 26-28). The specimen is also similar to *T. blandus* given by Desikachary (1989, pl. 73, figs. 2-3). It might be a resting spore of a *Thalassiosira* species.

115 *Navicula (Lyrella) hennedyi* var. *granulata* Grunow in Schmidt et al. 1874 (No formal transfer to *Lyrella* can be found for this variety). Appears to be a good match for Hendey (1970, pl. 2, fig. 14), but the concept of this and related species requires clarification.

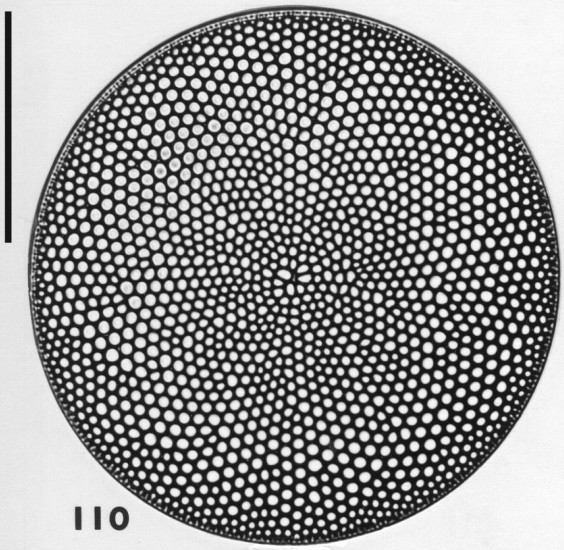
116-119 *Mastogloia bahamensis* Cleve 1893. See Hustedt (1933, fig. 963b).

120 *Lyrella concilians* (Cleve) Mann in Round, Crawford and Mann 1990. See Hendey (1970, pl. 6, fig. 60).

121 *Glyphodesmis nancoorense* (Grunow) Kolbe 1957. See Desikachary (1989, pl. 687, figs. 1-2). The identity of this specimen is in some doubt. It is given as *Plagiogramma ceylanense* Leuduger-Fortmorel on slide HC-3755 held at NIWA, Greta Point, Wellington, New Zealand. According to Desikachary (1989, pl. 687, figs. 1-3), it is *G. nankoorense* (Grun.) Kolbe, and his specimen (fig. 3) is identical to this specimen and another from an unknown locality (in this volume, pl. 54, fig. 28).

122-123 *Plagiogramma pulchellum* Greville 1859. See Desikachary (1989, pl. 687, fig. 12).

Magnifications: figs. 110-111: x500; all others: x1000
Scale Bar: scale bar is 60 microns for the figures at x500; 30 microns at x1000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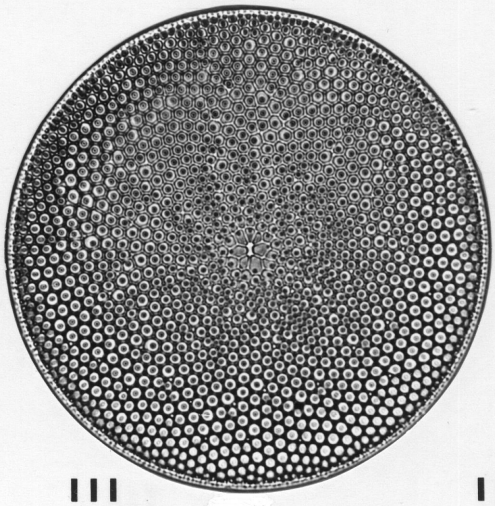
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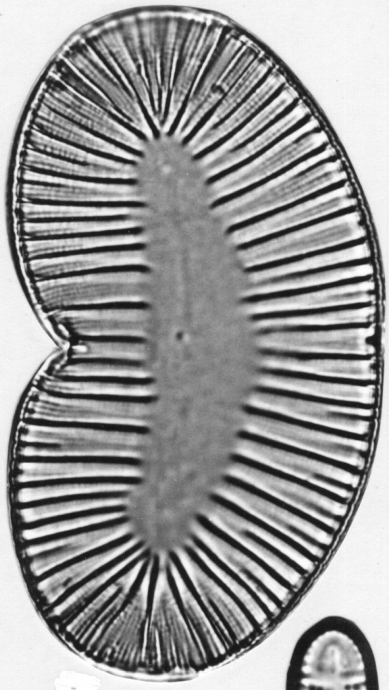
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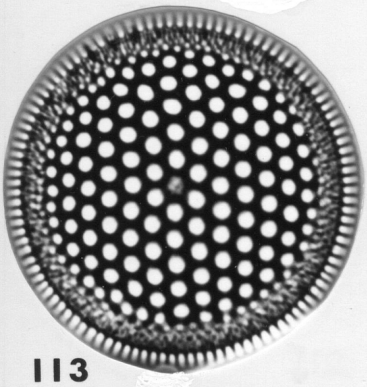
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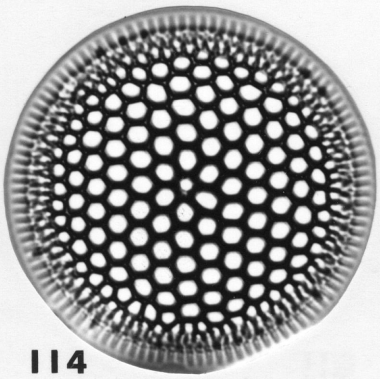
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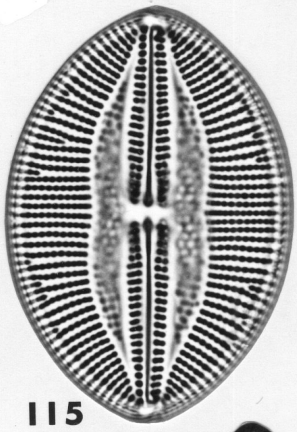
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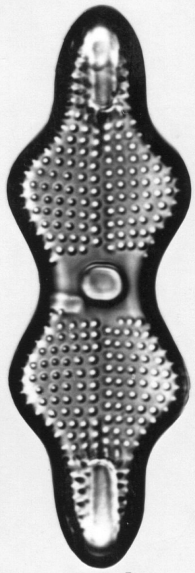
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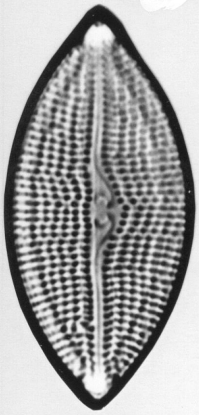
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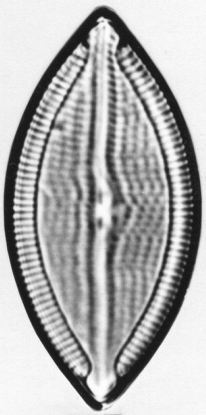
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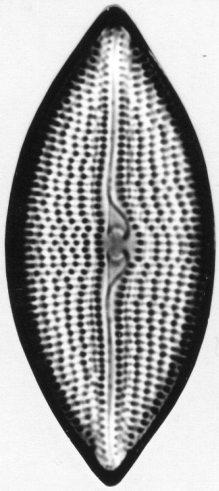
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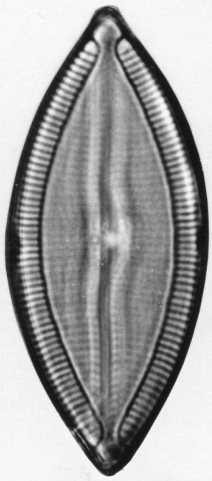
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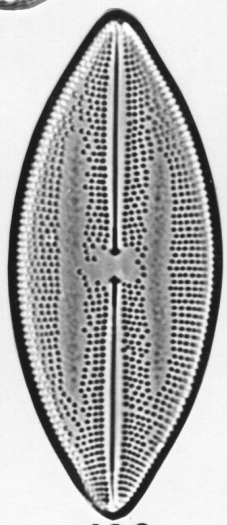
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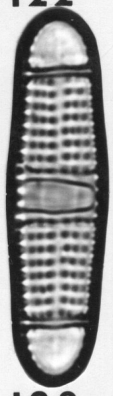
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Plate 44. MARINE DIATOMS FROM SINGAPORE

Source of Material

From the Morris Watt Collection, Otago Museum, New Zealand

Slide No. 174, catalogue No. 65
Slide No. 194, catalogue No. 80

Slides are labelled as "Muntok, Singapore", however Muntok (or Mentok) is in Indonesia, therefore the geography of these samples is uncertain.

Plate Forty-four:

1 *Actinocyclus subtilis* (Gregory) Ralfs in Pritchard 1861. See Van Heurck (1880-1885, pl. 124, fig. 7).

2 *Coscinodiscus radiatus* Ehrenberg 1840. See Hendey (1964, pl. 22, fig. 7).

3-4 *Cyclotella baltica* (Grunow) Håkansson 2002. See Håkansson (2002, p. 104, fig. 373). This is one of the few *Cyclotella* species from a marine habitat. *C. baltica* Håkansson stat. nov. (Håkansson 2002), shows valve face fultoportulae in the specimen of fig. 373 and these are clearly seen in the specimen of fig. 4 here.

5 *Azpeitia nodulifer* (Schmidt) G. Fryxell and P.A. Sims in Fryxell, Sims and Watkins 1986. See Fryxell, Sims and Watkins (1986, p. 19, pl. 30, fig. 4A). The genus *Azpeitia* has been equated to *Triceratium* (VanLandingham, 1968a, p. 406), but many species originally placed in *Coscinodiscus*, including *C. nodulifer* (Schmidt's Atlas, 1874-1959, pl. 59, figs. 20, 22-23) were transferred to *Azpeitia*.

6 *Actinoptychus trilingulatus* (Brightwell) Ralfs in Pritchard 1861. See Foged (1975, pl. 5, fig. 5) and Desikachary and Prema (1987, pl. 336, fig. 6).

7-8 *Stephanopyxis turris* (Greville and Arnott) Ralfs in Pritchard 1861. See John (1983, pl. 6, figs. 9-11).

9 *Azpeitia nodulifer* (Schmidt) Fryxell and Sims in Fryxell, Sims and Watkins 1986. Refer to fig. 5 on this plate for additional notes.

10 *Campylodiscus decorus* de Brébisson 1854. See Grunow (1862, pl. 9, fig. 7).

11 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Paddock (1985) for variety of forms.

12 *Diploneis smithii* form (?) (Brébisson in W. Smith) P.T. Cleve 1894. See Foged (1975, pl. 18, fig. 3) and the smaller forms found in Hustedt (1927-1966, fig. 1051).

13 *Amphora crassa* sensu Foged 1987. A doubtful identification. This frustule shows the outline of valves presented by Foged (1987, pl. 24, fig. 8) of a specimen from Viti Levu, Fiji. The references to *A. crassa* Gregory in Schoeman, Archibald and Sims (1986) appear to be correct, but do not support the reference of Foged (1975).

14 *Azpeitia nodulifer* (Schmidt) G. Fryxell and P.A. Sims in Fryxell, Sims and Watkins 1986. Refer to fig. 5 on this plate for additional notes.

15 *Plagiodiscus martensianus* Grunow and Eulenstein in Grunow 1867. See Desikachary (1989, pl. 672, figs. 1-11).

16 *Lyrella lyra* (Ehrenberg) Karajeva 1978. See Desikachary (1989, pl. 632, fig. 9) of a specimen from Singapore, referred to as *Navicula lyra*.

17 *Lyrella lyroides* (Hendey) Mann in Round, Crawford and Mann 1990. See Hustedt (1927-1966, fig. 1547).

Magnifications: figs. 1-9, 11-17: x750; fig. 10: x375
Scale Bar: scale bar is 40 microns for the figures at x750; 80 microns for fig. 10

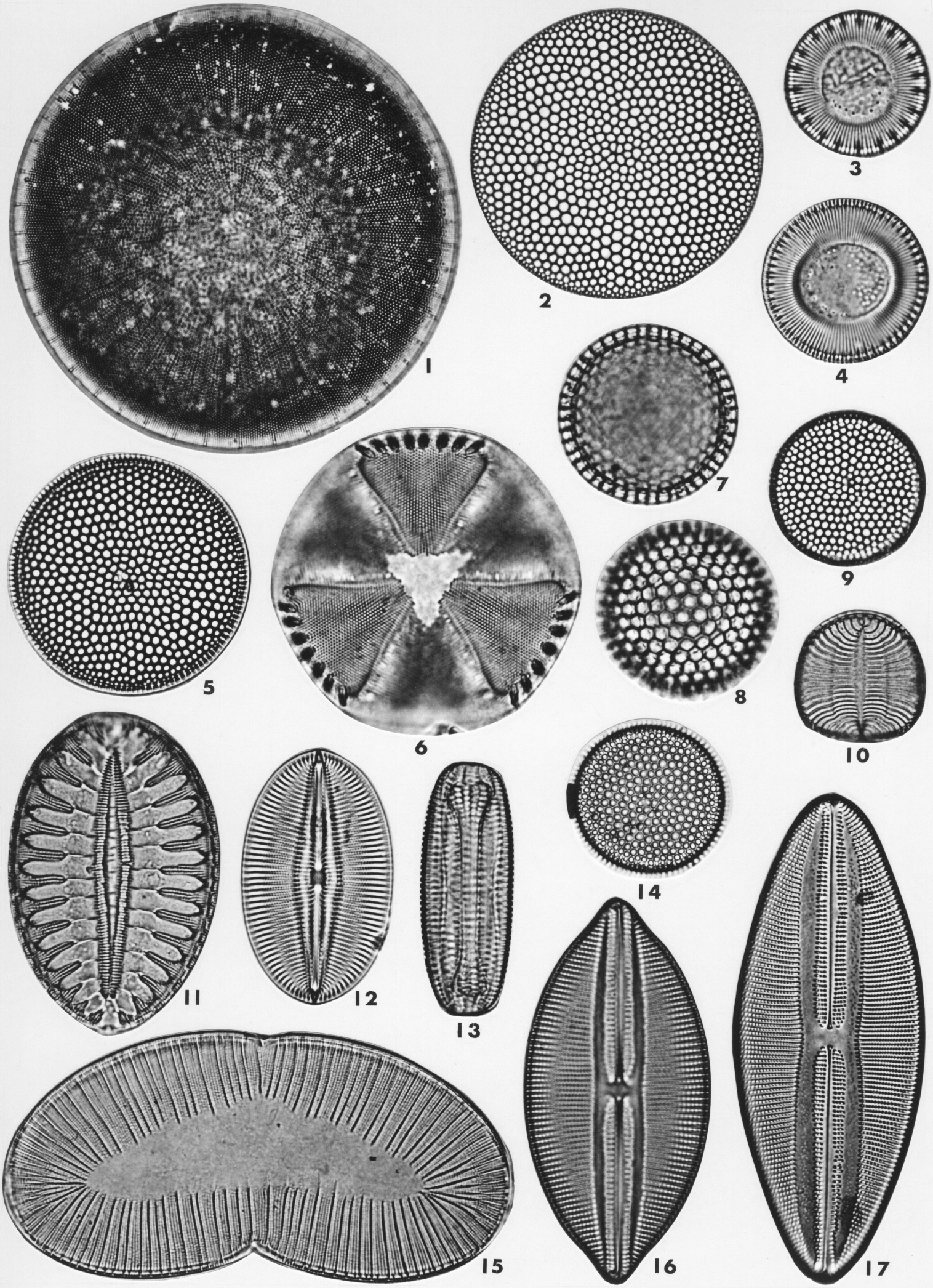
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Plate 45. MARINE DIATOMS FROM SINGAPORE

Source of Material

From the Morris Watt Collection, Otago Museum, New Zealand.

Slide No. 174, catalogue No. 65
Slide No. 194, catalogue No. 80

Slides are labelled as “Muntok, Singapore”, however Muntok (or Mentok) is in Indonesia, therefore the geography of these samples is uncertain.

Plate Forty-five:

18 *Frickea lewisiana* (Greville) Heiden in Schmidt et al. 1906. See Schmidt's Atlas (1874-1959, pl. 264, fig. 1); also Patrick and Reimer (1966, p. 311, pl. 22, figs. 6a-c).

19 *Dictyoneis marginata* (Lewis) Cleve 1890. See Schmidt's Atlas (1974-1959, pl. 160, figs. 28-29) and Cleve (1894-1895, p. 30, pl. 5, fig. 32).

20 *Trachyneis aspera* (Ehrenberg) Cleve 1894. See Desikachary (1989, pl. 760, fig. 2) of a specimen from Singapore.

21 *Caloneis robusta* Cleve 1894. See Grunow 1877 in Schmidt's Atlas (1874-1959, pl. 50, figs. 1-2), given as *Navicula robusta* Grunow. See also Cleve (1894-1895, p. 55).

22 *Caloneis elongata* (Grunow in Schmidt) Boyer 1927. See Schmidt's Atlas (1874-1959, pl. 50, figs. 27-29); also Navarro (1982a, pl. 21, fig. 8). The specimen given as *C. madraspatensis* R. Subrahm by Desikachary and Prema (1987, pl. 251, fig. 1) is probably a synonym of *C. elongata*.

23 *Nitzschia graeffii* Grunow in Cleve 1878. See Grunow (1880, p. 394, pl. 12, fig. 4).

24 *Psammodictyon panduriforme* (Gregory) Mann in Round, Crawford and Mann 1990. See Gregory (1857, pl. 6, fig. 102) and Foged (1975, pl. 29, fig. 13), identified as *Nitzschia panduriformis*.

25-26 *Mastogloia quinquecostata* (?) Grunow 1860. See Grunow (1860, pl. 7, fig. 8b); also Hustedt (1933, fig. 989a) and Desikachary and Prema (1987, pl. 266, fig. 11). Provisional identification. The four longitudinal costa in this specimen is not as well-defined as they are in the references given here.

27 *Tryblionella cocconeiformis* (Grunow) Mann in Round, Crawford and Mann 1990. See Desikachary (1989, pl. 655, fig. 8), identified as *Nitzschia cocconeiformis*.

28 *Triceratium scitulum* Brightwell 1853. See Desikachary (1989, pl. 790, fig. 7) of a specimen from Singapore.

29 *Nitzschia* sp. indet.

30 *Synedra formosa* Hantzsch in Rabenhorst 1863. See Hustedt (1932, fig. 720).

31-32 *Stictodesmis australis* Greville 1863. See Greville (1863, p. 535, pl. 13, figs. 1-4). NOTE: Greville's taxon of figs. 31 and 32 was renamed as *Navicula lorenzii* (Grunow) Hustedt and is now called *Climaconeis lorenzii* (Cox 1982).

33 *Eunotogramma frauenfeldii* (Grunow) Grunow in Van Heurck 1883. See Grunow in Van Heurck (1880-1885, pl. 126, fig. 14) and Hendey (1971, p. 385, figs. 16-17).

34 *Triceratium scitulum* fo. *quadrata* Schmidt in Schmidt et al. 1885. See Desikachary (1989, pl. 790, figs. 1-2; pl. 776, fig. 2).

35 *Cerataulina bicornis* (Ehrenberg) Hasle in Hasle and Sims 1985. See Hasle and Sims (1985, p. 219, figs. 1-11).

Magnifications: fig. 18: x1000; figs. 19-29, 31-35: x750; fig. 30: x375
Scale Bar: scale bar is 30 microns for fig. 30; 40 microns for all figures at x750; 30 microns for fig. 18

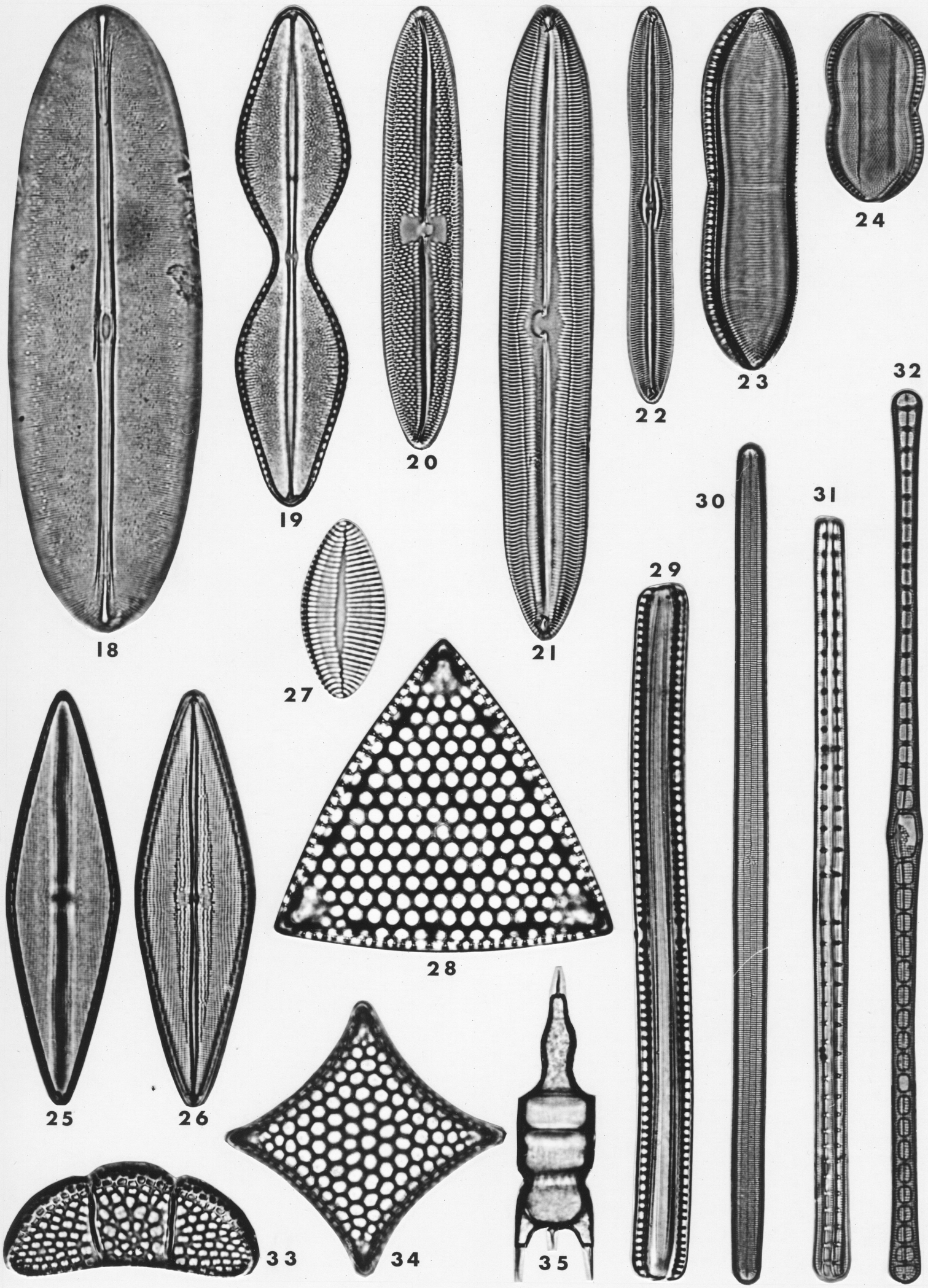
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Plate 46: MARINE DIATOMS FROM SINGAPORE

Source of Material

From the Morris Watt Collection, Otago Museum, New Zealand

Slide No. 185, catalogue No. 74
Slide No. 186, catalogue No. 75
Slide No. 187, catalogue No. 76
Slide No. 201, catalogue No. 82

Slides are labelled as “Rea Island, Singapore”, however the island being referred to is uncertain.

Plate Forty-six:

1 *Coscinodiscus radiatus* Ehrenberg 1840. See Hendey (1964, pl. 22, fig. 7).

2 *Thalassiosira* sp. indet.

3 *Diploneis chersonensis* (Grunow) Cleve 1894. See Hendey (1964, pl. 32, figs. 7-8).

4 *Coscinodiscus radiatus* Ehrenberg 1840. See Hendey (1964, pl. 22, fig. 7).

5 *Psammodiscus nitidus* (Gregory) Round and Mann 1980. See Round and Mann (1980, p. 368, fig. 1b).

6 *Actinoptychus trilingulatus* Schmidt in Schmidt et al. 1874. See Schmidt's Atlas (1874-1959, pl. 1, fig. 20) and also Foged (1975, pl. 5, fig. 5).

7 *Triceratium scitulum* Brightwell 1853. See Brightwell (1853, pl. 4, fig. 9b) and also Desikachary (1989, pl. 776, figs. 2, 6, 8).

8 *Diploneis* sp. indet. See Laws (1988, pl. 23, fig. 3) given as *Diploneis bombus*, but figure agrees well with this specimen. No further reference was found that equates to this species. The specimen of fig. 8 is quite different from the illustration of *Navicula musca* in Gregory (1857, pl. 1, fig. 6), but is in closer agreement with Schmidt's Atlas (1874-1959, pl. 160, fig. 3) of *Navicula intercedens*, particularly in valve outline. Also, the illustrations of *Diploneis interrupta* var. *caffa* in Giffen (1970, p. 273, figs. 29-30) are somewhat similar. However, all three of these doubtful candidates lack the well-defined secondary row of robust striae adjacent and parallel to the raphe as in the specimen of fig. 8 here.

9 *Triceratium scitulum* Brightwell 1853. See Brightwell (1853, pl. 4, fig. 9a) and also Desikachary (1989, pl. 397, fig. 6) given as *T. favus*, but it cannot be this species. See fig. 13 below for *T. favus*. Hendey (1964, p. 107) gives diagnostic features for *T. favus*, stating that the areolae are arranged in straight lines parallel to the valve

margins, which is not the case for *T. scitulum* where the areolae are irregularly disposed, as seen in this specimen.

10 *Lyrella* cf. *lyrelloides* (Hendey) Mann in Round, Crawford and Mann 1990. See Hustedt (1927-1966, fig. 1547). The group of taxa around *Lyrella lyra* remains puzzling because of the enormous variation of forms ranked as "varieties" in the literature. The specimen shown appears to be a rather good match for *L. lyrelloides* as illustrated in Hustedt (1927-1966, fig. 1547). Whether the presence of granulation in the lateral areas of many of these taxa indicates separate status is unclear.

11-12 *Trachyneis antillarum* var. *kurzii* (Grunow) Cleve 1894. See Cleve (1878, pl. 2, fig. 12a) given as *Alloioneis kurzii*. See also Desikachary (1989, pl. 756, figs 5, 7).

13 *Triceratium favus* Ehrenberg 1839. See Hendey (1964, p.108, pl. 25, fig. 4).

Magnifications: fig. 10: x1000; all others: x750
Scale Bar: scale bar is 40 microns for the figures at x750; 30 microns for fig. 10

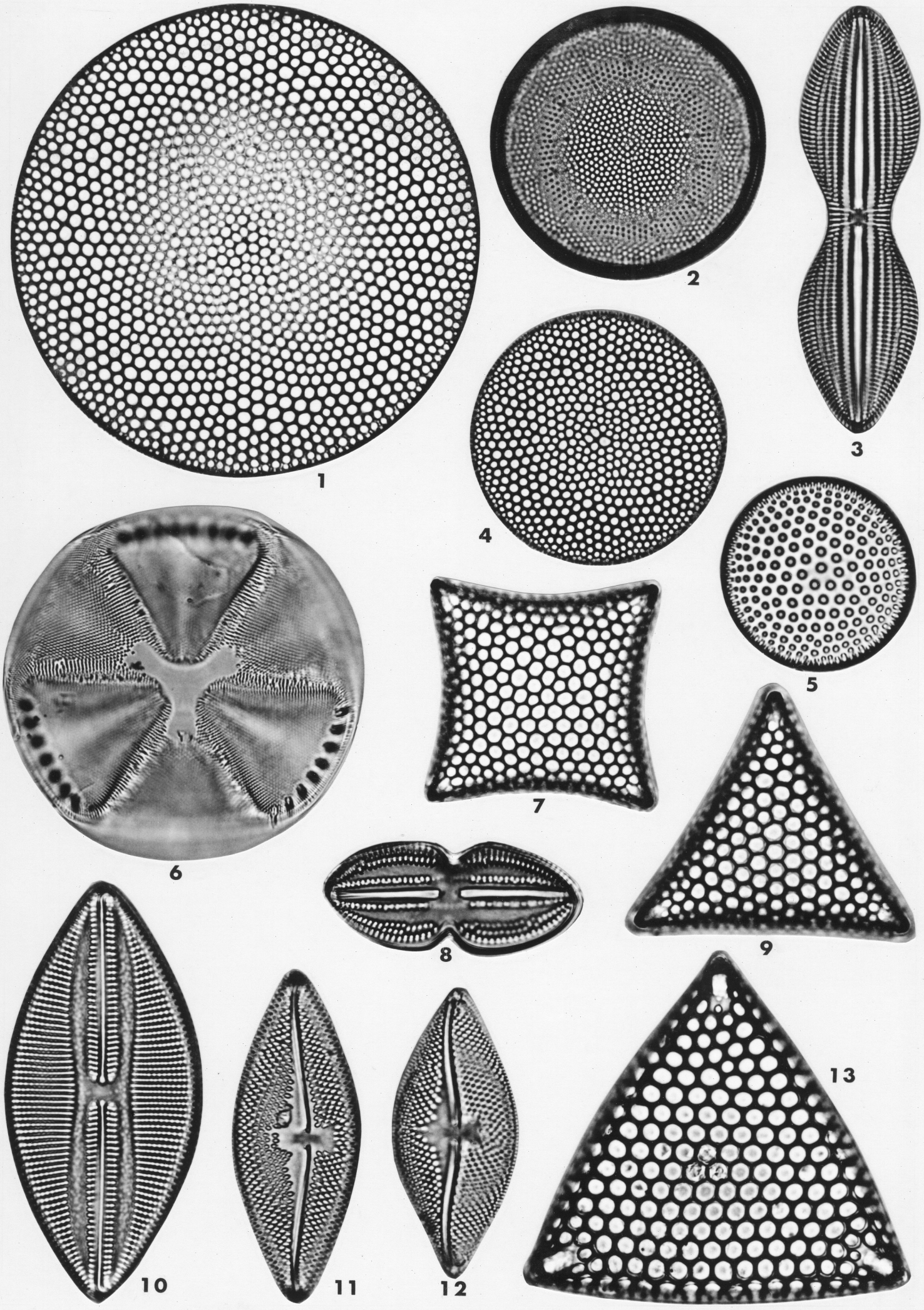
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Plate 47. MARINE DIATOMS FROM SAMOA

Source of Material

The sources of the diatom plate figures are slides from the Healey collection held at the National Institute of Water and Atmospheric Research, (NIWA), Greta Point, Wellington, New Zealand, as follow:

HC 1178 Apia, Samoa
HC 1589 a selected group of 50 forms, recent marine, Samoa
HC 1649 - HC 1650, Apia, Samoa, recent marine
HC 1701 strew, recent marine, Samoa
HC 2964 from algae, Samoa. Thum slide No.2519
HC 3227 *Navicula lyra*, strew, recent marine, Apia, Samoa, Möller
HC 3228 Recent marine strew, Apia, Samoa, Möller
HC 3229 *Aulacodiscus recedens*, strew, recent marine, Samoa, Möller
HC 3230 Recent marine strew, Samoa, Möller

Plate Forty-seven:

1 *Campylodiscus biangulatus* Greville 1862. See Schmidt's Atlas (1874-1959, pl. 14, fig. 18) of a specimen from Samoa.

2-3 *Surirella fastuosa* var. *cuneata* Deby in Mills 1935. See Schmidt's Atlas (1874-1959, pl. 4, figs. 1-2 and pl. 206, fig. 15) given as *C. cuneata*. See also Paddock (1985, pl. 8, fig. A6).

4 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Schmidt's Atlas (1874-1959, pl.19, fig. 12).

5 *Navicula (Lyrella) clavata* var. *indica* (Greville) Cleve 1895. See Hustedt (1964, fig. 1512) and Desikachary (1989, pl. 625, fig. 4).

6 *Campylodiscus biangulatus* Greville 1862. See Schmidt's Atlas (1874-1959, pl. 14, fig. 18).

7-8 *Actinocyclus normanii* (?) (Gregory in Greville) Hustedt 1957. Identity is uncertain. The specimen closely resembles that of *Coscinodiscus symmetricus* Greville. See Schmidt's Atlas (1974-1959, pl. 57, fig. 27) of a specimen from Singapore.

9 *Lyrella lyroides* (Hendey) Mann in Round, Crawford and Mann 1990. See Hendey (1964, pl. 33, figs. 3-4), given as *Navicula lyroides*.

10 *Lyrella robertsiana* Greville 1865. See Hendey (1970, p. 137, pl. 3, fig. 24), given as *Navicula robertsiana*.

11 *Navicula brasiliensis* Grunow 1863. See Hendey (1958, p. 64, pl. 1, fig. 1) and also Desikachary (1989, pl. 623, fig. 2).

12-13 *Caloneis robusta* Cleve 1894. See Grunow 1877 in Schmidt's Atlas (1874-1959, pl. 50, figs. 1-2) given as *Navicula robusta* Grunow. See also Cleve (1894, p. 55).

Magnifications: figs. 9-10, 12-13: x500; all others x750.
Scale Bar: scale bar is 60 microns for the figures at x500; 40 microns at x750

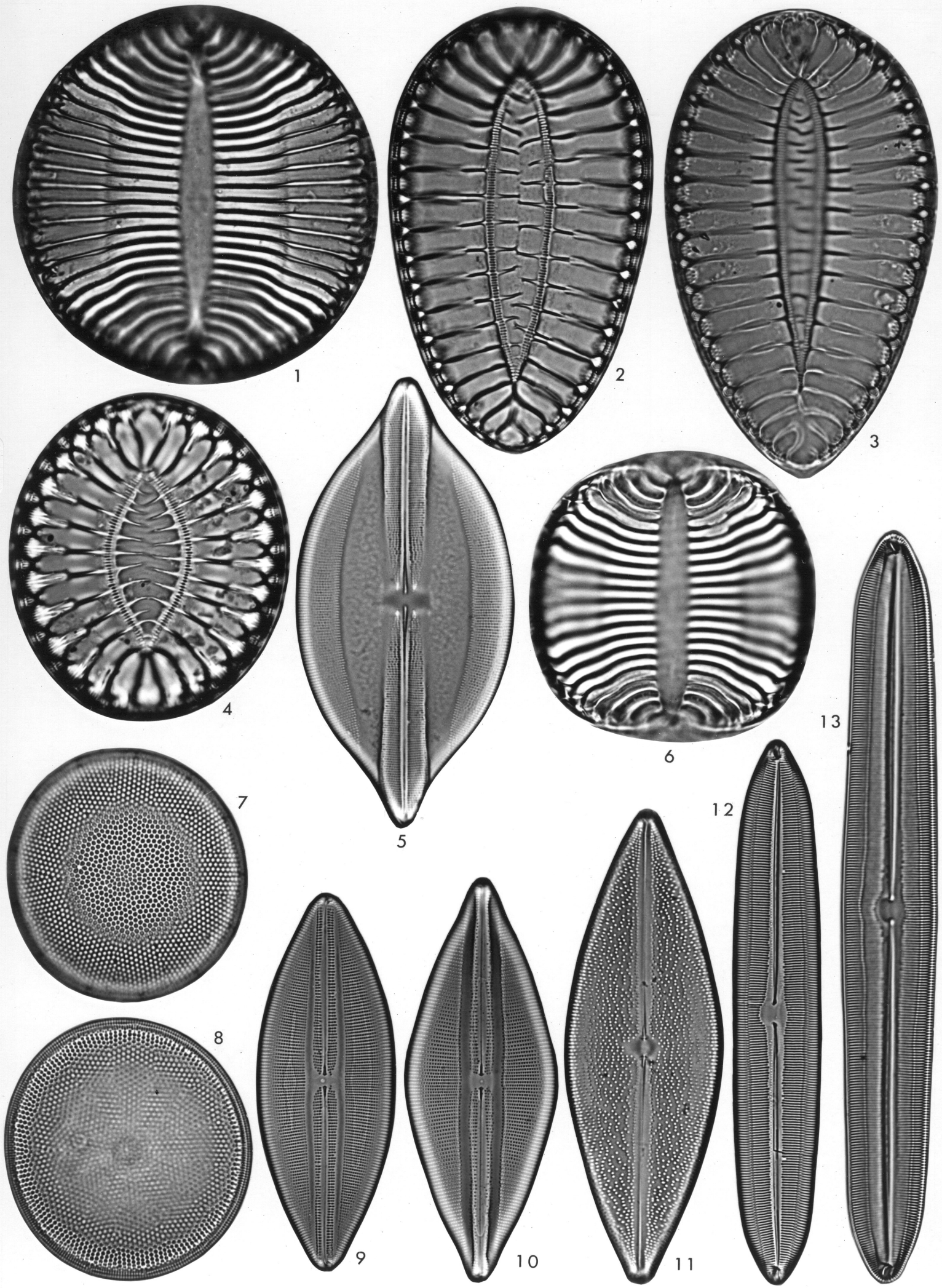
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Plate 48. MARINE DIATOMS FROM SAMOA

Source of Material

The sources of the diatom plate figures are slides from the Healey collection held at the National Institute of Water and Atmospheric Research, (NIWA), Greta Point, Wellington, New Zealand, as follow:

HC 1178 Apia, Samoa
HC 1589 a selected group of 50 forms, recent marine, Samoa
HC 1649 - HC 1650, Apia, Samoa, recent marine
HC 1701 strew, recent marine, Samoa
HC 2964 from algae, Samoa. Thum slide No.2519
HC 3227 *Navicula lyra*, strew, recent marine, Apia, Samoa, Möller
HC 3228 Recent marine strew, Apia, Samoa, Möller
HC 3229 *Aulacodiscus recedens*, strew, recent marine, Samoa, Möller
HC 3230 Recent marine strew, Samoa, Möller

Plate Forty-eight:

14 *Aulacodiscus recedens* A. Mann 1925. See A. Mann (1925, p. 31, pl. 6, fig. 3).

15 *Triceratium scitulum* Brightwell 1853. See Brightwell (1853, p. 250. pl. 4, fig. 9).

16 *Trigonium reticulum* Ehrenberg 1844. See Hendey (1970, pl. 6, fig. 70).

17-18 *Triceratium favus* fo. *quadrata* (Grunow in Schmidt et al.) Hustedt 1930. See Schmidt's Atlas (1874-1959, pl. 84, fig. 4).

19 *Triceratium sparsipunctatum* Hustedt in Schmidt et al. 1959. See Schmidt's Atlas (1874-1959, pl. 467, fig. 29) and also Hustedt in Simonsen (1987, p. 466, pl. 702, figs. 1-3).

20-21 *Trigonium formosum* var. *pentagonalis* (Schmidt) Desikachary and Prema 1987. See Schmidt's Atlas (1874-1959, pl. 79, fig. 4) of a specimen from Samoa, and also Desikachary (1989, pl. 801, fig. 3), given as *Triceratium formosum* var. *pentagonalis*.

22 *Trigonium formosum* (Brightwell) Hendey 1971, a whole frustule.

23 *Trigonium arcticum* var. *californicum* (Grunow) Wornardt 1967. See Schmidt's Atlas (1874-1959, pl. 79, fig. 5), given as *Triceratium arcticum* var. *californicum*.

24 *Triceratium pentacrinus* (Ehrenberg) Wallich 1858. See Desikachary (1989, pl. 786, figs. 1-9).

25 *Trachyneis aspera* (Ehrenberg) Cleve 1894. Hendey (1964, pl. 29, fig. 13).

26 *Psammodictyon panduriforme* (Gregory) Mann in Round, Crawford and Mann 1990. See Foged (1975, pl. 29, fig. 13); also Lange-Bertalot and Krammer (1987, pl. 19, fig. 8), given as *Nitzschia panduriformis*.

27-28 *Diploneis crabro* (Ehrenberg) Ehrenberg 1854. See Schmidt's Atlas (1874-1959, pl. 11, figs. 15, 16, 18).

29 *Thalassiosira endoseriata* Hasle and Fryxell in Fryxell and Hasle 1977. See Mahood, Fryxell and McMillan (1986, p. 146, fig. 91). Also, specimen is similar to *Actinocyclus normanii* (A. Witkowski, written commun., 2012).

30 *Nitzschia graeffii* Grunow in Cleve 1878. See Grunow (1880, pl. 12, fig. 4); also Schmidt's Atlas (1874-1959, pl. 349, fig. 42) and Lange-Bertalot and Krammer (1987, pl. 23, fig. 1).

31 *Psammodictyon panduriforme* (Gregory) Mann in Round, Crawford and Mann 1990. See Foged (1975, pl. 29, fig. 13); also Lange-Bertalot and Krammer (1987, pl. 19, fig. 8), given as *Nitzschia panduriformis*.

Magnifications: figs. 17-18, 20-23: x500; figs. 15, 25, 29: x750; all others: x1000
Scale Bar: scale bar is 60 microns for the figures at x500; 40 microns at x750; 30 microns at x1000

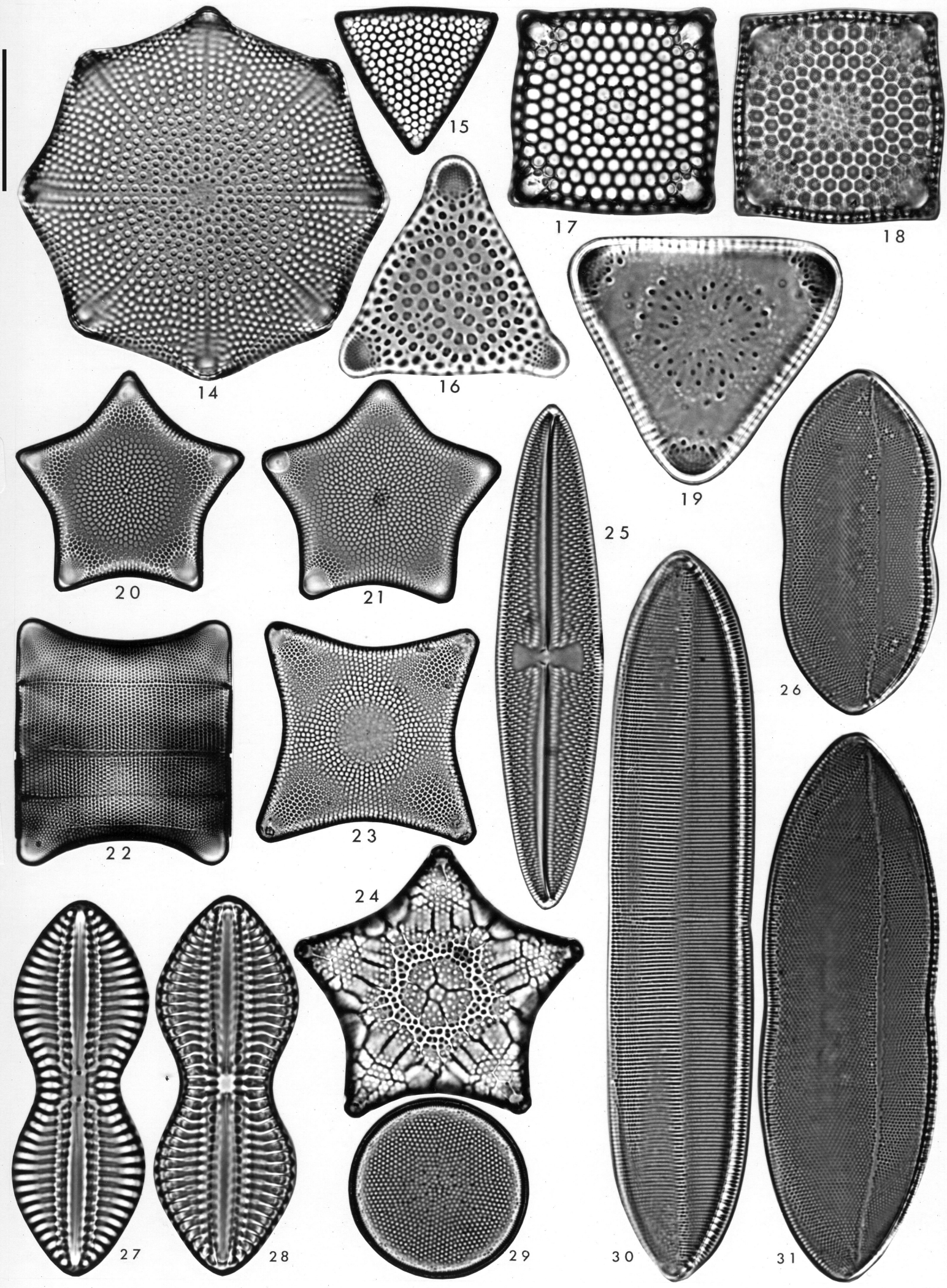
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Plate 49. MARINE DIATOMS FROM SAMOA

Source of Material

The sources of the diatom plate figures are slides from the Healey collection held at the National Institute of Water and Atmospheric Research, (NIWA), Greta Point, Wellington, New Zealand, as follow:

HC 1178 Apia, Samoa
HC 1589 a selected group of 50 forms, recent marine, Samoa
HC 1649 - HC 1650, Apia, Samoa, recent marine
HC 1701 strew, recent marine, Samoa
HC 2964 from algae, Samoa. Thum slide No.2519
HC 3227 *Navicula lyra*, strew, recent marine, Apia, Samoa, Möller
HC 3228 Recent marine strew, Apia, Samoa, Möller
HC 3229 *Aulacodiscus recedens*, strew, recent marine, Samoa, Möller
HC 3230 Recent marine strew, Samoa, Möller

Plate Forty-nine:

32 *Lyrella lyra* (Ehrenberg) Karajeva 1978. See Desikachary (1989, pl. 633, fig. 9), given as *Navicula lyra*.

33 *Surirella fastuosa* (Ehrenberg) Ehrenberg 1843. See Schmidt's Atlas (1874-1959, pl. 19, fig. 13).

34 *Triceratium favus* fo. *quadrata* (Grunow in Schmidt et al.) Hustedt 1930. See Desikachary (1989, pl. 775, fig. 2 and pl. 776, fig. 3)

35 *Trigonium zonulatum* (Greville) Mann 1907. See Greville in Williams (1988, pl. 74, figs. 7-8) and also Desikachary (1989, pl. 806, figs. 3-4).

36 *Navicula (Lyrella) spectabilis* fo. *angelorum* (Cleve) Hustedt 1964 (No formal transfer to *Lyrella* can be found for this form). See Desikachary (1989, pl. 647, fig. 1).

37 *Diploneis nitescens* (Gregory) Cleve 1894. See Hustedt (1937, fig. 1047).

38 *Aulacodiscus orientalis* Greville 1864 . See Greville (1864, pl. 2, fig. 6) and Schmidt's Atlas (1874-1959, pl. 34, figs. 1-3).

39 *Nitzschia nicobarica* (Grunow) Grunow 1880. See Grunow (1880, pl. 12, fig. 2) and also Lange-Bertalot and Krammer (1987, pl. 16, fig. 7) of a specimen from Apia, Samoa, No. 1454 in the collection of Grunow.

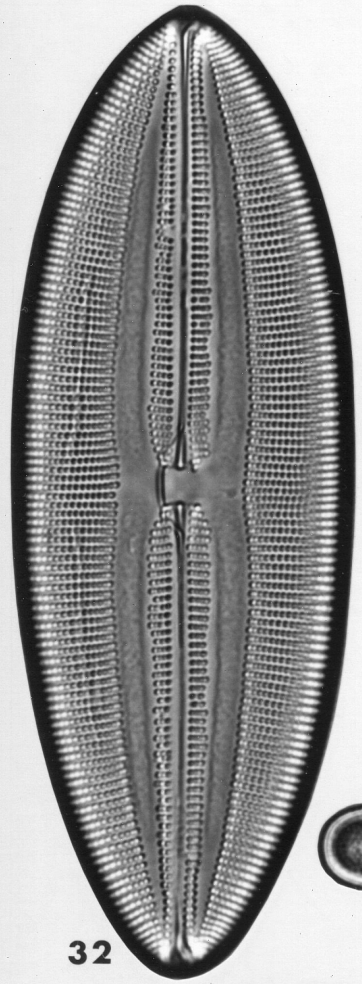
40 *Stictodiscus parallelus* (Ehrenberg) Castracane 1886. See Schmidt's Atlas (1874-1959, pl. 75, figs. 11-13 and pl. 76, figs. 14-17) given as *Triceratium parallelum* forma *trigona*.

41-42 *Mastogloia horvathiana* Grunow 1860, a whole frustule. See Brun (1895, pl. 16, figs. 66-67); also Hustedt (1933 fig. 890) and Foged (1975, pl. 13, figs. 6-7).

43 *Mastogloia splendida* (Gregory) H. Peragallo 1888. See Stephens and Gibson (1979, p. 507, figs. 41-46).

44 *Lyrella lyroides* (Hendey) Mann in Round, Crawford and Mann 1990. See Hendey (1964, p. 209, pl. 33, figs. 3-4), given as *Navicula lyroides*.

Magnifications: figs. 33, 38: x750; all others: x1000
Scale Bar: scale bar is 40 microns for all figures at x750; 30 microns at x1000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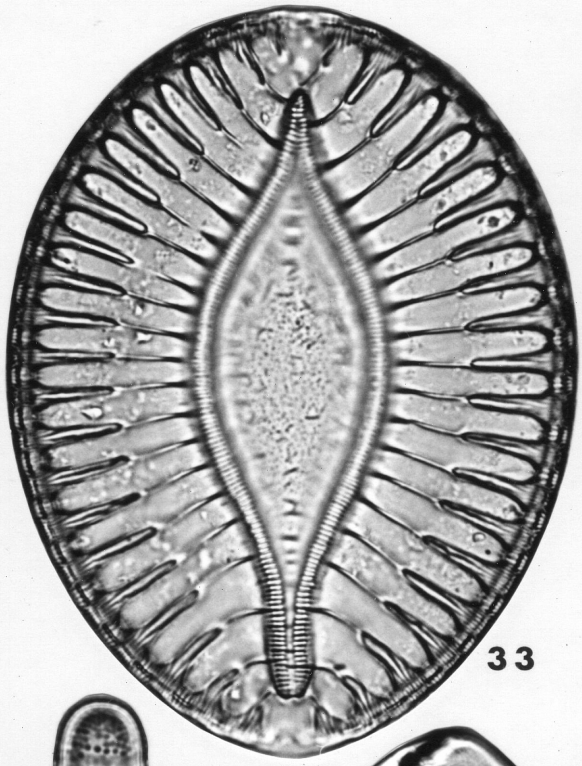
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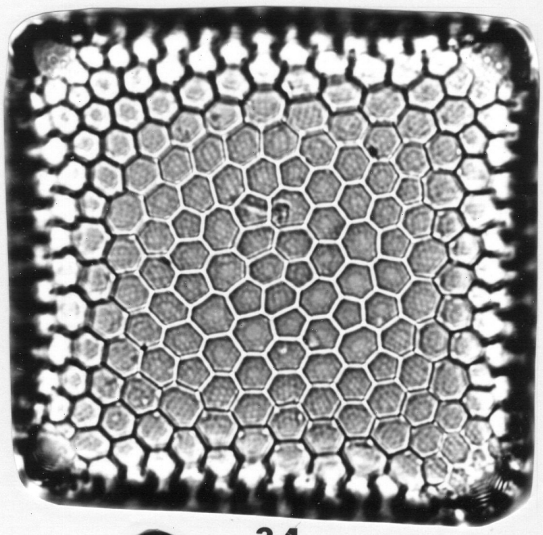
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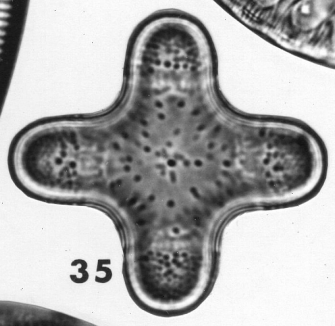
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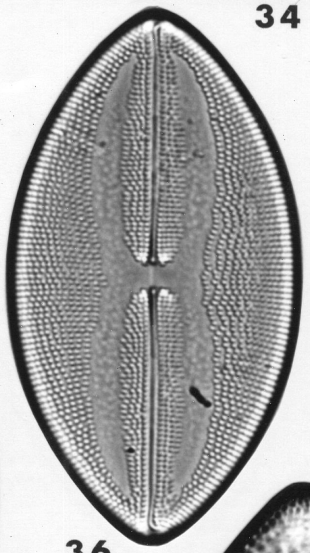
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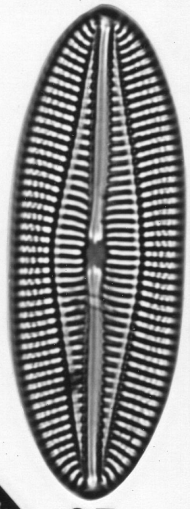
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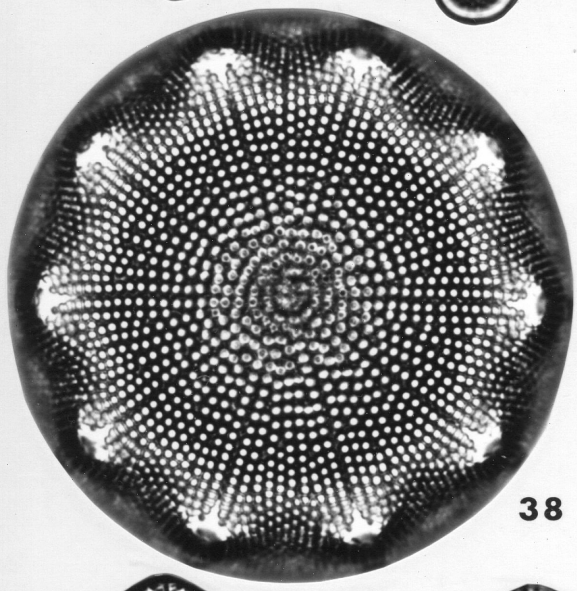
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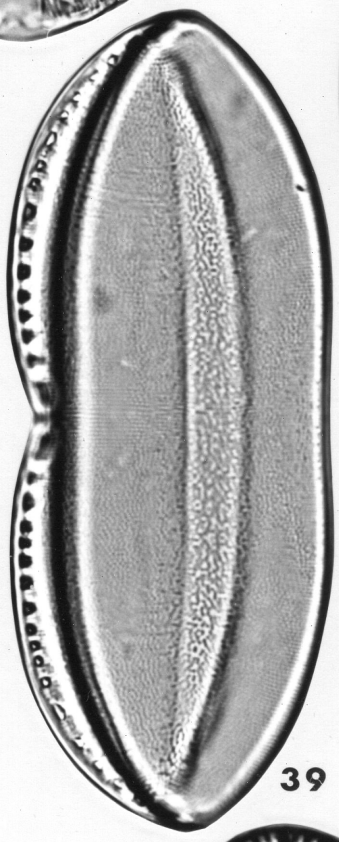
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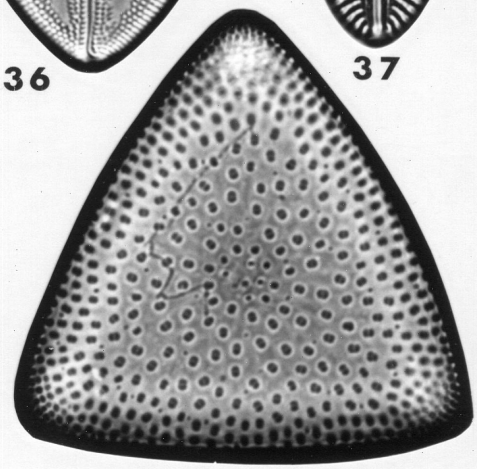
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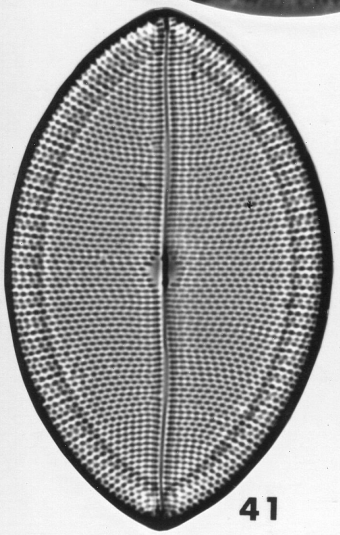
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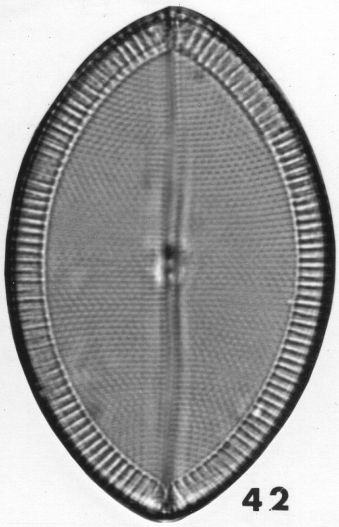
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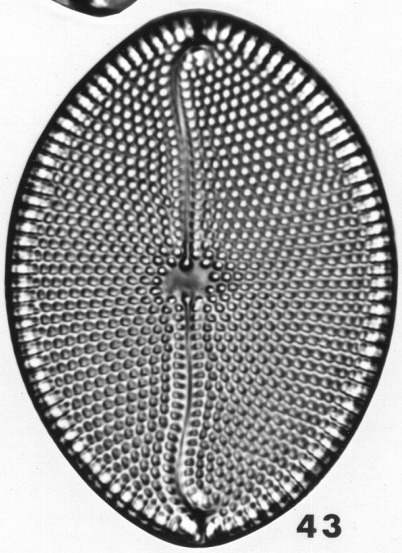
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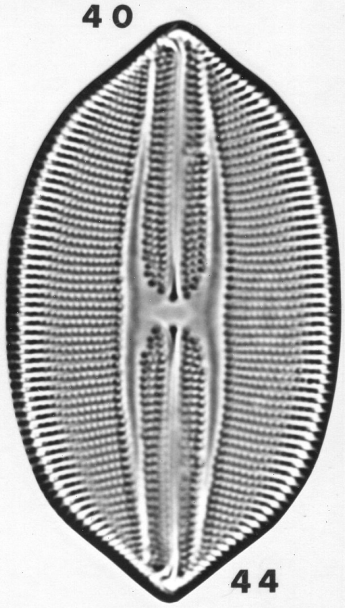
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Plate 50. MARINE DIATOMS FROM SAMOA

Sources of Materials

The sources of the diatom plate figures are slides from the Healey collection held at the National Institute of Water and Atmospheric Research (NIWA), Greta Point, Wellington, New Zealand, as follow:

HC 1178 Apia, Samoa
HC 1589 a selected group of 50 forms, recent marine, Samoa
HC 1649 - HC 1650, Apia, Samoa, recent marine
HC 1701 strew, recent marine, Samoa
HC 2964 from algae, Samoa. Thum slide No.2519
HC 3227 *Navicula lyra*, strew, recent marine, Apia, Samoa, Möller
HC 3228 Recent marine strew, Apia, Samoa, Möller
HC 3229 *Aulacodiscus recedens*, strew, recent marine, Samoa, Möller
HC 3230 Recent marine strew, Samoa, Möller

Plate Fifty:

45 *Actinocyclus pruinosus* Castracane 1886 . A specimen from slide HC 1650, which is similar to specimens on slides HC 24, HC 1122 and HC 2018. A very doubtful species. The only reference, Castracane (1886, p. 144, pl. 4, fig. 2) from the Challenger Expedition, was not available for the study.

46 *Trigonium arcticum* var. *sexangulatum* (Boyer) Desikachary and Prema 1987. See Desikachary and Prema (1987, pl. 327, fig. 8).

47 *Podocystis spathulata* (Shadbolt) Van Heurck 1896. See Hendey (1964, pl. 27, fig. 3).

48 *Trachyneis aspera* (Ehrenberg) Cleve 1894. See Desikachary (1989, pl. 762, fig. 1).

49 *Plagiodiscus martensianus* Grunow and Eulenstein in Grunow 1867. See Foged (1975, pl. 30, fig. 1) of a specimen from Tanzania.

50 *Achnanthes longipes* Agardh 1824. See Desikachary and Prema (1987, pl. 254, fig. 15).

51 *Triceratium balearicum* fo. *biquadrata* (Janisch in Schmidt et al.) Hustedt 1930. See Schmidt's Atlas (1874-1959, pl. 98, fig. 4-5), given as *T. biquadratum*. See also Hustedt (1930, pl. 815, fig. 477).

52 *Podosira ambigua* Grunow 1879. See Grunow (1879, pl. 21, figs. 4a-c).

53 *Triceratium weissei* Pantocsek 1889. See Schmidt's Atlas (1874-1959, pl. 79, fig. 2)

given as *T. formosum* of a specimen from Samoa. See also Desikachary and Prema (1987, pl. 396, figs. 3-4).

54 *Diploneis notabilis* (Greville) Cleve 1894. See Hustedt (1937, figs. 1074b-c) and Williams (1988, pl. 46, fig. 4).

55 *Grammatophora maxima* Grunow 1862. See Grunow (1862, pl. 5, fig. 5).

56-57 *Podosira (Pseudopodosira?) argus* Grunow 1878. See Grunow (1879, pl. 21, figs. 6a-c) and Desikachary (1989, pl. 685, figs. 1-7). This species might belong to the genus *Pseudopodosira*, but no record of the transfer can be found.

58 *Surirella eximia* Greville 1857. See Schmidt's Atlas (1874-1959, pl. 365, fig. 7) and Williams (1988, p. 48, pl. 56, fig. 8).

Magnifications: fig. 46: x500; figs. 48, 51, 56-57: x750; all others: x1000
Scale Bar: scale bar is 60 microns for fig. 46; 40 microns for all figures at x750; 30 microns at x1000

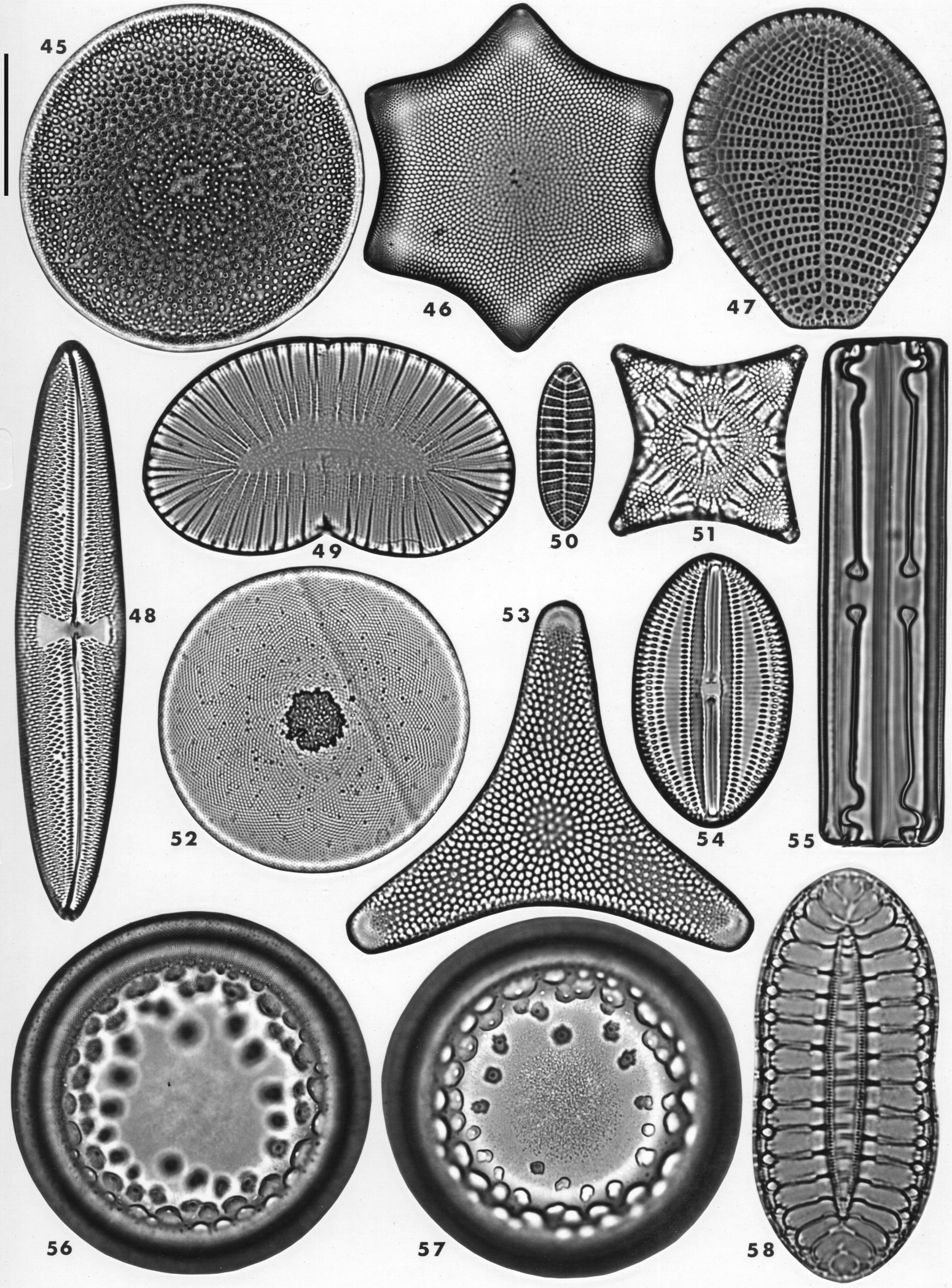
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Plate 51. MARINE DIATOMS FROM SAMOA

Source of Material

The sources of the diatom plate figures are slides from the Healey collection held at the National Institute of Water and Atmospheric Research, (NIWA), Greta Point, Wellington, New Zealand, as follow:

HC 1178 Apia, Samoa
HC 1589 a selected group of 50 forms, recent marine, Samoa
HC 1649 - HC 1650, Apia, Samoa, recent marine
HC 1701 strew, recent marine, Samoa
HC 2964 from algae, Samoa. Thum slide No.2519
HC 3227 *Navicula lyra*, strew, recent marine, Apia, Samoa, Möller
HC 3228 Recent marine strew, Apia, Samoa, Möller
HC 3229 *Aulacodiscus recedens*, strew, recent marine, Samoa, Möller
HC 3230 Recent marine strew, Samoa, Möller

Plate Fifity-one:

59-60 *Thalassiosira* sp. indet. The specimen has marginal processes, but identity is uncertain.

61 *Lyrella robertsiana* (Greville) Mann in Round, Crawford and Mann 1990. See Hendey (1970, pl. 3, figs. 23-24) which closely resembles this specimen and also Ricard (1977, pl. 3, fig. 1), identified as *Navicula robertsiana*.

62 *Triceratium robertsianum* Greville 1866. See Schmidt's Atlas (1874-1959, pl. 83, figs. 2-3) of a specimen from Samoa.

63 *Triceratium dictyotum* Sims and Ross 1990. See Schmidt's Atlas (1874-1959, pl. 85, fig. 8) given as *Biddulphia reticulata* fo. *trigona*. Assignment to *Biddulphia* was revised by Sims and Ross (1990) and *B. reticulata* was re-named *Triceratium dictyotum*.

64 *Cocconeis pseudomarginata* Gregory 1857. See Hendey (1964, pl. 28, fig. 20).

65 *Rhabdonema punctatum* (Harvey and Bailey) Stodder 1880. See Grunow (1862, pl. 9, fig. 3a) and also Desikachary and Prema (1987, pl. 385, figs. 2, 5).

66 *Rhabdonema adriaticum* Kützing 1844. See W. Smith (1856, pl. 38, fig. 305b).

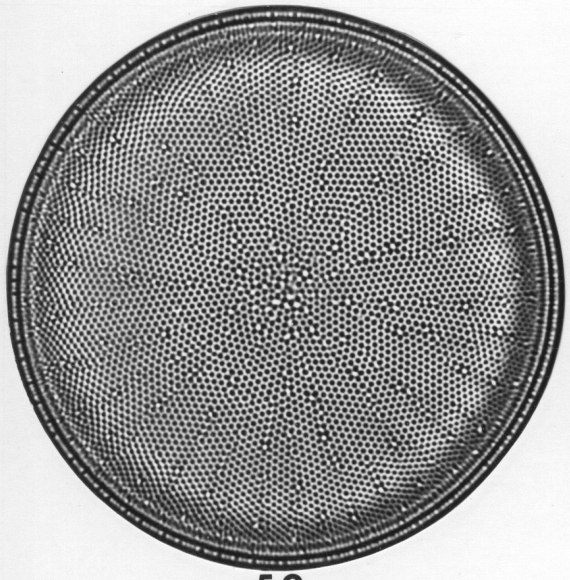
67 *Navicula (Lyrella) lyra* var. *dilatata* Schmidt in Schmidt et al. 1874 (No formal transfer to *Lyrella* can be found for this variety). See Ricard (1977, pl. 3, fig. 4).

68 *Lyrella lyra* (Ehrenberg) Karajeva 1978. See Hendey (1964, pl. 33, fig. 2), identified as *Navicula lyra*.

69 *Diploneis nitescens* (Gregory) Cleve 1894. See Hustedt (1937, fig. 1047).

70 *Surirella eximia* Greville 1857. This species is now assigned to *S. fastuosa*. See Paddock (1985, pl. 8, fig. L-7).

Magnifications: figs. 61-62, 65-66, 68: x750; all others: x1000
Scale Bar: scale bar is 40 microns for the figures at x750; 30 microns at x1000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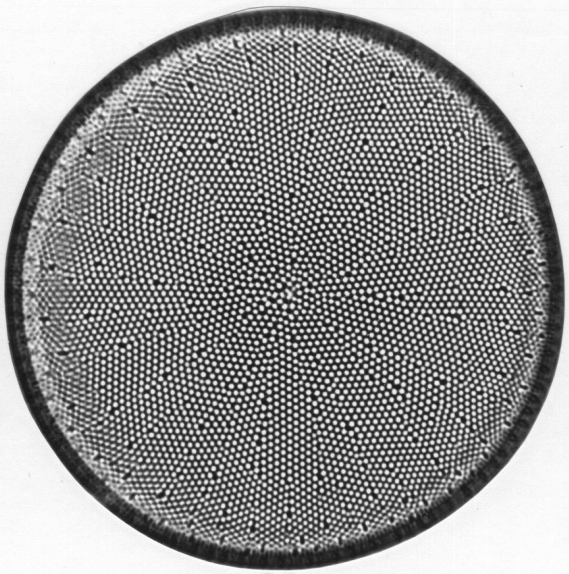
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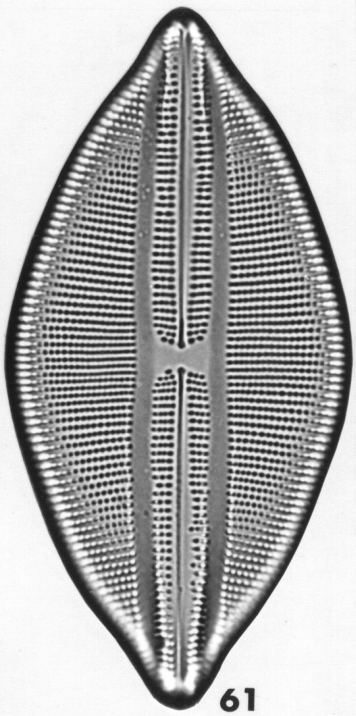
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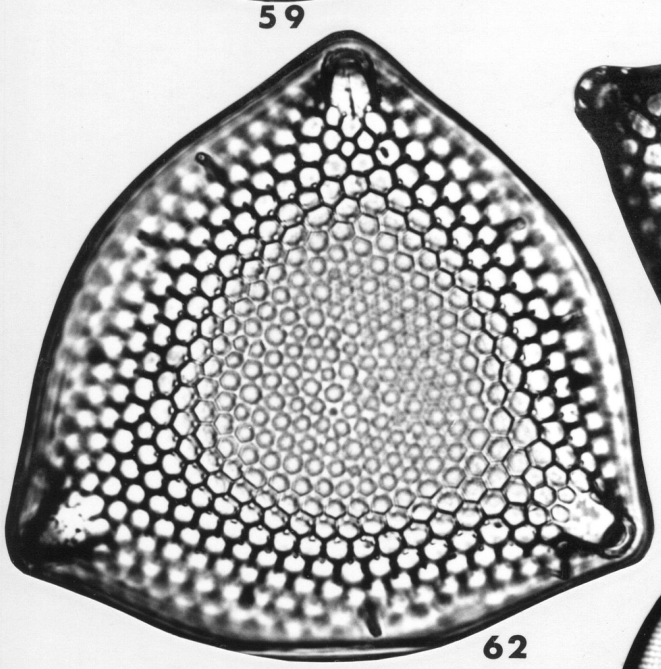
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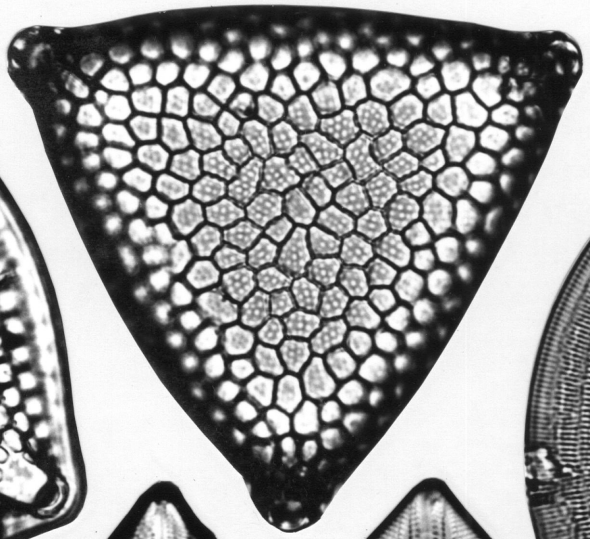
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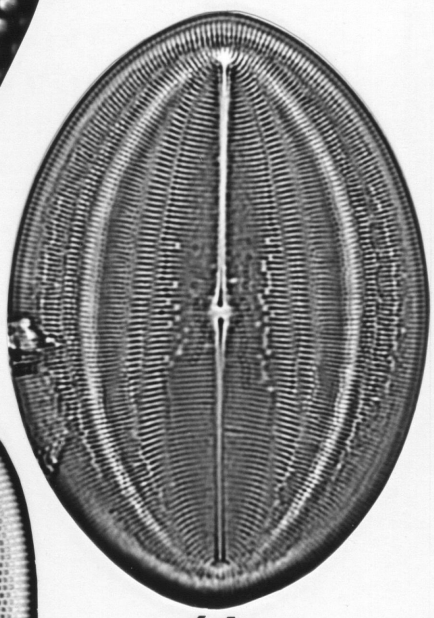
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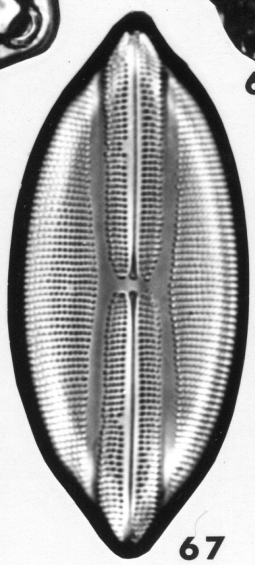
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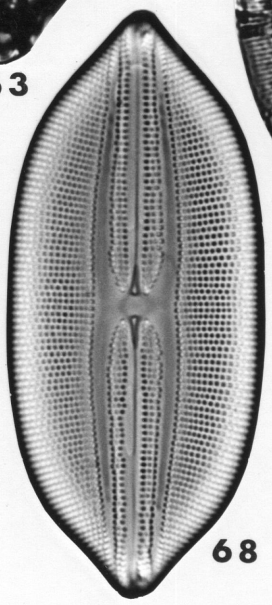
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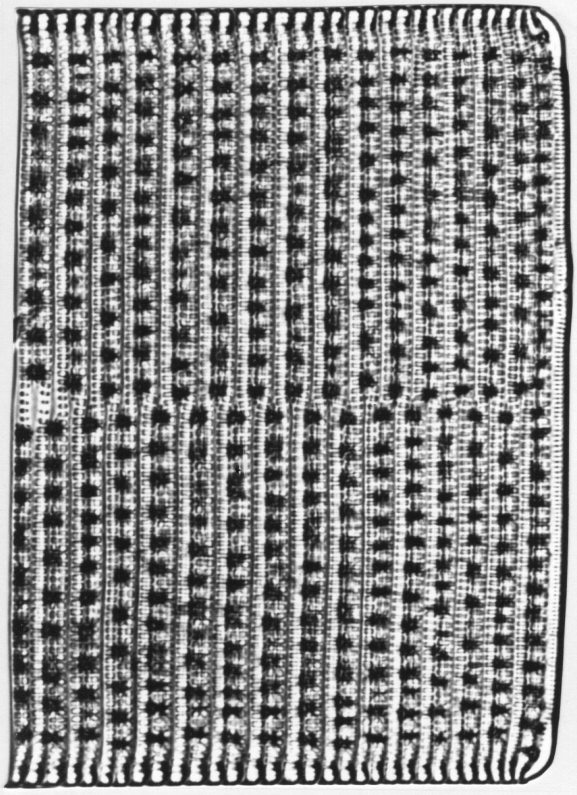
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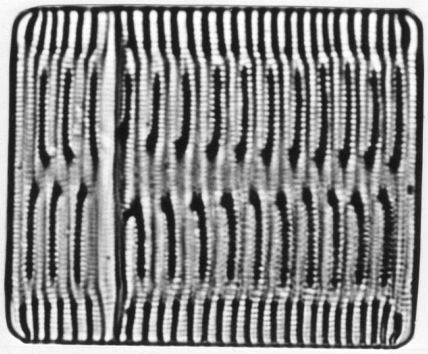
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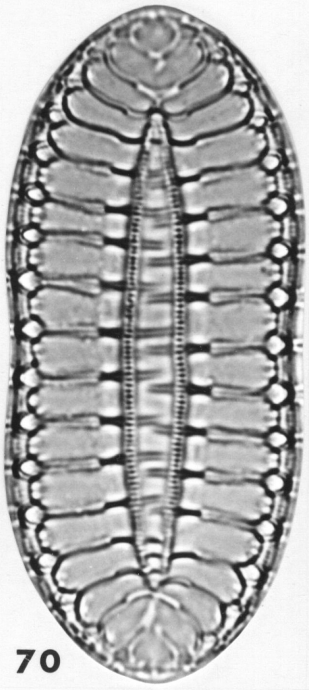
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Plate 52. DIATOMS FROM VARIOUS OR UNKNOWN LOCALITIES

Source of Material

All specimens are from slides in the Healey Collection (HC), held at the National Institute of Water and Atmospheric Research (NIWA), Greta Point, Wellington, New Zealand. Data on locality and maker of the slide have been added based on the slide labels. Where no locality is given, the slide presents a selected specimen.

Plate Fifty-two:

1 *Lyrella spectabilis* (Gregory) Mann in Round, Crawford and Mann 1990, slide HC-3750. This is possibly a specimen of *N. perplexa*. See Peragallo and Peragallo (1897-1908, pl. 23, fig. 13) and also Hendey (1964, pl. 33, fig. 13), given as *Navicula spectabilis*. This specimen bears no resemblance to Gregory's (1857, p. 9, pl. 9, fig. 10) specimen for *Navicula spectabilis*. He states: "The blank spaces between the marginal and central bands are very broad".

2 *Lyrella sandriana* (Grunow) Mann in Round, Crawford and Mann 1990, slide HC-3822. See Grunow (1863, pl. 13, fig. 5); Hustedt (1964, fig. 1481) and Desikachary (1989, pl. 645, fig. 3), given as *Navicula sandriana*.

3 *Lyrella praetexta* (Ehrenberg) Mann in Round, Crawford and Mann 1990, slide HC-3747. See Hendey (1964, pl. 33, fig. 1) and Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 97, fig. 5), given as *Navicula praetexta*.

4 *Lyrella genifera* (Schmidt) Mann in Round, Crawford and Mann 1990, slide HC-1816, Jamaica. See Hustedt (1964, fig. 1505), given as *Navicula genifera*. The first specimen of two (see fig. 7 on this plate for specimen one).

5 *Lyrella hennedyoides* Hustedt 1964, slide HC-1617, Gulf of Mexico. See Hustedt (1964, fig. 1479a), given as *Navicula hennedyoides*.

6 *Petroneis monilifera* (Cleve) Stickle and Mann in Round, Crawford and Mann 1990, slide HC-3740. The slide is incorrectly named as *N. granulata*. See Hendey (1964, pl. 31, figs. 4-5) and also Foged (1975, pl. 21, fig. 2). These agree exactly with the slide specimen illustrated here, identified as *Navicula monilifera*.

7 *Lyrella genifera* Schmidt) Mann in Round, Crawford and Mann 1990, slide HC-1816, Jamaica. The second specimen of two (see fig. 4 on this plate for specimen one). See Hustedt (1964, fig. 1505), given as *Navicula genifera*.

8 *Lyrella clavata* (Gregory) Mann in Round, Crawford and Mann 1990, slide HC-3822. See Gregory (1856, pl. 5, fig. 17), Hustedt (1964, fig. 1509a-b) and Desikachary and Prema (1987, pl. 300, fig. 1), given as *Navicula clavata*.

9 *Diploneis fusca* Gregory 1857, slide HC-3739. See Hendey (1964, pl. 32, fig. 4).

10 *Lyrella approximata* (?) (Greville) Mann in Round, Crawford and Mann 1990, slide

HC-1818, Jamaica. A doubtful identification. This specimen does not equate to the original illustration of Greville in Williams (1988, pl. 44, fig. 15). However it is somewhat similar to Hustedt's (1964, fig. 1494) specimen of *N. approximata* var. *kittoniana*, but more closely resembles Hendey's (1970, pl. 2, fig. 13) specimen.

11 *Lyrella praetexta* (Ehrenberg) Mann in Round, Crawford and Mann 1990, slide HC-1617, Gulf of Mexico. See Hendey (1964, pl. 33, fig. 1) and Witkowski, Lange-Bertalot, and Metzeltin (2000, pl. 97, fig. 5), given as *Navicula praetexta*.

Magnifications: figs. 2, 4, 7, 8, 10: x750; all others: x1000
Scale Bar: scale bar is 40 microns for the figures at x750; 30 microns at x1000

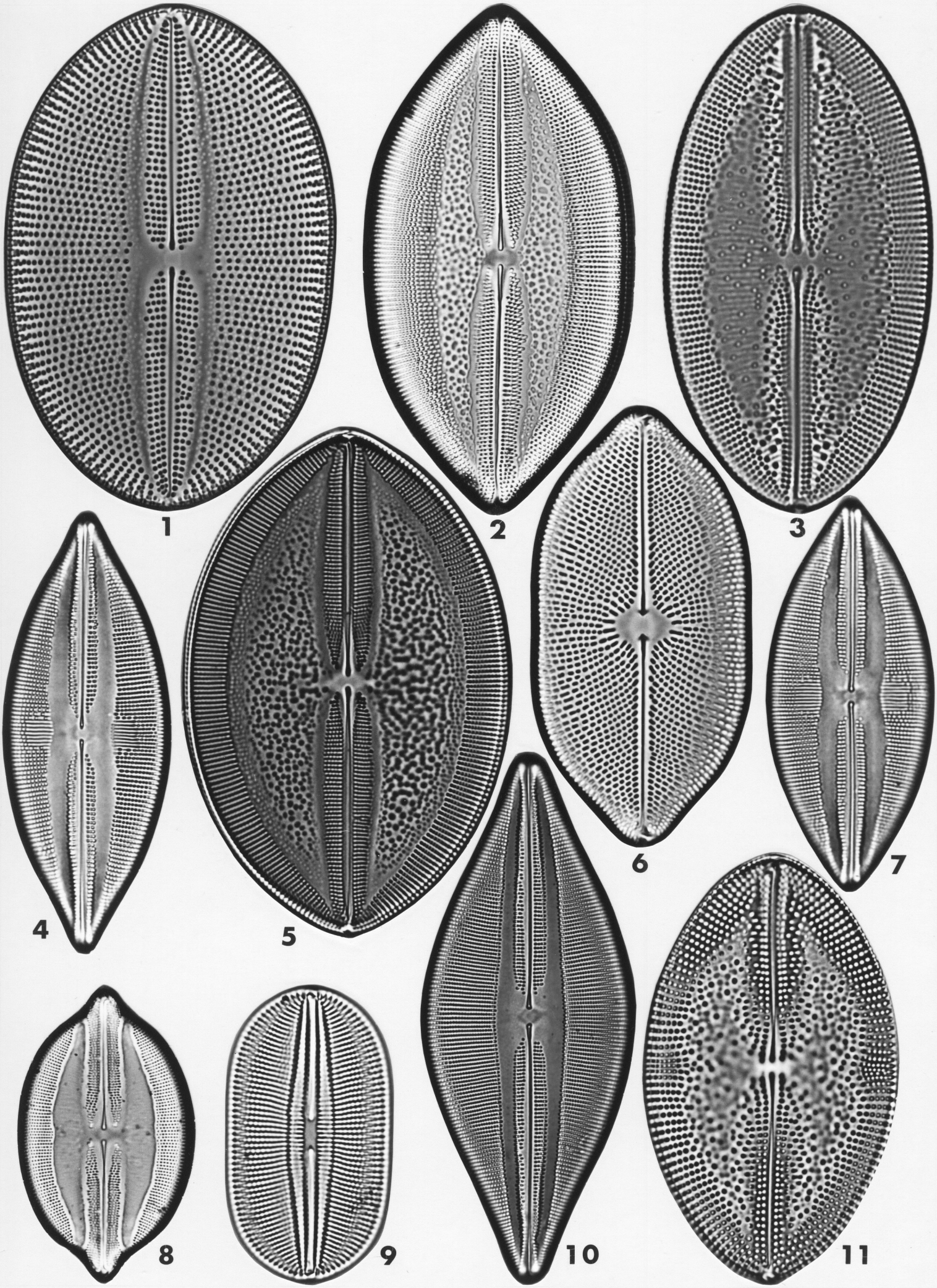
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Plate 53: DIATOMS FROM VARIOUS OR UNKNOWN LOCALITIES

Source of Material

All specimens are from slides in the Healey Collection (HC), held at the National Institute of Water and Atmospheric Research (NIWA), Greta Point, Wellington, New Zealand. Data on locality and maker of the slide have been added based on the slide labels. Where no locality is given, the slide presents a selected specimen.

Plate Fifty-three:

12-13 *Triceratium septangulatum* Kitton 1874. Slide HC-1778. See Schmidt's Atlas (1874-1959, pl. 85, figs. 1-2 and pl. 86, figs. 11-13) given as *T. grande* var. *septangulatum.*

14 *Mastogloia angulata* Lewis 1861. Slide HC-1815, Florida. See Hustedt (1933, fig. 885) and Foged (1975, pl. 13, figs. 1-2).

15 *Mastogloia angulata* Lewis 1861. Slide HC-3726, incorrectly identified as *M. apiculata*. See Foged (1975, pl. 12, figs. 2-3) correctly identified as *M. angulata* (compare with fig. 14). The original figure of W. Smith (1856, pl. 62, fig. 387) for *M. apiculata* agrees exactly with Foged (1975, pl. 14, figs. 9-10 and 13-14). The partectal band of *M. apiculata* is uniform throughout, whereas in *M. angulata* the central cells protrude noticeably.

16 *Lyrella durandii* (Kitton) Mann in Round, Crawford and Mann 1990. Slide HC-1082, Hong Kong. See Schmidt's Atlas (1874-1959, pl. 129, fig. 3) given as *Navicula durandii* var. *intermedia*, a specimen from Singapore.

17 *Mastogloia fimbriata* (Brightwell) Cleve 1895. Slide HC-1064, Viti Levu, Fiji. See Hustedt (1933, fig. 884) and Foged (1975, pl. 13, fig. 3) which exactly agrees with fig. 17.

18 *Cyclotella bodanica* Eulenstein in Grunow 1878, high focus-low focus. Slide HC-3703. See Schmidt's Atlas (1874-1959, pl. 224, figs. 29-32).

19 *Cocconeis extravagens* Janisch in Schmidt et al. 1894. Slide HC-1337, Kerguelen Islands. See Schmidt's Atlas (1874-1959, pl. 189, fig. 29). Slide HC-1337 in the Healey Collection is labeled "*Cocconeis magellanica*, select (= *imperatrix*) Kerguelan Island". According to the literature, the epithet "magellanica" has not been assigned in the genus *Cocconeis*. *C. magellanica* is, therefore, an invalid name. The reference "(= *imperatrix*)" on the slide label refers to *C. imperatrix* Schmidt 1894, but the specimen does not correspond to this species.

20 *Cocconeis extravagans* Janisch in Schmidt et al. 1894. Slide HC-1643, Adelaide, Australia. See Schmidt's Atlas (1874-1959, pl. 189, fig. 30). According to VanLandingham (1968b, p. 784), *Cocconeis extravagans* is a synonym of *C. costata* var. *kerguelensis* (Petit) Cleve (Cleve, 1895, p. 182).

21 *Nitzschia pulcherrima* (Grunow in Kitton) Grunow in Cleve and Möller 1878. Slide HC-1371, Colon, Panama. This is an incorrect identification. See Schmidt's Atlas (1874-1959, pl. 350, fig. 3 and pl. 351, fig. 1) which is of a specimen from Colon.

22 *Tryblionella brightwellii* (Kitton in Pritchard) Mann in Round, Crawford and Mann 1990. Slide HC-1246, Sierra Leone. See Hendey (1958, pl. 6, fig. 6) identified as *Nitzschia brightwellii*.

Magnifications: figs. 12-13: x250; figs. 21-22: x500; fig. 16: x750; all others: x1000
Scale Bar: scale bar is 120 microns for the figures at x250; 60 microns at x500; 40 microns at x750; 30 microns at x1000

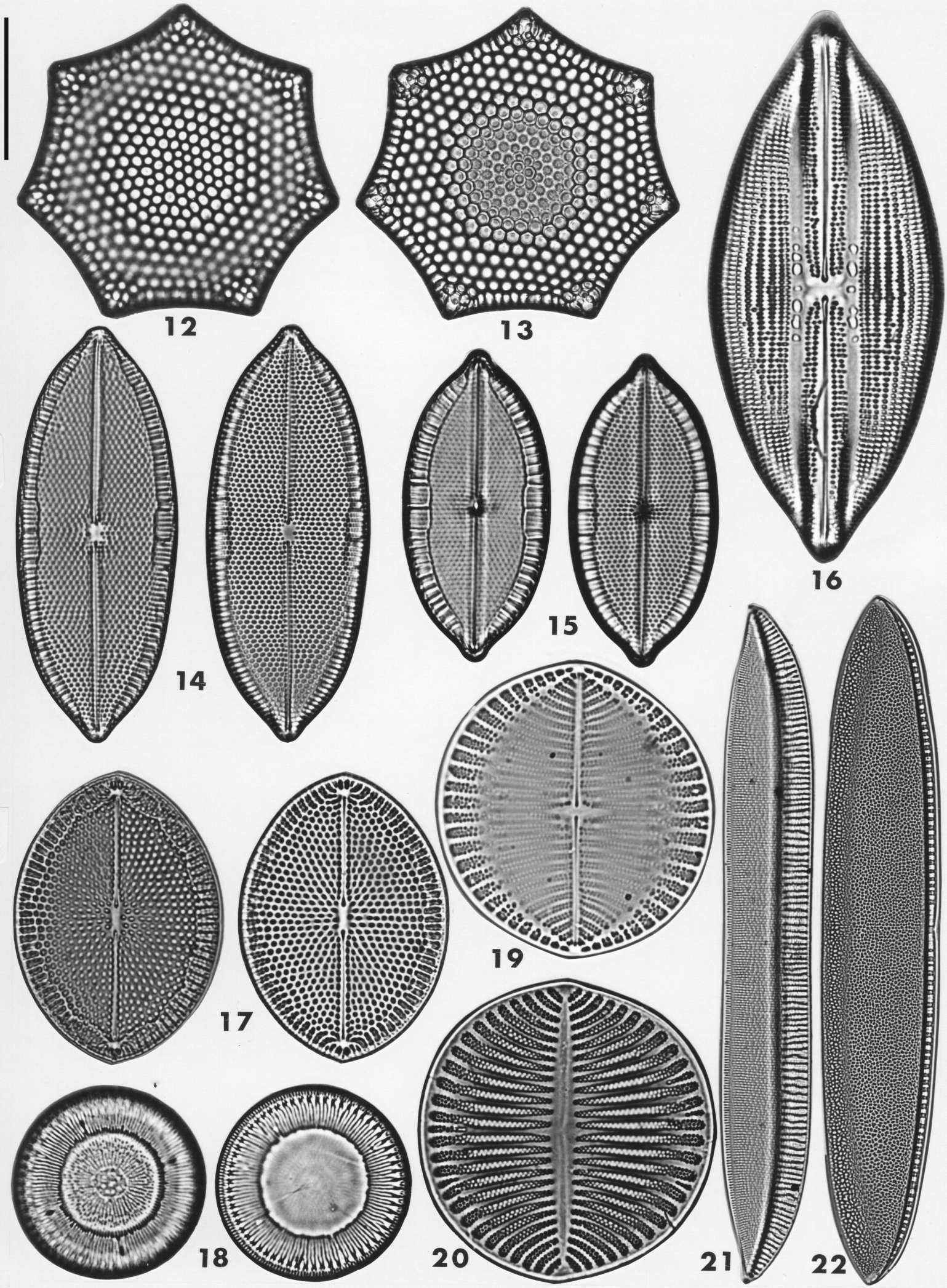
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Plate 54: DIATOMS FROM VARIOUS OR UNKNOWN LOCALITIES

Source of Material

All specimens are from slides in the Healey Collection (HC), held at the National Institute of Water and Atmospheric Research (NIWA), Greta Point, Wellington, New Zealand. Data on locality and maker of the slide have been added based on the slide labels. Where no locality is given, the slide presents a selected specimen.

Plate Fifty-four:

23 *Diploneis ornata* Schmidt in Schmidt et al. 1881. Both images of same specimen at different focus. Slide HC-3744. See Schmidt's Atlas (1874-1959, pl. 69, fig. 5).

24 *Aulacodiscus sollittianus* Norman 1861. See Norman (1861, p. 7, pl. 2, fig. 5), Rattray (1888, p. 377) and Schmidt's Atlas (1874-1959, pl. 33, fig. 13). The two images are of the same specimen, but at different focus. Slide HC-1966. Norman's illustration is rather inaccurate and his description is brief but states appropriately ..."processes large, and, under a low power, appearing as if they had rings attached to them." Rattray's description (1888, p. 377) is more precise and is more applicable to the figures presented here.

25 *Diploneis gemmata* (Greville) Cleve 1894. Slide HC-3604, Colon, Panama. See Hustedt (1937, fig. 1050a) of a specimen given as *D. gemmata* var. *basilica*.

26 *Diploneis pandura* (Brebisson) F.W. Mills 1934. Slide HC-3745. See Hustedt (1937, fig. 1034) of a specimen given as *D. crabro* var. *pandura*.

27 *Navicula peregrina* (Ehrenberg) Kützing 1844. Slide HC-3607, Kinnegar, Hollywood. See Schmidt's Atlas (1874-1959, pl. 47, figs. 57-58).

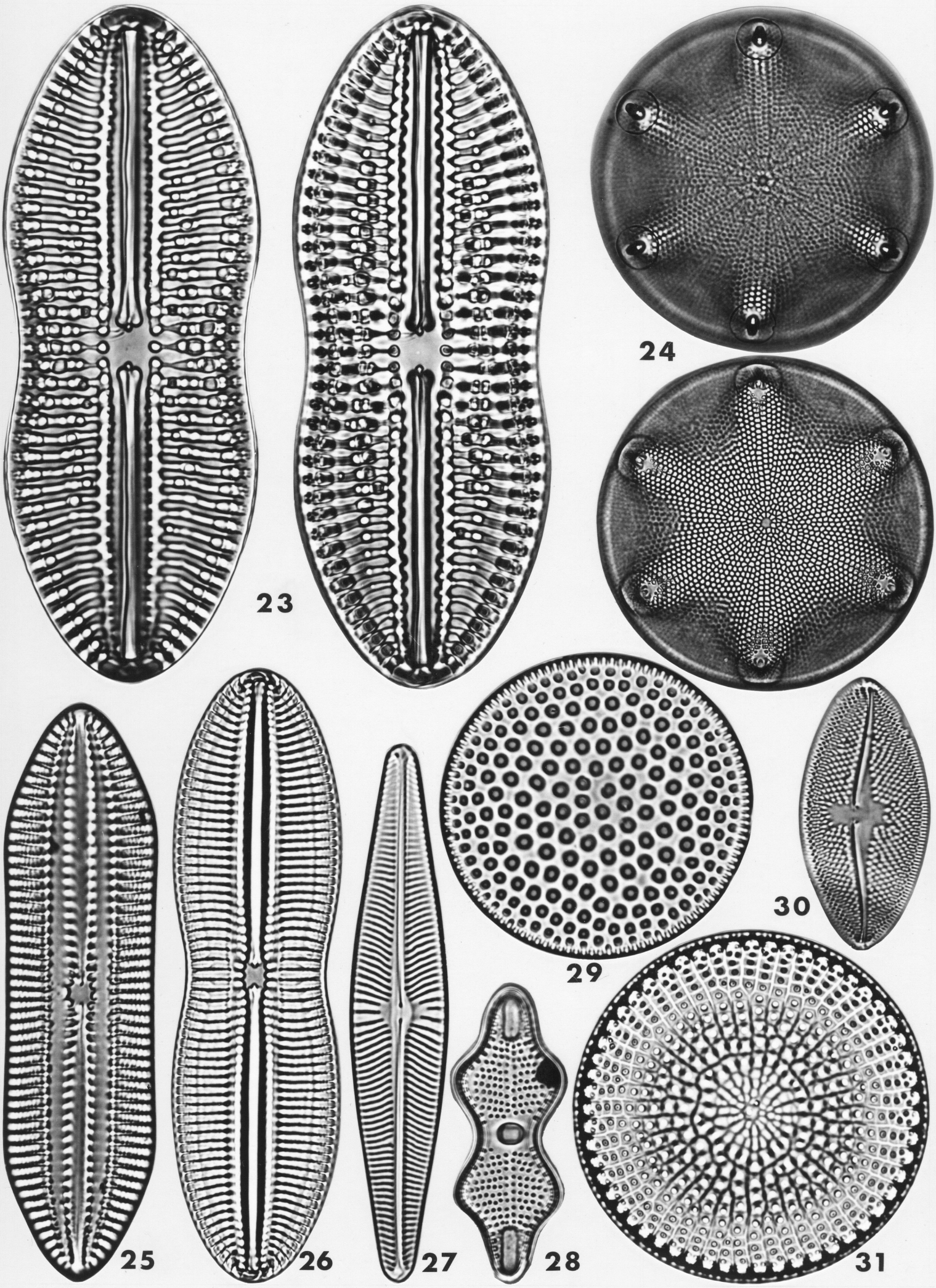
28 *Glyphodesmis nankoorense* (Grunow) Kolbe 1957. Slide HC-3755. The identity is somewhat in doubt. It is given as *Plagiogramma ceylanense* Leuduger-Fortmorel. According to Desikachary (1989, pl. 687, figs. 1-3), it is *G. nankoorense* and is identical to this specimen and another shown in this volume (pl. 43, fig. 121).

29 *Psammodiscus nitidus* (Gregoy) Round and Mann 1980. See Round and Mann (1980, p. 368, fig. 1B). Slide HC-782, Algoa Bay. Specimen given as *Stictodiscus* n. sp.

30 *Trachyneis antillarum* var. *kurzii* (Grunow in Cleve) Cleve 1894. See Cleve (1878, pl. 2, fig. 12) and also Desikachary (1989, pl. 756, figs. 3-5). Slide HC-1678, from surface of ancient lava, Puy-de-Dome, France.

31 *Stictodiscus insignis* Greville 1861. Slide HC-725, Macassar Straits. A doubtful identification, but the specimen agrees well with Desikachary (1989, pl. 713 fig. 1) of *S. hardmanianus*. Greville's (1861, p. 41, pl. 4, fig. 4) and description does not agree with the HC 725 specimen of fig. 31 above. Unfortunately, a photo of Greville's type specimen in Williams (1988, pl. 55, fig. 10) is poorly defined and conveys little information.

Magnifications: figs. 24, 29: x500; figs. 26, 30-31: x750; figs. 23 and 28: x1000
Scale Bar: scale bar is 60 microns for the figures at x500; 40 microns at x750; 30 microns at x1000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References Cited

Andrews, G.W., 1975, Taxonomy and stratigraphic occurrence of the marine diatom genus *Rhaphoneis*: Nova Hedwigia, Beihefte, v. 53, p. 193-222.

Archibald, R.E.M., 1983, The diatoms of the Sundays and Great Fish rivers in the eastern Cape province of South Africa; Bibliotheca Diatomologica, v. 1: Vaduz, J. Cramer, 362 p., 34 pls.

Archibald, R.E.M., and Schoeman, F.R., 1983, *Amphora coffeaeformis* (Agardh) Kutzing: A revision of the species under light and electron microscopy: South African Journal of Botany, v. 3, no. 2, p. 83-102.

Boyer, C.S., 1920, Rare species of North American Diatomaceae: Bulletin of the Torrey Botanical Club, v. 47, p. 67-72.

Brightwell, Thomas, 1853, On the genus *Triceratium*, with descriptions and figures of the species: Quarterly Journal of Microscopical Science, v. 1, p. 245-252.

Brightwell, Thomas, 1856, Further observations on the genus *Triceratium*, with descriptions of figures of new species: Quarterly Journal of Microscopical Science, v. 4, p. 272-276.

Brightwell, Thomas, 1859, On some of the rarer or undescribed species of Diatomaceae. Part 1: Quarterly Journal of Microscopical Science, v. 7, p. 179-181.

Brun, Jacques, 1895, Diatomées lacustres, marines ou fossiles, espèces nouvelles ou insuffisamment connues: Le Diatomiste, v. 2, p. 43-52.

Castracane, Francesco, 1886, Report on the Diatomaceae collected by H.M.S. Challenger during the years 1873-76: Botany, v. 2: London, Longmans, 178 p.

Cholnoky, B.J., 1963, Beiträge zur Kenntniss des marinen Litorals von Südafrika: Botanica Marina, v. 5, no. 2-3, p. 38-83.

Cleve, P.T., 1878, Diatoms from the West Indian archipelago: Kungliga Svenska vetenskaps-akademiens handlingar, v. 5, no. 8: Stockholm, P.A. Norstedt, 22 p.

Cleve, P.T., 1881, On some new and little known diatoms: Kungliga Svenska vetenskaps-akademiens handlingar, v. 18, no. 5: Stockholm, Norstedt, 28 p.

Cleve, P.T., 1894-1895, Synopsis of the Naviculoid diatoms, Part 1-2: Kungliga Svenska vetenskaps-akademiens handlingar, v. 26, no. 2 (v. 1) and v. 27, no. 3 (v. 2): Stockholm, Norstedt, 2 v.

Cleve, P.T., and Grunow, Albert, 1880, Beiträge zur Kenntniss der arctischen Diatomeen: Kungliga Svenska vetenskaps-akademiens handlingar, v. 17, no. 2: Stockholm, Norstedt, 121 p.

Cleve-Euler, Astrid, 1951, Die diatomeen von Schweden und Finnland. Part I: Kungliga Svenska vetenskaps-akademiens handlingar, ser. 4, no. 1: Stockholm, Almqvist and Wiksell, 163 p.

Cleve-Euler, Astrid, 1953, Die diatomeen von Schweden und Finnland. Part II, Arraphideae, Brachyraphideae: Kungliga Svenska vetenskaps-akademiens handlingar, ser. 4, v. 4, no. 1: Stockholm, Almqvist and Wiksell, 158 p.

Cleve-Euler, Astrid, 1955, Die diatomeen von Schweden und Finnland. Part IV, Biraphideae 2: Kungliga Svenska vetenskaps-akademiens handlingar, ser. 4, v. 5, no. 4: Stockholm, Almqvist and Wiksell, 232 p.

Cox, E.J., 1979, Taxonomic studies on the diatom genus *Navicula* Bory: The typification of the genus: Bacillaria, v. 2, p. 137-153.

Cox, E.J., 1982, Taxonomic studies on the diatom genus *Navicula* Bory. IV. *Climaconeis* Grun., a genus including *Okedenia inflexa* (Bréb.) Eulenst. ex De Toni and members of the *Navicula* sect. Johnsonieae sensu Hustedt: British Phycological Journal, v. 17, no. 2, p. 147-168.

Cox, E.J., 1988, Taxonomic studies on the diatom genus *Navicula* Bory: The establishment of *Parlibellus* gen. nov. for some members of *Navicula* sect. Microstigmaticae: Diatom Research v. 3, no. 1, p. 9-38.

De Stefano, M. and Marino, D., 2002, Morphology and taxonomy of *Amphicocconeis* gen. nov. (Achnanthales, Bacillariophyceae, Bacillariophyta) with considerations on its relationship to other monoraphid diatom genera: European Journal of Phycology, v. 38, p. 361-370.

De Toni, Giambattista, 1894, Sylloge algarum omnium hucusque cognitarum, t. 3, v. 2, Bacillarieae: Patavii, Typis Seminarii, p. 819-1556.

Desikachary, T.V., 1989, Atlas of diatoms, Pt. 6, Marine diatoms of the Indian Ocean region, pl. 662-809: Madras, Madras Science Foundation.

Desikachary, T.V., and Prema, P., 1987, Atlas of diatoms, Pt. 3, Diatoms from the Bay of Bengal, pl. 222-331; Pt. 4, Diatoms from the Arabian Sea and Indian Ocean, pl. 332-400A: Madras, Madras Science Foundation.

Edwards, A.R., 1991, The Oamaru diatomite: New Zealand Geological Survey Paleontological Bulletin 64, 260 p.

Ehrenberg, C.G., 1841, Charakteristik von 274 neuen arten von infusorien. Bericht über die zur Bekanntmachung geeigneten: Verhandlungen der Königlich-Preussischen Akademie der Wissenschaften zu Berlin, p. 197-219.

Foged, Niels, 1975, Some littoral diatoms from the coast of Tanzania: Bibliotheca Phycologica, v. 16: Vaduz, J. Cramer, 126 p.

Foged, Niels, 1978, Diatoms in Eastern Australia: Bibliotheca Phycologica, v. 41: Vaduz, J. Cramer, 242 p.

Foged, Niels, 1979, Diatoms in New Zealand, the North Island: Bibliotheca Phycologica, v. 47: Vaduz, J. Cramer, 225 p.

Foged, Niels, 1980, Diatoms in Oland, Sweden: Bibliotheca Phycologica, v. 49: Vaduz, J. Cramer, 192 p.

Foged, Niels, 1984, Freshwater and littoral diatoms from Cuba: Bibliotheca Diatomologica, v. 5: Vaduz, J. Cramer, 243 p.

Foged, Niels, 1985, Diatoms in Samos, a Greek island in the Aegean; Diatoms in Kos and Kalymnos, two Greek islands in the Aegean: Bibliotheca Diatomologica, v. 10: Vaduz, J. Cramer, 118, 104 p.

Foged, Niels, 1987, Diatoms from Viti Levu, Fiji Islands: Bibliotheca Diatomologica, v. 14: Berlin, J. Cramer, 194 p.

Fryxell, G.A., and Hasle, G.R., 1972, *Thalassiosira eccentrica* (Ehrenb.) Cleve, *T. symmetrica* sp. nov., and some related centric diatoms: Journal of Phycology, v. 8, no. 4, p. 297-317.

Fryxell, G.A., and Hasle, G.R., 1977, The genus *Thalassiosira*: Some species with a modified ring of central strutted processes: Nova Hedwigia, Beihefte, v. 54, p. 67-98.

Fryxell, G.A., Sims, P.A., and Watkins, T.P., 1986, *Azpeitia* (Bacillariophyceae): Related genera and promorphology: Systematic Botany Monographs, v. 13, p. 1-74.

Gasse, Françoise, 1986, East African diatoms: Taxonomy, ecological distribution: Bibliotheca Diatomologica, v. 11: Berlin, J. Cramer, 201 p.

Germain, Henry, 1981, *Navicula falaisiensis* Grunow, *Cymbella cesatii* (Rabh.) Grun. Et variété capitata nov. Var., *C. microcephala* Grun. et *C. delicatula* Kützing: Cryptogamie Algologie, v. 2, no. 2, p. 123-129.

Giffen, M.H., 1963, Contributions to the diatom flora of South Africa. 1. Diatoms of the estuaries of the eastern Cape Province: Hydrobiologia, v. 21, no. 3-4, p. 201-265.

Giffen, M.H., 1970, New and interesting marine and littoral diatoms from sea point, near Cape Town, South Africa: Botanica Marina, v. 13, p. 87-90.

Gregory, William, 1855, On a post-Tertiary lacustrine sand containing diatomaceous exuviae from Glenshira, near Inverary: Quarterly Journal of Microscopical Science, v. 3, p. 30-43.

Gregory, William, 1856, On the post-Tertiary diatomaceous sand of Glenshira, Part II: Transactions of the Microscopical Society of London, new series, v. 4, p. 35-48.

Gregory, William, 1857, On new forms of marine Diatomaceae found in the Firth of Clyde and in Loch Fine: Transactions of the Royal Society of Edinburgh, v. 21, pt. 4: Edinburgh, Royal Society of Edinburgh, 72 p.

Greville, R.K., 1859, Descriptions of new species of British Diatomaceae, chiefly observed by the late Professor Gregory: Quarterly Journal of the Microscopical Science, v. 7, p. 155-166, pls. 7, 8.

Greville, R.K., 1860, A monograph of the genus *Asterolampra* including *Asteromphalus* and *Spatangidium*: Transactions of the Microscopical Society of London, new series, v. 8, p.102-124.

Greville, R.K., 1861, Descriptions of new and rare diatoms: Transactions of the Royal Microscopical Society of London, new series, v. 9, var. pag.

Greville, R.K., 1863, Descriptions of new genera and species of diatoms from the South Pacific: Transactions of the Botanical Society of Edinburgh, v. 7, p. 534-543 (part 1).

Greville, R.K., 1864, Descriptions of new and rare diatoms, series XI: Transactions of the Microscopical Society of London, new series, v. 12, p. 8-14, pls. 1-2.

Greville, R.K., 1865, Descriptions of new and rare diatoms, series XVI: Transactions of the Microscopical Society of London, new series, v. 13, p. 43-57, pls. 5-6.

Greville, R.K., 1866, Descriptions of new and rare diatoms, series XX: Transactions of the Microscopical Society of London, new series, v. 14, p. 121-130.

Grunow, Albert, 1860, Üeber neue oder ungenügend gekannte Algen. Erste Folge. Diatomeen, Familie Naviculaceen: Verhandlungen der Kaiserlich-Koniglicen Zoologisch-Botanischen Gesellschaft in Wien, v. 10, no. 4, p. 503-582.

Grunow, Albert, 1862, Die Österreichischen Diatomaceen, nebst anschluss einiger neuen arten von andern lokalitäten und einer kritischen übersicht der bisher bekannten gattungen und arten, erst folge: Grunow [published by the author], 158 p.

Grunow, Albert, 1863, Über einige neue und ungenügend bekannte arten und gattungen von Diatomaceen. Zweite Folge: Verhandlungen der Kaiserlich-Koniglicen Zoologisch-Botanischen Gesellschaft in Wien, v. 13, p. 137-162, pls. 13-14.

Grunow, Albert, 1879, Algen und Diatomaceen aus dem Kaspischen Meere [New species and varieties of Diatomacea from the Caspian Sea]: Journal of the Royal Microscopical Society, v. 2, p. 677-691.

Grunow, Albert, 1880, On some new species of *Nitzschia* (with notes by Kitton): Journal of the Royal Microscopical Society, series 3, v. 3, no. 1, p. 394-397.

Hagelstein, Robert, 1939, Botany of Porto Rico and the Virgin Islands, Diatomaceae, in Scientific Survey of Porto Rico and the Virgin Islands, v. 8, pt. 3: New York, New York Academy of Sciences, p. 313-450.

Håkansson, Hannelore, 2002, A compilation of species in the genera *Stephanodiscus*, *Cyclostephanos* and *Cyclotella* with a new genus in the family Stephanodiscaceae: Diatom Research, v. 17, no. 1, p. 1-139.

Hasle, G.R., 1972, The distribution of *Nitzschia seriata* Cleve and allied species: Nova Hedwigia, Beihefte, v. 39, p. 171-190.

Hasle, G.R., 1979, *Thalassiosira decipiens* (Grun.) Jørgensen (Bacillariophyceae): Bacillaria, v. 2, p. 85-108.

Hasle, G.R. and Fryxell, G.A., 1977, The genus *Thalassiosira*: Some species with a linear areola array: Nova Hedwigia, Beihefte, v. 54, p. 15-66.

Hasle, G.R., and Sims, P.A., 1985, The morphology of the diatom resting spores *Syringidium bicorne* and *Syringidium* simplex: British Phycological Journal, v. 20, no. 3, p. 219-225.

Hasle, G.R., and Sims, P.A., 1986, The diatom genus *Coscinodiscus* Ehrenb.: *C. argus* Ehrenb. and *C. radiatus* Ehrenb.: Botanica Marina, v. 29, p. 305-318.

Hasle, G.R., and Syvertsen, E.E., 1993, New nomenclatural combinations of marine planktonic diatoms. The families Thalassiosiraceae and Rhaphoneidaceae: Nova Hedwigia, Beihefte, v. 106, p. 297-314.

Hendey, N.I., 1951, Littoral diatoms of Chichester Harbour with special reference to fouling: Journal of the Royal Microscopical Society, v. 71, p. 1-86.

Hendey, N.I., 1958, Marine diatoms from some West African ports: Journal of the Royal Microscopical Society, v. 77, no. 1-2, p. 28-85.

Hendey, N.I., 1964, An introductory account of the smaller algae of British coastal waters, Pt. 5, Bacillariophyceae (Diatoms): London, Her Majesty's Stationery Office, 317 p.

Hendey, N.I., 1970, Some littoral diatoms from Kuwait: Nova Hedwigia, Beihefte, v. 31, p. 107-167.

Hendey, N.I., 1971, Some marine diatoms from the Galápagos Islands: Nova Hedwigia, v. 22, p. 371-422.

Hickel, Barbara, and Håkansson, Hannelore, 1987, Dimorphism in *Cyclostephanos dubius* (Bacillariophyta) and the morphology of initial valves: Diatom Research, v. 2, p. 35-46.

Honeywill, Claire, 1998, A study of British *Licmophora* species and a discussion of its morphological features: Diatom Research, v. 13, no. 2, p. 221-271.

Houpt, P.M., 1987, Observations on the marine tube-dwelling diatom *Navicula pseudocomoides* in culture: Diatom Research, v. 2, no. 1, p.47-53.

Hustedt, Freidrich, 1927-1966, Die Kieselalgen Deutschlands, Österreichs und der Schweiz mit Berücksichtigung der übrigen Länder Europas sowie der angrenzenden Meeresgebiete, in Rabenhorst, L., Kryptogamen-Flora von Deutschland, Österreich und der Schweiz, 7: Leipzig, Akademische Verlagsgesellschaft, 3 v.

John, Jacob, 1983, The diatom flora of the Swan River Estuary, Western Australia: Bibliotheca Phycologica, v. 64: Vaduz, J. Cramer, 358 p.

Kaczmarska, I. and Fryxell, G.A., 1996, *Alveus*, gen. nov. (Bacillariaceae, Bacillariophyta), a heavily silicified diatom found in warm water oceans: Microscopy Research and Technique, v. 33, p. 2-11.

Kemp, K.D., and Paddock, T.B.B., 1990, A description of two new species of the diatom genus *Mastogloia* with further observations on *M. amoyensis* and *M. gieskesii*: Diatom Research, v. 5, no. 2, p. 311-323.

Krammer, Kurt, and Lange-Bertalot, Horst, 1985, Naviculaceae: Neue und wenig bekannte taxa, neue kombinationen und synonyme sowie bemerkungen zu einigen gattungen: Bibliotheca Diatomologica, v. 9: Berlin, J. Cramer, 230 p.

Lange-Bertalot, Horst, and Krammer, Kurt, 1987, Bacillariaceae, Epithemiaceae, Surirellaceae: Neue und wenig bekannte taxa, neue kombinationen und synonyme sowie bemerkungen und ergänzungen zu den Naviculaceae: Bibliotheca Diatomologica, v. 15: Berlin, J. Cramer, 289 p.

Lange-Bertalot, Horst, and Krammer, Kurt, 1989, *Achnanthes*, eine monographie der gattung mit definition der gattung *Cocconeis* und nachtragen zu den Naviculaceae: Bibliotheca Diatomologica, v. 18: Berlin, Cramer, 393 p.

Laws, R.A., 1988, Diatoms (Bacillariophyceae) from surface sediments in the San Francisco Bay estuary: Proceedings of the California Academy of Science, v. 45, p. 133-154.

Mahood, A.D., Fryxell, G.A., and McMillan, Michelle, 1986, The diatom genus *Thalassiosira*: Species from the San Francisco Bay system: Proceedings of the California Academy of Sciences, v. 44, no. 8, p. 127-156.

Mann, Albert, 1925, Marine diatoms of the Philippine Islands: U.S. National Museum Bulletin 100, v. 6, pt. 1: Washington, Government Printing Office, 182 p.

McIntire, C.D. and Reimer, C.W., 1974, Some marine and brackish-water *Achnanthes* from Yaquina Estuary, Oregon (U.S.A.): Botanica Marina v. 17, n. 3, p. 164-175.

Meister, F.R., 1934 (1935), Seltene und neue Kieselalgen, I: Berichte der Schweizerischen Botanischen Gesellschaft (Zurich), v. 44, p. 87-108.

Meister, F.R., 1937, Seltene und neue Kieselalgen, II: Berichte der Schweizerischen Botanischen Gesellschaft, v. 47, p. 258-276.

Navarro, J.N., 1982a, Marine diatoms associated with mangrove prop roots in the Indian River, Florida, U.S.A.: Bibliotheca Phycologica, v. 61, Vaduz, J. Cramer, 151 p.

Navarro, J.N., 1982b, A survey of the marine diatoms of Puerto Rico. IV. Suborder Araphidineae: Families Diatomaceae and Protoraphidaceae: Botanica Marina, v. 25, p. 247-263.

Norman, G., 1861, On some undescribed species of Diatomaceae: Transactions of the Microscopical Society, London, v. 9, p. 5-9.

Osada, Keigo, and Kobayasi, Hiromu, 1990, *Entomoneis centrospinosa* sp. nov., a brackish diatom with raphe-bearing keel: Diatom Research, v. 5, no. 2, p. 387-396.

Paddock, T.B.B., 1985, Observations and comments on the diatoms *Surirella fastuosa* and *Campylodiscus fastuosus* and on other species of similar appearance: Nova Hedwigia, v. 41, p. 417-444.

Paddock, T.B.B., and Kemp, K.-D., 1990, An illustrated survey of the morphological features of the diatom genus *Mastogloia*: Diatom Research, v. 5, no. 1, p. 73-103.

Paddock, T.B.B., and Sims, P.A., 1980, Observations on the marine diatom genus *Auricula* and two new genera, *Undatella* and *Proboscidea*: Bacillaria, v. 3, p. 161-196.

Patrick, R.M., and Reimer, C.W., 1966, The diatoms of the United States exclusive of Alaska and Hawaii; v. 1. Fragilariaceae, Eunotiaceae, Achnanthaceae, Naviculaceae: Philadelphia, Academy of Natural Sciences of Philadelphia, 688 p.

Peragallo, H., and Peragallo, M., 1897-1908, Diatomées marines de France et des districts maritimes voisins: Grez-sur-Loing, France, M.J. Tempère, 2 v., 137 pls.

Rattray, John, 1888, A revision of the genus *Aulacodiscus* Ehrenberg: Journal of the Royal Microscopical Society, v. 8, p. 337-382.

Rattray, John, 1890, A revision of the genus *Actinocyclus*, Ehrb.: London, Quekett Microscopical Club, p. 137-212.

Riaux-Gobin, Catherine, and Compère, Pierre, 1996, Observations sur le polymorphisme de *Cocconeis califonica* Grunow, aux Îles Kerguelen: Diatom Research, v. 11, p. 89-103.

Ricard, Michel, 1975, Quelques diatomées nouvelles de Tahiti décrites en microscopie photonique et électronique à balayage: Bulletin du Muséum National d’Histoire Naturelle, v. 23, p. 201-229.

Ricard, Michel, 1977, Les peuplements de diatomées des lagons de l'archipel de la Société (Polynésie Française): Extrait de la Revue Algologique, v. 12, no. 3-4, p. 135-336.

Ross, R., 1981, Proceedings of the Sixth Symposium on Recent and Fossil Diatoms, Budapest, September 1-5, 1980: Taxonomy, Morphology, Ecology, Biology: Koeltz, Koenigstein, v. VIII, 92 pls, 487 p.

Round, F.E., and Mann, D.G., 1980, *Psammodiscus* nov. gen. based on *Coscinodiscus nitidus*: Annals of Botany, v. 46, no. 3, p. 367-373.

Round, F.E., Crawford, R.M., and Mann, D.G., 1990, The Diatoms: Biology and Morphology of the genera: Cambridge University Press, Cambridge, 747 p.

Sar, E.A., Romero, O., and Sunesen, I., 2003, *Cocconeis* Ehrenberg and *Psammococconeis* Garcia (Bacillariophyta) from the Gulf of San Matías, Patagonia, Argentina: Diatom Research, v. 18, no. 1, p. 79-106.

Schmidt's Atlas (Schmidt, Adolf), 1874-1959, Atlas der diatomaceen-kunde: Leipzig, O.R. Reisland, 6 v.

Schoeman, F.R., and Archibald, R.E.M., 1986, Observations on *Amphora* species (Bacillariophycaea) in the British Museum (Natural History). V. Some species from the subgenus *Amphora*: South African Journal of Botany, v. 52, no. 5, p. 425-437.

Schoeman, F.R., and Archibald, R.E.M., 1987, Observations on *Amphora* species (Bacillariophyceae) in the British Museum (Natural History). VI. Some species from the subgenus *Halamphora* Cleve: Nova Hedwigia, v. 44, no. 3-4, p. 377-398.

Schoeman, F.R., Archibald, R.E.M., and Sims, P.A., 1986, Observations on *Amphora* species (Bacillariophyceae) in the British Museum (Natural History). IV. Some species from the subgenus *Diplamphora* Cleve: Cryptogamie Algologie, v. 7, no. 1, p. 9-21.

Schrader, H.J., 1969, Die pennaten diatomeen aus dem obereozän von Oamaru, Neuseeland: Beihefte zur Nova Hedwigia no. 28: Lehre, 124 p., 39 pls.

Simonsen, Reimer, 1987, Atlas and catalogue of the diatom types of Friedrich Hustedt: Berlin, J. Cramer, 3 v., 772 pls.

Sims, P.A., Fryxell, G.A., and Baldauf, J.G., 1989, Critical examination of the diatom genus Azpeitia: Species useful as stratigraphic markers for the Oligocene and Miocene Epochs: Micropaleontology, v. 35, p. 293-307.

Sims, P. A. and Ross, R., 1990, *Triceratium pulvinar* and *T. unguiculatum*, two confused species: Diatom Research v. 5, n. 1, p. 155-169.

Smith, William, 1853-1856, A synopsis of the British Diatomaceae: London, John van Voorst, 2 v.

Stephens, F.C., and Gibson, R.A., 1979, Ultrastructural studies on some *Mastogloia* (Bacillariophyceae) species belonging to the group Ellipticae: Botanica Marina, v. 12, no. 8, p. 499-509.

Sterrenburg, F.A.S., 2002, The case of *Pleurosigma aequitoriale* Cleve. Constancea v. 83.3 (http://ucjeps.berkeley.edu/constancea/83/) Accessed June 15 2012.

Stosch, H.A. von, and Simonsen, Reimer, 1984, *Biddulphiopsis*, a new genus of the Biddulphiaceae: Bacillaria, v. 7, p. 9-36.

Strelnikova, N.I., Fourtanier, E., Kociolek, J.P., and Barron, J.A., 2001, Ultrastructure studies of *Coscinodiscus* and *Cestodiscus* species from the Eocene and Oligocene in Jahn, R., Kociolek, J.P, Witkowski, A., and Compère, P. (eds.), Lange-Bertalot-Festschrift: Studies on Diatoms: Koenigstein (Koeltz Scientific Books), 63-96.

Toyoda, K., Idei, M., Nagumo, T., and Tanaka, J., 2005, Fine-structure of the vegetative frustule, perizonium and initial valve of *Achananthes yaquinenesis* (Bacillariophyta): European Journal of Phycology, v. 40, n. 3, p. 269-279.

Tynni, Risto, 1975, Über Finnlands rezente und subfossile Diatomeen, v. 8: Geological Survey of Finland Bulletin 274, 55 p.

van der Werff, A., and Huls, H., 1957-1974, Diatomeënflora van Nederland (reprinted 1976): Koenigstein, Otto Koeltz Science Publishers, 10 v.

Van Heurck, Henri, 1880-1885, Synopsis de diatomées de Belgique: Van Heurck [published by the author], 2 v., 132 pls.

Van Heurck, Henri, 1896, A treatise on the Diatomaceae: London, William Wesley and Son, 558 p., 35 pls.

VanLandingham, S.L., 1968a, Catalogue of the fossil and recent genera and species of diatoms and their synonyms, Part I. *Achnanthes* through *Bacillaria*: Lehre, Cramer, p. i-xi, 1-493.

VanLandingham, S.L., 1968b, Catalogue of the fossil and recent genera and species of diatoms and their synonyms, Part II. *Bacteriastrum* through *Coscinodiscus*: Lehre, Cramer, 1096 p.

VanLandingham, S.L., 1978, Catalogue of the fossil and recent genera and species of diatoms and their synonyms, Part VII. *Rhoicosphenia* through *Zygoceros*: Lehre, Cramer, pp. 3606-4241.

Villareal, T.A., and Fryxell, G.A., 1983, The genus *Actinocyclus* (Bacillariophyceae): Frustule morphology of *A. sagittulus* sp. nov. and two related species: Journal of Phycology, v. 19, no. 4, p. 452-466.

Williams, D.M., 1988, An illustrated catalogue of the type specimens in the Greville diatom herbarium: Bulletin of the British Museum (Natural History), Botany, v. 18, no. 1, p. 1-148.

Witkowski, A. and Lange-Bertalot, H., 2004, *Ehrenbergiulva* Witkowski, Lange-Bertalot et Metzeltin nom. nov. - a new name for *Ehrenbergia* Witkowski et al.: Diatom Research, v.19, n. 1, p. 143-144.

Witkowski, A., Lange-Bertalot, H., and Metzeltin, D., 2000, Diatom flora of marine coasts, I: Iconographia Diatomologica, v. 7: Konigstein, A.R.G. Gantner, 925 p.

Register of Taxa

This index lists the species name as listed in the plate text at the time of identification. In some cases, taxonomic names have changed since identification. Therefore it is recommended that species synonymy be researched using available species databases, such as the California Academy of Sciences Catalogue of Diatom Names (*http://research.calacademy.org/izg/research/diatom/*) or AlgaeBase (*http://www.algaebase.org/*) if a specific species is of interest. In addition, through a collaboration with PLANKTON*NET (*http://planktonnet.awi.de/*), the entire collection is individually referenced and searchable.

Species	**Plate**	**Fig**
Achnanthes brevipes	3	80
Achnanthes citronella	3	77
	21	12
Achnanthes kuwaitensis	21	10
Achnanthes lacus-vulcani	1	29
Achnanthes longipes	21	9
	50	50
Achnanthes longipes (?)	16	74
Achnanthes manifera	21	8
Achnanthes marginalis	3	79
Achnanthes sp. indet.	21	11
Actinocyclus crassus	4	93
	38	26-27
Actinocyclus decussatus	20	20
	37	18-19
	39	1-2
Actinocyclus ehrenbergii	21	2
Actinocyclus ingens	35	29-30
Actinocyclus normanii (?)	39	15-17
	47	7-8
Actinocyclus octonarius var. sparsus	4	92
Actinocyclus octonarius var. tenellus	28	10
	37	5-6
	39	3-6

Species	Plate	Fig
Actinocyclus pruinosus	38	28-29
	50	45
Actinocyclus radiatus	4	96, 97
Actinocyclus ralfsii	21	1
Actinocyclus sp. indet.	4	88
Actinocyclus subtilis	44	1
Actinocyclus tenuissimus	4	94
Actinoptychus adriaticus	6	128
	21	3
Actinoptychus asiaticus	6	127,129-131
Actinoptychus senarius	17	97
	30	1
Actinoptychus speciosus	39	7-8
Actinoptychus trilingulatus	44	6
	46	6
Alveus marinus	8	155
Amphicocconeis debesi	22	24
Amphicocconeis disculoides	1	37
Amphicocconeis disculoides (?)	1	38
Amphitetras subrotundata	5	108-112
Amphora acuta	41	61-62
Amphora aff. egregia	17	109-110, 124
Amphora angusta var. ventricosa	24	73
Amphora bigibba	17	118
	21	18
Amphora bigibba var. interrupta	17	117
Amphora bistriata	2	44
Amphora cingulata	2	53-54
	17	125
Amphora cingulata (?)	2	55
Amphora coffeaeformis	17	114
Amphora complexa	34	19
Amphora crassa	2	48-50
	11	54
	44	13
Amphora decussata	24	69
Amphora egregia	12	65
Amphora gigantea var. nodosa	21	21
Amphora grevilleana	12	64

Species	Plate	Fig
Amphora grevilleana (?)	17	111
Amphora gründleri	12	63
	17	112
	19	11-14
Amphora hustedtii	21	19-20
Amphora obtusa	2	40-42
	17	122, 127
	24	72
Amphora obtusa var. oceanica	2	39
Amphora ocellata	2	47
Amphora ostrearia	15	61
Amphora praelata	2	45
Amphora proteus sensu Payne	12	62
Amphora proteus var. oculata	41	63
Amphora rhombica var. intermedia	24	70
Amphora robusta	12	67
Amphora schmidtii	12	61
Amphora sp. indet.	2	56
	17	115-116, 126
	21	17
	24	71
Amphora spectabilis	2	46
	17	123
	34	11
Ampohra sp. indet.	17	121
Arachnoidiscus sp. indet.	31	11
Aulacodiscus orientalis	38	30
	49	38
Aulacodiscus recedens	48	14
Aulacodiscus sollittianus	54	24
Auliscus clevei	9	10-11
Auliscus sculptus	36	35, 38
Auricula amphitritis	15	62-63
Azpeitia apiculata	4	91, 95
Azpeitia neocrenulata	15	31
	21	4

Species	Plate	Fig
Azpeitia nodulifer	11	33, 45, 47
	21	5-6
	38	25
	44	5, 9, 14
Biddulphia biddulphiana	5	118
Biddulphia pulchella	20	21
Biddulphia spinosa	13	74
Biddulphia tuomeyi	17	96
	36	39
Biddulphiopsis membranacea	21	7
Caloneis consimilis	8	161
	16	88
Caloneis elongata	45	22
Caloneis liber	8	162
Caloneis liber var. bicuneata	23	39
Caloneis liber var. umbilicata	8	163
	35	24
Caloneis linearis	16	84
Caloneis maxima	33	26
Caloneis probabilis	13	84
Caloneis probabilis (?)	23	38
Caloneis robusta	19	2-3
	28	6
	45	21
	47	12-13
Caloneis sp. indet.	16	80
Caloneis westii	23	37
Campylodiscus biangulatus	47	1, 6
Campylodiscus daemelianus	31	10
	32	1
Campylodiscus decorus	44	10
Campylodiscus echeneis	28	11
Campylodiscus fastuosus	21	14
Campylodiscus imperialis	14	25
Campylodiscus iyengarii	11	32
Campylodiscus ralfsii	6	133
	21	15
Campylodiscus samoensis	21	16
Campylodiscus sp. indet.	5	121
Campylodiscus stellatus	38	23

Species	Plate	Fig
Campylodiscus thuretii	6	132, 136
Campyloneis grevillei	34	9-10
	36	41
	37	8-9
Campyloneis horologium	32	3
Cerataulina bicornis	45	35
Cestodiscus denarius	11	15-17
	20	23
Climacosphenia elongata	7	152
	16	93
Cocconeiopsis sp. indet.	1	8
Cocconeis apiculata	15	54
	22	22
Cocconeis britannica	1	19, 25-26, 32
Cocconeis californica	1	35
Cocconeis californica var. (?)	1	34
Cocconeis capensis	1	30
Cocconeis dirupta	18	140-141
Cocconeis dirupta var. flexella	22	25, 30
Cocconeis distans	11	37
	18	150
Cocconeis extravagens	53	19-20
Cocconeis grata	9	12-13
	11	36
Cocconeis grunowii	18	149
Cocconeis heteroidea	18	147
Cocconeis heteroidea var. curvirotunda	22	36
Cocconeis latecostata	22	23
Cocconeis ornata	1	28
Cocconeis pellucida	38	39
Cocconeis peltoides	1	36
Cocconeis pinnata	15	45
	18	148
Cocconeis placentula	1	31, 33
Cocconeis placentula var. lineata	22	26
Cocconeis pseudomarginata	1	20-21
	18	145-146
	22	28
	51	64

Species	Plate	Fig
Cocconeis pseudomarginata (?)	15	48
Cocconeis scutellum	1	27
	15	44
	22	31-32, 35
Cocconeis sp. indet.	15	46
	22	27, 33-34
Coscinodiscus asteromphalus	30	2
Coscinodiscus cinctus	39	26-27
Coscinodiscus hauckii var. mesoleia	15	32
	17	98
Coscinodiscus jonesianus var. commutata	30	6-7
Coscinodiscus obscurus	39	24-25
Coscinodiscus oculus-iridis	29	14
Coscinodiscus perforatus var. cellulosa	29	13
Coscinodiscus radiatus	20	22
	34	2
	36	36
	43	110-111
	44	2
	46	1, 4
Coscinodiscus sp. indet.	30	4
Cyclostephanos dubius	15	35-36
Cyclotella baltica	39	13-14
	44	3-4
Cyclotella bodanica	53	18
Cymbella (Encyclonema) grossestriata var. obtusiuscula	18	131-132
Cymbella tumida	4	101
	15	56
	18	133
Cymbella turgidula	15	55
Delphineis minutissima (?)	1	23
Delphineis surirella	1	22
Dictyoneis jamaicensis	14	4
	16	86
Dictyoneis marginata	45	19
Dimergramma (?) sp. indet.	0	43
Dimerogramma marinum	15	53
	23	40-41
Diploneis aff. cynthia	41	65

Species	Plate	Fig
Diploneis bomboides	17	99
Diploneis bombus	3	65, 68-69, 75
	11	49, 51
	17	100
Diploneis caffra	23	51-52
Diploneis chersonensis	3	73-74
	19	7
	23	55
	34	18
	35	27-28
	42	96
	46	3
Diploneis chinensis	14	19
Diploneis coffaeiformis	3	78
	15	37-38
Diploneis crabro	3	66-67
	12	57-58
	23	45-46
	42	97-98
	48	27-28
Diploneis crabro var. gloriosa	32	8
Diploneis crabro var. limitanea	34	17
	42	108-109
Diploneis crabro var. pandura	12	55
	42	99, 102-105
Diploneis cynthia	14	10
	37	12
Diploneis diplosticta	14	14-15
	42	100-101, 107
Diploneis exemta	3	76
	33	31-32
Diploneis fusca	3	70
	14	13
	18	134
	33	27
	52	9
Diploneis fusca var. pelagi	11	48

Species	Plate	Fig
Diploneis gemmata	3	83
	10	25-26
	54	25
Diploneis gemmatula	12	59
	23	53-54
Diploneis graeffii	3	71, 84
	18	135
Diploneis hustedtii	41	72-73
Diploneis lacrimans	10	24
Diploneis lineata	14	22
Diploneis litoralis	23	44, 49
Diploneis mediterranea	14	16
	15	66-67
	17	106-108
	18	136
Diploneis mirabilis	2	51
Diploneis nitescens	3	82
	10	28
	13	82-83
	18	142
	37	13-14
	41	64, 78-82
	49	37
	51	69
Diploneis notabilis	26	99-100
	50	54
Diploneis novaeseelandiae	28	2
Diploneis ornata	54	23
Diploneis pandura	12	56
	54	26
Diploneis papula	2	62
	23	50
Diploneis papula var. constricta	14	12
Diploneis prisca	14	23
Diploneis serratula	10	27
Diploneis smithii	23	48
	32	11
	42	88-91, 95
Diploneis smithii (?)	19	8, 15
Diploneis smithii form (?)	44	12

Species	Plate	Fig
Diploneis sp. indet.	23	47
	14	18
	17	102, 104-105
	46	8
Diploneis splendida	23	56-57
	28	1
Diploneis subcincta	14	24
Diploneis suborbicularis	41	74-75
	42	106
Diploneis suspecta	17	101
Diploneis vacillans	14	11
	15	64-65
	17	103
Diploneis vacillans var. renitens	3	72
Diploneis vetula	3	81
Diploneis weissflogii	11	50
Ehrenbergiulva granulosa	4	99
	39	28-29
Ehrenbergiulva hauckii	4	98
Endictya oceanica	4	89
Entomoneis centrospinosa	24	59
Epithemia zebra var. porcellus	18	151
Eunotogramma frauenfeldii	24	58
	45	33
Fallacia forcipata	7	144
	15	39
Fallacia forcipata var. (?)	33	30
Fragilariopsis doliolus	26	113
Frickea lewisiana	45	18
Frustulia asymmetrica	24	60
Frustulia interposita	24	61
Glyphodesmis nankoorense	43	121
	54	28
Glyphodesmis tumida	10	20
	15	52
Glyphodesmis williamsonii fo. lanceolata	23	42
Grammatophora angulosa	7	151
Grammatophora gibberula	7	150
Grammatophora hamulifera	24	64

Species	Plate	Fig
Grammatophora marina	34	13
Grammatophora maxima	50	55
Grammatophora oceanica	24	65
	37	10
Grammatophora oceanica var. macilenta	17	128
Grammatophora oceanica var. subtilissima	37	11
Grammatophora probata	40	40-41
Grammatophora serpentina	34	12
	35	31
Grammatophora sp. indet.	17	129
Grammatophora undulata	40	45
Halamphora cymbifera	2	43
Hemidiscus cuneiformis	4	102, 107
	10	30
	13	71
Hyalosynedra laevigata	27	128
Hyalosynedra sp. indet.	8	160
Hydrosilicon mitra	37	7
Licmophora ehrenbergii	24	63
Licmophora ehrenbergii var. (?)	24	62
Luticola sp. indet.	16	81
	18	143-144
Lyrella approximata	9	1
	13	75
	14	3
Lyrella approximata (?)	52	10
Lyrella atlantica	7	143
	33	33
Lyrella barbitos	32	19
Lyrella cf. lyrelloides	46	10
Lyrella clavata	52	8
Lyrella concilians	43	120
Lyrella durandii	53	16
Lyrella genifera	52	4, 7
Lyrella hennedyi	8	167
	10	17
	13	76
	15	40-41
Lyrella hennedyoides	52	5

Species	Plate	Fig
Lyrella impercepta	2	52
	15	42-43
	41	70, 76-77
Lyrella lyra	20	19
	26	94-95, 97
	31	13
	33	20, 22
	42	84
	44	16
	49	32
	51	68
Lyrella lyroides	10	16
	44	17
	47	9
Lyrella lyroides	49	44
Lyrella perplexoides	41	71
Lyrella praetexta	8	165
	13	77
	33	24, 28
	52	3, 11
Lyrella robertsiana	14	1-2
	42	85
	47	10
	51	61
Lyrella sandriana	8	169
	52	2
Lyrella sp indet.	8	164
Lyrella sp. indet.	15	59-60
Lyrella spectabilis	10	14
	11	53
	12	60
	42	83, 86-87
	52	1
Lyrella venusta	16	72-73
Mastogloia amoena	1	1
Mastogloia amoena var. turgida	1	2
Mastogloia angulata	41	68-69
	53	14, 15
Mastogloia bahamensis	43	116-119

Species	Plate	Fig
Mastogloia binotata	1	7, 9
Mastogloia binotata (?)	22	29
Mastogloia exilis	25	76
Mastogloia fimbriata	1	4, 5, 10
	25	79-80
	32	4-7
	34	3-4, 7-8
	38	31-32
	53	17
Mastogloia gieskesii	25	78
Mastogloia horvathiana	34	5-6
	35	25-26
	36	43
	38	33
	49	41-42
Mastogloia jelineckiana	15	49-50
Mastogloia jelineckii var. marina	16	85
Mastogloia ovulum	1	11
Mastogloia paradoxa	25	74-75
Mastogloia pseudolatecostata	1	6
Mastogloia quinquecostata	38	34-35
Mastogloia quinquecostata (?)	45	25-26
Mastogloia rhombus	11	34
Mastogloia splendida	1	3
	33	23
	37	4
	49	43
Navicula (Lyrella) clavata var. impressa	8	170
Navicula (Lyrella) clavata var. indica	47	5
Navicula (Lyrella) clavata var. indica.	41	66-67
Navicula (Lyrella) durandii var. rhomboidea	30	5
Navicula (Lyrella) hennedyi fo. granulata	10	15
Navicula (Lyrella) hennedyi var. californica	16	79
Navicula (Lyrella) hennedyi var. granulata	26	98, 101-102
	29	15
	42	92-94
	43	115
Navicula (Lyrella) lyra var. dilatata	51	67
Navicula (Lyrella) lyra var. elliptica fo. bullata	20	16-18
	32	12

Species	Plate	Fig
Navicula (Lyrella) spectabilis fo. angelorum	49	36
Navicula (Lyrella) spectabilis var. controversa	30	3
Navicula (Lyrella) spectabilis var. punctata	11	52
Navicula (Parlibellus?) gründleri	11	39
	13	80
Navicula applicita	2	63-64
Navicula brasiliensis	28	9
	29	17
	31	8
	32	9-10
	47	11
Navicula carinifera	16	78
Navicula cryptocephaloides	26	104
Navicula digitoradiata	2	59
	15	57
Navicula digitoradiata (?)	18	137
Navicula directa var. remota	16	91-92
Navicula longa	3	86-87
Navicula nicobarica	16	77
	18	139
	24	66-67
Navicula palpebralis	2	60-61
	16	76
Navicula palpebralis var. angulosa	16	75
Navicula pennata var. maxima	33	35
Navicula peregrina	54	27
Navicula perplexa	8	168
Navicula protracta fo. elliptica (?)	18	138
Navicula pseudocomoides	24	68
Navicula rudis	26	103
Navicula schaarschmidtii	10	18
Navicula sp. indet.	26	106-107
Navicula superimposita	3	85
Navicula zanzibarica var. zebuana	32	18
Nitzschia angularis	25	93
Nitzschia brittoni	25	82
Nitzschia corpulenta	15	51
	25	81
Nitzschia costata	25	91
Nitzschia fluminensis	16	89-90

Species	Plate	Fig
Nitzschia graeffii	45	23
	48	30
Nitzschia gruendleri	9	8
Nitzschia insignis var. adriatica	25	90
Nitzschia insignis var. marginifera	25	85
Nitzschia jelineckii	17	130
	40	47
Nitzschia longa	25	84
Nitzschia longissima fo. costata	25	86-87
Nitzschia macilenta	8	154
Nitzschia nicobarica	9	7
	49	39
Nitzschia pacifica	4	106
Nitzschia panduriformis var. lata	7	145
	25	77, 88
Nitzschia panduriformis var. peralbata	25	89
Nitzschia panduriformis var. pustulata	25	83
Nitzschia praelonga	10	31
Nitzschia pulcherrima	53	21
Nitzschia punctata var. coarcata	13	73
Nitzschia sp. indet.	34	15
	45	29
Nitzschia spectabilis (?)	34	14
Nitzschia vidovichii	25	92
Odontella aurita	21	13
Oestrupia delecta	14	17
Oestrupia powellii var. egyptiaca	16	87
Oestrupia powellii var. egyptica	14	5
Oestrupia powellii var. galapagensis	26	115
Oestrupia powellii var. vidovichii	33	25
Oestrupia zanardiniana	35	23
Opephora schwartzii	16	83
Opephora sp. indet.	26	111
Paralia sulcata	27	124
Parlibellus delognei	2	57-58
Parlibellus takoradiensis	10	29
Petroneis monilifera	33	29
	52	6
Pinnularia bistriata	15	58
Pinnulariosigma raeana	31	12

Species	Plate	Fig
Plagiodiscus martensianus	43	112
	44	15
	50	49
Plagiodiscus nervatus	26	108
Plagiogramma costatum	40	44
Plagiogramma decussatum	40	43
Plagiogramma pulchellum	43	122-123
Plagiogramma pulchellum var. pygmaea	16	82
Plagiogramma sp. indet.	40	42
Plagiogramma spinosom	12	66
Plagiogramma staurophorum	26	112
Plagiogramma tessellatum	13	81
Plagiogramma validum	10	21
	13	78
Plagiogramma validum var. tumidulum	10	22
Plagiogramma wallichianum	10	23
Planktoniella blanda	28	12
Pleurosigma diverse-striatum	8	166
Podocystis adriatica	6	134
	26	114
Podocystis spathulata	50	47
Podosira (Pseudopodosira?) argus	50	56-57
Podosira ambigua	50	52
Podosira argus	38	36-37
Podosira maxima	38	24
Porpeia quadriceps	41	59-60
Proschkinia complanatula	26	105
Psammodictyon panduriforme	40	46, 48-49
	45	24
	48	26, 31
Psammodiscus nitidus	4	104, 105
	15	26-29
	46	5
	54	29
Pseudoamphoprora sp. indet.	27	127
Rhabdonema adriaticum	7	146-149
	26	109
	32	15
	36	42
	51	66

Species	Plate	Fig
Rhabdonema arcuatum	37	17
Rhabdonema punctatum	28	5
	32	16-17
	37	15-16
	51	65
Rhaphoneis amphiceros	1	12-16
Rhaphoneis amphiceros (?)	15	47
Rhaphoneis amphiceros form (?)	1	24
Rhaphoneis nitida	1	17-18
Rhaphoneis sp. indet.	15	30
Rhopalodia contorta	17	113
Rhopalodia gibberula var. baltica	38	38
Rhopalodia musculus	26	118
Rhopalodia vermicularis	15	68
Roperia tesselata	4	90
	15	33
Schuettia annulata	29	16
Seminavis sp. indet.	17	119-20
Stephanopyxis campechiana	11	46
Stephanopyxis turris	44	7-8
Stictodesmis australis	27	132
	45	31-32
Stictodiscus californicus var. nankoorensis	15	34
Stictodiscus harrisonianus	11	35
Stictodiscus insignis	54	31
Stictodiscus manilensis	39	9-12
Stictodiscus nankoorensis	11	44
Stictodiscus parallelus	9	5, 9
	11	40-41
	49	40
Stictodiscus parallelus fo. hexagona	5	113-115
Surirella eximia	50	58
	51	70

Species	Plate	Fig
Surirella fastuosa	6	122-126, 135
	13	69-70
	14	8-9, 20-21
	16	69-71
	20	24
	27	120-123, 125
	28	3-4
	31	9, 15
	35	21-22
	36	37
	38	20-22
	40	32-39
	44	11
	47	4
	49	33
Surirella fastuosa var. cuneata	13	68
	47	2-3
Surirella fastuosa var. opulenta	32	2
Surirella macraeana	40	30-31
Synedra baculus	8	157
Synedra formosa	8	158
	27	129, 130-131
	45	30
Synedra fulgens	8	156
Synedra superba	8	159
	32	13-14
Tabularia gaillonii	8	153
Thalassiosira decipiens	27	126
Thalassiosira eccentrica	4	100
Thalassiosira endoseriata	48	29
Thalassiosira nanolineata	20	25
Thalassiosira sp. indet.	11	18-23
	20	26
	43	113-114
	46	2
	51	59-60
Thalassiosira symmetrica	4	103
Toxarium hennedyanum	16	95
Toxarium undulatum	16	94
Trachyneis antillarum	28	7

Species	Plate	Fig
Trachyneis antillarum var. kurzii	46	11-12
	54	30
Trachyneis aspera	19	5-6
	26	110
	33	34
	35	34
	40	50-51
	45	20
	48	25
	50	48
Trachyneis aspera (?)	6	137-138
Trachyneis debyi	28	8
	31	14
Trachyneis schmidtiana	10	19
Trachyneis sp. indet.	40	52
Trachyneis velata	35	32-33
Triceratium arcticum	7	139-140
Triceratium arcticum fo. quadrata	5	120
Triceratium balearicum fo. biquadrata	50	51
Triceratium broeckii	36	40
Triceratium campechianum	9	2-4
Triceratium dictyotum	51	63
Triceratium dubium	26	117
Triceratium favus	31	16
	41	55-58
	46	13
Triceratium favus fo. quadrata	48	17-18
	49	34
Triceratium finnmarchicum	5	119
Triceratium junctum	7	141-142
Triceratium pentacrinus	9	6
	34	16
	48	24
Triceratium pentacrinus fo. quadrata	5	116-117
	34	20
Triceratium reticulum	14	6-7
	48	16
Triceratium robertsianum	34	1
	51	62

Species	Plate	Fig
Triceratium scitulum	19	9-10
	31	17
	45	28
	46	7, 9
	48	15
Triceratium scitulum fo. quadrata	45	34
Triceratium septangulatum	53	12-13
Triceratium shadboltianum (?)	29	18
Triceratium sparsipunctatum	48	19
Triceratium trinitus (?)	13	79
Triceratium weissei	50	53
Trigonium alternans	26	116
Trigonium arcticum var. (?)	37	3
Trigonium arcticum var. californicum	48	23
Trigonium arcticum var. kerguelense	37	2
Trigonium arcticum var. sexangulatum	50	46
Trigonium formosum	48	22
Trigonium formosum var. pentagonalis	48	20-21
Trigonium graeffeanum	27	119
	37	1
Trigonium subofficiosum	41	53-54
Trigonium zonulatum	49	35
Tropidoneis vitrea	19	1
Tryblionella brightwellii	53	22
Tryblionella cocconeiformis	45	27
Tryblionella graeffii	19	4
Tryblionella jelineckii	13	72