Abstract

This contribution is the result of the studies on the collections obtained by Dr. M. OHNO during the 16th Japanese Antarctic Research Expedition in 1975–76. The author determined 134 taxa of fresh and marine forms of algae, comprising 51 taxa of blue-green algae, 71 taxa of diatoms and 12 taxa of green algae. The characteristic feature of the algal flora of the Skarvsnes area, especially that in Lake Hunazoko, is the rich marine species of diatoms, while freshwater species of blue-green algae are abundant in the streams. Judging from this, the nature of the algal species from the lakes in the Skarvsnes area is characteristic of high content of salt, and those from the stream water is entirely of a freshwater nature.

Many species of marine diatoms are found in the inland lakes; especially notable in Melosira (3 taxa), Coscinodiscus (8 taxa), Actinocyclus (2 taxa), Hyalodiscus (1 taxon) and Charotia (2 taxa) of centricous diatoms, and Cocconeis (1 taxon), Trachyneis (1 taxon) and Fragilariopsis (3 taxa) of pennaceous diatoms, while the species of blue-green algae belonging to the Oscillatoriaceae were found in the streams.

1. Introduction

The present contribution is based on the collections made in the Skarvsnes area by Dr. Masao OHNO of Kochi University, a member of the 16th Japanese Antarctic Research Expedition (JARE-16) in 1975–76. Till now the Japanese Antarctic Research Expeditions have been surveying in the Syowa Station and neighboring areas and in other faraway areas of foreign stations. FUKUSHIMA reported the algae, chiefly diatoms and blue-green algae, obtained in the Kasumi and Sinnan Rocks ice-free area (1962a,b), Cape Royde, Cape Evans, and Cape Barne of Ross Island (1964), Byvågåsane and Ongulkalven (1963), West Ongul Island (1974), Molodezhnaya and Mirny Stations (1966), and South Georgia (1974). AKIYAMA chiefly studied on his collections of the terrestrial and cryoalgae from the ice-free area of the Lützow-Holm Bay (1967, 1974). NEGORO reported the diatoms of East Ongul Island and Langhovde (1968). HIRANO studied on the collections obtained by the 1st Japanese Antarctic Research Expedition from the ponds of East Ongul Island and its neighborhood (1959, 1965) and the collections from the Yukidori Valley (1979).

2. Materials

The Skarvsnes ice-free area is about 60 km south of Syowa Station, and it extends between lat. 69°25′S and lat. 69°31′S, and between long. 69°32′E and long. 69°48′E. The largest lake surveyed in the Skarvsnes area is Lake Suribati, which is 750 m east-west, 850 m north-south, and is situated about 600 m east of Mt. Suribati (258 m above sea level). Many lakes and ponds are scattered on the westside of Mt. Suribati, which we have surveyed, but the lakes and ponds in the east half of the ice-free area of Skarvsnes are not yet surveyed. Lake Hunazoko (23 m below sea level) is situated near lat. 26°S and long. 34°E, and is half the size of Lake Suribati. The camp is located on the seaside facing Torinosu Cove, near lat. 69°29′S and long. 39°33′40″E (Fig. 1).

The list of sampling localities and notes on the circumstances are shown in Tables 1 and 2. The list of species and their occurrence in the studied area are given in Table 3.

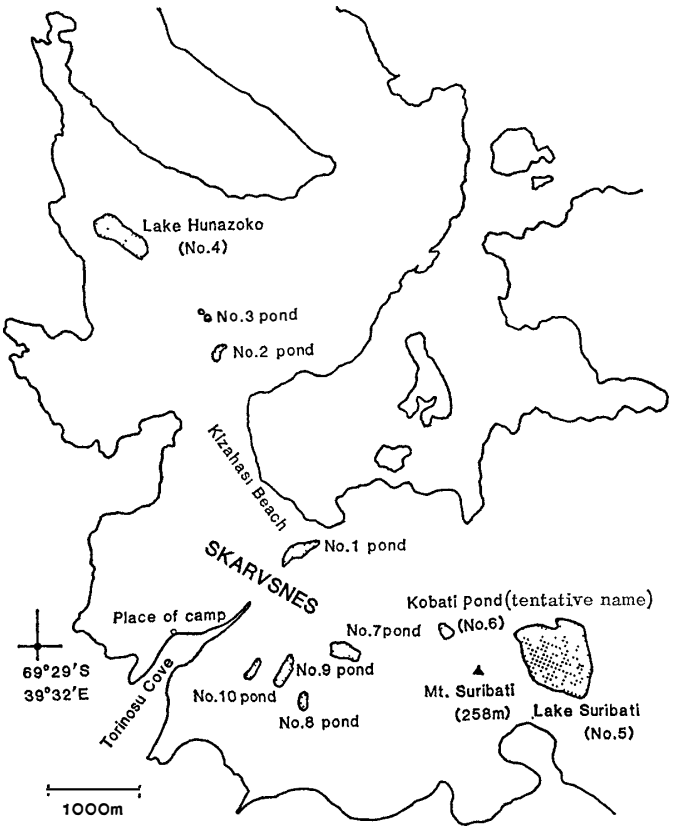

Fig. 1. Sampling lakes and ponds in the Skarvsnes area.

Table 1. The data of the samples obtained from lakes and streams in the Skarvsnes area, Antarctica.

Vial No.	Date of collection	Locality	Note observed by the collector
42	Jan. 27, 1975	No. 1 pond	Surface of stones
43	——	——	Sand
44	——	——	——
45	——	——	Blue-green algae
46	——	——	Mud
47	Jan. 28, 1975	No. 2 pond	Bottom sand
48	——	——	Upper surface of stone
49	——	——	Bottom sand
50	——	No. 3 pond	Upper surface of stone
51	——	Pond near No. 3 pond	Blue-green algae
52	——	No. 3 pond	Blue-green algae
53	——	Lake Hunazoko (No. 4)	
54	——	——	
55	——	——	Littoral sand
56	——	——	
57	——	——	Pond water
58	——	——	Condensed pond water
59	Jan. 29, 1975	Lake Suribati (No. 5)	Surface of stone
60	——	——	Sand
61	——	——	Upper surface of sand
62	——	Kobati Pond (No. 6)	Upper surface of sand
63	——	Lake Suribati (No. 5)	Sand
64	——	No. 7 pond	Blue-green algae
65	——	——	Blue-green algae
66	——	——	Surface of stone
67	——	——	Sand
68	Jan. 29, 1975	No. 8 pond	Sand
69	——	——	Sand
70	——	——	Surface of stone
71	——	No. 9 pond	Surface of stone
72	——	——	Sand
73	——	——	Blue-green algae
74	——	No. 10 pond	Sand
75	Jan. 31, 1975	Stream near camp	Sand
76	Jan. 27, 1975	——	Green algae
77	Jan. 31, 1975	——	Green algae
78	——	——	Blue-green algae
79	——	——	On the stone (Blue-green algae)
80	——	——	On the stone (Blue-green algae)
81	——	——	Green algae
82	——	——	Blue-green algae
83	——	——	Blue-green algae
84	——	——	On the stone
85	——	——	Green algae
86	——	——	Green algae
87	Jan. 31, 1975	Penguin rookery	Sand
88	——	——	Sea water from neighborhood
89	——	Stream near camp	Sea water
90	——	——	Algae at sea shore
91	——	——	*Prasiola* sp.
92	——	——	
93	——	——	
94	——	Upper place of Lake Suribati	Blue-green algae

Table 2. Data concerned the physico-chemical observations from lakes and ponds in the Skarvsnes area, Antarctica (from the observations by M. OHNO).

Name of pond	Date of collection	Air temp. (°C)	Water temp. (°C)	Electric conductivity (μ℧/cm)	Cl. (g/*l*)	pH
No. 1 pond	Jan. 27, 1975		10.9	720	1.2	7.6
No. 2 pond	Jan. 28, 1975		10.0	2,200	3.8	8.1
No. 3 pond	Jan. 28, 1975	0.6	9.8	8,400	14.5	8.5
Lake Hunazoko	Jan. 28, 1975		13.8	83,000	143.2	7.9
Lake Suribati	Jan. 29, 1975	0.9	7.8	63,000	108.7	8.2
Kobati Pond	Jan. 29, 1975	0.8	8.3	11,700	20.2	
No. 7 pond	Jan. 29, 1975	−0.4	10.3	2,100	3.6	8.4
No. 8 pond	Jan. 29, 1975	0.0	9.2	1,600	2.8	8.4
No. 9 pond	Jan. 29, 1975	0.7	7.3	3,400	5.8	8.4
No. 10 pond	Jan. 29, 1975	1.8				

Table 3. A list of the freshwater algae from Skarvsnes, Antarctica.

Species \ Locality	No. 1 pond (42–46)	No. 2 pond (47–49)	No. 3 pond (50, 52)	Pond near No. 3 pond (51)	Lake Hunazoko (53–58)	Lake Suribati (59–61)	Kobati Pond (62, 63)	No. 7 pond (64–67)	No. 8 pond (68–70)	No. 9 pond (71–73)	No. 10 pond (74)	Stream near camp (75–86)	Penguin rookery (87, 88)	Pond near camp (90–93)	Upper place of Lake Suribati (94)
Microcystis pulverea										+					
Chroococcus minutus	+	+										+			
Ch. pallidus	+											+			
Ch. turgidus	+											+			
Synechococcus aeruginosus	+	+								+		+	+		
S. maior											+	+			
Gloeocapsa dermochroa								+				+			
G. kuetzingiana												+			
G. ralfsiana												+			
Chamaesiphon incrustans												+			
Calothrix parietina												+			
C. pulvinata												+			
Nostoc borneti									+						
N. longstaffi	+											+			
N. minutum	+														
Nodularia quadrata	+		+	+			+								
Oscillatoria agardhii												+			
O. anguina									+						
O. angusta			+												
O. angustissima	+														
O. brevis									+						
O. curviceps	+														
O. irrigua								+		+					
O. koettlizi												+			
O. nigra												+			
O. simplicissima												+			
O. splendida												+			
O. tenuis var. *tenuis*	+		+					+		+					
O. tenuis var. *nigra*		+													
Phormidium ambiguum var. *ambiguum*												+			

Table 3. (*Continued*).

Species \ Locality	No. 1 pond (42–46)	No. 2 pond (47–49)	No. 3 pond (50, 52)	Pond near No. 3 pond (51)	Lake Hunazoko (53–58)	Lake Suribati (59–61)	Kobati Pond (62, 63)	No. 7 pond (64–67)	No. 8 pond (68–70)	No. 9 pond (71–73)	No. 10 pond (74)	Stream near camp (75–86)	Penguin rookery (87, 88)	Pond near camp (90–93)	Upper place of Lake Suribati (94)
Phormidium ambiguum var. *maior*												+			
Ph. angustissima	+						+	+		+	+	+			
Ph. antarcticum	+	+		+											
Ph. autumnale												+			
Ph. bohneri											+	+			
Ph. crouani										+		+			
Ph. foveolarum	+														
Ph. incrustatum												+			
Ph. laminosum									+		+				
Ph. priestleyi												+			
Ph. retzii												+			
Ph. subfuscum												+			
Ph. tenue												+			
Ph. uncinatum												+			
Lyngbya borneti												+			
L. erebi						+									
L. kuetzingiana							+								
L. martensiana												+			
L. scotti							+		+						
Schizothrix antarctica												+			
S. muelleri															+
Microcoleus vaginatus												+			
Melosira arctica	+														
M. sol					+										
M. sulcata					+										
Hyalodiscus scoticus					+										
Cyclotella bodanika var. *lemanensis*	+														
C. meneghiniana	+	+	+		+										
Coscinodiscus decipiens	+														
C. excentricus					+										
C. gyratus					+										
C. lentiginosus					+										
C. normanicus					+	+									
C. plicatulus					+										
C. pseudodenticulatus					+										
C. robustus var. *latemarginatus*					+										
C. tabularis					+										
Charcotia australis					+										
C. irregularis					+										
Actinocyclus curvatulus					+										
A. divisus					+										
Eucampia balaustium					+										
Tabellaria flocculosa								+		+					
Fragilaria construens	+														
F. pinnata					+										
F. virescens var. *elliptica*					+										
Synedra inaequalis								+							
S. minuscula					+										
S. pulchella												+			
Licmophora antarctica					+										

Table 3. (*Continued*).

Species \ Locality	No. 1 pond (42–46)	No. 2 pond (47–49)	No. 3 pond (50, 52)	Pond near No. 3 pond (51)	Lake Hunazoko (53–58)	Lake Suribati (59–61)	Kobati Pond (62, 63)	No. 7 pond (64–67)	No. 8 pond (68–70)	No. 9 pond (71–73)	No. 10 pond (74)	Stream near camp (75–86)	Penguin rookery (87, 88)	Pond near camp (90–93)	Upper place of Lake Suribati (94)
Eunotia arcus var. *bidens*	+														
Cocconeis imperatrix	+				+	+									
Achnanthes brevipes var. *brevipes*					+										
A. brevipes var. *intermedia*						+									
A. gainii	+														
A. hankiana					+										
Frustulia rhomboides f. *undulata*	+														
Diploneis africana					+										
D. latefurcata					+										
D. subcincta					+										
Stauroneis anceps	+	+							+			+			
S. perminuta		+										+			
S. phoenicenteron												+			
Navicula abbreviata												+			
N. arcuata	+	+													
N. complanatoides					+										
N. criophila	+														
N. cryptocephala var. *intermedia*	+	+	+	+	+	+	+								
N. directa var. *directa*					+										
N. directa var. *incus*	+				+										
N. gregaria	+				+			+							
N. molesta	+	+													
N. murrayi	+	+													
N. muticopsis	+	+			+				+	+					
N. ordinaria									+						
Pinnularia borealis												+			
P. brevicostata	+														
P. cymatopleura			+	+	+			+		+		+			
P. quadratarea var. *bicuneata*	+				+										
P. quadratarea var. *soederlundii*	+				+										
Trachyneis aspera					+										
Tropidoneis laevissima		+	+	+	+	+	+								
Amphora angusta var. *ventricosa*					+										
A. ovalis var. *ovalis*					+										
A. ovalis var. *pediculus*					+										
A. veneta	+	+			+			+		+		+			
Cymbella tumida		+													
C. turgidula					+										
Fragilariopsis antarctica					+										
F. curta	+				+	+									
F. obliquecostata					+										
Hantzschia amphioxys	+	+										+			
H. linearis	+	+													
Nitzschia dubia var. *australis*	+	+										+			
Pleurococcus antarcticus	+														
Microspora stagnorum							+		+			+			
Ulothrix subtilissima			+												
U. variabilis			+												
Hormidiopsis crenulata												+			
Prasiola crispa ssp. *antarctica*													+		

Table 3. (*continued*).

Species \ Locality	No. 1 pond (42–46)	No. 2 pond (47–49)	No. 3 pond (50, 52)	Pond near No. 3 pond (51)	Lake Hunazako (55–58)	Lake Suribati (59–61)	Kobati Pond (62, 63)	No. 7 pond (64–67)	No. 8 pond (68–70)	No. 9 pond (71–73)	No. 10 pond (74)	Stream near camp (75–86)	Penguin rookery (87, 88)	Pond near camp (90–93)	Upper place of Lake Suribati (94)
Cosmarium clepsydra var. *dissimile*	+														
C. cucurbita var. *rotundatum*											+			+	
C. subcrenatum	+														

3. Enumeration of the Species Examined

Class 1. Cyanophyceae

Order 1. Chroococcales

Fam. 1. Chroococcaceae

Microcystis pulverea (WOOD) FORTI in GEITLER, Dr. L. Rabenhorst's Kryptogamen-Flora, **14**, 143, 1932; HIRANO, Mem. Natl Inst. Polar Res., Spec. Issue, **11**, 7, 1979.

Colonies globose, outer line of gelatinous sheath distinct and not stratified; cells densely aggregate, 2 μm in diameter. Hab. No. 9 pond. Already known from Yukidori Valley. Pl. 2, f. 15.

Chroococcus minutus (KÜTZ.) NÄG. in GEITLER, *l.c.*, **14**, 232, f. 112a, 113c, 1932; HIRANO, *l.c.*, **11**, 7, 1979.

Colonies small; cells 12 μm in diameter. Hab. No. 2 pond and stream. Already known in Kasumi Rock; ice-free rock.

Ch. pallidus NÄG. in GEITLER, *l.c.*, **14**, 238, f. 116b, 1932; HIRANO, *l.c.*, **11**, 9, 1979.

Cells small, 5–8 μm in diameter, gelatinous sheath smooth. Hab. Small stream near camp. Already known in Lake Yukidori.

Ch. turgidus (KÜTZ.) NÄG. in GEITLER, *l.c.*, **14**, 228, f. 109b, 1932.

Cells about 13–14 μm in diameter, with a gelatinous sheath which is thin, not stratified in general. Cosmopolitan.

Synechococcus aeruginosus NÄG. in GEITLER, *l.c.*, **14**, 274, f. 133d, e, 1932.

Cells elliptic or narrowly elliptic, 20–30 μm long and 15–20 μm wide without sheath. Hab. Penguin rookery, stream near camp. Pl. 2, f. 18.

S. maior SCHRÖTER in GEITLER, *l.c.*, **14**, 274, 1932; BROADY, Br. Antarct. Surv. Sci. Rep., **98**, 21, f. 2m, 1979; HIRANO, *l.c.*, **11**, 10, pl. 2, f. 6, 1979.

Cells 26–30 μm long and 17–22 μm wide. Hab. No. 10 pond and stream near camp. Already known from Lake Yukidori.

Key to genus *Gloeocapsa*

1. Gelatinous envelope yellowish or brown, and not stratified.
   2. Cells small, 3 μm in diameter without envelope or below 3 μm ..... *G. dermochroa*
   2. Cells 3–5 μm in diameter..... *G. kuetzingiana*
1. Gelatinous envelope reddish, stratified, 4–7 μm in diameter..... *G. ralfsiana*

Gloeocapsa dermochroa NÄG. in GEITLER, *l.c.*, **14**, 194, f. 90, 1932; HIRANO, *l.c.*,

11, 10, pl. 5, f. 10–12, 1979.

Cells covered by yellowish-brown and not stratified gelatinous envelope; cells 3 μm in diameter. Hab. No. 7 pond, stream near camp. Already known from Yukidori Valley. Pl. 2, f. 19; pl. 3, f. 17; pl. 5, f. 6, 7.

G. kuetzingiana NÄG. in GEITLER, *l.c.*, **14**, 194, f. 91a, 1932; HIRANO, *l.c.*, **11**, 10, pl. 4, f. 21, 22, 1979.

Cells 3.5–4.5 μm in diameter, with yellow or yellowish-brown and not stratified gelatinous envelope, attached on the stone of the streams. Hab. On the stone of the stream. Already known from Yukidori Valley. Pl. 2, f. 16, 17.

G. ralfsiana (HARVEY) KÜTZ. in GEITLER, *l.c.*, **14**, 204, f. 96, 97, 1932; HIRANO, *l.c.*, **11**, 9, pl. 5, f. 1–9, 1979.

Cells 4–7 μm in diameter, with reddish and stratified gelatinous envelope. Hab. On the stone of the stream. Already known from Lake Yukidori and Yukidori Valley.

Order 2. Chamaesiphonales

Fam. 2. Chamaesiphonaceae

Chamaesiphon incrustans GRUN. in GEITLER, *l.c.*, **14**, 433, f. 253, 1932.

Cells 4 μm in diameter, the gonidia not produced, attached on the surface of the other algae. It seems to be the juvenile. Hab. Stream near camp. Vial No. 77. New record in Antarctica.

Order 3. Hormogonales

Fam. 3. Rivulariaceae

Calothrix parietina (NÄG.) THUR. in GEITLER, *l.c.*, **14**, 604, f. 380, 1932.

Trichome 6 μm in diameter in basal part, gradually attenuated from basal part of the trichome toward the apex; trichome cells short in the basal part but gradually become elongate, about 2–3 times longer than the basal cell; heterocyst semiglobose, 6.5 μm in diameter, gelatinous sheath yellow to yellowish brown in color and stratified but has a hair-like appearance in terminal part. Hab. On the stone surface of the stream.

The present species resembles *C. antarctica* FRITSCH but seems to be somewhat different from his species by the narrower and not constricted trichome and by the smaller size of heterocyst. Pl. 3, f. 4; pl. 5, f. 2.

C. pulvinata KÜTZ. in GEITLER, *l. c.*, **14**, 600, f. 374 c-e, 1932.

Trichome 12 μm wide without sheath, distinctly constricted at the contact wall, slightly attenuated from basal part of the trichome toward the apex; trichome cell short, about half or one-third of the diameter of trichome; heterocyst basal, somewhat conical, 8 μm in diameter, gelatinous sheath yellow to yellow-brown in color in the inner part but colorless in the outer one. Hab. Stream near camp. New to Antarctica. Pl. 5, f. 2.

Fam. 4. Nostocaceae

Key to genus *Nostoc*

1. Gelatinous sheath distinct and constricted according to the constriction of trichome ..... *N. longstaffi*

1. Gelatinous sheath indistinct.
   2. The breadth of cell 2.5–3 μm .....*N. minutum*
   2. The breadth of cell 3–4 μm.....*N. borneti*

Nostoc borneti GAIN in Deuxième Exped. Antarct. Fr. (1908–1910) Sci. Nat. Doc. Sci., 166, f. 77, 78, 1912; GEITLER, *l.c.*, **14**, 850, 1932.

Trichomes 3–4 μm wide, well flexuose; heterocyst globose 5 μm in diameter. Hab. Nos. 8 and 9 ponds. Already known from Antarctica. Pl. 4, f. 3–5.

N. longstaffi FRITSCH in Natl. Antarct. Exped. 1901–1904, Nat. Hist., **6**, 40, pl. 3, f. 132–137, 1912a; GEITLER, Süssw.-Flora, **12**, 304, f. 353, 1925.

Trichomes well flexuose; mucous sheath well flexuose according to the flexuosity of trichome; cells 3–4 μm wide; heterocyst 5–6 μm wide. Hab. Attached on the stone surface of stream near camp. Pl. 4, f. 1–2.

N. minutum DESMAZ. in GEITLER, *l.c.*, **14**, 850, f. 540, 1932.

Trichomes flexuose, 2.5–3 μm in diameter; heterocyst 4–5 μm wide; sheath not visible. Hab. No. 1 pond. Pl. 1, f. 11.

Nodularia quadrata FRITSCH, *l.c.*, **6**, 45, pl. 2, f. 109–115, 1912a; GEITLER, *l.c.*, **14**, 865, f. 553, 1932.

Trichomes straight or slightly curved, 4–5 μm wide: cells short, distinctly constricted at the contact wall; heterocyst quadrate, breadth almost equal to the cells of trichome. Hab. Nos. 1 and 3 ponds, other pond near the latter. This species is widely distributed in ice-free area of Skarvsnes. Pl. 1, f. 1–4.

Fam. 5. Oscillatoriaceae

Key to genus *Oscillatoria*

1. Cells short, length of cells shorter than the breadth.
   2. Trichomes attenuated near the apex.
      3. Cells short, up to 1/3–1/6 as long as wide.....*O. anguina*
      3. Cells about equal to wide or slightly less than wide....*O. agardhii*
   2. Trichomes not attenuated at the apex.
      3. Trichomes narrow, up to 0.5–1.2 times as long as wide.
         4. Trichomes 0.6 μm wide..... *O. angustissima*
         4. Trichomes 0.8–1.2 μm wide.....*O. angusta*
      3. Trichomes wide.
         4. Trichomes 6–11 μm wide.
            5. Cells about 0.5 times as long as wide.....*O. nigra*
            5. Cells 0.5–2/3 times as long as wide.....*O. irrigua*
         4. Trichomes 10–17 μm wide.....*O. curviceps*
1. Cell length equal to the breadth or slightly longer than the breadth.
   2. Trichomes over 4 μm wide.
      3. Apex of trichomes capitate.....*O. koettlizi*
      3. Apex of trichomes not capitate.
         4. Cells with a series of granules along the cross walls.
            5. Trichomes slightly constricted at the cross walls
               .....*O. tenuis* var. *tenuis*
            5. Trichomes not constricted at the cross walls.
               6. Trichomes not attenuated at the apex

.....*O. tenuis* var. *nigra*

6. Trichomes attenuated at the apex.....*O. brevis*

4. Cells without a series of granules along the cross walls
..... *O. simplicissima*

2. Trichomes up to 2–3 μm wide; cells 2–3 times longer than wide
..... *O. splendida*

It is questionable that too many species are assigned to the *Oscillatoria* species and this question may be applied to the case of separating the *Phormidium* species.

Oscillatoria agardhii GOM. in GEITLER, *l.c.*, **14**, 974, f. 618k, 621, 1932.

Trichomes gradually attenuated toward the apex, 4–6 μm wide, not constricted at the cross walls; cells half the length of the breadth. The apex of the trichomes seems to have a capitate appearance. Hab. On the stone surface of the stream near camp. Already known from Ongul Islands.

O. anguina (BORY) GOM. in GEITLER, *l.c.*, **14**, 948, f. 599b, 1932.

Trichomes straight, 6–8 μm wide, but attenuated and curved near the apex, not constricted at the cross walls, with a series of granules along the both sides of the cross walls. Hab. No. 8 pond. New to Antarctica.

O. angusta KOPPE in GEITLER, *l.c.*, **14**, 965, 1932.

Trichomes narrow, about 1 μm wide, not constricted at the cross walls; cells elongate, 5–7 μm long. Hab. No. 3 pond. New to Antarctica.

O. angustissima W. & G. S. WEST in GEITLER, *l.c.*, **14**, 965, 1932.

Trichomes 0.5 μm wide, not attenuated toward the apex, not constricted at the cross walls; cells long, about 1–1.5 times longer than wide. Hab. No. 1 pond. New to Antarctica.

O. brevis KÜTZ. in GEITLER, *l.c.*, **14**, 977, f. 619a, 1932.

Trichomes straight, 4–6.5 μm wide, gradually attenuated toward the apex, not constricted at the cross walls, length of cell equal to the width, with a series of granules on both sides of the cross walls. Hab. No. 8 pond. Already known from Antarctica.

O. curviceps AG. in GEITLER, *l.c*,. **14**, 947, 1932.

Trichomes straight, slightly attenuated and curved in one side near the apex, 10–17 μm wide; cells short, the length about 1/3–1/6 of the width, not constricted at the cross walls and with a series of granules along the both sides of the cross walls. Hab. No. 1 pond. New to Antarctica.

O. irrigua KÜTZ. in GEITLER, *l.c.*, **14**, 961, f. 611a, b, 1932.

Trichomes straight, 6–11 μm wide, not constricted at the cross walls, with a series of granules along the both sides of the cross walls; length of cell corresponds to half or 2/3 of the width. Hab. Nos. 7 and 9 ponds. Already known from South Victoria Land. Pl. 1, f. 5–10.

O. koettlizi FRITSCH, *l.c.*, **6**, 34, pl. 1, f. 55–59, 1912a; GEITLER, *l.c.*, **12**, 363, f. 440, 1925.

Trichomes straight, 8 μm wide, not constricted at the cross walls, slightly attenuated near the capitated apex; cells short, the length corresponds to the about 1/3 of the width, contain pseudogranules, without the series of granules along the cross walls. Hab. Stream near camp. Already recorded from Antarctica by W. & G. S. WEST.

O. nigra VAUCH. in GEITLER, *l.c.*, **14**, 960, 1932.

Trichomes straight, 8.5 μm wide, not attenuated toward the apex, with a series of granules on both sides of the cross walls; the length of cell corresponds to half of the width. Hab. Stream near camp. New to Antarctica.

O. simplicissima GOM. in GEITLER, *l.c.*, **14**, 961, 1932.

Trichomes straight, but slightly curved in one side near the apex, not attenuated toward the apex and not constricted at the cross walls, 8–10 μm wide, without the series of granules along both sides of the cross walls; cells short, length of cell corresponds to 1/4–1/2 times longer than the width. Hab. Stream near camp. Already known from Lake Miers, South Victoria Land. Pl. 1, f. 16–18.

O. splendida GREV. in GEITLER, *l.c.*, **14**, 972, f. 611m–o, 620d–f, 1932.

Trichomes straight or slightly curved, not constricted at the cross walls, 2–3 μm wide, gradually attenuated toward the apex; length of cell 3–9 μm and 2–3 times longer than the width, apical cell spherical, with the series of granules along the cross walls. Hab. Stream near camp. New to Antarctica.

O. tenuis AG. var *tenuis* in GEITLER, *l.c.*, **14**, 959, f. 611f–g, 1932.

Trichomes straight, 6 μm wide, constricted at the cross walls, with the series of granules along the cross walls of both cells; cell length 1/3 times longer than the width. Hab. Nos. 1, 3, 7 and 9 ponds. Already known from Antarctica (East Ongul Island).

O. tenuis AG. var. *nigra* SCHKORB. in GEITLER, *l.c.*, **14**, 959, 1932.

Trichomes solitary or aggregated, 5 μm wide, not constricted at the cross walls; cells short, half of or equal to the width of trichome, with the series of granules along the cross walls of both cells. Hab. No. 2 pond. New to Antarctica. Pl. 2, f. 11.

Key to genus *Phormidium*

1. Trichomes curved and constricted at the cross walls.
   2. Trichomes less than 1 μm of the trichome..... *Ph. angustissima*
   2. Trichomes 1–3 μm wide.
      3. Cells shorter than the width.
         4. Length of cells equal to the width or less than the width, width of trichome 1.5 μm wide..... *Ph. foveolarum*
         4. Length of cells about half of the width, 3 μm wide ..... *Ph. priestleyi*
      3. Cells longer, up to 3 times longer than the wide, 1–2 μm wide ..... *Ph. tenue*
   2. Trichomes over 3 μm wide.
      3. Trichomes 4–6 μm wide..... *Ph. ambiguum* var. *ambiguum*
      3. Trichomes 9.5 μm wide..... *Ph. ambiguum* var. *maior*
1. Trichomes not constricted at the cross walls of both cells.
   2. Trichomes narrow, 3 μm less than the wide.
      3. Length of cells equal to the width of the trichome or less than the width of trichome..... *Ph. bohneri*
      3. Length of cells 1–2 times longer than the width, 1–2 μm wide.
         4. Cells of trichomes 0.6 μm wide, length of cell 1–2 times longer than the width..... *Ph. antarcticum*

4. Cells of trichomes 1–2 μm wide, length of cell slightly longer than the width..... *Ph. laminosum*

2. Trichomes 4–10 μm wide.

3. Trichomes not attenuated, cells without a series of granules along the cross walls of both cells.

4. Length of cells shorter than the width, till 0.5–1 times longer than the width ..... *Ph. crouani*

4. Length of cells equal to the width..... *Ph. retzii*

3. Trichomes attenuated near the apex.

4. Length of cells less than the width, about 1/4–1/2 times longer than the width.

5. Trichomes 5.5–9 μm wide, apex capitate and curved in one side..... *Ph. uncinatum*

5. Trichomes 8–11.5 μm wide, apex not capitate ..... *Ph. subfuscum*

4. Length of cell almost equal to the width of cell.

5. Trichomes curved near the apex and capitate ..... *Ph. autumnale*

5. Trichomes straight, not curved and not capitate at the apex ..... *Ph. incrustatum*

Phormidium ambiguum GOM. var. *ambiguum* in GEITLER, *l.c.*, **14**, 1015, f. 647e, 1932.

Trichomes curved, constricted at the cross walls, gradually attenuated toward the capitated apex, about 4–6 μm wide; cells short with a series of granules along the cross walls, length less than the width. Hab. Stream near camp. New to Antarctica.

Ph. ambiguum GOM. var. *maior* LEMM. in GEITLER, *l.c.*, **14**, 1015, 1932.

Trichomes 10 μm wide, not constricted at the cross walls, with a series of granules along the cross walls; cells short, about 1/3 times longer than wide. Hab. Stream near camp. New to Antarctica. Pl. 2, f. 12, 13.

Ph. angustissima W. & G. S. WEST, Br. Antarct. Exped. 1907–09, Rep. Sci. Invest., **1** (7), 292, 1911; GEITLER, *l.c.*, **14**, 996, 1932.

Trichomes constricted at the cross walls, 0.6–0.8 μm wide; cells cylindrical, about 4–5 times longer than wide, without a series of granules along the cross walls. Hab. Widely distributed in Skarvsnes. Already known from Antarctica.

Ph. antarcticum W. & G. S. WEST, *l.c.*, **1** (7), 292, pl. 25, f. 74, 75a–g, 1911; GEITLER, *l.c.*, **14**, 1006, f. 644a, 1932.

Trichomes 0.6 μm wide, not attenuated toward the apex; length of cell about 2–3 times longer than wide. Hab. Nos. 1 and 2 ponds. This species was described by W. & G. S. WEST from the Pony Lake, Ross Island, Antarctica.

Ph. autumnale (AG.) GOM. in W. & G. S. WEST, *l.c.*, **1** (7), 291, pl. 25, f. 77–85, 1911; GEITLER, *l.c.*, **14**, 1026, f. 652k, l, 653a, 1932.

Trichomes straight, not constricted at the cross walls, attenuated at the apical part and curved in one side, 4–7 μm wide, sometimes with a series of granules; cells 0.5–1 times longer than wide. Hab. Stream near camp. Already known from South Orkney Islands (Signy Island) and Antarctica.

Ph. bohneri SCHMIDLE in GEITLER, *l.c.*, **14**, 1008, 1932.

Trichomes straight, not constricted at the cross walls, about 1.7–2 μm wide, not attenuated toward the apex; length of cell equal or slightly shorter than wide. Hab. No. 10 pond, and stream near camp. Already reported from Yukidori Valley area.

Ph. crouani GOM. in GEITLER, *l.c.*, **12**, 386, f. 484, 1925.

Trichomes slightly curved, not constricted at the cross walls and also without a series of granules along the both sides of cross walls, slightly attenuated near the apex, 7.5–10.5 μm wide; apical cells conical. Hab. No. 9 pond and stream near camp. New to Antarctica. Pl. 2, f. 22–25.

Ph. foveolarum GOM. in GEITLER, *l.c.*, **14**, 999, f. 636b, 1932.

Trichomes constricted at the cross walls, not attenuated toward the apex, 1.5 μm wide; cells as long as wide or slightly shorter than wide, without a series of granules along the cross walls. Hab. No. 10 pond. Recently reported from South Orkney Islands by BROADY. New to Antarctica.

Ph. incrustatum (NÄG.) GOM. in GEITLER, *l.c.*, **14**, 1017, f. 649a, 1932.

Trichomes straight, not constricted at the cross walls, gradually attenuated toward the apex, 4–5 μm wide; cells almost quadrate, length of cell slightly shorter than wide, with a series of granules along the cross walls. Hab. Stream near camp. Already known from Yukidori Valley area (pond and stream).

Ph. laminosum (AG.) GOM. in GEITLER, *l.c.*, **14**, 1005, f. 642c, 1932; HIRANO, *l.c.*, **11**, 13, pl. 2, f. 15, 1979.

Trichomes narrow and curved, not constricted at the cross walls, narrow near the apical part, 1–2 μm wide; cells slightly longer than wide, with a granule at both side of the cross walls. Hab. Nos. 8 and 10 ponds. Already known from Yukidori Valley area (pond and stream).

Ph. priestleyi FRITSCH in Br. Antarct. (Terra Nova) Exped. 1910, Nat. Hist. Rep., Bot., **1**, 10, pl. 1, f. 16, 1917; GEITLER, *l.c.*, **14**, 1001, f. 638, 1932; HIRANO, *l.c.*, **11**, 12, pl. 2, f. 16, 1979.

Trichomes slightly curved and not attenuated toward the apex, 3 μm wide, constricted at the cross walls, without a series of granules along the cross walls of both cells; cells shorter, the length of cells half of the width. Hab. Stream near camp. Reported from Yukidori Valley. Already known from Antarctica.

Ph. retzii (AG.) GOM. in GEITLER, *l.c.*, **14**, 1012, f. 647, 1932; HIRANO, *l.c.*, **11**, 13, pl. 2, f. 12–14; pl. 4, f. 4–7, 1979.

Trichomes straight, not constricted at the cross walls, 4.5–12 μm wide, slightly attenuated near the apex; length of cells shorter or longer than wide. Hab. Stream near camp. Already known from Yukidori Valley area.

Ph. subfuscum KÜTZ. in GEITLER, *l.c.*, **14**, 1022, f. 652d–g, 1932.

Trichomes straight and not constricted at the cross walls, 8–11 μm wide, gradually attenuated toward the capitated apex; cells shorter than wide, the length 1/4–1/2 times longer than wide, with a series of granules along the cross walls. Hab. Stream near camp. New to Antarctica.

Ph. tenue (MENEGH.) GOM. in GEITLER, *l.c.*, **14**, 1004, f. 642d, e, 1932; FUKUSHIMA, Antarct. Rec., **31**, 84, f. D, E, 1968.

Trichomes slightly curved, slightly constricted at the cross walls, without a series of granules along the cross walls, gradually attenuated toward the apex; cells elongate,

1–2 μm wide, about 3 times longer than wide. Hab. Stream near camp. Already known from Kasumi Rock ice-free area, Prince Olav Coast, Antarctica.

Ph. uncinatum (AG.) GOM. in GEITLER, *l.c.*, **14**, 1025, f. 652h, i, 1932; HIRANO, *l.c.*, **11**, 13, pl. 1, f. 5–7, 1979.

Trichomes straight, 5.5–9 μm wide, not constricted at the cross walls, gradually attenuated toward the apex and curved near the apical part, apical cell capitate; cells 1/3–1/2 times longer than the width, rarely equal to the width, with a series of granules along the cross walls. Hab. Attached on the stone of small stream. Already known from Yukidori Valley area. Pl. 2, f. 7–10, 14.

Key to genus *Lyngbya*

1. Trichomes constricted at the cross walls.
   2. Trichomes 2.5–3 μm wide, without a series of granules along the cross walls..... *L. scotti* var. *minor*
   2. Trichomes 3.5–4 μm wide, with a series of granules along the cross walls..... *L. kuetzingiana*
1. Trichomes not constricted at the cross walls.
   2. Trichomes not attenuated toward the apex.
      3. Trichomes 1 μm wide..... *L. erebi*
      3. Trichomes 6–10 μm wide..... *L. martensiana*
   2. Trichomes attenuated toward the apex, 10–11 μm wide..... *L. borneti*

Lyngbya scotti FRITSCH var. *minor* FRITSCH, *l.c.*, **6**, 29, pl. 2, f. 94–96, 1912a; GEITLER, *l.c.*, **14**, 1058, 1932.

Trichomes flexuose, 3 μm wide, slightly constricted at the cross walls, slightly attenuated near the apex; cells slightly longer than the width; mucous sheath slightly thick. Hab. Stream near camp. Already known from Antarctica.

L. borneti ZUKAL in GEITLER, *l.c.*, **14**, 956, f. 585, 609, 1932; HIRANO, *l.c.*, **11**, 15, pl. 1, f. 1–3; pl. 4, f. 8–12, 1979.

Trichomes 12–16 μm wide, not constricted at the cross walls, not attenuated toward the apex, with or without a series of granules along the cross walls; cells almost quadrate, length equal to the width. Hab. On the stone surface of stream. Already known from Yukidori Valley area. Pl. 2, f. 1–4.

L. erebi W. & G. S. WEST, *l.c.*, **1** (7), 290, pl. 25, f. 72a–d, 1911; GEITLER, *l.c.*, **14**, 1056, 1932.

Trichomes flexuose, 1–1.5 μm wide, not attenuated toward the apex; cells slightly shorter than the width. Hab. Lake Suribati. Already reported from the pond on the slope of Mt. Erebus, Ross Island. Pl. 2, f. 6.

L. kuetzingiana SCHMIDLE in GEITLER, *l.c.*, **14**, 1059, 1932.

Trichomes straight or flexuose, 2 μm wide, attenuated toward the apex, not constricted at the cross walls and without granules. Hab. Kobati Pond (tentative name). Already known from Yukidori Valley area. Pl. 2, f. 20.

L. martensiana MENEGH. in GEITLER, *l.c.*, **14**, 1064, f. 676, 1932; HIRANO, *l.c.*, **11**, 15, pl. 2, f. 20, 21, 1979.

Trichomes not constricted at the cross walls and not attenuated toward the apex, with a series of granules along both sides of the cross walls, 8–8.5 μm wide; cells short,

cell length corresponds to 1/4–1/2 of the width. Hab. Stream near camp. Already reported from Yukidori Valley area.

Schizothrix muelleri NÄG. in GEITLER, *l.c.*, **14**, 1110, f. 715, 1932.

Trichomes 10 μm wide in basal part; cell length corresponds to the width of the trichome, slightly shorter at the base, slightly constricted at the cross walls; mucous sheath stratified at the base but breaks up at the middle of trichome. Hab. Upper place of Lake Suribati. New to Antarctica. Pl. 3, f. 1–3; pl. 5, f. 1.

S. antarctica FRITSCH, *l.c.*, **1**, 11, pl. 1, f. 21–24, 1917; GEITLER, *l.c.*, **14**, 1099, f. 704, 1932.

Trichomes narrow, 0.5 μm wide; cell length 1.5 times longer than the width; mucous sheath violet in color in low magnification. Hab. Stream near camp. This species was first described by FRITSCH from the collections of Cape Sastrugi, Evans Cove.

Microcoleus vaginatus (VAUCH.) GOM. in GEITLER, *l.c.*, **14**, 1136, f. 741, 1932.

Mucous sheath thick and flexuose, contains two or three trichomes; trichomes 4μm wide, not constricted at the cross walls; cell length more than 1.5 times than the width. Hab. Attached on the surface of the rocks. Already known from Antarctica.

Class 2. Bacillariophyceae

Fam. 1. Coscinodiscaceae

Melosira arctica (EHRENB.) DICKIE in HUSTEDT, Dr. L. Rabenhorst's Kryptogamen-Flora, **7** (1), 233, f. 96, 1930; CLEVE-EULER, K. Svenska Vetensk Akad. Handl., **2** (1), 32, f. 29a–m, 23–1, 1951.

Valves circular in vertical view, 23–33 μm in diameter, marginal striae very short, other part of the valve occupied by the irregular net-like manner. The species is similar to *M. arenaria* but differs by the broad area of the marking while the irregular markings of *M. arenaria* are confined to the narrow area of the central part in the valve space. Hab. No. 1 pond. Already known in the seas of the Northern Hemisphere. Pl. 7, f. 6–9.

M. sol (EHRENB.) KÜTZ. in HUSTEDT, *l.c.*, **7** (1), 270, f. 115, 1930.

Valves large, 86 μm in diameter; inner part of valve smooth and structureless, outer part with the radial series of costae. Hab. Lake Hunazoko. Marine species. Pl. 7, f. 3, 4.

M. sulcata (EHRENB.) KÜTZ. in VAN HEURCK, Treatise Diat., 444, pl. 19, f. 624, 1896; HUSTEDT, *l.c.*, **7** (1), 276, f. 118, 119, 1930.

Valves circular, 15 μm in diameter, inner part of valve smooth but with a series of special markings disposed in a circular pattern. Hab. Lake Hunazoko. Pl. 7, f. 11, 12.

Hyalodiscus scoticus (KÜTZ.) GRUN. in HUSTEDT, *l.c.*, **7** (1), 293, f. 133, 1930; Wiss. Ergebn., **2** (3), 108, 1958.

Valves small, circular, convex, consist of three parts, outer margin narrow, shortly and radially striated, median part wide with a plenty of oblique decussating series of delicate puncta, inner part with coarse markings. Hab. On the ground of penguin rookery. New to Antarctica. Pl. 10, f. 1–3.

Cyclotella bodanica EULENSTEIN var. *lemanensis* O. MÜLLER in HUSTEDT, *l.c.*, **7** (1),

356, f. 185, 1930; CLEVE-EULER, *l.c.*, **2** (1), 46, f. 56c–h, 1951.

Valves circular, 40 μm in diameter, striae in peripheral zone robust but gradually narrow toward the center, central part of the valves smooth and occupies about half of the radius. Hab. No. 1 pond. New to Antarctica. Pl. 6, f. 10.

C. meneghiniana KÜTZ. in HUSTEDT, *l.c.*, **7** (1), 341, f. 174, 1930; CLEVE-EULER, *l.c.*, **2** (1), 48, f. 63a–c, 1951.

Valves small and circular, 13–15 μm in diameter; striae in peripheral zone robust, central part smooth. Hab. Nos. 1–3 ponds and Lake Hunazoko. New to Antarctica. Pl. 6, f. 11, 12.

Coscinodiscus decipiens GRUN. in VAN HEURCK, Synop. Diat. Belgique, pl. 91, f. 10, 1882; CLEVE-EULER, *l.c.*, **2** (1), 71, f. 116a–c, 1951.

Valves large and circular, about 20 μm in diameter, outer part of valve furnished with a series of short spines, median part consists of irregular and somewhat radial series of areolae: areolae large in center but gradually become smaller toward the periphery. Hab. No. 1 pond. Marine species. Already known from Antarctica. Pl. 8, f. 6, 7.

C. excentricus (EHRENB.) CLEVE in HUSTEDT, *l.c.*, **7** (1), 388, f. 201, 1930; CLEVE-EULER, *l.c.*, **2** (1), 71, f. 118a, 1951.

Valves circular in valval view, about 50 μm in diameter, marginal part of the valve occupied by the short and equidistantly disposed spines and the radial series of short striae, the majority of the valve face occupied by the hexagonal areolae. Hab. Lake Hunazoko. Marine species. Already known from Antarctica. Pl. 8, f. 4.

C. gyratus JANISCH in HUSTEDT, *l.c.*, **2** (3), 114, f. 17, 1958.

Valves circular, about 30 μm in diameter; series of granular striae radially disposed but some of the granular striae short and disposed among the long striae so that the striae in the central part of the valves are given somewhat rough appearance. Hab. Lake Hunazoko. Marine species. New to Antarctica. Pl. 6, f. 9.

C. lentiginosus JANISCH in HUSTEDT, *l.c.*, **2** (3), 116, pl. 4, f. 22–25, 1958.

Valves circular, 20–22 μm in diameter, the margin with the short spines and granular areolae disposed from the margin to the center of the valve and show some differentiate appearance among the areolae; namely, series of areolae disposed in normally radial in some specimens and areolae disposed in long and short series alternately in other specimens and sometimes in curved irregular series. Hab. Lake Hunazoko. Marine species. Already known from Antarctica. Pl. 8, f. 8; pl. 11, f. 10, 11.

C. normanicus GREG. in CLEVE-EULER, *l.c.*, **2** (1), 58, f. 78, 1951.

Valve circular, about 45 μm in diameter; punctate striae disposed in radial series, central area of the valves narrow and scarcely visible. Hab. Lakes Hunazoko and Suribati. CLEVE-EULER gives 61–110 μm in diameter in the present species. New to Antarctica. Pl. 7, f. 5; pl. 9, f. 4, 5.

C. plicatulus GRUN. in CLEVE-EULER, *l.c.*, **2** (1), 63, f. 89, 1951.

Valves circular, about 35 μm in diameter, furnished with short spines on the inner side of the margin, punctate striae disposed radially and densely. Hab. Lake Hunazoko. Marine species. New to Antarctica. Pl. 6, f. 3.

C. pseudodenticulatus KARSTEN in HUSTEDT, *l.c.*, **2** (3), 117, pl. 4, f. 20, 21, 1958.

Valves large, about 52 μm in diameter; the arrangement of the areolae dense and somewhat radial especially in middle part of the valve, outer and inner parts of the valve with the oblique series of areolae and many short spines disposed on all faces of the valves. Hab. Lake Hunazoko. Marine species. New to Antarctica. Pl. 6, f. 1.

C. robustus GREV. var. *latemarginatus* PANT. in PANTOCSEK, Beitr. Kenn. fossil. Bacill. Ungarn, I, 72, pl. 22, f. 201, 1903a.

Valves circular, 30 μm in diameter; areolae disposed on all faces of valves not in a radial series but in an oblique series, and seem to be hexagonal appearance. Hab. Lake Hunazoko. Marine species. New to Antarctica. Pl. 8, f. 5.

C. tabularis GRUN. in HUSTEDT, *l.c.*, **2** (3), 119, pl. 6, f. 48–56, 1958.

Valves moderate on size, circular, 30 μm in diameter, valve face furnished with many granules which are not arranged radially. Hab. Near Lake Hunazoko. Marine species. New to Antarctica. Pl. 7, f. 1, 2.

Charcotia australis (KARSTEN) M. PER. in FUKUSHIMA, Antarct. Rec., **17**, 57, pl. 1, f. 11, 1963.——*Coscinodiscus australis* KARSTEN, Wiss. Ergebn. Dtsch. Tiefsee-Exped. 1898–99, II, **2** (1), 79, pl. 4, f. 2, 1905.

Valves small and circular about 42 μm in diameter, series of granules radial and disposed fairly separate from each other, alternately long and short; central area small containing one or a few granules. Hab. Lake Hunazoko. Already reported by FUKUSHIMA from the material of Ongulkalven. Pl. 6, f. 2.

C. irregularis M. PER. in FUKUSHIMA, *l.c.*, **17**, 57, pl. 1, f. 10, 1963.

Valves fairly large and circular, 100–110 μm in diameter, granules of series radial and more densely disposed than those of *C. australis*, and also alternately long and short; central area of valve furnished with a plenty of granules which are irregularly disposed. Hab. Lake Hunazoko. Marine species and found with the preceding species. Already reported by FUKUSHIMA from Ongulkalven. Pl. 6, f. 2; pl. 8, f. 1; pl. 10, f. 5, 6.

Fam. 2. Actinodiscaceae

Actinocyclus curvatulus JANISCH in HUSTEDT, *l.c.*, **7** (1), 538, f. 307, 1930; *l.c.*, **2** (3), 129, pl. 8, f. 82, 83, 1958.

Valves circular, about 100 μm in diameter; areolae cover all faces of the valve and almost equal in size. This valval sculpture is not changed from the center to the marginal edges of the valve. Hab. Lake Hunazoko. Marine species. New to Antarctica. Pl. 6, f. 4.

A. divisus (GRUN.) HUSTEDT, *l.c.*, **2** (3), 129, pl. 8, f. 81, 1958.

Valves large, circular in valval view, 65–70 μm in diameter, marginal spines small and equidistantly disposed; majority of the valve face occupied by the radial series of small and somewhat elongate areolae. Hab. Lake Hunazoko. Marine species. New to Antarctica. Pl. 8, f. 2, 3.

Fam. 3. Biddulphiaceae

Eucampia cf. *balaustium* CASTR. in HUSTEDT, *l.c.*, **2** (3), 136, pl. 5, f. 40–43, 1958; KOZLOVA, Diat. Ind. Pacific Sect. Antarct., 106, pl. 2, f. 10a, b, 1966.

Valves narrowly lanceolate, 55 μm long and 15 μm wide, furnished with a plenty of robust granules. Hab. Lake Hunazoko. Marine species. Already known from

the bottom mud of the southern Indian Ocean. Pl. 9, f. 6.

Fam. 4. Fragilariaceae

Tabellaria flocculosa (ROTH) KÜTZ. in HUSTEDT, Süssw.-Flora, **10**, 123, f. 101, 1930.

Cosmopolitan species. Hab. Nos. 7 and 9 ponds.

Fragilaria construens (EHRENB.) GRUN. var. *venter* (EHRENB.) GRUN. in HUSTEDT, *l.c.*, **10**, 141, f. 138, 1930.

Valves small, 10 μm long and 4 μm wide. Hab. No. 1 pond. Pl. 10, f. 8.

F. pinnata EHRENB. in HUSTEDT, *l.c.*, **10**, 142, f. 141, 1930.

Valves narrowly elliptic, with broadly rounded ends, 13 μm long and 8 μm wide. Hab. Lake Hunazoko. Cosmopolitan species. New to Antarctica.

F. virescens RALFS var. *elliptica* HUSTEDT, *l.c.*, **10**, 142, f. 147, 1930.

Valves rhomboidal with rounded ends, 19 μm long and 8 μm wide. Hab. No. 1 pond. Already known from Antarctica. Pl. 10, f. 4.

Synedra inaequalis KOBAYASHI in J. Jap. Bot., **40**, 347, pl. 12, f. 1a–d, 1965.

Valves lanceolate, 72 μm long and 8.5 μm wide, gradually narrowed toward the subcapitate apex, pseudoraphe straight, axial area narrow and linear, pseudoraphe not central in position and inclined to either side of the valve. Hab. No. 7 pond. New to Antarctica. Pl. 9, f. 1.

S. minuscula GRUN. in HUSTEDT, *l.c.*, **10**, 158, f. 180, 1930.

Valves narrowly lanceolate, 16–17 μm long and 3 μm wide, striae 16 in 10 μm, ends well rounded; central area elliptic, striae in this area short. Hab. Lake Hunazoko. New to Antarctica. Pl. 6, f. 15.

S. pulchella KÜTZ. in HUSTEDT, *l.c.*, **10**, 160, f. 187, 1930; CLEVE-EULER, *l.c.*, **4** (1), 66, f. 387a–e, 1953a.

Valves narrow lanceolate, 62 μm long and 5.5 μm wide; apices subcapitate, pseudoraphe linear, striae consist of punctations and 13 in 10 μm. Hab. Stream near camp. New to Antarctica. Pl. 16, f, 13.

Licmophora antarctica CARLSON, Wiss. Ergebn. Schwed. Südpolar-Exped., IV, **2** (14), 30, pl. 3, f. 23, 24, 1913.

Valves clavate form, heteropolar, 90–110 μm long and 10–11 μm wide; striae consist of dotted lines, transversely but slightly divergently disposed at the end, 6 in 10 μm; broad end rounded but other narrow end acutely rounded. Valves gradually attenuated from the broad end to the narrow end. Hab. Lake Hunazoko. Marine species. Already recorded from Graham Land by CARLSON. Pl. 11, f. 1–2.

Fam. 5. Eunotiaceae

Eunotia arcus EHRENB. var. *bidens* GRUN. in HUSTEDT, *l.c.*, **10**, 175, f. 217, 1930.

Valves 28 μm long and 4.5 μm wide, ventral margin slightly concave, dorsal margin with two elevations; striae about 13 in 10 μm. Hab. No. 1 pond. On the ground near penguin rookery. New to Antarctica. Pl. 6, f. 13, 14; pl. 17, f. 11, 12.

Fam. 6. Achnanthaceae

Cocconeis imperatrix A. SCHMIDT. in HUSTEDT, *l.c.*, **2** (3), 144, 1958; FUKUSHIMA, *l.c.*, **15**, 47, pl.1, f. 1, 2, 1962b.

Valves elliptic in valval view, 45 μm long and 30 μm wide, axial area narrow-linear in upper valve, sublinear or narrow-lanceolate in lower valve; ribs slightly

radial, each rib consists of two rows of small granules. Hab. Lakes Hunazoko and Suribati and No. 1 pond. Already known from Antarctica. Marine species. Pl. 11, f. 5; pl. 12, f. 12, 13.

Achnanthes brevipes AG. var. *brevipes* in HUSTEDT, *l.c.*, **10**, 210, f. 309, 1930; CLEVE-EULER, *l.c.*, **4** (5), 49, f. 596a, d, 1953b.

Valves linear-lanceolate, 62 μm long and 10 μm wide, lateral margin slightly convex in one side and the other side almost straight; ends rounded, striae consist of slightly larger granules, granulated striae 5–6 in 10μm. Hab. Lake Hunazoko. Already known from Kasumi Rock. Pl. 17, f. 6.

A. brevipes AG. var. *intermedia* (KÜTZ.) CL. in HUSTEDT, *l.c.*, **10**, 210, f. 310, 1930; CLEVE-EULER, *l.c.*, **4** (5), 50, f. 596e–g, 1953b.

Valves lanceolate, 15 μm long and 6 μm wide, with broadly rounded ends, striae radial. Hab. Lake Suribati. Already known from Antarctica.

A. gainii (M. PER). FUKUSHIMA, *l.c.*, **17**, 57, pl. 1, f. 12, 1963.

Valves lanceolate, 40 μm long, 7.5–8 μm wide, with broadly rounded ends; striae 6 in 10 μm, consist of granules. Hab. No. 1 pond. Already known from Ongul-kalven. Pl. 10, f. 12; pl. 13, f.11.

A. hankiana GRUN. in HUSTEDT, *l.c.*, **10**, 202, f. 290, 1930.

Valves elliptic-rhomboidal, 14 μm long and 8 μm wide; punctate-striae slightly radial near the center of the valve, pseudoraphe with linear axial area. Hab. Lake Hunazoko. New to Antarctica. Pl. 10, f. 7, 10.

Fam. 7. Naviculaceae

Frustulia rhomboides (EHRENB.) DE TONI f. *undulata* HUSTEDT, *l.c.*, **7** (2), 729, f. 1099b, 1937.

Valves rhomboidal, 65 μm long and 13 μm wide, lateral margin delicately undulate; striae radial. Hab. No. 1 pond. New to Antarctica. Pl. 10, f, 11; pl. 16, f. 12.

Diploneis africana HEIDEN & KOLBE in Dtsch. Südpolar-Exped., **8** (5), 614, pl. 2, f. 57, 1928.

Valves small, linear-elliptical, middle part of the valve somewhat retuse, apical parts cuneiform and the extremity rounded, 26–30 μm long and 8–10 μm wide. Hab. Lake Hunazoko. New to Antarctica. Pl. 14, f. 6, 7.

D. latefurcata (FONT.) CLEVE-EULER, *l.c.*, **4** (5), 75, f. 640, 1953b.

Valves narrowly elliptic, 40–44 μm long, 14–19 μm wide, ends of valve rounded, transverse costae slightly radial. Hab. Lake Hunazoko. Marine species. New to Antarctica. Pl. 14, f. 4, 5.

D. subcincta (A.S.) CLEVE in CLEVE-EULER, *l.c.*, **4** (5), 70, f. 630a, 1953b.

Valves somewhat linear, central part slightly constricted so that the lateral sides of this part concave, terminal part of the valve cuneiform and the extremity rounded, 82–98 μm long and 30–33 μm wide. Hab. Lake Hunazoko and Nos. 1 and 3 ponds. Already recorded from the Kasumi Rock ice-free area by FUKUSHIMA. Pl. 14, f. 1.

Stauroneis anceps EHRENB. in HUSTEDT, *l.c.*, **10**, 256, f. 405, 1930; CLEVE-EULER, *l.c.*, **4** (5), 207, f. 943a, b, 1953b.

Valves lanceolate, 35–40 μm long and 9 μm wide, ends stretched and slightly capitate at the extremity, axial area narrowly linear. Hab. Nos. 1, 2 and 8 ponds,

and stream near camp. Already known from the Sinnan Rocks ice-free area, Prince Olav Coast. Pl. 12, f. 10, 11.

S. perminuta GRUN. in FUKUSHIMA, *l.c.*, **27**, 17, f. Ia, 1966; FUKUSHIMA *et al.*, Antarct. Rec., **50**, 38, pl. 2, f. M,N, 1974.

Valves small, rhomboidal in valval view, 13 μm long and 4 μm wide, axial area slightly sublinear, ends rounded; striae slightly densely radial. Hab. No. 3 pond and stream near camp. Already known from Antarctica. Pl. 6, f. 13, 14; pl. 10, f. 9.

S. phoenicenteron EHRENB. in HUSTEDT, *l.c.*, **10**, 255, f. 404, 1930.

Valves lanceolate, 170 μm long and 22 μm wide. Hab. Stream near camp. Cosmopolitan species. New to Antarctica.

Navicula abbreviata (GRUN.) CLEVE-EULER, *l.c.*, **4** (5), 151, f. 806, 1953b.

Valves small and sublinear, 18–20 μm long and 4.5–5 μm wide, ends truncate and rounded, axial area narrow and linear, central area transversely rectangular or indistinctly elliptic; striae raidal and central striae short and somewhat separated from each other. Hab. Lake Suribati. New to Antarctica. Pl. 6, f. 17, 18.

N. arcuata HEIDEN & KOLBE, *l.c.*, **8** (5), 628, pl. 3, f. 80, 1928.

Valves small, 15–16 μm long and 5 μm wide, transversely rectangular with inflated middle part, ends well rounded; striae delicate and densely and radially disposed, central area circular. Hab. Nos. 1 and 2 ponds. New to Antarctica. Pl. 6, f. 16.

N. complanatoides HUSTEDT, *l.c.*, **7** (3), 340, f. 145, 1962.

Valves rhomboid-lanceolate, 32–40 μm long and 5 μm wide, lateral margin slightly convex, axial area narrow-linear, central area not extended; striae 15 or 16 in 10 μm. Hab. Lake Hunazoko. New to Antarctica. The present species and *Navicula complanata* GRUN. resemble each other in the size and shape of the valve but the arrangement of striae of *N. complanata* is denser than *N. complanatoides*. Pl. 13, f. 7, 8.

N. criophila (CASTR.) DE TONI in HUSTEDT, *l.c.*, **2** (3), 145, pl. 9, f. 101–103, 1958.

Valves narrowly rhomboidal with somewhat acute ends, 46 μm long and 5 μm wide; striae radial in central part of valve and horizontal near the end, 11–12 in 10 μm; axial area somewhat inclined toward one side (not central of long axis) and central area also inclined to one side. Hab. No. 1 pond. Marine plankton. Already known from Antarctic Sea. Pl. 15, f. 10.

N. cryptocephala KÜTZ. var. *intermedia* GRUN. in HUSTEDT, *l.c.*, **10**, 295, f. 497b, 1930; FUKUSHIMA, *l.c.*, **15**, 50, pl. 2, f. 5, 6, 1962b.

Valves rhomboidal, both ends slightly stretched or not, 25–38 μm long and 7–8 μm wide; striae radial, 12–13 in 10 μm, central area small, owing to the alternating long and short striae. Hab. Nos. 1, 2 and 3 ponds, and Lake Hunazoko. Cosmopolitan species. Pl. 12, f. 4–9; pl. 17, f. 7, 8.

N. directa W. SM. var. *directa* in CLEVE-EULER, *l.c.*, **4** (5), 129, f. 751a, 1953b.

Valves narrow lanceolate, 52 μm long and 8 μm wide, ends rounded; striae 10 in 10 μm; axial area narrowly linear, central area scarcely visible owing to the short central striae. Hab. Lake Hunazoko. New to Antarctica. Pl. 9, f. 2.

N. directa W. SM. var. *incus* (A.S.) CLEVE, K. Svenska Vetensk Akad. Handl., **27** (3), 27, 1895; FUKUSHIMA, *l.c.*, **15**, 50, pl. 2, f. 18, 1962b.

Valves narrowly rhomboidal, 135 μm long and 15 μm wide, ends acutely rounded

at the extremity, raphe somewhat inclined toward one side (not central); striae disposed horizontal and parallel to each other; central area half elliptic, striae asymmetric and not become short in one side while gradually shortened in opposite side. Hab. No. 1 pond and Lake Hunazoko. Marine plankton. Already known from Antarctic Sea. Pl. 13, f. 1; pl. 18, f. 14.

N. gregaria DONK. in CLEVE-EULER, *l.c.*, **4** (5), 130, f. 755a–c, 1953b.

Valves lanceolate, with distinctly stretched and somewhat subcapitate ends, 22–30 μm long and 5–6 μm wide; striae slightly radiate, 15 in 10 μm; central area indistinct or slightly elliptic, axial area narrowly linear. Hab. Nos. 1 and 7 ponds, and Lake Hunazoko. New to Antarctica. Pl. 11, f. 6–8.

N. molesta KRASSKE in HUSTEDT, *l.c.*, **7** (3), 252, f. 1379, 1962.

Valves rhomboidal, with stretched, subcapitate and rounded ends, 25–30 μm long and 6–7 μm wide; striae slightly radial but slightly convergent near the end, axial area narrow and linear. Hab. Nos. 1 and 2 ponds. Already known from Ross Island. Pl. 15, f. 11–13.

N. murrayi W. & G. S. WEST, Br. Antarct. Exped. 1907–09, Rep. Sci. Invest., **1** (7), 285, pl. 26, f. 129, 1911; HUSTEDT, *l.c.*, **7** (3), 610, f. 1611, 1966.

Valves linear-elliptic, 30–50 μm long and 8–10 μm wide; punctate striae disposed radially, 14–15 in 10 μm, axial area narrow lanceolate or linear, central area formed transversely fascia. Hab. Nos. 1 and 2 ponds. Already known from Antarctica. Pl. 13, f. 9, 10, 13, 14.

N. muticopsis VAN HEURCK in FRITSCH, Natl. Antarct. Exped. 1901–1904, Nat. Hist., **6**, 51, 1912a; FUKUSHIMA, *l.c.*, **15**, 50, pl. 2, f. 14, 1962b.

Valves small, elliptic with well rounded and capitated ends, 17–24 μm long and 8–10 μm wide; punctate striae radial, axial area narrow-linear with a dilated central area, with distinct isolated puncta in one side of the central area. Hab. Characteristic species and endemic in Antarctica. Widely distributed in the Skarvsnes area but not found in streams. Pl. 9, f. 3, 7–11; pl. 13, f. 4.

N. ordinaria HUSTEDT, *l.c.*, **7** (3), 771, f. 1744, 1966.

Valves narrow elliptic with rostrate and slightly capitate ends, 30 μm long and 7 μm wide; striae consist of dotted lines, disposed radially and slightly roughly in the center, and densely disposed near the ends; axial area narrow-linear, central area slightly elliptic. Hab. No. 8 pond. New to Antarctica.

Pinnularia borealis EHRENB. in HUSTEDT, *l.c.*, **10**, 326, f. 597, 1930.

Valves sublinear, lateral margin slightly convex, with truncately rounded ends, 36–40 μm long and 9–10 μm wide; striae 5 in 10 μm, central striae short, raphe slightly curved near the center, axial area narrow and slightly lanceolate. Hab. Rather rare in streams near camp. Already known from Antarctica. Pl. 17, f. 9, 10.

P. brevicostata CLEVE, *l.c.*, **27** (3), 86, 1895; CLEVE-EULER, *l.c.*, **5** (4), 37, f. 1045a, b, 1055, 1955.

Valves lanceolate with rounded ends, 68 μm long and 15 μm wide; striae short, horizontal in the middle, 8–9 in 10 μm and convergent at end; axial area broadly lanceolate. Hab. No. 1 pond. Known in cold waters of the Northern Hemisphere. Pl. 13, f. 3.

P. cymatopleura W. & G. S. WEST, *l.c.*, **1** (7), 285, pl. 26, f. 133, 134, 1911; FRITSCH,

l.c., **6**, 51, pl. 2, f. 101; pl. 8, f. 12, 1912a (as *Navicula*); FUKUSHIMA *et al.*, *l.c.*, **46**, 127, pl. 1, f. L–R, 1973.

Valves small, 25 μm long and 6 μm wide, lateral margin slightly convexo-undulate (3 at the lateral and 2 at the end), ends capitate and rounded, axial area lanceolate; striae delicate and densely disposed, 17–18 in 10 μm, somewhat radial in the center and convergent at the end. Hab. Widely distributed in Skarvsnes. Pl. 13, f. 12.

P. quadratarea (A.S.) CL. var. *bicuneata* HEIDEN & KOLBE, *l.c.*, **8** (5), 596, pl. 2, f. 33–35, 1928.

Valve linear in the central part with cuneate ends, ends rounded at the extremity, 53–103 μm long and 16–21 μm wide; axial area narrow and sublinear, central area elliptic; striae consist of dotted lines, horizontal at the center but slightly divergent at the cuneate part of the valve, 7–8 in 10 μm. Hab. No. 1 pond and Lake Hunazoko. Already known from Antarctica. Pl. 12, f. 1–3.

P. quadratarea (A.S.) CL. var. *soederlundii* CLEVE in CLEVE-EULER, *l.c.*, **5** (4), 10, f. 982c, 1955.

Valves linear and narrower than var. *bicuneata*, gradually attenuated near the rounded end, 78–85 μm long and 10 μm wide, central fascia longitudinally large and long quadrate; striae 10 in 10 μm. Hab. Lake Hunazoko. Marine species. New to Antarctica. Pl. 11, f. 3, 4; pl. 18, f. 15.

Trachyneis aspera (EHRENB.) CL. in W. & G. S. WEST, *l.c.*, **1** (7), 282, 1911; CLEVE-EULER, *l.c.*, **5** (4), 5, f. 976a, b, 1955.

Valves large, lanceolate, lateral margin gently convex, apex rounded, 125 μm long and 22 μm wide; central part of the valves destitute of granular striae but formed a stauros stretched outwards. Hab. Lake Hunazoko. Already recorded from the Kasumi Rock ice-free area by FUKUSHIMA. Pl. 15, f. 1, 2; pl. 16, f. 1.

Tropidoneis laevissima W. & G. S. WEST, *l.c.*, **1** (7), 281, pl. 26, f. 115–120, 1911; FUKUSHIMA, *l.c.*, **14**, 88, f. M, 1962a.

Valves linear-lanceolate, 44–55 μm long and 8–9 μm wide, lateral margin in the middle part straight and parallel, gradually attenuated to the rounded end, raphe straight but slightly curved at the end; central stauros narrow and slightly dilated, and reaches the lateral margin. Hab. Widely distributed in many lakes and ponds of the Skarvsnes area. Marine species. Already known from Antarctica. Pl. 18, f. 9–13.

Amphora angusta GREG. var. *ventricosa* GREG. in CLEVE-EULER, *l.c.*, **4** (5), 104, f. 705d, 1953b.

Valves half lanceolate, ventral margin straight, dorsal margin bent at the middle, 120 μm long and 17 μm wide, raphe straight and slightly bent toward the dorsal margin; striae roughly disposed, irregular in length and divergent. Hab. Lake Hunazoko. New to Antarctica. Pl. 13, f. 2.

A. ovalis KÜTZ. var. *ovalis* in CLEVE-EULER, *l.c.*, **4** (5), 90, f. 667a, 1953b.

Valves large with acute ends, half elliptic in outline, 76 μm long and 13 μm wide; granulate striae somewhat radial, 9 in 10 μm, inner margin concave, central part of the valve smooth and destitude of striae. Hab. Lake Hunazoko. Cosmopolitan species. Pl. 14, f. 2, 3.

A. ovalis KÜTZ. var. *pediculus* (KÜTZ.) V. H., Synop. Diat. Belgique, 59, pl. 1,

f. 8, 1885 (as *A. pediculus* KÜTZ, f. 4, 5.); PATRICK & REIMER, Monogr. Acad. Natl. Sci. Philadelphia, **2** (1), 69, pl. 13, f. 5a–6b, 1975.

Valves crescent-shaped, 36–50 μm long and 7–9 μm wide, ventral margin slightly inflated at the middle, dorsal margin strongly convex. Hab. Lake Hunazoko. Marine species. Pl. 16, f. 2–6.

A. veneta (KÜTZ.) HUSTEDT, *l.c.*, **10**, 345, f. 631, 1930; FUKUSHIMA *et al.*, *l.c.*, **50**, 36, pl. 1, f. A–C, H, 1974.

Valves crescent-shaped, 33–42 μm rarely 60 μm long and 6–9 μm wide, ventral margin straight or slightly tumid at the center, ends elongated and slightly constricted below the capitate apex; striae densely disposed except in central part of the valve but roughly disposed in the center. Hab. Nos. 1, 2, 7 and 9 ponds, Lake Hunazoko and stream near camp. Already known from Antarctica. Pl. 14, f. 8. 9, 11; pl. 15, f. 3–8; pl. 16, f. 7–11.

Cymbella tumida (BRÉB.) VAN HEURCK in HUSTEDT, *l.c.*, **10**, 366, f. 677, 1930; CLEVE-EULER, *l.c.*, **5** (4), 166, f. 1255a, 1955.

Valves moderate in size, 60 μm long and 18 μm wide, ventral margin almost straight and slightly tumid in the center, dorsal margin strongly convex, terminal part of valves slightly rostrate, truncately round at the extremity, raphe curved in the center; axial area linear but strongly dilated at the middle so that central area rhomboid; striae all radiate, puncto-like, 9–10 in 10 μm; raphe gently curved, isolated puncta disposed in ventral side of the central area. Hab. No. 2 pond. Already known from the Prince Olav Coast. Pl. 15, f. 9.

C. turgidula GRUN. in HUSTEDT, *l.c.*, **10**, 362, f. 670, 1930; CLEVE-EULER, *l.c.*, **5** (4), 157, f. 1240, 1955; PATRICK & REIMER, *l.c.*, **2** (1), 59, pl. 10, f. 9, 1975.

Valves half elliptic with somewhat rostrated ends, ventral margin slightly tumid and dorsal margin strongly convex, 46–48 μm long and 12–13 μm wide, axial area narrow and slightly curved, central area slightly dilated; striae radial, 10 in 10 μm, isolated puncta disposed on ventral side. Hab. Lake Hunazoko. New to Antarctica. Pl. 14, f. 10.

Fam. 8. Nitzschiaceae

Fragilariopsis antarctica (CASTR.) HUSTEDT in FUKUSHIMA, *l.c.*, **15**, 47, pl. 2, f. 11, 1962b; KOZLOVA, *l.c.*, 90, pl. 5, f. 9–11, 1966.

Valves lanceolate, 30 μm long and 10 μm wide, ends broadly rounded; costae parallel to each other but somewhat obliquely disposed, 6 in 10 μm. Already reported by NEGORO under the name of *Denticula antarctica* (CASTR.) CARLSON from Langhovde. Hab. Lake Hunazoko. Pl. 6, f. 8; pl. 11, f. 9.

F. curta (V.H.) HUSTEDT, *l.c.*, **2** (3), 160, f. 140–144, 159, 1958; FUKUSHIMA, *l.c.*, **15**, 47, pl. 1, f. 4, 5, 1962b.

Valves small, cylindrical, 20–22 μm long and 9 μm wide, ends broadly rounded; costae disposed almost horizontal and parallel to each other, 10 in 10 μm. Hab. Lakes Hunazoko and Suribati, and No. 1 pond. Already known from the Kasumi Rock ice-free area, Cape Royds and others. Pl. 6, f. 5–7.

F. obliquecostata (VAN HEURCK) HEIDEN & KOLBE in HUSTEDT, *l.c.*, **2** (3), 163, f. 149–151, 1958; KOZLOVA, *l.c.*, pl. 6, f. 16, 1966; FUKUSHIMA, *l.c.*, **15**, 47, pl. 2, f.

12, 13, 1962b.

Valves elongate lanceolate, 42–76 μm long and 7–8 μm wide; end rounded; costae disposed horizontal and parallel to each other, 8 in 10 μm. Hab. Lake Hunazoko. Already known from the Prince Olav Coast, the Sinnan Rocks ice-free area and the Cape Royds. Pl. 13, f. 5, 6.

Hantzschia amphioxys (EHRENB.) GRUN. in HUSTEDT, *l.c.*, **10**, 394, f. 747, 1930; FUKUSHIMA, *l.c.*, **14**, 86, f. G. 1962a.

Valves 62–117 μm long and 8–11 μm wide. Hab. Widely distributed in ponds and streams of the Skarvsnes area. Cosmopolitan species. Pl. 17, f. 1–5.

H. linearis (O.M.) CLEVE-EULER, *l.c.*, **3** (3), 51, f. 1421a–d, 1952.

Valves narrow and straight, 60–70 μm long, 5–6 μm wide, lateral margin straight, both margins parallel, suddenly narrowed and constricted near the capitate and extremity rounded end; striae 15 in 10 μm. Hab. Nos. 2 and 8 ponds. New to Antarctica. Pl. 18, f. 6–8.

Nitzschia dubia S. SMITH var. *australis* M. PER. in PERAGALLO, Deuxième Exped. Antarct. Fr. (1908–1910), Sci. Nat. Doc. Sci., **16**, 65, pl. 3, f. 17, 18, 1921; FUKUSHIMA, *l.c.*, **17**, 58, pl. 1, f. 8, 9, 1963; FUKUSHIMA *et al.*, *l. c.*, **50**, 38, pl. 3, f. D, E, 1974.

Valves moderate in size, 65–67 μm long, 7 μm wide, ventral margin almost straight, dorsal margin slightly convex but retuse in the middle, ends suddenly attenuated and somewhat rostrate; striae dense and about 20 in 10 μm. Hab. Nos. 1 and 2 ponds, and stream near camp. Already known from Antarctica. Pl. 18, f. 1–5.

Class 3. Chlorophyceae

Fam. 1. Pleurococcaceae

Pleurococcus antarcticus W. & G. S. WEST f. *robusta* W. & G. S. WEST, Br. Antarct. Exped. 1907–09, Rep. Sci. Invest, **1** (7), 276, pl. 24, f. 52–54, 1911; HIRANO, Mem. Natl Inst. Polar Res., Spec. Issue, **11**, 18, pl. 3, f. 11, 12; pl. 6, f. 7–10, 1979.

Cells solitary and globose, 35 μm in diameter; covered with a thick and smooth gelatinous envelope which is not stratified. Hab. No. 1 pond. Already known from Green Lake and others. The genus *Pleurococcus* is at present considered as a synonym of various green algae. Pl. 3, f. 16.

Fam. 2. Microsporaceae

Microspora stagnorum (KÜTZ.) LAGERH. in HEERING, Süssw.-Flora, **6**, 151, f. 212, 1914; HIRANO, *l.c.*, **11**, 20, pl. 1, f. 12–14; pl. 7, f. 6, 1979.

Cells cylindrical, length about 1.5 times longer than width, 8 μm wide. Hab. Kobati Pond (tentative name). Pl. 5, f. 12, 13.

Fam. 3. Ulothrichaceae

Ulothrix subtilissima RABENH. in HEERING, *l.c.*, **6**, 31, f. 26, 1914; HIRANO, *l.c.*, **11**, 19, pl. 1, f. 15–16, 1979.

Cells 10–13 μm long and 6–7 μm wide. Hab. No. 3 pond. Pl. 3, f. 5–8; pl. 5, f. 5.

U. variabilis KÜTZ. in PRESCOTT, Cranbrook Inst. Sci. Bull., **30**, 97, pl. 6, f. 13, 1951; HIRANO, *l.c.*, **11**, 19, pl. 1, f. 17, 18, 1979.

Cells 7–7.5 μm long and 6–6.5 μm wide. Hab. No. 3 pond. Pl. 3, f. 9; pl. 5, f. 4.

Hormidiopsis crenulata (KÜTZ.) HEERING, *l.c.*, **6**, 51, f. 62, 1914; HIRANO, *l.c.*, **11**,

21, pl. 1, f. 19–21; pl. 8, f. 1–5, 1979.

Cells 10–12 μm long and 10–18 μm wide without mucous sheath, 30 μm wide with mucous sheath. Hab. Stream near camp. Pl. 5, f. 3, 10 and 11.

Fam. 4. Prasiolaceae

Prasiola crispa (LIGHTF.) MENEGH, ssp. *antarctica* (KÜTZ.) KNEBEL, Hedw., **75**, 20, 1935; KOBAYASI, Bull. Natl. Sci. Mus., **3** (1), 52, f. 1, 2, 1956.

The specimens resemble the description by KOBAYASI on the specimens obtained from Erebus Bay. Hab. On the wet ground near penguin rookery.

Fam. 5. Desmidiaceae

Cosmarium clepsydra NORDST. var. *dissimile* (RACIB.) KRIEGER & GERLOFF, Gatt. *Cosm.*, Part 2, 145, pl. 30, f. 9, 1965; HIRANO, *l.c.*, **11**, 22, pl. 9, f. 2–4, 1979.

Cells small, 20–24 μm long and 20 μm wide; semicells variable in form, somewhat reinform, apex narrow and slightly retuse, lower lateral margin shorter than the upper one, divergent and slightly convex, upper lateral margin convergent and faintly undulate. Vertical view of semicell elliptic with a prominent papilla-like projection on each side. Cell wall smooth. Hab. No. 1 pond. Pl. 3, f. 13–15; pl. 5, f. 8, 9; pl. 10, f. 13–16, 18.

C. cucurbita BRÉB. var. *rotundatum* (KRIEGER) KRIEG. & GERLOFF, *l.c.*, 390, pl. 67, f. 4, 1969.

Cells 38 μm long, 10 μm wide, and isthmus 9.5 μm wide. Hab. Stream near camp. Pl. 2, f. 5.

C. subcrenatum HANTZSCH in W. & G. S. WEST, Monogr. Br. Desm., **3**, 223, pl. 86, f. 10–14, 1908; HIRANO, *l.c.*, **11**, 23, pl. 9, f, 8, textf. 1, f. 1–2, 1979.

Semicells trapeziform, apex truncate or slightly undulate, lateral margin convex and convergent upward, crenate or undulate, upper lateral margin crenate and lower ones simple and undulate, inside of lateral margin and apex with a concentric series of punctations, vertical series of punctations disposed in the center of semicell. Cells 30–32 μm long, 28–30 μm wide, and isthmus 8–9 μm wide. Hab. Nos. 1 and 7 ponds. Pl. 10, f. 17, 19; pl. 3, f. 10–12; pl. 5, f. 14–16.

4. Conclusion

The collections consist of 37 vials of specimens from lakes and ponds, 20 vials of those from streams and some others. The author determined 134 taxa of fresh and marine forms of algae. The algae consist of chiefly blue-green algae (51 taxa), diatoms (71 taxa) and green algae (12 taxa). Simple and unicellular algae such as *Chlamydomonas*, *Chlorella* and others including their cysts were not determined owing to the lack of details of the chloroplast or resting stage because of the preserved materials. Blue-green algae found in the benthic slime of littoral zone of lakes and streams are not planktonic.

The collections were divided into lake group, stream group and other subterrestial group in the Skarvsnes area. There are many species of diatoms of marine form in the lake group, especially notable in Lake Hunazoko: *Melosira* 3 taxa (*M. arctica*, *M. sol*, *M. sulcata*), *Coscinodiscus* 8 taxa (*C. decipiens*, *C. excentricus*, *C. gyratus*, *C. lentiginosus*, *C. normanicus*, *C. plicatulus*, *C. pseudodenticulatus*, *C. robustus* var. *latemarginatus*), whereas blue-green algae are few in number of species. On the other hand, there are plenty of freshwater forms of blue-green algae belonging to the Oscillatoriaceae in the streams and they lack brackish and marine forms of diatom. Consequently, the author supposed them to have an oligohaline water quality.

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