Cyanophyceae from Mauritius

Ko MARUYAMA*

モーリシアス島のランソウ類

丸　山　　晃*

要　旨

第5次南極観測隊がモーリシアス島から持ち帰った材料51本を基として検定の結果，29種，1品種のランソウ類を得た．これらの組成は流水域（汚染状態）—流水域（自然状態）—静水域の順で複雑になる傾向を示している．一般にモーリシアス島のランソウ類は貧弱である．個体数の多い種も少なく，*Oscillatoria splendide*, *Phormidium bohneri* など，また分布域の比較的広い種も，*Oscillatoria tenuis*, *Phormidium foveolarum* など，わずかにあげられるにすぎない．

モーリシアス島のランソウ類は組成がアフリカ大陸と類似しており，またアフリカ大陸との共通種／固有種の百分率が1より大きく，この島に大陸と同様の影響が比較的強く及んでいることを示している．

The present report deals with the samples from Mauritius (57.5°E, 20.5°S; 60×45 Km; Fig. 1) collected by Dr. H. FUKUSHIMA during the fifth Japanese Antarctic Research Expedition, 1960–1961.

Samples in 51 bottles, mostly benthos, were examined, from which 30 taxa of blue-green algae were obtained. The systematic composition of blue-green algae has a tendency to become complicated in proportion to the habitat which varies in the following order: running water (polluted)—running water (natural)—standing water. The number of species shows the same tendency. The blue-green algae of Mauritius was generally poor, and was examined only at 52 stations.

The species having a large number of individuals are only the following; *Chroococcus parasitica*, *Oscillatoria splendida*, *Phormidium angustissimum*, *P. bohneri*, and *Lyngbya subtilis*. Such species as *Oscillatoria splendida*, *O. tenuis*, *Phormidium bohneri*, *P. foveolarum*, and *Lyngbya subtilis* comparatively widely distributed in the island

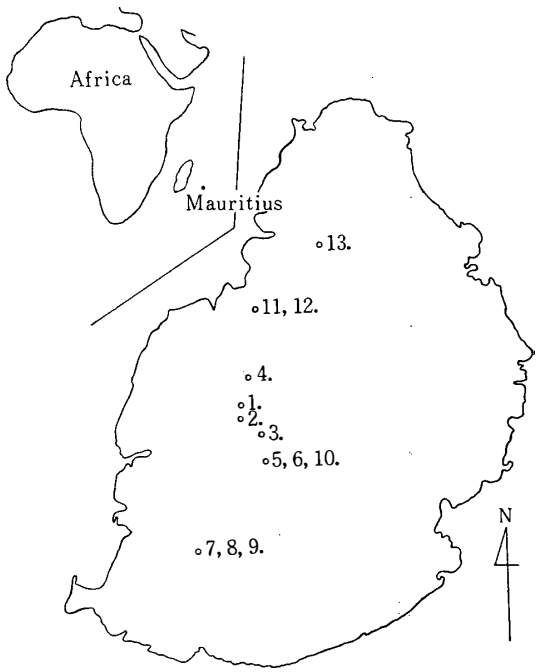

Fig. 1. Location of stations.
13. Pamplemousses. 11,12. Port Louis 4. Moka R. 1. Rossehill R. 2. Rhenix R. 3. Euconlée R. 5,6,10. Curepipe. 7,8,9. Maccabe

* 東京大学応用微生物研究所. Institute of Applied Microbiology, the University of Tokyo.

Table 1. Systematic composition and occurrence of blue-green algae in Mauritius.

	Habitats	Running Water									Standing Water				No. of Cases Examined		
		Polluted Water				Natural Water									Runn. W.		
	Station No. (Sample No.) / Scientific Names	1 (714–47)	2 (718–20)	3 (721–23)	4 (742–43)	5 (724–26)	6 (731–36)	7 (744–47)	8 (748–51)	9 (752–57)	10 (727–30)	11 (737–39)	12 (740–41)	13 (758–64)	Poll. W.	Nat. W.	Stand. W.
Chroococcaceae	Microcystis flos-aquae	1*											1		1		1
	—— holsatica			1											1		
	—— pallida	1				1									1	1	
	—— parasitica	1													1		
	Gloeocapsa kuetzingiana											1	1				2
	Dactylococcopsis africana									2						1	
Oscillatoriaceae	Oscillatoria cortiana					1										1	
	—— jasorvensis									1						1	
	—— limnetica						2			1						2	
	—— pseudogeminata					1				2						2	
	—— splendida			1		2	1								1	2	
	—— tanganika ?						1									1	
	—— tenuis			1	1				1		3				2	1	1
	—— sp.								1							1	
	Phormidium angustissimum											1		1			2
	—— bohneri			2								1		1	1		2
	—— foveolarum	1										1	1	1	1		3
	—— inundatum ?								1							1	
	—— molle f. tenuior										1						1
	—— tenue	1									1				1		1
	Lyngbya kuetzingii			1		1									1	1	
	—— limnetica												1				1
	—— subtilis					1				1			1			2	1
Nost.	Anabaena contorta													3			1
	—— sp.								1	2				1		2	1
M.	Microchate geoppertiana													1			1
Rivul.	Calothrix brebiarticulata												1				1
	—— fusca							1								1	
	—— minima									1						1	
S.	Stigonema minutissimum												1				1
	Total No. of Families and Species	2–5	2–5		1–1	2–6	1–3	1–1	2–4	4–7	1–3	2–4	4–7	3–6	11	21	
		2–10				4–16					6–15				Total 32		20
		4–22															
		6–32													52		

*=No. of samples, black letter=abundant.

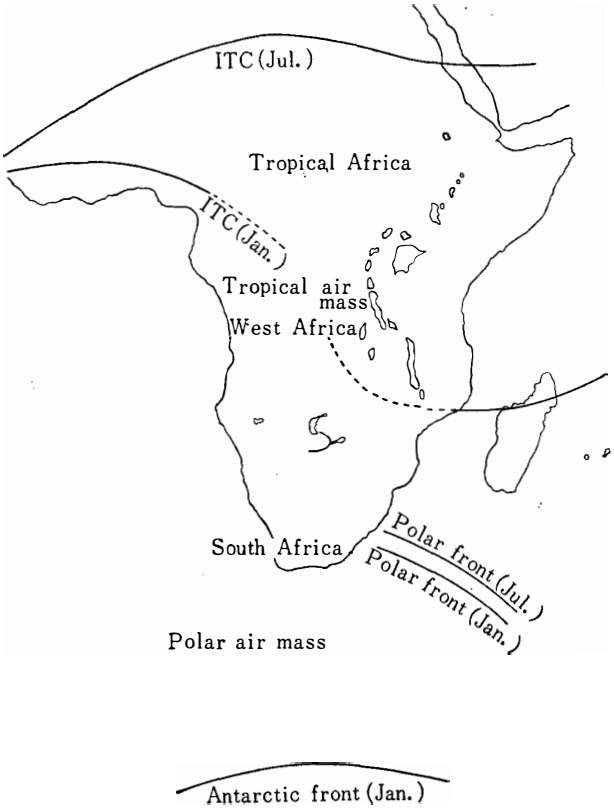

Fig. 2. Geografical distribution of air mass (modified from HAURWITZ and AUSTIN).

Table 2. Systematic composition of blue-green algae in Mauritius and other regions.

	Antarctica	Mauritius	South Africa	West Africa	Tropical Africa
Chroococcaceae	27 (25.5)	6 (20.0)	16 (29.1)	64 (21.6)	76 (26.9)
Chamaesiphonaceae				2 (0.7)	2 (0.7)
Pleurocapsaceae					2 (0.7)
Oscillatoriaceae	50 (47.2)	17 (56.7)	32 (58.2)	125 (42.2)	116 (41.0)
Nostocaceae	19 (17.9)	2 (6.7)	5 (9.1)	32 (10.8)	43 (15.2)
Scytonemataceae	3 (2.8)		1 (1.8)	38 (12.8)	13 (4.6)
Microchataceae	1 (0.9)	1 (3.3)		6 (2.0)	3 (1.1)
Rivulariaceae	6 (5.7)	3 (10.0)	1 (1.8)	16 (5.4)	20 (7.1)
Stigonemataceae		1 (3.3)		13 (4.4)	8 (2.8)
Total No. of Species	106	30	55	296	283

Table 3. Number of endemic (underline) and common species in Mauritius and other regions.

	Antarctica	Mauritius	South Africa	West Africa	Tropical Africa
Antarctica	<u>71</u>	9 (0.82)	9	25	26
Mauritius	9	<u>11</u> (1.00)	5	12	17
South Africa	9	5 (0.45)	<u>18</u>	32	30
West Africa	25	12 (1.09)	32	<u>167</u>	120
Tropical Africa	26	17 (1.55)	30	120	<u>142</u>

(Table 1).

The writer tentatively divided Antarctica and Africa into four regions on the basis of the air mass index, as shown in Fig. 2, and contrasted the systematic composition of blue-green algae in Mauritius with other regions (Table 2), and noticed a marked partial tendency those of Mauritius Island (Table 1). The systematic composition of blue-green algae of the island has something in common with that of Africa. Such a relation is found in the flora of the Mauritius having undergone the same influence as the continent of Africa as shown in Table 3 which gives the number of endemic (underline) and common species (number within parenthesis=number of common s./ number of endemic s.) in Antarctica and Africa.

The writer's sincere gratitude is expressed to Dr. H. FUKUSHIMA, Assistant Professor of Yokohama Municipal University, for his guidance and encouragement throughout this work.

Stations of the two principal habitats are listed below, with description of blue-green algal constituents, etc.

1. Running water

St. 1 (Samps. 714–717). Rosehill River. Mar. 31, 1961. A very polluted stream, about 3 meters wide, 0.05 meters deep, with mud bottom. Samp. 714. *Phormidium tenue*; Samp. 716. *Microcystis flos-aquae*, *P. foveolarum*; Samp. 717. *M. pallida*, *M. parasitica* (abundant).

St. 2 (Samps. 718–720). Rhenix River. Mar. 31, 1961. A very polluted stream, about 3 meters wide, 0.05 meters deep. Air temp. 25.5°C, water temp. 27.0°C, pH 7.7. Only a few grass-green algae and diatoms are found.

St. 3 (Samps. 721–723). Euconlée River. Mar. 31, 1961. A very polluted stream, about 3 meters wide, 0.05 meters deep, with mud bottom. Samp. 721. *Lyngbya kuetzingii*, *Microcystis holsatica*, *Oscillatoria tenuis*, *Phormidium bohneri*; Samp. 722. *P. bohneri*; Samp. 723. *O. splendida*.

St. 4 (Samps. 742 and 743). Moka River. Mar. 31, 1961. A slightly polluted stream, about 20 meters wide, 0.3 meters deep, with mud bottom. Samp. 742. *Oscillatoria tenuis*.

St. 5 (Samps. 724–726). Curepipe Botanical Garden. Mar. 31, 1961. A natural stream, about 1 meters wide, 0.05 meters deep, with mud bottom. *Chatephora* grows in this stream. Samp. 724. *Oscillatoria splendida*; Samp. 725. *O. cortiana*, *O. splendida* (abundant); Samp. 726. *Lyngbya kuetzingii*, *L. subtilis* (abundant), *Microcystis pallida*, *O. pseudogeminata*.

St. 6 (Samps. 731–736). Curepipe Botanical Garden. Mar. 31, 1961. A natural stream, 0.6 meters wide, 0.1 meters deep, with mud bottom. *Chara* grows in this stream. Samp. 732. *Oscillatoria tanganica*?; Samp. 735. *O. limnetica*; Samp. 736. *O. limnetica*; *O. splendida*.

St. 7 (Samps. 744–747). Maccabe Native Plant Reserved Forest. Mar. 31, 1961.

A natural stream, 0.3 meters wide, 0.1 meters deep, with mud bottom, pH 6.4. Samp. 747. *Calothrix fusca*.

St. 8 (Samps. 748–751). Maccabe Native Plant Reserved Forest. Mar. 31, 1961. A natural stream, with mud bottom, pH 6.4. *Chara* grows in this stream. Samp. 748. *Phormidium inundatum*?; Samp. 750. *Oscillatoria tenuis*; Samp. 751. *Anabaena* sp., *O.* sp.

St. 9 (Samps. 752–757). Maccabe Native Plant Reserved Forest. Mar. 31, 1961. A natural stream, about 3 meters wide, 0.15 meters deep, with mud bottom. Samp. 753. *Calothrix minima, Oscillatoria jasorvensis, O. pseudogeminata*; Samp. 754. *O. limnetica, O. pseudogeminata*; Samp. 755. *Anabaena* sp.; Samp. 756. *Dactylococcopsis africana*; Samp. 757. *D. africana, Lyngbya subtilis*.

2. Standing water

St. 10 (Samps. 727–730). Curepipe Botanical Garden. Apr. 1, 1961. A permanent pond, about 50 meters in diameter. *Nymphaea* grows in this pond. Samp. 727. *Oscillatoria tenuis*; Samp. 729. *O. tenuis, Phormidium molle* f. *tenuior, P. tenue*; Samp. 730. *O. tenuis*.

St. 11 (Samps. 737–739). Mauritius Institute, Port Louis. Apr. 1, 1961. A permanent pond, 3 meters in diameter, 0.4 meters deep. Samp. 738. *Gloeocapsa kuetzingiana, Phormidium bohneri* (abundant); Samp. 739. *P. angustissima* (abundant), *P. foveolarum*.

St. 12 (Samps. 740 and 741). Mauritius Institute, Port Louis. Apr. 1, 1961. A water tank, 2 meters in diameter, 0.4 meters deep. Samp. 740. *Calothrix brebiarticulata, Lyngbya limnetica, L. subtilis, Microcystis flos-aquae, Stigonema minutissima*; Samp. 741. *Gloeocapsa kuetzingiana, P. foveolarum*.

St. 13 (Samps. 758–764). Pamplemousses Botanical Garden. Apr. 1, 1961. A permanent pond. *Euryale* and *Salvinia* grow in this pond. Samp. 759. *Phormidium angustiesimum*; Samp. 760. *P. bohneri*; Samp. 762. *Anabaena contorta*; Samp. 763. *A. contorta, P. foveolarum*; Samp. 764. *A. contorta, A.* sp., *Microchate geoppertiana*.

Chrococcaceae

1. *Microcystis flos-aquae* (Wittr.) Kirchn.: Tilden, Minesota Algae, 1:35, pl. 2, Fig. 18, 1910; Geitler, in Pascher's Süsswasser Flora, 12: 60, Figs. 41-42, 1925; Huber-Pestalozzi, in Thienemann's Binnengewasser, 12(1): 135, Abb. 5, 1938; Komarek & Ettl, Algologische Studien, 47–51, 1958; Desikachary, in Randhawa's I.C.A.R. Monographs on Algae, 1: 94, Pl. 17, Fig. 11; Pl. 18, Fig. 11, 1959.

   = *Microcystis aeruginosa* f. *flos-aquae* (Wittr.) Elenkin, Monogr. Algar. Cyan., 1: 103, 1938; *Anacystis cyanea* (Kütz.) Drouet & Daily, Butler Univ. Bot. Stud., 10: 221, 1952; Rev. Coccoid Myxophyceae, 36, 1956.

Colonies 40–50 μ in diameter, cells 2.5–7 μ in diameter. Pl. 1, Fig. 1. Loc. St. 1, Samp. 716; St. 12, Samp. 740.

Standing water. Fresh water. Plankton or often as a neuston.

Sierra Leone, Belgian Congo. Leuduger (1898); Nyassa Lake, Schmidle (1903); Griqualand West, Fritch & Rich (1930); Brackpan, Florida Lake, Frischgewaagd Dam, Harteveestpoot Dam, Rietkuil, Weltevreden East Pan, in Transvaal; Princess Vlei, Cape Flats, Zeakae Vlei, in Cape Province; Maloti Lake, in Portuguese East Africa; Rift Valley Lake, Rich (1é32); Pan in Southern Rhodesia, Rich (1935); Edouard Lake, Kivu Lake, Mokoto Lake, Frémy (1949); Baringo Lake, Bita Lake, Tana Lake, Victoria Lake, Meel (1954); in Africa; Ceylon, India, Burma, Japan, in Asia; Europe; Central America.

2. *Microcystis holsatica* Lemm. var. *holsatica*: Geitler, 1. c., 61, 1925; Huber-Pestalozzi, 1. c., 136, 1938; Komarek & Ettl, 1. c., 47–51, 1958; Desikachary, 1. c., 96, 1959.

=*Clathrocystis holsatica* Lemm., Forschungsber. biol. Stat. Plön, 10: 150; Forti in De Toni, Sylloge Algarum, 5: 95, 1907; *M. pulveria* f. *holsatica* (Lemm.) Elenkin, Monogr. Alg. Cyan. 1: 124, 1938; *Anacystis incerta* (Lemm.) Drouet & Daily, Rev. Coccoid Myxophyceae, 42, 1956.

Colonies 30–35 μ in diameter, Cell 0.8 μ in diameter. Pl. 1, Fig. 2. Loc. St. 3, Samp. 721.

Standing water. Fresh water or polluted water. Plankton or benthos (among other algae).

Belgian Congo, Leuduger (1898); Edouard Lake, Frémy (1949); Ceylon, Japan, in Asia; Europe.

3. *M. pallida* (Farlow.) Lemm.: Tilden, 1. c., 36, 1910; Geitler, 1. c., 61, 1925; Komarek & Etll, 1. c., 47–51, 1958.

=*Anacystis incerta* (Lemm.) Drouet & Daily, Rev. Coccoid Myxophyceae, 42, 1956.

Colonies 20–75 μ in diameter, cells 3–7 μ in diameter. Pl. 1, Fig. 3. Loc. St. 1, Samp. 717, St. 5, Samp. 726.

Fresh water. Benthos (among other algae).

North America.

4. *M. parasitica* Kütz. var. *parasitica*: Rabenh., Flora Europae Algarum, 2: 52, 1865; Geitler, 1. c., 62, Fig. 48, 1925; Kornarek & Etll, 1. c., 47–51, 1958.

=*Anacystis parasitica* Kütz., Fl. Eur. Alg. 2: 52, 1865.

Colonies 30 μ in diameter, cells 2 μ in diameter. Pl. 1, Fig. 4. Loc. St. 1, Samp. 717.

Standing water. Fresh water. Periphyton.

Antarctica, Fritch (1912); Belgian Congo, Leuduger (1898); Edouard Lake, Nyassa Lake, Mell (1954); in Africa; Japan, in Asia; Europe.

5. *Gloeocapsa kuetzingiana* Näg.: Rabenh., 1. c., 46, 1865; Geitler, 1. c., 90, 1925; Desik., 1. c., 118, 119, Pl. 23, Fig. 4; Pl. 24, Fig. 12, 1959.

Cells 4–6μ in diameter with sheath, 1.5–3.5μ in diameter without sheath. Pl. 1, Fig. 5. Loc. St. 11, Samp. 738, St. 12, Samp. 741.

Subaquatic.

India, Japan, in Asia; Europe.

6. *Dactylococcopsis africana* G. S. West.: Geitler, 1. c., 115, 1925.

Cells 2–2.5μ in diameter, 46–53μ in length. Pl. 1, Fig. 6. Loc. St. 9, Samps. 756–757.

Standing water. Fresh water. Plankton.

Victoria Lake, Mell (1954); in Africa.

Oscillatoriaceae

7. *Oscillatoria cortiana* (Menegh.) Gom.: Tilden, 1. c., 81, Pl. 4, Fig. 34, 1910; Geitler, 1. c., 372, 373, Fig. 456, 1925; Desik., 1. c. 233, Pl. 38, Fig. 14, 1959.

Trichomes 4.5μ in diameter, cells 3.5–7.5μ in length. Pl. 1, Fig. 7. Loc. St. 5, Samp. 725.

Standing water or running water. Fresh water. Periphyton or Neuston.

Antarctica, Wille (?); Belgian Congo, Sierra Leone, Leuduger (1898); Edouard Lake, Frémy (1949); Tanganika Lake, Meel (1954); Ceylon, India, Japan, in Asia; North America; Europe.

8. *O. jasorvensis* Vouk.: Desik. 1. c., 221, 222, 1959.

Trichomes 3.5μ in diameter, cells 2–4μ in length. Pl. 1, Fig. 8. Loc. St. 9, Samp. 753.

Running water. Fresh water.

Burma, Japan, in Asia.

9. *O. limnetica* Lemm.: Geitler, 1. c., 365, 1925; Huber-Pestalozzi, 235, 236, Abb. 183, 1938; Komarek & Etll, 1. c., 165, 166, Tab. 19, Fig. 9, 1958; Desik., 1. c., 226, Pl. 37, Fig. 3, 1959.

=*O. splendida* var. *limnetica* (Lemm.) Playfair, Biol. Richmond. River, 130, Pl. 6, Fig. 4, 1914.

Trichomes 1–2μ in diameter, cells 2–5.5μ in length. Pl. 1, Fig. 9. Loc. St. 6, Samps. 735–736; St. 9, Samp. 754.

Standing water or running water. Fresh water or polluted water. Plankton or benthos (among other algae).

Sierra Leone, Leuduger (1898); Edouard Lake, Kivu Lake, Mokoto Lake, Meel (1954); Cylon, India, Japan, in Asia; Europe.

10. *O. pseudogeminata* Schmidle var. *pseudogeminata*: Geitler, 1. c., 433, 1925; Desik., 1. c., 228, 229, Pl. 41, Fig. 10, 1959.

Trichomes 1.5–2μ in diameter, cells 1.5–4μ in length. Pl. 1, Fig. 10. Loc. St. 5, Samp. 726, St. 9, Samps. 753–754.

Subaquatic. Freshwater.

India, Burma, in Asia; Europe.

11. *O. splendida* Grev. var. *splendida*; Tilden, 1. c., 76, 77; Pl. 4, Figs. 23–25, 1910; Geitler, 1. c., 370, Fig. 449, 1925; Huber-Pestalozzi, 1. c., 237, 238, Abb. 186, 1938; Desik., 1. c., 234, Pl. 37, Figs. 7–8; Pl. 38, Fig. 10, 1959.

Trichomes 2–2.5μ in diameter, 2.5–8.5μ in length, Pl. 1, Fig. 11. Loc. St. 3, Samp. 723, St. 5, Samps. 724–725, St. 6, Samp. 736.

Standing water, running water, or Subaquatic. Fresh, brackish, salt, or polluted water. Plankton, benthos, or periphyton.

Sierra Leone, Leuduger (1898); Kamerun, Schmidle (1902 a); Nyassa Lake, Schmidle (1903); Victoria Nyazza, Osten (1908); Belfast Pan in Transvaal, Griqualand West, Fritch & Rich (1930); Weltevreden West Pan in Transvaal, Rich (1932); in Africa; India, Burma, Japan, in Asia; North America; Europe.

12. *Oscillatoria tanganica* G. S. West. ?: Geitler, 1. c., 367, Fig. 445, 1925; Huber-Pestalozzi, 1. c., 237, Abb. 186, 1938; Komarek & Etll, 1. c., 163–165, 1958; Desik., 1. c., 233, 234, Pl. 40, Figs. 6–8, 1959.

Trichomes 3.5μ in diameter, cells 1.5–2.5μ in length. Pl. 1, Fig. 12. Loc. St. 6, Samp. 732.

Standing water or running water. Fresh water. Plankton.

Tanganika Lake, Meel (1954); in Africa; India, in Asia.

13. *O. tenuis* Ag. var. *tenuis*: Rabenh. 1. c., 102, 103, 1865; Tilden, 1. c., 71–73, Pl. 4, Figs. 17–18, 1910; Geitler, 1. c., 362, 363, Figs. 27, 28 a, 1925; Huber-Pestalozzi, 1. c., 235, Abb. 180, 1938; Disik., 1. c., 222, 223, Pl. 42, Fig. 15, 1959.

Trichomes 3.5–5.5μ in diameter, cells 2–5.5μ in length. Pl. 1, Fig. 13. Loc. St. 3, Samp. 721, St. 4, Samp. 742, St. 8, Samp. 750, St. 10, Samps. 727, 729, 730.

Standing water, running water, or subaquatic. Fresh, brakish, or salt water. Plankton or benthos.

Antarctica, West & West (1911), Fritch (1912), Wille (?); Angola, West (1898); Sierra Leone, Cameroons, Leuduger (1898); Tr. Afr., Schmidle (1902 b); Nyassa Lake, Schmidle (1903); Griqualand West, Fritch & Rich (1930); Région des Volcans, Edward Lake, Frémy (1949); Mogol River in North Transvaal, Cholnoky (1954); Albert Lake, George Lake, Tanganika Lake, Victoria Lake, Meel (1954); Pakistan, Ceylon, India, Burma, Japan, in Asia; West Indies, North America; Greenland, Europe.

14. *O.* sp.

Trichomes 4μ in diameter; cells 3–4μ in length. Pl. 1, Fig. 14. Loc. St. 8, Samp. 751.

15. *Phormidium angustissimum* W. & G. S. West. f. *angustissimum*: Geitler, 1. c., 377, 1925; Desik., 1. c., 253, 1959.

Cells 1μ in diameter, 1–5.5μ in length. Pl. 1, Fig. 15. Loc. St. 11, Samp. 739, St. 13, Samp. 759.

Running water or subaquatic. Fresh water.

Antarctica, Fritch (1912), Wille (?); Angola, West (1897); Tanganica Lake,

Victoria Lake, Meel (1954); Burma, Japan, in Asia; Europe.

16. *P. bohneri* Schmidle: Geitler, 1. c., 382, 1925; Desik., 1. c., 261, 262, 1959.

Cells 1–1.8μ in diameter, 1–3.5μ in length. Pl. 1, Fig. 16. Loc. St. 3, Samps. 721-722, St. 11, Samp. 738, St. 13, Samp. 760.

Subaquatic.

Cameroons, Leuduger (1898), Schmidle (1902a); Burma, in Asia; Europe.

17. *Phormidium foveolarum* (Mont.) Gom.: Tilden, 1. c., 94, Fig. 54, 1910; Geitler, 1. c., 377, 378, Fig. 469, 1925; Desik., 1. c., 254, 255, 1959.

Trichomes 2–2.5μ in diameter, 1–2.5μ in length. Pl. 1, Fig. 17. Loc. St. 1, Samp. 716, St. 11, Samp. 739, St. 12, Samp. 741, St. 13, Samp. 763.

Subaquatic. Fresh or polluted water.

Tanganica Lake, Meel (1954); India, Japan, in Asia; North America; Europe.

18. *P. inundatum* Kütz. var. *inundatum*?; Rabenh., 1. c., 116, 1865; Tilden, 1. c., 100, Pl. 14, Figs. 69–70, 1910; Geitler, 1. c., 384, 1925.

Filaments 2.5μ in diameter, 3–3.5μ in length. Pl. 1, Fig. 18. Loc. St. 8, Samp. 748.

Standing water, running water, or subaquatic. Fresh water. Benthos.

Antarctica, Wille ( ); Cameroon, Belgien Congo, Leuduger (1898); Griqualand West, Fritch & Rich (1930); Nyassa Lake, Meel (1954); Japan, in Asia; North America; Europe.

19. *P. molle* (Kütz.) Gom. f. *tenuior* W. & G. S. West.: Geitler, 1. c., 378, 1925; Desik., 1. c., 255, 1959.

Trichomes 1.5μ in diameter, 2.5μ in length. Pl. 1, Fig. 19. Loc. St. 10, Samp. 729.

Standing water or subaquatic. Fresh water. Periphyton.

India, in Asia; England, in Europe.

20. *P. tenue* (Menegh.) Gom. var. *tenue*: Rabenh., 1. c., 128, 1865; Tilden, 1. c., 98, Pl. 4, Figs. 63–65, 1910; Geitler, 1. c., 381, Figs. 478, 1925; Desik., 1. c., 259, Pl. 43, Figs. 13–15; Pl. 44, Fig. 7–9, 1959.

=*Leptothrix subtilissima* Kütz, Tab. Phycologicae, 1: 65, 1845; *Hyphaeothrix subtilissima* Rabenh., Fl. Eur. Alg. 2: 77, 1865.

Trichomes 1.5–2.5μ in diameter, cells 2.5–4μ in diameter. Pl. 1, Fig. 20. Loc. St. 1, Samp. 714, St. 10, Samp. 729.

Standing water, running water, or subaquatic. Fresh or salt water. Benthos (among other alga).

Antarctica, Fritch (1912), Wille ( ); Sierra Leone, Belgian Congo, Leuduger (1898); Griqualand West, Fritch & Rich (1930); Pan in Southern Rhodesia, Rich (1935); Belfast Pan in Transvaal, Fritch & Rich (1937); Edouard Lake, Région des Volcans, Gabum, Frémy (1949); Tanganica Lake, Meel (1954); Pakistan, Ceylon, India, Burma, Malaya, Japan, in Asia; North America; Europe.

21. *Lyngbya kuetzingii* Schmidle var. *kuetzingii*: Geitler, 1. c., 402, 1925; Desik.,

1. c., 282, 284, Pl. 48, Fig. 2, 1959.

Filaments 2–2.5μ in diameter, trichomes 1.8–2μ in diameter, 0.8–2μ in length. Pl. 1, Fig. 21. Loc. St. 3, Samp. 721, St. 5, Samp. 726.

Standing water. Fresh water. Periphyton.

Antarctica, West & West (1911), Wille (?); Belgian Congo, Leuduger (1898); Edouard Lake, Frémy (1949); Victoria Lake, Meel (1954); in Africa; India, Japan, in Asia; Europe.

22. *Lyngbya limnetica* Lemm. f. *limnetica*: Geitler, 1. c., 399, Fig. 504, 1925; Huber-Pestalozzi; 1. c., 243, Abb. 207, 1938; Komarek & Etll, 1. c., 172, 1958; Desik., 1. c., 294, Pl. 50, Fig. 11, 1959.

Filaments 1μ in diameter, 2μ in length. Pl. 1, Fig. 22. Loc. St. 12, Samp. 740.

Standing water. Fresh or salt water. Plankton or benthos.

Antarctica, West & West (1911); Wille (?); Belgian Congo, Leuduger (1898); Victoria Nyassa, Osten (1908); Région des Volcans, Mokoto Lake, Frémy (1949); Edouard Lake, Kivu Lake, Tanganika Lake, Meel (1954); in Africa; Ceylon, India, Burma, Java, Japan, in Asia; New Zealand, Chatham Is., in Oceania; Europe.

23. *L. subtilis* W. West. var. *subtilis*: Geitler, 1. c., 446, 1925; Desik., 1. c., 294 1959.

Filaments 2–2.5μ in diameter, trichomes 1.8–2μ in diameter, cells 3–4μ in length. Pl. 1, Fig. 23. Loc. St. 5, Samp. 726, St. 9, Samp. 757, St. 12, Samp. 740.

Subaquatic.

India, in Asia; Europe.

Nostocaceae

24. *Anabaena contorta* Bachm: Geitler, 1. c., 314, Fig. 361, 1925; Momarek & Ettl., 1. c., 119–124, 1958.

Trichomes 3.5–5μ in diameter, 3–5μ in length, heterocysts 4–4.8μ in diameter. Pl. 2, Fig. 24. Loc. St. 13, Samps. 762–764.

Grönland.

25. *A.* sp.

Trichomes 3–5μ in diameter, cells 3–11μ in length. Pl. 2, Fig. 25. Loc. St. 8, Samp. 751, St. 9, Samps. 755–756, St. 13, Samp. 764.

Microchataceae

26. *Microchate geoppertiana* Kirchn.: Geitler, 1. c., 279, Fig. 330, 1925.

Filaments 6μ in diameter, trichomes 4μ in diameter, cells 1–5μ in length, heterocysts 4.5μ in diameter, 4.5μ in length. Pl. 2, Fig. 26. Loc. St. 13, Samp. 764.

Standing water. Fresh water.

Europe.

Plate 1.

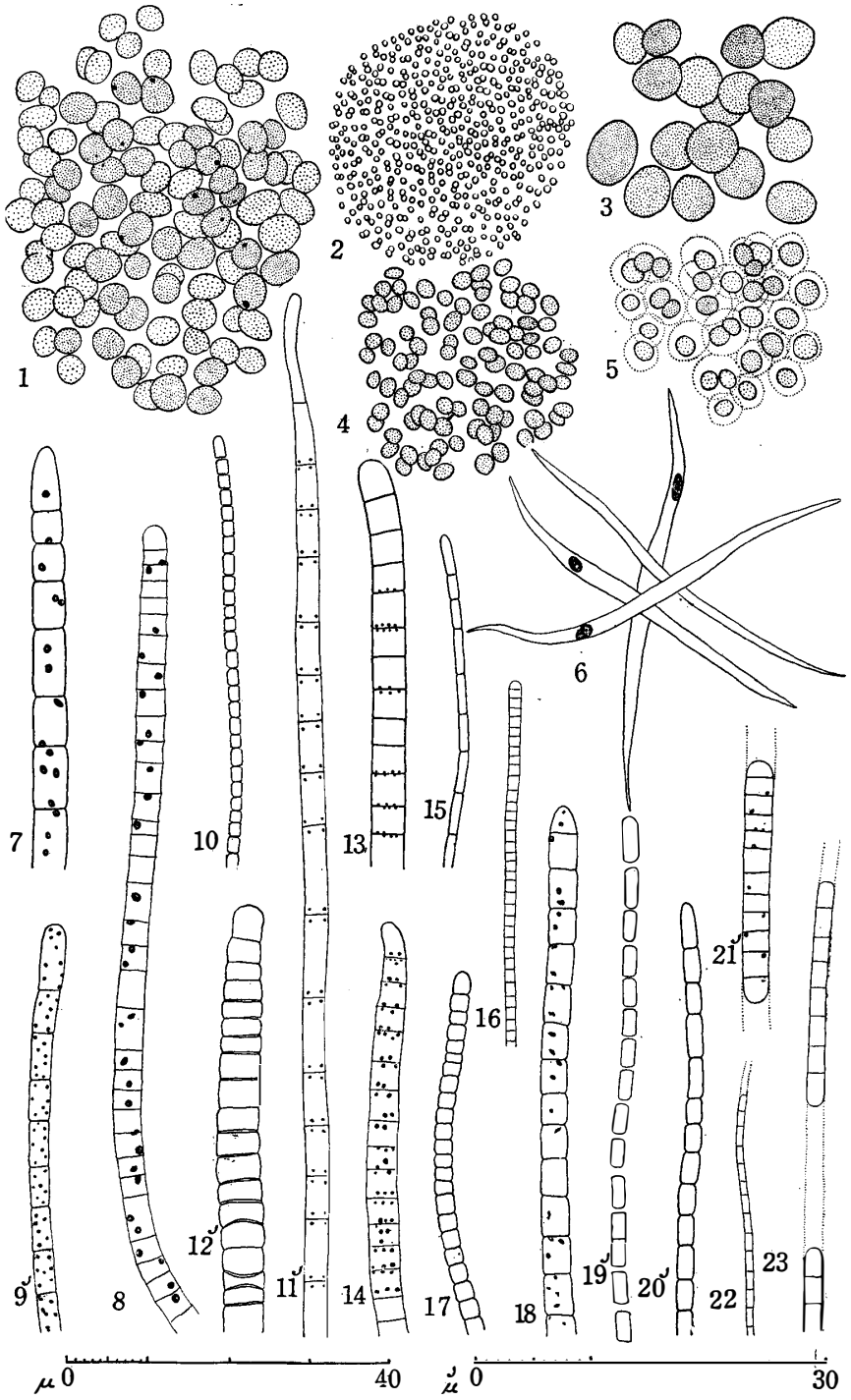

Fig. 1. Microcystis flos-aquae
Fig. 2. ——— holsatica
Fig. 3. ——— pallida
Fig. 4. ——— parasitica
Fig. 5. Gloeocapsa Kuetzingiana
Fig. 6. Dactylococcopsis africana
Fig. 7. Oscillatoria cortiana
Fig. 8. ——— jasorvensis
Fig. 9. ——— limnetica
Fig. 10. ——— pseudogeminata
Fig. 11. ——— splendida
Fig. 12. ——— tanganica ?
Fig. 13. Oscillatoria tenuis
Fig. 14. ——— sp.
Fig. 15. Phrmidium angustissimum
Fig. 16. ——— bohneri
Fig. 17. ——— foveolarum
Fig. 18. ——— inundatum ?
Fig. 19. ——— molle f. tenuior
Fig. 20. ——— tenue
Fig. 21. Lyngbya kuetzingii
Fig. 22. ——— limnetica
Fig. 23. ——— subtilis

Plate 2.

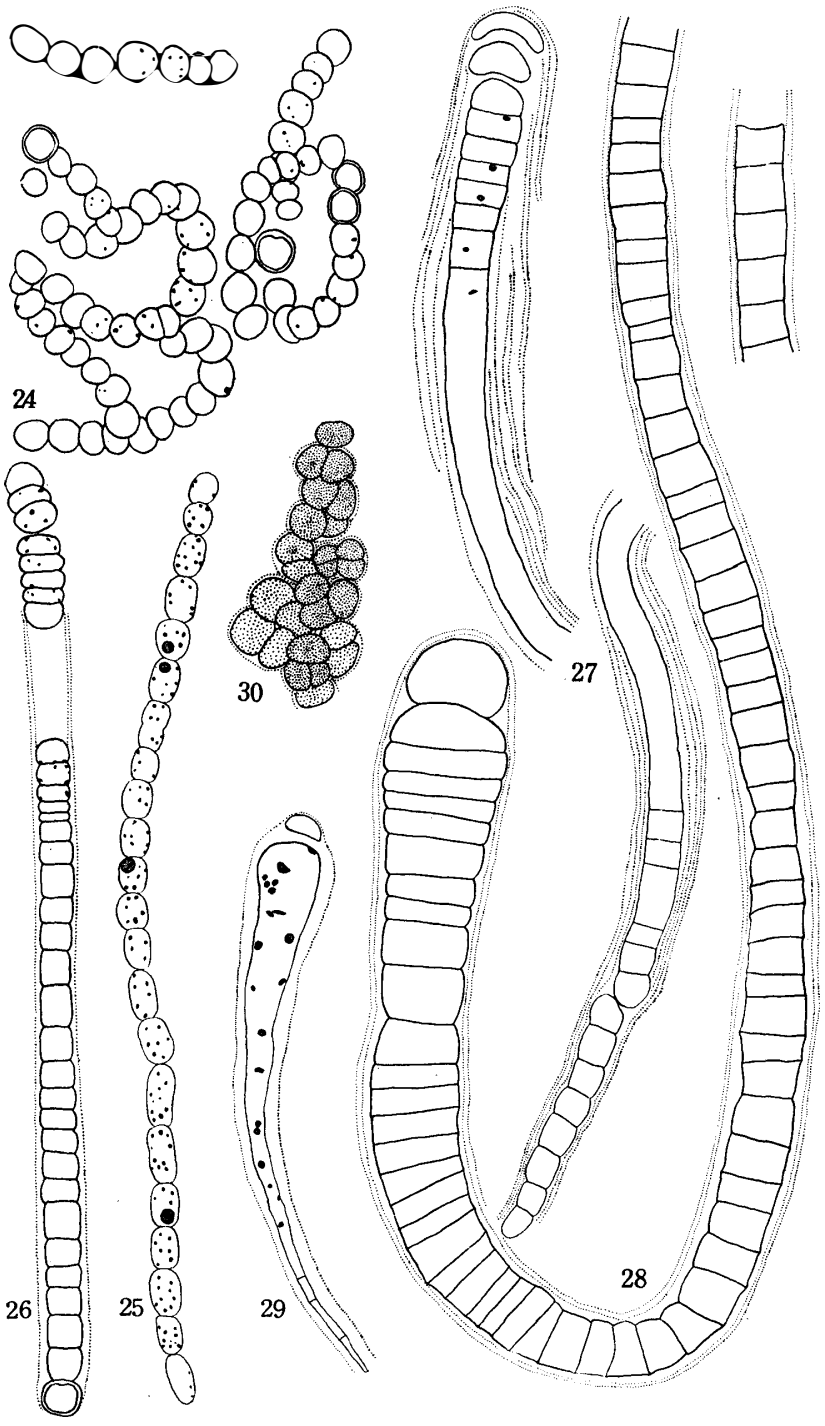

Fig. 24. Anabaena contorta
Fig. 25. ——— sp.
Fig. 26. Microchate geoppertiana
Fig. 27. Calothrix brebiarticulata
Fig. 28. Calothrix fusca
Fig. 29. ——— minima
Fig. 30. Stigonema minutissimum

Rivulariaceae

27. *Calothrix brebiarticulata* W. & G. S. West.: Tilden, 1, c., 267, 1910; Geitler, 1. c., 326, 327, 1925; Desik., 1. c., 537, 538, Pl. 10, Fig. 9, 1959.

Filaments 13 μ in diameter, 170 μ in length, trichomes 7 μ in diameter, cells 2.5–5 μ in length, heterocysts 8 μ in diameter. Pl. 2, Fig. 27. Loc. St. 12 Samp. 740.

Standing water or running water. Fresh water. Periphyton.

Angola, West (1897); in Africa; Ceylon, in Asia; West Indies.

28. *Calothrix fusca* (Kütz) Born. et Flah. Var. *fusca*: Born. & Flah., Rev. Nost. Hétér., Ann. Sci. Nat. Bot. 7 (3): 364, 365, 1886; Tilden, 1. c., 265, 266, Pl. 19, Figs. 10-11, 1910; Geitler, 1. c., 221, Fig. 260, 1925; Desik., 1. c., 527, 529, Pl. 107, Fig. 10, 1959.

=*Masticothrix aeruginosa* Kütz., Phyc. generalis, 232, 1843.

Filaments 12 μ in diameter, trichomes 10.5 μ in diameter, cells 2–4 μ in length. Pl. 2, Fig. 28. Loc. St. 7, Samp. 747.

Standing water or running water. Fresh water. Periphyton or benthos (among other alga).

Antarctica, Carlson (1913); Angola, West (1897); Belgian Congo, Leuduger (1898); Belfast Pan, in Transvaal, Schmidle (1902 b); Pan in Southern Rhodesia, Rich (1935); Edouard Lake, Meel (1954); in Africa; Ceylon, India, Burma, Japan, in Asia; Hawaii, North America; Europe.

29. *C. minima* Frémy: Geitler, 1. c., 223, Fig. 262, 1925.

Filaments 10 μ in diameter, 75 μ in length, trichomes 7.5 μ in diameter, heterocysts 4.5 μ in diameter. Pl. 2, Fig. 29. Loc. St. 9, Samp. 753.

Subaquatic.

Sierra Leone, Leuduger (1898); Ubangui-Sheri, Frémy (1949); A. E. F., Woodhead (1958); in Africa; Europe.

Stigonemataceae

30. *Stigonema minutissimum* Borzi: Geitler, 1. c., 184, 185, 1925.

Filaments 25 μ in diameter, cells 3–3.5 μ in diameter. Pl. 2, Fig. 30. Loc. St. 12, Samp. 740.

Subaquatic.

North Africa; Europe.

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