Some Additional Records of Philippine Marine Chlorophyta[1]

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The following report concerns collections of marine algae selected from larger collections made in the Philippines in 1958 and more recently. Of the algae reported, the following are new records for the Philippines: *Enteromorpha aragoensis* Bliding, *E. intermedia* Bliding, *Chamaedoris orientalis* Okamura, *Rhipiliopsis peltata* (J. Agardh) A. and E. S. Gepp and *Udotea glaucescens* (Harvey) J. Agardh. In addition, the collections contain material of *Trichosolen*, a genus heretofore unreported from the Philippines, but it was not possible to designate the species.

1. *Enteromorpha aragoensis* Bliding, 1960:174.

Collection: *16482*[2,3], collected by Dr. Gregorio T. Velasquez at Dikasalarin, Baler, Quezon Province, April 23, 1958.

2. *Enteromorpha flexuosa* (Wulfen) J. Agardh, 1883:126.

Fig. 1.

Collections: *16293*, small meadows on rock surfaces within about 0.6 meters of low tide line, along southern breakwater of the South Harbor, Manila, Rizal Province, March 1, 1958; *16351*, on dead shells on dark sand in 1.2 to 1.5 meters of water at low tide, Paranaque, Rizal Province, March 9, 1958; *16573*[3], collected by E. G. Meñez on a hard sandy bottom in 0.15 to 0.6 meters of water on an exposed shore just north of Cuyo, Cuyo Island, Palawan Province, April 30, 1958, (10° 52.2′ N.; 121° 01′ E.).

3. *E. intermedia* Bliding, 1955: 262.

Fig. 2.

When found this alga consisted of coarse tubular bright green fronds and when viewed from a distance appeared to be without conspicuous branching, but seen to be beset with short fine branches when viewed more closely; main axes usually less than 0.8 mm in diameter and frequently up to 30 cm long.

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[2] Such five-place numbers are those of the collections in the herbarium and notebooks of Maxwell S. Doty, who made most of the collections where another collector is not cited.

[3] The authors gratefully acknowledge the assistance of Dr. Carl Bliding of Boras, Sweden, in the determination of this collection.

Collection: *16100*[3], constantly submerged in water on outrigger of canoe at the Fisheries Commission laboratory at Dagatdagatan, Rizal Province, February 2, 1958.

4. *E. ramulosa* (J. E. Smith) Hooker, 1833:319.

Fig. 3

Varying from almost microscopic strands to strands that are perhaps enlarged, rather straight, axes up to 0.5 mm in diameter and 6 cm long.

Collections: *16097*[3], green wisps on coconut husk fibers at high tide line under *Avicennia*, Fisheries Commission laboratory, Dagatdagatan, Rizal Province, February 2, 1958; *16099*[3], entangled in branches of *Gracilaria* in Fisheries Commission laboratory ponds at Dagatdagatan, Rizal Province, February 2, 1958; *16353*, on dead shells on dark sand in 1.2 to 1.5 meters of water at low tide, Paranaque, Rizal Province, March 9, 1958.

5. *Trichosolen* sp.

Fig. 5.

Of the collections listed below all are assigned to *Trichosolen* with some uncertainty except for *16291* which bore the characteristic reproductive structures. Even this collection could not readily be assigned to a known species. With reference to collection *16291* the thalli formed erect oval clumps up to 9 cm tall in stands of *Enteromorpha* within 0.4 meter of water below low tide line along the north (protected) side of the breakwater forming the south boundary of South Harbor, Manila. There were two forms, *16291* and a smaller much finer tuft preserved as *16292*. The former proved generally fertile and the latter generally sterile and of much finer branches.

On the fertile thalli what we assume to be gametangia were lateral on the lateral branches of the older parts of most axial systems. They seemed to develop from being slender pyriform objects into more or less fusiform broader protrusions from the branches without a cell wall forming at their bases. The larger ones were seen to have a thickened hemisphere at their tips, but no canal was seen in this thickening. Discharge of contents was not observed. However, in the apical one-third of what were adjudged to be the most mature gametangia there was a somewhat orange mass that was separate from and distinct in appearance from the chloroplast-rich contents in the basal third of the gametangium and of the parent branch.

Collections: *16072*, in unialgal tufts on coral or shell debris scattered on the rather plane, stable, sandy bottom at 1.2 to 1.8 meters, Argao Point, Cebu, January 13, 1958; *16291* and *16292*, forming meadow on horizontal rock surface just below low tide level, along southern breakwater of the South Harbor, Manila, Rizal Province, March 1, 1958; *16712* and *16714*, Benticayan Bay just south of Vinticayan Point, Benticayan, Cantanduanes Province, May 21, 1958.

6. *Rhipiliopsis peltata* (J. Agardh) A. and E. S. Gepp, 1911:45, figs. 118–122.

Figs. 9–12

In both external and internal structure the material matches closely the des-

cription of the Gepps with the exception that the filaments average somewhat larger in diameter, being in the range of 29 to 39 μ. The collection listed below appears to be the first report of this species apart from the Australian area. Another species, *Rhipiliopsis aegyptiaca*, has only been reported (Nasr, 1944) from the Red Sea.

Collection: *18365*, collected by E. G. Meñez at Maribojoc, Sanco Point (08° 14.7′ N; 126° 27.2′ E.), Bislig, Surigao Province, Mindanao, July 5, 1958.

7. *Chlorodesmis comosa* Harvey and Bailey, 1851:373.

This alga is readily recognized by its felted base and dichotomously branched erect filaments which are remotely branched and which possess supra-dichotomial constrictions at unequal distances from the branching.

Collections: *16142 B*, growing among coelenterate corals in dense coral bed along the Lingayan Gulf side of Scout Island, Hundred Islands, Pangasinan Province, February 16, 1958; *16224*, below low tide level, eastern shore south of Cuenco Cave, Cuenco Island, Hundred Islands, Pangasinan Province, February 15, 1958; *16333*, Virgin Cave Island, Hundred Islands, Pangasinan Province, February 15, 1958; *16485*, collected by Gregorio T. Velasquez at Dikasalarin, Baler, Quezon Province, April 23, 1958;*16572*, collected by E. G. Meñez on hard sandy bottom in 0.15 to 0.6 meters of water on exposed shore just north of Cuyo, Cuyo Island, Palawan Province, April 30, 1958; *16675*, Benticayan Bay just south of Vinticayan Point, Benticayan, Catanduanes Province, May 21, 1958; *16827*, wave exposed open sea facing cleft between nearly vertical shores of mainland and an islet near tip of Negumbuaya Point, Bato, Catanduanes Province, May 20, 1958; *16992*, collected by Gregorio T. Velasquez at Digisit, Baler, Quezon Province, April 24, 1958; *18232*, collected by E. G. Meñez, Mati, Davao, Mindanao, June 24, 1958.

8. *Avrainvillea erecta* (Berkeley) A. and E. S. Gepp, 1911:29, pl. 9, figs. 84, 85, pl. 10, figs. 86–89.

Fig. 7 & 8

Most of the specimens in the collections listed below typically represent the species, showing the dense, often cylindrical, massive group of "rootlets" at the base, the shortly-stipitate small brownish frond that varies considerably in shape and thickness, and which is made up of more or less cylindrical nontapering yellow to fulvous filaments ranging from 25 to 40 μ in diameter.

It is not surprising to find this species commonly represented in the collections as it was first described from the Philippines by Berkeley (1842, p. 157, pl. 7, fig. 11) as *Dichonema erectum*.

In the collections at hand, Nos. *16753* and *16754* show a great variation in frond form which varies from flat subcuneate, subreniform, to conical cylindrical. The latter fronds have extremely loose filaments that act as a network holding large quantities of sand, and we believe them to be simply an ecological form. Such a condition appears to exist for other species since Taylor (1960, p. 158) calls attention to the fact that in *A. longicaulis, A. nigricans* and perhaps other species it is not unusual to find plants "with part or all of the blade exceedingly loose and open in texture, or even in lesser or greater part of completely unconsolidated, plumose filaments."

Collections: *10898*, Puerto Galera, Mindoro, December 2–4, 1953; *16213*, ca. 0.31 meter below low tide level on flat bottom in a cove, eastern shore, south of Cuenco Cave, Cuenco Island, Hundred Islands, Pangasinan Province, February 15, 1958, *16538*, collected by E. G. Meñez on hard sandy bottom in 0.15 to 0.6 meters of water on exposed shore just north of Cuyo, Cuyo Island, Palawan Province, April 30, 1958, *16753* and *16754*, reef flat between headlands of Virac Point, Virac, Catanduanes Province, May 20, 1958; and (with some uncertainty as to identity) *16799*, sandy mud flat in cove along middle of west side of Nagumbuaya Point, Bato, Catanduanes Province, May 20, 1958.

9. *Avrainvillea obscura* J. Agardh, 1887: 57.

The specimens at hand agree well with the detailed description of A. and E. S. Gepp (1911, p. 32). The bases of some of the thalli are felted together although each base retains, more or less, its separate identity.

Collection: *16657*, Benticayan Bay, just south of Vinticayan Point, Benticayan, Catanduanes Province, May 21, 1958.

10. *Avrainvillea sordida* Murray and Boodle, 1889: 70.

Figs. 13 & 14

Our first impression was that the collection below represented a *Rhipilia*. Microscopic examination revealed none of the lateral branchlets with tenaculate tips that are characteristic of that genus. Instead, the filaments proved to be typically those of *Avrainvillea* and in the specimens at hand varied from about 24 to 30 μ in diameter to 9.0 μ in diameter at the tapered tips. The fronds are only vaguely zonate, olivaceous, with a yellowish tinge, gregarious from a short base, and fall well within the variations in shape and size noted in A. and E. S. Gepp (1911, p. 40) for *A. sordida*.

Collection: *16751*, reef flat between headlands of Virac Point, Virac, Catanduanes Province, May 20, 1958.

11. *Udotea argentea* Zanardini var. *spumosa* A. and E. S. Gepp, 1911:126, pl. 2, fig. 15, pl. 3, fig. 25a, pl. 7, figs. 61, 62.

Fig. 6

Collection: *16533*, collected by E. G. Meñez on hard sandy bottom in 0.15 to 0.6 meters of water on exposed shore just north of Cuyo, Cuyo Island, Palawan Province, April 30, 1958.

12. *Udotea glaucescens* (Harvey) J. Agardh, 1887: 70.

The thalli reach 3 cm in height, the frond monostromatic, glaucescent, uncorticated and unzoned, made up to parallel usually dichotomously branched filaments which are calcified and laterally adherent. Several fronds are crowded and appear to arise from a common stipe. The filaments of the stipe possess the typical lateral appendages or fibulae characteristic of this species. The frond filaments are constricted at unequal distances above the dichotomies and range in diameter up to 85 μ.

Collection: *16784*, reef flat between headlands of Virac Point, Virac, Catanduances Province, May 20, 1958.

13. *Udotea javensis* (Montagne) A. and E. S. Gepp, 1904:363, pl. 467, figs. 1–4.

Collection: *16592*, collected by E. G. Meñez on hard sandy bottom in 0.15 0.6 meters of water on exposed shore just north of Cuyo, Cuyo Island, Palawan Province, April 30, 1958.

14. *Udotea orientalis* A. and E. S. Gepp, 1911: 119, figs. 1, 4, 47, 48.

Fig. 4

The several collections contain specimens that in shape and size are typically this species, and which show the zoned, uncorticated flabellae consisting of dichotomously branched unadorned filaments which have the supra-dichotomial constrictions very unequally situated.

Collections: *16158*, below low tide level on the western shore south of Cuenco Cave, Cuenco Island, Hundred Islands, Pangasinan Province, Februray 15, 1958; *16477*, collected by Gregorio T. Velasquez at Dikasalarin, Baler, Quezon Province, April 23, 1958; *16647*, Benticayan Bay, just south of Vinticayan Point, Catanduanes Province, May 21, 1958; *16828*, were exposed open sea facing cleft between nearly vertical shores of mainland and an islet near tip of Negumbuaya Point, Bato, Catanduanes Province, May 20, 1958; *16909*, on coral and on reef flat off first point east of Calayucay Bay, Albay Gulf, Albay Province, May 19, 1958; *16994*, collected by Gregorio T. Velasquez at Digisit, Baler, Quezon Province, April 24, 1958; *18353* collected by E. G. Meñez at Maribojac (Sanco Point), Bislig, Surigao, Mindanao, July 5, 1958.

15. *Chamaedoris orientalis* Okamura, 1931: 98, pl. 10.

Fig. 15

Thalli limply erect from, apparently, hard sand or rock covered with a centimeter or two of sand; heads bright green, up to about 2.5 cm in diameter, appearing singly at the tips of ringed stipes 1.3 mm in diameter and up to 5 cm long; filaments in heads 0.4 mm in diameter.

Since these specimens show the wide filaments reputedly characteristic of *Chamaedoris orientalis* Okamura, together with the fact that the capitulum is developed from filaments arising from 10 or more articulations in the upper end of the stipe, we have no hesitation in assigning them to this species.

Collection: *16476*, collected by Gregorio T. Velasquez at Dikasalarin, Baler, Quezon Province, April 23, 1958.

16. *Cymopolia van-bossei* Solms-Laubach, 1893: 78, pl. 8b, figs. 9, 10, 15, 16.

Fig. 16

Thalli unbranched, 8–(10)–15 segments long, forming whitish oblanceolate or narrow clavate frond 10 to 15 mm tall tipped with a green tuft of non-calcified filaments, composed below of calcified segments usually 1 mm in diameter and up to 1 cm long.

Collections: *14365*, collected by Doty and Vicente Alvarez, Poo Point at

entrance to Port Carmen, Cebu Island, February 3, 1965; *16689*, Benticayan Bay, just south of Vinticayan Point, Benticayan, Catanduanes Province, May 21, 1958; *16787*, collected by Doty and Gregorio T. Velasquez on reef flat between headlands of Virac Point, Catanduanes Province, May 20, 1958; *16795*, forming colonies on igneous rocks near low tide line on sandy mud flat in cove along middle of west side of Nagumbuaya Point, Bato, Catanduanes Province, May 20, 1958; *18182* and *18264*, collected by E. G. Meñez on rocks in small pools above low tide level at Mangagoy, Bisling, Surigao Province, June 29 and July 1 (respectively), 1958.

Scattered or aggregated in small turf-like areas on the tops of stones at or below low tide line on sandy mud flats or above low tide line but submerged in pools. Those from the Surigao (Island of Mindanao) collections were composed of somewhat more rounded segments that were in general larger in diameter than those from the more northern location, Catanduanes Island. While most of the specimens in our collections, cited below, are fragmentary they agree with the detailed description of this species given by Gilbert (1943: 20) except that the complete thalli usually had more segments than the four to nine found by that author in the one collection available for his study.

17. *Acetabularia dentata* Solms-Laubach, 1895: 23, pl. 1, fig. 11.

Fig. 18 & 19

The material parallels the description by Solms-Laubach closely with the exception that the segments of the corona superior are deeply lobed rather than "little or scarcely emarginate."

Collection: *18191*, collected by E. G. Meñez from rocks on flat at the east side of the Bislig Bay Lumber Company mill, Mangagoy, Bislig, Surigao Province, June 29, 1958.

18. *Acetabularia major* Martens, 1866: 25, pl. 4, fig. 3.

Fig. 17

The material is in excellent condition. Some of the caps are 2.3 cm in diameter and the rays show the vertical notches on the side walls near their base which are characteristic of this species.

Collections: *16106*, largely on shells, stones, rhizomes of *Thalassia* (or *Enhalus*), *Diplanthera* or *Halophila* and covered with about 10 cm of water at low tide on the mud flat 1/4 to 1/2 km east of Lucap, Pangasinan Province, February 17, 1958; *16810*, extensively covering horizontal —.5 to —6 meter surfaces of igneous rock in large groove or cleft extending to and exposed to sea waves from the open Pacific between an islet and mainland near tip of Nagumbuaya Point, Bato, Catanduanes Province, May 20, 1958.

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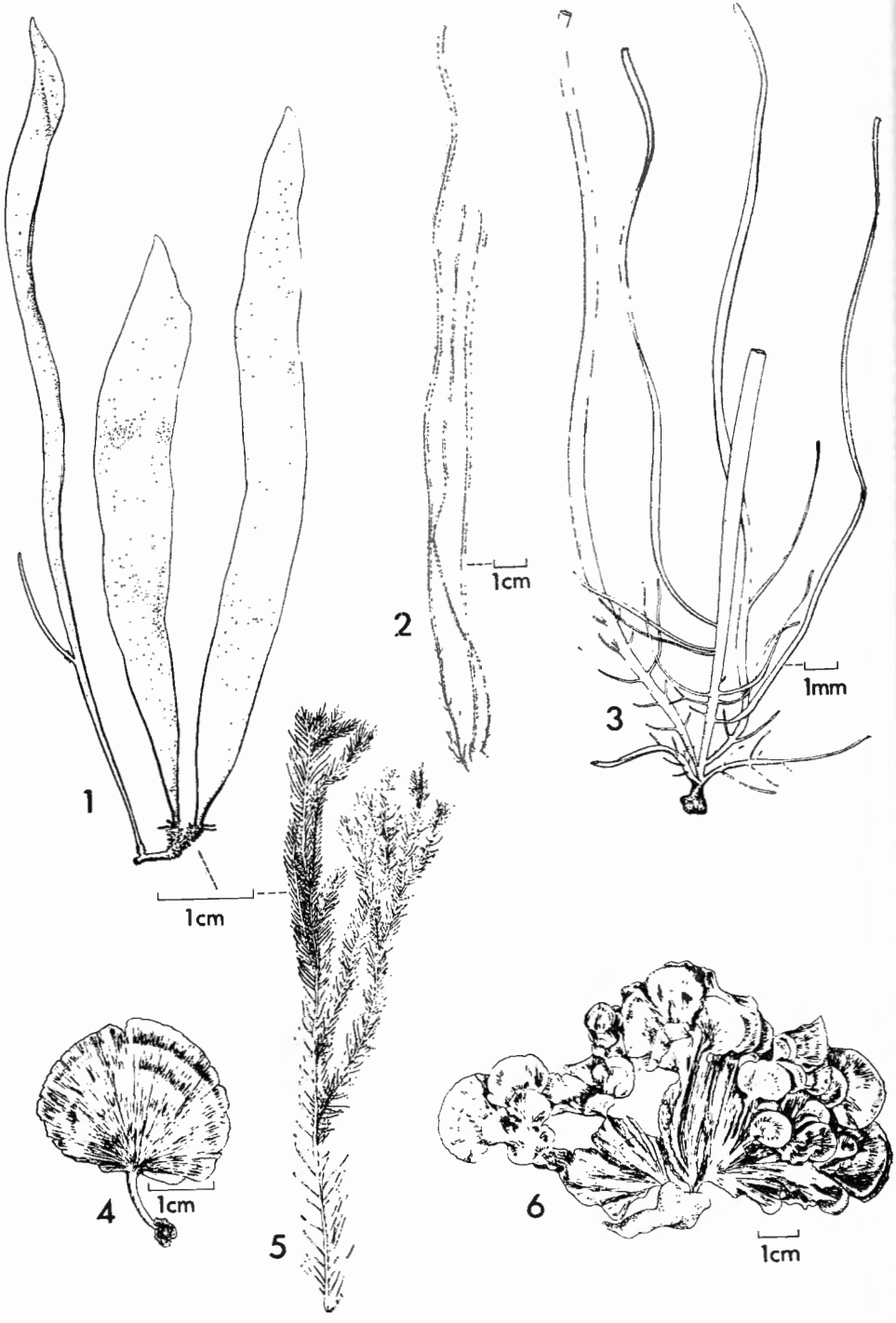
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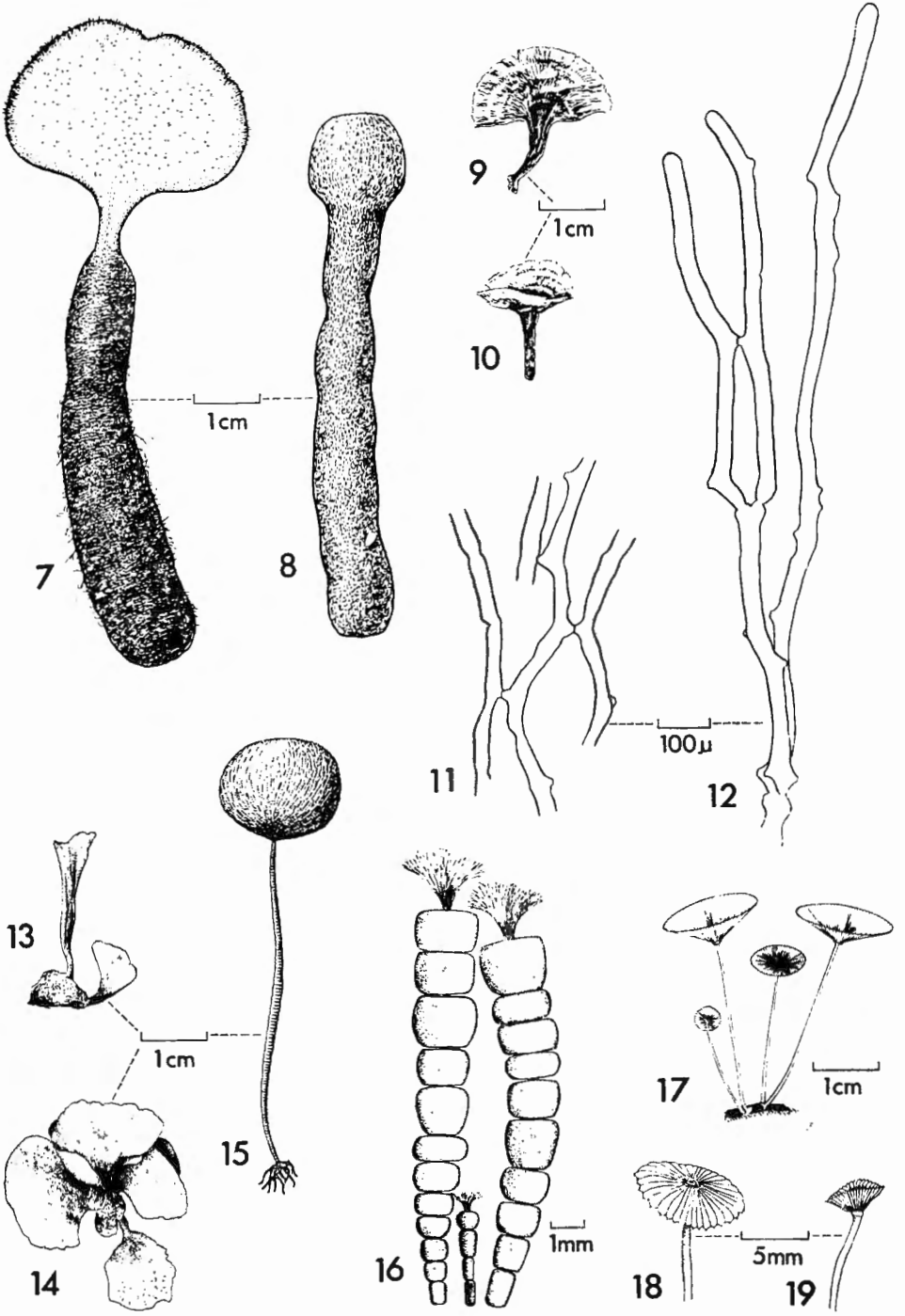
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Legends for Figures

Fig. 1. *Enteromorpha flexuosa* (Wulfen) J. Agardh. Sketch of thalli from collection *16293*.

Fig. 2. *Enteromorpha intermedia* Bliding. Sketch of thalli from collection *16100*.

Fig. 3. *Enteromorpha ramulosa* (J. E. Smith) Hooker. Sketch of thallus from collection *16099*.

Fig. 4. *Udotea orientalis* A. and E. S. Gepp. Sketch of specimen from collection *16909*.

Fig. 5. *Trichosolen* sp. Sketch of thallus from collection *16291*.

Fig. 6. *Udotea argentea* Zanardini var. *spumosa* A. and E. S. Gepp. Sketch of thallus from collection *16533*.

Figs. 7 and 8. *Avrainvillea erecta* (Berkeley) A. and E. S. Gepp. Fig. 7, sketch of a typical thallus from collection *16799*. Fig. 8, sketch of a thallus from collection *16754* showing one of the wide varieties of aberrantly-shaped fronds.

Figs. 9–12. *Rhipiliopsis peltata* (J. Agardh) A. and E. S. Gepp. Figs. 9 and 10, sketches of two thalli from collection *18365*. Figs. 11 and 12, outline drawings of filaments from expanded portion of thallus showing the characteristic pseudoconjugation of lateral protuberances from adjacent filaments found in this genus.

Figs. 13 and 14. *Avrainvillea sordida* Murray and Boodle. Sketches of thalli from collection *16751*.

Fig. 15. *Chamaedoris orientalis* Okamura. Sketch of specimen from collection *16476*.

Fig. 16. *Cymopolia van-bossei* Solms-Laubach. Sketches of thalli from collection *18182*.

Fig. 17. *Acetabularia major* Martens. Sketch of thalli from collection *16106*.

Figs. 18 and 19. *Acetabularia dentata* Solms-Laubach. Sketches of two thalli from collection *18191*.