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**MARINE ALGAE OF THE TE VEGA 1965 EXPEDITION  
IN THE WESTERN PACIFIC OCEAN**

**by Wm. Randolph Taylor**

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## MARINE ALGAE OF THE TE VEGA 1965 EXPEDITION IN THE WESTERN PACIFIC OCEAN

by Wm. Randolph Taylor<sup>1</sup>

The widespread interest in oceanography currently developing has revived the practice of research cruises, but these have generally been devoted to problems of the open ocean rather than of the shoreline, the littoral and sublittoral. The marine institutes of both Atlantic and Pacific coasts of North America have been most active in this open sea work. It is particularly noteworthy that one series promoted by Leland Stanford Jr. University with the M/V *Te Vega* did afford opportunity for work in shallow water along shore.<sup>2</sup> Professor Lawrence R. Blinks, Director of the Hopkins Marine Station of that University was Chief Scientist for the 1965 cruise with which this report is concerned, and the algal material was collected by Dr. Charles F. Cleland, then at Stanford University.<sup>3</sup> The writer is greatly indebted to him for the opportunity to study the material, which was accompanied by extensive field notes and partial identification. For the most part these data could only have been fully utilized by the person who had done the work in the field, but the

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<sup>2</sup> The field work of this M/V *Te Vega* cruise of the winter of 1965 was conducted under National Science Foundation Grant no. G-17465 to Stanford University. Part of the laboratory research on the algae was done under National Science Foundation Grant no. GB-3186 to the University of Michigan. For these supporting grants the collector and the writer are most grateful. A selection of voucher specimens has been placed in the Herbarium of the University of Michigan and the balance returned to the collector.

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general characters of the stations are outlined on following pages, based on the notes provided. Unfortunately much time has elapsed since the material was collected and the large proportion which was in formaldehyde has suffered accordingly; nevertheless much of value remained and it is possible now to give a report in which a large proportion of records are new for the areas concerned. So far as these collections are concerned, the reports start with observations near Singapore, swing up past northern Borneo and through the southern Philippines, then down through the Bismark Archipelago to New Britain Island, over to Bougainville Island in the Solomon Islands, with the last sampling from Guadalcanal Island.

The stations visited by the Te Vega Expedition in question are so distant from each other that a thorough review of the pertinent phyto-geographical literature is impracticable. Most curiously, Singapore, which has been a famous botanical center for many decades has never been favored with a major published algal flora, although the former Director of the Botanical Garden, Dr. H.M. Burkill, collected there extensively, and so the first station, the nearby Hantu Island, has no marine phycological history. Nevertheless, the Siboga Expedition reports of Mme A. Weber-van Bosse (1913-1923) apply very well, even though ranging far to the east of Indonesia.

There have been several papers on Philippine marine algae, summarized by me (1966) and supplemented by others, as Trono (1972). The Caroline Islands have been visited by E.G. Menez and reported upon by Trono (1968, 1969), and Tsuda both collected there and reported his results (1972). The Bismark Archipelago has less algal history. The Zaca Expedition collected in the Solomon and Santa Cruz Islands in 1933 and Setchell reported on the plants (1935), while the Solomons have had the benefit of a recent study by Womersley (1969, 1970). Chapman has recently published on the algae of Fiji (1971). Setchell (1924) dealt with the algae of Samoa. The Society and Tuamotu island groups far to the east have been visited several times: Setchell reported on Tahitian algae (1926) and those collected by a Smithsonian Institution group in 1957 were studied by me (1973). While very much to the north of the Te Vega Expedition route, the algal flora of the Marshall Islands shows much similarity, and my account (1950) and those of Dawson (1956, 1957) are useful for consultation.

From the literature cited in these papers a fairly complete idea of the Indonesian-Polynesian marine flora can be obtained, and it leads one to a wealth of minor scattered records. In addition, the bibliographic compilations of Walker (1947) and of Trono (1966) must be considered. When all this is taken into account it seems clear that the information on the algal flora of this vast area is still too fragmentary to justify any firm conclusions as to floristic trends, although attempts were early made to do this (Weber-van Bosse 1913-1923; Yamada 1926).

List of Stations

Station 1. 16 I 1965

MALAYSIA, Pulau Hantu. An islet 11-16 km west of Singapore, off the Malay Peninsula.

The area studied was in general a firm but silty shoal, with scattered rocks exposed, and a few mangroves. The dominant alga reported was *Sargassum*, but none was collected. A bit higher *Turbinaria conoides* was prominent, and *Bryopsis pennata* seems to have been frequent on these coarse algae. Various small species were collected, but none seemed to occur in conspicuous communities. Interesting genera include *Microdictyon*, *Bornetella*, *Martensia* and *Tolypiocladia*. Notable near high tide line were communities of *Halophila ovalis* (R. Br.) J.D. Hooker, a widespread marine phanerogam.

Station 2. 23 I 1965

SOUTH CHINA SEA at about 1° 47' N.L., 107° 47' E.L.

A few floating algae were collected, mostly *Sargassum* and its epiphytes, none in conspicuous quantity.

Station 3. 24 I 1965

SOUTH CHINA SEA at about 2° 31' N.L., 110° 42' E.L.

This was a small collection from floating material, basically portions of *Sargassum* plants with some epiphytes.

Station 4. 26 I 1965

SOUTH CHINA SEA at about 6° 33' N.L., 115° 51' E.L.

This sample was reported to have had a few more items than had Sta. 3, but *Leveillea jungermannioides* and *Sphacelaria furcigera* were the most common epiphytes on the *Sargassum*, and only these species yielded voucher specimens.

Stations 6, 7. 31 I 1965

MALAYSIA, Pulau Gaya area. These stations were in a complex of islands off the east coast of North Borneo.

Station 6 is on the west side of Pulau Mantabuan. The aspect is reported to be one of sparse vegetation over a sandy bottom. The chief alga seems to have been *Enteromorpha lingulata*, but various other things were here or at Station 7, mostly *Champia parvula* and *Laurencia papillosa*. While the *Champia* might have been an epiphyte, the other

things probably grew on rocks and shells exposed above the sand. Station 7, off the south side of Pulau Gaya nearby, is reported to have involved a reef of live corals nearly free of algal colonies, though a little *Halimeda opuntia* was noted, but not collected.

Stations 8-10. 31 I to 6 II 1965

MALAYSIA, Pulau Gaya area.

Station 8 consisted of a shoal sand-spit between two islands, part of the crest being barely uncovered at low water, and part of the shore of Pulau Tatagan nearby. Pieces of shell and dead coral lay about and live corals became more abundant as one moved into deeper water. The vegetation involved a conspicuous mat of *Valonia aegagropila* over which the water, 1.8-2.4 meters deep, was at times found to reach a temperature of 38°C. *Dictyosphaeria cavernosa* was common and grew especially well in the shelter of the *Valonia* and other larger algae. *Valonia ventricosa* was also notable here, and one large individual displaced 90 ml. *Spongiocladia dichotoma*, a most curious plant, was also notable here. A little deeper, scattered rocks bore a good vegetation of the very common *Halimeda opuntia*, *H. macroloba*, several *Caulerpa*s and *Microdictyon montagnei*. Patches of turtle-grass, *Enhalus acoroides* (L., f.) Royle, showed colonies of *Padina* associated with it.

Station 9. 31 I to 6 II 1965

MALAYSIA, Pulau Gaya area, Pulau Tatagan.

This material is chiefly from one of the islets adjoining Station 8, with which collection the material was bottled, and it involved part of the north shore of the sand spit. The islet was fairly rich in algae along the northwest side. Here *Caulerpa racemosa* and *Dictyota dichotoma* were common on the scattered rocks, where also there was quite a bit of *Chlorodesmis comosa*. Mangrove roots near shore carried *Lobophora variegata* and smaller epiphytes. *Halophila ovalis* was quite common on the sandy areas, and a variety of *Caulerpa mexicana* was found with it.

Station 10. 4, 5 II 1965

MALAYSIA, Pulau Gaya.

Collections were made progressively along the shoal and beyond the collection Stations 8, 9, and thus beyond the *Valonia aegagropila* community. There were occasional rocks and broken coral masses here. On the lower sides of them and not found elsewhere, appeared *Caulerpa verticillata* and *Udotea javensis*. *Valonia ventricosa* plants grew in some numbers on dead coral: *Spongiocladia dichotoma* grew rather abundantly in a few patches on old coral near shore, and *Dictyosphaeria cavernosa* was common where somewhat shaded, while in

deepest shade *D. versluysii* also occurred. In the sand *Avrainvillea erecta* was common. *Caloglossa* is reported on mangrove roots near the end of the route, but did not appear among the specimens preserved. This was a station with a relatively richly varied flora.

Station 11. 4, 5 II 1965

MALAYSIA, Pulau Gaya area, Pulau Mantabuan.

This collection was made off a sandy beach south of the pearling station. *Avrainvillea erecta* was again common. One large clump of *Hydroclathrus clathratus* was seen.

Stations 12, 12a. 6 II 1965

MALAYSIA, Pulau Gaya area, Pulau Mantabuan.

On the south side there was a community of *Valonia aegagropila* and associates similar to that of Station 9. On the north and west a broad sandy flat with patches of turtle-grass was bounded outside by patches of coral, beyond which there is a deeper lagoon-like zone about a meter deep at low tide, where there was a rather different flora from that elsewhere. It especially consisted of genera favoring sheltered water, such as *Hypnea*, *Ceramium*, *Champia*, *Spiridia*, *Centroceras*, and *Tolyptocladia*. The broken coral reef bordering this on the seaward side had a heavy growth of *Enteromorpha clathrata*, *Trichosolen* and *Polysiphonia*.

Station 13. 13 II 1965

PHILIPPINES, Mindanao Island, Zamboanga, off Zamboanga City.

This station involved a small offshore islet and lagoon. *Ulva reticulata* was very abundant on the sandy bottom, and *Cladophoropsis philippinensis* with *Valonia aegagropila* formed large masses with it. *Boergesenia* was reported as common on the bottom, but no voucher specimens were received.

Station 14. 26 II-4 III 1965

BISMARCK ARCHIPELAGO, New Britain Island, Rabaul area.

This station was on the north side of Crater Peninsula opposite the town of Rabaul. *Sargassum cristaeifolium* in quantity, and *Galaxaura oblongata* were found here, washed ashore.

Station 15. 26 II-4 III 1965

BISMARCK ARCHIPELAGO, New Britain Island, Rabaul.

This material was collected from a small, rocky island in Rabaul

Harbor. On the rubble of dead corals and rocks there were a few scraps of algae, but only *Actinotrichia rigida* was in fair condition. By diving *Galaxaura veprecula* was obtained from a depth of about 20 meters.

Station 16. 26 II-4 III 1965

BISMARK ARCHIPELAGO, New Britain Island, Rabaul area, Duke of York Islands.

A general and rather varied collection, some 17 species being represented in the material recovered, reflecting the variety of areas concerned. The species of *Halimeda* were the most noteworthy elements, but large plants of *Valonia ventricosa* with a displacement up to 75 ml. seem to have been prominent. There were 3 *Caulerpas*, and the occurrence of large plants of *Udotea argentea* was notable.

Station 17. 26 II-4 III 1965

BISMARK ARCHIPELAGO, New Britain Island, Rabaul harbor.

On an old ship hull there was a growth of *Caulerpa serrulata*, and some *Bryopsis* which was not preserved.

Station 18. 26 II-4 III 1965

BISMARK ARCHIPELAGO, New Britain Island, Rabaul, Matupi I.

This station involved a turtle-grass bed of *Cymodocea serrulata* (R. Br.) Asch. & Magn. and *Halodule univervis* (Forssk.) Asch., with associated *Halophila ovalis*, in 1.2-2.4 meters' depth of water. It yielded more *Udotea argentea*, *Dictyopteris repens* and several little things, such as *Neomeris annulata*, *Acetabularia major* and *Sphacelaria tribuloides*.

Station 19. 26 II-4 III 1965

BISMARK ARCHIPELAGO, New Britain Island, Rabaul.

On a coral patch at this station there was some *Caulerpa serrulata*, and on exposed rocks *Turbinaria ornata* was reported but without voucher specimens.

Station 20. 26 II-4 III 1965

BISMARK ARCHIPELAGO, New Britain Island, Rabaul area.

On the shore of Point Gazelle 16-32 km south of Rabaul there was a collecting area with considerable surf, where at depths of 0.3-1.0 meter *Chlorodesmis comosa*, *Hydroclathrus clathratus* and *Ceratodictyon spongiosum* were found. *Boergesenia forbesii* was reported very common in a narrow zone at a depth of about 0.3 m.

Station 21. 8 III-15 III 1965

SOLOMON ISLANDS, Bougainville Island, Kieta area, Puk Puk Islet.

This collection was made on a protected southern point with *Sargassum* and *Padina australis* growing on hard objects over the sand or on patches of coral reef at depths of 0.6-1.8 meters. There were many smaller things in addition. Most notable for this station were *Chlorodesmis comosa*, *Neomeris dumetosa*, and the spectacular *Halymenia durvillaei*.

Station 22. 8 III-15 III 1965

SOLOMON ISLANDS, Bougainville Island, Kieta area, Puk Puk Islet.

While made from the east side of the islet the vegetation was similar, but because of the lack of segregation of the Kieta area materials little beyond *Galaxaura apiculata* could be directly attributed to it.

Station 23. 8 III-15 III 1965

SOLOMON ISLANDS, Bougainville Island, Kieta area.

The material of this collection came from the fringing reef several miles from shore, separated from it by deep water and exposed to moderate-to-heavy surf. Inside this was a lagoon-like area with much dead coral and a sandy shoal, free from surf but with substantial surge currents. For this area most notable was *Tydemannia expeditionis* which was present in quantity, a splendid acquisition. *Caulerpa pickeringii* among the 4 *Caulerpas* found was less showy, but almost as important. *Halimeda incrassata* and *H. micronesica* occurred here. Stations 21 and 23 each yielded about 20 species of algae.

Stations 25, 26. 8 III-15 III 1965

SOLOMON ISLANDS, Bougainville Island, Kieta area, near Marowa Point.

This material came from the first point east of Marowa Point. This was exposed to moderate surf. Many of the algae were growing in shade, due to the neighboring cliff with overhanging vegetation. The substrate was rock, more or less sand-covered, and corals were absent. *Halimedas* were reported in evidence, but not collected; *Cladophoropsis* ? *zollingeri* formed extensive mats. *Chnoospora minima* in a small form was the only conspicuous brown alga. *Actinotrichia rigida* was frequent on the rocks, as were *Galaxaura squalida* and *G. apiculata*.

Station 27. 21 III 1965

SOLOMON ISLANDS, Guadalcanal Island, Kamembo Reef.

This station was 16-32 km north of Honiara. A companion on the



expedition contributed to the Cleland collections a small plant of *Halymenia durvillaei* from this station, found on a coral head at a depth of 3.0-4.5 m.

List of species<sup>4</sup>

CHLOROPHYCEAE

ULVALES

Ulvaceae

*Enteromorpha lingulata* J. Agardh MALAYSIA, Pulau Gaya area, Stas. 6, 12.

*Enteromorpha clathrata* (Roth) J. Agardh Pulau Gaya area, Sta. 12.

*Ulva reticulata* Forssk. PHILIPPINES, Mindanao I., Sta. 13.

CLADOPHORALES

Cladophoraceae

*Chaetomorpha crassa* (C. Agardh) Kütz. Mindanao I., Sta. 13.

*Chaetomorpha linum* (Müll.) Kütz. SOLOMON ISLANDS, Bougainville I., Sta. 21.

*Rhizoclonium hookeri* Kütz. Pulau Gaya area, Sta. 9; Bougainville I., Sta. 25.

Filaments in this material range from 35  $\mu$ m to 100  $\mu$ m, and so cover the widest range I have ascribed to the species.

*Cladophora* sp. Material of this genus was not a feature of these collections, though a small specimen which I could not assign to any species, did occur in the Pulau Gaya area material.

SIPHONOCLADIALES

Dasycladaceae

*Neomeris annulata* Dickie BISMARK ARCHIPELAGO, New Britain I., Sta. 18.

*Neomeris dumetosa* Lamx. MALAYSIA, Pulau Hantu, Sta. 1; Bougainville I., Sta. 21.

*Bornetella oligospora* Solms-Laub. Pulau Hantu, Sta. 1.

*Acetabularia major* Solms-Laub. New Britain I., Sta. 18.

*Acetabularia parvula* Solms-Laub. Pulau Gaya area, Sta. 10; Bougainville I., Sta. 21.

Valoniaceae

*Valonia aegagropila* C. Agardh Pulau Gaya area, Stas. 8-10; Mindanao I., Sta. 13; Bougainville I., Stas. 21, 25.

*Valonia ventricosa* J. Agardh Pulau Gaya area, Stas. 8, 10; New Britain I. area, Duke of York Islands, Sta. 16; Bougainville I., Stas. 21, 22.

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<sup>4</sup> In listing the localities where the various species were found the name of the general area: PHILIPPINES, SOLOMON ISLANDS, etc., will be given only at the first appropriate place, since, like the detailed site characterization, it can be ascertained through the station number in the preceding descriptions of localities.

- Boergesenia forbesii* (Harv.) Feldm. Pulau Gaya area, Stas. 8, 9; New Britain I., Sta. 20; Bougainville I., Sta. 25.
- Valoniopsis pachynema* (Mart.) Børg. Bougainville I., Sta. 25.
- Dictyosphaeria cavernosa* (Forssk.) Børg. Pulau Hantu, Sta. 1; Pulau Gaya area, Stas. 8, 10.
- Dictyosphaeria versluysii* Weber-van Bosse. Pulau Gaya area, Sta. 10; New Britain I., Stas. 21, 22.
- Cladophoropsis philippinensis* W.R. Taylor. Mindanao I., Sta. 13.
- Cladophoropsis zollingeri* (Kütz.) Borg.? Bougainville I., Sta. 25.
- Spongocladia dichotoma* (Zan.) Murr. & Bood. Pulau Gaya area, Sta. 10.
- Microdictyon montagnei* Harv. Pulau Hantu, Sta. 1; adrift, South China Sea, Sta. 2; Pulau Gaya area, Sta. 8.
- Anadyomene plicata* Zan. Duke of York Ids., Sta. 16; Bougainville I., Stas. 21, 23, 25.
- Anadyomene wrightii* Gray. Bougainville I., Sta. 23.

## SIPHONALES

## Bryopsidaceae

- Bryopsis pennata* Lamx. Pulau Hantu, Sta. 1; New Britain I., Sta. 17; Bougainville I., Stas. 21, 23.
- Trichosolen parva* (Dawson) Taylor Pulau Gaya, Sta. 12. These plants were 1-2 cm tall, taller than those reported by Dawson from Viêt Nam (1954, p. 393) and more densely clothed with ramelli, but the dimensions of axes and ramelli, the shape and range of measurements of the gametangia are close. Certainly in view of the little we know of the range of variation in the genus one had best regard these plants as a relatively luxuriant form of *T. parva*.

## Caulerpaceae

- Caulerpa ambigua* Okam. Bougainville I., Sta. 21.
- Caulerpa lentillifera* J. Agardh. Pulau Gaya area, Sta. 9; Duke of York Ids., Sta. 16.
- Caulerpa lessonii* Bory. Pulau Gaya area, Sta. 8.
- Caulerpa peltata* (Lamx.) Weber-van Bosse. Pulau Gaya area, Stas. 9, 12; New Britain I. area, Sta. 16; Bougainville I., Sta. 23.
- Caulerpa pickeringii* Harv. & Bail. Bougainville I., Sta. 23.
- Caulerpa racemosa* (Forssk.) Weber-van Bosse Pulau Gaya area, Stas. 8, 10; Duke of York Ids., Sta. 16; Bougainville I., Sta. 23.
- Caulerpa serrulata* (Forssk.) J. Agardh. Pulau Hantu, Sta. 1; Pulau Gaya area, Stas. 8, 10; New Britain I., Stas. 17, 19; Bougainville I., Sta. 21.
- Caulerpa sertularioides* (Gmel.) Howe Pulau Gaya area, Stas. 8, 9.
- Caulerpa taxifolia* (Vahl) C. Agardh ? Pulau Gaya area, Sta. 9.
- Caulerpa urvilliana* Mont. Duke of York Ids., Sta. 16.
- Caulerpa verticillata* J. Agardh. Pulau Gaya area, Sta. 10.

## Codiaceae

- Chlorodesmis comosa* Bail. & Harv. Pulau Gaya area, Sta. 9; New Britain I., Sta. 20; Bougainville I., Sta. 21.

- Avrainvillea erecta* (Berk.) A. & E. S. Gepp. Pulau Gaya area, Stas. 8, 9.
- Avrainvillea lacerata* J. Agardh. Bougainville I., Sta. 23.
- Tydemannia expeditionis* Weber-van Bosse. Bougainville I., Sta. 23.
- Udotea argentea* Zan. Duke of York Islands, Sta. 16; New Britain I., Sta. 18.
- Udotea javensis* (Mont.) A. & E. S. Gepp. Pulau Gaya area, Sta. 10; Bougainville I., Sta. 21.
- Codium tenue* Kütz. Rabaul, Sta. 15; Duke of York Ids., Sta. 16; Kieta, Sta. 23.
- Halimeda cylindrica* Decne. Duke of York Ids., Sta. 16; New Britain I., Stas. 18, 19.
- Halimeda discoidea* Decne. Pulau Gaya area, Sta. 9; Bougainville I., Sta. 21.
- Halimeda incrassata* (Ell.) Lamx. Bougainville I., Sta. 23.
- Halimeda macroloba* Decne. Pulau Hantu, Sta. 1; Pulau Gaya area, Sta. 8; Duke of York Ids., Sta. 16.
- Halimeda micronesica* Yam. Bougainville I., Sta. 23.
- Halimeda opuntia* (L.) Lamx. Pulau Hantu Sta. 1; Pulau Gaya area, Stas. 8, 9; Mindanao I., Sta. 13; New Britain I., Sta. 15; Duke of York Ids., Sta. 16; Bougainville I., Stas. 21, 23.

## PHAEOPHYCEAE

## SPHACELARIALES

## Sphacelariaceae

- Sphacelaria furcigera* Kütz. South China Sea, Sta. 4.
- Sphacelaria novae-hollandiae* Sond. Bougainville I., Sta. 23.
- Sphacelaria tribuloides* Menegh. New Britain I., Sta. 18; Bougainville I., Sta. 21.

## DICTYOTALES

## Dictyotaceae

- Dictyota apiculata* J. Agardh, var. *jedamensis* Weber-van Bosse? Pulau Gaya area, Stas. 8, 12.
- Dictyota ceylonica* Kütz., var. *rotundata* Weber-van Bosse? Pulau Gaya area, Sta. 12.
- Dictyota dichotoma* (Huds.) Lamx. Pulau Hantu, Sta. 1; Pulau Gaya area, Sta. 9; Duke of York Ids., Sta. 16; Bougainville I., Sta. 23.
- Dictyota divaricata* Lamx.? Pulau Gaya area, Sta. 12; Duke of York Ids., Sta. 16.
- Dictyopteris repens* (Okam.) Børg. New Britain I., Sta. 18; Bougainville I., Sta. 21.
- Padina australis* Hauck. Pulau Hantu I., Sta. 1; New Britain I., Sta. 18; Bougainville I., Sta. 21.
- "*Dictyterpa*" or "*Vaughniella*" phase of *Padina*. Pulau Gaya area, Stas. 9, 10; Mindanao I., Sta. 13; Bougainville I., Sta. 23. Some of the *P. australis* material is transitional from this phase.
- Lobophora variegata* (Lamx.) Womersl. Pulau Gaya area, Stas. 9, 10; Bougainville I., Sta. 23.

## NCTARIALES

## Asperococcaceae

- Chnoospora minima* (Her.) Papenf. Bougainville I., Sta. 26.  
*Hydroclathrus clathratus* (Bory) Howe Pulau Gaya area, Stas.  
 8, 10; New Britain I., Sta. 20.

## CALES

## Sargassaceae

*Sargassum*. Several specimens of *Sargassum* in the Cleland material defied identification with the reference materials available, *S. cristaeifolium* and *S. swartzii* being the ones clearly recognizable. The best that I can do at present is to suggest the possible relationships of the more distinctive of them. In addition to the 6 doubtful ones, other pieces in the collection may be variants of these, or may be other less distinctive forms.

*Sargassum capillare* Kütz.? Pulau Gaya area, Pulau Mantabuan, Sta. 12a. Tall, exceeding 6.5 dm, much branched, the axes terete, nearly smooth. The leaves crowded on the lateral branches, about 2 mm broad, 10 mm long, linear-lanceolate, the margins sharply serrate, elaborately proliferous, as to lesser degrees are the leaf faces, the stems and the vesicles. Cryptostomata few, on each side of the subpercurrent costas. Vesicles small, short-stalked. Receptacles sparingly forked, exceeding the leaves.

*Sargassum cristaeifolium* C. Agardh New Britain Island, Sta. 14.

*Sargassum myriocystum* J. Agardh ? Pulau Gaya, Sta. 9. To 2 dm tall, the axes terete, densely spinulose. The leaves to about 7 mm broad, 30 mm long, broadly lanceolate, the costae percurrent, the leaf margins erose-dentate, the cryptostomata small, numerous, scattered.

*Sargassum ornatum* Grev.? Adrift, South China Sea, Sta. 3. To at least 3 dm tall, the axes terete, smooth. The leaves crowded on the lateral branches, to 5 mm broad, 35 mm long, oblong-ovate, broad to the rounded apex, sharply serrate. Costa not reaching to the leaf tip; cryptostomata small, numerous, scattered. Vesicles short-stalked, short oval, apiculate.

*Sargassum polycystum* J. Agardh ? Adrift, South China Sea, Sta. 2. Plants very delicate, the terete axes spinulose. The leaves chiefly on the upper axes and the outer parts of the lateral branches, small, about 2.0-2.5 mm broad, 1 cm long, lanceolate, strongly serrate. Costa subpercurrent; cryptostomata few, somewhat irregularly dispersed.

*Sargassum swartzii* (Turn.) J. Agardh Adrift, South China Sea, Sta. 2. Plants to at least 3 dm tall, the stems flat, smooth. The leaves to 3.0-3.5 cm long, narrowly lanceolate, long-attenuate, shallowly dentate. Costa percurrent, with the cryptostomata in an irregular row on each side. Vesicles large, spherical.

- Sargassum* sp. Bougainville I., Kieta area, Sta. 22. About 3 dm tall, much branched, the stems terete, smooth. The leaves rather crowded, small, to 2.5 mm broad, 12 mm long, narrow, acute, sharply dentate. Costa inconspicuous, about 0.6 the length of the leaf; cryptostomata rather numerous, scattered on each side of the costa. Vesicles numerous, very small, round to oval, frequently apiculate.
- Turbinaria condensata* Sond., prox. Pulau Gaya area, Sta. 10.
- Turbinaria conoides* J. Agardh Pulau Hantu, Sta. 1; Pulau Gaya area, Sta. 10.
- Turbinaria murrayana* Bart. New Britain I., Sta. 20.
- Turbinaria ornata* (Turn.) J. Agardh Bougainville I., Sta. 21.

## RHODOPHYCEAE

## BANGIALES

## Bangiaceae

- Erythrotrichia carnea* (Dillw.) J. Agardh Pulau Gaya area, with *Trichosolen*, Sta. 12.

## NEMALIONALES

## Chaetangiaceae

- Actinotrichia rigida* (Lamx.) Decne. New Britain I., Sta. 15; Bougainville I., Stas. 21, 25.
- Galaxaura apiculata* Kjellm. Bougainville I., Stas. 22, 25.
- Galaxaura fasciculata* Kjellm., prox. Bougainville I., Sta. 21.
- Galaxaura oblongata* (Sol.) Lamx. New Britain I., Sta. 14.
- Galaxaura squalida* Kjellm. Bougainville I., Sta. 25.
- Galaxaura ventricosa* Kjellm. New Britain I., Sta. 15. This material agrees well with the description of *G. ventricosa*, except that the marginal spinulose cells were minutely apiculate.

## CRYPTONEMIALES

## Rhizophyllidaceae

- Desmia hornemanni* Lyngb. Bougainville I., Sta. 23.

## Corallinaceae

- Fosliella farinosa* (Lamx.) Howe Pulau Gaya area, Sta. 12; Duke of York Ids., Sta. 16.
- Lithophyllum moluccense* Fosl. Bougainville I., Sta. 23.
- Amphiroa anceps* (Lamk.) Decne. Bougainville I., Sta. 23.
- Amphiroa foliacea* Lamx. New Britain I., Sta. 20; Bougainville I., Sta. 22.
- Amphiroa fragilissima* (L.) Lamx. Pulau Gaya area, Sta. 8; Duke of York Ids., Sta. 16.
- Amphiroa tribulus* (Sol.) Lamx.? Pulau Gaya area, Stas. 8, 9.
- Jania tenella* Kütz.? Bougainville I., Sta. 26. This small sample at first seemed to resemble *J. rubens*, but the upper branching was more spreading. The diameter of the lower axes ranged from 120-260  $\mu\text{m}$ , which is not too different from *J. rubens*, but the segment length below was only 1.5-1.75 times the diameter and above to 2.0-2.5 times, which is too short for that species. In fact, it is rather short for *J. tenella* as figured by Kützting (1858, 8, pl. 85 II).

## Grateloupiaceae

- Halymenia durvillaei* Bory. New Britain I., Stas. 21, 22;  
Guadacanal I., Sta. 27.

## GELIDIALES

## Gelidiaceae

- Gelidiella acerosa* (Forssk.) Hamel Pulau Gaya area, Stas. 8, 9; Bougainville I., Stas. 21, 25.  
*Gelidiella myrioclada* (Børg.) Feldm. & Hamel Bougainville I., Sta. 25.  
*Gelidiopsis intricata* (C. Agardh) Vick. Pulau Gaya area, Stas. 8, 10; Duke of York Ids., Sta. 16; New Britain I., Sta. 18; Bougainville I., Sta. 23.  
*Gelidiopsis repens* (Kütz.) Schm. Bougainville I., Stas. 21, 25. The upper branching is more regularly digitate than figured by Okamura (1936, p. 636) but the resemblance to his figure is otherwise close.  
*Gelidium latifolium* (Grev.) Thuret & Bornet, *prox.* Pulau Gaya area, Sta. 9; Bougainville I., Sta. 25.  
*Pterocladia caloglossoides* (Howe) Dawson, *prox.* Bougainville I., Stas. 23, 25, 26. The fragments submitted are so small that the full habit cannot be confirmed, but in detail there is agreement.

## GIGARTINALES

## Hypneaceae

- Hypnea cervicornis* J. Agardh Pulau Gaya area, Stas. 10, 12; Duke of York Ids., Sta. 16.  
*Hypnea nidulans* Setch.? Bougainville I., Sta. 23.  
*Hypnea spinella* (C. Agardh) Kütz. Bougainville I., Sta. 23.

## Sphaerococcaceae

- Ceratodictyon spongiosum* Zanard. Duke of York Ids., Sta. 16; New Britain I., Sta. 20.

## Gracilariaceae

- Gracilaria debilis* (Forssk.) Børg. Mindanao I., Sta. 13.

## Solieriaceae

- Eucheuma crassum* Zanard. Pulau Hantu, Sta. 1.

## RHODYMENIALES

## Champiaceae

- Lomentaria hakodatensis* Yendo ? Kieta area, Sta. 21. These plants are smaller and less branched than *L. sinensis* Howe (1924, p. 139, pl. 1 fig. 1), which has been reduced to synonymy under *L. hakodatensis*, and the tetrasporangial branchlets seem to stand erect and to be sagittate to lanceolate in shape. The lower branches often curve down and attach at the tips.  
*Champia parvula* (C. Agardh) Harv. Pulau Gaya area, Stas. 6, 12; Mindanao I., Sta. 13; Duke of York Ids., Sta. 16; Bougainville I., Sta. 23.  
*Champia viellardii* Kütz.? Bougainville I., Stas. 21, 23.  
*Coelarthrum boergesenii* Weber-van Bosse. Bougainville I., Sta. 21.

## CERAMIALES

## Ceramiaceae

*Antithamnion* sp. Pulau Gaya area, Stas. 12, 12a. There was abundant material of this plant, but unfortunately it was all sterile. The plants were about 5 mm tall, growing on *Enhalus* leaves. The main filaments reached a diameter of 15-47  $\mu\text{m}$ . The branchlets were opposite or verticillate, of equal length, sub-simple low on the axes, but above closely alternately branched, not secund. The cells near the bases of the branchlets were 12-14  $\mu\text{m}$  diam., near the tips 7.7-9.3  $\mu\text{m}$ . No gland cells were found.

*Wrangelia bicuspidata* Børg. ? New Britain I., Sta. 15; Bougainville I., Sta. 21.

*Griffithsia* sp. Pulau Gaya area, Sta. 12. Not adequate for identification to species.

*Ceramium* sp. Duke of York Ids., Sta. 16. Same observation.

*Centroceras clavulatum* (C. Agardh) Mont. Pulau Gaya area, Sta. 12; Bougainville I., Sta. 26.

*Spyridia filamentosa* (Wulf.) Harv. Pulau Gaya area, Stas. 11, 12.

## Delesseriaceae

*Martensia flabelliformis* Harv. ? Pulau Hantu, Sta. 1.

## Rhodomelaceae

*Polysiphonia flaccidissima* Hollenb., var. New Britain I., Sta. 19. Determined by the kindness of Dr. George F. Hollenberg.

*Polysiphonia savatieri* Hariot. Pulau Gaya area, Sta. 12.

Determined by the kindness of Dr. George F. Hollenberg.

*Tolypiocladia glomerulata* (C. Agardh) Schmitz ? Pulau Hantu, Sta. 1; Pulau Gaya area, Sta. 12; New Britain I., Sta. 15; Bougainville I., Sta. 23.

*Bostrychia binderi* Harv. Bougainville I., Sta. 25.

*Bostrychia calliptera* Mont. ? Pulau Gaya area, Sta. 10.

*Herposiphonia secunda* (C. Agardh) Ambronn, prox. Bougainville I., Sta. 21.

*Herposiphonia tenella* (C. Agardh) Ambronn prox. Pulau Gaya area, Sta. 10; Bougainville I., Sta. 21.

*Leveillea jungermannioides* (Mart. & Her.) Harv. South China Sea, Sta. 4; Bougainville I., Sta. 24.

*Amansia glomerata* C. Agardh ? Bougainville I., Stas. 21, 23.

*Acanthophora spicifera* (Vahl) Børg. Pulau Hantu, Sta. 1; Pulau Gaya, Sta. 11; Bougainville I., Stas. 21, 22.

*Laurencia obtusa* (Huds.) Lamx. Pulau Gaya area, Sta. 12.

*Laurencia papillosa* (Forssk.) Grev. Pulau Gaya area, Stas. 6, 8; Duke of York Ids., Sta. 16; Bougainville I., Stas. 22, 23.

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