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Author(s)	Yamada, Yukio
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A List of Marine Algae from Ryukyusho, Formosa

I. Chlorophyceae and Phaeophyceae

By

YUKIO YAMADA

In the spring of 1941 the writer had the third opportunity of collecting marine algae on the coast of Formosa. He visited for the first time a small island, Ryukyusho which is located about 4 miles south west off Toko, on the west coast of the main island. Though this islet is but a small one, being about 1 mile in length, shows a rather rich marine vegetation.

As the first part of the present list 24 species of the Chlorophyceae and 25 species belonging to the Phaeophyceae are enumerated here and the Rhodophyceae will follow as the second part. As the new species one Chlorophyceaen speceis, *Codium formosanum*, and one Phaeophycean species, *Ectocarpus formosanus* are described.

Here the writer wishes to thank those gentlemen who helped him on the journey, especially Mr. T. NISHIMURA and Dr. Y. NAKAMURA. The pecuniary aid for this journey was given by the Education Ministry.

CHLOROPHYCEAE

ULVACEAE

Monostroma

Monostroma nitidum WITTROCK

Monogr. Monost. (1866) p. 41, pl. 2, fig. 7, a–c; OKAMURA, Alg. Ogasawara-jima (Bot. Mag. Tokyo, vol. 11, 1897) p. 1; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 78, Mar. Chlorophyc. Ryukyu (Journ. Fac. Sci., Hokkaido Univ., ser. 5, vol. 3, no. 2, 1934) p. 34.

Japanese name: *Hitoegusa*.

In every respects the Ryukyusho specimens agree fairly well with those from Naha, Ryukyu, excepting only one small difference. The former has slightly thinner thallus than the latter, measuring about 20 μ in thickness.

Enteromorpha

Enteromorpha compressa GREVILLE

Alg. Brit. (1830) p. 180; J. AGARDH, Till alg. syst., VI (1887) p. 137; COLLINS, Green alg. N. Amer. (1909) p. 201; SETCHELL and GARDNER, Mar. alg. Pacif. coast

of N. Amer., Chlorophyc. (1920) p. 251; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 79.

Japanese name: *Hira-awonori.*

Ulva

Ulva Lactuca LINNAEUS

Spec. plant. vol. 2 (1753) p. 1163; THURET and BORNET, Etudes phyc. (1878) p. 5, pl. 2, 3; COLLINS, Green alg. N. Amer. (1909) p. 214; SETCHELL and GARDNER, Mar. alg. Pacif. coast of N. Amer., Chlorophyc. (1920) p. 265; OKAMURA, Mar. alg. Kotosho (Bull. Biogeogr. Soc. Jap., vol. 2 no. 2, 1931) p. 96.

Japanese name: *Usuiro-awosa* (nov.)

VALONIACEAE

Valonia

Valonia aegagropila AGARDH

Spec. Alg. (1824) p. 429; J. AGARDH, Till alg. syst. VII (1887) p. 99; KÜTZING, Spec. alg. (1849) p. 505, Tab. Phyc., vol. 6 (1856) pl. 87, fig. 1; KUCKUCK, Ueber Bau. u. Fortpfl. von Halicystis u. Valonia (1909) p. 174; WEBER van BOSSE, Liste alg. Siboga, vol. 1 (1913) p. 60; BOERGESEN, Mar. alg. Dan. W. Ind., vol. 1 (1913) p. 31, Some mar. alg. from north. part of Arabian Sea etc. (1934) p. 8, Some mar. alg. from Mauritius, I Chlorophyc. (1940) p. 11, Add. list (1946) p. 13; YAMADA, Merresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 80, Mar. Chlorophyc. Ryukyu (Journ. Fac. Sci., Hokkaido Univ., ser. 5, vol. 3, no 2, 1934) p. 37; TSENG, Mar. Chlorophyc. Hainan (Chin. Mar. Biol. Bull. vol. 1, no 5, 1936) p. 134.

Japanese name: *Tama-baronia.*

Dictyosphaeria

Dictyosphaeria bokotensis YAMADA

Meeresalg. Formosa, II (Bot. Mag. Tokyo, vol. 39, 1925) p. 81, Mar. Chlorophyc. Ryukyu (Journ. Fac. Sci., Hokkaido Univ., ser. 5. vol. 3, no. 2, 1934) p. 38.

Japanese name: *Toge-kikkogusa.*

The amount of the cellulose spines found on the wall inside the cells seems to vary in a considerable degree. The Ryukyusho specimens are provided with far less number of them than those from the Pescadores Isl. and the Ryukyu Isl.

SIPHONOCLADACEAE

Boergesenia

Boergesenia Forbesii (HARVEY) FELDMANN

Sur un nouveau genre de Siphonocladiacées (Compt. rend. Acad. Sc., T. 206, 1938)

p. 1503, Sur la classification de l'ordre des Siphonocladales (Rev. gen. Bot. vol. 50, 1938) p. 14; BOERGESEN, Some mar. alg. Mauritius, Additional list to Chlorophyc. and Phaeophyc. (1948) p. 21.

Valonia Forbesii HARVEY, Ceylon alg. no. 75 and Friendly Isl. alg. no. 112, Char. of new alg. (1859) p. 333; OKAMURA, Alg. Ogasawara-jima (Bot. Mag. Tokyo, vol. 11, 1897) p. 2; WEBER van BOSSE, Liste alg. Siboga, vol. 1 (1913) p. 59; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 79, Mar. Chlorophyc. Ryukyu (Jour. Fac. Sci., Hokkaido Univ., ser. 5. vol. 3, 1934) p. 36; TSENG, Mar. Chlorophyc. Hainan (Chin. Mar. Biolog. Bull., vol. 1, no. 5, 1936) p. 134.

Japanese name: *Magatamamo.*

In Ryukyusho the present species was found growing also on the sandy bottom of littoral pools as in Kaiko, main Island, and TSENG also reported the same habitate.

BOODLEACEAE

Boodlea

Boodlea coacta (DICKIE) MURRAY et DE TONI

On Boodlea, a new gen. of Siphonocladiac. (Journ. Linn. Soc., Bot., vol. 25, 1890) p. 245, pl. 49; OKAMURA, Illustr. mar. alg. Japan, vol. 1 (1901), p. 41, pl. 15; YAMADA and TANAKA, Mar. alg. Yonakuni (Sci. Pap. Inst. Algolog. Res., vol. 2. no. 1. 1938) p. 55.

Cladophora coacta DICKIE, Notes on alg. coll. by Moseley of H. M. S. Challenger, etc. (Jaurn. Linn. Soc., Bot., vol. 15, 1877) p. 451.

Japanese name: *Aomogusa.*

Boodlea composita (HARVEY et HOOKER fil.) BRAND.

Ueber Anheft. d. Cladophorac. etc (1905) p. 187; REINBOLD in WEBER VAN BOSSE's Liste alg. Siboga, vol. 1 (1913) p. 70; YENDO, Notes on alg. new to Japan, IV. (Bot. Mag. Tokyo, vol. 30, 1916) p. 47; BOERGESEN, Some mar. alg. from north. part of Arabian Sea (1934) p. 9, Some mar. alg. from Mauritius, I (1940) p. 21,; TSENG, Chlorophyc. Hainan (Chin. Mar. Biol. Bull., vol. 1, no. 5, 1936) p. 136, TAYLOR, Pacific mar. alg. of Allan Hancock Expd. to Galapagos Isl. (1945) p. 50.

Japanese name: *Hane-aomogusa* (nov).

The Ryukyusho speciemens which are preserved in formalin coincide fairly well with this species, especially with the precise description of the Mauritius specimens given by BOERGESEN.

Microdictyon

Microdictyon nigrescens (YAMADA) SETCHELL

Notes on Microdictyon (1925) p. 107, Genus Microdictyon (1929) p. 523; YAMADA and TANAKA, Mar. alg. Yonakuni (Sci. Pap. Inst. Algol. Res., vol. 2, no. 1, 1938) p. 55.

Rhipidiphyllon nigrescens YAMADA, Meeresalg. Formosa, II (Bot. Mag. Tokyo, vol. 39, 1925) p. 83.

Japanese name: *Kuro-aminoyo.*

Valoniopsis

Valoniopsis pachynema (MARTENS) BOERGESEN

Some mar. alg. from north. part of Arab. Sea etc. (1934) p. 10, Some mar. alg. from Ceylon (Ceylon Journ. of Sci., vol. 12, pt. 2, 1936) p. 63, Mar. alg. Mauritius, Additions to the parts previously published (1949) p. 5; TSENG, Mar. Chlorophyc. Hainan (Chin. Biol. Bull. vol. 1, no. 5, 1936) p. 138; YAMADA and TANAKA, Mar. alg. Yonakuni (Sci. Pap. Inst. Alg. Res. Hokkaido Univ., Vol. 2, no. 1, 1938) p. 56; DAWSON, Mar. alg. Gulf of California (Allan Hancock Pacific Expedition, vol. 3, no. 10, 1944) p. 206,

Bryopsis pachynema MARTENS, Preus. Exped. nach Ostasien, Tange (1866) p. 24, pl. 4, fig. 2.

Valonia confervoides HARVEY, Ceylon alg. no. 73, Friendly Isl. alg. no. 101; J. AGARDH, Till alg. syst. VIII (1887) p. 100; HEYDRICH, Einige alg. Loochoo Ins. (Ber. d. deut. bot. Ges., vol. 25, 1907) p. 101; OKAMURA, Icon. Japan. Alg., vol. II (1907) p. 59, pl. 65, figs. 7–10; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 80.

Valonia pachyneme WEBER VAN BOSSE, Liste alg. Siboga, vol. 1 (1913) p. 61.

Japanese name: *Hoso-baronia.*

Anadyomene

Anadyomene Wrightii GRAY

On Anadyomene and Microdictyon (Journ. Bot. 1866) p. 48, pl. 44, fig. 5; J. AGARDH, Till alg. system., VIII, (1887) p. 124; OKAMURA, Alg. Ogasawara-jima (Bot. Mag. Tokyo, vol. 11, 1897) p. 2, Icon. Japan. alg., vol. 1 (1908) p. 198, pl. 40, figs. 1–6; WEBER VAN BOSSE, Liste alg. Siboga, vol. 1. (1913) p. 73; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 84, Mar. Chlorophyc. Ryukyu (Journ. Fac. Sci., Hokkaido Univ., Ser. 5, vol. 3, no. 2, 1934) p. 40; BOERGESEN, Some mar. alg. from Mauritius, I (1940) p. 32, fig. 9.

Japanese name: *Ukioriso.*

CLADOPHORACEAE

Cladophora

Cladophora patentiramea (MONTAGNE) KÜTZING

Spec. alg. (1849) p. 416, Tab. Phyc. vol. 4 (1854) pl. 69; REINBOLD in WEBER VAN BOSSE's Liste alg. Siboga, vol. 1 (1913) p. 83; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 86; SETCHELL, Tahitian algae (1926) p. 74, pl.

9; BOERGESEN, Some mar. alg. from Mauritius, I (1940) p. 36, fig. 12.
Conferva patentiramea MONTAGNE, "Prodr. phyc. antarct., p. 15."
Japanese name: *Hosoba-shiogusa* (nov.)

Cladophora fuliginosa KUETZING

Spec. alg. (1849) p. 515; COLLINS, Green alg. N. Amer. (1909) p. 348; BOERGESEN, Mar. alg. Dan. West Ind., vol. 1 (1913) p. 22; HOWE, in BRITTON and MILLSPAUGH's Bahama flora (1920) p. 601; TAYLOR, Mar. alg. Florida (1928) p. 62, pl. 4, fig. 5; YAMADA, Notes on some Jap. alg., IV (Journ. Fac. Sci., Hokkaido Univ., ser. 5, vol. 2, 1932) p. 268, Mar. Chlorophyc. Ryukyu (Ibid. vol. 3, no. 2. 1934) p. 43, fig. 8; TSENG, Mar. Chlorophyc. Hainan (Chin. Mar. Biol. Bull., vol. 1, no. 5, 1936) p. 153, fig. 15.
Blodgettia confervoides HARVEY, Ner. Bor. Amer., vol. 3 (1858) p. 48, pl. 45, C.
Japanese name: *Kabi-shiogusa*.

Cladophora (Aegagropila) Sibogae REINBOLD

Einige neue Chlorophyc. aus Ind. Ozean (Nouva Notar., ser. XVI, 1905) p. 146, in WEBER VAN BOSSE's Liste alg. Siboga, vol. 1 (1913) p. 81, fig. 19; OKAMURA, Mar. alg. Kotosho (Bull. Biogeogr. Soc. Japan, vol. 2, 1931) p. 96; YAMADA, Mar. Chlorophyc. Ryukyu (Journ. Fac. Sci., Hokkaido Univ., ser. 5, vol. 3, no. 2, 1934) p. 45; YAMADA and TANAKA, Mar. alg. Yonokuni (Sci. Pap. Inst. Algolog. Res., vol. 2, no. 1, 1938) p. 57.
Japanese name: *Nedashi-shiogusa*.

Chaetomorpha

Chaetomorpha Linum (MUELLER) KUETZING

Phyc. germ. (1845) p. 204, Spec. alg. (1849) p. 378, Tab. phyc., vol. 3, (1853) pl. 55, fig. 3; WEBER VAN BOSSE, Liste alg. Siboga, vol. 1 (1913) p. 84; YENDO, Notes on alg. new to Japan, IV (Bot. Mag. Tokyo, vol. 30, 1916) p. 48; BOERGESEN. Mar alg. Canary Isl. (1925) p. 44, Some mar. alg. north. part of Arabian Sea (1934) p. 18, List mar. alg. Bombay (1935) p. 12, Mar. alg. Iranian Gulf (1939) p. 63; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 88, Mar. Chlorophyc. Ryukyu (Journ. Fac. Sci., Hokkaido Univ., vol. 3, no. 2, 1934) p. 42; YAMADA and TANAKA, Mar. alg. Yonakuni (Sci. Pap. Inst. Algolog. Res., vol, 2, no. 1, 1938) p. 58.
Japanese name: *Usuiro-juzumo*.

Chaetomorpha crassa (AGARDH) KUETZING

Phyc. germ. (1845) p. 204, Spec. alg. (1849) p. 379, Tab. phyc., vol. 3 (1953) pl. 59; WEBER VAN BOSSE, Liste alg. Siboga, vol. 1 (1913) p. 85; BOERGESEN, Mar. alg. Dan. West Ind., vol. 1 (1913) p. 18, Mar alg Ceylon (1936) p. 64; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 88, Mar. Chlorophyc. Ryu-

kyu (Journ. Fac. Sci., Hokkaido Univ., ser. 5, vol. 3, no. 2, 1934) p. 42; OKAMURA, Mar. alg. Kotosho (Bull. Biogeogr. Soc. Japan. vol. 2, no. 2, 1931) p. 97; TSENG, Mar. Chlorophyc. Hainan (Chin. Mar. Biol. Bull., vol. 1, no. 5, 1936) p. 146.

Conferva crassa C. AGARDH, Syst. alg. (1824) p. 99.

Japanese name: *Huto-juzumo.*

BRYOPSIDACEAE

Bryopsis

Bryopsis Harveyana J. AGARDH

Till alg. syst., VIII. (1886) p. 22; HEYDRICH, Einige alg. Loo-choo Ins. (Ber. d. deut. bot. Ges., vol. 25, 1907) p. 100; VICKERS, Phyc. Barbad., vol. 1 (1908) pl. 51; COLLINS, Green alg. N. Amer. (1909) p. 405; SETCHELL, American Samoa, part. I. Vegetation of Tatuila Isl. (1924) p. 174, Tahitian alg. (1926) p. 80; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39. 1925) p. 90; OKAMURA, Mar. alg. Kotosho (Bull. Biogeogr. Soc. Japan. vol. 2, no. 2, 1931) p. 100; YAMADA and TANAKA, Mar. alg. Yonakuni (Sci. Pap. Inst. Algolog. Res., vol. 2, no. 1. 1938) p. 60.

Japanese name: *Kataha-no-hanemo.*

CAULERPACEAE

Caulerpa

Caulerpa sertularioides (GMELIN) HOWE

Phyc. stud., II, (1905) p. 576; SVEDELIUS, Ecol. and syst. account of Ceylon sp. of Caul. (1906) p. 114; OKAMURA, Icon. Japan. alg., vol. 3 (1913) p. 36, pl. 110, figs. 1–3; BOERGESEN, Mar. alg. Dan. West-Ind., part 1 (1913) p. 133, fig. 106, Some Ind. green and brown alg.etc II (Journ. Ind. Bot. Soc., vol. 11, 1932) p. 59, YAMADA, Mar. Chlorophyc. Ryukyu (Journ. Fac. Sci., Hokkaido Univ., ser. 5, vol. 3, no. 2, 1934) p. 68; TSENG, Mar. Chlorophyc. Hainan (Chin. Mar. Biol. Bull., vol. 1, no. 5, 1936) p. 179; YAMADA and TANAKA, Mar. alg. Yonakuni (Sci. Pap. Inst. algolog. Res., vol. 2, no. 1, 1938) p. 61; DAWSON, Mar. alg. Gulf. Calif. (1944) p. 213.

Fucus sertularioides GMELIN, Hist. Fuc. (1768) p. 151, pl. 15, fig. 4.

Fucus plumaris FORSKAL, Fl. Aegipt.-Arab. (1775) p. 190.

Caulerpa plumaris AGARDH, Spec. alg. vol. 1, (1822) p. 436; WEBER VAN BOSSE, Monogr. Caul. (1898) p. 294; REINKE, Ueber Caul. (1900) p. 17, figs. 21–22.

Japanese name: *Takanohazuta.*

Caulerpa racemosa (FORSKAL) WEBER VAN BOSSE

Monogr. Caul. (1898) p. 357, Liste alg. Siboga, vol. 1 (1913) p. 104; BOERGESEN, Ecolog. and system. account of Caul. of Dan. West. Ind. (1907) p. 378, Mar. alg. Dan. West Ind., vol. 1 (1915) p. 147, Some Ind. green and brown alg. etc. II (1932) p. 59; OKAMURA, Icon. Japan. alg., vol. 3 (1913) p. 66, pl. 119.

var. **clavifera** WEBER VAN BOSSE, l. c. p. 361.

The Ryukyusho specimens of this variety are represented by the forms: **macrophysa** and **microphysa**.

Japanese name: *Sennarizuta.*

var. **laetevirens** WEBER VAN BOSSE, l. c. p. 366.

Japanese name: *Surikogizuta.*

Caulerpa peltata LAMOUROUX

"Journ. de Bot., vol. 2 (1809) pl. 3, fig. 2"; WEBER VAN BOSSE, l. c. p. 373, pl. 31 figs. 9–11, pl. 32, fig. 9; J. AGARDH, Till alg. syst. p. 37; REINKE, Ueber Caul. (1900) p. 39; SVEDELIUS, Ecol. and syst. account of Ceylon sp. of Caul. (1906) p. 131; BOERGESEN, Mar. alg. Canary Isl., vol. 1 (1925) p. 112, Some Ind. green and brown alg. etc. II (Journ. Ind. Bot. Soc., vol. 11, no. 1, 1932) p. 62, fig. 5, Some mar. alg. from Mauritius, I (1940) p. 51; YAMADA, Mar. Chlorophyc. Ryukyu (Journ. Fac. Sci., Hokkaido Univ., ser. 5, vol. 3, no. 2, 1934) p. 72; YAMADA and TANAKA, Mar. alg. Yonakuni (Sci. Pap. Inst. Alg. Res., vol. 2, no. 1, 1938) p. 61.

Japanese name: *Takaisizuta.*

CODIACEAE

Codium

Codium intricatum OKAMURA

Icon. Japan. alg., vol. 3 (1913) p. 74, pl. 120, figs. 9–13, On alg. Hatidyo (Rec. Oceanogr. Works in Jap., vol. 2, 1930) p. 104; SCHMIDT, Beitr. zur Kenntn. Codium (1923) p. 55; YAMADA, Mar. Chlorophyc. Ryukyu (1934) p. 29; TSENG, Mar. Chlorophyc. Hainan (Chin. Mar. Biol. Bull. vol. 1, no. 5, 1936) p. 169.

Japanese name: *Motsure-miru.*

As it was already noticed by O. C. SCHMIDT (l. c.) the present species was described with a rather short and incomplete diagnose. When the writer came across with this species from Naha, Ryukyu Isl. he found that his specimens did not agree with the original description in the size of the utricles. According to the original description the utricles are 770–1150 μ in breadth while in the writer's specimens they rarely exceeded 500 μ in breadth, usudlly being about 250–300 μ. As other characteristics, however, showed good agreement the writer considered that his Ryukyu specimens might be a form of *C. intricatum* (l. c. p. 80). TSENG also found about the same thing in his Hainan specimens (l. c. p. 170). But afterward the writer examined several specimens including a cotype specimen of this species in the OKAMURA Herbarium to find that the utricles of all these specimens had not so great diameter as described in the diagnose, though the type specimen was not examined because it was not found. The breadth of the utricles of this species, therefore, seems to be usually 250–300 μ rarely reaching 500 μ.

Codium formosanum spec. nov. Text-figs. 1–2.

Thallus leviter decumbens vel erectus, per parvo disco affixus, 5–10 cm altus, 4–7 mm diam., leviter compressus vel cylindraceus, sed infra ramificationem semper compressus, repetite dichotome ramosus angulis ratundatis; ramis saepe unilateralibus,

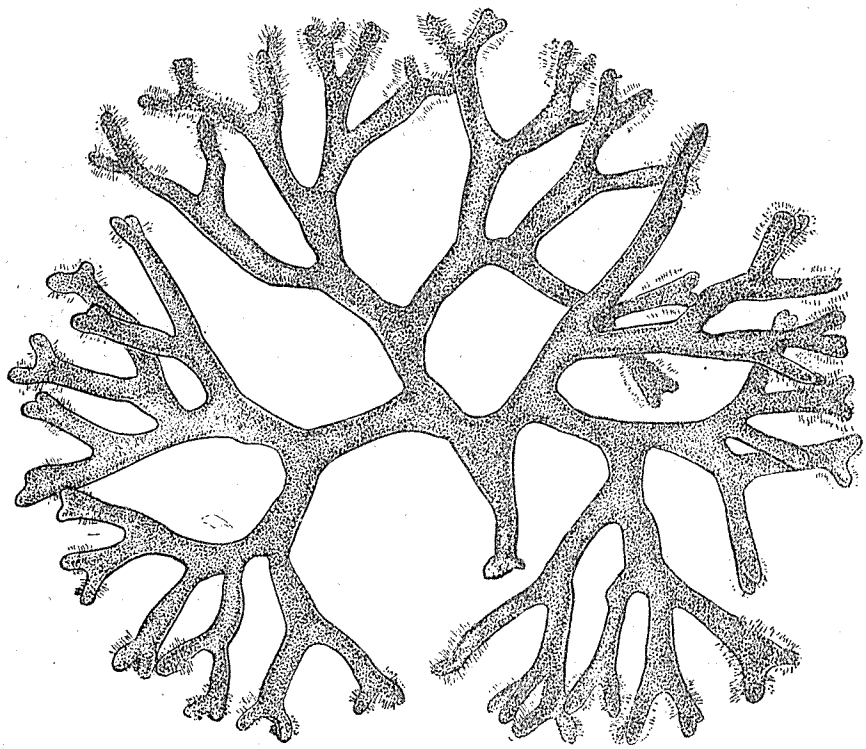

Fig. 1. *Codium formosanum* YAMADA. ×1

non adhaerentibus; utriculis forma magnitudineque variabilibus, typice clavatis, sed nunc crassis et longe clavatis, nunc tenuibus et clindraceis, ca. 800–1200 μ longis, 250–300 μ crassis, nonnunquam 600 μ attingentibus, apice truncatis vel rotundato-truncatis, membrana apicali plusminusve incrassata, 8–10 μ crassa, non striata; filamentis medularibus ca. 300 μ crassis; pilis copiosis, ad humeros utriculorum prope extremitatem ramulorum productis, ca. 25 μ crassis; gametangiis fusiformibus vel late fusiformibus, 240–260 μ longis, 60–80 μ crassis, supra medium utriculorum positis.

Japanese name: *Takasago-miru.*

Thallus 5–10 cm high, attaching to rocks by means of a small disc-shaped holdfast, slightly decumbent or erect, 4–7 mm in diam., slightly compressed or cylindrical, but always compressed under the dichotomies, 3–8 times dichotomously ramified with wide

and round angles; branches often becoming unilateral and free from each other; utricles variable in the shape and size, usually clavate, or sometimes thick and longly obovate, or thin and nearly cylindrical, about 800–1200 μ long, 250–300 μ in diam., but often reaching 600 μ, nearly truncate or slightly rounded at apices with slightly thickened membrane about 8–10μ in thickness; medulary filaments about 30 μ thick;

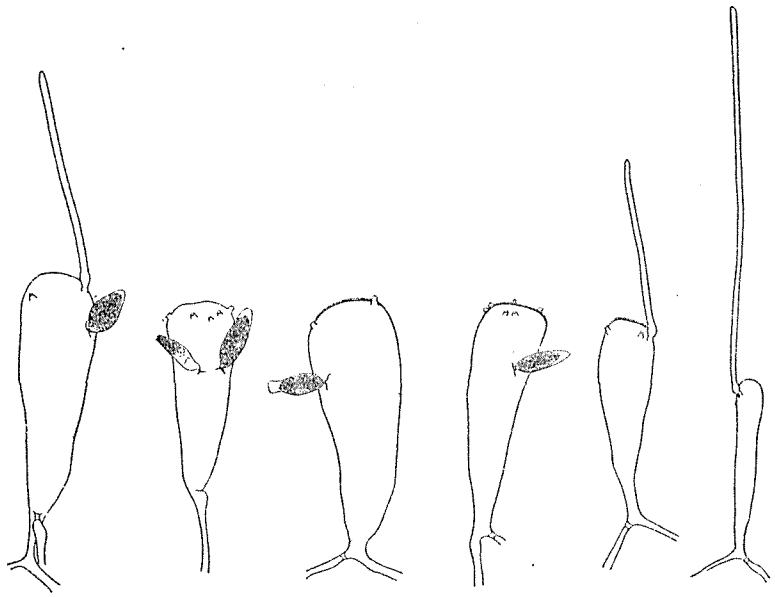

Fig. 2. *Codium formosanum* YAMADA.
Six utricles showing different shapes and sizes.

hairs abundant near the extremities of branches, 1–5 on the shoulders of utricles, about 25 μ thick; gametangia fusiform or thickly fusiform, 240–260 μ long, 60–80 μ thick, situated above the middle part of the utricles.

The present species seemes to show some relation to *C. contractum* KJELLM. But in *C. contractum* KJELLM. the erect thallus is dark green in color and always thickened near the apex of branches, which are not the case in *C. formosanum*. Furthermore it is to be noted that the utricles of the Formosan species are generally thicker than those of the Japanese species. On the other hand the new species seems to be nearly related to *C. cervicorne* SETCH. et GARD. from the Gulf of California. But the former species is distinguishable from the latter by the compressed thallus and the utricles whose membrane is not so thickened at apices as those in the Mexican species.

Halimeda

Halimeda cuneata HERING

"Flora (1846) p. 214"; BARTON, Gen. Halimeda (1901) p. 15, pl. 2, figs. 2–14;

OKAMURA, Icon. Japan. alg., vol. 3 (1915), p. 202, pl. 147; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 93, Mar. Chlorophyc. Ryukyu (Journ. Fac. Sci., Hokkaido Univ., ser. 5, vol. 3, no. 2, 1934) p. 80, fig. 49.

Japanese name: *Uchiwa-sabotengusa.*

Halimeda Opuntia LAMOUROUX

Sur la classif. de Polyp. corall. (1912) p. 186; BARTON, l. c. p. 18, pl. 2, figs. 1-27.

f. **Renschii** (HAUCK) BARTON, l. c. p. 22; WEBER VAN ROSSE, Liste alg. Siboga, vol. 1 (1913) p. 122; OKAMURA, Icon. Japan. alg., vol. 3 (1915) p. 208, pl. 148, figs. 8–12; BOERGESEN, Mar. alg. Easter Isl. (1924) p. 254; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo,vol. 39, 1925) p. 93.

Halimeda Renschii HAUCK, Ueber einige von Hildebrandt im Roten Meere u. Ind. Ozean gesam. Alg. (Hedwigia, 1886) p. 167.

Japanese name: *Hime-sabotengusa.*

PHAEOPHYCEAE

ECTOCARPACEAE

Ectocarpus

Ectocarpus formosanus spec. nov. Text-fig. 3.

Frons minutus, in fronde Codii pulvinatus, ex parte basilare inter utriculos hospitis penetrante et filamentibus erectis liberisque compositus; partibus basilaribus aliquantum rhizoideis rarissime irregulariter ramosis, cellulis forma irregularibus, pallidis, 11–15 μ latis, ca. 3–6-plo diam. longioribus; filamentis erectis librisque vix 1 mm altis, semelter irregulariter dichotome juxta basim ramosis, piliferis cellulis leviter tenuioribus quam eis partis basilaris vel fere equicrassis, ad dissepimenta levissime vel non constrictis, sursum tenuioribus et longioribus et pallidioribus; chormatophoris irregulariter taeniatis vel irregulariter discoideis; sporangiis plurilocularibus cylindrico-pyriformibus usque ad conicis, plerumque sessilibus, saepe 1-cellulato pedicellatis, raro in ramulis brevibus terminalibus, 60–95 μ longis, 20–25 μ latis, plerumque prope basim filamentorum erectorum dispositis.

Japanese name: *Nankai-shiomidoro.*

Thallus minute, felt-like, growing on the frond of Codium, composed of basal parts penetrating among the utricles of the bost and erect free filaments; basal parts somewhat rhizoid-like, very rarely ramifying in an irregular manner, composed of cells irregular in shape, pale green in colour, about 11-15 μ thick, about 3-6 times as long as thick or longer; erect part above the surface of the host scarecely exceeding 1 mm in hight, ramifying 1–3 times in an irregularly dichotomous manner near the base, cells slightly slenderer than or nearly the same as those of the basal penetrating parts, very slightly or not constricted at dissepments; becoming gradually slenderer, longer

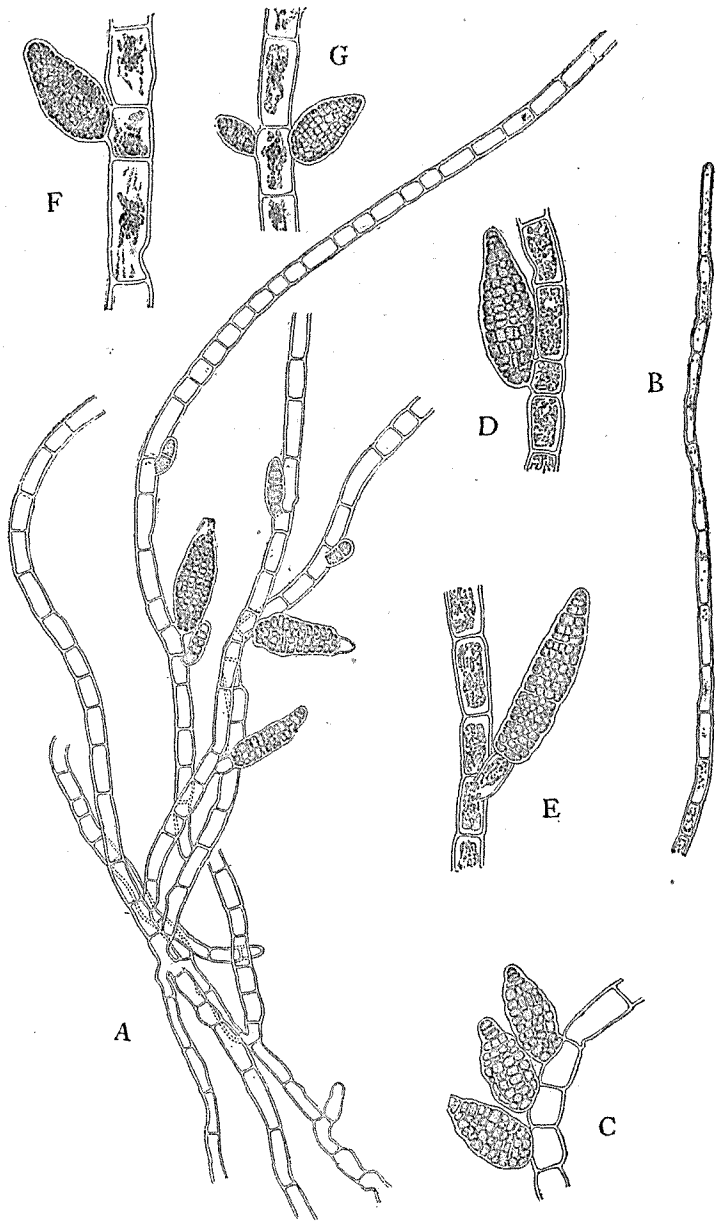

Fig. 3. A–E *Ectocarpus formosanus* YAMADA. A. A plant showing the habit. × 170. B. Hair-like portion. × 155. C–E. Parts bearing plurilocular sporangia. × 260. F–G. *Ect. van Bosseae* SETCH. et GARD. ? showing plurilocular sporangia and chromatophores. F. × 330. G. × 260.

and paler upwards forming a hair-like portion near the extremities; growing zones a little above the base of the erect filaments; chromatophores like irregularly broken ribbon or irregularly discoid; plurilocular sporangia cylindrico-pyriform to conical, usually sessile, often provided with a short, one celled pedicel or rarely apical on short branches, 60–95 μ long, 20–25 μ thick, produced mostly near the base of the erect filaments.

The new species seems to be related nearly to *E. ceylanicus* BOERG. which grows also on *Codium*, but can be distinguished from it by its slenderer filaments and different shape of the plurilocular sporangia. On the other hand *E. izuensis* SEGAWA comes also near the species in question. This species, however, has thicker cell membran than *E. formosanus* and moreover the upper part of this specie is not hair-like as the new species.

Ectocarpus van Bosseae SETCHELL et GARDNER?

SETCHELL's American Samoa, pt. 1. Vegetation of Tatuila Isl. (1924) p. 170, fig. 36.

Ectocarpus sp. WEBER VAN BOSSE, Liste alg. Siboga, vol. 1 (1913) p. 131, figs. 35–36.

Japanese name:

The specimens of the present species in Ryukyusho were found growing on the leaves of *Sargassum* together with a small *Ectocarpus* not exactly determined.

The thallus is small, reaching scarecely 1 cm in hight, and sparingly ramifies in nearly dichotomous (mostly in the lower parts of the thallus) or alternate manner, and the branches end in a slender hair-like portion. The cells are 18–42 μ thick, 2–4 times as long as thick, and slightly constricted at dissepiments. The chromatophores are irregularly disc-shaped or often elongate. The plurilocular sporangia are ovate or longly ovate, obtuse at apices and sessile on the shorter cells or provided with a short pedicel. But it is often found that two sporangia are produced on the same cell. They are usually about 50 μ long and about 25 μ thick. As mentioned above our specimens agree in general with *E. van Bosseae* S. et G., but there is one point which does not coincide with the description of this species. That is the base of the frond. Our speciemens show clearly the rhizoidal base while *E. van Bosseae* shows the creeping filaments. That is why the writer put a query after the speeific name.

Ectocarpus breviarticulatus J. AGARDH

Nya alg. fr. Mexico (1847) p. 7; BOERGESEN, Mar. alg. Dan. West Ind., part. 2 (1914) p. 173, fig. 136, Mar. alg. Easter Isl. (1924) p. 256, fig. 136, Some mar. alg. from Mauritius, II (1941) p. 39, Contrib. to S. Ind. mar. alg. flora, II (1937) p. 312; SETCHELL, Amer. Samoa, pt. 1. Vegetation of Tatuila Isl. (1924) p. 171, fig. 37; YAMADA, Meeresalg. Formosa, II (Bot. Mag. Tokyo, vol. 39, 1925) p. 239; YAMADA and TANAKA, Mar. alg. Yonakuni (Sci. Pap. Inst. Alg. Res., vol. 2, no. 1 1938) p. 66.

Ectocarpus hamatus CROUAN, in MAZÉ et SCHRAMM's Essai de classif. alg. de

Guadel. (1870) p. 111; VICKERS, Phyc. Barbad., II (1908) pl. 29.

Japanese name: *Tamagata-shiomidoro.*

Of the present species there are two kinds of specimens; the one growing on rocks and reaching about 2 cm in hight, while the other epiphytic on *Chnoospora pacifica* and about 5–7 mm high. But both agree well with the descriptions and figures cited above. All specimens, however, seem to be still young, because there are only few plurilocular sporangia which are still small in size. At the base of the frond there are creeping parts from which the erect filaments issue. The cells forming the erect filaments are slightly constricted at dissepiments, about 28 μ in thickness and 1–2 times as long as thick. The chromatophores are irregularly disc-shaped.

DICTYOTACEAE

Padina

Padina minor YAMADA

Meeresalg. Formosa, II (Bot. Mag. Tokyo, vol. 39, 1925) p. 251, fig. 5, Notes on some Japan. alg., II (Journ. Fac. Sci., Hokkaido Univ., ser. 5, vol. 1, no. 2, 1931) p. 68; OKAMURA, Icon. Japan. alg., vol. 6 (1931) p. 56, pl. 279, figs. 6–9.

Japanese name: *Usuyuki-uchiwa.*

Padina australis HAUCK

Ueber einige von Hildebrandt im Rot. Meere u. Ind. Ozean gesam. Alg. (Hedwigia, vol. 26, 1887) p. 44; WEBER VAN BOSSE, Liste alg. Siboga, vol. 1 (1913) p. 179, fig. 52; YAMADA, Meeresalg. Formosa, II (Bot. Mag. Tokyo, vol. 39, 1925) p. 251, Notes on some Japan. alg. II (Journ. Fac. Sci., Hokkaido Univ., ser.5, vol. 1, no. 2, 1931) p. 71, fig. 2, pl. 18; OKAMURA Mar. alg. Kotosho (Bull. Biogeogr. Soc. Jap. vol. 2, no. 2, 1931) p. 103, Icon. Japan alg. .vol. 6 (1932) p. 88, pl. 295, figs. 1–4.

Japanese name: *Usuba-umiuchiwa.*

As pointed out very precisely by Dr. BOERGESEN, the arrangement of the tetrasporngial sori of this species is very peculiar (Some Indian green and brown algae especally from shores of Presid. Bombay, p. 171). He described specially the relation between the hair-lines and the sorus lines. To my great interest quite the same thing was observed in our Kotosho specimens. The hair lines beneath the sporagial rorus are always on the same surface as the sorus while the hair lines above the sorus are not on the same surface as the sorus, but on the opposite side of the frond. This fact seems to support Dr. BOERGESEN's conclusion to consider *P. australis* HAUCK as a synonym of *P. gymnospora* VICKERS. But the writer has never found in our specimens any part of the frond consisting of three layers of cells, while in *P. gymnospora* VICKERS some still thicker parts of the frond are described (cf. KÜTZING, Tab. Phyc. vol. 9, pl. 71, ; VICKERS, Phyc. Barbad. I, pl. 7). That is why the writer hasitates to name the present alga *P. gymnospora* VICKERS following to Dr. BOERGESEN, and

calls *P. australis* HAUCK.

Dictyota

Dictyota ceylanica KÜTZING var. **anastomosans** var. nov. Text-fig. 4.

Segmenta fasciculis rhizoidearum anastomosantia.

Japanese name: *Hai-amiji* (nov.)

Our specimens were found growing on the frond of *Laurencia* etc. They creep on the host, their branches laying one upon the other and thus forming an irregular mass about 3–6 cm wide. The fascicles of rhizoids are sent out of many places of the segments for fixing themselves to each other. The rhizoids are many-celled and

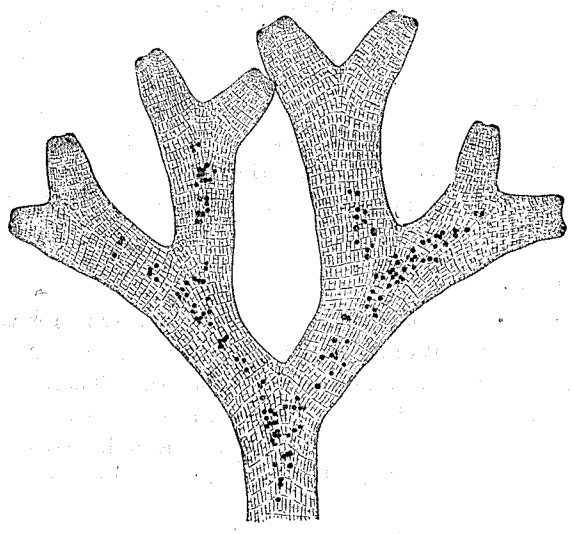

Fig. 4. *Dictyota ceylanica* KG. var. *anastomosans* YAMADA. An upper portion of the frond showing tetrasporangia. × 15.

usually do not ramify, and at apices they are rounded or sometimes expanded. The thallus are divided dichotomously. The segments are narrow, entire at margin, about 1 mm in width and about 115 μ in thickness; the shape of the large central cells in the cross-section is rather variable according to the places, some being slightly longer than wide or vice versa. They are about 80 μ high and include much contents which turn black when dried and these black points give the segments many parallel lines in the surface view. The tetrasporangia are about 65 μ in diam. and scattered on the median parts of the upper segments, being never found on the marginal parts.

As mentioned above the Ryukyusho specimens show coincidence in general with the KÜTZING's figures cited above, and also with BOERGESEN's description (l. c.).

But our specimens have, like BOERGESEN's ones, many fascicles of rhizoids as mentioned above which, according to Me. WEBER VAN BOSSE, are not present in *D. ceylanica* KG. So the writer separates his plant from this KÜTZING's species as a variety.

Dictyota hamifera SETCHELL

Tahitian algae (1926) p. 92, pl. 14.

Japanese name: *Kagi-amijigusa* (nov.)

The specimens of Ryukyusho agree fairly well with the description and figures of Prof. SETCHELL. They were found growing on the frond of *Laurencia* together with *Leveillea* and *Mastophora*. The thallus are about 3–4 cm long, 1–2 mm wide, and ramify in a nearly regularly dichotomous manner and are provided with several broad-based, somewhat spinose branchlets or irregularly divided slender ramuli here and there on the margin. In the upper parts of the frond there are several hooked branchlets which curve outward and slightly inflated. The branches are divided at the apices and each apex shows a terminal cell or two side by side, but nearly always there is another one on the outside shoulder of the apex not far apart from the terminal cell or cells which, according to SETCHELL, represents the initial cell of the hooked branch (cf. SETCHELL's l. c. pl. 14, fig. 2). The thallus is about 80–120 μ thick and in the cross-section the inner large cells are about 80 μ high and the outer layer is about 15 μ thick. The hair-clusters are found mostly in the upper parts of the branches. The tetrasporangia are about 75 μ in diameter and scattered irregularly in the median part of the branches.

Dictyopteris

Dictyopteris delicatula LAMOUROUX

Text-figs. 5—6.

"Journ. Philom. (1809) no. 20, pl. 6, fig. B."; VICKERS, Phyc. Barbad. vol. 2 (1908) pl. 3; WEBER VAN BOSSE, Liste alg. Siboga, vol. 1 (1913) p. 181; BOERGESEN, Mar. alg. Dan. West Ind., part 2 (1914) p. 216, figs. 116–167, Contrib. to South Ind. alg. flora (1937) p. 26.

Japanese name: *Hai-yahazu* (nov.)

Our specimens were found creeping on the frond of *Amansia glomerata*, *Gelidiopsis*, *Mastophora*, *Champia* etc., attaching to the host by means of rhizoids which are sent out of the mid-rib or margins of the frond. The fronds are about 4 cm long, about

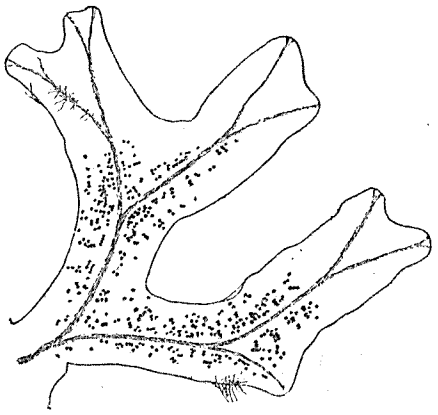

Fig. 5. *Dictyopteris delicatula* BOERG. × 4

2 mm broad, and about 150 μ in thickness. They ramify dichotomously with broad and round angles, and on both sides of the midrib there are small hair-groupes which are disposed rather regularly. They consist of two layers of cells except near the mid-rib and at magin.

Some specimens are provided with oogonia. They are about 80–50 μ across in the surface view, and about 85 μ high, and scattered irregularly on both sides of the

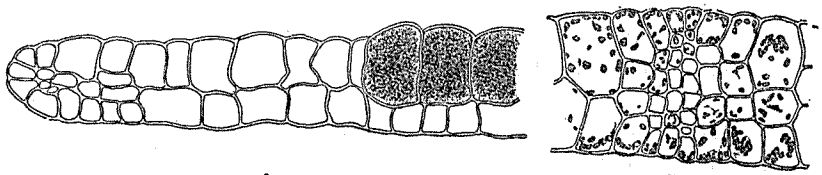

Fig. 6. *Dictyopteris delicatula* BOERG.
Transverse sections of the thallus showing oogonia (A) and mid-rib (B). A. × 150. B. × 170.

mid-rib, and on both surfaces of the frond. The cross section of the frond shows that the oogonia are not produced by the division of vegetative cells, but the cells which correspond to the vegetative ones become oogonia.

Our specimens resemble *D. repens* (OKAM.) BOERG. superficially, but easily distinguished by the presence of a rib along the margin of the frond and of the regularly arranged hair-groups as pointed out by Dr. BOERGESEN regarding to *D. repens* from Easter Island (cf. Mar. alg. Easter Island, The natural history of Juan Fernandez and Easter Island, vol. 2, 1924, p. 265).

ENCOELIACEAE

Colpomenia

Colpomenia sinuosa DERBÈS et SOLIER

"Mem. Phys. alg. (1856) p. 11"; OKAMURA, Icon. Japan. alg. vol. 1 (1907) p. 86, pl. 19, figs. 11–12, pl. 20, figs. 10-12; BOERGESEN, Mar. alg. Dan. West Ind., part 2 (1914) p. 176; YAMADA, Meeresalg. Formosa, II (Bot. Mag. Tokyo, vol. 39, 1925) p. 241.

Japanese name: *Hukuronori.*

Hydroclathrus

Hydroclathrus clathratus (BORY) HOWE

Algae in BRITTON and MILLSPAUGH, Bahama Flora (1920) p. 590.

Hydroclathrus cancellatus BORY

"Dict. class. VIII (1826) p. 419"; OKAMURA, Icon. Jap. alg., vol. 1 (1907) p.

18, pl. 4, fig. 11, pl. 5, figs. 7–13; BOERGESEN, Mar. alg. Dan. West Ind. part 2 (1914) p. 177; YAMADA, Meeresalg. Formosa (Bot. Mag. Tokyo, vol. 39, 1925) p. 241.

Japanese name: *Kagomenori.*

Chnoospora

Chnoospora implexa (HERING) J. AGARDH

Spec. alg. vol. 1 (1848) p. 172; KÜTZING, Tab. Phyc. vol. 9 (1859) pl. 87, fig. 2; GRUNOW, Alg. Fidschi etc. (1874) p. 25; WEBER VAN BOSSE, Liste alg. Siboga, vol. 1 (1913) p. 137; BOERGESEN, Some mar. alg. Mauritius, I (1941) p. 63; YAMADA, Meeresalg. Formosa, II (Bot. Mag. Tokyo, vol. 39, 1925) p. 242.

Chnoospora obtusangula SONDER, Alg. trop. Austr. (1871) p. 45; OKAMURA, Icon. Japan. alg., vol. 4 (1921) p. 52, pl. 164, figs. 1–9.

Japanese name: *Murachidori.*

Chnoosorra pacifica J. AGARDH

Nya algar from Mexico (1847) p. 67; KÜTZING, Tab, Phyc., vol. 9 (1859) pl. 86, fig. I; SETCHELL and GARDNER, Mar. alg. (Exped. of Calif. Acad. Sci. to Gulf of Calif. 1924) p. 728, Amer. Samoa, part. I. Vegetation of Tatuila Isl. (1924) p. 168.

Chnoospora fastigiata J. AGARDH var. *pacifica* J. AGARDH, Spec. alg., vol. 1 (1848) p. 172; BOERGESEN, Mar. alg. Easter Isl. (Nat. Hist. of Juan Fernandez and Easter Isl., vol. 2, 1924) p. 163, figs. 11–12.

Chnoospora fastigiata J. AGARDH, BARTON, On fruit of *Ch. fastigiata* (Journ. Linn. Soc., vol. 33, 1898) p. 507, pl. 28.

Japanese name: *Tachi-murachidori* (nov.)

Some of our sepcimens reach the hight of 15 cm but branching is not so dense as that in KÜTZING's figure cited above.

FUCACEAE

Turbinaria

Turbinaria ornata J. AGARDH

Spec. alg. vol. 1 (1849) p. 266; BARTON, Syst. and struct. account of Turbinaria (1891) p. 219; YENDO, Fucac. Jap. (1907) p. 43; WEBER VAN BOSSE, Liste alg. Siboga, vol. 1 (1913) p. 149; SETCHELL, Amer. Samoa, pt. I. Vegetation of Tatuila Isl. (1924)p. 166, Tahitian algae (1926) p. 94; YAMADA, Meeresalg. Formosa, II (Bot. Mag. Tokyo, vol. 39, 1925) p. 244, List mar. alg. from Atoll Ant (Sci. Pap. Inst. Alg. Res., Hokkaido Univ., vol. 3, no. 1, 1945) p. 39.

Fucus turbinatus β ornatus TURNER, Fuci, I (1808) p. 50, pl. 24, figs. c–h.

Japanese name: *Rappa-moku.*

The frond of the present species is comparatively small, forming a conical outline

and fleshy in texture, the upper surfaces of all leaves make up the surface of the cone, so that it is rather difficult to look the inside of the cone. They grow side by side very densely on rocks facing to the heavy surf. The presence of thick spines in two rows on the leaf blades seems to be a good characteristic of the present species. *T. ornata* J. AG. is a dioecious species.

Turbinaria trialata KÜTZING

Tab. Phyc., vol. 10 (1860) p. 24, pl. 67; BARTON, l. c.p. 218; YENDO, l. c. p. 43; BOERGESEN, Mar. alg. Dan. West Ind., vol. 2 (1914) p. 217, fig. 168.

Japanese name: *Takatsukimoku.*

The Ryukyusho specimens of this species are slenderer than the preceding species, and prefer the sheltered places.

Sargassum echinocarpum J. AGARDH Text-fig. 7.

Spec. alg., vol. 1 (1848) p. 327, Spec. Sarg. Austr. (1889) p. 87; REINBOLD in WEBER VAN BOSSE's Liste alg. Siboga, vol. 1 (1913) p. 155; GRUNOW, Add. ad cognit. Sarg. (1916) p. 383, no. 83; SETCHELL, Some mar. plants of Southeastern Melanesia (The Templeton Crocker Exped. to west Polynesia and Melanesia Insl. 1933, 1935) p. 265.

Japanese name: *Takasagomoku* (nov.)

Fig. 7. *Sargassum echinocarpum* J. AG. A habit sketch showing the characters of the leaves, vesicles and receptacles. × 1.5.

Root elevated disc with diam. of about 1.5–2 cm; stem very short, stopping the growth very soon, scarecely reaching 1 cm in length, cylindrical, nearly smooth, sending 2–4 primary branches in every direction; primary branches up to 1 m long, compressed throughout the whole length, about 3 mm wide in the broadest portion, smooth, not glandulose, sending off secondary branches from the margin at intervals of about 3–5 cm; secondary branches not long, up to about 13 cm in length, distichously and alternato-pinnately arranged, compressed, giving off tertiarly branches from their margin in distichous manner;

leaves variable in shape, oblong or elliptical, 3–4 cm long, 1.2 cm wide or broadly lanceolate or broadly linear, shortly stipitate, at margin serrate, sometimes two-seriately serrate, especially in the leaves of the lower parts of the frond, obtuse at the apex, cuneate at the base, provided with an evanescent mid-rib and very conspicuous, irregularly disposed cryptostomata; vesicles ovate or elliptical, up to 1.5 cm long, slightly compressed,provided with a few cryptostomata, and with minute spine-like protuberances at the margin, apiculate or coronated with a small leaf-like appandage at apices, petiolate, petioles shorter than vesicles themselves,flattened, provided with short spine-like protuberances at the margin; receptacles forming a dense, about 5–8 mm long glomerules, verrucoso-cylindrical, cymosely ramified, provided with few spines, containing both male and female conceptacles.

As stated above our Ryukyusho specimens include two forms as to the shape of the leaves, the one having short oblong or elliptical leaves, while the leaves of the other are much longer than the former and lanceolate or linear in shape. These longer ones often reach the length of 8 cm and the apex is not obtuse, but rater acute. There are, however, many intermodiate forms, linking the extremities.

Sergassum crassifolium J. AGARDH

Spec. alg., vol. 1 (1848) p. 326, Spec. Sarg. Austr. (1889) p. 89; REINBOLD, in WEBER VAN BOSSE's Liste alg. Siboga, vol. 1 (1913) p. 158; GRUNOW, Additam. ad cognit. Sarg. (1916) p. 390, no. 91; YAMADA, On the species of Sargassum from the South Japan, II (Jap. Journ. Bot., vol. 18, no. 9, 1942) p. 511, figs. 14–15 (in Japanese).

Japanese name: *Atsubamoku.*

The present species seems to be distributed very commonly along the coast of Formosa.

Sargassum Sandei REINBOLD Text-fig. 8.

in WEBER VAN BOSSE's Liste alg. Sibaga, vol. 1 (1913) p. 158, pl. 4; YENDO, Notes on alg. new to Japan, VII (Bot. Mag. Tokyo, vol. 31, 1917) p. 196.

Japanese name:

Plant mediocre, about 30–50 cm. long, yellowish brown, not very rough, dioicous; root preudodisc, about 2 cm in diam.; stem very short, scarecely exceeding 1 cm, terete, about 2–3 mm in diam., verrucous or smooth, giving off 2–5 primary branches in every direction; primary branches filiform, very slightly compressed or terete, smooth or angular, sending off secondary rami at intervals of about 2–3 cm; secondary rami alternato-pinnate, but often being disturbed by the torsion of primary branches, about 5–15 cm long, filiform, very slightly compreseed or terete; leaves cuneato-oblong or linear-oblong or broadly linear, up to about 4 cm long, very shortly stipitate, asymmetrically cuneate at the base, crispato-dentate at the margin, very obtuse and sometimes duplicated, at apices provided with an evanescent mid-rib and many irregulary arranged clear cryptostomata; vesicles obovate, up to about 8 mm in length, provided with cryptostomata, and bicuspidate or muticous at apices, shortly petiolate, petiole

Fig. 8. *Sargassum Sandei* REINBOLD. A habit sketch showing the characters of the leaves, vesicles and female receptacles. × 1.

compressed or complanate, much shorter than the vesicle itself; male receptactes terete or compressed or triquetrous, verrucous, provided with few spines or teeth at apices or in the upper parts, cymoso-racemose, female ones triquetrous, alato-dentate with large teeth at the margin.

f. **heterophyllum** f. nov.

Folia in partibus superioribus frondium linearia, remote-dentata, apice obtusissima vel truncata, ad basim longe cuneata.

In essential charaeteristics the Ryukyusho specimens agree well with the description and figuras given by REINBOLD. But some specimens which the writer separated as a distinct form show strong variability in the form of the leaves, those in the upper parts of the frond being conspicuously narrower than those in the lower parts of the frond.

Sargassum coriifolium J. AGADH

f. **duplicatum** f. nov. Text-fig 9.

Folia saepe duplicata, margine biserialiter dentata.

Our Ryukyusho specsimens agree well with the present species in general, but very often leaves become duplicated at the margin and are provided with the double rows of the teeth.

OKAMURA described a new *Sargassum* from Kotosho, Formosa, naming *S. prolongatum*. It seems to the writer, however, that this species represents another form of *S. coriifolium* J. AG. Hence the following combination.

f. **prolongatum** (OKAMURA) comb. nov.

S. prolongatum OKAMURA, Mar. alg. from Kotosho (Bull. Biogeogr. Soc. Jap., vol. 2, 1931) p. 105, pl. 11, Icon. Japan. alg., vol. 6 (1932) p. 66, pl. 283 pl. 284, figs. 1–7.

Fig. 9. *Sargassum coriifolium* J. AG. var. *duplicatum* YAMADA.
A habit sketch showing the characters of the leaves, vesicles and receptacles. × 2

Sargassum polycystum C. AGARDH

Syst. alg. (1824) p. 304; J. AGARDH, Spec. alg., vol. 1 (1848) p. 310, Spec. Sarg. Austr. (1889) p. 119; GRNUOW, Addit. ad cognit. Sarg. (1913) p. 444, no. 138; RE NBOI D in WEBER VAN BOSSE's Liste alg Siboga, vol. 1, (1913) p. 169; SETCHELI, Templeton Crocker Expedition, Mar. plants (Proc. Calif. Acad. Sci., 4. Ser., vol. 21, no. 21, 1935) p. 266; YAMADA, On the species of Sargassum from the South Japan, I (Jap. Journ. Bat., vol. 18, no. 7, 1942) p. 371, figs. 5–6 (in Japanese).

Sargassum microphyllum YENDO (non AGARDH) Fucac. Jap. (1907) p. 137; YAMADA, Meeresalg. Formosa, II (Bot Mag. Tokyo, vol. 39, 1925) p. 247; OKAMURA, Mar. alg. from Kotosho (Bull. Biogeogr. Soc. Japan, vol. 2, no. 2, 1931) p. 108.

Sargassum ambiguum SONDER, Alg. trop. Austr. (1871) p. 41.

Japanese name: *Kobamoku*.

When the writer collected this species for the first time at Garanbi, Formosa, not far from Ryukyusho, he followed the determinatiom of YENDO who reported the same plant from Ryukyu under *S. microphyllum* AG. with a query. And afterward OKAMURA also reported the same species from Kotosho, a small island off the south eastern coast of Formosa. By the nature *S. polycystum* AG. *S.microphyllum* AG., *S. myriocystum* AG., *S. parvifolium* (TURN.) AG., *S. gracile* J. AG. etc. are related so closely to each other that some of them may represent only a local form of the other. According to REINBOLD (l. c), however, *S. microphyllum* AG. can be distinguiched from *S. polycystum* AG. by the presence of the narrow, filiform leaves and also by the absence of the mid-rib on the leaves. Following to this opinion of REINBOLD the writer preferred the name, *S. polycystum* AG. for our Ryukyusho specimens as well as the Garanbi specimens.

As is described and illustrated in my previous papers (l. c. 1925 and 1942) these specimense are very peculiar in showing several stolons issued from the upper parts of the short stem which do not seem common in *Sargassum* though they have been described and illustrated in *Turbinaria* especially by KÜTZING (Tab. phyc., vol. 9, pls. 66–68), Mr. and Mrs. GEPP (Marine algae and marine phanerogams of the Sealark Expedition, p. 183, pl. 24, figs. 25–27), and Mrs. WEBER VAN BOSSE (Liste des algues du Siboga, vol.1. p. 150). And the writer observed the same stolons in a specimen from Guam preserved in the herbarium of the University of California, which was determined by REINBOLD as *S. polycystum* AG. (U. C. no. 144914). Consequently it seems to the writer that having stolons is a good characteristic of the present species, or at least of this species-group.

Regarding to the species in question the writer collected some specimens in Saipan, in 1925 which correspond not only to the Formosa specimens mentioned above but also to the description of *S. ambiguum* SONDER (l. c.). The good coincidence of the Saipan specimens with the latter is seen specially in the fact that in both specimens the receptacles are often carpophyllous, some branchlets of receptacles becoming foliose. And the writer thinks that it is not unreasonable to consider the identity of *S. ambiguum* SOND. with *S. polycystum* AG.