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On the Marine Algae of Susaki, Prov. Izu, and its Vicinity III.

By

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With Plates XXXII-XXXVI.

In April, 1935, the writer visited the Island of Kōzu, and brought back a quantity of algal material to the laboratory. Since that journey, the writer has been a frequent visitor at the island in order to complete his collection. In consequence of the investigation of them, some noteworthy algae for the Japanese algal flora have been found.

As to the marine flora of the Island of Miyake, the outline is gradually becoming clear from studies being carried out in co-operation with Mr. K. HAYASI. Some interesting algae have been found there by him and the writer, which are listed in the following pages.

In addition to them, some rare algae are also herein mentioned which were collected by the writer along the coast of the Izu peninsula, after the appearance of the second report of this paper.

In the course of this investigation, the writer has felt keenly the need of further investigation in the district upon the subject of algal distribution.

To the great regret of the writer, in the course of this study, Dr. K. OKAMURA, under whose direction this work had been carried on, passed away in Tōkyō, August 21, 1935. Then Dr. Y. YAMADA was asked to direct this work.

Here, the writer wishes to express his hearty thanks to Prof. Y. YAMADA for his kind direction.

Thanks are also due to Mr. N. TōDA who helped him with much kindness in the journey to the Island of Kōzu.

The present study has been carried out, as before, at the Mitsui Institute of Marine Biology. The writer feels very glad to take this opportunity to express his sincere thanks to Mr. T. MITSUI and Prof. I. AMEMIYA, for affording the opportunity for this study.

CHLOROPHYCEAE

ULVACEAE

Ulva fasciata DELILE

"Egypt. (1813), p. 153, pl. 58, f. 5"; VICKERS, Phyc. Barb. (1908), pl. 2; YAMADA, Notes on some Jap. Alg., VI (1935), p. 27.

Japanese name: *Ribon-aosa*.

Hab.: Kōzu-sima.

Ulva sublitoralis spec. nov.

Pl. XXXII, and Text-fig. 1.

Frons indivisa interdum lobata, obovata vel elongata, interdum 1 m alta, in partibus inferioribus 130–270 μ , superioribus ca. 35 μ crassa, ad basin crasse et breviter sitpitata, in partibus inferioribus subcostata, margine undulatissima; cellulis in costa 2–3-plo diametro longioribus, prope marginem quadratis.

Fila radicalia non inter sed extra 2-strata cellulas producta.

Japanese name:

Ō-aosa.

Hab.: Kōzu-sima.

Growing on rocks and other algae (including *Aneuria Lorenzii*) dredged from the bottom at 25–45 meter depth.

Fronde simple or sometimes lobed, variously shaped, from obovate to elongated, sometimes 1 m long, with a short, thickened (0.8–1 mm), cuneate stipe, densely ruffled on the margins, with a

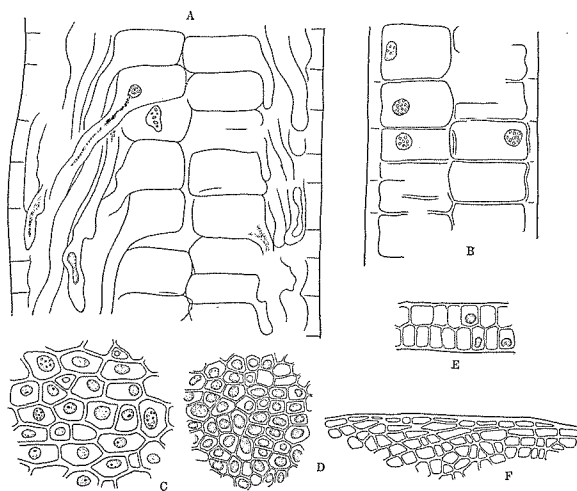


Fig. 1. *Ulva sublitoralis* SEGAWA.

A. Longitudinal section of the basal part of the frond. B. Longitudinal section of the midrib. C. Surface-view of the midrib. D. Surface-view of the upper part of the frond. E. Longitudinal section of the upper part of the frond. F. Surface-view of the marginal part. $\times 90$.

plane, thick "midrib" at least near the base, dark green or green in colour; margins smooth having no microscopic teeth; membrane 130–270 μ thick as

to the "midrib" and down to 35μ thick on the margins; two layers of cells very closely attached to one another, and covered with thick outer walls; cells of the stipe rather square, or nearly so in cross section, forming rhizoidal prolongations on the outer sides; cells of the "midrib" vertically elongated in section up to 2-3 times as long as wide, but becoming nearly square towards the margins; cells in surface view 4- to 6-sided; chromatophore small, cucullate at outer end of cells.

The present species grows abundantly around the Island of Kōzu. It is characterized by the very much thickened middle portion and the external prolongation of the rhizoidal filaments. In this combination of characters it seems amply distinct from all other species of the genus.

The lack of microscopic teeth was carefully examined in the young fronds found on the frond of *Aneuria Lorenzii*.

Most species of *Ulva* have their habitats in the littoral belt or vicinity. Here, such a deeper bottom, as mentioned above, seems a suitable habitat for this species.

The plant adheres to paper in drying excepting the basal portion.

VALONIACEAE

Willeella japonica YAMADA et SEGAWA spec. nov. Pl. XXXIII, 1 and Text-fig. 2.

Frons ca. 5 cm alta, rhizoideis e cellulis inferioribus adfixa, in uno plano dense ramosa. Rami ex apices cellularum primo oppositi, dein palmati vel stellati. Cellulae in ramulis ultimis parvae, $30-60\mu$ crassae, 1-1.5-plo diametro longiores.

Japanese name: *Hira-siogusa*.

Hab.: Kōzu-sima.

Frond ca. 5 cm high, standing upon rhizoidal filaments issuing downwards from the lower part of the rachis and branches near the base, not acropetally and repeatedly branched in a plane. From each node, it branches at first oppositely, later plamately or stellately. Branches having no anastomoses with each other. Cells of the rachis cylindrical, ca. 150μ in diam., 1-4 times as long as diam.; cells of ultimate branches smaller than the others, $30-60\mu$ in diam., 1-1.5 times as long as diam.; terminal cells oviform, acuminate.

The specimens of this interesting alga were found on other algae (including *Cladophora* sp.) dredged from the bottom at 25-45 meter depth.

Judging from the appearance, these specimens are to be identified with



Fig. 2. *Willeella japonica* YAMADA et SEGAWA.
A. Upper part of the thallus. B. Base of a plant. $\times 30$.

the genus *Willeella* established by BÖRGESEN,¹⁾ though they differ from *W. ordinata* in several respects.

BÖRGESEN stated in his paper "the plant (*W. ordinata*) grows acropetally by means of an apical cell." The accompanying figure concerning the mode of ramification of the present alga shows the intercalary growth.

Furthermore, BÖRGESEN noted "Every other of these pair of branches are small and dwarfish and composed, as a rule, of a single cell or sometimes of a few cells and generally not ramified. The other pairs of branches are more vigorously branched and have a similar development as the main branches." In the material at hand the ramification is not so regular.

Comparing with BÖRGESEN's figure, the attachment of this alga also

1) BÖRGESEN: Some Indian Green and Brown Algae especially from the Shores of the Presidency of Bombay (1930), p. 155.

shows some differences.

As stated by BÖRGESSEN, the apical cell both in the main stem and in the branches is conical or oviform, smaller than others, and acuminate. Moreover, it usually has a thick membrane. From the peculiarity of the apical cell it reminds one of the correspondence to the tenacula found in *Boodlea*, *Microdictyon Montagnei* and *Struvea*. But as to this, further studies are necessary to determine the exact relation between these organs.

The plant does not adhere to paper in drying.

Microdictyon Vanbosseae SETCHELL

Pl. XXXIV, 2.

Notes on Microdictyon. II (1926), p. 153; The Genus Microdictyon (1929), p. 543, f. 66-70.

Microdictyon n. sp. ?, REINBOLD, in WEBER VAN BOSSE's Liste des Algues du Siboga I (1913), p. 67.

Japanese name: *Sibori-amimoyō*.

Hab.: Kōzu-sima.

The present specimens were collected by dredging from the bottom at 25-45 meter depth, entangling on the frond of *Gelidium* and other algae.

Frond light green, delicate, closely adhering to paper in drying; venation distinct, enclosing pinnules, or pinnule-like areas of more or less cuneate outline; primary filaments 130-170 μ in diameter with segments 130-800 μ long; ultimate segments very rarely free, 50-100 μ in diameter; meshes of two forms, the more numerous small, and the less numerous larger, irregularly or deformed circular.

Considering the following peculiarities of the present material: 1) the second branching, 2) the wedge-shaped reticulate pinnules, 3) the presence of two kinds of meshes; the more numerous small and triangular or polygonal, the occasional large and nearly circular, there is no doubt but that the present alga is the same as the above mentioned species.

It grows densely entangling on other algae as in *Ulva reticulata*. Thus the exact outline and the size of the frond are not clear. Among a great number of specimens, fortunately, there are two specimens which possess the basal portion. At the base these specimens show the appearance of f. *explanatum*, and on the other hand show that of f. *typicum* at the upper part.

Struvea delicatula KÜTZING

Text-fig. 3.

MURRAY et BOODLE, A struct. and syst. account of *Struvea* (1888), p. 281, pl. 16, f. 6; OKAMURA, Icon., I (1908), p. 203, pl. 40, f. 9-12; On the Alg. from Hatidyo (1930), p. 103; YAMADA, Mar. Chlor. from Ryukyu

(1934), p. 46, f. 10.

Struvea tenuis (non ZANARDINI) OKAMURA, Icon., I (1908), p. 201, pl. 40, f. 7-8.

Japanese name: *Sainome-amiha*.

Hab.: Miyake-zima.

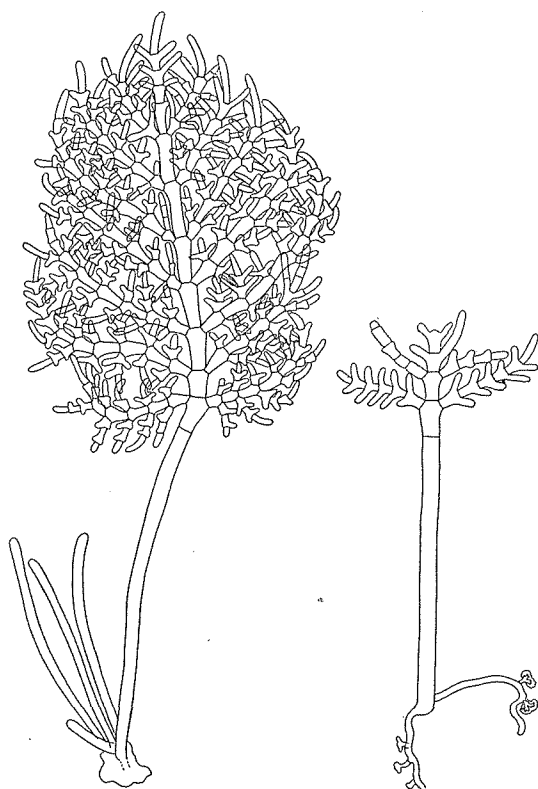


Fig. 3. *Struvea delicatula* Kuetzing. $\times 10$.

Only two specimens are in hand. One of these was found on a frond of *Eckloniopsis radicata* taken up by a diver from the bottom at a 25 meter depth. The other one was dredged by the writer growing on the same alga from just the same place.

The former has a nearly complete leaf. It is 1.2 cm high. The stipe is simple, 5 mm high, 0.3 mm thick, and has no corrugation. The leaf is ovate in shape, 7 mm long and 4.5 mm wide, tripinnately branched.

The latter seems to be a young form of the former. The frond is 6 mm, and the stipe is 4 mm in height; four pairs of pinnae issue from the upper part of the rachis. No tenacula develops at all.

***Struvea orientalis* A. et E. S. GEPP**

Pl. XXXIII, 2-3 and Text-fig. 4.

Mar. Alg. and Mar. Phanerog. of "Sea-lark" Exped. (1908), p. 377, pl. 47, f. 6a, b, 8a, b. 9.

Japanese name: *Ō-amiha*.

Hab.: Kōzu-sima.

A large number of specimens referable to this species were found at Kōzu-sima, in summer, 1936. All the specimens were dredged from a bottom of a 25-45 meter depth. They are widely variable in size, shape,

and in other respects. Speaking as to the size, they vary from 6 to 20 cm or more in height. As to the shape, some specimens are simple, and some are divided.

The specimens are solitary or caespitose. The stipe is simple or divided. The leaf base is cordate. From the rachis, several pairs of branches are formed; thus they are 6 or more times pinnately branched, and at the nodes, very frequently, branched in a stellate manner. The



Fig. 4. *Struvea orientalis* GEPP. $\times 3.5$.

frond consists of a close reticulum, the minute meshes of which are often almost completely filled in with cells or branchlets of later growth. The cells of the rachis are 4–15 mm long, 0.5 mm wide in the lower portion. The branchlets are ca. 0.25 mm and ultimate cells 0.1 mm wide.

These characteristics show a moderate difference from the other *Struvea* excepting *S. orientalis*. This species was described basing upon rather incomplete specimens from Amirante. A photograph of one of the present specimens is reproduced in Pl. 33, Fig. 2, and it seems to the writer to be a complete form of GEPP's plant figured in 6 b. Furthermore, the state of the frond shown in GEPP's fig. 6 a occurs frequently in the specimens at hand. Some specimens are so large and broken, that it is impossible to say what the normal outline of the frond may be.

From these aspects, the writer is inclined to call the present plant by the same name as the plant from Amirante, though it differs from the latter in the following respects. In the present plant, many transverse corrugations can be observed not only in the stipe but also in the inner parts of the leaf, here and there. The tendency to corrugation is shown in all the present specimens. GEPP stated in his diagnosis "Stipite rugoso vel laevi." The corrugation seems sometimes very invisible in the dried specimens.

Furthermore, as to the character of the margin, he noted "...with margin not entire but composed of free projecting branchlets," but in the present specimens, the branchlets of the margin are not always free.

CLADOPHORACEAE

Cladophora Ohkuboana HOLMES

"Mar. Alg. fr. Jap., (1895), p. 349, pl. 10, f. 1"; OKAMURA, Icon., VII (1934), p. 47, pl. 325, f. 1–3.

Japanese name: *Kata-siogusa*.

Hab.: Sirahama; Ō-sima (collected by S. MATUMOTO).

Cladophora japonica YAMADA

Notes on some Japan. Alg., II (1931), p. 65, pl. 16; OKAMURA, Icon., VII (1934), p. 48, pl. 325, f. 4–7.

Japanese name: *Ō-siogusa*.

Hab.: Susaki; Ōse.

CAULERPACEAE

Caulerpa parvifolia HARVEY

Phyc. Austr., vol. 3 (1860), pl. 172; WEBER VAN BOSSE, Monogr. des

Caul., (1898), p. 281, pl. 22, f. 5; OKAMURA, On Alg. from Hatidyo (1930), p. 105; Icon., VI (1931), p. 58, pl. 280, f. 1.

Japanese name: *Hina-ivazuta*.

Hab.: Miyake-zima.

The species was found in the upper littoral belt at Yunohama, on the west coast of the Island of Miyake entangled with *Valonia* sp. forming a felted mass.

The leaves are 3–5 mm long and 1–2 mm wide. The present specimens are smaller than the other author's material.

PHAEOPHYCEAE

DICTYOTACEAE

Dilophus radicans OKAMURA

List of mar. alg. coll. in Caroline and Mariana Isl. 1915 (1916), p. 7, pl. 1, f. 1–6; On Alg. from Hatidyo (1930), p. 101; Icon., VI (1931), p. 44, pl. 275, f. 1–8.

Japanese name: *Hime-hukurin*.

Hab.: Miyake-zima.

The alga was found in the upper littoral belt, at Yunohama, forming entangled masses.

Spathoglossum pacificum YENDO

Nov. Alg. Japon., Decas I–III (1920), p. 2.

Japanese name: *Komongusa*.

Hab.: Sirahama.

Dictyopteris plagiogramma (MONTAGNE) VICKERS

"Liste des Alg. Mar. de Barbade (1905), p. 45"; Phyc. Barbad. (1908), pl. 4; OKAMURA, Icon., VI (1931), p. 45, pl. 275, f. 9–16; On Alg. from Hatidyo (1930), p. 102.

Japanese name: *Suzi-yahazu*.

Hab.: Kōzu-sima.

Five specimens dredged from deep water of Kōzu are at hand. OKAMURA reported it from Hatizyō-zima and Tanega-sima in his Icones. Later on he added it from Okino-sima (Tosa Prov.) in his "Nihon-kaisōsi". Probably Kōzu-sima is the northern limit of distribution in our territory. The present specimens are larger than OKAMURA's, 5–10 cm high, and 5 mm broad.

MYRIOCLADIACEAE

Myriocladia Kuromo YENDO

Nov. Alg. Japon., Decas I-III (1920), p. 1; OKAMURA, Nihon-kaisōsi (1936), p. 204, f. 108.

Japanese name: *Kuromo*.

Hab.: Sirahama; Miyake-zima (collected by K. HAYASI).

CHORDACEAE

Chorda Filum (LINNÉ) LAMOUROUX

"Essai, p. 26"; OKAMURA, Illust. Mar. Alg. Jap. (1901), p. 55, pl. 20.

Japanese name: *Turumo*.

Hab.: Ō-sima.

This species has only once been found in the littoral zone at Tōsiki-hana, on the south coast of the island.

FUCACEAE

Cystophyllum Turneri (KÜTZING) YENDO

The Fucaceae of Japan (1907), p. 40, pl. 3, f. 7-11.

Japanese name: *Hie-moku*.

Hab.: Sirahama.

Three fragmentary fronds were found cast up on the shore.

Sargassum fulvellum AGARDH

"Spec., p. 34".

Sargassum enerve AGARDH, "Spec., p. 17"; YENDO, The Fucaceae of Japan (1903), p. 96, pl. 13, f. 1-6; OKAMURA, Icon., V (1925), p. 29, pl. 209.

Japanese name: *Hondawara*.

Hab.: Susaki; Miyake-zima (collected by K. HAYASI).

Sargassum fulvellum seems to be a comparatively rare species in this district. All specimens at hand are drifted material on the shore.

Sargassum crispifolium YAMADA

Notes on some Jap. Alg., II (1931), p. 72, pl. 20.

Japanese name: *Kobukuro-moku*.

Hab.: Susaki; Miyake-zima (collected by K. HAYASI).

All the specimens were found cast up on the shore.

RHODOPHYCEAE

CHAETANGIACEAE

Scinaia moniliformis J. AGARDH

"Till Alg. Syst., IV, p. 72"; OKAMURA, Icon., VI (1930), p. 28, pl. 265, f. 1-4; On Alg. from Hatidyo (1930), p. 93.

Japanese name: *Zyuzu-husanori*.

Hab.: Kōzu-sima.

Only one specimen dredged from the sublittoral zone is at hand. OKAMURA mentioned some specimens having short joints in his Icones. The present specimen corresponds with that. The frond is small (5 cm high), but complete and cystocarpiferous.

Scinaia Cottonii SETCHELL

"The Scinaia Assemblage (1914), p. 103, pl. 2, f. 24"; OKAMURA, Icon., IV (1921), p. 94, pl. 173, f. 1-7.

Japanese name: *Hira-husanori*.

Hab.: Heda.

Four fragmentary specimens dredged from the bottom at 40 m depth in Heda, on the west coast of Izu Peninsula were referred to this species. The frond is compressed, ca. 7 mm wide and the apex is bifid. The colourless cells of the epidermis are rectangular-oblong, 28-40 μ long, 8-28 μ wide. The hypodermal cells are oblong. The cystocarps are scattered with some tendency towards intramarginal aggregation, depresso-globular, 150 $\times$ 250 μ .

According to OKAMURA, "the transverse wrinkles are very peculiar to the present plant which most probably should have escaped the keen eyes of COTTON and SETCHELL as they become often hardly visible in preparing for herbarium-specimens." In the present specimens, the transverse wrinkles are not seen even in fresh state. But, as to the matter, the writer can not speak positively because of the paucity of material.

GELIDIACEAE

Gelidium tenue OKAMURA

Gelidium and Pterocladia of Japan, (1934), p. 56, pl. 23, pl. 31, f. 8-10; Icon., VII (1935), p. 55, pl. 339, pl. 335-1, f. 9-11.

Japanese name: *Kohira*.

Hab.: Miyake-zima (collected by K. HAYASI).

DUMONTIACEAE

Pikea californica HARVEY

"Ner. Bor. Amer. II, p. 246, pl. 49B"; OKAMURA, Icon., IV (1921), p. 127, pl. 181, f. 1-6.

Japanese name: *Mitigaesō*.

Hab.: Sirahama.

In our territory, *Pikea californica* has been found only on the coast from Kinkasan to Cape Inuboe.¹⁾ It is an interesting fact that now the range of distribution of this species is extended to the province of Izu beyond Cape Inuboe.

Dudresnaya japonica OKAMURA

Icon., I (1908), p. 209, pl. 41-42.

Japanese name: *Hi-birōdo*.

Hab.: Susaki; Tōzi; Ōse; Sirahama.

The specimens from Tōzi were dredged from the bottom at 15-30 meter depth. The others are drifted material.

GRATELOUPIACEAE

Halymenia(?) rotunda OKAMURA

Nihon-kaisōsi (1936), p. 536, f. 252. (in Japanese).

Erythrymenia obovata (non SCHMITZ) OKAMURA, Icon., VI (1930), p. 30, pl. 266, f. 4-12.

Japanese name: *Marubagusa*.

Hab.: Susaki. Washed ashore.

There is but one specimen at hand. To determine it, the anatomical characteristics have been studied. In this respect, the plant corresponds fairly well with OKAMURA's above-mentioned species. Furthermore, it has been possible to examine OKAMURA's specimen for comparison. As in his description, the specimen has a coriaceous frond and imperfectly adheres to paper in drying.

Following KYLIN's suggestion,²⁾ OKAMURA had provisionally put it into the genus *Halymenia* in his "Nihon-kaisōsi".

The members of the *Halymenia* usually have gelatinous fronds. If

1) OKAMURA: On the distribution of marine algae in Japan (Proceedings of the third Pan-Pacific Science Congress, Tokyo, 1926), p. 962.

2) KYLIN: Die Florideenordnung Rhodymeniales (1931), p. 13.

the present alga is rightly a *Halymenia*, it may be the most peculiar species in the genus in respect to the texture.

Grateloupia ramosissima OKAMURA

Icon., III (1913), p. 60, pl. 117, f. 1-11.

Japanese name: *Suzi-mukade*.

Hab.: Sirahama.

Carpopeltis flabellata (HOLMES) OKAMURA

Icon., VII (1934), p. 37, pl. 321, f. 1-6.

Grateloupia flabellata HOLMES, "On Mar. Alg. fr. Japan (1895), p. 254, pl. 9, f. a-b."

Japanese name: *Komenori*.

Hab.: Arasidomari near Susaki; Ō-sima.

Specimens having the typical form of this species were abundantly collected in the above-mentioned localities growing on rocks in the littoral zone.

CALLYMENIACEAE

Callophyllis adhaerens YAMADA

Notes on some Jap. Alg., IV (1932), p. 273, pl. 6, f. a.

Rhodophyllis capensis (non KÜTZING) YENDO, Not. Alg. Jap., V, (1916), p. 260.

Japanese name:

Hab.: Susaki; Sirahama; Kisami; Miyake-zima (collected by K. HAYASI).

NEMASTOMACEAE

Platoma izunosimensis spec. nov.

Pl. XXXV, and Text-fig. 5.

Frons ca. 10 cm alta, plana, crassiuscula, gelatinoso-carnosa, sessilis, primo integra et reniformis, dein palmate vel irregulariter partita, undulata. Segmenta latiuscula, 1-5 cm lata, ramulis a apicibus vel a marginibus pectinate ornata.

Japanese name: *Niku-hōnoo*.

Hab.: Kōzu-sima; Miyake-zima.

Frond ca. 10 cm high, flat, very thick, gelatinous fleshy, attached to the substratum by means of a scutate disc, sessile, at first reniform and undivided, afterward palmately or irregularly divided, undulate. Segments

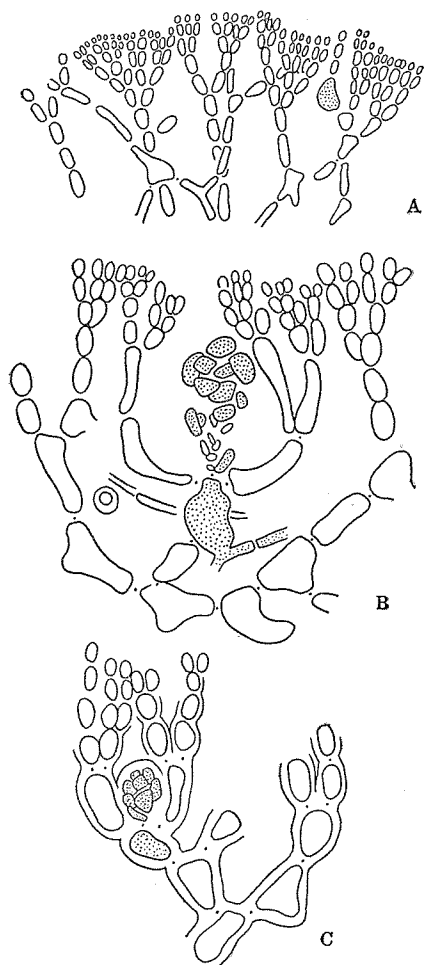


Fig. 5. *Platoma izunosimensis* SEGAWA.
A. Cross-section of thallus with an auxiliary (?) cell. $\times 180$. B-C. Young cystocarps. B. $\times 300$. C. $\times 460$.

1-5 cm broad, sending off pectinately numerous branchlets from the apex or margin. Cystocarps small, scattered all over the surface.

In some specimens, the small protuberances are seen on the surface of the frond. In almost all the material, very frequently, ovate and brilliantly yellowish cells are seen in the cortical layer. They are the innermost cells of the cortical cell-series. Though there is some question, they may be auxiliary cells.

The alga grows at a depth of 5-10 meters. At first glance, it appears to resemble an old frond of *Meristotheca papulosa* in external habit.

Judging from the external appearance of the specimen, the anatomical structure and its fruiting, it is referable to the genus *Platoma*. Its frond shows a great likeness to that of *P. cyclocolpa* (MONTAGNE) SCHMITZ. The Mediterranean plant, however, seems usually to bear narrow segments, considering from the figures of the frond given by many authors, whereas the present plant usually has broader segments.

SEBDENIACEAE

Sebdenia Yamadai OKAMURA et SEGAWA spec. nov.

Pl. XXXIV, 1 and
Text-fig. 6.

Frons plana, carnosomembranacea, 0.5-1 mm crassa, decumbens vel declinata, prope marginem umbilicato affixa, subreniforme vel irregulariter expansa, 5-13 cm lata, margine undulato-plicata, repanda vel lobata, interdum ex margine prolifera. Cystocarpia per totam frondem superiorem

sparsa, subprominentia. Tetrasporangia nematheciformi-aggregata, inter paranemata sparsa, longe elliptica, irregulariter zonatim divisa.

Japanese name:

Hab.: Kumomi; Miyake-zima.

Frond carnosio-membranaceous, 0.5–1 mm thick, decumbent or declinate, being attached to the substratum by means of a marginal disc appearing as if umbilicated and sometimes papillose from the under surface, reniform or irregular in outline, 5–13 cm broad; margins undulato-plicate, repand or lobed, sometimes sending off small proliferous lobes from the margin. Cystocarps 500–600 μ in diam., slightly prominent, scattered over the surface except on the lower part of the frond. Tetrasporangial

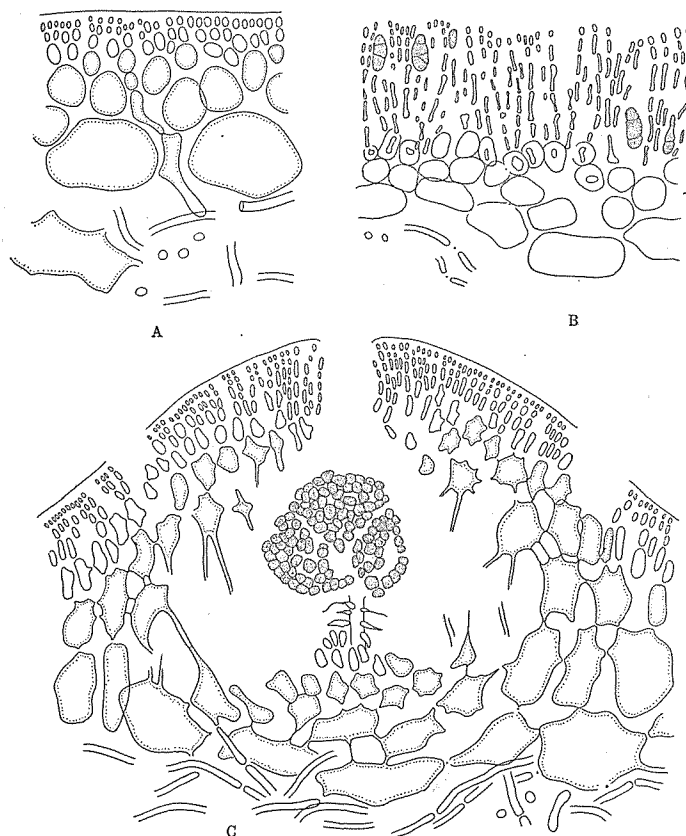


Fig. 6. *Sebdenia Yamadai* OKAMURA et SEGAWA.

A. Cross-section of thallus. B. Cross-section through the frond showing tetrasporangia. C. Cross-section through a cystocarp. $\times 150$.

nemathecia irregular in outline; filaments constructing nemathecia simple or sparingly ramified, made up of 5–9 slender cells; tetrasporangia long elliptical ca. 35μ long, 15μ broad, irregularly zonately divided; the surface of the nemathecia lubricous.

Anatomically the medullary layer is made up of numerous cellular filaments. The cortical layer is composed of two kinds of cell layers; the outermost layer made up of 1–4 rows of small cells and the inner of 3–5 rows of larger cells.

The plant adheres imperfectly to paper in drying.

Of this genus, *Sebdenia Monardiana* was investigated precisely by SJESTEDT. The cystocarps of the present alga correspond very well to his figure.¹⁾ The present plant is characterized by the tetrasporangia which are collected in the nemathecia, and belong to the zonate type.

SPHAEROCOCCACEAE

Phacelocarpus japonicus OKAMURA

Illust. Mar. Alg. Jap., (1902), p. 108, pl. 27.

Japanese name: *Kizi-no-o*.

Hab.: Susaki; Sirahama; Tōzi.

SOLIERIACEAE

Eucheuma serra J. AGARDH

“Spec. Alg., II (1852), p. 626”; WEBER VAN BOSSE, Liste des Algues du Siboga, IV (1928), p. 411, pl. 13, f. 4, 4; KYLIN, Die Florideen Ordnung Gigartinales (1932), p. 24, pl. 10, f. 21; YAMADA, The species of *Eucheuma* from Ryukyu and Formosa (1936), p. 120, f. 1, 2, pl. 21, 22.

Japanese name: *Toge-kirinsai*.

Hab.: Ōsima; Sikine-zima; Kōzu-sima; Miyake-zima.

No. 139 in the first part of this report corresponds exactly to this species. YAMADA reported it from Sikine-zima. The alga seems to be distributed widely on the coast of Izu Province.

GRACILARIACEAE

Gracilaria chorda HOLMES

“Mar. Alg. fr. Japan (1895), p. 253”; OKAMURA, Icon., IV (1918), p. 41, pl. 161.

Japanese name: *Turu-siramo*.

1) SJESTEDT: Floridean Studies (1926), p. 24, f. 14–B.

Hab.: Susaki; Sirahama; Nisina.

PHYLLOPHORACEAE

Ahnfeltia concinna J. AGARDH

"Alg. Liebm., p. 12"; YENDO, Notes on Alg. new to Japan., V (1916), p. 256; OKAMURA, Icon., IV (1932), p. 173, pl. 191; On Alg. from Hatidyo (1930), p. 95.

Japanese name: *Saimi*.

Hab.: Susaki; Ō-sima; Sikine-zima; Kōzu-sima; Miyake-zima.

Very common in the littoral zone.

RHODYMENIACEAE

Gloioderma Iyoensis OKAMURA

Icon., VII (1934), p. 27, pl. 315, f. 11-16.

Japanese name: *Hime-hisibukuro*.

Hab.: Sirahama; Miyake-zima.

The material from Sirahama was collected on the frond of *Gelidium* sp. dredged from deep water, and the other on *Amphiroa dilatata* cast ashore. In the material, the frond ramifies irregularly and abundantly, and the branches attach, here and there, to each other forming a mass. Furthermore, the fronds have the creeping habit on the other algae, at least at the base. Therefore, at first, it seemed to be a new *Gloioderma* distinct from *G. Iyoensis*. However, in consequence of the study of all other characters, they are found to resemble *G. Iyoensis* so closely that the present material can not be distinguished from it.

Botryocladia leptopoda (J. AGARDH) KYLIN

Die Florideenordnung Rhodymeniales (1931), p. 17, pl. 6, f. 14.

Crysomenia Uvaria OKAMURA, Icon., IV (1921), p. 133, pl. 184, f. 1-9; On Alg. from Hatidyo (1930), p. 96.

Japanese name: *Hana-no-eda*.

Hab.: Miyake-zima.

Only one specimen was collected by Mr. KURIHARA at Minowa, on the eastern coast of Miyake-zima, in October, 1936. It was washed ashore.

Rhodymenia intricata (OKAMURA) OKAMURA

Phyllophora intricata OKAMURA, Icon., IV (1921), p. 129, pl. 182, f. 1-8.

Japanese name: *Masago-sibari*.

Hab.: Susaki; Tōzi.

Several sterile specimens were dredged from deep water. They agree with OKAMURA's figures mentioned above.

Weberella micans HAUPTFLEISCH

In ENGLER and PLANTLE's Nat. Pflanzenfam. Rhodophyc. (1897), p. 401; YAMADA, Notes on some Jap. Alg., IV (1932), p. 275, pl. 9.

Japanese name: *Ueba-gusa*.

Hab.: Ō-sima.

A sterile specimen is at hand.

CHAMPIACEAE

(Lomentarieae)

Lomentaria pinnata

spec. nov. Text-fig. 7.

Frons 2–3 cm alta, 1–1.5 mm lata, compressa, distiche bi-tripinnatim ramosa, non articulata; pinnis et pinnulis basi constrictis; pinnulis ultimis ovatis vel oblongis, apice obtusis.

Japanese name:

Hime-husitunagi.

Hab.: Miyake-zima.

Growing in shallow rock pools in the upper littoral belt.

Plants arising from a weekly developed creeping part. Frond 2–3 cm high, 1–1.5 mm in width, compressed, distichous, bi-tripinnate, not articulate; pinnae and pinnulae constricted at base; ultimate

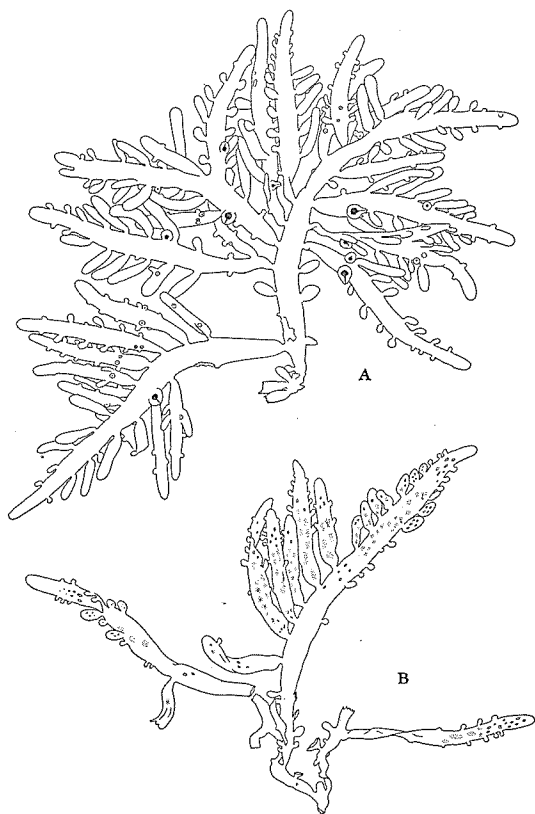


Fig. 7. *Lomentaria pinnata* SEGAWA.
A. Cystocarpic plant. B. Sporangial plant. $\times 2.3$.

pinnulae ovoid to oblong, obtuse at the apex; cystocarps scattered on the surface of frond; tetrasporangia in sori at the bottom of orbicular.

The present species shows some likeness to *Lomentaria hakodatensis* YENDO from which it differs in having fronds of larger diameter, and having more distinct constrictions at the bases in branching. It approaches also *L. rosea* especially in the material having the broader frond.

***Binghamia californica* FARLOW**

Text-fig. 8.

In INAGAKI, Oshorowan oyobi soreni kinsetu seru Engan no Kaisan-kosōrui (Hokkaidō-Teikoku-Daigaku, Rigakubu, Kaisō-kenkyuzyo Hōkoku, No. 2) (in Japanese) (1933), p. 43, f. 16, a-c, f. 17, a-b; SEGAWA. The second part of this report (1936), p. 188, no. 44.

Japanese name:

Hab.: Ō-sima; Miyake-zima.

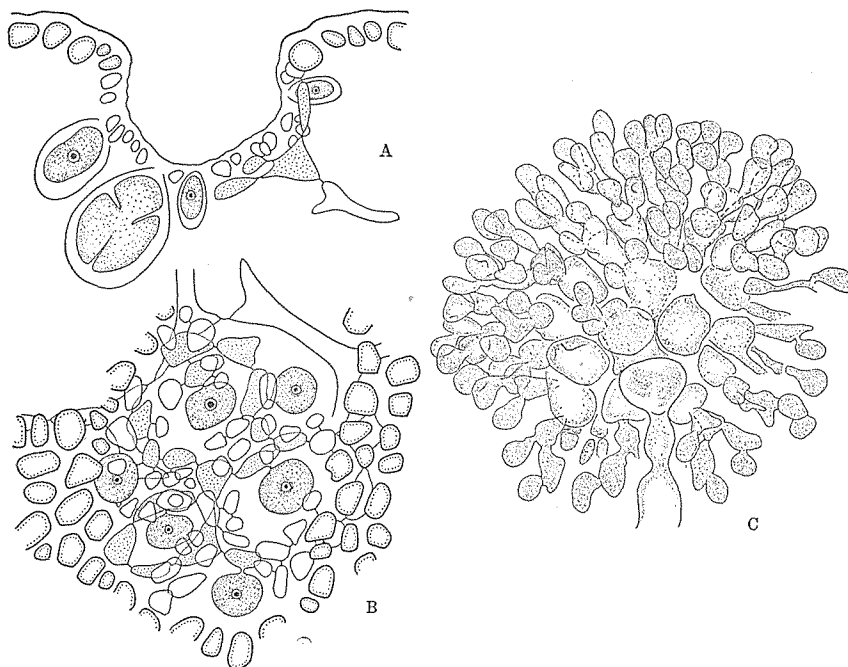


Fig. 8. *Binghamia californica* FARLOW.

- A. Cross-section through the frond showing tetrasporangia. $\times 230$.
- B. Tetrasporangia seen from above. $\times 350$.
- C. Gonimoblast. $\times 230$.

In the second part of this paper, the present alga was placed in the family *Rhodymeniaceae*.

As the result of anatomical observations, it seems that the genus *Binghamia* stands more nearly to the genus *Lomentaria* than any other of the genera belonging to the *Rhodymeniales*.

The tetraspores, as in *Lomentaria*, are triangularly divided, and grouped in the orbicular hollows of the frond, corresponding to the uppermost cells of the cortical cell-rows. As to the cystocarps, the carpospores are formed of several cells of gonimoblast-filaments.

The *Champiaceae* was divided by KYLIN¹⁾ into two groups: *Lomentarieae* and *Champieae*. The *Lomentarieae* has been represented by only one genus: *Lomentaria*. It is interesting to add the genus *Binghamia* to the *Lomentarieae* as a member.

(*Champieae*)

***Champia bifida* OKAMURA**

Illust. Mar. Alg. Jap., (1901), p. 67, pl. 24.

Japanese name: *Hira-watunagisō*.

Hab.: Susaki.

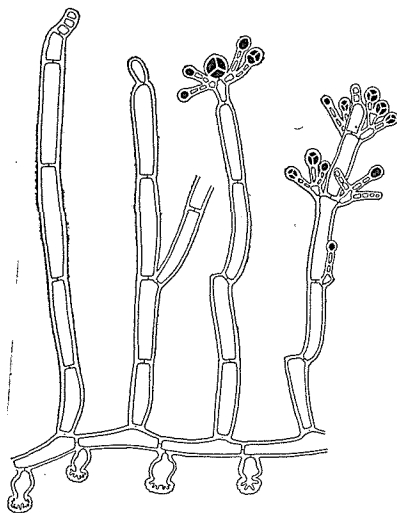


Fig. 9. *Spermothamnion Tamamiru*
SEGAWA.

Tetrasporic plant. $\times 50$.

CERAMIACEAE

Spermothamnion Tamamiru

• spec. nov.

Text-figs. 9-10.

Planta epiphytica, parva, 1-2 mm alta. Pars basalis irregulariter romosa; cellulis 30-50 μ crassis, 2-6-plo diametro longioribus. Rhizoidea ovalia, 70-120 μ longa, prope partem mediam 35-45 μ lata, ad basin discis rotundis ornata. Filamenta erecta fere simplicia, ex 5-15 cellulis composita, rarissime ramosa, cellulis 30-45 μ lata, 3-8-plo diametro longioribus. Sporangia subglobosa, ca. 50 μ longa, ca. 45 μ lata, triangulaliter divisa, in ramulis parvis

1) KYLIN: Die Florideenordnung Rhodymeniales (1931), p. 26, 28.

terminalia. Corpuscula antheridiorum oblonga, eodem modo ac sporangia disposita. Procarpia terminalia.

Japanese name: *Tamamiru-hibidama*.

Hab.: Susaki; Sirahama; Tōzi.

Almost all the material of this alga at hand was found on the fronds of *Codium mamillosum* as an epiphyte. Only once was it found on *C. contractum*. The specimens can at any season be collected from a 20–30 meter depth at Tanoura near Susaki.

The plant has decumbent filaments creeping upon the upper vesicles of *Codium*, sending unicellular rhizoids oval in shape, at least swollen near the middle down between the vesicles. At the end, the rhizoid has a circular disc by means of which it fastens itself to the utricle of *Codium*.

The rhizoids issue downwards near the back end of cells of decumbent filaments, while the erect filaments are found near the foremost end of them, like *Spermothamnion capitatum* (SCHOUSBOE) BORNET, *Sper. gorgoneum* (MONTAGNE) BORNET, *Sper. codicola* YAMADA et TANAKA, etc. From every cell of the creeping filament issues one erect filament, but very rarely two as in *Sper. codicola*. The erect filaments are simple or sometimes branched, 1–2 mm high, consisting of a small number of cells.

The tetrasporangia are subglobose, tripartite, about 50μ long, 45μ broad, with a thick membrane measuring $3\text{--}9\mu$; they are terminal on the special and lateral branchlets which are branched dichotomously or irregularly and consist of a few small cells. The antheridial stands are subglobose, ca. 55μ long, 40μ broad, formed at a similar position as the sporangia. The procarys are formed terminal on the erect filaments or branchlets.

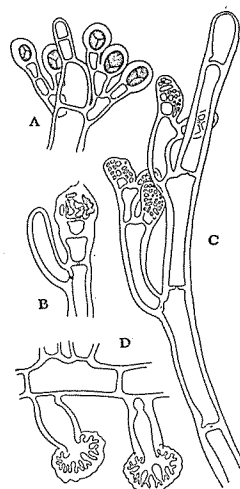


Fig. 10.

Spermothamnion Tamamiru
SEGAWA.

- A. Tetrasporangia. $\times 30$.
- B. Procary.
- C. Antheridial stands.
- D. Rhizoids. C–D. $\times 90$.

Rhodocallis elegans KÜTUING?

In OKAMURA, Icon., VII (1934), p. 21, pl. 313, f. 4–12.

Japanese name: *Benihiba-damasi*.

Hab.: Arasidomari near Susaki.

There is only one specimen at hand. It was dredged by Mr. K. KATO from the bottom at 20 meter depth.

It is a sterile individual and younger than OKAMURA's material referred to this species with some question by him. It answers well to the description and figures of OKAMURA's material.

Spyridia filamentosa (WULFEN) HARVEY

"In HOOK, Br. Fl. II, p. 336"; OKAMURA, Icon., III (1913), p. 8, pl. 102, f. 5-14; IV (1916), p. 6, pl. 152, f. 1-3.

Japanese name: *Ubuge-gusa*.

Hab.: Sikine-zima; Kōzu-sima (collected by N. TōDA); Miyake-zima.

Ceramium crassum OKAMURA

Icon., VI (1930), p. 26, pl. 269.

Japanese name: *Huto-igisu*.

Hab.: Susaki; Sirahama; Ō-sima.

RHODOMELACEAE

Chondria intricata OKAMURA

Icon., II (1912), p. 180, pl. 99, f. 10-18.

Japanese name: *Moture-yuna*.

Hab.: Susaki; Miyake-zima (collected by K. HAYASI).

One of the specimens from Miyake-zima is tetrasporiferous.

Chondria expansa OKAMURA

Icon., V (1927), p. 163, pl. 243, f. 9-17.

Japanese name: *Mosa-yanagi*.

Hab.: Susaki; Tōzi; Ō-sima.

As in *Chondria intricata*, no reproductive organ of this species has been described. Among the drifted material collected from Ō-sima there were many fronds with tetraspores.

Amansia Mitsuii spec. nov.

Pl. XXXVI, and Text-fig. 11.

Pars inferior ignota. Frons plana, linealis, 7 cm alta, 3-5 mm lata, a margine bi-tripinnata, in partibus inferioribus conspicue costata, margine regulariter dentata; apicibus incurvatis; pinnis et pinnulis ad basin angustioribus; stichidiis linealibus, incurvatis, superficialibus, prope dentem simplici serie ornatis. Cystocarpia ignota.

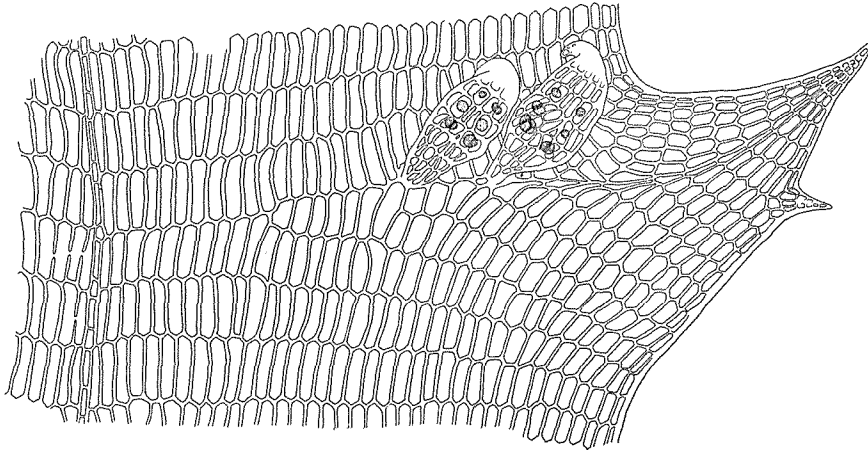


Fig. 11. *Amansia Mitsuii* SEGAWA.
Portion of the frond showing stichidia. $\times 30$.

Japanese name: *Usuba-hiodosi*.

Hab.: Kōzu-sima. Dredged from the bottom at 25–45 meter depth.

Frond flat, linear, 7 cm high, 3–5 mm broad, repeatedly bi-tripinnately branched from the margins; apices incurved; margins regularly serrate; midribs conspicuous in the lower part, changing to slender nerves in the upper part and the branches; branches and branchlets tapering at the base.

The microscopical examination of this material shows it to be an *Amansia*, but it differs from almost all other species of the genus hitherto described. The stichidia of this species spring from the surface of the frond as in *A. Kuetzingioides*, and are arranged 2–3 in a line near every marginal tooth, tapering towards both ends and incurved at the apex.

As to the stichidia, the present species has some likeness to *A. Kuetzingioides*, but in the latter there is no involute apex of the segments. Furthermore, the general appearance shows some likeness to *A. Daemellii*, but judging from the characters of the branching it differs from the latter species.

A few specimens of tetrasporic material obtained by dredging are at hand, but they are not complete ones so that the lower portion could not be observed.

PLATE XXXII

PLATE 32

Ulva sublitoralis SEGAWA. $\times \frac{1}{2}$.

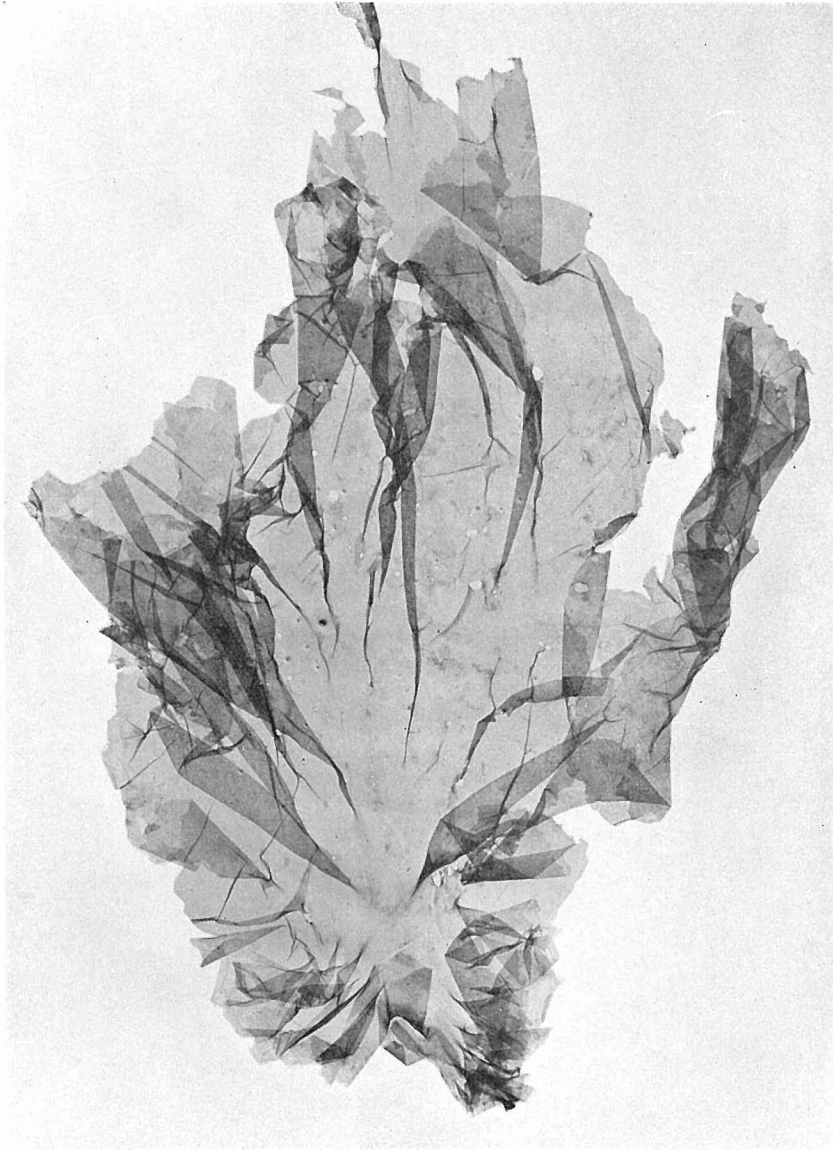


PLATE XXXIII

PLATE 33

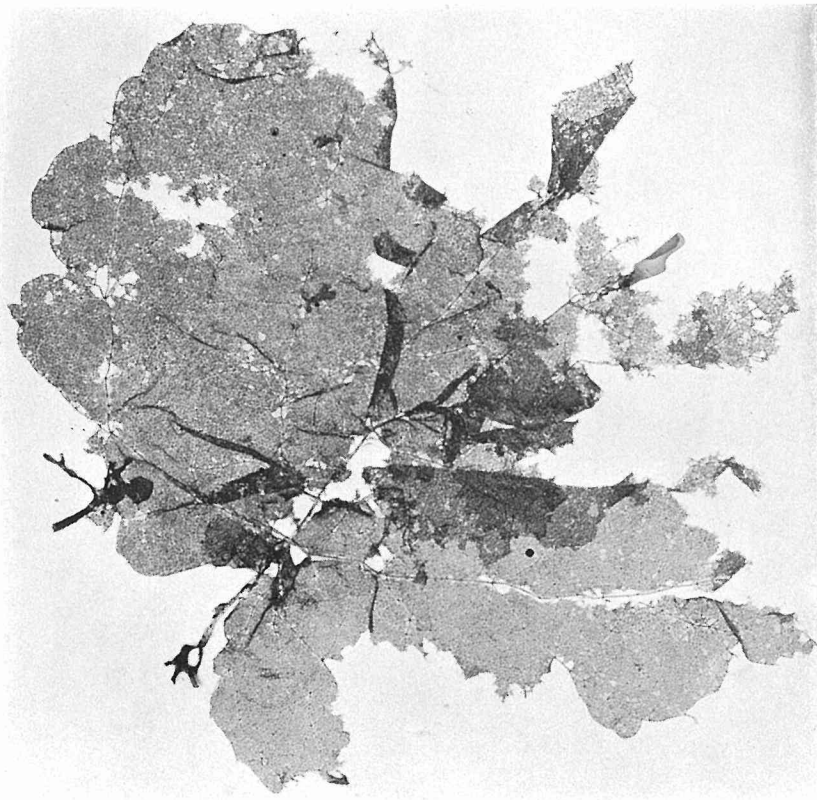
1. *Willella japonica* YAMADA et SEGAWA. $\times 1$.
- 2-3. *Struvea orientalis* GEPP. 2. $\times 1$, 3. $\times \frac{4}{5}$.



1



2

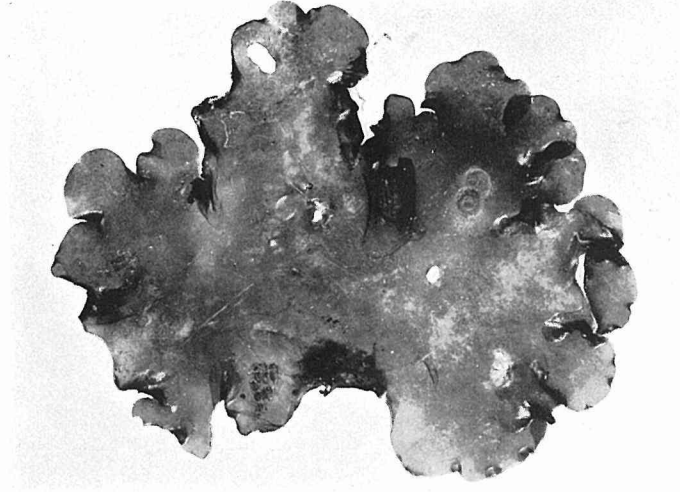


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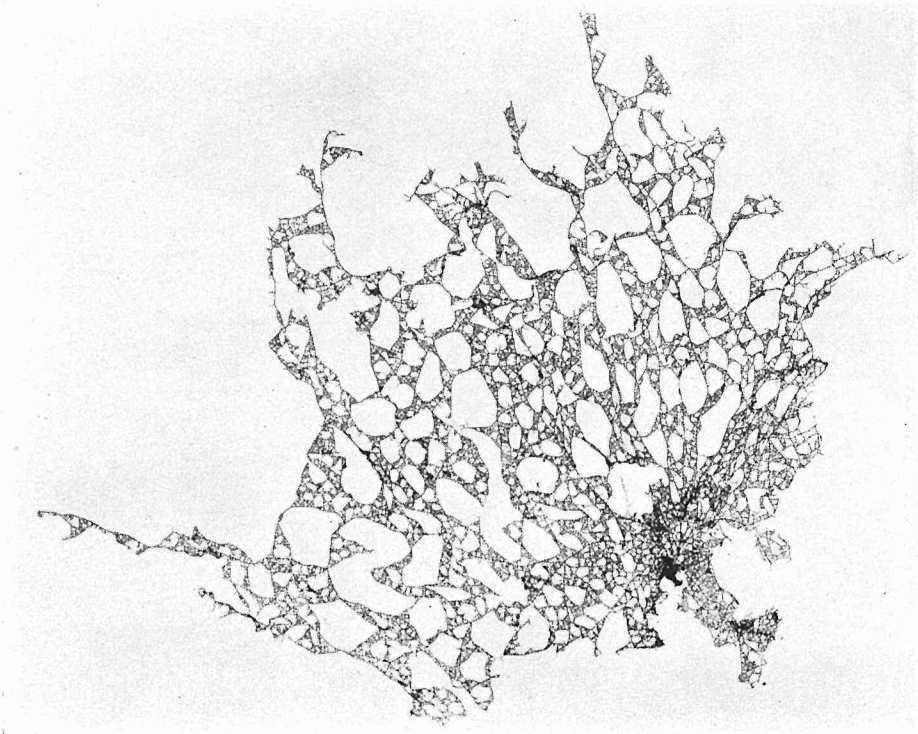
PLATE XXXIV

PLATE 34

1. *Sebdenia Yamadai* OKAMURA et SEGAWA. ×1.
2. *Microdictyon Vanbosseae* SETCHELL. ×1.



1



2

PLATE XXXV

PLATE 35

Platoma izunosimensis SEGAWA. $\times 1$.

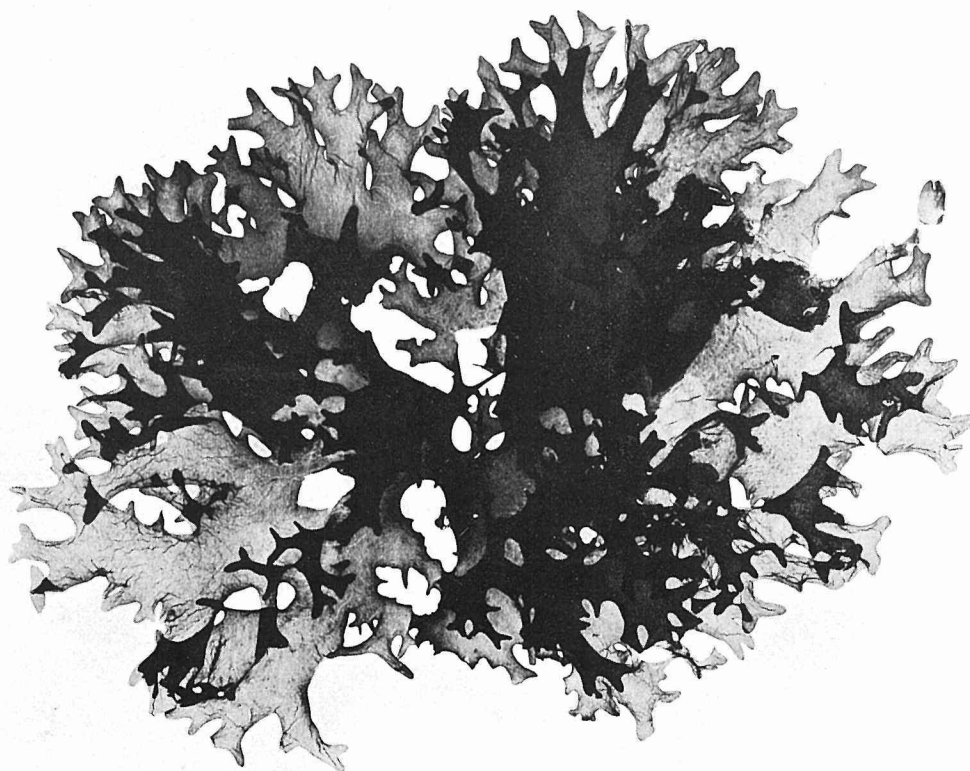
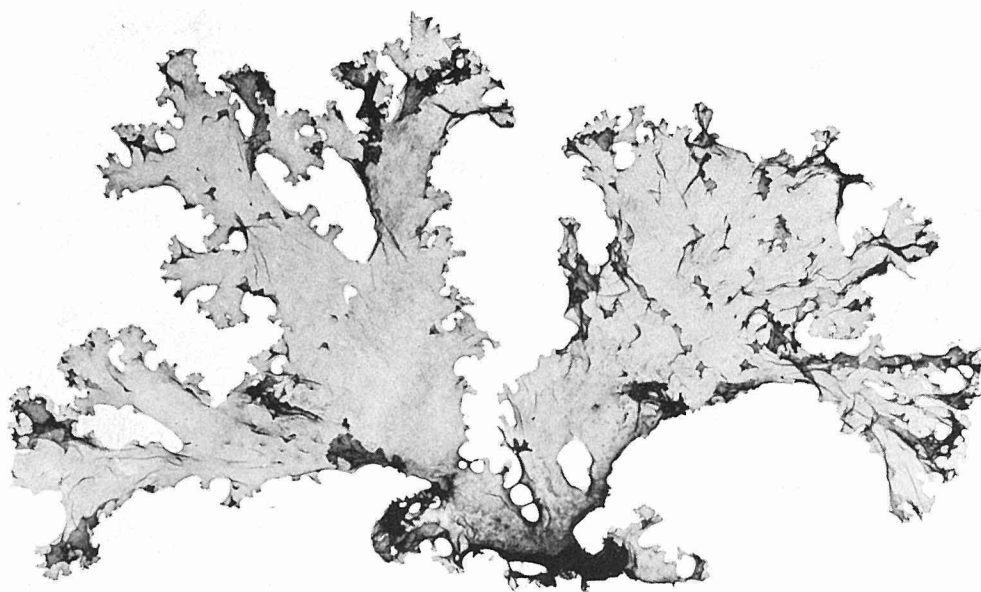


PLATE XXXVI

PLATE 36

Amansia Mitsuii SEGAWA. $\times 1$.

