9. Marine Algae of Mutsu Bay and Adjacent Waters. II.*

BY

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After the appearance of the first part of this report, I made collection two times in Mutsu Bay and its adjacent waters, in May and August, 1927. All the species enumerated in the following list have been studied from the materials which I collected myself and most of them are not included in the first part of the report.

Of 51 species listed in the present paper which contains 7 Chlorophyceæ, 18 Phaeophyceæ and 26 Rhodophyceæ, 37 are found inside Mutsu Bay, so that the number of all the species in this Bay which has been referred to amounts to 86 in all. As plants newly added to our marine flora, 12 species are mentioned, of which 6 are new not only to our flora, but also to the science, namely Gobia saxicola, Elachista taeniformis, Elachista tenuis, Halothrix ambigua, Dictyota spathulata and Dasya sessilis.

To our great regret, some species are left for future study, because of the lack of fruits and other reasons, but we hope to be able to give information about them some other day.

I wish to express my sincerest thanks to Dr. K. OIKAMURA for his valuable suggestions and criticisms throughout the course of this study and my cordial thanks are also due to Prof. HAYATA and Prof. TAHARA and also to the members of the Marine Biological Station at Asamushi who helped me with much kindness during the course of the present study.

*A contribution from the Marine Biological Station, Asamushi, Aomori-Ken.
CHLOROPHYCEAE.

CODIACEAE.

1) **Codium adhaerens** Agardh.


**Nom. jap.** Hai-miru.

**Loc.** Ōma.

**Distr.** Riu-ku, Ogasawara-jima, Hyuga to Rikuzen on the Pacific side.

CLADOPHORACEAE.

2) **Cladophora albida** Kützing.

**Fig. 1.**

Fronds about 10 cm high, attached to the frond of *Laurencia*, forming a dense entangled mass; filaments very slender even at the base, scarcely exceeding 60 µ in diameter, silky, yellowish green, slightly shining, dichotomously branched; cells cylindrical, 6-8-10 times as long as diameter, very slightly constricted at joints with cell-membrane rather thick; ramuli secund or alternate, patent, with terminal cells somewhat acute; chromatophores not abundant.

In referring our plant to the present species, I have not been able to see any authentic specimen, but consulting with the descriptions of Kützing, **Harvey**, **De Toni** etc. I am strongly convinced of doing so, though there are some differences. The cells of our plant are somewhat longer than those in Harvey's figure (Phyc. Brit. l.c.), but I cannot take it as a character by which our plant is separated from the present species. This is the first time that the present species has been reported as growing within our boundaries, but it seems to be widely distributed on our coast.

3) **Cladophora densa** Harvey

**Fig. 2.**


**Loc.** Gomi-jima, Ōma.

**Distr.** Hakodate.

As Harvey's original description of this species is too short and imperfect, I will give a full description with a figure.

Fronds about 8 cm high, densely caespitose, attached by means of slender creeping ramified rhizoids to the rock in the littoral zone, not profusely branched; filaments erect, rigid, di-trichotomously ramified with the basal cell attenuated below and not annulated; cells of the main filaments very long, cylindrical, about 190 µ in diameter becoming more slender and shorter upwards; cells of the upper branchlets about 100 µ thick, 5-15 times as long as diameter, obtuse at the apex, sometimes swollen with irregular outline, scarcely constricted at joints, with thick cell-wall and striated especially in the lower cells. Colour of
the frond is deep green when fresh, but it turns somewhat yellowish in drying.

In referring our plant to this species, I have examined some specimens collected by Yendo at Hakodate, type-locality, which were identified by him after the comparison with the original specimen of Harvey. Our plant agrees so exactly, not only with the original description but also with Yendo's specimens, that we can scarcely doubt that it is identical with this species.

4) Cladophora glaucescens Harvey.


Loc. Asamushi, Oshima.

Distr. Echigo, Uzen, Mutsu, Rishiri, Yangeshiri, Hakodate, Oshoro, Hitachi.

Fronds caespitose, with basal portions firmly coalesced to a thick tuft-like stem, glaucous, about 15 cm long; filaments much branched, dichotomous or alternate or often secund in the upper portion, ending in long erect and obtuse ramuli; segments 60–70 μ thick and very long, 5–8 times as long as diameter, constricted very slightly at the joints, with thick wall near the base of the frond, with ramuli 35–40 μ thick; chromatophores not very dense.

The occurrence of the present species within our boundary was confirmed by Yendo after having examined Harvey’s Herbarium. COLLINS describes in his l.c. “ending in long erect acute...ramuli”. In our plant, however, every terminal segment has an obtuse top and in this point it differs a little from Cl. glaucescens determined by Collins and Setchell-Gardner. But in other characteristics, e.g. dimension of segments, mode of ramification, colour of fronds, chromatophore etc. our plant agrees very well with the description of the present species. This species seems to be very common in Mutsu Bay and other localities.

5) Cladophora Stimpsonii Harvey.


Loc. Asamushi.

Distr. Hakodate, Muroran, Shiriya.

Plants loosely tufted, of delicate texture, often very long, attaining about 35 cm, di-trichotomously ramified; branches alternate or some-
times opposite, in the upper portion often secund, with patent axils, and with the articulations 5–8 times as long as diameter; cells of the lower portion very long, about 160 μ in diameter but becoming more short and slender upwards, very slightly constricted at joints; terminal cells somewhat acute, but some are obtuse, about 40 μ thick. Colour light green. Cell-membrane thick near the base of the frond, striated.

I have compared the plant with a specimen collected at Hakodate and distributed from the Herbarium of the U.S. North Pacific Exploring Expedition under Commanders Ringgold and Rodgers, and it agrees very well with Harvey’s species. In addition it should be stated that Asamushi is situated very near to the type-locality.

6) Cladophora utriculosa Kützing.


Loc. Nonai, Natsudomarizaki.

Distr. Wakasa, Tajima, Echigo, Shima, Samé.

This species of Cladophora is more or less easily distinguishable from many other species of this genus found on our coast, because of its densely fasciculated branchlets. The specimens from Nonai are much more robust than the others which were found in Natsudomarizaki. Both have been found on the stem of Coccophora Langsdorffii. The accompanying figure shows the mode of ramification.

BRYOPSIDACEAE.

7) Bryopsis hypnoides Lamouroux.

Fig. 6, a, b.
Fronds caespitose, 7 cm high, irregularly and pinnately branched with branches again irregularly and not dichotomously ramified, having branchlets issued from every side of the rachis; ultimate ramuli slightly constricted at the base and often branched. Colour light green. The texture of the plant is very soft and the frond adheres very closely to paper in drying.

Our plant agrees very well with Vicker’s illustrations given in her “Phyc. Barbad.” The present species appears to prefer rather protected places, being found on stones and shells on the upper sublittoral zone.

PHAEOPHYCEAE.

SPHACELARIACEAE.

8) Sphacelaria variabilis Sauvageau. Fig. 7, a-c.


Loc. Asamushi, Asadokoro, Natsudomarizaki.

Distr. Hyūga, Sagami, Noto.

Erect filaments up to 3 mm high, forming a dense tuft on Coccolithus Langsdorfii, arising from closely intertwined creeping filaments, less branched, with lateral and subterminal hairs; hairs abundant, very long, composed of 4–12 cells, about 14–18 μ thick; cells of the frond about 30–40 μ thick below, as long as broad or a little longer; propagula slender, once or twice forked, with a stalk slightly attenuated at the base, about 24 μ thick beneath the forks, 230–270 μ long; rays scarcely attenuated toward the apices, as long as the stalk when matured; sporangia and gametangia unknown.

According to Sauvageau, S. variabilis is said to have no hair, while ours have it as described above. Except for the presence of hairs our plants agree well with the character of S. variabilis.
ENCOELIACEAE.

9) Punctaria latifolia Greville.


Syn. Homoeostroma latifolium J. Agardh.


Loc. Asamushi, Ōma.
Distr. Hirado, Ise, Mikawa, Kazusa, Noto, Sado.

Our plant was found on the leaves of Zostera, often accompanied by Scytosiphon lomentarius and Halothrix ambigua growing in sheltered places. The size is rather small, but other characteristics agree very well with the description of the present species.

10) Colpomenia sinuosa Derbes et Solier.


Loc. Asamushi.
Distr. Very common.

11) Scytosiphon lomentarius J. Agardh.


Loc. Very common in Mutsu Bay, Ōma.
Distr. On both coasts from Taiwan to Shumushu-Island.

DESMARESTIACEAE.

12) Desmarestia viridis Lamouroux.

Okamura. The first part of this report p. 6, No. 17.
Loc. Asamushi.

13) Desmarestia tabacoides Okamura.


DICTYOSIPHONACEAE.

14) Dictyosiphon foeniculaceus Greville.


Loc. Natsudomari-zaki.

In every respect our plant coincides very well with the American plant of which Setchell and Gardner give the description and illustrations in detail. It grows on the frond of Scytosiphon lomentarius in sheltered places in sublittoral regions, and zoosporangia are found abundantly in June. This is the first time that this species has been found not only in this district but even within our boundaries.

15) Gobia saxicola Okamura et Yamada sp. nov. Fig. 9, a, b.

Fronds caespitose, filiformis, cylindrica, simplex, cava, praeter basin solidum, parvo disco ad saxum asfixa, saepe torta, vivo elastica; tela cortitig, Dictyosiphon foeniculaceus calia erecta, ex 2-4 cellulis composita; cellulis terminalis pyriformis 17-24 µ longa, 11-14 µ lata; fila centralia 7-14 µ crassa, leve corolata; pili sparsi, 6-7 µ lati; zoosporangia obovoidea vel obovata vel ellipsoidea, 27-30 µ longa, 18-21 µ lata.
0.3 cm in diameter, often twisted, elastic, attached to the rocks or stones with a small disc. The basal portion of the frond is very slender and solid for a short distance, soon becoming gradually thicker and hollow upwards tapering to a blunt apex. Cortical filaments straight, perpendicular to the main axis, composed of 2-4 cells with terminal cells pyriform which measure 17-24 µ in length, 11-14 µ in diameter; hairs few in number, 6-7 µ thick; central filaments loose, slightly coloured, freely anastomosing, 7-14 µ in diameter; zoosporangia obovate or elliptical, 27-30 µ long, 18-21 µ broad.

The new species has some resemblances to *Gobia simplex* Set. et Gard. in its general aspects, but there are many differences which separate it satisfactorily from the latter species. Our plant is often twisted and always grows on rocks or stones, not being attached to other algae as *Gobia simplex* which is found also in this country, and it does not closely adhere to paper in drying as the latter species. In anatomical structure, it differs from that of the related plant in the measurement of every part as stated above and moreover in having the central filaments slightly coloured.

Though there are so many differences in the present plant, yet we cannot put it in a genus other than *Gobia*, as the structure of the frond and mode of propagation is quite the same as this genus.

Our plant was collected in all cases in the "Splitz" zone or in upper littoral zone, sometimes together with *Gloioptus furcata*.

### ELACHISTACEAE

16) **Elachista fucicola** Areschoug.


*Loc.* Oma.

*Distr.* Iwaki, Rikuzen.

The specimens which I referred to the present species have gametangia only (in June), and paraphyses are very few in number, not being so markedly curved as those illustrated by Sethchell and Gardner in the American plant. The thickness of the erect free filaments varies 60-70 µ. The plants were collected in rock-pool growing on the fronds of *Sargassum micracanthum* and *Turbinaria fusiformis*.

17) **Elachista taeniaeformis** Yamada sp. nov.

Thallus parvos laxos lubricos pulvinos format; pars basalis non conspicua; filamenta erecta ad basin abrupte, ad apicem versus conspicue et longe attenuata, sub medio latissima; cellulae filamenti erecti cylindricae brevissimae, ad basin in longitudine partem quartam diametri aequantes, sursum sensim elongatae sed longitudine numquam diametron exdunt praeter partem superiorem, ad septa leve constrictae.
Thallus forming a small, rather loose tuft, 3 mm high, somewhat lubricous; the basal portion not conspicuous; erect, free, filaments abruptly attenuated at the base, long and strongly tapering to the apex, with the broadest portion beneath the middle part, 65–88 μ at the broadest part, 7–16 μ near the apex about 17 μ broad at the very base; cells of erect free filaments discoidal, about ½ times as long as diameter in most parts, becoming a little longer upwards, but the length does not exceed the diameter except a few apical cells, slightly constricted at joints; chromatophores discoid, arranged parietally like a net; zoosporangia elongato-obovate, or elliptical, about 100 μ long and 30 μ broad; gametangia cylindrical, thin, 70–100 μ long, about 4–5 μ in diameter, producing 10–30 gametes; paraphyses clavate, not curved, constricted at joints; hairs 10–14 μ thick, few in number.

By the character of having short-celled, erect, free filaments abruptly attenuating towards the base, the present species shows a close affinity to *Elachista flaccida* Aresch., from which, however, it differs in the slenderness of the upper part of the erect free filaments which is very peculiar to our plant and by which both species are very readily known from one another.

Our plant is found in the cryptostomata and on other portions of *Sargassum Horneri*, growing in a pool in the littoral zone.
Elachista tenuis Yamada sp. nov.

Fig. 11. Elachista tenuis Yamada sp. nov. ca. x 350.

sporangium ignotum.

Nom. jap. Hosomimakura.

Loc. Oshima.

Thallus forming small tufts in the cryptostomata of Sargassum confusum, about 0.5 cm high, somewhat lubricous; the basal portion composed of a small dense and lubricous mass of slightly branched filaments whose cells are usually ellipsoid; erect free filaments not constricted at joints even when old, scarcely attenuated at the both ends, 12-17 μ broad throughout the whole length with cylindrical cells, which are 1.5-2 times as long as diameter; chromatophores granular, gathering to a band-like mass in the centre of the cell; gametangia cylindrical or somewhat clavate, matured ones about 95 μ long, about 7 μ broad, being divided into 8-20 or more loculi; paraphyses few in number, clavate, the lower portion composed of long thick-walled cells, gradually shorter and swollen above measuring about 7-8 μ in the upper portion, slightly constricted at joints, somewhat curved; zoosporangia unknown.

The present species is distinguished by its slender, erect free filaments. They do not exceed 17 μ in diameter, usually measuring 14-16 μ, and neither attenuated to both ends nor constricted at joints. The band-like coalescing of chromatophores also helps us in separating the present species from the allied ones.

19) Halothrix ambigu Yamada sp. nov.

Fig. 12. Halothrix ambigu Yamada sp. nov. a... ca. x 60, b... ca. x 80, c... ca. x 80.

Thallus magnos pulvinos ad hospitem format; pulvini lubrici magni, rubro-flavescentes, 10-14 mm longi; pars basalis crassa, ex filimentis leve dichotomis, laxe aggregatis constructa; cellulae filamentorum elongatae hyaline, constrictae ad septa, membrana tenui, chromatophoris irregulariter discoideis; filamenta erecta, sensim versus utroque fines attenuata; cellulae filamentorum erectorum 1/3-1/2-plo diametro longioribus leve constrictae ad septa; zoosporangia obovata; gametangia ad superficiem filamentorum erectorum numero et forma irregulare distri-
Thallus forming large tufts on other algae, becoming larger and larger by confluenting to each other, 10-14 mm high, rather lubricous, light reddish-yellow; the basal portion very thick, composed of sparingly dichotomous and loosely attached filaments; cells of the filaments elongated, colourless, constricted at joints, thin-walled; the erect free filaments gradually attenuated to both ends, 70-100 μ thick at the broadest portion; their cells 1—4/5 times at the base, 1—3/4 times at the thickest part, 1—1 1/2 times near the apex, as long as diameter, slightly constricted at joints; chromatophores irregularly discoid; zoosporangia obovate, 65-90 μ long, 27-37 μ broad; sori of gametangia produced on the surface of the erect free filaments, irregular in shape and number; paraphyses moniliform, clavate, curved, about 240-380 μ long; zoosporangia and gametangia are found in one and the same individual.

The present species resembles some species of *Elachista* in every respect so closely that one would refer it to that genus except that he can find gametangia. But the presence of the unique gametangia necessitates my putting it in *Halothrix* as a distinct species, separating it from *H. lumbricalis*. The gametangia are mostly found in every portion of the erect free filaments. All our plants were found on the leaves of *Phyllospadix* which grows in the sublittoral zone or rock pools.

**CHORDARIACEAE.**


*Syn. Cylindrocarpus rugosa* Okamura.


*Loc.* Oshima, Ōma.

*Dist*. Very common from Shima to Hakodate.

Our plants are small and irregular in shape, the largest one measuring about 4 cm in length; though the fronds are small, yet in some specimens zoosporangia are met with.

**DICTYOTACEAE.**

21) *Dictyota spathulata* Yamada sp. nov. Fig. 13.

Fronds 10 cm alta molto dichotoma laxe implicata angulis patentibus ex una tela cellularum medullarum magnarum et serie singula cellularum minorum periphericarum per totam frondem composita; segmenta marginis integra angusta, 0.4-1.5 mm lata, ca 150 μ crassa imprimitur elongata, segmenta extrema latiuscula lineari-spathulata ad apicem obtusa; tetrasporangia ad utrasque superficies praeter medium discontinuiter generata; color fusco-flavescens.


*Loc.* Natsudomarizaki.

Fronds 10 cm alta multo dichotoma laxe implicata et angulis patentibus ex una tela cellularum medullarum magnarum et serie singula cellularum minorum periphericarum per totam frondem composita; segmenta marginis integra angusta, 0.4-1.5 mm lata, ca 150 μ crassa imprimitur elongata, segmenta extrema latiuscula lineari-spathulata ad apicem obtusa; tetrasporangia ad utrasque superficies praeter medium discontinuiter generata; color fusco-flavescens.
on the mother frond. Colour dark brown, becoming black in drying, especially in older parts.

The present plant appears to be closely related to *D. linearis* A. G., but in general it is more coarse and robust than the latter. It is found on stones in the littoral or upper sublittoral zone. The illustrations of *D. linearis* in Kützing's Tab. Phyc. IX. t. 21, fig. 2 seems to have some resemblance to our plant. But in ours, segments are more patent than those shown in his illustrations judging from his figure, and also more patent than the specimen of that species from Corsican Island determined by Borgesen, which is in my possession.

LAMINARIACEAE.

22) **Agarum Turneri** Postels et Ruprecht.


**Nom. Jap.** Aname.

**Kec.** Oma.

**Distr.** Kurile Islands, Hokkaido, Chosen.

23) **Costaria Turneri** Greville.


**Nom. Jap.** Zatamine.

**Loc.** Oma.

**Distr.** From Rikuchu to the Kurile Islands, Chosen.

FUCACEAE.

24) **Turbinaria fusiformis** Yendo.

Okamura, The first part of this report, p. 7, No. 30.

**Loc.** Oshima.

25) **Sargassum enerve** Agardh.


MARINE ALGAE OF MUTSU RAY

26) **Helminthocladiaceae** Yendoana Narita.


**Loc.** Oma.

**Distr.** From Kyusyu to Rikuzen on the Pacific coast, and to Echigo in the Japan Sea.

RHODOPHYCEAE.

HELMINTHOCLADIAEAE.

26) **Helminthocladiaceae** Yendoana Narita.


**Loc.** Oma.

**Distr.** From Kyusyu to Rikuzen on the Pacific coast, and to Echigo in the Japan Sea.

GIGARTINACEAE.

28) **Gigartina unalaskensis** Ruprecht.


**Syn.** Gigartina pacifica Kjellman.


**Nom. Jap.** Ibo-nori.
In referring the present alga to this species I have followed Yendo's opinion who made some comparative studies of many original and authentic specimens in several herbaria in Europe. My specimens are rather small in size though they have many matured cystocarps on the margin as well as on the surfaces of the frond. They form a dense, dark, brownish-purple mat which covers a wide area of rock in the shallow littoral pool.

**RHODYMENIACEAE.**

29) **Lomentaria hakodatensis** Yendo.

*Okamura*, The first part of this report, p. 12, No. 57.

**Loc.** Gomi-jima.

Fronds epiphytic on other algae with intricated and stoloniferous roots, with cylindrical stem and branches strictly monopodial, elongated, filiform; upper branches short, articulated with internodes 3–6 mm long; branchlets regularly opposite or verticillate, constricted at the base, lanced or catenato-articulate, with awl-shaped apex. Sori of tetrascorpanium immersed in the lower thickened part of the branches. Cystocarps urn-shaped, sessile.

30) **Champia parvula** J. Agardh.


**Loc.** Asamushi, Natsudomarizaki, Benten-jima.

**Distr.** Very common on the both coasts of the main Island, Tosa in Shikoku. Tetraspores-August.

Our plants are found sometimes on rocks, sometimes on other algae, forming a dense tuft. They are somewhat slender in comparison with the southern forms within our boundary, e.g. those illustrated by *Okamura* in his *Icones Jap. I, c.*

31) **Chylocladia lubrica** Yendo.


**Loc.** Benten-jima, Natsudomarizaki.

**Distr.** Ōma, Horozuki.

Fronds somewhat erect, thinly membranaceous, lubricious, filiform, irregularly and decompoundly much branched with spreading branches intricated to each other by adhesion and shortened upwards, not constricted at the insertion; ultimate branchlets sub-opposite, recurved, constricted at the base, somewhat obuse at the apex. Cystocarps urn-shaped, sessile at the branchlet; tetrascorpanium in ultimate branches, forming linear sori in 1–3 parallel longitudinal rows with the spores arranged in an interrupted series; soriferous parts slightly ventricose and fusiform.

This species has been found in many cases on other algae e.g. *Laurencia, Cococphora* etc. which grow in shallow pools or shaded places. It forms a very dense and entangled mass, being about 10–
16 cm high. Fronds are about 0.8 mm thick at the basal part and gently taper upward and are very lubricous in texture. Our specimens are only tetrasporic, but Yendo's original specimen has well developed cystocarps.

**DELESSERIACEAE.**

32) *Nitophyllum monanthos* J. Agardh. Fig. 15, a, b.

![Fig. 15. *Nitophyllum monanthos* J. Ag.](image)


**Nom. Jap.** Hai-usubanori.

**Loc.** Benten-jima.

**Distr.** Islands Koshiki, Gotō, Hyōgo, Bōshū, Shimofuro, Tappi, many places in Hokkaido.

After having made a comparative study with authentic specimens, Yendo referred a species of *Nitophyllum* having the creeping habit to *N. monanthos* J. Ag. The present plant very well agrees with Yendo's specimens, and creeps on the frond of *Gelidium*, attaching itself to it by means of many minute rhizoidal processes emitted from the underside. In almost all details, our plant agrees pretty well with that of Yendo, but the number of cell-layers is almost always three in ours, while Yendo describes it as having five in his case. Unfortunately, our specimens have no reproductive organ.

**BONNEMAISONIACEAE.**

33) *Asparagopsis hamifera* (Harriot) Okamura.

Icon. of Jap. Alg. IV, p. 131, pl. 183, fig. 10-11, pl. 184, fig. 10-16.

**Syn.** Bonnemaisonia hamifera Harriot.


![Fig. 16. *Polysiphonia hakodatensis* Yendo.](image)
with the original specimen of *Yendo* in every respect. They are found in sheltered places growing on *Rhodomela subfusca* Ag.

36) **Polysiphonia japonica** Harvey.
   **Loc.** Yuno-shima, Oshima, Natsudomarizaki.
   **Distr.** Fusan (Chosen).
   Fronds about 6 cm high, solitary or caespitose, much branched, with patent branches, forming a globose mass, dark red, gelatinous when young, becoming coarse in age; hairs present, very variable in quantity according to individuals; articulations short, about 350–500 μ long near the base of the frond, very seldom exceeding the diameter, and half as long as diameter in the upper branchlets; pericentral cells four in number with very thick wall, in the main filaments provided with some subsidiary cells which disappear in the upper portion of the branches; tetraspores produced in the branchlets in spiral arrangement; cystocarps ovato-globose, sessile on the branchlets. Antheridia unknown.
   This alga grows epiphytically on the fronds of other algae or on stones. The amount of hair appears to depend upon the locality where the alga grows. Our plants which were found on *Grateloupia* growing in the sheltered place in Yuga-shima are provided with many hairs while those from Oshima collected on the exposed rock are not so densely covered with them. The articulations are generally short but in rare cases some have longer ones, about 1.5 times as long as the diameter, especially in the upper portions of branches. Furthermore, it should be added that in our plant the base of the ultimate branchlets is generally apt to be constricted.

37) **Polysiphonia urceolata** Greville.
   **Fig. 17.**
   **Nom. Jap.** Shôjô-kenori.
   **Loc.** Asamushi.
   **Distr.** Otaru, Hakodate, Shiokubi, Hidaka, Iwai-jima (Prov. Suwo), Sagami, Noto.
This species is very common in Asamushi and in its vicinity, mostly growing on the rocks in the littoral or upper sublittoral zone. The tetraspores are produced on the ultimate branchlets or axillary ones. Cystocarps urn-shaped with a short pedicel.

I have compared our plants with many European ones identified by Foslé, Cotton, and Börgesen, and do not find any essential difference between ours and the European's.

38) *Polysiphonia violacea* Greville. Fig. 18.

*Loc.* Futago-jima.

*Distr.* So far known only from Asamushi.

Our plant has been found only once in the above locality on the rock in the littoral belt.

39) *Dasya sessilis* Yamada sp. nov. Fig. 19, a, b, c.

*Syn.* *Dasya punicea* Yendo (non Meneghis).


Frons 14 cm alta, ad basin ca. 1.5 mm crassa caespitosa vel solitaria, dense ramosa; ramis irregulariter pinnatis, sursum sensim abbreviatis, a basi usque ad extremitas cellulis corticalibus linearibus et sursum ramulis monosiphonics densis obductis. In sectione transversali frondis inter cellulam centralen et cellulas pericentralis cellae minores observantur. Ramuli monosiphonici 2-3 mm longi, ca. 30 μ crassi ad basin, dichotomi praeque ad basin, ex parte corticalis dense exsurgent. Stichidia ovata vel longe ovata, sessilia ad partem basalem ramuli creantur. Cystocarpia urceolata, ad apicem rami breve sessilia. Color sanguineus.

*Loc.* Asamushi, Futago-jima, Ōshima, Benten-jima.

*Distr.* Unknown.

Frons 14 cm high or more, solitary or caespitose, densely branched, with branches irregularly pinnate, gradually shortened upwards and covered with dense hair-like ramuli. Colour deep red, but turns to somewhat yellowish in drying. The basal part of branches is mostly destituted of ramuli. The diameter of the filament is about 1.5 mm or more near the base; it is densely covered with narrow cortical cells up to their extremity. In the cross-section there are found some small cells between the central cell and the pericentral ones. The ramuli are very dense, 2-3 mm long, dichotomous, especially near the base, about 80 μ thick below. Stichidia ovata or elongato-ovate, taper-
ing above, sessile, produced near the base of ramuli. Cystocarps urceolate, sessile, formed at the top of the short, corticated branches. Antheridia unknown.

The present plant seems to have some resemblances to Dasya punicea Meneg., so far as I have studied the literature and illustrations; and some specimens which Yendo referred to D. punicea are very likely the same as ours.

In our plant the shape of the stichidia is rather variable, sometimes being ovate, sometimes more elongated and in appearance approaching those of D. punicea Meneg., illustrated by Zanardini (Icon. Pyc. Adriat. Tab. 52). But in all the cases stichidia are sessile in our plant, while those of D. punicea have a short pedicel; so that we can easily distinguish one from the other.

CERAMIACEAE.

40) Griffithsia corallina Agardh. (?)

Fig. 20.


Loc. Nonai.

Distr. Unknown.

Fronds forming a dense tuft, about 5 cm high, alternato-pinnate and often irregular in ramification, lesser branches swollen for the most part becoming narrower upwards; articulations slender in main branches, about 2 mm long, slightly constricted, but in lesser branchlets they are somewhat swollen to ovoid segments, gradually diminishing in size upwards; hairs are present at the upper shoulder of cells of ramuli, and branch three or four times in 2-4-chotomous manner; tetrasporangia are borne in the inside of oblong and curved involucres which are formed in a verticillate manner mostly on the shoulder of upper cells. Cystocarps and antheridia unknown. Mixed with hairs, there are often found some short and dwarf branches which ramify repeatedly as well as di- or trichotomously.

As it appears from the above description, there seems to be some differences between our plants and G. corallina Ag., especially in the mode of ramification and measurement of every part of the frond, our plant being more slender than the European one. But as other charac-
ters all agree with those of the present species and as I do not consider the above difference to be sufficient to separate our plant from it, I have identified our plant provisionally with that species. Only one small tuft of the present plant has occurred in the collection as the first time for the study of this plant.

41) *Callithamnion corymbosum* Lyngbye. Fig. 21, a, b.


*Loc.* Nonai.

*Distr.* Unknown.

Frond 3-4 cm high, attached to the stone or on other algae, forming a dense, soft, lubricous tuft; much branching in dichotomous manner, corymbose upwards; filaments ecorticated throughout, about 70 μ thick at the base of the frond, 6-10 μ at the terminal cells; articulations cylindrical, slightly constricted at joints, 3-10 times as long as diameter; every terminal cell provided with a long hair, which is sometimes fallen off. Tetraspores ovoid, about 50 μ long, 40 μ broad.

Though our plant is more slender than the European one, I have referred our plant to the present species because there is no essential difference to separate ours from the Europeans except the slenderness of the frond. The tetrasporangia are rather few in number and we have found neither cystocarps nor antheridia.

42) *Acrothamnion pulchellum* J. Agardh. (?) Fig. 22, a, b.


*Loc.* Ōshima, Futago-jima.

*Distr.* Hakodate, Shiokubi, Oshoro.

Fronds caespitose, attaching to the shells of *Mytilus* by means of rhizoids emitted from the basal part of the frond, 15 mm high, oppositely and bipinnately branched; the main axis composed of a single row of cells; cells of the rachis 40-50 μ thick, 2-5 times as long as broad near the base; every two pinnae standing opposite on the rachis not on the same plane but on the two different planes facing each other; pinnae are emitted from beneath the apex of each cell of the rachis and from opposite sides of it, the basal cell being very small and each pinna having about 4-8 pairs of pinnules, but in the upper portion of pinnae pinnules of the upper side are sometimes wanting; the terminal cell of pinnules acute. Tetrasporangia produced in many cases on a basal cell of the pinnules, cruciately divided. Colour beautifully red. Both antheridia and cystocarps unknown.

As stated above, in our plant every two pinnae standing opposite on the rachis are not on the same plane as described by J. Agardh, but are on the two different planes facing each other. But this disposition might easily be made unrecognisable by the pressure of the cover-glass.

In determining the present plant I have followed Yendo, and do not know whether J. Agardh’s plant has the same arrangement of pinnae as in ours; but if his plant has in vivo an arrangement of pinnae differing from ours, I am in doubt whether my plant and Yendo’s are not the same as J. Agardh’s species.

43) *Ceramium paniculatum* Okamura.

The first part of this report, p. 14, No. 67.

*Loc.* Benten-jima.
44) Ceramium tenuissimum J. Aghardh.

Fig. 23, a, b.

Sp. Alg. II, p. 120.
Loc. Natsudomarizaki.
Distr. Echigo, Fusan, Taiwan.

Frond about 6 cm high, fine, forming a loose tuft on other algae, about 85 µ thick near the base, about 30 µ in the upper ramuli, dichotomously much branched, with terminal segments slightly involuted; articulations pellucid, those of the middle portion 2-6 times as long as diameter, becoming gradually shorter above, at the nodes coated with coloured cells, no spine, sometimes with short roots emitted from nodes. Tetraspores formed at the nodes of short, lateral ramuli, very prominent, and often secundly seriated in a longitudinal row. A single frond of this plant has been found on the frond of Sargassum Thunbergii in a sheltered place at the locality mentioned.

45) Ceramium clavulatum Aghardh.


46) Prionitis patens Okamura.

Loc. Oma.
Distr. From Taiwan to Prov. Iwaki on the Pacific coast; Wakasa, Sado on the Japan Sea side; Chosen.

GRATELOUPIACEAE.
NEMASTOMACEAE.

47) **Schizymenia Dubyi** J. Agardh.

Fig. 24.


**Loc.** Benten-jima, Nonaí.

Our plant resembles *Dilsea edulis* J. Ag. in general aspect. It grows on stones or rocks in the upper sublittoral zone or in littoral pools, and imperfectly adheres to paper in drying.

48) **Nemastoma Nakamurae** Yendo.

Fig. 25, a, b.


**Syn.** Nemastoma Cowdreyi Howe.


**Loc.** Nonaí.

**Distr.** Inaba, Noto, Echigo.

Frond carnoso-gelatinous, cylindrical or somewhat compressed, dichotomous, very much branched, with obtuse axils; segments in the lower and middle portions equal in thickness, 2–3 mm thick, often here and there provided with decussately proliferating, minor branchlets; upper segments slenderer becoming attenuated and subulate upwards; medullary filaments articulated, sparingly branched, loosely anastomosing; cortical layer consisting of di-trichotomous, moniliform, fasciculated filaments whose articulations are larger and globose in the lower portion, becoming minor and elongated toward the periphery, ultimate ones being sometimes filiform; tetrasporangia cruciate, formed from the ultimate cells.

This plant seems to prefer rather shaded places in the upper sublittoral zone and so far has been found only in the Japan Sea as shown above. Howe described a new species of *Nemastoma* from China naming it *N. Cowdreyi*. I am not able to see his specimen,
but comparing his description and the accompanying photograph, we are strongly inclined to believe that his new species is nothing but Yendo’s species.

**CORALLINACEAE.**

49) *Amphiroa crassissima* Yendo.

*Loc.* Ōma.

*Distr.* Idzu, Sagami, Bōshū.

50) *Cheilosporum yessoense* Yendo.

*Loc.* Ōma.

*Distr.* Bōshū, Hakodate.

51) *Corallina pilulifera* Postels et Ruprecht.


*Loc.* Benten-jima, Ōma.

*Distr.* From Kyūshū to Hokkaido in the Pacific Ocean, Echigo in the Japan Sea.