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## Report of the Biological Survey of Mutsu Bay.

### 4. Marine Algae of Mutsu Bay and Adjacent Waters. I.\*

By

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The following is the list of the marine algae collected by Prof. TAHARA, Prof. KOKUBO, and Mr. OKABE during the year 1925-1927 in Mutsu Bay and a few other localities in the Province of Mutsu. The materials were put at my disposal for the determination of the species.

The species here enumerated are limited to those which have been exactly identified, and those which are doubtful or can not be determined with certainty are not mentioned. The latter species belong mostly to the genera *Cladophora*, *Bryopsis*, *Chondrus*, *Polysiphonia*, *Dasya*, *Laurencia*, etc.

The species which I have here enumerated are 85 in number, of which 10 belong to Chlorophyceae, 28 to Phaeophyceae, and 47 to Rhodophyceae. Of them 54 are the species growing in the warmer waters, 19 in the colder sea, 7 widely distributed, 3 peculiar to the Japan Sea and two unknown. Again, among 85 species, 49 are algae indigenous to Japan and the neighbouring seas, of which 2 are known in Chinese waters, such as *Chordaria firma* GEPP and *Ceramium Boydenii* GEPP. On making a comparison of the number of species growing in the Pacific Ocean with that of the Japan Sea, we see the following relation:—

Algae peculiar to the Japan Sea. . . . .	3
Algae peculiar to the Pacific Ocean . . . . .	18
Algae common to the Pacific and to the Japan Sea . . . . .	61
Distribution unknown . . . . .	3
	85

Of 85 species enumerated in this list, 49 are found in Mutsu Bay and the remaining 36 only in the adjacent waters, and among 49

\* A Contribution from the Marine Biological Station, Asamushi, Aomori-Ken.

species of Mutsu Bay three species, namely, *Desmarestia ligulata* (LIGHTF.) LMX., *Rhodymenia palmata* (L.) GREV., and *Grateloupia ligulata* (SUR.) SCHMITZ, are plants of the Pacific origin, while those peculiar to the Japan Sea are also three in number. They are *Sargassum confusum* AG., *Coccophora Langsdorfii* GREV., and *Grateloupia divaricata* OKAM. The latter species is found also along the Pacific coast from the Strait of Tsugaru to Miyako in the Province Rikutyu. As the collection in the Bay proceeds more and more, I think that the number of plants in Mutsu Bay peculiar to the Pacific coast will predominate over those indigenous to the Japan Sea.

The literature cited is restricted, for convenience, mostly to the original literature and to that which contains illustrations of the species and is accessible to our students. Again, the distribution mentioned under every species in the list is chiefly limited to the Japanese and adjacent waters.

In the course of the study I have been fortunate enough to find an alga newly added to our flora of marine algae, *Sorocarpus wuaeformis* (LYNGB.) PRINGSH., which has been collected at Asamushi by Prof. TAHARA, to whom I am very much obliged.

#### CHLOROPHYCEAE.

##### ULVACEAE.

- 1) **Enteromorpha compressa** (L.) GREV. Alg. Brit. p. 180. t. 18.  
*Nom. Jap.* Awo-nori.  
*Loc.* Samé.  
*Distr.* Cosmopolitan.
- 2) **Ent. Linza** (L.) J. AG. Till Alg. Syst. VI, p. 134, t. 4, f. 110-112; OKAM. Icon. III, p. 163, pl. 138.  
*Nom. Jap.* Usuba-awonori.  
*Loc.* Asamushi.  
*Distr.* Widely distributed along the Pacific Coast; Japan Sea.
- 3) **Ulva pertusa** KJELLM. Mar. Chlorophy. fr. Jap. p. 4, t. 1. fig. 1-5, t. 3, f. 1-8; OKAM. Icones Vol. IV, p. 79, pl. 169, f. 8, pl. 170.  
*Nom. Jap.* Ana-awosa.  
*Loc.* Asadokoro; Samé.  
*Distr.* Widely distributed in the Pacific and the Japan Sea.

#### CLADOPHORACEAE.

- 4) **Chaetomorpha aerea** (DILLW.) KG. Sp. p. 379.  
*Loc.* Ōma Benten.  
*Distr.* Ranging from Nemuro to Onahama (Prov. Iwaki) and from Oshoro to Prov. Iwami in the Japan Sea.
- 5) **Ch. crassa** (AG.) KG. Phyc. Germ. p. 204.  
*Nom. Jap.* Hosodyuzumo.  
*Loc.* Ōma.  
*Distr.* Widely distributed in the warmer parts along the Pacific and the Japan Sea.
- 6) **Ch. moniligera** KJELLM. Mar. Chlorophyc. fr. Jap. p. 24, taf. 4, f. 17-23.  
*Nom. Jap.* Dyuzumo.  
*Loc.* Samé.  
*Distr.* In the colder waters; Hokkaido and Nō (Prov. Echigo).

#### BRYOPSIDACEAE.

- 7) **Bryopsis plumosa** (HUDS.) AG. Sp. p. 448.  
*Nom. Jap.* Hanemo.  
*Loc.* Ōma Benten.  
*Distr.* Widely distributed in the warmer parts in the Pacific and Japan Sea.

#### CAULERPACEAE.

- 8) **Caulerpa Okamurai** WEB. v. BOSSE, in OKAM. Alg. Ogasawarajima p. 5, pl. 1, f. 13-14; OKAM. Icon. Vol. IV, p. 11, pl. 154, f. 1-8.  
*Nom. Jap.* Fusa-iwaduta.  
*Loc.* Ōma Benten.  
*Distr.* Common in the warmer parts of the Pacific and Japan Sea.
- 9) **Codium fragile** (SUR.) HARIOT. Alg. du Cap. Horn, p. 32, 1889.  
*Syn.* *Acanthocodium fragile* SUR. Alg. Jap., 1870, p. 23, t. 8.  
*Codium mucronatum* var. *Californicum* J. AG. OKAM. Icon. Vol. III, p. 117, pl. 130.  
*Nom. Jap.* Miru.  
*Loc.* Futagojima.  
*Distr.* Common in the warmer waters of the Pacific and Japan Sea.

- 10) **C. divaricatum** HOLM. New Mar. Alg. fr. Jap. p. 250, pl. 7, f. 2 a, b;  
OKAM. Icon. Vol. III, p. 155, pl. 136.  
*Nom. Jap.* Kuromiru.  
*Loc.* Ōmazaki.  
*Distr.* Common in the warmer parts of the Pacific.

## PHAEOPHYCEAE.

## ECTOCARPACEAE.

- 11) **Sorocarpus uvaeformis** PRINGSH. (LYNGB.) Beitr. z. Morph. der  
Meeresalg. p. 12, t. 3, f. 1-8.  
*Loc.* Asamushi.  
*Distr.* Unknown.

## ENCOELIACEAE.

- 12) **Hydroclathrus cancellatus** BORY. Dict. Class., Vol. 8, 1825, p. 419;  
OKAM. Icon. Vol. I, p. 18, pl. 4-5.  
*Nom. Jap.* Kagomé-nori.  
*Loc.* Ōma.  
*Distr.* Widely distributed in the warmer parts of the country  
along the both coasts.
- 13) **Colpomenia sinuosa** DERB. et SOL. f. **deformans** S. et G. Alg.  
N. W. Amer., 1903, p. 242, pl. 18, f. 13-15.  
*Nom. Jap.* Watamo.  
*Loc.* Asamushi.  
*Distr.* Pretty widely distributed.
- 14) **Punctaria plantaginea** GREV. J. Ag. Anal. Alg. Cont. III, p. 5.  
*Loc.* Asamushi.  
*Distr.* Unknown.

Fronds are linear-lanceolate, gradually tapering to a slender apex and to a short stipe below, with a breadth of 4-7 mm. and a length of 10-15 cm. It consists internally of two layers of larger empty parenchymatic cells, covered on both sides with 2-4 layers of cells, of which those of the outer one or two layers are filled with colored contents. The two cells of the epidermal layer correspond to the one of the inner layer.

- 15) **Coilodesme Cystoseirae** (RUPR.) S. et G. Alg. N. W. Amer., 1903,  
p. 241; OKAM. Icon. Vol. IV, p. 55, pl. 164.  
*Nom. Jap.* Yezo-fukuro.  
*Loc.* Samé (on *Cystophyllum hakodatense* YENDO).  
*Distr.* Etorofu, Nemuro, Prov. Hidaka.

## DESMARESTIACEAE.

- 16) **Desmarestia ligulata** (LIGHTF.) LMX. Essai, 1813, p. 25; OKAM.  
Icon. Vol. II, p. 82, pl. 72, 75, f. 1-4.  
*Nom. Jap.* Urushi-gusa.  
*Loc.* Futagojima.  
*Distr.* Ranging from Hokkaido to Prov. Hitachi.
- 17) **D. viridis** (MUELL.) LMX. Essai, 1813, p. 43; OKAM. Icon. Vol. II, p.  
84, pl. 73, 75, f. 5-6.  
*Nom. Jap.* Ké-urushigusa.  
*Loc.* Utetsu.  
*Distr.* Ranging from Nemuro to Prov. Iyo in the Pacific Coast  
and Prov. Echigo and Wakasa in the Japan Sea.

## CHORDARIACEAE.

- 18) **Leathesia difformis** (L.) ARESCH. Phyc. Scand. I, 1846, p. 154;  
OKAM. Icon. Vol. I, p. 80, pl. 18, f. 1-14.  
*Nom. Jap.* Nebarimo.  
*Loc.* Futagojima; Samé.  
*Distr.* Widely distributed in the warmer parts known as far  
north as Muroran.
- 19) **Chordaria Chordaria** (HARV.) HOWE Chinese Mar. Alg., 1924, p. 136.  
*Syn. Chordaria Cladosiphon* KG. Tab. Phyc. IX, t. 2, f. 2; OKAM.  
Icon. Vol. III, p. 188, pl. 144-145.  
*Nom. Jap.* Kusa-moduku.  
*Loc.* Hanagurizaki near Asamushi.  
*Distr.* Widely distributed in the warmer parts of the Pacific  
and Japan Sea.
- 20) **Ch. firma** GEPP Chinese Mar. Alg. p. 162, t. 460, f. 7-8; OKAM. Icon.  
Vol. III, p. 183, pl. 143-144.  
*Nom. Jap.* Ishi-moduku.  
*Loc.* Hanagurizaki near Asamushi.

*Distr.* Common in the warmer parts of the both coasts.

#### HETEROCHORDARIACEAE.

- 21) **Heterochordaria abietina** (RUPR.) S. et G. *Melanophyc.* p. 550, pl. 36, f. 18-19, pl. 91.  
*Syn.* *Chordaria abietina* RUPR. *Farl. list of Mar. Alg. of the Un. St.* 1875, p. 357; OKAM. *Icon.* Vol. II, p. 122, pl. 85.  
*Nom. Jap.* Matsumo.  
*Loc.* Asamushi; Samé.  
*Distr.* Ranging from Shumushu Isl. to the Cape Inubo-e, and in the Prov. Echizen in the Japan Sea.

#### DICTYOTACEAE.

- 22) **Dictyota dichotoma** (HUDS.) LAM. *Essai*, p. 58; OKAM. *Icon.* Vol. III, p. 39, pl. 111-113.  
*Nom. Jap.* Amidi-gusa.  
*Loc.* Asamushi; Ōshima; Ōma Benten.  
*Distr.* Widely distributed in the warmer parts of the both coasts.
- 23) **Haliseris undulata** HOLM. *New Mar. Alg. f. Jap.* p. 251, pl. 8, f. 1; OKAM. *Icon.* Vol. I, p. 51, pl. 11, f. 1-10.  
*Nom. Jap.* Shiwa-yahadu.  
*Loc.* Shimofuro.  
*Distr.* Widely distributed in the warmer parts of the both coasts.
- 24) **H. divaricata** OKAM. *Icon.* Vol. I, p. 57, 1907, pl. 13-14.  
*Nom. Jap.* Yezo-yahazu.  
*Loc.* Asamushi; Ōshima; Samé.  
*Distr.* Native of the colder waters ranging as far west as Prov. Iyo in the Pacific and Prov. Echigo in the Japan Sea.

#### LAMINARIACEAE.

- 25) **Chorda Filum** (L.) LAM. *Essai* p. 26; OKAM. *Illustr. of Mar. Alg. of Jap.* p. 55, pl. 20.  
*Nom. Jap.* Tsurumo.  
*Loc.* Yunoshima.  
*Distr.* Widely distributed in the both coasts.
- 26) **Laminaria japonica** ARESCH. *Phyc. Capenses* p. 29; MIYABE *Lamin.* p. 21, pl. 1; OKAM. *Icon.* Vol. V, p. 85, pl. 221.

*Nom. Jap.* Makombu or Kombu.

*Loc.* Samé.

*Distr.* Ranging from Muroran to Kinkazan.

- 27) **Undaria pinnatifida** (HARV.) SUR. *Illustr. Alg. d. Jap.* p. 77, pl. 6-7; OKAM. *Icon.*, Vol. V, p. 118, pl. 231, 235, f. 1-10.  
*Syn.* *Undaria distans* MIYABE and OKAM., *MIYABE Lamin.* p. 57, pl. 36.  
*Nom. Jap.* Wakamé.  
*Loc.* Gomijima near Asamushi (Sporophyll in June).  
*Distr.* Widely distributed in the warmer parts of the both coasts, ranging from Kyusyu to Hakodate in the Pacific and from Rishiri to Kyusyu along the Japan Sea.
- 28) **Alaria crassifolia** KJELLM. KJELLM and PETERS. *Om Jap. Lamin.* p. 276, t. 10, f. 9-12; YENDO *Alaria* p. 105, pl. 9, f. 1-3, pl. 10, f. 1-3, pl. 18, f. 1-18; MIYABE *Lamin.* p. 54, pl. 22.  
*Nom. Jap.* Chigaiso.  
*Loc.* Samé.  
*Distr.* In the colder waters ranging from Hidaka to Kinkazan.

#### FUCACEAE.

- 29) **Pelvetia Wrightii** (HARV.) YENDO. *Fuc. of Jap.* p. 20, pl. 1, f. 4-5.  
*Syn.* *Fucus Wrightii* HARV. *Char. new Alg.* p. 328.  
*Nom. Jap.* Yezo-ishigé.  
*Loc.* Samé.  
*Distr.* In the colder waters ranging from the Kurile to the Cape Inubo-e.
- 30) **Turbinaria fusiformis** (HARV.) YENDO. *Fuc. of Jap.* p. 44, pl. 4, f. 1-7; OKAM. *Icon.* Vol. III, p. 109, pl. 128-129.  
*Syn.* *Cystophyllum fusiforme* HARV. *Char. new Alg.* p. 328.  
*Nom. Jap.* Hiziki.  
*Loc.* Shimofuro.  
*Distr.* Ranging from Kyusyu to Hakodate, rare and scatteredly found in the Japan Sea.
- 31) **Sargassum Horneri** AG. *Sp.* p. 38; OKAM. *Icon.* Vol. V, p. 3, pl. 202; YENDO *Fuc. of Jap.* p. 74, pl. 10.  
*Syn.* *S. furcato-dentatum* O'KUNTZE. *Revisio v. Sarg.* p. 224, pl. 2, f. 25; OKAM. *Icon.* l. c. p. 4; YENDO *l. c.* p. 79, pl. 10, f. 8.

- Nom. Jap.* Akamoku.  
*Loc.* Kodomari; Ōmazaki.  
*Distr.* Widely distributed in the both coasts from Kyusyu to Karafuto.
- 32) **S. micracanthum** (KUTZ.) YENDO. *Fuc. of Jap.* p. 123, pl. 15, f. 10-21; OKAM. *Icon. Vol. V*, p. 51, pl. 214.  
*Nom. Jap.* Togé-moku.  
*Loc.* Asamushi.  
*Distr.* Ranging from Shiribeshi to Kyusyu in the both coasts.
- 33) **S. tortile** AG. *Dec. n. 2*; YENDO *Fuc.* p. 85, pl. 12, f. 1-8; OKAM. *Icon. Vol. V*, p. 26, pl. 208.  
*Nom. Jap.* Yoré-moku.  
*Loc.* Hadakaiwa near Asamushi.  
*Distr.* Widely distributed in the both coasts from Kyusyu to Prov. Oshima.
- 34) **S. Thumbergii** (O'KUNTZE) OKAM. *Icon. Vol. V*, p. 6, pl. 203; YENDO *Fuc.* p. 114, pl. 15, f. 5.  
*Nom. Jap.* Umitorano-wo.  
*Loc.* Hadakaiwa near Asamushi.  
*Distr.* Widely distributed in the both coasts.
- 35) **S. confusum** AG. *Syst.* p. 301; YENDO *Fuc.* p. 106, pl. 14, f. 1-12.  
*Nom. Jap.* Fushi-suzimoku.  
*Loc.* Asamushi.  
*Distr.* Plant peculiar to the Japan Sea; Cheefoo and Wei-hai-wei.
- 36) **S. piluliferum** AG. *Sp.* p. 27; YENDO *Fuc.* p. 54, pl. 6, f. 1-7; OKAM. *Icon. Vol. V*, p. 69, pl. 216.  
*Nom. Jap.* Mamétawara.  
*Loc.* Kodomari.  
*Distr.* Widely distributed in the warmer waters in the both coasts.
- 37) **Cystophyllum Hakodatense** YENDO *Fuc.* p. 32, pl. 2, f. 13-15; OKAM. *Icon. Vol. V*, p. 43, pl. 211.  
*Nom. Jap.* Uganomoku.  
*Loc.* Samé.  
*Distr.* Karafuto, Hokkaido, Prov. Iwaki.
- 38) **Coccophora Langsdorfii** (TURN.) GREV. *Alg. Brit.* pl. 34; YENDO *Fuc.* p. 48, pl. 5; OKAM. *Icon. Vol. V*, p. 1, pl. 201.

- Syn. C. phyllamphora* J. AG. *Sp. I*, p. 250.  
 „ *C(?) imperata* YENDO *Fuc.* p. 53, pl. 4, f. 8-12.  
*Nom. Jap.* Sugimoku.  
*Loc.* Asamushi; Ōmazaki.  
*Distr.* Coast of the Japan Sea, along the Main Island and Korea. Monotypic species peculiar to the Japan Sea. The plant was first collected by Dr. LANGSDORF in the Russian Expedition made by the ships "Nerva" and "Nadeshda" round the world in 1801-1809, and known in its various stages under different specific names. It is found in the Japan Sea only along the northern half of the coast of the Main Island. It is known as far west as Ishikawa Pref. along the coast of the Main Island. In the Strait of Tsugaru it has hitherto been collected at Iwaya near Cape Shiriya, but not yet on the Pacific coast.  
 YENDO'S *Coccophora (?) imperata* is nothing but the young form of the present plant.

## RHODOPHYCEAE.

## BANGIACEAE.

- 39) **Bangia fuscopurpurea** (DILLW.) LYNGB. *Hydrophyt. Dan.* p. 83, t. 24 c; OKAM. *Icon. Vol. IV*, p. 87, pl. 171, f. 6-12.  
*Nom. Jap.* Ushiké-nori.  
*Loc.* Asamushi.  
*Distr.* Widely distributed.

## HELMINTHOCLADIACEAE.

- 40) **Nemalion vermiculare** SUR. *Illustr. Alg. d. Jap. I*, p. 91, t. 34; OKAM. *Icon. Vol. IV*, p. 23, pl. 158, f. 1-16.  
*Nom. Jap.* Umizomen.  
*Loc.* Yunoshima.  
*Distr.* Ranging from Kyusyu to the Strait of Tsugaru along the both coasts; but very abundant in the Japan Sea and rather rare in the Pacific coast.

## GELIDACEAE.

- 41) **Gelidium Amansii** LAM. *Essai* p. 41; OKAM. *Icon. Vol. III*, p. 25, pl. 106.

*Nom. Jap.* Tengusa.

*Loc.* Samé; Shimofuro; Ōmazaki; Kukurizaki; Ōshima; Mourajima.

*Distr.* Widely distributed in the warmer parts along the both coasts.

- 42) **G. divaricatum** MART. Preus. Exped. n. Ost-Asien p. 30, pl. 8, f. 4; OKAM. Illustr. Mar. Alg. of Jap. p. 5, pl. 2.

*Nom. Jap.* Himetengusa.

*Loc.* Ōmazaki; Asamushi.

*Distr.* Ranging from Hyuga to the Str. of Tsugaru.

- 43) **Pterocladia capillacea** (GMEL.) BORN. et THUR. Not. Alg. p. 57, t. 20, f. 1-7; OKAM. Icon. Vol. III, p. 50, pl. 115.

*Nom. Jap.* Obakusa.

*Loc.* Omazaki; Urashima.

*Distr.* Ranging from Taiwan to the Str. of Tsugaru along the Pacific coast and in the Japan Sea.

#### GIGARTINACEAE.

- 44) **Endocladia complanata** HARV. Char. New Alg. n. 37; OKAM. Icon. Vol. I, p. 129, pl. 27, f. 12-20, pl. 28, f. 13-17.

*Nom. Jap.* Isodantsu.

*Loc.* Ōmazaki.

*Distr.* Ranging from Kyusyu to the Str. of Tsugaru along the Pacific coast.

- 45) **Chondrus ocellatus** HOLM. Mar. Alg. fr. Jap. p. 252, t. 9, f. 2.

*Nom. Jap.* Tsunomata.

*Loc.* Asamushi; Ōma; Utetsu.

*Distr.* Ranging from Kyusyu to Hakodate along the Pacific coast and in the Japan Sea.

- 46) **Gymnogongrus flabelliformis** HARV. GRAY's List of Jap. p. 332; SUR. Alg. Jap. p. 36, t. 248; OKAM. Icon. Vol. IV, p. 128, pl. 181, f. 7-9, p. 182, f. 9-14.

*Syn. G. japonicus* SUR. Alg. Jap. p. 36, t. 24 A.

*Nom. Jap.* Okitsu-nori.

*Loc.* Asamushi; Ōshima near Asamushi; Futagojima.

*Distr.* Ranging from Kyusyu to Hakodate along the coast of the Pacific and Japan Sea.

- 47) **G. furcellatus** var. **japonicus** HOLM. New Mar. Alg. from Jap. p. 256, pl. 11, f. 2.

*Nom. Jap.* Harigané.

*Loc.* Ōma Benten; Shimofuro; Samé.

*Distr.* Ranging from Prov. Kii to the Str. of Tsugaru.

- 48) **Gigartina tenella** HARV. Char. new Alg. p. 331, n. 52; OKAM. Icon. Vol. I, p. 159, pl. 33, f. 1-8.

*Nom. Jap.* Sugi-nori.

*Loc.* Ōmazaki; Asamushi Urashima.

*Distr.* Ranging from Kyusyu to the Str. of Tsugaru in the Pacific and in the Japan Sea.

- 49) **G. intermedia** SUR. Alg. Jap. p. 30, t. 17 B; OKAM. Icon. Vol. I, p. 172, pl. 35.

*Nom. Jap.* Kai-nori.

*Loc.* Samé; Asamushi.

*Distr.* From Prov. Tosa (probably from Kyusyu) to Hakodate; not in the Japan Sea.

- 50) **G. ochotensis** RUPR. sec. KJELLM. Beringh. Alg. p. 31; YENDO Notes on Alg. new to Japan, IV (Bot. Mag. Tokyo, Vol. XXX), p. 57, f. 4.

*Loc.* Samé.

*Distr.* North-eastern coast of the Ochotsk Sea and Otaru.

- 51) **Iridaea laminarioides** var. **cornucopiae** J. AG. Sp. II, p. 253. YENDO Notes on Alg. new to Japan VI. (Bot. Mag. Tokyo, Vol. XXXI), p. 78, f. 1.

*Nom. Jap.* Ginnanso.

*Loc.* Samé.

*Distr.* Coast of the northern Japan.

#### SPHAEROCOCCACEAE.

- 52) **Gracilaria confervoides** (L.) GREV. Alg. Brit. p. 123; OKAM. Icon. Vol. IV, p. 1, pl. 151.

*Nom. Jap.* Ogo-nori.

*Loc.* Asamushi; Tsubakiyama; Samé.

*Distr.* Widely distributed in the both coasts as far north as Shumushu.

#### RHODYMENIACEAE.

- 53) **Rhodymenia palmata** (L.) GREV. Alg. Brit. p. 98.

*Nom. Jap.* Darusu.

*Loc.* Asamushi; Samé; Ōmazaki (cystocarps in August).

*Distr.* From the Kurile as far west as Prov. Rikūzen.

- 54) **Chylocladia Wrightii** (HARV.) OKAM. Nippon Sorui Mei-i, 1902, p. 45.

*Syn. Halosaccion (Halocaelia) Wrightii* HARV. Char. new Alg. p. 332.

*Nom. Jap.* Ō-taoyagiso.

*Loc.* Asamushi; Samé.

*Distr.* Hakodate, Akashi, Prov. Mikawa.

- 55) **Ch. japonica** (HARV.) OKAM. Nippon Sorui Mei-i, 1902, p. 45.

*Syn. Halosaccion (Halocaelia) japonicum* HARV. Char. new Alg. p. 332.

*Nom. Jap.* Taoyagiso.

*Loc.* Mourajima.

*Distr.* Hakodate.

- 56) **Lomentaria catenata** HARV. GRAY'S List of Plants col. in Jap. p. 331;

OKAM. Illustr. Mar. Alg. Jap. p. 75, pl. 26.

*Nom. Jap.* Fushi-tsunagi.

*Loc.* Ōmazaki.

*Distr.* Ranging from Kyusyu to the Str. of Tsugaru along the both coasts.

- 57) **L. hakodatensis** YENDO Bot. Mag. Tokyo Vol. XXXIV, 1920, p. 6.

*Loc.* Ōmazaki.

*Distr.* Hakodate; Otaru; Isl. Rishiri, Prov. Hidaka, Inaba, Bosyu and Owari.

#### DELESSERIACEAE.

- 58) **Hemineura schmitziana** DE TONI et OKAM. Neue Meeresalg. aus Jap.

(Ber. d. deutsch. bot. Ges., 1882, p. 76, t. 16, f. 6-12; OKAM. Illustr. mar. Alg. Jap. p. 23, pl. 8.

*Nom. Jap.* Habutae-nori.

*Loc.* Ōmazaki.

*Distr.* Ranging from Kyusyu to the Str. of Tsugaru; not in the Japan Sea.

- 59) **Botryocarpa japonica** OKAM. Icon. Vol. II, p. 109, pl. 81-82.

*Nom. Jap.* Suzushiro-nori.

*Loc.* Ōmazaki.

*Distr.* Hakodate, Iwaizaki.

Plant in the colder waters north from Kinkazan and also in the north-eastern coast of Korea.

#### RHODOMELACEAE.

- 60) **Laurencia obtusa** (HUDS.) LMX. Essai p. 42; OKAM. Icon. Vol. IV, p. 175, pl. 193.

*Nom. Jap.* Mitsudé-sozo.

*Loc.* Sai.

*Distr.* Common in the warmer parts of the both coasts.

- 61) **L. pinnatifida** (GM.) LMX. Essai, p. 42; OKAM. Icon. Vol. IV, p. 174, pl. 192.

*Nom. Jap.* Hané-sozo.

*Loc.* Shimofuro; Ōshima near Asamushi.

*Distr.* Common in the warmer parts of the both coasts.

- 62) **Chondria dasyphylla** (WOODW.) AG. Sp. Alg. p. 350.

*Nom. Jap.* Yanagi-nori.

*Loc.* Urashima.

*Distr.* Common in the warmer parts of the both coasts.

- 63) **Ch. crassicaulis** HARV. Char. new Alg. p. 329; OKAM. Icon. Vol. I, p. 12, pl. 3.

*Nom. Jap.* Yuna.

*Loc.* Urata; Samé.

*Distr.* From Kyusyu to Etorofu in the Pacific and in the Japan Sea.

- 64) **Rhodomela subfusca** AG. Sp. p. 378; OKAM. Icon. Vol. IV, p. 151, pl. 186-187.

*Nom. Jap.* Ito-fuzimatsu.

*Loc.* Asamushi.

*Distr.* Native in the northern waters but distributed as far west as Kyusyu in the Pacific and Japan Sea.

- 65) **Symphocladia gracilis** (MART.) FKBG. Rhodom. p. 282; OKAM. Icon. Vol. II, p. 169, pl. 97.

*Nom. Jap.* Iso-murasaki.

*Loc.* Asamushi; Samé.

*Distr.* From Kyusyu to Hakodate along the Pacific coast and in the Japan Sea.

- 66) **Polysiphonia Morowii** HARV. GRAY'S List of Jap. plant n. 5; OKAM. Icon. Vol. III, p. 104, pl. 127, f. 1-8.  
*Nom. Jap.* Moroi-nori.  
*Loc.* Asamushi; Ōshima.  
*Distr.* Ranging from the northern parts to Kinkazan and to Naoetsu in the Japan Sea.

## CERAMIACEAE.

- 67) **Ceramium paniculatum** OKAM. Contr. Knowl. mar. Alg. Jap., II (Bot. Mag. Tokyo, 1896) p. 36, pl. 3, f. 22, 23; OKAM. Icon. Vol. IV, p. 114, pl. 179, f. 8-16.  
*Nom. Jap.* Hari-igisu.  
*Loc.* Ōmazaki.  
*Distr.* From Kyusyu to Hakodate in the Pacific side.
- 68) **C. japonicum** OKAM. Contr. Knowl. mar. Alg. Jap. (Bot. Mag. Tokyo, 1896), p. 38, pl. 2, f. 24-28; OKAM. Icon. Vol. III, p. 91, pl. 124, f. 14-22.  
*Nom. Jap.* Hané-igisu.  
*Loc.* Ōmazaki; Asamushi; Yunoshima; Samé.  
*Distr.* Probably the plant of the warmer waters known as far west as Prov. Shima in the Pacific and in the Japan Sea.
- 69) **C. Hypneoides** (J. AG.) OKAM. On Campylaephora Hypn. (Bot. Mag. Tokyo, Vol. 41, 1927) p. 365, with figs.  
*Syn. Campylaephora Hypneoides* J. AG. Sp. Alg. Vol. II, p. 150; SUR. Alg. Jap. p. 28, t. 14, f. 1-4; OKAM. Icon. Vol. II, p. 99, pl. 79, f. 1-13.  
*Nom. Jap.* Ego-nori.  
*Loc.* Mimmaya; Asadokoro.  
*Distr.* Widely distributed from Kyusyu to Etorofu. This alga is very abundant in the Japan Sea but found scattered in the Pacific.
- 70) **C. rubrum** (HUDS.) J. AG. Syn. p. 60.  
*Nom. Jap.* Igisu.  
*Loc.* Asamushi; Ōshima.  
*Distr.* Widely distributed in the warmer parts of the Pacific and Japan Sea.
- 71) **C. Boydenii** GEPP Chin. mar. Alg. (Journ. of Bot. Vol. 42, 1904) p. 164, pl. 460, f. 1-3; OKAM. Icon. Vol. I, p. 248, pl. 50.  
*Nom. Jap.* Amikusa, Igisu.

- Loc.* Ōmazaki.  
*Distr.* Ranging from Kyusyu to the Str. of Tsugaru along the Pacific and in the Japan Sea to Prov. Teshiwo.
- 72) **Ptilota pectinata** (GMEL.) KJELLM. Alg. of Arct. Sea p. 174; OKAM. Icon. Vol. I, p. 235, pl. 47.  
*Nom. Jap.* Kushi-benihiba.  
*Loc.* Samé.  
*Distr.* Ranging from Urup to Prov. Rikutyu and in the Japan Sea from Soya to Naoetsu.
- 73) **Microcladia dentata** OKAM. Icon. Vol. IV, p. 46, pl. 162.  
*Nom. Jap.* Kosuzi-saeda.  
*Loc.* Ōmazaki.  
*Distr.* Shimabara, Prov. Echigo.
- 74) **M. elegans** OKAM. Icon. Vol. I, p. 1.  
*Nom. Jap.* Saeda.  
*Loc.* Samé.  
*Distr.* Shiribeshi and Shiwoya (Hokkaido), Prov. Sagami and Totomi.

## GRATELOUPIACEAE.

- 75) **Grateloupia lancifolia** (HARV.) OKAM. Contr. Knowl. mar. Alg. Jap. (Bot. Mag. Tokyo, Vol. XIII, 1899) p. 7; OKAM. Icon. Vol. I, p. 167, pl. 34, f. 9-14.  
*Syn. Gigartina lancifolia* HARV. Char. new Alg. n. 30.  
*Gigartina horrida* OKAM. Contr. Phycol. Jap. (Bot. Mag. Tokyo, Vol. VII, p. 99) pl. V, f. 1-II.  
*Nom. Jap.* Kyonohimo.  
*Loc.* Asamushi Urashima.  
*Distr.* From Kagoshima to Hakodate along the Pacific and in the Japan Sea.
- 76) **G. affinis** (HARV.) OKAM. Contr. to Phycol. of Jap. (Bot. Mag. Tokyo, 1893) p. 100, pl. V, f. 3-5.  
*Syn. Gigartina affinis* HARV. Char. new Alg. n. 31.  
*Nom. Jap.* Matsu-nori.  
*Loc.* Asamushi; Ōshima; Urata; Shimofuro; Samé.  
*Distr.* Muroran, Yamaguti Pref.
- 77) **G. filicina** (WULF.) AG. Sp. I, p. 223.



*Nom. Jap.* Mukadé-nori.

*Loc.* Urashima; Ōmazaki; Asadokoro.

*Distr.*: Widely distributed in the warmer parts of the both coasts.

- 78) **G. divaricata** OKAM. New or little known Alg. from Jap. (Bot. Mag. Tokyo, 1895) p. 482, pl. 9, f. 1-2; OKAM. Icon. Vol. III, p. 55, pl. 116-117, f. 12-18.

*Nom. Jap.* Kata-nori.

*Loc.* Asamushi; Ōmazaki.

*Distr.* Plant peculiar to the Japan Sea, but distributed through the Strait of Tsugaru to Iwaizaki along the Pacific coast, and to Abashiri through the Strait of Soya by the Tsushima current.

- 79) **G. ligulata** (SUR.) SCHMITZ KLEIN. Beitr. Florid., 1894, p. 27.

*Syn. Grateloupia furcata* HOLM. Mar. Alg. f. Jap., 1895, p. 254, t. X, f. 3 a-c. *Schizymenia? ligulata* SUR. Alg. Jap. p. 29, t. 15.

*Loc.* Asamushi; Futaōjima.

*Distr.* Enoshima, Prov. Bosyu and Izu.

- 80) **Pachymenia carnosia** J. AG. Epicr. p. 145.

*Nom. Jap.* Akahada.

*Loc.* Shimofuro.

*Distr.* Miyako (Prov. Rikutyu); probably a plant of the colder waters.

#### GLOIOSIPHONACEAE.

- 81) **Gloiosiphonia capillaris** (HUDS.) CARM. Berk. Glean of Brit. Alg. p. 45, t. 17, f. 3; OKAM. Icon. Vol. III, p. 86, pl. 124, f. 1-13.

*Nom. Jap.* Itofunori.

*Loc.* Asamushi; Ōshima.

*Distr.* From Kyusyu to Hakodate along the Pacific coast and in the Japan Sea.

- 82) **Gloiopeltis furcata** (P. et R.) J. AG. Sp. II, p. 235; OKAM. Icon. Vol. V, p. 164, pl. 244.

*Syn. Gloiop. coliformis* HARV. Char. new Alg. p. 332, n. 36.

*Nom. Jap.* Fukurofunori.

*Loc.* Asamushi; Ōshima; Samé.

*Distr.* Widely distributed in the Pacific coast as far north as Etorofu. Rare and scattered in the Japan Sea.

#### DUMONTIACEAE.

- 83) **Dumontia simplex** COTTON. Mar. Alg. f. Corea (Kew Bull. 1906).

*Loc.* Asamushi; Ōshima.

*Distr.* Plant perhaps native of the colder waters.

- 84) **Dilsea edulis** STACKH. Mem. Soc. Mosc. II, p. 55, 71; OKAM. Icon. Vol. IV, p. 115, pl. 180.

*Nom. Jap.* Akaba.

*Loc.* Samé.

*Distr.* Plant found in the colder waters; Prov. Rikutyu and Rishiri, Otaru.

- 85) **Hyalosiphonia caespitosa** OKAM. Icon. Vol. II, p. 50-55, pl. 64-65.

*Nom. Jap.* Isomumemodoki.

*Loc.* Asamushi.

*Distr.* From Kyusyu to the Strait of Tsugaru in the Pacific and from Prov. Wakasa to Oshoro in the Japan Sea.

May 18th, 1927.