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A PRELIMINARY REPORT ON THE ALGAE

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The most of the botanical collections of the expedition were made by Mr. John Thomas Howell, Assistant Curator of the Herbarium of the California Academy of Sciences, who was especially concerned with the Phanerogams, the collection of algae being more or less incidental. However, up to the present time our studies have revealed at least one hundred and twenty-five genera and approximately two hundred and fifty species.

Collections of algae were made at thirty-two different stations, principally among the Galapagos Islands. A considerable number of species were collected along the coast of Lower California, interesting principally in giving us new data on the southern extension in the known distribution of many species common along the coast of California. A few interesting species were collected on the coast of Costa Rica, at Guadalupe Island off the northern coast of Lower California, and at Clarion Island, Revillagigedo Group.

The present paper deals with the new species, varieties, and combinations that have been identified during our studies up to the present

time. Possibly before completing the study we may come across a few more.

Of these new species 18 are Myxophyceae, 1 Chlorophyceae, 3 Melanophyceae, and 23 Rhodophyceae.

It is hoped that we may be able to render the complete account in the near future.

Polycystis clarionensis Setchell and Gardner, sp. nov.

Plate 3, figures 2a, 2b

Coenobia forma magnitudineque valde variabilis, gelina firma ultra massam cellularum minime extendente margine levi inclusa, usque ad 600 μ in diametro longiore; cellulis atrocyaneo-viridibus, dense conglobatis, homogeneis, sphericis usque ad ellipsoideis, 3-7 μ diam. (vulgo 4-5 μ).

Colonies extremely variable in shape and size, enclosed by a firm jelly extending only slightly beyond the cell mass, making a smooth margin, up to 600 μ in longest diameter; cells dark blue-green, densely congested, homogenous, spherical to ellipsoidal, 3-7 μ diam. (mostly 4-5 μ).

On rocks among encrusting algae.

Type: No. 236504, Herb. Calif. Acad. Sci., collected by J. T. Howell (No. 569a) Mar. 24, 1932, at **Sulphur Bay, Clarion Island.**

Dermocarpa simulans Setchell and Gardner, sp. nov.

Plate 3, figure 3

Cellulis sphericis, liberis, 35-38 μ diam., protoplastis homogeneis, aeruginosis; parietibus levibus, hyalinis, 4-4.5 μ crassis; gonidangiis cellulis magnitudine similibus; gonidiis 2-2.5 μ diam.

Cells spherical, not attached, 35-38 μ diam., protoplast homogeneous, aeruginous; cell wall smooth, hyaline, 4-4.5 μ thick; gonidangia same size as the cells; gonidia 2-2.5 μ diam.

Floating free among *Rhizoclonium robustum.*

Type: No. 236530, Herb. Calif. Acad. Sci., collected by J. T. Howell (No. 170b) June 11, 1932, at **North Seymour Island, Galapagos.**

The specimens were very sparse and floating free, making it difficult to determine much in regard to the variations in size, etc. among the individuals, but the specimens represented are quite constant in shape and size and all seemed to be mature.

They differ very little from *D. sphaerica* S. and G., from the California coast. They are two to three times greater in diameter than that species.

Dermocarpa sphaerica var. **galapagensis** Setchell and Gardner, var. nov.

Cellulis sphericis, 15-18 μ diam., parietibus 4 μ crassis, conspicuis; gonidangiis 16-20 μ diam.

Cells spherical, 15-18 μ diam., cell wall 4 μ thick, conspicuous; gonidangia 16-20 μ diam.

Growing on the surface of colonies of *Aphanocapsa salinarum*.

Type: No. 236517, Herb. Calif. Acad. Sci., collected by J. T. Howell (No. 576) June 1, 1932, **southeast side of Narborough Island, Galapagos.**

Xenococcus angulatus Setchell and Gardner, sp. nov.

Plate 3, figures 6a, 6b

Cellulis in parietibus externis cellularum superficialum hostis numerosis, valde angulatis et forma magnitudineque irregularibus, sed vulgo ut in sectione hostis visis radialiter elongatis, in gregibus 1-6 aggregatis.

Cells embedded in the outer walls of the surface cells of the host, very angular and irregular in shape and size but usually somewhat elongated radially as seen in section view of the host, occurring in groups of one to six; gonidangia not observed.

Endophytic in the walls of *Callymenia angustata*.

Type: No. 236508, Herb. Calif. Acad. Sci., collected by J. T. Howell (739a) Aug. 12, 1932, from 16 fathoms depth, at **Santa Maria Bay, Lower California.**

This species of *Xenococcus* is extremely abundant on the surface walls on both sides of the host of which we have but a single specimen. The cells are small and angular, dividing in two planes perpendicular to each other and both planes perpendicular to the surface of the host. The manner of cell division leads us to place the species in the family Chamaesiphonaceae rather than in the Chroococcaceae, although we have seen no gonidia.

Xenococcus endophyticus Setchell and Gardner, sp. nov.

Plate 3, figures 1a, 1b, 1c

Endophyticus, plus minusve distortionem cellularum efficiens, ante divisionem lenticularis, demum vulgo coenobia 4-12-cellularia formans; cellulis singulis maturis 14-20 μ × 8-12 μ, in planis duobus dividentibus; colore aeruginosis; gonidiis nondum observatis.

Plants endophytic, causing more or less distortion of the cells of the host, lenticular in form before division, then usually forming colonies of 4-12 cells; single mature cells 14-20 μ × 8-12 μ, dividing in two planes only; gonidangia not observed; color aeruginous.

Embedded in the cell wall of *Rhizoclonium riparium.*

Type: No. 236509, Herb. Calif. Acad. Sci., collected by J. T. Howell (429b) May 22, 1932, **five miles northeast of Webb Cove, Albemarle Island, Galapagos.**

Lyngbya adherens Setchell and Gardner, sp. nov.

Plate 5, figure 13

Filamentis vulgo per longitudinem totam epiphyticis, plus minusve tortuosis, sed interim rectis; trichomatibus 2.8-3.2 μ diam., apicibus rectis, obtusis, attenuatisque, ad dissepimentis valde conspicuis constrictis; vaginis tenuissimis, hyalinis, moderate gelatinosis; cellulis quadratis aut quam longis parum brevioribus; protoplasto homogeneo.

Filaments epiphytic mostly throughout their entire length, but in part with free ends, usually more or less tortuous, although occasionally straight; trichomes 2.8-3.2 μ diam., with straight, blunt, non-attenuated apices, constricted at the very conspicuous cross-walls; sheath very thin, hyaline, somewhat gelatinous; cells quadrate to slightly shorter than the diameter; protoplast homogeneous.

Clinging closely to various small species of Rhodophyceae.

Type: No. 236520, Herb. Calif. Acad. Sci., collected by J. T. Howell (278) May 17, 1932, at **Charles Island, Galapagos.**

Lyngbya Holdenii DeToni from Connecticut seems to be a very close relative of this species from the Galapagos Islands, judging from the similarity in structure. The cross-walls of the Galapagos material are more conspicuous, the cells are narrower and shorter, and the filaments are attached mostly by their whole length and are much shorter.

Lyngbya prostrata Setchell and Gardner, sp. nov.

Plate 3, figures 4a, 4b

Filamentis tortuosis, per longitudinem totam adhaerentibus, 0.8-1.1 μ diam., ad dissepimentis constrictis, neque apice attenuatis neque capitatis; cellulis quadratis usque ad parum longioribus brevibusve; vaginis inconspicuis.

Filaments tortuous, adhering to the host by their entire length, 0.8-1.1 μ diam., constricted at the cross-walls, neither attenuated at the apices nor capitate; cells quadrate to very slightly longer or shorter; sheath inconspicuous.

Adhering to *Polysiphonia* sp.

Type: No. 236511, Herb. Calif. Acad. Sci., collected by J. T. Howell (608a) Aug. 4, 1932, dredged from **20 fathoms depth at San Jose del Cabo, Lower California.**

This species of *Lyngbya* was observed on but one specimen of *Polysiphonia.* The filaments are short and adhere very firmly to the

host throughout their entire length, not having the ends free like certain members of the *Leibleinia* group. The paucity of specimens observed is to be regretted, but specimens of the host are exceedingly scarce among the collections.

Lyngbya epizooica Setchell and Gardner, sp. nov.

Filamentis inter apices liberas adhaerentibus, vulgo minus quam 300 μ longis; trichomatibus neque attenuatis, constrictis neque capitatis, arcuatis 5-5.4 μ diam.; cellulis 1-1.5 μ longis, protoplastis homogeneis usque ad minute granulatis, aerugineis; vaginis tenuissimis, hyalinis, homogeneis.

Filaments attached between the free ends, mostly less than 300 μ long; trichomes neither constricted nor attenuated nor capitate, straight or arcuate, 5-5.4 μ diam.; cells 1-1.5 μ long, with homogeneous to finely granular aeruginous protoplasts; sheath very thin, hyaline, homogeneous.

Attached to very small worm tubes.

Type: No. 236523, Herb. Calif. Acad. Sci., collected by J. T. Howell (497) Mar. 24, 1932, at **Sulphur Bay, Clarion Island.**

A few small worm tubes were found among algae which had an abundance of this diminutive species of *Lyngbya* attached to them. It belongs to the *Leibleinia* section of the genus, and of the known species is probably closest to *L.gracilis* Rabenhorst, originally from Europe. The filaments are narrower, not constricted, of a different color, and the cells are much shorter.

Lyngbya Willei var. **galapagensis** Setchell and Gardner, var. nov.

A typo per trichomata aeruginea usque ad 175 μ longa, 2.4-2.8 μ diam., et per cellulas quam diametro ½ brevioras, abludens.

Trichomes aeruginous, up to 175 μ long, 2.4-2.8 μ diam.; cells ½ as long as the diam.; otherwise as the species.

Attached to the filaments of *Boodlea* sp.

Type: No. 236513, Herb. Calif. Acad. Sci., collected by J. T. Howell (413a), Apr. 27, 1932, at **Villamil, Albemarle Island, Galapagos.**

Lyngbya Kuetzingiana var. **pacifica** Setchell and Gardner, var. nov.

A typo per filamenta comparate longa tortuosaque, per vaginas distinctissimas, trichomata 3.6-3.8 μ diam.; et per cellulas ⅓-½ breviora, protoplastis homogeneis, abludens.

Filaments relatively long and tortuous; sheath very distinct; trichomes 3.6-3.8 μ diam.; cells ⅓-½ as long as broad, with homogeneous protoplast; otherwise like the species.

Intermingled with other Myxophyceae, in tide pools.

Type: No. 236510, Herb. Calif. Acad. Sci., collected by J. T. Howell (776) July 2, 1932, at **Braxillito Bay, Costa Rica.**

Lyngbya sinuosa Setchell and Gardner, sp. nov.

Plate 4, figure 7

Filamentis brevibus, usque ad 400 μ longis; trichomatibus lente regulariterque sinuosis aut plus minusve tortis; ad dissepimenta lente constrictis, apicibus leviter attenuatis, 5 μ diam., cellulis 1.6-2.4 μ longis; cellula terminali non capitata.

Filaments short, up to 400 μ long; trichome gently and regularly sinuous or more or less irregularly contorted, slightly constricted at the cross-walls, slightly attenuated at the apices, 5 μ diam., with cells 1.6-2.4 μ long; end cell blunt, not capitate.

Sparsely distributed among other microscopic algae scraped from rocks.

Type: No. 236512, Herb. Calif. Acad. Sci., collected by J. T. Howell (310) Mar. 22, 1932, at **Sulphur Bay, Clarion Island.**

This species does not seem to be abundant and is probably in the juvenile stage, the longest filaments being only about 400μ long. Structurally it resembles very closely *Lyngbya spiralis* Geitler, from a hothouse at the University of Vienna. It differs in being slightly attenuated at the apices and constricted at the cross-walls.

Lyngbya codicola Setchell and Gardner, sp. nov.

Trichomatibus singulis aut in fasciculis parvis, 2.4-2.7 μ diam., cellulis quadratis aut quam longis leviter brevioribus, rectis, neque attenuatis neque constrictis, cellula apicali neque capitata neque pariete terminali incrassato; vaginis tenuibus sed distinctis.

Trichomes single or in small fascicles, 2.4-2.7 μ diam., with quadrate cells or slightly shorter than broad, straight, neither attenuated nor constricted; end cell neither capitate nor with a thickened end wall; sheath thin but distinct.

Among the utricles of *Codium Geppii.*

Type: No. 236521, Herb. Calif. Acad. Sci., collected by J. T. Howell (806) July 2, 1932, at **Braxillito Bay, Costa Rica.**

Lyngbya consociata Setchell and Gardner, sp. nov.

Trichomatibus singulis aut lente fasciculatis, 1-1.3 μ diam., cellulis quadratis aut quam crassis leviter longioribus, rectis, neque attenuatis neque constrictis; dissepimentis inconspicuis; protoplastis homogeneis; vaginis tenuissimis inconspicuisque.

Trichomes single or in small fascicles, 1-1.3 μ diam., with cells quadrate or very slightly longer than broad, straight, neither attenuated nor constricted; cross-walls inconspicuous; contents homogeneous; sheath very thin and inconspicuous.

Among utricles of *Codium Geppii*.

Type: No. 236522, Herb. Calif. Acad. Sci., collected by J. T. Howell (807) July 2, 1932, at **Braxillito Bay, Costa Rica.**

Near to *L. subtilis* but has narrower and shorter cells.

Microcoleus subtorulosus var. **pacificus** Setchell and Gardner, var. nov.

A typo per trichomata in vaginis communibus 12-15, 8.5-9 μ diam.; cellulis 3-4 μ longis; cellula apicali quadrata aut quam crassa leviter longiore; dissepimentis valde distinctis; abludens.

Trichomes 12-15 in a sheath, 8.5-9 μ diam.; cells 3-4 μ long; apical cell quadrate to slightly longer than broad; cross-walls very distinct; otherwise as the species.

Dredged from 20 fathoms depth.

Type: No. 236516, Herb. Calif. Acad. Sci., collected by J. T. Howell (614a) Aug. 14, 1932, at **San Jose del Cabo, Lower California.**

The species, *M. subtorulosus* of Gomont, was founded on *Phormidium subtorulosum* Brébisson, who collected it at Falaise, France. It has been reported since from Sweden, Florida, and the Indo-Malaysian Archipelago, always in fresh water.

The material of the variety proposed here is marine, exceedingly sparsely represented in this collection, and was brought up in the dredge among other diminutive algae.

Microcoleus Howellii Setchell and Gardner, sp. nov.

Plate 3, figure 5

Filamenta per algas alias sparsa, non stratum formantia; vaginis firmis, hyalinis, comparate levibus, trichomata usque ad 25 arcte collecta includentibus; trichomatibus aeruginosis, 6-6.5 μ diam., ad apices lente attenuatis, neque capitatis neque constrictis; cellulis 2-3 μ longis, protoplastis homogeneis.

Filaments scattered among other algae, not forming a stratum; sheath firm, hyaline, relatively smooth, enclosing up to 25 trichomes tightly bound together; trichomes aeruginous, 6-6.5 μ diam., slightly tapering at the apices, not capitate, not constricted; cells 2-3 μ long, with homogeneous protoplast.

Mingled with other small algae on rocks.

Type: No. 236515, Herb. Calif. Acad. Sci., collected by J. T. Howell (413), Apr. 27, 1932, in tide pools at **Villamil, Albemarle Island, Galapagos.**

Calothrix Laurenciae Setchell and Gardner, sp. nov.

Filamentis epiphyticis, per totam longitudinem ad hostem adhaerentibus, parte terminali solummodo libera; trichomatibus basi tumidis, usque ad pilos valde graciles (2 μ diam.) attenuantibus, proxime 100 μ longis usque ad plus minusve, basi 8-10 μ diam., eramosis; cellulis quam diam. ½-⅓-plo brevioribus; heterocystis basalibus, subsphericis; vaginis valde tenuibus, totaliter arcte applicatis, hyalinis, homogeneis; sporis nondum visis.

Filaments epiphytic, adhering to the host by their entire length or only the apical portion free; trichome swollen at the base, tapering to a very slender (2 μ thick) hair, approximately 100 μ long to slightly more or less, 8-10 μ diam. at the base, unbranched; cells ½ to ⅓ as long as broad; heterocysts basal, subspherical; sheath very thin, close fitting throughout, hyaline, homogeneous; spores unknown.

Growing on *Laurencia* sp.

Type: No. 236525, Herb. Calif. Acad. Sci., collected by J. T. Howell (231b) Mar. 24, 1932, at **Sulphur Bay, Clarion Island, Galapagos.**

The species seems to be near to *C. codicola* S. and G., from Guadalupe Island. It is a smaller plant and is unbranched. Its habitat is strikingly different.

Scytonema guyanense var. **marinum** Setchell and Gardner, var. nov.

Filamentis 28-40 μ diam.; trichomatibus 10-18 μ diam.; cellulis quadratis usque ad in filamentorum partibus vetustioribus duplo longioribus in apicibus increscentibus ½-⅓ brevioribus; vaginis vulgo homogeneis sed pro parte leviter lamellosis.

Filaments 28-40 μ diam.; trichome 10-18 μ diam.; cells quadrate to 2 times as long as the diam. in the older parts of the filament, ½-⅓ as long at the growing apices; sheaths mostly homogeneous but in part slightly lamellose.

Forming a dense stratum on a lava flow in tide pools exposed at low tide.

Type: No. 236480, Herb. Calif. Acad. Sci., collected by J. T. Howell (819) May 28, 1932, at **northeast side of Narborough Island, Galapagos.**

Mastigocoleus corallinae Setchell and Gardner, sp. nov.

Plate 4, figure 8

Filamentis valde tortuosis, 2.5-3.5 μ diam., cellulis quam diam. 3-5-plo longioribus; protoplastis homogeneis dilute cyaneo-viridibus; vaginis valde inconspicuis; heterocystis sparsis, 3-5 μ diam., in ramulis curtis terminalibus aut sessilibus, non intercalaribus.

Filaments very tortuous, 2.5-3.5 μ diam., with cells 3-5 times as long as the diam.; protoplast homogeneous, pale blue-green; sheath very inconspicuous; heterocysts sparse, 3-5 μ diam., terminal on short branches or sessile, not intercalary.

Growing among crustaceous Corallines.

Type: No. 236514, Herb. Calif. Acad. Sci., collected by J. T. Howell (570) Mar. 24, 1932, at **Sulphur Bay, Clarion Island.**

This species of *Mastigocoleus* closely resembles *M. testareum* Lagerh., usually found in the shells of various species of mollusks. The filaments are narrower and the cells are longer and the heterocysts smaller than in that species.

Rhizoclonium robustum Setchell and Gardner, sp. nov.

Plate 5, figure 11

Filamentis comparate curtis (1-2 cm. longis) tortuosisque, 350-400 μ (usque ad 650 μ) diam.; segmentis diametro 1-3-plo longioribus; parietibus crassis, in segmentis vetustioribus usque ad 40 μ; rhizoideis frequentissimis, magnis, segmento singulo, attenuato, tortuoso, simplice ramosove aut pro parte in segmentis propriis diversis instructo; pyrenoideis numerosissimis parvisque.

Filaments relatively short (1-2 cm. long) and tortuous, 350-400 μ (up to 650 μ) diam.; cells 1-3 diameters long; walls thick, up to 40 μ thick in the older segments; rhizoids numerous, large, composed of a long, tapering, tortuous, unbranched or branched segment, or in part separated by cross-walls into several segments; pyrenoids very numerous and small.

In tide pools at low tide.

Type: No. 236507, Herb. Calif. Acad. Sci., collected by J. T. Howell (170a) June 11, 1932, at **North Seymour Island, Galapagos.**

The specimens representing the species are very sparse, there being but a small tuft among specimens of *Bifurcaria galapagensis*, making it extremely difficult to determine much as to the range of variation in the species. It is one of the very largest species thus far described as regards the diameter of the filaments, but the filaments are very short. The rhizoids are large, some being a hundred microns in diameter at the point of origin. Some are simple, others more or less branched, segmented or unsegmented. Some are attenuated to a point and others are divided into hapteres. The species is apparently a very close relative of *Rhizoclonium grande* Boergesen recently published from Bombay, India. The filaments and rhizoids average larger but not modified for attachment, and are segmented. The filaments were not attached.

Ectocarpus granulosoides var. **pygmaeus** Setchell and Gardner, var. nov.

A typo per frondem 1 cm. aut minus altum, cellulis filamentorum primariorum 40-45 μ diam., iis ramulorum ultimorum 12-15 μ diam., ramulis ultimis pro parte piliferis; gametangiis sessilibus, 35-45 μ longis, 11-15 μ diam.; filamentis corticantibus sparsis; zoosporangiis nondum visis; abludens.

Fronds 1 cm. or less high, cells of the main filaments 40-45 μ diam., those of the ultimate ramuli 12-15 μ diam.; ultimate ramuli in part piliferous; gametangia sessile, 35-45 μ long, 11-15 μ diam., corticating filaments sparse; zoosporangia unknown. Otherwise as the species.

Growing on *Cystoseira osmundacea.*

Type: No. 236518, Herb. Calif. Acad. Sci., collected by J. T. Howell (625) Aug. 20, 1932, at **San Martin Island, Lower California.**

The general size of the plants, the dimensions of the cells and of the gametangia are all less than those of the species, the type locality of which is San Pedro, California.

Ralfsia pangoensis var. **galapagensis** Setchell and Gardner, var. nov.

Thallus peripherice valde irregularis, 4-6 mm. latus; filamentis erectis cellulis 25-35 compositis; sporangiis inter filamenta erecta sparsis non in nematheciis aggregatis, 28-34 μ × 115-125 μ, in pedicellis filamentorum erectorum, cylindricis, 5-7 μ diam., diametro 1-2-plo longiore, apicalibus pyriformibus usque ad subglobosis.

Thallus very irregular in outline, 4-6 mm. wide, erect filaments composed of 25-35 cells; sporangia scattered among the erect filaments, not in nemathecia, 28-34 μ × 115-125 μ, on 8-12-celled pedicels; cells in erect filaments, cylindrical, 5-7 μ diam., 1-2-times as long as broad, apical cell pyriform to subglobose.

Adhering firmly to rocks by the whole under surface.

Type: No. 236506, Herb. Calif. Acad. Sci., collected by J. T. Howell (781) June 8, 1932, at **Conway Bay, Indefatigable Island, Galapagos.**

The variety is probably much more widely distributed among the islands of the Galapagos than is indicated here. The plants grow among other encrusting algae and are not readily recognizable.

Spatoglossum Howellii Setchell and Gardner, sp. nov.

Plate 9, figure 27, text figure 1

Frons linearis, 20-38 cm. alta, 4-7 mm. lata, 400-500 μ crassa, basi dense stuposa, breviter stipitata, marginibus regulariter et crasse serrata, dichotomo ramosa dichotomiis paucis, colore atro-fusca, siccitate fere atra; medullae cellulis parietibus tenuibus, 4-stratis; cellulis superficialibus chromatophoris sphericis dense conglobatis impletis, quadratis usque 2-plo longioribus a supero visis, maturitate in partibus fructificantibus in sectione radiater elongatis; oogoniis (?) ellipsoideis, 90-110 μ longis, 55-65 μ crassis, numerosissimis, singulis aut valde rare binis super partes magnas laterum binorum frondis sparsis; antheridiis tetrasporisque nondum visis.

Fronds linear, 20-38 cm. high, 4-7 mm. wide, 400-500 μ thick, with a dense stupose base, a short (1-2 cm.) stipe, and irregularly and coarsely serrate margins, dichotomously branched, but with few dichotomies; color dark brown, almost black on

drying; medulla mostly composed of four layers of thin-walled cells; surface cells filled with densely congested, spherical chromatophores, square to 2 times as long as broad in surface view, elongated radially in section view at maturity in the fruiting parts; oogonia (?) ellipsoidal, 90-110 μ long, 55-65 μ wide, very numerous, scattered singly or very rarely in pairs over a large part of both sides of the frond; antheridia and tetraspores not observed.

In tide pools.

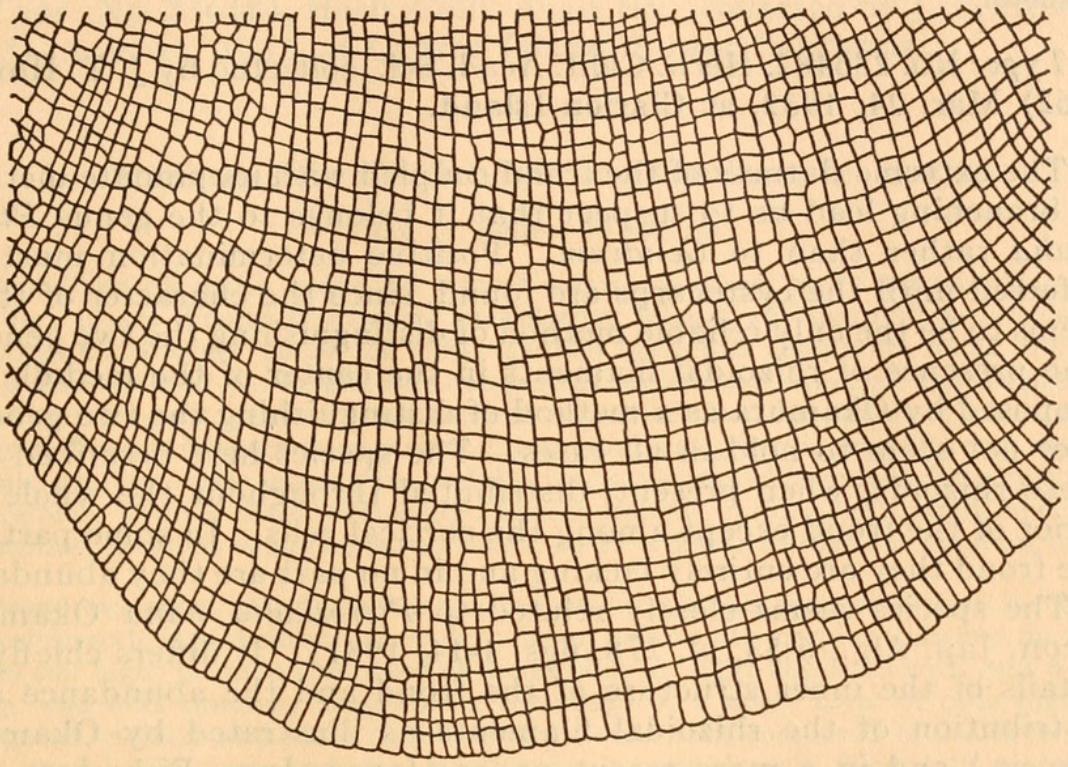


Fig. 1. *Spatoglossum Howellii* Setchell and Gardner, new species. Apical portion of a frond showing the character of the cells. × 45.

Type: No. 236485, Herb. Calif. Acad. Sci., collected by J. T. Howell (958) May 22, 1932, **five miles northeast of Webb Cove, Albemarle Island, Galapagos.**

Gelidium (Pterocladia) Okamurai Setchell and Gardner, sp. nov.

Plate 6, figure 16; plate 17, figure 38

Frondibus complanatis, vulgo e rhizomatibus repentibus orientibus, 3-4-plo dense pinnatis, 3-5 cm. altis, axibus primariis 1-1.5 mm. latis, ramulis basi ½-plo aut plus constrictis et apice nullo modo aut leviter attenuatis et rotundatis; cellula apicali parvissima inconspicuaque, medulla cellulis cylindriciis arcte compactis, 20-25 μ diam. 2-3-stratis subcorticalibus leviter minoribus composita; corticibus 2-stratosis cellulis coloratis 5-7 μ diam. compositis; filamentis rhizoidalibus in partibus frondium nonnullis apparentibus, in partibus nullis copiosis, per medullam totam maxime inaequaliter distributis et angustissimis; tetrasporangiis in soris linearibus aggregatis et in ramulis ultimatis subultimatisque positis; cystocarpiis antheridiisque nondum visis.

Fronds complanate, mostly arising from a creeping rhizome, 3-4 times densely pinnate, 3-5 cm. high, main axes 1-1.5 mm. wide, with the ramuli constricted one-half or more at the base and not at all or only slightly tapering and rounded at the apices; apical cell very small and inconspicuous; medulla composed of closely compacted cylindrical cells 20-25 μ diam., the 2-3 subcortical layers slightly smaller; cortex composed mostly of 2 layers of color-bearing cells 5-7 μ diam.; rhizoidal filaments present only in certain parts of a frond, in no parts very abundant, distributed very unevenly throughout the entire medulla and very narrow; tetrasporangia in linear sori on the ultimate and subultimate ramuli; cystocarps and antheridia unknown.

Type: No. 236482, Herb. Calif. Acad. Sci., collected by J. T. Howell (462) Mar. 24, 1932, at **Clarion Island.**

The extreme flatness of the frond coupled with its pinnate method of branching lead us to suspect that it belongs to the genus *Pterocladia* rather than to *Gelidium.* Positive determination must be deferred until the cystocarps are found, since the character of these seems to be the only reliable method of distinguishing the two genera. The presence of rhizoidal filaments in the center of the medulla, as proposed by Okamura as a method of distinguishing the two genera, does not seem to hold in all cases. The species here described has these rhizoids, when present, distributed throughout the whole interior of the frond except among the cortical cells. In some parts of the frond they are entirely lacking and in no part are they abundant.

The species seems closely related to *Pterocladia nana* Okamura (Icon. Jap. Alg., 6:53, pl. 278, figs. 1-14, 1931). It differs chiefly in details of the inner structure of the frond and the abundance and distribution of the rhizoidal filaments as illustrated by Okamura (loc.cit.) and in a more recent paper (Journ. Imp. Fish. Inst. 29: 1934). This new species is respectfully dedicated to the memory of Dr. K. Okamura of Tokyo, Japan, in recognition of his able exposition of the *Gelidiums* and *Pterocladias* of Japan.

Weeksia Templetonii Setchell and Gardner, sp. nov.

Plate 10, figure 28

Frondibus disco parvo affixis, mucilagineis, flaccidis, linea exteriore orbicularibus, 8-12 cm. altis, 200-250 μ crassis; stipite curto gracilique, venis falsis (textu non differentiato) paucis obscurisque; medulla reticulo filamentarum cellulis comparate rectis 5-7 μ diam., diam. 8-12-plo longiorum, composita; corticibus strato singulo cellulis chromatophoriferis leviter radialiter elongatis, 7×10 μ compositis; stratis subcorticalibus 2-stratosis, cellulis sphericis subsphericisve, pauce chromatophoriferis compositis; cystocarpiis numerosis, parvissimis, super superficies frondium uniformiter sparsis; ramellis auxiliaribus curvatis, plurime 6-8-cellularibus; cellulis proxime 7 μ diam.; tetrasporangiis late ellipsoideis usque ad subsphericiis, 18-22 μ × 22-26 μ, cruciatis; antheridiis nondum visis.

Fronds attached by a small disk, mucilaginous, flaccid, orbicular in outline, 8-12 cm. high, 200-250 μ thick, with a very short slender stipe and a few faint, radiating, false veins, but no differentiation of tissues to form them; medulla composed of a network of filaments with relatively straight cells 5-7 μ diam., 8-12 times as long;

cortex composed of a single layer of color-bearing cells slightly elongated radially, 7 × 10 μ; subcortex composed of mostly 2 layers of spherical or subspherical cells with few chromatophores; cystocarps numerous, very small, distributed uniformly over the surface of the frond; curved auxiliary branchlets composed of 6-8 cells mostly; cells of these branchlets approximately 7 μ diam.; tetrasporangia broadly ellipsoidal to subspherical, 18-22 μ × 22-26 μ, cruciately divided; antheridia unknown.

Dredged from 20 fathoms.

Type: No. 236484, Herb. Calif. Acad. Sci., collected by J. T. Howell (703), Aug. 15, 1932, at **Cedros Island, Lower California.**

Weeksia Howellii Setchell and Gardner, sp. nov.

Plate 11, figures 29 and 30

Frondibus elongatis usque ad suborbicularibus, disco parvo affixis stipite in frondem ipsam directe transiente, irregulariter lobatis aut marginibus laciniatis, tenuibus flaccidisque, 20-30 cm. altis; medulla filamentis comparate rectis, cellulis 6-8 μ diam. et 8-12-plo longioribus composita; corticibus 1-stratosis cellulis parum radialiter elongatis, plus minusve conicis; subcorticibus 2-3-stratosis cellulis forma magnitudineque irregularibus, plerumque angulatis et granulis dense farctis; cystocarpiis frondis omnis sparsis in medulla immersis; ramellis auxiliaribus curvatis 7-9-cellulis, 10-13 μ diam. compositis; tetrasporangiis uniformiter sparsis, non frequentibus, sphericis usque ad subsphericis, 18-22 μ diam., antheridiis nondum visis.

Frond elongated to suborbicular, attached by a small disk with stipe merging almost directly into the frond, irregularly lobed or laciniate margins, thin and flaccid, 20-30 cm. high; medulla composed of moderately straight filaments with cells 6-8 μ diam. and 8-12 times as long; cortex composed of a single layer of cells slightly elongated radially and more or less conical; subcortex composed of 2-3 layers of cells irregular in shape and size, mostly angular and densely filled with granules; cystocarps distributed over the frond, deeply embedded in the medulla; curved auxiliary branchlets composed of 7-9 cells; cells of auxiliary branchlets 10-13 μ diam.; tetrasporangia distributed evenly over the frond, not abundant, spherical to subspherical, 18-22 μ diam.; antheridia unknown.

Dredged.

Type: No. 236496, Herb. Calif. Acad. Sci., collected by J. T. Howell (89) Aug. 17, 1932, at **Natividad Island,** between Cedros Island and the main land, **Lower California.**

Callymenia angustata Setchell and Gardner, sp. nov.

Plate 12, figure 32

Frondibus linearibus, in lobis paucis, angustis, stipitatis fissis et proliferationibus paucis marginalibus, tenuibus, membranaceis flaccidis, basi cuneata, stipite gracili, 7 cm. altis, usque ad 18 mm. latis, 50-60 μ crassis; medulla fibris laxis, comparate sparsis in diam. irregularibus composita; corticibus strato uno cellulis proxime isodiametricis, angustis, 5-8 μ diam. et strato uno cellulis plus minusve ellipsoideis quam cellulis superficialibus leviter majoribus, compositis; cystocarpiis comparate magnis, latere uno leviter et latera altero prominente protuberantibus, clausis; tetrasporangiis antheridiisque nondum visis.

Frond linear, deeply split into a few narrow, stipitate lobes and a few marginal proliferations, thin, membranaceous and flaccid, with a cuneate base and very slender stipe, about 7 cm. high, widest part 18 mm. wide, 50-60 μ thick; medulla composed of loose, relatively sparse fibers irregular in diameter; cortex composed of a single layer of nearly equidiametric, angular cells 5-8 μ diam. and a layer of more or less ellipsoidal cells slightly larger than the surface cells, cystocarps relatively large, protruding slightly on one side and prominently on the other side of the frond, without an ostiole; tetrasporangia and antheridia unknown.

Dredged from 16 fathoms depth.

Type: No. 236489, Herb. Calif. Acad. Sci., collected by J. T. Howell (739) Aug. 12, 1932, at **Santa Maria Bay, Lower California.**

We have but a single cystocarpic specimen of the above species from which to make the determination and description. The plant was in formaldehyde and was considerably softened and blistered, as may be seen from the illustration on plate 12.

The determination can thus necessarily be only tentative. Tetrasporic and young cystocarpic plants will be required before a thoroughly satisfactory classification can be attained.

Gymnogongrus martinensis Setchell and Gardner, sp. nov.

Plate 12, figure 31

Frondibus dense caespitosis, cartilagineis, pluribus e basi communi confluente orientibus complanatis 2-3.5 cm. altis, infra furcam primam 2-4 mm. latis, 0.5-0.75 mm. crassis, basi cuneatis, fere astipitatis, dichotomis sed per occasionem marginibus pinnato-ramosis; medulla cellulis crassi-parietalibus subsphericis 100-125 μ diam., adversus superficiem minoribus, composita, in subcortice et in seriebus anticlinis transeuntibus; protoplastis cellularum iis series anticlinas exceptis profuse anastomosantibus; cystocarpiis parvis, proxime 1 mm. diam., e superficie una tantum protuberantibus.

Fronds densely caespitose, cartilaginous, several arising from a common confluent base, complanate, 2-3.5 cm. high, 2-4 mm. wide below the first forking, 0.5-0.75 mm. thick, cuneate at the base, almost without stipe; dichotomously branched, with occasional pinnate branching from the margin; medulla composed of thick-walled subspherical cells, 100-125 μ diam., smaller toward the surface, merging into the subcortex and into the anticlinal rows of cortical cells; protoplast of all cells except the anticlinal rows profusely anastomosing; cystocarps small, approximately 1 mm. diam., projecting only on one side of the frond.

Growing on rocks in the lower littoral belt. San Martin Island, Lower California, Aug. 19, Howell No. 192; San Bartolome Bay, Lower California, Aug. 14, Howell No. 697.

Type: No. 236483, Herb. Calif. Acad. Sci., collected by J. T. Howell (192) Aug. 19, 1932, at **San Martin Island, Lower California.**

Gracilaria secundata Setchell and Gardner, sp. nov.

Frondibus cartilagineis, cylindricis usque ad leviter compressis, ramis curtis, secundatis et ramulis fructiferis numerosis; medulla cellulis subsphericis comparate tenuiparietalibus, 135 μ diam.; in subcortice gradatim deminuentibus; corticibus seriebus anticlinis cellularum 2-3, coloratis, subsphericis et a superficie visis 4-9 μ diam., compositis; in planta tetrasporangialibus radialiter elongatis; cellulis subcorticalibus anastomosantibus; tetrasporangiis numerosis, in ramulis fructiferis et supra partes vetustiores frondis sparsis, subsphericis, 24-28 μ diam.; magnitudine plantae totae et reproductione altera ignota.

Frond cartilaginous, cylindrical to slightly compressed, with short secund branches and numerous fructiferous ramuli 1-3 mm. long; medulla composed of subspherical, relatively thin-walled cells, up to 135 μ diam., gradually diminishing in size in the subcortex; cortex composed of short anticlinal rows of 2 or 3 color-bearing cells, subcircular and 4-9 μ diam., as seen in surface view, elongated radially in the tetrasporic plant; subcortical cells anastomosing; tetrasporangia numerous on the fructiferous ramuli and also scattered over other parts of the frond, subspherical, 24-28 μ diam. Size of whole plant and other forms of reproduction unknown.

Dredged from 20 fathoms depth.

Type: No. 236481, Herb. Calif. Acad. Sci., collected by J. T. Howell (733b) Aug. 4, 1932, at **San Jose del Cabo, Lower California.**

A single branching fragment of the upper part of a species of *Gracilaria* was found among other species of algae dredged at San Jose del Cabo. The fragment shows abundance of tetrasporangia, mostly immature. These are produced most abundantly in short papillae distributed promiscuously on the part of the frond at our disposal.

In general, the naming of species from such fragmentary parts should be decried, but the form, structure and distribution of the asexual spores of this fragment seem to us to be so distinct from all described species as to make it desirable to place it on record.

Sarcodiotheca meridionalis Setchell and Gardner, sp. nov.

Plate 13, figure 33

Frondibus magnitudine variabilibus, 8-16 cm. altis, 5-16 mm. latis, flaccidis, colore saturate carminatis, infero ad stipitem curtum angustumque leviter attenuatis, per discum parvum ad saxa, etc., affixis, 2-4-plo furcatis et per occasionem ramo parvo laterali instructis; medulla 2-3-stratosa, cellulis magnis, subsphericis et parietibus crassis minutis in lateribus quibusque strati tenuis centralis filamentorum, nonnullorum quam diam. 40-plo longiorum; corticibus 2-stratosis, cellulis in plantis tetrasporangialibus forma irregularibus; tetrasporangiis 50-56 × 82-88 μ; cystocarpiis antheridiisque nondum visis.

Fronds variable in size, 8-16 cm. high, 5-16 mm. wide, flaccid, of a rich carmine color, tapering gradually below to a short narrow stipe, attached to rocks, etc. by a small disk, 2-4 times furcate and with an occasional small lateral branch; medulla composed of 2-3 layers of large, thick-walled, subspherical cells on either side of a

thin central layer of filaments, some of which are 40 times as long as broad; cortex composed mostly of two layers of irregularly shaped cells in the tetrasporic plant; tetrasporangia 50-56 × 82-88 μ; cystocarps and antheridia unknown.

Dredged from 15-20 fathoms depth.

Type: No. 236487, Herb. Calif. Acad. Sci., collected by J. T. Howell (72) Aug. 20, 1932, at **San Martin Island, Lower California.**

Sarcodiotheca cuneata Setchell and Gardner, sp. nov.

Plate 14, figure 34

Frondibus usque ad 14 cm. altis et infra furcam primam 3 cm. latis, 5-6-plo dichotomis, ramis ad furcam quamque deminuentibus, ad occasionem proliferatione marginali, per discum parvum affixis, stipite ex usu carente sed supra discum basi cuneata directe mergentibus; colore saturate carminato; medulla 3-stratosa, cellulis vulgo magnis subsphericis, 75-100 μ × 120-180 μ, in lateribus quibusque reticuli angusti fibrarum cellulis 5-8 μ diam. et 15-20-plo longioribus, composita; corticibus 1-stratosis, cellulis chromatiferis leviter radialiter elongatis compositis; subcorticibus 1-2-stratosis cellulis majoribus dilute coloratis compositis; cystocarpiis comparate paucis magnisque, a uno latere plus protuberantibus, corticibus supra parte protuberante usque ad 7-10 strata incrassatis, pericarpiis fibris cellulis curtis et protoplasmate farctis inclusis; carposporis in glomerulis magnis densisque conglobatis, 45-55 μ diam., forma subsphericis usque ad irregularibus, non angulatis; antheridiis tetrasporangiisque nondum visis.

Fronds up to 14 cm. high, up to 3 cm. wide below the first forking, 5-6 times dichotomously branched, branches diminishing in size at each forking, with an occasional marginal proliferation, attached by a small disk, practically without stipe, merging directly into the cuneate base; color dark carmine; medulla composed of three layers, for the most part, of large subspherical cells, 75-100 × 120-180 μ, on either side of a narrow mesh of central fibers with cells 5-8 μ diam., 15-20 times as long; cortex composed of a single layer of color-bearing cells slightly elongated radially; subcortex of 1-2 layers of larger cells with little color; cystocarps relatively few and largem protruding much more prominently on one side than the other, with the cortex thickened to 7-10 layers of cells over the bulging part, enclosed by a dense pericarp composed of fibers intermingled with short cells rich in protoplasmic content; carpospores in large dense clusters, 45-55 μ diam., subspherical to irregular in form, not angular; antheridia and tetrasporangia unknown.

Dredged in 15-20 fathoms.

Type: No. 236488, Herb. Calif. Acad. Sci., collected by J. T. Howell (72a) Aug. 20, 1932, at **San Martin Island, Lower California.**

Sarcodiotheca linearis Setchell and Gardner, sp. nov.

Plate 5, figures 12a, 12b; plate 15, figure 35

Frondibus linearibus, 6-13 cm. altis, 2-6 mm. latis, comparate tenuibus flaccidisque, 2-5-plo furcatis, ramificatione in speciminibus nonnullis prope basim oriente, per totam longitudinem in latitudine prope aequalibus, basim usque ad stipitem curtam attenuatis, per discum parvum affixis; medulla cellulis magnis subsphericisque in subcortice magnitudine deminuentibus, centro filamentis paucis

angustique interspersis; corticibus 2-3-stratosis, cellulis chromatiferis leviter radialiter elongatis, compositis; cystocarpiis in centro frondis locatis et a lateribus quibusque symmetrice protuberantibus, per pericarpium proprium inclusis; antheridiis per superficiem frondis sparsis, numerosis, radialiter elongatis; tetrasporangiis per superficiem frondis sparsis, 25-60 μ diam.

Fronds linear, 6-13 cm. high, 2-6 mm. wide, relatively thin and flaccid, 2-5 times furcate, in some specimens beginning to branch very close to the base approximately the same width throughout the greater portion of the length, tapering at the base to a short stipe, attached by a small disk; medulla composed of large subspherical cells diminishing in size in the subcortex, with a few narrow filaments interspersed in the center of the frond; cortex composed of two to three layers of color-bearing cells slightly elongated radially; cystocarps located in the center and bulging equally on both sides of the frond, surrounded by a definite pericarp; antheridia distributed over the surface of the frond, numerous, elongated radially; tetrasporangia distributed over the surface of the frond, 25-60 μ diam.

Dredged from 20 fathoms depth. San Lucas Bay, Lower California, Howell Nos. 41, 44a, 48.

Type: No. 236479, Herb. Calif. Acad. Sci., collected by J. T. Howell (48) Aug. 5, 1932, at **San Lucas Bay, Lower California.**

Laurencia clarionensis Setchell and Gardner, sp. nov.

Plate 7, figures 19-21

Frondibus carnosis, microscopicis, usque ad 3 mm. altis, 150-225 μ diam., pro parte erectis pro parte prostratis; ramulis fructiferis cylindricis, basi non constrictis; cellulis superficiaribus ad apices ramulorum non radialiter elongatis; crassitudinibus lenticularibus parietalibus cellularum medullae in axibus frondium et vulgo ad basim ramorum sparsis; cystocarpiis urceolatis, prope apices ramuli fructiferorum lateralibus; tetrasporangiis comparate magnis sparsisque, 100-125 μ diam., 2-4-prope apices ramorum fructificantium positis.

Fronds carnose, microscopic, up to 3 mm. high, 150-225 μ diam., in part erect and in part prostrate; branching sparse and irregularly alternate; fruiting ramuli cylindrical, not constricted at the base; surface cells not radially elongated at the apices of branches, lenticular thickenings in the walls of the medullary cells sparse in the main axes, usually at the base of the branches; cystocarps urn-shaped, lateral near the apices of fruiting ramuli; tetrasporangia relatively large and sparse, 100-125 μ diam., 2-4 near the apices of fruiting branches.

Growing on rocks among other diminutive algae. Sulphur Bay, Clarion Island, Mar. 24, Howell Nos. 231, 234, 305 and 308a.

Type: No. 236503, Herb. Calif. Acad. Sci., collected by J. T. Howell (305) Mar. 24, 1932, at **Sulphur Bay, Clarion Island.**

Laurencia densissima Setchell and Gardner, sp. nov.

Plate 16, figure 36; plate 17, figure 37

Frondibus cylindricis, cartilagineis, disco parvo affixis, fere valde abundanter multifarie e basi ramosis, ramis primariis et ordinibus 3-4 quibusque successivis prope basim axis majoris longissimis deinde gradatim longitudine usque ad apices ex iis oriendis deminuentibus, peripheriam conicam efficientibus; cellulis superficiaribus apicalibus frondium neque protuberantibus neque radialiter elongatis et palisadiformibus; crassitudinibus parietalibus lenticularibus comparate in medulla frequentissimis; ramulis fructiferis cylindricis usque ad leviter clavatis; pro parte compositis, vulgo simplicibus.

Fronds cylindrical, cartilaginous, attached by a small disk, branching very profusely on all sides beginning near the base; primary branches and each succeeding three or four orders longest near the base of the main axis and each order likewise in turn, then gradually diminishing in length to the apices of the axes from which they spring, producing a conical effect to the outline; cells neither protruding nor elongated and arranged like palisades at the apices of the fronds; medullary cells provided with fairly abundant lenticular thickenings; fructiferous ramuli cylindrical to slightly clavate, compound in part, but mostly simple.

Albemarle Island, May 22, Howell Nos. 352, 389, 405, 428a, 443, 484; Charles Island, May 15, Howell Nos. 435, and May 17, Howell No. 506; Narborough Island, May 31, Howell No. 875; all Galapagos.

Type: No. 236486, Herb. Calif. Acad. Sci., collected by J. T. Howell (405) May 22, 1932, at **Albemarle Island, Galapagos.**

Laurencia turbinata Setchell and Gardner, sp. nov.

Plate 19, figure 40

Frondibus a disco et a ramulis rhizoidalibus prope basim orientibus affixis, usque ad 25 cm. altis, cylindricis, robustis, cartilagineis, rubro-purpureis, ramificatione abundanti, multifaria, ramis ordinum successivarum regulariter in longitudine deminuentibus, frondem total conicam efficientibus; axibus primariis percurrentibus; ramulis fructiferis immaturis compositis, turbinatis, cellulis superficiaribus proxime isodiametricis; crassitudinibus lenticularibus in parietibus cellularum medullarum frequentibus; plantis omnibus sterilibus.

Fronds attached by a disk and by numerous rhizoidal branches from near the base, up to 25 cm. high, cylindrical, robust, cartilaginous, reddish-purple, branching profusely on all sides, the branches of different orders reduced regularly and gradually in length, giving the frond as a whole and the branches of each order a conical appearance; main axes percurrent; fructiferous ramuli compound, turbinate, their surface cells approximately equidiametric; lenticular thickenings abundant in the walls of the medullary cells; reproductive organs unknown.

San Martin Island, Lower California, Aug. 17, Howell No. 66; northeast side of Narborough Island, May 31, Howell No. 147; Albemarle Island, May 22, Howell No. 37.

Type: No. 236494, Herb. Calif. Acad. Sci., collected by J. T. Howell (147) May 31, 1932, at **Narborough Island, Galapagos.**

In habit, this species resembles *L. virgata* very closely, from which it differs in being more densely branched and the branches of various orders forming more regularly conical fronds, and in having turbinate instead of cylindrical fruiting branches, as illustrated by Kuetzing (Tab.Phyc., 15:pl. 73) for *L. ericoides*, considered by Yamada (Notes on Laurencia, Univ. Calif. Publ. Bot., 16:208, 1931) to be a synonym of *L. virgata*.

Laurencia mediocris Setchell and Gardner, sp. nov.

Plate 18, figure 39

Frondibus a disco parvo affixis, cartilagineis, cylindricis, 4-7 cm. altis, axi centrali percurrenti, modice irregulariterque ramosis, ramis ramulisque curtis, compositis, turbinatis, fructiferis indutis; cellulis corticalibus in apicibus ramulorum fructiferorumque non radialiter elongatis sed a superficie visis quam longae 2-plo latioribus; crassitudinibus lenticellaribus in parietibus cellularum medullae modice frequentibus; speciminibus omnibus sterilibus.

Fronds attached by a small disk, cartilaginous, cylindrical, 4-7 cm. high, with a central percurrent axis, moderately and irregularly branched, the branches being densely clothed with short, compound, turbinate, fruiting ramuli; cortical cells not radially elongated in the ultimate and fruiting ramuli, but approximately twice as wide as long, as seen in surface view at the apices of the ramuli; lenticular thickenings moderately abundant in the cells of the medulla. Specimens all sterile.

Type: No. 236492, Herb. Calif. Acad. Sci., collected by J. T. Howell (404) May 22, 1932, at **Albemarle Island, Galapagos.**

The plants of this species are relatively small. They resemble in gross morphological characters certain forms of *L. paniculata* but lack the palisade arrangement of the cortical cells and have characteristic lenticular thickenings in the walls of the medullary cells, a character lacking in *L. paniculata*.

This species of *Laurencia* seems to be closely related to *L. pannosa* Zanardini, the type locality of which is Sarawak, Borneo, the description of which is incomplete so far as the details of cellular structure are concerned. We have not examined the type, but are relying upon Yamada's observation (*loc. cit.*, p. 199) on the material in the herbarium of Weber von Bosse from the Malay Archipelago and identified by her as *L. pannosa* Zan. Our plants do not show the projecting cells radially elongated and forming a palisade-like layer, reported present in the material from Malay. They are also considerably smaller.

Chondria pacifica Setchell and Gardner, sp. nov.

Plate 20, figure 41

Frons gracilis flaccidaque, 7-12 cm. alta, 0.5-0.75 mm. diam., axi percurrente abeunte; ramificatione alterna, multifaria, in 3-4 ordinibus, moderate abundanti; ramulis ultimis fructiferis, simplicibus, cylindricis, basi valde constrictis, apice truncatis; medulla cellulis (75 × 300 μ, in partibus vetustioribus multo longioribus) parietibus tenuibus, et cum axi centrali percurrenti cellulis usque ad 800 μ longis prebita; cortice axium primariorum cellulis longis angustisque, 10-15 × 90-150 μ composito; puncto vegetationis in depressione distincto apicali cum flocco pilorum curtorum, ramosorum, protrudentium immerso; tetrasporangiis generis typicis; antheridiis cystocarpiisque nondum visis.

Fronds slender and flaccid, 7-12 cm. high, 0.5-0.75 mm. diam., without a distinct percurrent axis; branching alternate on all sides, of 3-4 orders, moderately abundant; ultimate, fruiting ramuli simple, cylindrical, much constricted at the base, with truncate apices; medulla composed of large (75 × 300 μ, much longer in older parts) thin-walled cells and a distinct percurrent central filament with cells up to 800 μ long; cortex composed of a single layer of long, narrow cells, 10-15 × 90-150 μ, on the main axes; growing point a distinct apical depression with a tuft of short, branched, protruding hairs; tetrasporangia typical of the genus; antheridia and cystocarps unknown.

Dredged in shallow water.

Type: No. 236491, Herb. Calif. Acad. Sci., collected by J. T. Howell (674) Aug. 14, 1932, at **San Bartolome Bay, Lower California.**

This species belongs to the section *Coelochondria* of Falkenberg (p. 191, 1901), the growing point being sunken in an apical depression, the central filament there giving rise to a dense tuft of short branched hair filaments which fill the depression and protrude only slightly.

Heterosiphonia erecta Gardner (emend.)

Plate 21, figures 42-43; plate 22, figure 44; plate 23, figure 46

Fronds 2-5 cm. long, in part prostrate and attached to the substratum by rhizoids and in part erect, both the prostrate and the erect parts branched; the system of branching being sympodial, producing a more or less zigzag appearance in various axes; the main axis divided into few to many similar axes; all axes clothed with ramuli of limited growth which in turn bear ultimate subulate, monosiphonous ramuli 8-12 cells long, some of which become fructiferous; all branches in one plane; main axes approximately 400 μ diam. and composed of 4 large pericentral cells; normally two or three segments between each successive pair of alternate branches but at times four; mature tetrasporangial stichidia approximately 1 mm. long, cylindrical with a conical apex; tetraspores tetrahedral; cystocarps sparse, sessile near the base of ultimate ramuli, relatively large, 600-700 μ diam. at the base, flask-shaped with relatively long neck and definite ostiole.

Growing on various species of jointed Corallines, etc., abundant on the southern coast of California. San Nicholas Island, California, Mar. 13, H. W. Clark, No. 444; San Bartolome Bay, Lower Cali-

fornia, Aug. 14, Howell No. 760b. Specimens all fragmentary and immature.

Heterosiphonia subsecundata Setchell and Gardner, Proc. Calif. Acad. Sci., 19:164, 1930.

Exsiccatae. The species was distributed from the Herbarium of the University of California, centuries, No. 255, sub *Heterosiphonia subsecundata* (Suhr) Falkenb., collected at about three miles north of Santa Monica, Calif., by N. L. Gardner, Jan. 1913, and by Collins, Holden and Setchell, Phyc.Bor.Amer., No. 146, sub *Dasya subsecunda* Suhr, collected at La Jolla, Calif., June 1895, by Mrs. E. Snyder.

Gardner, Univ. Calif. Publ. Bot., 14:98, 1927.

Recently in connection with the study of the very scanty material collected on the Crocker Expedition we became suspicious as to the identity of our California species with the *Dasya subsecundata* of Suhr, the type locality of which is Valparaiso, Chile. Through the courtesy of Prof. Dr. E. Irmscher of the herbarium at Hamburg we have been able to examine the type specimen coming from Herb. Binder (plate 21, figs. 42 and 43), and probably the same as the one from which Suhr drew his description, certainly the same specimen from which Harvey (Ner.Austr., p. 67, pl. 27, 1847) made his description and drawings. We find that the species has seven pericentral cells as described and figured by Harvey (loc.cit.), but the pericentral cells are not so uniform in length as Harvey shows them, nor are they so uniformly divided crosswise in each segment as figured by Falkenberg in his Rhodomelaceae (plate 18, fig. 20). The California species has uniformly four large, undivided, uniform, pericentral cells.

Heterosiphonia erecta Gardner was described from a single specimen which has uniformly two segments between the successive branches of different orders, and was thus figured, and was compared with a seemingly typical specimen of the species passing currently as *Heterosiphonia subsecundata* (Suhr) Falkenb., which had uniformly three segments between branches, and consequently the new species, *H. erecta*, was based upon this seeming difference in character. In the present study we have examined a large number of individuals and find that the number of intervening segments is exceedingly variable, some individuals having uniformly two, others three, and still others in which there is a mixture, and finally there are occasionally four segments between branches. This character therefore, being variable, cannot be used as a specific difference, and we are extending the original description to include what apparently was two species. There is much variation in the length and thickness of the fronds, in the branching, and in the extent of attachment, but we have not been able to discover at present any permanent basis for segregation into species.

Antithamnion sublittorale Setchell and Gardner, sp. nov.

Plate 6, figure 15

Frondibus diminutivis, pro parte repentibus pro parte erectis, 6-10 mm. altis, axibus primariis 55-65 μ diam.; furcatione axium primariarum comparate rara, semper ramulo ramis lateralibus ejusmodi opposito; cellulis infero diam. 3-4-plo longioribus; ramificatione disticha; ramulis binis geminatisve alterne et distiche ramosis, 3-5-ramulosis; ramulis binis 12-15-cellulis longis, cellula basali curtiora, cellulis mediis fere 15 × 45 μ; ramificatione ramulorum binorum in cellula e basi tertia incipiente, supra cellula quaque succedente ad finem superiorem 3-5 ramulos succedentes, alternos, ultimos steriles generante; tetrasporangiis basim 1-2, ad latera superum ramulorum geminatorum et ad cellulas primas et secundas, vulgo secundas, eo e cellula basali abortante, cellulis glandularibus comparate magnis, per ramulos distributis sparsis; antheridiis in ramulis ultimis geminatisque positis, glomerulos parvos ramulosque formantibus; cystocarpiis nondum visis.

Fronds diminutive, partially creeping and partially erect, 6-10 mm. high, main axes 55-65 μ diam.; forking of the main axes relatively sparse, always a ramulus opposite to such lateral branches; cells below 3-4 times as long as broad, shorter in the upper erect part; branching distichous; paired, or geminate ramuli branched alternately and distichously, 3-5 branches; paired ramuli 12-15 cells long, the basal cell being shorter than the other cells, those in the median part being about 15 × 45 μ; branching of the paired ramuli beginning on the third cell from the base, each successive cell above giving rise at the upper end to the 3-5 successive alternate, ultimate, sterile ramuli; tetrasporangia 1-2 at the base, on the upper side of the paired ramuli and on the first and second cells, usually the latter, the one from the basal cell being abortive; gland cells relatively large, scattered among the ramuli, sparse; antheridia in small branched clusters on the geminate and the ultimate ramuli; cystocarps not observed.

Epiphytic on other algae, dredged from 20 fathoms depth.

Type: No. 236524, Herb. Calif. Acad. Sci., collected by J. T. Howell (613) Aug. 4, 1932, at **San Jose del Cabo, Lower California.**

The species seems to be closely related to *Antithamnion antillanum* Boergesen but differs much in details of branching.

Antithamnion sp.

A few sterile specimens of a species of *Antithamnion* seemingly very closely related to *A. sublittorale* described above were noted among the specimens of that species. They are constructed very much the same, but the ultimate and the geminate ramuli do not taper, and the cells are shorter and cylindrical.

Neomonospora Setchell and Gardner, nom. nov.

Monospora Solier, in Castagne, Cat. Pl. Mars., p. 242, 1845; non *Monospora* Hochstetter, Flora, 2: 660, 1841.

Neomonospora multiramosa Setchell and Gardner, sp. nov.

Plate 4, figures 10a-10c

Frondibus flaccidissimis, caespitosis, 6-10 cm. altis, basi 250-300 μ diam., usque ad apices leviter et gradatim attenuatis, parietibus cellularum vetustiorum et prope basim incrassatis lamellosisque; cellula apicali obtuse acuta, 20-30 μ diam.; ramificatione valde profusa, vulgo alterna sed simulate dichotoma, ramis 1-3-cellulis post cellulam apicalem orientis, primum prope apicem cellulae suppositae sed mox ad apicem progressis et magnitudinem axis primarii aequantibus; protoplastis subtiliter granulosis; chromatophoris numerosis parvissimisque; tetrasporangiis subsphericis, singulis in pedicellis curtis 1-3-cellulosis suffultis, positionem ramorum in apicibus cellularum occupantibus, 50-65 μ diam., cruciatis; cystocarpiis antheridiisque nondum visis.

Fronds very flaccid, caespitose, 6-10 cm. high, 250-300 μ diam. at the base, tapering gradually to the apices, cell wall in the older cells near the base thick and lamellose; apical cell bluntly acute, 20-30 μ diam., branching very profusely, mostly alternate though seemingly dichotomous, the branches arising from one to three cells back of the apical cell and laterally near the top of the cell but soon moving around to the top of the cell and becoming equal in size to the main axis; protoplast finely granular; chromatophores numerous and very small; tetrasporangia subspherical, borne singly on short, 1-3-celled pedicels occupying the position of branches on the upper ends of cells, 50-65 μ diam., cruciately divided; cystocarps and antheridia not observed.

Type: No. 236490, Herb. Calif. Acad. Sci., collected by J. T. Howell (720) Aug. 4, 1932, dredged from 20 fathoms depth at **San Jose del Cabo, Lower California.**

We hesitate to place this species of Rhodophyceae in the genus *Monospora* of Solier. The material is all nonsexual. In addition, the absence of monospores—propagula—a prominent character of *M. pedicellata*, the type species of the genus, renders it still more problematical.

Following strict rules of nomenclature, the generic name *Monospora* for a genus of algae must be suppressed, having been antedated by a genus of flowering plants, proposed by Hochstetter, Flora, 2:660, 1841. Solier's *Monospora* was proposed in 1845, *in* Castagne, Catalogue des plantes, Marseille, page 242. We are here proposing the generic name *Neomonospora* for the entity.

The branches arise not by the splitting of the apical cell, but laterally, at the upper end of the second, third, or even fourth cell back of the apical cell, and soon catch up in length with the branches from which they spring, at the same time its base moving around and assuming a position on top of the mother cell, giving the appearance of a true dichotomy, whereas in reality they are alternate.

Typically the species seems to be dichotomously branched, but occasionally two branches arise simultaneously on opposite sides of the filament, finally giving the appearance of a trichotomy. More frequently than this, a branch seems to arise from the middle of a cell, or if from the top of the cell it is not carried up with the increasing length of the mother cell.

Typically there is a single sporangium at a node, occupying the position of one fork, but occasionally there are two by the side of the main axis, or one between two forks. They have from one- to three-celled pedicels.

Ceramium Howellii Setchell and Gardner, sp. nov.

Plate 6, figure 14

Frondibus 4-7 mm. altis, 180-220 μ diam., rhizoideis affixis, pro parte prostratis, pro parte erectis, ramis sparsis, filamentorum prostratorum secundis, erectorum irregulariter alternis, curtis, et patentibus, in toto corticatis, nodis a superficie visis nullis; cellulis corticantibus angulatis, 4-7 μ diam., inordinatis, unistratosis; cellulis centralibus magnis cylindricisque, approxime isodiametricis; tetrasporangiis omnino immersis, numerosis, irregulariter in ramellis lateralibus, curtis, et paululum tumidis positis; antheridiis partes superiores frondis tegentibus; cystocarpiis nondum visis.

Fronds 4-7 mm. high, 180-220 μ diam., attached by rhizoids, partly prostrate and partly erect, branching relatively sparse, secund on the prostrate filaments, irregularly alternate and short and widespreading on the erect filaments, completely corticated throughout with no indication, on the surface, of nodes; corticating cells angular, 4-7 μ diam., without definite arrangement, one layer only; central filament composed of large cylindrical cells, approximately as long as broad; tetrasporangia completely embedded, numerous and without definite order on short, somewhat swollen lateral branches with irregular cruciate division; antheridia covering the upper part of the frond; cystocarps unknown.

Growing on rocks, southeast side of Narborough Island, June 2, Howell Nos. 283, 379, 668.

Type: No. 236527, Herb. Calif. Acad. Sci., collected by J. T. Howell (379) June 2, 1932, at the southeast side of **Narborough Island, Galapagos.**

This species of *Ceramium* is apparently a close relative of *C. bicorne* S. and G. (New Mar. Alg. 1924, p. 773, pl. 28, fig. 64 and pl. 74) from Isla Partida, Gulf of California. It differs from that species in the character of the apices, in being less branched, and in being completely corticated.

Ceramium fimbriatum Setchell and Gardner

Plate 7, figure 18

Tetrasporangiis verticillatis, sphericis, 55-65 μ diam., protuberantibus, bracteatis, bracteis in parietibus tetrasporangiis indutis.

Tetrasporangia in whorls, spherical, 55-65 μ diam., protruding, bracteate, bracts within the sporangial wall.

Dredged from 20 fathoms depth, San Jose del Cabo, Lower California, Aug. 4, Howell No. 618b.

Setchell and Gardner, New Mar. Alg., Calif., Acad. Sci., 12: 777, 1924.

Among some other small algae dredged at San Jose del Cabo were found a few specimens of the above species reported from Gulf of California, at Eureka, by Setchell and Gardner (loc.cit.) The type material was sterile. The specimens reported here are in excellent tetrasporic fruit and show very plainly that they belong to J. G. Agardh's series *Brachygonia*, in which the tetrasporangia are borne in whorls.

Ceramium zacae Setchell and Gardner, sp. nov.

Plate 8, figures 22a-22c

Frondibus epiphyticis, hostem per rhizoidea curta, penetrantibus, 3-6 mm. altis, 100-130 μ diam., dichotomo-ramosis, ad nodos solummodo corticatis; cingulis corticantibus proxime 5 seriebus cellularum tametsi magnopere angulatarum et irregulariter positarum, infero truncatis, supero cellulis paululum elongatis et irregularibus, non tumidis, marginibus frondium levibus; cellulis filamenti centralis subsphericae, paululum longioribus quam crassis; tetrasporangiis protrudentibus in lateribus frondum et adaxialibus et abaxialibus, ebracteatis; antheridiis cystocarpiisque nondum visis.

Fronds epiphytic, attached to the host by short, branched, penetrating rhizoids, 3-6 mm. high, 100-130 μ diam., dichotomously branched, corticated only at the nodes; corticating bands composed of approximately 5 horizontal rows of cells although quite angular and irregularly placed, truncate on the lower side and cells somewhat elongated and irregular on the upper side of the band, not swollen, making the frond smooth on the margin; cells of the central filament subspherical, being slightly longer than broad; tetrasporangia protruding on both adaxial and abaxial side of the frond, not bracteate, antheridia and cystocarps unknown.

Growing on *Codium fragile*.

Type: No. 236529, Herb. Calif. Acad. Sci., collected by J. T. Howell (757) Aug. 14, 1932, at **San Bartolome Bay, Lower California.**

This species of *Ceramium* clearly belongs to J. Agardh's Series 2, *Dicholinea*, in which the tetrasporangia are arranged in two fairly regular rows, one on each flank (abaxial and adaxial) of the last three to four dichotomies of the frond. Its nearest known relatives seem to be *C. Ledermannii* Pilger and *C. leptosiphon* Pilger, both imperfectly described, diminutive species, epiphytic on other algae.

Ceramium codiophila Setchell and Gardner, sp. nov.

Plate 8, figure 23

Frons epiphytica, floccosa, per filamenta rhizoidalia plus minusve apicibus bulbosa affixa, 4-6 mm. altis, proxime 0.25 mm. diam., vulgo simplex, rare bifurcata et ramulis paucis curtisque, lateralibus vestita, lente basi apiceque attenuata, pilis numerosis longis, angustis unicellularis, dense prorsusque a nodis et e cellulis parvioribus verticillater orientibus vestitis; cellulis corticantibus comparate magnis,

usque ad 38 μ diam., subsphaericis, chromatophoris parietalibus sparsis instructis; cellulis filamenti centralis magnis, sphericis; tetrasporangis verticillatis, internodalibus, immersis sed interdum protrudentibus, 55-65 μ diam.; antheridiis nondum visis.

Fronds epiphytic, tufted, attached by rhizoidal filaments more or less bulbose at the apices, 4-6 mm. high, approximately one-fourth of a millimeter in diameter, mostly simple though occasionally bifurcate, and with a few short lateral ramuli, tapering slightly at the base and the apex, densely corticated throughout, and clothed with numerous long, narrow, unicellular hairs arising in whorls between the nodes and from smaller cells; cortical cells relatively large, up to 38 μ diam., subspherical, with scattered parietal chromatophores; cells of central filament large, spherical; tetrasporangia in whorls between the nodes, embedded within the frond but occasionally slightly bulging outward, 55-65 μ diam.; antheridia not observed; cystocarps near the apices of the principal axes, surrounded by 2-3 relatively large involucral branches.

Attached to *Codium fragile.*

Type: No. 236526, Herb. Calif. Acad. Sci., collected by H. W. Clark (229) Mar. 18, 1932, at **Guadalupe Island.**

Ceramium Templetonii Setchell and Gardner, sp. nov.

Plate 8, figures 25, 26

Frondibus diminutivis, 5-10 mm. altis, 110-130 μ diam., dichotomo-ramosis, apicibus forcipatis, corticatione, zonata, cylindricis, nodis fructiferis exceptis non tumidis; cingulis nodalibus proxime 5 seriebus cellularum, proxime isodiametricarum tametsi infero lente majorum longiorumque quam supero; axibus centralibus cellulis subsphericis usque ad triplo longioribus chromatophoris longis, flexuosis et pro parte ramosis compositis; tetrasporangiis comparate magnis, 55-65 μ diam.; 4-6-verticillatis, bracteatis, bracteis simulate in parietibus sporangiorum; antheridiis cystocarpiisque nondum visis.

Fronds diminutive, 5-10 mm. high, 110-130 μ diam., dichotomously branched, forcipate apices, with zonate cortication, cylindrical, not swollen except at the fruiting nodes; nodal bands composed of approximately five horizontal rows of cells, nearly equally truncate above and below and composed of cells of nearly uniform dimensions although slightly larger and longer below than above the center of the band; central axis composed of cells subspherical to three times as long as broad, with long, crooked, in part branched, narrow chromatophores; tetrasporangia relatively large, 55-65 μ diam., in whorls of 4-6, bracteate, the bracts seemingly within the sporangial wall; antheridia and cystocarps unknown.

Growing on rocks.

Type: No. 236528, Herb. Calif. Acad. Sci., collected by J. T. Howell (276) May 17, 1932, at **Post Office Bay, Charles Island, Galapagos.**

This species of *Ceramium* belongs to J. Agardh's Series 3, *Periclinia,* in which the tetrasporangia develop in whorls at the nodes on the last few dichotomies of the frond.

Hildenbrandtia galapagensis Setchell and Gardner, sp. nov.

Frondibus tenuibus, ad saxa per superficies inferas totas adhaerentibus, rhizoides carentibus, 300-350 μ crassis, speciminibus usque ad 4 cm. plura expansis; filamentis erectis arcte compactis, cellulis 3.5-4 μ diam. et proxime isodiametricis; cavitatibus fructiferis subsphericis, ostiolo angusto; tetrasporangiis 10-14 μ × 22-28 μ, irregulariter divisis.

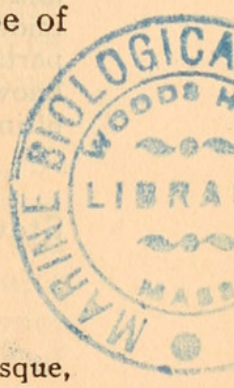
Fronds thin, adhering very firmly to rock by the entire under surface, without rhizoids, 300-350 μ thick, some specimens several centimeters in expanse; erect filaments very closely compacted, with cells 3.5-4μ diam. and approximately as long as broad; fruiting cavities subspherical, with a small aperture; tetrasporangia 10-14 × 22-28 μ, irregularly divided.

Apparently very abundant on rocks in the lower littoral and upper sublittoral belts.

Indefatigable Island, June 8, Howell No. 162a; North Seymour Island, June 11, Howell Nos. 171, 177; Charles Island, Apr. 26, Howell Nos. 242, 273, 537; Cedros Island, Lower California, Aug. 15, Howell No. 703a; Indefatigable Island, June 9, Howell No. 975; southeast side Narborough Island, June 2, Howell No. 984.

Type: No. 236519, Herb. Calif. Acad. Sci., collected by J. T. Howell (537) Apr. 26, 1932, at **Charles Island, Galapagos.**

The combination of characters which distinguishes the species from all other marine species of this genus is the thinness and expanse of the thallus, the small size of the cells, and the globular shape of the tetrasporangial cavities.



Polyopes clarionensis Setchell and Gardner, sp. nov.

Plate 4, figure 9; plate 6, figure 17; plate 23, figure 45

Frondibus erectis, infero cylindricis rigidisque, supero complanatis ligulatisque, 2.5 cm. altis, parte ligulato 1-1.5 mm. lato et 125-150 μ crasso, subdichotome ramoso, medulla ⅓-plo partis complanatae occupante et fibris complexis, 5-7 μ diam. composita; corticibus filamentis anticlinis cellulis 4-6 coloratis compositis; tetrasporangiis numerosis, in nematheciis latera utraque et prope apices segmentorum terminalium occupantibus, 25-30 μ longis, 10-13 μ latis, cruciatis; cystocarpiis antheridiisque nondum visis.

Fronds erect, cylindrical and rigid below, flat and ligulate above, 2.5 cm. high, the ligulate portion 1-1.5 mm. wide and 125-150 μ thick, subdichotomously branched; medulla occupying approximately one-third of the thickness of the flattened portion and composed of compound fibers 5-7 μ diam.; cortex composed of anticlinal filaments with 4-6 color-bearing cells; tetrasporangia numerous, in nemathecia on both sides and near the apices of the terminal segments, 25-30 μ long, 10-13 μ wide, cruciately divided; cystocarps and antheridia not observed.

Type: No. 236505, Herb. Calif. Acad. Sci., collected by J. T. Howell (462a) Mar. 24, 1932, at **Clarion Island.**

A single tetrasporic plant of this diminutive species was detected among specimens of *Gelidium Okamurai*. It is therefore impossible at present to state anything of the variation in size of the plants of this species.

Its nearest known relative is probably *Polyopes sinicola* S. and G., from the Gulf of California. This species is more markedly differentiated into stipe and blade than is *P. sinicola*, and there is a distinct difference in the internal structure of the two species.

Phycodrys elegans Setchell and Gardner, sp. nov.

Plate 24, figure 47

Frondibus tenuissimis flaccidisque, axi centrali percurrente, approxime 12 cm. altis, basi usque ad stipitem gracilem erosis, profuse alterneque ramosis, ramis primariis basi angustatis, prope apices manifeste amplificatis et in lobis numerosis, linearibus, rotundatis, magnitudine variabilibus divisis; costa in axi centrali et ramis primariis conspicuis, in partibus superis evanescentibus; venulis aut nerviis microscopicis, alternis; cystocarpiis antheridiisque nondum visis; tetrasporangiis maxima parte in soris binis distinctis prope apices loborum ultimorum positis.

Frond very thin and flaccid, with central percurrent axis, approximately 12 cm. high, wearing away to a slender stipe at the base, profusely and alternately branched, beginning near the base, the lower primary branches being approximately 6 cm. long, primary branches narrowed at the base, decidedly broadening near the apices and divided into numerous linear, rounded, ultimate lobes very variable in size; midrib conspicuous in the central axis and primary branches, vanishing in the upper parts; veinlets, or nerves microscopic, alternate; cystocarps and antheridia unknown; tetrasporangia for the most part in two distinct sori near the apices of the ultimate lobes.

Type: No. 236493, Herb. Calif. Acad. Sci., collected by Albert Stewart (No. 2327) Feb. 23, 1905, at **Chatham Island, Galapagos.**

Ochtodes Crockeri Setchell and Gardner, sp. nov.

Plate 25, figure 48

Frondibus cartilagineis, purpureo-rubris, comparate robustis, vulgo pluribus e disco confluento oriendis, praecipue supero, abundanter ramosis; ramificatione irregulari, subdichotoma usque ad irregulariter alterna aut pro parte subsecunda; ramulis curtis acutis, neque longis neque leviter attenuatis; medulla axium primarium et ramorum majorum cellulis crassi-parietalibus, subparenchymaticis, subsphericis composita; corticibus seriebus anticlinis in partibus senioribus cellularum 3-4, in ramuli plurium compositis; cystocarpiis valde prominentibus, simplicibus aut in nematheciis inconspicuis pluribus plus minusve confluentibus immersis; tetrasporangiis zonatis, 5.5-6.6 × 28-32 μ in seriebus anticlinis corticis ramulorum suppositis; antheridiis nondum visis.

Fronds cartilaginous, relatively robust, generally several arising from a confluent disk, 7-18 cm. high, profusely branched, especially so in the upper parts; branching irregular, subdichotomous to irregularly alternate, or in part subsecund; ramuli short, acute, but not long and gradually tapering; medulla in the main axes and

principal branches composed of thick-walled, subparenchymatous, subspherical cells; cortex composed of anticlinal rows of 3-4 cells in the older parts, more in the ramuli; cystocarps very prominent, simple or several, more or less confluent; tetrasporangia in inconspicuous nemathecia on ramuli, terminal on anticlinal filaments of the cortex, 5.5-6.5 × 28-32 μ, zonate; antheridia unknown; color purplish-red.

Growing on rocks. Five miles northeast of Webb Cove, Albemarle Island, May 22, Howell Nos. 395, 403, 424, 967; northeast side of Narborough Island, May 31, Howell Nos. 139, 876; June 2, Howell No. 829; southeast side of Narborough Island, June 1, Howell No. 147a.

Type: No. 236495, Herb. Calif. Acad. Sci., collected by J. T. Howell (139) May 31, 1932, at **northeast side of Narborough Island, Galapagos.**

Two species of this interesting genus have previously been described, viz., *O. secundiramea* (Mont.) Howe, from Martinique, and *O. capensis* J. Ag. from the Cape of Good Hope. The first species was doubtfully referred to the genus *Hypnea* by Montagne and has been variously referred by different authors since. The species here described differs from both of these species in being very much more robust, some of the specimens measuring eighteen centimeters high and the chief axes about two millimeters in diameter, in not tapering so gradually in the upper parts, the attenuation being principally at the apices of the ultimate ramelli, and in being much more profusely branched. The cells of both the cortex and medulla seem to be larger in general than those of the other two species mentioned above, those of the medulla becoming over 100 μ in diameter.

A conspicuous character of the genus, well represented in *O. Crockeri*, is the prominent seriate cystocarps, often several coalescing. The presence of tetraspores has apparently hitherto been unobserved and they are here reported for the first time. They occur in quite numerous but inconspicuous nemathecia on the ramuli of the upper parts of the fronds. The sporangia are formed by the elongation of terminal cells of the anticlinal rows of cells, or anticlinal filaments. Practically all of the terminal cells of a nemathecial area are thus transformed. They are narrow and zonately divided.

PLATE 3

Figs. 1a, 1b, 1c. *Xenococcus endophyticus* Setchell and Gardner, sp. nov. Showing various stages in development in the walls of the host, *Rhizoclonium*. × 400.

Fig. 2a. *Polycystis clarionensis* Setchell and Gardner, sp. nov. Showing various shapes and sizes of colonies, diagrammatic and much enlarged.

Fig. 2b. *Polycystis clarionensis* Setchell and Gardner, sp. nov. A single small colony. × 300.

Fig. 3. *Dermocarpa simulans* Setchell and Gardner, sp. nov. Several typical plants, some vegetative and some with gonidia. × 300.

Fig. 4a. *Lyngbya prostrata* Setchell and Gardner, sp. nov. Diagrammatic.

Fig. 4b. *Lyngbya prostrata* Setchell and Gardner, sp. nov. Typical trichomes. × 1000.

Fig. 5. *Microcoleus Howellii* Setchell and Gardner, sp. nov. Terminal portion of three trichomes. × 450.

Fig. 6a. *Xenococcus angulatus* Setchell and Gardner, sp. nov. Several groups as seen in surface view on the host. × 500.

Fig. 6b. *Xenococcus angulatus* Setchell and Gardner, sp. nov. Groups as seen in sectional view of the host. × 500. The host is *Callymenia angustata* Setchell and Gardner, sp. nov.

PLATE 4

Fig. 7. *Lyngbya sinuosa* Setchell and Gardner, sp. nov. Part of a single normal filament. × 500.

Fig. 8. *Mastigocoleus corallinae* Setchell and Gardner, sp. nov. A group of normal trichomes. × 700.

Fig. 9. *Polyopes clarionensis* Setchell and Gardner, sp. nov. A fragment of a longitudinal section of a tetrasporic plant. × 350.

Fig. 10a. *Neomonospora multiramosa* Setchell and Gardner, sp. nov. Terminal parts of filaments showing various stages in the development of branches. × 50.

Fig. 10b. *Neomonospora multiramosa* Setchell and Gardner, sp. nov. A fragment taken from near the base of a filament showing thick, laminated walls. × 50.

Fig. 10c. *Neomonospora multiramosa* Setchell and Gardner, sp. nov. Three filaments showing variation in position and length of pedicels of tetrasporangia. × 50.

PLATE 5

Fig. 11. *Rhizoclonium robustum* Setchell and Gardner, sp. nov. Showing simple, branched, and septate rhizoids. × 25.

Fig. 12a. *Sarcodiotheca linearis* Setchell and Gardner, sp. nov. Section of antheridial plant. × 200.

Fig. 12b. *Sarcodiotheca linearis* Setchell and Gardner, sp. nov. Longitudinal section of sterile plant. × 200.

Fig. 13. *Lyngbya adherens* Setchell and Gardner, sp. nov. A few filaments attached to the host. × 500.

PLATE 6

Fig. 14. *Ceramium Howellii* Setchell and Gardner, sp. nov. Fragment showing surface cells and a tetrasporangial branch. × 150.

Fig. 15. *Antithamnion sublittorale* Setchell and Gardner, sp. nov. A piece of a tetrasporic frond showing the position of tetrasporangia and gland cells and the method of branching. × 100.

Fig. 16. *Gelidium* (*Pterocladia*) *Okamurai* Setchell and Gardner, sp. nov. Cross section of frond showing the position of rhizoids. × 200.

Fig. 17. *Polyopes clarionensis* Setchell and Gardner, sp. nov. Cross section of a frond. × 350.

PLATE 7

Fig. 18. *Ceramium fimbriatum* Setchell and Gardner. A fragment of a tetrasporangial plant. × 150.

Fig. 19. *Laurencia clarionensis* Setchell and Gardner, sp. nov. Apical portion of a ramulus showing a single lateral cystocarp. × 320.

Fig. 20. *Laurencia clarionensis* Setchell and Gardner, sp. nov. A portion of a prostrate filament with erect branches with tetraspores. × 40.

Fig. 21. *Laurencia clarionensis* Setchell and Gardner, sp. nov. The same as fig. 20 but not fruiting. × 40.

PLATE 8

Fig. 22a, 22b. *Ceramium zacae* Setchell and Gardner, sp. nov. Apical portions of tetrasporic fronds. × 150.

Fig. 22c. *Ceramium zacae* Setchell and Gardner, sp. nov. Portion of lower part of frond showing corticating bands. × 150.

Fig. 23. *Ceramium codiophila* Setchell and Gardner, sp. nov. Apical portion of a frond. × 100.

Fig. 24. *Ceramium codiophila* Setchell and Gardner, sp. nov. Portion of a tetrasporic frond. × 100.

Fig. 25. *Ceramium Templetonii* Setchell and Gardner, sp. nov. Apical portion of a tetrasporic frond. × 150.

Fig. 26. *Ceramium Templetonii* Setchell and Gardner, sp. nov. Segment from the lower part of the frond showing corticating bands and chromatophores in central cells. × 150.

PLATE 9

Fig. 27. *Spatoglossum Howellii* Setchell and Gardner, sp. nov. Photograph of dried plants, the type.

PLATE 10

Fig. 28. *Weeksia Templetonii* Setchell and Gardner, sp. nov. Photograph of a battered specimen, the type. × 1.

PLATE 11

Fig. 29. *Weeksia Howellii* Setchell and Gardner, sp. nov. Photograph of the type specimen of a dried cystocarpic plant.

Fig. 30. *Weeksia Howellii* Setchell and Gardner, sp. nov. Photograph of the type specimen of a dried tetrasporic plant.

PLATE 12

Fig. 31. *Gymnogongrus martinensis* Setchell and Gardner, sp. nov. Photograph of a group of normal plants. × 1.

Fig. 32. *Callymenia angustata* Setchell and Gardner, sp. nov. Photograph of the type specimen of a cystocarpic plant. × 1.

Plate 13

Fig. 33. *Sarcodiotheca meridionalis* Setchell and Gardner, sp. nov. Photograph of the type specimens.

Plate 14

Fig. 34. *Sarcodiotheca cuneata* Setchell and Gardner, sp. nov. Photograph of the type specimen of a cystocarpic plant. × 1.

Plate 15

Fig. 35. *Sarcodiotheca linearis* Setchell and Gardner, sp. nov. Photograph of a series of typical plants. × 1.

Plate 16

Fig. 36. *Laurencia densissima* Setchell and Gardner, sp. nov. Photograph of the type specimen of a tetrasporic plant. × 1.

Plate 17

Fig. 37. *Laurencia densissima* Setchell and Gardner, sp. nov. Photograph of a branch of the type specimen of a tetrasporic plant. × 4.

Fig. 38. *Gelidium* (*Pterocladia*) *Okamurai* Setchell and Gardner, sp. nov. Photograph of the type specimen. × 1.

Plate 18

Fig. 39. *Laurencia mediocra* Setchell and Gardner, sp. nov. Photograph of the type specimen. × 1.

Plate 19

Fig. 40. *Laurencia turbinata* Setchell and Gardner, sp. nov. Photograph of the type specimen of a tetrasporic plant.

PLATE 20

Fig. 41. *Chondria pacifica* Setchell and Gardner, sp. nov. Photograph of a group of dried plants. × 1.

PLATE 21

Fig. 42. *Dasya subsecunda* Suhr. Photograph of the type specimen.

Fig. 43. *Dasya subsecunda* Suhr. Photograph of a branch of the type specimen. × 10.

PLATE 22

Fig. 44. *Heterosiphonia erecta* Gardner. Photograph of a much branched erect frond.

PLATE 23

Fig. 45. *Polyopes clarionensis* Setchell and Gardner, sp. nov. Photograph of the type specimen. × 2.

Fig. 46. *Heterosiphonia erecta* Gardner. Photograph of a group of typical tetrasporic plants. × 1.

PLATE 24

Fig. 47. *Phycodrys elegans* Setchell and Gardner, sp. nov. Photograph of the type specimen. × 1.

PLATE 25

Fig. 48. *Ochtodes Crockeri* Setchell and Gardner, sp. nov. Photograph of the type specimen. × 1.