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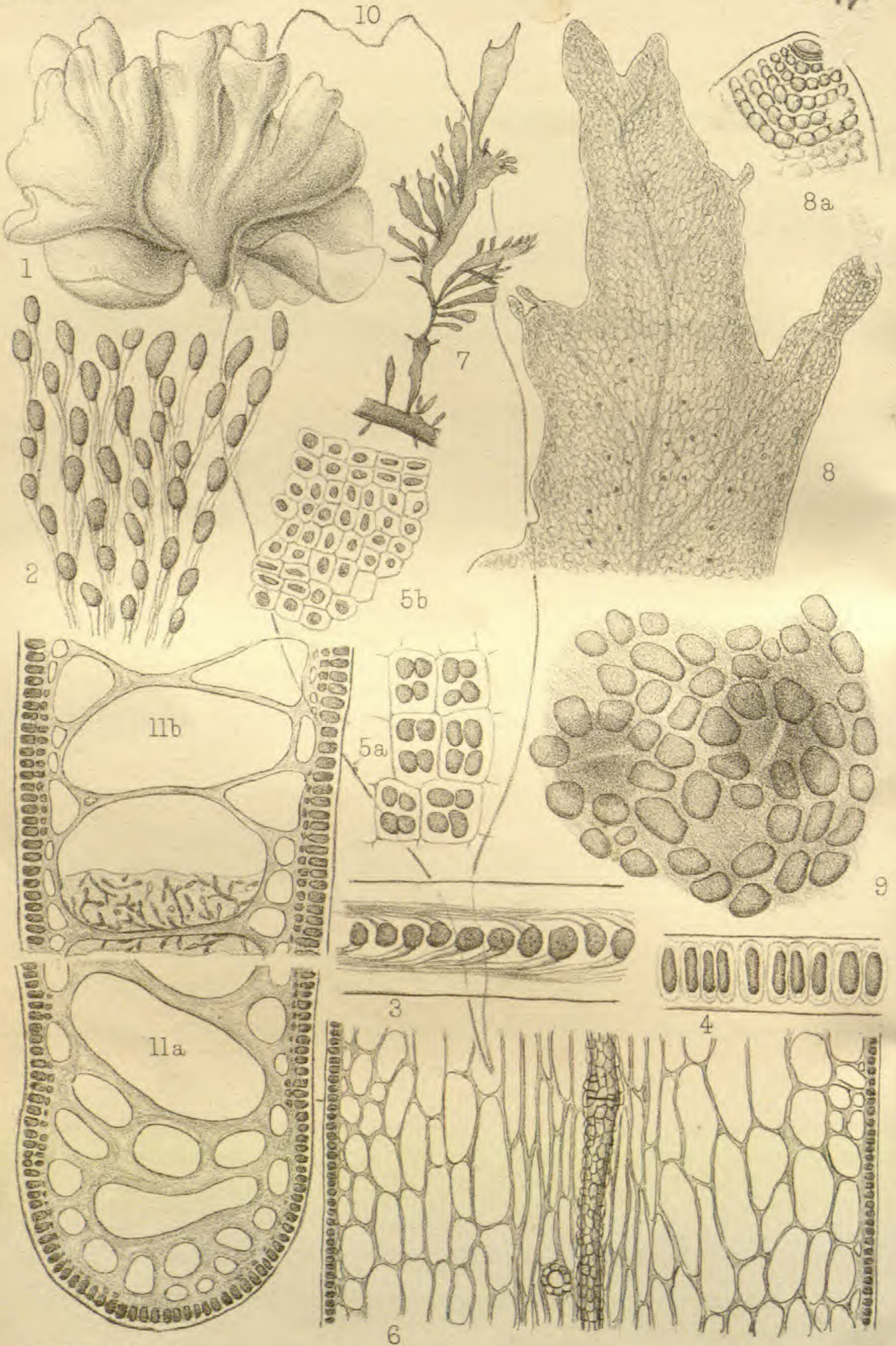
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Antarctic Algae.

ANTARCTIC ALGÆ.

BY A. AND E. S. GEPP.

(PLATE 470.)

THE following is a list of the marine algæ brought from the South Orkneys by the Scottish Antarctic Expedition, and communicated to us by Mr. R. N. Rudmose Brown. The South Orkneys lie about 45° W. long. and 61° S. lat.; they are therefore situated outside the antarctic circle, and far to the south-east of Cape Horn. No algæ have hitherto been recorded from these islands, so far as we are aware, the nearest being from South Georgia, and described by P. F. Reinsch in Neumayer's *Internationale Polarforschung*, 1882-3: *Die Deutschen Expeditionen*, Band ii. (1890), pp. 366-449.

There are but twelve species in the present list; four of them, however, are new to science, one representing a new genus. One of the species has been recorded hitherto only from South Georgia, and most of the others are known from the Falklands and Cape Horn. Of the four novelties, two were brought back by the British Antarctic Expedition also.

CHLOROPHYCÆ.

1. *Monostroma endiviæfolium*, n. sp. Thallus sessilis, subnigrescenti-viridis, membranaceus, callo vix ullo, mox expansus, maxime et dense crispato-undulatus, haud laceratus, parvus, 2-4 cm. altus et latus, $60-67 \mu$ crassus; cellulis geminis vel quaternis, in sectione thalli transversali verticaliter rectangularibus, angulis rotundatis; cellulis basalibus longissime caudatis.

Hab. Shore pools and exposed at low tide, No. 10, Feb. 4, 1903, Saddle Island, South Orkneys.

The nearest allies of *M. endiviæfolium* are *M. Blyttii* Wittr. and *M. splendens* Wittr. From *M. Blyttii* it differs in having an excessively crisped, not lacerate, frond, and in being smaller. Also the cells of *M. endiviæfolium* seen in surface view are more widely separated than those of *M. Blyttii*. From *M. splendens* it differs in colour, in not being coriaceous, in its smaller size, thicker thallus, and longer narrower cells as seen in section.

Reinsch, in his list of South Georgian Algæ (p. 420), quoted above, describes a new variety *macrogyne* of *Ulva Lactuca*. This plant is, he says, composed of a single layer of cells, those at the base being very longly caudate. The former of these characters would place Reinsch's plant in *Monostroma* rather than in *Ulva*. The habit of var. *macrogyne* is, however, quite different from that of *M. endiviæfolium*. It is broad, large and flat like *Ulva Lactuca*, and the size of the cells is much smaller than that of our plant. If we regard var. *macrogyne* as a *Monostroma*, these two plants are the only antarctic species of the genus known to us.

PHÆOPHYCÆ.

2. *Lessonia grandifolia*, n. sp. Callus radicalis dense et irregulariter ramosus, coriaceus. Stipes valde compressus, marginibus

obtusis, bis vel ter vel quater dichotomus, subter quamque dichotomiam expansus; rami plano-convexi ancipites marginibus acutis, laxè torti. Stipes totus e callo usque ad laminas 30-120 cm. Laminæ lanceolato-lineares, longissimæ (1-8 metr.), latæ (8-45 cm.), marginibus grosse undulatis integerrimis, apice deleto, fissiles, in sicco coriaceæ sed fragiles. Stipitis substantia lacunis annulisque carens. Sporangia ignota.

Hab. Scotia Bay, South Orkneys, near surface, April, 1904. Also from Cape Adare and Coulman Island, Brit. Antarct. Exped.

L. grandifolia is not one of the dendroid species of *Lessonia*, but is remarkable for its huge laminæ. In habit and structure it is most nearly allied to *L. laminarioides*, but differs from it in being far larger, in having a flat, twisted stipe, and laminæ resembling large fronds of *Laminaria saccharina*. The structure of the lamina is, like that of *Lessonia laminarioides*, composed of three strata—a cortex of small brown cells, a subcortex of larger cells, and a medulla composed of hyphæ mostly running longitudinally. But in *L. grandifolia* the medulla contains a number of scattered "trumpet-hyphæ," resembling those described by Grabendörfer (Bot. Zeit. 43 (1885), p. 645, tab. vi. fig. 11) for *L. ovata*, but, unlike those, enclosed in a sheath of very small cells. In a transverse section of the stipe the medulla is evident to the naked eye as a narrow darker band from end to end of the section. This difference of colour is indistinguishable under the microscope.

3. ADENOCYSTIS LESSONII Hook. & Harv. South Orkneys, Bay M, Nov. 1903.

Geogr. Distr. Cape Horn, Falklands, Auckland and Campbell Islands, Cockburn Island, Kerguelen, Tasmania, and New Zealand.

4. DESMARESTIA ROSSII Hook. & Harv. South Orkneys, Bay A, 1-3 fathoms, March 1, 1903.

Geogr. Distr. Cape Horn, Falklands.

It is surprising that the 'Scotia' collections contain no example of the plant called *D. media* in the *Flora Antarctica*, part ii. (1847), p. 466. It is a common species in the south polar region, and well represented in the 'Discovery' collections; but it is not—as Harvey supposed—identical with the northern *D. media* Grev. (*Sporochnus medius* C. Ag.). We have been compelled to rename the southern species *D. HARVEYANA*. Our reasons for this will be given in the report on the British Antarctic Expedition.

FLORIDÆ.

5. ACANTHOCOCCUS SPINULIGER Hook. & Harv. South Orkneys, Bay A, 9-10 fathoms, May, 1903. Scotia Bay, Dec. 1903.

Geogr. Distr. Cape Horn, Falklands, Punta Arenas.

6. EPYMENIA sp. South Orkneys, Bay A, 9-10 fathoms, May, 1903.

Two specimens without fruit. They resemble *E. obtusa* in general habit and structure, but they lack the midrib in the base of the flabellate branches. The length of the midrib seems, however, to be a variable character in *E. obtusa*.

7. *PLOCAMIUM HOOKERI* Harv. South Orkneys, Bay A, 9-10 fathoms, Aug. 29, 1903; April, 1903; May, 1903.

The last specimen is so covered with diatoms as to be unrecognizable until it is cleaned.

Geogr. Distr. Kerguelen, Heard Island, South Georgia.

8. *P. COCCINEUM* Lyngb. South Orkneys, Scotia Bay, Dec. 1903. Bay A, 9-10 fathoms, May, 1903.

Geogr. Distr. Cosmopolitan.

9. *Pteridium proliferum*, n. sp. Frons fruticulosa, circa 12 cm. alta, alterne dichotoma (sed ramificatio ob proliferationes copiosas obscura); rami complanati, costati, alati, costa inferne conspicua, superne attenuata, omnino sine venis lateralibus; rami ramulique laciniati, a marginibus costaque prolificantes, alterne et irregulariter dichotomi. Ramuli ultimi membranacei, ligulati vel cuneato-ligulati, usque ad apices obsolete et simpliciter costati, irregulariter lacerati vel grosse dentati, prolificantes. Cellulæ paginales homœocystideæ omnes rotundato-angulatæ. Tetrasporangia sine ordine utroque latere costæ phyllorum parvorum disposita, soros nec in unum confluentes, nec ad apicem attinentes formantia.

Hab. South Orkneys, Bay A, 9-10 fathoms, May, 1903.

We should have preferred to style our plant simply *Delesseria proliferata*, using *Delesseria* in the old wide sense. But that genus, as emended by J. G. Agardh, is now so limited in its scope that we are compelled to refer the plant to *Pteridium*, although we regard it and certain other genera latterly split off *Delesseria* as too nearly allied to be worthy of generic rank. In our species the mode of branching is very much masked by the abundant proliferations. It is in habit most like *P. alata* and *P. pleurosporum*, but differs from the former in being much more irregularly branched, and in having no lateral veins. From *P. pleurosporum* it differs in being very prolific, and in the sori not being confluent over the costa. The sori, in fact, resemble those of *Hypoglossum denticulatum* as figured in Kützing's Tab. Phyc. xvi. tab. 15, 1 (= *Pteridium spinulosum* J. Ag.). De Toni divides the genus *Pteridium* into three sections, the first of which contains species with a "frons teretiuscula," which our plant has not; the second section has an obsolete costa; and the third shows a difference in the form and disposition of the cortical cells, which cover the costa and the frond, when seen in surface view, besides having lateral veins. Our plant therefore falls into none of these sections. It may be thought that *P. proliferum* approaches more nearly to *Hypoglossum*; but from that genus it differs in being branched, as well as prolific. From *Erythroglossum* it differs in having proliferations emerging from the costa, and in the similarity in form and size of the cortical cells of costa and frond. It differs from Reinsch's *Delesseria condensata* in having a much less strongly marked costa, and in being prolific.

10. *PTERONIA PECTINATA* Schmitz (= *Polysiphonia pectinata* Hook. & Harv.). South Orkneys, Scotia Bay, Dec. 1903.

Geogr. Distr. Cape Horn, Falklands, South Georgia.

Reinsch (*l. c.* p. 374), in his note on this plant, says he believes

it had never been figured. But he had overlooked the coloured figure in Harvey's *Nereis Australis*, tab. xxvii., which represents part of the thallus of a specimen from the Falklands collected by Mrs. Sullivan, preserved in the Royal Herbarium, Kew, where there is an original drawing showing the structure, habit, and cystocarp.

11. *PTILOTA CONFLUENS* Reinsch. South Orkneys, Scotia Bay, Oct. 1903. Three incomplete plants, without fruit.

Geogr. Distr. South Georgia.

This species is described and figured by Reinsch (*l. c.* p. 376, tab. iii. figs. 5-9). His figure of a portion of the frond, being reduced to one-third its natural size, is not very helpful in determination. The figures of the structure, combined with the clear diagnosis and remarks, are, however, enough to enable us to recognize our plant as *P. confluens*. Reinsch remarks that the axillary cell in his specimen has almost disappeared. In our plant it is still quite clear.

Leptosarca, n. gen.

Frons plana, membranacea, simplex aut ramosa (prolificationes exserens), stratis duobus contexta: cellulis interioribus paucis maximis submonostromaticis inanibus leptodermis siccitate collapsis, cellulis corticalibus monostromaticis, endochromate denso roseo-rubro repletis. Fructus et sporangia ignota.

12. *L. simplex*, n. sp. Frons simplex, oblongo-lanceolata, inferne in stipitem angustatam attenuata, margine sparse undulata, 14-22 cm. longa (apice incompleta), 1.5-4.0 cm. lata, 230 μ crassa.

Hab. South Orkneys, shores of Bay C, No. 24B, March 26, 1903.

This genus is founded purely on vegetative characters, which are so strongly marked as to separate it from all existing genera. The distinctive feature is its structure, and this points to an affinity with *Tyleiophora* and *Gracilaria*, but from these *Leptosarca* is at once distinguished by its extreme thinness and its monostromatic cortex. The walls of the great interior cells are very thin, except at the margin of the thallus. In order to see these interior cells it is indispensable to examine fresh or pickled material, since in dried specimens the whole of this inner stratum is found to be entirely crushed and unrecognizable. We failed in all our efforts to make this compressed tissue open out sufficiently even to show whether it was composed of cells or filaments. In dried specimens the genus may be recognized by the unusually large coloured angular cells which compose the cortex, and are arranged almost always in a single layer.

Another species, *L. dumontioides* (= *Halosaccion dumontioides* Harv.), brought back in the 'Discovery,' will be described in the Report on the British Antarctic Expedition.

In certain parts of the frond of *L. simplex* we find small filaments creeping round the cell-walls. Reinsch (*l. c.* p. 413, tab. xv. figs. 11-13) records two species of *Entonema* from South Georgia, endophytic in other algæ; but our plant does not agree with these, nor indeed with any other species of the genus. We have only the vegetative

filaments of our endophyte, and we hesitate, therefore, to give any definite opinion on it. Since, however, the algæ from South Orkneys are few and interesting, it is worth while recording it, as it may occur among other antarctic collections.

13. *Phyllophora antarctica*, n. sp. Frons e stipite brevi mox in laminam membranaceam ligulatam sæpius opposito-sinuatam simplicem vel dichotomam expansa, ramis approximatis et ad apicem et secundum margines prolificantibus; cystocarpiis marginalibus pedicellatis; tetrasporangia ignota.

Hab. Coulman Island, off Cape Wadsworth, *British Antarctic Expedition*.

The lamina is about 1 cm. wide, and may attain a length of 15 cm. This species was not found by Mr. Rudmose Brown. It will be treated of more fully among the 'Discovery' algæ.

DESCRIPTION OF PLATE 470.

Monostroma endiviæfolium, n. sp. — Fig. 1. Portion of plant, nat. size. 2. Caudate basal cells, seen in surface view, $\times 150$. 3. Ditto, seen in longitudinal section, $\times 150$. 4. Upper part of thallus, transverse section, $\times 150$. 5. Ditto, surface view. *a*, showing cells in twos and fours shortly after division; and *b*, when they are more evenly distributed, $\times 150$.

Lessonia grandifolia, n. sp. — Fig. 6. Longitudinal section of lamina, showing central strand of hyphæ, with one "trumpet-hypha" in longitudinal, and one in transverse view.

Pteridium proliferum, n. sp. — Fig. 7. Branch showing proliferations from margin and midrib, nat. size. 8. Tetrasporic branchlet with growing points, and showing, not cortex, but interior tissue, $\times 30$. 8*a*. Apex of lobe, surface view, $\times 150$. 9. Tetrasporangia, surface view, showing their subcortical position, $\times 350$.

Leptosarca simplex, n. gen. et sp. — Fig. 10. Plant with eroded apex, nat. size. 11. Transverse section of thallus. *a*, taken from margin, showing thick-walled cells; *b*, taken from middle of frond, where the cells have much thinner walls. In *b* may be seen filaments of *Entonema* creeping over the cell-walls, $\times 150$.

ATLANTIC ALGÆ OF THE 'SCOTIA.'

BY A. AND E. S. GEPP.

THE following algæ were collected by the Scottish Antarctic Expedition in tropical and subtropical waters off the coast of Brazil, at St. Paul Rocks and St. Vincent, Cape de Verde.

1. *Ulva Lactuca* L. St. Vincent, Station 24, Dec. 1, 1902.

Geogr. Distr. Cosmopolitan.

2. *Chatomorpha* sp. A fragment. Between Rio and Bahia, off the coast of Brazil, "Station 81, Dec. 20, 1902. Lat. $18^{\circ} 24'$ S. Long. $37^{\circ} 58'$ W."

3. *Microdictyon umbilicatum* Zan. Off Brazil, same locality as No. 2.

Geogr. Distr. Mediterranean, Warm Atlantic, Warm Pacific, Indian Ocean, Red Sea.