

## II.—BOTANY.

### ART. XIV.—*Revised List of New Zealand Seaweeds.*—

#### Part I.

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[Read before the Philosophical Institute of Canterbury, 4th October, 1899.]

Plates V.—VII.

THE following list is based chiefly upon the work of Professor J. G. Agardh, and to a large extent follows the order of his "De Algis Novæ-Zealandiæ marinis." No general account of the New Zealand seaweeds has been published since 1864, when Hooker's "Handbook of the New Zealand Flora" was issued. Agardh's annotated list, referred to above, appeared in the Lund Univ. Årskrift, tom. xiv., 1877. It is to be hoped that the following paper will give New Zealand students a clue to the work that has been done since that date, and will also lay the foundations for a knowledge of the distribution of our species within New Zealand. No attempt is made in it to deal with external distribution, or to give an extended synonymy of the species. It will, however, be found that the list increases the proportion of endemic species, largely because earlier algologists somewhat hastily identified similar forms with European species, as, for example, in the genera *Porphyra* and *Ulva*.

They also too frequently considered such names as "New Zealand," "Australia," "East Coast" as sufficiently descriptive of the habitat. This led to the inclusion, particularly in Hooker's Handbook, of a number of Australian species in our list, and still leads to doubts as to the acceptance of other species not recently collected. In this revision, therefore, I have not included any species of Harvey which have not been accepted by Agardh or collected subsequently to the publication of the "Flora Novæ-Zealandiæ." On this ground also species endemic to the Auckland or Campbell Islands have been excluded, as no recent collections have been made in these groups. My own collections have been made almost entirely on the eastern and southern coasts of both Islands, and include stations intermediate between Mongonui in the

north and Paterson's Inlet (Stewart Island) in the south. For the benefit of future collectors I may mention the following localities as good collecting-grounds: Half-moon Bay (Stewart Island). *South Island*—The Bluff, the Nuggets, Akatore (near Tokomairiro), very good; Brighton, Lower Green Island Beach, St. Clair, good; Moeraki, Akaroa, fair; Taylor's Mistake, fair; Double Corner (Amberley), Kaikoura, very good. *North Island*—Wellington Heads (Lyall's Bay, Island Bay, &c., probably the best collecting-ground in the colony for all forms of shore-life), Castlepoint, Rangitoto Channel, Bay of Islands, very good; Mongonui, fair. There are, no doubt, many other good localities, particularly in the North Island; but a collector visiting any of the above is sure to be well rewarded for his pains.

I have to thank Mr. Crosby Smith, who has collected very carefully in the neighbourhood of Dunedin, for a number of localities for various species, and also for other kind assistance in the preparation of this paper.

#### REVISED LIST OF NEW ZEALAND SEAWEEDS.

##### Sub-class CYANOPLYCEÆ.

##### Order **Nostocaceæ.**

1. *Tolypothrix irregularis*. Fl. Nov.-Zel., p. 265.  
On tidal mud, amongst patches of *Vaucheria*: *Colenso*.
2. *Calothrix scopulorum*. Fl. Nov.-Zel., p. 265.  
Seashores, on rocks and mud; common: *Colenso*.
3. *Lyngbya*, sp., J. Ag., De Alg. N.Z. Mar., p. 1.  
On corallines and other *Algæ*, at Auckland and Bay of Islands: *Berggren*.
4. *Rivularia australis*, Harv. (Harvey Gibson, Journal of Botany, June, 1893).

##### Sub-class CHLOROPHYCEÆ.

##### Order **Caulerpacææ.**

5. *Caulerpa articulata*. Fl. Nov.-Zel., p. 261.  
East Coast: *Colenso*.
6. *Caulerpa latevirens*, var., J. Ag. ("Till Algernes Systematik," J. Ag., p. 34) (*Caulerpa sedoides*: Fl. Nov.-Zel., p. 261).  
Lyall's Bay: *Lyall*; *Berggren*; *R. M. L.* Moeraki: *R. M. L.*

This species has only been imperfectly described, and requires further examination. It is very abundant in the deep tidal pools in the neighbourhood of Island and Lyall's Bays, Wellington.

7. *Caulerpa brownii*. J. Ag. (*C. brownii* and *C. furcifolia*: Fl. Nov.-Zel., p. 260).  
 Lyall's Bay: *Lyall*. Bluff, Warrington, Banks Peninsula,  
 Lyall's Bay: *Berggren*. St. Clair, Kaikoura, Lyall's Bay:  
*R. M. L.* Green Island Beach: *J. C. S.* Chatham Islands:  
*Travers*; *Dr. Schavinsland*.
8. *Caulerpa hypnoides*. Fl. Nov.-Zel., p. 260.  
 East Coast: *Colenso*. Bay of Islands: *Berggren*.

Order **Codiaceæ**.

9. *Bryopsis vestita*, J. Ag., De Alg. N.Z. mar., p. 3 (*B. plumosa*: Fl. Nov.-Zel., p. 261?).  
 Bluff, Warrington: *Berggren*. Lyttelton, Wellington:  
*R. M. L.* St. Clair, Green Island Beach: *J. C. S.*
10. *Codium adhaerens*. Fl. Nov.-Zel., p. 261.  
 Everywhere abundant.
11. *Codium tomentosum*. Fl. Nov.-Zel., p. 261.  
 Everywhere abundant.

Order **Cladophoraceæ**.

Our New Zealand species of *Cladophora* are in need of careful revision. I have several in my collection which I find it impossible to identify, one at least probably new. The species are nearly all difficult of discrimination, and have been but little collected. As it is almost impossible to name them without type specimens, the following list of species is copied from Agardh's De Algis Nov.-Zel. mar. I have, however, inserted, somewhat hesitatingly, two species not previously recorded in any New Zealand list—*C. feredayi* and *C. valonioides*. The identification of the latter is due to Kjellman. Mr. Crosby Smith was the first to call my attention to the former. He obtained a specimen of it at the lower Green Island Beach. Since then I have collected it myself at various more southern localities. It seems to be identical with the Australian species (Harvey, Phyc. Aust., vol. i., pl. 47). I sent a named specimen of it to Professor Agardh, who noted it "*C. feredayi, forsitan ita.*"

12. *Cladophora crinalis*. Fl. Nov.-Zel., p. 263.  
 New Zealand: *Colenso*. Half-moon Bay: *R. M. L.*
13. *Cladophora gracilis*. Fl. Nov.-Zel., p. 263.  
 Port William: *Lyall*.
14. *Cladophora daviesii*. Fl. Nov.-Zel., p. 263.  
 Tauranga: *Colenso*; *Berggren*.

15. *Cladophora colensoi*. Fl. Nov.-Zel., p. 262.  
Hawke's Bay: *Colenso*.  
I have a specimen from the Kaik, Otago Harbour, collected by Mr. Crosby Smith, which apparently belongs to this species.
16. *Cladophora verticillata*. Fl. Nov.-Zel., p. 262.  
Port William: *Lyall*.
17. *Cladophora pellucida*. Fl. Nov.-Zel., p. 262.  
Waitemata Harbour: *Lyall*. The Bluff: *R. M. L.*
18. *Cladophora feredayi* (?). Harv., Phyc. Austr., vol. i.  
Lower Green Island Beach: *Crosby Smith*. The Nuggets, the Bluff: *R. M. L.*  
This may only be a much laxer form of *C. pellucida*, growing in deeper water.
19. *Cladophora lyallii*. Fl. Nov.-Zel., p. 262.  
South Island: *Lyall*. Half-moon Bay: *J. C. S.*; *R. M. L.*
20. *Cladophora herpestica*. Fl. Nov.-Zel., p. 262.  
Bay of Islands: *Hombroon*; *Hooker*.
21. *Cladophora valonioides*, Sond. (Harvey Gibson, Journal of Botany, June, 1893).
22. *Lychæte longarticulata*, J. Ag., De Alg. N.Z. mar., p. 2.  
Banks Peninsula: *Berggren*.
23. *Lychæte linum*. Fl. Dan. and C. Ag. Syst., p. 97 (*Conferva ærea*: Fl. Nov.-Zel., p. 263?).  
Tauranga: *Berggren*. The Bluff, Lyttelton, Wellington: *R. M. L.*
24. *Lychæte darwini*. Fl. Nov.-Zel., p. 263.  
East Coast: *Lyall*; *Colenso*. Bluff, Warrington, Banks Peninsula: *Berggren*. Akatore, St. Clair, Taylor's Mistake, Kaikoura: *R. M. L.* Chatham Islands: *Dr. Schawinsland*.

## Order Ulvaceæ.

25. *Ulva rigida*, Ag. (*Ulva lobata* and *Ulva latissima*, Harv., Fl. Nov.-Zel., p. 265).  
Everywhere common.
26. *Ulva bullosa*(?), Roth., Fl. N.Z., ii., p. 265.  
I have specimens gathered at Happy Valley and Oriental Bay, Wellington, apparently to be referred to the plant designated by Harvey "*Ulva bullosa*(?)." This identification is, however, more than questionable. *Ulva bullosa*, Roth., is now *Monostroma bullosum*, J. Ag. (Till Alg. Syst., part iii., p. 97). On forwarding specimens collected by myself to Agardh, he considered them as probably nearer the doubtful species—*Ulva cornucopiæ*.

27. *Enteromorpha bulbosa* (Suhr in Flora, 1839, p. 72), J. Ag., Till Alg. Syst., iii., p. 139.  
Chatham Islands.
28. *Enteromorpha lingulata*, J. Ag., Till Alg. Syst., iii., p. 143.  
Intermediate between *E. compressa* and *E. clathrata*.  
Probably common.
29. *Enteromorpha compressa*. Fl. Nov.-Zel., ii., p. 264.  
This is said to be a cosmopolitan species, but of this Agardh is doubtful (Till Alg. Syst., iii., p. 137), and does not include New Zealand in the list of localities from which he has authentic specimens. This may be an omission, as he recognises it in his De Alg. N.Z. mar.
30. *Enteromorpha linza*.  
Chatham Island: *Dr. Schauinsland*.
31. *Enteromorpha clathrata*. Fl. Nov.-Zel., ii., p. 265.  
Bluff, Lyall's Bay, Tauranga: *Berggren*. St. Clair: *J. C. S.*  
Oriental Bay, Evans Bay, Lyttelton: *B. M. L.*
32. *Enteromorpha ramulosa* (Engl. Bot., tab. 2137), J. Ag., Till Alg. Syst., iii., p. 154.  
Otago Harbour: *Lyall*.
33. *Enteromorpha acanthophora* (Kuetz., Sp. Alg., p. 479.)  
J. Ag., Till Alg. Syst., iii., p. 157.  
New Zealand: *Berggren*. Chatham Islands: *Dr. Schauinsland*.
34. *Enteromorpha minima*. Kuetz., Sp. Alg., p. 482.  
Chatham Islands: *Dr. Schauinsland*.  
The species belonging to the subdivision *Clathrata* (genus *Enteromorpha*) are still in much confusion, and only careful collection throughout the colony is likely to enable us to group them properly.
35. *Porphyra nobilis*. J. Ag., Till Alg. Syst., iii., p. 62.  
New Zealand: *Berggren*. Common.
36. *Porphyra columbina*: J. Ag., Till Alg. Syst., iii., p. 70.  
(Mont., Prodr. Phyc. Ant., p. 14). Common. *P. laciniata*:  
Harv., Fl. Nov.-Zel., p. 264.
37. *Bangia ciliaris*. Fl. Nov.-Zel., p. 264.  
"On leaves of *Zostera*, Cook Strait: *Lyall*."  
This plant has not been collected recently.
38. *Bangia lanuginosa*. Fl. Nov.-Zel., p. 264.  
On *Chordaria*: *Colenso*. Not collected recently.  
I have a distinct species of *Bangia*, from the bridge on the Purakino River.

## Sub-class PHÆOPHYCEÆ.

Order **Ectocarpaceæ**.

(The New Zealand species are but little known.)

39. *Ectocarpus pusillus*. Fl. Nov.-Zel., p. 222.  
Hawke's Bay: *Colenso*.
40. *Ectocarpus confervoides*. Fl. Nov.-Zel., p. 222.  
Otago and Blind Bay: *Lyall*.
41. *Ectocarpus siliculosus*.  
Bay of Islands: *Hooker*. Port Cooper and Port William:  
*Lyall*. Tauranga: *Davies*. Lyttelton: *R. M. L.* Cape Kidnapper:  
*Colenso*. St. Clair, Puketeraki: *J. C. S.*

Order **Sphacelariaceæ**.

42. *Stypocaulon funiculare* (*Sphacelaria funiculare*). Fl. Nov.-Zel., p. 221.  
Akaroa: *Hombroon* and *Lyall*. Taylor's Mistake: *R. M. L.*  
East Coast: *Colenso*. St. Clair (fairly common): *J. C. S.*
43. *Stypocaulon paniculatum* (*Sphacelaria paniculatum*). Fl. Nov.-Zel., p. 221.  
Everywhere abundant.
44. *Sphacelaria botryoclada*. Fl. Nov.-Zel., p. 221.  
East Coast and Cook Strait: *Lyall*. St. Clair: *J. C. S.*  
Agardh doubtfully identifies some specimens collected at the Bluff as belonging to this species.
45. *Anisocladus congestus*, Rke. (Harvey Gibson, Journal of Botany, June, 1893).  
French Pass: *Dr. Schawinsland*.

Order **Chordariaceæ**.

46. *Herponema pulvinatum*, J. Ag., Till Alg. Syst., i., 56 (*Sphacelaria pulvinata*: Fl. Nov.-Zel., 221).  
In the receptacles of *Carpophyllum*: *Colenso*. St. Clair: *J. C. S.*
47. *Herponema maculans*, J. Ag., Till Alg. Syst., i., 56 (*Elachista maculæformis*, J. Ag., Alg. Nov.-Zel., p. 4).  
On *Fucodium chondrophyllum*: *Berggren*.
48. *Myriocladia chorda*, J. Ag., Till Alg. Syst., i., p. 18 (*Chordaria sordida*: Fl. Nov.-Zel. (?)).  
Probably common.
49. *Corynophlæa cystophoræ*, J. Ag., Till Alg. Syst., i., p. 22; Harvey Gibson, Journal of Botany, June, 1893.  
The Bluff, Moeraki, Kaikoura, Lyall's Bay, Bay of Islands (probably common): *R. M. L.* French Pass: *Dr. Schawinsland*.

50. *Corynophlœa umbellata*, J. Ag., Till Alg. Syst., i., p. 21; Harvey Gibson, Journal of Botany, June, 1893.
51. *Mesogloia intestinalis*. Fl. Nov.-Zel., p. 220.  
Blind Bay, Auckland, Otago Harbour: *Lyall*.  
I have a plant collected at Dunedin by Mr. J. Crosby Smith which may belong to this species, but the original identification of the genus is more than open to suspicion.
52. *Leathesia difformis*, L. Aresch. Phyc. Scand., p. 376.  
French Pass: *Dr. Schawinsland*.  
This is probably *Leathesia berkleyi* (Fl. Nov.-Zel.; p. 220). The plant is common throughout the Islands. I have observed it at various places between Half-moon Bay, Stewart Island, and Mongonui.
53. *Scytothamnus australis*. Fl. Nov.-Zel., p. 219.  
Everywhere plentiful on tidal rocks. The position of the genus is uncertain.

Order **Enceeliaceæ.**

(Murray, "Introduction to Study of Seaweeds, p. 104.)

54. *Asperococcus sinuosus*. Fl. Nov.-Zel., p. 219.  
Everywhere plentiful near high-water mark.

Order **Laminariaceæ.**

55. *Adenocystis lessoni*. Fl. Nov.-Zel., p. 218; Phycological Memoirs, x. (Brit. Mus.).  
An annual, everywhere abundant between the months of October and May. The best specimens, however, come from the South Island. The finest I have seen were growing on tidal flats, Wyckcliffe Bay, Otago Peninsula.
56. *Ecklonia richardiana*. Fl. Nov.-Zel., p. 218.  
This is apparently the common species of *Ecklonia*, wrongly referred to in Hooker's Handbook as *E. radiata*.  
Lyttelton: *R. M. L.* Hawke's Bay: *Colenso*. Lyall's Bay, Bay of Islands: *Berggren*.
57. *Ecklonia radiata*. Fl. Nov.-Zel., p. 217.  
The occurrence of this plant in New Zealand is somewhat doubtful. I have a juvenile specimen from the Bay of Islands which possibly belongs to this species, and Agardh has specimens from the Chatham Islands which he also doubtfully refers to *E. radiata* (De Alg. N.Z. Mar., p. 6).
58. *Ecklonia exasperata*. Fl. Nov.-Zel., p. 217.  
New Zealand: *D'Urville*; *Cunningham*; *Hooker*. Island Bay, Mongonui: *R. M. L.*
59. *Ecklonia brevipes*, J. Ag., De Alg. N.Z. Mar., p. 5.  
Bay of Islands (very sparingly): *Berggren*.

60. *Ecklonia flabelliformis*. Fl. Nov.-Zel., p. 218.

Wangari Bay: *D'Urville*. Bay of Islands: *Hooker*.

The species of this genus (*Ecklonia*) are still insufficiently defined. Juvenile forms vary so much from older forms that until series at all stages of development have been collected we are not likely to be able to classify them properly.

61. *Lessonia variegata*, J. Ag., De Alg. N.Z. Mar., p. 6; R.M.L., Trans. N.Z. Inst., vol. xxvi., p. 304.

Akatore, the Nuggets, Lyall's Bay, Kaikoura (in rock-pools): *R. M. L.* One specimen, in drift-weed, Tumble-down Bay, Banks Peninsula: *R. M. L.* Whangaruru; *H. B. Kirk!*

This plant is only found in deep rock-pools at more or less isolated spots on the coast-line. It does not occur in the neighbourhood of Lyttelton or Dunedin. It is very plentiful in the neighbourhood of Wellington, where, however, the Makara Stream (Mr. Kirk informs me) is the western boundary of its habitat. The immense tree-like South American *Lessonias* have not yet been authentically recorded from New Zealand.

62. *Macrocystis dubenii* (*M. pyrifer*). Fl. Nov.-Zel., p. 217.

This plant is generally reported as everywhere abundant on the New Zealand coast, but I was unable to find it on the east coast of the North Island, though I looked for it at the following ports: Napier, Gisborne, Auckland, Whangaroa, Bay of Islands, Mongonui. I have not been able to find any specimens of the extraordinary length mentioned by the earlier voyagers. The longest I have actually measured was about 100 ft. in length; but the stems were then so twisted into cables that it was impossible to say whether they belonged to one plant or several.

63. *Chorda lomentaria*. Fl. Nov.-Zel., p. 218.

Everywhere plentiful on tidal flats, and in shallow rock-pools.

#### Order *Sporochneæ*.

64. *Sporochnus stylosus*. Fl. Nov.-Zel., p. 216.

"Otago Harbour and Foveaux Strait: *Lyall*."

This plant has not been collected recently, and its occurrence in New Zealand may be considered somewhat doubtful.

65. *Perithalia capillaris*, J. Ag., Till Alg. Syst., vi., p. 5.  
Barrier Island, Thames: *Colenso*.

66. *Carpomitra cabreræ*. Fl. Nov.-Zel., p. 217.

Lyall's Bay: *Lyall*. Hawke's Bay: *Colenso*. Chatham Islands, Kaikoura, Lyttelton: *R. M. L.*



67. *Carpomitra halyseris*.

Bay of Islands: *Cunningham*; *Sinclair*; *Ljall*; *Hooker*.  
Lyall's Bay: *Berggren*.

Harvey Gibson (*Journal of Botany*, June, 1893) considers this only a variety of the preceding.

Order **Splachnidiaceæ**.

68. *Splachnidium rugosum*. Fl. Nov.-Zel., p. 215; Phyc. Mem. (Brit. Mus.), i., Miss M. O. Mitchell and Miss F. G. Whitting; *Trans. N.Z. Inst.*, vol. xxv., p. 288, R. M. L.

An annual, everywhere abundant except during winter months, on tidal rocks.

Order **Dictyotaceæ**.

69. *Glossophora harveyi*, J. Ag., *Till Alg. Syst.*, ii., p. 111: (*Dictyota kunthii*: Fl. Nov.-Zel., p. 219).

New Zealand and Chatham Islands. Common.

Agardh (*loc. cit.*) retains the specific name *kunthii* for the South American plant, with which the New Zealand one was formerly considered identical.

70. *Dictyota dichotoma*. Fl. Nov.-Zel., p. 219.

Hawke's Bay: *Colenso*. Queen Charlotte Sound: *Ljall*.  
Bay of Islands: *Berggren*.

It is very doubtful whether this plant is identical with the European *D. dichotoma*. It may possibly be *D. radicans*, Harv., but I have not seen any specimen which agrees with *D. radicans* "in rooting by scattered thread-like fibres issuing from the stipes and lamina"; but see J. Ag., *Till Alg. Syst.*, ii., 92. Indeed, I am by no means certain that we have in New Zealand any species of *Dictyota*, as it is quite possible that immature specimens of *Glossophora harveyi* have been confused with *D. dichotoma*. Although Agardh states (*De Alg. N.Z. mar.*, p. 5) that *D. dichotoma* was collected at the Bay of Islands by Berggren, he does not recognise this habitat in his *Till Alg. Syst.* I have in my herbarium an immature specimen of *Glossophora* from the Bay of Islands which I long mistook for a species of *Dictyota*. Previous writers may have done similarly.

71. *Zonaria turneriana*, J. Ag., *Till Alg. Syst.*, i., 48 (*Zonaria interrupta*: Fl. Nov.-Zel. p. 218).

The New Zealand species is distinct from the South African *Z. interrupta*, with which it was formerly confused. (J. Ag.).

Common on tidal rocks about low-water mark.

72. *Zonaria sinclairii*. Fl. Nov.-Zel., p. 218.

This plant was originally described by Harvey from specimens sent from New Zealand, but does not seem to have been collected in New Zealand since. I have one of the specimens distributed by Harvey, and think that it may turn out to be only a form of *Z. turneriana*. A careful collection of specimens of *Zonaria* in the neighbourhood of Wellington would probably settle the point as far as New Zealand is concerned.

73. *Zonaria velutina*. Fl. Nov.-Zel., p. 218.

Common in rock-pools between tidal limits.

I have a very distinct species of *Zonaria* collected by Mr. Crosby Smith at Dunedin. It may be the Victorian *Z. canaliculata*, but it would be dangerous to name it from a single specimen.

#### Order Desmarestiaceæ.

74. *Desmarestia ligulata*. Fl. Nov.-Zel., p. 217.

Akaroa: *Lyll*. Warrington, Banks Peninsula: *Berggren*.  
St. Clair: *Crosby Smith*. Kaikoura: *R. M. L.*

#### Order Fucaceæ.

75. *D'Urvillæa utilis*. Fl. Nov.-Zel., p. 216.

This plant as well as *Macrocystis* has generally been reported to be abundant on the New Zealand coast. I was, however, unable to find it at any of the places on the east coast of the North Island already mentioned under *Macrocystis*. It is generally found on rocks exposed to the full force of the breakers.

76. *Notheia anomala*. Fl. Nov.-Zel., p. 215.

Common; parasitic on *Hormosira*, and very rarely on *Fucodium* (Phyc. Mem., Brit. Mus., part ii., Miss M. O. Mitchell).

Miss E. Barton has finished an exhaustive research upon this plant, which will be published immediately in the "Transactions of the Linnæan Society."

77. *Hormosira banksii*, Harv., Fl. Tasm.

*a. labillardieri*. Fl. Nov.-Zel., p. 215.

Everywhere common between tidal limits.

*β. sieberi*. Fl. Nov.-Zel., p. 215.

In tidal pools near high-water mark.

78 *Fucodium chondrophyllum*, J. Ag. (*Xiphophora chondrophylla*: Fl. Nov.-Zel., p. 215).

Common on tidal rocks in exposed situations.

79. *Fucodium gladiatum* (*Xiphophora billardieri*). Fl. Nov.-Zel., p. 215.

It is very questionable whether this plant has been found in New Zealand. Specimens from New Zealand thus named have, according to Agardh, been generally, perhaps always, varieties of the preceding (De Alg. N.Z. mar., p. 7).

80. *Cystophora platylobium*, J. Ag. (*Cystophora lyalli*: Fl. Nov.-Zel., p. 214).

The Bluff (rock-pools), New Brighton (drift-weed), Kaitioura (drift-weed), Wellington Heads (drift-weed): *R. M. L.* Foveaux Strait: *Lyall*. Bluff, Lyall's Bay, Napier: *Berggren*.

81. *Cystophora distenta*, J. Ag., De Alg. Chatham. in Act. Holm.

Chatham Islands: *Travers*. Bluff: *Berggren*. French Pass: *Dr. Schawinsland*.

82. *Cystophora scalaris*, J. Ag., *ib.*

St. Clair: *Crosby Smith*. Chatham Islands: *Travers*. Bluff, Dunedin, Warrington, Banks Peninsula, Lyall's Bay: *Berggren*.

83. *Cystophora dumosa*, Ag. and Grev.; J. Ag., *l.c.*  
Common.

84. *Cystophora retroflexa*. Fl. Nov.-Zel., p. 214.  
Abundant.

85. *Cystophora torulosa*. Fl. Nov.-Zel., p. 214.  
Common.

86. *Carpophyllum angustifolium*, J. Ag., De Alg. N.Z. mar., pp. 8, 9. Plate V., fig. 1, and Plate VII., *b.*

Bay of Islands (very rare): *Berggren*.

I obtained specimens of this plant apparently from the same tidal pools from which Berggren obtained it. I append a description which will probably be sufficient for systematic purposes (Agardh's specimen did not include rhizoid or bladders): *C. angustifolium*, rhizoid, matted, fibrous, consisting of a mass of anastomosing hapteres, which are expanded at their terminations, and closely appressed to the surface of the rock, forming a disc-like structure; frequently enclosing numerous pebbles, shells, and other extraneous material. From this disc are derived a large number of pendulous flexuous stems, 80–150 cm. in length and 1–2 mm. broad.\* This breadth remains constant throughout the whole length, with only a slight tapering at the tips. In transverse section the stem is oval. At distances of from 3–4 cm. short pinnate branches of

\* These measurements and the general description apply to the dried specimen only.

from 10–15 cm. in length are given off. At the base of the stem they sometimes reach 40 cm. in length. These are similar in general appearance to the main stem, and bear alternate leaves. They are sometimes themselves again slightly pinnately subdivided. On the lower half of the stem the branches are frequently abraded, leaving only alternate tooth-like projections to mark their original positions. The leaves are somewhat variable in dimensions and shape, 10–20 mm. long and 2–5 mm. broad, linear to lanceolate, and frequently falcate, acute to acuminate, entire or sinuous, ecostate, sessile or very shortly stipitate, thicker and more coriaceous than the leaves of *C. phyllanthus* or *C. maschalocarpum*. Bladders spherical, pear-shaped, or elliptical, apiculate or bearing small leaflets on the summit 1–2 cm. in length, few in number, and replacing the leaves. Receptacles minute, borne in fascicles in the axils of the leaves, the main stem of the fascicle being persistent. I append a photograph of a dried specimen. Plate V., fig. 1.

87. *Carpophyllum phyllanthus*, Turn., Hist., iv., tab. 206. Plate V., fig. 2.; Plate VII., *f, g, h*.

This plant is by no means so common as *C. maschalocarpum*, but it is generally to be found in deep tidal pools anywhere along the coast. As there has been much confusion as to the species of this genus, I give photographs of typical specimens of each, which will enable them to be more readily distinguished than by much description; and also drawings of typical leaves.

88. *Carpophyllum maschalocarpum*, Turn., Hist., iv., tab. 205. Plate VI., fig. 1, 2, and Plate VII., *a, c*.

Everywhere abundant.

This plant is ordinarily very distinct from the previous, but intermediate forms are sometimes found. There are many varieties; to one distinct form I propose to give the name "*laxum*."

*C. maschalocarpum*, var. *laxum*, R. M. L. This differs from the ordinary form in the more sinuous stems, much more open habit, narrower, more acute, sometimes acuminate leaves. It is apparently distinct also in its habitat, as I have only found it growing at the Sugar-loaves, Taranaki, and in the drift-weed occasionally at Island Bay (Wellington). Intermediate forms exist between this and the common form. I append a photograph of the plant.

89. *Carpophyllum plumosum*, J. Ag. (*Sarg. plumosum*: Fl. Nov.-Zel., p. 212). Plate VI., fig. 3, and Plate VII., *d, e*.

Many previous collectors have stated that this plant is very common on the New Zealand coasts. Berggren collected it.

at Lyall's Bay, Napier, Tauranga, Hokianga, Bay of Islands, but it seems to me to be distinctly a northern form. I have no specimens from the South Island, and found it increase in abundance from Wellington to Auckland in the North Island. In the Rangitoto Channel in January I found it to be the most abundant of all the *Fucaceæ*.

90. *Marginaria boryana*. Fl. Nov.-Zel., p. 213.  
Bluff, Dunedin, Banks Peninsula: *Berggren*. Sumner, St. Clair, Kaikoura: *R. M. L.*

91. *Marginaria urvilleana*. Fl. Nov.-Zel., p. 214.  
Banks Peninsula: *Lyall*. Castlepoint: *Colenso*. Bluff, Lyall's Bay: *Berggren*. Kaikoura: *R. M. L.*

92. *Landsburgia myricifolia*, J. Ag., Alg. Chatham Is.

93. *Landsburgia quercifolia*. Fl. Nov.-Zel., p. 213.  
Bay of Islands: *D'Urville*; *Colenso*; *Hooker*; *Lyall*. Bluff, Lyall's Bay, Napier, Hokianga: *Berggren*. Sumner, Kaikoura, New Plymouth: *R. M. L.*

94. *Sargassum sinclairii*. Fl. Nov.-Zel., p. 211.  
Everywhere common.

95. *Sargassum verruculosum* (*Sarg. raoulii*). Fl. Nov.-Zel., p. 212.  
Akaroa: *Raoul*. Bluff: *Berggren*. Stewart Island, Kaikoura: *R. M. L.*

This is one of the rarest of our *Fucaceæ*. I have other species of *Sargassum*, from Stewart Island and the Bay of Islands; but, as this is one of the most difficult of all the genera of the *Algæ*, I hesitate identifying them without abundance of material.

#### CHIEF REFERENCES.

1. "Flora Novæ-Zelandiæ," 1853-1855. (Sir J. D. Hooker.)
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3. "De Algis marinis Novæ-Zelandiæ," 1877. (J. G. Agardh.)
4. "Till Algernes Systematik," parts i., ii., iii., and vi., 1872. (J. G. Agardh.)
5. "Om Chatham-barnes Alger," 1870. (J. G. Agardh.)
6. "On some Marine Algæ from New Zealand," 1893. (R. J. Harvey Gibson), *Journal of Botany*, vol. xxxi.
7. "Ergebnisse einer Reise nach dem Pacific." (Professor Dr. Schäuinsland, 1896-97.) *Meersalgen von Th. Reinbold*. (Sonder-Abdr. a. Abh. Nat. Ver. Brem., 1899, Bd. xvi., H. 2.)

## EXPLANATION OF PLATES V.-VII.

## PLATE V.

Fig. 1. *Carpophyllum angustifolium*, J. Ag. Bay of Islands; collected in January; R. M. L.

Fig. 2. *Carpophyllum phyllanthus*, Turn., Hist., iv. Both specimens are from the same plant, which was gathered at Lyall's Bay in the month of September.

## PLATE VI.

Fig. 1. *Carpophyllum maschalocarpum*, Turn., Hist., iv. Collected at Lyttelton in the autumn; R. M. L.

Fig. 2. *Carpophyllum maschalocarpum*, var. *laxum*, R. M. L. Sugar-loaves, Taranaki; January; R. M. L.

Fig. 3. *Carpophyllum plumosum*, J. Ag. Bay of Islands; January; R. M. L. The winter form differs from this considerably (see Plate VII., fig. e).

## PLATE VII.

a. *Carpophyllum maschalocarpum* (tip of frond).

b. *C. angustifolium* (tip of frond).

c. *C. maschalocarpum*, var. *laxum* (tip of frond).

d. *C. plumosum* (tip of frond; summer form).

e. The same, winter form.

f., g. Basal leaves of *C. phyllanthus*.

h. Leaf from upper portion of plant.

All natural size.

ART. XV.—On New Lichens from Australia and New Zealand.

By JAMES STIRTON, M.D., F.L.S., &c.

(Continuation of Paper in Trans. N.Z. Inst., vol. xxx., p. 382)

Communicated by T. W. Naylor Beckett, F.L.S.

[Read before the Philosophical Institute of Canterbury, 6th September, 1899.]

*Sticta rubella*, Hook., presents obstacles to a complete determination, inasmuch as the original specimens are barren. Nylander in his Lich. N.Z. (1889) merely mentions two new stations for the plant, without giving a description of the apothecia or spores, leading to the inference that these are also barren.

In a parcel of lichens sent several years ago by the late Baron F. von Mueller there is a *Sticta* in fruit, whose characters are nearly identical with those given by Nylander in his Synopsis Meth., page 361. I am extremely sorry I can only discriminate two or three of the specimens in this parcel. The rest seem to have been soaked, almost macerated, in