CONTRIBUTIONS TO THE MARINE ALGAE OF NEWFOUNDLAND[1, 2]

By

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INTRODUCTION

Relatively little is known of the benthonic marine algae of Newfoundland. De la Pylaie (1824, 1829) listed several collections from the Island, but as suggested by Taylor (1954) his catalogue is too old to be currently useful. The only recent account of marine algae from Newfoundland is that given by Wilce (1959) who collected at four locations on the northwest and central west coasts. His collections were made while enroute to the Labrador Peninsula. There are so few other published records (see Taylor, 1957 for listings) that the composition of the Newfoundland marine flora has been inferred from collections of the nearby islands of St. Pierre and Miquelon (Le Gallo, 1947, 1949). The present paper summarizes the species found during two trips (1948 and 1967) to Newfoundland. Collections were made from a variety of coastal environments.

During the month of August, 1948, a survey of the distribution and abundance of algae of potential economic value was made by Humm for the Newfoundland Industrial Development Board. A general collection was made and field notes were kept. In July and August, 1967, Dawes and Mathieson made extensive collections and field observations along the coast of Newfoundland. The second trip was conducted in conjunction with a survey of algae of economic importance, and it was sponsored by Marine Colloids Inc.

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Procedures

1948: Since only the month of August was available for field work the areas visited were limited to the more populated and accessible localities of the eastern coast, particularly the Avalon and Burin Peninsulas, and to the portion of the north coast from Cape Freels to Gander Bay — including Fogo Island and New World Island (Fig. 1). The portions of the eastern coastline with an accessible road were covered by automobile. Stops were made at each cove, village or coastal area where there was accessible shallow water and where a small boat could be obtained. The coastal areas included the lower part of the Burin Peninsula, the eastern side of Placentia Bay from Argentia to St. Bride's, the eastern side of St. Mary's Bay, Trepassey Bay, the eastern side of the Avalon Peninsula, Conception Bay and the eastern side of Trinity Bay (Fig. 1).

The 38-foot motor vessel Duckhawk was used to visit stations in upper Placentia Bay and the western side of St. Mary's Bay, including many islands in both and the coastline and islands along the eastern portion of the north coast between Cape Freels and Notre Dame Bay. Most of these areas were inaccessible except by boat. Stations were examined and representative collections were made from a dory which was launched from the larger vessel. Station descriptions are given for each location where collections were made. Herbarium voucher specimens from the summer collections of 1948 are in the personal herbarium of H. J. Humm and the Herbarium of Duke University.

1967: The locations visited during 1967 were selected on the basis of previous observations (i.e. the 1948 field notes of H. J. H.) and (or) after examination of hydrographic charts. Most of the locations were shore sites, but a number of offshore islands were studied in Conception Bay by means of a fishing vessel (Fig. 1). A skiff and outboard motor were available for use at all stations. Collections were made at most locations in the littoral zones (on foot) and sublittoral zones (by diving with a snorkel or hooka apparatus). A record of surface water salinity and temperature was

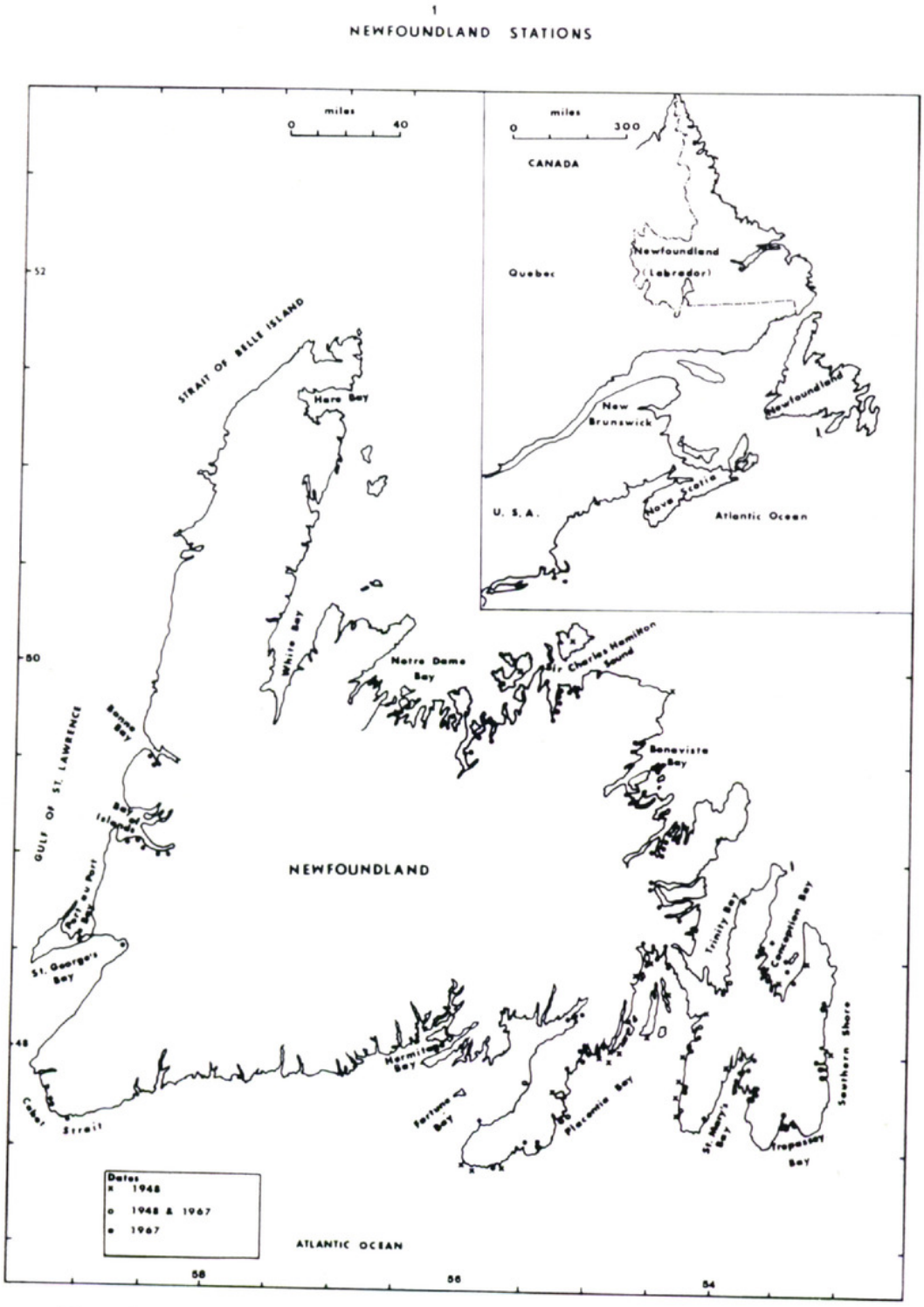

Fig. 1. Map of Newfoundland showing sites of collections.

made at most stations with a thermometer and a set of hydrometers. All of the field data were recorded at the site with a portable tape recorder. Representative collections were made of all the conspicuous species at each station. The collections were preserved (4% formalin) for later identification and preparation of herbarium specimens (about 900 herbarium voucher specimens). All of the 1967 collections from the Southern Shore, Trepassey Bay, St. Mary's Bay, Placentia Bay, and Fortune Bay are deposited in the Herbarium of the University of South Florida, Tampa (see Description of Stations for specific details of locations, dates, etc.) ; all other 1967 collections are deposited in the Herbarium of the University of New Hampshire, Durham.

A variety of references was consulted for identification of species and determination of presently known distributions along the Atlantic Coast of North America (Adey, 1964, 1965, 1966; Blomquist and Humm, 1946; Bornet and Flahault, 1886-88; Cardinal, 1964, 1965, 1966, 1967a, b, c, d; Collins, 1909; Edelstein and McLachlan, 1966, 1967a, b; Edelstein, McLachlan and Craigie, 1967; Fritsch, 1935, 1945; Gomont, 1892; Humm, in press; MacFarlane and Milligan, 1965; Scagel, 1966; Taylor, 1957; Widdowson, 1964; Wilce, 1959, 1965; Wulff et al. 1968; Zaneveld, 1966). The nomenclature of the recent British Checklist (Parke and Dixon, 1964) has been applied in most cases. The vertical distribution of the major algal components described in this article is according to the biological classification of Lewis (1964).

Description of the Area

Newfoundland, an island of 42,734 square miles and a province of Canada, is located off the East Coast of North America, northeast of the Gulf of St. Lawrence between 47° and 52° north latitude and 52° and 59° west longitude.[3] The coast is rocky (often precipitous) and usually lacks sandy beaches. In general, there is not much shallow water. The

[3]The province is properly designated as Newfoundland and Labrador; the Island as Newfoundland.

coastal waters are remarkably clear with visibility usually better than 30 feet.

Although Newfoundland is farther south than the British Isles, its climate and surrounding waters are cooler. The Labrador Current flows southward from Baffin Bay along the coast of Labrador and along the eastern shore of Newfoundland to the Grand Banks southeast of the Island where it converges with the Gulf stream which flows east-northeast. A small branch of the Labrador current leaves the main current north of the Island and enters the Strait of Belle Isle, moves into the Gulf of St. Lawrence and then southwestward through Cabot Strait between the southwestern tip of Newfoundland and the eastern end of Nova Scotia. These currents keep the surface waters surrounding the Island generally a little below 0° C during much of the winter season. During summer, the water temperatures vary between 14 and 18° C. The highest temperatures (20 to 22° C— in August) are found in small bays and estuaries. The surface water salinities on the open coast are lower than typical open ocean waters (i.e. they range from 32 to 33 o/oo) — primarily because of melting ice. Lower salinities occur in bays, harbours and estuaries which are fed by fresh-water streams. In many cases, the fresh water forms a surface layer with low salinity and high temperature.

Several types of marine algal habitats can be distinguished in Newfoundland depending upon the degree of wave action: exposed open coasts; semi-exposed beaches or coves; sheltered harbours, bays, or estuaries. The open coastal areas are subjected to heavy wave action and exhibit a pronounced zonation of plants and animals. A variety of red, brown and green algae is present in the littoral zone; various kelps (particularly *Alaria esculenta*) and red algae dominate the sublittoral zone. The substrate in such areas usually consist of large boulders or rocky ledges. Numerous coves interrupt the open coast line. They are formed by small streams and are bordered by steep rocky cliffs. Wave action is reduced, but the scouring effects of ice action are often conspicuous. A variety of fucoids can be found in the lit-

toral zone, as well as various green and brown algae. *Alaria esculenta* is not a dominant component of the sublittoral zone. The substrate at the headlands of the coves consists of coarse sand or pebbles with scattered boulders. Sheltered harbours, bays or estuaries form the upper arms of larger bays — e.g. Conception or Trinity Bay. The vegetation in the littoral zone is dominated by *Ascophyllum nodosum*, *Fucus vesiculosus*, filamentous brown and many green algae. *Dictyosiphon foeniculaceus*, *Chordaria flagelliformis*, *Chorda filum*, *Ahnfeltia plicata*, *Chondrus crispus*, *Polysiphonia* spp. and *Zostera marina* dominate the sublittoral zone. Their relative abundance varies with the type of substrate (small boulders, pebbles, sand and silt) and the degree of fresh water runoff. Mudflats form the upper ends of these sheltered locations, and relatively few species are found here except fucoids and green algae.

Results

A total of 155 species of marine algae was collected during the two trips to Newfoundland — including 10 Cyanophyta, 36 Chlorophyta, 47 Phaeophyta and 62 Rhodophyta. The following annotated list of species includes some synonymy, the collection sites, habitat notes, noteworthy taxonomic features and records of presently known geographical distribution along the Atlantic Coast of North America. The distribution of each species is designated numerically for its occurrence in one of the following geographical areas:

#1 Newfoundland northward
#2 Northern New England to Newfoundland or northward
#3 Southern New England to Newfoundland or northward
#4 New Jersey — Maryland to Newfoundland or northward
#5 North Carolina to Newfoundland or northward
#6 South Carolina to Newfoundland
#7 Tropics (at least Florida) to Newfoundland or northward

A Description of Stations follows the List of Species.

List of species

Cyanophyta

CYANOPHYCEAE

Chroococcales

CHROOCOCCACEAE

**Anacystis dimidiata* (Kützing) Drouet *et* Daily[4]

Occasional as an epiphyte on *Rhizoclonium riparium* which was growing on woodwork in the littoral zone at Forest Field. #7

[4]**Not previously recorded from Newfoundland.

Gomphosphaeria aponina Kützing

Mixed with *Rhizoclonium riparium* on woodwork in the littoral zone at Forest Field. #7

ENTOPHYSALIDACEAE

Chlorogloea conferta (Kützing) Setchell *et* Gardner *ex* Gardner

(= *Entophysalis conferta* (Kützing) Drouet *et* Daily)

Found as an epiphyte on *Ceramium areschougii* at Ship Harbour and on *Rhodymenia palmata* and other algae at Marystown. #7

**Entophysalis granulosa* Kützing

(= *Entophysalis deusta* (Meneghini) Drouet *et* Daily)

On the intergenicula of *Corallina officinalis* at Dog Cove. #7

Nostocales

OSCILLATORIACEAE

**Lyngbya confervoides* (C. Agardh) Gomont

Found once as an epiphyte on *Enteromorpha intestinalis* at O'Donnell's Beach. #7

**Microcoleus tenerrimus* Gomont

Mixed with *Rhizoclonium riparium* on woodwork in the littoral at Forest Field. #7

**Schizothrix calcicola* (C. Agardh) Gomont

Found as an epiphyte on *Ceramium areschougii* at Ship Harbour, and on pier pilings at Big Barachois. #7

**Spirulina subsalsa* (Oersted) Gomont
Mixed with mats of *Rhizoclonium* spp. at Forest Field. #7

RIVULARIACEAE

**Calothrix confervicola* ((Roth) C. Agardh) Bonet *et* Flahault
Found twice; once as an epiphyte on *Ceramium areschougii* at Ship Harbour and once as an epiphyte on *Polysiphonia flexicaulis* at Boswarlos (a). Probably of world wide distribution, but apparently not recorded previously from Newfoundland. #7

**Calothrix crustacea* (Thuret) Bornet *et* Flahault
Found on rocks, pier pilings and on various plants in the littoral zone at Harbour Grace (c), Sweet Bay, Embree, Laurenceton and Margaree. #7

Chlorophyta

CHLOROPHYCEAE

Chlorococcales

CHLOROCOCCACEAE

Codiolum pusillum (Lyngbye) Kjellman in Foslie f. *longipes* (Foslie) Collins
Forming blackish-green patches on rocks in the upper littoral zone at Renews, Ship Cove and Carbonear Island. #2

Tetrasporales

PALMELLACEAE

Gloeocystis scopulorum Hansgirg
Forming a blackish-green layer on rocks in the littoral zone (mixed with *Ulothrix flacca*) at Great Paradise. #2

Ulotrichales

CHAETOPHORACEAE

**Entocladia wittrockii* Wille
Found within the cell walls of *Elachista fucicola*, which in turn was growing on *Ascophyllum nodosum* in the eulittoral zone at Great Paradise. #3

**Pilinia lunatiae* Collins
On a shell of *Lunatia heros* in the eulittoral zone at Big Barachois. #2

Pringsheimiella scutata (Reinke) Marchew
Found as an epiphyte on *Polysiphonia lanosa* at Point Crewe and on *Ceramium rubrum* at Dog Cove. #7

**Pseudendoclonium marinum* (Reinke) Aleem *et* Schulz (= *Protoderma marinum* Reinke in Taylor, 1957)
Uncommon; found on rocks in the mid and lower eulittoral at Placentia Sound, Sweet Bay, mouth of Gander River and Gander Bay, Embree, Davidsville (b), and Glenburnie (a). #7

ULOTRICHACEAE

**Stichococcus marinum* (Wille) Hazen
Free filaments entangled in *Elachista fucicola*, which in turn was epiphytic on *Ascophyllum nodosum*, at Great Paradise. #3

Ulothrix flacca (Dillwyn) Thuret in Le Jolis
Found as an epiphyte on *Fucus vesiculosus* and *Ascophyllum nodosum*, and on rocks in the littoral zone at Great Paradise. #4

ULVACEAE

**Capsosiphon fulvescens* (C. Agardh) Setchell *et* Gardner
Occasional on mud covered rocks in the littoral zone of protected coves and bays — particularly in brackish water areas. Collected at Marystown, Milton, Lethbridge (a), Sweet Bay, mouth of Gander River and Gander Bay, Big Cove, Brown's Arm, Laurenceton, all stations in Humber Arm, York Harbour, Boswarlos (a), Winter House, and Woody Point. #4

**Enteromorpha erecta* (Lyngbye) J. Agardh
Found on scattered rocks in the littoral zone of mud flats at Brown's Arm and the mouth of the Gander River and Gander Bay. #3

Enteromorpha groenlandica (J. Agardh) Setchell *et* Gardner
Found as an epiphyte on *Cladophora flexuosa* at Lethbridge (a) and on pier pilings at Big Barachois. #2

Enteromorpha intestinalis (L.) Link
Common on rocks in the upper-middle eulittoral zone — particularly in areas of fresh water run-off. Collected at O'Donnell's Beach, Salmonier Arm, Port au Bras, Lawn, Brigus Bay, Hant's Harbour, Adeyton, Lethbridge (a), Sweet Bay, mouth of Gander River and Gander Bay,

Davidsville (b), Noggin Cove, Embree, Brown's Arm, Humber Arm (a, b), Benoit's Cove, Stephenville Crossing, Boswarlos (a, b), Winter House and Glenburnie. #7

**Enteromorpha linza* (L.) J. Agardh

Occasional on rocks in the eulittoral and upper sublittoral at Trepassey Harbour (b), Point Verde, Cuslett, Garnish, Harbour Grace (c), Sweet Bay and Frenchman's Cove. #7

Enteromorpha micrococca Kützing

Found on rocks and pier pilings in the littoral fringe and upper eulittoral at Renews, Harbour Grace (c), Sweet Bay and Glenburnie. #2

Enteromorpha minima Nägeli

(= *Blidingia minima* (Nägeli *ex* Kützing) Kylin)

Found once on boulders in the upper eulittoral-littoral fringe at Long Beach. #7

**Enteromorpha plumosa* Kützing

Found entangled amongst other algae in the eulittoral zone at Marystown, and in a high, marshy tide pool at the mouth of the Gander River and Gander Bay. #7

**Enteromorpha prolifera* (O. F. Müller) J. Agardh

Found on rocks in the eulittoral zone at Marystown. #7

Monostroma fuscum (Postels *et* Ruprecht) Wittrock

f. *blyttii* (Areschoug) Collins

Present on rocks and as an epiphyte in the lower eulittoral and sublittoral at Trepassey Harbour (a), Lawn, and Hant's Harbour. #3

Monostroma grevillei (Thuret) Wittrock

On rocks in the eulittoral zone at Big Barachois. #3

Monostroma oxyspermum (Kützing) Doty

On rocks in the eulittoral zone at Marystown. #7

Monostroma pulchrum Farlow

Collected once as an epiphyte on *Chondrus crispus* in the lower eulittoral at Margaree. #3

**Percursaria percursa* (C. Agardh) Rosenvinge

Found on scattered rocks and pier pilings in the upper eulittoral zone of muddy bays — particularly brackish water areas. Collected at Noggin Cove, Marystown and Embree where it was mixed with *Enteromorpha* and *Rhizoclonium* spp. #4

CLADOPHORALES

CLADOPHORACEAE

Chaetomorpha atrovirens Taylor

Found as entangled mats amongst various plants in the sublittoral and lower eulittoral zones at Riverhead, Salmonier Arm, Tickles, Dog Cove, St. Mary's, Ship Harbour and Bloomfield. Specimens listed here are distinguished according to the characteristics given by Taylor (1957). However, we are not convinced that *C. atrovirens* and *C. linum* are distinct, for there is considerable variation of color and size in natural populations of this complex. #3

**Chaetomorpha linum* (O. F. Müller) Kützing

Found mixed with *C. atrovirens* in the sublittoral zone at Salmonier Arm, and entangled amongst other algae in Placentia Sound. #7

**Chaetomorpha melagonium* (Weber *et* Mohr) Kützing

Present on boulders and vertical ledges in the lower eulittoral and sublittoral zones at Placentia Sound, Branch, Harbour Mille and Margaree. #4

Cladophora flexuosa (O. F. Müller) Harvey

(= *C. sericea* (Hudson) Kützing sensu van den Hoek)

Present on rocks in high tide pools or on scattered rocks in the littoral zone at Riverhead, Salmonier Arm, St. Mary's Harbour, Marystown, Lethbridge (a) and Brown's Arm. Often mixed with *C. gracilis*. #7

Cladophora gracilis (Griffiths *ex* Harvey in Mackay) Kützing

(= *C.sericea* (Hudson) Kützing sensu van den Hoek)

In high tide pools or on scattered rocks in the littoral zone at Salmonier Arm, Bloomfield, Hant's Harbour, Lethbridge (d), mouth of Gander River and Gander Bay, Benoit's Cove, Bloomfield, and Margaree. #4

Cladophora ruprestris (L.) Kützing

Entangled amongst other algae along the town front at Marystown. #3

**Rhizoclonium kerneri* Stockmayer

Entangled amongst other algae in the mud flat area at Marystown. #7

**Rhizoclonium riparium* (Roth) Harvey
v. *implexum* (Dillwyn) Rosenvinge
Found as free-floating masses or entangled mats amongst various plants throughout the eulittoral zone; however, it is often most conspicuous in high, marshy tide pools. Collected at Trepassey Harbour, O'Donnell's Beach, Forest Field, Hant's Harbour, Milton, Gull Cove, Lethbridge (a), Sweet Bay, Bloomfield, mouth of the Gander River and Gander Bay, Embree and Margaree. #7

**Rhizoclonium tortuosum* Kützing
Found as an epiphyte and on rocks in the lower eulittoral at Riverhead, St. Mary's Harbour and Point Crewe. #4

Spongomorpha arcta (Dillwyn) Kützing
Relatively common on rocks in the lower eulittoral and upper sublittoral at Bay Bulls, Ferryland, Trepassey Harbour (b), Salmonier Arm, Point Verde, Branch, Gooseberry Cove, Ship Cove, Red Harbour, Port au Bras, Garnish, Carbonear Island, Harbour Grace (c), Brigus Bay, Hant's Harbour, Long Beach, Lethbridge (a, c), Bloomfield and Margaree. #4

Spongomorpha hystrix Strömfelt
Found on rocks in shallow water at Ferryland and the east coast of the Avalon Peninsula. #2

Spongomorpha lanosa (Roth) Kützing
Found once on rocks in the lowest eulittoral at Laurenceton. #3

**Spongomorpha spinescens* Kützing
Collected twice on rocks in the lowest eulittoral at Trepassey Harbour and Brigus Bay. #2

Urospora collabens (C. Agardh) Holmes *et* Batters
On woodwork in the littoral zone at Dog Cove. #2

Urospora penicilliformis (Roth) Areschoug
Found once on a pier piling at Harbour Grace (c); mixed with various blue green algae in the littoral fringe and upper eulittoral. #4

Phaeophyta
PHAEOPHYCEAE
ECTOCARPALES

ECTOCARPACEAE

Ectocarpus confervoides (Roth) Le Jolis
(= *E. arctus* Kützing in Parke and Dixon, 1964)
Common as an epiphyte on various plants in the eulittoral and upper sublittoral — less common on rocks; collected at Ferryland, Trepassey Harbour (a, b), St. Mary's, Salmonier Arm, Point Verde, Red Harbour, Port au Bras, Garnish, Spread Eagle, Kelly's Island (b), Bell Island, Carbonear Island, Harbour Grace (c), Brigus Bay, Hant's Harbour, Long Beach, Shoal Harbour, Lethbridge (c), mouth of Gander River and Gander Bay, Laurenceton, Humber Arm (b), Frenchman's Cove stations and Woody Point. #7

**Ectocarpus fasciculatus* Harvey
Found as an epiphyte on various plants in the lower eulittoral-upper sublittoral at St. Mary's, Point Verde, Gooseberry Cove and Margaree. #4

Ectocarpus siliculosus (Dillwyn) Lyngbye
Found occasionally as an epiphyte on *Chorda filum* and *Chordaria flagelliformis* in the lower eulittoral-upper sublittoral at St. Mary's, Salmonier Arm, Lawn, Harbour Grace (a), Kings Beach, Sweet Bay, Humber Arm (b) and Frenchman's Cove (b). #7

**Ectocarpus tomentosus* (Hudson) Lyngbye
Found as an epiphyte and entangled amongst other algae in the eulittoral and sublittoral at Trepassey Harbour (b), Salmonier Arm, Placentia Sound, Spread Eagle and York Harbour. #4

**Giffordia granulosa* (J. E. Smith) Hamel
On rocks in the sublittoral zone at Dog Cove. #4

**Giffordia ovata* (Kjellman) Kylin
On *Chordaria flagelliformis* from the mainland west of Chamber's Island. #3

**Giffordia sandriana* (Zanardini) Hamel

Found once on rocks in the eulittoral zone at Trepassey Harbour (b). #3

Pilayella littoralis (L.) Kjellman

A common epiphyte on *Ascophyllum nodosum* and Fucus spp. in the mid-lower eulittoral; occasionally on rocks. Collected at Bay Bulls, Ferryland, Trepassey Harbour (a, b), St. Mary's, O'Donnell's Beach, Salmonier Arm, Point Verde, Perch Cove, Branch, Gooseberry Cove, Port au Bras, Grand Bank, Foxtrap, Harbour Grace (c), Brigus Bay, Hant's Harbour, Long Beach, Adeyton, Lethbridge (a), Sweet Bay, Bloomfield, Big Cove, Laurenceton, Humber Arm (b), Stephenville Crossing, Frenchman's Cove (b) and Margaree. #4

RALFSIACEAE

**Ralfsia clavata* (Harvey in Hooker) Crouan frat.

Found once on the intergenicula of *Corallina officinalis*, which was growing in the upper sublittoral at Kelley's Island (b). #4

Ralfsia fungiformis (Gunner) Setchell *et* Gardner

Found once on rocks in the lower eulittoral at Lethbridge (b) mixed with *Ralfsia verrucosa*. #2

Ralfsia verrucosa (Areschoug) J. Agardh

Common on rocks and shells (often in tide pools) throughout the eulittoral zone at Trepassey Harbour (a), Salmonier Arm, Tickles, Little St. Lawrence Harbour, Dildo, Spread Eagle, Hant's Harbour, Adeyton, Lethbridge (a-c), Sweet Bay, Bloomfield, mouth of Gander River and Gander Bay, Embree, Big Cove, Laurenceton and Humber Arm (a). #4

SPHACELARIALES

SPHACELARIACEAE

Sphacelaria cirrosa (Roth) C. Agardh

Found on pier pilings in the mid-low eulittoral zone at Laurenceton and as an epiphyte on *Polysiphonia nigrescens* in the sublittoral at Frenchman's Cove (b). #3

Sphacelaria racemosa Greville v. *arctica* (Harvey) Reinke

Found once on mud covered rocks in the eulittoral at Humber Arm (a). #1

Sphacelaria plumosa Lyngbye
(= *Chaetopteris plumosa* (Lyngbye) Kützing in Taylor, 1957)
Found once as an epiphyte on *Dictyosiphon foeniculaceus* in the lower eulittoral at Laurenceton. #2

STYPOCAULACEAE
Halopteris scoparia (L.) Sauvageau
Found on scattered rocks (often sand covered) in the sublittoral zone at Frenchman's Cove (b) and Boswarlos (a). #2

TILOPTERIDALES

TILOPTERIDACEAE
**Haplospora globosa* Kjellman
A single gametophytic specimen was collected from a rock in the upper sublittoral at Gooseberry Cove; mixed with *Porphyra miniata*, *Ceramium rubrum*, and *Rhodomela confervoides*. #3

CHORDARIALES

CHORDARIACEAE
Chordaria flagelliformis (O. F. Müller) C. Agardh
Common on rocks (often mud covered) in the lower eulittoral-upper sublittoral zone; occasionally as an epiphyte in the same zone. Often mixed with *Dictyosiphon foeniculaceus* and difficult to distinguish from it in the field. Collected at Bay Bulls, Ferryland, Trepassey Harbour (a, b), St. Mary's, O'Donnell's Beach, Salmonier Arm, Tickles, Point Verde, Ship Harbour, Cuslett, Gooseberry Cove, Ship Cove, Red Harbour, Port au Bras, Lamaline, Grand Bank, Garnish, North Harbour, Foxtrap, Bell Island, Carbonear Island, Harbour Grace (c), Brigus Bay, Hant's Harbour, Long Beach, Shoal Harbour, Lethbridge (a, b), Sweet Bay, Embree, Big Cove, Humber Arm (c), Frenchman's Cove (b), Margaree, Bottle Cove and Boswarlos (a, b). #4
Eudesme virescens (Carmichael *ex* Harvey in Hooker) J. Agardh
Found once growing on rocks in the lower eulittoral at Trepassey Harbour (a). #3

**Eudesme zosterae* (J. Agardh) Kylin
Epiphytic on *Zostera marina* in the sublittoral zone at Salmonier Arm and Spread Eagle; also on stones along the town front at Marystown. #7
Sphaerotrichia divaricata (C. Agardh) Kylin
On rocks (often mud covered) and epiphytic on *Fucus vesiculosus* in the eulittoral and sublittoral zones of protected bays at Lethbridge (a, c, d), Embree and Big Cove. #4

CORYNOPHLAEACEAE
Leathesia difformis (L.) Areschoug
Epiphytic on *Corallina officinalis* and other plants in the lower eulittoral-upper sublittoral zone at Lamaline and Margaree. #5

ELACHISTACEAE
Elachista fucicola (Velley) Areschoug
A common epiphyte on *Ascophyllum nodosum* and *Fucus* spp. from the mid eulittoral to the upper sublittoral at Bay Bulls, Ferryland, Trepassey Harbour (a, b), O'Donnell's Beach, Point Verde, Parker's Cove, Port au Bras, Harbour Mille, Spread Eagle, Kelley's Island (b), Brigus Bay, Hant's Harbour, Long Beach, Adeyton, Lethbridge (c), Sweet Bay, mouth of Gander River and Gander Bay, Noggin Cove, Big Cove, Brown's Arm, Frenchman's Cove (b), Margaree and Boswarlos (b). #4
Elachista lubrica Ruprecht
Growing on fucoids in the sublittoral zone (on a pier piling) at Marystown. #2

MYRIONEMATACEAE:
**Ascocyclus distromaticus* Taylor
*Found once as an epiphyte on *Zostera marina* in the sublittoral at Salmonier Arm. #3
**Myrionema strangulans* Greville
Found as an epiphyte (on *Enteromorpha erecta, Chaetomorpha atrovirens* and kelps) at the mouth of the Gander River and Gander Bay, Placentia Sound, Gooseberry Cove, Harbour Mille, Kelly's Island (b), Bay Bulls and Trepassey Harbour (b). #5

DESMARESTIALES

DESMARESTIACEAE

Desmarestia aculeata (L.) Lamouroux
On rocks in the sublittoral zone at Trepassey Harbour (b), Salmonier Arm, Dog Cove, Ship Cove, Garnish, Bell Island, Carbonear Island, Brigus Bay and Shoal Harbour. #4

Desmarestia viridis (O. F. Müller) Lamouroux
On rocks in the sublittoral zone at Ferryland, Trepassey Harbour (a), St. Mary's, Salmonier Arm, Dog Cove, Gooseberry Cove, Grand Bank, Harbour Mille, Spread Eagle, Foxtrap, Kelly's Island (b), Bell Island, Carbonear Island, Hant's Harbour and Margaree. #4

DICTYOSIPHONALES

DICTYOSIPHONACEAE

**Dictyosiphon ekmanii* Areschoug
On rocks in shallow water at Big Barachois. #2

Dictyosiphon foeniculaceus (Hudson) Greville
Very common on mud covered rocks in the lower eulittoral-upper sublittoral — particularly in sheltered bays. Often mixed with *Chordaria flagelliformis* which is difficult to distinguish in the field. Collected at Bay Bulls, Ferryland, Trepassey Harbour (a, b), St. Mary's, O'Donnell's Beach (a), Salmonier Arm, Tickles, Point Verde, Patrick's Cove, Placentia Sound, Gooseberry Cove, Ship Cove, Red Harbour, Port au Bras, Little St. Lawrence Harbour, Lamaline, North Harbour, Dildo, Foxtrap, Kelly's Island (b), Bell Island, Harbour Grace (c), Brigus Bay, Hant's Harbour, Long Beach, Adeyton, Shoal Harbour, Lethbridge (a, c), Sweet Bay, Bloomfield, mouth of Gander River and Gander Bay, Embree, Big Cove, Laurenceton, Humber Arm (b), Frenchman's Cove (b), Margaree, Boswarlos (a, b) and Woody Point. #4

PUNCTARIACEAE

Asperococcus echinatus (Mertens) Greville
Found once on rocks in a mid-eulittoral tide pool at Hant's Harbour. #3

**Delamarea attenuata* (Kjellman) Rosenvinge

On rocks in the eulittoral zone at Bay Bulls, Point Verde, Ship Cove, Long Beach, Shoal Harbour and Margaree. #3

**Myriotrichia filiformis* Harvey

Found as an epiphyte on *Cystoclonium purpureum* from the mainland west of Chamber's Island, and on *Dictyosiphon foeniculaceus* from Placentia Sound. #4

**Punctaria latifolia* Greville

Found on scattered rocks in the eulittoral zone at Port au Bras, North Harbour and Dildo. #4

**Punctaria plantaginea* (Roth) Greville

Uncommon, on rocks in the eulittoral zone at Long Harbour, Lamaline and Frenchman's Cove (b). #4

SCYTOSIPHONACEAE

Petalonia fascia (O. F. Müller) Kuntze

On rocks (often in tide pools) and epiphytic on various algae in the eulittoral zone at Trepassey Harbour (b), Cuslett, Gooseberry Cove, Port au Bras, Lawn, Garnish, Bacon Cove; Carbonear Island, Hant's Harbour, Long Beach and Sweet Bay. The variety *zosterifolia* was found once at Renews. #7

**Scytosiphon lomentarius* (Lyngbye) Link

On rocks (often in tide pools) and occasionally epiphytic on various plants in the eulittoral zone at St. Mary's, Ship Cove, Grand Bank, Garnish, Foxtrap, Kelly's Island (b) and Carbonear Island. #5

STRIARIACEAE

Stictyosiphon tortilis (Ruprecht) Reinke

Present on rocks and pier pilings in the eulittoral and upper sublittoral zones of the protected bays at Brown's Arm, and Laurenceton. Mixed with *Enteromorpha* spp, *Chordaria flagelliformis* and *Dictyosiphon foeniculaceus*. #2

LAMINARIALES

ALARIACEAE

Alaria esculenta (L.) Greville

(including *A. musaefolia* (De la Pylaie) J. Agardh sensu Widdowson, 1964). Relatively common in the sublittoral zone (usually below 3 feet) of rocky exposed coastal areas.

Collected at Bay Bulls, Trepassey Harbour (b), St. Mary's, Point Verde, Branch, Cuslett, Gooseberry Cove, Ship Cove, Red Harbour, Grand Bank, Carbonear Island, Brigus Bay, Hant's Harbour, Long Beach, Dog Cove and Margaree. #3

CHORDACEAE

Chorda filum (L.) Stackhouse

Common on small rocks and shells in the sublittoral zone of sheltered bays and harbours. Collected at Trepassey Harbour stations, Riverhead, O'Donnell's Beach (a), Salmonier Arm, Dog Cove (adrift), Point Verde, Red Harbour, Port au Bras, Little St. Lawrence Harbour, Lawn, Garnish, Harbour Mille, Dildo, Spread Eagle, Foxtrap, Bell Island, Harbour Grace (a), Brigus Bay, Hant's Harbour, Adeyton, Lethbridge (a-d), Sweet Bay, mouth of Gander River and Gander Bay, Embree, Big Cove, Brown's Arm, Laurenceton, Humber Arm (b), Frenchman's Cove (a, b), York Harbour, Bottle Cove, Boswarlos (b) and Woody Point. #4

LAMINARIACEAE

Agarum cribrosum (Mertens) Bory

Common in the sublittoral zone of exposed and semi-exposed areas below 5 feet. It doesn't appear to be eaten by urchins which were usually found in large numbers in the same areas. Collected at Trepassey Harbour (b), St. Mary's, Point Verde, Lamaline, Point Crewe, Lories, Burin Peninsula, Foxtrap, Kelly's Island (b), Carbonear Island, Harbour Grace (a), Brigus Bay, Hant's Harbour, and Margaree. #2

**Laminaria digitata* (Hudson) Lamouroux

Present in the sublittoral zone of rocky exposed coastal areas. Collected at Branch, Cuslett, Gooseberry Cove, Grand Bank, Harbour Mille and Brigus Bay. Frond segmentation varies considerably on different specimens, but each has a consistent + − anatomy (i.e. mucilage ducts are present in the blades and absent from the stipes, Wilce, 1965). #3

**Laminaria nigripes* J. Agardh

Found in the same exposed rocky habitat as *L. digitata*, but it was much less common. Collected at Margaree and Red Rock Point. It has a + + anatomy (Wilce, 1965). #1

Laminaria saccharina (L.) Lamouroux sensu Wilce

The plants designated here are of three ecotypes (Wilce, 1965), which are distinguished according to their anatomy (i.e. + +, + − and − −). They are found on rocks in the sublittoral zone of exposed or semi-exposed coastal areas. The + − ecotype (*L. saccharina* (L.) Lamouroux, in Taylor, 1957) was the least common of the three and it it was only found at Little St. Lawrence Harbour. The + + ecotype (*L. groenlandica* Rosenvinge in Taylor, 1957) was found at North Harbour, Carbonear Island and Margaree. The − − ecotype (*L. agardhii* Kjellman, in Taylor, 1957) was the most common of the three and was found at all the Trepassey Harbour stations, St. Mary's, Riverhead, Salmonier Arm, Tickles, Ship Harbour, Lawn, Lamaline, Spread Eagle, Brigus Bay and Bloomfield. The − − and + + ecotypes (as they are designated by Taylor, 1957) have not previously been recorded in Newfoundland. #4

Saccorhiza dermatodea (De la Pylaie) J. Agardh

On rocks in the sublittoral zone of exposed coastal areas. Collected at Ferryland, O'Donnell's Beach, Point Verde, Branch, Gooseberry Cove, Ship Cove, Lamaline, Garnish, Harbour Mille, Bacon Cove, Bell Island, Carbonear Island, Brigus Bay, Frenchman's Cove (b), Margaree and Bottle Cove. #2

FUCALES

FUCACEAE

Ascophyllum nodosum (L.) Le Jolis

Very common on rocks from the mid eulittoral to the upper sublittoral at semi-exposed coastal and sheltered locations. Collected at Bay Bulls, Trepassey Harbour stations, Riverhead, O'Donnell's Beach, Salmonier Arm, Parker's Cove, Port au Bras, Spread Eagle, Foxtrap, Hant's Harbour, Adeyton, Lethbridge (a-c), Sweet Bay, Bloomfield, mouth

of the Gander River and Gander Bay, Noggin Cove, Embree, Big Cove, Laurenceton, Humber Arm (b), Benoit's Cove, Frenchman's Cove (b), Margaree, Boswarlos (a), Winter House, Glenburnie and Woody Point. #5

Fucus distichus (L.) emend, Powell ssp. *distichus* Powell

On rocks in high eulittoral tide pools at Big Barachois, Garnish, Carbonear Island, Hant's Harbour, Big Cove and Margaree. #2

Fucus distichus (L.) emend. Powell ssp. *edentatus* (De la Pylaie) Powell

Found twice on rocks in the lower eulittoral — upper sublittoral at Hant's Harbour and Margaree. #4

Fucus distichus (L.) emend. Powell ssp. *evanescens* (C. Agardh) Powell

On a vertical rock wall in the lower eulittoral at Bacon Cove. #3

Fucus vesiculosus L.

Common on rocks from the mid eulittoral to the upper sublittoral at semi-exposed coastal and sheltered areas. Collected at Bay Bulls, Ferryland, Trepassey Harbour stations, Riverhead, O'Donnell's Beach, Salmonier Arm, Tickles, Point Verde, Ship Harbour, Cuslett, Parker's Cove, Port au Bras, Lamaline, Grand Bank, Garnish, Harbour Mille, Dildo, Spread Eagle, Foxtrap, Kelly's Island (b), Carbonear Island, Harbour Grace (c), Brigus Bay, Hant's Harbour, Long Beach, Adeyton, Shoal Harbour, Lethbridge (a-d), Sweet Bay, Bloomfield, mouth of Gander River and Gander Bay, Noggin Cove, Mason's Cove, Embree, Big Cove, Brown's Arm, Laurenceton, Humber Arm (a, b), Benoit's Cove, Frenchman's Cove, Margaree, Stephenville Crossing, Boswarlos (a, b), Winter House, Glenburnie and Woody Point. #5

Rhodophyta

RHODOPHYCEAE

BANGIOPHYCIDAE

GONIOTRICHALES

GONIOTRICHACEAE

**Asterocystis ramosa* (Thwaites in Harvey) Gobi *ex* Schmitz.

Found once epiphytic on *Ceramium areschougii* at Ship Harbour. #7

**Goniotrichum alsidii* (Zanardini) Howe

Epiphytic on various plants in the eulittoral and sublittoral zones of sheltered locations. Collected at Salmonier Arm, Great Paradise, Dog Cove, Placentia Sound, Point Verde, Lethbridge (a, c), Bloomfield, Brown's Arm, Humber Arm (b), Frenchman's Cove (b) and Boswarlos (a, b). #7

BANGIALES

BANGIACEAE

**Bangia ciliaris* Carmichael

Found as an epiphyte on larger algae at Marystown, Topsail Beach, Hant's Harbour and Bloomfield. #4

Porphyra miniata (C. Agardh) C. Agardh

Growing on rocks or epiphytic on selected plants (e.g. *Chondrus crispus, Gigartina stellata*) in the lower eulittoral — upper sublittoral at all Trepassey Harbour stations, Point Verde, Branch, Gooseberry Cove, Ship Cove, Red Harbour and Lawn. #2

Porphyra umbilicalis (L.) J. Agardh

Found on rocks and epiphytic on various plants in the eulittoral zone at St. Mary's, Branch, Green Point, Gooseberry Cove, Ship Cove, Grand Bank, Point Verde, Port au Bras, Garnish, Harbour Mille, Dildo, Harbour Grace (c), Brigus Bay, Adeyton, Sweet Bay, Humber Arm (b), mouth of Gander River and Gander Bay, York Harbour, Winter House and Woody Point. The forma *epiphytica* Collins was also found on *Fucus vesiculosus* at Sweet Bay. #5

ERYTHROPELTIDACEAE

**Erythrotrichia carnea* (Dillwyn) J. Agardh

Found epiphytic on *Ceramium areschougii at* Ship Harbour and on various algae in front of the town at Marystown. #7

FLORIDEOPHYCIDAE

NEMALIONALES

ACROCHAETIACEAE

**Acrochaetium amphiroae* (Drew) Papenfuss

Found epiphytic on *Rhodymenia palmata* at Point Verde and Harbour Mille. #3

**Acrochaetium attenuatum* (Rosenvinge) Hamel, f.
Found epiphytic on *Chaetomorpha atrovirens* at Dog Cove. #3

**Acrochaetium flexuosum* Vickers
Found epiphytic on *Chaetomorpha atrovirens* from Placentia Sound. #7

**Kylinia alariae* (Jonsson) Kylin
Epiphytic on *Alaria esculenta* at Ferryland and at Port au Bras. #2

**Kylinia compacta* (Jao) Papenfuss
Found once epiphytic on *Cladophora gracilis* at Lethbridge (a). #3

**Kylinia hallandica* (Kylin) Kylin
Found once epiphytic on *Petalonia fascia* at Trepassey Harbour (b). #1

**Kylinia moniliformis* (Rosenvinge) Kylin
Epiphytic on *Giffordia ovata* in shallow waters along the mainland shore west of Chamber's Island. #3

**Kylinia secundata* (Lyngbye) Papenfuss
Growing as an epiphyte on *Sertularia*, which in turn was on *Fucus vesiculosus*, at St. Mary's. #3

**Kylinia virgatula* (Harvey) Papenfuss
Found once epiphytic on *Cladophora gracilis* at Lethbridge (a). #7

**Rhodochorton purpureum* (Lightfoot) Rosenvinge
In shaded rock crevices at Witless Bay and Gull Cove. #3

BONNEMAISONIACEAE

Trailliella intricata (J. Agardh) Batters
Epiphytic on various plants in the sublittoral zone of protected harbours or bays. Collected at Salmonier Arm, Point Verde, Ship Harbour, Cuslett, North Harbour, Frenchman's Cove (b), York Harbour and Stephenville Crossing. According to Harder (1948) *Trailliella intricata* is the tetrasporophyte of *Asparagopsis hamifera*. However, the latter plant is only recorded from Long Island and southern Massachusetts (Taylor, 1957). Chihara

(1961) has recently given an extensive review of the life history of the group. #3

CRYPTONEMIALES

CHOREOCOLACEAE

**Choreocolax polysiphoniae* Reinsch

Parasitic on *Polysiphonia lanosa,* which in turn was epiphytic on *Ascophyllum nodosum.* Collected at O'Donnell's Beach, Parker's Cove, Garnish and Margaree. #3

CORALLINACEAE

Clathromorphum circumscriptum (Strömfelt) Foslie

(As *Phymatolithon compactum* (Kjellman) Foslie in Taylor, 1957)

On rocks and shells in the lower eulittoral and sublittoral at St. Mary's, Salmonier Arm, Tickles, Branch, Hant's Harbour and Margaree. #2

Corallina officinalis L.

On rocks in eulittoral tide pools and in the sublittoral zone at Trepassey Harbour (b), Salmonier Arm, Tickles, Dog Cove, Point Verde, Cuslett, Gooseberry Cove, Ship Cove, Lamaline, Foxtrap, Kelly's Island (b), Carbonear Island, Hant's Harbour and Margaree. #2

Leptophytum laeve (Strömfelt) Adey

(= *Lithothamnium laeve* (Strömfelt) Foslie, in Taylor, 1957)

On stones in the upper sublittoral on the west side of Sound Island. #3

Lithothamnium glaciale Kjellman

On rock surfaces and shells in the lowest eulittoral and sublittoral at Riverhead, O'Donnell's Beach, Salmonier Arm, Lamaline, Foxtrap, Kelly's Island (b), Harbour Grace (a), Hant's Harbour and Sweet Bay. This plant forms a conspicuous residual cover in areas of heavy sea urchin grazing. #2

**Lithothamnium tophiforme* Unger

Found loose in shallow water at Ship Harbour. The validity of this species is subject to question (Adey, 1966). #2

**Phymatolithon rugulosum* Adey

Found once on rocks in the sublittoral zone at Salmonier Arm. #2

GLOIOSIPHONIACEAE

Gloiosiphonia capillaris (Hudson) Carmichael *ex* Berkeley
Found on rocks in the lower eulittoral — upper sublittoral at Branch and Gooseberry Cove; also found epiphytic on *Chordaria flagelliformis* from the mainland west shore of Chamber's Island. #3

HILDENBRANDIACEAE

Hildenbrandia prototypus Nardo
On rock surfaces and shells in the eulittoral and upper sublittoral zones at Trepassey Harbour (a), Salmonier Arm, Placentia Sound, Parker's Cove, Spread Eagle, Lethbridge (a-c), Sweet Bay, Bloomfield, mouth of Gander River and Gander Bay, Embree, Big Cove and Humber Arm (a). #7

POLYIDEACEAE

**Polyides rotundus* (Hudson) Greville
(= *Polyides caprinus* (Gunnerus) Papenfuss in Taylor, 1957)
On stones in the sublittoral zone at Perch Cove. #3

SQUAMARIACEAE

**Rhodophysema elegans* (Crouan frat *ex* J. Agardh) Dixon (including *Rhododermis parasitica* Batters sensu Dixon, 1964)
Present on rocks in the lower eulittoral zone at Sweet Bay, epiphytic on *Spongomorpha arcta* in the eulittoral zone at Salmonier Arm and Lethbridge (c) and at the base of *Ascophyllum nodosum* and on a vertical rock wall (eulittoral) at Placentia Sound. #2

**Rhodophysema georgii* Batters
(= *Rhododermis georgii* (Batters) Collins in Taylor, 1957)
Found once epiphytic on *Zostera marina* leaves in the sublittoral zone at Lethbridge (d). #3

GIGARTINALES

GIGARTINACEAE

Chondrus crispus Stackhouse
Relatively common on rocks in the eulittoral (usually the

lowest part) and sublittoral zones at all Trepassey Harbour stations, St. Mary's, Riverhead, O'Donnell's Beach, Salmonier Arm, Tickles, Point Verde, Ship Harbour, Cuslett, Parker's Cove, Red Harbour, Little St. Lawrence Harbour, Harbour Mille, North Harbour, Hant's Harbour, Shoal Harbour, all Lethbridge stations, Bloomfield, Embree, Humber Arm (b), Benoit's Cove, Margaree, Stephenville Crossing and Boswarlos (a). #4

Gigartina stellata (Stackhouse) Batters

On rock surfaces in the lower eulittoral and upper sublittoral at Trepassey Harbour (a) and Branch. #3

NEMASTOMATACEAE

**Platoma bairdii* (Farlow) Kuckuck

On stones in the lower eulittoral zone at Perch Cove. #3

PHYLLOPHORACEAE

Ahnfeltia plicata (Hudson) Fries

Present on rocks (often sand and mud covered) in the lower eulittoral and sublittoral at Salmonier Arm, Dog Cove, Branch, Placentia Sound, Cuslett, Gooseberry Cove, Shoal Harbour, Lethbridge (a, b), mouth of the Gander River and Gander Bay, Embree, Humber Arm (b) and Boswarlos (b). #4

Phyllophora brodiaei (Turner) Endl.

Found on rock surfaces in the sublittoral zone at Salmonier Arm; mixed with *P. membranifolia*. #4

Phyllophora membranifolia (Goodenough *et* Woodward) J. Agardh

Found in the sublittoral zone at Salmonier Arm. #4

RHODOPHYLLIDACEAE

Cystoclonium purpureum (Hudson) Batters

Growing as an epiphyte and on rocks in the sublittoral zone at O'Donnell's Beach, along mainland west of Chamber's Island, Point Verde, Ship Harbour, Branch, Harbour Mille and North Harbour. #4

RHODYMENIALES

RHODYMENIACEAE

Halosaccion ramentaceum (L.) J. Agardh

Relatively common on rock surfaces in the lower eulittoral

and upper sublittoral at Bay Bulls, Trepassey Harbour stations, Point Verde, Branch, Taylor Bay, Cuslett, Gooseberry Cove, Ship Cove, Red Harbour, Lawn, Harbour Mille, Bell Island, Carbonear Island, Brigus Bay, Hant's Harbour, Long Beach and Margaree. #2

Rhodymenia palmata (L.) Greville

On rocks and epiphytic on kelps in the sublittoral zone at Bay Bulls, Trepassey Harbour stations, Riverhead, O'Donnell's Beach, Salmonier Arm, Point Verde, Branch, Cuslett, Gooseberry Cove, Ship Cove, Red Harbour, Port au Bras, Little St. Lawrence Harbour, Harbour Mille, North Harbour, Bell Island, Carbonear, Harbour Grace (c), Brigus Bay and Margaree. #4

CERAMIALES

CERAMIACEAE

**Antithamnion americanum* (Harvey) Farlow in Kjellman

On woodwork in the eulittoral zone at Marystown. #4

**Antithamnion boreale* (Gobi) Kjellman

Found as an epiphyte on *Desmarestia aculeata* in the sublittoral zone at Brigus Bay. #2

**Antithamnion cruciatum* (C. Agardh) Nageli

Epiphytic on larger algae along the town front at Marystown. #7

Antithamnion pylaisaei (Montagne) Kjellman

Epiphytic on other algae along the town front of Marystown and at Perch Cove. #3

**Ceramium areschougii* Kylin

Found once in the sublittoral zone at Ship Harbour. #3

**Ceramium elegans* (Ducluzeau) C. Agardh

Found as an epiphyte on large algae at Marystown and Humber Arm (b). #2

**Ceramium rubriforme* Kylin

On *Chondrus crispus* along the mainland west of Chamber's Island; also at Dog Cove. #3

Ceramium rubrum (Hudson) J. Agardh

v. *pedicellatum* Duby

Collected on rocks in the lower eulittoral and sublittoral at Point Verde, Branch, and Gooseberry Cove. #7

**Plumaria elegans* (Bonnemaison) Schmitz
Mixed with *Membranoptera alata* around the bases of *Agarum cribrosum* in the lower eulittoral — upper sublittoral zones at several locations on the Burin Peninsula. #4

**Ptilota plumosa* (Hudson) C. Agardh
On rocks in the sublittoral zone at Point Crewes. #2

Ptilota serrata Kützing
On rocks and epiphytic on various plants (particularly the stipes and holdfasts of kelps) in the sublittoral zone at Point Verde, Branch, Brigus Bay, Hant's Harbour, York Harbour, Stephenville Crossing and the Burin Peninsula. #4

DELESSERIACEAE

**Membranoptera alata* (Hudson) Stackhouse
(including *Membranoptera denticulata* (Montagne) Kylin in Taylor, 1957). Found as an epiphyte on *Desmarestia aculeata* in the sublittoral zone at Brigus Bay and mixed with *Plumaria elegans* around the bases of *Agarum cribrosum* at many locations on the Burin Peninsula. #2

Phycodrys rubens (Hudson) Batters
Found once on rocks in the sublittoral zone at Brigus Bay. #4

RHODOMELACEAE

**Polysiphonia arctica* J. Agardh
Found once on rocks in the sublittoral zone at Ship Harbour. #2

**Polysiphonia elongata* (Hudson) Greville *ex* Harvey in Hooker
On rocks in the upper sublittoral along the mainland shore west of Chamber's Island, and at Marystown. Fine branches were present throughout the summer. #3

**Polysiphonia fibrillosa* (Dillwyn) Harvey in Hooker
On rocks and epiphytic on various algae in the lower eulittoral and sublittoral at Point Verde, Kelly's Island (b), Sweet Bay, mouth of the Gander River and Gander Bay, Big Cove, and Humber Arm (b). #4

**Polysiphonia flexicaulis* (Harvey) Collins
On rocks and epiphytic on various algae in the lower

eulittoral and sublittoral at Salmonier Arm, Marystown, Garnish, Hant's Harbour, Lethbridge (c), Laurenceton and Boswarlos (a, b). #3

**Polysiphonia harveyi* Bailey
Found once epiphytic on *Chordaria flagelliformis* in the upper sublittoral zone at Hant's Harbour. #6
Polysiphonia lanosa (L.) Tandy
Epiphytic on *Ascophyllum nodosum* at O'Donnell's Beach, Parker's Cove, Garnish and Margaree. #4

**Polysiphonia nigra* (Hudson) Batters
Found once on rocks in the sublittoral zone at Salmonier Arm. #4

**Polysiphonia nigrescens* (Hudson) Greville
On rocks in the sublittoral zone of semi-exposed coasts (Hant's Harbour and Bell Island) and sheltered estuarine regions (Salmonier Arm, Brown's Arm, Humber Arm (b), Frenchman's Cove (b) and Stephenville Crossing). It is most common in the latter regions where it is mixed with *Chorda filum, Chordaria flagelliformis, Dictyosiphon foeniculaceus* etc. #6

**Polysiphonia novae-angliae* Taylor
Found once epiphytic on *Chordaria flagelliformis* in the sublittoral zone at Sweet Bay. #4
Polysiphonia urceolata (Lightfoot *ex* Dillwyn) Greville var *patens* (Dillwyn) Harvey
On rocks in the lowest eulittoral and sublittoral at Marystown, Point Verde, Perch Cove, Kelly's Island (b), Bell Island, Carbonear Island, Brigus Bay, Hant's Harbour and Sweet Bay. #4

Rhodomela confervoides (Hudson) Silva
On rocks in the lower eulittoral (often in tide pools) and in the sublittoral at Trepassey Harbour stations, Salmonier Arm, Point Verde, Branch, Cuslett, Gooseberry Cove, Ship Cove, Lawn, Harbour Mille, Kelly's Island (b), Carbonear Island, Brigus Bay, Hant's Harbour, Margaree and Stephenville Crossing. #4

Description of stations

Southern Shore

Bay Bulls: A semi-exposed bay approximately 2 miles long and ¾ mile wide with steep sides. The substrate consisted of large outcroppings. Sea urchins grazing and the scouring effects of ice were visible in the sublittoral zone. Visited August 2, 1967. (Approximate position: Lat. 47° 18′ N, Long. 52° 49′ W).

Witless Bay: A semi-exposed bay on the east coast of the Avalon Peninsula. Visited August 22, 1948. (Approximate position: Lat. 47° 18.5′, Long. 52° 51′ W).

Ferryland: A semi-exposed bay formed from a ridge of offshore islands. The substrate consisted of large boulders, which showed conspicuous ice scouring. Numerous sea urchins were evident. Visited August 22, 1948 and August 4, 1967. (Approximate position: Lat. 47° 01′ N, Long. 52° 53′ W).

Fermeuse: A sheltered bay (about 4 miles long and ½ mile wide) with a small creek flowing into it. Substrate of scattered boulders grading into mud (at the head). Visited August 4, 1967. (Approximate position: Lat. 46° 58.3′ N, Long. 52° 36.5′ W).

Renews: A sheltered cove with a large creek flowing into it. Substrate of scattered boulders grading into mud (at the head). Visited August 22, 1948 and August 4, 1967. (Approximate position: Lat. 46° 56′ N, Long. 52° 59′ W).

Cappahayden: An exposed open coastal shore. Substrate of large boulders grading into small stones. Visited August 22, 1948 and August 4, 1967. (Approximate position: Lat. 46° 52′ N, Long. 52° 56.6′ W).

Trepassey Bay

Trepassey Harbour (*a*): A semi-exposed area on Powles Peninsula (head) just south of the Observatory Station — outside of the berm. Substrate ranging from large boulders to small pebbles. In August 1967 the surface water salinity was 33.2 o/oo, and the temperature 15°C. Visited August 22, 1948 and August 4 & 5, 1967. (Approximate position: Lat. 46° 42.5′ N, Long. 53° 23.5′ W).

Trepassey Harbour (*b*) : A sheltered location in the northwest arm of Trepassey Bay — near the Fishery. An area of steep cliffs. Substrate ranging from small boulders to large rocks. Visited August 22, 1948 and August 5, 1967. (Approximate position: Lat. 46° 45′ N, Long. 53° 26′ W).
Biscay Bay: A sheltered bay due east of Trepassey Harbour. Visited August 22, 1948 and August 4, 1967. (Approximate position: Lat. 46° 47′ N, Long. 53° 18′ W).

St. Mary's Bay

St. Mary's: A semi-exposed beach with shingle-pebble and occasional rock outcrops — in St. Mary's Harbour. Ice scouring evident on rocks. Visited August 11, 1948 and August 6, 1967. (Approximate position: Lat. 46° 56′ N, Long. 53° 34′ W).
Coots Pound: A sheltered berm area enclosing a river outlet in St. Mary's Harbour. Substrate of shingle-pebbles and with occasional outcrops of boulders. Surface water salinity 32 o/oo, temperature 20°C. Visited August 6, 1967. (Approximate position: Lat. 46° 56.8′ N, Long. 53° 30.5′ W).
Riverhead: A sheltered area at the head of St. Mary's Harbour. Substrate of shingles-pebbles and with occasional boulders. Visited August 11, 1948 and August 6, 1967. (Approximate position: Lat. 46° 58′ N, Long. 53° 32′ W).
O'Donnell's Beach (*a*) : A sheltered beach with pebbles and boulders. Surface water salinity 34 o/oo, temperature 20°C. Visited August 6, 1967. (Approximate position: Lat. 47° 04.8′ N, 53° 33.5′ W).
O'Donnell's Beach (*b*) : A sheltered area 3½ miles south of O'Donnell's Beach; substrate of flat limestone ledges projecting into a sandy beach. Visited August 6, 1967. (Approximate position: Lat. 47° 05′ N, Long. 53° 37′ W).
Admiral's Beach: A sheltered beach with a shingle substrate. Surface water temperature 18°C. Visited August 6, 1967. (Approximate position: Lat. 47° 01′ N, Long. 53° 37′ W).
Salmonier Arm: A number of locations were examined in the sheltered bay. The substrate ranged from large boulders to pebbles, sand and silt from the mouth of the arm

to the river itself. On August 6, 1967 the surface water salinity ranged from 15 o/oo (at the head) to 35 o/oo (at the mouth), while the surface water temperatures ranged from 23°C (at the head) to 20°C (at the mouth). The following stations were occupied:

(a) 1½ miles south of Mt. Carmel — west side of the arm. Visited August 6, 1967. (Approximate position: Lat. 47° 07.8′ N, Long. 53° 31′ W).

(b) Mt. Carmel — west side of the arm. Collections were made at the pier near the church. Visited August 6, 1967. (Approximate position: Lat. 47° 08′ N, Long. 53° 30′ W).

(c) 1½ miles north of Mt. Carmel — west side of the arm. Visited August 6, 1967. (Approximate position: Lat. 47° 09.5′ N, Long. 53° 27′ W).

(d) 3 miles south of Salmonier River — west side of the arm. Visited August 6, 26 & 27, 1967. (Approximate position: Lat. 47° 10.3′ N, Long. 53° 26.5′ W).

(e) Forest Field — near St. Catherines on the east side of the arm. Visited August 4, 1968. (Approximate position: Lat. 47° 09.3′ N, Long. 53° 25.5′ W).

(f) 3 miles south of the Salmonier River — east side of the arm. Visited August 6, 1967. (Approximate position: Lat. 47° 07.5′ N, Long. 53° 26.5′ W).

(g) 1½ miles north of New Bridge — east side of the arm. Visited August 6, 1967. (Approximate position: Lat. 47° 08.5′ N, Long. 53° 28.5′ W).

(h) 1½ miles north of St. Joseph's Church — east side of the arm. Visited August 6, 1967. (Approximate position: Lat. 47° 07.5′ N, Long. 53° 29.5′ W).

Tickles: A sheltered berm area consisting of shingles-pebbles. Only a few large boulders were evident. Surface water salinity 33.3 o/oo, temperature 20°C. Visited August 7, 1967. (Approximate position: Lat. 47° 10.5′ N, Long. 53° 33.5′ W).

Dog Cove: A semi-exposed cove west of Cape Dog. Visited August 11, 1948. (Approximate position: Lat. 47° 02′ N, Long. 53° 44′ W).

Branch: A semi-exposed cove of about 1 mile in width.

Substrate ranged from rock ledges, pebbles to sand. In August, 1967, the water was of two layers: an upper silty, brackish and warmer layer (25 o/oo and 20°C) and a lower layer which was clear, more saline and colder (35 o/oo and 10°C). Visited August 12, 1948 and August 9, 1967. (Approximate position: Lat. 46° 53′ N, Long. 53° 59′ W).

Placentia Bay and the Extreme Southern Tip of the Burin Peninsula

Perch Cove: A semi-exposed cove on the eastern side of Placentia Bay — about 1.3 miles south of Cuslett. Visited August 12, 1948. (Approximate position: Lat. 46° 53′ N, Long. 54° 12′ W).

Cuslett: A small semi-exposed cove with steep rocky sides; approximately ½ mile long and wide. Substrate at the head of the cove consisted of pebbles. Visited August 12, 1948 and August 9, 1967. (Approximate position: Lat. 46° 54.5′ N, Long. 54° 10.5′ W).

Patrick's Cove: A semi-exposed cove approximately 6 miles north of Cuslett. Visited August 12, 1948. (Approximate position: Lat. 46° 59′ N, Long. 54° 07.5′ W).

Gooseberry Cove: A small semi-exposed cove with steep rocky sides; approximately ½ mile wide and ¾ mile long. Substrate of scattered boulders below the ledges. Visited August 9, 1967. Approximate position: Lat. 47° 03.9′ N, Long. 54° 06′ W).

Ship Cove: A small semi-exposed cove (approximately ¾ mile wide and 1 mile long) with the same topography and substrate as Gooseberry Cove except that the headland substrate was coarse sand. Visited August 12, 1948 and August 9, 1967. (Approximate position: Lat. 47° 06′ N, Long. 54° 03′ W).

Big Barachois: A sheltered beach at the mouth of the Big Barachois River. Visited August 12, 1948. (Approximate position: Lat. 47° 06′ N, Long. 54° 05′ W).

Green Point: A semi-exposed beach approximately 2 miles south of Placentia Harbour. Visited August 12, 1948. (Approximate position: Lat. 47° 11′ N, Long. 54° 03′ W).

Point Verde: An exposed open coastal site. Substrate con-

sisting of large boulders. Surface water salinity 35 0/00, temperature 17°C. Visited August 8, 1967. (Approximate position: Lat. 47° 14′ N, Long. 54° 00.5′ W).

Ferndale: A sheltered cove at the entrance to Placentia Harbour; with steep sides. Substrate of boulders and stones. Visited August 9, 1967. (Approximate position: Lat. 47° 13′ N, Long. 53° 54′ W).

Fox Harbour: A sheltered cove (approximately 15 feet deep) in Placentia Sound; polluted waters. Substrate of scattered boulders and mud. Visited August 9, 1967. (Approximate position: Lat. 47° 19.2′ N, Long. 53° 54.8′ W).

Ship Harbour: A semi-exposed harbour in Placentia Sound; with steep vertical sides; substrate of large boulders. Visited August 12, 1948 and August 9, 1967. In late August 1967 the surface water temperature was 15°C. (Approximate position: Lat. 47° 22′ N, Long. 53° 55′ W). The Placentia Sound area was also visited by Humm on August 13 and 15, 1948.

Long Harbour: A sheltered harbour on the northwest coast of the Avalon Peninsula. Visited August 13, 1948. (Approximate position: Lat. 47° 27′ N, Long. 53° 48′ W).

Arnold's Cove: A sheltered cove with long beaches and small cliffs. Substrate of scattered boulders. Surface water salinity 33.6 0/00, temperature 16°C. Visited August 12, 1967. Approximate position: Lat. 47° 45.8′ N, Long. 53° 59.4′ W).

North Harbour: A sheltered harbour with a flat sloping bottom. Substrate of silt-covered pebbles and limestone outcrops. Surface water salinity 32 0/00, temperature 18°C. Visited August 12, 1967. (Approximate position: Lat. 47° 50.8′ N, Long. 54° 06′ W).

Garden Cove: A sheltered area with a strong tidal current. Substrate of large boulders. Surface waters are turbid, brackish (18 0/00) and warm (20°C). Visited August 12, 1967. (Approximate position: Lat. 47° 50.8′ N, Long. 54° 50.8′ W).

Swift Current: A sheltered site west of Garden Cove; substrate of scattered boulders. Surface water temperature

20°C, salinity 30 0/00. Visited August 10, 1967. (Approximate position: Lat. 47° 53′ N, Long. 54° 15′ W).

Sound Island: Collections were made on the west side of the Island. Visited August 12, 1948. (Approximate position: Lat. 47° 47′ N, Long. 54° 13.5′ W).

Chamber's Island (west of): Collections were made along the mainland west of the Island. Visited August 15, 1948. (Approximate position: Lat. 47° 35′ N, Long. 54° 22′ W).

Haystack: A sheltered cove on the northeastern port of Long Island. Visited August 15, 1948. (Approximate position: Lat. 47° 37′ N, Long. 54° 07′ W).

Merasheen: A semi-exposed cove on the south-west corner of Merasheen Island. Visited August 15, 1948. (Approximate position: Lat. 47° 22′ N, Long. 54° 23′ W).

Long Island: An island about 1 mile wide and 4.7 miles long — due south of Petit Forte on the western side of Placentia Bay. Visited August 15, 1948. (Approximate position: Lat. 47° 19′ N, Long. 54° 42′ W).

Petit Forte: A sheltered coastal area due north of Long Island, and on the western side of Placentia Bay. Visited August 15, 1948. (Approximate position: Lat. 47° 20′ N, Long. 54° 42′ W).

Little Harbour: A sheltered harbour due west of Baine Harbour. Visited August 15, 1967. (Approximate position: Lat. 47° 18′ N, Long. 54° 48′ W).

Great Paradise: A semi-exposed site on the northwest coast of the Burin Peninsula. Visited August 15, 1948. (Approximate position: Lat. 47° 18′ N, Long. 54° 37′ W).

Parker's Cove: A sheltered cove (about 1 mile long). Collections were made from the pier and on scattered boulders. Surface water temperature 20° C, salinity 30 o/oo. Visited on August 10, 1967. (Approximate position: Lat. 47° 25′ N, Long 54° 50′ W).

Baine Harbour: A protected harbour with poor algal growth. Visited August 11, 1967. (Approximate position: Lat. 47° 22′ N, Long. 54° 55′ W).

Red Harbour: A semi-exposed rocky site with large rock outcrops and boulders. Surface water temperature 17° C,

salinity 25 o/oo. Visited on August 10, 1967. (Approximate position: Lat. 47° 17.5′ N, Long. 54° 59′ W).
Marystown: A sheltered site along the town front at Marystown; within Mortier Bay. Visited August 17, 1948. (Approximate position: Lat. 47° 10′ N, Long. 55° 10′ W).
Port au Bras: A semi-exposed cove with steep cliffs. Located about ½ mile south of the town. Visited on August 17, 1948 and August 11, 1967. In August 1967 the surface water salinity was 29 o/oo and the temperature 15° C. (Approximate position: Lat. 47° 14.3′ N, Long. 55° 08′ W).
Bull Cove: A rocky coastal area with polluted water and poor visibility. Visited on August 11, 1967. (Approximate position: Lat. 47° 03′ N, Long. 55° 09′ W).
Little St. Lawrence Harbour: A protected harbour. Collections were made in the north side of the harbour. The substrate (boulders) was covered with fine sediment. The water was of two layers: an upper silty, brackish and warmer layer (15 o/oo and 18° C) and a lower layer which was clear, more saline and colder (32.8 o/oo and 10° C). Visited on August 11, 1967. (Approximate position: Lat. 46° 56′ N, Long. 55° 21′ W).
Lawn: A semi-exposed rocky shore line with large boulders. The upper surface layers was warmer and less saline (15 o/oo and 18° C) than the lower layer (32.8 o/oo and 10° C). Visited on August 11, 1967. (Approximate position: Lat. 46° 56′ N, Long. 55° 32′ W).
Taylor Bay: A semi-exposed bay on the southern tip of the Burin Peninsula — just north of Point au Gaul. Visited August 17, 1948. (Approximate position: Lat. 46° 50′ N, Long. 55° 43′ W).
Lamoline: A semi-exposed shallow bay with scattered boulders. Surface water salinity 33.3 o/oo, temperature 17° C. Visited on August 11, 1967. (Approximate position: Lat. 46° 52′ N, Long. 55° 48′ W).
Lories: An exposed location on the southern tip of the Burin Peninsula; near Point May. Visited August 17, 1948. (Approximate position: Lat. 46° 51′ N, Long. 55° 55′ W).

Point Crewe: An exposed location approximately 3 miles west of Lories. Visited August 17, 1948. (Approximate position: Lat. 46° 52.5′ N, Long. 55° 58′ W).

Fortune Bay

Grand Bank: An exposed coastal area with substrate of large boulders and pebbles. Surface water salinity 33.2 o/oo, temperature 18° C. Visited August 11, 1967. (Approximate position: Lat. 47° 06′ N, Long. 55° 48′ W).

Garnish: An exposed coastal area with substrate grading from large outcrops to sand. Collection was made ½ mile south of the town. Visited August 11, 1948 and August 11, 1967. In August, 1967, the surface water salinity was 32 o/oo and the temperature 16° C. (Approximate position: Lat. 47° 14′ N, Long. 55° 22.2′ W).

Harbour Mille: A semi-exposed coastal area with steep cliffs. Bottom irregular and of large boulders. Surface water salinity 33 o/oo, temperature 19° C. Visited August 12, 1967. (Approximate position: Lat. 47° 35′ N, Long. 54° 56.5′ W).

Little Harbour East: A "V" shaped protected cove with a river flowing into it; approximately ½ mile south of Little Harbour East proper. A delta extends about ½ mile into the cove and it consists mostly of large pebbles. No large stones were present except along the sides. The surface water salinity at the head was brackish (18.2 o/oo) and it increased towards the mouth; temperature 20° C. Visited August 12, 1967. (Approximate position: Lat. 47° 35.5′ N, Long. 54° 50.8′ W).

Trinity Bay

Dildo: A sheltered beach located approximately ½ mile south of Dildo. Substrate of scattered boulders and pebbles which were covered with sediments. Visited August 15, 1967. (Approximate position: Lat. 47° 34′ N, Long. 52° 32′ W).

Spread Eagle: A sheltered beach located approximately 1 mile south of Spread Eagle. Substrate and topography similar to that at Dildo. Visited August 15, 1967. (Approximate position: Lat. 47° 32.5′ N, Long. 52° 35.5′ W).

Gull Cove: A semi-exposed cove on the east side of Trinity. Visited August 25, 1948. (Approximate position: Lat. 47° 48′ N, Long. 53° 31′ W).

Hant's Harbour: Collections were made on the exposed coastal side and the sheltered inner harbour side. The substrate on the exposed side ranged from large outcrops of rocks to scattered boulders, while scattered boulders and mud were present on the harbour side. The sublittoral area showed extensive grazing by sea urchins and also ice scouring. Surface water salinity 33.1 o/oo, temperature 12° C. Visited August 17, 1967. (Approximate location: Lat. 48° 01′ N, Long. 53° 16.5′ W).

Long Beach: Located on the South Arm of Random Sound. A semi-exposed location with scattered boulders in the littoral and sublittoral zones. Surface water salinity 33.8 o/oo, temperature 11° C. Visited August 18, 1967. (Approximate position: Lat. 48° 01′ N, Long. 53° 50.5′ W).

Adeyton: Located on the North West Arm of Random Sound. A sheltered beach with scattered boulders in the littoral and sublittoral zones. Visited August 18, 1967. (Approximate position: Lat. 48° 05′ N, Long. 53° 55′ W).

Shoal Harbour: A sheltered harbour with few scattered boulders in the littoral zone and a sand-mud bottom in the sublittoral. Surface water salinity 35.5 o/oo, temperature 13° C. Visited August 18, 1967. (Approximate position: Lat. 48° 12′ N, Long. 54° 00′ W).

Milton: Collection was made at a bridge which crosses the extreme northwest portion of Smith Sound. The area is a protected, shallow bay with occasional boulders on a mud flat. Visited August 18, 1967. (Approximate position: Lat. 48° 13′ N, Long. 53° 49.5′ W).

Conception Bay

Kelly's Island (a): An exposed coastal area on the south west corner of the Island. Substrate of large outcrops and scattered boulders. Visited August 16, 1967. (Approximate position: Lat. 47° 33′ N, Long. 53° 01′ W).

Kelly's Island (b): An exposed coastal area on the northwest side of the Island. Substrate and topography as at

station "a". The sublittoral area showed extensive grazing of sea urchins, and ice scouring was also evident. Much of the vegetation was restricted to cracks and crevices. Visited August 16, 1967. (Approximate position: Lat. 47° 33.3′ N, Long. 53° 00′ W).

Foxtrap: A semi-exposed coastal area with scattered boulders. Much of the substrate was denuded by ice action. Surface water salinity 31.6 o/oo, temperature 14.4° C. Visited August 16, 1967. (Approximate position: Lat. 47° 31′ N, Long. 52° 58′ W).

Bell Island: Collections were made on the southwest corner of the Island in a semi-protected cove area which had steep cliffs. The substrate ranged from large outcrops, boulders, pebbles to sand. Surface water temperature 15° C. Visited on August 16, 1967. (Approximate position: Lat. 47° 37′ N, Long. 53° 00.5′ W).

Carbonear Island: Collections were made on the east side of the Island in an exposed rocky beach. Substrate of large boulders. Surface water salinity 31.0 o/oo, temperature 8° C. Visited August 16, 1967. (Approximate position: Lat. 47° 41.5′ N, Long. 53° 12.5′ W).

Harbour Grace (a): A semi-exposed portion at the mouth of the harbour. Substrate of large rock outcrops and scattered boulders. The vegetation was heavily grazed by sea urchins. Visited August 16, 1967. (Approximate position: Lat. 47° 41.5′ N, Long. 53° 12.5′ W).

Harbour Grace (b) — Kings Beach: A sheltered beach southwest of station "a". Substrate of scattered boulders which were heavily covered with sediments. The water was very dirty in appearance. Visited August 16, 1967. (Approximate position: Lat. 47° 40.5′ N, Long. 53° 14′ W).

Harbour Grace (c): A sheltered beach in the town of Harbour Grace. Collections were made from the pier pilings. Surface water salinity 21.4 o/oo, temperature 6° C. Visited August 16, 1967. (Approximate position: Lat. 47° 41′ N, Long. 53° 13′ W).

Brigus Bay: An exposed coastal area with steep cliffs. Substrate of large massive outcrops of rocks grading into boul-

ders in the sublittoral zone. Surface water salinity 31.4 o/oo, temperature 12° C. Visited August 16, 1967. (Approximate position: Lat. 47° 31′ N, Long. 53° 13′ W).

Topsail Beach: A semi-exposed location east of Kelly's Island. Collections were made by Mr. Frank Martin on May 5, 1953. (Approximate position: Lat. 47° 32′ N, Long. 52° 56′ W).

Bacon Cove: A semi-exposed site south of Colliers Point. Visited on August 8, 1948. (Approximate position: Lat. 47° 25′ N, Long. 53° 13′ W).

Bonavista Bay

Lethbridge (a): A sheltered beach in Goose Bay. Substrate of scattered boulders in the littoral zone grading into a muddy sublittoral area. Surface water salinity 33.2 o/oo, temperature 20° C. Visited August 18, 1967. (Approximate position: Lat. 48° 22′ N, Long. 53° 49.5′ W).

Lethbridge (b): A sheltered beach 1 mile past Lethbridge on the road towards Brooklyn. Substrate and topography the same as station "a". Surface water salinity 30.8 o/oo, temperature 23° C. Visited August 18, 1967. (Approximate position: Lat. 48° 22′ N, Long. 53° 50.5′ W).

Lethbridge (c): A sheltered beach 2 miles past Lethbridge (north) on the road towards Brooklyn. Substrate, topography and vegetation as at stations "a" and "b". Surface water salinity 32.8 o/oo, temperature 20° C. Visited August 18, 1967. (Approximate position: Lat. 48° 23.7′ N, 53° 51′ W).

Lethbridge (d): A sheltered beach 3 miles past Lethbridge on the road towards Brooklyn. Substrate of fine gravel grading into scattered rocks and mud in the sublittoral zone. Visited August 18, 1967. (Approximate position: Lat. 48° 24.7′ N, Long. 53° 49.5′ W).

Sweet Bay: A sheltered location with large outcrops of rocks and scattered boulders. The vegetation was localized in cracks and crevices because of extreme ice action. Visited August 19, 1967. (Approximate position: Lat. 48° 27.2′ N, Long. 53° 38.1′ W).

Bloomfield: A sheltered beach in Goose Bay — 1 mile past

the post office. Substrate of scattered boulders grading into mud in the sublittoral zone. Surface water salinity 33.8 o/oo, temperature 15° C. Visited August 19, 1967. (Approximate position: Lat. 48° 23′ N, Long. 53° 54.9′ W).

Sir Charles Hamilton Sound

Gander Bay (a) — Mouth of Gander River and Gander Bay: A mud flat with abundant fresh-water runoff. Substrate of scattered boulders grading into mud in the sublittoral. Surface water salinity 22.7 o/oo, temperature 18° C. Visited August 20, 1967. (Approximate position: Lat. 49° 15.7′ N, Long. 54° 29.2′ W).

Gander Bay (b): A mud flat area 1.2 miles north of station "a". Substrate and topography the same as station "a". Surface water salinity 30.2 o/oo, temperature 20° C. Visited August 20, 1967. (Approximate position: Lat. 49° 15.8′ N, Long. 54° 28′ W).

Gander Bay (c): A mud flat area 4.1 miles north of station "a". Substrate and topography the same as at stations "a" and "b". Visited August 20, 1967. (Approximate position: Lat. 49° 20.4′ N, Long. 54° 21′ W).

Davidsville (a): A mud flat area with scattered boulders and a few pebbles. Opposite the post office in Davidsville. Collection was made from a pier piling at the location. Surface water salinity 23.5 o/oo, temperature 18° C. Visited August 20, 1967. (Approximate position: Lat. 49° 21′ N, 54° 21.5′ W).

Davidsville (b): A mud flat area with scattered rocks — 1.5 miles north of Davidsville. Visited August 20, 1967. (Approximate position: Lat. 49° 22.5′ N, Long. 54° 21′W).

Carmanville: A mud flat area with scattered rocks (opposite a general store), ½ mile before the ferry dock to Fogo Island. Visited August 20, 1967. (Approximate position: Lat. 49° 23′ N, Long. 54° 19′ W).

Noggin Cove: A sheltered cove with little vegetation present. Most of the substrate was mud, but occasional rocks were present. Surface water salinity 34.0 o/oo, temperature 21.5° C. Visited August 20, 1967. (Approximate position: Lat. 49/ 23′ N, Long. 54° 22′ W).

Notre Dame Bay

Lewisporte: A sheltered beach in Burnt Bay; with brackish water. Substrate of pebbles. Visited August 21, 1967. (Approximate position: Lat. 49° 15′ N, Long. 55° 04′ W).

Embree: A sheltered beach in Little Burnt Bay. Substrate of large boulders. A collection was made from a pier piling at the location and from the boulders. Surface water salinity 31.2 o/oo, temperature 18° C. Visited August 21, 1967. (Approximate position: Lat. 49° 18.5′ N, Long. 55° 01′ W).

Mason's Cove (a): A sheltered beach in Little Burnt Bay with large scattered boulders. Visited August 21, 1967. (Approximate position: Lat. 49° 19.5′ N, Long. 55° 01.2′ W).

Mason's Cove (b): A sheltered cove (approximately ¼ mile wide) three miles north of Mason's Cove. No name applied to it on the charts. Substrate of scattered rocks and mud. Visited August 21, 1967. (Approximate position: Lat. 49° 20.5′ N, Long. 55° 03′ W).

Big Cove: A sheltered cove at the end of the road in Little Burnt Bay. Substrate of scattered boulders. Visited August 21, 1967. (Approximate position: Lat. 49° 21′ N, Long. 55° 04′ W).

Brown's Arm: A mud flat area with brackish water. Substrate of scattered boulders and mud. Visited August 21, 1967. (Approximate position: Lat. 49° 16.2′ N, Long. 55° 08.5′ W).

Laurenceton: A sheltered beach in the Bay of Exploits. Substrate of small rocks. The area was comparatively barren of vegetation because of ice jams. Surface water salinity 34.8 o/oo, temperature 19° C. Visited August 21, 1967. (Approximate position: Lat. 49° 16.2′ N, Long. 55° 17′ W).

Bay of Islands

Humber Arm (a): A sheltered bay five miles out of Corner Brook. Substrate of small rocks grading into sand-mud in the sublittoral. Surface water salinity 25.1 o/oo, temperature 19° C. Visited August 23, 1967. (Approximate position: Lat. 48° 57.5′ N, Long. 57° 58′ W).

Humber Arm (b): A sheltered beach eight miles out of

Corner Brook. The substrate and topography are the same as at station "a". Visited August 23, 1967. (Approximate position: Lat. 48° 58.8′ N, Long. 57° 55.5′ W).
Benoit's Cove: A sheltered cove in Humber Arm. Substrate and topography the same as Humber Arm stations "a" and "b". A freshwater stream emptied into the cove. Visited August 23, 1967. (Approximate position: Lat. 49° 01′ N, Long. 58° 08′ W).
Frenchman's Cove (a): A sheltered cove with gravel substrate. Visited August 23, 1967. (Approximate position: Lat. 49° 03′ N, Long. 58° 12′ W).
Frenchman's Cove (b): A sheltered location approximately 8 miles west of Frenchman's Cove. Substrate of scattered rocks and pebbles. Visited August 23, 1967. (Approximate position: Lat. 49° 03′ N, Long. 58° 18′ W).

Cabot Strait

Margaree: An exposed rocky shore west of Port aux Basques. Substrate of large rock outcrop and scattered boulders. Visited August 24, 1967. (Approximate position: Lat. 47° 34.5′ N, 59° 04′ W).

Gulf of St. Lawrence

Bottle Cove: An exposed coastal beach. Substrate of sand and a few scattered boulders. Visited August 24, 1967. (Approximate position: Lat. 47° 42′ N, Long. 59° 15.5′ W).
Red Rock Point: An exposed coastal area with scattered boulders on a sandy beach. Visited August 24, 1967. (Approximate position: Lat. 47° 41.2′ N, Long. 59° 15′ W).

St. George's Bay

Stephenville Crossing: A sheltered beach of scattered boulders grading into sand-mud. Visited August 24, 1967. (Approximate position: Lat. 48° 31′ N, Long. 58° 28′ W).

Port au Port Bay

Boswarlos (a): A semi-exposed sandy beach with occasional rock outcrops. Located 1 mile before Boswarlos. Visited August 24, 1967. (Approximate position: Lat. 48° 35.3′ N, Long. 58° 49′ W).

Boswarlos (b): A semi-exposed sandy beach with the same topography and substratum as station "a". Visited August 24, 1967. (Approximate position: Lat. 48° 36′ N, Long. 58° 50′ W).
Winter House: An exposed open coastal beach south of the "Bar" on Port au Port Bay. Substrate of large scattered boulders and sand. Visited August 24, 1967. (Approximate position: Lat. 48° 42′ N, Long. 58° 48′ W).

Bonne Bay

Glenburnie: A sheltered location 1.1 miles past Glenburnie in the South Arm of Bonne Bay. Substrate of scattered boulders and mud. The transparency of the water was very good. Surface water salinity 32.8 o/oo, temperature 22° C. Visited August 25, 1967. (Approximate position: Lat. 49° 27′ N, Long. 57° 54′ W).
Woody Point: A sheltered location at the ferry dock at Woody Point — South Arm of Bonne Bay. Visited August 25, 1967. (Approximate position: Lat. 49° 30.5′ N, 57° 54.8′ W).

Discussion[1]

Of the 155 species of marine algae listed by us from a variety of coastal environments around Newfoundland 81 species appear to be new records for the Island. In addition Collins (1905) records 2 species which we have not seen

[1]A recent paper by Lee (Lee, R. K. S. 1968, "A collection of marine algae from Newfoundland I. Introduction and Phaeophyta". Nat. Canad. **95:** 957-978) has been published since our manuscript was submitted for publication. He records 26 species of brown algae from Newfoundland and the French islands of St. Pierre and Miquelon as well as 22 red and 16 green algae. Five of the brown algae were designated as new records (*Acrothrix novae-angliae, Desmarestia media, Punctaria plantaginea, Laminaria agardhii* and *L. groenlandica*). We have not seen the first two species, but record the last three. Although no distributional information is given on the red and green algae, one of the green (*Urospora mirabilis*) and four of the red algae (*Clathromorphum compactum, Euthora cristata, Ptilota pectinata* (?) and *Pantoneura baerii*) have not been recorded by us. According to our information a total of 185 species of marine algae is now known from Newfoundland.

(Porphyra linearis and *Calothrix scopulorum)*, while Taylor (1957) lists 14 *(Bolbocoleon piliferum, Cladophora expansa, Ulva lactuca, Alaria pylaii, Chorda tomentosa, Fucus miclonensis, F. spiralis, Laminaria longicruris, Bangia fuscopurpurea, Euthora cristata, Furcellaria fastigiata, Phymatolithon laevigatum, Rhodomela lycopodioides,* and *Rhodophyllis dichotoma)*, and Wilce (1959) lists 7 others *(Scytonema* sp., *Prasiola crispa, Laminariocolax tomentosoides, Leptonema fasiculatum, Dumontia incrassata, Peyssonnelia rosenvingii,* and *Phymatolithon lenormandi)*. At present a total of 178 species of benthonic marine algae are recorded from Newfoundland. Detailed seasonal investigations will no doubt add substantially to this number, for most collections have been restricted to the summer months and nothing is known of the winter-early spring vegetation.

A comparison of the marine flora of the nearby Islands of St. Pierre and Miquelon (Delamare, et al 1888; De la Pylaie, 1829; Hariot, 1889; Le Gallo, 1947, 1949; Taylor, 1957) indicates that seven other species *(Lyngbya aestuarii, Pleurocapsa kerneri, Cladophora albida, Antithamnion floccosum, Gracilaria verrucosa, Sorocarpus micromorus,* and *Omphalophyllum ulvaceum)* as well as the forma *scorpioides* of *Ascophyllum nodosum* are recorded for the vicinity of Newfoundland. Some of these will probably also be found in Newfoundland.

Of the red, brown and green algae reported by us 47% were recorded from the Labrador Peninsula (Wilce, 1959), 89% from the Canadian Maritime Provinces (Edelstein and McLachlan, 1966, 1967a, b; Edelstein, McLachlan and Craigie, 1967; MacFarlane and Milligan, 1965) and 50% from Jaffrey Point, New Hampshire (Mathieson, *et al*, in press). It is evident that there is a high degree of similarity between the floras in all of the areas. Of the 178 species recorded from Newfoundland only 3 do not extend south of the Island, 37 extend only to northern New England, 45 more stop in southern New England, while 46 reach New Jersey-Maryland, 6 North Carolina, 2 South Carolina and 39 reach to the tropics. Thus the marina flora of Newfound-

land is primarily subarctic in character, but it has a strong component of boreal and cosmopolitan species. In contrast, the marine flora of Labrador is primarily composed of arctic and subarctic components (Wilce, 1959) and it has a larger arctic element than Newfoundland. Several of the species recorded from Labrador are not known from Newfoundland or the Maritime Provinces. However, additional collections from the northern coasts of Newfoundland may show a somewhat larger arctic component.

A comparison of the number of species in the Maritime Provinces (Edelstein and McLachlan, 1966, 1967a, b; Edelstein, McLachlan and Craigie, 1967; MacFarlane and Milligan, 1965), Newfoundland and Labrador (Wilce, 1959) indicates that there is a reduction in the number of species farther north — i.e. as the winter conditions become more extreme. In fact, according to Wilce (1959), the arctic-subarctic floras of the north are primarily characterized by a lack of species and color diversity. Similarly fewer species are recorded from the northern than from the southern shores of Newfoundland. Although ice scouring is more rigorous in northern than southern Newfoundland, many of the southern locations show pronounced scouring. Extensive grazing by sea urchins *(Strongylocentrotus drobachiensis)* is evident in the sublittoral zones (from 10 to at least 30 feet) of many exposed and semi-exposed open coasts. The combined effects of sea urchin grazing and ice scouring eliminate the bulk of the mid-sublittoral vegetation on the latter coasts. The residual flora in such areas consists mostly of crustose corallines, *Agarum cribrosum*, *Desmarestia* spp. and occasional small plants of other species in crevices.

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