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NATURAL HISTORY OF THE HOGAN GROUP

2. SOME MARINE ALGAE FROM HOGAN ISLAND, BASS STRAIT,

WITH AN ACCOUNT OF THE MARINE ZONATION

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(with one text-figure and one plate)

ABSTRACT

The marine zonation of Hogan Island was studied as part of the McCoy Society expedition early in 1968. The composition of the supra-littoral zone is similar to that in Tasmania and Wilson's Promontory while the composition of the littoral zone and the sublittoral fringe has greater resemblance to South Australian coasts. A list of the algae collected is appended.

INTRODUCTION

The algae of the Victorian and Tasmanian coasts have been studied for over one hundred and fifty years and algal collections from these southern shores form the basis of the classical work on the Australian algae. However, on the Eastern Bass Strait Islands, which form an almost uninterrupted chain linking Victoria and Tasmania and thus present a unique opportunity to study the range of marine organisms, only a few algal collections of the most common species have been made.

The earliest collection from the Eastern Bass Strait Islands is that of R. Brown, made on Deal Island, Kent Group in the summer of 1803. The specimens were described by Turner (1808, 1809, 1811, 1819) and are referred to, in part, by Harvey (1840, 1847, 1863). A small collection was also made from Deal Island by Bennett and Pope for their intertidal zonation survey (Bennett and Pope 1960). Similar collections for this and an earlier survey (Bennett and Pope 1953) were made from Citadel Island, Glennies Group and Goose Island in the Furneaux Group.

The earliest collection of marine algae from the Furneaux Group is that of J. Milligan, the superintendent and medical officer of the Aborigines on Flinders Island from 1843-1847. These are discussed and listed in Harvey (1863). Some marine algae collected on Flinders Island by Mueller were described by De Toni (1896) while the only recent records from this island are those by F. Perrin (see Guiler 1952) and Saenger (1967). The intertidal zonation of Fisher Island, immediately south of Flinders Island, has been described by Guiler (Guiler, Serventy and Willis 1958) and an account of the important species given. Gillham (1965) has discussed subsequent changes in the marine flora of Fisher Island. Cribb (1956, 1958) discusses a few algal species which have been dredged from the vicinity of Cape Barren and Goose Islands, Furneaux Group, by A.M. Olsen.

The collection described here was made during the McCoy Society expedition to Hogan Island from January 20th to February 2nd, 1968.

GENERAL

The Hogan Island Group is situated 42 km south-east of Wilson's Promontory (see map, Hope *et al.* this volume) where it is constantly exposed to the prevailing westerly winds. Hence, the rocky west coast of Hogan Island is exposed to the westerly winds while the rocky east coast is relatively sheltered. Using the exposure scale of Bennett and Pope (1960), the west coast of Hogan Island can be classified as "maximal exposed" and the east coast as a "moderate exposed" rocky coast.

The coastline of Hogan Island consists entirely of steeply-sloping rocks of fine-grained and porphyritic granites with the exception of two small sandy beaches on the eastern side of the island. The calcarenite which overlays the granite and covers much of the island, only occurs in the intertidal zone at one point. At this locality on the northern coast, one small limestone rock-pool is found high in the upper littoral zone.

No meteorological information is available for the island and as the field trip was of such limited duration, no temperature, wind and rainfall data could be obtained.

The tidal range on the east coast of Hogan Island was estimated to be 1.2 - 1.95 m using a graduated, firmly fixed, vertical pole. This estimation includes spring tides which occurred during the latter part of the stay on the island. This together with the zonation pattern observed on the eastern coast, indicates a mean tidal range of approximately 1.2 - 1.5 m. As diving equipment was available, the sub-littoral zone was also investigated and has been included in the description of the sub-littoral fringe.

NOTES ON THE MARINE ZONATION

The marine zonation of the rocky shores of Hogan Island agrees well with the general pattern described for the Tasmanian coastline by Bennett and Pope (1960). These authors have recognized four basic zones: (a) supra-littoral (spray) zone; (b) upper littoral (barnacle) zone; (c) lower littoral (coralline) zone and (d) the sub-littoral fringe.

An 0.6 m wide line transect from the east coast of Hogan Island (fig. 1) shows the vertical distribution of the major zone forming species in relation to the approximate mean low water level. The generalized zonation pattern is shown on the right in Figure 1.

The Supra-littoral Zone

The orange lichen band (*Caloplaca* sp.) is well developed and conspicuous. The black band immediately below it (see plate 1) consists of a "sooty black growth" (mainly composed of *Microthelia aterrima* (Anzi) Zahlbruckner).

Only *Melarapha unifasciata* (Gray) was collected from this zone; *Melarapha praeternissa* (May) appears to be absent. The common rock-crab of New South Wales, *Leptograpsus variegatus* (Fabricius) does occur in this zone but is more frequent in the upper littoral zone.

The Upper Littoral Zone

The barnacles *Chthamalus antennatus* Darwin and *Chamaesipho columna* (Spengler) occur high in this zone, occupying the same shore levels as they do on the Victorian (Bennett and Pope 1953) and South Australian (Womersley and Edmonds 1958) coasts. *Catophragmus polymerus* Darwin occurs throughout, though in greater density at the lower levels while *Balanus nigrescens* Lamarck occurs only at the lower levels and extends into the coralline mat of the lower littoral zone. Small patches of the mussel *Mytilus planatus* (Lamarck) are present. The most common molluscs at this level are *Cellona solida* (Blainville), *Siphonaria diemensiensis* Quoy et Gaimard, *Lepsiella reticulata* (Blainville), *Patelloida alticosta* (Augas) and *Austrocochlea constricta*

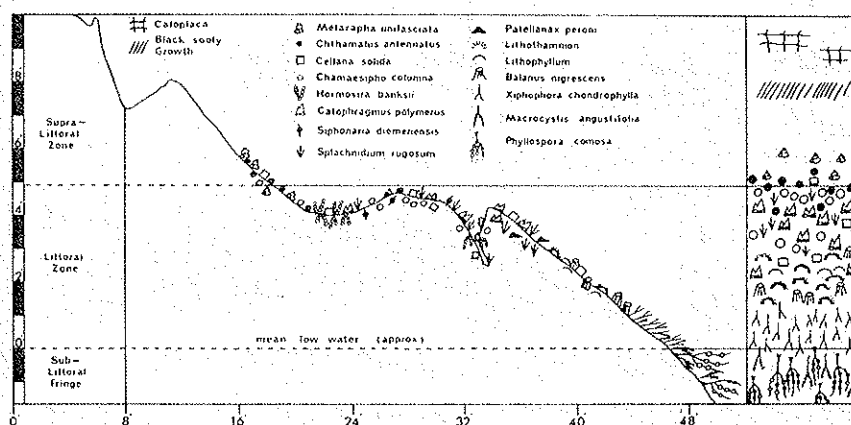


FIG. 1 - The vertical distribution of the more common organisms along a line transect on the east coast. On the right, a generalized pattern of the east coast zonation is shown in relation to the approximate mean low water level.

(Lamarck). The red anemone *Actinia tenebrosa* Farquhar occurs in crevices and under ledges.

The algae common in this zone are *Ulva lactuca*, *Splachnidium rugosum* and *Rivularia australis*. *Laurencia botryoides* and *Pterocladia capillacea* occur in crevices and channels at this level.

The Lower Littoral Zone

The coralline weed mat is well developed and *Lithophyllum hyperellum* occurs sporadically through it. As already mentioned, *Balanus nigrescens* occurs in the upper regions of this zone. The following molluscs are numerous in this zone: *Cellana solida*, *Melanerita melanotragus* (Smith), *Bembecium nanum* (Lamarck), *Patellanax peroni* (Blainville), *Austrocochlea adalaida* (Philippi) and *Aulocochiton cimolia* (Reeve). A red encrusting sponge and the echinoderm *Patiriella exiqua* (Lamarck) are also present.

Algae present on the smooth granite slopes are *Ulva lactuca*, *Halopteris* spp., *Leathesia difformis*, *Amphiros ephedraea*, *Corallina* spp., *Hymenocladia conspersa*, *Jania* spp., *Laurencia* spp., *Plocosium angustum* and *Pterocladia capillacea* while *Caulerpa brownii*, *C. geminata*, *Codium fragile* subsp. *tasmanicum*, *C. pomoides* and *Xiphophora chondrophylla* are restricted to rock pools and crevices at this level.

The Sub-littoral Fringe and the Sub-littoral Zone

The characteristic algae of this fringe are *Cystophora subfarcinata*, *Ecklonia radiata*, *Macrocystis angustifolia* and *Phyllospora comosa* on the eastern coast and *Cystophora intermedia* on the western coast.

A narrow zone of *Xiphophora chondrophylla* occurs immediately above the large brown algae of this zone (plate 1). Between the holdfasts of the large brown algae, small corallines and "Lithothamnia" are frequent.

The sub-littoral zone is dominated by the same large brown algae as are present in the sub-littoral fringe, at least to a depth of 6 m. However, below 3 m *Codium australicum*, *C. pomoides* (up to 12.5 cm in diameter), *Myriogloia sciurus*, *Melanthalia*

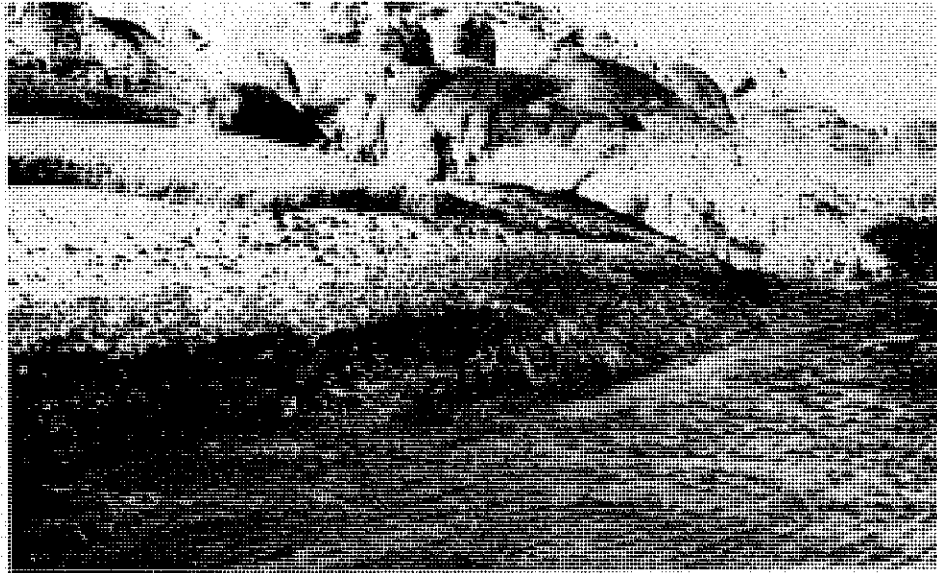


FIG. 1 - General view of the site of the transect line on the east coast of Hogan Island showing the conspicuous black lichen band in the supra-littoral zone.



FIG. 2 - Gently sloping rocks on the east coast showing the lower regions of the barnacle zone, the coralline zone, the dark band of *Xiphophora chondrophylla* and the upper portion of the sub-littoral fringe.

obtusata, *Flocanium* spp. and corallines are common.

DISCUSSION

It must be considered that the hot, dry conditions during the summer may have temporarily altered the occurrence and abundance of the intertidal organisms. Furthermore, as collections were made only in summer, only summer forms were collected. For this reason, the absence of certain species must be treated with caution, while any biogeographical interpretations must be based on the presence of particular species.

The pattern of the supra-littoral zone of Hogan Island, with the well-developed lichen bands, closely resembles that of the cool-temperate regions of Tasmania (Bennett and Pope 1960; Guiler 1950) and Wilson's Promontory in Victoria (Bennett and Pope 1953). This similarity is probably mainly due to the influence of air temperature, wind and the resultant salt spray. It is likely that the air temperatures and wind velocities influencing the coasts of Hogan Island approximate more closely to Tasmania and Wilson's Promontory than to the remaining Victorian and South Australian coasts.

The species composition of the littoral zone and the sub-littoral fringe however, appears to be more closely linked to Victorian and South Australian coasts than to Tasmanian coasts. This suggests warmer waters around Hogan Island when compared to Tasmania and possibly Wilson's Promontory.

The presence of *Balanus nigrescens*, which according to Bennett and Pope (1960, p. 206) "fails to bridge Bass Strait to Tasmania but in South Australia is as common as it is in New South Wales" suggests increased water temperatures around Hogan Island relative to the Tasmanian mainland. *Balanus nigrescens* is reported from Wilson's Promontory (Bennett and Pope 1953) but was not collected by these authors on Citadel Island, Deal Island and Goose Island (Pope, pers. comm.). It is also absent from Fisher Island in the Furneaux Group (Guiler, Serventy and Willis 1958).

Xiphophora chondrophylla forms a characteristic narrow zone around Hogan Island while *X. gladiata* (Labillardiere) Montagne is absent from Hogan Island. Similarly, Bennett and Pope (1960) collected *X. gladiata* at western, eastern and southern localities while *X. chondrophylla* was collected on the warmer northern coast of Tasmania.

Some similarity with South Australian coasts can be seen in the sub-littoral fringe. On the exposed western coast of Hogan Island, *Cystophora intermedia* was the dominant alga in the sub-littoral fringe while *Durvillea potatorum* Areschoug was absent. Womersley and Edmonds (1958) have shown *Cystophora intermedia* to be the characteristic alga in the sub-littoral fringe of exposed coasts in the slightly warmer waters west of Robe, while in the cooler waters east of Robe and around Tasmania, it appears to be replaced by *Durvillea potatorum*.

This suggests that *Cystophora intermedia* is common in the exposed sub-littoral fringe of Hogan Island because of slightly higher water temperatures when compared to similar coasts in Tasmania and parts of Victoria where *Durvillea potatorum* is common.

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APPENDIX

A LIST OF THE ALGAE COLLECTED ON HOGAN ISLAND

CHLOROPHYTA

Order Ulvales

Fam. Ulvaceae

Enteromorpha clathrata (Roth) Greville

Common only on horizontal areas in the lower intertidal zone.

Ulva lactuca Linnaeus*Ulva* sp.

Free-floating thalli were found in brackish water soaks approximately 30.5 m above high water mark on the western side of the island.

Order Cladophorales

Fam. Cladophoraceae

Chaetomorpha darwini (Hooker) Kuetzing

Order Caulerpales

Fam. Caulerpaceae

Caulerpa brownii (C. Agardh) Endlicher*Caulerpa geminata* Harvey*Caulerpa obscura* Sonder

Order Derbesiales

Fam. Derbesiaceae

Derbesia clavaeformis (J. Agardh) De Toni

Order Codiales

Fam. Codiaceae

Codium australicum Silva*Codium fragile* subsp. *tasmanicum* (J. Agardh) Silva*Codium pomoides* J. AgardhPHAEOPHYTA

Order Ectocarpales

Fam. Ectocarpaceae

Ectocarpus siliculosus (Dillwyn) LyngbyeEpiphytic on *Hormosira banksii*

Order Sphacelariales

Fam. Sphacelariaceae

Sphacelaria furcigera Kuetzing

Fam. Stypocaulaceae

Halopteris funicularis (Montagne) Sauvageau*Halopteris* ? *gracilescens* (J. Agardh) Womersley

The material is sterile

Order Dictyotales

Fam. Dictyotaceae

Dictyota dichotoma (Hudson) Lamouroux*Dictyota prolifera* Lamouroux*Pachydictyon paniculatum* (J. Agardh) J. Agardh*Dictyopteris muelleri* (Sonder) Reinbold*Zonaria sinclairii* Hooker et Harvey

Order Chordariales

Fam. Corynophlaeaceae

Leathesia difformis (Linnaeus) Areschoug

Fam. Chordariaceae

Myriogloia sciurus (Harvey) Kuckuck

Fam. Splachnidiaceae

Splachnidium rugosum (Linnaeus) Greville

Fam. Notheiaceae

Notheia anomala Harvey et Bailey

Order Sporochnales

Fam. Sporochnaceae

Perithalia caudata (Labillardière) Womersley
 Order Dictyosiphonales
 Fam. Punctariaceae
Colpomentia peregrina (Sauvageau) Hamel
 Order Laminariales
 Fam. Lessoniaceae
Macrocystis angustifolia Bory
 Fam. Alariaceae
Ecklonia radiata (C. Agardh) J. Agardh
 Order Fucales
 Fam. Hormosiraceae
Hormosira banksii (Turner) Decaisne
 Fam. Fucaceae
Xiphophora chondrophylla (R. Brown) Montagne
 Fam. Seirococcaceae
Phyllospora somosa (Labillardière) C. Agardh
 Fam. Cystoseiraceae
Acrocarpia paniculata (Turner) Areschoug
Caulocystis cephalornithos (Labillardière) Areschoug
Cystophora intermedia J. Agardh
Cystophora moniliformis (Esper) Womersley et Nizamuddin
Cystophora subfarcinata (Mertens) J. Agardh
 Fam. Sargassaceae
 Sub-genus *Arthrophyucus* J. Agardh

RHODOPHYTA

Order Bangiales
 Fam. Erythropeltidaceae
Erythrotrichia carnea (Dillwyn) J. Agardh
 Order Nemalionales
 Fam. Chaetangiaceae
Chaetangium fastigiatum (Bory) J. Agardh
 Fam. Donnemaisoniaceae
Asparagopsis armata Harvey
 The tetrasporic phase of this plant, known as *Falkenbergia rufolanosa* (Harvey) Schmitz was also collected.
 Order Gelidiales
 Fam. Gelidiaceae
Gelidium australe J. Agardh
Gelidium glondulaefolium Hooker et Harvey
Pterocladia capillacea (Gmelin) Bornet et Thuret
 Order Cryptonemiales
 Fam. Corallinaceae
Lithothamnion sp.
Lithophyllum hyperellum Foslie
Amphiroa ephedraea (Lamarck) Decaisne
Corallina spp.
 The specimens probably represent *C. officinalis* Linnaeus and *C. cuvieri* Lamouroux
Jania spp.
 The specimens probably represent *J. fastigiata* Harvey and *J. microrarthrodia* Lamouroux
 Order Gigartinales
 Fam. Gracilariaceae
Melanthalia obtusata (Labillardière) J. Agardh
 Fam. Plocamiaceae
Plocanium angustum (J. Agardh) Hooker et Harvey
Plocanium?costatum (J. Agardh) Hooker et Harvey
 Order Rhodomeniales
 Fam. Rhodomeniaceae
Hymenocladia conspersa (Harvey) J. Agardh
Hymenocladia sanguinea (Harvey) Sparling

Fam. Lomentariaceae

Champia tasmanica Harvey? *Lomentaria* sp.

The lack of fertile material has not permitted definite determination of this material.

Order Ceramiales

Fam. Ceramiaceae

Antithamnion sp.

Epiphytic on a number of brown algae.

? *Antithamnionella* sp.Fragments probably representing this genus were found amongst the tufts of *Lynbya majuscula*.*Ballia callitricha* (C. Agardh) Kuetzing*Ceramium* spp.

Fragments of this genus were epiphytic on other algae.

Centroceras clavulatum (C. Agardh) Montagne*Lejolisia aegagrophila* J. AgardhEpiphyte on *Xiphophora chondrophylla**Spyridia biannulata* J. Agardh*Wrangelia clavigera* Harvey

Fam. Delesseriaceae

Phytomphora amansioodes (Sonder) Womersley

Fam. Rhodomelaceae

Herpopteros fallax FalkenbergEpiphyte on *Pterocladia capillacea**Polysiphonia nigrita* SonderAt least two further species of *Polysiphonia* were collected but the material was inadequate for determination.*Laurencia botryooides* Gaill*Laurencia clavata* Sonder*Laurencia elata* (C. Agardh) Harvey*Laurencia forsteri* (Mertens) Greville*Laurencia heteroclada* Harvey*Laurencia obtusa* Lamouroux

three further specimens of red algae were collected but were inadequate for determination.

CYANOPHYTA

Order Nostocales

Fam. Oscillatoriaceae

Lynbya majuscula (Dillwyn) Harvey

Fam. Rivulariaceae

Calothrix sp.*Rivularia australis* Harvey*Rivularia firma* Womersley