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**TOPOGRAPHY AND CORAL DISTRIBUTION OF
BUSHY AND REDBILL ISLANDS AND SURROUND-
ING REEF, GREAT BARRIER REEF, QUEENSLAND**

by Carden C. Wallace and E. R. Lovell

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by Carden C. Wallace^{1/} and E.R. Lovell^{2/}

INTRODUCTION

The following description presents information obtained by the authors over a ten day period, 26 December 1972 to 4 January 1973. The purpose of this paper is to provide an introduction to an area which was previously unstudied, as an aid to further investigation.

Locality: The area studied is located on the inner shelf of the Great Barrier Reef Province, southern region, latitude 20° 57'S, longitude 150° 5'E. This is approximately 92 km ENE of Mackay, on the Queensland coast (see inset, fig.1).

Orientation and size: The reef is oval, its long axis running NNW to SSE. Maximum length is approximately 6 km, and width 4 km. Surrounding water depth ranges from 26 m to 54 m.

Winds and rainfall: The main wind influence is east-southeasterly to southeasterly and continues throughout the year (see inset, fig.1). Rainfall at nearby Pine Islet averaged 3478 points per year in the period 1935-1973, the highest falls being in January to March (information from the Australian Bureau of Meteorology).

Tidal range: The reef lies within a zone of high tidal range, this being approximately 5 m (taken by extrapolation from Maxwell 1968, fig.42).

Other descriptions of the area: The reef and islands are described briefly in the Australia Pilot Vol.IV (1962). Bushy Island is mentioned and figured by Steers (1938), who visited the area during rough weather and made a rapid survey. A collection of 23 coral specimens, comprising 7 species, in the

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Great Barrier Reef Committee collections at the Queensland Museum is labelled "Redbill Reef, coll.: Geranium". This was apparently obtained from the reef flat adjacent to Redbill Island by Charles Hedley in 1924 (see Hedley, 1925, and also Appendix 1, this paper).

TOPOGRAPHY

The Islands

Orientation, structure and size: The islands are situated on the western edge of the reef, Bushy Island 1.2 km NNW of Redbill. Redbill is a continental island, composed principally of alkali granite bisected by dykes of microdiorite and trachyandesite. It is approximately 21 m high and 1.6 hectares in area. Bushy Island is a coral cay, of area approximately 7.3 hectares, the beach crest being approximately 4 m above the inner reef flat. It is composed of coral sand, and a sand pit is developed at the NNE end of the island. A ridge of beach rock extends along the E-SSE edge (see fig.2), not on the SW side as recorded by Steers (1938).

Terrestrial vegetation: Species lists of plants from both islands are given in Appendix 2. Nineteen species were recorded from Bushy Island, with three predominating. The extent of the dominants is shown in fig.2. The most prevalent species, in terms of area occupied, is Pisonia grandis. The Pisonia forest excludes other species except on its margin. Pandanus sp. extends as a continuous margin along the western perimeter of the Pisonia forest to the north east, and as clumps around the remainder of the island. Bordering this and extending to the beach is a band of Tournefortia argentea. Other conspicuous beach species are Thuarea involuta, Ipomoea pes-caprae, Salsola kali and Scaevola taccada.

The Reef

Methods: Observations were made along transect lines at right angles to the reef edge (see fig.1). Lines were worked variously by walking out at low tide, by skin diving and by diving with compressor unit from a small boat, depending on accessibility and depth. Contour measurements were made with a graduated pole. As time and manpower were limited, many additional observations on the reef were made qualitatively in areas outside the transect lines.

Transect lines were marked in metres. The method of observation was to note coral species present within 15 cm on either side of the transect line in each metre segment. This was found to be a reasonably satisfactory way of covering a large cross-section of the reef for a preliminary study, although it is not proposed as an adequate or standard method for more detailed survey. Corals were recorded by presence

along the 1 m segment. In the early part of the survey, numbers of colonies were counted, individual colonies being defined as by Loya (1972). This method proved to be applicable in inner reef flat areas, but difficult to apply to the arborescent and layered-plate corals in outer areas. In cases where the species could not be separated in the field from related species, corals were identified to genus only. This was found to be necessary in genera such as Psammocora, Porites, and Montipora. A representative collection of corals was made, and these have been tentatively identified (see Appendix 1).

In qualitative work, as much as possible of the non-transect area was covered by walking out and diving, listing corals observed, and collecting specimens of each species. The sectors of the reef least observed were the outer lagoon and the eastern region (see fig.1).

The authors did not have sufficient opportunity (or facilities) to study the off-reef floor. Although the floor immediately adjacent to the reef front (8-12 m depths) was examined on three transect sites and in qualitative work, that beyond was not studied. It is hoped that this area can be the focus of further work on a return visit.

Reef structure: The reef can be regarded as consisting of a central region and three generalized surrounding regions. These can be seen in the aerial photograph (plate 1) and in fig.1.

1. The central region is generally lower than the surrounding regions, and has an inner and an outer lagoon. These reach low water depths of approximately 3 m, and have a sandy base, with scattered alcyonarian and coral growth in small patch reefs. In the non-lagoonal areas microatolls are developed, and coral growth is generally denser.

2. To the west of the central region is the region of the reef least exposed to prevailing winds. The largest zone in this region is an "inner flat" zone (in the terminology of Stoddart 1969) which extends between the islands, gradually merging with the central region in the east, and delimited by a series of green algal banks in the west. The algal flora of these banks has not yet been studied. A single bank approximately 40 m wide in the vicinity of Bushy Island breaks up into a series of narrow ledges at the tip of the Bushy Island sand spit, and into two main banks with ramifying small axillaries between Bushy and Redbill, these extending to the south west end of the reef (see fig.1). Beyond the algal banks is a "reef flat proper," which is widest in the NW and much reduced in the SW end of the region. A small lagoon is developed in this zone immediately SW of the sand spit. The "outer reef flat" in this western region is characterized by luxuriant alcyonarian growth and sponges, as well as a diverse and luxuriant coral composition. This zone continues to the reef edge, where very dense

coral growth occurs uninterrupted down the face of the reef slope to the first part of the floor at approximately 10 m. A very open spur and groove system is developed in the reef front.

3. In the region most exposed to prevailing winds, zonation is somewhat different. The widest and innermost zone is one of dense microatoll development, the microatolls being very low (approximately 30 cm in height), and elongated in a direction at right angles to the reef edge. In some areas these structures have grown together to form a continuous pavement which crumbles easily underfoot. Beyond this is a shallow "inner flat" zone with oystercovered coral boulders, and some special characteristics (such as the presence of the commercial trochus Trochus (Rochia) niloticus). This is followed by a zone of consolidated coral rubble and sand, with green algal covering, possibly analogous to the algal banks mentioned previously, but wider and more gradually sloping. Scattered coral colonies appear in this zone towards the reef edge and a narrow reef flat zone at approximately mean low water mark bordered by the reef edge is apparently analogous to the "algal ridge" of other reefs - coral cover is low but dense, of corymbose and encrusting forms, with Acropora cuneata in low vertical plates perpendicular to the reef edge (see plate 3). The reef front in this area drops as a series of terraces, between which the floor is studded with coral boulders. A spur and groove system is developed, the grooves often being secondarily overgrown, forming long slits in the reef.

4. The eastern side of the reef was the least investigated, but in the vicinity of transect 6 (NNE end of reef) it was seen to combine features of the leastexposed and the mostexposed regions. A very wide sandy "inner flat" is separated by broken algal banks from a relatively barren outer flat, then a zone of flattened coral growth, followed by luxuriant coral growth on the reef front to the floor at approximately 8 m, where large coral-covered knolls occur.

CORAL DISTRIBUTION

Distributions are variously described, depending on the methods and intensity by which zones were studied. The study concentrated on Scleractinia, but Millepora and Tubipora have been included.

"Inner Flat" Zones:

Table 1 gives coral occurrences in sections of transects running through "inner flat" zones. The zone is characterized by a small number of species, the commonest being the massive Porites (mainly P. lutea), Goniastrea australensis and Acropora palifera. (Note: The classification of Wijsman-Best (1972) is followed for Faviid species. The authors suspect that a

thorough taxonomic study of A. palifera and A. cuneata may prove them to be a single species.)

Algal Banks

The only corals occurring on the green algal banks were occasional very small encrustations of the "inner flat" species, in particular Porites, Goniastrea and Favites.

Lagoons

No lagoonal transects were made, but the following species were recorded from patch reefs within the lagoons:

<u>Pocillopora damicornis</u>	<u>Favia speciosa</u>
<u>Seriatopora hystrix</u>	<u>Favites abdita</u>
<u>Stylophora mordax</u>	<u>F. virens</u>
<u>Acropora digitifera</u>	<u>Goniastrea pectinata</u>
<u>A. palifera</u>	<u>Platygyra lamellina</u>
<u>A. hyacinthus</u>	<u>Cyphastrea serailia</u>
<u>A. cf. syringodes</u>	<u>Echinopora lamellosa</u>
<u>Montipora</u> (plate and branching species)	<u>Leptastrea purpurea</u>
<u>Astreopora myriophthalma</u>	<u>Lobophyllia corymbosa</u>
<u>Fungia actiniformis</u>	<u>Acanthastrea echinata</u>
<u>F. fungites</u>	<u>Symphyllia nobilis</u>
<u>Porites</u> (massive and branching species)	<u>Millepora exaesa</u>
<u>Goniopora tenuidens</u>	<u>M. tenera</u>
<u>Montastrea curta</u>	

Microatoll Zone of the Central Region

No transects were made in the microatoll zone, but the following species were recorded:

(a) forming microatolls:

Seriatopora hystrix
Porites andrewsi
Porites sp. 1 and 2 (branching)
Acropora palifera forma a
Pavona frondifera

Table 1. Comparison of coral occurrences in "inner flat" zones, expressed as % of total metre segments in which the coral occurs

Species	Transect 1 (length 172m)	Transect 2 (length 94m)	Transect 3A (length 98m)	Transect 3B (length 97m)	Transect 5 (length 46m)
<u>Porites</u> (<u>P. lutea</u> , <u>P. lichen</u> , <u>P. annae</u>)	35	28	8	33	4
<u>Goniastrea</u> (<u>G. australensis</u> , <u>G. pectinata</u>)	35	39	4	21	11
<u>Acropora palifera</u>	12	31	4	4	0
<u>A. digitifera</u>	6	21	2	0	0
<u>Pocillopora damicornis</u>	5	13	9	2	0
<u>Tubipora musica</u>	0	12	3	2	0
<u>Favites abditata</u>	1	0	0	0	7
<u>Goniopora tenuidens</u>	1	0	0	0	0
<u>Symphyllia nobilis</u>	0	0	0	0	2

(b) occurring on and around microatolls:

<u>Millepora exaesa</u>	<u>P. daedalia</u>
<u>Goniastrea australensis</u>	<u>P. sinensis</u>
<u>G. pectinata</u>	<u>Aerhelia horrescens</u>
<u>G. retiformis</u>	<u>Tubipora musica</u>
<u>Porites (massive species)</u>	<u>Acropora spicifera</u>
<u>Leptastrea purpurea</u>	<u>A. hebes</u>
<u>Goniopora tenuidens</u>	<u>Fungia actiniformis</u>
<u>Pocillopora damicornis</u>	<u>Symphyllia nobilis</u>
<u>Cyphastrea serailia</u>	<u>Favia speciosa</u>
<u>Platygyra lamellina</u>	<u>F. pallida</u>

Microatoll Zone of the most exposed Region

This zone was also not studied in detail, but the structural basis of the microatolls was seen to be provided by Acropora palifera forma a.

"Reef Flat Proper"

The only area corresponding to this zonation studied was in the vicinity of Transect 2, and was seen to be of similar coral composition to the "inner flat" zone, although depth was greater.

"Outer Flat" Zone

The whole "outer flat", to the edge of the reef, is here treated. Table 2 compares coral representation in three transects. The comparative lengths of the transects should be noted.

Reef Slope

Four transects passing over the first part of the reef slope are compared in table 3. Those in the region of transects 2 and 4 were gently sloping (12 m slope to a depth of 10 m); those of transects 5 and 6 dropped sharply to the floor. Alcyonarians were most prevalent in the region of transect 2 (least exposed side of reef).

Floor adjacent to first part of Slope

In all four areas studied, this part of the reef was characterized by the presence of coral knolls. The most obvious scleractinians on these knolls are arborescent forms (including Acropora intermedia, A. cf. acuminata, A. pulchra, Hydnophora rigida), "bottle brush" forms (Acropora exilis, A. cf. rosaria,

Table 2. Comparison of coral occurrences in "outer flat" zones, expressed as % of total metre segments in which the coral occurs

Species	Transect 2 (length 287m)	Transect 5 (length 46m)	Transect 4 (length 59m)	Transect 6 (length 12m)
<u>Porites</u> (massive species)	31.0	69.0	42.5	50.0
<u>Goniastrea</u> (<u>australensis</u> and <u>pectinata</u>)	12.5	2.0	29.0	
<u>Acropora</u> <u>cuneata</u> and <u>palifera</u>	13.5	45.5	47.5	8.5
<u>Favites</u> (<u>abdita</u> , <u>virens</u> and <u>flexuosa</u>)	10.0	30.5	22.0	35.5
<u>Pocillopora</u> <u>damicornis</u>	10.0	32.5	5.0	25.0
<u>Acropora</u> <u>humilis</u>	8.0	32.5	27.0	8.5
<u>Leptastrea</u> <u>purpurea</u>	2.0	19.5	12.0	8.5
<u>Montipora</u> (several species)	2.0	11.0	5.0	16.5
<u>Montastrea</u> <u>curta</u>	1.0	2.0	1.5	16.5
<u>Acropora</u> <u>hebes</u>	6.0	22.0		
<u>Seriatopora</u> <u>hystrix</u>	14.0	17.5		
<u>Symphyllia</u> <u>nobilis</u>	2.0	26.0		
<u>Stylophora</u> <u>mordax</u>	12.0	8.5		
<u>Platygyra</u> (3 species)	5.0	13.0	42.5	

Table 2 cont'd.

<u>Favia (speciosa, pallida)</u>	5.0	13.0	39.0	33.5
<u>Acropora cf. syringodes</u>	4.0	11.0	47.5	8.5
<u>Goniopora tenuidens</u>	3.5	6.5	22.0	
<u>Millepora sp.</u>	2.0	8.5	5.0	33.5
<u>Fungia fungites</u>	0.5	4.5	27.0	
<u>Acropora spicifera</u>	0.5	4.5	12.0	25.0
<u>Acrhelia horrescens</u>	1.0	2.0	1.5	8.5
<u>Coscinaria columna</u>	0.5	2.0		
<u>Echinophyllia aspera</u>	0.5	2.0		35.5
<u>Tubipora musica</u>	6.0			
<u>Euphyllia glabrescens</u>	4.0			
<u>Hydnophora exesa</u>	3.0			8.5
<u>Acanthastrea echinata</u>	3.5			
<u>Fungia scutaria</u>	2.0			
<u>Echinopora lamellosa</u>	1.5			
<u>Acropora intermedia</u>	1.0			8.5
<u>Acropora formosa</u>	1.0			

Table 2 cont'd.

Species	Transect 2 (length 287m)	Transect 5 (length 46m)	Transect 4 (length 59m)	Transect 6 (length 12m)
<u>Acropora</u> cf. <u>acuminata</u>	1.0			
<u>Acropora</u> cf. <u>clavus</u>	1.0			35.5
<u>Astreopora</u> sp.	1.0			
<u>Caulastrea</u> <u>furcata</u>	1.0			
<u>Echinopora</u> <u>gemmaea</u>	0.5			
<u>Oulophyllia</u> <u>crispa</u>	0.5			
<u>Favia</u> <u>stelligera</u>	0.5			
<u>Leptoria</u> <u>phrygia</u>	0.5			
<u>Turbinaria</u> sp.	0.5			
<u>Merulina</u> <u>ampliata</u>		4.5		8.5
<u>Acropora</u> <u>squamosa</u>		4.5		
<u>A.</u> <u>exilis</u>		2.0		
<u>Echinopora</u> <u>horrida</u>		2.0		
<u>Tubastrea</u> sp.				16.5

Table 2 cont'd.

<u>Cyphastrea serailia</u>	8.5
<u>Mycedium tubifex</u>	25.0
<u>Lobophyllia corymbosa</u>	8.5
<u>Acropora cf. rosaria</u>	8.5

Table 3. Comparison of coral occurrences in reef slope zones, expressed as % of total metre segments in which the coral occurs

Species	Transect 2 (length 12m)	Transect 4 (length 12m)	Transect 5 (length 4m)	Transect 6 (length 8m)
<u>Acropora cuneata</u>	8.5	67.0		
<u>Montipora</u> (encrusting species)	50.0	25.0	75.0	
<u>Favites</u> sp.	33.5	33.5		
<u>Acropora formosa</u>		41.5		
<u>Goniastrea australensis</u>		33.5		
<u>Leptastrea purpurea</u>	25.0	16.5	50.0	
<u>Porites</u> (massive species)	16.5	8.5	50.0	25.0
<u>Stylophora mordax</u>	8.5	25.0	50.0	
<u>Acropora variabilis</u>	8.5	25.0		
<u>A. humilis</u>		41.5		
<u>Goniopora tenuidens</u>	8.5	16.5		37.5
<u>Echinopora lamellosa</u>	16.5	16.5		
<u>Pocillopora damicornis</u>	8.5	16.5	25.0	
<u>Astreopora myriophthalma</u>	25.0			

Table 3 cont'd.

<u>Coscinaraea</u> <u>columna</u>	25.0		
<u>Cyphastrea</u> <u>serailia</u>	16.5		
<u>Millepora</u> <u>exaesa</u>	16.5	25.0	
<u>Seriatopora</u> <u>hystrix</u>		50.0	
<u>Fungia</u> <u>actiniformis</u>			25.0
<u>Acropora</u> <u>hyacinthus</u>		8.5	
<u>A.</u> <u>corymbosa</u>		8.5	
<u>A.</u> <u>cf. quelchi</u>		8.5	
<u>Turbinaria</u> <u>sp.</u>	8.5		
<u>Favia</u> <u>favus</u>	8.5		
<u>Tubipora</u> <u>musica</u>	8.5		
<u>Lobophyllia</u> <u>corymbosa</u>	8.5		
<u>Plesiastrea</u> <u>versipora</u>	8.5		12.5
<u>Merulina</u> <u>ampliata</u>	8.5	25.0	12.5
<u>Fungia</u> <u>fungites</u>	8.5		
<u>Pectinia</u> <u>lactuca</u>	8.5		
<u>Oulophyllia</u> <u>crispa</u>	8.5	25.0	

Table 3 cont'd.

Species	Transect 2 (length 12m)	Transect 4 (length 12m)	Transect 5 (length 4m)	Transect 6 (length 8m)
<u>Galaxia fascicularis</u>			25.0	
<u>Echinophyllia aspera</u>			25.0	
<u>Platygyra lamellina</u>			25.0	
<u>Echinopora horrida</u>			25.0	
<u>Leptoria phrygia</u>			25.0	
<u>Parascolymia vitiensis</u>				12.5
<u>Pachyseris rugosa</u>				12.5
<u>Acropora sp.</u>				12.5

A. murrayensis), and encrusting to plate forms (Montipora, Echinopora lamellosa, Merulina ampliata). In the region of transect 2, Pectinia lactuca is common on coral knolls and on the reef floor; in general, in this area alcyonarian growth is more luxuriant than scleractinian growth on coral knolls.

The floor is generally sandy, and coral growth includes scattered "sprawling" Acroporas such as A. cf. syringodes and various Fungiids.

DISCUSSION

Bushy-Redbill is a large reef, which presents a variety of reef associations and zonations. In this brief study some 147 Scleractinian species, from 54 genera, (61 genera and subgenera) were recorded, and it could be expected that rarer species and genera would be found by more intensive survey. The reef is reasonably accessible from the Queensland mainland, and Bushy Island is one of the few habitable coral cays in the central Great Barrier Reef Province. This would appear to be an excellent reef for further study of coral reef and reef-associated topics.

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APPENDIX 1

Scleractinian corals and non-scleractinian hard corals recorded from Bushy-Redbill Reef

The following identifications were made (by C.W.) from literature descriptions, and wherever possible with the aid of specimens in the Queensland Museum identified by J.W. Wells (Stephenson and Wells, 1956; Wells, 1955). Many of the identifications are thus of a very tentative nature. Where specimens have been entered into the Queensland Museum collections, the registration numbers are given. Some groups, particularly the genus Acropora, have not been registered, pending further study. Species also represented in the Great Barrier Reef Committee collection are marked with an asterisk.

Other Abbreviations:

- (S) sight record only
(OC) specimen collected, but not deposited in the Queensland Museum.

CLASS ANTHOZOA

SUBCLASS ZOANTHARIA

ORDER SCLERACTINIA

Suborder Astrocoeniina

Family Thamnasteriidae

- Psammocora contigua (Esper) G6931
P. cf. (Stephanaria) togianensis Umbgrove G6927
P. cf. (Plesioseris) haimeana Milne-Edwards and Haime G6925,
 G6934
P. sp.1 G6846, G6928, G6935

Pocilloporidae

- Stylophora mordax (Dana) G6871
S. pistillata (Esper) G6870
Seriatopora hystrix (Dana) G6874, G7220
Pocillopora damicornis (Linnaeus)* G6867-8, G6872-3
P. verrucosa (Ellis and Solander) (S)

Acroporidae

- Acropora abrotanoides (Lamarck).
A. cf. acuminata Verrill
A. aspera (Dana)
A. cf. brueggemani (Brook)
A. cf. clavigera (Brook)
A. cf. conferta (Quelch)
A. corymbosa (Lamarck)
A. cuneata (Dana)
A. decipiens (Brook)
A. delicatula (Brook)
A. digitifera (Dana)
A. exilis (Brook)
A. formosa (Dana)
A. cf. glochicladus Crossland
A. haimei Milne-Edwards and Haime
A. hebes (Dana)
A. humilis (Dana)*
A. hyacinthus (Dana)
A. intermedia (Brook)
A. cf. latistella (Brook)
A. cf. murrayensis Vaughan
A. palifera (Lamarck)
A. palifera forma a (Brook)
A. cf. polymorpha (Brook)
A. pulchra (Brook)
A. cf. quelchi* Crossland
A. cf. rosaria (Dana)
A. cf. rotumana (Gardiner)
A. spicifera (Dana)
A. squamosa (Brook)*
A. cf. syringodes (Brook)

- A. cf. variabilis (Klunzinger)
A. sp.1 (flat plate)
A. sp.2 (fructicose)
A. sp.3 (arborescent)
A. sp.4 (arborescent)
A. sp.5 (=A. rosaria forma 1, Crossland)
A. sp.6 (plate)
Montipora danae (Milne-Edwards and Haime) G6875, G6877, G6881
M. divaricata Brueggeman G6917
M. erythraea von Marenzeller G6913-6
M. foliosa (Pallas) G6921
M. foveolata (Dana) G6920
M. verrucosa (Lamarck) G6879-81
M. sp.1 G6923
M. sp.2 G6922
M. sp.3 G6884
M. sp.4 G6885
M. sp.5 G6924
M. sp.6 G6883
Astreopora myriophthalma (Lamarck) G6763, G6951
A. sp.1 G6946, G6949
A. sp.2 G6896

Suborder Fungiina

Super Family Agariciidae

Agariciidae

- "Agariciella" ponderosa (Gardiner) G7219
Pavona cf. clavus (Dana) G6926
P. cf. decussata (Dana) G6843
P. frondifera Lamarck G6841, G6844, G6932
P. (Pseudocolumnastrea) pollicata Wells G6842
Pachyseris rugosa (Lamarck) G6838
P. speciosa (Dana) G6839
Leptoseris ?mycetoseroides Wells G6930

Siderastreidae

- Anomastrea (Pseudosiderastrea) tayamai (Yabe and Sugiyama)
 G7230
Coscinaraea columna (Dana) G6840, G6845

Super Family Fungiidae

Fungiidae

- Fungia (Ctenactis) echinata (Pallas) (OC)
F. (Pleuractis) scutaria (Lamarck) G6779
F. (Heliofungia) actiniformis Quoy and Gaimard (OC)
F. (Fungia) fungites (Linnaeus) G6775, G6777-8
Herpolitha limax (Esper) G6772, G6774
Polyphyllia talpina (Lamarck) G6776
Parahalomitra robusta (Quelch) G6771, G6773
Podobacia crustacea (Pallas) G6933

Super Family Poriticae
Poritidae

- Goniopora tenuidens (Quelch) G6816, G6939
G. lobata Milne-Edwards and Haime G6817, G6942
Porites andrewsi Vaughan G6832-5
P. annae Crossland G6823-6
P. lobata Dana G6827-8
P. lichen Dana G6831, G6938
P. lutea Milne-Edwards and Haime* G6829-30, G6936-7
P. sp.1 (branching) G6818-22
P. sp.2 (branching) G6837, G6940-1
Alveopora mortenseni Crossland G6929
A. sp.1 G6836

Suborder Faviina
Super Family Faviicae
Faviidae

Subfamily Faviinae

- Caulastrea furcata Dana G6897-9, G7040
Favia favus (Forskaal) G7185-6
F. pallida (Dana) G7200
F. speciosa (Dana) G7184, G7202
F. stelligera (Dana) G7183, G7201
F. cf. matthai
F. cf. valenciennesi G7188
Favites abdita (Ellis and Solander) G7205-8
F. flexuosa (Dana) G7197, G7209, G7221
F. virens (Dana) G7210-1
Oulophyllia crispa (Lamarck) G6894-5, G7199
Goniastrea pectinata* (Ehrenberg) G6853, G6855, G6904
Goniastrea australensis (Milne-Edwards and Haime) G6903,
G6905, G6907, G6912, G7190-1
G. retiformis (Lamarck) G6851, G6955
Platygyra sinensis (Milne-Edwards and Haime)* G6856-7
P. daedalea Ellis and Solander G6852, G7213
P. lamellina (Ehrenberg) G6854
Leptoria phrygia (Ellis and Solander)
Hydnophora rigida (Dana) G6762, G6765
H. exesa (Pallas) G6893

Subfamily Montastreinae

- Montastrea curta (Dana) G6850, G6901-2, G6911
Plesiastrea versipora (Lamarck) G7187
Leptastrea purpurea (Dana) G6908-10, G7187, G7214-7
L. transversa Klunzinger G7212
Cyphastrea japonica Yabe and Sugiyama G6886, G6890
C. serailia (Forskaal) G6887-8
Echinopora gemmacea (Lamarck) G6889
E. horrida Dana G6769
E. lamellosa (Esper) G6766-8, G6891-2

Oculinidae

Galaxeinae

- Galaxia fascicularis (Linnaeus) G7099
Acrhelia horrescens (Dana) (OC)

Merulinidae

- Merulina ampliata (Ellis and Solander) G6866
Clavarina scabricula (Dana) G6761

Mussidae

- Acanthastrea echinata (Dana) G6900
Lobophyllia corymbosa (Forskaal) G7101, G7105
L. costata (Dana) G7100, G7103-4, G7107, G7109
L. hemprichii (Ehrenberg) G7102
L. (Palauphyllia) hataii Yabe, Sugiyama and Eguchi G7106
Symphyllia nobilis (Dana) G6764
Parascolymia vitiensis (Brueggeman) G7039, G7041-2
Cynarina lacrymalis (Milne-Edwards and Haime) G7043

Pectiniidae

- Echinophyllia aspera Ellis and Solander G6859-60, G6944
Mycedium tubifex (Dana) G6862-63, G6865
Pectinia lactuca (Pallas) G6861
Oxypora lacera (Verrill) (S)

Suborder Caryophylliina

Super Family Caryophylliicae

Caryophylliidae

Eusmiliinae

- Euphyllia glabrescens (Chamisso and Eysenhardt) G6876, G7145
Catalophyllia plicata (Milne-Edwards and Haime) G6895
Physogyra lichtensteini (Milne-Edwards and Haime) (S)
Plerogyra sp. (OC)

Suborder Dendrophylliina

Dendrophylliidae

- Dendrophyllia nigrescens (Dana) G6869
Tubastrea sp.
Turbinaria peltata (Esper) G6849, G6954
T. cf. lichenoides Bernard G6848
T. sp.1 G6847, G6945
T. sp.2 G6952
T. sp.3 G6948
T. sp.4 G6858

Non-Scleractinian corals

SUBCLASS OCTOCORALLIA

STOLONIFERA

Tubiporidae

Tubipora musica (Linnaeus)*

CLASS HYDROZOA

MILLEPORINA

Milleporidae

Millepora exaesa Forskaal G7218, G7222

M. tenera Boschma G7223-4

APPENDIX 2

Vascular plant flora of Bushy and Redbill Islands

Bushy Island:

PANDANACEAE

Pandanus sp.

GRAMINEAE

Sporobolus virginicus (L.) Kunth

Thuarea involuta (Forst.) R. & S.

PALMAE

Cocos sp.

CHENOPODIACEAE

Salsola kali L.

CASUARINACEAE

Casuarina equisetifolia L.

NYCTAGINACEAE

Pisonia grandis R. Br.

AIZOACEAE

Sesuvium portulacastrum (L.) L.

LAURACEAE

Cassytha filiformis L.

TILIACEAE

Triumfetta procumbens Forst. f.

LEGUMINOSAE

Sophora tomentosa L.

MALVACEAE

Abutilon albescens Miq.

CONVOLVULACEAE

Ipomoea pes-caprae (L.) R. Br.

BORAGINACEAE

Tournefortia argentea L.f.
Cordia subcordata Lam.

MYOPORACEAE

Myoporum acuminatum R. Br.

VERBENACEAE

Vitex trifolia L.

GOODENIACEAE

Scaevola taccada (Gaertn.) Roxb.

COMPOSITAE

Tridax procumbens L.

Redbill Island:

GRAMINEAE

Thuarea involuta (Forst.) R. & S.

MORACEAE

Ficus opposita Miq.

AIZOACEAE

Sesuvium portulacastrum (L.) L.



Plate 1: Air photograph of Bushy-Redbill Reef. Crown copyright reserved; reproduced from material supplied by the Department of Minerals and Energy, Canberra.

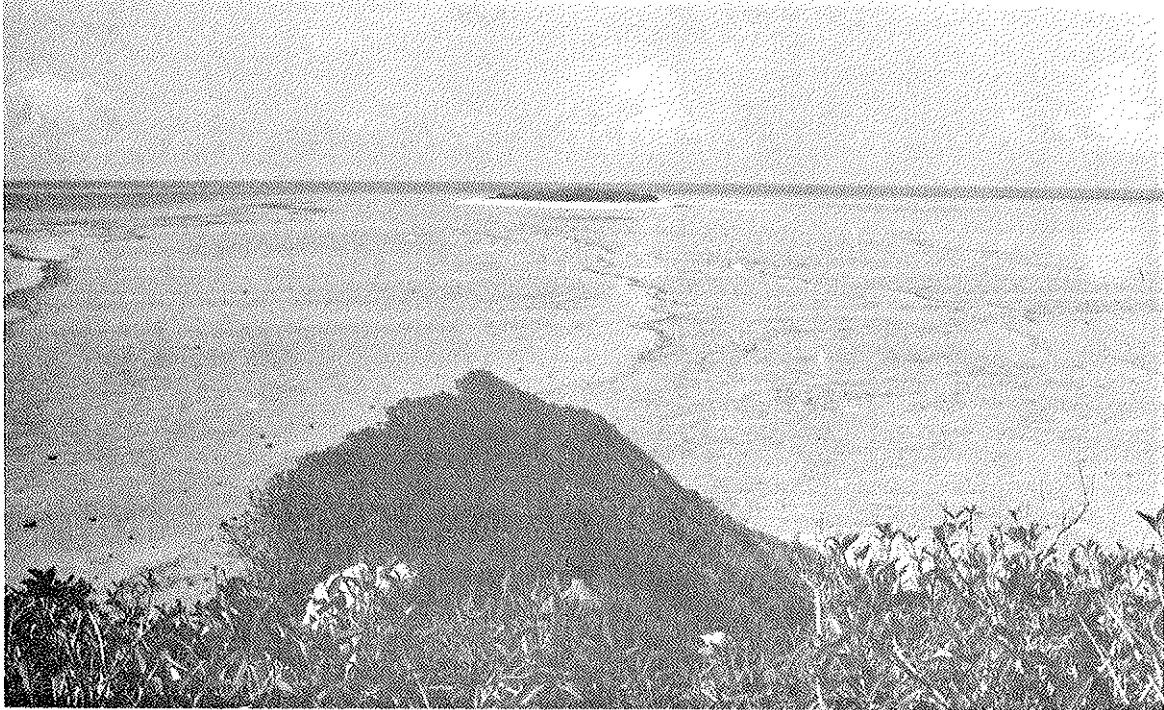


Plate 2: Reef flat between Redbill Island (foreground) and Bushy Island, showing broken algal banks.

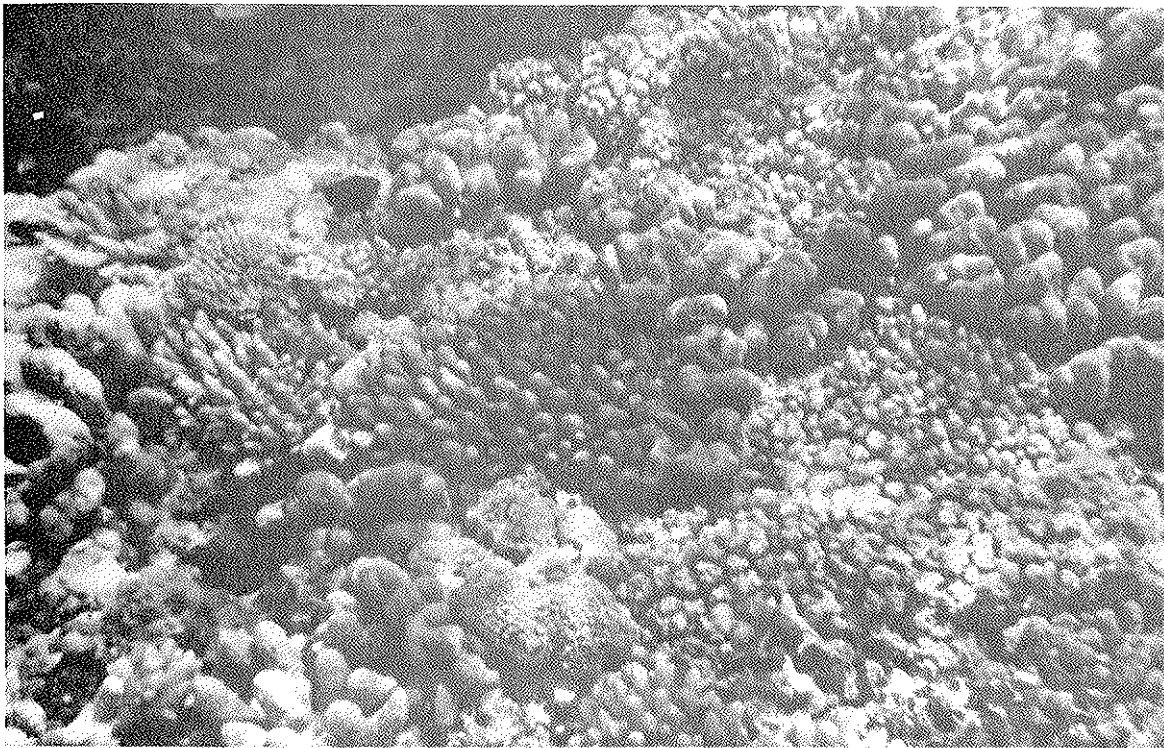


Plate 3: Reef crest in the vicinity of transect 4 (exposed side of reef).

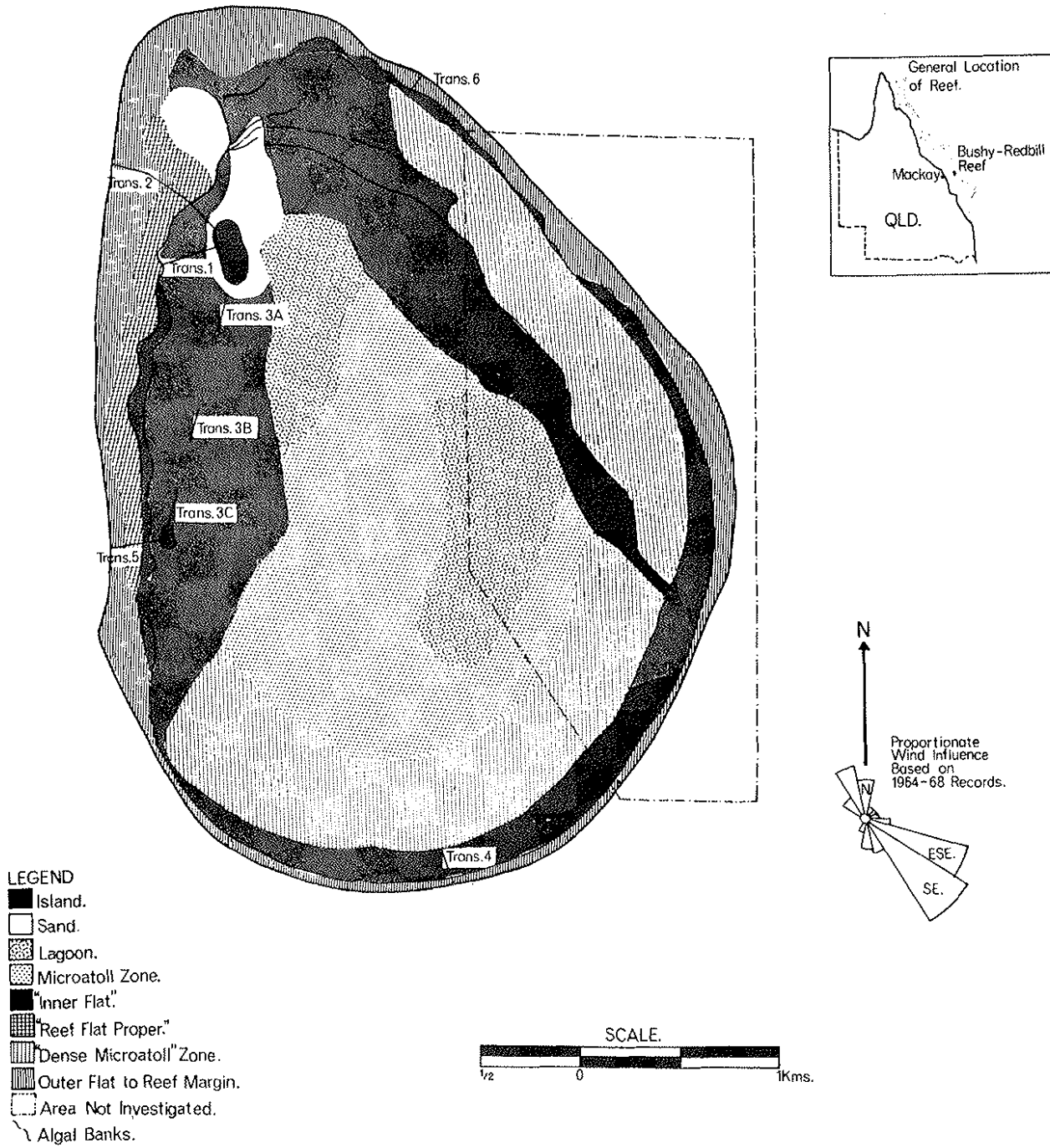


Fig. 1: Diagrammatic representation of general zonation of Bushy-Redbill Reef, with position of transect lines indicated. Insets indicate prevailing winds and relative position of the reef with reference to the Queensland coast.

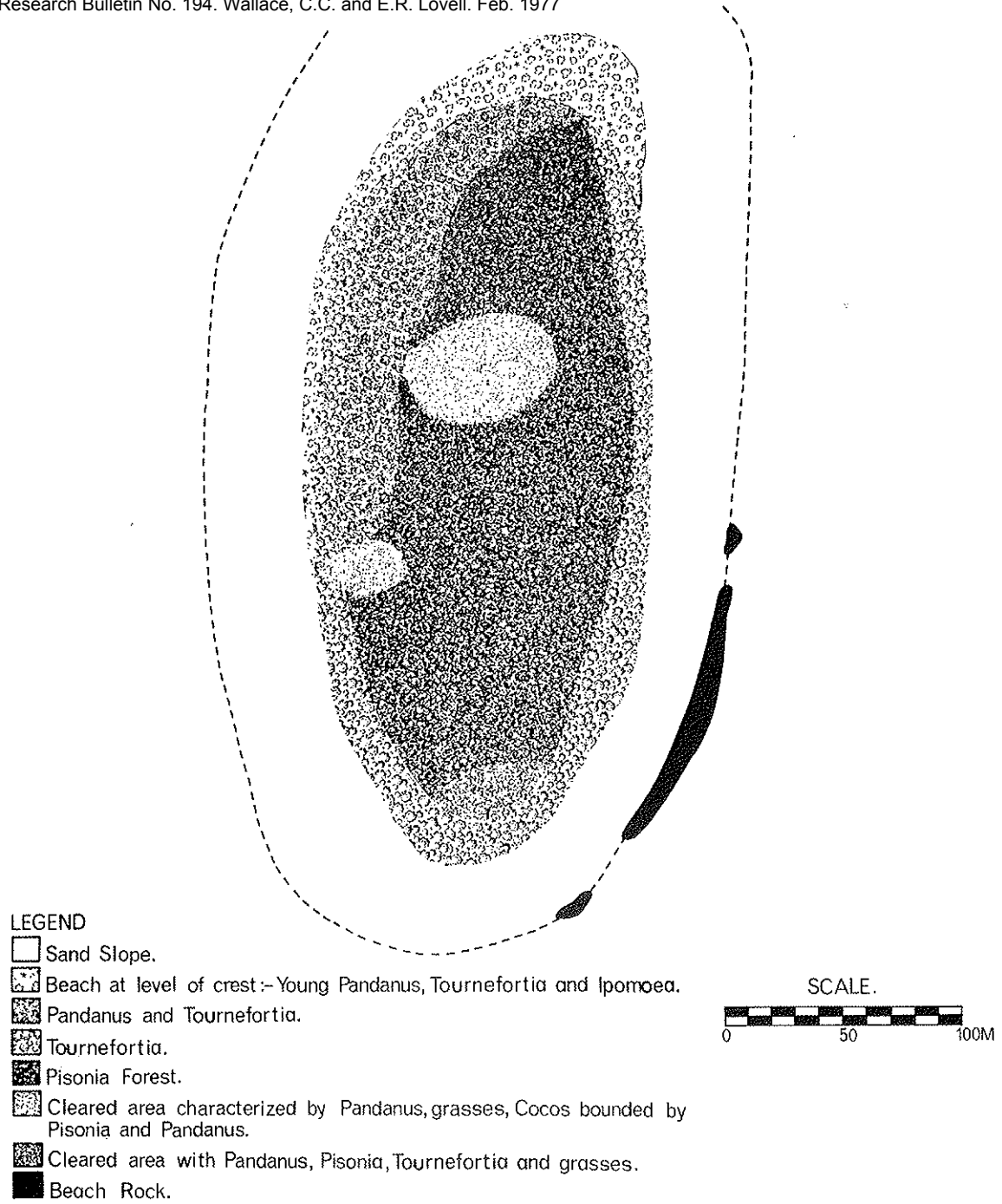


Fig. 2: Zonation of the dominant vegetation of Bushy Island. Position of beach rock also noted.

Fig. 3: Schematic profile of Bushy Island and adjacent reef and lagoon in the vicinity of transect 2. Selected photographs typifying reef zones and vegetation have been included.

