

A REVISION OF THE CORAL GENUS *LEPTOSERIS*
(SCLERACTINIA: FUNGIINA: AGARICIIDAE)

ZENA D. DINESEN
James Cook University of North Queensland

ABSTRACT

Seventeen of the 28 nominal recent species of *Leptoseris* are placed in synonymy. The remaining seven Indo-Pacific species and two species from the Caribbean region are redescribed, and two new species found in Great Barrier Reef waters, *Leptoseris foliosa* and *Leptoseris glabra*, are described. History, ecology, and zoogeography of the genus are discussed.

The scleractinian genus *Leptoseris* has seldom been treated in any depth in taxonomic works. Although widely distributed geographically, it is a comparatively uncommon coral; it never occurs on reef flats, usually preferring deep water or shaded conditions. Hence it is poorly represented in museum collections and most previous workers have had at their disposal only small suites of specimens. Consequently, they have not appreciated the range of variation exhibited by some species.

The aim of this study is to provide a revision covering all recent species of *Leptoseris*. To this end many hundreds of specimens were collected, by SCUBA diving, from Great Barrier Reef waters, principally from the central region of the Great Barrier Reef, from the Lizard Island region, and the Palm Islands. Information about the living colonies, and their habitat, was recorded. I have also examined numerous specimens from a variety of Indo-Pacific and West Indian localities, including nearly all available type specimens, and other museum specimens referred to in the literature.

The large series available for most species demonstrated considerable variability in some species, and seventeen of the 28 available names are shown to be synonyms. I recognise 11 recent species, seven of which occur in the Great Barrier Reef region.

TAXONOMIC HISTORY

Initially species were assigned to existing genera; subsequently several genera were created to accommodate the various species. This confusion persisted because of the variety of

growth forms found within the genus. *Leptoseris papyracea* (Dana), for example, was originally placed in several different genera.

INDO-PACIFIC SPECIES: The first described species of *Leptoseris* is apparently *Agaricia crispa* Ehrenberg, 1834. Dana (1846) moved Ehrenberg's species to *Pavonia*, and added *P. papyracea*, although the descriptions suggest that these two species are probably synonymous. The genus *Leptoseris* was established in 1849 by Milne-Edwards and Haime who did not attribute to the genus the small branching species now recognised as *Leptoseris*; their 1851 description (p. 133) is as follows: 'Polypier composé et adhérent. Plateau commun, nu, délicatement strié, s'élevant de façon à constituer un disque subcrateriforme, dont le centre est occupé par un individu parent et entoure par de plus petits. Calices très imparfaitement circonscrits, mais bien radiés; rayons cloisonnaires très longs. Columelle tuberculeuse.

La *Leptoseris* est très voisine des Mycédies, mais elle nous paraît devoir en être distinguée à cause de la diffluence des calices qui sont toujours fort rares, et de la grande étendue des rayons septo-costaux.'

Milne-Edwards and Haime (1849, 1851) also described the genus *Haloseris* in which they placed Ehrenberg's *crispa*, but not Dana's species *papyracea*. Their rather brief description of *Leptoseris* led Rousseau (1854) to include in it *Leptoseris edwardsi*, which is in fact a *Lithophyllon* (see Wells 1966).

Duncan (1884) listed *Leptoseris*; however, he relegated *Haloseris* to a subgenus of *Lophoseris*

(=*Pavona*). Quelch (1886) described two new genera — *Cylloseris* with its numerous hydnochoroid projections (it is not surprising that he did not recognise in it the *Leptoseris* of Milne-Edwards and Haime) and *Domoseris* which he admitted (p. 125) 'somewhat resembles *Leptoseris* at the extreme marginal parts'.

Bassett-Smith (1890) considered Dana's *papyracea* referable to *Pavonia* rather than to *Leptoseris* and described two further species, *P. pretiosa* and *P. ramosa*, both synonyms of *L. papyracea*. However Rehberg (1892) established the genus *Folioseris* in which he placed both *papyracea* and the *crispa* of Ehrenberg (but not *H. crispa* of Milne-Edwards and Haime because of its lack of columella). But his own specimens of *F. papyracea* are not the same as Dana's species and are synonymous with *L. gardineri* van der Horst!

Gardiner (1905) doubted whether *Domoseris* was distinct from *Leptoseris*, but clearly considered *Cylloseris* (*C. incrustans*) separate, for he described *L. incrustans* as a new species. Vaughan (1907) similarly questioned the validity of *Domoseris*, and placed *Folioseris* in synonymy with *Leptoseris*. Like Vaughan, van der Horst (1921) felt that *Folioseris* and Dana's *papyracea* belonged in *Leptoseris*, and he recognised that Quelch's *Cylloseris* is also a *Leptoseris*.

Although Vaughan (1918) and Faustino (1927) placed both *papyracea* and its synonym *L. digitata* Vaughan in *Leptoseris*, they both retained *Haloseris* as a separate genus. Finally, Yabe, Sugiyama, and Eguchi (1936) referred several specimens of a *Leptoseris* species typified by the presence of collines and (often) lacking 'normal' *Leptoseris* corallites to *Agaricia* (?) *minikoiensis*, mistakenly believing them to be the same as Gardiner's (1905) *Agaricia ponderosa* var. *minikoiensis*. Ma (1937) instead placed these specimens in a new subgenus, *Agaricia* (*Agariciella*), but gave no reasons in the text. Wells (1954) described this species as *Leptoseris?* *mycetoseroides* and included in synonymy the Japanese specimens.

ATLANTIC SPECIES: *Madrepora cucullata* was described by Ellis and Solander in 1786. Milne-Edwards and Haime (1849) made this the type of a new genus, *Helioseris*, but later (1851) submerged this in *Mycedium*. Wells (1956) considered *Helioseris* a synonym of *Leptoseris* but subsequently (1973) re-established the genus because of its lack of a columella. However, since some specimens have a distinct columellar

structure, there seems to be no good reason for retaining *Helioseris* as a separate genus, and the species *cucullata* is now included in *Leptoseris*. A second Caribbean species, *Mycedium caillei* Duchassaing and Michelotti, 1864, was retained in *Mycedium* by Pourtalès (1874), but because of the species' obvious agariciid characters, subsequent authors (Vaughan 1901, Porter 1972, Wells 1973) referred the species to *Agaricia*. This species is here included in *Leptoseris*, as it seems much more closely allied to other species of that genus than to any *Agaricia*.

Thus in accordance with Vaughan and Wells (1943), and Wells (1956) I include *Haloseris*, *Helioseris*, *Cylloseris*, *Domoseris*, and *Folioseris* in *Leptoseris* adding Ma's *Agariciella* as did Wells (1956).

ECOLOGY AND ZOOGEOGRAPHY

Several species of *Leptoseris* may be found in soft bottom areas (coarse sand to mud) living apparently free, or attached to a piece of substrate such as coral rubble. The genus also occurs unshaded on solid substrate, and in crevices, caves, and overhangs. It may grow in conditions of strong current but very rarely in high energy situations with waves or surf. It can occur as deep as 470 m (Vaughan 1907) and plays a significant role in the deeper hermatypic communities. Wells (1954), in his description of the seaward slope of Bikini Atoll, defines the *Leptoseris* zone as 91–146 m, below the *Echinophyllia* zone but above the ahermatypic *Sclerhelia*–*Dendrophyllia* zone. At Bikini these zones may be more clearly defined than usual and also deeper than usual because of extreme water clarity. But there is no doubt that *Leptoseris* is important in coral communities occurring below the normal hermatypic range, and subsequent records confirm this view. (See, for example, Barnes *et al.* 1971, Pichon 1973, Dinesen 1977.)

Leptoseris is a coral of fairly restricted habitat, and its contribution to reef structure is limited. However, in soft bottom areas with large stands of *L. gardineri*, and an abundance of *L. glabra* and *L. scabra*, it may be a dominant coral in a strictly local sense. Furthermore, in some Outer Barrier situations (especially in channels and some back reef patches) which are favourable for growth of *Leptoseris*, large colonies of several species are not uncommon. Their contribution to the total coral cover is of some significance.

Five Australian species (*L. hawaiiensis*, *L. glabra*, *L. mycetoseroides*, *L. papyracea*, and *L. scabra*) have been tested for the presence of

zooxanthellae, and all tests have proved positive. It is likely that all *Leptoseris* species are hermatypic, though quite possibly some deep-living specimens may lack zooxanthellae. The preference of many *Leptoseris* species for deep water or shady conditions may be due to an inability to tolerate too much light, or to competitive exclusion, or both. Specimens of *Leptoseris* have been found in shallow water in gullies, exposed to strong sunlight but only for limited periods. This observation suggests that if *Leptoseris* is sensitive to over-illumination, it is not the light intensity itself but rather the time of exposure to strong light that has an adverse effect.

The distributions of the various species are given following each description. The records indicate that *Leptoseris* is widely distributed in the Indo-Pacific but less well represented in the Caribbean region. Definite records for some species may be widely spread geographically, but it seems reasonable to assume that many of these species do occur throughout much of the Indo-Pacific, and could be found if sought in the right biotopes.

From available data, two species (*L. incrustans* and *L. solida*) are confined to the eastern or eastern and central Pacific, and *L. foliosa* to the western Pacific. Few collections have been made of *L. cailleti*, all from localities broadly scattered in the Caribbean area. There has been little mention of *L. cucullata* in the literature, but Wells (1973) reported that it is not uncommon throughout the West Indies in depths below about 8 m.

TERMINOLOGY

The terminology followed is basically that given by Moore, Hill, and Wells (1956). The specific use of the following terms should be noted.

'Septocostae' is used as defined by Duncan (1884, p. 201): 'The costae may be directly continuous with the septa at the calicular margin, and may pass from calice to calice. Where there is continuity, the costae are termed septocostae.' Although some workers may refer to the continuation of septa between centres as 'costae', it seems traditional in the *Leptoseris* literature to call these 'septocostae'. In a genus where a distinct mural structure is generally lacking, the point at which a septum becomes a septocosta may be somewhat arbitrary. Here 'septum' denotes that part of the structure which lies within what is judged to be the thecal rim. The term 'costae' is reserved for the striations on the non-calicular surface.

'Septal profile' denotes the shape of the septal margin as septa drop into the fossa. The 'upper margin profile' of the septocostae is the shape of the septocostal margin in section, e.g. rounded or acute. 'Surface ornamentation' refers to the granulations visible under the lens on the surface of the septa and septocostae. This includes 'lateral ridges', which may be set in rows on the sides of septa and septocostae, parallel to the upper margin.

The 'fossa' ('calicular axial fossa', Duncan 1884, p. 201) is the axial depression in a calice, usually partly filled by the columella, here considered to be demarcated by the inner ends of the septa. Some species typically have corallites which are inclined towards the corallum margin. In such cases the inner or proximal side of a corallite will be raised into a cushion-like structure, here termed 'proximal cushion'.

METHODS

FIELD METHODS: Material was collected by SCUBA diving. Details of depth and general habitat were always recorded; colour, growth form of entire living colonies, and microhabitat (e.g. position in a cave) were usually recorded. Some specimens encountered in caves (where identifiable in the field) were not collected.

LABORATORY METHODS: Specimens were cleaned in a solution of sodium hypochlorite. Material was examined with a Nikon SMZ-2 binocular microscope, and measurements (apart from corallum size) were taken using an eyepiece with a square grid graticule. Where only a small suite was available for a species, measurements were taken from all material. With larger series, a proportion of representative specimens (20–40 per cent) was measured and examined in detail. Remaining material was checked over and all major features noted. In general, at least four measurements were made of each character on a specimen, and rather more measurements were made of septal number, size of corallites and fossae, and thickness of septocostae. Emphasis has been placed on those characters most useful in distinguishing the species.

MEASUREMENT OF CHARACTERS: For most measurements, the range is given first, followed by the mean or usual figure in parenthesis — e.g. corallites 1.0–5.0 mm (2.0–3.0 mm) by 1.0–4.0 mm (2.0–2.5 mm).

Corallum: In general, only the dimensions of the largest coralla examined are given. These are listed as length in the larger diameter followed by the maximum width at right angles to this. Height is sometimes indicated in the case of erect colonies.

Corallites: In the absence of a well defined thecal rim (e.g. in *L. foliosa*), it is difficult to give precise measurements of corallite size. In such cases, measurements should be treated as a guide only. Since corallites are often elliptical, the length of the greater axis is normally given first, followed by that of the shorter axis. The distance between corallites or rows of corallites was measured between fossae. Only a radial measurement is given, i.e. the distance apart parallel to the corallum margin or branch tips.

Septal counts: If corallites are poorly defined, the number of septa per centre may be a somewhat subjective estimate, especially if many new septocostae are inserted in the area surrounding a corallite. For example, in his description of the holotype of *L. mycetoseroides*, Wells (1954) gives the total septa as 25–35. On the same specimen I was not able to count as many as 35 septa in a calice. Presumably the figure reached depends upon one's estimate of the corallite border. Some *Leptoseris* species have many more septa per centre than others, so that septal number is still a very useful character.

Septocostae: The thickness of septocostae was measured using the grid graticule where each grid square = 0.5 mm. Each square could be approximately divided by eye into quarters, i.e. about 0.125 mm. Measurements are given to two decimal places; where these are quoted as increments of <0.5 mm, they should be considered merely a good estimate. Septal thickness has not been measured because the septa always taper and become thinner towards the centre of the corallite. The maximum septal thickness is never greater than the maximum thickness of the septocostae, and is usually less. Since septocostae tend to be thinner at the corallum margin, measurements were made both at the margin and elsewhere on the corallum.

The number of septocostae in a given distance (5 mm) was most conveniently measured by counting with the grid at right angles to rows of parallel septocostae. For very narrow forms (e.g. *L. papyracea*) septocostae were counted within 2.5 mm, but for consistency these figures have been corrected for a 5 mm distance.

Dentation of septocostal margin: For large dentations, the size of these is indicated. Where

dentations are minute, figures are restricted to the number of dentations in a given distance of septocostal margin.

Fossae: Usually the diameter of the longer axis is followed by that of the shorter axis. Depth of fossae is merely estimated (e.g. deep, very shallow).

Costae: For the number of costae in 5 mm, separate counts for the corallum margin were not made. Costal spines, where set in a row, were measured within 1 mm.

Collines, proximal cushions, nodules: The range or maximum size of these structures is indicated, if appropriate.

IDENTIFICATION OF *LEPTOSERIS*: Because *Leptoseris* often occurs in a relatively restricted range of biotopes, there may be less intraspecific variation than in corals which are very widely distributed on reefs (e.g. acroporids and faviids). However, some *Leptoseris* species may vary considerably, both in the general morphology of the corallum and in finer skeletal structure. Much of the variation within the species may be found within a single colony, especially as regards corallite size, septal number and columellar development. Many of the species must be differentiated by taking into account a combination of characters, when material comes close to the species' limits in some characters. Which characters will be most useful in identifying a specimen may depend both on the species in question and on the material itself. For this reason, it is not possible to construct a simple dichotomous key to the species of *Leptoseris*. The inclusion of a more complex key would probably lead to unnecessary confusion. For identification, reference should first be given to the photographic plate, then to the appropriate species descriptions bearing in mind generic characters are not always repeated in individual descriptions.

Certain species of some corals may be more easily distinguished in the field than in the laboratory. (See, for example, Wallace 1978 on *Acropora*.) Although typical specimens of all species of *Leptoseris* can be recognised underwater by the experienced observer, in my experience, problems with the identification of *Leptoseris* are best resolved by examining specimens under the microscope.

The most important characters for distinguishing species are as follows: corallum shape, size and arrangement of corallites, number of septa per centre, and the structure of the septocostae.

SYNONYMY: No synonymies given by other authors have been accepted without investigation. With the exception of *L. cucullata*, the type of which has not been examined, synonymy lists are restricted to material examined by the author or by M. Pichon (of James Cook University), and to specimens which have been clearly illustrated in the literature. For example, Ma (1959) includes a number of plates of *Leptoseris* specimens collected by earlier workers. Only where his figures provide unequivocal illustrations of a species, have they been included in the synonymy.

The holotype of the type species of *Leptoseris*, *L. fragilis* Milne-Edwards and Haime, appears to have been lost (see note following generic synonymy).

The holotype of *Leptoseris tenuis* van der Horst has also apparently been mislaid. This problem is considered in the discussion section for *L. foliosa*.

BATHYMETRIC RECORDS: The minimum and maximum records are given for specimens collected in Great Barrier Reef waters, but for other material only the maximum record is quoted (except if the species does not occur on the Great Barrier Reef).

DISTRIBUTIONS: Information does not include all records in the literature, but only records for material listed in the synonymy and for specimens examined by the author. Records for unregistered specimens or material received after the species descriptions were written have been included where they increase the geographical range of a species.

MATERIAL EXAMINED: Because a large amount of material is involved, collection details have been summarised. For material from the Great Barrier Reef region, relatively precise locality details are included. All such specimens were collected between 1976 and 1978, mostly by the author, but collector and actual collection dates are not listed. For other material, only the registration number and general locality are given.

Collecting stations from the Lizard Island group have been divided into four areas, as follows. Area 1: Lagoon (protected). Area 2: N. Watson's B. to W. side of N. Pt (fairly protected). Area 3: E. side of N. Pt to N. of Crystal Beach (fairly exposed). Area 4: Crystal Beach to South I. (fairly exposed).

All material listed is in registered museum or university collections. These institutions are listed below, with the abbreviations used in the text.

- AHF: Allan Hancock Foundation (University of Southern California)
 AM: Zoölogisch Museum, Amsterdam
 BM: British Museum (Natural History)
 CM: University Museum of Zoology, Cambridge
 DB: Discovery Bay, Jamaica
 EN: Collection from Enewetak (specimens currently at James Cook University (JCU) but to be moved to Bernice P. Bishop Museum, Hawaii)
 GF: Collection of G. Faure (Centre Universitaire, Reunion)
 MP: Collection of M. Pichon from Indonesia — Philippines region and Great Barrier Reef (specimens at JCU)
 MPIO: Collection of M. Pichon from southwest Indian Ocean (specimens at JCU)
 PM: Museum Nationale d'Histoire Naturelle, Paris
 QM: Queensland Museum
 TWCMS: Tyne and Wear County Council Museum, Sunderland, England
 UT: University of Tohoku
 UTA: University of Tel Aviv
 USNM: United States National Museum
 WAM: Western Australian Museum
 ZD: Collection of Z. Dinesen (specimens at JCU)

SYSTEMATICS

Family AGARICIIDAE Gray, 1847

Genus *Leptoseris* Milne-Edwards and Haime, 1849

Leptoseris Milne-Edwards and Haime, 1849, p. 72.

(Type species *Leptoseris fragilis* Milne-Edwards and Haime, 1849, by monotypy. Published simultaneously with *Haloseris* Milne-Edwards and Haime, 1849, p. 72, and *Helioseris* Milne-Edwards and Haime, 1849, p. 72, and selected as valid name for the genus by Vaughan and Wells, 1943, p. 125.)

Haloseris Milne-Edwards and Haime, 1849, p. 72.

(Type species *Haloseris lactuca* Milne-Edwards and Haime, 1849, by monotypy. Placed in synonymy with *Haloseris crista* (Ehrenberg, 1834) by Milne-Edwards and Haime in their 1851 description.)

Helioseris Milne-Edwards and Haime, 1849, p. 72.

(Type species *Madrepora cucullata* Ellis and Solander, 1786, by monotypy.)

Cylloseris Quelch, 1886, p. 124. (Type species

Cylloseris incrustans Quelch, 1886, by monotypy.)

Domoseris Quelch, 1886, p. 125. (Type species *Domoseris solida* Quelch, 1886, so designated in this revision.)

Folioseris Rehberg, 1892, p. 26. (Type species *Agaricia crispa* Ehrenberg, 1834, so designated in this revision.)

(*Agariciella*) Ma, 1937, p. 149. (Type species *Leptoseris mycetoseroides* Wells, 1954 [misidentified by Ma as *Agaricia (Agariciella) minikoiensis* Gardiner 1905] by monotypy.)

The holotype of *Leptoseris fragilis* Milne-Edwards and Haime, 1849, appears to have been lost. The specimen in the Paris Museum which is supposed to be the holotype is a *Coscinaraea*, and does not fit the description given by Milne-Edwards and Haime (in 1851). Chevalier (1961) redescribed *L. fragilis* from a specimen which he stated was the 'genotype'. Since Chevalier's description is consistent with that of Milne-Edwards and Haime, I assume that Chevalier then had before him the true type specimen. There being no evidence that the true holotype is not a *Leptoseris* (according to the present understanding of the genus) it seems preferable to retain the name *Leptoseris*, than to abandon it in favour of a little-known synonym.

In their description of *L. fragilis*, Milne-Edwards and Haime describe small specimens with distinct central corallites, which might be young *L. hawaiiensis*, *L. scabra* or *L. glabra*. Subsequent authors have referred juvenile examples of more than one species to *L. fragilis*. Thus although *L. fragilis* is given as the type species of the genus, it has not been possible to give this species further consideration in this revision.

I have not been able to obtain the holotype of *Agaricia crispa* Ehrenberg, 1834, from the Berlin Museum. A photograph supplied by the museum is inscribed "*Haloseris crispa* Ehrenberg Philippinen? Kat. Nr. 820". However, the photographed specimen, while clearly a *Leptoseris*, appears larger than that described by Ehrenberg, and rather resembles *Leptoseris cailleti* Duchassaing and Michelotti, a Caribbean species. I am therefore in doubt as to whether the photograph is of the type specimen. It seems very likely that Ehrenberg's *crispa* is a *Leptoseris* (and judging from the literature, probably synonymous with *L. papyracea* (Dana, 1846)). Thus while reference is given to this species in the generic synonymy, it could not be further considered for species synonymies.

DESCRIPTION

CORALLUM: Colonial, colony formation by circumoral then marginal budding. Growth form encrusting, explanate, bowl-shaped, tubuliferous, fan-shaped or branching. Corallum unifacial, but the margin may be reflected over onto the non-calical surface. Size from a few centimetres to about 0.5 m; stands of *L. gardineri* may be several metres across. Colour: beige, brown, green, dark red, mauve, grey, either uniform, or patchy with more than one colour. Sometimes a white margin; occasionally centres and septocostae of

contrasting colour. Polyps apparently very small, with few, short, pointed tentacles.

CORALLITES: Round or elliptical, from 1.0 mm across, up to 12.0 mm in the longer axis of elliptical corallites. Longer axis usually parallel to corallum margin or branch tips. Corallites flush, slightly sunken, or better delineated, with raised rims and directed upwards or towards corallum margin. Scattered or in roughly concentric rows parallel to corallum margin, with 2-30 centres per row. Parent corallite sometimes distinguishable; corallites or rows adjacent or up to several centimetres apart. Proximal cushions, where present, up to 6 mm high, and raised nodular areas up to 8 mm above general corallum surface. Hydraphoroid projections, where present, up to 4 mm high and 7 mm long at base. Collines, if developed, as concentric ridges or intersecting so as to enclose 1-12 centres. Collines 1-5 mm thick at base, up to 8 mm high.

SEPTA: Equal to strongly alternating, with first order thicker and more exsert. Rarely divisible into cycles. Profile rounded or acute, and variable according to orientation of corallites. Septa taper to become thinner at centre of corallites. Margin smooth or slightly uneven, but not dentate. Usually imperforate. Number per centre: 6-50.

SEPTOCOSTAE: Equal to strongly alternating, with the first order thicker and more exsert. Straight, slightly flexuous, or very contorted. In coralla with branches which become wider towards the tip, septocostae may form a diverging, fan-like pattern as septocostae become more numerous higher up the branches. Upper margin profile rounded, acute, or flattened with a narrow ridge running down centre. Margin smooth; with long, wave-like undulations, 0.5-2.5 mm long; with minute dentations, 3-10 in 1 mm; or with large, often peg-like dentations, 6-18 in 5 mm. Septocostae perforate or imperforate. Thickness: <0.13-1.0 mm. Number in 5 mm: 11-36.

SURFACE ORNAMENTATION: Surface of septa and septocostae nearly smooth, or covered with minute, irregularly shaped granulations, sparse to profuse. Granulations may coalesce to form minute, sharp, wavy, irregular ridges, visible only under the lens. Lateral ridges sometimes present; very small granulations may be set in a row along each ridge.

FOSSA: Round or oval, measuring <0.25–6.0 mm by <0.25–2.0 mm. Shallow to a few millimetres deep, depending on shape and orientation of corallites.

COLUMELLA: Weakly to well developed, sometimes absent; development variable within one corallum. Structure styliform; papillae in a row; one or a few twisted particles or plates, more or less fused; or a solid boss, often with sculptured, uneven surface. A few principal septa, to all septa, may reach columella.

NON-CALICINAL SURFACE: Almost smooth, or marked with fine, equal or subequal costae. Costae straight, slightly flexuous, or, in branching coralla, forming a fan-like pattern as do the septocostae. Number in 5 mm: 12–34. Costae smooth or with minute spines, often visible only under the lens, irregularly spaced, scattered over and between costae or set in a row along each costa. Number in 1 mm: 3–12. Underside of colonies frequently covered with encrusting organisms, such as bryozoa.

DISTRIBUTION

Indo-Pacific and Caribbean region.

BATHYMETRIC RANGE: From 3 m (GBR) to 470 m (at Hawaii, Vaughan 1907).

DISCUSSION

Of the six recent agariciid genera, *Leptoseris* seems most closely allied to *Gardineroseris* Scheer and Pillai, and especially to *Pavona* Lamarck. Indeed, the distinction between *Leptoseris* and some unifacial *Pavona* species is still somewhat uncertain. For instance, Veron and Pichon (1979) have moved *Pavona yabei* Pillai and Scheer to *Leptoseris*, though the present author considers this species a *Pavona*.

Previous descriptions of these two genera become unsatisfactory in the case of a few species whose generic position is uncertain. To labour over unequivocal genus diagnoses is not very useful when the distinction between these genera may to some extent be artificial. Since the validity of the species themselves remains unquestioned, the best course seems to be to outline the differences at species level.

Pavona yabei has close affinities with *L. mycetoseroides*. However, coralla of *P. yabei* are usually distinctive, being often much larger and forming vertically-growing vases or fluted tubes. The collines are more consistently well-developed

in *P. yabei*, and the radial collines (i.e. those running from the centre to the corallum margin) are always much more prominent than in *L. mycetoseroides*. The septa and septocostae tend to be somewhat thinner and more alternating than in *L. mycetoseroides*.

Pavona cf. *explanulata* (Lamarck) *sensu* Veron and Pichon (1979) may resemble several *Leptoseris* species, notably *L. hawaiiensis*, *L. glabra*, and *L. mycetoseroides* at marginal parts which lack collines. But on the same colony, *P.* cf. *explanulata* may have thickly encrusting or massive areas as well as laminar plates, and the corallites tend to be more numerous than in *Leptoseris*. Septa and septocostae are strongly alternating, which is not the case in *L. hawaiiensis* and *L. mycetoseroides*. According to Veron and Pichon (1979), *P.* cf. *explanulata* has first order septocostae thinner than those of the second order, and septocostae which frequently branch to three or more corallites. Both these features distinguish this species from any *Leptoseris*.

L. mycetoseroides also shows some affinities with *Gardineroseris planulata* (Dana), with which it has previously been confused. Larger colonies of *G. planulata* may become very massive, and the species always lacks oval, outwardly inclined corallites which may occur near the margin in *L. mycetoseroides*. Collines are always well developed, and usually high and very acute. They frequently enclose single centres, which is much less often the case in *L. mycetoseroides*. Finally, the septa tend to be more numerous than in the *Leptoseris* species.

Leptoseris cucullata (Ellis and Solander, 1786) (Plate 1, figs. 1–3)

Madrepora cucullata Ellis and Solander, 1786, p. 157, pl. 42.

Helioseris cucullata: Milne-Edwards and Haime, 1849, p. 72. Wells, 1973, p. 23, fig. 14.

Leptoseris nobilis: Ma, 1959, p. 17, pl. 35.

MATERIAL EXAMINED

Belize, Carrie Bow Cay, USNM 47319–22; Jamaica, DB 598, 2082, 2432; 13°11.3'N, 61°06.5'W, USNM P-878 (included with specimens of *L. cailleti*).

DESCRIPTION

CORALLUM AND CORALLITES: Corallum a thin, irregular plate, centrally attached, or encrusting with free margin. Largest colony examined measures 17.5 cm by 13 cm, several millimetres

thick, but <1 mm thick at the margin. Colour: green and brown (Colin 1978).

Corallites round or more often elliptical, measuring 1.0–6.0 mm (2.0–4.0 mm) by 1.0–6.0 mm (2.0–3.0 mm). Usually strongly inclined towards corallum margin, but sometimes sunken in. Corallites arranged singly or in rows, with up to 12 centres per row. Usually fairly crowded, but corallites or rows may be up to 1.5 cm apart. Parent sometimes distinguishable.

Where corallites are in rows, proximal cushions may form a short low ridge, 1–5 mm (2–4 mm) above the general surface, and 1–3 mm (1–2 mm) thick at the base. Ridges usually slightly inclined towards corallum margin; one specimen (USNM 47322) has short ridges and rather acute proximal cushions; these are directed upwards and give the corallum a slightly hydnochoroid appearance. Occasional raised nodular areas on some specimens, up to 8 mm high, may have corallites on them.

SEPTA: Usually strongly alternating, rarely subequal; three orders occasionally visible. Profile rounded or acute. Septal margin may be uneven but not dentate. Septa imperforate. Number per centre: 12–44 (21).

SEPTOCOSTAE: Usually strongly alternating, with first order thicker and much more exsert. Usually rather straight; rarely crenellated on raised areas. Upper margin profile acute except where septocostae well thickened. Margin non-dentate. Septocostae imperforate. Thickness: Margin (first order septocostae): <0.13–0.25 mm (<0.25 mm). Margin: (second order septocostae): to 0.13 mm (<0.13 mm). Elsewhere (first order septocostae): 0.13–0.75 mm (0.25 mm to nearly 0.5 mm). Elsewhere (second order septocostae): <0.13–0.5 mm (<0.25 mm). Number in 5 mm: Margin: 12–24 (17). Elsewhere: 11–20 (15).

SURFACE ORNAMENTATION: Septa and septocostae with small, fairly profuse granulations, though second order generally smoother. Rarely all septocostae scarcely granulated. Lateral ridges not developed.

FOSSA: Usually elliptical, measuring 0.5–2.5 mm (0.75–2.0 mm) by 0.5–1.5 mm (<1.0 mm). Fairly deep.

COLUMELLA: Absent in some specimens, in others, developed in some, but never all, fossae. A small twisted plate or knob, or a few loosely fused particles. Normally only a few (rarely most) first order septa reach the columella.

NON-CALICINAL SURFACE: Costae normally equal. Number in 5 mm: 14–22 (17). Costae smooth or with minute spines, usually set in rows on costae. Number in 1 mm: 3–7 (4).

HABITAT AND VARIATION

There is little information available on the preferred habitat of this species. Wells (1973) reports that it is not uncommon below 8 m; specimens from Carrie Bow Cay were collected on the fore-reef slope.

The small series available shows some variation in the spacing of corallites, development of short ridges, and columellar development.

DISTRIBUTION

West Indies: Belize (Carrie Bow Cay); Jamaica; St. Vincent; Barbados.

BATHYMETRIC RANGE: 6–27 m (Carrie Bow Cay) to 37–40 m (near St Vincent). Colin (1978) gives a range of from 3 m to at least 90 m.

AFFINITIES

The shape and arrangement of the corallites render this species much more similar to *Leptoseris* than to *Agaricia*. The retention of the genus *Helioseris* seems unnecessary, since a columellar structure is sometimes present.

The species is easily distinguished from other *Leptoseris*. The short ridges in some examples are quite different from the collines in *L. mycetoseroides*, from which it differs markedly in all major characters. *L. cucullata* is easily distinguished from *L. glabra*, both by its thinner septa and septocostae, and by its columellar development.

Leptoseris papyracea (Dana, 1846) (Plate 1, fig. 4; Plate 2, figs. 1–2)

- Pavonia papyracea* Dana, 1846, p. 323, pl. 22, fig. 3.
Haloseris crispa: Milne-Edwards and Haime, 1851, p. 134. Rousseau, 1854, p. 120, pl. 27, fig. 2.
Pavonia pretiosa Bassett-Smith, 1890, p. 444.
Pavonia ramosa Bassett-Smith, 1890, p. 444.
Leptoseris papyracea: van der Horst, 1921, p. 30, pl. 5, fig. 7. Wells, 1954, p. 443, pl. 154, figs. 1, 2. Veron and Pichon, 1979, p. 38, figs. 65, 66.
Leptoseris digitata Vaughan, 1907, p. 140, pl. 42, figs. 1, 2. Matthai, 1924, p. 52, pl. 11, figs. 5, 7. Durham and Barnard, 1952, p. 31, pl. 2, figs. 10a, 10b. Nemenzo, 1976, p. 239, pl. 5, fig. 1.
Leptoseris panamensis Durham and Barnard, 1952, p. 36, pl. 2, figs. 11a, 11b.
Leptoseris zamboi Nemenzo, 1971, p. 158, pl. 5, figs. 4, 5.

MATERIAL EXAMINED

NON-GBR MATERIAL: Amirante Is., BM E.16; Macclesfield Bank, BM 1892.10.17.130 (*Pavonia ramosa* holotype); Tizard Bank, BM 16B (*Pavonia pretiosa* holotype); Philippines, PM 119 (mentioned Milne-Edwards and Haime, 1851, as *Haloseris crista*); Hawaii, USNM 20892 (*Leptoseris digitata* cotype); Panama, AHF 1 (*Leptoseris panamensis* holotype); Colombia, AHF 10-4 (mentioned Durham and Barnard, 1952, as *Leptoseris digitata*); Coco I., AHF 10-3 (mentioned Durham and Barnard, 1952, as *Leptoseris digitata*); Ecuador, AHF 11-2 (*Leptoseris panamensis* paratype).

GBR MATERIAL: Townsville Region: Between 18°50'S–19°01'S and 146°58'E–147°07'E, BM 1979.4.1.1, USNM 54210, QM G12248–9, ZD 20292, 20294–5.

DESCRIPTION

CORALLUM AND CORALLITES: Corallum small and delicate, of twisted branches which tend to widen towards the tip. Largest colony collected measures 5 cm by 4.5 cm, up to 4 mm thick at the base but <1 mm at the margin. Nemenzo (1971) described a larger colony. Colour: pale brown.

Corallites round or elliptical, measuring approximately 1.0–3.5 mm (2.0–3.0 mm) across. There is usually space for one corallite only within the branch width, but occasionally there are two abreast. Corallites superficial, slightly sunken or sometimes slightly inclined towards branch tips. Corallites usually a few millimetres apart along branches, but up to >1 cm.

SEPTA: Equal or subequal, sometimes a few markedly thicker and more exsert than the rest. Profile usually rounded. Margin sometimes uneven, but not dentate; septa imperforate. Number per centre: 8–22 (14).

SEPTOCOSTAE: Equal or subequal, tending to diverge as branches widen and new septocostae are inserted. A few septocostae may be especially thickened and exsert. Upper margin profile rounded, acute, or slightly flattened. Margin may be ragged but rarely dentate. Dentations present on a few specimens (e.g. the types of *P. ramosa*, BM 1892.10.17.130, and *L. digitata*, USNM 20892), these minute, irregularly spaced, 5–10 in 1 mm. Septocostate usually imperforate. Thickness: Margin: <0.13–0.25 mm (<0.25 mm). Elsewhere: <0.13–0.75 mm (0.25 mm). Number in 5 mm: (very variable according to pattern of insertion of septocostae) Margin: 16–28 (20). Elsewhere: 12–20 (16).

SURFACE ORNAMENTATION: Septa and septocostae rather well granulated; granulations may occur as sharp, wavy ridges. Lateral ridges sometimes present, usually not well developed.

FOSSA: Round or elliptical, measuring 0.25–2.0 mm (<1.0 mm) across. Rather shallow.

COLUMELLA: Variably developed, sometimes absent, especially in young corallites. A small pillar; a few twisted particles or plates; or a solid boss. Few to the majority of septa reach the columella.

NON-CALICINAL SURFACE: Marked with fine costae. Number in 5 mm: 16–30 (22). Costal spines in rows or scattered. Number in 1 mm: 4–12 (7). Costae sometimes reduced to rows of spines, and direction of costae may then be unclear.

HABITAT AND VARIATION

Material has been collected from soft-bottom biotopes of coarse sand and mud, at stations over 25 km offshore, in deeper water. Unlike *L. gardineri*, it has not been found in the close vicinity of fringing reefs, and apparently occupies a different type of biotope.

Although there is some variation in branch shape, septal number, presence of minute dentations on the septocostae, and columellar development, the series of specimens (from a wide geographical range) is very consistent.

DISTRIBUTION

Indo-Pacific: Madagascar; Amirante Is.; Andaman Is.; South China Sea; Indonesia; Sulu Sea; Philippines; Great Barrier Reef; Marshall Is.; Hawaii; Panama; Colombia; Coco I.; Ecuador.

BATHYMETRIC RANGE: 26–35 m (GBR); 108–176 m (at Bikini, Wells 1954).

AFFINITIES

This species is easily distinguished from *L. gardineri* by its much smaller, thinner branches and superficial corallites. In growth form it resembles its West Indian counterpart, *L. cailleti*, but the latter has much better circumscribed corallites which are strongly inclined towards branch tips.

Leptoseris cailleti (Duchassaing and Michelotti,
1864)
(Plate 2, figs. 3–4)

Mycedium cailleti Duchassaing and Michelotti, 1864,
p. 93 (reprint). Pourtalès, 1874, p. 44, pl. 9, figs. 1,
2.

Agaricia cailleti: Vaughan, 1901, p. 311, pl. 20.

MATERIAL EXAMINED

20°00.4'N, 71°40.7'W, USNM P-1148; 12°15.4'N,
69°57.5'W, USNM P-760; Off Mayagüez, Puerto Rico,
USNM 54215, 54216; Off St Thomas, USNM 6079;
15°33.7'N, 61°14.7'W, USNM P-932; 13°11.3'N,
61°06.5'W, USNM P-878.

DESCRIPTION

CORALLUM AND CORALLITES: Corallum of delicate, twisted branches which widen from the base; branches may fuse, or occasionally curl to form tubes. Branches measure <5 mm thick at base, often <1 mm thick at margin; and 0.5–3.0 cm (<1.0–2.0 cm) across. Sometimes dead at the base. Largest colony measures 8 cm high and 12 cm wide. Colour: light brown.

Corallites round or more often elliptical, measuring 1.0–4.0 mm (1.5–2.5 mm) by 1.0–4.0 mm (1.0–<2.0 mm). Sometimes flush or slightly sunken, but usually strongly inclined towards branch tips. Usually scattered, occasionally in rows with up to six centres per row. Often close; rarely up to 8 mm apart along branches. Proximal cushions low, 0.5–1.0 mm above the general surface.

SEPTA: Equal, sometimes subequal, profile normally rounded. Septa non-dentate, imperforate. Number per centre: 6–26 (16).

SEPTOCOSTAE: Equal, occasionally subequal with first order slightly more exsert. Straight or slightly flexuous, with upper margin profile usually acute. Septocostae non-dentate, imperforate. Thickness: Margin: <0.13–0.25 mm (<0.25 mm). Elsewhere: 0.13–0.38 mm (0.25 mm). Number in 5 mm: Margin: 18–30 (21). Elsewhere: 16–26 (19).

SURFACE ORNAMENTATION: Sides of septa and septocostae with small, fairly profuse granulations. Lateral ridges not developed.

FOSSA: Usually elliptical, measuring <0.5–2.0 mm (<1.0 mm) by <0.25–1.0 mm (0.25–0.5 mm). Shallow to fairly deep.

COLUMELLA: Poorly to well developed. Of a few twisted particles, more or less fused, sometimes in a row; or a more solid boss with sculptured surface. Few to most septa may reach columella; in general, about half the septa reach.

NON-CALICINAL SURFACE: Marked with fine but distinct costae, equal or a few particularly thickened. Number in 5 mm: 20–30 (22). Costal spines usually present, in a row along each costa; spines often more conspicuous than in other *Leptoseris* species. Number in 1 mm: 4–9 (6).

HABITAT AND VARIATION

The series available is small but represents a variety of localities. All specimens are remarkably similar, and the only notable variation is in branch shape and columellar development.

Few collections have been made of this apparently rare species, which has been found in comparatively deeper water. Puerto Rican specimens (USNM 54215 and 54216) were collected at 48 m on a sponge bank about 6 km long, 16 km off the coast. This area is exposed to strong currents (1 knot or more), and exposed to strong swell which comes through the Mona channel during the winter, and which runs in a direction opposite to the current. Even at this depth, there can be some effects of swell (P. Colin, pers. comm.). Specimens were in small depressions or alongside other objects such as large sponges.

DISTRIBUTION

Caribbean region: Approximately 9°–20°N, 61°–78°W. This includes the Antilles from the Dominican Republic to Barbados; Curaçao; and the north coast of Panama.

BATHYMETRIC RANGE: 33–40 m (near Dominica) to 60–68 m (near Curaçao). Pourtalès (1874) reports a dead specimen from 183 m at Barbados.

AFFINITIES

The growth form of *L. cailleti*, and the structure and arrangement of the corallites, suggest it is much more closely allied to *Leptoseris* than to *Agaricia*. In some respects it may, ecologically speaking, be the Atlantic counterpart of *L. papyracea*. The species are easily distinguished by the quite different nature of the corallites.

Leptoseris incrustans (Quelch, 1886)
(Plate 3, figs. 1–2)

Cyloseris incrustans Quelch, 1886, p. 124, pl. 6, figs. 4–4b.

Leptoseris incrustans: Ma, 1959, (*pars*), p. 17, pl. 31. not *Leptoseris incrustans* Gardiner, 1905, p. 948, pl. 92, fig. 25 (= *L. hawaiiensis* Vaughan).

MATERIAL EXAMINED

Tahiti, BM 1886.12.9.171–2 (*Cyloseris incrustans* cotypes).

DESCRIPTION

CORALLUM AND CORALLITES: Corallum partly encrusting with free margin, reflected downwards. Both specimens entire, growing over dead pieces of the same species. Larger specimen measures 8.5 cm by 5 cm; thickness at margin <1 mm; elsewhere 2–3 mm between projections, up to 10 mm thick including projections.

Corallites round or elliptical, measuring 1.0–3.5 mm (1.0–2.0 mm) by 1.0–1.5 mm (1.0 mm). Close, numerous, often superficial and flush or slightly sunken in. Corallites often in no particular orientation, but near the edge they may be inclined towards corallum margin. Occasionally in short rows, with up to eight centres per row, usually less. Corallites up to 6 mm apart, generally less; parent not distinguishable.

Corallum has numerous, rather pointed, hydno-phoroid projections, raised 2–4 mm (2–3 mm) above the general surface. Projections often with elongate rather than round base. Length at base is 2–7 mm, width at base 1–2 mm. Often arranged in no particular relation to corallites. Proximal cushions may be slightly pointed and resemble projections.

SEPTA: Equal, thin, often well spaced. Profile usually acute. Non-dentate, imperforate. Number per centre: 12–27 (14–20).

SEPTOCOSTAE: Equal, often flexuous due to projections and close corallites; sometimes contorted over raised areas. Upper margin profile usually acute. Non-dentate, imperforate. Thickness: Margin: <0.13–0.25 mm (~0.13 mm). Elsewhere: 0.13–0.25 mm (slightly under 0.25 mm). Number in 5 mm: Margin: 28–32 (30). Elsewhere: 21–28 (23).

SURFACE ORNAMENTATION: Sides of septa and septocostae with very small, profuse granulations. Lateral ridges present, rather weakly developed.

FOSSA: Usually elliptical, measuring 0.75–1.25 mm (1.0 mm) by 0.5–0.75 mm. Shallow.

COLUMELLA: A style or small knob, round or compressed. Most septa meet the columella, though sometimes only near the base of styliform columellae.

NON-CALICINAL SURFACE: Costae low, equal. Number in 5 mm: 22–30. Costal spines, where present, usually scattered rather than in rows. Number in 1 mm: 6–8.

HABITAT AND VARIATION

Quelch gives no habitat information for this species. Since only two, very similar specimens are available, it is not possible to comment on the variation. It should be noted that the specimens were collected in a marginal region, in terms of coral diversity and reef development.

DISTRIBUTION

Indo-Pacific: Tahiti.

BATHYMETRIC RANGE: Not known.

AFFINITIES

This species has previously been confused with *L. hawaiiensis* (including its synonym *L. incrustans* Gardiner) and with *L. mycetoseroides*. A further, unregistered specimen from Hawaii, which seems to belong in *L. incrustans*, suggests that the species has close affinities with *L. hawaiiensis*. However, *L. incrustans* does appear to be a valid species, distinguished from *L. hawaiiensis* by its numerous hydno-phoroid projections and small, often superficial corallites.

Leptoseris solida (Quelch, 1886)
(Plate 3, fig. 3; Plate 4, figs. 1–3)

Domoseris solida Quelch, 1886, p. 126, pl. 5, figs 5, 5a.

Domoseris porosa Quelch, 1886, p. 125, pl. 5, figs. 4–4c.

Leptoseris solida: Wells, 1954, p. 444, pl. 154, figs. 8, 9.

Leptoseris paschalensis Wells, 1972, p. 186, fig. 1, 4, fig. 2, 1–3, ig. 3, 1–3.

MATERIAL EXAMINED

Bikini Atoll, USNM 44799 (mentioned Wells, 1954); Tahiti, BM 1886.12.9.177 (*Domoseris solida* holotype), 1886.12.9.296 (*Domoseris porosa* holotype); Easter I.,

USNM 53156 (piece of holotype of *Leptoseris paschalensis*), MHD76 (piece of paratype of *Leptoseris paschalensis*).

DESCRIPTION

CORALLUM AND CORALLITES: Corallum plate-shaped or encrusting. Largest colony measures 25 cm by 22 cm, about 1 cm thick centrally, <1 mm thick at the margin.

Corallites round or elliptical, measuring 1.0–5.0 mm (2.0–4.0 mm) by 1.0–4.0 mm (2.0–3.0 mm). Corallites sometimes sunken in, but usually strongly inclined towards corallum margin. Scattered or sometimes in short rows, with up to six centres per row. Corallites very close or up to 2 cm apart.

Proximal cushions up to 5 mm high. Corallum often has rounded nodules, similar in shape to proximal cushions, up to 5 mm high, arranged in no particular relation to corallites.

SEPTA: Unequal in size, sometimes clearly alternating, sometimes with a few septa especially thickened and exsert. Profile usually rounded. Septa non-dentate, occasionally perforate. Number per centre: 8–26 (15).

SEPTOCOSTAE: Usually strongly alternating, with some septocostae particularly thick and exsert; more equal near corallum margin. Often very contorted and crenellated over proximal cushions and nodules; even here, first order septocostae remain more exsert. Upper margin profile usually rounded, but in second order septocostae it may be acute, or flattened with a narrow ridge down the centre. Margin not dentate, but often uneven in that it forms long, wave-like undulations; these are low, extending 0.5–2.5 mm (>1.0 mm) along the septocostal margin. This gives septocostae an irregular appearance; however, margin is never divided into the distinct, peg-like teeth typical of *L. scabra*.

Septocostae sometimes perforate. Thickness: Margin (both orders): <0.13–0.38 mm (0.25 mm or less). Elsewhere (first order septocostae): <0.13–1.0 mm (0.25–0.5 mm). Elsewhere (second order septocostae): <0.13–0.5 mm (<0.25–0.38 mm). Number in 5 mm: Margin: 15–23 (19). Elsewhere: 14–20 (16).

SURFACE ORNAMENTATION: Septa and septocostae, especially those of the first order, well granulated; granulations rough, rather profuse, sometimes coalescing to form sharp, wavy ridges. Lateral ridges sometimes developed, mostly on second order septocostae.

FOSSA: Round or elliptical, measuring <0.25–2.0 mm (0.5–1.0 mm) by <0.25–0.5 mm. Usually deep.

COLUMELLA: Weakly to well developed. Usually of twisted particles, more or less fused; occasionally a boss. Few to many septa, but usually at least half, reach the columella.

NON-CALICINAL SURFACE: Costae equal or subequal. Number in 5 mm: 14–23 (19). Smooth, or covered with small spines, scattered or in a row along each costa. Number in 1 mm: 6–10 (7). In his description of *L. paschalensis*, Wells (1972) reports juvenile, mono- to tricentric offsets on the non-calicular surface.

HABITAT AND VARIATION

There is little information regarding the habitat of this species. The series available is small, but shows some variation in growth form, arrangement of corallites and thickness of septa and septocostae. In particular, Wells' holotype of *L. paschalensis* (USNM 53156) has thinner septocostae with a more even margin.

DISTRIBUTION

Indo-Pacific: Marshall Is.; Tahiti; Easter I.

BATHYMETRIC RANGE: 40–100 m (at Easter I., Wells 1972) to 106–165 m (at Bikini, Wells 1954).

AFFINITIES

This species has previously been confused with *L. scabra*. However, the septocostae in *L. solida* may have an undulating margin, but this is never divided into the distinct teeth found in *L. scabra*. Furthermore, *L. solida* has smaller corallites with fewer septa and smaller fossae, and corallites are usually more strongly inclined towards the corallum margin.

L. solida has some affinity with *L. glabra* in that the septocostae are fairly thick, strongly alternating and basically non-dentate. However, the latter species is easily distinguished by its larger corallites with more septa, better developed columella, and much straighter septocostae.

***Leptoseris hawaiiensis* Vaughan, 1907**

(Plate 4, fig. 4; Plates 5–7)

Leptoseris striatus Saville-Kent, 1871, p. 284. (*Nomen oblitum*)*Leptoseris hawaiiensis* Vaughan, 1907, p. 137, pl. 39, pl. 40. Matthai, 1948, p. 192, pl. 4, figs. 9, 10. Wells, 1954, p. 444, pl. 154, figs. 3, 4. Veron and Pichon, 1979, p. 52, figs. 92–8, 740.*Leptoseris tubulifera* Vaughan, 1907, p. 141, pl. 42, fig. 3, pl. 43.*Leptoseris gravieri* van der Horst, 1922, p. 422.*Leptoseris incrustans* Gardiner, 1905, p. 948, pl. 92, fig. 25.*Leptoseris incrustans* (Quelch): Wells, 1954, p. 444, pl. 154, figs. 5–7.**MATERIAL EXAMINED**

NON-GBR MATERIAL: Amirante Is., BM 1937.11.17.123 (*Leptoseris gravieri* holotype); Reunion, GF REU.254, REU.812, REU.831–2, REU.899; Chagos Is., TWCMS C9055, C9058–9, C9061, C9063, C9066, C9074, C9080, C12403, C12408; Maldives, CM Registered but not numbered. (*Leptoseris incrustans* Gardiner holotype); Borneo, BM 1851.1.20–12 (*Leptoseris striatus* holotype); Paternoster Is., AM Coel 695 (incorrectly labelled type of *Leptoseris tenuis*); Philippines, MP 1811–75, 2656–75; Bikini Atoll, USNM 44796, 44798 (mentioned Wells, 1954, as *Leptoseris incrustans*); Eniwetak, EN 2869; Hawaii, USNM 20843–5, 20875–6 (*Leptoseris hawaiiensis* cotypes); USNM, 20846 (*Leptoseris tubulifera* cotype); Tahiti, ZD 20325.

GBR MATERIAL: Lizard I. region: Jewell Reef — Outer Slope, QM G12254, G12269, G12274, G12282, ZD 9193, 9205, 9232, 9256, 20284. Carter Reef — Outer Slope, ZD 9840; Knoll, back reef, BM 1979.4.2.3, ZD 9600; Channel to N. of Carter Reef; BM 1979.4.2.8, 1979.4.2.12, QM G12284, ZD 9768–9, 20302. Yonge Reef — Outer slope, QM G12255, G12261, G12268, MP 2636, 2638, ZD 9789, 9792, 9798, 10571–4, 10872, 20169; Back reef, BM 1979.4.2.5, USNM 54203, QM G12250, G12257, G12262–3, G12278, ZD 9570, 9573, 9779–81, 9783, 10579, 10656, 10680; Channel to N. of Yonge Reef, BM 1979.4.2.4, ZD 9761, 10920, 20303. Unnamed reef S. of Yonge Reef — Channel to N. of reef, BM 1979.4.2.2. S. Ribbon Reef — Back reef, BM 1979.4.2.10–11, USNM 54202, QM G12252–3, G12265, G12267, G12272, G12275, G12283, ZD 20260; Plug Reef, S. end of reef, QM G12271, G12273. Lizard I. — Area 2, ZD 20067, 20086; Area 3, BM 1979.4.2.9, USNM 54204, QM G12251, G12258, G12258–60, G12264, G12266, G12276, G12279, G12281, ZD 20043; Area 4, ZD 9814. Palm Is. Group: Pelorus Is., W. side, BM 1979.4.2.1, 1979.4.2.7. Eclipse Is., QM G12256.

Townsville region: Keeper Reef, SE. side, ZD 20246. Heron I. Region: Heron Reef, N. side, BM 1979.4.2.6, QM G12270, G12277, G12280, ZD 10699.

DESCRIPTION

CORALLUM AND CORALLITES: Corallum commonly encrusting with free margin; sometimes plate or bowl-shaped, or entirely encrusting; rarely tubuliferous or foliose. Largest colony collected measures 39 cm by 34 cm, >1 cm thick but <1 mm at the margin. Some plate-shaped and encrusting coralla may be extremely thin. Colour: Dark to light brown or beige, rarely green or dark red. Sometimes patchy, e.g. brown with green, red, or beige patches. Occasionally a white margin.

Corallites round or oval, measuring 1.0–7.0 mm (2.0–5.0 mm) by 1.0–5.0 mm (2.0–4.0 mm). Often flush or slightly sunken; sometimes with raised rims and directed upwards; or inclined towards corallum margin. Corallites sparse or crowded; scattered or in short rows, with up to 12 centres per row. Corallites or rows up to >3 cm apart. Parent corallite sometimes distinguishable.

Corallum occasionally with nodules, up to 5 mm high. Tubes, when present, up to 8 mm wide, usually less. Proximal cushions up to 5 mm high.

SEPTA: Equal or subequal, profile rounded or acute. Margin non-dentate, though sometimes uneven. Septa rarely perforate. Number per centre: 8–48 (21).

SEPTOCOSTAE: Equal or subequal; usually straight or slightly flexuous, but sometimes very contorted over raised areas, especially on encrusting coralla. Upper margin profile often very acute and pointed rather than tapering. Margin non-dentate, or with minute dentations, 3–10 (7) in 1 mm. On some specimens margin is slightly pitted and discontinuous; this condition is often associated with perforate septocostae. However, septocostae most often imperforate. Thickness: Margin: <0.13–0.38 mm (<0.25 mm). Elsewhere: 0.13–0.38 mm (0.25–0.38 mm). Number in 5 mm: Margin: 20–30 (23). Elsewhere: 15–26 (19).

SURFACE ORNAMENTATION: Septa and septocostae lightly and minutely granulated. Lateral ridges often well developed.

FOSSA: Usually elliptical, measuring 0.25–5.0 mm (0.5–1.0 mm) by <0.25–0.75 mm (0.5 mm). Shallow to rather deep.

COLUMELLA: Weakly to fairly well developed. Generally rather a loose structure of twisted particles; sometimes a solid boss. The number of septa reaching the columella varies from few to all septa, though often shorter septa do not reach columella.

NON-CALICINAL SURFACE: Costae equal or subequal. Number in 5 mm: 16–27 (22). Costal spines scattered or in rows on costae. Number in 1 mm: 4–9 (6).

HABITAT AND VARIATION

This species is most frequently found on Outer Barrier reefs, where it is not uncommon in overhangs and caves (especially on the ceilings and back walls). It has a definite preference for a shaded environment; and rarely occurs in very turbid water conditions.

There is considerable variation in growth form and corallite size and arrangement. For example, some specimens (including Vaughan's cotype USNM 20843) are very thin with small, sparse corallites directed upwards. Heavier coralla (thick plates and thick encrusting colonies) tend to have larger, more numerous corallites, slightly sunken, or directed towards corallum margin, and sometimes contorted septocostae. A few specimens (e.g. ZD 9570) exhibit a variety of corallite types within one corallum. These differences are not readily related to differences in micro-habitat. However, Australian specimens resembling Vaughan's cotype (USNM 20843) have been collected in very poorly illuminated conditions. Thinly encrusting colonies with numerous, rather superficial corallites have been found most often on the ceilings of caves.

DISTRIBUTION

Indo-Pacific: Red Sea; Amirante Is.; Reunion; Chagos Archipelago; Maldivé Is.; Thailand; Borneo; Seringapatam Atoll (NW. Australia); Indonesia; Philippines; Great Barrier Reef; Marshall Is.; Hawaii; Tahiti.

BATHYMETRIC RANGE: 3–46 m (GBR); 470 m (at Hawaii, Vaughan 1907).

AFFINITIES

This species is mostly closely allied to *L. myctoseroides*. In particular, specimens with close but poorly delineated corallites may resemble *L. myctoseroides* in which collines are absent or very poorly developed. In such cases, *L. hawaiiensis* is best distinguished by its septocostae, which are often fewer and less granulated, with a more pointed upper margin profile, and better developed lateral ridges.

Leptoseris scabra Vaughan, 1907 (Plates 8–9)

Domoseris regularis Quelch, 1886, p. 127, pl. 5, figs. 6–6b. (*Nomen oblitum*).

Leptoseris scabra Vaughan, 1907, p. 139, pl. 41, figs. 1, 1a, 2. Wells, 1954, p. 444, pl. 155, figs. 1, 2. Veron and Pichon, 1979, p. 48, figs. 83–91, 739.

Leptoseris columna Yabe and Sugiyama, 1941, p. 75, pl. 63, figs. 2–2d.

Leptoseris explanata Yabe and Sugiyama, 1941, p. 75, pl. 63, figs. 3–3e.

MATERIAL EXAMINED

NON-GBR MATERIAL: Reunion, GF REU.835, REU.849, REU.853, REU.893, REU.897, REU.901; Mauritius, GF MAU-849; Chagos Is., TWCMS C9070–3, C9076–8, C9086–8, C9090–1, C9097, C9099–100; Palau, UT 64333 (*Leptoseris columna* holotype), 64334 (*Leptoseris explanata* holotype); Bikini Atoll, USNM 44801 (mentioned Wells, 1954); Hawaii, USNM 20886 (*Leptoseris scabra* cotype); Tahiti, BM 1886.12.9.295 (*Domoseris regularis* cotype).

GBR MATERIAL: Lizard I. region: Jewell Reef—Outer slope, BM 1979.4.3.1, 1979.4.3.4, QM G12290, G12330, ZD 9192–3, 20312–13. Carter Reef—Knoll, back reef, USNM 54212, QM G12324, ZD 9613; Channel to N. of Carter Reef, BM 1979.4.3.10, USNM 54211, ZD 9765. Yonge Reef—Outer slope, MP 2637, 3492, 3759, ZD 9748, 9791, 9819; Back reef, ZD 10578; Channel to N. of Yonge Reef, BM 1979.4.3.11, QM G12288, ZD 9744, 9746, 9750–1. Unnamed reef S. of Yonge Reef—Channel to N. of reef, QM G12295, ZD 10348. S. Ribbon Reef—Back reef, QM G12321. Lizard I.—Area 1, QM G12319, G12327, G12331, ZD 9940, 10032–3; Area 2, BM 1979.4.3.14, USNM 54214, QM G12289, G12291, G12294, G12303, G12305, G12307, G12320, G12326, G12332–3, ZD 9037, 9125, 9273, 9577, 9579, 9581–2, 9586, 9631, 9776, 9910, 10127, 10215, 10974; Area 3, BM 1979.4.3.15, QM G12297, G12299, G12302, G12323, G12325, MP 2737, ZD 9270, 9273, 9275, 9335, 9338, 9340, 9342, 9802, 10236, 10241, 10301, 10342–3, 10349, 10354–5, 10364, 10597, 20315, 20317; Area 4, BM 1979.4.3.8, QM G12292, G12301, G12308, G12322, G12328, MP 3244, ZD 9371, 9382–4, 9833, 10175, 10178, 10622, 20128, 20314, 20318–21. Nymph I., QM G12298, G12334, ZD 9285, 9292. MacGillivray Reef, QM G12316. North Direction I., ZD 10552.

Palm Is. Group: Pelorus I., W. side, BM 1979.4.3.5, 1979.4.3.7, QM G12287, G12296, G12304, G12306, G12309, G12313, ZD 9524. Orpheus I., Pioneer B., BM 1979.4.3.13, QM G12285, G12314, ZD 9520, 9528, 9878, 9909. S. Calliope Channel; BM 1979.4.3.2; QM G12293, ZD 9526. Curacoa I., SW. side; BM 1979.4.3.6, 1979.4.3.12, QM G12317, ZD 20322. Great Palm I., NW. side, BM 1979.4.3.3, 1979.4.3.9, QM G12300, G12311–12, ZD 9838. Eclipse I., USNM 54213, QM G12286, G12315, G12318, G12329. Brisk I., QM G12310, ZD 20323.

DESCRIPTION

CORALLUM AND CORALLITES: Corallum usually encrusting with free margin; sometimes plate- or bowl-shaped, or erect with a foliose margin which may curl around to form low tubes. The largest colony collected measures 33 cm by 30 cm, and up to >1 cm thick, but less at the margin. Colour: Usually mid-brown, sometimes green, brownish-green, or beige; rarely mauve or grey. Occasionally a combination of colours, e.g. pale nodules or darker septocostae. Sometimes a white margin.

Corallites usually elliptical, measuring 2.0–10.0 mm (3.0–6.0 mm) by 2.0–7.0 mm (2.0–4.0 mm). Corallites sometimes flush or slightly sunken, but usually with raised rims and directed upwards or towards corallum margin. Sparse or crowded; scattered, or arranged in roughly concentric rows (especially in flatter colonies or near the margin). Up to 20 centres per row, but often <10. Corallites or rows up to >3 cm apart; parent corallite sometimes distinguishable.

Proximal cushions up to 5 mm high. Nodules, not necessarily adjacent to corallites, up to 8 mm high.

SEPTA: Generally strongly alternating, with first order much thicker and more exsert; sometimes one or two septa particularly thickened. Septa rarely equal. Profile usually rounded. Margin may be uneven but not dentate; septa usually imperforate. Number per centre: 10–48 (24).

SEPTOCOSTAE: Rarely equal, usually strongly alternating even at the margin. Sometimes fairly straight between centres, but often very labyrinthine over proximal cushions and nodules. Here second order septocostae may become as thickened as those of first order. Upper margin profile of first order septocostae rounded or subacute; second order septocostae usually with flatter margin with a narrow ridge down the centre. First order septocostae dentate, bearing irregular, often blunt, peg-like dentations. Height from crest to base is 0.13–0.75 mm (0.25–0.5 mm). Spacing 6–18 (10) in 5 mm. Second order septocostae sometimes with similar though smaller dentations, but frequently non-dentate. Dentations often best developed on proximal sides of corallites. Occasionally, if septocostae equal, all septocostae may have smaller, more regular dentations along entire length of margin between centres.

Septocostae perforate or imperforate. Thickness: Margin (first order septocostae): 0.13–0.5 mm (0.25–0.38 mm). Margin (second order septocostae): <0.13–0.38 mm (0.25 mm or less). Elsewhere (first order septocostae): 0.25–0.75 mm (0.38–0.5 mm). Elsewhere (second order septocostae): 0.13–0.5 mm (0.38 mm). Number in 5 mm: Margin: 15–28 (21). Elsewhere: 11–24 (17).

SURFACE ORNAMENTATION: Sides of septa and septocostae, especially those of first order, well granulated; granulations rough, sometimes coalescing to form sharp, wavy ridges. Lateral ridges conspicuous on thinner, second order septocostae.

FOSSA: Usually elliptical, measuring 0.5–4.0 mm (1.0–2.0 mm) by 0.25–1.0 mm (0.25–0.75 mm). Often deep.

COLUMELLA: Weakly to well developed. Structure a style; a few twisted particles, more or less fused; a solid boss; or papillae in a row in very elliptical fossae. Number of septa reaching columella varies from a few septa, to most septa if columella well developed. In general, most first order septa reach columella, most second order septa do not.

NON-CALICINAL SURFACE: Costae equal or subequal. Number in 5 mm: 16–26 (21). Spines, where present, often scattered over costate. Number in 1 mm: 4–12 (8).

HABITAT AND VARIATION

L. scabra is one of the commonest species of *Leptoseris*. It occurs unshaded on soft bottoms or firm substrates, also in crevices, overhangs and caves (most frequently on the back or side walls). Colonies from areas with high sedimentation rates tend to be more erect, with curled or foliose margins. Larger, plate-shaped colonies have been collected mostly in clearer water, from exposed stations at Lizard I. and at the Outer Barrier. More encrusting colonies are common in a variety of biotopes.

Most specimens are typically very scabrous. However, some specimens (representing a variety of growth forms) have areas of the corallum in which the septocostae are much smoother and less alternating; a few specimens are scarcely dentate throughout. This variation does not seem to be related to habitat differences. Specimens with equal and often more regularly dentate septocostae were collected at Outer Barrier stations,

alongside specimens with more typically alternating and dentate septocostae, and this difference may well be genetic.

DISTRIBUTION

Indo-Pacific: Reunion; Mauritius; Chagos Archipelago; Houtman Abrolhos Is.; Palau; Great Barrier Reef; Solomon Is.; Marshall Is.; Hawaii; Tahiti.

BATHYMETRIC RANGE: 5–55 m (GBR); 143–406 m (at Hawaii, Vaughan 1907).

AFFINITIES:

Unusual examples of this species with less alternating, less scabrous septocostae may come close to specimens of *L. glabra* with less alternating septocostae. *L. scabra* is also closely related to *L. solida*, as discussed previously.

Leptoseris gardineri van der Horst, 1921 (Plate 10)

Leptoseris gardineri van der Horst, 1921, p. 30. Hoffmeister, 1925, p. 41, pl. 4, fig. 2. Yabe and Sugiyama, 1941, p. 73, pl. 63, figs. 1–1c. Wells, 1954, p. 444. Veron and Pichon, 1979, p. 40, figs. 67–70.

Folioseris papyracea: Rehberg, 1892, p. 26, pl. 2, fig. 8, pl. 4, fig. 2.

Leptoseris papyracea: Gardiner, 1905, p. 947, pl. 92, fig. 23.

MATERIAL EXAMINED

NON-GBR MATERIAL: Indonesia, Lombok, AM Siboga-Expeditie, Stat. 19.

GBR MATERIAL: Palm Is. Group: Pelorus I., W. side, BM 1979.4.4.1., 1979.4.4.4, ZD 9538. Orpheus I., Pioneer B., BM 1979.4.4.2, QM G12335–7, G12339, ZD 9532, 9534, 9540, 9891–5, 9897–8, 9902–4. Great Palm I., Butler B., QM G12338. Eclipse I., BM 1979.4.4.3, USNM 54201. Esk I., ZD 9536.

DESCRIPTION

CORALLUM AND CORALLITES: Corallum erect and branching, branches often >20 cm high, 1–3 cm wide; branches may fuse. Branches fairly flat, or somewhat curled with calicinal surface innermost. Margin may be reflected onto non-calicinal surface for >1 cm, and corallites may develop here so that at the margin, corallum appears bifacial. Bases of branches, buried in sediment, frequently dead. Colonies may consist of a few branches, or stands several metres across. Colour: Brown or beige, sometimes with a white margin.

Corallites round or elliptical, measuring 2.0–8.0 mm (4.0–6.0 mm) by 2.0–6.0 mm (3.0–4.0 mm). Often with raised rims, directed upwards or towards branch ends; sometimes flush. Scattered or up to three abreast on a branch; close or >3 cm apart along branches.

SEPTA: Subequal to alternating, with first order septocostae thicker and more exsert. Profile usually rounded, sometimes acute. Septa non-dentate, imperforate. Number per centre: 10–36 (24).

SEPTOCOSTAE: Alternating, with first order septocostae especially thicker; less alternating at margin. As branches widen, second order septocostae become first order ones. Upper margin profile of first order septocostae rounded; second order septocostae with rounded profile, or margin may be flat with a narrow ridge down the centre. Septocostae non-dentate, imperforate. Thickness: Margin: 0.13–0.5 mm (0.25 mm). Elsewhere: 0.13–0.75 mm (0.25–0.38 mm). Number in 5 mm: Margin: 14–24 (18). Elsewhere: 12–18 (15).

SURFACE ORNAMENTATION: Surface of septa and septocostae, especially those of first order, well granulated, sometimes with sharp, wavy ridges. Lateral ridges more conspicuous on thinner, second order septocostae.

FOSSA: Usually elliptical, measuring 0.5–2.5 mm (1.0–2.0 mm) by <0.5–2.0 mm (0.5–1.0 mm). Shallow to fairly deep.

COLUMELLA: Poorly to well developed. A few twisted particles, or a more solid boss. All septa may reach columella, but usually only those of the first order.

NON-CALICINAL SURFACE: Often distinctly costate, with costae tending to diverge and become more numerous towards branch tips. Number in 5 mm: 12–22 (18). Costal spines minute, scattered or in rows along costae. Number in 1 mm: 4–8 (6).

HABITAT AND VARIATION

This species occurs on soft bottoms, often in conditions of high sedimentation and turbid water, and specimens were collected in relatively shallow water in the vicinity of fringing reefs. There may be considerable variation in branch shape and size, even within one colony. However, most skeletal characters are rather consistent, despite some variation in corallite size, and the extent to which septa and septocostae are alternating.

DISTRIBUTION

Indo-Pacific: Maldives; Indonesia; Palau; Great Barrier Reef; Marshall Is.; Samoa.

BATHYMETRIC RANGE: 10–18 m (GBR); to 55 m (at Bikini, Wells 1954).

AFFINITIES

This species is most closely allied to *L. glabra*. However, coralla of *L. glabra*, if branching, have wider branches; the corallites are larger with more septa per centre, and septa and septocostae are generally more alternating than in *L. gardineri*.

***Leptoseris mycetoseroides* Wells, 1954**
(Plates 11–13)

Leptoseris? *mycetoseroides* Wells, 1954, p. 445, pl. 153, figs. 4–6.

Leptoseris incrustans: van der Horst, 1922, p. 422, pl. 32, figs. 3, 4. Ma, 1959 (*pars*), p. 17, pl. 30, pl. 32, figs. 3, 4.

Agaricia (?) *minikoiensis*: Yabe, Sugiyama, and Eguchi, 1936, p. 55, pl. 42, figs. 5–7.

Agaricia (*Agariciella*) *minikoiensis*: Ma, 1937, p. 149, pl. 45, figs. 2, 3.

Leptoseris mycetoseroides: Veron and Pichon, 1979, p. 57, figs. 99–103, 741.

not *Agaricia ponderosa* var. *minikoiensis* Gardiner, 1905, p. 937, pl. 90, fig. 7.

MP 2647, 3317, 3769, ZD 9369, 9824, 20170; Back reef, QM G12373, ZD 9784–6, 10583, 10676; Channel to N. of Yonge Reef, USNM 54205, QM G12381, ZD 9755, 9758, 9762. Unnamed reef S. of Yonge Reef — Channel to N. of reef, QM G21356. S. Ribbon Reef — Back reef, BM 1979.4.5.5, QM G12350, ZD 9311, 9320, 9328, 20268, 20272; Plug Reef, S. end of S. Ribbon Reef, USNM 54206, QM G12378, G12389, ZD 9298, 9301–2, 9304–5, 9307, 9315, 20256. Lizard I. — Area 1, USNM 54207, ZD 9122, 9623; Area 2, BM 1979.4.5.1, QM G12362, G12377, ZD 9591–3, 9992; Area 3, BM 1979.4.5.6, 1979.4.5.10, 1979.4.5.13, 1979.4.5.15, USNM 54209, QM G12341–2, G12349, G12351, G12357, G12361, G12367, G12369, G12382, G12386, MP 3140. ZD: 9339, 9344, 9349–51, 9393, 9806–8, 9810, 9932, 9934, 9936–9, 9982, 9993, 10031, 10078, 10083–4, 10104, 10170, 10227, 10284, 10310, 10346, 10357, 10394, 10402; Area 4, QM G12352, ZD 9389–90, 9621, 9831, 10216–17, 20126, 20306. Nymph I., ZD 9283. Eyrie Reef, QM G12359. MacGillivray Reef, QM G12385. ZD 9280. N. Direction I., QM G12376.

Palm Is. Group: Pelorus I., W. Side, ZD 9505–7, 20307. Curacoa I., SW. side, ZD 20308. Great Palm I., BM 1979.4.5.9, QM G12374, ZD 9541, 20309. Brisk I., QM G12387, ZD 20310. Dido Rock, ZD 20311.

Townsville region: John Brewer Reef, ZD 9554, 9558, 9560, 9562–3. Keeper Reef, ZD 20239.

Heron I. region: Heron Reef — NW. side, BM 1979.4.5.3, QM G12345, ZD 10815; — S. side, QM G12344, G12348, G12354. Wistari Reef, N. side, QM G12347, ZD 10772.

MATERIAL EXAMINED

NON-GBR MATERIAL: Madagascar, MPIO 127–67, 142–67, 534–67, 539–67, 1131–69; Reunion, GF REU.96, REU.217, REU.320, REU.386, REU.518, REU.872; Mauritius, GF MAU.355. MPIO MAU-142, MAU-145; Chagos Is., TWCMS C9036–54, C9056, C9062, C9064–5, C9067, C9082, C9083–5, C9092–4, C9096, C12402, C12405–7, C12410; Houtman Abrolhos Is., WAM 389–77, 498–77; Philippines, MP 2504–75, 2567–75; Celebes, MP 1810–76, 1812–76; Kyūsyū, UT 44907 (mentioned Yabe, Sugiyama and Eguchi, 1936, as *Agaricia* (?) *ponderosa* var. *minikoiensis*, and Ma, 1937, as *Agaricia* (*Agariciella*) *minikoiensis*); Solomon Is., WAM 119–77; Bikini Atoll, USNM 44805 (*Leptoseris?* *mycetoseroides* holotype); Enewetak, EN 1501, 1642, 2207, 2325, 2447, 2918, 2929.

GBR MATERIAL: Lizard I. region: Jewell Reef — Outer slope, BM 1979.4.5.2, 1979.4.5.4, 1979.4.5.7, 1979.4.5.14, USNM 54208, QM G12346, G12353, G12358, G12360, G12365–6, G12370–2, G12375, G12380, G12383–4, ZD 9191, 9196, 9200, 9203–4, 9206, 9209–11, 9224, 9230, 9236–8, 9242–5, 9248, 9250, 20304–5. Carter Reef — Outer slope, ZD 9770; Back reef, BM 1979.4.5.11, QM G12363, ZD 9599, 9602, 9604, 9610–11, 9615; Channel to N. of Carter Reef, BM 1979.4.5.8, ZD 10541. Yonge Reef — Outer slope, BM 1979.4.5.12, QM G12343, G12388, G12390,

DESCRIPTION

CORALLUM AND CORALLITES: Corallum most commonly encrusting, sometimes with a free or laminar edge; rarely a plate. Largest specimen collected measures 65 cm by 50 cm, >1 cm thick, but thinner at the margin. Colonies often only a few millimetres thick. Colour: Usually mid-brown, occasionally light or dark brown, or beige. Sometimes green (which may be very bright); or basically brown with patches of another colour, e.g. white, red, beige, or green. Rarely mauve or greyish-brown. Rarely with bright green centres, with or without bright green septocostae.

Corallites usually elliptical, but sometimes round or slightly polygonal, measuring 1.0–7.0 mm (1.0–5.0 mm) by 1.0–4.0 mm (1.0–3.0 mm). Arrangement may depend on development of collines (see below). Corallites flush, somewhat sunken, or near corallum margin sometimes inclined towards margin. Numerous or sparse; where in rows, up to >30 centres per row, but usually <20. Corallites up to >2 cm apart; parent corallite rarely distinguishable.

Collines are a distinctive feature of this species. They may be poorly developed as short, roughly

concentric ridges, or more prominent, bordering long rows of corallites. Concentric collines (those parallel to the corallum margin) may be intersected by other collines, so as to enclose 1–12 (<6) centres, scattered or in short rows. Concentric collines better developed than intersecting ridges; collines often weaker or absent near corallum margin. Here corallites may be inclined towards margin, with proximal cushions as in some other *Leptoseris* species. Collines 1–5 mm (1–3 mm) thick at base, and up to 8 mm above general surface.

SEPTA: Equal or subequal; with profile rounded or acute. Septa non-dentate, imperforate. Number per centre: 6–32 (17).

SEPTOCOSTAE: Equal or subequal; straight, flexuous, or rarely contorted. Upper margin profile usually rounded, sometimes acute. Margin not dentate, but a few specimens have occasional peaks, 0.5–0.75 mm high, extending from the septocostal margin (see Plate 13, fig. 3). These occur only sporadically (not more than once per septocosta on each colline) and have only been found on specimens with large corallites and well developed collines.

Septocostal margin occasionally slightly pitted and discontinuous, especially if septocostae are perforate. However, septocostae normally imperforate. Thickness: Margin: <0.13–0.25 mm (<0.25 mm). Elsewhere: <0.13–0.5 mm (0.25 mm or slightly less). Number in 5 mm: Margin: 22–36 (28). Elsewhere: 14–32 (24).

SURFACE ORNAMENTATION: Sides of septa and septocostae usually with rather rough and fairly profuse granulations. Lateral ridges may be present, but generally more weakly developed than in *L. hawaiiensis*.

FOSSA: Usually elliptical, measuring <0.5–2.0 mm (<1.5 mm) by 0.25–1.0 mm (<0.5 mm). Often shallow.

COLUMELLA: Moderately or well developed; rarely weak, or absent in a few fossae. Usually a round or compressed style; less commonly of loosely fused twisted particles or a boss. Usually most septa reach the columella. However, in a few specimens, about half the septa are much shorter and never reach the columella.

NON-CALICINAL SURFACE: Costae faint, equal or subequal. Number in 5 mm: 20–34 (28). Costal spines, where present, scattered or in rows. Number in 1 mm: 4–10 (7).

HABITAT AND VARIATION

This is one of the commonest species of *Leptoseris*. It occurs on firm substrate, most often in conditions with clear water, but also in turbid water. It can occur unshaded, but most frequently in gullies, overhangs and caves (principally on the ceilings, but also on the side and back walls).

This is undoubtedly the most variable species in the genus, with considerable variation in corallite size, septal number, and size and development of collines. Two extreme forms can be distinguished: coarse forms with large corallites and tall, thick, rounded collines; and fine forms, with smaller corallites, fewer septa and thinner collines. However, the majority of specimens fall between these two extremes, and it seems clear that a single species is involved. Corallite size, septal number and type of colline tend to be relatively consistent within one corallum, i.e. the range of intraspecific variation in these characters is not encountered within a single colony. Coarse and fine forms may be found growing alongside each other, and the differences appear to be genetic. The basic structure of the septa and septocostae remains relatively constant through the series.

Development of collines and corallite shape may be highly variable within one specimen. Some coralla have collines developed all over. But quite commonly, collines are not developed throughout, and about half the colony may lack collines, and may have flush corallites, or 'normal' *Leptoseris* corallites with proximal cushions. The reasons for this variation are not clear. However, some specimens have been found with collines best developed on the most illuminated parts of the corallum, while thinner, laminar areas without collines occur on more shaded parts of the colony.

DISTRIBUTION

Indo-Pacific: Madagascar; Reunion; Mauritius; Saya de Malha; Chagos Archipelago; Houtman Abrolhos Is.; Indonesia; Philippines; Celebes; Kyûsyû; Honsyû; Great Barrier Reef; Solomon Is.; Marshall Is.

BATHYMETRIC RANGE: 3–46 m (GBR); 23–80 m (at Bikini, Wells 1954).

AFFINITIES

As already noted, certain specimens which lack collines may come close to *L. hawaiiensis*. *L. myctoseroides* has similar septa and septocostae to those of *L. foliosa*, but in the latter species they are much more granulated, and the species are easily separated on growth form alone.

Previous workers have been in doubt as to the generic position of this species, as discussed in the history of the genus. However, apart from the presence of collines, this species has much closer affinities with other *Leptoseris* than with species in other genera.

***Leptoseris foliosa* n. sp.**
(Plate 14)

Leptoseris tenuis: Yabe and Sugiyama, 1941, p. 74, pl. 62, figs. 4-4c, 5-5a, pl. 64, fig. 1. Veron and Pichon, 1979, p. 65, figs. 115-20, 742.
not *Leptoseris tenuis* van der Horst, 1921, p. 31, pl. 5, figs. 9, 10; 1922, p. 422.

HOLOTYPE

Lizard I., Area 1 (lagoon), 8 m, M. Pichon, November 1977, BM 1979.4.6.1.

PARATYPES

Lizard I. region: Turtle Is., W. side, BM 1979.4.6.5-6. Lizard I. — Area 1, BM 1979.4.6.3-4, QM G12391-2, G12396-7, ZD 9069, 9944; Area 2, QM G12395, G12398; Area 4, BM 1979.4.6.2.

Palm Is. Group: Pelorus I., W. side, QM G12394. Great Palm I., S. side, QM G12393. Esk I., N. side, USNM 54200, ZD 9503.

DIAGNOSIS

Corallum usually encrusting at base, with upper part foliose. Corallites small, superficial, slightly sunken, often in short rows. Septa and septocostae equal, close, non-dentate, very well granulated. Columella well developed, usually a style or boss, fossa small and shallow.

DESCRIPTION

CORALLUM AND CORALLITES: Corallum usually with encrusting base, with the upper part foliose, often fan-shaped. Margin often very curved, and may curl round to form tubes, up to 4 cm wide. Rarely a plate. Largest colony collected measures 12 cm high, 5 cm wide at the base, 13.5 cm across the broadest part of the fan. Thickness at base approaching 1 cm, but <1 mm at margin. Colour: Dark and light brown.

Corallites often very elliptical, measuring 1.0-4.0 mm (1.0-2.0 mm) by 1.0-2.0 mm (1.0-1.5 mm). Corallites superficial and poorly delineated, usually slightly sunken in; scattered or in short rows, with up to nine centres per row. Usually crowded, but rows or corallites up to 1 cm apart. Proximal cushions never present. Occasional, peak-shaped nodules up to 4 mm high. Parent corallite rarely distinguishable.

SEPTA: Equal, close, often with rounded profile. Septa non-dentate, imperforate. Number per centre: 8-28 (18).

SEPTOCOSTAE: Equal, close, usually fairly straight, sometimes contorted especially on encrusting parts. Upper margin profile normally rounded; rarely with a narrow ridge down the centre. Septocostae non-dentate, imperforate. Thickness: Margin: <0.13-0.25 mm (<0.25 mm). Elsewhere: <0.13-0.38 mm (0.25 mm). Number in 5 mm: Margin: 20-30 (24). Elsewhere: 18-28 (21).

SURFACE ORNAMENTATION: Surface of septa and septocostae very well granulated, granulations rough and very profuse. Lateral ridges weakly developed or absent.

FOSSA: Usually elliptical, measuring <0.25-1.25 mm (0.5-0.75 mm) by <0.25-0.5 mm (<0.5 mm). Very shallow.

COLUMELLA: Rather well developed, a style or boss, often with uneven, sculptured surface; occasionally a looser structure of particles in a row. Most or all septa reach the columella.

NON-CALICINAL SURFACE: Costae very faint, equal or subequal. Number in 5 mm: 18-28 (22). Costal spines small, often scattered over costae. Number in 1 mm: 6-10 (8).

HABITAT AND VARIATION

Most specimens were collected in turbid water conditions on soft bottoms (fine sand or mud) but attached to a piece of substrate, in shallow water in the vicinity of fringing reefs. The erect growth form may help to reduce the effects of sedimentation. The only plate-shaped specimen was collected in more exposed conditions, in deeper water (20 m) from a cave. Poor illumination may explain its different growth form.

Most specimens are very consistent in general growth form, although the shape of the upper, foliose part is somewhat variable. Corallite size and arrangement, structure of septa and septocostae, and columellar development are remarkably consistent.

DISTRIBUTION

Indo-Pacific: Great Barrier Reef and Solomon Is.

BATHYMETRIC RANGE: 8–20 m (GBR).

AFFINITIES

This species is most closely related to forms of *L. mycetoseroides* with small corallites. The septa and septocostae are very similar, but much more granulated in the new species. *L. foliosa* is easily distinguished by its growth form, and by the quite different arrangement of the corallites.

DISCUSSION

Yabe and Sugiyama referred their specimen (UT 62526) to *Leptoseris tenuis* van der Horst. The specimen marked 'type' of *L. tenuis* (AM Coel 695), loaned from the Zoölogisch Museum, Amsterdam, is clearly not the holotype illustrated by van der Horst (1921, pl. 5, figs. 9, 10), and the type appears to have been lost. Specimen AM Coel 695 is a *L. hawaiiensis*, as are two other specimens (AM Coel 696, BM 1937.11.17.73) from the Percy Sladen Expedition, identified by van der Horst, and mentioned by him (1922, p. 422). A further specimen (BM 1937.11.17.101) from the same expedition, also identified and mentioned by van der Horst, is a *L. mycetoseroides*. Van der Horst's descriptions and figures (1921; 1922) of *L. tenuis* certainly do not suggest that it is the same as *L. tenuis sensu* Yabe and Sugiyama, 1941. Hence *L. foliosa* is here described as a new species.

Leptoseris glabra, n. sp. (Plates 15–16)

Leptoseris cf. *hawaiiensis*: Yabe and Sugiyama, 1941, p. 73, pl. 62, figs. 3–3d.

Leptoseris explanata: Veron and Pichon, 1979, p. 42, figs. 71–82, 738.

not *Leptoseris hawaiiensis* Vaughan, 1907, p. 137, pl. 39, pl. 40.

not *Leptoseris explanata* Yabe and Sugiyama, 1941, p. 75, pl. 63, figs. 3–3e.

HOLOTYPE

Palm Is. Group, Pelorus I., W. side, 17 m, Z. Dinesen, April 1976, BM 1979.4.7.1.

PARATYPES

NON-GBR MATERIAL: Red Sea, Eilat, UTA NS10749; Reunion, GF REU.503; Houtman Abrolhos Is., WAM 390–77; Solomon Is., WAM 116–77; Palau, UT 60635 (mentioned Yabe and Sugiyama, 1941, as *Leptoseris* cf. *hawaiiensis*).

GBR MATERIAL: Lizard I. region: Jewell Reef — Outer slope, BM 1979.4.7.10, QM G12413, G12418, ZD 20288. Carter Reef — Knoll, back reef, QM G12420, ZD 9597; Channel to N. of Carter Reef, BM 1979.4.7.5, QM G12403, G12421, ZD 9765, 10537; Channel to S. of Carter Reef, QM G12410. Yonge Reef — Outer slope, ZD 9790; Back reef, QM G12415, G12422, ZD 9568–9, 9571; Channel to N. of Yonge Reef, BM 1979.4.7.2, 1979.4.7.6, USNM 54199, QM G12404, ZD 9760, 10919. Unnamed reef S. of Yonge Reef — Channel to N. of reef, QM G12412, G12424. S. Ribbon Reef — Plug Reef at S. end, QM G12402, G12406. Lizard I. — Area 2, BM 1979.4.7.3, ZD 9583.

Palm Is. Group: Pelorus I., W. side, BM 1979.4.7.7, QM G12407, G12416, G12419, ZD 9846. Orpheus I., Pioneer B., BM 1979.4.7.9, USNM 54198, QM G12401, G12405, G12411, G12414, G12417, G12423, ZD 9496, 9875, 9879, 9882, 9889. Curacoa I., SW. side, QM G12399, G12408. Eclipse I., BM 1979.4.7.4. Esk I., S. side, BM 1979.4.7.8. Brisk I., QM G12409. Dido Rock, QM G12400.

DIAGNOSIS

Corallum plate- or bowl-shaped; partly encrusting; or erect with foliose margin, often dissected into wide fronds. Corallites large and elliptical with wide fossae and numerous septa. Septa and septocostae strongly alternating, those of the first order being thicker and much more exsert. Septocostal margin typically smooth. Columella usually well developed, a solid boss or twisted particles, more or less fused.

DESCRIPTION

CORALLUM AND CORALLITES: Corallum plate- or bowl-shaped; encrusting with free margin; or erect with foliose margin, which may be divided into wide fronds. Fronds usually several centimetres across, but may be <2 cm wide where recently divided. Fronds flat, or curled around to form low tubes, up to about 3 cm across. Margin may be reflected onto non-calicular surface for up to 2 cm and corallites may develop here so that, at the margin, corallum appears bifacial. (See Plate 16, fig. 2.) Largest specimen collected measures 47 cm by 35 cm, >1 cm thick, but <1 mm at the margin. Colour: Usually brown or beige, sometimes green, or brown with beige. Often a white margin; sometimes paler septa and septocostae.

Corallites usually elliptical and large, measuring 2.0–12.0 mm (5.0–8.0 mm) by 2.0–6.0 mm (3.0–5.0 mm). Sometimes almost flush, but usually inclined towards corallum margin. Parent

corallite sometimes distinguishable. Corallites numerous to sparse, scattered or in roughly concentric rows, with up to 25 centres per row. Corallites or rows adjacent to over 6 cm apart. Proximal cushions up to 6 mm high.

SEPTA: Usually strongly alternating, with those of the first order thicker and more exsert. Profile usually rounded. Margin non-dentate; septa imperforate. Number per centre: 10–50 (30).

SEPTOCOSTAE: As septa, usually strongly alternating, even at corallum margin. Straight or slightly flexuous, rarely contorted over raised areas of corallum. Upper margin profile of first order septocostae normally rounded; margin of second order septocostae flatter, often with a narrow ridge running down the centre. Margin non-dentate; septocostae nearly always imperforate. A few specimens have a slightly pitted and discontinuous septocostal margin, and some perforations in the septocostae. Occasionally three orders of septocostae can be distinguished. Thickness: Margin (first order septocostae): 0.13–0.5 mm (0.38 mm). Margin (second order septocostae): <0.13–0.38 mm (0.25 mm). Elsewhere (first order septocostae): 0.13–0.75 mm (0.5 mm). Elsewhere (second order septocostae): <0.13–0.5 mm (0.38 mm). Number in 5 mm: Margin: 12–20 (16). Elsewhere: 11–18 (14).

SURFACE ORNAMENTATION: Surface of septa and septocostae, especially those of first order, well granulated; granulations often coalesce to form sharp, wavy ridges, these being more conspicuous than in other species. Lateral ridges prominent on second order septocostae.

FOSSA: Usually elliptical, measuring 0.75–6.0 mm (1.5–4.0 mm) by <0.5–1.0 mm (0.5 mm). Shallow to over 3.0 mm deep in prominent corallites.

COLUMELLA: Usually well developed, elliptical to fit shape of fossa. Often a solid boss with uneven, sculptured surface; sometimes of twisted particles, more or less fused. Few to most septa may reach columella; in general, most first order septa reach columella, most second order septa do not.

NON-CALICINAL SURFACE: Costae, when present, usually equal. Number in 5 mm: 10–22 (15). Costal spines may be scattered or in a row along each costa. Number in 1 mm: 5–9 (7).

HABITAT AND VARIATION

Specimens have been collected principally from two very different biotopes. Those from protected areas, with high sedimentation rates and turbid water, may be found on muddy bottoms. They are usually erect, somewhat foliose, sometimes tubuliferous. This growth form may help to reduce the effects of sedimentation. Specimens from Outer Barrier localities, found on firm substrate, are usually plate-shaped or partly encrusting. They have been found unshaded, but more often in gullies and caves (on the ceiling or floor).

Apart from the growth form, there is also some variation in corallite size and septal number. In general, the structure of the septa and septocostae, and the columella, are rather consistent. A few specimens have been found with rather more equal septa and septocostae, and this condition may sometimes be associated with poor illumination.

DISTRIBUTION

Indo-Pacific: Red Sea; Reunion; Houtman Abrolhos Is.; Great Barrier Reef: Solomon Is.; Palau.

BATHYMETRIC RANGE: 5–44 m (GBR); 110 m (at Palau, Yabe and Sugiyama 1941).

AFFINITIES

This species is most closely related to *L. gardineri*. However, coralla of *L. gardineri* have narrow branches, with generally smaller corallites and fewer septa. The septa and septocostae, though of similar structure, are less alternating in *L. gardineri*.

As previously discussed, *L. glabra* also has some affinities with *L. scabra* and *L. solida*.

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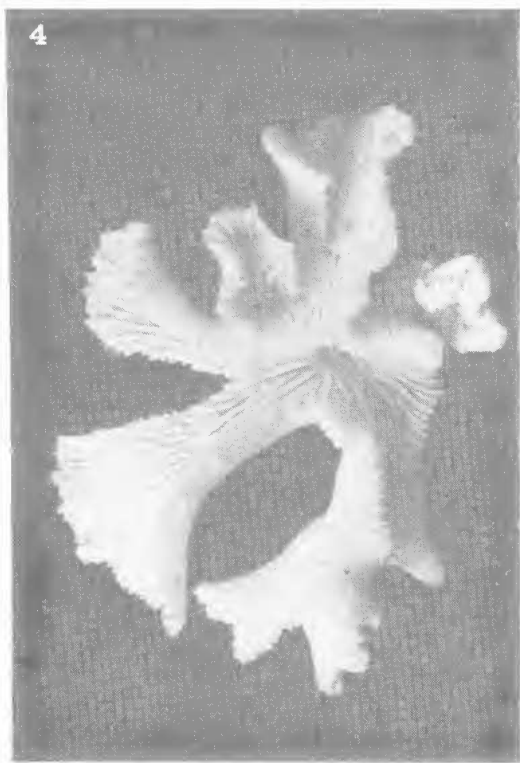
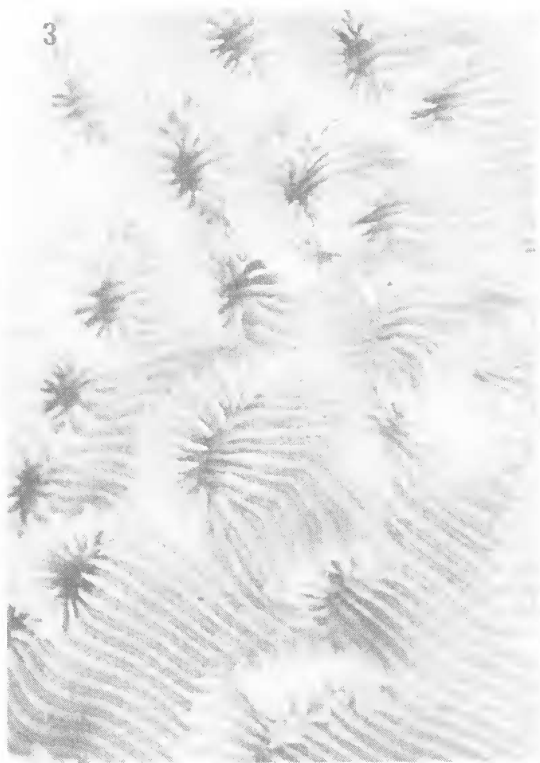
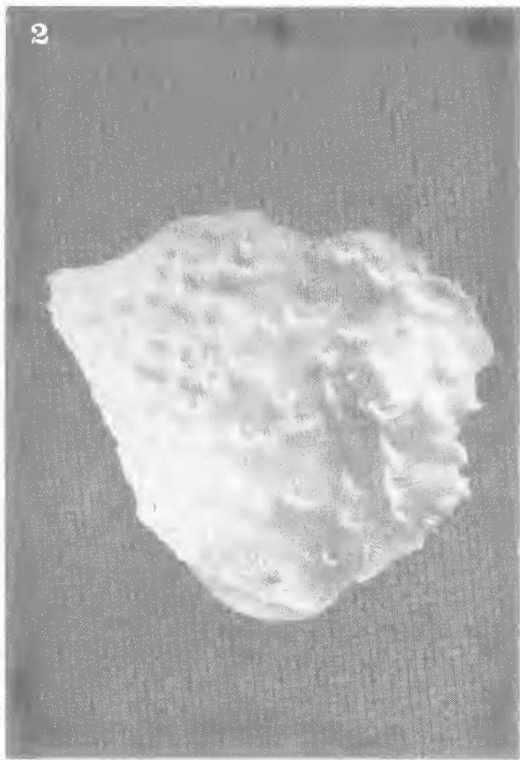
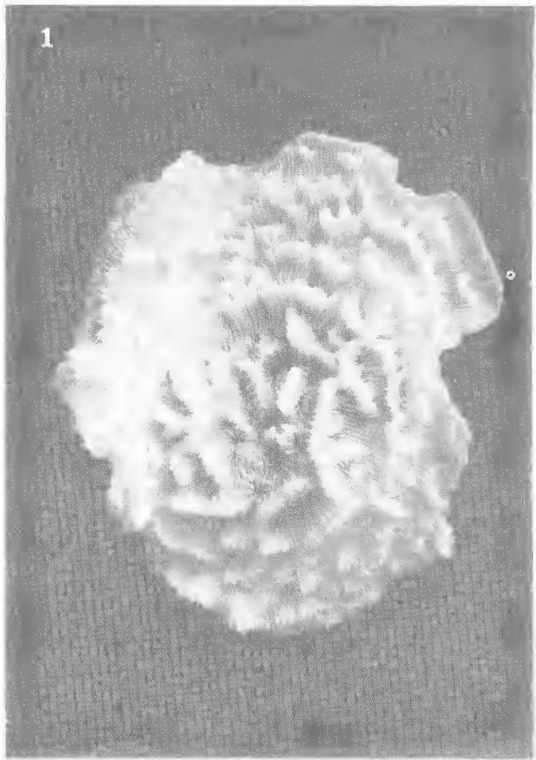
MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 1

FIG. 1: *Leptoseris cucullata* (Ellis and Solander, 1786). $\times 0.9$. Belize, Carrie Bow Cay, USNM 47321.

FIGS. 2, 3: *L. cucullata*. $\times 0.8$; $\times 3.4$. Jamaica, DB 2432.

FIG. 4: *Leptoseris papyracea* (Dana, 1846). $\times 4.4$. Macclesfield Bank, BM 1892.10.17.130 (piece of holotype of *Pavonia ramosa*).



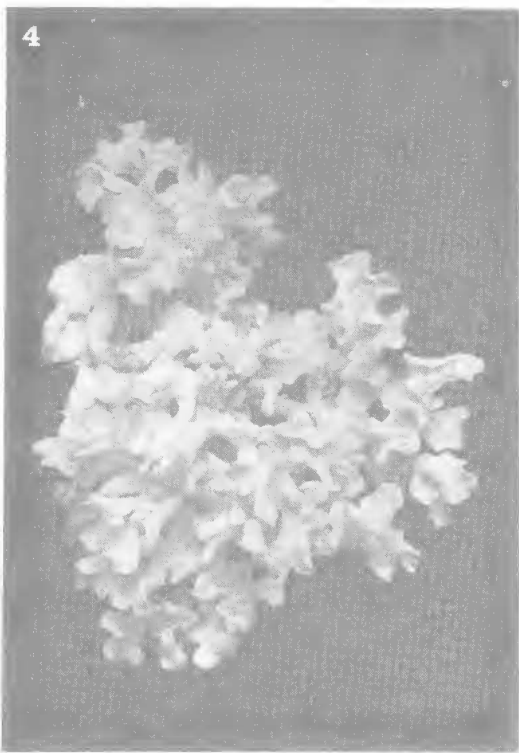
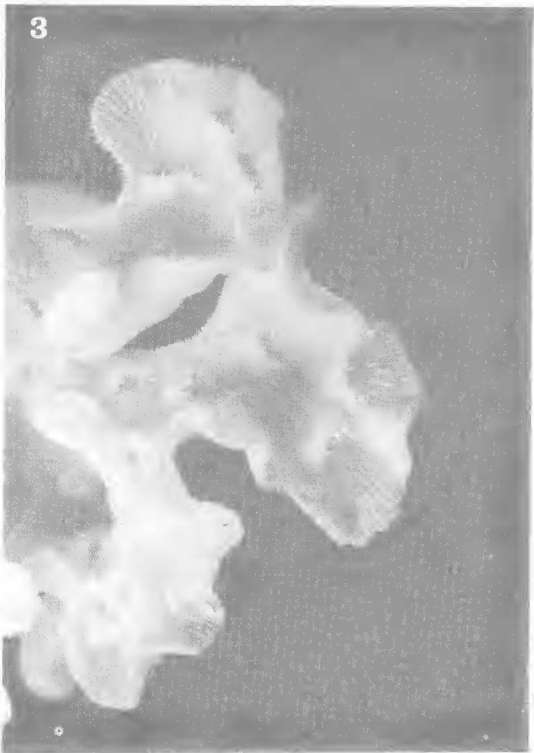
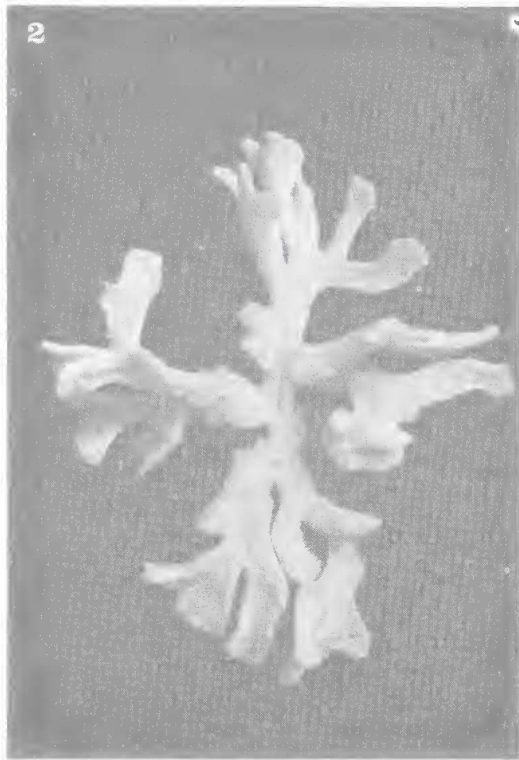
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PLATE 2

FIG. 1: *Leptoseris papyracea* (Dana, 1846). × 3. Tizard Bank, BM 16B
(*Pavonia pretiosa* holotype).

FIG. 2: *L. papyracea*. × 1.5. 19°01'S, 146°58'E, (off Townsville), GBR,
25 m, ZD 20292.

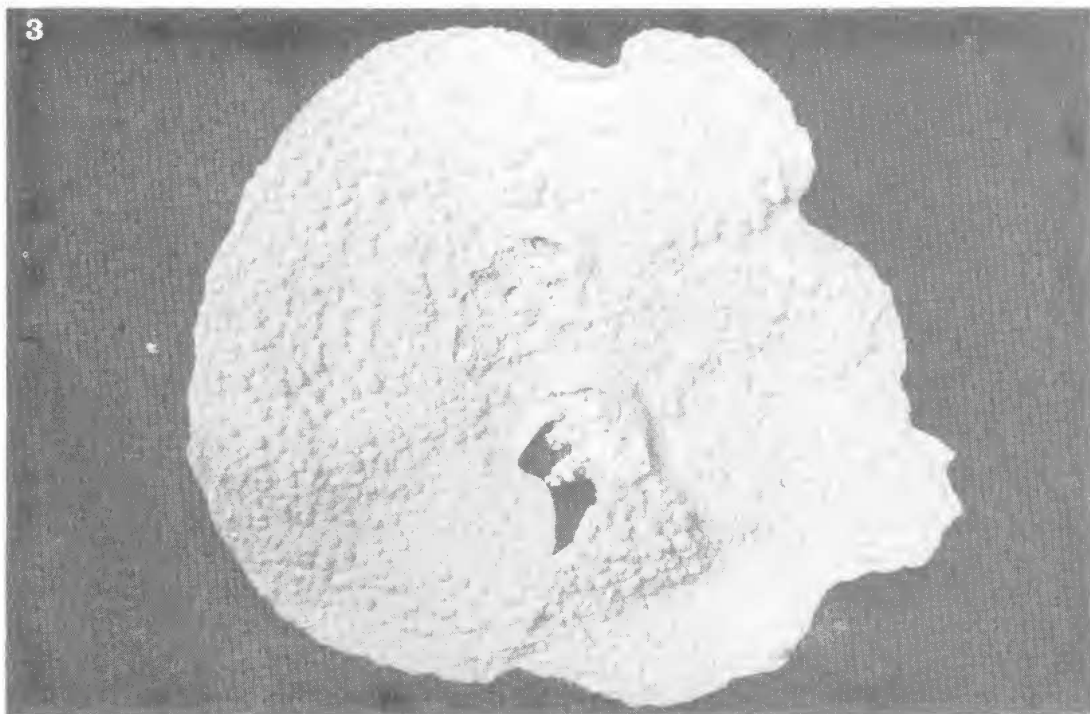
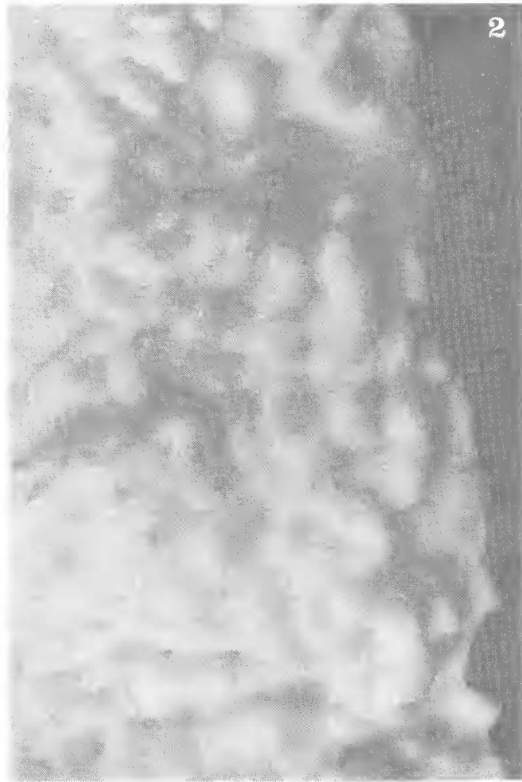
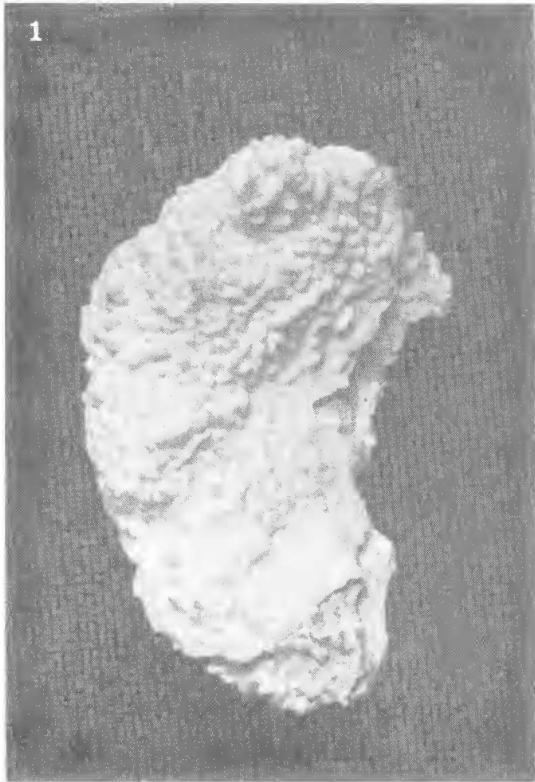
FIGS. 3, 4: *Leptoseris cailleti* (Duchassaing and Michelotti, 1864). ×
2.8; × 0.6. Off Mayagüez, Puerto Rico, USNM 54215.



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PLATE 3

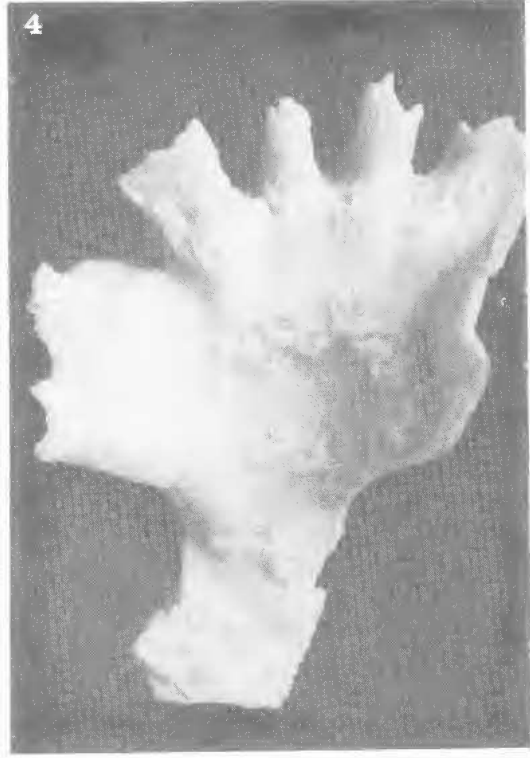
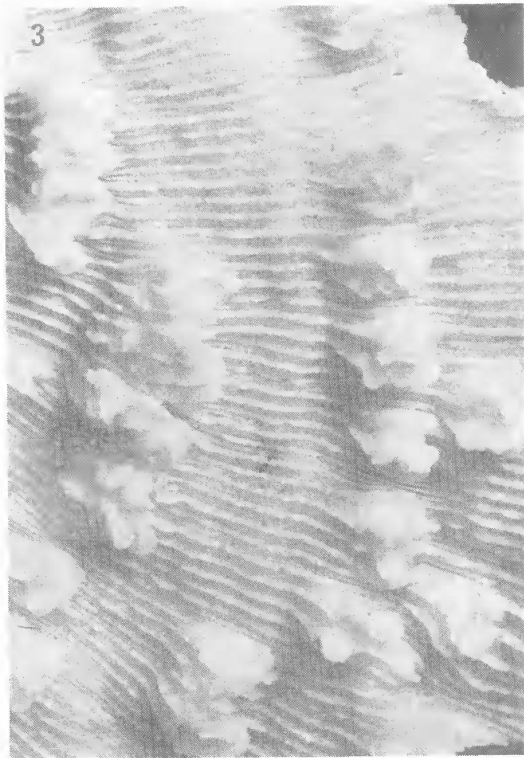
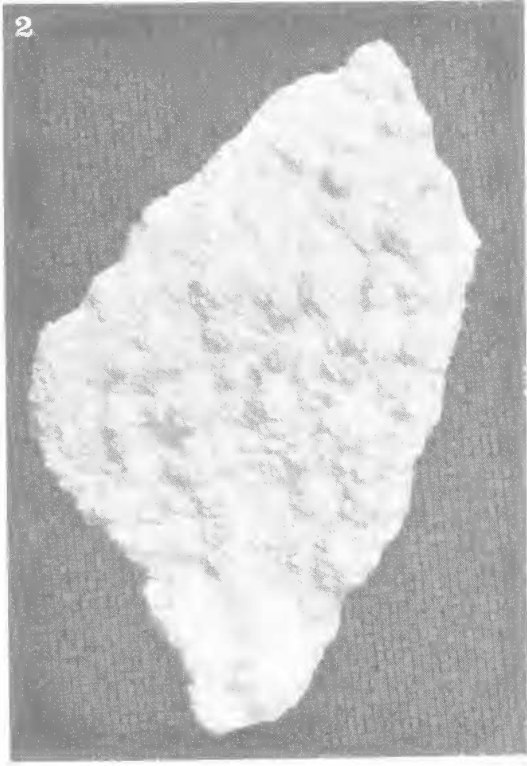
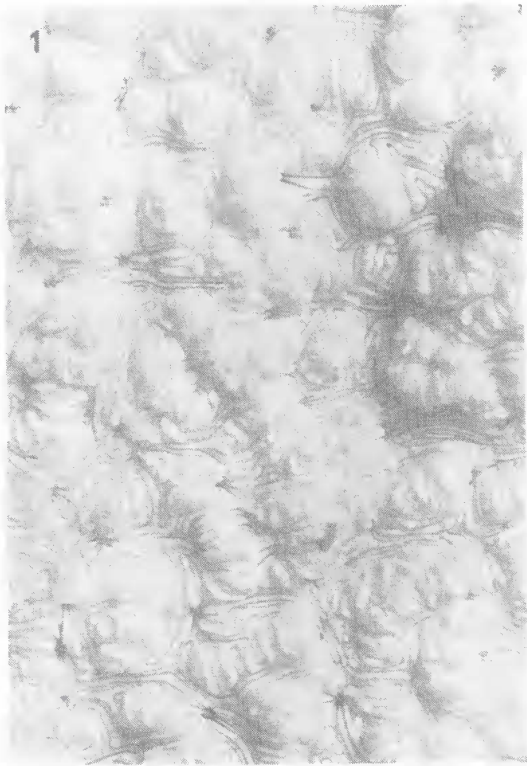
FIGS. 1, 2: *Leptoseris incrustans* (Quelch, 1886). × 0·7; × 2·9. Tahiti,
BM 1886.12.9.172 (*Cylloseris incrustans* cotype). --
FIG. 3: *Leptoseris solida* (Quelch, 1886). × 0·4. Tahiti, BM
1886.12.9.177 (*Domoseris solida* holotype).



MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 4

- FIG. 1: *Leptoseris solida* (Quelch, 1886). × 3. Tahiti, BM 1886.12.9.177. (*Domoseris solida* holotype).
- FIG. 2: *L. solida*. × 1. Tahiti, BM 1886.12.9.296 (*Domoseris porosa* holotype).
- FIG. 3: *L. solida*. × 3. Easter I, USNM 53156 (piece of holotype of *L. paschalensis*).
- FIG. 4: *Leptoseris hawaiiensis* Vaughan, 1907. × 1.5. Hawaii, USNM 20875 (*L. hawaiiensis* cotype).

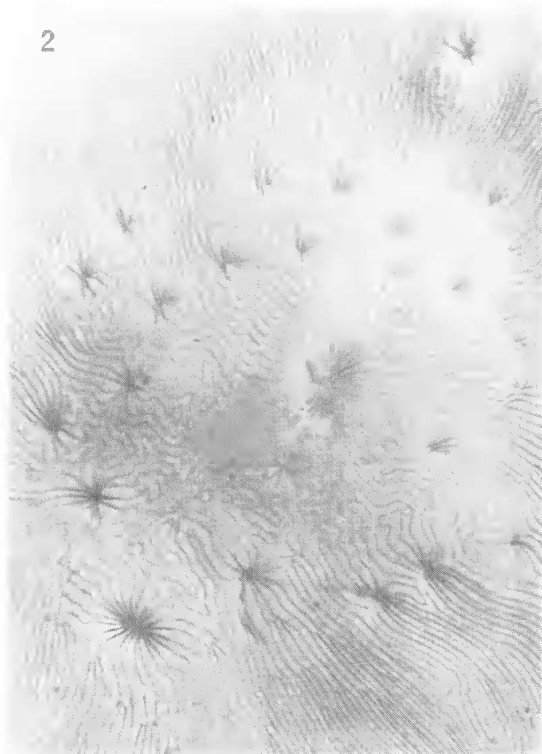
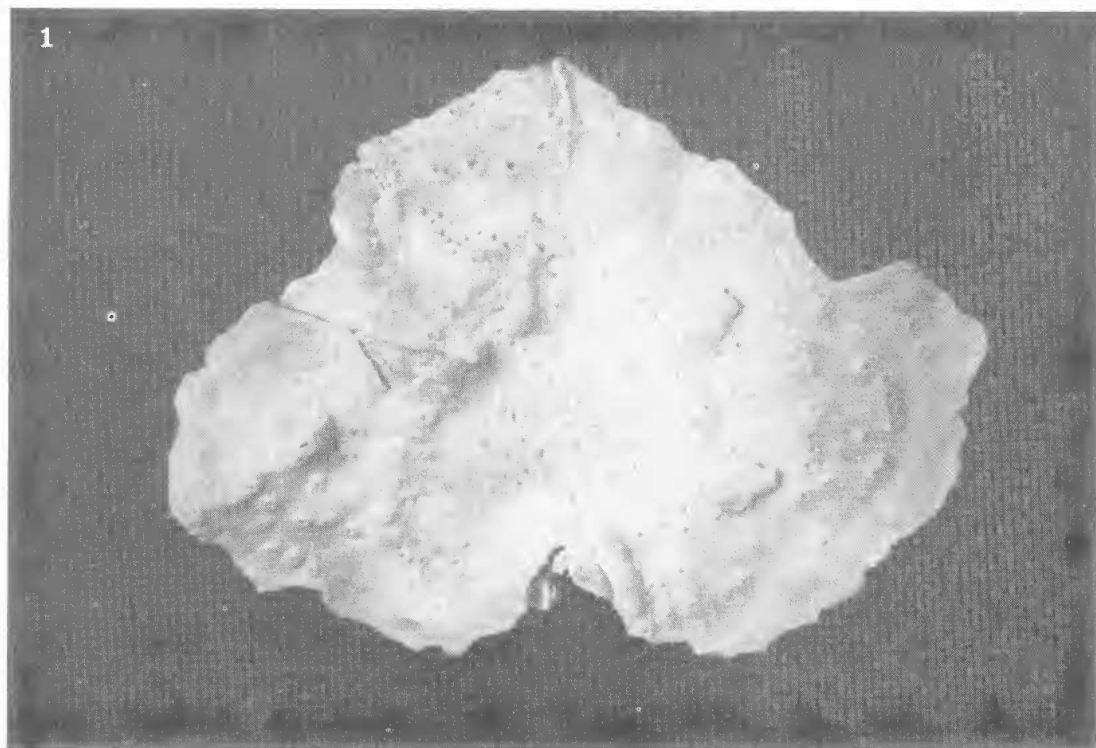


MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 5

FIGS. 1, 2: *Leptoseris hawaiiensis* Vaughan, 1907. × 0·6; × 3·4. USNM 20843 (*L. hawaiiensis* cotype).

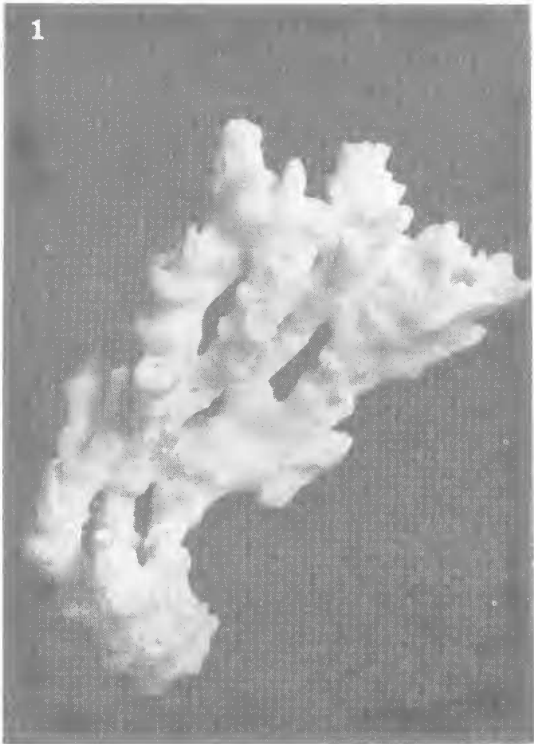
FIG. 3: *L. hawaiiensis*. × 1·6. Borneo, BM 1851.1.20–12 (*L. striatus* holotype).



MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 6

- FIG. 1: *Leptoseris hawaiiensis* Vaughan, 1907. × 1·3. Hawaii, USNM 20846 (*L. tubulifera* cotype).
- FIG. 2: *L. hawaiiensis*. × 3·3. Maldives, CM Registered but not numbered (*L. incrustans* Gardiner holotype).
- FIG. 3: *L. hawaiiensis*. × 3. Amirante Is, BM 1937.11.17.123 (*L. gravieri* holotype).
- FIG. 4: *L. hawaiiensis*. × 3. Channel to N. of Carter Reef, GBR, 5 m, ZD 9769.



MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 7

FIG. 1: *Leptoseris hawaiiensis* Vaughan, 1907. × 3. Outer slope, Carter Reef, GBR, 8 m, ZD 9840.

FIG. 2: *L. hawaiiensis*. × 3. Back reef, Yonge Reef, GBR, 6 m, ZD 9570.

FIG. 3: *L. hawaiiensis*. × 0.6. Channel to N. of Carter Reef, GBR, 5 m, ZD 9769.



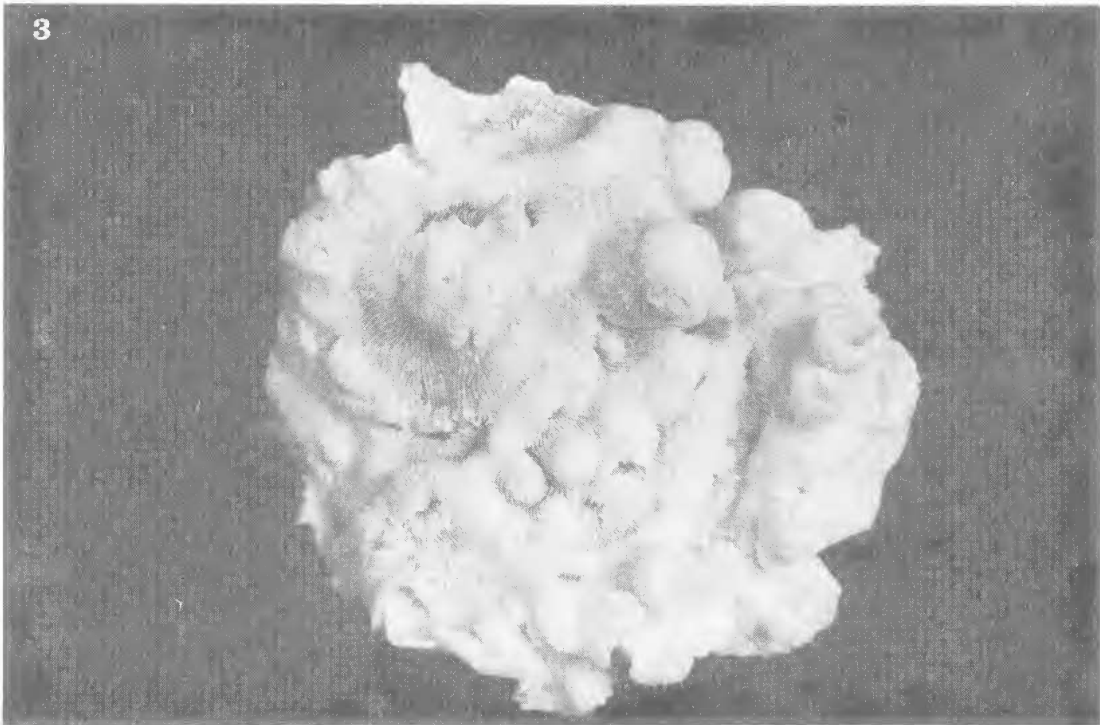
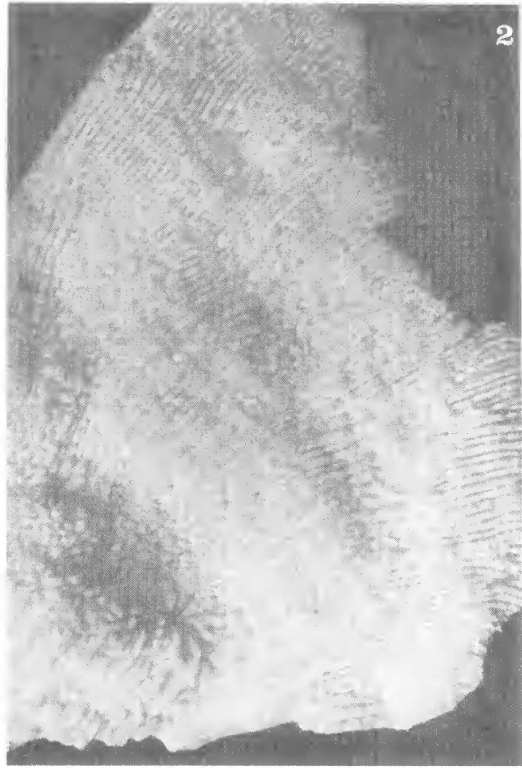
MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 8

FIG. 1: *Leptoseris scabra* Vaughan, 1907. $\times 2.9$. Hawaii. USNM 20886 (*L. scabra* cotype).

FIG. 2: *L. scabra*. $\times 1$. Tahiti, BM 1886.12.9.295 (*Domoseris regularis* cotype).

FIG. 3: *L. scabra*. $\times 1.3$. Lizard I., Area 2, GBR, 12 m, ZD 9273.

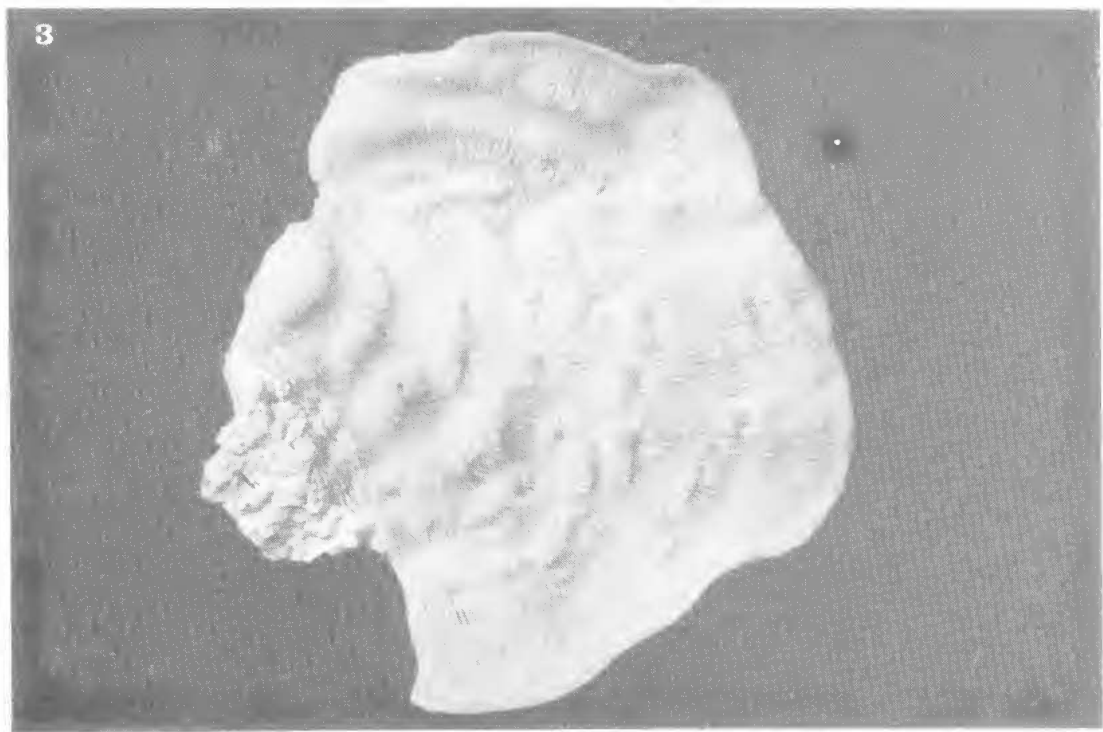
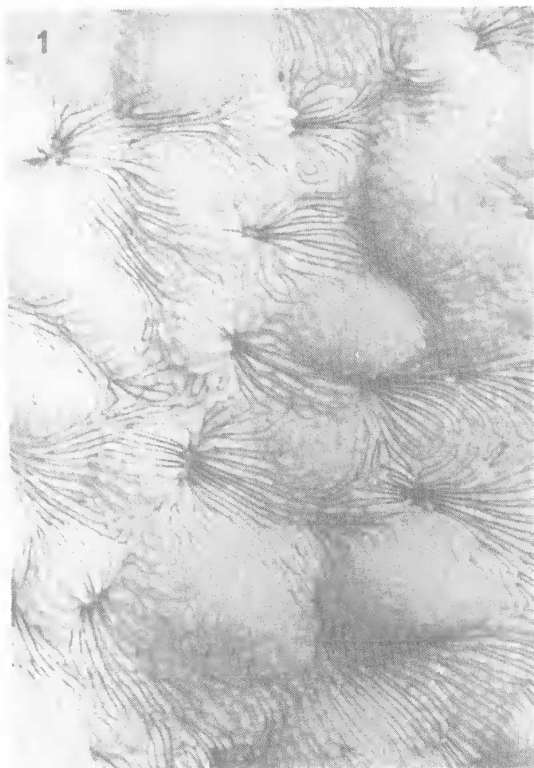


MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 9

FIG. 1: *Leptoseris scabra* Vaughan, 1907. × 3. Lizard I., Area 2, GBR,
12 m, ZD 10215.

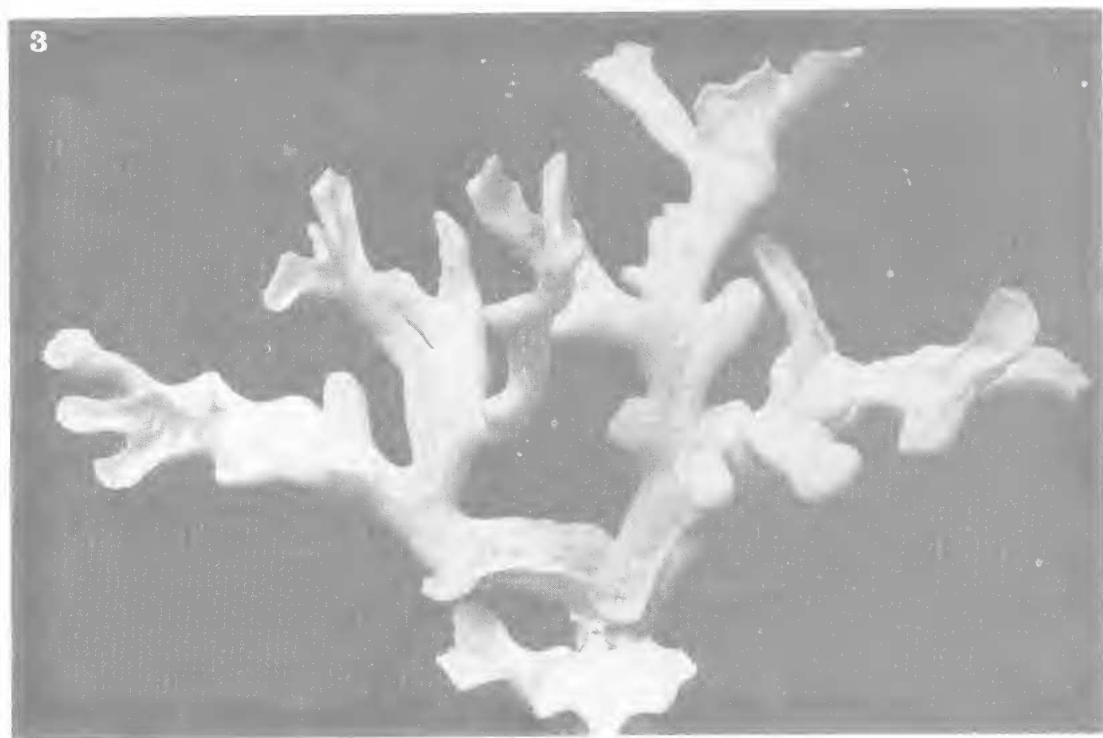
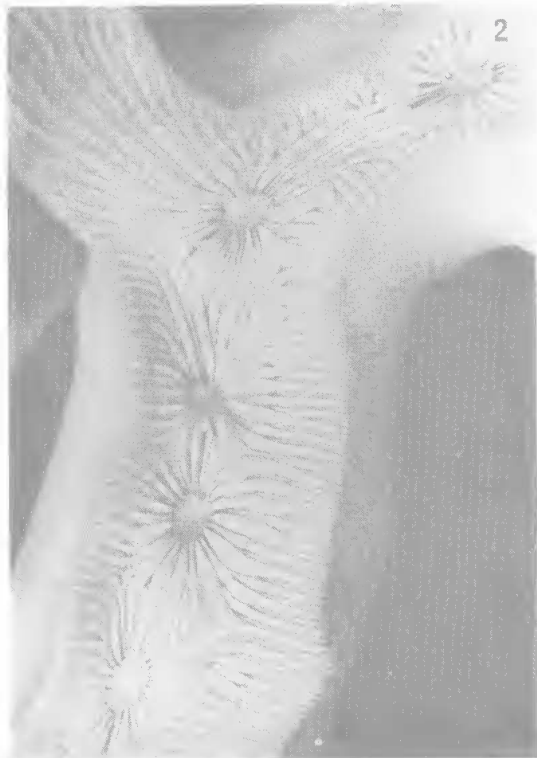
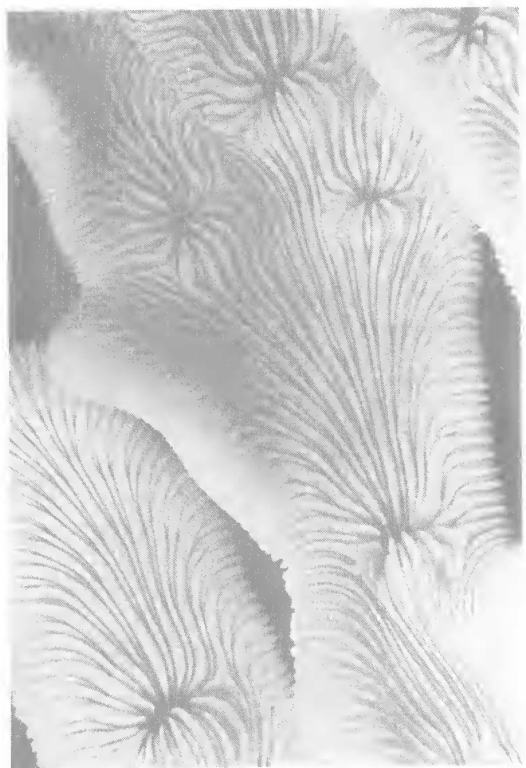
FIGS. 2, 3: *L. scabra*. × 3; × 1. Back reef, Carter Reef, GBR, 10 m, ZD
9613.



MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 10

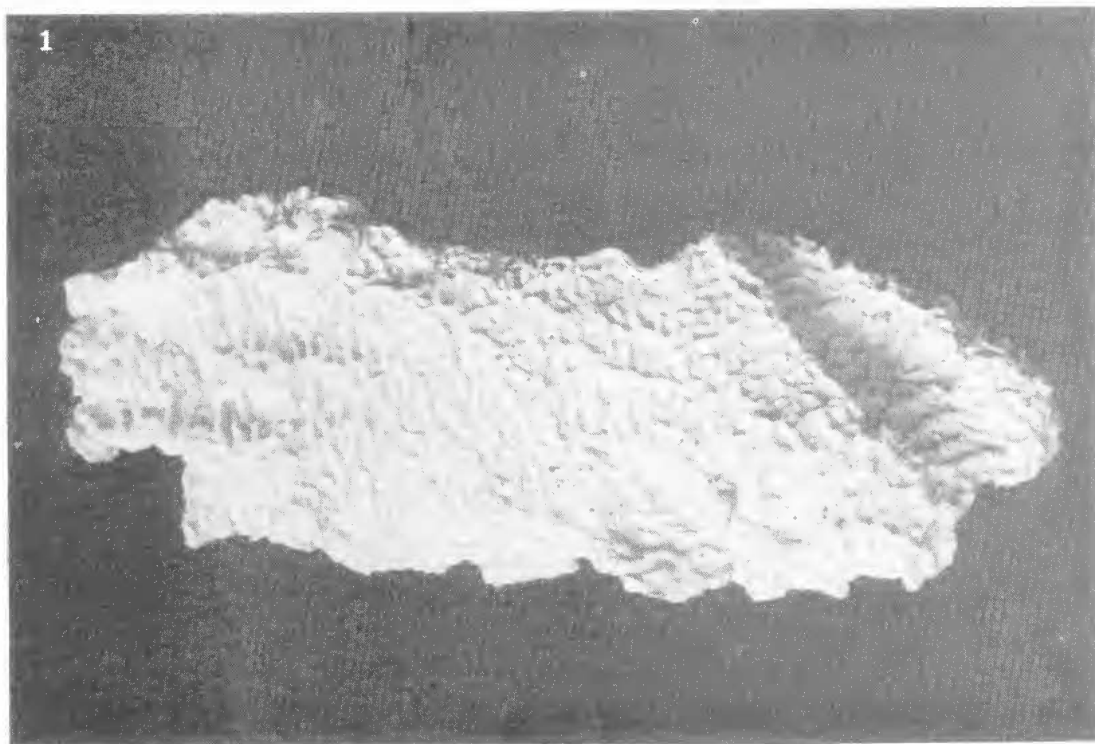
FIG. 1: *Leptoseris gardineri* van der Horst, 1921. $\times 2.9$. Orpheus I.,
Pioneer B., Palm Is. Group, GBR, 15 m, ZD 9893.
FIGS. 2, 3: *L. gardineri*. $\times 3$; $\times 0.6$. Pelorus I., W. side, Palm Is. Group,
GBR, 18 m, ZD 9538.



MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 11

FIGS. 1, 2: *Leptoseris mycetoseroides* Wells, 1954. × 0·5; × 3. Bikini Atoll, USNM 44805 (*L.?* *mycetoseroides* holotype).
FIG. 3: *L. mycetoseroides*. × 0·7. Kyûsyû, UT 44907.

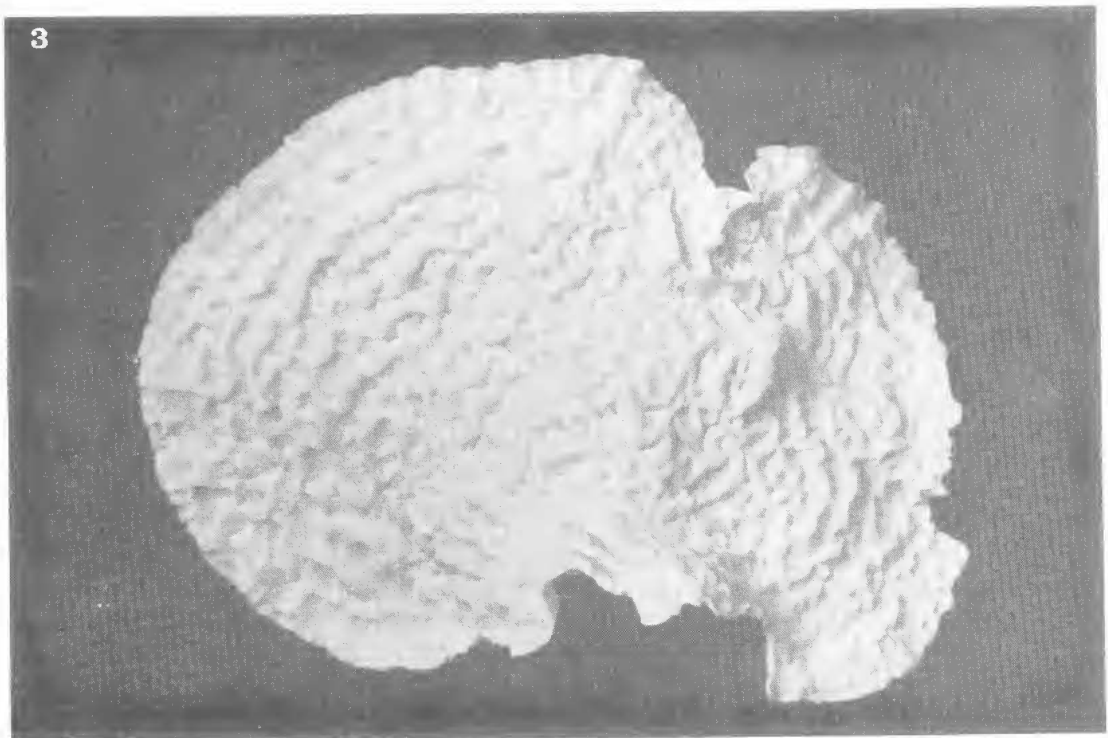
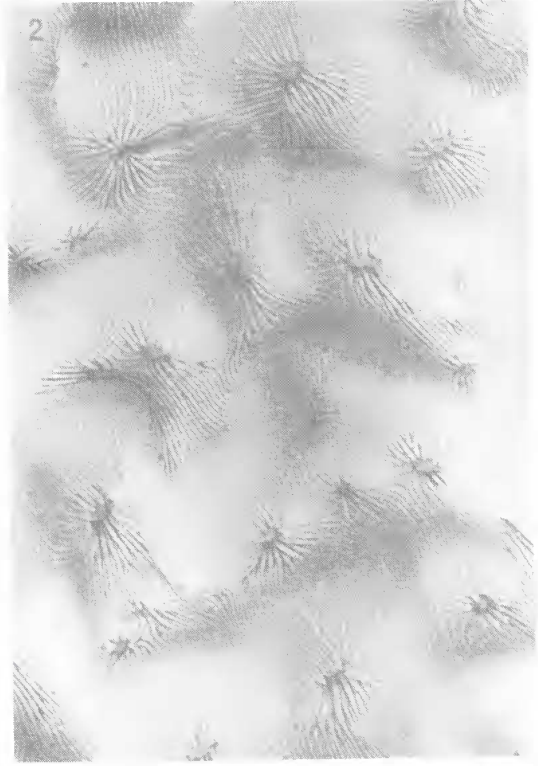


MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 12

FIG. 1: *Leptoseris mycetoseroides* Wells, 1954. $\times 3$. Outer slope, Jewell Reef, GBR, 15 m, ZD 9224.

FIGS. 2, 3: *L. mycetoseroides*. $\times 3.3$; $\times 0.5$. Back reef, Carter Reef, GBR, 8 m, ZD 9615.



MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 13

FIGS. 1, 2: *Leptoseris mycetoseroides* Wells, 1954. $\times 0.6$; $\times 3$. Outer slope, Yonge Reef, GBR, 40–56 m, MP 3679.

FIG. 3: *L. mycetoseroides*. $\times 3.8$. John Brewer Reef, GBR, 9 m, ZD 9554.

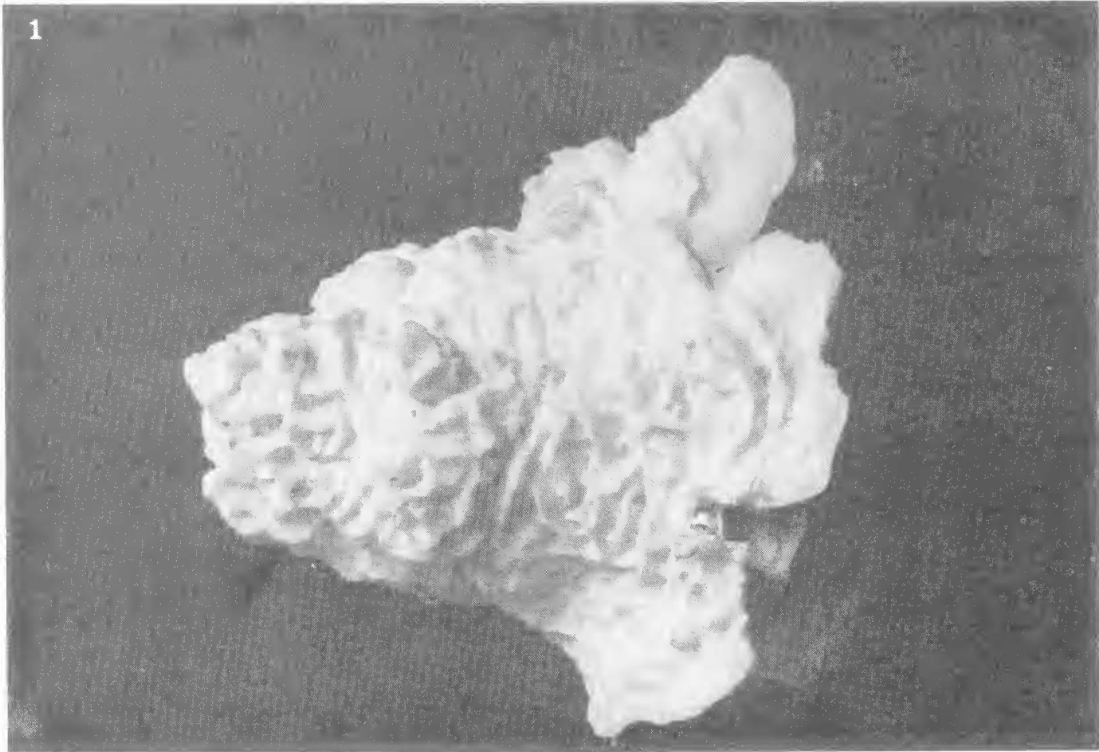
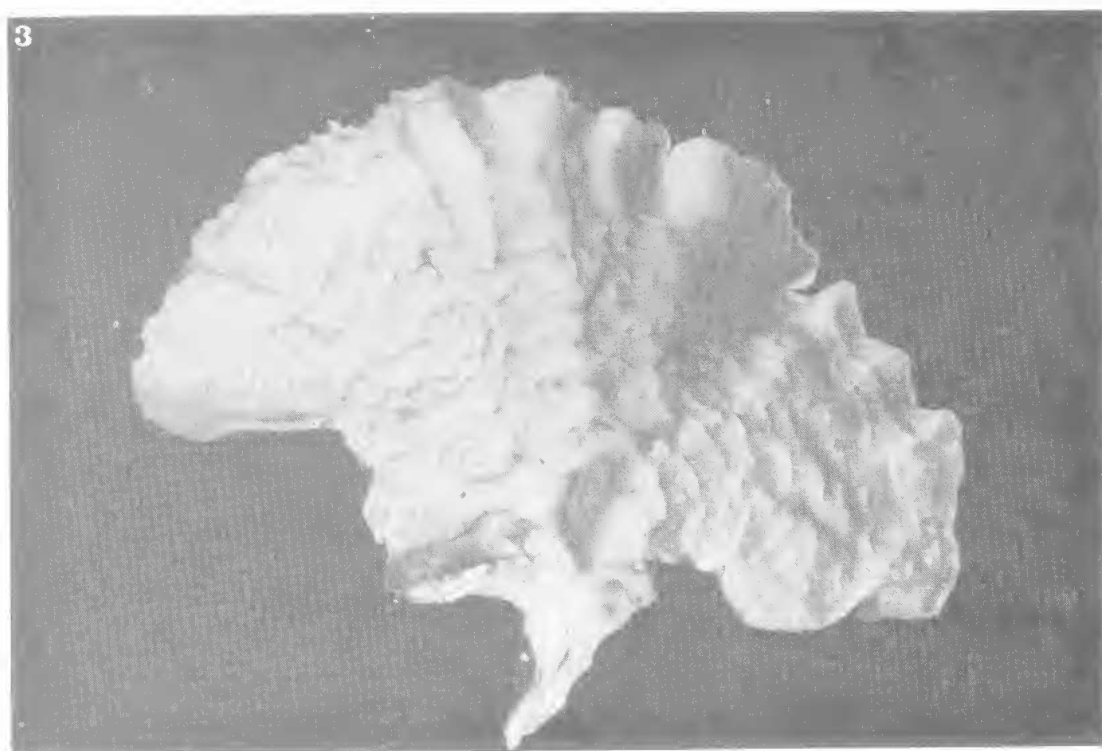
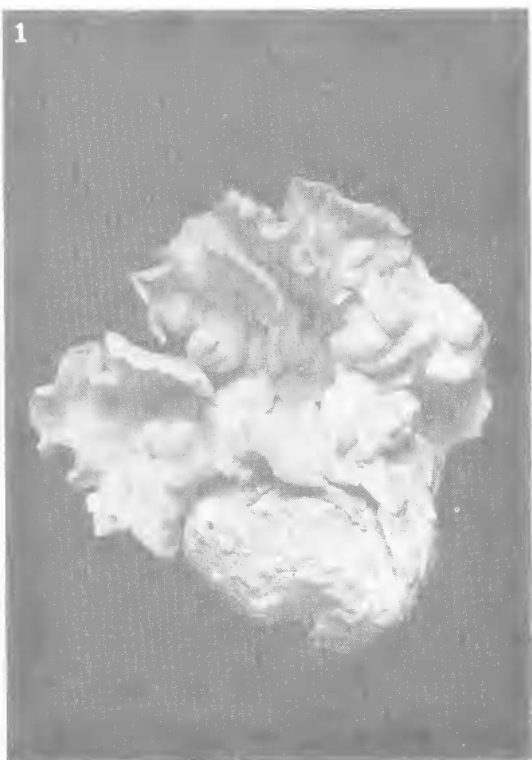


PLATE 14

FIGS. 1, 2: *Leptoseris foliosa* n. sp. $\times 0.7$; $\times 3.9$. Lizard I., Area 1, GBR, 8 m, BM 1979.4.6.1. (holotype).

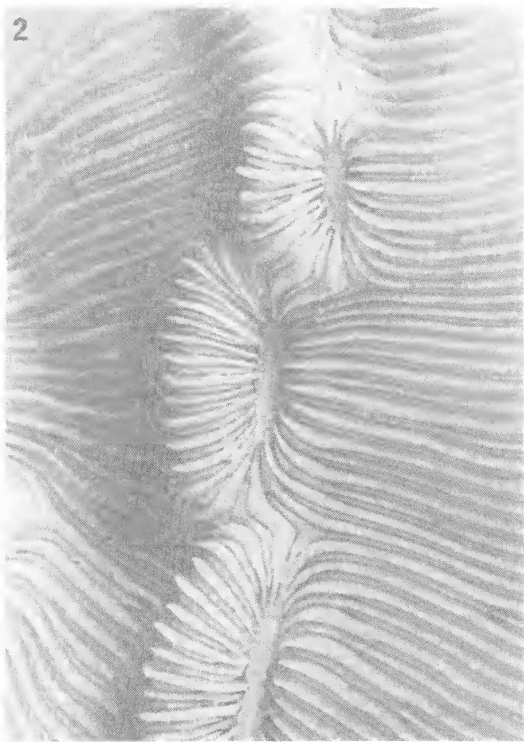
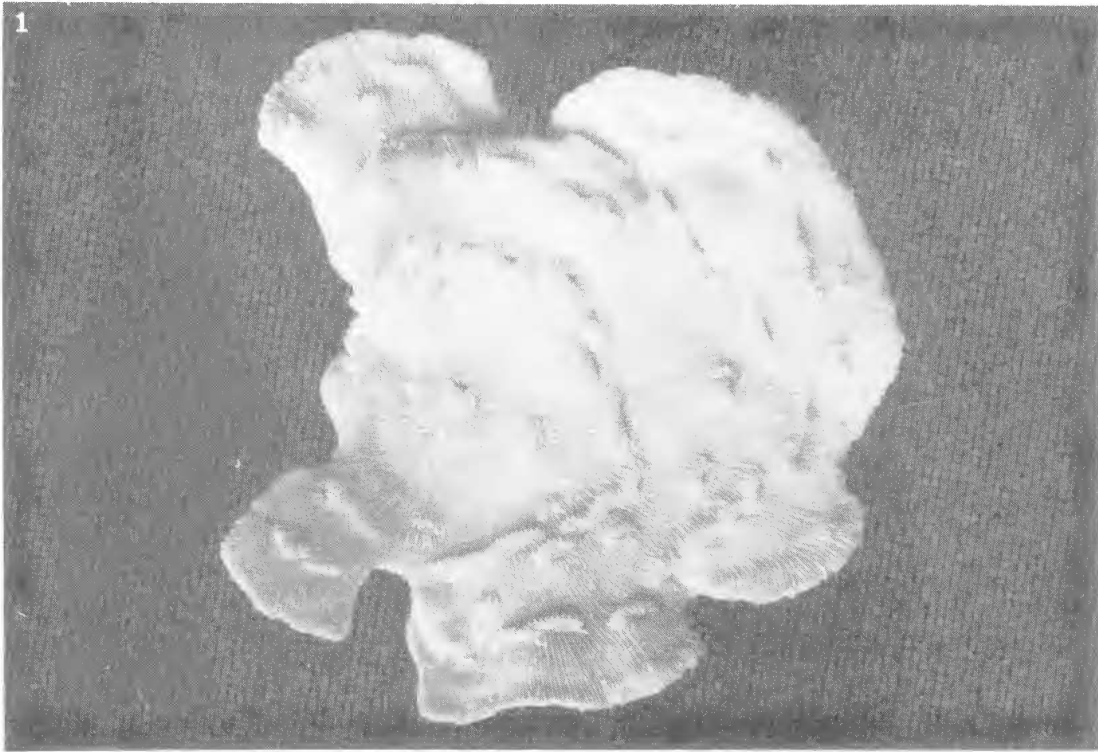
FIG. 3: *L. foliosa*. $\times 0.8$. Lizard I., Area 1, GBR, 5–10 m. BM 1979.4.6.3. (paratype).



MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 15

FIGS. 1, 2: *Leptoseris glabra*, n. sp. $\times 0.7$; $\times 3$. Pelorus I., W. side, Palm Is. Group, GBR, 17 m, BM 1979. 4.7.1 (holotype).
FIG. 3: *L. glabra*. $\times 3.2$. Orpheus I., Pioneer B., Palm Is. Group, GBR, 14 m, ZD 9496 (paratype).



MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 16

FIGS. 1, 2: *Leptoseris glabra* n. sp. $\times 0.6$; $\times 1.7$. Orpheus I., Pioneer B.,
Palm Is. Group, GBR, 14 m, ZD 9496 (paratype).
FIG. 3: *L. glabra*. $\times 3$. Channel to N. of Carter Reef, GBR, 5 m, BM
1979.4.7.5 (paratype).

