A REVISION OF THE GENUS *LOBOPHYTUM* VON MARENZELLER (OCTOCORALLIA, ALCYONACEA)

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With 51 text-figures and 31 plates

Abstract

In this revision of the genus *Lobophytum* 46 valid species are recorded. Owing to my visits to several museums I could examine most type-specimens; of only four holotypes (*L. batarum, L. borbonicum, L. lighti* and *L. rotundum*) the depository is unknown to me. One new species, *L. hapalolobatum,* is described. A list of invalid synonyms and varieties is inserted, and five keys may be helpful in identifying the corals.

Introduction

After my revisions of the genera *Sinularia* (1980) and *Sarcophyton* (1982), that of the genus *Lobophytum* is presented here. In this genus the number of valid species is 46 (in *Sarcophyton* it was 35), the number of invalid species and varieties is 23 (in *Sarcophyton* it was 50). The valid and invalid species etc. are listed below.

In the collection of the Zoological Museum at København there are two colonies, referred to *L. gazellae* by Tixier-Durivault (1956, 1958). However, the specimens belong to a new species, which I name *L. hapalolobatum.*

The species *proprium,* referred to *Sarcophyton* by Tixier-Durivault (1970a), is a valid *Lobophytum* species.

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General remarks

In the revision of the genus *Sarcophyton* (Verseveldt, 1982: 5), I gave a key to five genera of Alcyonacea. From this key it appears that in *Sarcophyton* the capitulum is smooth or has open folds, whereas in *Lobophytum* there are crests or finger-like, closed lobes; in both genera the polyps are dimorphic.

In respect of the nomenclature, important alterations have taken place. In September 1981 the Australian Institute of Marine Science (Cape Ferguson, Townsville, Queensland, Australia) organized the First International Workshop on Octocorals, in order to promote the exchange of information between workers in this group and to make a critical revision of the English, German and French terms used in the study of octocorals. As a result of the discussions an "Illustrated trilingual glossary of morphological and anatomical terms applied to Octocorallia" was compiled. It will appear in Beaufortia, and in the present paper will be quoted as "AIMS Glossary".

The colony. – In *Lobophytum* the colony may be either low and encrusting, or dish- or bowl-shaped, or erect, with a more or less distinct stalk. It consists of a polyp-bearing part, the capitulum, and a basal part without anthocodiae, the stalk. In the literature the latter part is often named "sterile stalk"; the capitulum would then be the fertile part. But are these adjectives correctly used? The term "sterile" is always used in the sense of "unfruitful, unproductive, not producing genital cells" (also in the sense of "free from microbes"); in that case fertile is the opposite. But in the case of the capitulum and the stalk the terms are used in an entirely different meaning: "with or without anthocodiae" (not "with or without polyps", for in the stalk polyps are present, viz. the basal parts of the polyps, their gastric cavities). So the AIMS workshop decided to abandon the terms "sterile" and "fertile" as adjectives to qualify stalk and capitulum.

In the AIMS Glossary the coenenchyme is described as "the colonial me-

sogloea usually containing sclerites and penetrated by gastrodermal canals". So it includes both surface layer and interior, and for this reason it is not correct to speak of coenenchymal sclerites in the meaning of internal sclerites. In this paper I will avoid the terms coenenchyme and coenenchymal.

The sclerites. – In most *Lobophytum* species the clubs have ill-defined heads. In general they resemble each other so much that they can hardly be used for taxonomical purposes. In identifying *Lobophytum* species the shape of a colony and especially that of the capitulum with its lobes is more important.

The AIMS Glossary gives descriptions and photographs of all kinds of sclerites. It stands to reason that between these types all sorts of transitional forms occur. Such forms should be described more or less fully by the authors, for example as club- to spindle-shaped, or rod- to needle-shaped.

I may call attention to two forms of sclerites, which are important in *Lobophytum.*

(1) In *Lobophytum* capstans are very common. In former glossaries (Bayer, 1956: F174; 1961: 20) and also in the AIMS Glossary the capstan is described as a (monaxial) rod with two whorls of warts (or tubercles) and terminal tufts of warts. Though in navigation a capstan looks different (a terminal tuft is absent), the term is current in octocoral literature now, and it is recommended to use it instead of the term barrel. With regard to the number of whorls with capstans I differ from Tixier-Durivault. In her revision (1958) she states that capstans (her "tonnelets") like that shown in our fig. 20m and we have four girdles of warts. But my view (in conformity with the description in the AIMS Glossary) is that there are two girdles or zones of warts, for a terminal cluster is not a girdle.

(2) It is noteworthy that in many *Lobophytum* species and especially in the surface layer of the lobes, fusiform sclerites are found which are rather smooth. They bear only a few low ledges, running lengthwise; see figs. 7a-c, 29a-c. They cannot be considered young sclerites, for in many cases they have the same length as the other sclerites. They are so common that in my opinion they are of no value for taxonomy. In the descriptions of the species I usually do not mention them; in a few cases I give drawings. The shape is, however, so typical that I think it desirable to give them a name of their own, viz. "shuttle". The difference between a shuttle and a spindle is that a spindle has distinct prominences; a shuttle is smooth (apart from the ledges just mentioned).

The autozooids and siphonozooids. – Generally speaking the remarks that were made in this respect in my paper on *Sarcophyton*, can also be made in this paper on *Lobophytum*. In very few cases the autozooids are not totally

retracted. Near the edge of the crest-like lobes, near the summits of finger-like lobes and in the marginal part of the disk the autozooids are more closely set, and therefore the number of siphonozooids is very small. For the rest I refer to my revision of *Sarcophyton*.

GROUPS AND KEYS

Just as in the genera *Sinularia* and *Sarcophyton*, I give keys as an expedient in identifying *Lobophytum* colonies. The warning not to over-estimate the value of the keys is also due here, as is the advice to consult another key in case of doubt.

The keys are based on the length of the sclerites in the interior of the stalk and on the presence or absence of spindles in that part of the colony. I distinguish five groups of species; each group has its own key. A sixth key is added, for there are some species, which can be placed both in group I or II and in group III or IV.

The groups (and keys) are:

Group I. In stalk interior capstans, 0.15-0.20 mm long; spindles shorter than 0.30 mm may be present.

Group II. In stalk interior capstans, 0.15-0.20 mm long; spindles longer than 0.30 mm are present.

Group III. In stalk interior capstans and oblong sclerites, 0.20-0.30 mm long; spindles longer than 0.30 mm are absent.

Group IV. In stalk interior capstans and oblong sclerites, 0.20-0.30 mm long; spindles longer than 0.30 mm are present.

Group V. In stalk interior spindles only, more than 0.30 mm long.

Key VI. In stalk interior capstans and oblong sclerites, about 0.18-0.23 mm long, usually in company with spindles.

LIST OF VALID *LOBOPHYTUM* SPECIES

In the following list the numbers I to VI refer to the keys to which the species belong. The abbreviations RMNH etc. refer to the museum in which the holotype is kept.

The alphabetical list contains the names of forty-six species. One species, viz. *L. hapalolobatum*, is new.

altum Tixier-Durivault, 1956; IV; MNHN.
batarum Moser, 1919; V; depository unknown.

borbonicum Von Marenzeller, 1886; I; depository unknown.
catalai Tixier-Durivault, 1957; III; MNHN.
compactum Tixier-Durivault, 1956; I; MNHN.
crassum Von Marenzeller, 1886; II; NHMW.
crebriplicatum Von Marenzeller, 1886; IV; NHMW.
cristatum Tixier-Durivault, 1970a; III; MNHN.
cryptocormum Verseveldt & Tursch, 1979; II; RMNH.
delectum Tixier-Durivault, 1966; I; MNHN.
densum Tixier-Durivault, 1970a; IV; MNHN.
denticulatum Tixier-Durivault, 1956; IV; MNHN.
depressum Tixier-Durivault, 1966; V; MNHN.
durum Tixier-Durivault, 1956; IV; MNHN.
gazellae Moser, 1919; IV; ZMB.
hapalolobatum sp. nov.; II; ZMK.
hirsutum Tixier-Durivault 1956; IV; MNHN.
ignotum Tixier-Durivault, 1956; II; MNHN.
irregulare Tixier-Durivault, 1970a; IV; MNHN.
jaeckeli Tixier-Durivault, 1956; VI; ZMH.
laevigatum Tixier-Durivault, 1956; III; MNHN.
lamarcki Tixier-Durivault, 1956; III; MNHN.
latilobatum Verseveldt, 1971; IV; RMNH.
legitimum Tixier-Durivault, 1970a; III; MNHN.
lighti Moser, 1919; II; depository unknown.
meandriforme Tixier-Durivault, 1956; III; MNHN.
michaelae Tixier-Durivault, 1966; III; MNHN.
microlobulatum Tixier-Durivault, 1970a; I; MNHN.
microspiculatum Tixier-Durivault, 1956; I; MNHN.
mirabile Tixier-Durivault, 1956; II; MNHN.
patulum Tixier-Durivault, 1956; III; MNHN.
pauciflorum (Ehrenberg, 1834); III; ZMB.
planum Tixier-Durivault, 1970a; II; MNHN.
proprium (Tixier-Durivault, 1970a); IV; MNHN.
pusillum Tixier-Durivault, 1970a; I; MNHN.
ransoni Tixier-Durivault, 1957; III; MNHN.
rotundum Tixier-Durivault, 1957; II; depository unknown.
salvati Tixier-Durivault, 1970a; III; MNHN.
sarcophytoides Moser, 1919; V; ZMB.
schoedei Moser, 1919; V; ZMB.
solidum Tixier-Durivault, 1970a; I; MNHN.
strictum Tixier-Durivault, 1957; I; MNHN.
variatum Tixier-Durivault, 1957; III; MNHN.
varium Tixier-Durivault, 1970a; III; MNHN.
venustum Tixier-Durivault, 1957; IV; MNHN.
verum Tixier-Durivault, 1970a; V; MNHN.

INVALID SYNONYMS AND SPECIES

The following species and varieties are identical with other *Lobophytum* species or they do not belong to this genus.

angulatum Tixier-Durivault, 1956 = *crassum* Von Marenzeller, 1886. See p. 25.
caledonense Tixier-Durivault, 1956 = *crassum* Von Marenzeller, 1886. See p. 25.
candelabrum Roule, 1908 = *pauciflorum* (Ehrenberg, 1834). See p. 74.
carnatum Tixier-Durivault, 1956 = *Sarcophyton crassocaule* Moser, 1919. See Verseveldt, 1982: 27, 31-34, fig. 10.
chevalieri Tixier-Durivault, 1970a = *pauciflorum* (Ehrenberg, 1834). See p. 74.
crassum var. *australicum* May, 1899 = *crassum* Von Marenzeller, 1886. See p. 25.
crassum var. *cristagalli* Von Marenzeller, 1886 (= *cristagalli* Von Marenzeller in: Tixier-Durivault, 1956) = *crassum* Von Marenzeller, 1886. See p. 25.
crassum var. *proliferum* Von Marenzeller, 1886 = *crassum* Von Marenzeller, 1886. See p. 25.
crassum var. *sansibaricum* May, 1898 = *crassum* Von Marenzeller, 1886. See p. 25.
crebriplicatum var. *crassospiculatum* Moser, 1919 (= *crassospiculatum* Moser in: Tixier-Durivault, 1956) = *crassum* Von Marenzeller, 1886. See p. 25.
hedleyi Whitelegge, 1897 = *crassum* Von Marenzeller, 1886. See p. 25.
madreporoides Ridley, 1887 = *pauciflorum* (Ehrenberg, 1834). See p. 74.
nodosum Tixier-Durivault, 1969 = *catalai* Tixier-Durivault, 1957. See p. 22.
oblongum Tixier-Durivault, 1956 = *crebriplicatum* Von Marenzeller, 1886. See p. 32.
pauciflorum var. *philippinense* Moser, 1919 = *pauciflorum* (Ehrenberg, 1834). See p. 74.
pauciflorum var. *validum* Von Marenzeller, 1886 = *pauciflorum* (Ehrenberg, 1834). See p. 74.
pulchellum Tixier-Durivault, 1957 = *Sarcophyton pulchellum* (Tixier-Durivault, 1957). See Verseveldt, 1982: 65-67.
radiatum Tixier-Durivault, 1957 = *Sarcophyton crassocaule* Moser, 1919. See Verseveldt, 1982: 27, 34.
robustum Tixier-Durivault, 1957 = *ransoni* Tixier-Durivault, 1957. See p. 83.
roxasi Moser MS = *gazellae* Moser, 1919.
spissum Tixier-Durivault, 1970 = *varium* Tixier-Durivault, 1970. See p. 95.
tenerum Tixier-Durivault, 1957 = *Sarcophyton crassocaule* Moser, 1919, Verseveldt, 1982: 28, 34, fig. 11.
undatum Tixier-Durivault, 1957 = *Sarcophyton crassocaule* Moser, 1919. See Verseveldt, 1982: 28, 34.

KEYS

Key I. In stalk interior capstans, 0.15-0.20 mm long; spindles shorter than 0.30 mm may be present

1. Colony with small spherical lobes, 6-9 mm in diameter; in all parts of colony many sclerites with a distinct waist . *pusillum* Tixier-Durivault
— Colony with small (1-2 mm wide, a few mm tall) or large, digitiform or crest-like lobes 2
2. Colony with small (1-2 mm wide, a few mm tall), crowded lobes; sclerites in interior of lobes warty spindles, 0.20-0.25 mm long; capstans in stalk interior slender, often irregular in shape . . . . . *microlobulatum* Tixier-Durivault
— Colony with larger digitiform or crest-like lobes 3
3. In stalk interior merely capstans, 0.13-0.17 mm long; capitulum consists of crests with finger-like lobules . . *microspiculatum* Tixier-Durivault
— In stalk interior along with capstans oblong or fusiform sclerites with a maximum length of 0.22-0.28 mm 4
4. In stalk interior ovals, 0.15-0.18 mm long, covered with big, closely set warts, usually without a waist; in interior of lobes and stalk no spindles. . . . . *borbonicum* Von Marenzeller
— In stalk interior capstans with a distinct waist and oval or spindle-shaped sclerites, up to 0.23 or 0.26 mm long 5
5. Most lobes are crests; interior of lobes contains spindles up to about 0.40 mm long 6
— Most lobes are digitiform; in addition to capstans, interior of lobes has oblong sclerites, up to about 0.25 mm long 7
6. In interior of lobes spindles only, up to 0.43 mm long; in stalk surface warty clubs, 0.09-0.20 mm long . . . *compactum* Tixier-Durivault
— In interior of lobes capstans as well as spindles, the latter up to 0.40 mm long; in stalk surface spindles, 0.07-0.13 mm long, clubs are scarce here . . . . . *delectum* Tixier-Durivault
7. Capitulum with loosely placed, thick, digitiform lobes, up to about 30 mm high (pl. 18 fig. 4); capstans in stalk interior with long waist . . . . . *solidum* Tixier-Durivault
— Capitulum with compactly disposed lobes, up to 15 mm high (pl. 23 fig. 2); capstans in stalk interior with shorter waist . . . . . *strictum* Tixier-Durivault

Key II. In stalk interior capstans, 0.15-0.20 mm long, and spindles longer than 0.30 mm

1. Colony flat or dish-shaped 2
— Colony with crests or finger-like lobes 3
2. Colony with few finger-like lobes, chiefly arising from the margin of the disk; in interior of disk capstans, 0.15-0.18 mm long, along with oblong sclerites and blunt spindles, up to 0.31 mm long . . . . . *planum* Tixier-Durivault
— Colony fragile; disk rather flat, passes into many lobes which spread in about the same plane as the disk; in interior of disk no capstans, but pointed or blunt spindles, up to 0.40 mm long . . . *lighti* Moser
3. Spindles in stalk interior up to 0.40 or 0.50 mm long 4
— Spindles in stalk interior up to 0.32 or 0.35 mm long 6
4. Lobes are thin crests, radially directed; stalk high, inverted conical; capitulum circular . . . . . *rotundum* Tixier-Durivault
— Lobes finger-like 5
5. Capitulum cup-shaped, with branched, slender, finger-like lobes on the edge; stalk of colony slender, up to 90 mm long; spindles in stalk interior slender, up to 0.40 mm long . . *cryptocormum* Verseveldt & Tursch
— Capitulum with short, thick, sometimes finger-like lobes; stalk short, wide; spindles in stalk interior thick, up to 0.48 mm long . . . . . *ignotum* Tixier-Durivault
6. Capitulum with soft, more or less finger-like lobes (pl. 9 figs. 4, 5) . . . . . *hapalolobatum* sp. nov.
— Capitulum with crests 7
7. Lobes thick (5-9 mm), erect crests . . . *crassum* Von Marenzeller
— Lobes thin (3 mm) flat crests, often turned down and imbricating . . . . . *mirable* Tixier-Durivault

Key III. In stalk interior capstans and oblong sclerites, 0.20-0.30 mm long; spindles longer than 0.30 mm are absent

1. In surface layer of disk or lobes and stalk many sclerites are irregular in shape, more or less deformed 2
— Sclerites in all parts of colony regular in shape: clavate, fusiform, capstan-like, etc. 3
2. Colony with erect, finger-like lobes, with rounded summits . . . . . *cristatum* Tixier-Durivault

— Colony flat, plate-like . . . . . *patulum* Tixier-Durivault

3. Colony stone-hard, with the shape of an oblique parallelepiped with a bumpy upper side; clubs in surface layer of upper side small (0.09-0.14 mm long); internal capstans strikingly wide (0.16-0.19 mm) . . . . . *laevigatum* Tixier-Durivault

— Colony plate-shaped or with many digitiform or crest-like lobes . 4

4. Colony plate-shaped with few, low lobes (pl. 29); in surface layer of outside of colony clubs up to 0.25 mm long with big, closely set warts . . . . . *variatum* Tixier-Durivault

— Colony with numerous finger- or crest-like lobes 5

5. Lobes mainly finger-like 6

— Lobes mainly crest-like 10

6. Surface layer of lobes and stalk with numerous tiny rods and clubs, 0.04-0.08 mm long, and longer clubs up to about 0.15 mm . . . . . *catalai* Tixier-Durivault

— Such small sclerites are absent 7

7. Clubs in surface layer of lobes 0.15-0.20 mm long . . . . . *legitimum* Tixier-Durivault

— Sclerites in surface layer of lobes 0.10-0.22 mm long 8

8. Sclerites in surface layer of lobes and stalk mainly spindle-shaped . . . . . *pauciflorum* (Ehrenberg)

— Sclerites in surface layer of lobes and stalk club-shaped 9

9. Sclerites in interior of lobes are oblong forms (0.20-0.25 mm long) and pointed spindles (up to 0.40 mm long) . . . *salvati* Tixier-Durivault

— Sclerites in interior of lobes are cylinders and irregular forms, up to 0.29 mm long . . . . . *varium* Tixier-Durivault

10. Lobes spreading out horizontally and partly overlapping one another . . . . . *lamarcki* Tixier-Durivault

— Lobes erect 11

11. Lobes strikingly voluminous (10-16 mm thick), often cockscomb-like, with swollen edge; capstans in stalk interior 0.23-0.26 mm long . . . . . *ransoni* Tixier-Durivault

— Lobes much thinner, edge 5-8 mm thick; capstans usually 0.20-0.23 mm long 12

12. Lobes closely set; sclerites without a long waist . . . . . *michaelae* Tixier-Durivault

— Lobes less densely placed; sclerites in all parts of colony with distinct waist . . . . . *meandriforme* Tixier-Durivault

Key IV. In stalk interior capstans and oblong sclerites, 0.20-0.30 mm long; spindles longer than 0.30 mm are present

1. In all parts of the colony or especially in the surface layer of the stalk sclerites with forms deviating from the standard types 2
— Sclerites in all parts of colony show normal forms: clubs, spindles, capstans, etc. 3
2. Colony with erect, more or less finger-like lobes; sclerites in surface layer of stalk ovals and deformed sclerites with few, simple processes . . . . . *gazellae* Moser
— Colony with densely placed, low lobes; most sclerites in surface layer of lobes and stalk are cylindriform with few, small processes, often accumulated at one or both ends . . . . . *proprium* (Tixier-Durivault)
3. Colony bowl-shaped with raised border and few crest- or finger-like lobes 4
— Colony encrusting, with many crest-like lobes 6
4. Clubs in surface layer of lobes and also many sclerites in stalk with ill-defined heads; sclerites in surface layer of outside usually densely covered with warts . . . . . *durum* Tixier-Durivault
— Clubs in surface layer of lobes and especially in the stalk with distinct heads 5
5. In surface layer of lobes most clubs are 0.17-0.29 mm (there are also clubs 0.12 mm long) × 0.07-0.10 mm; in surface layer of outside of colony most clubs are 0.10-0.16 mm × 0.07-0.10 mm *latilobatum* Verseveldt
— Clubs in surface layer of lobes are 0.07-0.15 × 0.03-0.06 mm; those in the outside of the raised border are 0.07-0.16 × 0.07-0.08 mm . . . . . *venustum* Tixier-Durivault
6. Lobes spreading horizontally and partly overlapping one another . 7
— Lobes erect, not overlapping 8
7. The scarcely visible autozooids are 1.0-1.5 mm apart; clubs in stalk surface up to 0.16 mm long; capstans in stalk interior 0.08-0.09 mm wide; spindles in stalk interior up to 0.35 mm long and 0.08-0.09 mm wide . . . . . *hirsutum* Tixier-Durivault
— The distinct autozooids are 1-3 mm apart; clubs in stalk surface up to 0.22 mm long; capstans in stalk interior 0.10-0.12 mm wide; spindles in stalk interior up to 0.45 mm long and 0.09-0.11 mm wide . . . . . *irregulare* Tixier-Durivault
8. Lobes thick, distally 6-9 mm wide; sclerites in interior of lobes and stalk with a waist . . . . . *altum* Tixier-Durivault
— Lobes thinner, distally 4-6 mm wide; sclerites in interior of lobes and

stalk without a waist 9

9. Lobes cockscomb-like, about 4 mm thick; autozooids small, numerous, centres 0.20-0.40 mm apart; in surface layer of lobes the smaller clubs (0.07-0.10 mm long) bear numerous, irregularly placed, high prominences (fig. 16a-c); larger clubs (up to 0.20 mm) have wide heads . . . . . *denticulatum* Tixier-Durivault

— Lobes closely set, sinuous; autozooids bigger, centres 1.0-2.5 mm apart; clubs in surface layer of lobes with few, low, blunt thorns arranged in girdles, the heads are narrow 10

10. Clubs in stalk surface 0.13-0.21 mm long, they bear big warts; in stalk interior most sclerites are oblong, 0.21-0.26 mm long . . . . . *crebriplicatum* Von Marenzeller

— Clubs in stalk surface 0.10-0.15 mm long, they bear thorns or simple warts; in stalk interior most sclerites are capstans, 0.17-0.22 mm long . . . . . *densum* Tixier-Durivault

Key V. In stalk interior no capstans, but spindles only, more than 0.30 mm long

1. Colony flat and plate-like, or deep bowl-shaped 2

— Colony thick, encrusting, with many crest-like lobes 3

2. Colony flat, plate-like; in disk surface most clubs are 0.15-0.20 mm long . . . . . *depressum* Tixier-Durivault

— Colony bowl-shaped with raised border; clubs in surface layer of lobes 0.07-0.15 mm long . . . . . *sarcophytoides* Moser

3. Lobes small, erect, sinuous, densely arranged; in surface layer of lobes many small spindles, 0.08-0.12 mm long, and clubs without central wart . . . . . *verum* Tixier-Durivault

— Lobes large, rather thin, erect or lying down; in surface layer of lobes no spindles, but clubs only, the smaller ones provided with a central wart 4

4. Lobes erect (see Moser, 1919, pl. 6 fig. 13) . . . . . *batarum* Moser

— Lobes more or less lying down (see Moser 1919, pl. 6 fig. 14 and our pl. 28 fig. 4) . . . . . *schoedei* Moser

Key VI. In stalk interior capstans and oblong sclerites, about 0.18-0.23 mm long, usually in company with spindles

1. Colony stalked 2
— Colony without a distinct stalk: encrusting, or flat and dish-shaped . 4
2. Stalk long, narrowing basally, the greater part buried in sand; lobes finger-like, arising from edge of concave disk . . . . . *cryptocormum* Verseveldt & Tursch
— Stalk short, not slender; lobes crest-like, crowded and arising from whole surface of capitulum 3
3. Lobes irregular in shape, not distinctly radially placed; capstans in stalk interior slender, 0.08-09 mm wide . . . *densum* Tixier-Durivault
— Lobes sinuous, radially directed; capstans in stalk interior thick, 0.10-0.12 mm wide . . . . . *jaeckeli* Tixier-Durivault
4. Colony flat, dish- or bowl-shaped, with few lobes 5
— Colony low, encrusting, with many lobes 6
5. Colony bowl-shaped with raised border; in lobes interior no capstans; sclerites in surface layer of outside of colony very warty . . . . . *durum* Tixier-Durivault
— Colony dish-shaped; in lobes interior capstans are present (accompanied with oblong sclerites and spindles), the capstans are 0.15-0.18 mm long; sclerites in surface layer of outside of colony not strikingly warty . . . . . *planum* Tixier-Durivault
6. Lobes erect, short, digitiform or slightly flattened, crowded . . . . . *strictum* Tixier-Durivault
— Lobes crest-like, erect or spreading horizontally 7
7. Crests thin, flat, spreading horizontally and partly overlapping; in stalk interior spindles occur (in company with oblong capstan-like sclerites); sclerites with short waist (if present) . . *hirsutum* Tixier-Durivault
— Crests strong, erect, straight or sinuous; in stalk interior no spindles; sclerites in all parts of colony with distinct, long waist . . . . . *meandriforme* Tixier-Durivault

Descriptions

Lobophytum altum Tixier-Durivault, 1956

(fig. 1, pl. 1 fig. 1)

Lobophytum altum Tixier-Durivault, 1956: 476; 1958: 123-125, figs. 132-134; 1966: 69-71, figs. 49-51; 1972: 18 (listed only).

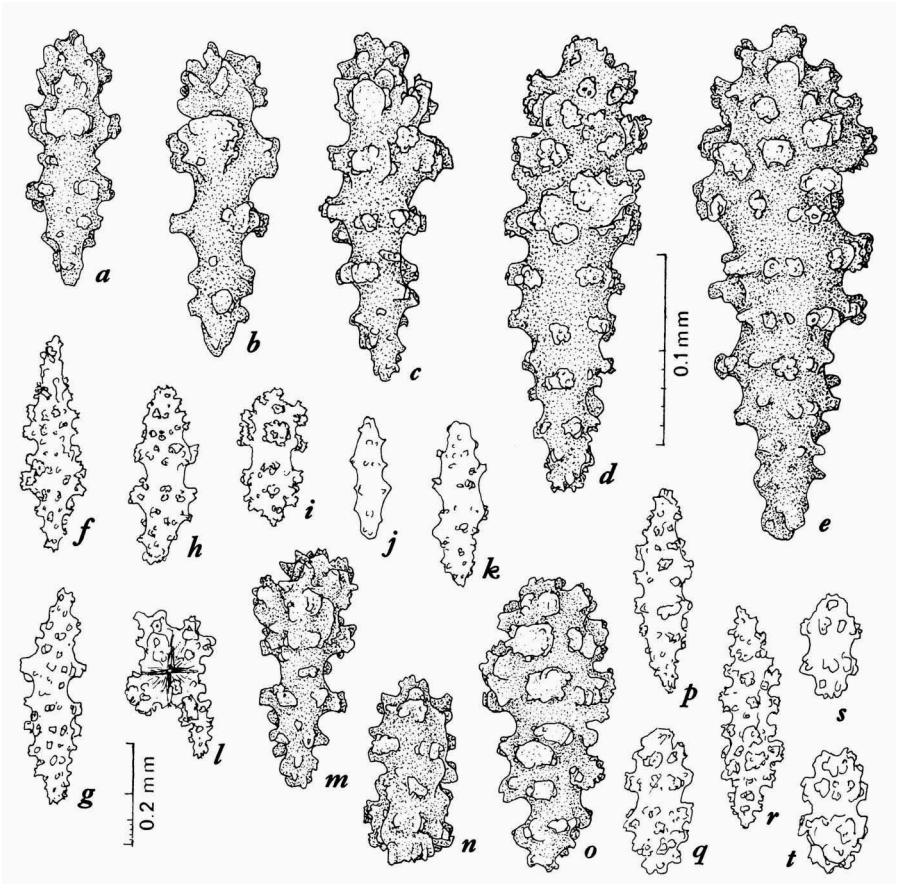

Fig. 1. *Lobophytum altum* Tixier-Durivault, holotype, MNHN. a-e, sclerites from surface layer of a lobe; f-l, sclerites from interior of a lobe; m-o, sclerites from surface layer of the stalk; p-t, sclerites from interior of the stalk. Enlargement of a-e, m-o indicated by 0.1 mm scale at d; that of f-l, p-t by 0.2 mm scale at g.

The holotype is represented by Tixier-Durivault (1958: fig. 132, enlargement × 0.6). Pl. 1 fig. 1 shows the same colony at full size.

The autozooids are very small. On the lobes the centres are 0.8 to 2.0 mm apart, at the base of the lobes the distance is up to about 2.5 mm. At the edge of the lobes are one to three siphonozooids between two autozooids, at the base up to four.

The surface layer of the lobes has clubs 0.13 to 0.27 mm long (fig. 1a-e). The heads and handless are warty; on the handles the warts are zoned. The interior of the lobes contains spindles, 0.30 to 0.43 mm long (fig. 1f-h). Most of them have a distinct median waist. Sometimes the warts are arranged in

girdles; towards the middle of the spicule the warts are bigger. In addition to the spindles there are cylinders, also provided with a median waist. They are covered with warts (fig. 1i) or bear some low, cone-shaped processes (fig. 1j, k). Irregularly shaped crosses are also common (fig. 1l).

The sclerites in the surface layer of the stalk are small, 0.10 to 0.15 mm long. They are warty clubs (fig. 1m, o) or warty cylinders (fig. 1n). In the stalk interior there are capstans, dumb-bells, barrels and cylinders, 0.20 to 0.27 mm long and 0.13 to 0.15 mm wide, usually provided with a median waist and for the rest bearing small or big warts, which often form one distinct zone on both sides of the waist (fig. 1q, s, t). There are also many spindles, which look like those in the lobes interior; the length is up to 0.44 mm (fig. 1 p, r). Between barrels and spindles there are countless transitional forms.

Geographical distribution.— Seychelles, Rodrigues.

Lobophytum batarum Moser, 1919

(figs. 2, 3, pl. 7 fig. 1)

Lobophytum batarum Moser, 1919: 268-272, fig. 14, pl. 6 fig. 13; Roxas, 1933: 362; Tixier-Durivault, 1956: 476-477; 1958: 95-98, figs. 92, 95, 96; 1966: 57-58, figs. 34-36; 1970b: 125; Utinomi, 1977: 17.

Not *Lobophytum batarum*, Utinomi, 1954: 53-54, fig. 8, pl. 1 fig. 4.

I did not find Moser's type specimen in any museum collection. But in the Paris Museum there is a colony which agrees well with Moser's description and figures. It was identified by Tixier-Durivault (1956) and figured in her fig. 92 (1958).

For the shape of the colonies the reader is referred to Moser's pl. 6 fig. 13 and to Tixier-Durivault's figure just mentioned.

In the specimen kept in the Paris Museum the autozooids are small; their mutual distances are 0.5 to 1.0 mm. The siphonozooids are scarcely visible; there is one between two autozooids.

The surface layer of a lobe contains three types of sclerites: (1) clubs, 0.09 to 0.20 mm long; their heads consist of a central wart, the handles bear two or more girdles of warts (fig. 2a-e); (2) clubs, 0.10 to 0.25 mm long; the wide heads consist of a number of warts, without a central wart (fig. 2f-h); (3) cylinders and rods, 0.15 to 0.25 mm long, with some widely spaced girdles of warts (fig. 2i); the longer spicules are slightly spindle-shaped.

In the surface layer of the stalk the same types (1) and (2) are met with; the length is practically the same as that of the clubs in the lobes (fig. 2n-q). Small spindles, 0.20 mm long and longer, may be regarded as transitional forms to internal spicules.

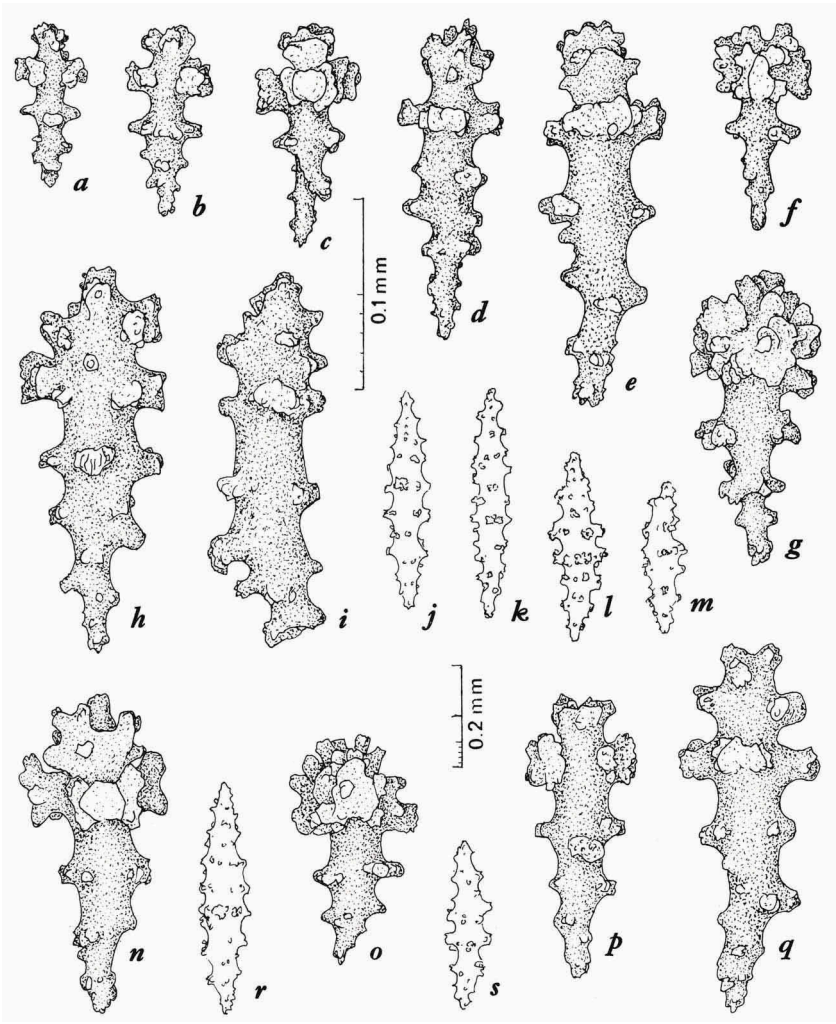

Fig. 2 *Lobophytum batarum* Moser, MNHN. a-i, sclerites from surface layer from a lobe; j-m, sclerites from interior of a lobe; n-q, sclerites from surface layer of the stalk; r, s, sclerites from interior of the stalk. Enlargement of a-i, n-q indicated by 0.1 mm scale at c; that of j-m, r and s by 0.2 mm scale below j.

The interior of lobes and stalk contains the same, pointed spindles, 0.30 to 0.47 mm long, with a number of zones of warts (fig. 2 j-m and r, s).

Utinomi (1977: 17) was of the opinion that his identification (1954: 53) of a coral from Kii-ôsima with *L. batarum* was incorrect. In the same place he suggests the possibility that *L. batarum* is identical with *L. venustum* Tixier-Durivault. A comparison of fig. 2 with fig. 50 immediately shows that the two species are not at all identical.

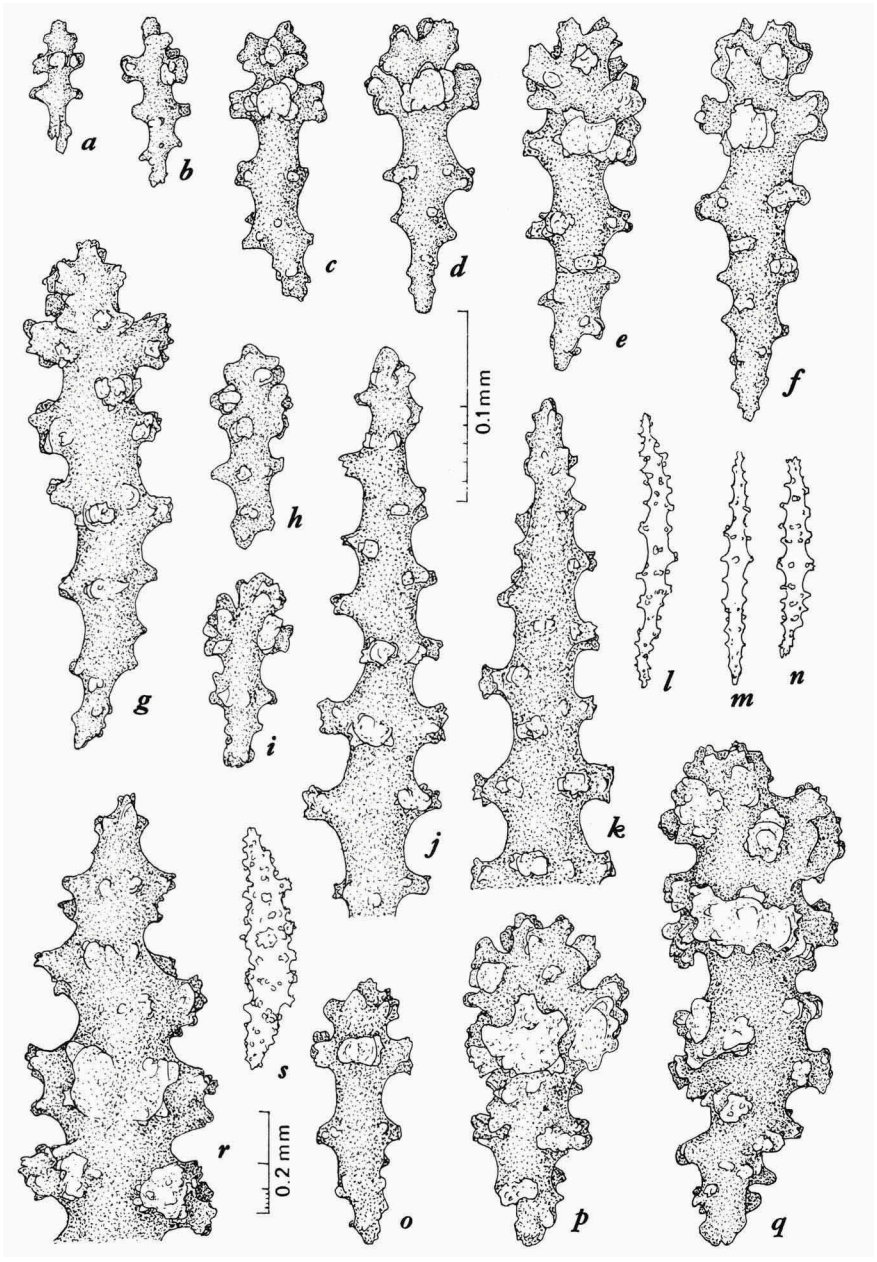

Fig. 3. *Lobophytum batarum* Moser (has been indentified with *"L. sarcophytoides"* Moser), MZWr no. 75. a-i, sclerites from surface layer of a lobe; j-n, sclerites from interior of a lobe; o-q, sclerites from surface layer of the stalk; r, s, sclerites from interior of the stalk. Enlargement of a-k, o-r by 0.1 mm scale at d; that of l-n and s by 0.2 mm scale below s.

In the Zoological Museum of Wroclaw University there is a colony, identified with *L. sarcophytoides*; its register number is MZWr no. 75; see: Wiktor, 1974: 31. In the bottle there are a few labels and a small metal plate with number C-2330. One of the labels runs as follows: "*Lobophytum sarcophytoides* Moser, 1919, Palavan, leg. Light, Syntypus (juv.)". Another label reads: "*Lobophytum sarcophytoides* Moser, Batas Islands, Palawan, Light S., Moser determ. 1915".

My first thought was that the specimen was the juvenile form of *L. sarcophytoides* mentioned by Moser (1919: 267, 268). It appeared, however, that we are dealing here not with a specimen of *L. sarcophytoides* but with one of *L. batarum*.

The colony (pl. 7 fig. 1) is low, encrusting. The diameters of the capitulum are 55 and 30 mm. The margin of the capitulum has folds which are open proximally but closed distally. This phenomenon was also recorded by Moser (1919: 270). In the central part of the capitulum the lobes are densely placed, flat, thin crests, with a width of 3 to 5 mm.

The autozooids and the siphonozooids are small but clearly visible. The autozooids are retracted, flush with the surface of the lobes; their diameter is 0.30 to 0.40 mm. The centres are on the average 0.60 mm apart. Between them there may or may not be one siphonozooid.

The surface layer of the lobes contains clubs, 0.07 to 0.28 mm long (fig. 3a-i). The heads consist of big warts; there is often a central wart. The handles bear small warts and blunt thorns with a tendency to zoning. In the interior of the lobes there are slender spindles, up to 0.57 mm long (fig. 3j-n); the prominences are high, simple warts.

The surface layer of the stalk has heavily warted clubs, 0.11 to 0.30 mm long (fig. 3 o-q). The sclerites in the interior of the stalk are 0.30 to 0.57 mm long (fig. 3r, s). The shorter ones are 0.10 to 0.12 mm wide, the longer ones 0.08 to 0.10 mm. They are covered with big warts (fig. 3r).

The only difference with the specimen from the Paris Museum is the length of the internal spindles: in the colony from the Paris Museum the spindles are up to 0.47 mm long, those in the specimen from the Wroclaw Museum measure up to 0.57 mm in length. I must point out, however, that Moser (1919: 269, at the end of his diagnosis of *L. batarum*) already said that in the basal part of the stalk the spindles may be longer than 0.50 mm.

Geographical distribution. — Palawan (Philippines), Vietnam, Nosy Bé (Madagascar) and Okinawa.

Lobophytum borbonicum Von Marenzeller, 1886

(fig. 4, pl. 2 fig. 1)

Lobophytum crassum var. *borbonicum* Von Marenzeller, 1886: 364-365, pl. 9 fig. 9; ? Lüttschwager, 1914: 30, fig. 2; Moser 1919: 287, fig. 24; Roxas, 1933: 366; Tixier-Durivault, 1956: 479-480; 1958: 176-177, fig. 146.

Lobophytum borbonicum, Tixier-Durivault, 1970a: 227-228, figs. 65, 66; Verseveldt, 1977a: 3 (listed only).

Tixier-Durivault (1970a: 227) used the variety name *borbonicum* as a specific name. I do not object to this; I consider *borbonicum* a valid species.

I have not succeeded in tracking down Von Marenzeller's type specimen. But of late years I have examined a few colonies which can be referred to this species. I also examined the specimen collected at Manguia Reef, near Touho, New Caledonia, by Chevalier, which was described by Tixier-Durivault, 1970a: 227, and is kept in the Paris Museum. I will take this colony as starting-point for a discussion of the species.

The enlargement of the colony, represented in Tixier-Durivault's fig. 65 (1970a; the colony is upside down in this figure), is × 0.7. Our pl. 2 fig. 1. shows the colony, seen from above and at natural size.

The autozooids are 1.0 to 1.2, sometimes 1.5 mm apart. There are one to four siphonozooids between two autozooids.

The surface layer of a lobe contains clubs, 0.12 to 0.18 mm long, with two girdles of warts below the head (fig. 4a-d); they are similar to the clubs of *L. crassum* (see fig. 8d-g; the sclerites drawn in Tixier-Durivault's fig. 66 R, S (1970a) in no way resemble clubs). In the interior of the lobes there are three forms of sclerites: (1) capstans with two distinct zones of warts and terminal clusters (fig. 4f, g); (2) oval-shaped bodies without a waist and without an arrangement of the prominences in girdles (fig. 4h); (3) longer cylinders with two zones of warts (fig. 4e). The length of (1) and (2) is usually 0.17 to 0.20 mm, that of (3) 0.22 to 0.25 mm.

The surface layer of the stalk has clubs, 0.08 to 0.11, sometimes 0.13 mm long (fig. 4i-l). They usually have two girdles of warts. The stalk interior is provided with oval sclerites, 0.15 to 0.18 mm long, with or without a median waist and covered with strikingly big, spiny, closely set warts: Von Marenzeller's blackberries (fig. 4m, o-q). In addition to these, there are longer, more cylinder-shaped forms, 0.20 to 0.22 mm long, with warts arranged in two, more or less distinct median girdles (fig. 4n). Rather striking is the relatively large number of crosses; in other specimens I also found a lot of them.

Now these results must be compared with the data recorded by Von Marenzeller (1886), Lüttschwager (1914) and Moser (1919) [Roxa's (1933) and Ti-

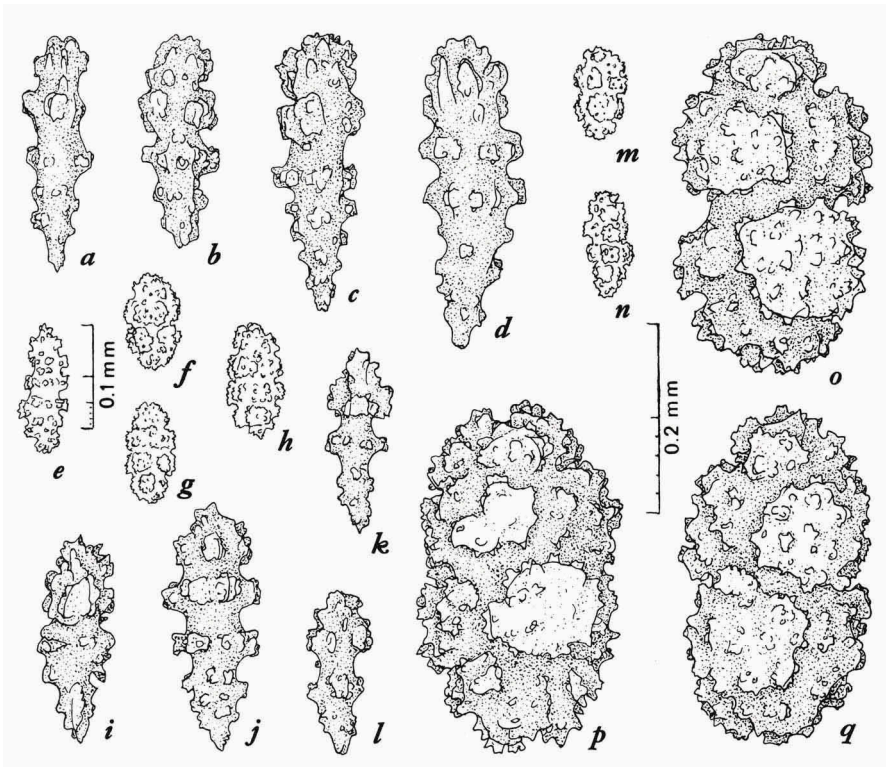

Fig. 4 *Lobophytum borbonicum* Von Marenzeller, MNHN. a-d, sclerites from surface layer of a lobe; e-h, sclerites from interior of a lobe; i-l, sclerites from surface layer of the stalk; m-q, sclerites from interior of the stalk. Enlargement of a-d, i-l, o-q indicated by 0.1 mm scale below n; that of e-h, m and n by 0.2 mm scale at e.

xier-Durivault's (1956, 1958) papers play no role here]. When doing so, we see that there is distinct agreement, though differences do exist. Von Marenzeller (1886) records that the sclerites in the surface layer are rich in prominences; the club in his pl. 9 fig. 9a does not show distinct zones of warts; in the specimens examined by me they are, indeed, zoned. Lüttschwager (1914) records disk spicules with a length of 0.28 and 0.36 mm; Von Marenzeller, however, mentions an average length of 0.21 mm; the longest spicules are 0.26 mm; in the specimens examined by me they measure 0.17 to 0.24 mm (in one specimen the lobes also contain a few spindles, 0.33 to 0.38 mm long). I therefore put a question-mark behind Lüttschwager's identification.

All investigators agree in respect of the shape and size of the internal sclerites in the stalk. However, a width of up to 0.06 mm as given by Moser (1919) must be a mistake; it is not in accordance with his own fig. 24b either.

In spite of all results mentioned above, it remains desirable to examine Von Marenzeller's type specimen.

Geographical distribution. — Réunion, Taytay Bay (Palawan), New Caledonia and Enewetak Atoll.

Lobophytum catalai Tixier-Durivault, 1957

(figs. 5, 6, pl. 2 figs. 2, 3)

Lobophytum catalai Tixier-Durivault, 1957: 111; 1958: 131-132, figs. 139, 143, 144; 1966: 76-78, figs. 58-60; 1969: 137-138; 1970a: 218; Verseveldt, 1977a: 8-10, figs. 3, 4, pl. 3.
Lobophytum nodosum Tixier-Durivault, 1969: 139-140, figs. 1-3.

The dried colony present in the Paris Museum and designated as "type", was drawn by Tixier-Durivault (1958: fig. 139, enlargement about × 0.6). Our photograph, pl. 2 fig. 3, shows the colony from another side and at full size.

On the distal parts of the lobes the autozooids are about 1.5 mm apart and there are two to three siphonozooids between two autozooids. At the base of the lobes the distance is up to 3 mm and the number of siphonozooids six to nine.

In the surface layer of the lobes there are numerous tiny rods and clubs, 0.04 to 0.08 mm long. The rods have two terminal clusters of very small prominences (fig. 5 a, c, e, g); the clubs have one cluster slightly thicker (fig. 5 b, d, f, h). In addition to these, there are longer clubs, up to 0.18 mm long, with ill-defined heads (fig. 5 i-k); the handles have zoned warts. The interior in the lobes contains oval capstans, cylinders and spindles, varying in length from 0.22 to 0.40 mm. They may have two, sometimes three or four rather distinct girdles of warts, but in other cases the prominences are irregularly distributed (fig. 5 l-p).

The surface layer of the stalk also has many small rods and clubs, 0.06-0.08 mm long (fig. 5 s, v), but the majority are club-shaped with a length of 0.08 to 0.15 mm (fig. 5 q, r, t, u). In the stalk interior there are capstans and oblong spicules, 0.22 to 0.27 mm long, sometimes up to 0.32 mm, with two to four zones of warts (fig. 5 w, x). Crosses are present, but long spindles are absent.

In a previous paper the present author (1977a: 10) stated that he compared colonies of *L. catalai* with the type specimen of *L. nodosum* Tixier-Durivault, 1969, and that he found a close agreement. It now seems fitting to give a full description of that type specimen of *L. nodosum*.

Tixier-Durivault's fig. 1 (1969) and our pl. 2 fig. 2 show the holoype of *L. nodosum* at natural size. On the lobes the centres of the autozooids are 1.5 to 2.2 mm apart; basally the distance is up to 3 mm. The number of siphonozooids between two autozooids is two to four or five, at the base of the lobes up to six.

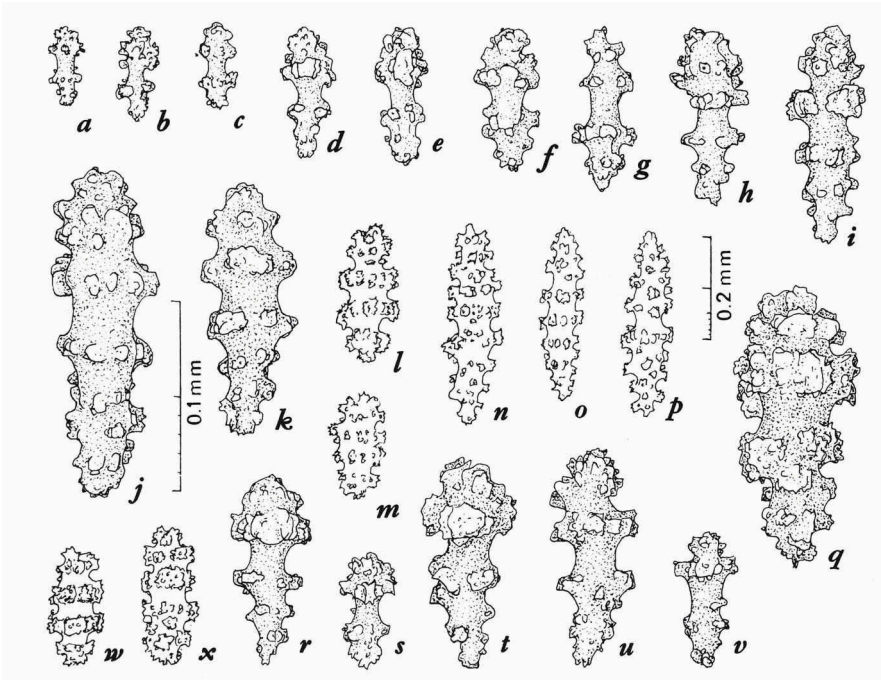

Fig. 5. *Lobophytum catalai* Tixier-Durivault, holotype, MNHN. a-k, sclerites from surface layer of a lobe; l-p, sclerites from interior of a lobe; q-v, sclerites from surface layer of the stalk; w, x, sclerites from interior of the stalk. Enlargement of a-k, q-v indicated by 0.1 mm scale at j; that of l-p, w and x by 0.2 mm scale at p.

The surface layer of the lobes contains two types of sclerites. First numerous very small, oval or slightly rectangular bodies, 0.05 to 0.06 mm long and covered with many tiny, rounded processes (fig. 6a-c). Secondly there are clubs, 0.08 to 0.18 mm long; their rounded thorns and simple warts may be either irregularly distributed or arranged in zones (fig. 6d, f-i). Between the two types transitional forms are met with (fig. 6e). The interior of the lobes contains cylinders (fig. 6j), oval or oblong sclerites (fig. 6k, n), wide spindles and irregular forms (fig. 6l, m). The length varies from 0.24 to 0.34 mm, rarely 0.37 mm.

The surface layer of the stalk has clubs and more cylindrical forms, much the same as those in the lobes (fig. 6o-r). The same applies to the internal sclerites in the stalk, though they are a little shorter, up to 0.29 mm (fig. 6s-v). Spindles are lacking.

From this description it appears that in many respects *L. nodosum* agrees with *L. catalai*. In both species the colonies are encrusting, the lobes are erect, more or less finger-like and often clavate (see also Tixier-Durivault, 1958, fig. 139). In the spiculation there are small points of difference. In *catalai* most of

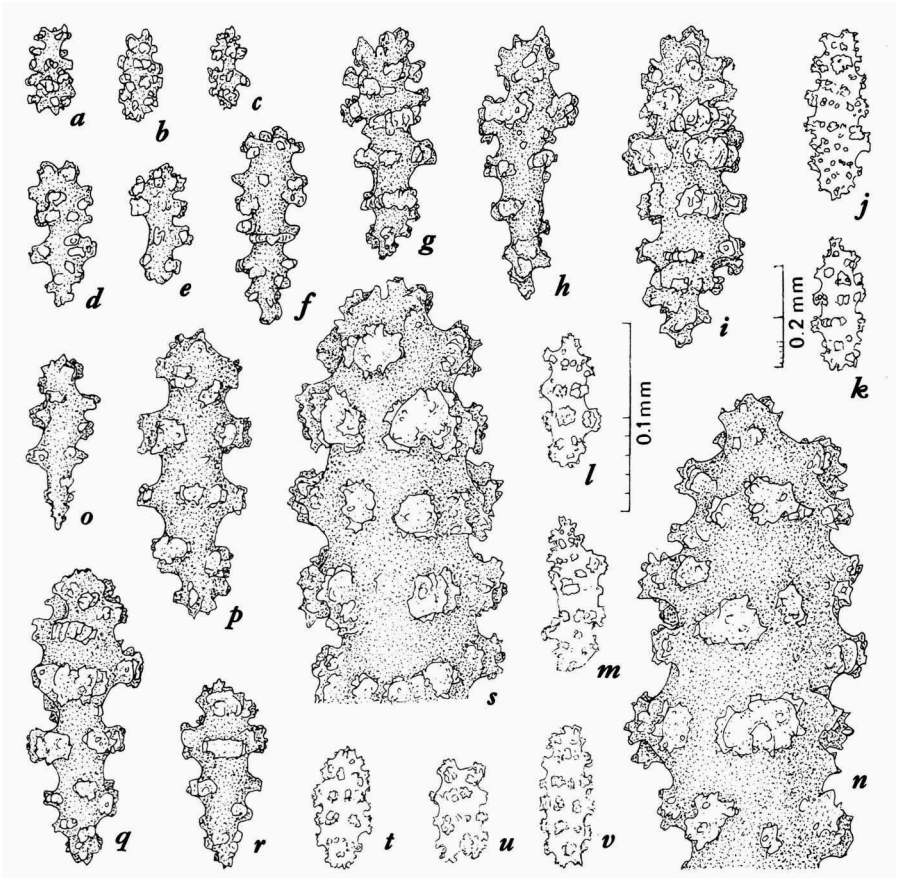

Fig. 6. *Lobophytum catalai* Tixier-Durivault (= *"L. nodosum"* Tixier-Durivault, 1969), MNHN. a-i, sclerites from surface layer of a lobe; j-n, sclerites from interior of a lobe; o-r, sclerites from surface layer of the stalk; s-v, sclerites from interior of the stalk. Enlargement of a-i, n-s indicated by 0.1 mm scale at l; that of j-m, t-v by 0.2 mm scale at i.

the small sclerites in the surface layer of the lobes have a distinct waist; in *nodosum* such sclerites are in minority. In *catalai* the sclerites in the interior of the lobes are regular in shape and the spindles are slender and pointed; in *nodosum* there are many irregularly shaped sclerites and the scarce spindles are thick, less pointed and slightly shorter. In *catalai* the coenenchymal sclerites of the stalk are also regular in shape, in *nodosum* irregular.

In my opinion these differences are too small to validate the junior specific name *nodosum*.

The colonies of *L. catalai* are not unlike those of *L. pauciflorum* (Ehrenberg), see also Tixier-Durivault (1966: fig. 58). But the sclerites, especially those in the surface layer of lobes and stalk, are quite different.

Geographical distribution. — Fiji Is., Bay of Cauda (Vietnam), Madagascar, Tuamotu, New Caledonia, Enewetak Atoll, Cook Is., Rurutu I., Gambier Is., Mururoa Is.

Lobophytum compactum Tixier-Durivault, 1956

(fig. 7, pl. 3)

Lobophytum compactum Tixier-Durivault, 1956: 478; 1958: 145-146, figs. 165-167; 1970b: 126.

I regard the specimen represented by Tixier-Durivault (1958: fig. 165) as the holotype. In this figure a part of the colony is drawn; the enlargement is about × 0.9. Our pl. 3 shows a larger portion of the colony, seen from the reverse side and at natural size.

The autozooids are 1 to 3 mm apart; at the base of the lobes the distance is slightly greater. On the distal part of the lobes the number of siphonozooids between two autozooids is one to three, at the base of the lobes up to five.

The surface layer of the lobes has two types of sclerites: (1) shuttles, 0.09 to 0.12 mm long, with two or three girdles of flat, volcano-shaped prominences (fig. 7a-c); (2) clubs, 0.09 to 0.23 mm long, with narrow, warty heads (fig. 7d-j) or with a slightly wider head (fig. 7k); the handles bear girdles of warts. In the interior of the lobes the sclerites are spindles, 0.26 to 0.43 mm long (fig. 7l-n). In their middle part the warts are usually zoned.

The surface layer of the stalk contains warty clubs, 0.09 to 0.20 mm long (fig. 7o-t) In the stalk interior the bulk of the sclerites are capstans, 0.15 to 0.20 mm long (fig. 7u, v, x), with two girdles of warts and terminal clusters. There are also a few spindles, up to 0.26 mm long (fig. 7w).

Geographical distribution. — Bay of Cauda (Vietnam).

Lobophytum crassum Von Marenzeller, 1886

(figs. 8, 9, pls. 4, 5, pl. 6 fig. 3, pl. 7 fig. 3)

Lobophytum crassum Von Marenzeller, 1886: 363-364, pl. 9 fig. 8; May, 1899: 119; Hickson & Hiles, 1900: 506; Thomson & Simpson, 1909: 4; Lüttschwager, 1914: 28-29, fig. 1; Moser, 1919: 282-286, fig. 22; Thomson & Dean, 1931: 65-67; Roxas, 1933: 365; Macfadyen, 1936: 43-45; Tixier-Durivault, 1956: 478-479; 1958: 173-176, figs. 191, 211, 212; 1966: 96-98, figs. 88-90; 1970a: 226-227; Verseveldt, 1960: 215-217; 1970: 209 (listed only); 1971: 16; 1974b: 95; 1977b: 173 (listed only); 1978: 49 (listed only); Utinomi, 1977: 18.

Alcyonium murale Dana, 1846: 622-623, pl. 58 fig. 3; Von Marenzeller, 1886: 350; Lüttschwager, 1914: 31-32.

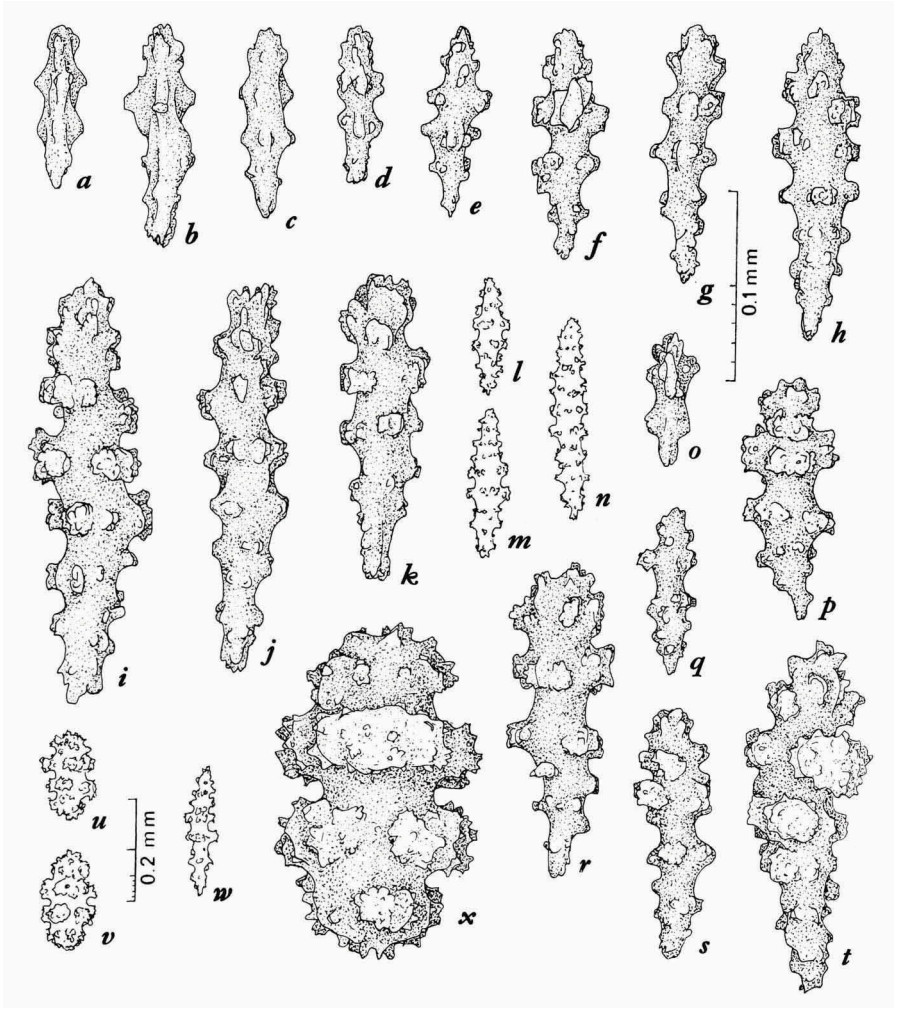

Fig. 7. *Lobophytum compactum* Tixier-Durivault, holotype, MNHN. a-k, sclerites from surface layer of a lobe; l-n, sclerites from interior of a lobe; o-t, sclerites from surface layer of the stalk; u-x, sclerites from interior of the stalk. Enlargement of a-k, o-t and x indicated by 0.1 mm scale at g; that of l-n, u-w by 0.2 mm scale at u.

Not *Lobophytum crassum*, Cohn, 1908: 224-225.

Lobophytum crassum var. *cristagalli* Von Marenzeller, 1886: 365, pl. 9 fig. 10; Lüttschwager, 1914: 30; Moser, 1919: 286-287, fig. 23.

Lobophytum cristagalli, Tixier-Durivault, 1956: 480; 1958: 158-161, figs. 187-189; 1966: 92, figs. 79-81; 1970a: 221; Verseveldt, 1971: 16-18, fig. 8; Utinomi, 1977: 18-19, fig. 2.

Lobophytum crassum var. *proliferum* Von Marenzeller, 1886: 365-366, pl. 9 fig. 11; Lüttschwager, 1914: 31.

Lobophytum crassum var. *sansibaricum* May, 1898: 28-29; 1899: 119-120, pl. 5 fig. 9; Lüttschwager, 1914: 29-30.

Lobophytum crassum var. *australicum* May, 1899: 120-121, pl. 5 fig. 10a, b; Lüttschwager, 1914: 31.

Lobophytum hedleyi Whitelegge, 1897: 216-217, pl. 10 figs. 2a-h; Thomson & Dean, 1931: 68; Verseveldt, 1960: 218; 1977b: 173 (listed only); Verseveldt & Alderslade, 1982: 622-625, fig. 2, pls. 2, 3.

? *Lobophytum hedleyi,* Pratt, 1905: 252-253; Roule, 1908: 176-177; Lüttschwager, 1914: 32; Moser, 1919: 287-288; Roxas, 1933: 366; Tixier-Durivault, 1972: 18 (listed only); Utinomi, 1977: 21, fig. 3.

Not *Lobophytum hedleyi*, Cohn, 1908: 223-224; Tixier-Durivault, 1956: 541; 1958: 163-164, figs. 180, 194, 195; 1966: 92-96, figs. 82-84.

Lobophytum pauciflorum, Pratt, 1903: 515-516, pl. 28 fig. 7, pl. 29 figs. 12-14.

Lobophytum crebriplicatum var. *crassospiculatum* Moser, 1919: 273-274, fig. 16; Roxas, 1933: 363.

Lobophytum crassospiculatum, Tixier-Durivault, 1956: 478; 1958: 132-134, figs. 140, 147, 148; 1960: 360 (listed only); 1966: 78-79, figs. 61-63; 1970a: 220; Utinomi, 1971: 90, fig. 2, pl. 15 fig. 1; 1977: 17-18.

Lobophytum crebriplicatum Marenzeller, Utinomi, 1953: 156-157, fig. 4f-h, pl. 8 fig. 7; Tixier-Durivault, 1958: 167-168, figs. 190, 203, 204.

Lobophytum angulatum Tixier-Durivault, 1956: 476; 1958: 156-158, figs. 178, 185, 186; 1970b: 124-125.

Lobophytum caledonense Tixier-Durivault, 1956: 477; 1958: 161-163, figs. 179, 192, 193; 1970a: 221; Verseveldt, 1974b: 95 (listed only).

In the Naturhistorisches Museum Wien there is the type specimen of *L. crassum* from Port Denison; its register number is C 2332. It was described by Von Marenzeller (1886: 363) and is represented here in pl. 4. I had an opportunity to examine this specimen.

The colony is 120 to 130 mm high. At the base the stalk is about 40 mm wide. Upwards it widens funnel-shaped; on one side the height is about 120 mm, on the other side 30 to 40 mm, so the base is oblique.

The hollow capitulum has diameters of 130 and 180 mm; the same dimensions were recorded by Von Marenzeller. The lobes are firm crests. The upper edge is 6 to 8 mm thick; downwards the lobes gradually widen. In the centre of the capitulum the lobes are up to 55 mm high; in the marginal part they are lower. The length of the lobes varies strongly: the longest crest reaches a length of about 60 mm; long lobes are more or less sinuous.

The autozooids are small; the openings left by the retracted anthocodiae are 0.20 to 0.35 mm wide. On the edges of the lobes the distance of the centres is 0.70 to 1.50 mm, at the base of the lobes it is 1 to 4 mm. The siphonozooids are clearly visible. On the distal part of the lobes there are one or two siphonozooids between two autozooids; basally the number is two to six.

The surface layer of the lobes contains clubs, 0.10 to 0.17 mm long (fig. 8d-h), sometimes longer, up to 0.24 mm (fig. 8g). They bear warts, which are zoned on the handle. The processes at the top of the club head are often tiny spines, directed upwards. The surface layer has also numerous shuttles, 0.09 to 0.16 mm long, with two or three girdles of low, cone-shaped processes (fig. 8a-

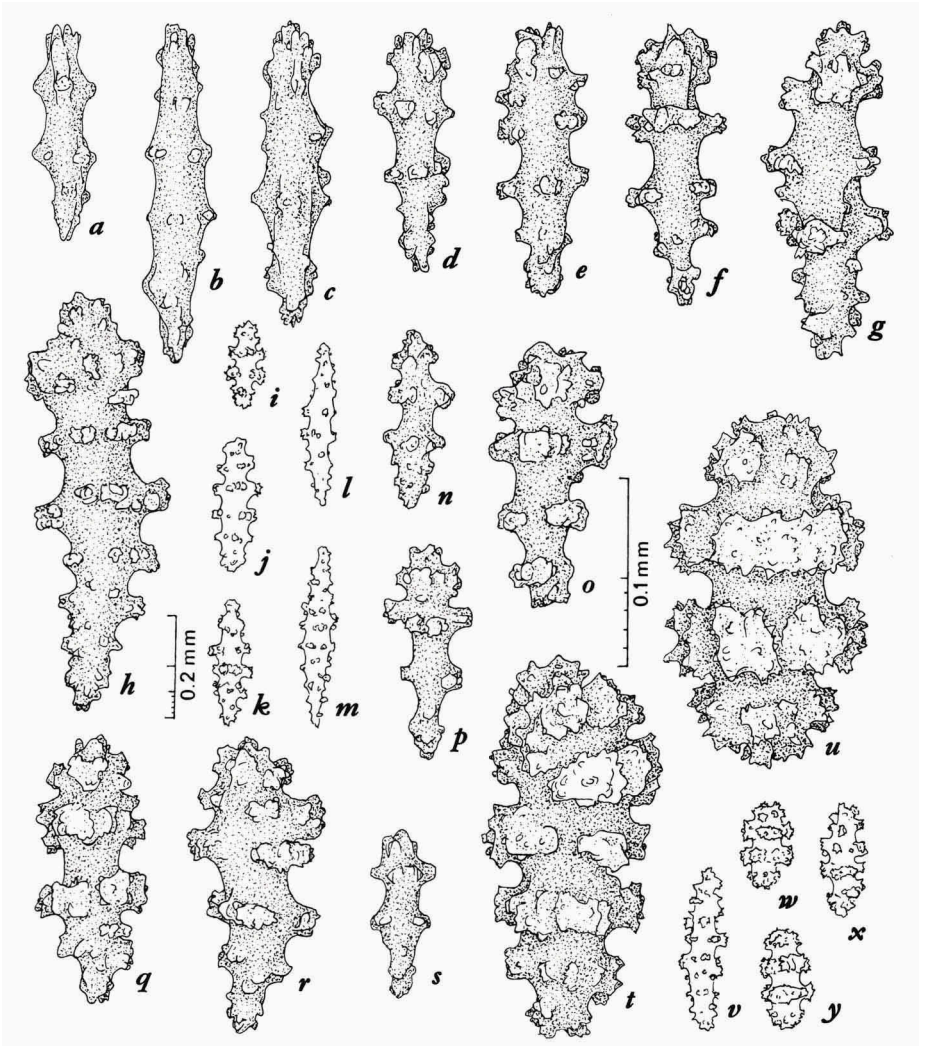

Fig. 8 *Lobophytum crassum* Von Marenzeller, holotype NHMW No. C 2332. a-h, sclerites from surface layer of a lobe; i-m, sclerites from interior of a lobe; n-t, sclerites from surface layer of the stalk; u-y, sclerites from interior of the stalk. Enlargement of a-h, n-u indicated by 0.1 mm scale at o; that of i-m, v-y by 0.2 mm scale at h.

c). In the interior of the lobes lie oblong, subcylindrical or fusiform sclerites. The shorter ones are capstans, 0.16 to 0.20 mm long and 0.08-0.10 mm wide (fig. 8i). They are not numerous and have two whorls of large, spiny warts and two terminal clusters of warts. The majority are spindles, 0.20 to 0.25 mm long, with four girdles of warts (fig. 8j, k); these are transitional forms to pointed spindles, up to 0.36 mm long and 0.05 to 0.08 mm wide (fig. 8l, m).

In the surface layer of the stalk there are clubs, 0.09 to 0.16 mm long (fig. 8n-s). Their warts are usually larger than those in the lobes. Larger, more or less club-shaped sclerites (fig. 8t) are transitional forms to internal sclerites. The latter are capstans, 0.17 to 0.20 mm long and 0.10 to 0.11 mm wide; they are provided with two girdles of big, spiny warts and clusters at the ends (fig. 8u, w-y). Longer sclerites, about 0.25 mm long and 0.08 to 0.09 mm wide, are intermediates to the scarce spindles, which are up to 0.33 mm long (fig. 8v).

In the Hamburg Museum there are two colonies of *L. crassum*, register nos. C 2420A and C 2420B. They are not types; the locality is unknown. The first-mentioned specimen has been drawn by Tixier-Durivault (1958, fig. 191); this specimen did not come from Berlin, as Tixier-Durivault (1958: 174) says, but from the Hamburg Museum. In this specimen the lobes look different: near the margin of the hollow capitulum they are long, finger-like. Von Marenzeller (1886: 363) already mentioned a colony with finger-like ends of the lobes in the marginal part of the capitulum.

Von Marenzeller (1886: 350) regarded *Alcyonium murale* Dana as a *Lobophytum*; according to him it might belong to his *L. crassum*. The general shape of the colony, the dimensions and texture of the lobes do point to a close relationship with *L. crassum*. However, we do not know anything about the sclerites of *A. murale* and as long as we remain in uncertainty about the spiculation, it is impossible to establish whether or not the two species are the same. If they are, the name *crassum* should be replaced by the older name *murale*. For the present, however, the best thing is to maintain the name *crassum*. See also Studer, 1894: 121-122.

Von Marenzeller (1886: 365) described a new variety of *L. crassum* from Tonga, viz. var. *cristagalli*. I did not come across the big colony described by Von Marenzeller, but in the Hamburg Museum I did find a smaller colony from Tonga, labelled *L. crassum* var. *cristagalli* V. Mar.; its register number is C 2415 (pl. 5). The capitulum has diameters of 70 and 50 mm. The total height is 75 mm, the stalk is about 55 mm high. The crest-like lobes are up to 45 mm high and up to 35 or 40 mm long. Their edge is 4 to 5 mm wide; they widen towards the base. The distinct autozooids are sometimes arranged in rows. Distally their centres are 0.80 to 1.40 mm apart; at the foot of the lobes the distance is up to 1.75 mm or more. On the edge of the crests there are one or two siphonozooids between two autozooids, at the base there are one to four.

In respect of the spiculation, there is hardly any difference between the type specimen of *L. crassum* and the variety *cristagalli*. According to Von Marenzeller the sclerites in the interior of the stalk should be different: the capstans have a longer smooth median zone, the waist, which separates the two median

whorls of compound warts. I did not examine Von Marenzeller's type specimen of the variety, and I therefore do not know whether the sclerites just mentioned and represented in his pl. 9 fig. 10c are numerous or not. But what I found in the specimen no. C 2415 is that they are rather scarce; their length is 0.10 to 0.14 mm. It is very noteworthy that the same sclerites are found in the type specimen of *L. crassum*!

The only difference is the width of the lobes: according to Von Marenzeller the lobes of *L. crassum* are 8 mm wide, those of var. *cristagalli* 5 mm. I think that the width of the lobes alone cannot be a distinguishing mark; compare the width of the digitiform lobes in *L. pauciflorum* (cf. pl. 20 and pl. 21).

Summa summarum I am of the opinion, like Roxas (1933: 366) that the variety name *cristagalli* (and consequently also the specific name *cristagalli*) must be dropped.

Pl. 7 fig. 3 shows a fragment of a colony of *L. crassum* var *proliferum*. The fragment has been described by Von Marenzeller (1886: 365-366). The dimensions of the specimen and the locality (Port Denison) correspond with Von Marenzeller's data. It is kept in the Viennese Museum, no. C 2333. Lüttschwager (1914: 28) and Moser (1919: 282) rightly considered this variety invalid. My own observations are briefly: (1) The sclerites in the surface layer of the lobes are 0.10 to 0.18 mm long. (2) The spindles in the interior of the lobes are 0.20 mm to 0.30 mm long, the warts are rather distant but distinctly arranged in girdles (see also Von Marenzeller's pl. 9 fig. 11b). (3) Most capstans in the interior of the stalk are 0.16 to 0.18 mm long.

Moser (1919: 273-274) held the view that most of the specimens referred to *L. crassum* var. *sansibaricum* May must be left in the type species *L. crassum*. He made an exception for one colony from Changu near Zanzibar, which, together with a colony from Port Galera-Bay, Mindoro, he referred to his new variety *L. crebriplicatum* var. *crassospiculatum*. According to him, there is an essential difference between that specimen from Changu and all the other colonies: the majority of the sclerites in the stalk interior are only 0.20 mm long or shorter, whereas the width is more than half the length; spindles, up to 0.32 mm long, are said to be scarce. But in comparing the drawing of the barrel-shaped sclerite in Moser's fig. 16d with that in his fig. 22d (of *L. crassum*) I cannot find any essential difference; and in *L. crassum* fusiform spicules with a length of 0.32 mm are also present.

In the Hamburg Museum there are a few colonies identified with *L. crassum* var. *sansibaricum* May; their register numbers are C 2416 (one colony) and C 2417 (two colonies). They were collected near Zanzibar by Stuhlmann

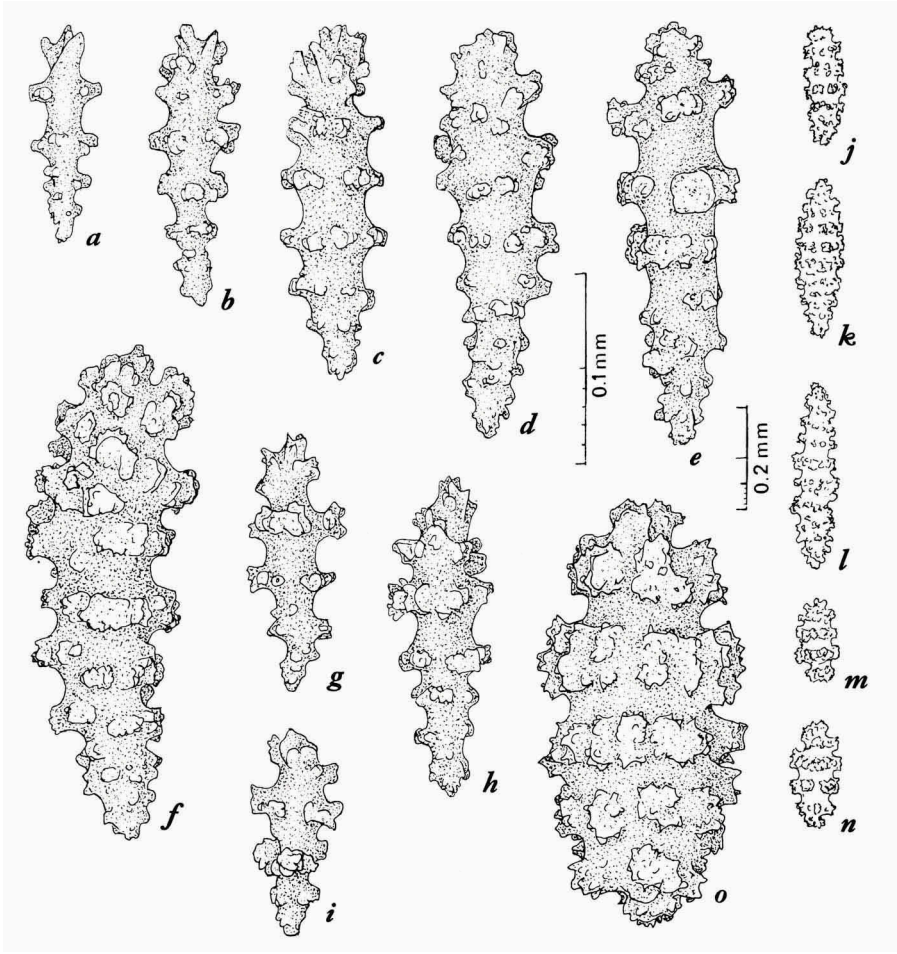

Fig. 9. *Lobophytum crassum* Von Marenzeller (= *"L. crassum* var. *sansibaricum"* May), ZMH No. C 2417. a-f, sclerites from surface layer of a lobe; g-i, sclerites from surface layer of the stalk; j-l, sclerites from interior of a lobe; m-o, sclerites from interior of the stalk. Enlargement of a-i and o indicated by 0.1 mm scale at d; that of j-n by 0.2 mm scale at e.

in 1888; pl. 6 fig. 3 shows the larger colony, no. C 2417. The lobes agree with those of the holotype (see pl. 4) and the sclerites are also quite identical (see fig. 9).

I come to the conclusion that all the colonies described under the names *L. crassum* var. *sansibaricum*, *L. crebriplicatum* var. *crassospiculatum* and *L. crassospiculatum* must be referred to *L. crassum* and that, consequently, the variety names and the specific name just mentioned must be dropped.

I agree with Lüttschwager (1914: 31) that *L. crassum* var. *australicum* May, 1899, is identical with *L. crassum* var. *proliferum*, which in its turn is a synonym of *L. crassum*.

L. hedleyi Whitelegge, 1897, is also conspecific with *L. crassum*. I examined Whitelegge's type specimen, kept in the Australian Museum at Sydney. It has lately been fully described by Verseveldt & Alderslade (1982).

The colony described by Pratt (1903: 515) as *L. pauciflorum* is nothing else but *L. crassum*.

Utinomi (1953: 156) described two colonies from the Tokara Islands under the name *L. crebriplicatum*. In a later paper (1971: 90) he synonymized this name with *L. crassospiculatum*: this species again is a synonym of *L. crassum*, as has been shown above.

The Hamburg Museum keeps four kolonies identified with *L. crebriplicatum*. One has register no. C 2418, its origin is Tonga and it has been depicted by Tixier-Durivault (1958: fig. 190; enlargement × 0.7). It appeared that in all respects the colony agrees with *L. crassum*. A striking feature is that in the interior of the stalk there are many cylindrical sclerites with a long waist, just as figured by Von Marenzeller (1886: pl. 9 fig. 10c). The other three specimens have register no. C 2419; they were collected at Bowen. Two of them belong to *L. jaeckeli* Tixier-Durivault, the third one to *L. mirabile* Tixier-Durivault.

L. angulatum Tixier-Durivault is a junior synonym of *L. crassum*. I also refer *L. caledonense* Tixier-Durivault, 1956, to *L. crassum*. Tixier-Durivault (1958: 163) already pointed out the resemblance of colony and sclerites of *L. caledonense* to those of *L. cristagalli* (= *L. crassum*, see above), but it is not true that the former can be very easily distinguished from the latter, on the contrary. The only difference may be the shape of the internal sclerites of the stalk, which often have a rather long waist, just as drawn by Von Marenzeller (1886: pl. 9 fig. 10c) for *L. crassum* var. *cristagalli*. But this is not sufficient ground for describing a new species.

Geographical distribution. — The species is widespread in coral reefs of the Indo-West Pacific tropical area.

Lobophytum crebriplicatum Von Marenzeller, 1886

(figs. 10, 11, pl. 8 figs. 1, 2)

Lobophytum crebriplicatum Von Marenzeller, 1886: 362-363, pl. 9 fig. 7; Lüttschwager, 1914: 34-35; Moser, 1919: 272-273, fig. 15; ? Molander, 1921: 9; Roxas, 1933: 362-363; Macfadyen, 1936: 45; Utinomi, 1956: 231; Verseveldt, 1978: 49 (listed only).

Not *Lobophytum crebriplicatum*, Utinomi, 1953: 156-157, fig. 4f-h, pl. 8 fig. 7; Tixier-Durivault, 1956: 480; 1958: 167-168, figs. 190, 203, 204; 1960: 360-361 (listed only); 1970a: 222-223; 1972: 18 (listed only); Verseveldt, 1974b: 95 (listed only).

Lobophytum oblongum Tixier-Durivault, 1956: 545; 1958: 141-143, figs. 161-163; 1970b: 127.

Von Marenzeller (1886: 362) described a colony with diameters of 10 and 12 cm. It was collected at Tonga and kept in the Museum Godeffroy, the old name of the Hamburg Zoological Museum.

I had the good luck to find in the Naturhistorisches Museum at Vienna a colony, numbered C 2334 and labelled: "*Lobophytum crebriplicatum* Von Marenzeller, loc. Tonga". The dimensions of this colony agree with those recorded by Von Marenzeller; it must be his holotype (our pl. 8 fig. 1). It was sold to the Viennese Museum by the Museum Godeffroy, together with a lot of other alcyonaceans.

The colony is rather low, encrusting. The total height is up to 65 mm. The stalk has almost the same height: the lobes hardly rise above the edge of the stalk. The capitulum is hollow. Seen from above it is approximately rectangular, the sides are 90 and 110 mm long. The flexible lobes are closely set; they are sinuous plates, a few are finger-like. The width is 4 to 5 mm, in places it is 8 mm; the height is 20 to about 40 mm.

The distinct autozooids are irregularly distributed. The average diameter is 0.40 mm. On the upper edge of the lobes the distance of the centres is 1.0 to 2.5 mm, at the base of the lobes 3 to 4 mm. Distally the number of siphonozooids between two autozooids is one to four, at the base of the lobes up to about seven.

In the surface layer of the lobes most clubs are 0.16 to 0.25 mm long (fig. 10c-g); a few are smaller, 0.11 to 0.14 mm (fig. 10a, b), others are larger, up to 0.29 mm. The shorter ones are often rod-shaped instead of club-shaped. In many cases the less distinct heads consist of some erect thorns, cf. Von Marenzeller (1886; pl. 9 fig. 7a, the uppermost club). The handles of the clubs bear small, zoned warts and tubercles. The interior of the lobes contains spindles, usually not longer than 0.40 mm, rarely 0.44 mm; the width is 0.06-0.09 mm (fig. 10h-j). They are pointed or blunt-ended, in the latter case the end bears a number of small processes (fig. 10h). The prominences are warts, which are irregularly distributed or placed on distinct girdles.

The surface layer of the stalk has clubs, 0.13 to 0.21 mm long, with big, zoned warts (fig. 10k-o). In the interior of the stalk there are numerous oblong, subcylindrical forms, 0.21 to 0.26 mm long and 0.08 to 0.10 mm wide; they usually have four whorls of warts and terminal clusters of warts (fig. 10p-r, t). In addition to these, there are a few pointed spindles, up to 0.35 mm long and 0.07 mm wide (fig. 10s).

In comparing these results with Von Marenzeller's data (1886: 363), we see that there are only small differences in dimensions. Much more important is the fact that in his pl. 9 fig. 7c Von Marenzeller depicted a sclerite from the stalk interior, which is not at all typical of the species. It looks like a transitio-

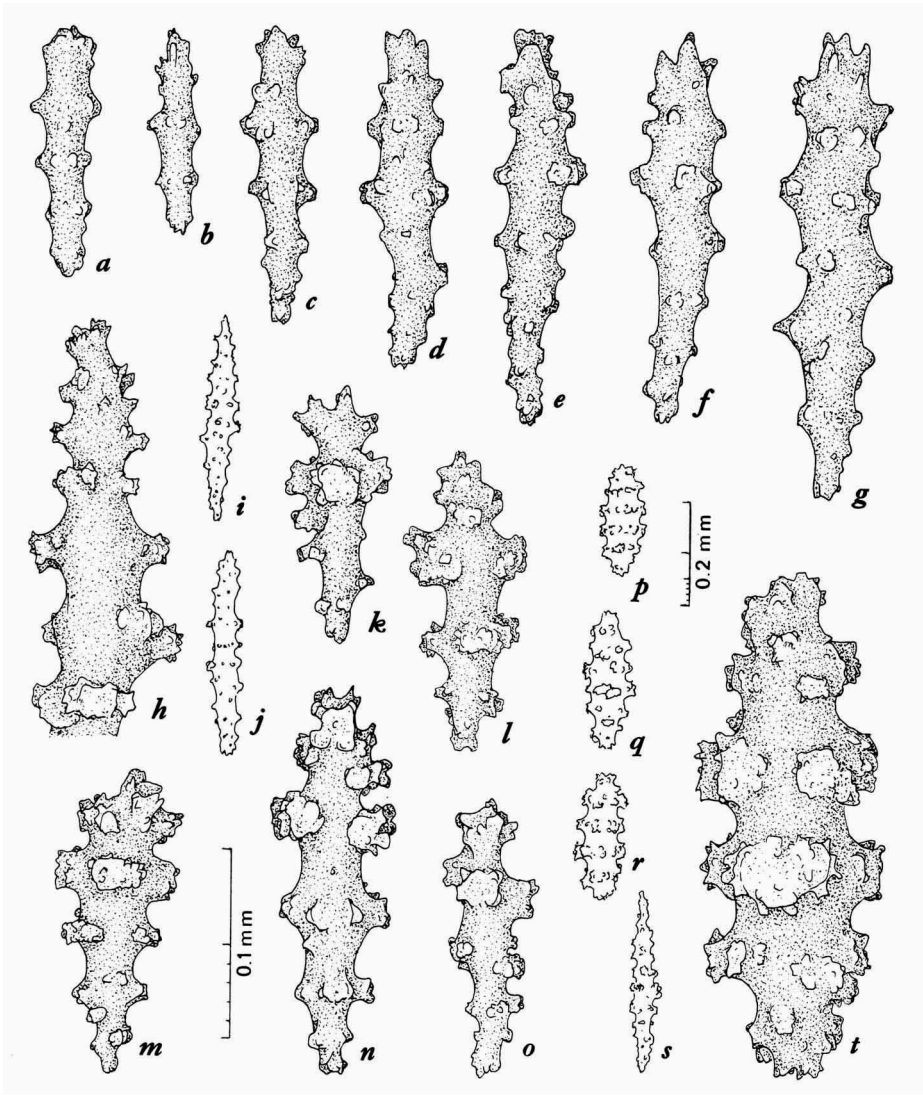

Fig. 10. *Lobophytum crebriplicatum* Von Marenzeller, holotype NHMW No. C 2334. a-g, sclerites from surface layer of a lobe; h-j, sclerites from interior of a lobe; k-o, sclerites from surface layer of the stalk; p-t, sclerites from interior of the stalk. Enlargement of a-h, k-o and t indicated by 0.1 mm scale at m; that of i, j, p-s by 0.2 mm scale at p.

nal form between the short, subcylindrical forms and the long spindles. The most common form, viz. that of our fig. 10p, r, t is not represented by Von Marenzeller. I think that this omission may have led to wrong identifications. The scale of enlargement of Von Marenzeller's figures is not correct either: the enlargement of his fig. 7 (pl. 9) is about × 120 instead of × 90.

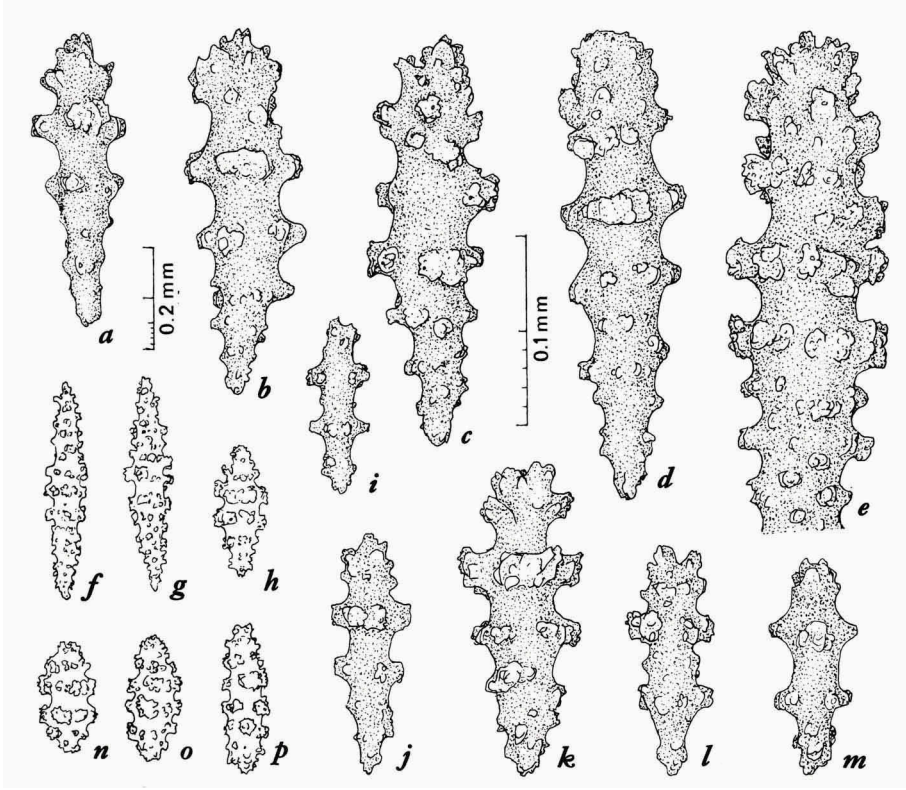

Fig. 11. *Lobophytum crebriplicatum* Von Marenzeller (holotype of *"L. oblongum"* Tixier-Durivault, 1956), MNHN. a-e, sclerites from surface layer of a lobe; f-h, sclerites from interior of a lobe; i-m, sclerites from surface layer of the stalk; n-p, sclerites from interior of the stalk. Enlargement of a-e, i-m indicated by 0.1 mm scale at c; that of f-h, n-p by 0.2 mm scale at a.

The colonies from Tokara Islands, referred to *L. crebriplicatum* by Utinomi (1953: 156) and later (1971: 90) to *L. crassospiculatum* by the same author, must be referred to *L. crassum.*

Tixier-Durivault (1958: 167) records the receipt of a type specimen of *L. crebriplicatum* from the Museum Godeffroy at Hamburg. This colony is represented in her fig. 190. I also received this colony from the Hamburg Museum, register no. C 2418; in this museum it is not registered as type! When examining the colony, I found that it belongs to *L. crassum*, see p. 32 in this paper. Consequently, Tixier-Durivault's description of the sclerites etc. does not square with our description.

The colony from New Caledonia, recorded by me in 1974b (p. 95), is also *L. crassum*; that from Guam, recorded by me in 1978 (p. 49), is indeed *L. crebriplicatum.*

Tixier-Durivault (1956, 1958) described a colony from Nha Trang as *L.*

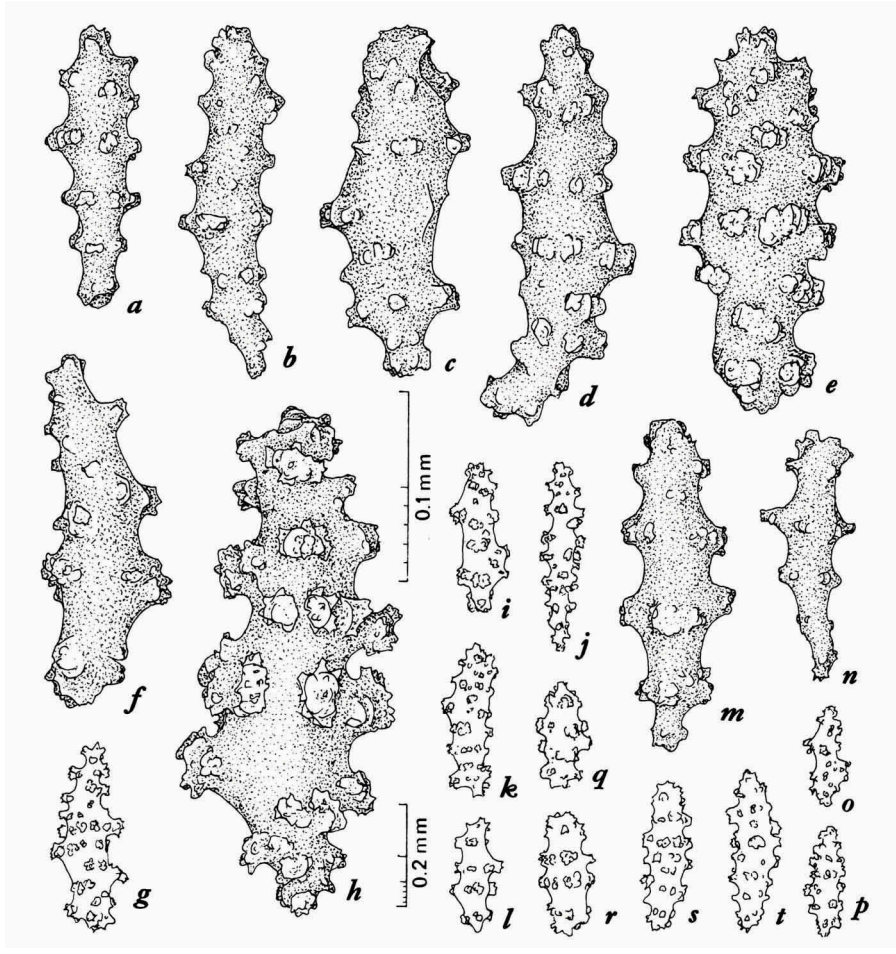

Fig. 12 *Lobophytum cristatum* Tixier-Durivault, holotype, MNHN. a-f, sclerites from surface layer of a lobe; g-l, sclerites from interior of a lobe; m-p, sclerites from surface layer of the stalk; q-t, sclerites from interior of the stalk. Enlargement of a-f, h, m and n indicated by 0.1 mm scale below c; that of g, i-l, o-t by 0.2 mm scale at h.

oblongum. Between this new species and the holotype of *L. crebriplicatum* there are only very small differences in degree, so the specific name *oblongum* must be abandoned. I think it desirable to give an illustration of the sclerites (fig. 11) and a photograph of this colony from Nha Trang at full size (pl. 8 fig. 2).

Geographical distribution. — Tonga Is., Great Barrier Reef, Palau Is., Bonin Is., Guam, Bay of Nha Trang (Vietnam).

Lobophytum cristatum Tixier-Durivault, 1970

(fig. 12, pl. 6 fig. 2)

Lobophytum cristatum Tixier-Durivault, 1970a: 209, figs. 35-37.

The holotype is represented in Tixier-Durivault's fig. 35 (enlargement × 0.7) and in our pl. 6 fig. 2 (natural size).

The autozooids are 2 to 3 mm apart. Between two autozooids there are two to six siphonozooids.

There is hardly any difference between the sclerites in the lobes and in the stalk. The surface layer of both lobes and stalk contains few clubs, 0.12 to 0.18 mm long, with less distinct heads and zones of warts (fig. 12a, b, m, n). The vast majority of the sclerites consist of short, stout spindles and rods, often irregularly curved and varying in length from 0.15 mm to 0.20 mm (fig. 12c-f, o, p). The prominences are warts, which are usually arranged in girdles. Longer sclerites, up to 0.27 mm long, are more fusiform.

In the interior of lobes and stalk irregularly shaped bodies occur (fig. 12g-l, q-t). The big warts are high, distinctly stalked (fig. 12h). In the lobes the length of the sclerites is up to 0.42 mm; in the stalk they are shorter, up to about 0.30 mm. Crosses are common.

The shape of the colony markedly resembles that of *L. pauciflorum*, but the sclerites are different. The irregularly shaped sclerites in all parts of the colony are typical for *L. cristatum*.

Geographical distribution.— New Caledonia.

Lobophytum cryptocormum Verseveldt & Tursch, 1979

(fig. 13)

Lobophytum cryptocormum Verseveldt & Tursch, 1979: 136-138, fig. 2, pl. 1.

This coral has been described and pictured in the paper mentioned above. The sclerites in fig. 2 of that paper have been drawn on a scale which differs somewhat from that used in the drawings in this revision. Therefore and also for the sake of completeness, I give a new drawing here (fig. 13).

In the surface layer of the lobes there are clubs, 0.11 to 0.22 mm long (fig. 13a-f). They bear two, sometimes three girdles of truncated thorns or small warts. The interior contains oblong capstans, averagely 0.21 mm long (fig. 13g) and many spicules, up to 0.40 mm long. These spicules are usuallly pointed spindles, sometimes blunt-ended rods, with some girdles of warts in the middle part (fig. 13h, i).

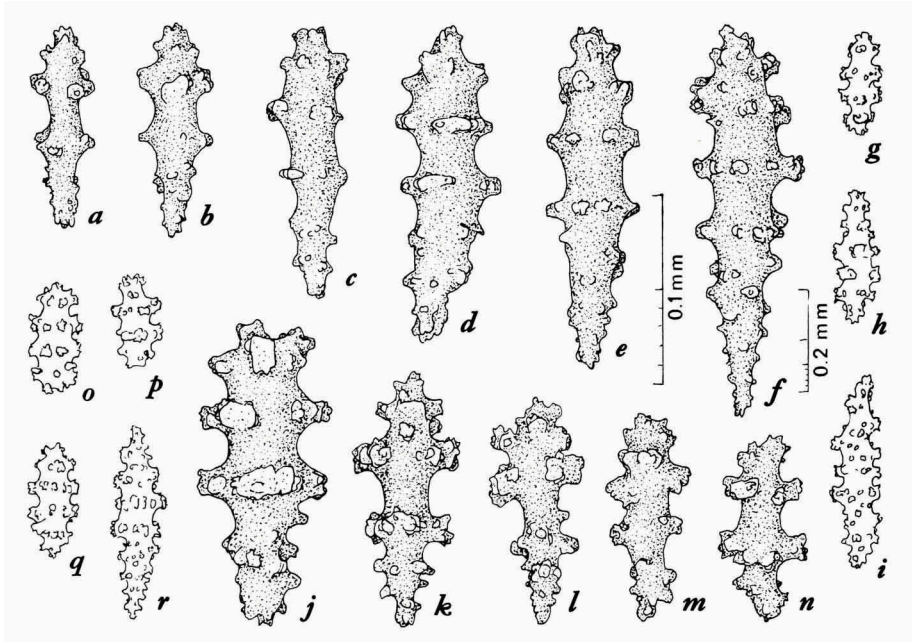

Fig. 13. *Lobophytum cryptocormum* Verseveldt & Tursch, holotype, RMNH Coel. no. 12861. a-f, sclerites from surface layer of a lobe; g-i, sclerites from interior of a lobe; j-n, sclerites from surface layer of the stalk; o-r, sclerites from interior of the stalk. Enlargement of a-f, j-n indicated by 0.1 mm scale at e; that of g-i, o-r by 0.2 mm scale at f.

The surface layer of the stalk has clubs, 0.11 to 0.17 mm long; they bear two zones of coarser warts (fig. 13j-m). Smaller sclerites, 0.10 to 0.12 mm long, are more rod-shaped, with two girdles of warts (fig. 13m). The interior is provided with capstans, 0.18 to 0.22 mm long (fig. 13o-q). Spindles, up to 0.39 mm long, are scarce (fig. 13r).

Geographical distribution.— Laing I. (N. coast of Papua New Guinea).

Lobophytum delectum Tixier-Durivault, 1966

(fig. 14, pl. 6 fig. 1)

Lobophytum delectum Tixier-Durivault, 1966: 74-76, figs. 55-57.

Tixier-Durivault's holotype is represented in her fig. 55 and in our pl. 6 fig. 1; the photograph shows the colony from the reverse side. Both in Tixier-Durivault's drawing and in our photograph the colony is shown at natural size (the enlargement "× 216× ⅔" in the caption of Tixier-Durivault's drawing is a comic mistake).

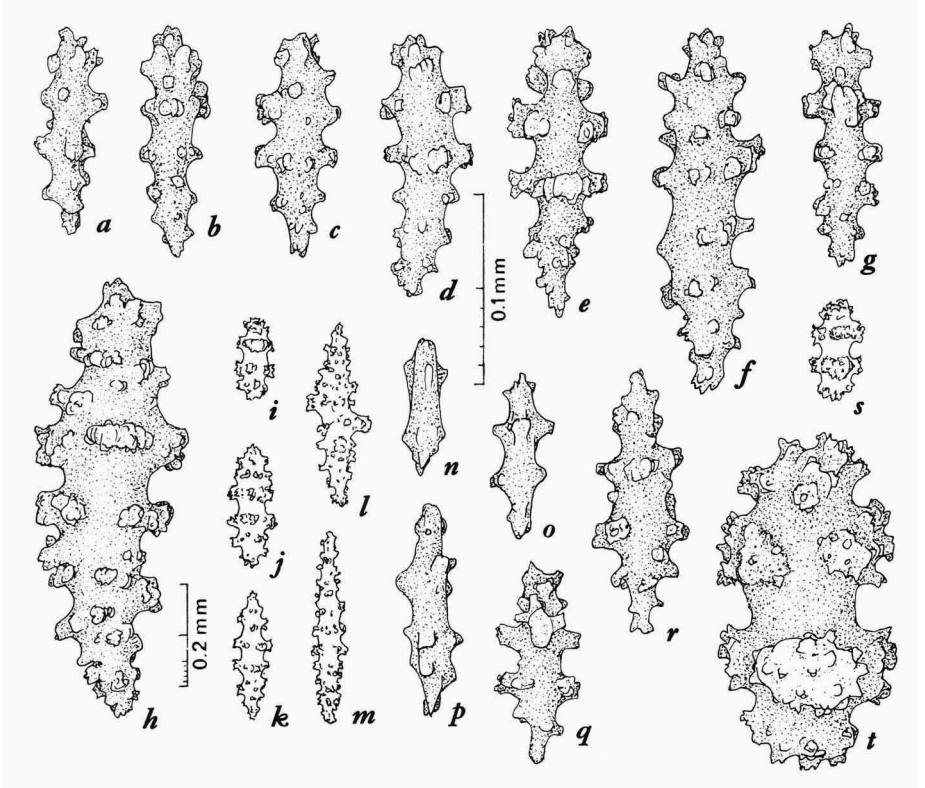

Fig. 14. *Lobophytum delectum* Tixier-Durivault, holotype, MNHN. a-h, sclerites from surface layer of a lobe; i-m, sclerites from interior of a lobe; n-r, sclerites from surface layer of the stalk; s, t, sclerites from interior of the stalk. Enlargement of a-h, n-r and t indicated by 0.1 mm scale at d; that of i-m and s by 0.2 mm scale at h.

The distance between the autozooids is usually 1.00 to 1.70 mm. There are one to four siphonozooids between two autozooids.

The outer layer of the lobes contains clubs with ill-defined heads, spindle- and rod-shaped sclerites, usually 0.10 to 0.16 mm, sometimes up to 0.20 mm long (fig. 14a-g). Still longer and stouter clubs are transitional forms to internal sclerites (fig. 14h). The prominences are zoned, simple warts. The interior of the lobes contains capstans and oblong or fusiform sclerites. The capstans and oblong sclerites are 0.15 to 0.23 mm long (fig. 14i, j). The prominences are compound warts arranged in two girdles and terminal clusters. The spindles vary in length from 0.25 to 0.40 mm (fig. 14k-m). The processes are zoned or irregularly placed.

In the surface layer of the stalk the majority of the sclerites are spindles, 0.07 to 0.13 mm long. Many of them are shuttles with some simple, blunt, cone-shaped processes (fig. 14n-p), others have high, wartlike processes (fig.

14q, r). True clubs are scarce. In the interior of the stalk there are capstans, 0.15 to 0.20 mm long, with two girdles of warts, which are markedly separated one from the other by a relatively wide median constriction (fig. 14s, t). Oblong sclerites, 0.22 to 0.28 mm long, are scarce; spindles are absent.

The shape of the lobes and the typical capstans in the stalk interior with their (often wide) median waist recall *L. cristagalli* (= *L. crassum*), but the sclerites in the surface layer of lobes and stalk differ distinctly.

Geographical distribution. — Nosy Bé (Madagascar).

Lobophytum densum Tixier-Durivault, 1970

(fig. 15, pl. 1 fig. 2)

Lobophytum densum Tixier-Durivault, 1970a: 210-213, figs. 41-43.

Our pl. 1 fig. 2 shows the holotype from another side than Tixier-Durivault's drawing, fig. 41; the enlargement in this drawing is about × 0.75. According to Tixier-Durivault, the capitulum consists of lobes, which are closely set, short, thick, flat, slightly undulated. That this description is correct is more apparent in our photograph than in the drawing mentioned above.

The autozooids are 1.00 to 1.20 mm apart; at the base of the lobes the distance may be up to 1.60 mm. The number of siphonozooids between two autozooids is one to three, at the base of the lobes sometimes four.

The sclerites in the surface layer of the lobes are indistinct clubs: the heads are weakly developed, they look more like spindles. They bear two or three zones of blunt, cone-shaped prominences. The length is 0.10 to 0.20 mm (fig. 15a-e). Larger clubs, up to 0.27 mm long (fig. 15f) are transitional forms to cylinders, 0.17 to 0.27 mm long, with girdles of warts. In the interior of the lobes there are cylinders and spindles, 0.25 to 0.40 mm long, with at least four zones of warts (fig. 15g-i).

The surface layer of the stalk contains spindles and clubs, 0.10 to 0.15 mm long (fig. 15j-m). The smaller ones are more fusiform and have high, blunt spines (fig. 15j-l); the larger ones bear simple warts (fig. 15m). The sclerites in the interior of the stalk closely agree with those in the lobes. The smaller ones, 0.17 to 0.22 mm long, have two distinct zones of warts, which are sometimes separated one from the other by a waist (fig. 15o). The larger ones, about 0.30 mm long, have usually four zones (fig. 15n,q). Spindles, 0.37 to 0.42 mm long, have warts arranged in girdles or irregularly distributed (fig. 15p).

Geographical distribution. — New Caledonia.

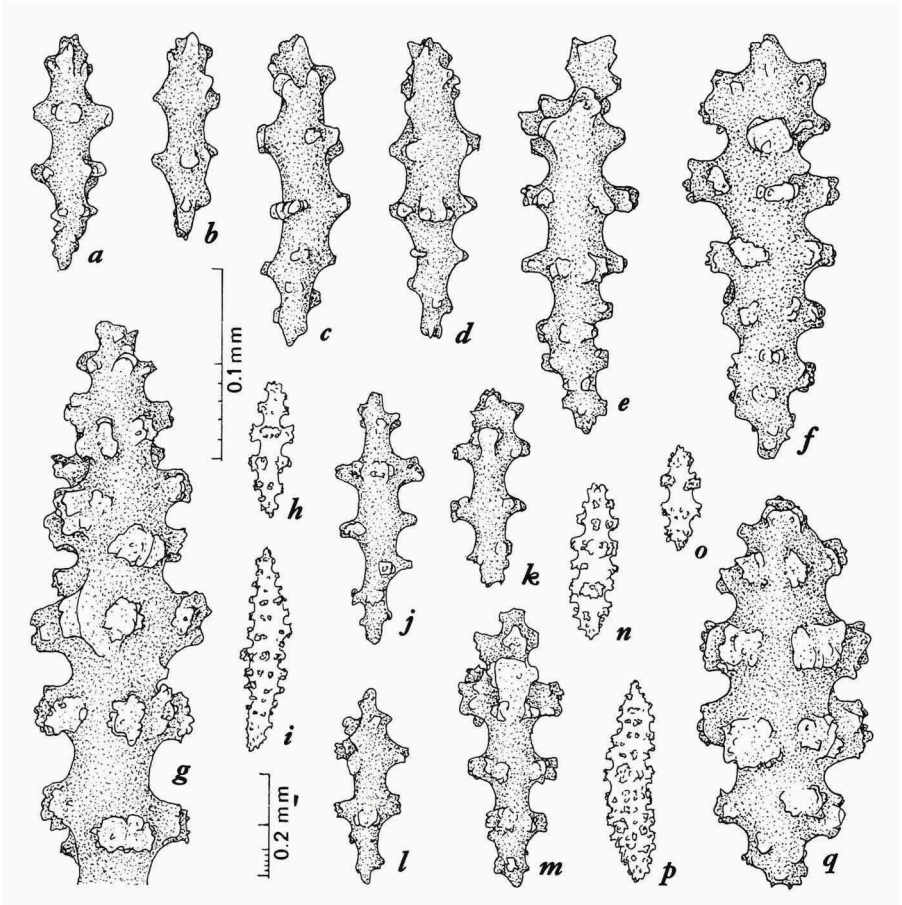

Fig. 15 *Lobophytum densum* Tixier-Durivault, holotype MNHN. a-f, sclerites from surface layer of a lobe; g-i, sclerites from interior of a lobe; j-m, sclerites from surface layer of the stalk; n-q, sclerites from interior of the stalk. Enlargement of a-g, j-m and q indicated by 0.1 mm scale below b; that of h, i and n-p by 0.2 mm scale below i.

Lobophytum denticulatum Tixier-Durivault, 1956

(fig. 16, pl. 7 fig. 2)

Lobophytum denticulatum Tixier-Durivault, 1956: 481; 1958: 105-106, figs. 103, 108, 109; 1966: 64-66, figs. 43-45; Verseveldt, 1977a: 10-13, figs. 5, 6, pl. 4 fig. 2; 1978: 49 (listed only).

The holotype is represented by Tixier-Durivault (1958: fig. 103, enlargement × 0.6) and by the same author (1966; fig. 43, about natural size). Our pl. 7 fig. 2 shows the same colony at full size.

The autozooids are markedly numerous; they are small: the diameter is

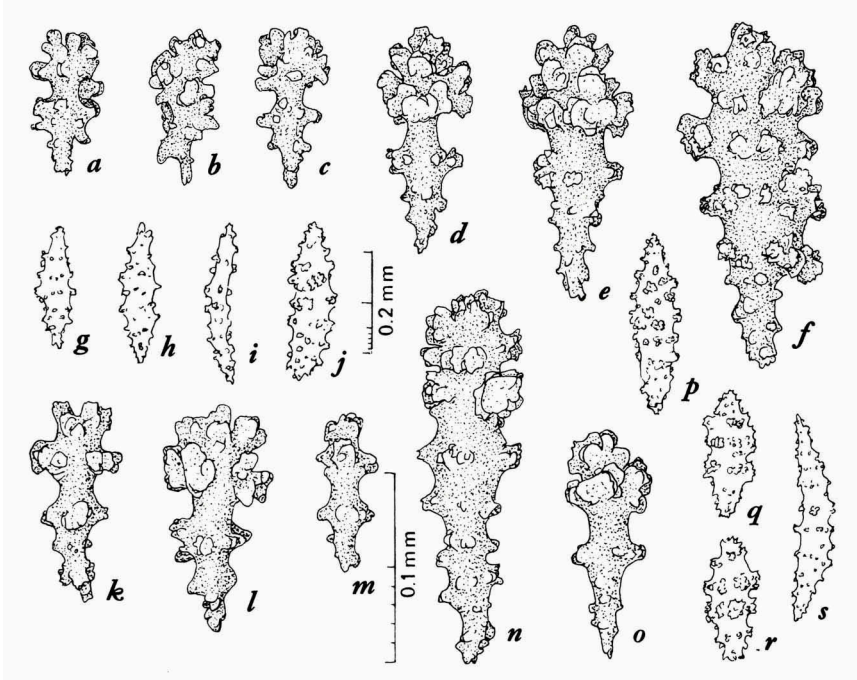

Fig. 16. *Lobophytum denticulatum* Tixier-Durivault, holotype, MNHN. a-f, sclerites from surface layer of a lobe; g-j, sclerites from interior of a lobe; k-o, sclerites from surface layer of the stalk; p-s, sclerites from interior of the stalk. Enlargement of a-f, k-o indicated by 0.1 mm scale at m; that of g-j, p-s by 0.2 mm scale at j.

0.20 to 0.40 mm. The distance between them is 0.40-0.60 mm, at the base of the lobes up to 1.00 mm. The siphonozooids are inconspicuous; there is only one siphonozooid between two autozooids.

The surface layer of the lobes has clubs, 0.07 to 0.20 mm long. A number of the smaller ones with a length of 0.07 to 0.10 mm have so many prominences that the clavate shape is indistinct (fig. 16 a,b). Others and also the larger sclerites are clearly clubs with a wide head and, below this, usually one girdle of warts and varying number of irregularly placed, small warts on the pointed handle (fig. 16c-e). Larger clubs, with a length of 0.22 mm and more, are transitional forms to internal spicules (fig. 16f). The latter are spindles, the bulk of them are 0.20 to 0.32 mm long; they have small, usually zoned warts (fig. 16g, h, j). Some slender spindles measure up to 0.40 mm in length (fig. 16i).

The surface layer of the stalk contains clubs, 0.10 to 0.20 mm long, which resemble those in the lobes (fig. 16k-o). The internal sclerites in the stalk also resemble those in the lobes, but they are a little longer (0.25 to 0.35 mm, sometimes 0.40 mm) and wider (fig. 16 p-s); the longer spindles are often more slender.

Geographical distribution.— Madagascar, Wake Is., Enewetak Atoll.

Lobophytum depressum Tixier-Durivault, 1966

(fig. 17, pl. 9 fig. 3)

Lobophytum depressum Tixier-Durivault, 1966: 88-92, figs. 76-78; Verseveldt, 1971: 18-21, figs. 9-11, pl. 6; 1974a: 95 (listed only).
Sarcophyton auricularis Verseveldt, 1968: 53-54.

The low, encrusting, dish-shaped holotype is represented by Tixier-Durivault (1966; fig. 76, enlargement × 1.2; a diameter of 8 mm as given by Tixier-Durivault is a slip of the pen). In the drawing mentioned the colony is shown from aside; our pl. 9 fig. 3 displays it as seen from above and at full-size.

In the middle of the disk the autozooids are 1 to 2 mm apart. The siphonozooids are scarcely visible; there are one to three between two autozooids.

In the surface layer of the disk there are clubs, usually 0.15 to 0.20 mm long (fig. 17b-e), but also smaller (0.10 to 0.15 mm, fig. 17a) and larger ones (0.20 to 0.32 mm) occur. They are all provided with two distinct zones of spines and warts and, in addition to these, a number of irregularly distributed prominences. The heads are not wide, the handles pointed. The interior of the disk contains spindles and cylinders, mostly 0.30 to 0.40 mm long (fig. 17f-i). They bear remote, rounded or truncated prominences, which may be zoned or irregularly distributed.

The surface layer of the basal part (there is no question of a stalk) has two types of sclerites. First there are clubs, 0.13 to 0.19 mm long. Some of them are distinctly clavate, with a wide, warty head and a blunt-ended handle, the latter with one or two zones of warts and futhermore some irregularly placed processes (fig. 17j). Others are less clavate: the "handle" is wide, sometimes hardly discernable from the warty head. The two parts are nearly always separated one from the other by a waist (fig. 17k, l). In addition to these clubs the surface layer contains numerous dumb-bells, 0.13 to 0.20 mm long, with two girdles of large warts (fig. 17m-o). The sclerites in the interior of the base of the colony are spindles and cylinders, closely resembling those in the interior of the disk. The length is 0.30 to 0.40 mm; the smaller ones usually have a waist (fig. 17p-r).

Geographical distribution.— Madagascar, New Caledonia.

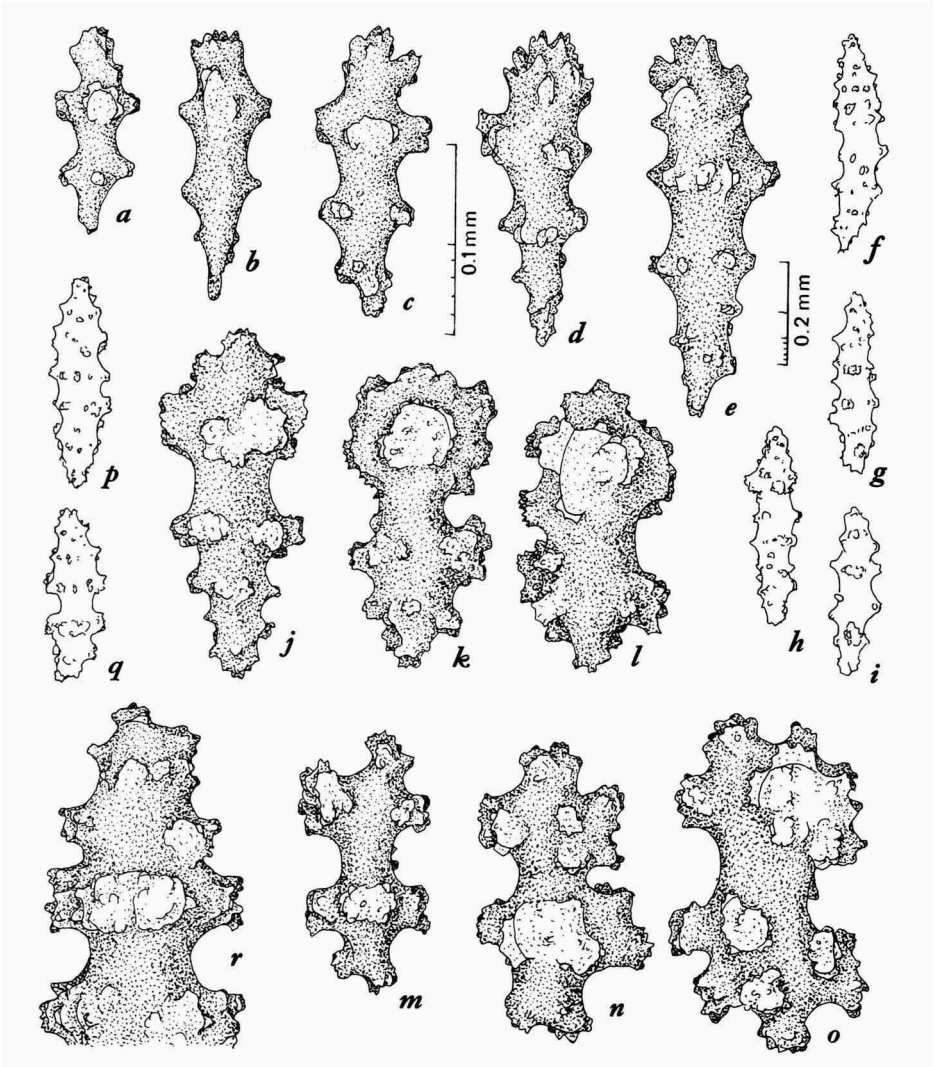

Fig. 17. *Lobophytum depressum* Tixier-Durivault, holotype, MNHN. a-e, sclerites from surface layer of the disk; f-i, sclerites from interior of the disk; j-o, sclerites from surface layer of the stalk; p-r, sclerites from interior of the stalk. Enlargement of a-e, j-o and r indicated by 0.1 mm scale at c; that of f-i, p and q by 0.2 mm scale at e.

Lobophytum durum Tixier-Durivault, 1956

(fig. 18, pl. 10)

Lobophytum durum Tixier-Durivault, 1956: 481; 1958: 154-156, figs. 172, 183, 184; 1970b: 126.

Tixier-Durivault (1958: 156) recorded three specimens from Vietnam. One of these, kept in the Paris Museum, was figured in her fig. 172 (enlargement almost × 0.7). I designate this specimen as the lectotype. It is represented in our pl. 10 at natural size.

On the lobes the autozooids are 1 to 2 mm apart; on the disk between the lobes the distance is 2 to 3 mm. There are one or two siphonozooids between two autozooids on the lobes, six to seven on the disk.

The sclerites in the surface layer of a lobe are clubs with ill-defined heads; the length varies from 0.11 to 0.21 mm (fig. 18a-e). They bear zoned warts; the larger clubs have the zones densely placed. The interior of the lobes has massive spindles, 0.20 to 0.36 mm long (fig. 18f-i). The shorter ones have two girdles of warts, the longer ones have more.

The surface layer of the encrusting base of the colony contains various types of sclerites. Some of them are fusiform or cylindrical, one end is scarcely wider, if at all, than the other end (fig. 18j-m, q). Others are more clavate (fig. 18n-q, r, s). The smaller ones have two girdles of warts, the larger ones have more. The warts are often placed in closely arranged zones, but sometimes they are irregularly distributed and densely cover the surface of the sclerite (fig. 18n). All these sclerites are mostly 0.10 to 0.18 mm long. The interior of the base contains sclerites, which vary in shape from capstans to spindles. The capstans are 0.19 to 0.22 mm long (fig. 18v); they have two to four girdles of warts. Longer, oblong sclerites on the average 0.24 mm long (fig. 18t) are transitional forms to the scarce spindles, up to 0.37 mm long, with four zones of warts and many smaller warts which irregularly cover the ends of the spindle (fig. 18u).

Geographical distribution.— Vietnam.

Lobophytum gazellae Moser, 1919

(fig. 19, pl. 9 figs. 1, 2)

Lobophytum gazellae Moser, 1919: 274-276, fig. 17, pl. 5 fig. 12; Roxas, 1933: 363-364; Macfadyen, 1936: 46.

Not *Lobophytum gazellae*, Tixier-Durivault, 1956: 481-482; 1958: 150-152, figs. 171, 175, 176; 1966: 87-88, figs. 73-75.

Lobophytum roxasi, Moser MS, see Roxas, 1933: 364-365.

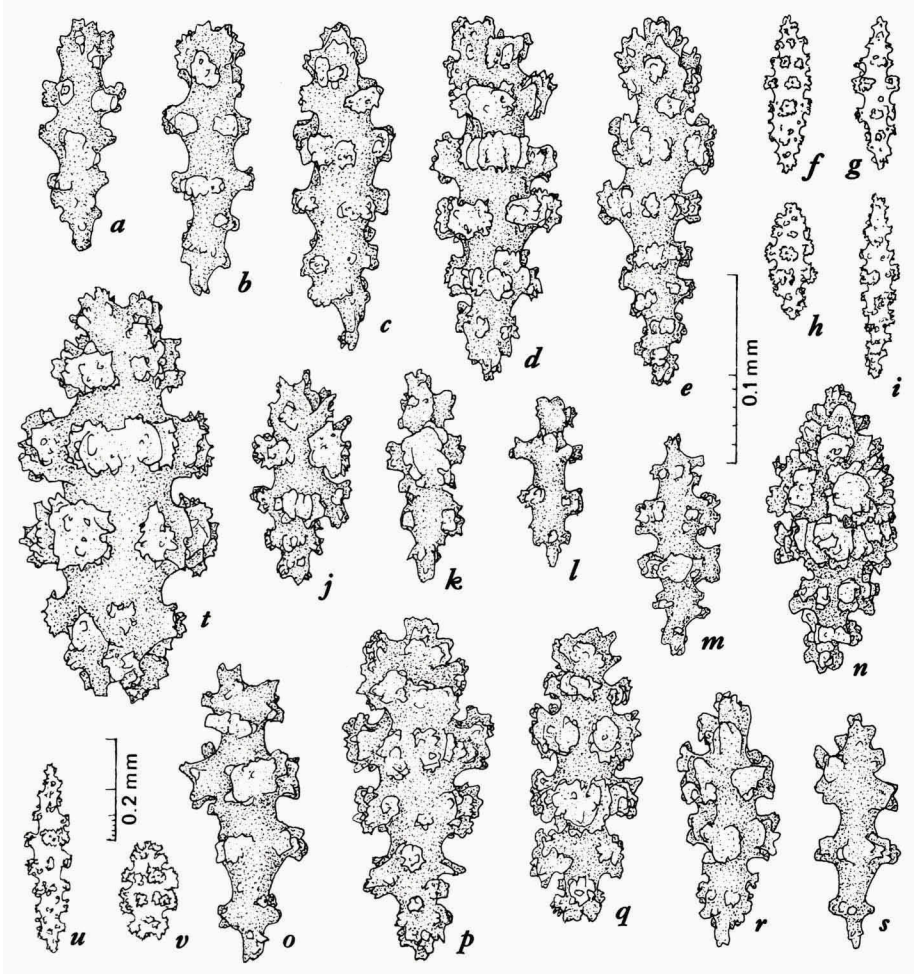

Fig. 18. *Lobophytum durum* Tixier-Durivault, lectotype, MNHN. a-e, sclerites from surface layer of a lobe; f-i, sclerites from interior of a lobe; j-s, sclerites from surface layer of the stalk; t-v, sclerites from interior of the stalk. Enlargement of a-e, j-t indicated by 0.1 mm scale at e; that of f-i, u and v by 0.2 mm scale above u.

Moser's (1919: 274) holotype is still present in the Berlin Museum, register no. 2341. It is a small colony from New Ireland. It is represented in Moser's pl. 5 fig. 12 and in our pl. 9 fig. 1; in both the enlargement is about × 1.

In the surface layer of the lobes there are many shuttles, 0.09 to 0.27 mm long (fig. 19b). Some others are slightly wider at one end, they look more club-shaped (fig. 19 c, e, g, h). In addition to these there are warty clubs, 0.16 to 0.25 mm long; the heads have some small warts, the handles have two or

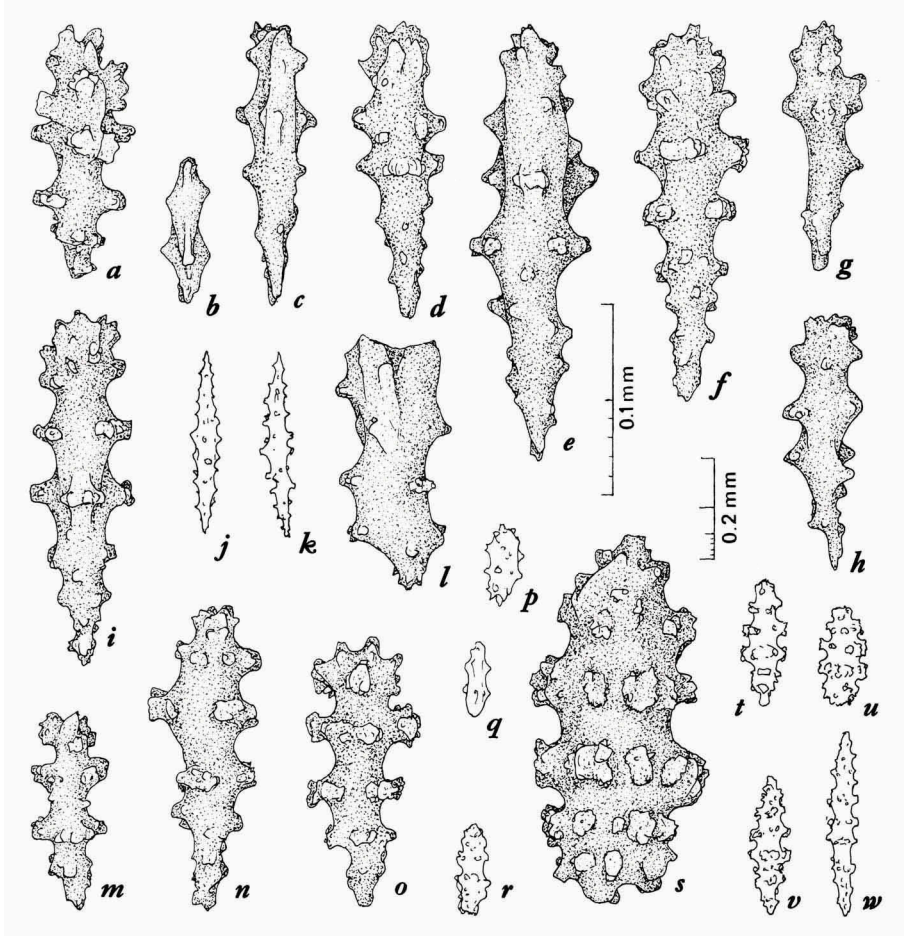

Fig. 19. *Lobophytum gazellae* Moser, holotype, ZMB No. 2341. a-i, sclerites from surface layer of a lobe; j and k, sclerites from interior of a lobe; l-r, sclerites from surface layer of the stalk; s-w, sclerites from interior of the stalk. Enlargement of a-i, l-o and s indicated by 0.1 mm scale at e; that of j, k, p-r, t-w by 0.2 mm scale below f.

three whorls of warts (fig. 19a, d, f, i). The interior of the lobes contains pointed spindles, up to 0.38 mm long. Some of them have irregularly placed, cone-shaped processes (fig. 19j), others have high, simple warts, which are sometimes zoned (fig. 19k).

The surface layer of the stalk has clubs, 0.09 to 0.18 mm long; the warts are arranged in girdles (fig. 19m-o). There are also many small ovals and irregularly shaped forms; some of them have few, simple prominences (fig. 19l, p. q). Others are oblong capstans (fig. 19r). The stalk interior is provided with capstans and oblong or fusiform sclerites. The capstans are 0.20 to 0.25 mm

long (fig. 19s, u), the spindles 0.25 to 0.36 mm (fig. 19v, w). The oblong forms are between the two (fig. 19t). The shorter sclerites usually have four girdles of warts, the spindles six to eight.

When comparing these results with Moser's data and figures, we see that there is good agreement. But Moser did not record the clubs in the surface layer of the stalk. The sclerites figured by him in his fig. 17 on the left- and right-hand side of the letter b and also depicted in our fig. 19l-p and r are far in the minority, especially those represented in our fig. 19r.

Tixier-Durivault (1956, 1958) wrongly referred two corals collected near Onrust I. to *L. gazellae*. The specimens are kept in the Zoological Museum at København. Examination of these colonies showed that they differ so much from the type colony of *L. gazellae* just described that I have been compelled to describe them as a new species: *L. hapalolobatum*, see below.

The type specimen of *L. roxasi* is kept in the Berlin Museum, register no. 6415; the colony is pictured in our pl. 9 fig. 2, at natural size. Not only the shape of the colony with its erect, finger-like lobes agrees with that of *L. gazellae*, but also the spiculation shows a close resemblance, though the capstans in the interior of the stalk are smaller: 0.15 to 0.23 mm. Roxas (1933: 365) already mentioned the similarity of the sclerites, but he added: "although other characters are entirely different". It is a pity that Roxas did not enumerate these differences; I could not find them. In my opinion the specific name *roxasi* must be dropped.

L. pauciflorum is closely allied to *L. gazellae*. Both have erect, finger-like lobes and, on the whole, the spiculation of the two species corresponds. But in *L. gazellae* the surface layer of the stalk contains many irregularly shaped, angular sclerites (see also Moser, 1919, fig. 17b) and the autozooids and siphinozooids are much smaller and difficult to see.

Geographical distribution. — New Ireland, Philippines, Low Isles (Great Barrier Reef).

Lobophytum hapalolobatum sp. nov.

(fig. 20, pl. 9 figs. 4, 5)

In the description of *L. gazellae* I explained the necessity for describing a new species, *L. hapalolobatum*, for two colonies, which have been treated as *L. gazellae* by Tixier-Durivault (1956, 1958). These colonies were collected by Dr. Th. Mortensen near Onrust I., Java Sea, in April 1929. They are kept in the Zoological Museum at København and are represented in our pl. 9 figs. 4, 5, at full size. The smaller colony was drawn by Tixier-Durivault (1958: fig. 171).

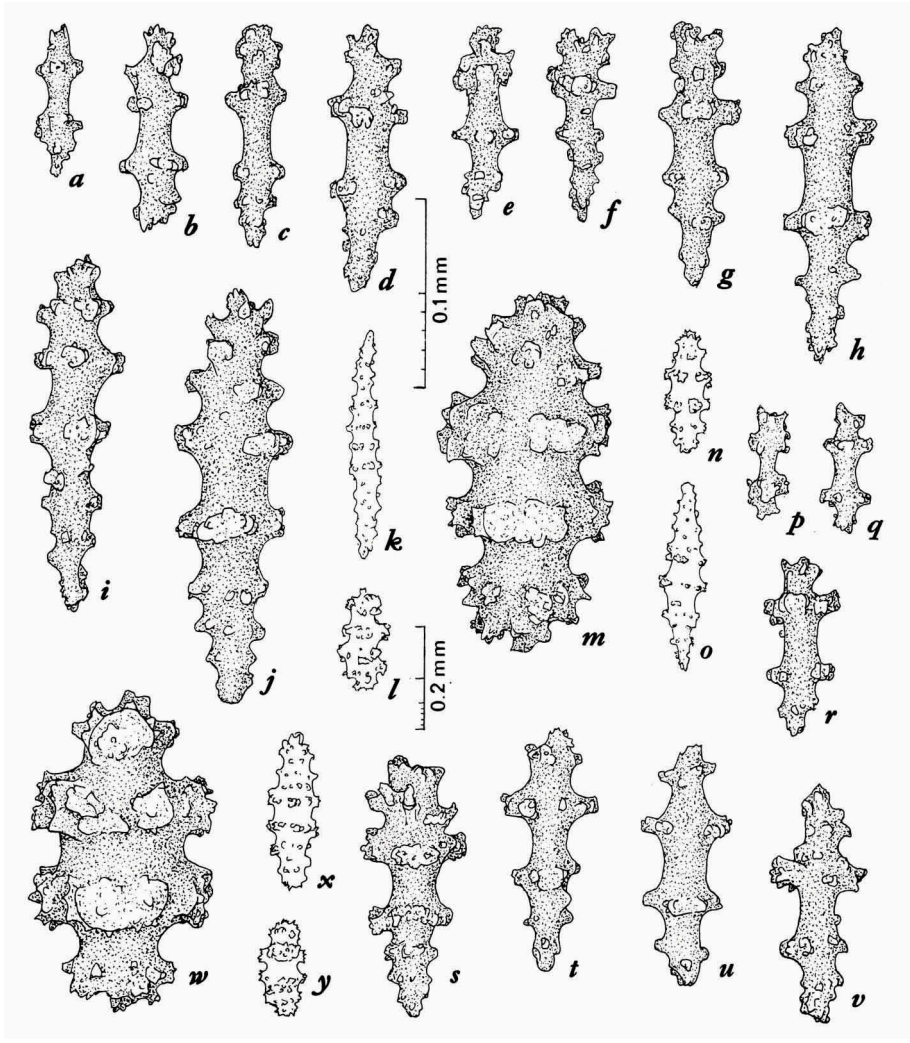

Fig. 20. *Lobophytum hapalolobatum* sp. nov., holotype (originally identified with *"L. gazellae"* Moser), ZMK. a-j, sclerites from surface layer of a lobe; k-o, sclerites from interior of a lobe; p-v, sclerites from surface layer of the stalk; w-y, sclerites from interior of the stalk. Enlargement of a-j, m, p-w indicated by 0.1 mm scale at d; that of k, l, n, o, x and y by 0.2 mm scale at l.

I select the larger colony as the holotype (pl. 9 fig. 4). It measures 80 mm in total height. On one side, "the front side", the stiff stalk is 30 mm high, at "the back side" the height is 65 mm. At the base the stalk is 25 mm wide; it broadens upwards. The slanting capitulum has a diameter of 65 mm, the projecting lobes included. The latter are soft. Most of the lobes are plates. The upper edge may be undulated, or the primary bear some finger-like secondary lobes;

the summits are rounded. At their base the plates are 8 or 9 mm thick; upwards they taper to a point. The length of the plates is up to about 25 mm, the height 30 mm.

The autozooids and siphonozooids are invisible to the naked eye. The openings of the retracted autozooids measure 0.45 mm in diameter; the siphonozooids are 0.30 mm wide. Consequently it is difficult to distinguish the two kinds of zooids. On the sides of the lobes the autozooids are 1.00 to 1.60 mm apart. There are usually three to five siphonozooids between two autozooids.

The surface layer of the lobes contains rods and spindles, 0.08 to 0.14 mm long, with two girdles of small warts separated by a long waist (fig. 20a-d, h). In many cases one end is slightly more pointed, the other end more expanded, so the spicule is a little clavate (fig. 20e-g). There are also longer clubs, up to 0.22 mm long, with ill-defined heads and with more girdles on the handles (fig. 20i, j).

The interior of the lobes contains capstans and spindles. The capstans, on the average 0.20 mm long, have two median zones of warts and terminal clusters (fig. 20l, m). The more elongated spicules, 0.25 to 0.30 mm long, bear two median zones and besides irregularly placed prominences, which sometimes form a few girdles (fig. 20n). The last-mentioned type of spicules may be considered transitional forms to spindles, 0.35 to 0.47 mm long, with two to four median girdles of warts (fig. 20k, o); their width is 0.07 to 0.10 mm.

The surface layer of the stalk has numerous small rods, 0.06 to 0.13 mm long, with two widely spaced zones of warts (fig. 20p-r, u, v). Rather striking is the great number of rods with a length of 0.06 to 0.09 mm (fig. 20p, q). The larger ones may show transitional forms to clubs, 0.10 to 0.15 mm long (fig. 20s, t). In the stalk interior there are warty capstans, 0.16 to 0.19 mm long (fig. 20w, y). They look like the capstans in the lobes, but are shorter. In addition to these capstans there are a few spindles, on the average 0.25 to 0.35 mm long (fig. 20x).

I designate the smaller colony (pl. 9 fig. 5) as the paratype. It has the same characters as the holotype. The latter is creamy in colour, the paratype is whiter.

The specific name *hapalolobatum*, from Latin *hapalus* = soft and *lobus* = protuberance, refers to the softness of the lobes.

Summarizing we see that *L. hapalolobatum* differs from *L. gazellae* in the following respects (the characters of *L. gazellae* are placed in square parentheses):

1) The lobes are very weak [Moser (1919: 275) says the disk is firm].

2) Most of the spicules in the surface layer of the lobes are short rods with distant girdles of warts [the sclerites are longer shuttles with laterally flattened

prominences and warty clubs up to 0.25 mm long].

3) In addition to spindles the interior of the lobes contains many capstans, 0.20 mm long [there are spindles only].

4) In addition to some clubs the surface layer of the stalk has a great many, very small rods, 0.06 to 0.13 mm long [rods are absent; there are only clubs, 0.12 to 0.18 mm long].

5) In the stalk interior the majority of the sclerites are 0.16 to 0.19 mm long [the length is usually 0.20 to 0.25 mm].

Geographical distribution.— Onrust I. (Java Sea).

Lobophytum hirsutum Tixier-Durivault, 1956

(fig. 21, pl. 11)

Lobophytum hirsutum Tixier-Durivault, 1956: 541-542; 1958: 168-170, figs. 197, 205, 206; 1970b: 126-127.

Pl. 11 shows the largest colony mentioned by Tixier-Durivault (1958: 170). It is a dried specimen, with diameters of 155 and 110 mm. I designate this specimen as lectotype. The three other colonies mentioned by Tixier-Durivault are smaller and are preserved in alcohol; I designate them as paralectotypes. Tixier-Durivault's (1958) fig. 197 is not a part of the lectotype, but of one of the paralectotypes.

In the lectotype the autozooids are only visible in the distal parts of the lobes. Their distance is 1.0 to 1.5 mm. The siphonozooids are also hardly discernable; in the distal ends of the lobes there are two to three, sometimes four between two autozooids.

In the surface layer of the lobes there are few clubs. Their length varies from 0.14 to 0.23 mm (fig. 21a-f). Heads and handles have warts, those in the middle form girdles. The clubs in the stalk hardly differ from those in the lobes (fig. 21l-r); they are 0.10 to 0.16 mm long.

The interior of the lobes contains pointed spindles, 0.30 to 0.44 mm long (fig. 21g-k); in the middle the warts are usually zoned. In the stalk most sclerites are oblong to cylindrical; their length is 0.18 to 0.25 mm, the width is 0.08 to 0.09 mm (fig. 21t-w). Longer spicules pass into spindles, up to 0.35 mm long and 0.08 to 0.09 mm wide, but they are scarce. The warts are zoned; they are not spiny (fig. 21s).

Geographical distribution.— Bay of Nha Trang (Vietnam).

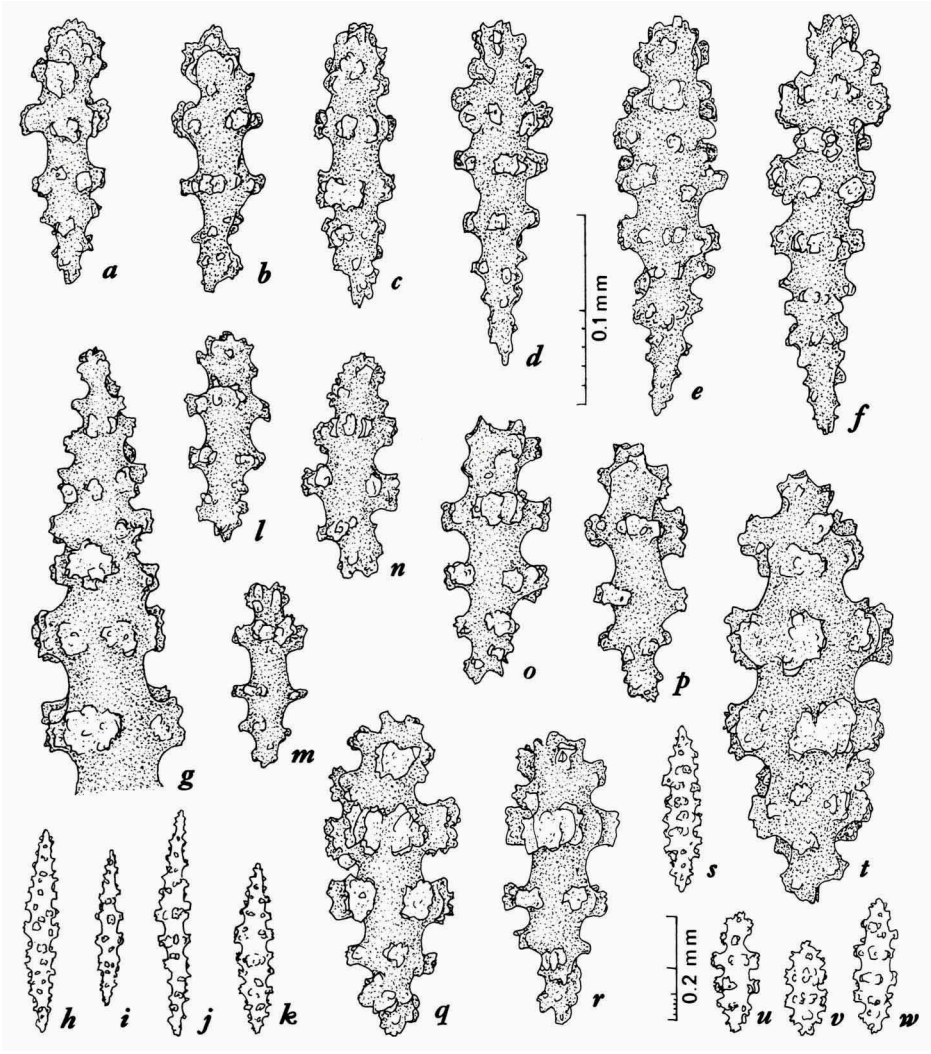

Fig. 21. *Lobophytum hirsutum* Tixier-Durivault, lectotype, MNHN. a-f, sclerites from surface layer of a lobe; g-k, sclerites from interior of a lobe; l-r, sclerites from surface layer of the stalk; s-w, sclerites from interior of the stalk. Enlargement of a-g, l-r and t indicated by 0.1 mm scale at d; that of h-k, s, u-w by 0.2 mm scale at r.

Lobophytum ignotum Tixier-Durivault, 1956

(fig. 22, pl. 9 fig. 6)

Lobophytum ignotum Tixier-Durivault, 1956: 542; 1958: 106-107, figs. 104, 110, 111.

I designate the small colony represented by Tixier-Durivault (1958: fig. 104) as the lectotype. In the figure mentioned the enlargement is × 0.7. Our pl. 9 fig. 6 shows the same colony at natural size.

On the lobes the distance between two autozooids is 1 mm, sometimes 1.5 mm. The number of the small siphonozooids between two autozooids is one to two, rarely three.

The sclerites in the surface layer of the lobes are shuttles, clubs and cylinders. The shuttles are numerous, the length is 0.09 to 0.22 mm (fig. 22c). The clubs have distant, small, low prominences, rounded or cone-shaped or truncated; in the middle part of the sclerite they are often zoned (fig. 22a, b, d-g); the length is 0.11 to 0.21 mm. The cylinders are thick, blunt-ended forms, 0.24 to 0.26 mm long and bearing the same small, distant, usually zoned prominences. The interior of the lobes contains wide spindles, 0.25 to 0.40 mm long and 0.09 to 0.10, sometimes 0.11 mm wide (processes included; fig. 22h-l). The warts are high and usually arranged in girdles.

The surface layer of the stalk has shuttles, clubs and rods. The shuttles are 0.06 to 0.13 mm long. The smaller ones are rather slender, but the longer ones are strikingly thick. The clubs measure 0.10 to 0.15 mm in length. The heads are irregularly covered with spines; the stalks bear two girdles of sometimes spiny processes (fig. 22m, n, p, q, s-u). The more rod-shaped spicules are 0.10 to 0.12 mm long (fig. 22 o, r) and have two zones of wart-like processes. Between the clavate and the rod-shaped types there are all kinds of transitional forms. In the interior of the stalk the majority of the sclerites are capstans, 0.17 to 0.23 mm long and 0.10 to 0.12 mm wide (fig. 22v, w, y). The shorter ones (0.17 to 0.20 mm long) have two girdles of warts, the longer ones have four. In addition to these, the interior contains bluntly pointed, massive spindles, 0.30 to 0.48 mm long, often densely set with warts, which are usually not zoned (fig. 22x, z).

The shape of the colony recalls that of *L. gazellae,* but the sclerites in all parts of the colony are different.

Geographical distribution.— The origin is unknown.

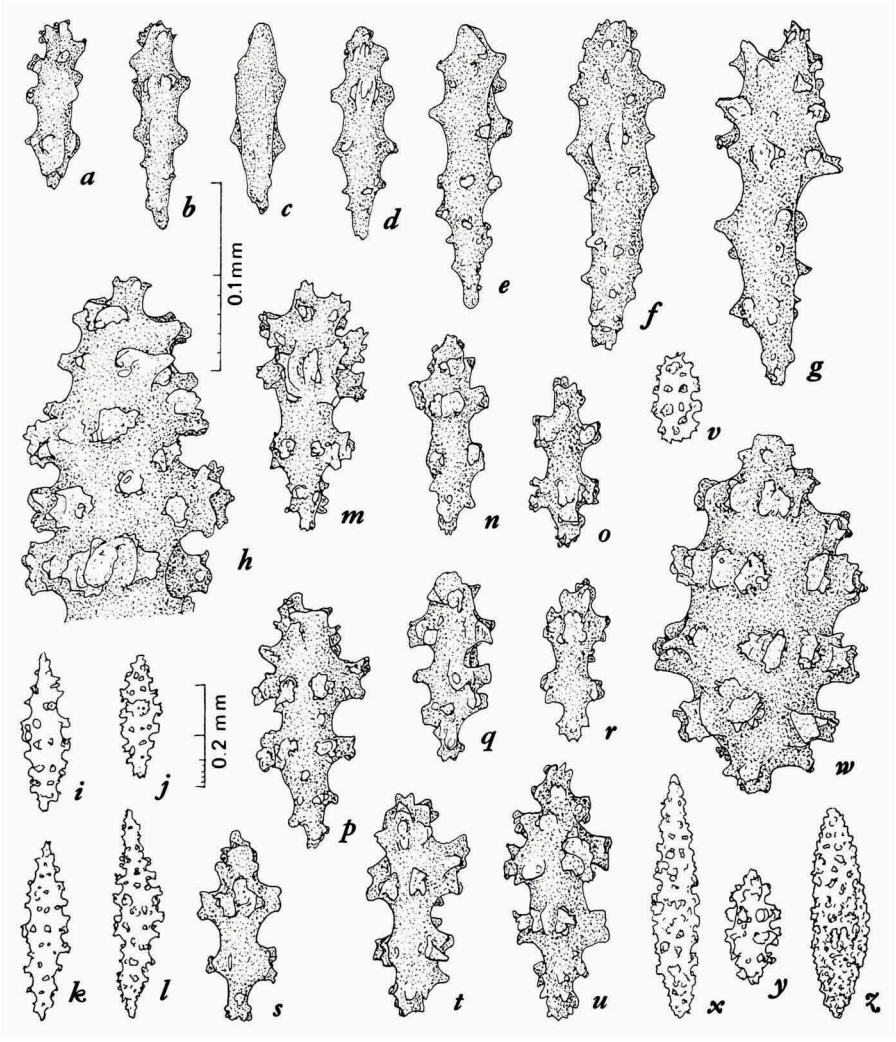

Fig. 22. *Lobophytum ignotum* Tixier-Durivault, lectotype, MNHN. a-g, sclerites from surface layer of a lobe; h-l, sclerites from interior of a lobe; m-u, sclerites from surface layer of the stalk; v-z, sclerites from interior of the stalk. Enlargement of a-h, m-u and w indicated by 0.1 mm scale at b; that of i-l, v, x-z by 0.2 mm scale at j.

Lobophytum irregulare Tixier-Durivault, 1970

(fig. 23, pl. 15 fig. 2)

Lobophytum irregulare Tixier-Durivault, 1970a: 224-225, figs. 61, 62.

Tixier-Durivault's type specimen, henceforth to be called the holotype, has

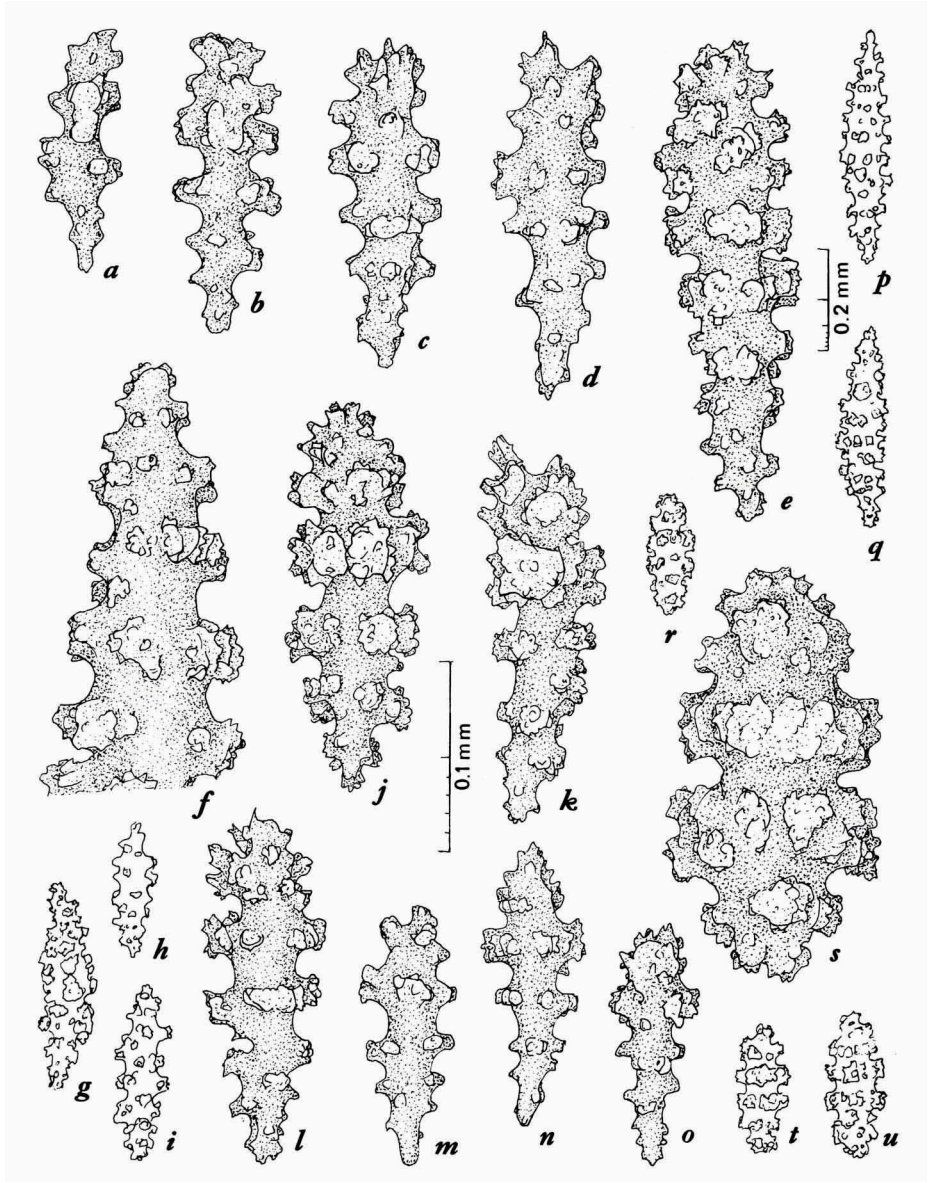

Fig. 23. *Lobophytum irregulare* Tixier-Durivault, holotype, MNHN. a-e, sclerites from surface layer of a lobe; f-i, sclerites from interior of a lobe; j-o, sclerites from surface layer of the stalk; p-u, sclerites from interior of the stalk. Enlargement of a-f, j-o and s indicated by 0.1 mm scale at j; that of g-i, p-r, t and u by 0.2 mm scale at p.

been pictured in her fig. 61; the enlargement is × 0.7. Pl. 15 fig. 2 represents the colony at full size and seen from above, just as in Tixier-Durivault's figure. The colony is low, the base is wide.

The autozooids are 1 to 2 mm apart, at the base of the lobes sometimes 3 mm. Distally there are one or two siphonozooids between two autozooids; proximally their number is two to six, sometimes a few more.

The surface layer of the lobes has warty clubs, 0.14 to 0.26 mm long (fig. 23a-e). In the middle part of the clubs the warts are often arranged in zones. The clubs in the surface layer of the stalk are usually slightly shorter, up to 0.22 mm (fig. 23j-o). The processes on the heads are often spiny; the spines are directed upwards.

The interior of the lobes contains spindles varying in length from 0.25 to 0.43 mm, but usually the length is about 0.30 mm (fig. 23f-i). The warts may be zoned or irregularly placed. In the interior of the stalk the bulk of the sclerites are oval or oblong capstans, about 0.23 to 0.25 mm long and 0.10 to 0.12 mm wide (fig. 23r-u); some are shorter, 0.18 to 0.20 mm, others are pointed spindles, up to 0.45 mm long and 0.09 to 0.11 mm wide (fig. 23p, q). The warts are often zoned.

Geographical distribution.— New Caledonia.

Lobophytum jaeckeli Tixier-Durivault, 1956

(fig. 24, pl. 15 fig. 3)

Lobophytum jaeckeli Tixier-Durivault, 1956: 542; 1958: 136-139, figs. 152, 155, 156.

In the Hamburg Zoological Museum three *Lobophytum* colonies are kept with the same register number C 2419. They were all wrongly called *L. crebriplicatum*. One of these is the (holo-)type of *L. jaeckeli* Tixier-Durivault (1956, 1958); it is described below. The second specimen looks very much like the holotype just mentioned; I designate it as paratype. The third colony looks quite different: it is low, encrusting, the crests are few, thinner and procumbent. This specimen belongs to *L. mirabile* Tixier-Durivault.

The holotype of *L. jaeckeli* is represented by Tixier-Durivault (1958; fig. 152, enlargement about × 0.65) and at full size in our pl. 15 fig. 3.

On the sides of the lobes the autozooids are 1.00 to 1.50 mm apart. Many of them are not fully retracted; their diameter is 0.80 to 1.00 mm. Between them there are one to three siphonozooids.

In the surface layer of the lobes there are very few clubs; their length varies from 0.14 to 0.23 mm (fig. 24c, d, f). They have few, low, blunt cones or distant simple warts. The majority of the sclerites are more or less spindle- or

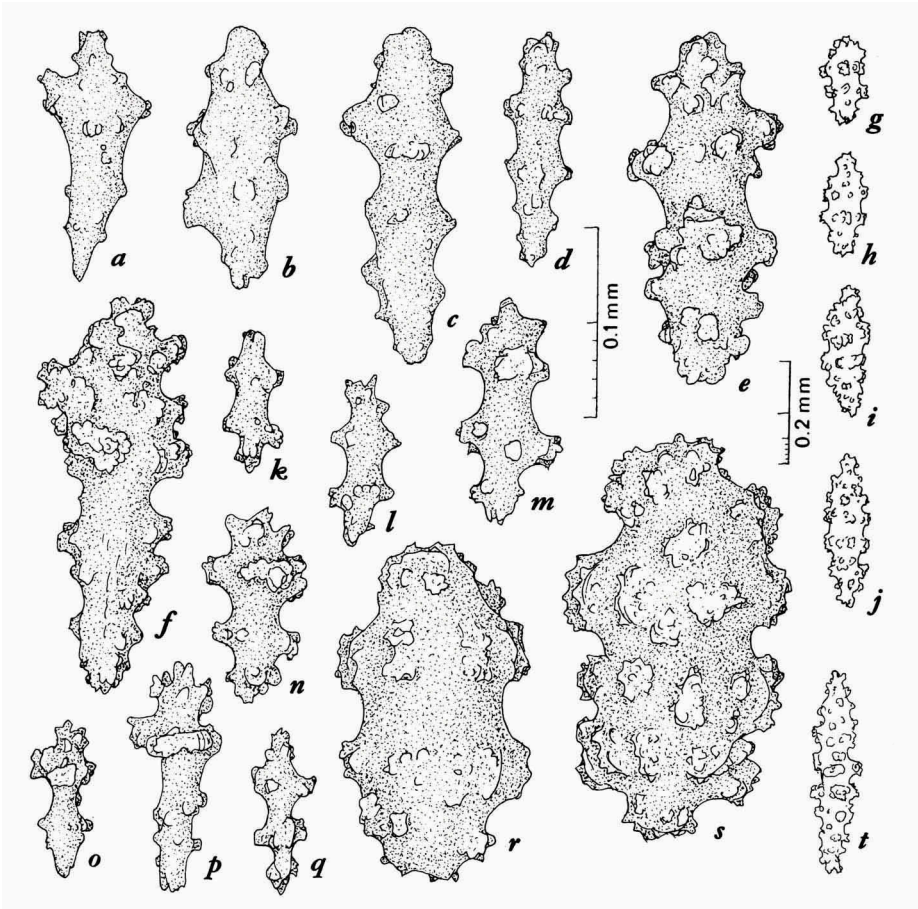

Fig. 24. *Lobophytum jaeckeli* Tixier-Durivault, holotype, MNHN. a-f, sclerites from surface layer of a lobe; g-j, sclerites from interior of a lobe; k-q, sclerites from surface layer of the stalk; r-t, sclerites from interior of the stalk. Enlargement of a-f, k-s indicated by 0.1 mm scale at d; that of g-j and t by 0.2 mm scale at e.

shuttle-shaped or irregular in form (fig. 24a, b, e). The interior of the lobes chiefly contains spindles, 0.18 to 0.35 mm long, usually with two median girdles of warts (fig. 24h-j). In addition there are oblong, capstan-like sclerites, 0.17 to 0.23 mm long (fig. 24g).

The surface layer of the stalk has small rods and clubs, 0.08 to 0.12 mm long (fig. 24k-q). Most of them have two girdles of small thorns or warts. The stalk interior is provided with capstans, 0.18 to 0.21 mm long. The warts may be simple (fig. 24r) or more compound (fig. 24s). The median girdles are usually distinct, but sometimes indistinct. In addition to the capstans there are many spindles, rarely longer than 0.40 mm (fig. 24t). Crosses are common.

The paratype is smaller, the height of the colony and the width of the capitulum are 80 mm. In the surface layer of the lobes there are less irregular forms of sclerites; the clubs, few in number, have the shape of the one represented in our fig. 24c. For the rest there are only small differences.

Geographical distribution. — Bowen, Port Denison, Australia.

Lobophytum laevigatum Tixier-Durivault, 1956

(fig. 25)

Lobophytum laevigatum Tixier-Durivault, 1956: 542-543; 1958: 116-118, figs. 121, 125, 126; 1969: 138-139; 1970b: 127.

The stone-hard holotype has the shape of an oblique parallelepiped (Tixier-Durivault, 1958: fig. 121). The upper side is almost square, the greatest diameter is 82 mm; its surface shows four low, rounded knobs. The maximum height of the colony is 37 mm.

At the margin of the disk the autozooids are 0.5 mm apart, in the centre 2 mm. Nearly everywhere there is only one siphonozooid between two autozooids, sometimes there are two or three.

The surface layer of the disk contains two types of sclerites, First, clubs, 0.09 to 0.14 mm, sometimes up to 0.18 mm long, with narrow heads (fig. 25c, g); they bear conical and truncated spines. Secondly, wider rods, sometimes slightly clavate, 0.09 to 0.20 mm long, with two terminal accumulations of processes and a long median waist (fig. 25a, b, d-f). Larger rods, up to about 0.30 mm long, are transitional forms to internal sclerites.

In the surface layer of the basal part of the colony (in point of fact it is impossible to speak of a stalk here) the sclerites are wider and more distinctly club-shaped (fig. 25n-r); the length is 0.09 to 0.14 mm.

In the interior of the colony the majority of the sclerites are compact capstans and cask-like bodies with two median zones of compound warts; the flat ends bear few, small warts (fig. 25i, m, s, t). The length varies from 0.22 to 27 mm, the width from 0.15 to 0.19 mm. In addition to these capstans, the interior of the disk contains cylinders with blunt ends; the length is 0.30 to 0.48 mm (fig. 25h, j-l); in the basal part of the colony such cylinders are absent.

Geographical distribution. — Bay of Nha Trang (Vietnam), Tuamotu Islands.

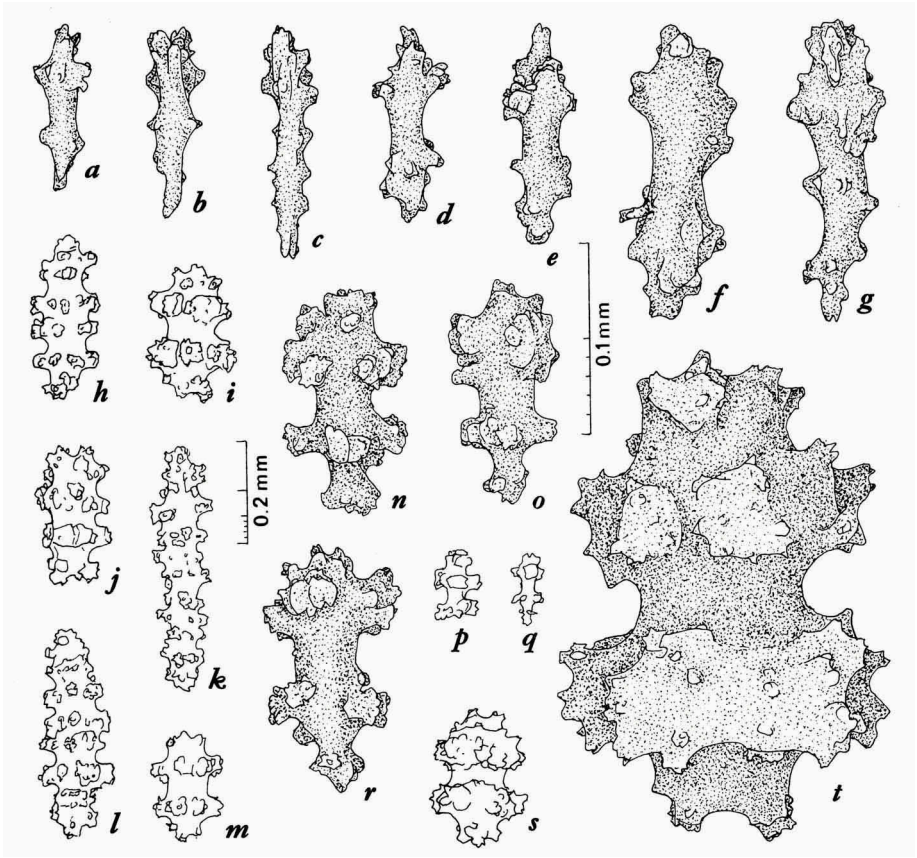

Fig. 25. *Lobophytum laevigatum* Tixier-Durivault, holotype, MNHN. a-g, sclerites from surface layer of the disk; h-m, sclerites from interior of the disk; n-r, sclerites from surface layer of basal part of colony; s and t, sclerites from interior of the basal part of the colony. Enlargement of a-g, n, o, r and t indicated by 0.1 mm scale at e; that of h-m, p, q and s by 0.2 mm scale below i.

Lobophytum lamarcki Tixier-Durivault, 1956

(fig. 26, pls. 12, 13)

Lobophytum lamarcki Tixier-Durivault, 1956: 543; 1958: 139-140, figs. 153, 157, 158; 1966: 79-82, figs. 64-66.

The holotype has diameters of 280 and 250 mm. Consequently, it is too large to be shown at natural size in this paper. I therefore give two photographs; one of these shows the colony at an enlargement of × 0.4 (pl. 12), the other shows a part of the colony at natural size (pl. 13).

The autozooids are only visible at the base of the lobes. Here the distance

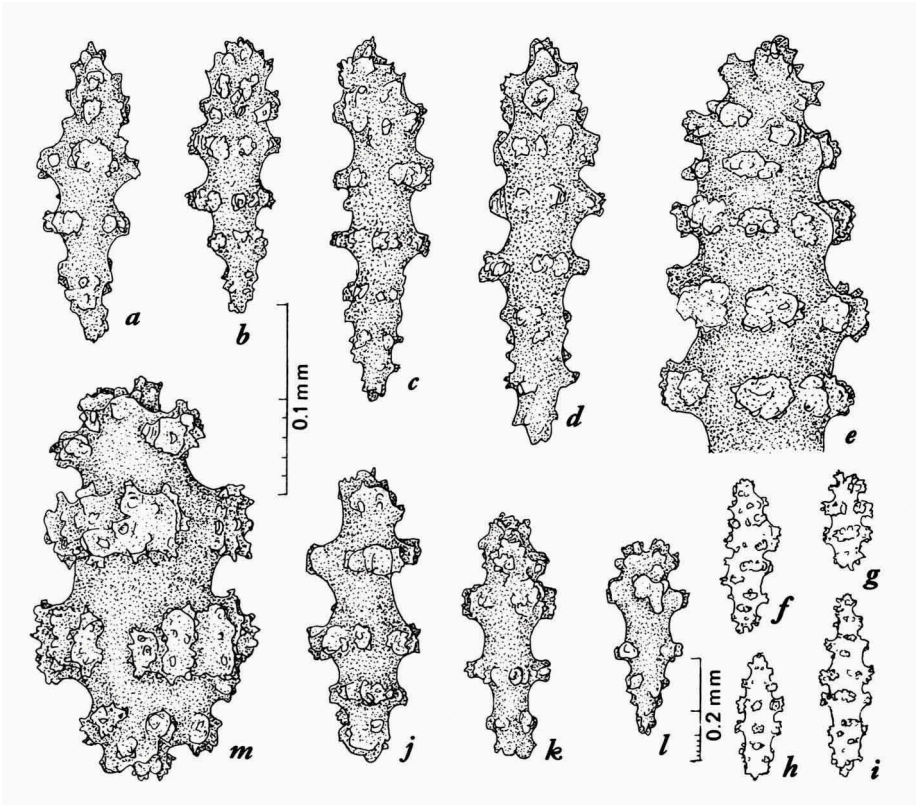

Fig. 26. *Lobophytum lamarcki* Tixier-Durivault, holotype, MNHN. a-d, sclerites from surface layer of a lobe; a-i, sclerites from interior of a lobe; j-l, sclerites from surface layer of the stalk; m, sclerites from interior of the stalk. Enlargement of a-e, j-m indicated by 0.1 mm scale at b; that of f-i by 0.2 mm scale at l.

between them is 1.5 to 2.5 mm. The siphonozooids can hardly be distinguished from the autozooids; their number is one to four between two autozooids.

The surface layer of the lobes contains relatively large clubs, 0.15 to 0.22 mm long (fig. 26a-d); in the middle of the spicule the warts are zoned. In the surface layer of the stalk the clubs are smaller, 0.10 to 0.19 mm (fig. 26j-l).

In the interior of the lobes there are oblong and spindle-shaped, warty spicules, 0.26 to 0.37 mm long (fig. 26e-i); in their middle part they have two to four girdles of warts. The interior of the stalk has capstans, 0.19 to 0.23 mm long and 0.12 to 0.13 mm wide (fig. 26m).

Geographical distribution. — Seychelles.

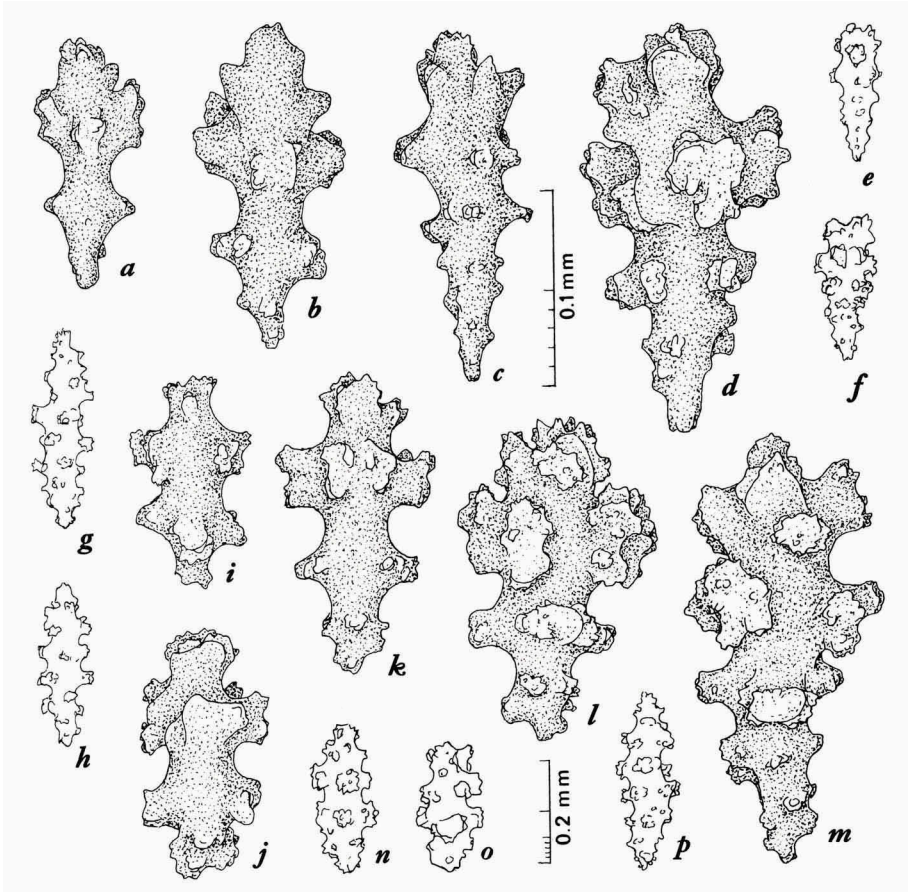

Fig. 27. *Lobophytum latilobatum* Verseveldt, holotype. RMNH Coel. no. 6625. a-f, sclerites from surface layer of a lobe; g, h, spicules from interior of a lobe; i-m, sclerites from surface layer of outside of colony; n-p, sclerites from interior of the base. Enlargement of a-d, i-m indicated by 0.1 mm scale at c; that of e-h, n-p by 0.2 mm scale below l.

Lobophytum latilobatum Verseveldt, 1971

(fig. 27, pl. 14)

Lobophytum latilobatum, Verseveldt, 1971: 21-23, figs. 12, 13, pl. 7 fig. 1.

Pl. 7 fig. 1 in the above-mentioned paper displays the whole colony; the enlargement is × 0.5. Pl. 14 in the present paper shows a part of the colony at full size.

For the polyps I refer to my paper of 1971 (p. 21).

For the sake of making a better comparison of the size of the sclerites with

those of other *Lobophytum* species, I give new drawings of them. The surface layer of the lobes contains clubs, 0.12 to 0.27 mm long (fig. 27a-f). They have distinct heads which rather vary in width, but also in the number and size of the warts. In the interior of the lobes there are spindles, up to 0.42 mm long; they bear high, usually irregularly placed warts (fig. 27g, h).

The surface layer of the outside of the bowl-shaped colony has short, thick, more or less capstan-like rods, 0.10 to 0.13 mm long (fig. 27i, j) and also clubs, 0.11 to 0.19 mm long, usually with wide heads (fig. 27k-m). The sclerites in the interior of the base of the colony are shorter than those in the interior of the lobes. There are capstans, 0.25 to 0.28 mm long (fig. 27n, o) and warty spindles, up to 0.36 mm long (fig. 27p).

Geographical distribution.— Madagascar.

Lobophytum legitimum Tixier-Durivault, 1970

(fig. 28, pl. 15 fig. 1)

Lobophytum legitimum Tixier-Durivault, 1970a: 215-216, figs. 49, 50.

Tixier-Durivault's holotype is part of a colony. It is represented by Tixier-Durivault (1970a: fig. 49). The drawing shows a side-view of the specimen, enlargement × 0.7; in the caption of the drawing the name *Lobophytum planum* must be changed into *Lobophytum legitimum*. Our pl. 15 fig. 1 shows the specimen at full size, seen from above.

On the lobes the autozooids are 1.5 to 2.5 mm apart; at the base of the lobes the distance is up to 3 mm. On the lobes the number of siphonozooids between two autozooids is three to seven, at their base the number is up to nine or ten.

In the surface layer of the lobes the clubs are 0.15 to 0.20 mm long (fig. 28a-d). The handles gradually shift into the heads. In the middle the simple warts and blunt spines are zoned. The surface layer of the stalk contains smaller clubs, 0.09 to 0.15 mm long (fig. 28j-m). In addition to the clubs there are many shuttles, both in lobes and stalk, with low, volcano-shaped, laterally flattened processes; in the lobes they are largest, up to 0.25 mm long.

In the interior of lobes and stalk there are oblong and cylindrical spicules, in the lobes usually 0.25 to 0.32 mm long, in the stalk slightly shorter: 0.20 to 0.26 mm (fig. 28e-i). The shorter ones, about 0.20 mm long, are capstans. The longer ones have four to six or more girdles. In the lobes still longer spicules occur, up to 0.42 mm long (fig. 28i).

Geographical distribution.— New Caledonia.

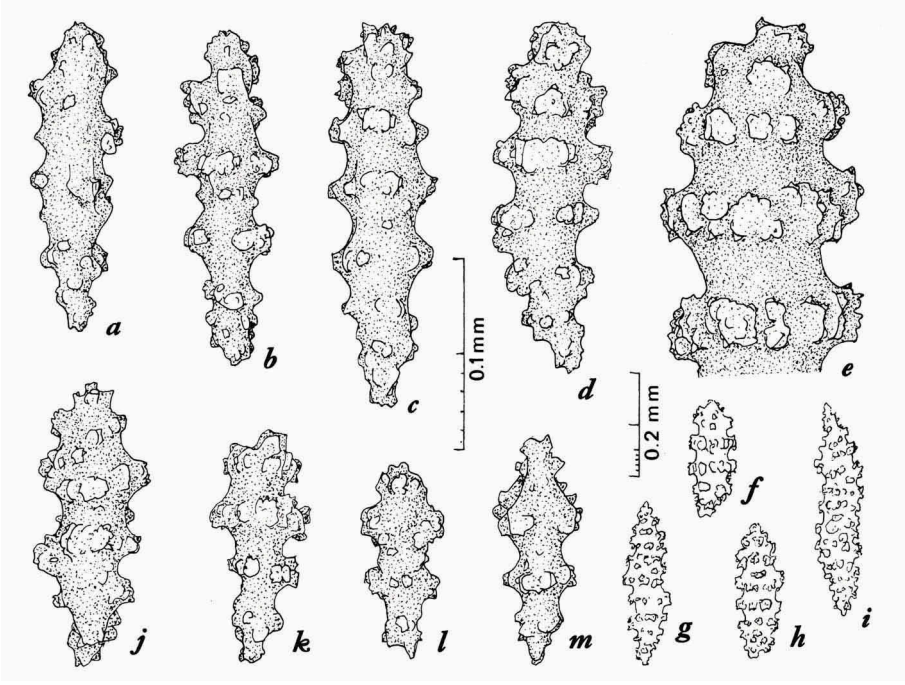

Fig. 28. *Lobophytum legitimum* Tixier-Durivault, holotype, MNHN. a-d, sclerites from surface layer of a lobe; e-i, sclerites from interior of a lobe; j-m, sclerites from surface layer of the stalk. Enlargement of a-e, j-m indicated by 0.1 mm scale at c; that of f-i by 0.2 mm scale at d.

Lobophytum lighti Moser, 1919

(fig. 29)

Lobophytum lighti Moser, 1919: 289-290, fig. 26, pl. 5 figs. 7, 11; Roxas, 1933: 366-367; Macfadyen, 1936: 46-47; Tixier-Durivault, 1956: 543; 1958: 148-150, figs. 170, 173, 174.

Moser's type specimen could not be found in any museum I visited. Fortunately, I could examine the specimen present in the Zoologisk Museum at København, described by Tixier-Durivault in 1958. It was collected at Puerto Galera, Mindoro, Philippines, February 1914, by Dr. Th. Mortensen's Pacific Expedition 1914-15. I found that this specimen does indeed belong to *L. lighti*. It is a pity that the colony is so badly damaged; many lobes are now broken off. For the shape of the colony I must refer to Tixier-Durivault's drawing (1958: fig. 170); in this figure the enlargement is about × 0.6.

The colony is low, encrusting, very soft and fragile. The stalk is about 25 mm high. The central part of the capitulum is rather flat. Along the edge there are many lobes; some of them end in two rounded lobules.

A good number of autozooids protrude above the surface of the lobes and

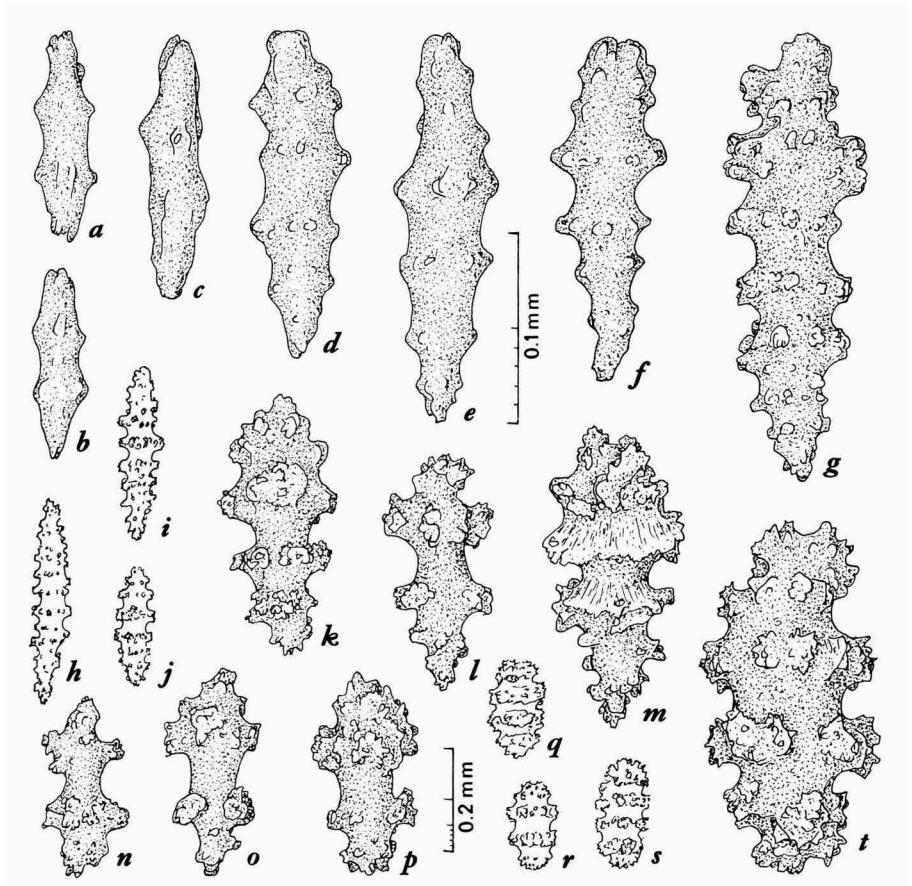

Fig. 29. *Lobophytum lighti* Moser, ZMK. a-g, sclerites from surface layer of a lobe; h-j, sclerites from interior of the disk; k-p, sclerites from surface layer at the base of stalk; q-t, sclerites from interior of the base of the stalk. Enlargement of a-g, k-p and t indicated by 0.1 mm scale at e; that of h-j, q-s by 0.2 mm scale at p.

the disk for a distance of up to 1.60 mm. The openings in which retracted autozooids can be seen, are 0.60 mm wide. On the lobes the centres of the autozooids are 1 mm apart; towards the centre of the disk the mutual distances are 1 to 2 mm. The anthocodiae are free from sclerites, except their distalmost parts, right at the base of the tentacles; here there are sometimes a few rod-shaped spicules, usually 0.05 to 0.06, rarely up to 0.14 mm long.

The distinct siphonozooids show themselves as small, shallow pits (see Moser's pl. 5 fig. 7). On the lobes there is only one siphonozooid between two autozooids; in the centre their number varies from one to five.

The sclerites in the surface layer of the capitulum are of two types: (1) many simple shuttles and spindles, 0.10 to 0.21 mm long, with girdles of low,

cone-shaped prominences (fig. 29a-e), and (2) distinct clubs, 0.17 to 0.25 mm long, with three or more zones of cone-shaped processes or simple warts (fig. 29f, g). In the interior of the disk there are pointed or blunt spindles, up to 0.40 mm long and covered with zoned warts (fig. 29h-j).

The surface layer of the stalk has clubs, quite different from those in the capitulum. They are shorter (0.08 to 0.15 mm) and wider, usually covered with two girdles of rather big warts (fig. 29k-p). In the interior of the stalk there are capstans and ovals or barrels, 0.17 to 0.20 mm long (sometimes longer), with two zones of compound warts and a cluster of warts at each end (fig. 29q-t). Spindles, up to 0.32 mm long, are scarce.

Colour. — The colony is light brown in colour.

Remark. — There is a reasonable resemblance to Moser's description of the type specimen and also to Macfadyen's description of the specimens from Low Isles.

Geographical distribution.— Philippines, Low Isles (Great Barrier Reef).

Lobophytum meandriforme Tixier-Durivault, 1956

(fig. 30, pl. 16)

Lobophytum meandriforme Tixier-Durivault, 1956: 543-544; 1958: 140-141, figs. 154, 159, 160.
Not *Lobophytum meandriforme*, Tixier-Durivault, 1966: 82, figs. 67-69.

The holotype, described by Tixier-Durivault in 1956 and, more fully, in 1958, is broken up into five pieces. The largest fragment has a diameter of 230 mm. Pl. 16 shows a smaller piece, at natural size. The piece represented by Tixier-Durivault (1958: fig. 154, enlargement × 0.5) is now broken in two.

Near the edge of the lobes the distance between two autozooids is 1 to 2 mm. More basally the distance is 4 to 5 mm, on the disk itself sometimes even 10 mm. The number of siphonozooids is large: near the edge of the lobes there are three to four siphonozooids between two autozooids, on the disk about fifteen to twenty.

The surface layer of the lobes contains some clubs, 0.08 to 0.16 mm long (fig. 30a-e). In the middle part the warts are arranged in two zones, which are separated one from the other by a more or less distinct median constriction, the waist. The surface layer also has many small cylindrical or fusiform sclerites (fig. 30f-h), which resemble the clubs, but the accumulations of warts at both ends of the rods are equally large, whereas in the clubs the cluster at one end is larger than at the other. These more or less cylindrical sclerites measure 0.06 to 0.17 mm and more in length. The longest ones become internal spicules, which in most cases consist of two terminal clusters of warts separated by

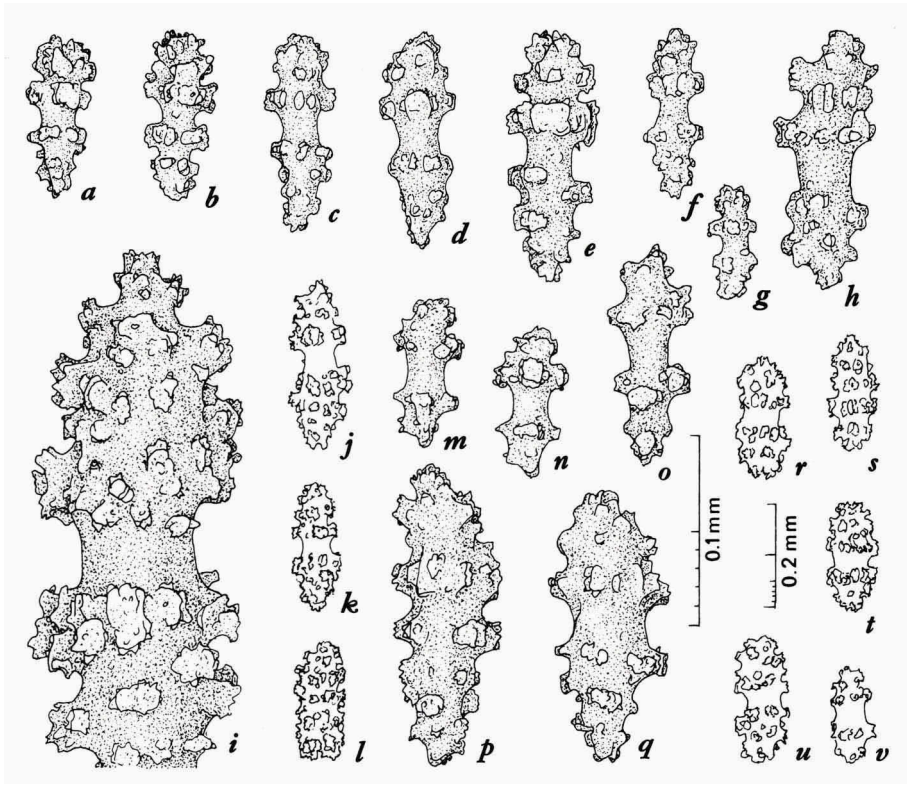

Fig. 30. *Lobophytum meandriforme* Tixier-Durivault, holotype, MNHN. a-h, sclerites from surface layer of a lobe; i-l, sclerites from interior of a lobe; m-q, sclerites from surface layer of the stalk; r-v, sclerites from interior of the stalk. Enlargement of a-i, m-q indicated by 0.1 mm scale at o; that of j-l, r-v by 0.2 mm scale below r.

a rather long waist (fig. 30i-k). Sometimes the warts are irregularly distributed, there is no waist (fig. 30l). The length varies from 0.21 to 0.33 mm.

The surface layer of the stalk contains very few clubs, 0.10 to 0.17 mm long (fig. 30p, q). The heads are often ill-defined, a waist is usually present. In addition to these, there are short rods (fig. 30m-o) and slightly spindle-shaped forms like the one depicted in fig. 30k; they are 0.08 to 0.15 mm long. The sclerites in the interior of the stalk are oblong dumb-bells, usually 0.18 to 0.23 mm long, seldom without a waist (fig. 30r-v).

It appears that the presence of a median waist is a distinct character of nearly all sclerites occurring in the holotype. I therefore seriously doubt the correctness of Tixier-Durivault's identification (1966: 82) of a colony from Madagascar with *L. meandriforme*. Especially the drawings of the internal spicules in the capitulum (her fig. 69A-E) nowhere show the remarkable character just mentioned. The nearly smooth sclerites depicted in her fig. 69G-K do

not occur in the holotype either. It is also noteworthy that in Tixier-Durivault's description (1958: 141) of the holotype the presence of the waist is explicitly stated ("tantôt à étranglement court tantôt à col élevé"), but in her later description (1966) this character is suppressed.

Geographical distribution.— The origin of the holotype is unknown.

Lobophytum michaelae Tixier-Durivault, 1966

(fig. 31, pl. 17 fig. 1)

Lobophytum michaelae Tixier-Durivault, 1966: 71-74, figs. 52-54.

The holotype is in fact a fragment of a colony. Pl. 17 fig. 1 shows the specimen as seen from above and at natural size. Tixier-Durivault's fig. 52 is a drawing of a part of the specimen, also at natural size.

On the lobes the autozooids are 1 to 1.5 mm apart; at the base of the lobes the distance is up to about 2.5 mm. Near the edge of the lobes there are one or two siphonozooids between two autozooids, more basally there are two to five.

In the surface layer of the lobes and of the stalk the clubs are not numerous. In both the length varies from 0.10 to 0.16 mm (fig. 31a-e, k-n). There are also little differences in shape: the heads are indistinct and the warts are zoned.

In the interior of lobes and stalk oval and oblong sclerites occur. In the lobes the length is usually 0.20 to 0.26 mm (fig. 31i, j), but longer sclerites, measuring up to 0.33 mm in length, also occur (fig. 31f-h). The latter are more or less cylindrical, but irregular forms derivable from cylinders are often present. The warts are zoned; a number of four zones is very common. Within the larger sclerites the warts are sometimes irregularly arranged. In the stalk most sclerites are 0.20 to 0.23 mm long (fig. 31r). They have two to four girdles of big warts. Larger, oblong sclerites, up to 0.33 mm long, have also zoned warts or the warts are irregularly distributed (fig. 31o-q).

Geographical distribution.— Madagascar.

Lobophytum microlobulatum Tixier-Durivault, 1970

(fig. 32, pl. 18 fig. 1)

Lobophytum microlobulatum Tixier-Durivault, 1970a: 225, 226, figs. 63, 64.

The (holo-)type of this species is shown in Tixier-Durivault's fig. 63; the enlargement is approximately × 0.6. Pl. 18 fig. 1 shows the same colony at full size.

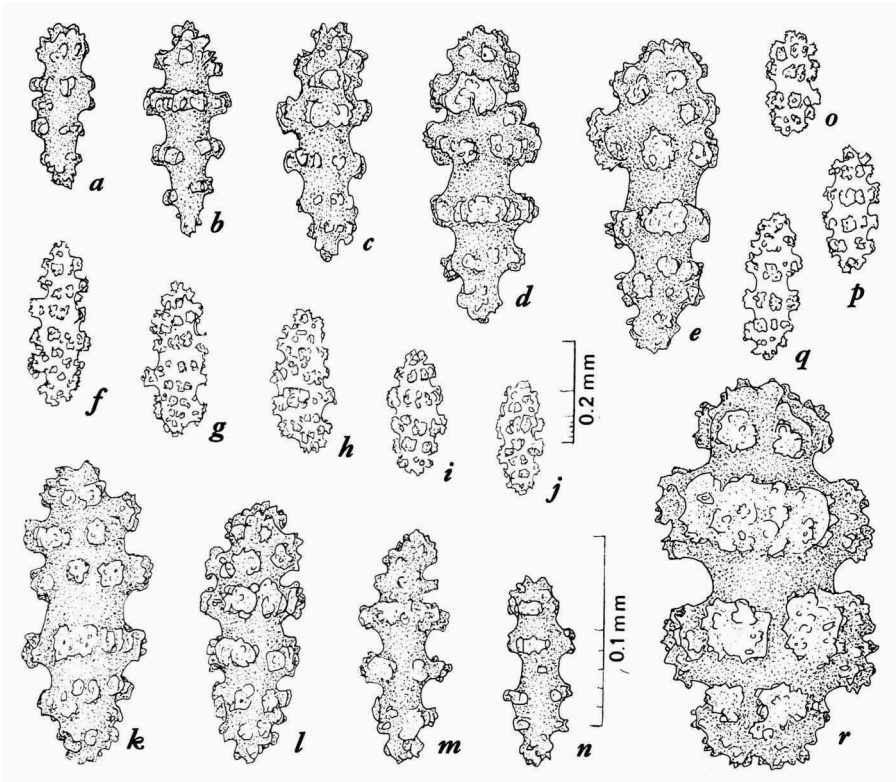

Fig. 31. *Lobophytum michaelae* Tixier-Durivault, holotype, MNHN. a-e, sclerites from surface layer of a lobe; f-j sclerites from interior of a lobe; k-n, sclerites from surface layer of the stalk; o-r, sclerites from interior of the stalk. Enlargement of a-e, k-n and r indicated by 0.1 mm scale at n; that of f-j, o-q by 0.2 mm scale at j.

The lobes of the dried specimen are so shrivelled that the difference between the autozooids and siphonozooids is not visible and I am not accountable for Tixier-Durivault's remarks on this subject. But a distance of 0.035 mm between the autozooids must be an error.

The surface layer of the lobes contains clubs, 0.10 to 0.20 mm long, with indistinct heads; the handles have two, sometimes ill-defined median zones of warts (fig. 32a-g). In addition to these clubs, there are many, nearly smooth, longitudinally striated shuttles, 0.09 to 0.17 mm long. The interior of the lobes contains rods and spindles, usually 0.20 to 0.25 mm long (fig. 32h, i). Longer spicules (up to 0.32 mm) are very scarce, at least in my preparations. In the middle of the sclerites the warts are arranged in two zones, which in many cases are ill-defined.

The clubs in the surface layer of the stalk are shorter; the majority is 0.12 to 0.17 mm long (fig. 32j-m). The interior of the stalk has capstans, 0.16 to 0.21

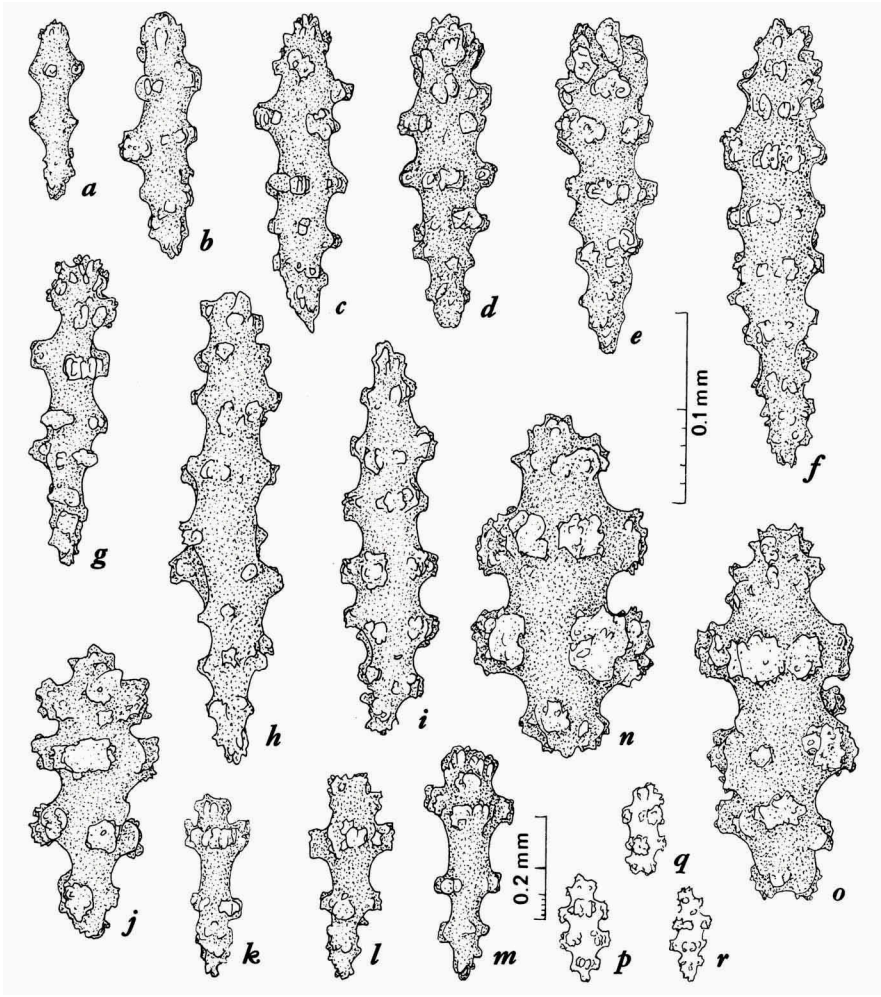

Fig. 32. *Lobophytum microlobulatum* Tixier-Durivault, holotype, MNHN. a-g, sclerites from surface layer of a lobe; h, i, sclerites from interior of a lobe; j-m, sclerites from surface layer of the stalk; n-r, sclerites from interior of the stalk. Enlargement of a-o indicated by 0.1 mm scale at e; that of p-r by 0.2 mm scale at m.

mm long, with two zones of compound warts and two terminal clusters (fig. 32n-r). Some of these sclerites are regular in shape (fig. 32n, p), others have straggling shapes with more irregularly disposed warts (fig. 32o, q, r).

In respect of the shape and the smallness of the sclerites this species shows a close resemblance to *L. microspiculatum*, but the shape of the lobes is quite different.

Geographical distribution.— New Caledonia.

Lobophytum microspiculatum Tixier-Durivault, 1956

(fig. 33, pl. 17 fig. 2)

Lobophytum microspiculatum Tixier-Durivault, 1956: 544; 1958: 177-178, figs. 200, 213, 214; 1966: 98-101, figs. 91-93; Verseveldt, 1974a: 3-5, fig. 1, pl. 1.

Tixier-Durivault's drawing (1958: fig. 200) shows a part of the holotype; the enlargement is × 0.7. Pl. 17 fig. 2 represents the colony at natural size.

On the lobes the distance between the centres of the autozooids is 1 to 2 mm; more basally the distance is up to 3 mm. Between two autozooids there are one to three siphonozooids; towards the base the number presumably increases, but in the dried specimen this is difficult to see.

All sclerites, except the smooth spindles mentioned below, have two median girdles of warts.

The sclerites in the surface layer of the lobes are clubs and spindles, 0.11 to 0.20 mm long (fig. 33a-f). The clubs have narrow heads; they often look like spindles with one end slightly wider. The interior of the lobes contains fusiform sclerites, which are either warty or smooth. The former are 0.23 to 0.30 mm long; the longer they are, the narrower and more spiky (fig. 33g, h, j). The smooth shuttles are 0.10 to 0.19 mm long; they are finely striated longitudinally (fig. 33i, k).

In the surface layer of the stalk there are few spindles and very few clubs: usually the latter hardly differ from the former. The length is 0.09 to 0.16 mm (fig. 33l-o). The interior of the stalk has short and thick capstans, 0.13 to 0.17 mm long, with two median girdles of simple or compound warts and two terminal cluster of prominences (fig. 33p-r).

Geographical distribution.— Madagascar, Red Sea.

Lobophytum mirabile Tixier-Durivault, 1956

(fig. 34, pl. 19)

Lobophytum mirabile Tixier-Durivault, 1956: 544; 1958: 164-167, figs. 196, 201, 202; 1966: 96, figs. 85-87.

Tixier-Durivault's (1958) fig. 196 is a drawing of a part of the holotype; the enlargement is × 0.7. Pl. 19 shows the whole colony at full size.

On the distal parts of the lobes the badly visible autozooids are 1.0 to 1.8 mm apart; more basally the distance is up to 3 mm. The number of siphonozooids is one or two and one to four, respectively.

In the surface layer of the lobes the clubs are 0.10 to 0.22 mm long (fig. 34a-f). The small ones have blunt thorns, the larger ones have warts; in both the

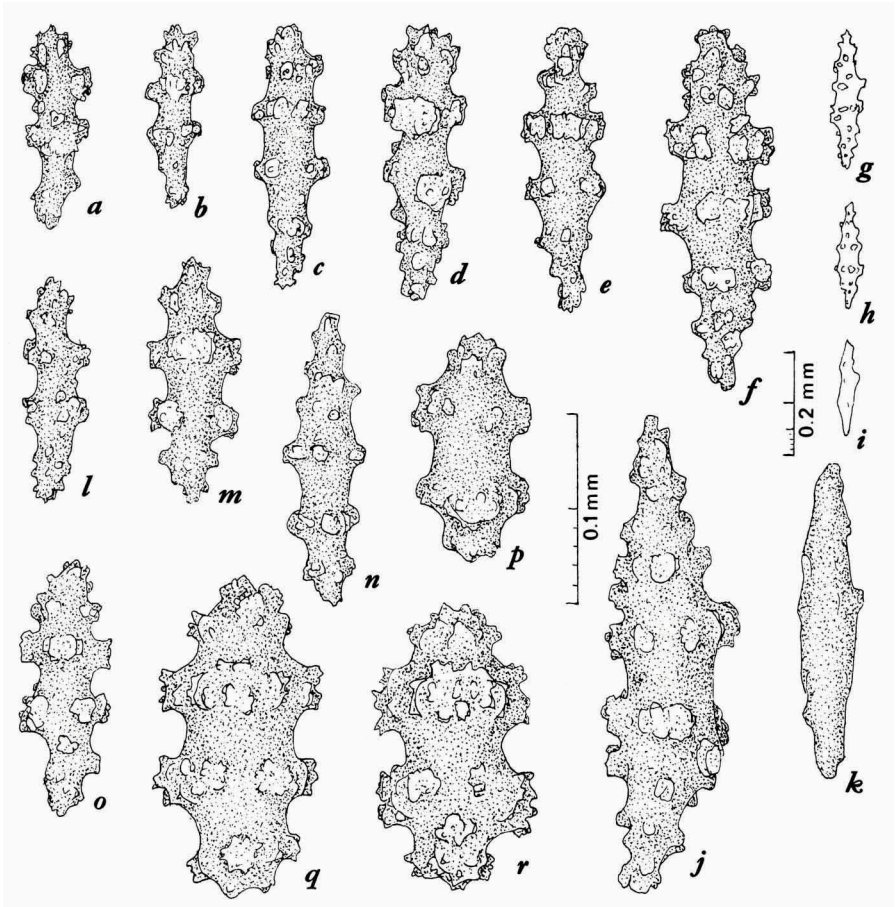

Fig. 33. *Lobophytum microspiculatum* Tixier-Durivault, holotype, MNHN. a-f, sclerites from surface layer of a lobe; g-k, sclerites from interior of a lobe; l-o, sclerites from surface layer of the stalk; p-r, sclerites from interior of the stalk. Enlargement of a-f, j-r indicated by 0.1 mm scale at p; that of g-i by 0.2 mm scale at f.

processes are arranged in whorls. The interior of the lobes contains thorny and warty spindles, 0.15 to 0.30 mm long (fig. 34g, h). The processes are either irregularly placed or in girdles.

The clubs in the surface layer of the stalk are shorter, measuring 0.08 to 0.17 mm in length (fig. 34i-l). Besides these clubs there are rod- and spindle-shaped spicules, 0.09 to 0.14 mm long, with two median girdles of prominences and a few of these on the ends. The interior of the stalk has barrels, capstans and spindles. The barrels and capstans are 0.15 to 0.20 mm long (fig. 34m, n, q), the spindles measure 0.15 to 0.32 mm in length (fig. 34o, p); the warts are spiny.

Geographical distribution. — Pacific Ocean, Madagascar.

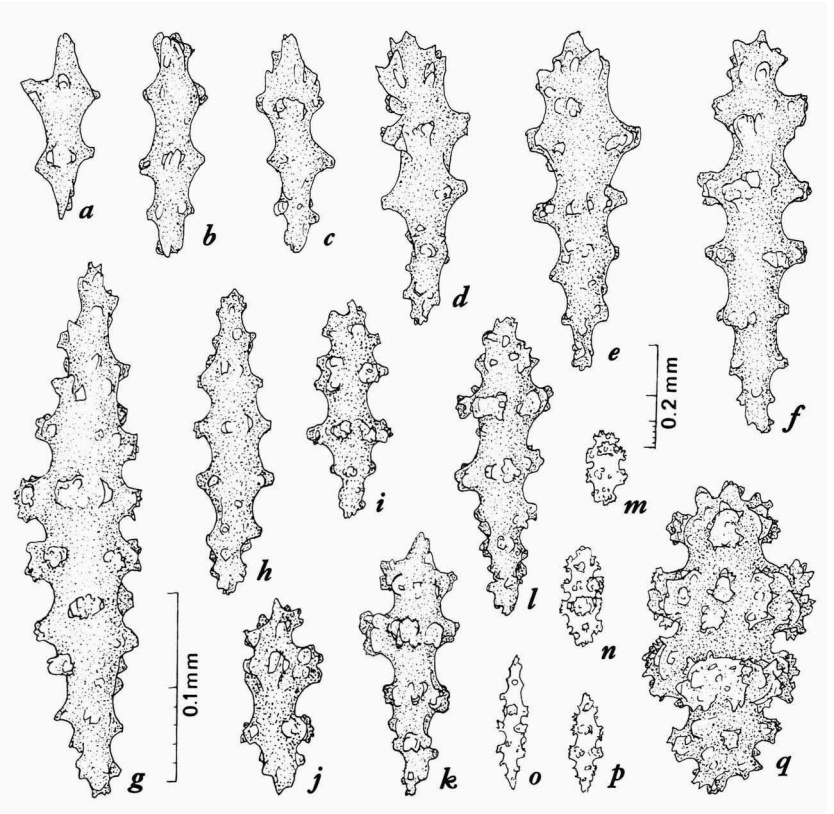

Fig. 34. *Lobophytum mirabile* Tixier-Durivault, holotype, MNHN. a-f, sclerites from surface layer of a lobe; g, h, sclerites from interior of a lobe; i-l, sclerites from surface layer of the stalk; m-q, sclerites from interior of the stalk. Enlargement of a-l and q indicated by 0.1 mm scale at g; that of m-p 0.2 mm scale at m.

Lobophytum patulum Tixier-Durivault, 1956

(fig. 35, pl. 20)

Lobophytum patulum Tixier-Durivault, 1956: 545; 1958: 114-116, figs. 120, 123, 124; 1966: 66-69, figs. 46-48.

The dried, dish-shaped holotype is represented in Tixier-Durivault's (1958) fig. 120; the enlargement is about × 0.55. Pl. 20 shows part of the colony at natural size.

The difference between autozooids and siphonozooids usually is hardly visible. The distance between two autozooids is presumably 0.5 to 1.0 mm. The number of siphonozooids between two autozooids is problaby one or two.

The surface layer of the disk contains (1) rods, 0.09 to 0.12 mm long, with

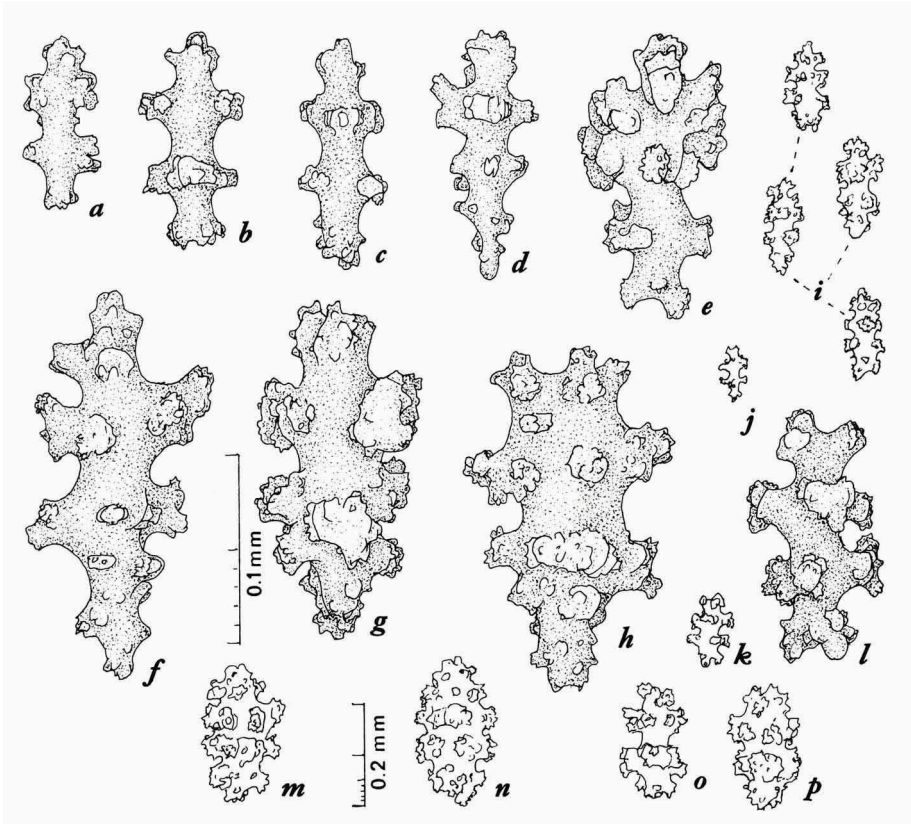

Fig. 35. *Lobophytum patulum* Tixier-Durivault, holotype, MNHN. a-h, sclerites from surface layer of the disk; i, sclerites from interior of the disk; j-l, sclerites from surface layer of the outside of the disk; m-p, sclerites from the interior of the base of the colony. Enlargement of a-h and l indicated by 0.1 mm scale at f; that of i-k, m-p by 0.2 mm scale at m.

two zones of warts and two terminal warts (fig. 35a-c), (2) clubs, 0.13 to 0.22 mm long (fig. 35d-h). These clubs are usually rather irregular in shape; the warts are sometimes arranged in girdles. The sclerites in the interior of the disk are oval and oblong bodies, 0.16 to 0.26 mm long, with two or three whorls of warts (fig. 35i).

In the surface layer on the outside of the raised border of the colony (as a matter of course a "stalk" is absent) clubs are lacking. The sclerites are rods with two zones of large, high warts and a few terminal ones (fig. 35j-l); the length is 0.10 to 0.17 mm. The interior of the basal portion of the colony has capstans and thick, oval bodies, 0.22 to 0.30 mm long (fig. 35m-p). The warts are arranged in two distinct zones plus terminal clusters, or they are irregularly distributed.

Geographical distribution.— Madagascar.

Lobophytum pauciflorum (Ehrenberg, 1834)

(figs. 36, 37, pl. 21 figs. 1, 2, pl. 22)

Lobularia pauciflora Ehrenberg, 1834: 58.
Alcyonium pauciflorum, Dana, 1846: 616- 617.
Sarcophytum pauciflorum, Klunzinger, 1877: 29, pl. 2 fig. 2; Ridley, 1883: 252.
Lobophytum pauciflorum, Von Marenzeller, 1886: 366-367; Studer, 1894: 122-123; Hickson & Hiles, 1900: 505; Pratt, 1905: 253; Thomson & Henderson, 1906: 421; Thomson & Mackinnon, 1910: 175 (listed only); Kükenthal, 1913: 11; Lüttschwager, 1914: 32-34; Moser, 1919: 277-281, fig. 19, pl. 5 figs. 3-6; Thomson & Dean, 1931: 69; Roxas, 1933: 367-368; Macfadyen, 1936: 47-48, pl. 3 fig. 1; Utinomi, 1953: 156, fig. 4a-e, pl. 8 fig. 6; 1971: 89, fig. 1, pl. 15 fig. 2; 1977: 20; Tixier-Durivault, 1956: 545-546; 1958: 127-130, figs. 138, 141, 142; 1970a: 217-218; 1970b: 127-128; Verseveldt, 1960: 218-220; 1965: 30-31; 1971: 15; 1974b: 95 (listed only); 1977a: 3 (listed only); 1977b: 173 (listed only); 1978: 49 (listed only).
Lobophytum pauciflorm var. *validum* Von Marenzeller, 1886: 366-368, pl. 9 fig. 12; ? Whitelegge, 1897: 216; Lüttschwager, 1914: 34; Moser, 1919: 281, fig. 20; Macfadyen, 1936: 48.
Lobophytum madreporoides Ridley, 1887: 225-227, pl. 17 figs. 7-12.
Alcyonium "rigidum Dana", May, 1899: 109, pl. 5 fig. 5a-c.
Lobophytum candelabrum Roule, 1908: 177-179, pl. 7 figs. 6-9; Thomson & Dean, 1931: 65.
Lobophytum pauciflorum var. *philippinense* Moser, 1919: 281-282, fig. 21; Roxas, 1933: 368; Tixier-Durivault, 1957: 106; 1958: 130.
Lobophytum chevalieri Tixier-Durivault, 1970a: 218-220, figs. 51-53.
Not *Lobophytum pauciflorum*, Pratt, 1903: 515-516, pl. 28 fig. 7, pl. 29 figs. 12-14; Gravely, 1927: 27, pl. 5 fig. 4.
Not *Alcyonium submurale* Ridley, 1883: 251-252.

Moser (1919: 277) recorded that among the forty-five specimens of *L. pauciflorum* which he examined, there were three colonies from the Red Sea, collected by Hemprich and Ehrenberg, and kept in the Berlin Museum, register numbers 295, 296 and 297. I had the good fortune to find one of these specimens in the museum mentioned,viz. no. 296. It is represented in pl. 21 fig. 2 at full size. I designate this specimen as the lectotype.

The colony is low, encrusting. The capitulum is rather flat. The lobes are erect, compactly disposed, digitiform, often flattened laterally; sometimes they are fused at their base, forming crests. Distally they often seem to have developed as the result of the fusion of two, sometimes three lobes. The width is on the average 5 mm, the height is 15 to 20 mm.

The autozooids are very distinct. On the summits of the lobes they are 1.5 to 2.00 mm apart; on the sides the distance is 2.50 to 4.00 mm. The siphonozooids are also distinct. On the tips of the lobes there are two or three between two autozooids, on the sides the number is six and more.

In the surface layer of the lobes the majority of the sclerites are fusiform, 0.10 to 0.21 mm long. Some of them are shuttles with cone-shaped prominences, which are arranged in two or more girdles (fig. 36a-c). Others are spindles with zones of warts (fig. 36e, g-j). But there are also some sclerites which are

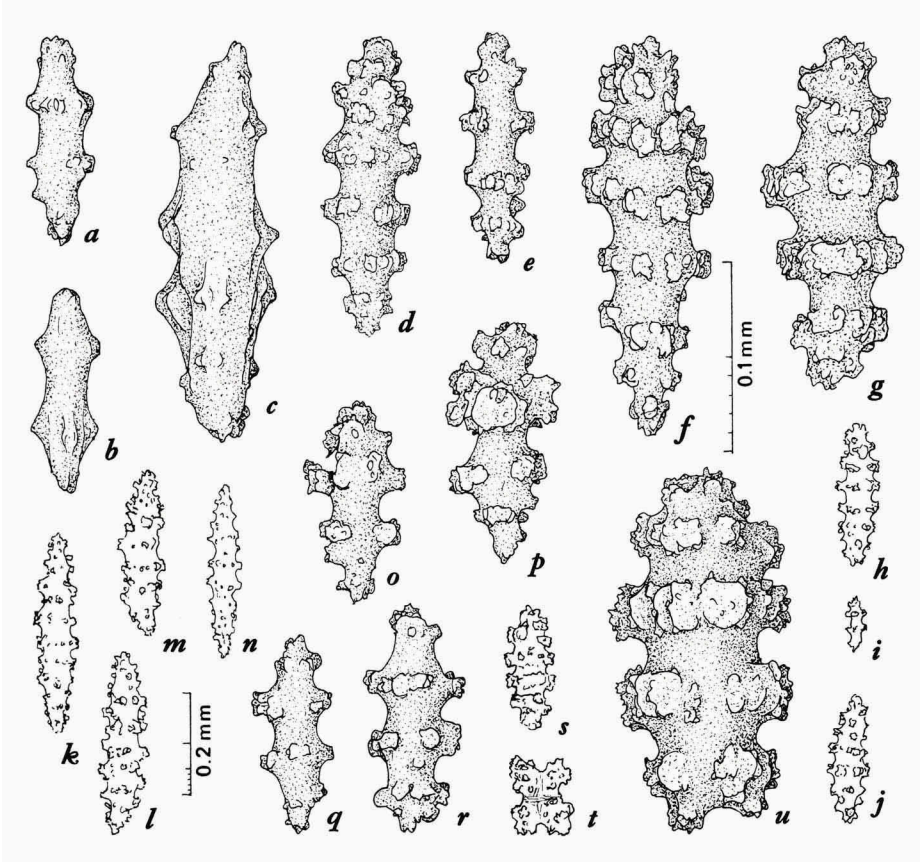

Fig. 36. *Lobophytum pauciflorum* (Ehrenberg), lectotype, ZMB No. 296. a-j, sclerites from surface layer of a lobe; k-n, sclerites from interior of a lobe; o-r, sclerites from surface layer of the stalk; s-u, sclerites from interior of the stalk. Enlargement of a-g, o-r and u indicated by 0.1 mm scale at f; that of h-j, k-n, s and t by 0.2 mm scale at l.

slightly club-shaped, with an accumulation of warts at one end and for the rest covered with zones of warts (fig. 36d, f). In the interior of a lobe there are spindles, 0.25 to 0.40 mm long and 0.09 to 0.10 mm wide (fig. 36k-n). Most of them are pointed. They are ornamented with warts, which are arranged in a number of zones. In the middle part of the spicule these zones are most distinct.

The surface layer of the stalk contains few, warty clubs; their length is 0.10 to 0.13 mm (fig. 36o, p). The majority of the sclerites are short, wide spindles, 0.09 to 0.15 mm long, with two zones of warts (fig. 36q, r). The stalk interior is provided with capstans and cylindrical or fusiform sclerites, the bulk of which are 0.20 to 0.24 mm long, sometimes the length is 0.18 mm and 0.26 mm; the width is 0.08 to 0.10 mm (fig. 36s, u). They have two to four girdles of com-

pound warts. Four-rayed crosses are common (fig. 36t).

In the Viennese Museum I found Von Marenzeller's (1886: 367) type specimen of *L. pauciflorum* var. *validum* (pl. 22); the register number is C 2340, the locality is Tonga Is. According to Von Marenzeller, it differs from the type specimen by the spiculation. I examined Von Marenzeller's variety. In the surface layer of the lobes there are more clubs; their length is 0.10 to 0.15 mm. In the interior of the lobes the spindles are up to 0.40 mm long, sometimes up to 0.44 mm; the width is 0.10 to 0.14 mm. The surface layer of the stalk has numerous small clubs, 0.07 to 0.09 mm long, sometimes 0.10 to 0.15 mm. In the interior of the stalk the capstans are 0.20 to 0.24 mm, rarely 0.26 mm long. So we see that the differences in spiculation with the lectotype are insignificant. For the shape and size of the lobes, see below.

I have also had an opportunity to examine Moser's (1919) type specimens of *L. pauciflorum* var. *philippinense*. They are kept in the Zoological Museum of Wroclaw University, catalogue no. 76 (see Wiktor, 1974: 31). Pl. 21 fig. 1 shows the largest colony; a metal label bears the number C-2401. The specimen has a length of 80 mm, a width of 50 mm, a height of 60 mm. Its colour is dark greyish brown. The lobes are rather slender. The autozooids are 1.10 to 2.20 mm apart; the number of siphonozooids between two autozooids varies from one to five.

In the surface layer of lobes and stalk most sclerites are clubs, 0.10 to 0:19 mm long (fig. 37b-e, i-l). Just as in the lectotype described above, the heads are weakly developed, in many cases the clubs are hardly distinguishable from spindles.

The spindles occurring in the interior of the lobes do not differ from those in the lectotype and, remarkably enough, the same applies to the capstans in the interior of the stalk: both in the lectotype and in the type specimen of the variety *philippinense* the capstans have the same length, viz. 0.18 to 0.23 mm. This fact is all the more remarkable because Moser (1919) used the length of these capstans as a distinguishing character between *L. pauciflorum* and the var. *philippinense*, see Moser, 1919: 262 (two times), 281.

Moser (1919: 282) recorded a second colony belonging to his var. *philippinense*. This colony is also present in the Wroclaw Museum, catalogue no. 76; a metal label bears the number C-2237. In this colony the sclerites differ in some respects. In the surface layer of the stalk the majority of the small sclerites are not clubs but rods, 0.10 to 0.15 mm long, with usually two girdles of prominences; clubs with one end slightly expanded occur sporadically. In the interior of the stalk the capstans are 0.15 to 0.20 mm long; those with a length of 0.15 to 0.17 mm are most common. So in this specimen they are shorter than 0.22 mm.

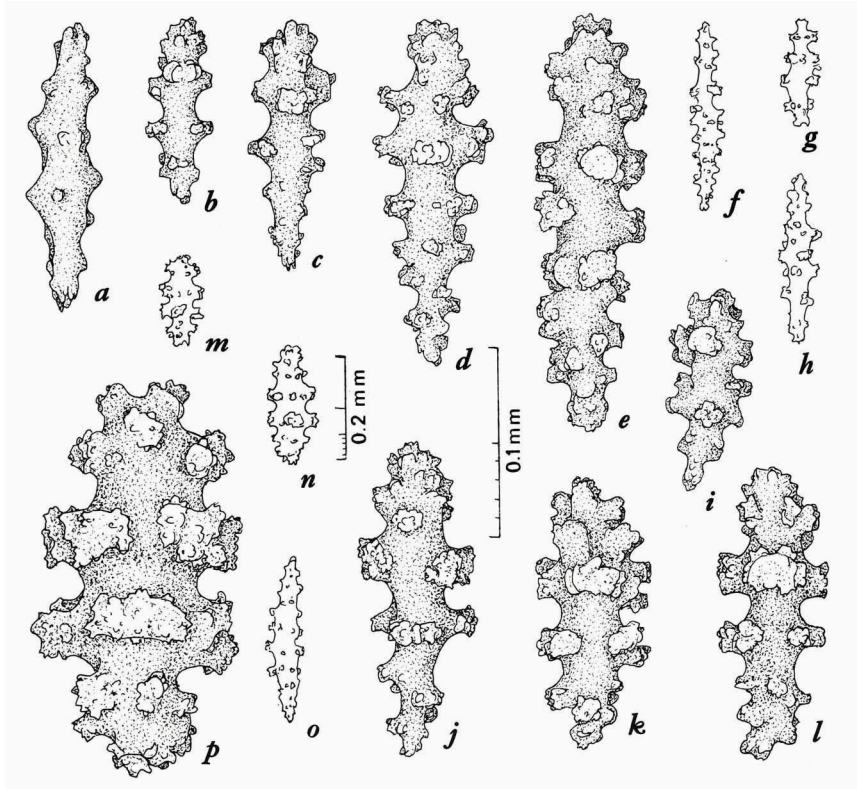

Fig. 37. *Lobophytum pauciflorum* (Ehrenberg), one of Moser's syntypes of *"L. pauciflorum* var. *philippinense"*, ZMWr No. 76. a-e, sclerites from surface layer of a lobe; f-h, sclerites from interior of a lobe; i-l, sclerites from surface layer of the stalk; m-p, sclerites from interior of the stalk. Enlargement of a-e, i-l and p indicated by 0.1 mm scale at d; that of f-h, m-o by 0.2 mm scale at n.

Summarizing we see that in the lectotype, in the var. *validum* and in the var. *philippinense* the sclerites show only small differences.

But what about the shapes and dimensions of the lobes? When looking at the photographs of the colonies (pls. 21 and 22), we immediately see striking differences. Moser (1919: 278-280) already pointed out this phenomenon.

The colony of the var. *philippinense*, represented in pl. 21 fig. 1, has slender, tapering lobes; the distal part is 3 to 4 mm wide. In the var. *validum* (pl. 22) the rounded lobes widen distally, the width is 8 to 10 mm. The lectotype from the Red Sea (pl. 21 fig. 2) has lobes which are intermediate between these two forms, the width is about 4 to 6 mm. Between these types transitional forms are found. So the shape and the width of the lobes is variable; in one and the same habitat colonies with and without tapering lobes occur. A constant character of the species is, however, the presence of erect, finger-like lobes, usually arising singly from the capitular surface, but also two to four lobes may

arise from a common ridge.

Our conclusion must be that the names of the varieties *validum* and *philippinense* must be abandoned.

It is clear that *L. madreporoides* Ridley, 1887, and *L. candelabrum* Roule, 1908, are synonyms of *L. pauciflorum*.

Alcyonium rigidum Dana, 1846, is now called *Sinularia rigida*. The colony from Jaluit, identified with *A. rigidum* by May (1899: 109) must be referred to *L. pauciflorum*.

The colonies referred to *L. pauciflorum* by Pratt (1903: 515) must be assigned to *L. crassum* Von Marenzeller.

The colony from Krusadai Island, wrongly identified with *L. pauciflorum* by Gravely (1927: 27), has flattened lobes; the picture of that colony (his pl. 5 fig. 4) is not at all like a colony of *L. pauciflorum*.

The colony of *L. chevalieri* Tixier-Durivault (1970a, fig. 51) shows a close resemblance to that of *L. pauciflorum*. The spiculation, too, corresponds with that of the latter. The high stalk is not sufficient reason for describing a new species; according to my observations, the height of the stalk is variable in *L. pauciflorum*. The specifie name *chevalieri* must be dropped.

Lüttschwager (1914: 34), Moser (1919: 227) and Tixier-Durivault (1958: 127) considered *Alcyonium submurale* Ridley, 1883, a synonym of *L. pauciflorum*. I do not agree with these authors, for *A. submurale* has "low ridges, which rise between the centre and the edge, gradually increasing in height towards the latter, but not attaining an altitude of more than an inch or two" (Ridley, 1883: 251). Ridley nowhere mentions digitiform lobes, he only records ridges and laminae. He compared his specimens with Dana's *A. murale*. The species "seems to differ mainly in the great height of the radiating ridges which there, as here, crow the disc; here, however, they are quite small, even in large specimens" (Ridley, 1883). A glance at Dana's pl. 58 fig. 3 immediately shows that Ridley's specimen cannot be *L. pauciflorum*.

In the course of years I have seen many colonies which I identified with *L. pauciflorum*. I found that in some respects there is a distinct variability. The erect, finger-like lobes may be more or less densely placed, firm or weak and flexible, with rounded or pointed summits, up to about 40 mm high and of a variable width. The clubs in the surface layer of the lobes may be scarce or even nearly absent; short spindles predominate. The length of the spindles in the interior of the lobes may be up to 0.45 mm. The length of the capstans in the stalk is usually 0.22 to 0.26 mm, but in some colonies the length is up to 0.30 mm, whereas in others most capstans are 0.15 to 0.20 mm long. In addition to these capstans, in the stalk of many colonies spindles are found, 0.35 to 0.40 mm long.

Geographical distribution. — The species is wide-spread in the warm Indo-West Pacific seas.

Lobophytum planum Tixier-Durivault, 1970

(fig. 38, pl. 23 fig. 1)

Lobophytum planum Tixier-Durivault, 1970a: 213-215, figs. 47, 48.

The holotype is figured by Tixier-Durivault (1970a: fig. 47, enlargement × 0.75) and in our pl. 23 fig. 1 at natural size.

On the lobes the autozooids are 1 to 2 mm apart, but on the surface of the disk the distance is up to 7 mm. The number of siphonozooids between two autozooids corresponds with the distance mentioned: on the lobes their number is two or three, on the disk between the lobes five to nine.

The surface layer of the lobes contains clubs, 0.10 to 0.21 mm long (fig. 38a-f). The heads of the larger clubs (fig. 38e, f) have heads with small prominences directed upwards. The handles bear a few girdles of small warts and blunt thorns. In the interior of the lobes there are capstans, cylinders and more or less spindle-shaped sclerites (fig. 38g-j). The smaller ones, 0.15 to 0.18 mm long, have two girdles of warts and terminal clusters. Longer, oblong forms, 0.22 to 0.25 mm long, may have three or four, often indistinct girdles. In still longer sclerites, up 0.31 mm, the warts are usually irregularly distributed (fig. 38j).

The surface layer of the outside of the more or less dish-shaped colony has clubs, 0.08 to 0.14 mm long (fig. 38k-n), so they are smaller than those in the disk surface. They have two or three zones of small warts and blunt thorns. The interior of the basal part of the specimen contains barrels and capstans, 0.17 to 0.24 mm long; the majority is 0.18 to 0.21 mm long (fig. 38o, p, r-t). The warts form zones and terminal clusters. Longer sclerites, up to 0.32 mm long, often have irregularly distributed warts (fig. 38q); sometimes these longer sclerites are spindle-shaped.

Geographical distribution.— New Caldedonia.

Lobophytum proprium (Tixier-Durivault, 1970)

(fig. 39, pl. 28 fig. 1)

The colony was referred to the genus *Sarcophyton* by Tixier-Durivault (1970a: 233). A closer examination of it and of Tixier-Durivault's drawing (1970a: fig. 70) and our photograph (pl. 28 fig. 1) revealed that the specimen

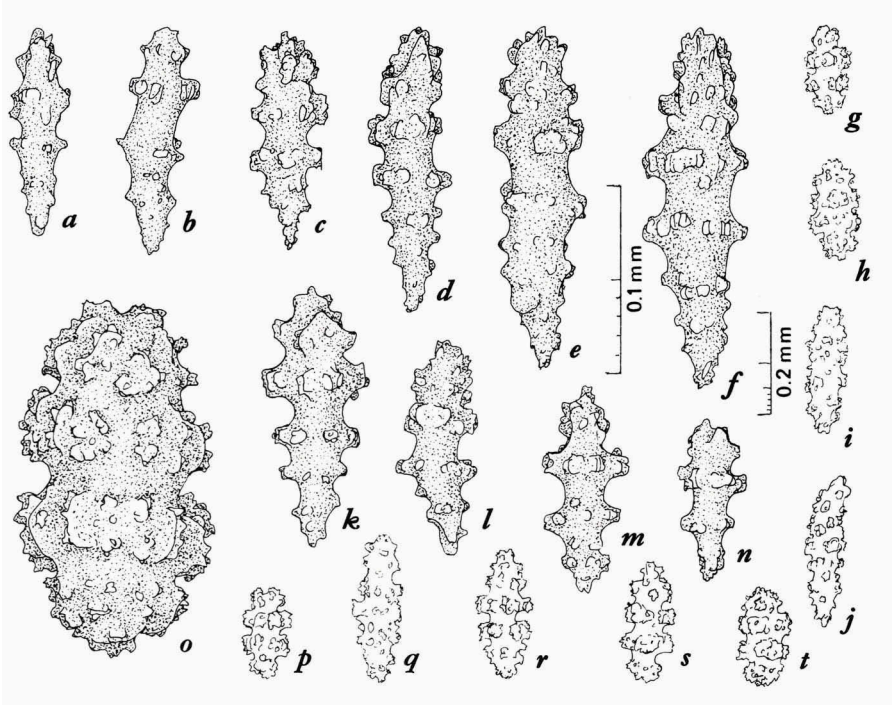

Fig. 38. *Lobophytum planum* Tixier-Durivault, holotype, MNHN. a-f, sclerites from surface layer of a lobe; g-j, sclerites from interior of a lobe; k-n, sclerites from surface layer of the outside of the plate-like colony; o-t, sclerites from the interior of the base of the colony. Enlargement of a-f, k-o indicated by 0.1 mm scale at e; that of g-j, p-t by 0.2 mm scale at f.

must be assigned to the genus *Lobophytum*, as the capitulum consists of densely placed, closed lobes, not of open folds as in *Sarcophyton*. The height of the colony is 40 mm, the maximum width of the capitulum is 33 mm. The enlargement of the colony in Tixier-Durivault's fig. 70 is × 0.85. Our pl. 28 fig. 1 shows it at natural size; I regard this colony as the holotype.

The openings left by the retracted autozooids are comparatively large, the centres are 0.5 to 1.0 mm apart. Between two autozooids there are one or two siphonozooids.

The sclerites widely differ from those in other species. In the surface layer of the lobes two principal forms of sclerites may be distinguished: (1) clubs, 0.07 to 0.13 mm long, with low conical processes or simple warts, which are sometimes zoned (fig. 39a, b) and (2) cylinders (fig. 39e) or more or less shuttle-shaped forms (fig. 39h), smooth or nearly smooth except at one or both ends, the latter covered with a number of low cones or small tubercles (fig. 39c-h). The length is up to about 0.25 mm. Between these main types there are intermediate forms, e.g. clubs, 0.18 mm long, with heads consisting of some

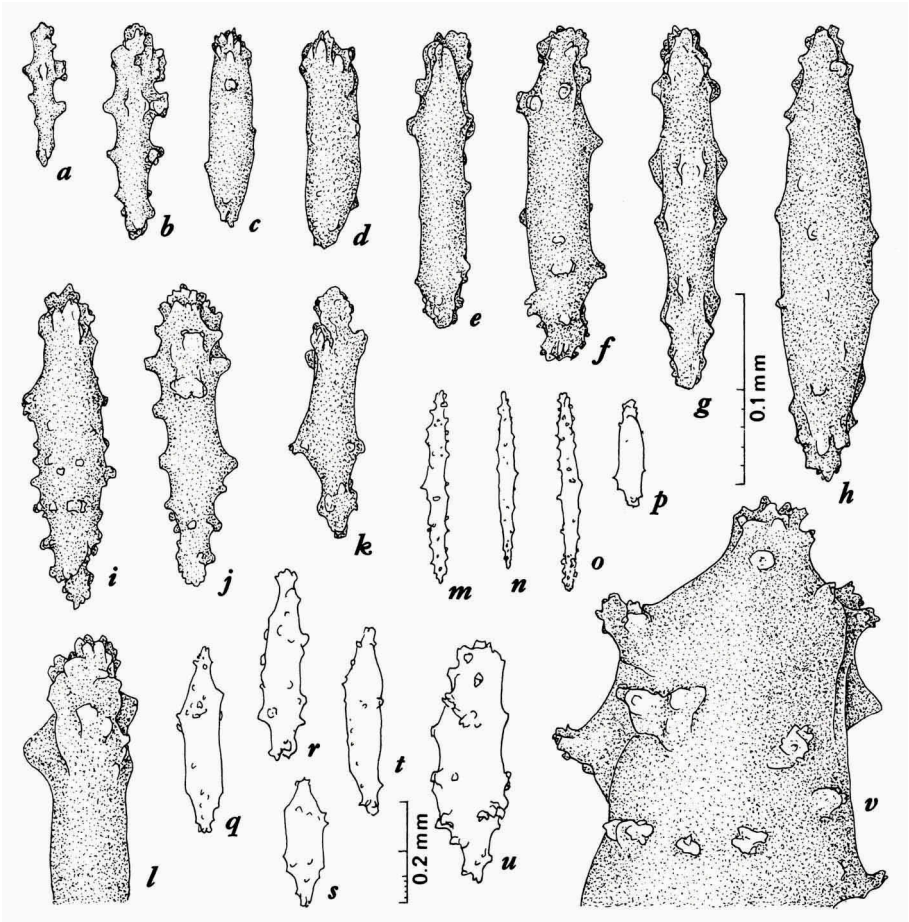

Fig. 39. *Lobophytum proprium* (Tixier-Durivault), holotype, MNHN. a-h, sclerites from surface layer of a lobe; i-l, sclerites from surface layer of the stalk; m-p, sclerites from interior of a lobe; q-v, sclerites from interior of the stalk. Enlargement of a-l and v indicated by 0.1 mm scale at g; that of m-u by 0.2 mm scale at t.

tubercles and nearly smooth handles. Neither is there a sharp distinction between sclerites from the surface layer and those from the interior of the lobes. The latter are slender rods and spindles, up to 0.45 mm long, usually with an accumulation of processes at both ends (fig. 39m-o); further there are nearly smooth ovals (fig. 39p).

The surface layer of the stalk contains clubs (fig. 39j, l) and other forms of sclerites (fig. 39i, k), usually 0.11 to 0.20 mm long; they are often nearly smooth. The interior has wide sclerites, up to 0.50 mm long, irregularly shaped, mostly with an accumulation of processes at the ends and a smoother

middle part (fig. 39q-v). In addition to these, there are numerous slender spindles resembling those in the lobes.

Geographical distribution.— New Caledonia.

Lobophytum pusillum Tixier-Durivault, 1970

(fig. 40, pl. 18 figs. 2, 3)

Lobophytum pusillum Tixier-Durivault, 1970a: 220, figs. 52-54.

The small holotype is represented in Tixier-Durivault's (1970a) fig. 54 (enlargement × 0.85) and in our pl. 18: in fig. 3 at natural size, in fig. 2 enlarged × 2.

The autozooids are 1.5 to 2.5 mm apart. There are two to five siphonozooids between two autozooids.

In the surface layer of the lobes there are three kinds of sclerites: shuttles with some laterally flattened, volcano-shaped processes, rods with truncated thorns (fig. 40a-c) and clubs with narrow heads and ornamented with truncated thorns and simple warts (fig. 40d-g). All these sclerites are about 0.10 to 0.20 mm, sometimes 0.25 mm long; they are often irregular in shape, slightly curved or crooked; the prominences may be zoned. The interior of the lobes contains cylinders and spindles, 0.18 to 0.37 mm long and sculptured with high, simple warts, which in the middle part of the sclerite may be zoned (fig. 40h-l). In many cases there is a distinct waist (fig. 4h, i, l).

Along with the more or less smooth shuttles (0.09 to 0.12 mm long) the surface layer of the stalk has rods and clubs, 0.07 to 0.15 mm long (fig. 40m-r). The stalk interior contains (1) dumb-bells and capstans, 0.18 to 0.20 mm long, with two girdles of warts and terminal clusters of warts (fig. 40u-w, y); (2) longer sclerites, on the average 0.22 mm long, with four zones of warts (fig. 40x) and (3) still longer cylinders or spindle-shaped sclerites, up to 0.26 mm long; the warts may be zoned or irregularly placed (fig. 40s, t).

A typical character of most sclerites in all parts of the colony is the presence of a median constriction, the waist.

Geographical distribution.— New Caledonia.

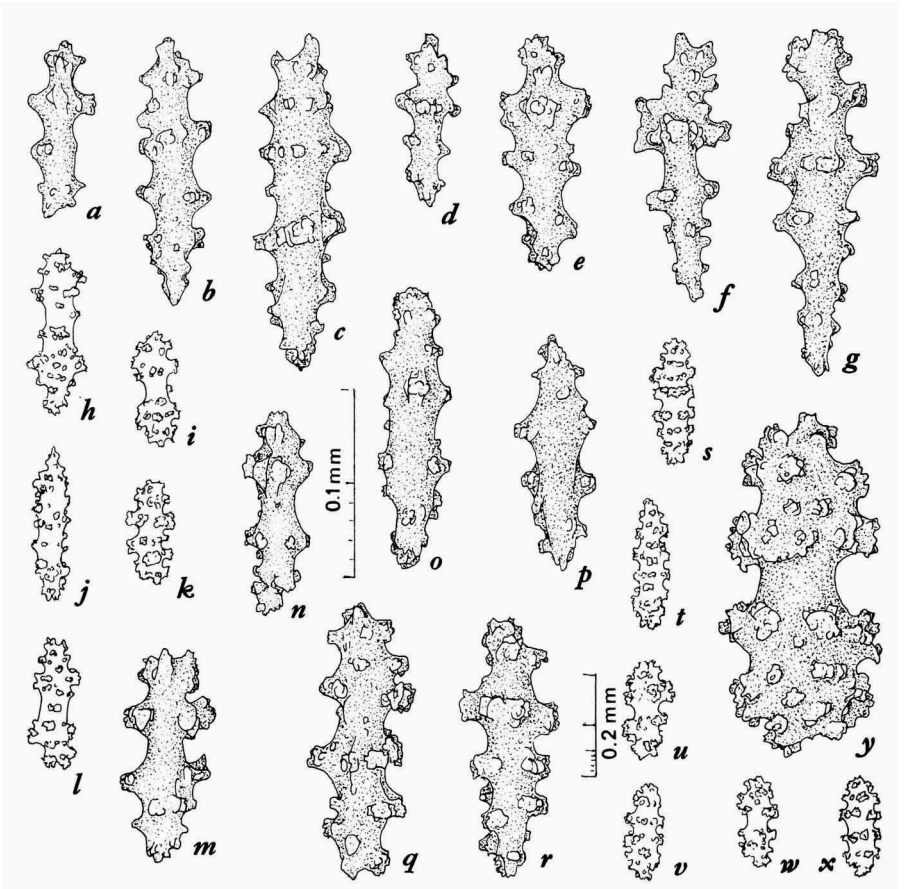

Fig. 40. *Lobophytum pusillum* Tixier-Durivault, holotype, MNHN. a-g, sclerites from surface layer of a lobe; h-l, sclerites from interior of a lobe; m-r, sclerites from surface layer of the stalk; s-y, sclerites from interior of the stalk. Enlargement of a-g, m-r and y indicated by 0.1 mm scale at n; that of h-l, s-x by 0.2 mm scale at r.

Lobophytum ransoni Tixier-Durivault, 1957

(fig. 41, pls. 24, 25)

Lobophytum ransoni Tixier-Durivault, 1957: 107; 1958: 119-122, figs. 129-131; 1970b: 128.
Lobophytum robustum Tixier-Durivault, 1957: 107-108; 1958: 125-127, figs. 135-137; 1970b: 128-129.

Tixier-Durivault (1958: 21) studied six specimens. The largest one had a capitulum with diameters of 220 and 150 mm; the other specimens were fragments. I investigated the large colony mentioned; I designate it as the lectotype. Tixier-Durivault's (1958) fig. 131 shows a part of this colony; the enlarge-

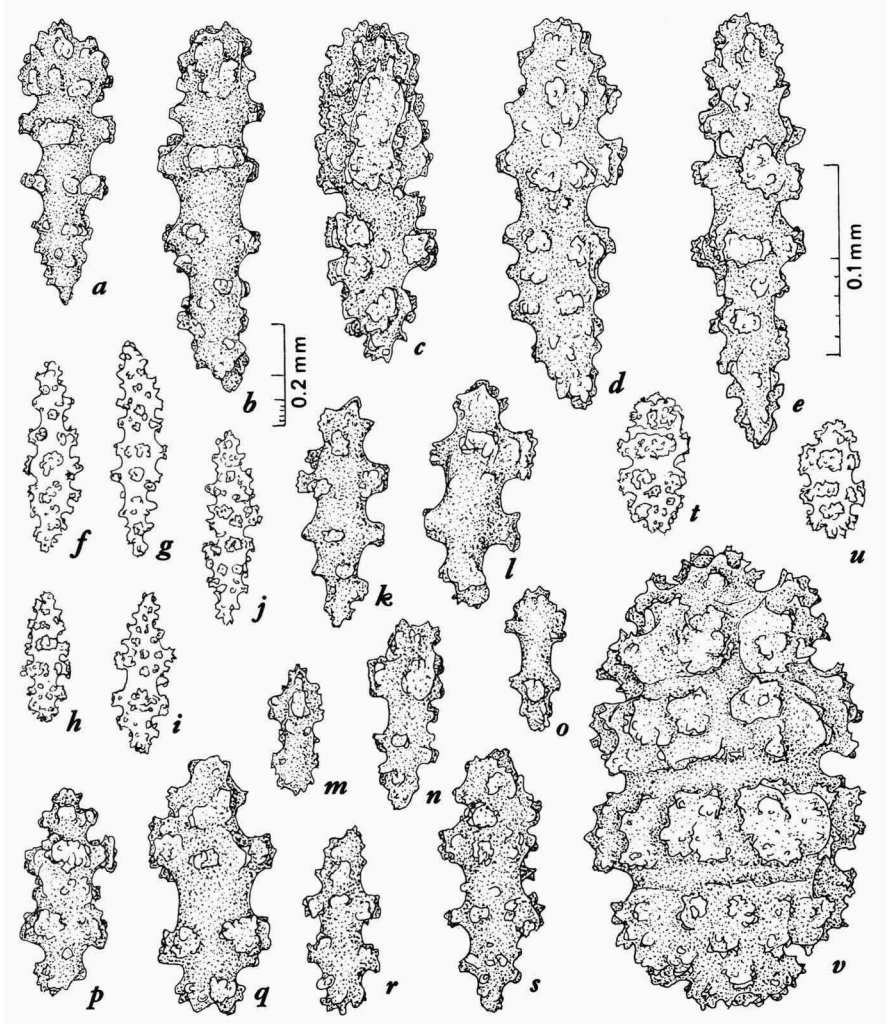

Fig. 41. *Lobophytum ransoni* Tixier-Durivault, lectotype, MNHN. a-e, sclerites from surface layer of a lobe; f-j, sclerites from interior of a lobe; k-s, sclerites from surface layer of the stalk; t-v, sclerites from interior of the stalk. Enlargement of a-e, k-s and v indicated by 0.1 mm scale at e; that of f-j, t and u by 0.2 mm scale at b.

ment is × 0.75. Our pl. 24 displays nearly the same part at natural size.

On the lobes the autozooids are 1.0 to 2.5 mm apart. Between two autozooids there are one to four or five siphonozooids. On the disk the distance between two autozooids and also the number of siphonozooids is greater.

The surface layer of the lobes contains clubs, 0.13 to 0.25 mm long (fig. 41a-

e). Some are distinctly clavate, others are indefinite. In the middle part of the sclerite the warts may be zoned. The interior of the lobes has spindles, 0.25-0.45 mm long, often more or less irregular in shape and ornamented with warts, which are sometimes zoned (fig. 41f-j).

In the surface layer of the basal part of the colony there are rods and more clavate sclerites (fig. 41k-s). The length varies from 0.07 to 0.14 mm. In their middle part the warts may be placed in two girdles, separated by a distinct waist. The interior of the "stalk" contains capstans, 0.23 to 0.26 mm long and 0.12 to 0.15 mm wide, with two girdles of warts and terminal clusters (fig. 41u, v). Longer sclerites (up to 0.30 mm) are often slightly fusiform; the warts may be placed in two distinct and two indistinct girdles (fig. 41t).

I include *L. robustum* in *L. ransoni*. Our pls. 24 and 25 show a close resemblance. There is also a marked agreement in the spiculation.

Geographical distribution. — Bay of Nha Trang (Vietnam).

Lobophytum rotundum Tixier-Durivault, 1957

Lobophytum rotundum Tixier-Durivault, 1957: 108; 1958: 134-136, figs. 149-151.

According to Tixier-Durivault (1958: 136), the type specimen is kept in "La Collection de Bruxelles". I found, however, that the specimen is present neither in the Institut Royal des Sciences Naturelles de Belgique at Brussels nor in the Koninklijk Museum voor Midden-Afrika at Tervuren. It is also absent from the Muséum National d'Histoire Naturelle at Paris. So apparently it has got lost and we must conform to Tixier-Durivault's description.

It appears that in Tixier-Durivault's fig. 151 the colony is represented on a slightly reduced scale.

The surface layer of the lobes has clubs, 0.17 mm long (according to the text; checking the dimensions in fig. 150 shows the length is 0.14 to 0.20 mm). In the interior of the lobes there are spiny spindles, up to 0.38 mm long; some of them are more or less clavate.

The surface layer of the stalk contains small clubs, 0.11 mm long (in fig. 149j-m: 0.11-0.16 mm). The sclerites in the interior of the stalk include ovals, 0.18 mm long (in fig. 149a-g: 0.18-0.23 mm). They are covered with numerous, densely placed warts, without a waist or with a very narrow one. They recall the same sclerites in *L. borbonicum*, but in that species the stalk interior is devoid of spindles, while in *L. rotundum* spindles are present. The length of these spindles is up to 0.42 mm; they are ornamented with numerous warts.

Geographical distribution. — Mansfield I. (= Mansoear I. ?), Dampier Strait, between New Guinea and Waigeo I., 1° S 131° E.

Lobophytum salvati Tixier-Durivault, 1970

(fig. 42, pl. 28 fig. 3)

Lobophytum salvati Tixier-Durivault, 1970a: 207-208, figs. 32-34; Verseveldt, 1977a: 13-15, figs. 7, 8, pl. 10 fig. 2.

The holotype (now kept in the Paris Museum in a dried state) is figured by Tixier-Durivault (1970a: fig. 32); the enlargement is × 0.8. Our pl. 28 fig. 3 shows the colony at natural size.

On the lobes the autozooids are 1 to 2 mm apart, more basally up to 3 mm. Between two autozooids there are two to four siphonozooids, at the base of the lobes six to eight.

The sclerites in the surface layer of the lobes are clubs, rods and spindles. The clubs are 0.10 to 0.22 mm long (fig. 42b-d, g). The heads are warty, the handles have girdles of warts and (often truncated) cones. The rods and spindles measure up to 0.24 mm in length (fig. 42a, e, f); here, too, the central prominences are zoned. The interior of the lobes contains oblong forms, 0.20 to 0.25 mm long (fig. 42h) and pointed spindles, up to 0.40 mm long (fig. 42i-k). The prominences are zoned or irregularly distributed; in many cases there is a distinct long waist.

In the stalk surface the warty clubs, the rods and spindles do not differ much from those in the lobes; the length is also the same (fig. 42l-p). In the interior of the stalk the oblong sclerites are usually 0.20 to 0.25 mm long; some reach a length of 0.32 mm (fig. 42q-s); the warts are usually zoned, a distinct waist is often present.

A comparison with Verseveldt's (1977a) fig. 8 is recommended.

Geographical distribution.— New Caledonia, Washington I.

Lobophytum sarcophytoides Moser, 1919

(fig. 43, pls. 26, 27)

Lobophytum sarcophytoides Moser, 1919: 267-268, fig. 13, pl. 6 fig. 16; Roxas, 1933: 361; Tixier-Durivault, 1957: 108-109; 1958: 98-99, figs. 93, 97, 98; 1966: 58-60, figs. 37-39; 1972: 18 (listed only); Verseveldt, 1960: 231; Utinomi, 1977: 19.

Moser's holotype is kept in the Berlin Museum, register no. 6416. Moser's pl. 6 fig. 16 shows the colony seen from aside; the enlargement is about × 0.8. Our pls. 26 and 27 show the same colony seen from aside and from above, and at full size.

As for the distribution of the autozooids and siphonozooids, I refer to Moser's (1919: 268) description.

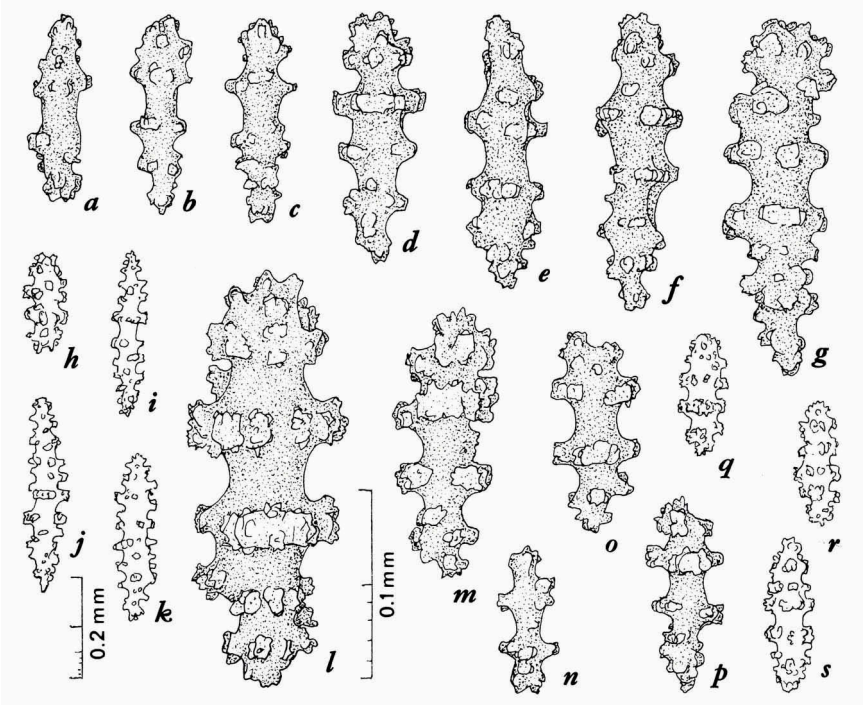

Fig. 42. *Lobophytum salvati* Tixier-Durivault, holotype, MNHN. a-g, sclerites from surface layer of a lobe; h-k, sclerites from interior of a lobe; l-p, sclerites from surface layer of the stalk; q-s, sclerites from interior of the stalk. Enlargement of a-g, l-p indicated by 0.1 mm scale at l; that of h-k, q-s by 0.2 mm scale at j.

The shape of the colony has been fully described by Moser (1919: 267-268). He rightly drew attention to the similarity of the colony with its marginal open folds to that of *Sarcophyton acutangulum* (in my revision of the genus *Sarcophyton* (Verseveldt, 1982) I assign *S. acutangulum* to *S. ehrenbergi*). The specific name *sarcophytoides* has thus rightly been given. The similarity goes still further, since the prominences covering the internal sclerites of the lobes are branched antler-like (see fig. 43p), which recalls the same character of *S. ehrenbergi.*

Nevertheless the colony cannot be referred to *S. ehrenbergi*, for it has, in addition to the open folds, also digitiform and crest-like lobes and the sclerites, especially those in the surface layer of lobes and stalks, are quite different.

The surface layer of the lobes contains small clubs, usually 0.07 to 0.15 mm long; a few measure up to 0.24 mm in length. They differ among themselves in shape. Some of them have a central wart (fig. 43a, h, i), others have heads composed of irregularly placed warts (fig. 43b-g, j-l). On the handles the prominences are usually arranged in one or two girdles, but not infrequently they

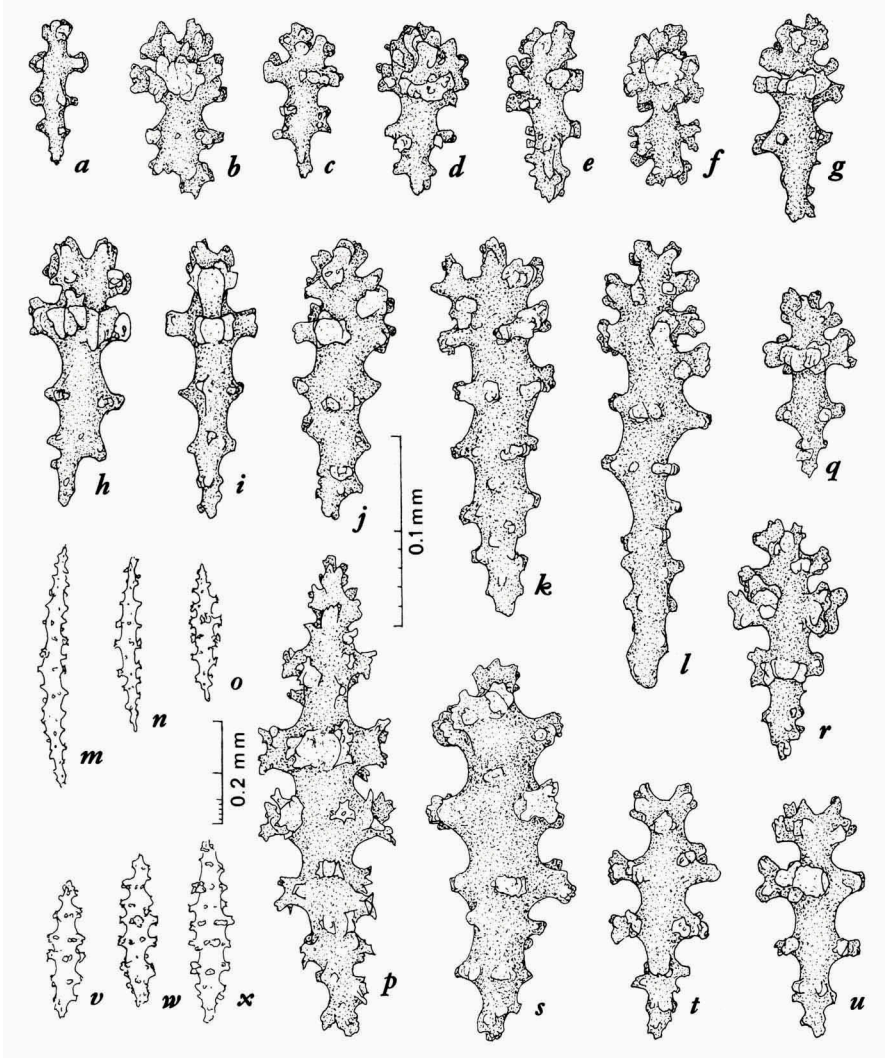

Fig. 43. *Lobophytum sarcophytoides* Moser, holotype, ZMB no. 6416. a-l, sclerites from surface layer of a lobe; m-p, sclerites from interior of a lobe; q-u, sclerites from surface layer of the stalk; v-x, sclerites from interior of the stalk. Enlargement of a-l, p-u indicated by 0.1 mm scale at j; that of m-o, v-x by 0.2 mm scale below o.

are irregularly distributed and have developed into high, branched processes (fig. 43f).

In the interior of the lobes there are slender, pointed spindles, up to 0.48 mm long (fig. 43m-o). The prominences are small, spiny warts, which are sometimes zoned. Especially the smaller spindles, about 0.25 mm long, have

warts, which are branched antler-like (fig. 43p). It is curious that Moser (1919) did not record these remarkable prominences.

The surface layer of the stalk has few clubs; they measure 0.07 to 0.14 mm in length; a few reach a length of 0.24 mm (fig. 43q-u). As in the lobes, the club heads have a central wart (fig. 43t, u) or they consist of a number of high warts (fig. 43q-s). The interior of the stalk is provided with spindles, usually 0.25 to 0.35 mm long, with zoned warts (fig. 43v-x). Crosses like that drawn by Moser (fig. 13d) are absent in my microscopic preparation.

Geographical distribution. — Philippines, New Caledonia, Nosy Bé (Madagascar), and Réunion, Ryukyu Archipelago.

Lobophytum schoedei Moser, 1919

(fig. 44, pl. 28 fig. 4)

Lobophytum schoedei Moser, 1919: 276-277, fig. 18, pl. 6 fig. 14; Roxas, 1933: 362; Tixier-Durivault, 1957: 109; 1958: 100-103, figs. 101, 102, 107; 1966: 60-63, figs. 40-42; 1970a: 210; 1972: 18-19 (listed only); Verseveldt, 1974: 95 (listed only); 1977a: 3.

Moser's type specimen is kept in the Zoological Museum at Berlin; register no. 6417. A label has "Tiop, Bougainville, Schöde S., 5127" ("S" means "Sammler" = collector). The colony is figured in Moser's pl. 6 fig. 14; the enlargement is about × 0.8. Our pl. 28 fig. 4 is a photograph of the same colony, represented at natural size.

In the surface layer of the lobes there are clubs, 0.08 to 0.25 mm long. The smaller ones with a length of 0.08 to about 0.20 mm have heads provided with a central wart (fig. 44a-f); the longer and wider ones, which measure 0.15 to 0.25 mm in length, have thick, warty heads, without a central wart (fig. 44g, h); they are derivable from the spindle type. On the handles the warts and blunt spines are zoned. The interior of the lobes contains spindles, usually 0.30 to 0.40 mm long and 0.07 to 0.10 mm wide; they are covered with girdles of warts (fig. 44i-k).

The surface layer of the stalk has clubs, which closely resemble those in the lobes; they vary in length from 0.08 to 0.21 mm (fig. 44l-g). In the interior of the stalk there are spindles, 0.35 to 0.44 mm long and 0.10 to 0.13 mm wide (fig. 44r-u), so they are distinctly wider than the spindles in the lobes. In most cases the warts are arranged in girdles, but sometimes they are irregularly distributed. A distinct waist is absent.

In some respects my notes differ more or less from Moser's description. A striking difference is the spiculation of the surface layer of the stalk. Moser records spindles and rods, up to 0.27 mm long, and dumb-bells, 0.15 mm long,

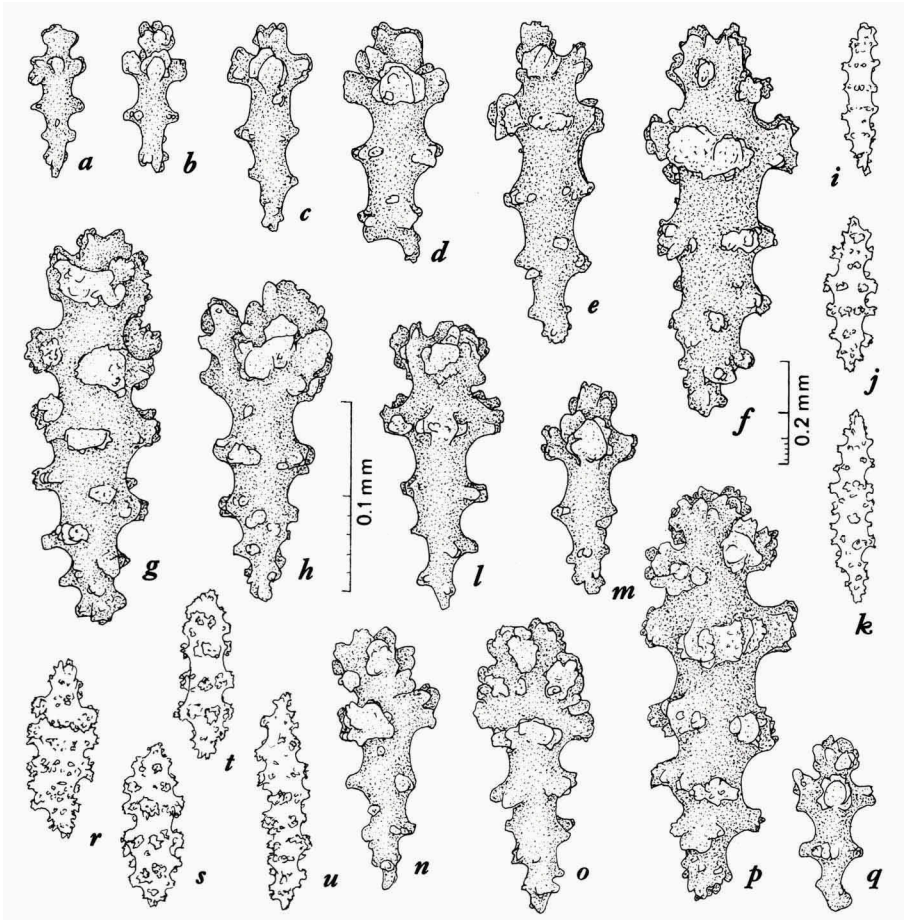

Fig. 44. *Lobophytum schoedei* Moser, holotype, ZMB no. 6417. a-h, sclerites from surface layer of a lobe; i-k, sclerites from interior of a lobe; l-q, sclerites from surface layer of the stalk; r-u, sclerites from interior of the stalk. Enlargement of a-h, l-q by 0.1 mm scale at h; that of i-k, r-u by 0.2 mm scale at f.

with a bare median constriction and thick, warty ends (Moser's fig. 18c). In my microscopic slide I could not find these dumb-bells. Neither could I find them in the interior of the stalk, but it is quite possible that in the distalmost part of the stalk sclerites as recorded by Moser are to be found.

The massive spindles in the stalk interior seem to be typical of the species.

Geographical distribution. — Bougainville, New Caledonia, Nosy Bé and Tuléar (Madagascar), Wake I.

Lobophytum solidum Tixier-Durivault, 1970

(fig. 45, pl. 18 fig. 4)

Lobophytum solidum Tixier-Durivault, 1970a: 213, figs. 44-46.

The holotype has been represented by Tixier-Durivault (1970a: fig. 44); the enlargement is × 0.75. Our pl. 18 fig. 4 shows the colony from the other side and at full size.

On the lobes the distance between the autozooids is 1 to 2 mm, at the base of the lobes up to about 3 mm. Between two autozooids there are one to three siphonozooids, but at the base of the lobes their number is four to seven or eight.

In the surface layer of the lobes there are clubs, 0.12 to 0.20 mm long (fig. 45 a-g). The heads are often so narrow that the sclerite is more rod- or spindle-shaped. Sometimes the head bears thorns, which are directed upwards (fig. 45a). The interior of the lobes contains capstans and oblong or spindle-shaped spicules, 0.16 to 0.26 mm long (fig. 45h-j).

The surface layer of the stalk contains clubs, 0.09 to 0.16 mm long, so they are shorter than those in the lobes (fig. 45k-p). The interior of the stalk has capstans, 0.15 to 0.20 mm long (fig. 45q, r, w) and slightly longer, more or less spindle-shaped spicules, up to 0.25 mm long (fig. 45s, t, v). Sometimes the warts are so densely accumulated at the ends of the sclerite that the sclerite looks like a dumb-bell (fig. 45u).

In all parts of the colony most sclerites are characterized by the presence of a distinct median waist, while in the middle part of the sclerite the warts are zoned.

I found that the sclerites described and illustrated by Tixier-Durivault (1970a) in her figures 45 and 46 are quite different from those in my mounted slides and represented in my fig. 45. According to the enlargement (× 220; × 2/3), the sclerite in Tixier-Durivault's fig. 45H is 0.32 mm long, the spindle in her fig. 46D measures 0.37 mm in length. I could not find such long sclerites in my slides. In order to check I made a new set of preparations, but the result was the same; so Tixier-Durivault's description and drawings must be wrong.

Geographical distribution.— New Caledonia.

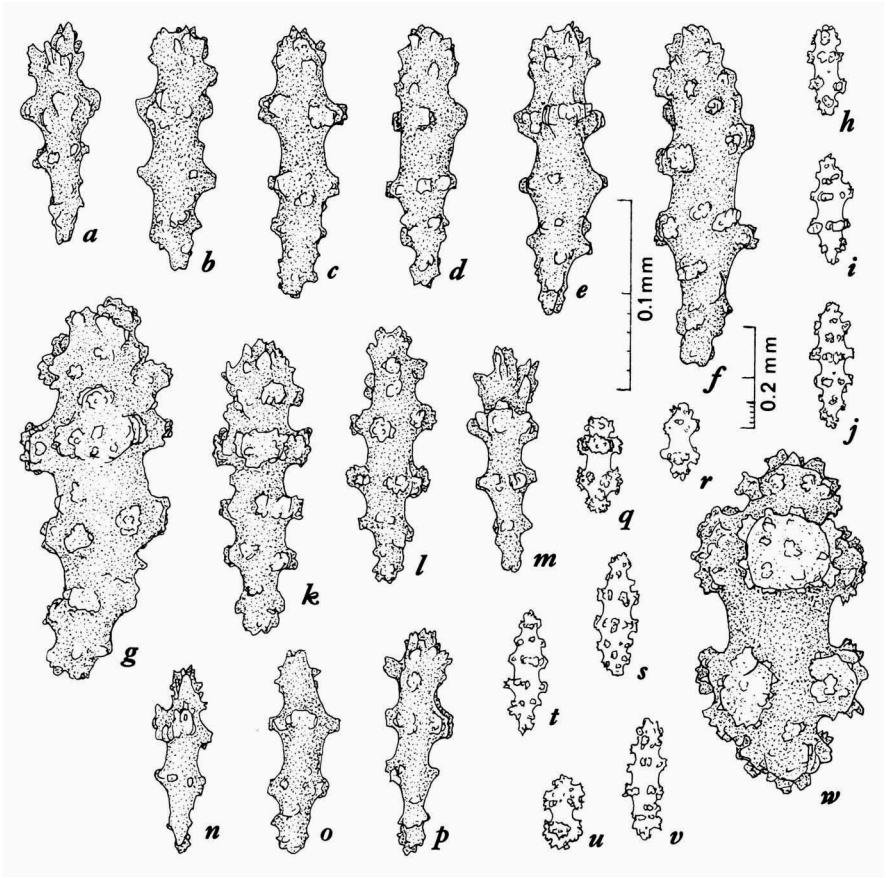

Fig. 45. *Lobophytum solidum* Tixier-Durivault, holotype, MNHN. a-g, sclerites from surface layer of a lobe; h-j, sclerites from interior of a lobe; k-p, sclerites from surface layer of the stalk; q-w, sclerites from interior of the stalk. Enlargement of a-g, k-p and w indicated by 0.1 mm scale at e; that of h-j, q-v by 0.2 mm scale at f.

Lobophytum strictum Tixier-Durivault, 1957

(fig. 46, pl. 23 fig. 2)

Lobophytum strictum Tixier-Durivault, 1957: 109; 1958: 170-172, figs. 198, 207, 208; 1970b: 129.

Tixier-Durivault (1957) recorded three colonies from the Bay of Nha Trang, one of which was kept in the Paris Museum. This colony was described in more detail by Tixier-Durivault (1958): a part of it was pictured in her fig. 198, so I designate this colony as the lectotype. Our pl. 23 fig. 2 displays it at natural size; Tixier-Durivault's fig. 198 is the right-hand part of this photograph; enlargement × 0.6.

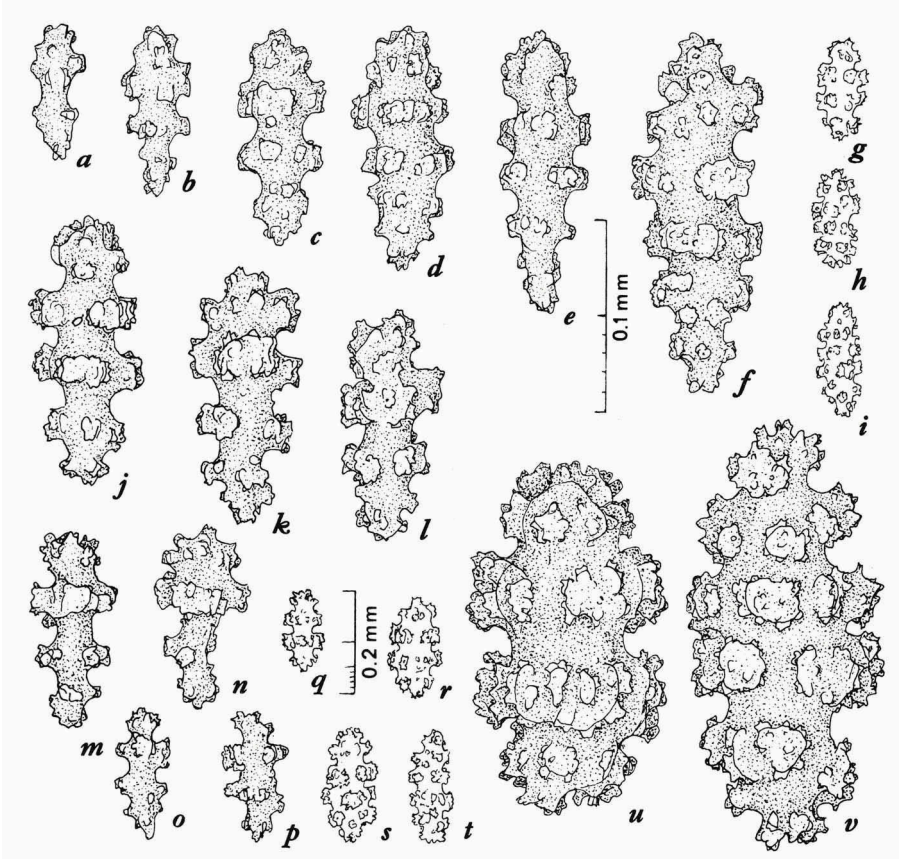

Fig. 46. *Lobophytum strictum* Tixier-Durivault, lectotype, MNHN. a-f, sclerites from surface layer of a lobe; g-i, sclerites from interior of a lobe; j-p, sclerites from surface layer of the stalk; q-v, sclerites from interior of the stalk. Enlargement of a-f, j-p, u and v indicated by 0.1 mm scale at e; that of g-i, q-t by 0.2 mm scale at q.

In the distal part of a lobe the autozooids are 1.5 to 2.0 mm apart; basally the distance is 2.5 to 3.0 mm. The number of siphonozooids between two autozooids is three to five and up to seven, respectively.

In the surface layer of the lobes the warty clubs measure 0.07 to 0.19 mm in length (fig. 46a-f). The interior of the lobes contains warty capstans and rounded cylinders, 0.18 to 0.25 mm long (fig. 46g-i). The warts may be zoned or irregularly distributed.

The clubs in the surface layer of the low stalk have larger warts than those in the lobes (fig. 46j-p); the length varies from 0.07 to 0.15 mm. In the interior there are oval capstans, 0.16 to 0.20 mm long, and oblong or cylindrical sclerites, up to 0.23 mm long; the width is 0.08 to 0.11 mm (fig. 46q-v). Just as in the sclerites in the lobes, the warts are zoned or irregularly placed.

Geographical distribution. — Bay of Nha Trang (Vietnam).

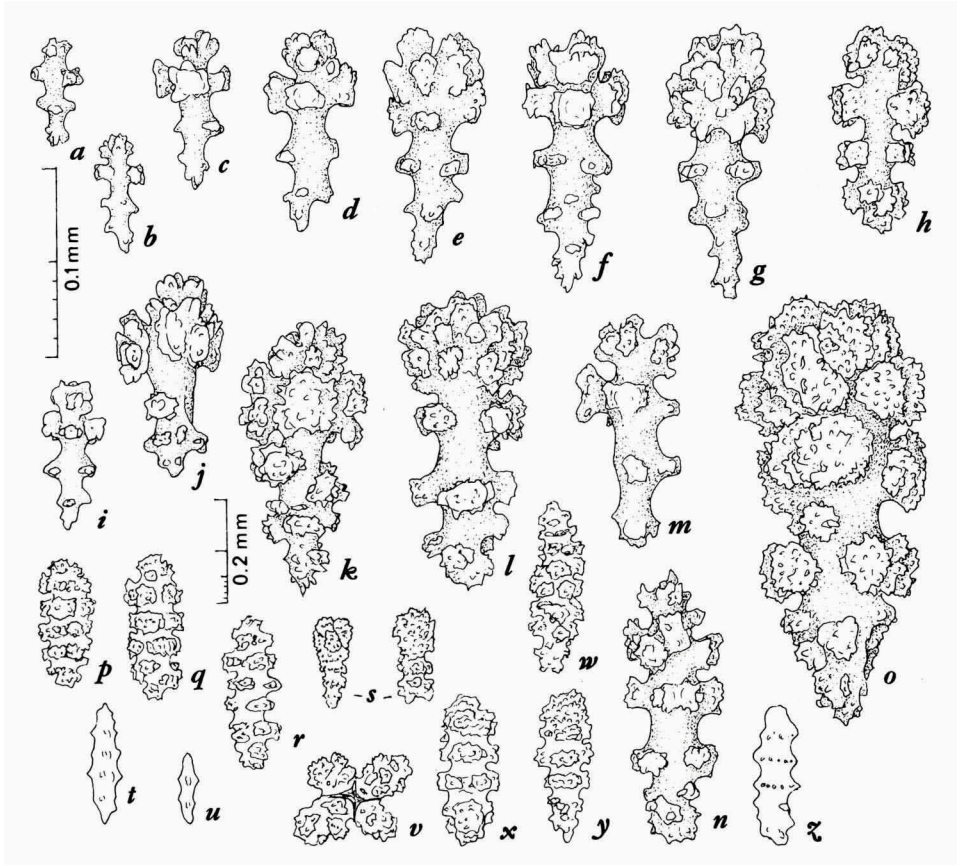

Fig. 47. *Lobophytum variatum* Tixier-Durivault, holotype, MNHN. a-h, sclerites from surface layer of the disk; i-o, sclerites from surface layer of the outside of the colony; p-v, sclerites from interior of the disk; w-z, sclerites from interior of the base of the colony. Enlargement of a-o indicated by 0.1 mm scale below a; that of p-z by 0.2 mm scale at j.

Lobophytum variatum Tixier-Durivault, 1957

(fig. 47, pl. 29)

Lobophytum variatum Tixier-Durivault, 1957: 110-111; 1958: 99-100, figs. 94, 99, 100; 1970a: 208-209; 1972: 19; Verseveldt, 1977a: 15-18, figs. 9-11.

Tixier-Durivault's holotype is represented in her (1958) fig. 94; the enlargement is × 0.7. It is broken up in several pieces now; it is displayed in our pl. 29 at natural size.

The thin, flat colony has a few low lobes. On these lobes the autozooids are 0.6 to 1.0 mm apart, on the disk the distance is up to 1.5 mm. From the outsi-

de the siphonozooids are invisible; a section parallel to the surface shows that their number between two autozooids varies from none to two; see also Verseveldt (1977a: 15).

In the surface layer of the disk there are clubs, 0.06 to 0.16 mm long. The smaller clubs have a central wart and, below this, a whorl of warts (fig. 47a-d). The larger ones often have big, warty heads (fig. 47e-g). The sclerite in fig. 47h is a rare, aberrant form.

The outside of the colony contains clubs, 0.08 to 0.25 mm long (fig. 47i-o). The heads are often thick and consist of closely set warts (fig. 47k, l, o).

The internal sclerites in the disk and in the base of the colony are identical, which is not surprising in view of the minor thickness of the colony. The sclerites are wide rods and cylinders, usually blunt-ended, sometimes pointed and more fusiform. They are up to 0.30 mm long, sometimes as long as 0.34 mm (fig. 47p-z). The prominences may be cones, simple warts and compound warts. They are arranged in four to five girdles or they are irregularly placed. Shuttles are numerous.

Geographical distribution. — New Caledonia, Madagascar.

Lobophytum varium Tixier-Durivault, 1970

(figs. 48, 49, pl. 30 figs. 1, 2)

Lobophytum varium Tixier-Durivault, 1970a: 221-222, figs. 57, 58.
Lobophytum spissum Tixier-Durivault, 1970a: 223-224, figs. 59, 60.

Tixier-Durivault's (1970a) holotype of *L. varium* (her "type" specimen) is a dried colony; it is figured in her fig. 57; the enlargement is × 0.65. Our pl. 30 fig. 1 shows the same colony seen from the same side, at natural size.

On the lobes the autozooids are 1 to 2 mm apart, at the base of the lobes slightly more. The siphonozooids are small but distinct. Their number between two autozooids is two to four and basally five to seven, rarely more.

The surface layer of the lobes contains clubs, 0.12 to 0.20 mm long (fig. 48 a-f), with narrow heads and zoned warts on the handles. In many cases the "heads" are so narrow that the sclerite is more rod-shaped; the length is then up to 0.24 mm. In the interior of the lobes there are cylindrical and spindle-shaped forms, usually 0.18 to 0.25 mm, rarely up to 0.29 mm long (fig. 48g-k). The prominences may have a tendency to zoning; sometimes the sclerites have an irregular shape (fig. 48l).

The clubs in the surface layer of the stalk are 0.09 to 0.15 mm long (fig. 48m-s). They look like those in the lobes. The interior of the stalk contains oblong and more cylindrical forms and slender capstans, 0.20 to 0.29 mm long

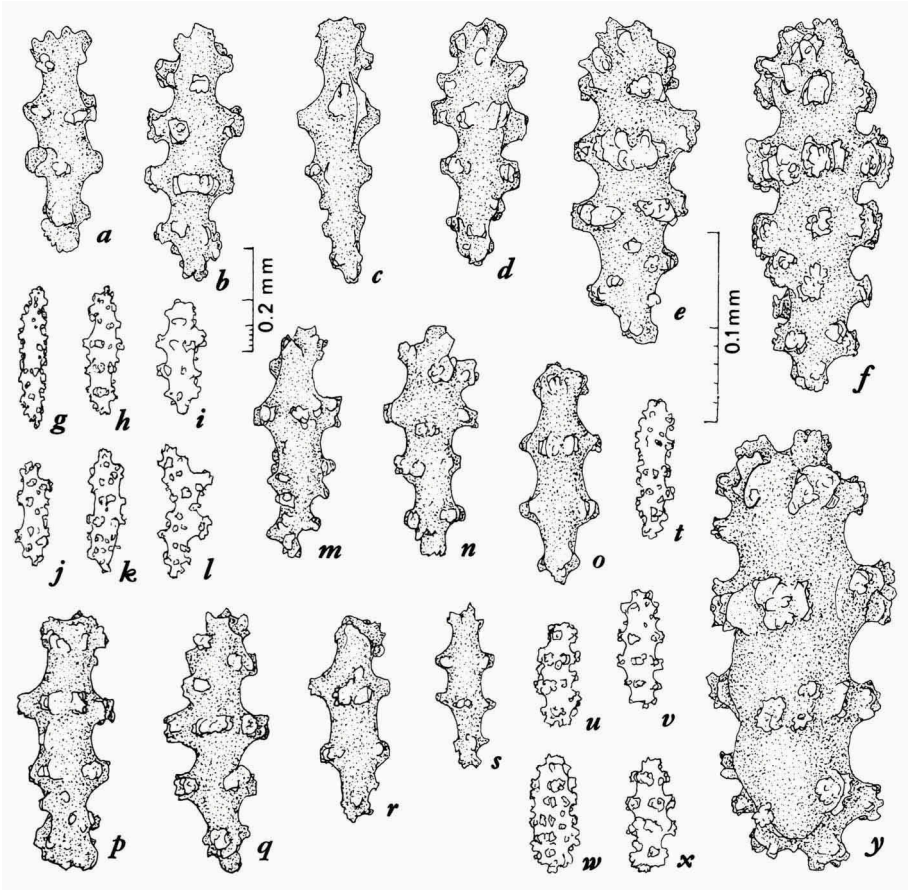

Fig. 48. *Lobophytum varium* Tixier-Durivault, holotype, MNHN. a-f sclerites from surface layer of a lobe; g-l, sclerites from interior of a lobe; m-s, sclerites from surface layer of the stalk; t-y, sclerites from interior of the stalk. Enlargement of a-f, m-s and y indicated by 0.1 mm scale at e; that of g-l, t-x by 0.2 mm scale at b.

(fig. 48t-y), but the majority has a length of 0.22 to 0.25 mm; the width is only 0.09-0.11 mm. They bear two median zones of warts and two terminal clusters. The more elongated spicules may have as many as four zones, but a lot of them are without zoning.

I compared the holotype just described with that of *L. spissum*. Our pl. 30 fig. 2 shows this colony seen from above. Its similarity with that of *L. varium* (pl. 30 fig. 1) and especially the conformity of the lobes, is not so distinct. But when comparing Tixier-Durivault's (1970a) drawings of the same colonies (her figs. 57 and 59), it appears that there is a marked resemblance. A comparison of her figs. 58 and 60 shows a striking resemblance of the sclerites. As to

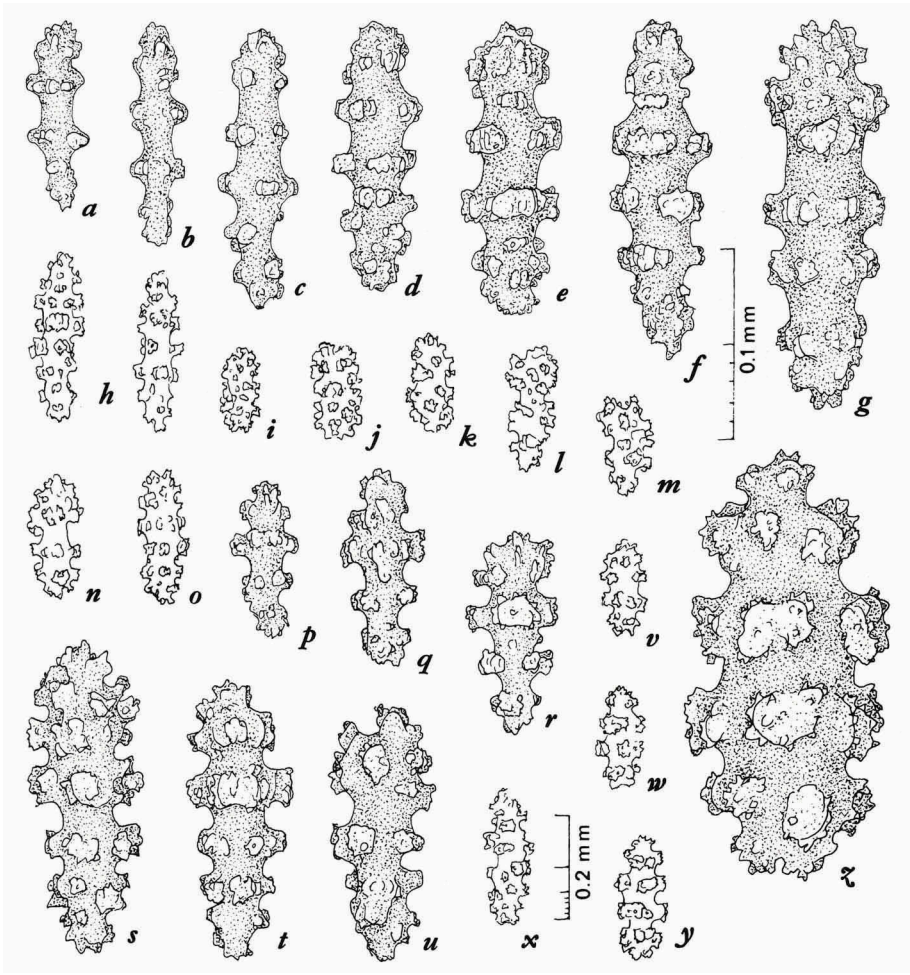

Fig. 49. *Lobophytum varium* Tixier-Durivault (holotype of *"L. spissum"* Tixier-Durivault, 1970a), MNHN. a-g, sclerites from surface layer of a lobe; h-o, sclerites from interior of a lobe; p-u, sclerites from surface layer of the stalk; v-z, sclerites from interior of the stalk. Enlargement of a-g, p-u and z indicated by 0.1 mm scale at f; that of h-o, v-y by 0.2 mm scale at x.

the distribution of the autozooids and siphonozooids as well as to the spiculation (fig. 49), there is also close agreement. The only difference between the two species is perhaps the length of the sclerites in the interior of the lobes: in *L. spissum* these spicules may be slightly longer. But this is not sufficient ground for retaining *L. spissum* as a separate species.

I choose *varium* as the "oldest" specific name, for it appears two pages (p. 221) before *spissum* (p. 223).

Geographical distribution. — New Caledonia.

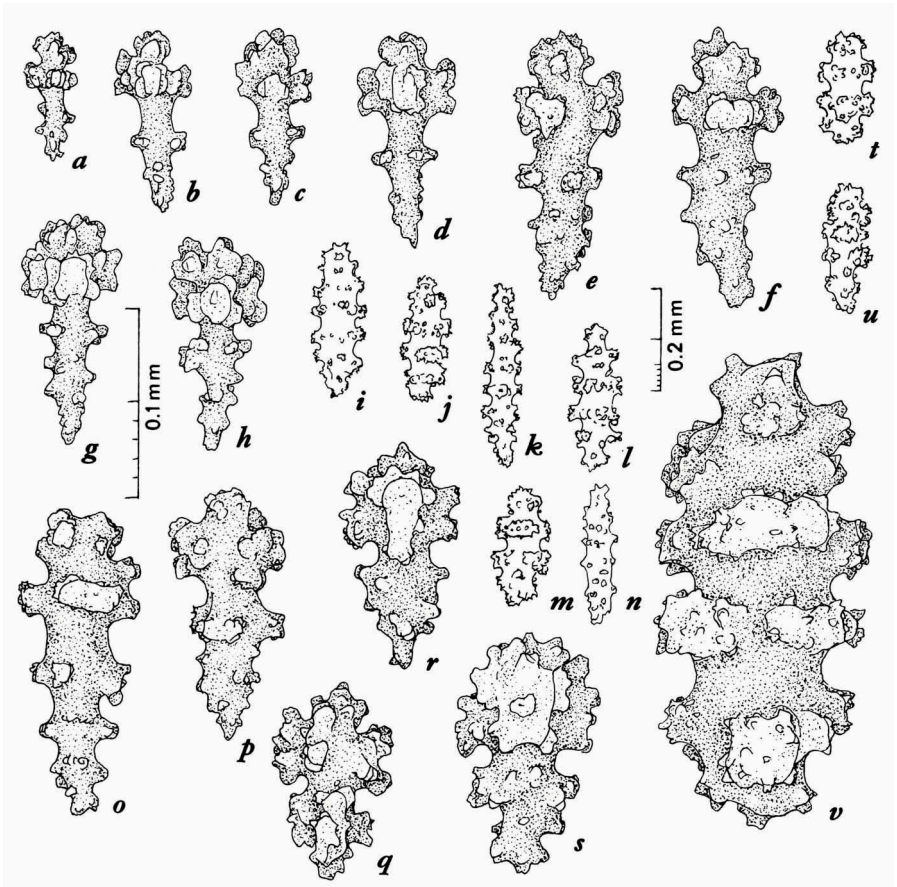

Fig. 50. *Lobophytum venustum* Tixier-Durivault, holotype, MNHN. a-h, sclerites from surface layer of the disk; i-n, sclerites from interior of the disk; o-s, sclerites from surface layer of the outside of the border; t-v, sclerites from interior of the base of the colony. Enlargement of a-h, o-s and v indicated by 0.1 mm scale at g; that of i-n, t and u by 0.2 mm scale at e.

Lobophytum venustum Tixier-Durivault, 1957

(fig. 50, pl. 31)

Lobophytum venustum Tixier-Durivault, 1957: 111; 1958: 147, figs. 164, 168, 169; 1966: 85-87, figs. 70-72.

The bowl-shaped holotype has been figured by Tixier-Durivault (1958: fig. 164; 1966: fig. 70). In the former figure the enlargement is × 0.75, in the latter × 0.85. Our pl. 31 shows the colony at natural size.

The numerous autozooids, on the avarage 0.5 mm in diameter, are 0.5 to 1.2 mm apart. Between two autozooids there are one or two siphonozooids; they are almost invisible.

The clubs in the surface layer of the lobes are 0.07 to 0.15 mm long. The distinct heads are 0.03 to 0.06 mm wide. Two main types can be distinguished: the head has a central wart (fig. 50 a, b, d-f) or the wide head consists of some irregularly placed warts (fig. 50 c, g, h). The handle bears one whorl of warts and some smaller tubercles. In the surface layer of the exterior of the colony (a real stalk is absent) the clubs have about the same length, but they are wider, viz. 0.07 to 0.08 mm (fig. 50o-s). The warts are larger, often irregularly and densely placed; a central wart is lacking.

The sclerites in the interior of the colony are 0.22 to 0.28 mm long (fig. 50i, j, l, m, t-v). The shorter ones have two girdles of warts, the longer ones three or four. In addition to these, the interior of the disk contains still longer, more spindle-shaped spicules, up to 0.36 mm long (fig. 50k, n). The prominences may be simple warts or low tubercles.

Geographical distribution.— Aldabra I.

Lobophytum verum Tixier-Durivault, 1970

(fig. 51, pl. 28 fig. 2)

Lobophytum verum Tixier-Durivault, 1970a: 209-210, figs. 38-40.

The colony figured by Tixier-Durivault (1970a: fig. 38) is a dry one. The enlargement of the drawing is × 0.75. Our pl. 28 fig. 2 shows the colony from the other side, at full size. I designate this specimen as the lectotype.

On the very sinuous lobes the autozooids are 1.5 to 2 mm apart; more basally the distance is probably slightly greater. The siphonozooids are indistinct; there are presumably two or three between two autozooids.

The surface layer of the lobes contains spindles and clubs. The spindles are small, 0.08 to about 0.12 mm long (fig. 51a-e), with two girdles of thorns and truncated spines. The clubs are larger, up to 0.20 mm long (fig. 51f-i). The prominences are widely spaced thorns and truncated spines; in the middle part of the club they are zoned. In the interior of the lobes there are spindles, varying in length from 0.20 to 0.45 mm (fig. 51j-m). The shorter ones have two median zones of warts, the longer ones have distantly placed low cones.

The clubs in the surface layer of the stalk are 0.12 to 0.20 mm long; they look like those in the lobes, but the processes are more wart-like (fig. 51n-r). The interior of the stalk contains spindles, usually 0.16 to 0.30 mm long (fig. 51u), but slender spindles, up to 0.52 mm long, are not rare (fig. 51s, t). In the shorter ones there are two girdles of warts in the middle of the spicule, in the long spindles the small warts are irregularly placed.

Geographical distribution.— New Caledonia.

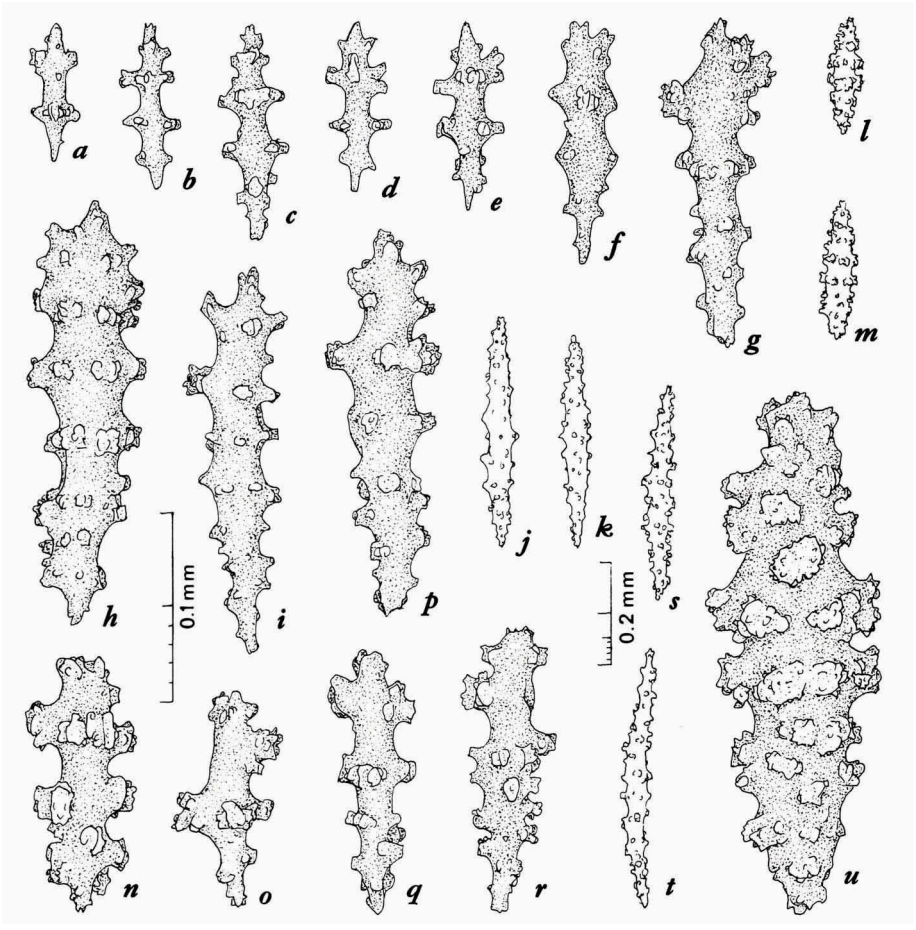

Fig. 51. *Lobophytum verum* Tixier-Durivault, lectotype, MNHN. a-i, sclerites from surface layer of a lobe; j-m, sclerites from interior of a lobe; n-r, sclerites from surface layer of the stalk; s-u, sclerites from interior of the stalk. Enlargement of a-i, n-r and u indicated by 0.1 mm scale at h; that of j-m, s and t indicated by 0.2 mm scale at k.

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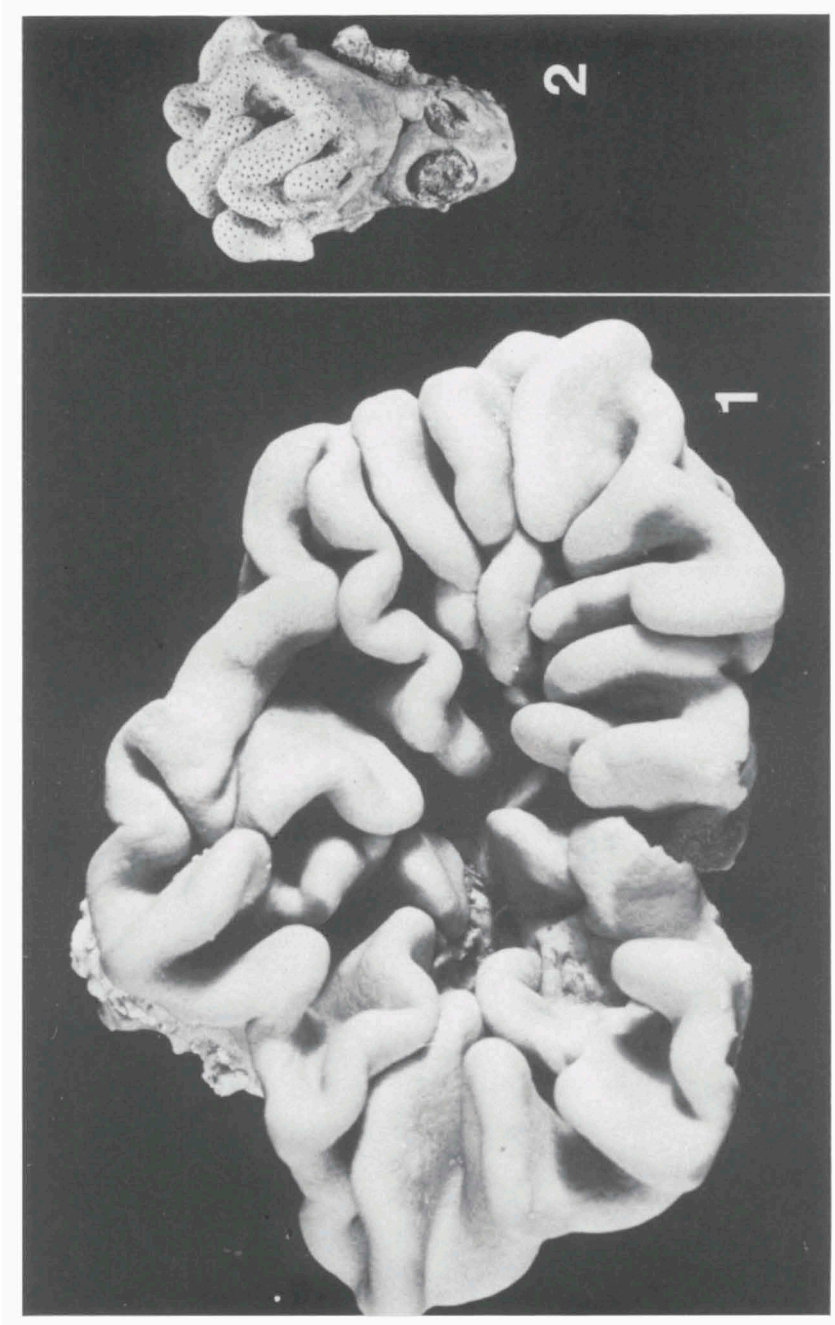


Fig. 1. *L. altum* Tixier-Durivault, holotype, MNHN, × 1. Fig. 2. *L. densum* Tixier-Durivault, holotype, MNHN, × 1.

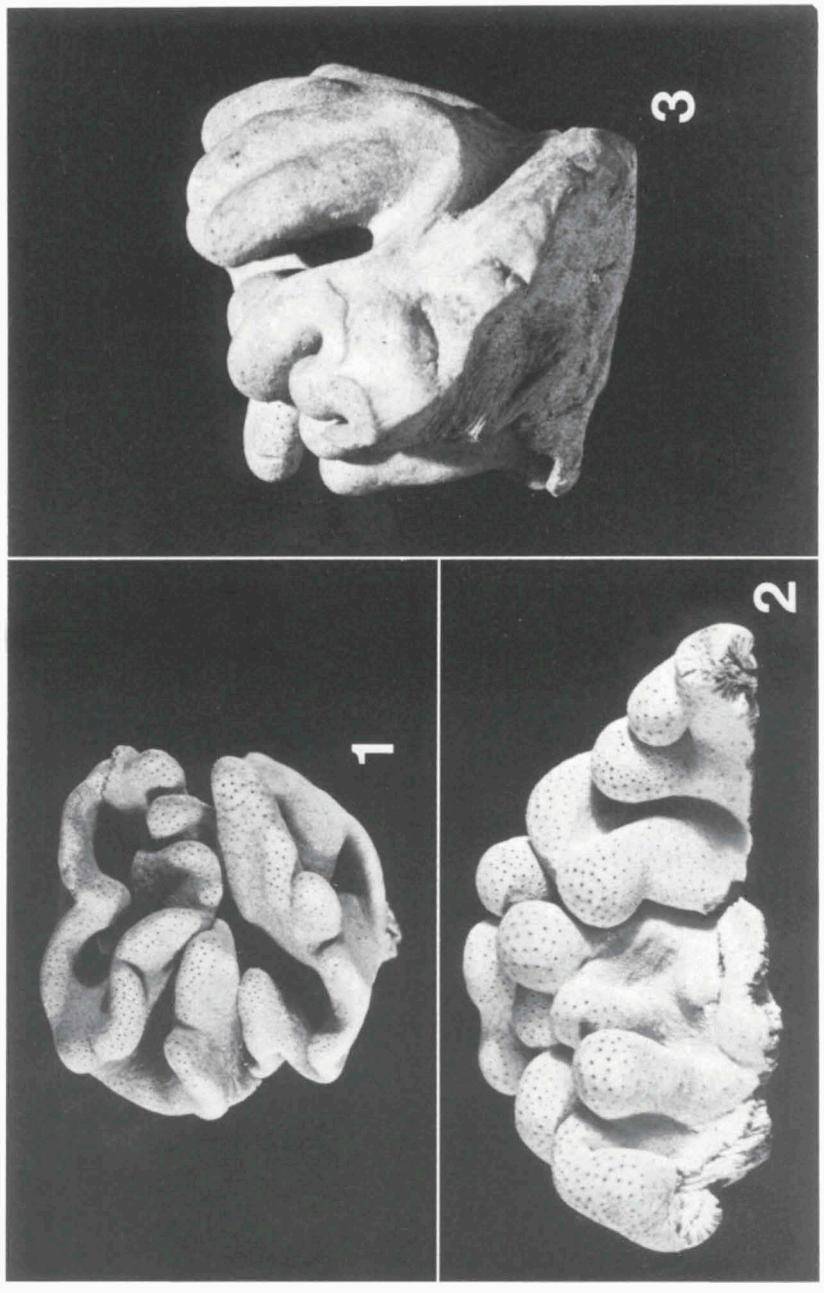
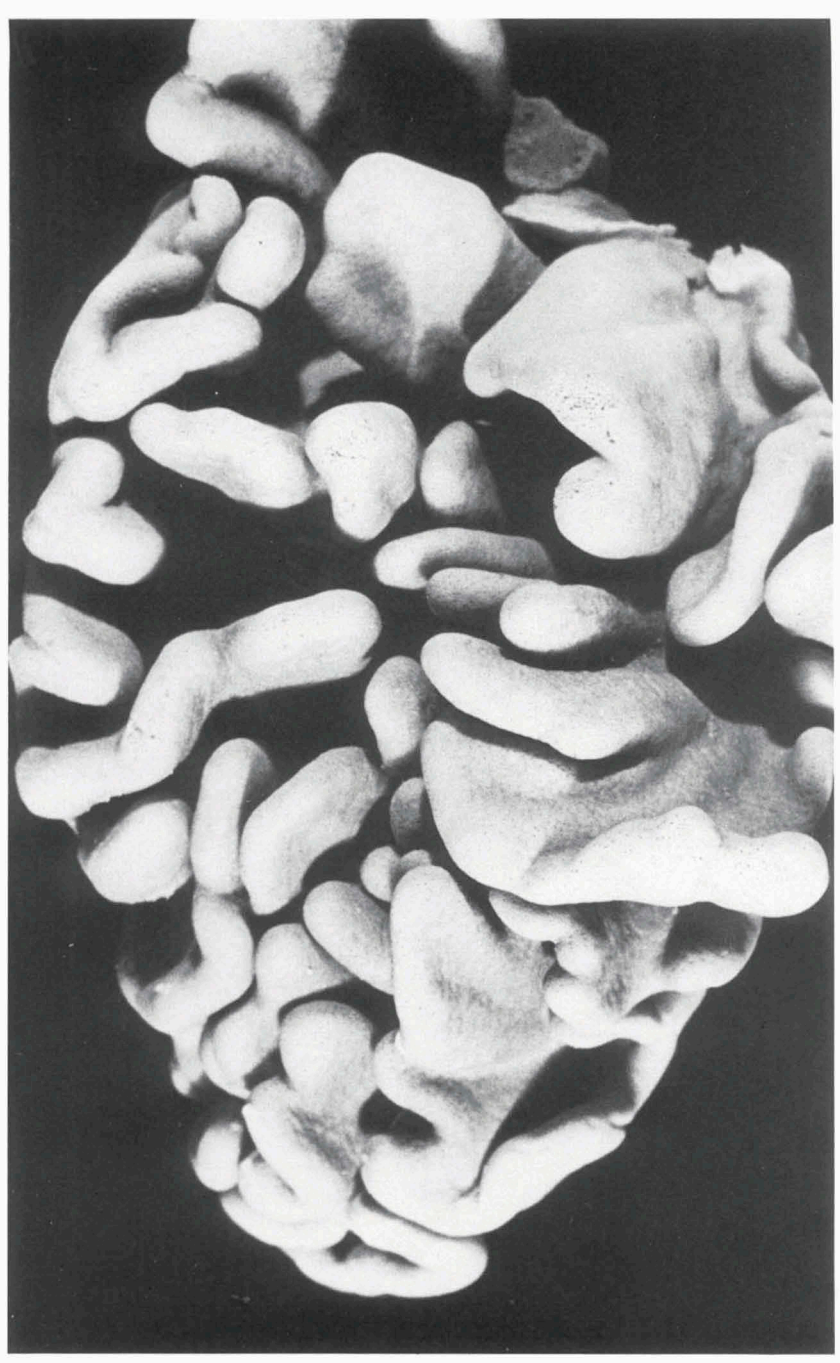


Fig. 1. *L. borbonicum* Von Marenzeller, MNHN, × 1. Fig. 2. *L. catalai* Tixier-Durivault, type of "*L. nodosum*" Tixier-Durivault, MNHN, × 1. Fig. 3. *L. catalai* Tixier-Durivault, holotype, MNHN, × 1.

L. compactum Tixier-Durivault, holotype, MNHN, × 1.



L. crassum Von Marenzeller, holotype, NHMW, no. C 2332, × 1.

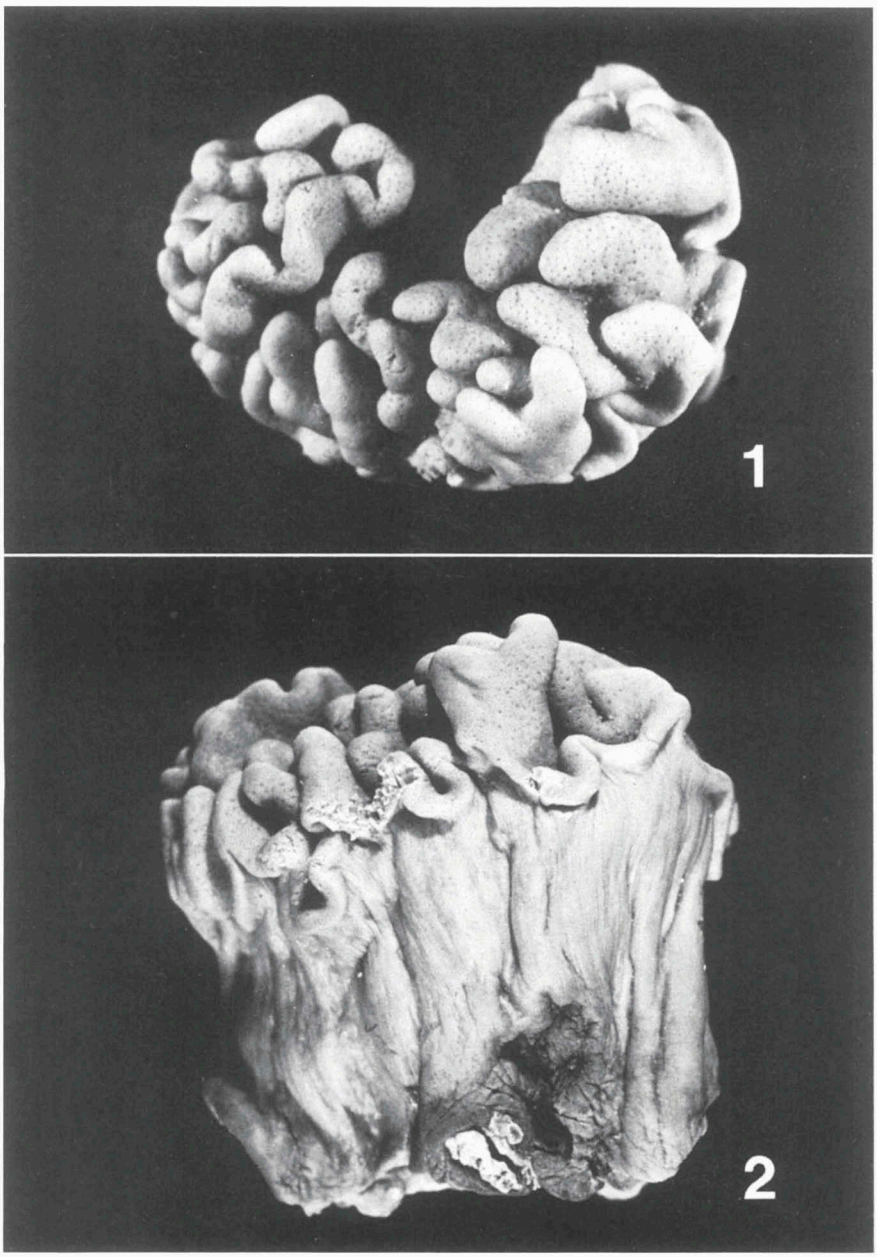


Fig. 1. *L. crassum* Von Marenzeller, syntype of *L. crassum* "var. *cristagalli*" Von Marenzeller, ZMH no. C 2415, seen from above, × 1. Fig. 2. The same colony, side-view, × 1.

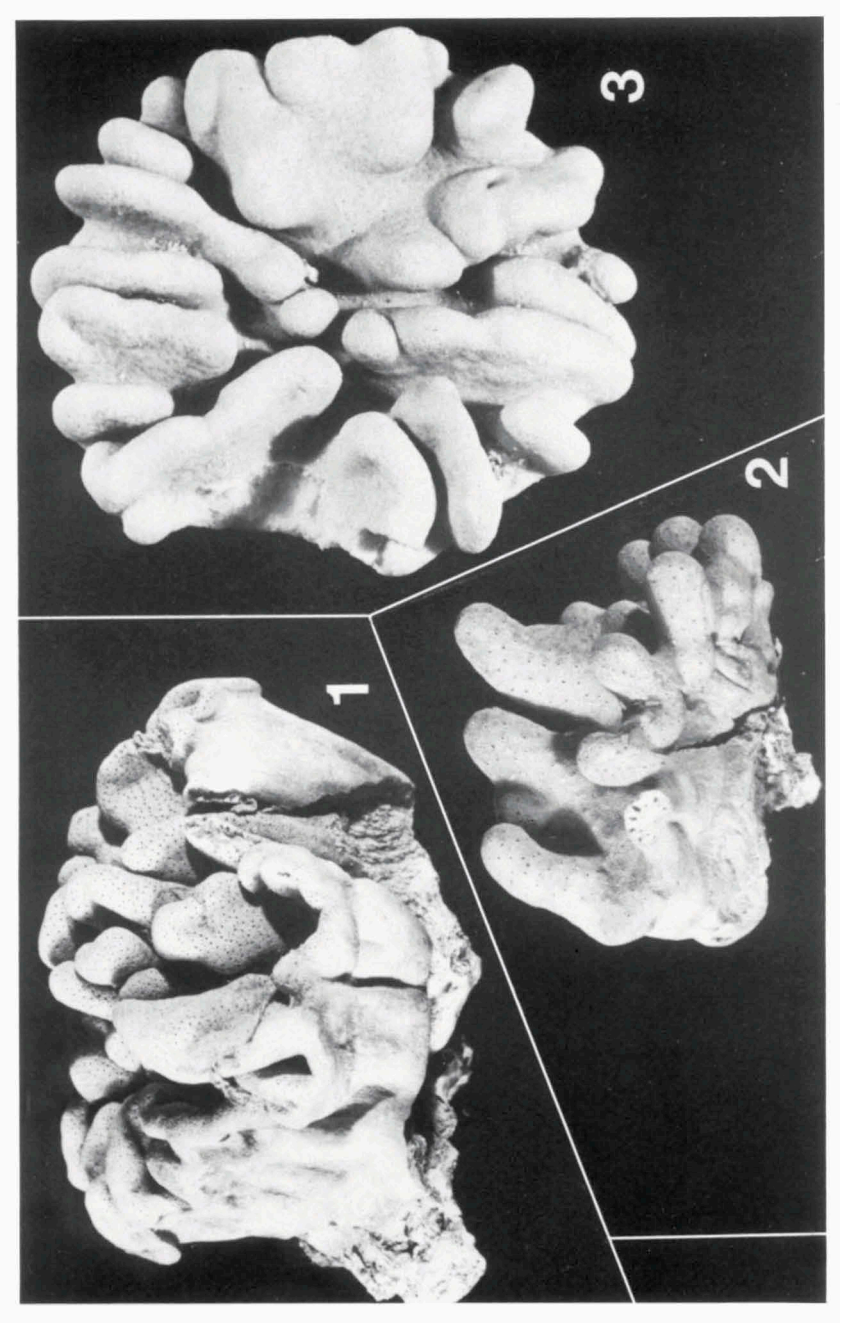


Fig. 1. *L. delectum* Tixier-Durivault, holotype, MNHN, × 1. Fig. 2. *L. cristatum* Tixier-Durivault, holotype, MNHN, × 1. Fig. 3. *L. crassum* Von Marenzeller, syntype of *L. crassum* "var. *sansibaricum*" May, ZMH no. C 2417, × 1.

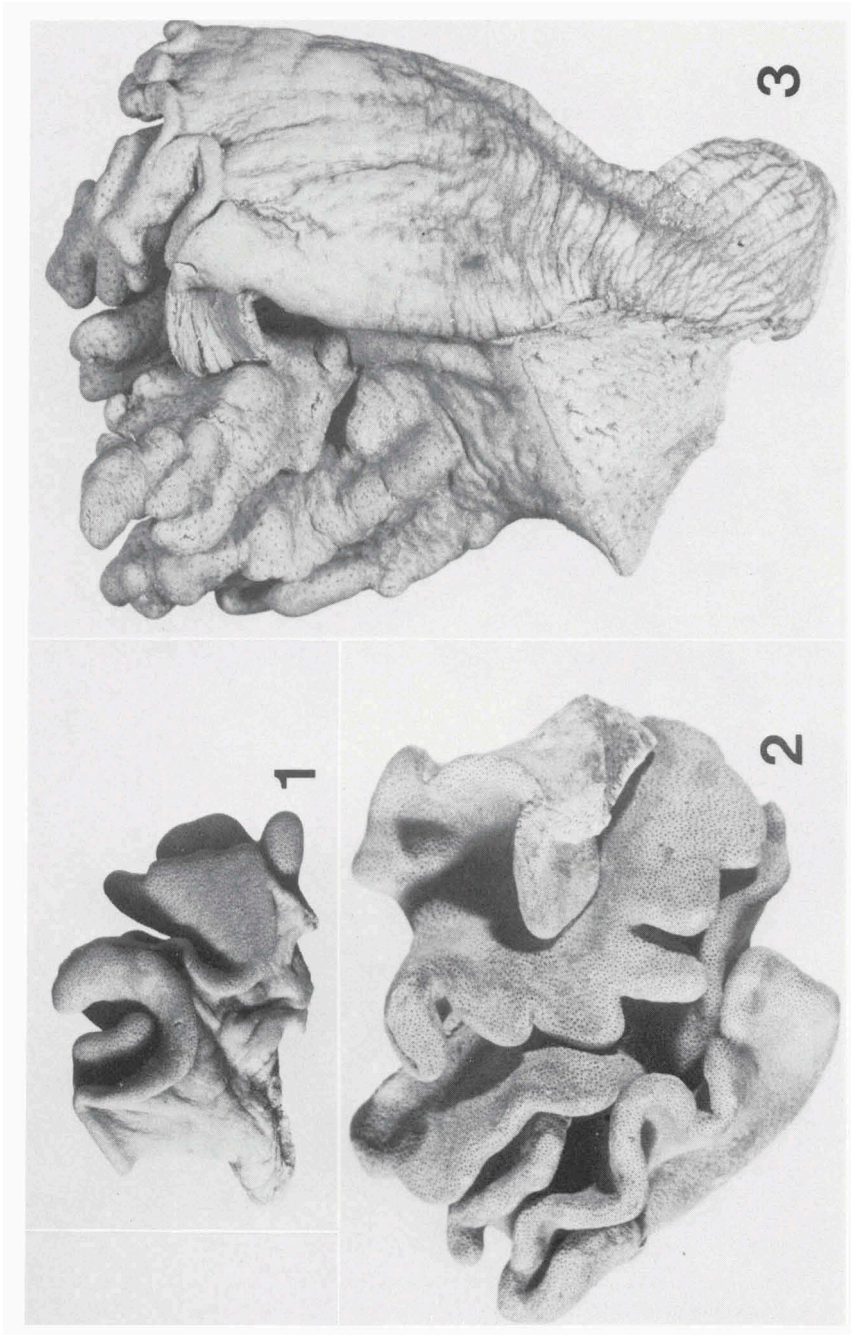


Fig. 1. *L. batarum* Moser, syntype of "*L. sarcophytoides*" Moser, ZMWr no. 75, × 1. Fig. 2. *L. denticulatum* Tixier-Durivault, holotype, MNHN, × 1. Fig. 3. *L. crassum* Von Marenzeller, holotype of *L. crassum* "var. *proliferum*" Von Marenzeller, NHMW no. C 2333, × 1.

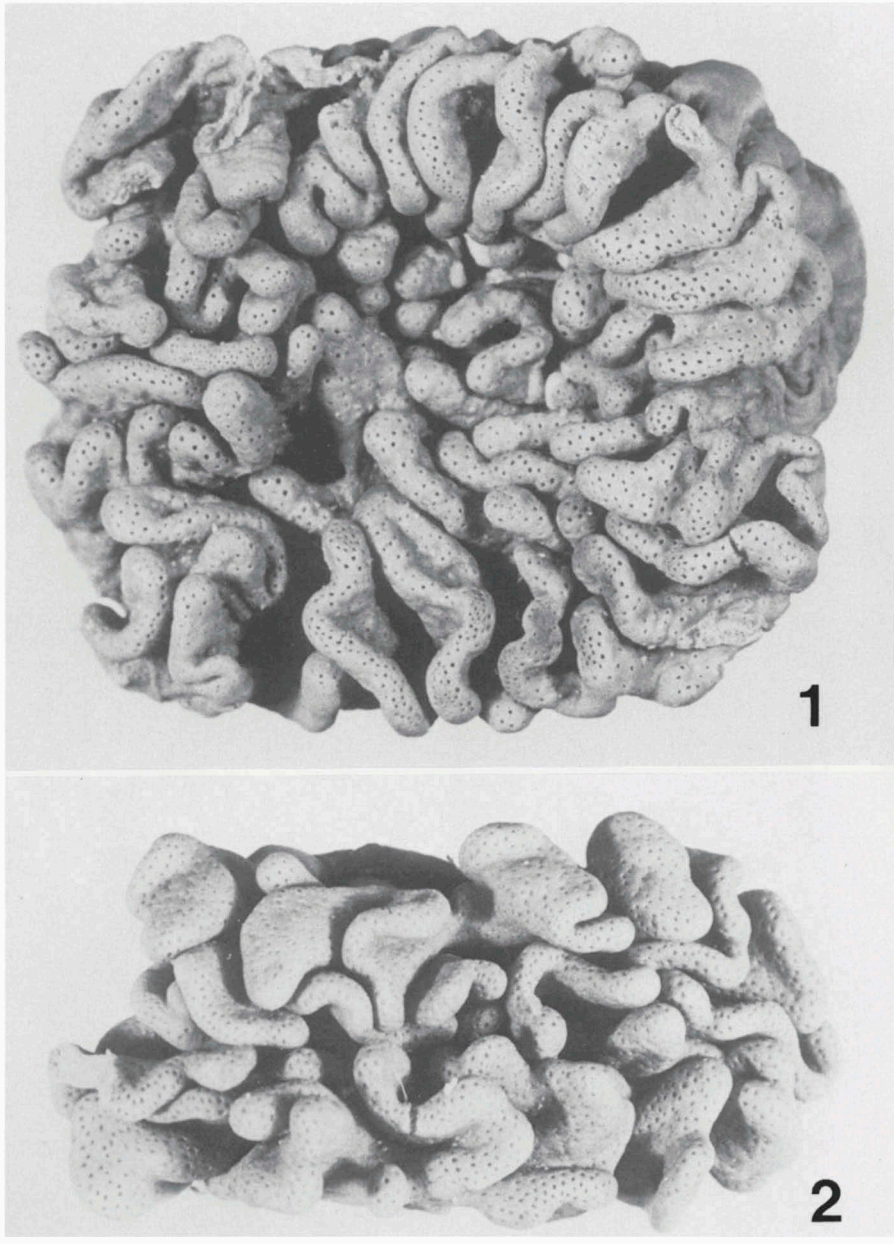


Fig. 1. *L. crebriplicatum* Von Marenzeller, holotype, NHMW no. C 2334, × 1. Fig. 2. *L. crebriplicatum* Von Marenzeller, holotype of "*L. oblongum*" Tixier-Durivault, MNHN, × 1.

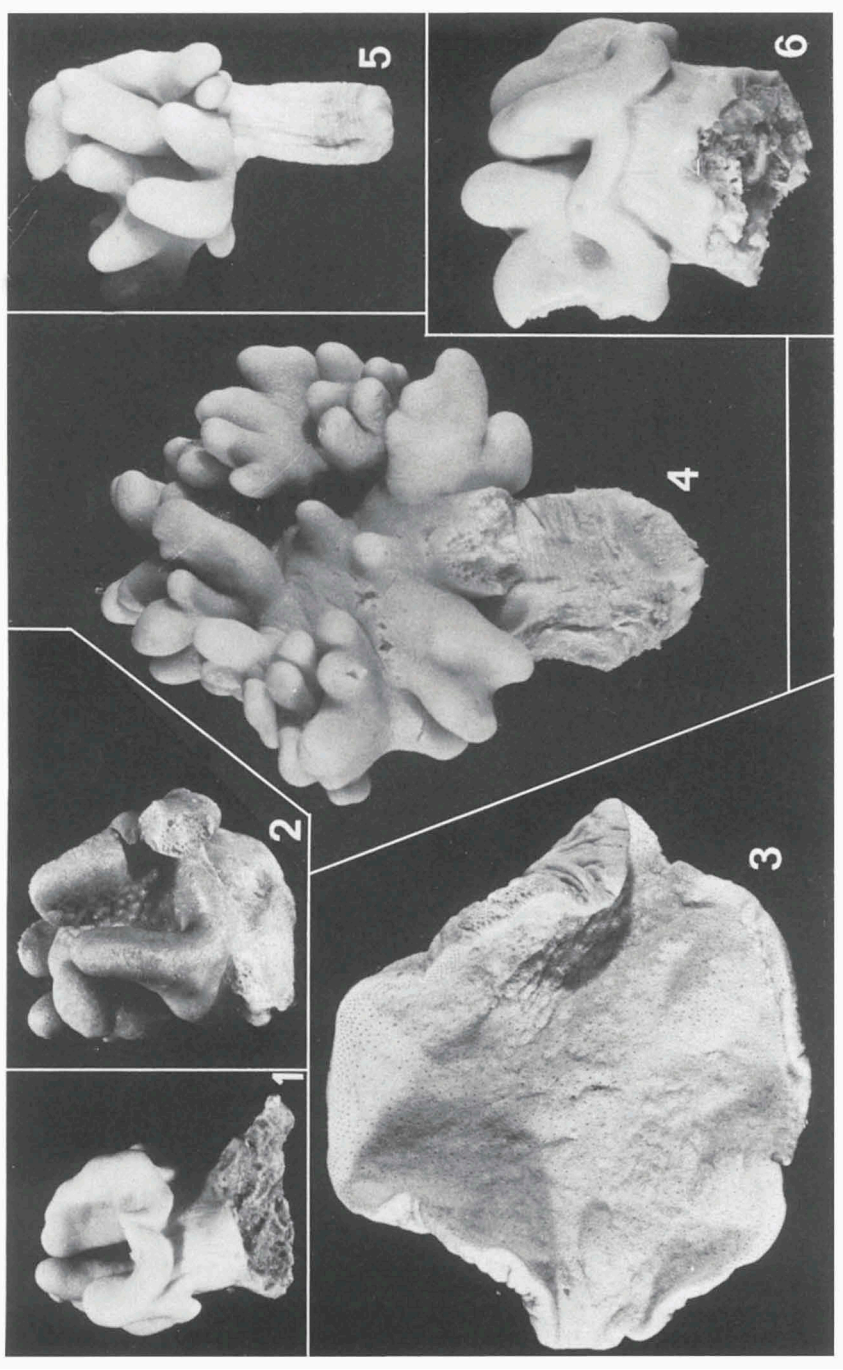
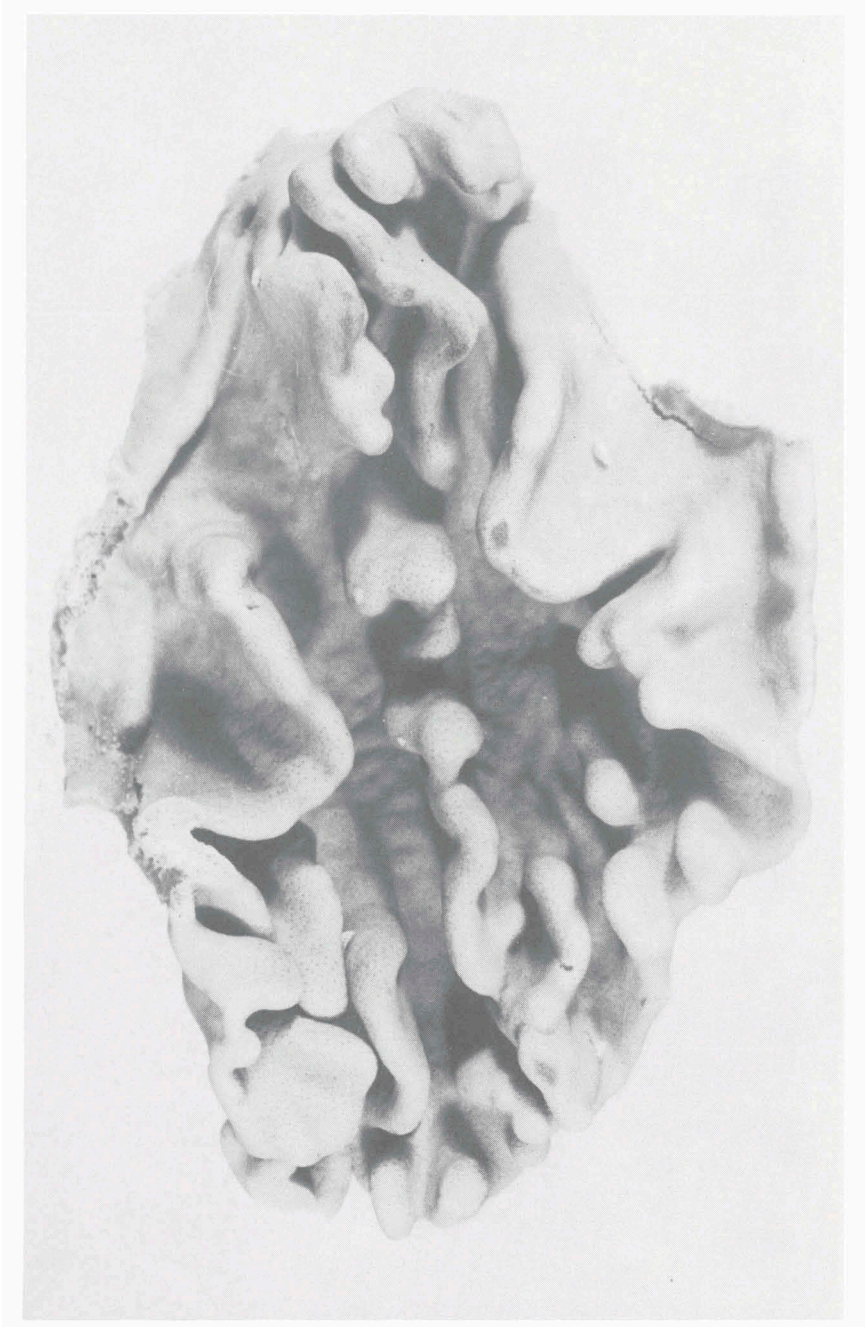
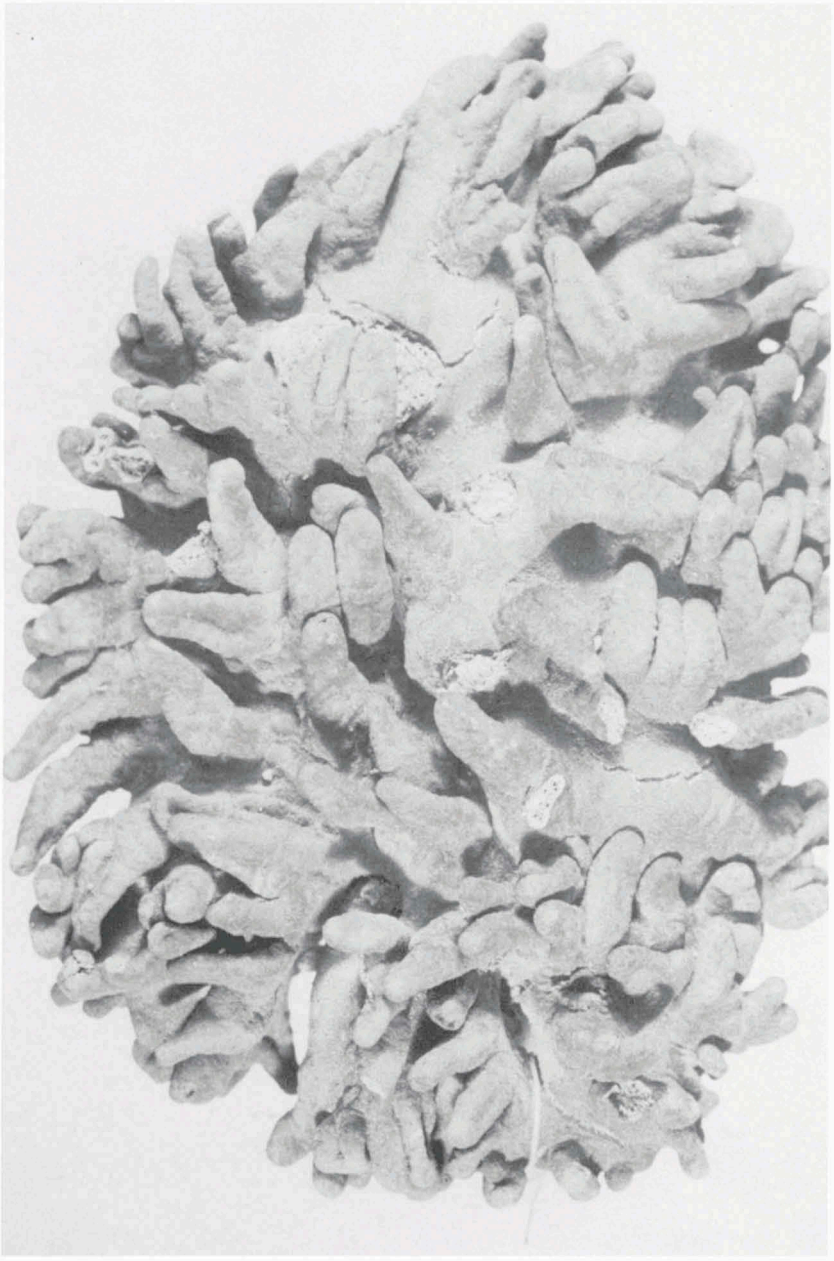


Fig. 1. *L. gazellae* Moser, holotype, ZMB no. 2341, × 1. Fig. 2. *L. gazellae* Moser, type-specimen of "*L. roxasi*" Moser MS, ZMB no. 6415, × 1. Fig. 3. "*L. depressum*" Tixier-Durivault, holotype, MNHN, × 1. Fig. 4. *L. hapalolobatum* sp. nov., holotype, ZMK, × 1. Fig. 5. *L. hapalolobatum* sp. nov., paratype, ZMK, × 1. Fig. 6. *L. ignotum* Tixier-Durivault, lectotype, MNHN, × 1.



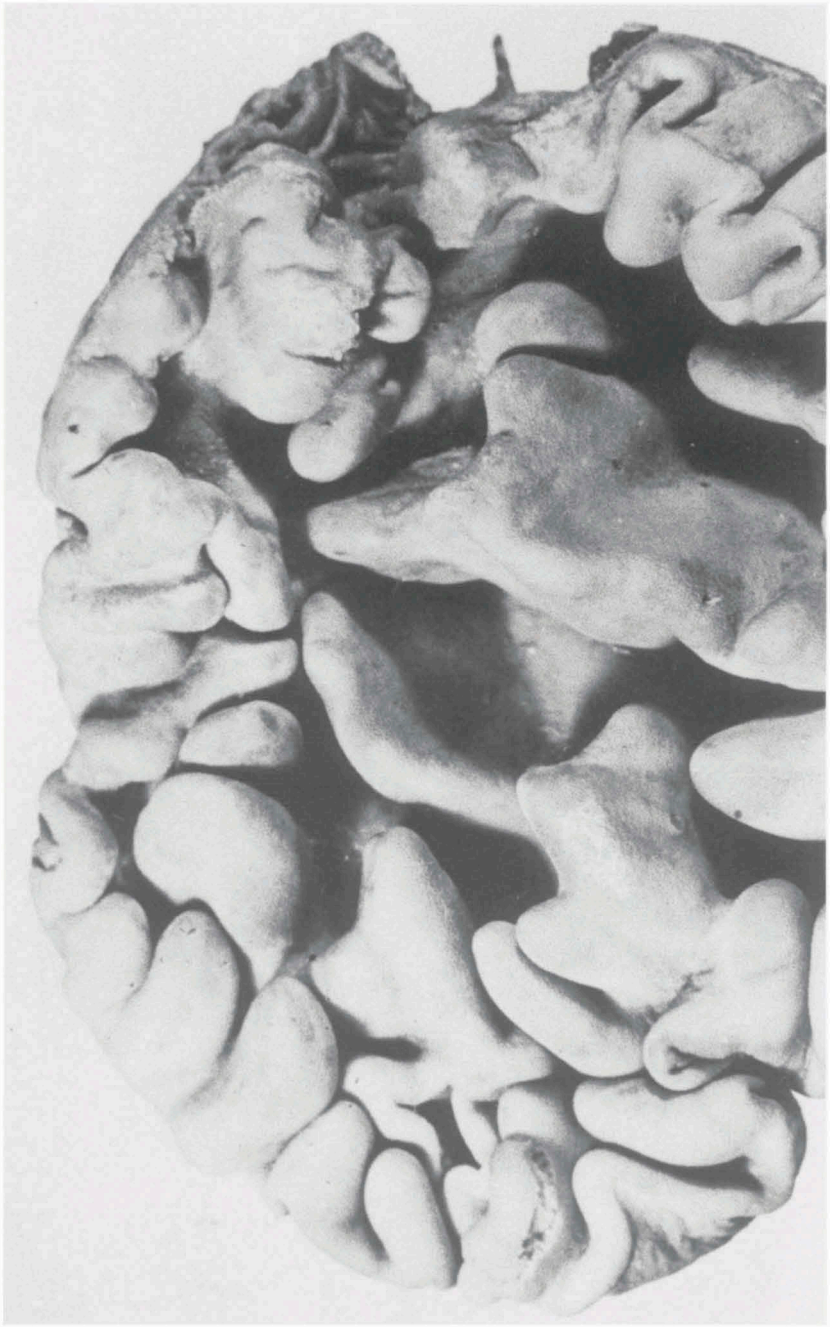
L. durum Tixier-Durivault, lectotype, MNHN, × 1.



L. hirsutum Tixier-Durivault, lectotype, MNHN, × 1.

L. lamarcki Tixier-Durivault, holotype, MNHN, × 0.4.

L. lamarcki Tixier-Durivault, holotype, MNHN, part of the colony, × 1.



L. latilobatum Verseveldt, holotype, RMNH Coel. no. 6625, × 1.

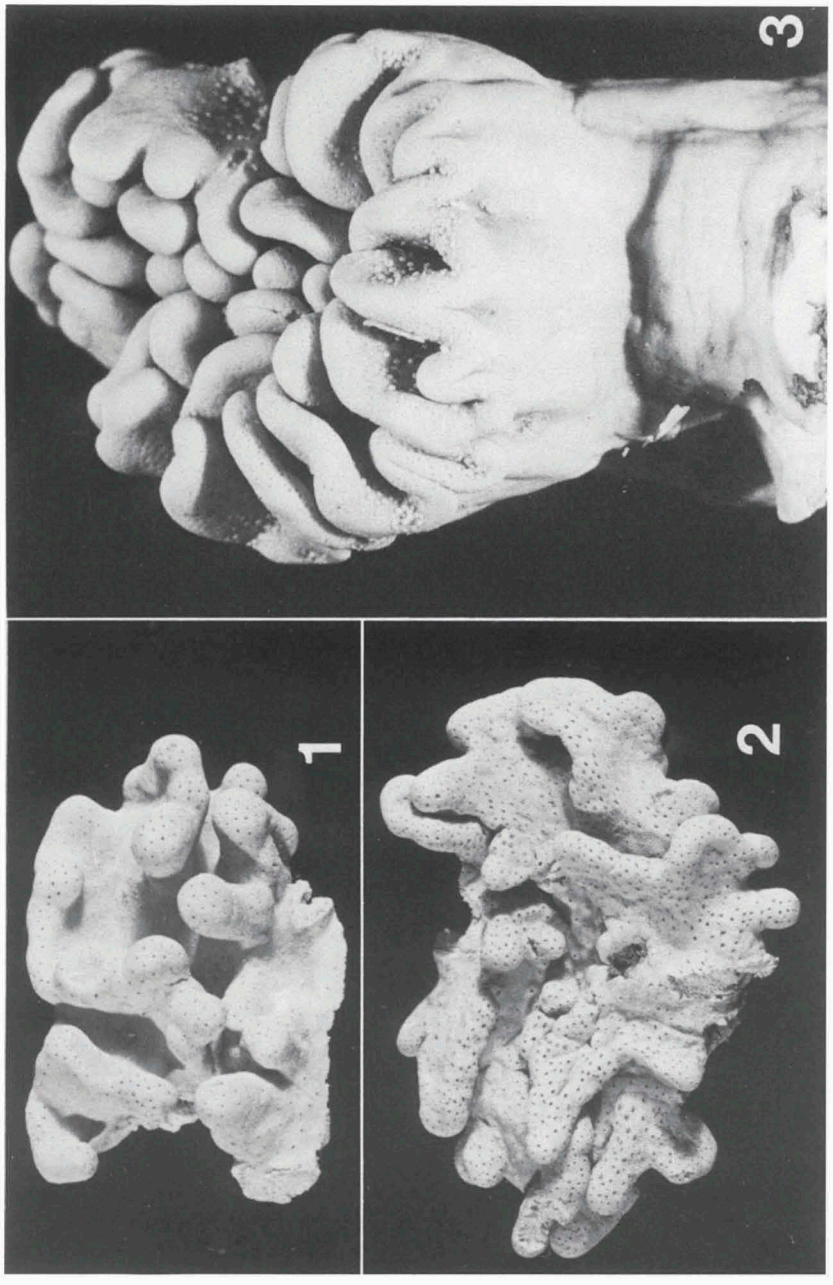
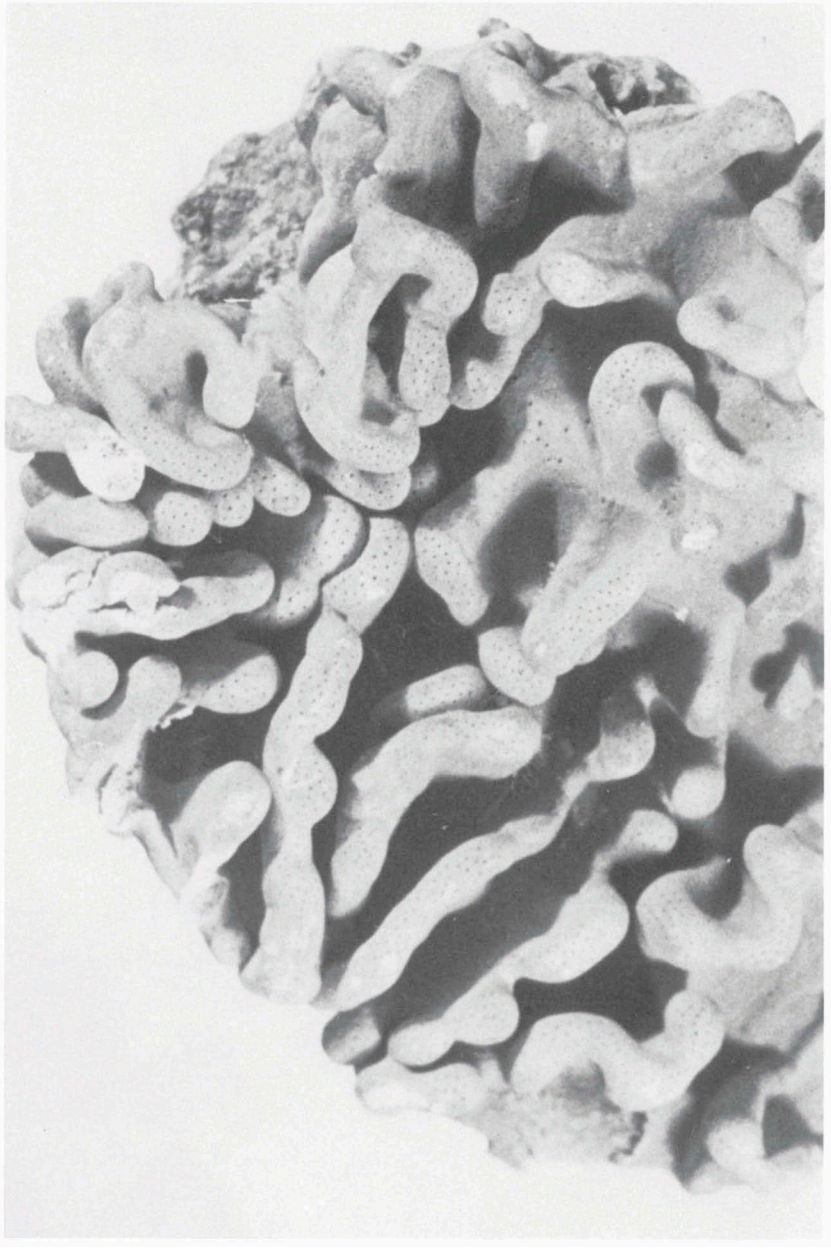


Fig. 1. *L. legitimum* Tixier-Durivault, holotype, MNHN, × 1. Fig. 2. *L. irregulare* Tixier-Durivault, holotype, MNHN, × 1. Fig. 3. *L. jaeckeli* Tixier-Durivault, holotype, ZMH C 2419, × 1.



L. meandriforme Tixier-Durivault, holotype, MNHN, × 1.

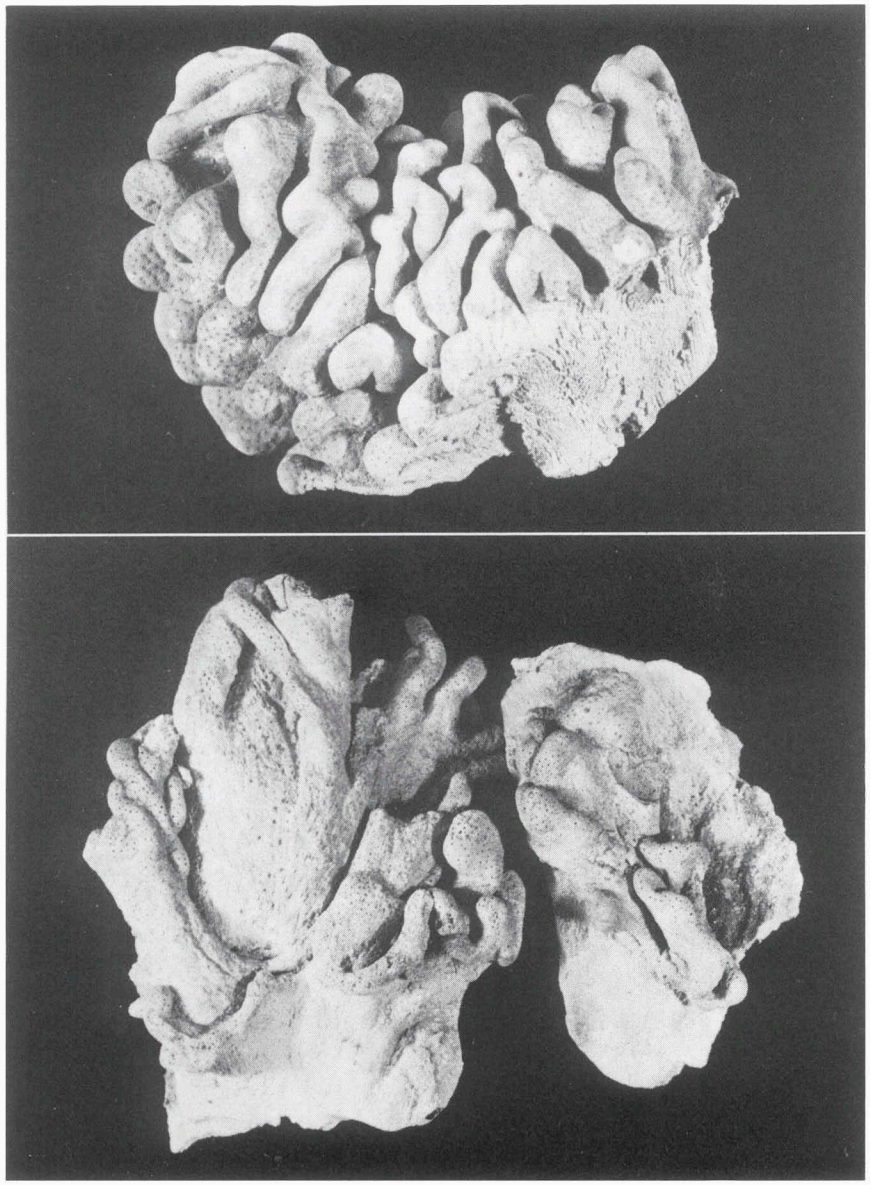


Fig. 1. *L. michaelae* Tixier-Durivault, holotype, MNHN, x 1. Fig. 2. *L. microspiculatum* Tixier-Durivault, holotype, MNHN, × 1.

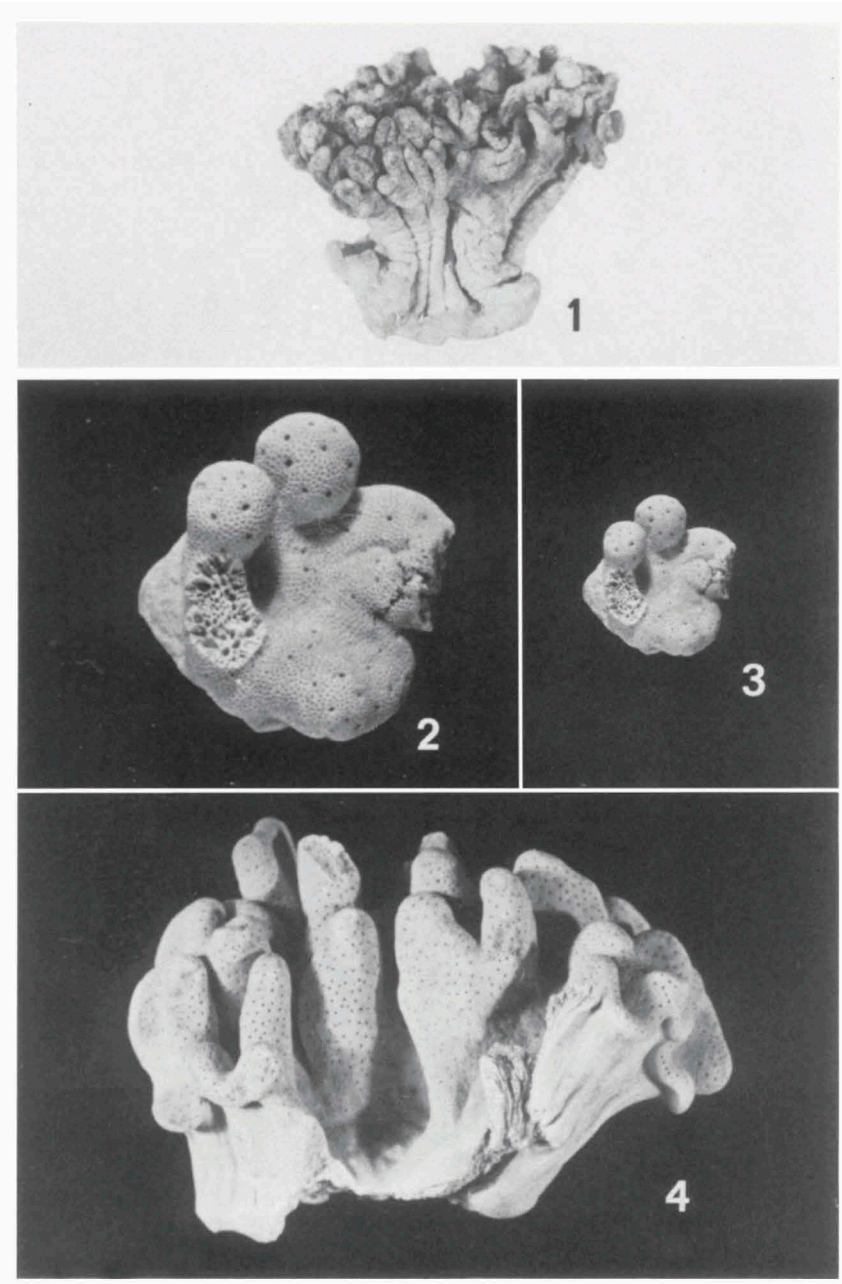
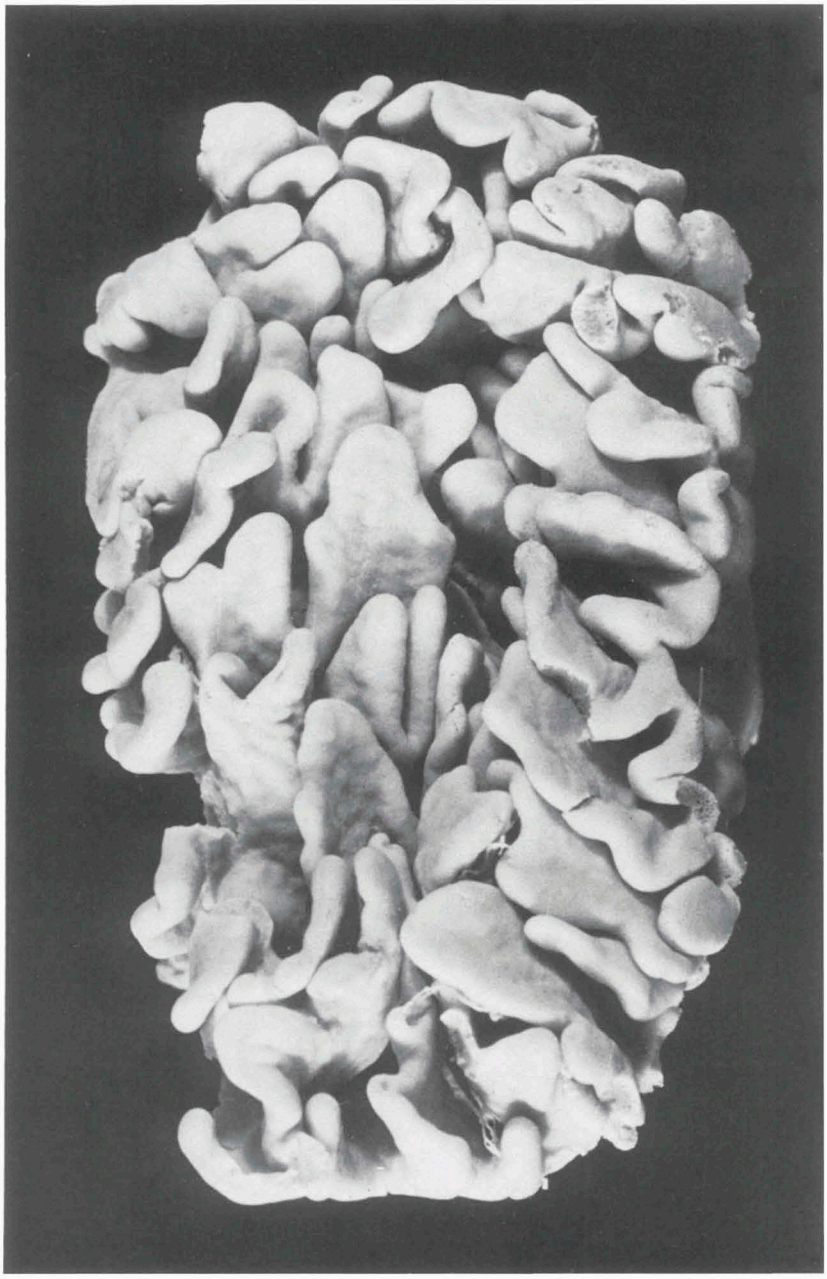


Fig. 1. *L. microlobulatum* Tixier-Durivault, holotype, MNHN, × 1. Fig. 2. *L. pusillum* Tixier-Durivault, holotype, MNHN, × 2. Fig. 3, the same colony, × 1: Fig. 4, *L. solidum* Tixier-Durivault, holotype, MNHN, × 1.



L. mirabile Tixier-Durivault, holotype, MNHN, × 1.

L. patulum Tixier-Durivault, holotype, MNHN, × 1.

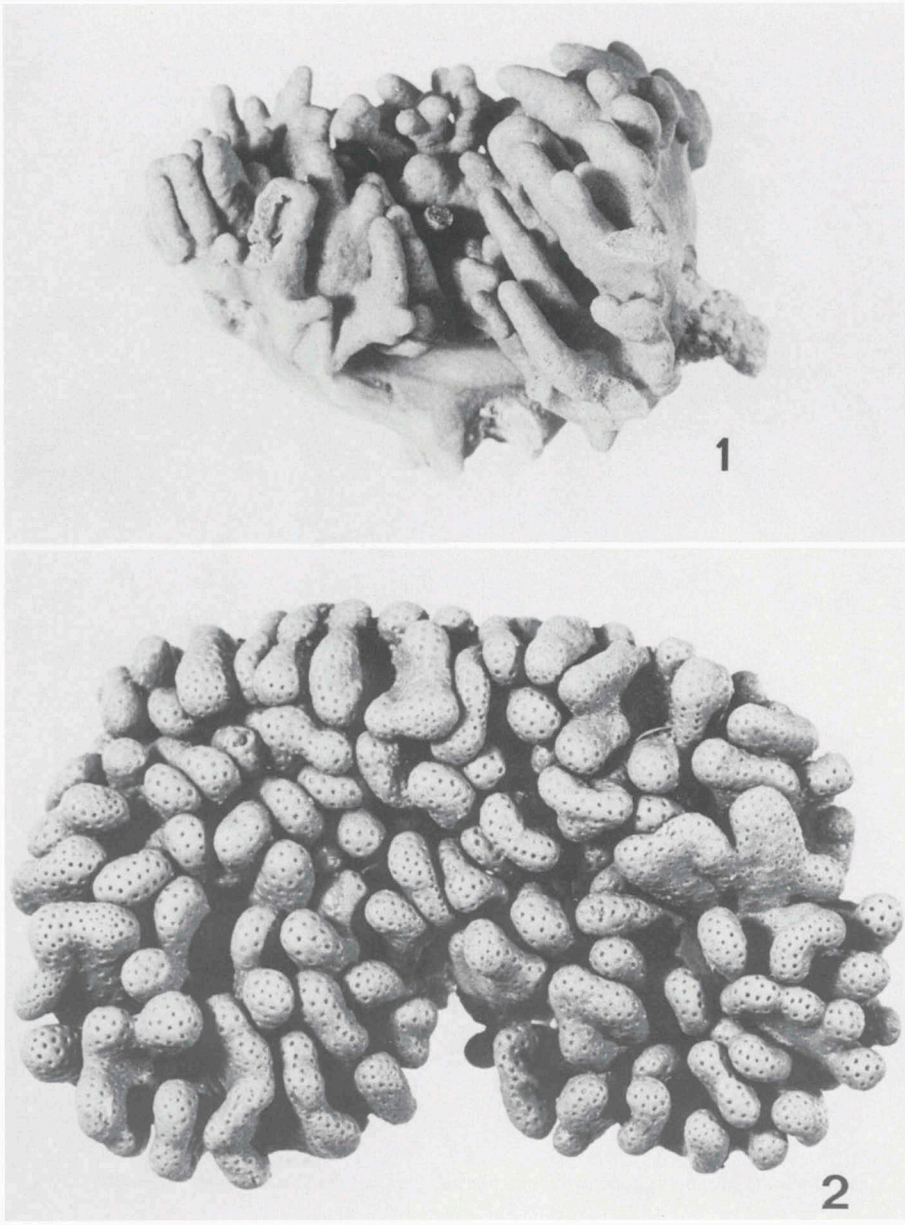
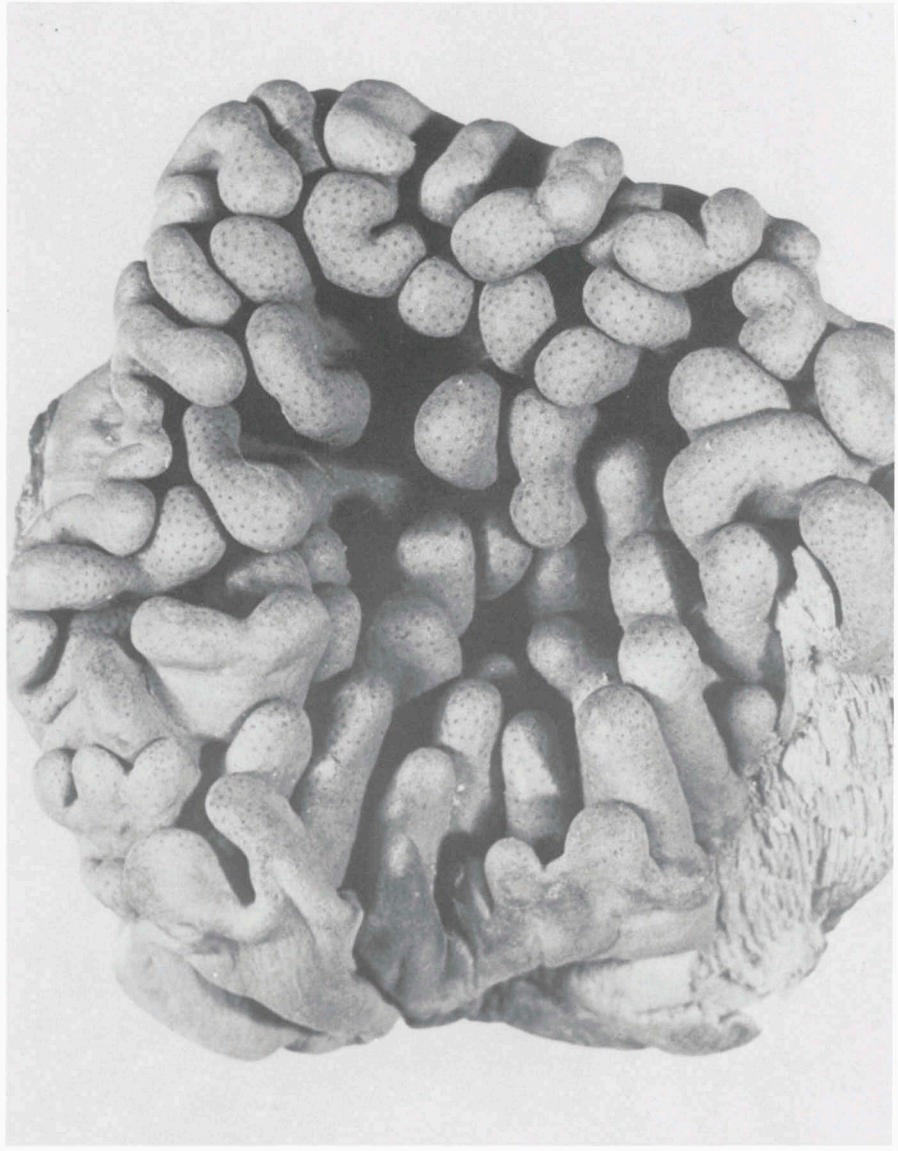


Fig. 1. *L. pauciflorum* (Ehrenberg), syntype of *L. pauciflorum* "var. *philippinense*" Moser, ZMWr no. 76, × 1. Fig. 2. *L. pauciflorum* (Ehrenberg), lectotype, ZMB no. 296, × 1.



L. pauciflorum (Ehrenberg), type of *L. pauciflorum* "var. *validum*" Von Marenzeller, NHMW no. C 2340, × 1.

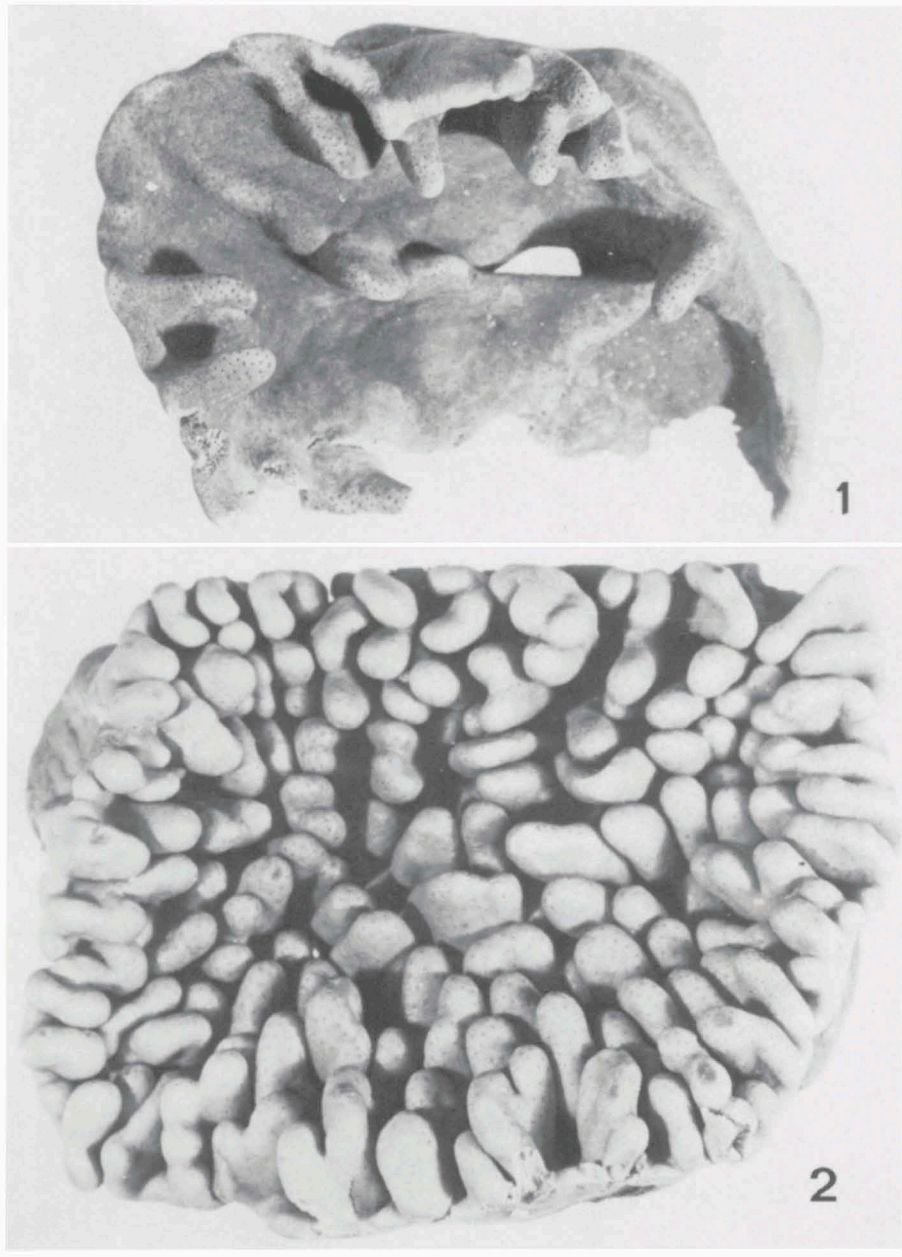
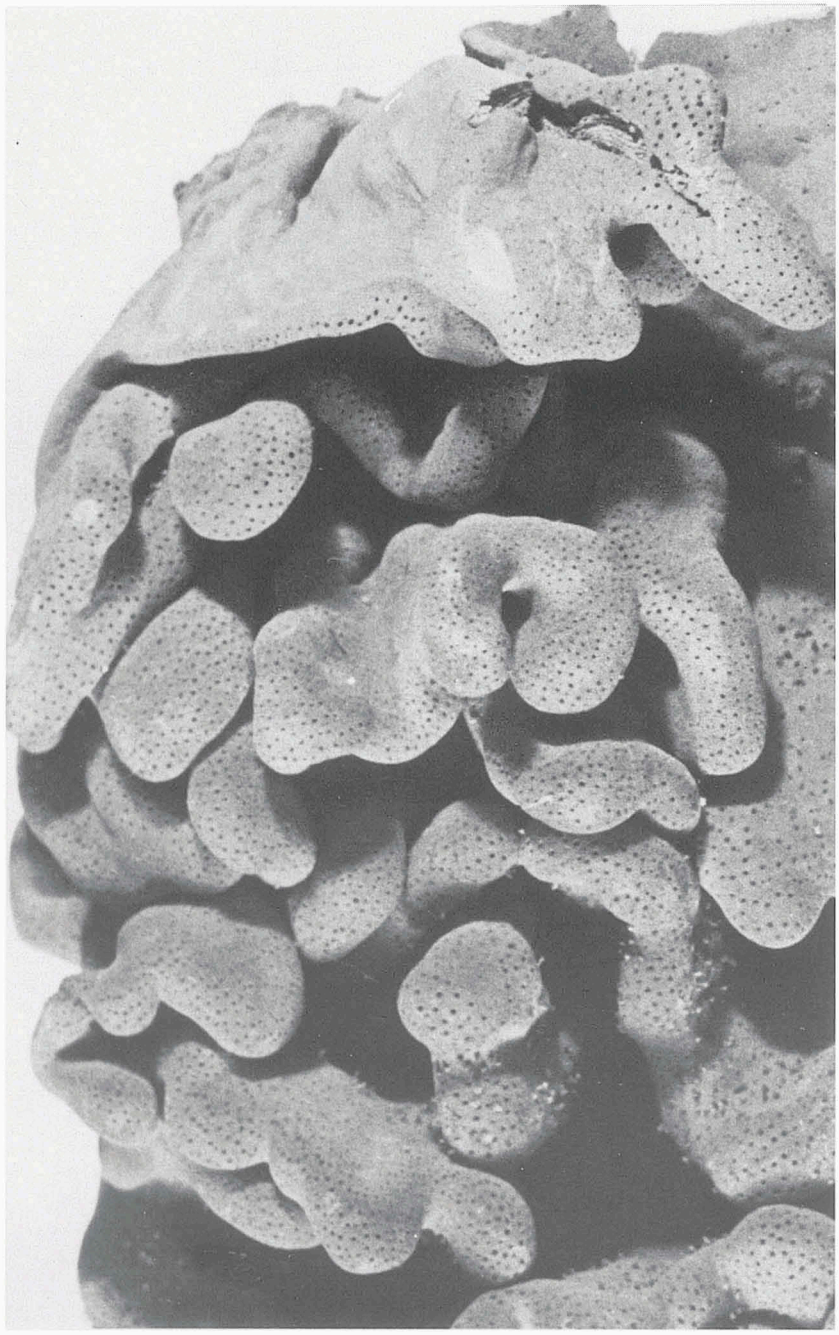


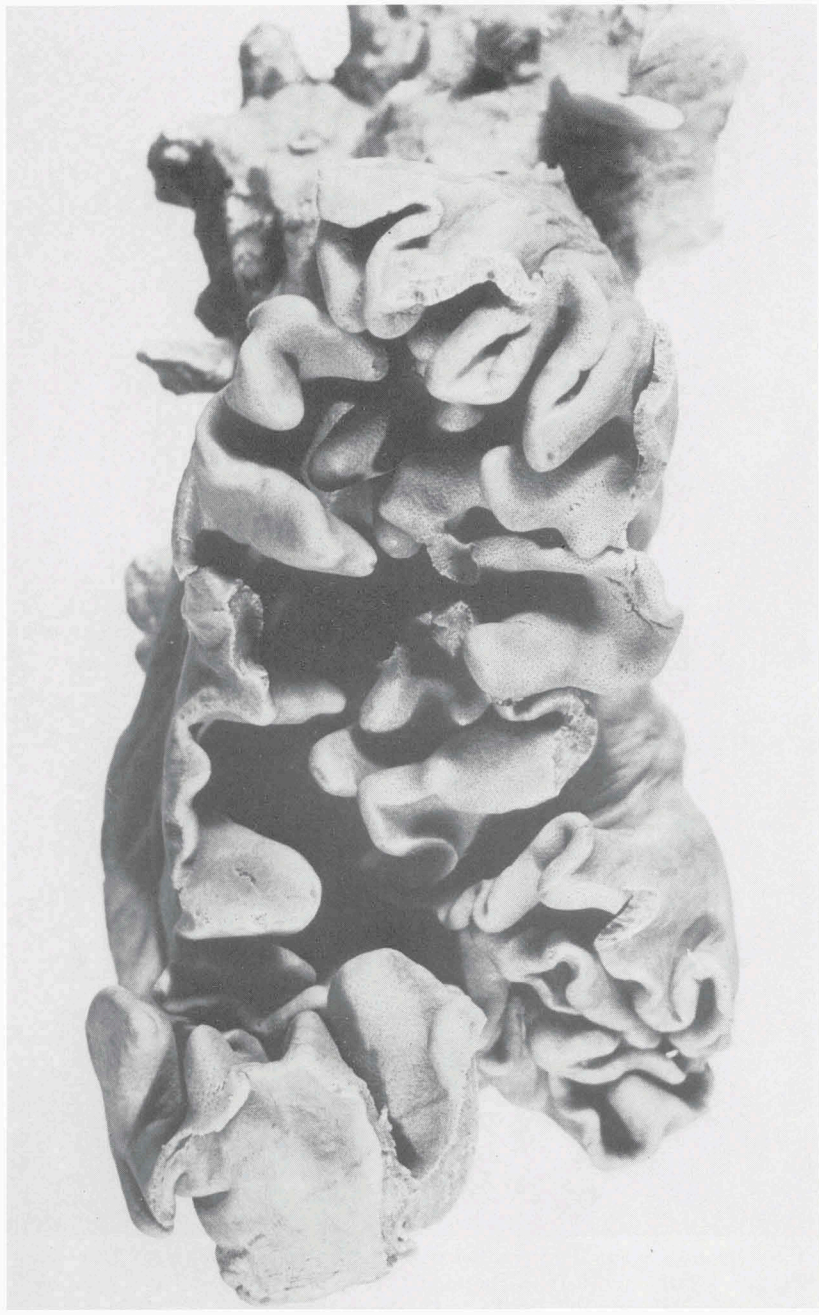
Fig. 1. *L. planum* Tixier-Durivault, holotype, MNHN, × 1. Fig. 2. *L. strictum* Tixier-Durivault, lectotype, MNHN, × 1.

L. ransoni Tixier-Durivault, lectotype, MNHN, × 1.



L. ransoni Tixier-Durivault, syntype of *"L. robustum"* Tixier-Durivault, MNHN, × 1.

L. sarcophytoides Moser, holotype, ZMB no. 6416, side-view, × 1.



L. sarcophytoides Moser, holotype, ZMB no. 6416, seen from above, × 1.

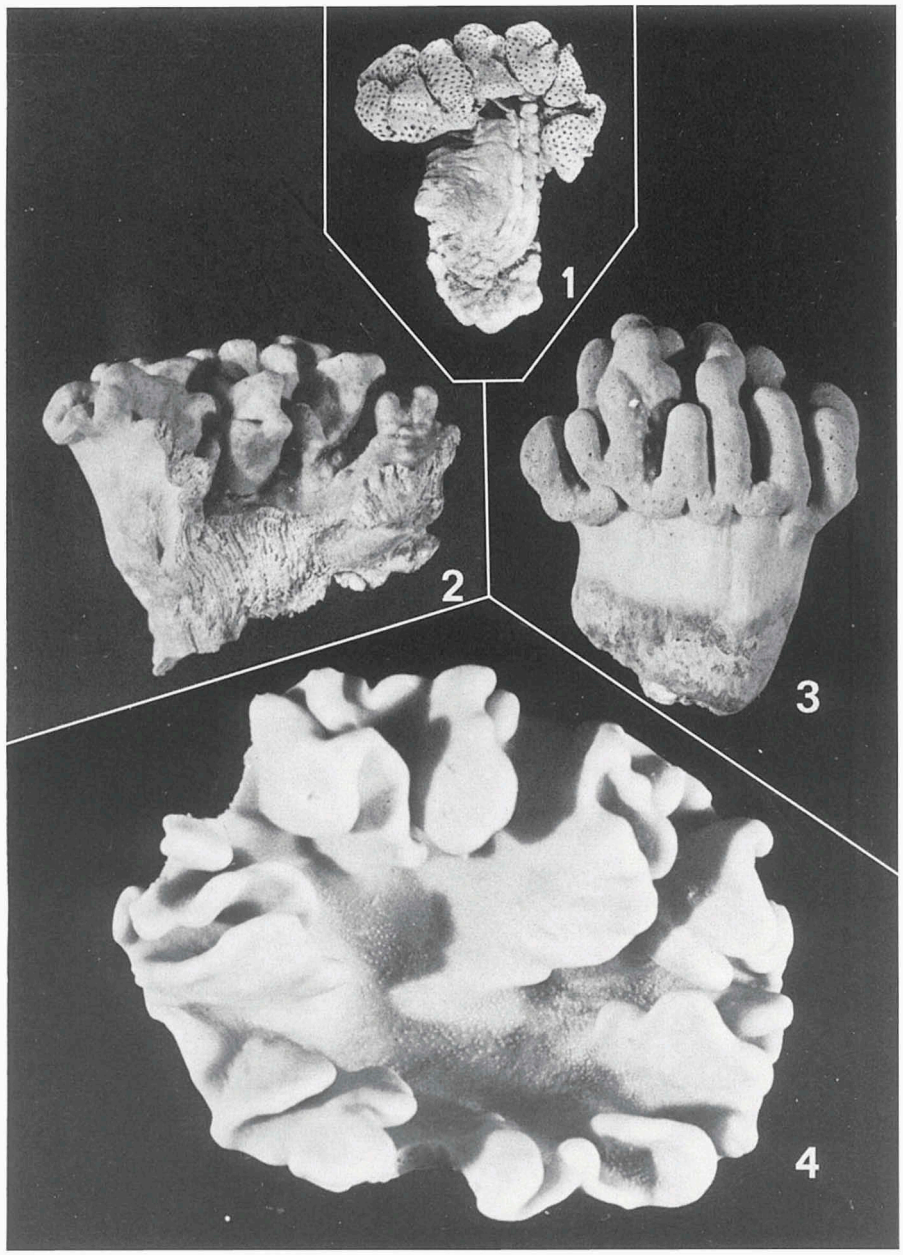
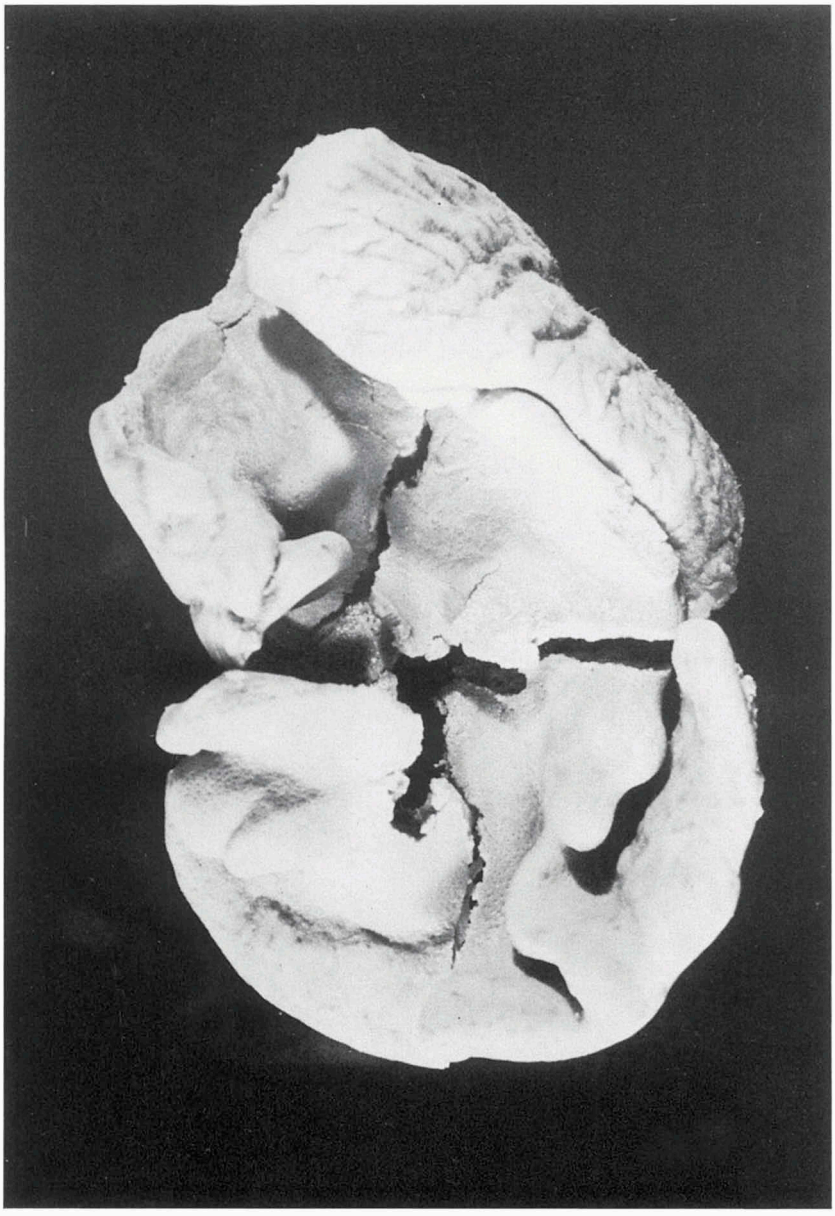


Fig. 1. *L. proprium* Tixier-Durivault, holotype of *"Sarcophyton proprium"* Tixier-Durivault, MNHN, × 1. Fig. 2. *L. verum* Tixier-Durivault, lectotype, MNHN, × 1. Fig. 3. *L. salvati* Tixier-Durivault, holotype, MNHN, × 1. Fig. 4. *L. schoedei* Moser, holotype, ZMB no. 6417, × 1.



L. variatum Tixier-Durivault, holotype, MNHN, × 1.

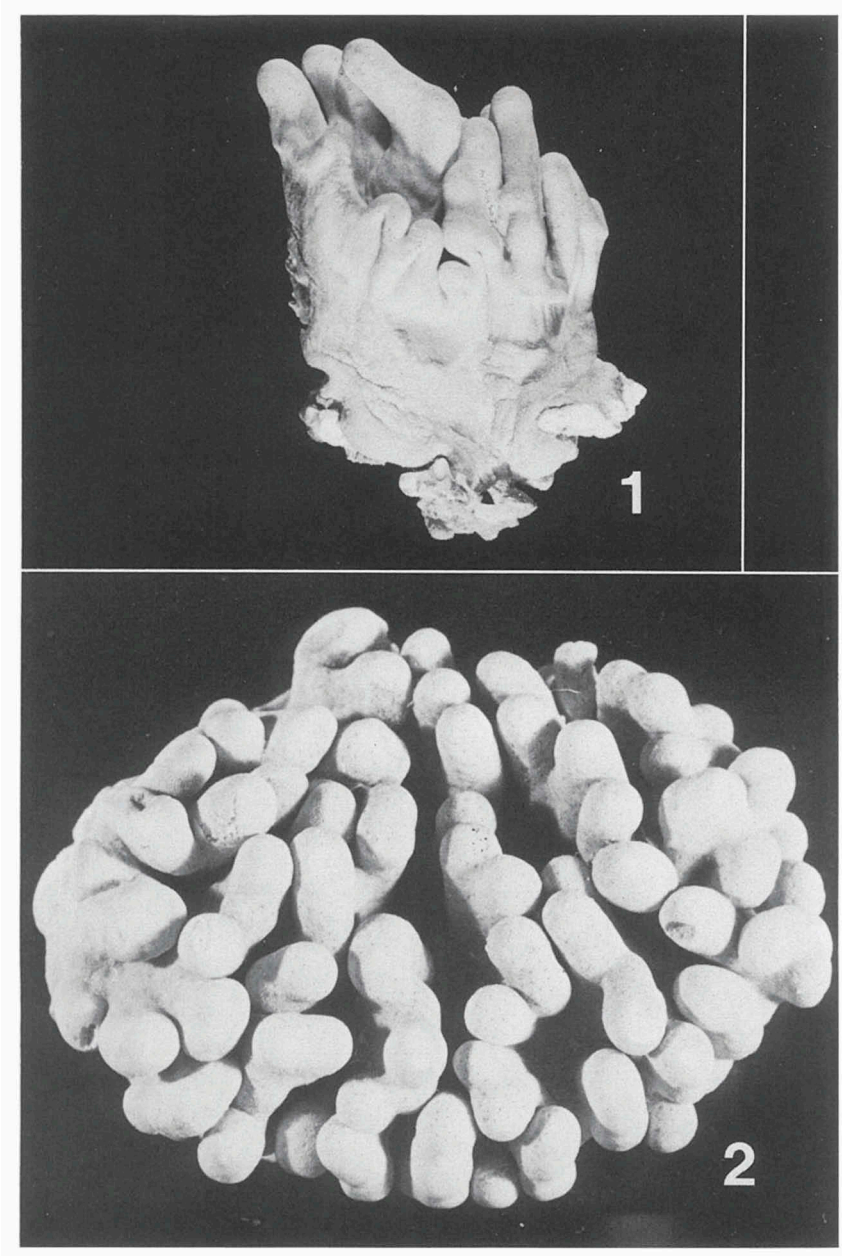


Fig. 1. *L. varium* Tixier-Durivault, holotype, MNHN, × 1. Fig. 2. *L. varium* Tixier-Durivault, holotype of *"L. spissum"* Tixier-Durivault, MNHN, × 1.

L. venustum Tixier-Durivault, holotype, MNHN, × 1.