A REDESCRIPTION OF *SOLANDERIA GRACILIS* DUCHASSAING & MICHELIN, 1846, AND GENERAL NOTES ON THE FAMILY SOLANDERIIDAE (COELENTERATA: HYDROZOA)[1]

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ABSTRACT

The little-known hydroid, *Solanderia gracilis* Duchassaing & Michelin, 1846, is redescribed on the basis of material recently collected at St. John, Virgin Islands, and found to be generically identical with *Dendrocoryne* Inaba, 1892, from the western Pacific, which thus becomes a junior synonym. *Rosalinda* and *Chitina,* the two other genera of the family Solanderiidae, are described and discussed, and the species assigned to them are considered to the extent permitted by the present state of knowledge. Keys are presented to the genera and to the recognizable species of *Solanderia.*

INTRODUCTION

The family Solanderiidae Marshall, 1892, includes a number of curious hydroid zoophytes that by the remarkable structure of the mesogloeal, chitinized skeleton and their mode of growth occupy an isolated position. This skeleton, composed of anastomosing, chitinized fibres, permeated and externally covered by the coenosarc, in dried condition has many features in common with the external appearance of many gorgonians. In fact the type species of the genus *Solanderia, Solanderia gracilis* Duchassaing & Michelin, was described as long ago as 1846 as a gorgonid and its place amongst the Hydroida has become clear only since the description of the soft parts of related species. The structure of the soft parts of *Solanderia gracilis* so far has remained unobserved and the object of the present note is to fill this gap and to present some general remarks on the family Solanderiidae.

For the material upon which the present notes are based I am indebted to the authorities of the United States National Museum, Smithsonian Institution. The specimens of *Solanderia gracilis* described below were collected during the course of a marine biological survey of the Virgin Islands, conducted by the Institute of Marine

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Science of the University of Miami under the sponsorship of the National Science Foundation and the Dingell-Johnson Program of the Virgin Islands. The specimens of *Solanderia secunda* were obtained at Ifaluk Atoll, Caroline Islands, during the fourth field season of the Coral Atoll Program conducted by the Pacific Science Board (National Academy of Sciences—National Research Council) under the sponsorship of the Office of Naval Research. I am particularly grateful to Frederick M. Bayer, formerly of the U. S. National Museum, now Research Associate Professor of the Marine Laboratory, Institute of Marine Science, University of Miami, who in various ways has cooperated in this study.

Historical Resume

For a concise historical review, presenting the state of affairs until 1893, the reader is referred to Weltner (1893, pp. 13-18). The following notes are intended only to summarize the situation and to present some additional information.

In 1846, Duchassaing and Michelin described, under the name *Solanderia gracilis,* a zoophyte the structure of which was compared both with *Corallium* and with *Melitaea* and said to be intermediate between these two gorgonians. The specimen(s) originated from the West Indian island of Guadeloupe; the material was deposited in the Muséum National d'Histoire Naturelle in Paris, whilst some of their material undoubtedly reached the Museo di Zoologia della Università di Torino in Italy. The material in the Paris Museum was subsequently studied by Haime and reported upon by Milne Edwards (1857, p. 189) as unmistakable colonies of Gorgonacea. Some of the material in the Turin Museum was sent by Professor Mich. Lessona to A. Kölliker, (cf. Kölliker, 1871, p. 12) who described and figured sections through the dried stem (l. c., p. 10 et seq., pl. 3 figs. 1, 2), representing the first published figures of *Solanderia gracilis.* Kölliker reached the conclusion that *Solanderia gracilis* represented a horny sponge closely allied to the family Ceratelladae Gray, 1868 (vide infra). Two species assigned to *Solanderia* since its foundation by Duchassaing and Michelin, viz. *Solanderia verrucosa* Möbius (1861, p. 3) and *Solanderia frauenfeldii* Kölliker (1865, p. 141) were removed from the genus *Solanderia* by Kölliker in 1871 and recognized as proper Gorgonaria; they are now known respectively as *Spongioderma verrucosum* (Möbius, 1861) and *Titanideum frauenfeldii* (Kölliker, 1865). The material of *Solanderia gracilis* studied by Kölliker was

deposited in the Zoological Museum at Munich, where it was rediscovered and redescribed by Stechow (1913, p. 18, figs. 1, 2) but unfortunately both description and drawings refer only to sections through a dried stem. No original observations on the structure of *Solanderia gracilis* have since been published.

Several genera established as "horny sponges" show in their skeletal structure an unmistakable resemblance to that of *Solanderia gracilis* as it is understood at present. These genera are *Ceratella* Gray (1868, p. 577, type species, by monotypy, *Ceratella fusca* Gray, 1868), *Dehitella* Gray (1868, p. 579, type species, by monotypy, *Dehitella atrorubens* Gray, 1868), *Chitina* Carter (1873, p. 13, type species, by monotypy, *Chitina ericopsis* Carter, 1873), and *Dendrocoryne* Inaba, 1892, type species, by present designation, *Dendrocoryne misakinensis* Inaba, 1892). Of these genera, only *Dendrocoryne* was described from freshly preserved material with polyps and gonophores; it was immediately recognized as a hydroid related to *Coryne* Gaertner, 1774. Goto (1897, p. 103), who published a translation of Inaba's original Japanese descriptions, suggested that the genus *Dendrocoryne* (misspelled *Deudrocoryne* in Goto's paper) be placed in a separate family Dendrocorynidae Goto, 1897. Brazier (1887, pp. 575, 576) and later on Bale (1888, p. 749) briefly described preserved specimens of *Ceratella fusca* Gray, 1868, which conclusively proved the relationship of the genus *Ceratella* with the hydroid zoophytes, as had already been suggested by Carter (1873, p. 8) on account of the presence of nematocysts in Gray's dried specimens of *Ceratella fusca* and *Dehitella atrorubens.* Spencer (1891, pp. 9-16) minutely described *Ceratella fusca* from well preserved material and showed that *Ceratella* and its allies represent a separate family, Ceratellidae, Gray, 1868 (correct spelling of Ceratelladae Gray, 1868, p. 577), which has no relationship whatsoever with the Hydractiniidae, with which family they had been lumped together by Carter (1873, p. 14). Nothing is known of the structure of the soft parts of *Dehitella atrorubens* Gray, 1868, and *Chitina ericopsis* Carter, 1873, and up to the present time well preserved colonies of these species, from which the structure of polyps and gonophores might be described, are fully unknown. Their skeletal structure, nevertheless, suggests that their proper place very probably is in the same family as *Ceratella, Dendrocoryne* and *Solanderia.* For this family the name Ceratellidae has been widely used. The almost universal use of this name has been promoted by the nearly complete oblivion

into which the papers by Duchassaing and Michelin (1846) and by Kölliker (1871) have lapsed. Marshall (1892, p. 10), though still convinced of their "spongy" nature, recognized the great resemblance in skeletal structure between *Solanderia, Ceratella,* and *Dehitella* and proposed to unite these forms in a separate family, Solanderiidae Marshall, 1892. This family name was revived by Stechow (1913, p. 16), and in spite of Hickson's (1910, pp. 34, 35) protestations against it and Totton's (1949, p. 45) complete neglect of this fully legitimate name, it must be used to designate the family of hydroids comprising *Solanderia, Ceratella, Dehitella, Chitina, Dendrocoryne,* et al. This has also been recognized by Rees (1957, p. 526), who applied Marshall's name in his enumeration of the families of capitate hydroids. Another genus of Solanderiidae has recently been introduced by Totton (1949, p. 46) under the name *Rosalinda,* type species *Rosalinda williami* Totton (1949, p. 46). The affinities and species of this genus will be described later on.

Family SOLANDERIIDAE Marshall, 1892

Encrusting or erect and branched, colonial, athecate hydroids with capitate tentacles. In both encrusting and erect forms there is a system of mesogloeal fibres of horny or chitinous appearance, supporting the soft parts. In the encrusting species, the intertwining and anastomosing fibres form a reticulate meshwork attached to the substratum by means of a continuous horny or chitinized membrane. Spines may be produced either by the chitinized membrane or by the trabecles of the meshwork. In the erect colonies, the mass of fibres is often considerable and forms a fan-shaped or bushy structure composed of anastomosing and intertwining, longitudinal and transverse fibres. Here, too, a kind of meshwork results, with openings between the individual fibres. The colony is attached to the substratum (e.g., rocks) by means of a flattened mass of hydrorhizal fibres. In both types, the whole fibrous mass is permeated by the coenosarc, visible at the surface of the colonies as a thin layer supporting the polyps. These are cylindrical structures 0.5 to 3.0 mm in length, with 10 to 50 capitate tentacles. The 4 or 5 oral tentacles are arranged in a whorl; the rest are distributed over the body. In some of the erect forms, the axial skeleton forms a cup-shaped structure under each hydranth (hydrophore); the development of this hydrophore varies considerable in the various species, and it may be completely absent.

As far as is known the species are dioecious, but no differences

between male and female colonies have been observed. In those cases in which the gonophores have been described, they are of eumedusoid nature, globular, shortly stalked to almost completely sessile, with distinct traces of the radial canals but without rudiments of tentacles. They insert directly on the coenosarc.

Representatives of this family have been found in tropical, subtropical and temperate parts of the Atlantic, Indian and Pacific Oceans. The depths recorded extend from the littoral zone down to about 400 m.

Type genus.—*Solanderia* Duchassaing & Michelin, 1846.

Additional genus.—*Rosalinda* Totton, 1949.

Doubtful genus.—*Chitina* Carter, 1873.

KEY TO THE GENERA OF THE FAMILY SOLANDERIIDAE

1. Encrusting species; the axial skeleton in the shape of a meshwork of fibres, covering the substratum and itself covered by a thin layer of coenosarc from which directly rise the hydranths. Polyps large, at least 2.5 mm long, with 30-50 tentacles. ..... *Rosalinda* Totton
1. Erect colonies, rising from a basal mass of hydrorhizal fibres. 2
2. Colonies usually fan-shaped, ramifications more or less in one plane. Polyps 0.5 - 1.5 mm long, with 10-40 tentacles. *Solanderia* Duchassaing & Michelin
2. Colonies of a bushy appearance, with a very thick, cordlike trunk composed of many, strongly intertwining and anastomosing, thick bundles of fibres. Polyps unknown. ..... *Chitina* Carter

Genus *Solanderia* Duchassaing & Michelin, 1846

Solanderia Duchassaing & Michelin, 1946, p. 219.
Ceratella Gray, 1868, p. 579.
Dehitella Gray, 1868, p. 579.
Dendrocoryne Inaba, 1892, nr. 41.
Spongiocladium Jäderholm, 1896, p. 6.

Colonies strongly branched, either fan-shaped, with the ramifications more or less strictly in one plane, or bushy, dichotomously branched colonies. In the fan-shaped colonies there is a main stem, usually branched, rising from a more or less flattened mass of irregularly intertwining hydrorhizal fibres, attaching the colony to the substrate. The main stem may reach a considerable diameter at its base (5-9 mm); the finer polyp-bearing ramifications are much slenderer (100-150 μ). The whole colony is supported by a system of mesogloeal fibres; in the finer ramifications there are longitudinal primary fibres, connected by transversal fibres. In the older (thicker) parts of the colony the thickness of the supporting mass of fibres is considerable and the structure of this axis is complicated. The whole axial mass, nevertheless, is strongly perforated and permeated

by the coenosarc. The polyps, rising from the thin, external covering of coenosarc, show a tendency to biserial arrangement in the main plane of ramification in the colony; they primarily occur along the finer branches and very occasionally on the stems. The place of insertion of the hydranths is either without special axial structure, or marked by a cup-shaped expansion of the axis, named the hydrophore. The development of this hydrophore is different in the various species and may vary from a shallow ring at the base of the hydranth to a produced, cup-shaped mass, supporting the whole hydranth. The polyps are elongated, spindle-shaped structures, 500-1500 μ long, with 10 to 40 capitate tentacles. The 4 or 5 distal tentacles are placed in a whorl surrounding a short, conical peristomal field. The remaining tentacles are distributed over the body.

As far as known, the species of this genus are dioecious. No external differences in shape between female and male colonies have been reported. The gonophores occur between the polyps on the smaller ramifications of the colonies and arise directly from the coenosarc. They are globular to elongated oval structures placed on a very short to moderately long stalk. Their size varies between one third to one fourth the length of the polyps; the stalk in some species may be half as long as the gonophore. Both male and female gonophores are eumedusoid, without even rudiments of tentacles, but, in sections, showing distinct traces of the radial canals.

The color of the colonies is yellowish, yellowish-brown, brown or purplish-red, and is retained, more or less, in the dried state. The polyps, coenosarc and gonophores, in the fixed specimens, are milky-white; in the living condition they probably are transparent.

Type species.—*Solanderia gracilis* Duchassaing & Michelin, 1846.

Further species.—*Ceratella fusca* Gray, 1868, *Dendrocoryne secunda* Inaba, 1892 (=*Solanderia rufescens* Jäderholm, 1896); *Dendrocoryne misakinensis* Inaba, 1892 (=*Spongiocladium laeve* Jäderholm, 1896); *Ceratella minima* Hickson, 1903; *Ceratella crosslandi* Thornely, 1908.

The following species, all based on dried material, must be considered as doubtful: *Dehitella atrorubens* Gray, 1868; *Ceratella procumbens* Carter, 1873; *Ceratella spinosa* Carter, 1873; *Ceratella labyrinthica* Hyatt, 1877; *Solanderia leuckarti* Marshall, 1892; *Solanderia rugosa* Marshall, 1892.

Remarks.—Gray's genus *Ceratella* (type species *Ceratella fusca*

Gray, 1868), undoubtedly is identical with *Solanderia*. Though the gonophores of *Solanderia gracilis* are still unknown, there is such complete conformity in the structure of colonies and polyps between this species and the type of *Ceratella* that they are certainly congeneric. Attention must be drawn here to the fact that *S. gracilis* is a completely ahydrophorate species, whilst in *Ceratella fusca* the hydrophores are well developed. In the genus *Dendrocoryne* Inaba (type *Dendrocoryne misakinensis* Inaba, 1892), the structure of the colony, the polyps and the gonophores are almost exactly as in *Ceratella fusca*, the only difference of importance being the fact that in both species of *Dendrocoryne*, *D. misakinensis* and *D. secunda*, there are no hydrophores, whilst *Ceratella fusca* is hydrophorate. From the completely ahydrophorate species *D. misakinensis*, a number of intermediate forms, e.g., *D. secunda* (spines beside the polyps) and *C. minima* (a shallow collar at the base of the polyps), gradually lead to such strongly hydrophorate species as *C. fusca*. As there are no other particulars separating the forms at the extreme ends of this line of development, it seems only reasonable to reserve for their reception one single genus, to which the oldest available name, *Solanderia* Duchassaing and Michelin, must be applied. Stechow (1923, p. 38), who maintained a distinction between *Dendrocoryne* and *Solanderia*, based on the presence or absence of hydrophores, apparently overlooked the fact that the type of *Solanderia* is ahydrophorate. If a distinction between hydrophorate and ahydrophorate species is maintained, *Solanderia* should replace *Dendrocoryne* and the generic name *Ceratella* should be applied to the hydrophorate species. The genus *Spongiocladium* Jäderholm, 1896, too, must be sunk into the synonymy of *Solanderia*; its type (*Spongiocladium laeve* Jäderholm) is synonymous with *Dendrocoryne misakinensis* Inaba.

The genus *Dehitella* Gray, 1868 (type *Dehitella atrorubens* Gray, 1868) differs from the remaining species of *Solanderia* by the mode of development of the colony and the arrangement of the hydrophores. The colonies are of an irregular, bushy appearance. There are several stems that rise from a communal, basal mass; they branch frequently and more or less dichotomously, diminishing only slightly in diameter. The hydrophores are arranged on all sides of the cylindrical branches, those of the terminal branches and branchlets incoherent, in the older parts of the colonies arranged in transversal systems forming sharp-edged ridges. Judging from the information

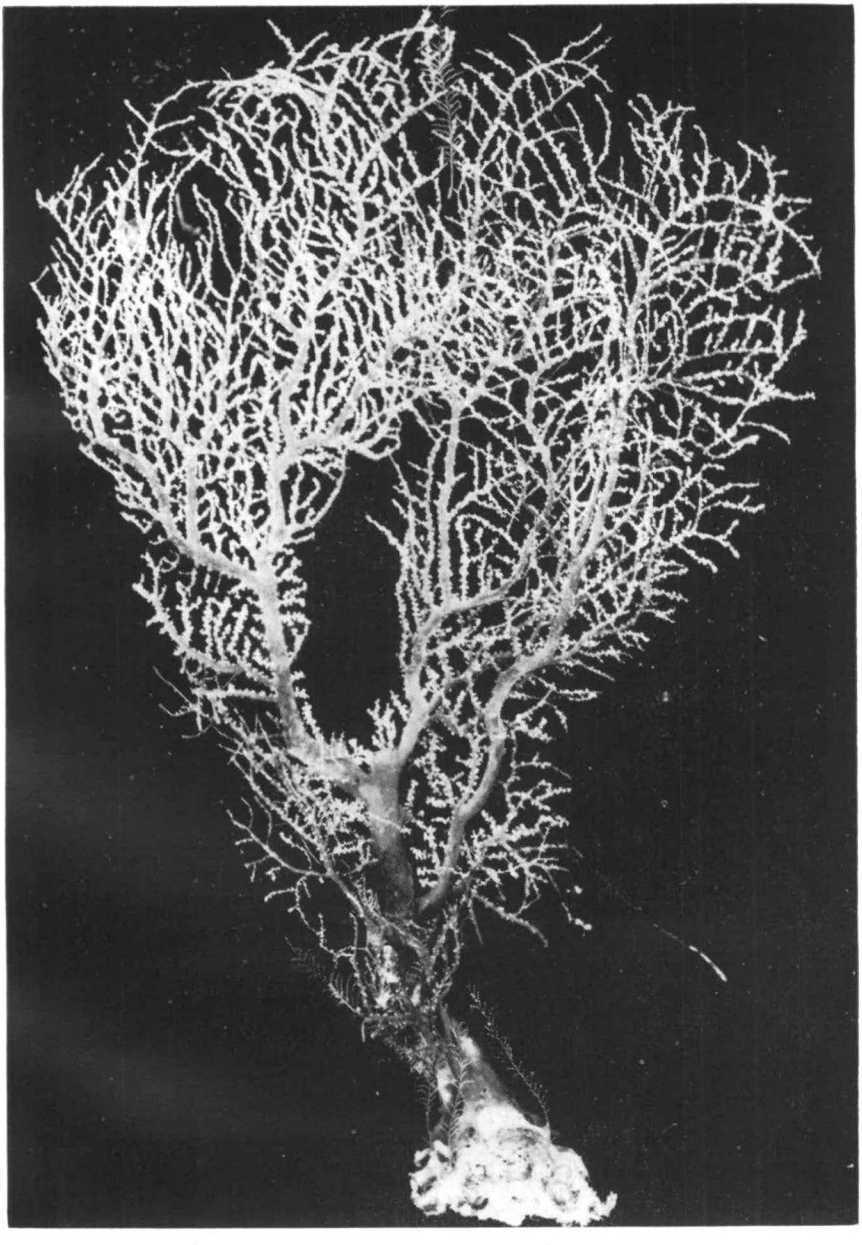

FIGURE 1. *Solanderia gracilis* Duchassaing & Michelin, Virgin Islands; formalin specimen, height 18 cm. (Photo by H. F. Roman.)

available on this species, the structure of the axis seems to be as in *Solanderia* so that there seems no objection, at least for the present, to include it in that genus. Although it must stand as a doubtful species, there is a fair chance that it can be recognized when found again. A redescription of this species, including information on the polyps, would then be imperative to establish its exact systematic position.

KEY TO THE WELL DESCRIBED SPECIES OF *Solanderia*

1. Distinct, cup-shaped hydrophores are present. ..... *S. fusca* (Gray)
1. Hydrophores reduced, either completely absent, shaped as a shallow ring at the base of the hydranth, or represented by two wing-shaped spines flanking the hydranth. 2
2. Two wing-shaped spines, one on each side of the hydranth are present.....3
2. Hydrophore either fully absent or represented by a shallow collar.....4
3. Number of capitate tentacles 15 to 20. ..... *S. secunda* (Inaba)
3. Number of capitate tentacles 30-40. ..... *S. crosslandi* (Thornely)
4. Hydrophore represented by a rim-shaped collar at the base of each hydranth. ..... *S. minima* (Hickson)
4. Hydrophore completely absent. 5
5. Densely ramified colonies with compressed stems and branches; color brownish. ..... *S. misakinensis* (Inaba)
5. Gracefully and less profusely branched colonies with cylindrical stems and branches; color purplish-red. ..... *S. gracilis* (Duchassaing & Michelin)

Solanderia gracilis Duchassaing & Michelin, 1846
Figs. 1, 2a, 3-5

Solanderia gracilis Duchassaing & Michelin, 1846, p. 219; Duchassaing, 1850, p. 21; Milne Edwards, 1857, p. 189; Duchassaing & Michelotti, 1860, p. 310 (sep. p. 34); Kölliker, 1871, p. 11, pl. 3 figs. 1, 2; Marshall, 1892, p. 9; Weltner, 1893, p. 14; Stechow, 1909, p. 41; Bedot, 1910, p. 379; Bedot, 1912, p. 369; Stechow, 1913, p. 18, figs. 1, 2; Bedot, 1916, p. 232; Bedot, 1918, p. 260; Bedot, 1925, p. 412.

Material.—Two colonies from Rams Head Point, St. John, Virgin Islands, collected by Mr. T. Chess. One of the colonies, collected Nov. 20th, 1959, at a depth of 10 feet, is dried; the other colony, collected May 19th, 1960, at a depth of 4 feet, is preserved in formalin. Both deposited in the U. S. National Museum.

Description.—Formalin specimen (Fig. 1): The general appearance of the colony is fan-shaped, with a height of 18 cm and a spread of 9 cm. All the ramifications are more or less strictly in one plane. There is a thick main stem with a diameter of 8.8 mm at the base, which rises from a more or less flattened basal disc composed of fused hydrorhizal fibres, by means of which the colony was attached to a rock. The basal disk also gives rise to a smaller stem, fused for

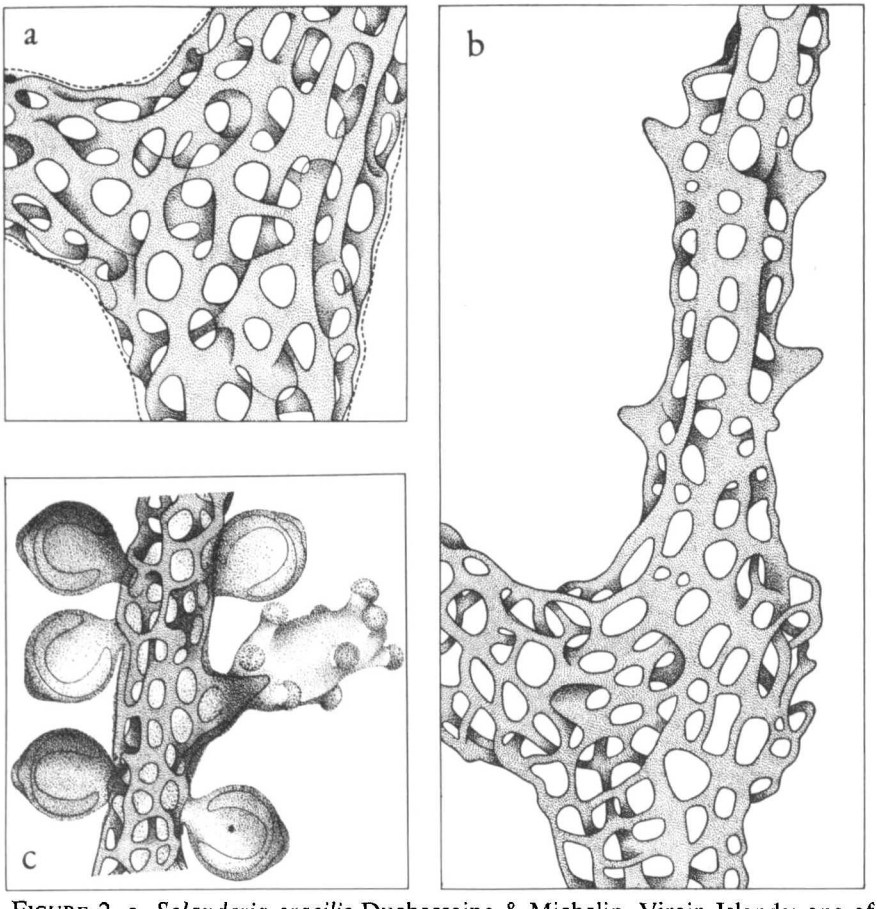

FIGURE 2. a, *Solanderia gracilis* Duchassaing & Michelin, Virgin Islands; one of the smaller branches, showing structure of mesogloeal skeleton, semi-diagrammatic, x75.—b, *Solanderia secunda* (Inaba), Ifaluk Atoll, Caroline Is.; mesogloeal skeleton of one of the smaller branches, semi-diagrammatic, x75.—c, *Solanderia secunda* (Inaba), Ifaluk Atoll; one of the smaller branches showing male gonophores and a hydranth, x35. (Drawings by H. Heyn.)

some distance with the main stem of the larger part of the colony. The branched and tortuous main stem can be followed distinctly throughout the colony by its considerable diameter and by the dark violet-red color, until in the upper parts it attains the same diameter as the finer ramifications. The stem gives rise to many repeatedly branched side branches with a diameter usually much less than that of the axis from which they rise, and of a more transparently

red color. The finest polyp-bearing branches in the present colony have a diameter of 120 μ; they result from repeated ramification of the side branches but also may originate directly from the stem (Fig. 1).

A close study of the finer ramifications of the colony shows that the axial (mesogloeal) skeleton is composed of fused chitinized or horny fibres, completely invested by the coenosarc. There appears to be a system of longitudinally arranged fibres, distinctly visible in the finer ramifications, connected by transversely arranged fibres of about the same diameter. In these branchlets the whole system of fibres results in the presence of a cylindrical, reticulated axis with numerous circular or oval openings, or "meshes," with a diameter of about 60 μ; the skeletal fibres are about 15 μ thick (Fig. 2a). In the slightly thicker branches the longitudinally arranged trabecles are quite distinct. They are stouter and of a darker color than the connecting trabecles and appear as distinctly raised, longitudinal beams. In the thick parts of the colony they become obscured by the greater development of the connecting trabecles and the axial skeleton is formed of a strongly intertwining system of fibres, producing a reticulated, but at the same time fairly compact, mass of cylindrical shape in which the primary longitudinal fibres are more or less obscured. Sections through such a stem have been figured by Kölliker (1871, pl. 3 figs. 1, 2) and Stechow (1913, textfigs. 1, 2).

The whole axis, of stem as well as of the branches, is permeated and externally covered by the soft coenosarc, which upon superficial inspection shows no distinction into ectodermal and entodermal layers. This layer of soft tissue is particularly evident in the finer branches where it has a finely granular appearance. Here and there this coenosarcal mass is raised to form the polyps. These occur principally along the finer branches of the colony, where they are distinctly arranged in the plane of ramification and consequently occur along two sides of the branches (Fig. 3). They tend to spread, however, over the ramifications of the main stem, though they do not occur on the thickest branches and are not strictly arranged in two rows. There are no specially prepared or indicated spots of the axial skeleton that mark the place of insertion of the polyps, nor do raised skeletal structures (hydrophores) occur at the base of the polyps. Beneath the insertion of certain polyps some of the holes of the cylindrical axis have fused to form a larger hole, but this condition seems to be exceptional. There is no indication of raised

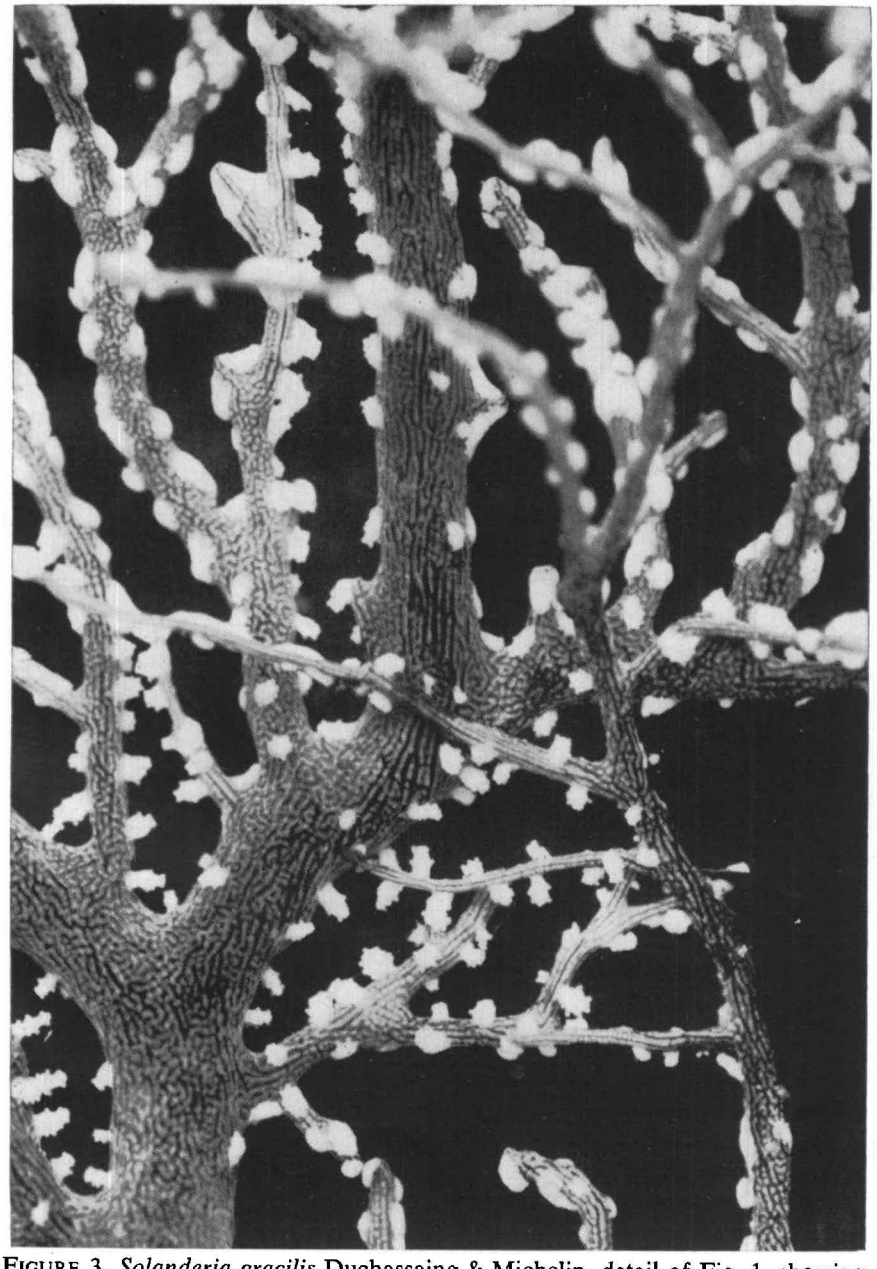

FIGURE 3. *Solanderia gracilis* Duchassaing & Michelin, detail of Fig. 1, showing structure of branches and arrangements of hydranths, x8. (Photo by H. F. Roman.)

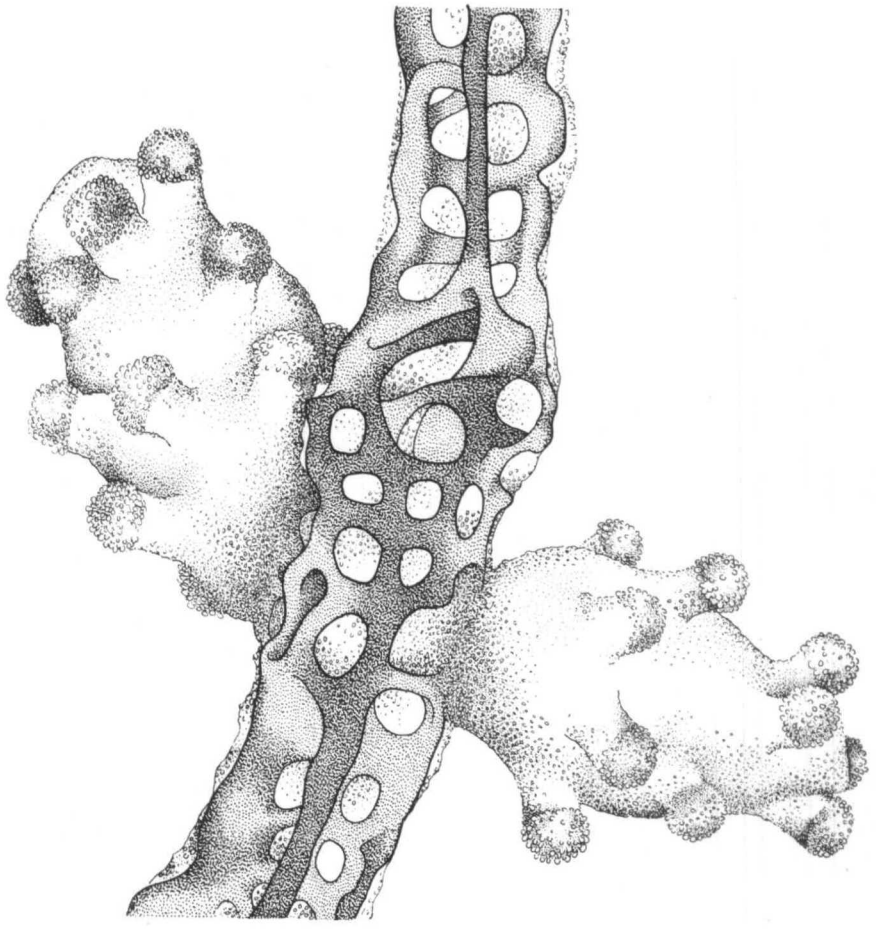

FIGURE 4. *Solanderia gracilis* Duchassaing & Michelin, Virgin Islands; a small branch with two hydranths, x 100. (Drawing by H. Heyn.)

ribs or horns alongside the insertion of the polyps (Fig. 4).

The polyps of the present specimen, though well preserved, are probably all slightly contracted. They are 600 μ long, elongated ovoid structures, with the greatest diameter of about 325 μ slightly above the middle; the peristome is more or less dome-shaped. Observation of a large number of polyps shows that the number of capitate tentacles varies between 12 and 15; they are more or less distinctly arranged in three whorls. In nearly all polyps, there is an apical whorl of 4 tentacles, separating the small oral field from the rest of the hy-

dranth. Some apparently well extended polyps have an intermediate row of 4 or 5 tentacles about halfway the length of the body, and a subbasal row of 4 or 5 tentacles. This arrangement in two rows is very indistinct in other polyps, probably as a result of contraction. The tentacles are short, 100-150 μ long, and distinctly capitate; the "head" is globular with a diameter of 75 μ and densely packed with nematocysts. There are two types of nematocysts and one type of glutinant. There are large, almost globular nematocysts, 13.5 μ long and 10.5 μ wide, sparingly distributed between smaller nematocysts, 7.5 μ long and 6.0 μ wide, which occur plentifully but may represent developmental stages of the larger type. The glutinants are oval, 6.0 μ long and 3.0 μ wide, with a thick, irregularly coiled thread.

The present colony has a deep purplish (magenta) color, deepening considerably in the stem and gradually becoming more transparently red in the ramifications. The finest branches are brownish-red. Coenosarc and polyps, in the preserved specimen, are milky white; in the living state probably transparent.

Unfortunately this beautifully preserved specimen is fully sterile.

Dried specimen (Fig. 5): The general shape of this specimen is like that of the formalin fixed colony, but the ramifications are more strictly in one plane. There is no trace of coenosarc or polyps, and nothing in the structure of the axial skeleton suggests where the polyps were inserted. The color is opaque brownish-red; the finer ramifications have a slightly brighter color. The height of the colony is 20 cm, the spread 17 cm.

Distribution.—West Indies. The type specimen was obtained from Guadeloupe; no further details are known. The type material, with the exception of some slides, is lost (vide infra). The present specimens all originate from the Virgin Islands, where they were obtained by diving in coastal waters between depths of 4 and 10 feet.

Remarks.—Prompted by Milne Edwards' remark (1857, p. 189) about the presence of a specimen of *Solanderia gracilis* Duchassaing & Michelin in the Paris Museum of Natural History, I asked the authorities of the Muséum National d'Histoire Naturelle if the specimen inspected by Haime and mentioned by Milne Edwards still could be traced. Dr. A. Tixier-Durivault, of the Laboratoire de Malacologie of the Muséum National, wrote that she found this specimen, a colony about 200 mm in height, which in her opinion represented a gorgonian of which only the axis remained. At my

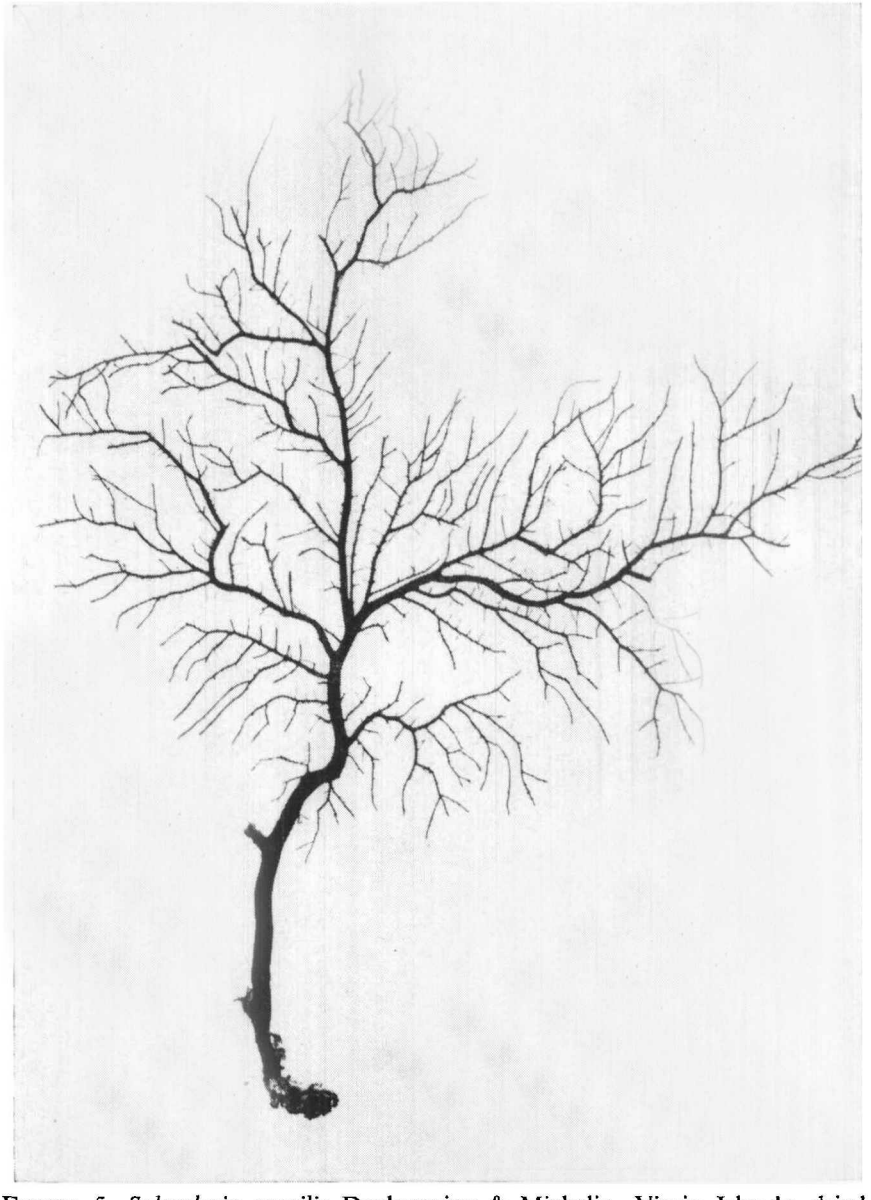

FIGURE 5. *Solanderia gracilis* Duchassaing & Michelin, Virgin Islands: dried specimen, height 20 cm. (Photo by H. F. Roman.)

request, she kindly sent a photograph and some fragments for examination. The specimen bears the label "Z 3, Solanderia gracilis, D & M. Mr. Baudin, Antilles, 1803." The fragments, which had every appearance of fragments of the axis of a gorgonian, were submitted to Dr. Frederick M. Bayer for further identification. Dr. Bayer identified the fragments as belonging to a species of the gorgonian family Melithaeidae (=Melitodidae), probably a species of the genus *Acabaria*. Even more important was his conclusion that the specimen cannot possibly have originated from the Antillean region, so that it seems quite clear that a mixing of labels must have occurred in the Paris Museum at some time or the other. Dr. Bayer has drawn my attention to Milne Edwards' remark on page 189, where the following information about *Solanderia gracilis* is given: "l'axe est occupé par un tissu spongieux, semblable à celui des entre-noeud des Mélitées." This makes it quite clear that the tissue of the axis of *Solanderia* is compared only with the internodes of the Melithaeas and that the jointed structure of a melitodid gorgonian would undoubtedly have been recognized (and reported upon) by Haime or Milne Edwards. It is reasonable to suppose, therefore, that the mixing of the labels must have occurred after the inspection of the colony of *Solanderia gracilis* by Haime. The whereabouts of Duchassaing and Michelin's original Paris specimen is unknown; probably it has become lost.

I also tried to find specimens of *Solanderia gracilis* in the Istituto e Museo di Zoologia della Università di Torino, prompted in this particular instance by Kölliker's remark (1871, p. 12) that he received some fragments of the original specimen from Turin. This time the quest proved to be partly successful. Dr. Lucia Rossi, curator of the invertebrate collection of the Turin Museum, told me that the original Turin specimen of *Solanderia gracilis* is unfortunately amongst a number of Duchassaing's types that are no longer present in the Turin Museum and have very probably been lost. Some fragments of the original Turin specimen(s), however, are still in the Zoologische Sammlung des Bayerischen Staates, München, and through the kindness of Dr. W. Engelhardt and Dr. H. Fechter of that Museum I had an opportunity to study them. They consist of 3 microscopical slides, two of which contain fragments of the axial skeleton, 1.0 to 2.5 mm thick, mounted in Canada balsam. These two slides bear the label "Solanderia gracilis Duch. Mich. Guadeloupe (Kölliker)." There is a third slide, which contains one transverse and three longitudinal sec-

tions through pieces of the axial skeleton, also mounted in Canada balsam. This slide is inscribed with a diamond and bears the following indication: "Solanderia gracilis Duch. Mich. 1846. Vom Original in Turin, 1 Quer, 3 Längsschnitten." Though it seems very clear that the two slides containing the fragments are from Kölliker's collection, I have little doubt that the third slide also was prepared by Kölliker from the Turin material to which he refers in his paper of 1871. This is also undoubtedly the slide from which Stechow made the drawings published in his paper (1913, figs. 1, 2).

All the slides very evidently have been made from dried material; there is no trace of perisarc or polyps. There is such complete conformity in the skeletal structure of the fragments on the slides with the dried colony from the Virgin Islands, that the slides could have been made from that material. It is unnecessary, therefore, to give a detailed description of the structure of the fragments here. The reticulated structure is identical with that of the dried Virgin Islands colony, there are no hydrophores or other indications of the places of insertion of the polyps, and the fragments have the same red color. There can be no doubt, in my opinion, that the fragments on the slides were obtained from the same species as that represented by the colonies from the Virgin Islands. The slides represent the only traceable fragments of the holotype of *Solanderia gracilis* Duchassaing & Michelin; the description of this species has now been completed from freshly preserved colonies in the United States National Museum. The structure of coenosarc and polyps has been described from stained and unstained preparations mounted on slides also deposited in the United States National Museum, while several slides have been deposited in the Rijksmuseum van Natuurlijke Historie at Leiden, Netherlands, and one in the collection of the Zoologische Sammlung des Bayerischen Staates at Munich, West Germany, to facilitate comparison with the fragments of the holotype.

Solanderia misakinensis (Inaba, 1892)

Dendrocoryne misakinensis Inaba, 1892, no. 37, figs. 106-110; Goto, 1897, p. 102, figs. 106-110, pl. 6 figs. 1-6; Stechow, 1909, p. 39, pl. 2 fig. 3; Bedot, 1918, p. 116; Jäderholm, 1919, p. 3; Bedot, 1925, p. 165: Kramp, 1947, pp. 6, 7.

Spongiocladium laeve Jäderholm, 1896, p. 6, pl. 1 figs. 3-6; Doflein, 1906, p. 259; Bedot, 1918, p. 261.

This species, of which I have no material at my disposal, has been fully described by Inaba, Goto, Stechow and Jäderholm. Axial struc-

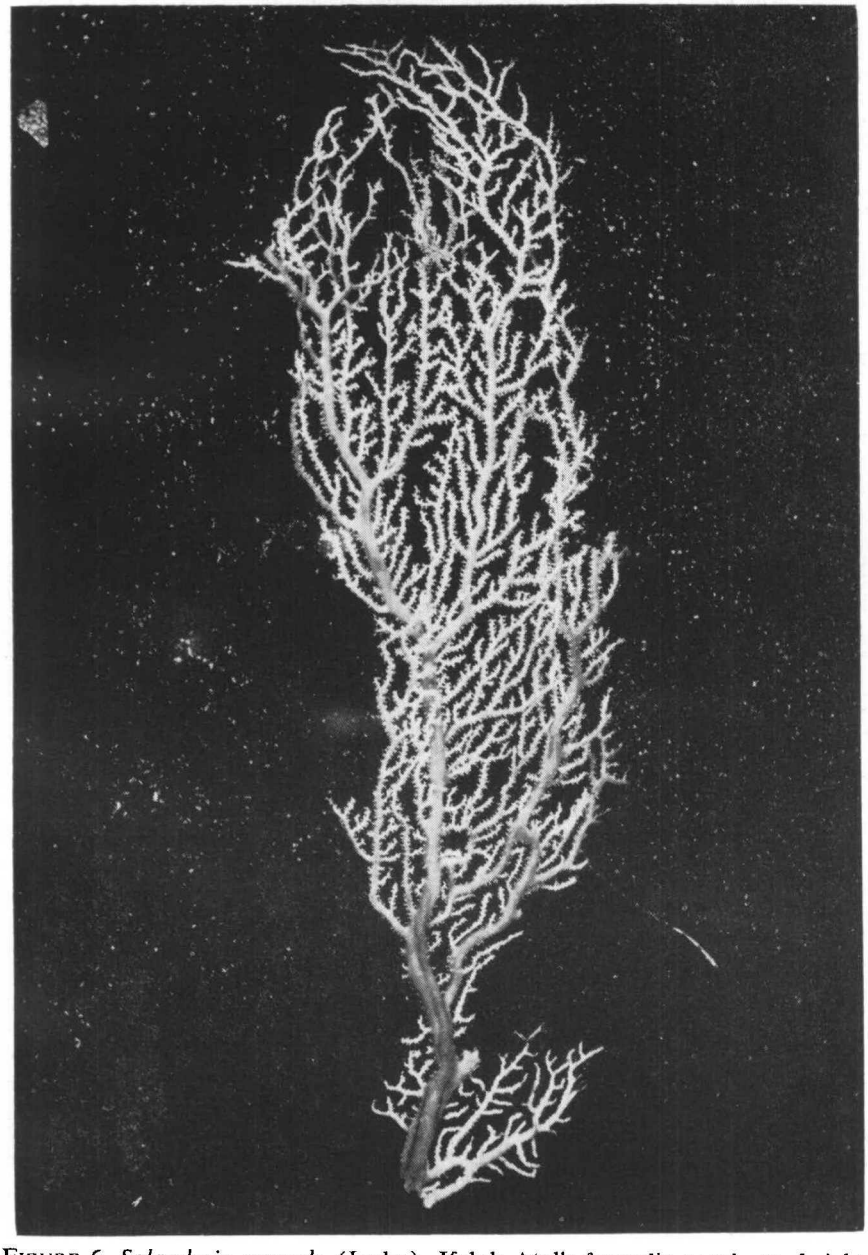

FIGURE 6. *Solanderia secunda* (Inaba), Ifaluk Atoll; formalin specimen, height 15 cm (basal part missing). (Photo by H. F. Roman.)

ture, hydranths, male and female gonophores are fairly well known. The colonies are very densely ramified, and the branches are compressed so that the meshes between the branches are smaller and a more or less compact fan-shaped structure results. Female and male gonophores occur on separate colonies. There are no hydrophores; the color of the preserved specimens is brown.

The species has been found exclusively in Japanese waters, occurring west of Misaki (Inaba, 1892; Goto, 1897), in Sagami Bay (Stechow, 1909; Jäderholm, 1919) and in Hirudo Strait, 33° 05′ N, 129° 16′ E (Jäderholm, 1896, as *Spongiocladium laeve*). The recorded depths are between 6 m and 36 fms.

Solanderia secunda (Inaba, 1892)

Figs. 2b-c, 6-9

Dendrocoryne secunda Inaba, 1892, no. 38, figs. 111-113; Goto, 1897, p. 102, figs. 111-113, pl. 1 figs. 7-11; Stechow, 1909, p. 40, pl. 2 figs. 1, 2, pl. 4 fig. 7; Stechow, 1913, p. 7; Bedot, 1918, p. 116; Bedot, 1925, p. 165.

Solanderia rufescens Jäderholm, 1896, p. 5, pl. 1 figs. 1, 2; Doflein, 1906, p. 259; Bedot, 1918, p. 116.

Material.—Three colonies from west of Elangalap Islet, Ifaluk Atoll, Caroline Islands, obtained by diving off the seaward reef slope at 20-30 feet depth, Nov. 3rd, 1953 (dived by Yaniseiman). The largest colony reaches a height of about 18 cm and a spread of 15 cm. One of the colonies has very youthful gonophores, another colony has young male gonophores, whilst the remaining colony is sterile.

Description.—Having dealt at such length with *Solanderia gracilis* I can describe the present species more briefly by comparing its structure with that of the previous species.

The general shape of the colony of *Solanderia secunda* is as in *S. gracilis;* it has a thick, repeatedly branched main stem and gradually thinning ramifications (Fig. 6). At the base of the main stem there is a more or less flattened portion by means of which the colonies have been attached to rocks. The structure of the mesogloeal axis is as in *S. gracilis;* in the finer ramifications there is a cylindrical arrangement of heavy longitudinal fibres connected by thinner transverse fibres. In this species the longitudinal fibers are slightly but distinctly raised and give the impression of longitudinal ribs, distinctly elevated above the circumference of the axial cylinder. These ribs form a pair of distinct, small spines at the base of each polyp. Consequently each hydranth is accompanied by a pair of distinct thorns, one on each side of the polyp, so that in this species the places of attachment of

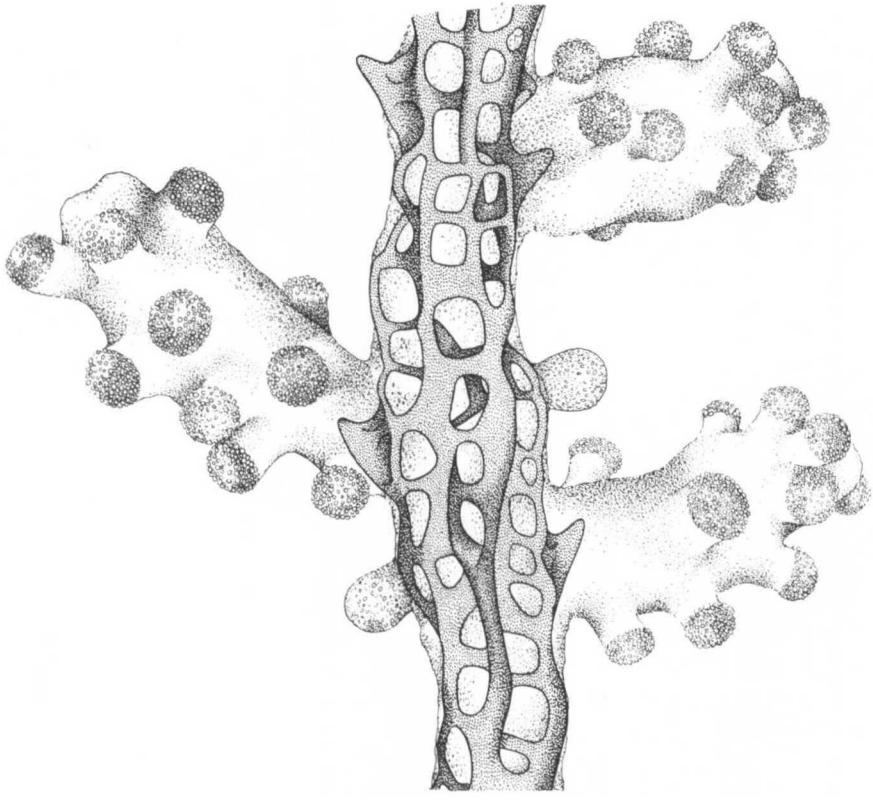

FIGURE 7. *Solanderia secunda* (Inaba), Ifaluk Atoll; a small branch with three hydranths and some young gonophores, x75. (Drawing by H. Heyn.)

the polyps are distinctly marked and may even be recognized in the dried colony. These thorns appear to represent the very beginning of the formation of the hydrophore, present here in a very primitive state and coming to fuller development in the other species of *Solanderia* (Fig. 2b).

Aside from the presence of thorns, there are scarcely any other differences in skeletal structure between the present species and *Solanderia gracilis*. The diameter of the opening between the fibres under a hydranth usually is slightly larger than that of apertures having no relation to polyps.

The hydranths have the same shape as those of *Solanderia gracilis* but are slightly longer, attaining a length of 700μ and a diameter of

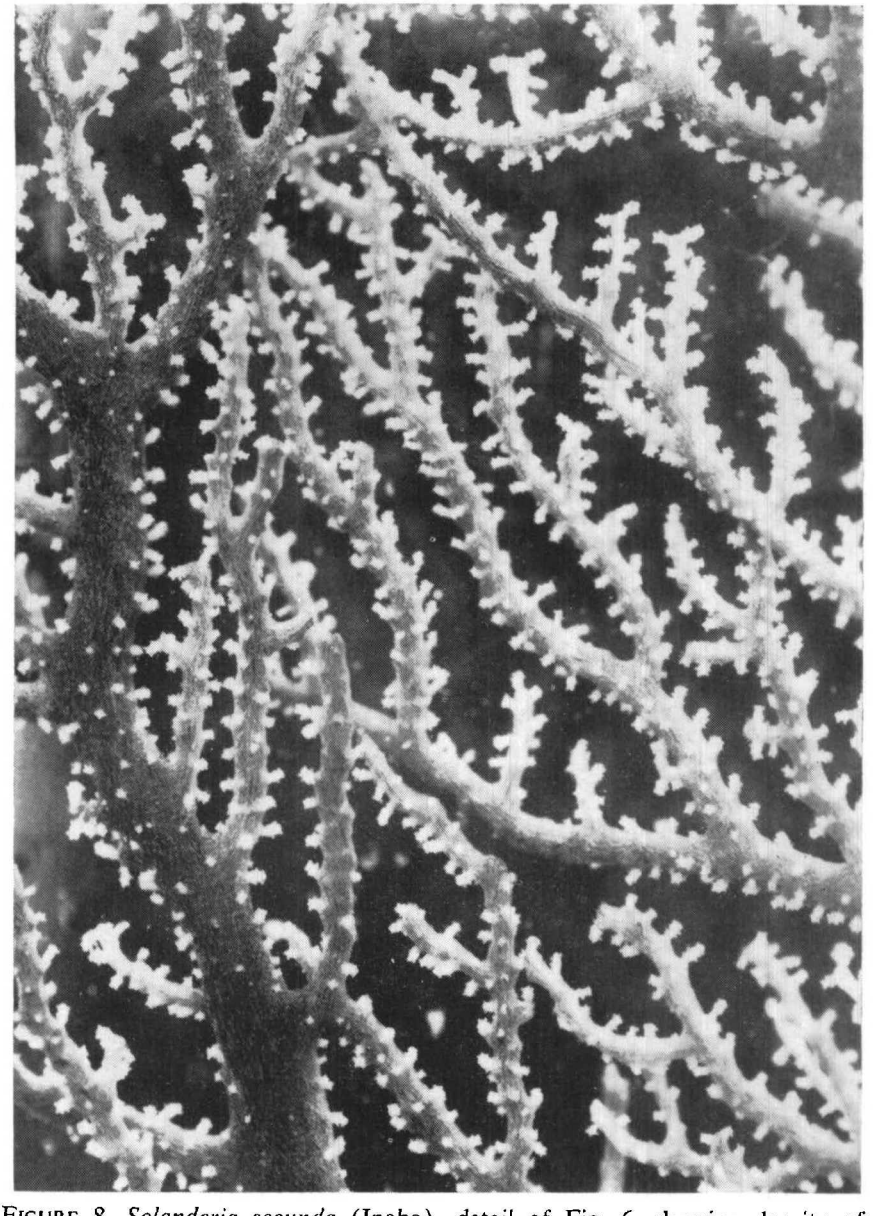

FIGURE 8. *Solanderia secunda* (Inaba), detail of Fig. 6, showing density of branching, x5. (Photo by H. F. Roman.)

375μ. There are 15 to 20 capitate tentacles, of which 4 or 5 are arranged in an oral whorl; the rest of the tentacles are distributed over the body (Fig. 7). In contradistinction to *Solanderia gracilis* the polyps here are more uniformly spread over the branches; on the finer ramifications they predominantly occur in two rows and are placed in the plane of ramification (Figs. 8, 9). The "heads" of the capitate tentacles contain many large, oval nematocysts, 14μ long and 10μ wide. In addition there are many smaller, almost globular nematocysts of 6 x 7 μ. Some glutinants do occur, but are very poorly represented. They are oval, 9μ long and 3μ wide. In addition there are, in the heads, many bean-shaped cells filled with highly refractile granules, staining heavily with acid fuchsine. The granular cells are 20μ long and have a maximal diameter of 9μ.

Gonophores.—As only one type of gonophore has been observed to occur on a colony, there is every evidence to suggest that the species is dioecious.

One of the colonies bears what appear to be youthful male gonophores. These are globular structures, distributed over the whole colony, but only sparingly present on the thick branches. Their diameter varies between 200 and 250μ and they are placed on very short stalks (Fig. 2c). In sections they appear to be eumedusoid, without remnants of tentacles and with only very indistinct rudiments of the radial canals. The "spadix" is surrounded by a thick layer of what appear to be youthful spermatogonia with distinct nuclei but without mitotic or meiotic activity. The gonophores on one of the remaining colonies are so young that their sex cannot be determined. Stechow (1909, p. 40) mentions male gonophores of this species, which are described as stalked, with the pedicels about as long as the gonophores (140-190μ).

The female gonophores are described and figured by Goto (1897, p. 101, pl. 6 fig. 11). The size of the gonophores is not given, but judging from the figures their diameter is about 450-500μ. They are globular and placed on short pedicels. There are no rudiments of tentacles, but in sections they show distinct radial canals.

No differences in shape between the male and female colonies appear from the available information and descriptions, though in the present specimen with the male gonophores the spines that flank the hydranth are fairly long and pointed.

The formalin fixed colonies have an opaque, chocolate-brown

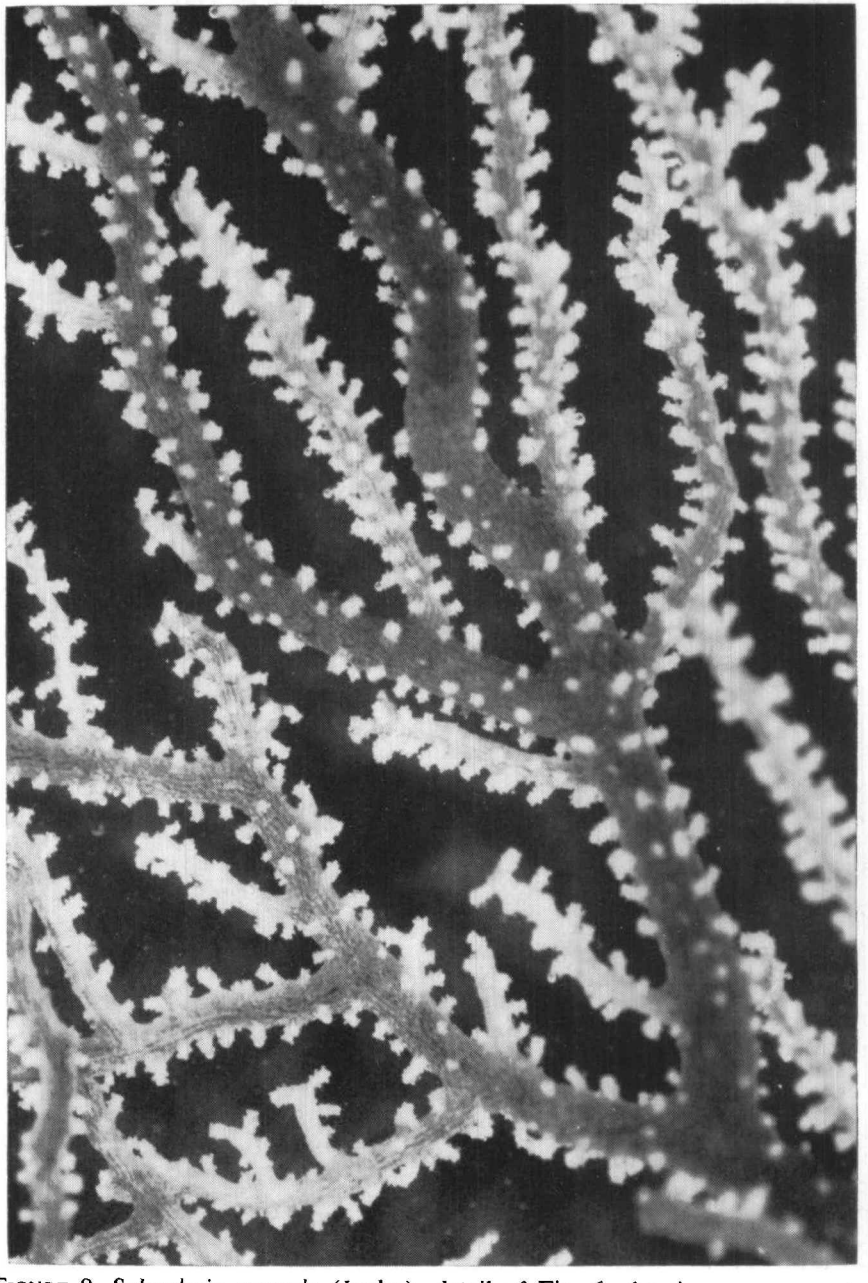

FIGURE 9. *Solanderia secunda* (Inaba), detail of Fig. 6, showing arrangement of hydranths on the finer ramifications, x5. (Photo by H. F. Roman.)

color, deepest on the main stem and its ramifications and gradually changing into yellowish-brown in the finer ramifications. The coenosarc, polyps and gonophores are milky white.

Distribution.—Tropical and subtropical parts of the Pacific Ocean. Inaba (1892) and Goto (1897) record specimens from Misaki, Sagami Bay and from the Bonin Islands (Ogasawara Gunto). Jäderholm records the species (as *Solanderia rufescens*) from Japan, without any further details; Stechow's (1909) material is also from Sagami Bay. The recorded depths are between 6 and 20 m. The present record considerably extends the area of distribution in a southerly direction.

Solanderia crosslandi (Thornely, 1908)

Ceratella crosslandi Thornely, 1908, p. 85.
Solanderia crosslandi, Stechow, 1909, p. 41; Bedot, 1925, p. 412; Kramp, 1947, p. 6.

This species, which was only very briefly characterized by Thornely, shows a very great resemblance to *Solanderia secunda.* The colonies are erect, with a brown stem, which is flattened and repeatedly branched, "anastomosing here and there and often expanding into spongy extremities, which sometimes adhere to other branches or to foreign bodies, spreading over them in a root-like manner." (Thornely, 1908, p. 85.) As in *Solanderia secunda,* there is no proper hydrophore, but there are two wing-shaped, pointed processes, one on each side of the hydranth. The hydranths are distributed over all sides of the stem and appear to have a larger number of tentacles (30-40) than in *S. secunda.* The size of the hydranths is not given and the gonophores are unknown. Height of the colonies about 23 cm, spread about 30 cm.

The type locality is Port Sudan, Sudanese Red Sea, where the species was found growing on shells and attached to the bottoms of vessels. The whereabouts of the type specimens is unknown; no distinct holotype has been fixed.

Solanderia minima (Hickson, 1903)

Ceratella minima Hickson, 1903, p. 114, pl. 13; Thornely, 1908, p. 85.
Solanderia minima, Stechow, 1909, p. 41; Bedot, 1925, p. 413.

In this species the development of the hydrophore is intermediate between the condition found in *S. gracilis,* where a hydrophore is completely absent, and that observed in *Solanderia fusca,* where a well developed, cup-shaped hydrophore invests the basal part of the

hydranth. In *S. minima* the mesogloeal skeleton of the finer branches is formed mainly by longitudinal fibres, connected by transverse fibres, leaving large holes in the cylindrical axis. The places of insertion of the hydranths appear to be distinctly marked, but the hydrophore is reduced and shaped as a frontal (abcauline) ridge at the base of each polyp. The colonies, probably because of their very youthful state, are sparingly branched and have a delicate appearance. The height varies between 29 and 35 mm, and the spread between 38 and 65 mm. Three colonies were mentioned by Hickson, but no distinct holotype was indicated. The whereabouts of the type material is unknown but probably it is in the Zoological Museum of the University of Manchester. The type locality is Zanzibar, probably collected in the coastal waters. No depth was recorded. The color of the specimens was not stated.

Solanderia fusca (Gray, 1868)

Ceratella fusca Gray, 1868, p. 579, fig. 2; Kölliker, 1871, p. 13; Carter, 1873, p. 10; Steinmann, 1878, p. 106; Carter, 1880, p. 304; Bale, 1884, pp. 48, 49, 50; Von Lendenfeld, 1885, p. 667; Von Lendenfeld, 1855a, pp. 612, 631; Brazier, 1887, pp. 575, 576; Brazier, 1887a, p. 577; Von Lendenfeld, 1887, p. 45; Whitelegge, 1887, p. 578; Bale, 1888, p. 748; Etheridge, 1889, p. 41; Whitelegge, 1889, p. 192; Marshall, 1892, p. 9; Spencer, 1892, pp. 8, 9, 20, pls. 2, 3, 3a; Steinmann, 1893, pp. 480, 481, pl. 3 fig. 2; Weltner, 1893, p. 14; Hickson, 1903, pp. 113-115; Hartlaub, 1905, p. 515; Nutting, 1906, pp. 934, 935, 939; Bedot, 1910, p. 262; Bedot, 1912, p. 270; Hickson, 1910, p. 35.

Solanderia fusca, Jäderholm, 1896, p. 6; Stechow, 1909, p. 41; Bedot, 1916, pp. 73, 232; Bedot, 1918, p. 260; Bedot, 1925, p. 412.

This is a distinctly hydrophorate species with a mode of growth not unlike that of *Solanderia gracilis,* but with larger polyps. It was described at great length by Spencer (1892, pp. 9-16, pls. 2, 3, 3a). Only the male gonophores have so far been described. These are globular structures of one fourth the length of the hydranths, distributed over the colony and rising directly from the coenosarc on short stalks, as in *S. secunda.* In sections they appear to be eumedusoid, completely without tentacles or indications of these, but with distinct rudiments of the radial canals. The colonies may reach a height of some 15 cm; the color is red or reddish-brown.

The species appears to be fairly common in the Sydney area, New South Wales, Australia, where it was found in Bondi Bay (type locality; Gray, 1868; Brazier, 1887), Wreck Bay, south of Jervis Bay; Broughton Island, north of Port Jackson, Sydney; Port Jackson

Heads, and off Port Jackson (all these localities given by Brazier, 1887a). Furthermore the species was met with at Flinders Island in Bass Strait (Spencer, 1892) and at Lord Howe Island, off the east coast of New South Wales. There is one record from the central Pacific: Nutting (1906) records the species from the north coast of Maui Island in the Hawaiian region. The maximal recorded depth is 56 fms.

The type material of *Ceratella fusca* is still in the British Museum (Natural History) where it is registered under the numbers 1884.12.6.15-16. The specimen figured by Gray (1868, fig. 2) is the larger of the two; it is now broken in two parts, registered under the number 1884.12.6.15 and is designated here to represent the lectotype. The smaller specimen, 1884.12.6.16 may be referred to as the paratype.

Doubtful Species

Solanderia leuckarti Marshall, 1892

Solanderia leuckarti Marshall, 1892, p. 14, pl. 4, pl. 7 figs. 5-11; Jäderholm, 1896, p. 5; Stechow, 1909, p. 41; Bedot, 1918, p. 260; Bedot, 1925, p. 412.

This species was founded by Marshall on two dried colonies of 22 and 17 cm height of unknown origin. The species has never been redescribed and the structure of the soft parts is fully unknown. Judging from the descriptions and drawings the mode of development of the colony is not unlike that of *Solanderia gracilis*. The specimen figured by Marshall (pl. 4) has probably lost the greater part of the finer ramifications. *Solanderia leuckarti*, as far as can be judged from Marshall's description and figures, is an ahydrophorate species and seems to possess distinct tubercles, composed of fused horny fibres, on the finer ramifications. Though a doubtful species, it may be recognized by the tuberculated nature of the branches. The original colonies were described by Marshall from the collections of the Zoological Museum of the University of Leipzig; he thinks that they may have originated from the Pacific, probably Japan, though there is no direct proof.

Solanderia labyrinthica (Hyatt, 1877)

Ceratella labyrinthica Hyatt, 1877, p. 551, pl. 17 fig. 30.
Solanderia labyrinthica Marshall, 1892, p. 13; Stechow, 1909, p. 41; Bedot, 1916, p. 232; Bedot, 1918, p. 260; Bedot, 1925, p. 412.

Hyatt based this species on a specimen from Mauritius in the collection of the Museum of Comparative Zoology at Harvard University; a second specimen, originating from Cape of Good Hope and

present in a private collection ("in Prof. Ward's collection, at Rochester", Hyatt, 1877, p. 551) is mentioned and figured. The particulars which Hyatt supplies concerning his new species certainly are too vague for recognition and it does not appear clearly from his description whether the figured specimen really is identical with the holotype, which has not been figured at all.

Solanderia labyrinthica is a strongly compressed species; the holotype is 50 mm high, 38 mm wide and only 3 mm thick. The stems and branches are very strongly ramified and tortuous; they anastomose repeatedly. There are apparently hydrophores, which are mainly confined to the sides of the branches and are maximally developed on the abcauline side of the hydranths. The holotype is probably still in the Museum of Comparative Zoology, Harvard. The type locality is Mauritius. No further details are known.

Solanderia atrorubens (Gray, 1868)

Dehitella atrorubens Gray, 1868, p. 579, fig. 1; Wright, 1870, p. 90, figs. 1, 2; Carter, 1873, p. 10; Carter, 1878, p. 298; Bale, 1884, pp. 48, 49; Von Lendenfeld, 1885, p. 667; Von Lendenfeld, 1885a, pp. 612, 631; Brazier, 1887, pp. 576; Brazier, 1887a, p. 577; Von Lendenfeld, 1887, p. 45; Marshall, 1892, p. 9; Spencer, 1892, pp. 8, 19; Steinmann, 1893, p. 480; Weltner, 1893, p. 14; Hickson, 1903, p. 113; Bedot, 1910, p. 281; Bedot, 1912, p. 282; Bedot, 1916, p. 89; Bedot, 1918, p. 115.

Solanderia atrorubens, Marshall, 1892, pp. 12, 14, pl. 5, pl. 7 figs. 2-4; Bedot, 1925, p. 412.

Solanderia (*Dehitella*) *atrorubens,* Stechow, 1909, p. 41.

From the other Solanderiidae this species stands apart by the mode of growth of the colonies, which are more bushy in appearance and do not show the fan-shaped structure usually found in this genus. A large number of cylindrical stems arise from the basal hydrorhizal mass; the stems regularly and frequently branch dichotomously and only very gradually diminish in diameter. The diameter of the stem is about 7 mm, of the branches 3 to 4 mm. There are very well developed hydrophores and the presence of these, coupled with the peculiar structure of the colonies, makes the species at once recognizable, even though the soft parts have never been described. The color of the dried colonies is brownish-yellow, but is probably much darker brown in the living state. The height is not stated in the descriptions, but judging from the figures the average height is 20 cm.

The type material of *Dehitella atrorubens* is still in the British Museum (Natural History) and consists of 4 syntype colonies and 3 separate dry slides carrying fragments (B.M. 1962.4.14.1-4). The

specimen of which part has been figured by Gray (1868, fig.1) bears number 1962.4.14.1; it is here designated as the lectotype. The origin of the colonies, Australia, is given by Gray with considerable doubt. The only other Australian locality is that mentioned by Von Lendenfeld (1887): Bondi Bay, New South Wales, Australian east coast. The species has also been recorded from Algoa Bay, South Africa (Brazier, 1887) and from Port Natal (Durban) on the South African east coast (Marshall, 1892).

Solanderia rugosa Marshall, 1892

Solanderia rugosa Marshall, 1892, p. 13; Stechow, 1909, p. 41; Bedot, 1918, p. 260; Bedot, 1925, p. 413.

This species was provisionally described by Marshall after three colonies in the Zoological Museum of the University of Leipzig, originating from Port Natal (Durban), African east coast. Marshall probably intended to publish later a more detailed account of this form, but I have been unable to trace any such account. The characters given in Marshall's brief diagnosis are certainly too vague to permit recognition of the species, the more so since no figure of it was published. *Solanderia rugosa* is a hydrophorate species with a certain resemblance with *S. atrorubens* Gray.

Solanderia spinosa (Carter, 1873)

Ceratella spinosa Carter, 1873, p. 12; Marshall, 1892, pp. 10, 11; Spencer, 1892, pp. 8, 21; Steinmann, 1893, p. 480; Hickson, 1903, p. 413; Bedot, 1912, p. 270.

Solanderia spinosa, Stechow, 1909, p. 41; Bedot, 1916, pp. 233; Bedot, 1918, p. 260; Bedot, 1925, p. 413.

This species has been described at some length by Carter after a dried colony in the British Museum (Natural History) (holotype B.M. 1872.8.1.17), originating from Port Natal (Durban), African east coast. No figures have ever been published and the soft parts have never been described. The colony has a rich, purple-red color; the main branches are said to be covered by "small, smooth, often subspatulate, erect spines." Moreover, distinct hydrophores occur. Carter's specimen, which is probably no more than a fragment, was about 9 cm high and 5 cm broad. Until the structure of the hydranths has been described it must stand as a doubtful species.

Solanderia procumbens (Carter, 1873)

Ceratella procumbens Carter, 1873, p. 10; Carter, 1878, p. 304; Higgin, 1878, p. xcv; Marshall, 1892, pp. 10, 11; Spencer, 1892, pp. 8, 20; Stein-

mann, 1893, pp. 480, 481, pl. 3 figs. 1-1c; Hickson, 1903, pp. 113, 114; Hartlaub, 1905, p. 514; Bedot, 1912, p. 270.

Solanderia procumbens, Stechow, 1909, p. 41; Bedot, 1916, pp. 73, 232; Bedot, 1918, p. 260; Bedot, 1925, p. 413.

The most distinguishing character of this species is the presence of distinct tubercles, distributed between the low hydrophores. The large, fan-shaped colonies are strongly branched, and the main stem may have a diameter of 2.5 cm. The structure of the hydrophores, judging from the only figures available (Steinmann, 1893, pl. 3 fig. 1, 1a, 1b, 1c) approaches the condition found in *Solanderia minima* Hickson: they are reduced to form a shallow collar at the base of the hydranth, reaching their greatest development on the frontal (abcauline) side of the polyps. The largest specimens are about 28 cm high and have a spread of 12.5 cm.

Carter based his species on five dried colonies in the British Musuem (Natural History), originating from Cape of Good Hope and Port Natal (Durban) on the African east coast. Four colonies (syntypes) are still in the British Museum; these bear the numbers B.M. 1867.3.22.1 (one colony from Cape of Good Hope), and B.M. 1872. 8.1.1 (three colonies from Port Natal). The dried colonies are of an ochre-brown color, but in living condition they probably are purplish-brown.

Genus *Chitina* Carter, 1873

The genus *Chitina* must also be considered as a very doubtful genus: its type species is only known in dried state, has never been figured, and moreover seems to be based on badly worn specimens. Its appearance seems to be quite different from that of *Solanderia;* the colonies are very bushy, with a thick main stem ("trunk") composed of strongly intertwining stems, cord like, dividing and anastomosing. Hydrophores seem to occur in the higher and not in the lower parts of the colonies, though their occurrence there and absence in the lower parts of colony may be largely the result of damage.

Type species.—Chitina ericopsis Carter, 1873

Chitina ericopsis Carter, 1873

Chitina ericopsis Carter, 1873, p. 13; Carter, 1877, pp. 46, 56, 60, 73; Carter, 1878, p. 308; Higgin, 1878, p. xcv; Steinmann, 1878, p. 106; Brazier, 1887, p. 577; Spencer, 1892, pp. 8, 21; Steinmann, 1893, pp. 480, 482; Weltner, 1893, p. 15; Hickson, 1903, pp. 113, 114; Hartlaub, 1905, p. 515; Stechow, 1909, p. 41; Bedot, 1912, p. 271; Bedot, 1916, p. 73; Bedot, 1918, p. 95; Bedot, 1925, p. 135.

This species is based on a number of dried colonies in the British Museum (Natural History), the largest specimen with a height of 35 cm and a "trunk" of 2.5 cm diameter. The exact number of colonies is not stated by Carter, but fragments of at least four colonies are still present. These syntypes, all originating from New Zealand (type locality), include the material collected by Dr. Sinclair (cf. Carter, 1873, p. 13), numbered B.M. 1857.1.2.36, and that presented by Sir G. Grey (cf. Carter, l.c.), numbered B.M. 1962.4.15.1-3. It seems very questionable whether Carter's description will permit recognition of the form should it be discovered in the living state. Steinmann, who described the axial structure from material supplied by Carter, makes it clear that the fibrous skeleton is exactly as in *Ceratella,* so that the main difference from *Solanderia,* as defined in the present paper, is in the mode of growth of the colony. The genus *Chitina* may very well turn out to be unseparable from *Solanderia,* as its only species shows, in its axial structure, nearly all the particulars found in the latter.

Genus *Rosalinda* Totton, 1949

Encrusting species, covering the external surface of corals, shells, worm tubes, Crustacea, etc. The fibrous, mesogloeal skeleton forms a reticulated structure with angular meshes about 0.2 mm in diameter, attached to the substratum by means of a thin, continuous layer of horny or chitinized material. Spines are borne on the trabeculae and on the basal layer, the last mentioned spines occurring in the middle of the meshes. The whole encrustation is covered by the coenosarc, which also bears the club-shaped polyps. There are 30 to 50 capitate tentacles. There are several types of nematocysts. The coenosarc of the basal encrustation contains "giant" nematocysts, mixed with smaller nematocysts, whilst on the "head" of the tentacles there are also large and small nematocysts, though here the large nematocysts are much smaller than the "giant" nematocysts of the coenosarc. The gonophores are unknown.

Type species.—Rosalinda williami Totton, 1949.

Additional species—Rosalinda incrustans (Kramp, 1947).

These two species can be distinguished according to the following key.

KEY TO THE SPECIES OF *Rosalinda*

1. Hydranths large, about 3 mm long, with 40 to 50 tentacles scattered over the body. Color unknown ..... *R. incrustans* (Kramp)

1. Hydranths smaller, 2.6 mm long, with a reduced number of tentacles (30 to 40). Colony rose colored. ..... *R. williami* Totton

Both species will be discussed together.

Rosalinda williami Totton, 1949.

Rosalinda williami Totton, 1949, pp. 45-47, figs. 3, 4.

Rosalinda incrustans (Kramp, 1947)

Halocharis (?) *incrustans* Kramp, 1947, p. 3, figs. 1-5.
Rosalinda incrustans Totton, 1949, p. 46.

Kramp (1947, p. 4) described a species of encrusting hydroid as *Halocharis* (?) *incrustans*. Though material of erect Solanderiidae (*Solanderia crosslandi* and *S. misakinensis*) was at Kramp's disposal and he noted certain important points of similarity, he doubtfully included the species in the genus *Halocharis* Agassiz, 1862, because of the structure of the hydranths. Totton, who obtained material of a second species of encrusting Solanderiidae, which he described as *Rosalinda williami*, pointed out that Kramp's *Halocharis incrustans* cannot possibly be maintained in that genus. The type species of *Halocharis* Agassiz, 1862, *H. spiralis* Agassiz, 1862, is conspecific with *Tubularia implexa* Alder, 1857, a species now classified in the genus *Zanclea* Gegenbauer, 1856. *Halocharis* Agassiz, 1862, therefore, is a junior subjective synonym of *Zanclea* Gegenbauer, 1856. Kramp's species, moreover, clearly has no affinities with the family Zancleidae Russell, 1953, and it seems clear that, even though the gonophores of this species are unknown, it should be transferred to the Solanderiidae. It is certainly congeneric with *Rosalinda williami*, also described from sterile material by Totton (1949, p. 46). Even though the encrusting and the erect species of the Solanderiidae differ widely in appearance, there is such complete conformity in the structure of the mesogloeal skeleton that there can be no doubt that both growth-types belong to one and the same family. Kramp's species originates from Josephine Bank, 36°40′N, 14°15′W, where it was found at a depth of 225 m attached to the carapace of the crab *Anamathia rissoana* Roux. The holotype of *Halocharis* (?) *incrustans* is in the Museum of Natural History, Göteborg, Sweden (no. 10991). Totton's *Rosalinda williami* was obtained from a worm tube and the coral *Desmophyllum cristagalli* Milne Edwards & Haime growing on a cable at 440 m depth in the Bay of Biscay (47°34′N, 7°05′W); the holotype is in the British Museum (Natural History) (reg. no. 1949.1.20.4).

A careful comparison of the descriptions of both species shows only very few actual points of difference. Totton describes the surface of *Rosalinda williami* as "sometimes smooth, sometimes irregularly folded" and "marked by shallow, deeper colored depressions, from 1.4 mm to 2.3 mm apart, and about 0.9 mm in diameter. From these arise club-shaped polyps", etc. (Totton, 1949, p. 47). No such depressions appear to be present in *R. incrustans,* but the shape of the hydranths, the presence of large and small nematocysts in the coenosarc of the basal encrustation, and the reticulated structure of the mesogloeal basal skeleton seem to be identical in both species. The absence of gonophores in both species considerably troubles the exact taxonomical evaluation of the two forms, though it does not appear unlikely that they prove to be conspecific.

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