

FIGURE 63. *Lophogorgia hebes* (Verrill), spicules. *a-c*, of a reddish purple specimen from Texas (USNM 50531): *a*, capstans of outer rind; *b*, spindle of inner rind; *c*, anthocodial rods. *d-f*, of a purple specimen from Sarasota, Florida (50260): *d*, spindles of inner rind; *e*, capstans of outer rind; *f*, anthocodial rods. *g-i*, of a yellow specimen from Texas (49751): *g*, capstans of outer rind; *h*, spindles of inner rind; *i*, anthocodial rods. *j-k*, of a specimen from North Carolina (49589): *j*, spicules of rind; *k*, anthocodial rods. (All figures drawn to the same scale.)

are always profusely branched and ramification tends to proceed in one plane; large colonies may assume the form of a dense bush (pl. VII fig. 4) but remain distinctly flattened, whereas smaller colonies are commonly flabellate and quite flat.

Characteristic of this species regardless of growth form are the plump, blunt, deep reddish, purple, or yellow cortical spindles and the broad, flat, brightly colored (pink, yellow, or amber) anthocodial rods the largest of which are as long as or slightly longer than the longest cortical spindles. The spindles of the outer cortex are predominantly blunt, but the axial sheath contains some sclerites that are more or less acute and a few of this type may be found in preparations of the outer layer.

## 62 *Lophogorgia miniata* (Milne Edwards & Haime), 1857

(Fig. 64 a-c)

*Gorgonia miniata* VALENCIENNES 1855, p. 12. (Guadeloupe.) [Nomen nudum.]

*Gorgonia miniata* MILNE EDWARDS & HAIME 1857, 1, p. 160. (Antilles.)

*Leptogorgia miniata*, DEICHMANN 1936, p. 180, pl. 19 figs. 1-7. (Puerto Colombia, Colombia.)

**Diagnosis.** Colonies branched in one plane, openly pinnate, the twigs commonly opposite but not always so, generally 12-25 mm. long but a few more than 30 mm. Calyces low, bluntly conical, distinct, usually in single series along the two edges of the twigs and in alternating double rows along the larger branches. Spicules predominantly blunt capstans about 0.08-0.09 mm. long (Fig. 64 b), but more acute double spindles about 0.1 mm. long (Fig. 64 a) are not unusual. The longest anthocodial rods (Fig. 64 c) are longer than the largest rind sclerites by as much as 1.7 times. Color, bright vermilion red.

**Material.** A dry fragment, presumably part of the type in the Paris Museum, sent to Verrill by Kölliker; Antilles (MCZ 5017). Also a complete specimen, dry, from Puerto Colombia, COLOMBIA, collected by Brother Elias (USNM 49590).

**Distribution.** Lesser Antilles and south shore of the Caribbean.

**Remarks.** The large specimen from Colombia is very similar to the fragment from Paris in the collections of the Museum of Comparative Zoölogy. There are numerous blunt capstans about 0.08 mm. in length, and spindles, also blunt, up to 0.1 mm. The anthocodial rods, which are nearly twice the length of the longest cortical spindles, are flat, tapered toward the ends, serrate, and orange or salmon pink in color. The cortical spicules are clear orange-red.

**Lophogorgia sp. indet. (a)**

(Fig. 61 i-k)

**Diagnosis.** Colonies pinnate, branches stiff, 1.5–2.0 mm. in diameter, crooked, upward curving. Calyces in alternating double rows along each side of the branches, producing a squarish cross section. The longer cortical spindles acutely pointed. Largest anthocodial rods somewhat longer than the longest cortical spindles.

**Description.** A flabellate colony 17 cm. tall without base, branched in one plane, closely resembles *Lophogorgia hebes* (Verrill) in general aspect. The polyps are in alternating double rows along two sides of the branches, imparting to them a squarish cross section. The major branches ascend sinuously, and the openly pinnate lateral twigs curve upward to follow the course of the main branches. The calyces are prominent and, toward the base, become hemispherical and oriented in rows separated by grooves marking the path of the stem canals. The spiculation differs

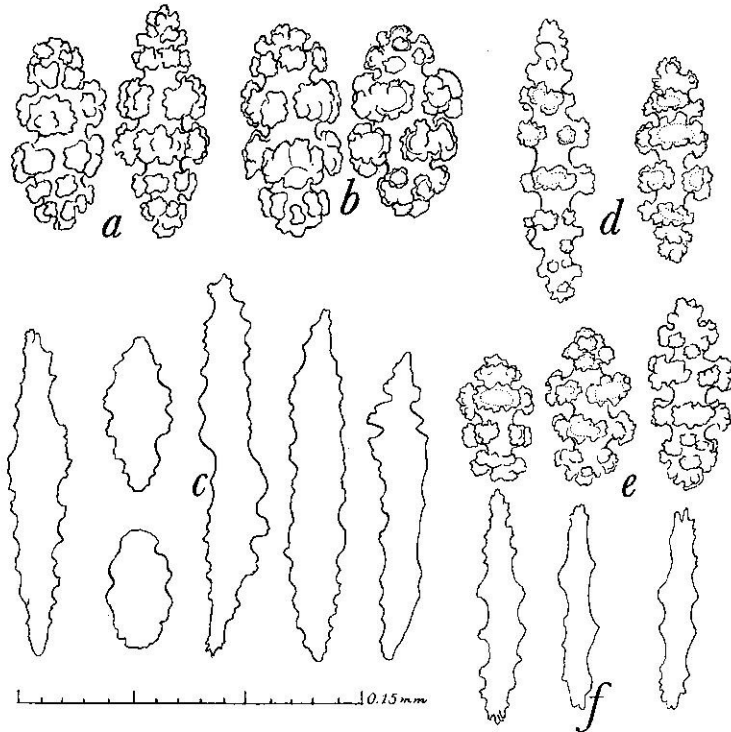


FIGURE 64. *Lophogorgia miniata* (Milne Edwards & Haime), spicules of a specimen from Colombia (USNM 49590): *a*, spindles of inner rind; *b*, capstans of outer rind; *c*, anthocodial rods. *Lophogorgia* sp. indet. (b), spicules of a specimen from Brazil (50226): *d*, spindles of inner rind; *e*, capstans of outer rind; *f*, anthocodial rods. (All figures drawn to the same scale.)

from that of *L. hebes* in the presence of numerous stout but acute spindles (Fig. 61 i) as well as blunt capstans (Fig. 61 j). The flat rods of the anthocodiae (Fig. 61 k) are more slender than is usually the case in *L. hebes*.

Material. Gulf coast of FLORIDA, F. G. Walton Smith coll., 1947, University of Miami Gulf Exp., lot 213, 1947, 1 specimen (USNM 50413).

Distribution. West coast of Florida.

Remarks. The material available is not sufficient to determine whether the differences between this form and *Lophogorgia hebes* represent individual variation or specific difference. It is included in the key and listed without a name, in the hope that additional material will be recognized.

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**Lophogorgia** sp. indet. (b)

(Fig. 64 d-f; Pl. VII fig. 2)

Diagnosis. Colonies branched in one plane, openly pinnate; terminal twigs stiff and nearly straight, slightly ascending (Pl. VII fig. 2). Calyces prominent, close set, alternating in two rows on each edge of the twigs and branches. The cortical spicules are slender but blunt capstans up to 0.08 mm. in length in the outer layer (Fig. 64 e), and slender, more acute spindles up to 0.12 mm. long in the axial sheath (Fig. 64 d). The flat anthocodial rods (Fig. 64 f) reach a length of 0.1 mm. Color of colonies, bright red ("scarlet-red or coral-red," Verrill). Spicules dull red, anthocodial rods colorless.

Material. BRAZIL, Paqueta, Richard Rathbun coll., 12.II.1877, 1 alcoholic specimen (USNM 50226).

Remarks. This specimen bears a strong outward resemblance to Wright & Studer's *Leptogorgia purpurea* from Bahia, Brazil, which is possibly identical with the species treated herein as *Lophogorgia punicea* (Milne Edwards & Haime). It differs, however, in its narrow, colorless anthocodial rods (fig. 64f) and, since those spicules seem to form a reasonably constant character, it cannot be synonymized with that species. Neither is the available material adequate for description as a new species, so it must remain for the present as a *species indeterminata*.

Genus **Pacifigorgia** Bayer, 1951

*Pacifigorgia* BAYER 1951, p. 94. (Type species, *Gorgonia stenobrochis* Valenciennes 1846, by original designation.)

Diagnosis. Colonies flabellate, in one plane; branches closely and regularly anastomosing to form a network. Cortical spicules including only acute double spindles and blunt double heads, never scaphoids.

Distribution. Pacific coast from the Gulf of California to Panama; Atlantic coast from Trinidad to Brazil. Endemic ampho-American.

Remarks. It is not necessary to repeat here the historical aspects of this genus, which were discussed at the time of its original publication and in a subsequent paper (BAYER 1953).

The genus *Pacifigorgia*, which contains about fifteen species in all, is represented in the Atlantic Ocean by only one, which has received several names over the years.

## 65 *Pacifigorgia elegans* (Milne Edwards & Haime), 1857

(Fig. 65)

- Rhipidogorgia elegans* MILNE EDWARDS & HAIME 1857, I, p. 177. (Iles de la Trinité.)  
*Rhipidogorgia elegans*, DUCHASSAING & MICHELOTTI 1864, p. 20, pl. 4 fig. 4. (In insula Trinitatis.)  
*Gorgonia hartti* VERRILL 1912, p. 391, pl. 29 figs. 6-6a, pl. 30 fig. 2, pl. 33 fig. 6, pl. 35 fig. 6. (Marannao, Brazil.)  
*Gorgonaria* [sic] *Crevauxi* STIASNY 1951, p. 72, pl. 22 figs. 4-5, pl. 20 fig. C. (Guyane française, Iles du Salut, Ile Royale.)  
*Rhipidogorgia elegans*, STIASNY 1951, p. 70, pl. 20 fig. A. (La Trinité.)  
*Pacifigorgia elegans*, BAYER 1959, p. 19, fig. 5. (Surinam.)

Diagnosis. Bright reddish purple anastomosing sea fans with cortical spindles reaching 0.12 mm. in length (Fig. 65 a) and double

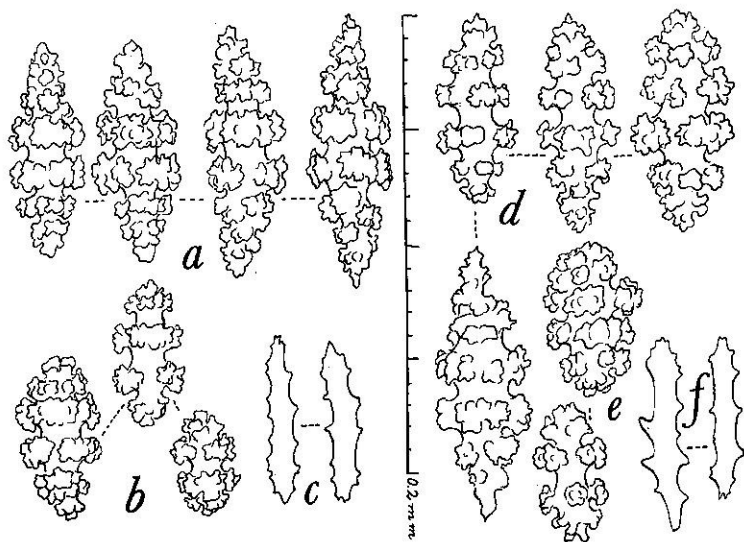


FIGURE 65. *Pacifigorgia elegans* (Milne Edwards & Haime). *a-c*, spicules of a specimen from Trinidad: *a*, spindles; *b*, double heads; *c*, anthocodial rods. *d-f*, syntype of *Gorgonia crevauxi* Stiasny from French Guiana: *d*, spindles; *e*, double heads; *f*, anthocodial rods. (All figures drawn to same scale.)

heads somewhat shorter, 0.05–0.08 mm., sometimes 0.1 mm. (Fig. 65 b). Anthocodiae with slender flat rods having widely spaced marginal serrations, usually about 0.07 mm. long but commonly shorter and occasionally longer (Fig. 65 c).

**Material.** Specimens from TRINIDAD, Toco, collected by Dr. Elisabeth Deichmann, in the Museum of Comparative Zoölogy; and a fragment of a syntype of *G. crevauxi* Stiasny from FRENCH GUIANA, through the courtesy of Dr. L. B. Holthuis of the Leiden Museum (USNM 50742). Several specimens from SURINAM, in 15 fathoms (USNM 50953).

**Distribution.** Trinidad to Maranhao, Brazil. Could be expected at Curaçao and adjacent islands, but has not yet been reported inside the Caribbean.

**Remarks.** Specimens collected by Miss DEICHMANN at Toco, Trinidad, agree in form with both VERRILL's and DUCHASSAING & MICHELOTTI's species, and with the former in regard to spiculation. It should be noted that the scaphoids mentioned by VERRILL for *G. hartii* are the result of contamination.

The syntype of *G. crevauxi* is identical with *G. hartii* except for the fact that the blunt double heads are somewhat larger. All published descriptions and all available material indicate that in the Atlantic there is but a single species of *Pacifigorgia*, for which the earliest name is *elegans* of MILNE EDWARDS & HAIME.

### Genus *Leptogorgia* Milne Edwards & Haime, 1857

*Leptogorgia* MILNE EDWARDS & HAIME 1857, 1, p. 163. (Type species, *Leptogorgia viminalis* Milne Edwards & Haime = *Gorgonia virgulata* Lamarck = ?*Gorgonia viminalis* Pallas, by subsequent designation: VERRILL 1869b, p. 420.]

*Leptogorgia*, VERRILL 1869b, p. 419.

*Leptogorgia*, (part) BIELSCHOWSKY 1929, p. 81.

*Leptogorgia*, (part) DEICHMANN 1936, p. 175.

**Diagnosis.** Gorgoniids with outer coenenchymal spindles partly in the form of short disk-spindles, partly long spindles with tubercles of outer surface partly fused and higher than those of the inner surface; inner coenenchyme with spindles having sculpture uniformly developed on all sides. Anthocodiae with weak or strong armature.

**Distribution.** Chesapeake Bay to the reefs of Brazil.

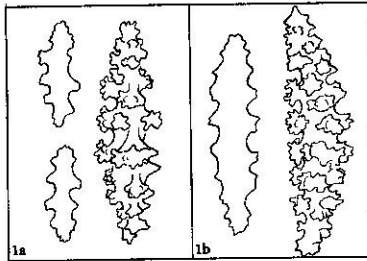
**Remarks.** There is absolutely no justification for considering *Gorgonia petechizans* Pallas to be the type species of *Leptogorgia* as was done by BIELSCHOWSKY and later authors, because that species was not originally included in *Leptogorgia*.

My concept of the genus differs from that of BIELSCHOWSKY in that I exclude all those species that have uniformly sculptured cortical spindles. Those species agree satisfactorily with the definition of *Lophogorgia*, where it seems more logical to place them.

## KEY 19

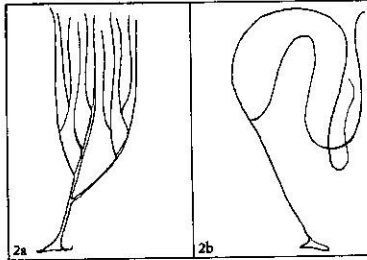
ILLUSTRATED KEY TO THE SPECIES OF *Leptogorgia*

1a. Anthocodial armature weak, the flat rods always less than  $\frac{2}{3}$  the length of the longest spindles of the rind. Colonies usually attached but sometimes free: 2



1b. Anthocodial armature strong, the rods reaching or exceeding  $\frac{2}{3}$  the length of the longest spindles in the rind. Colonies usually unattached: 3

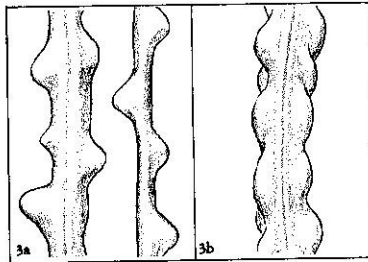
2a. Colonies with a number of long, straight branches, usually rather stiff; always attached: *Leptogorgia virgulata* (Lam.)



2b. Colonies unbranched or with only one or two long, slender, flexible branches. Colonies sometimes unattached: *Leptogorgia setacea* (Pallas)

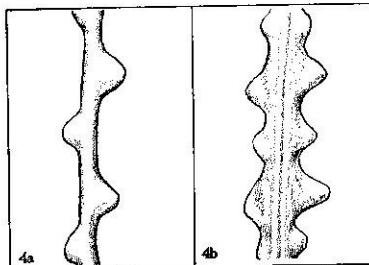
3a. Calyces prominent, widely separated: 4

3b. Calyces distinct but more closely spaced: *Leptogorgia medusa* (Bayer)



4a. Extremely slender colonies, diameter of stems (excluding calyces) 0.75 mm. or less: *Leptogorgia stheno* (Bayer)

4b. Stoutier colonies, diameter of stems (excluding calyces) 0.9 mm. or more: *Leptogorgia euryale* (Bayer)



66            **Leptogorgia virgulata** (Lamarck), 1815

(Fig. 66; Pl. VII fig. 7)

- ?*Gorgonia viminalis* PALLAS 1766, p. 184. (Mare Mediterraneum [in error, if this is the same species as Esper's].)
- Gorgonia viminalis*, ELLIS & SOLANDER 1786, p. 82, pl. 12 fig. 1. (Charleston, in South Carolina.)
- Gorgonia viminalis*, ESPER 1791, 2, p. 51, pl. 11 [but not 11A]. (Das mittelländische Meer [in error].)
- Gorgonia virgulata* LAMARCK 1815b, p. 157. (Habite l'Océan atlantique américain.)
- Gorgonia ceratophyta*, var. *flava* + var. *rubra* DONOVAN 1825, 4, p. 114, 115.
- Leptogorgia tenuis* VERRILL 1864a, p. 8. (Bay of New York.)
- Leptogorgia brasiliensis* VERRILL 1912, p. 392, pl. 29 figs. 3-3a, pl. 33 fig. 7, pl. 35 figs. 7-7a. (Mapelle, Bahia, Brazil.)
- Leptogorgia sulfurea* BIELSCHOWSKY 1929, p. 126, fig. 20, pl. 3 fig. 11. (Verbreitung?)
- Leptogorgia virgulata*, BIELSCHOWSKY 1929, p. 127, fig. 21, pl. 3 fig. 12. (Charleston, S. C.; Morehead City, N.C.)
- Leptogorgia virgulata*, DEICHMANN 1936, p. 177, pl. 19 figs. 24-34. (New York to Florida.)

**Diagnosis.** Colonies attached, with several long, whip-like branches (Pl. VII fig. 7). Polyps in multiple series along two sides of the branches, without projecting calyces, armed with flat rods (Fig. 66 c, g, h) half or less than half as long as the longest coenenchymal spindles. The shorter spicules of the outer cortex are mostly disk-spindles (Fig. 66 a, e, i); the longer spindles of the inner cortex are symmetrically sculptured (Fig. 66 b, f, j).

**Material.** A large number of specimens in the U. S. National Museum, from the BAY OF NEW YORK (569, 765, 766), CHESAPEAKE BAY (49763), NORTH CAROLINA (43036, 43415, 43420, 49592, 49753), SOUTH CAROLINA (44057, 49602, 50509), GEORGIA (49669, 49679), west coast of FLORIDA (6877, 15903, 44229, 44230, 44232, 49690, 49732, 49752, 50056, 50259, 50544, 50545, 50564, 50566, 50657), LOUISIANA (49813), and TEXAS (50529, 50532, 50416); also material from BRAZIL, collected by R. Rathbun (49749).

**Distribution.** Bay of New York? Chesapeake Bay to Georgia; west coast of Florida to Brazil.

**Remarks.** This is the common, moderately branched, whip-like *Leptogorgia* of the American east coast. The specimens from Brazil do not differ significantly, but may prove to be separable as a geographic subspecies. I have not seen material from localities between Texas and Brazil; the record from Jamaica, published by HARGITT & ROGERS (1901, p. 287) remains to be confirmed.



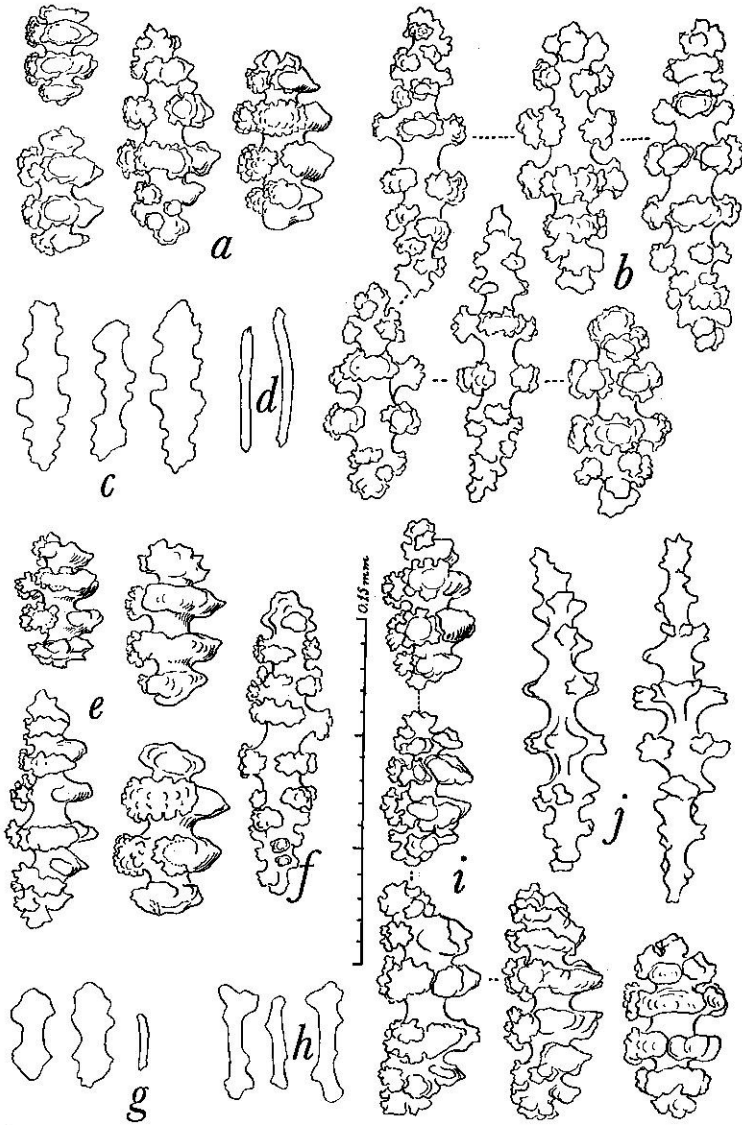


FIGURE 66. *Leptogorgia virgulata* (Lamarck), spicules. *a-d*, specimen from the Carolinas: *a*, disk-spindles; *b*, regular spindles of inner cortex; *c*, flat anthocodial rods; *d*, rodlets of tentacles. *e-g*, specimen from northwest Florida: *e*, disk-spindles; *f*, regular spindles; *g*, anthocodial and tentacular rods. *h-j*, specimen from Brazil: *h*, anthocodial rods; *i*, disk-spindles; *j*, regular spindles (All figures drawn to the same scale.)

**Leptogorgia setacea** (Pallas), 1766

(Figs. 67, 68 a-d)

*Gorgonia setacea* PALLAS 1766, p. 182. (Mare Americanum.)*Pterogorgia gracilis* VERRILL 1868a, p. 359, pl. 4 figs. 2-3. (Abrolhos Reefs, Brazil.)*Gorgonia gracilis*, VERRILL 1912, p. 393, pl. 29 fig. 2, pl. 35 figs. 5-5a. (Abrolhos Reefs, Brazil.)not *Xiphigorgia setacea*, KÜKENTHAL 1916b, p. 502.*Leptogorgia virgulata*, COWLES 1930, p. 332. (Chesapeake Bay.)*Leptogorgia setacea*, DEICHMANN 1936, p. 178, pl. 19 figs. 35-38. (North Carolina: Texas; Brazil.)

**Diagnosis.** Colonies attached or free, unbranched or with a very few long, flexible branches; polyps in single or double series along two sides of the stems, with low or moderately prominent calyces. Anthocodial rods (Fig. 67 d, e, m) less than  $2/3$  the length of the longest cortical spindles, usually only half or less than half as long. Disk-spindles of cortex similar to those of *L. virgulata* but more ornately sculptured (Fig. 67 b, h, j); outer rind also containing spindles with warts of outer surface more or less fused and spine like (Fig. 67 a, g, k). Spindles of inner rind uniformly sculptured all around (Fig. 67 c, i, l). Color, purple or yellow; Brazilian specimens may be nearly white.

**Material.** A large number of USNM specimens from VIRGINIA, Chesapeake Bay and vicinity, including those reported by Cowles (1930) (17319, 43029, 43241, 43242, 43245, 43252, 43254, 49757, 50588, 50702, 50706), and from FLORIDA, Fernandina (50590); from the Gulf of Mexico, west Florida (42717); LOUISIANA (50652), TEXAS (44218, 43411, 49977), and MEXICO, Matamoras (42162); also several specimens from BRAZIL (33606, 49657, 49659, 50654).

**Distribution.** Chesapeake Bay to Brazil. This species seems to have about the same range as *L. virgulata*, but has not been reported north of Chesapeake Bay.

**Ecology.** *Leptogorgia setacea* ventures into bays and river mouths where salinity is much reduced. It has been taken in Chesapeake Bay as far north as the mouth of the Potomac River (COWLES 1930, p. 332). In Brazil, it "grows abundantly in little tufts on the edges of the reefs of the Abrolhos region below low-tide, with *Hymenogorgia quercifolia*." (VERRILL 1868a, p. 360.) It is one of the few species of gorgonian that can live completely unattached.

**Remarks.** *Leptogorgia setacea* is a common inshore species along the Atlantic coast of North America, from Chesapeake Bay southward. It can be recognized by its unbranched, often unattached, filiform colonies with low, crowded, biserial calyces and small anthocodial rods. Its color may be yellow, purple, or some intermediate shade.

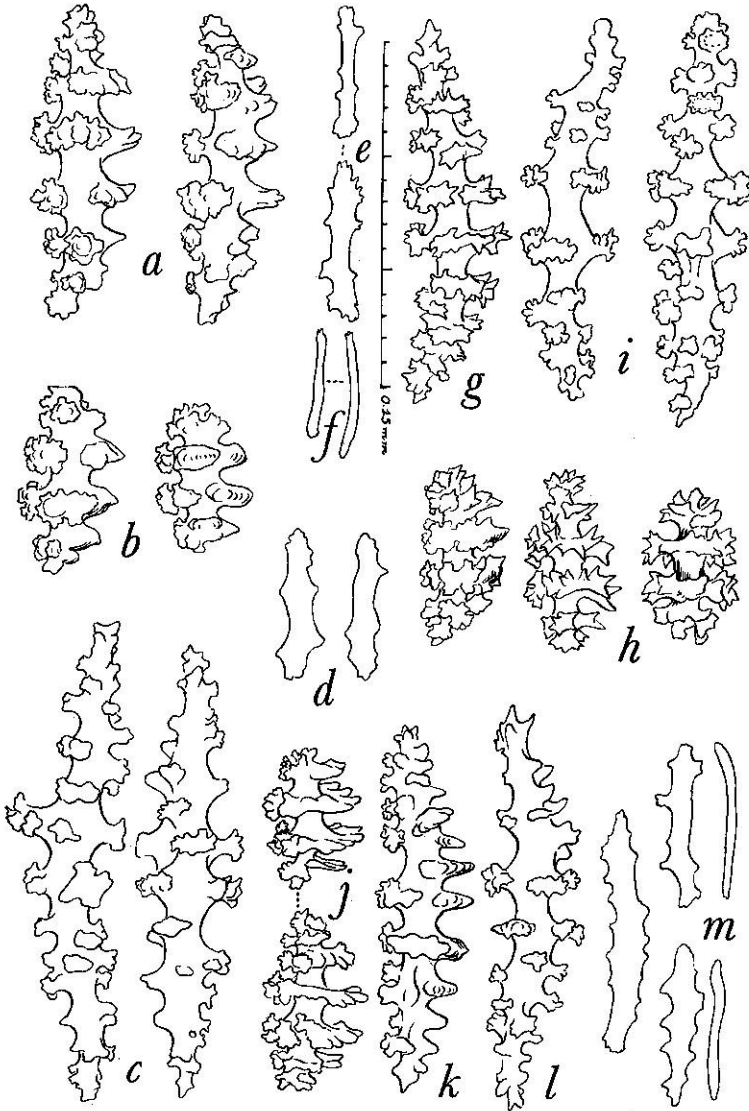


FIGURE 67. *Leptogorgia setacea* (Pallas), spicules. *a-d*, specimen from Chesapeake Bay: *a*, spindles of outer cortex; *b*, disk-spindles of outer cortex; *c*, spindles of inner cortex; *d*, anthocodial rods. *e-i*, specimen from Texas: *e*, anthocodial rods; *f*, tentacular rods; *g*, spindles of outer cortex; *h*, disk-spindles of outer cortex; *i*, spindles of inner cortex. *j-l*, specimen from British Guiana: *j*, disk-spindles of outer cortex; *k*, spindle of outer cortex; *l*, spindle of inner cortex; *m*, anthocodial and tentacular rods. (All figures drawn to same scale.)

The spicules of Brazilian specimens (Fig. 68 a-d) do not differ significantly from those of North American specimens.

68                    **Leptogorgia medusa** (Bayer), 1952

(Fig. 68 e-g)

*Eugorgia medusa* BAYER 1952, p. 188, fig. 1 t-y. (Off Boca Grande, Carrabelle, and Cape San Blas, Florida.)

**Diagnosis.** Colonies fixed or free, unbranched or with one or two long branches; diameter of stems 1.0-1.5 mm., exclusive of calyces. Polyps forming low, rounded, contiguous calyces set in double rows on each side of the stem in the midregion of the colony, single rows near the growing tips. Anthocodial rods up to 0.11 mm. in length (Fig. 68 g), the largest coenenchymal spindles about 0.14 mm. Outer rind with short disk-spindles and long spindles with partly fused warts (Fig. 68 e); inner rind with symmetrical spindles and small, flattened, belted rods (Fig. 68 f).

**Material.** The original USNM specimens from FLORIDA, off Boca Grande Light (10483), south of Carrabelle (holotype 49766, paratype 10464), and south of Cape San Blas (10331), Gulf of Mexico, 24-27 fms.

**Distribution.** Northern Gulf of Mexico.

**Remarks.** Colonies of *Leptogorgia medusa* are distinctive because of their low, close-set calyces and their uniform yellowish or pinkish buff coloration. The anthocodial armature is quite strong.

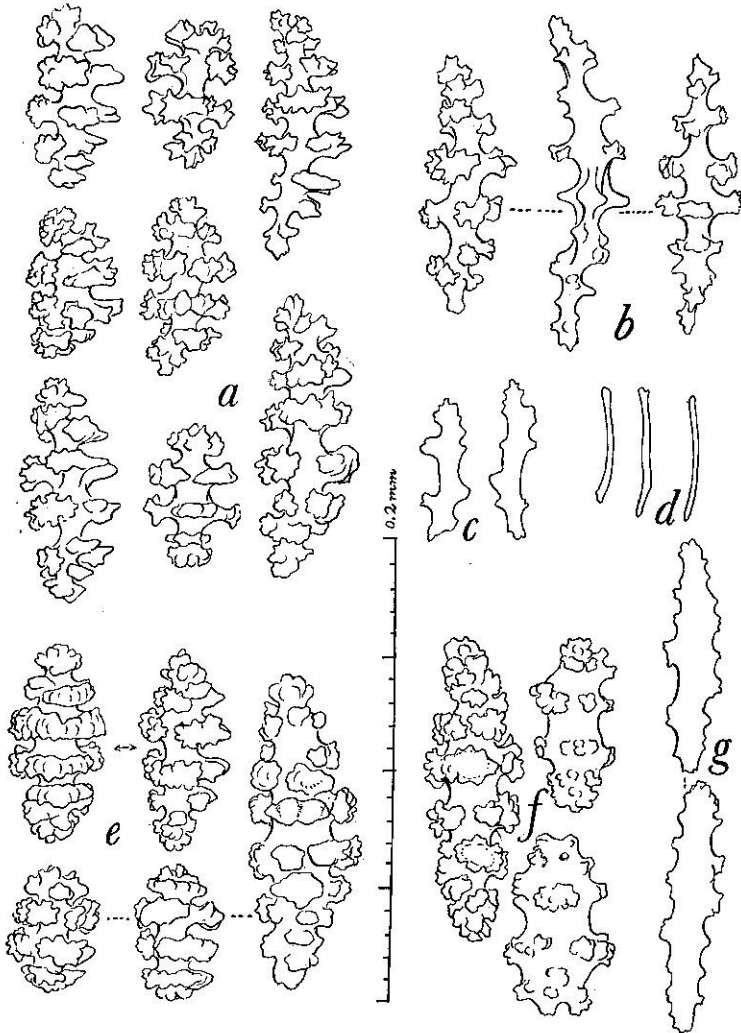
69                    **Leptogorgia stheno** (Bayer), 1952

(Fig. 69 a-e)

*Eugorgia stheno* BAYER 1952, p. 186, fig. 1 j-n. (Off Palm Beach and Miami, Florida, and Mobile, Alabama.)

*Leptogorgia stheno*, BAYER 1959, p. 17, fig. 4. (Surinam.)

**Diagnosis.** Colonies unattached, unbranched or rarely with one or two branches, extremely slender, diameter 0.4-0.75 mm. exclusive of calyces. Polyps biserial, alternating, forming prominent, conical calyces; anthocodiae armed with stout rods (Fig. 69 c) often attaining a length of 0.14 mm., or equal to the longest cortical spindles. Outer rind contains disk-spindles and longer spindles with partly fused warts (Fig. 69 a-b); inner rind contains symmetrically ornamented spindles (Fig. 69 d). Color, white or yellow, with red calyces;



FIGURES 68. *Leptogorgia setacea* (Pallas), spicules of a specimen from Brazil: *a*, disk-spindles and longer spindles with fused warts, from outer rind; *b*, spindles of inner rind; *c*, anthocodial rods; *d*, tentacular rods. *Leptogorgia medusa* (Bayer), spicules of a specimen from off Boca Grande, Florida: *e*, disk-spindles and longer spindles with fused warts, from outer rind; *f*, spindle and flat rods of inner cortex; *g*, anthocodial rods. (All figures drawn to same scale.)

uniform pale (white or yellow) and dark (reddish or pinkish orange) specimens, with yellow anthocodial rods, are occasionally found.

**Material.** The original USNM specimens, from FLORIDA, off Palm Beach (49784), Miami (49785), and ALABAMA, Mobile (holotype 49774, paratypes 49775-49777, also 49778-49783); five additional lots from off Palm Beach (50429, 50438) and the Gulf of Mexico (50033, 50062, 50063). One fragment of an extremely slender colony from SURINAM, in 14 fms. (50845).

**Distribution.** From Palm Beach, Florida, to the coast of Alabama; 14-67 fathoms.

**Remarks.** This species is very common on sandy ground in the Gulf of Mexico, where the colonies live completely unattached and have normal growing tips at both ends. Both attached and unattached specimens have been taken on rocky bottom off the east coast of Florida.

The incomplete material from Surinam might have lived either attached or free; the predominantly soft character of the bottom, mud with shells, suggests that they probably were unattached.

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### ***Leptogorgia euryale* (Bayer), 1952**

(Fig. 69 f-i)

*Eugorgia euryale* BAYER 1952, p. 186, fig. 1 o-s. (Gulf of Mexico, south of Carrabelle, Florida.)

?*Xiphigorgia setacea*, KÜKENTHAL 1916b, p. 502, figs. Z, A', pl. 23 fig. 6. (Honduras.)

**Diagnosis.** Colonies attached or free, simple, rarely branched, moderately slender, 0.9-1.0 mm. in diameter exclusive of calyces; polyps in alternating double rows along two sides of the stem, becoming strictly biserial near the growing ends; calyces prominent, widely separated. Longest anthocodial rods (Fig. 69 h) 0.75-0.8 as long as the longest cortical spindles. Outer rind with disk-spindles (Fig. 69 i); inner rind with symmetrically sculptured spindles (Fig. 69 f). Color, pale pink, calyces red with yellow area around aperture.

**Material.** FLORIDA, south of Carrabelle, 24 fms. (holotype USNM 49764, paratype 49765).

**Distribution.** Northern Gulf of Mexico; Honduras?

**Remarks.** It seems likely that the specimen that KÜKENTHAL called *Xiphigorgia setacea* is in reality the present species. Its few, long branches with prominent calyces and its coloration agree perfectly. Unfortunately, KÜKENTHAL did not figure the spicules of his specimen in adequate detail,

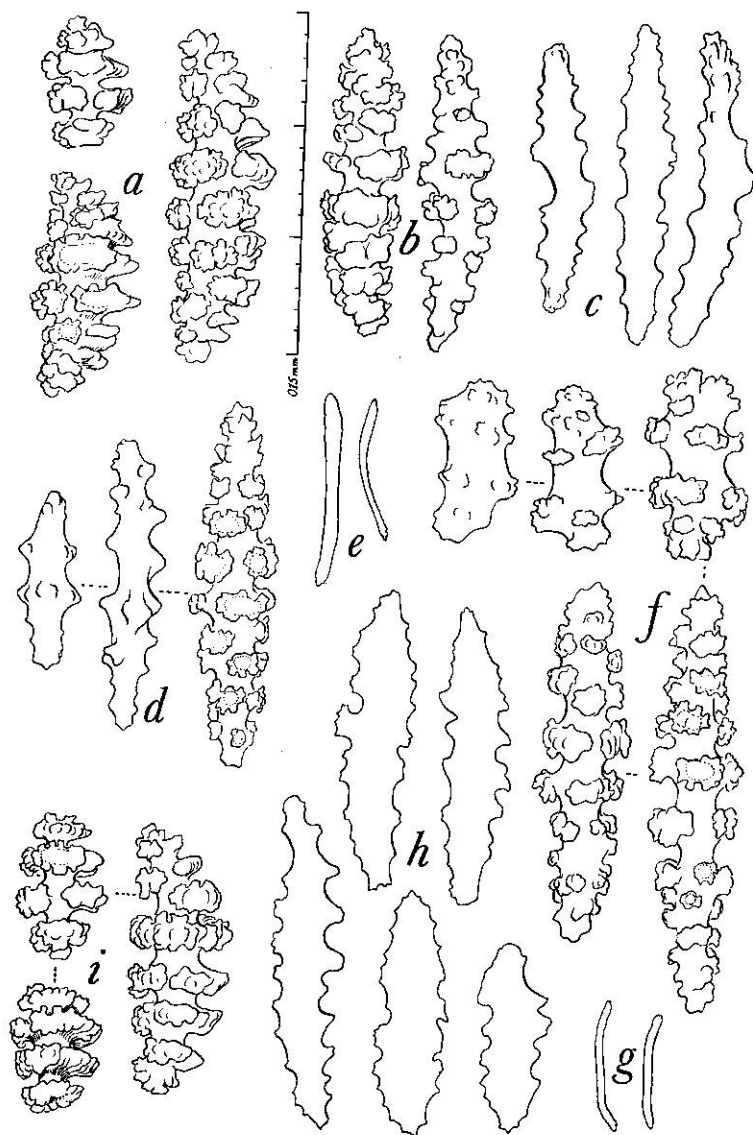


FIGURE 69. *Leptogorgia stheno* (Bayer), spicules: *a*, disk-spindles and longer spindles with fused warts, from outer cortex; *b*, spindles with partly fused warts, from outer cortex; *c*, anthocodial rods; *d*, spindles of inner cortex; *e*, tentacular rods. *Leptogorgia euryale* (Bayer), spicules: *f*, spindles and flattened rods of inner cortex; *g*, tentacular rods; *h*, flat rods from anthocodiae; *i*, disk-spindles and longer spindles with fused warts, from outer cortex. (All figures drawn to same scale.)

*Leptogorgia euryale* is similar to *L. steno* but much stouter, with longer symmetrical spindles, up to 0.185 mm. in length, and anthocodial rods reaching about 0.15 mm. Like *L. medusa*, the axial sheath layer of *L. euryale* contains blunt, flattened rods that seem to be missing in *steno*.

### Genus **Pseudopterogorgia** Kükenthal, 1919

*Pterogorgia* (part) of EHRENBERG, DANA, VALENCIENNES, DUCHASSAING & MICHELOTTI, KÖLLIKER, *et aliis*.

not *Pterogorgia* EHRENBERG 1834, p. 368. (Type species, *Gorgonia anceps* Pallas 1766, by subsequent designation: MILNE EDWARDS & HAIME 1850, p. lxxx.)

*Pterogorgia*, BIELSCHOWSKY 1918, p. 52.

*Pterogorgia*, KÜKENTHAL 1919, p. 853

*Pseudopterogorgia* KÜKENTHAL 1919, p. 854. (Type species, *Pseudopterogorgia australiensis* (Ridley), by original designation.)

*Pterogorgia*, KÜKENTHAL 1924, p. 351.

*Pseudopterogorgia*, KÜKENTHAL 1924, p. 355.

*Pterogorgia*, BIELSCHOWSKY 1929, p. 197.

*Pterogorgia*, DEICHMANN 1936, p. 193.

*Antillogorgia* BAYER 1951, p. 97. (Type species, *Gorgonia acerosa* Pallas 1766, by original designation.)

**Diagnosis.** Pinnately branched gorgoniids completely lacking anastomosis of branchlets. Outer layer of rind containing canoe-shaped scaphoid spicules.

**Distribution.** Bermuda; south and west Florida to Brazil; Indo-west-Pacific: Ceylon, East Indies, Phillipines, Torres Straits; Peru?

**Remarks.** The genus *Antillogorgia* was established to accommodate the plumose gorgoniids with scaphoid spicules, eliminated from *Pterogorgia* by its restriction to non-plumose forms with broad, flat branches (= *Xiphigorgia*). It is now quite clear, however, that several Indo-Pacific species, for which the name *Pseudopterogorgia* was proposed by KÜKENTHAL, are generically inseparable. Thus, the genus *Antillogorgia* becomes a junior subjective synonym of *Pseudopterogorgia*.

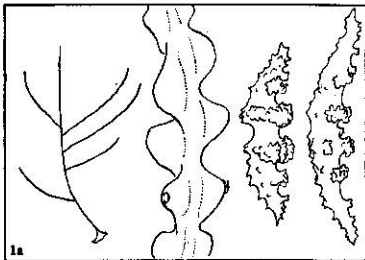
The scaphoids of Indo-Pacific species are characterized by features not found in those of the western Atlantic and there is some justification for recognizing two groups of species distinguished on this basis. The scaphoids of all Indo-Pacific species seem to be of one type, and of most Caribbean species of another, but one Atlantic species is very close to the Indo-Pacific group in this regard, and at least two others show intermediate conditions. I therefore have some hesitancy in formally subdividing the genus. If such subdivision proves advisable, *P. bipinnata* will belong to the nominate subgenus along with *P. australiensis* (Ridley), *P. oppositipinna* (Ridley) and its subspecies *parvispiculata* Bielschowsky, *P. pinnata* (Nutting) and *P. luzonica* Kükenthal. The remaining Atlantic species will fall within the subgenus *Antillogorgia* with *G. acerosa* as its type, with the possible exception of *P. blanquillensis* and *P. rigida*, which have scaphoids of an intermediate type.



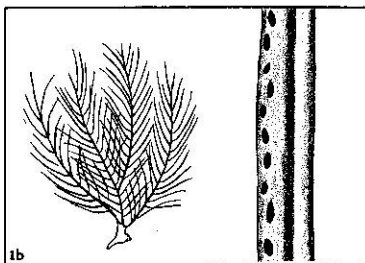
## KEY 20

ILLUSTRATED KEY TO THE SPECIES OF *Pseudopterogorgia*

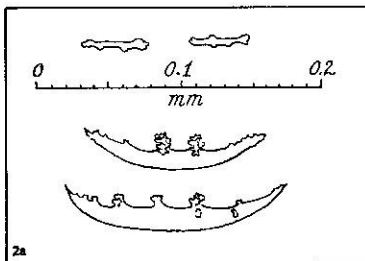
- 1a. Polyps forming distinct, conical calyces. Colonies small and straggling, openly pinnate, with few branchlets: 12. *Pseudopterogorgia marcgravii* spec. nov.



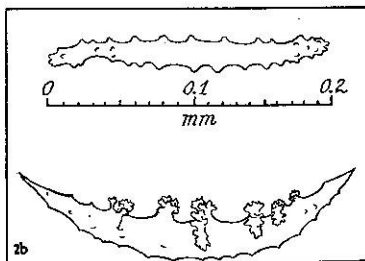
- 1b. Polyps forming low, indistinct calyces or none at all. Colonies larger, closely and regularly pinnate: 2



- 2a. Scaphoids reaching at most a length of 0.18 mm.; anthocodial rods when present not more than 0.14 mm. in length: 3

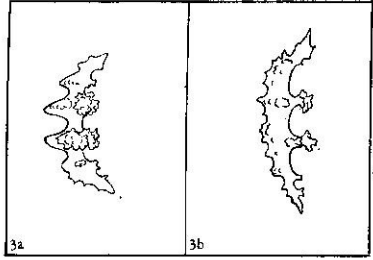


- 2b. Many of the scaphoids 0.2 mm. in length and often more than that. Anthocodial rods numerous and large, commonly exceeding 0.14 mm. in length: 9

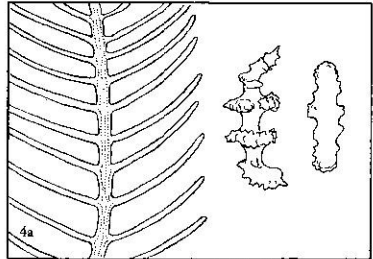


3a. Sculpture of convex side of scaphoids as high as, or higher than, that of concave side, and fused into prominent transverse ridges or collars: 4

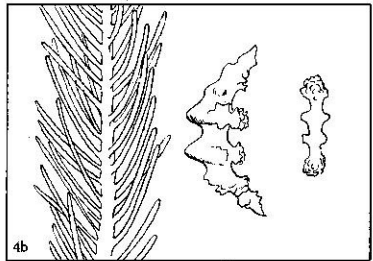
3b. Sculpture of convex side of scaphoids lower than that of concave side, sometimes suppressed completely: 5



4a. Twigs 4–10 mm. apart, strictly opposite, in one plane: *Pseudopterogorgia bipinnata* (Verrill)

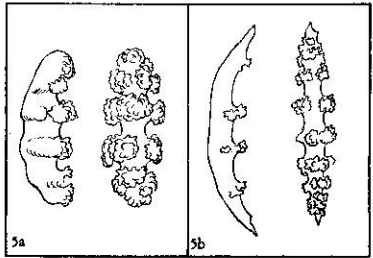


4b. Twigs 4 mm. apart or less, not strictly opposite, not in one plane, strongly ascending: *Pseudopterogorgia hallos* (Biel-schowsky)

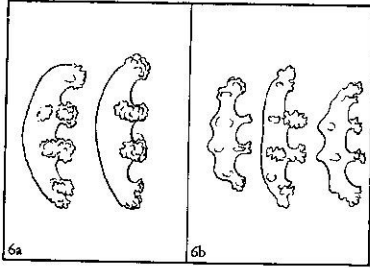


5a. Scaphoids typically blunt at the ends; regular spindles also blunt: 6

5b. Scaphoids pointed at the ends; regular spindles acute: 7

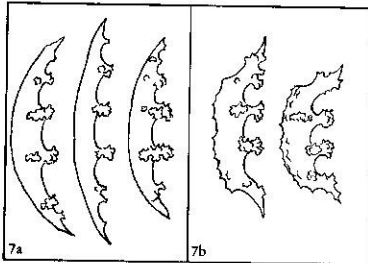


- 6a. Convex profile of scaphoids smooth or minutely echinulate, without low, broad ridges continued from concave side: *Pseudopterogorgia rigida* (Bielschowsky)



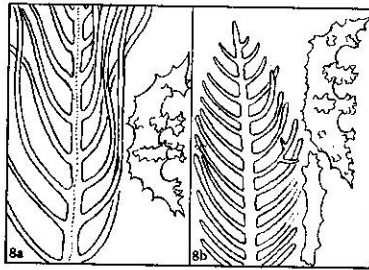
- 6b. Convex profile of scaphoids strongly echinulate, rarely smooth, often with low, broad, transverse ridges: *Pseudopterogorgia blaquillensis* (Stiasny)

- 7a. Scaphoids slender, gently and uniformly curved, parenthesis-like, the ends not recurved outward; convex profile smooth or very finely echinulate: *Pseudopterogorgia acerosa* (Pallas)



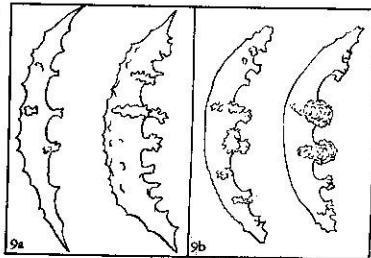
- 7b. Scaphoids stouter, more strongly bent, the ends recurved outward; convex profile distinctly echinulate: 8

- 8a. Large, flexible, ostrich-plume colonies with long branchlets; very slimy in life. Anthocodial rods lacking: *Pseudopterogorgia americana* (Gmelin)



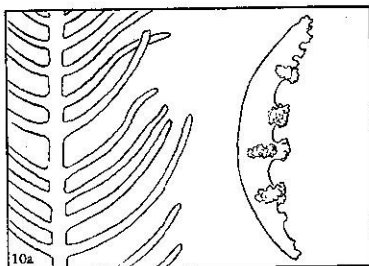
- 8b. Small, stiff, feather-like colonies with short branchlets; flat rods present in anthocodiae: *Pseudopterogorgia hummelincki* spec. nov.

- 9a. Convex profile of scaphoids strongly echinulate. Branches flexible and slender, 0.5–0.75 mm. in width: 11

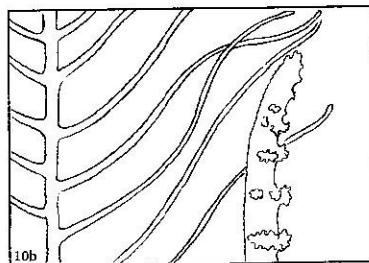


- 9b. Convex profile of scaphoids smooth or only weakly echinulate. Branches stouter, 1.5–2.0 mm. in width: 10

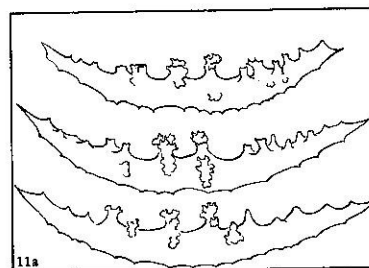
- 10a. Branchlets rather short, 3–4 cm., rather stiff. Scaphoids strongly curved. Colonies yellow or purple: *Pseudopterogorgia elisabethae* spec. nov.



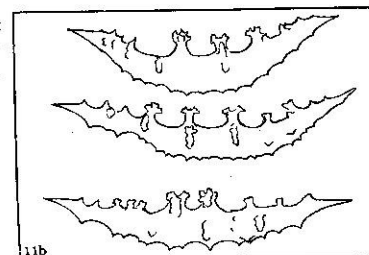
- 10b. Branchlets rather long, 6–10 cm., flexible. Scaphoids moderately curved. Colonies white: *Pseudopterogorgia albatrossae* spec. nov.



- 11a. Curvature of scaphoids uniform, parenthesis-like, the ends not recurved outward: *Pseudopterogorgia navia* spec. nov.



- 11b. Many scaphoids more strongly bent near the ends, which are recurved outward: *Pseudopterogorgia hystrix* spec. nov.



71 ***Pseudopteroqorgia bipinnata* (Verrill), 1864**

(Figs. 70-72; Pl. VIII fig. 3, XI fig. 1)

- Pterogorgia bipinnata* VERRILL 1864b, p. 31. (Cumaná, Venezuela.)  
 not *Gorgonia bipinnata*, HARGITT & ROGERS 1901, p. 287, pl. 3 fig. 4. [= *Gorgonia mariae* spec. nov.]  
 not *Pterogorgia bipinnata*, BIELSCHOWSKY 1918, p. 61. [= *Pseudopteroqorgia acerosa* (Pallas).]  
*Pterogorgia antillarum* BIELSCHOWSKY 1918, p. 61. (St. Thomas.)  
 not *Pterogorgia bipinnata*, BIELSCHOWSKY 1929, p. 213, fig. 37, pl. 4 fig. 21. [= *Pseudopteroqorgia acerosa* (Pallas).]  
*Pterogorgia antillarum*, BIELSCHOWSKY 1929, p. 215, fig. 38, pl. 5 fig. 25. (St. Thomas.)  
*Pterogorgia bipinnata*, DEICHMANN 1936, p. 195, pl. 21 figs. 1-16. (Marquesas, Florida; Cumaná, Venezuela.)  
*Pseudopteroqorgia bipinnata*, BAYER 1959, p. 20

Diagnosis. Colonies pinnately branched, chiefly in one plane, the secondary branches often branched to form bipinnate colonies. Twigs rather stiff, blunt, 25-40 mm. in length at full growth (longer than this, they bear lateral twigs), somewhat flattened, 1.0-1.5 mm. wide, straight or gently curved; almost invariably they are opposite, openly and quite uniformly spaced at intervals of about 5 mm. (4-8 mm.) and arising at angles of 60° to 70° with the main stems; a few twigs low in the colony may anastomose here and there. Polyps in a double row, commonly alternating, along each edge of the twigs, fully retractile and visible as small slits without any calycular prominence. Axis of main trunk more or less flattened in the plane of branching, longitudinally striated, brown in color; in the branches and twigs it becomes paler in color and very slender. Cortex consisting of an outer layer containing scaphoids up to 0.18 mm. in length, with the belts of tubercles fused to form collars on the convex side, as high as or higher than the unfused complicated tubercles on the concave side, and symmetrical, acute spindles up to 0.2 mm. in length; and an inner layer of spindles only. Anthocodiae with armature of large, flat rods with scalloped edges, 0.07-0.14 mm. in length, arranged 'en chevron' in the tentacle bases. Color usually violet, occasionally yellow or whitish; spicules clear violet, colorless, or pale yellow; anthocodial rods colorless.

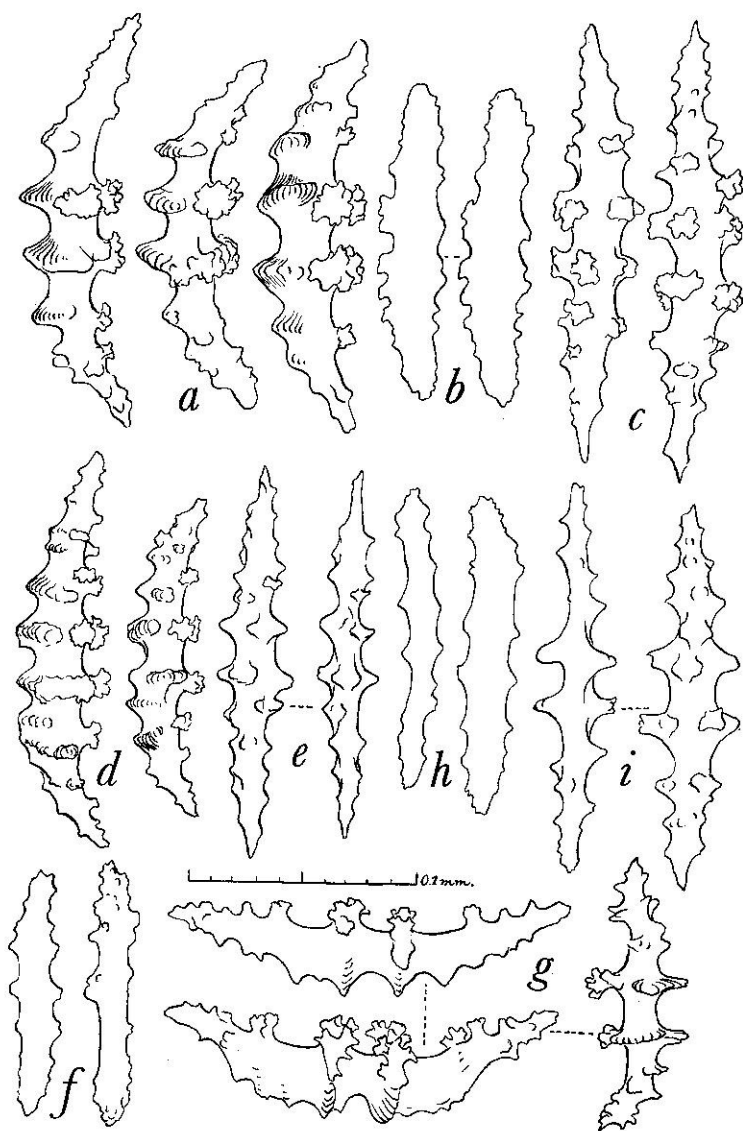


FIGURE 70. *Pseudopteroorgia bipinnata* (Verrill), spicules. *a-c*, of the holotype from Cumaná, Venezuela (MCZ 5080): *a*, scaphoids; *b*, anthocodial rods; *c*, spindles. *d-f*, of a specimen from Old Providence (USNM 44150): *d*, scaphoids; *e*, spindles; *f*, anthocodial rods. *g-i*, of a specimen from the Dry Tortugas (50249): *g*, scaphoids; *h*, anthocodial rods; *i*, spindles. (All figures drawn to the same scale).

**Description.** The holotype is a colony 22 cm. in height, lacking base, and 18 cm. in breadth (Pl. VIII fig. 3). It is spread in one plane and branched in a regular pinnate manner with the twigs arising from the stems at a wide angle ( $60^{\circ}$ - $70^{\circ}$ ). Eight of the lateral branches from the main stem are much elongated and produce lateral branches to form a bipinnate colony. There are a few anastomoses among twigs in the lower part of the colony, but a reticulate network is not formed. The spicules are long, pointed scaphoids reaching a length of 0.18 mm., which show typical fusion of the warts on the convex side (Fig. 70 a). The deeper layer of cortex contains symmetrical spindles of acute, slender form (Fig. 70 c). The anthocodial rods are flat and have numerous marginal sinuosities (Fig. 70 b). The dry colony is violet in color.

**Material.** The holotype from VENEZUELA, Cumaná, collected by J. P. Couthouy, V. 1859 (MCZ 5080); one specimen from the MARQUESAS KEYS (MCZ 5082), two from the DRY TORTUGAS (MCZ 5083, USNM 50249), and several other USNM specimens from: FLORIDA KEYS (50214, 50239), BAHAMAS (14513, 50212, 50213, 50731), CUBA (50216), GRAND CAYMAN (51398), OLD PROVIDENCE (44149, 44150).

**Distribution.** The Bahamas, Florida Keys and Antilles, Caribbean islands, and northern coast of South America.

**Remarks.** There has been confusion in the literature regarding this species, partly because of its variability and partly because of erroneous determinations. The following notes on the variation of the specimens studied are presented to clarify the identity of the species and the limits of its variation.

USNM 14513 contains two colonies about 20 cm. in height. They are quite bushy in appearance because neither the main branches nor the simple branchlets remain in one plane. The branchlets are 1.5-1.75 mm. wide and reach a length of about 30 mm. before giving rise to secondary branchlets. The polyps are not arranged strictly in double rows, but in irregular multiple tracts along the sides of the branchlets. The scaphoids reach a length of 0.16 mm. and have rather low, thick collars on their convex side (Fig. 70 a); the symmetrical spindles reach 0.17 mm. and are not unusual in any way (Fig. 70 c); the anthocodial rods are large, up to 0.13 mm. in length, and closely resemble those of the type (Fig. 70 b). In alcohol the colonies are light reddish purple, the polyps appearing as small, creamy white spots.

USNM 44149 is a small fragment of a colony of slender growth form. The twigs, which are narrow, 1.0 mm. wide and up to 30 mm. long, are in one plane and 3-4 mm. apart. The polyps occur usually in a single row along the narrow edges of the twigs. The scaphoids are up to 0.13 mm. in length and have thick, often warty collars on the convex side (Fig. 72 j); the spindles are rather slender and attain a length of 0.18 mm. (Fig. 72 i); the anthocodial rods are unusually narrow and at

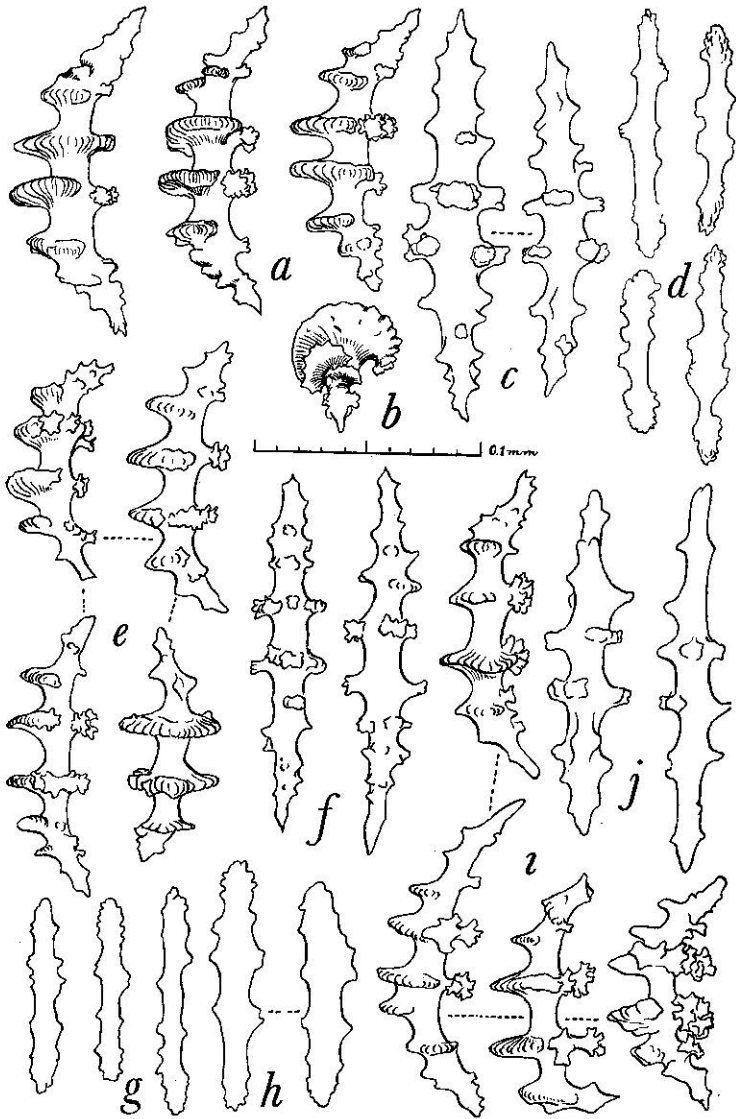


FIGURE 71. *Pseudopterogorgia bipinnata* (Verrill), spicules. *a-d*, of a specimen from Cuba (USNM 50216): *a*, scaphoids; *b*, end view of scaphoid; *c*, spindles; *d*, anthocodial rods. *e-g*, of a specimen from the Marquesas Keys (MCZ 5082): *e*, scaphoids; *f*, spindles; *g*, anthocodial rods. *h-j*, of a specimen from Nassau, New Providence (USNM 50212): *h*, anthocodial rods; *i*, scaphoids; *j*, spindles. (All figures drawn to the same scale.)



most 0.1 mm. long, with only moderate marginal lobulation. Colony pale violet in alcohol.

USNM 44150 is a single branch, very flexible and limber, about 13 cm. in length. It bears pinnate, opposite branches 30 mm. long at intervals of about 6 mm. The polyps occur in an open, alternating row along each side of the twigs. They are not fully retracted in preservation and thus are quite prominent, but they seem to have no well-formed calyces. The scaphoids reach a length of 0.17 mm. and have rather low, broad collars on the convex side (Fig. 70 d); the spindles are slender, acute, and about the same size as the scaphoids (Fig. 70 e); the anthocodial rods reach, or slightly exceed, 0.11 mm. The color of the specimen in alcohol is brownish white, but in life it apparently was green. The field label says: "Alcohol extracted the bright green color so rapidly this was at first glance taken to be an alga and was for a time kept in formalin." (W. L. SCHMITT.)

USNM 50212 is a flabellate branch with bipinnate ramification closely resembling the type specimen. It differs in having somewhat smaller scaphoids with strongly developed collars on the convex side (Fig. 71 i) and slightly smaller anthocodial rods (Fig. 71 h).

USNM 50213 is a tall and rather straggling colony with a stout main stem and several large branches. The unbranched lateral twigs reach a length of about 30 mm. before producing secondary twigs. The polyps are arranged in multiple rows along the two sides of the branchlets just as in 14513. The spicules include scaphoids up to 0.12 mm. in length, with thick collars; typical spindles up to 0.15 mm.; and anthocodial rods about 0.11 mm. long. The color in alcohol is light reddish purple, with the polyps appearing as white dots.

USNM 50214 is the largest specimen in the collection, a straggly but profusely branched colony about 45 cm. in height. Its branching is pinnate, with the twigs widely separated, usually 6 mm. apart but often as much as 15 mm. and occasionally 20–30 mm.; twigs 1.5–2.75 mm. wide and as much as 6 cm. long before producing secondary branchlets. The major branches are long and ascending, not in one plane. The scaphoids are at most 0.12 mm. in length, some with thick, coarse collars, some with thin, crest-like flanges on the convex surface (Fig. 72 e); the spindles also reach a length of about 0.12 mm. and are of typical form (Fig. 72 g); the anthocodial rods are small, at most 0.075 mm. in length, and broad (Fig. 72 d, h). Color of the dry colony, deep purple.

USNM 50216 is a broken colony 32 cm. tall, including base. It had several large lateral branches of which only one remains. Ramification is pinnate and the twigs are mostly in one plane, 5–6 mm. apart and up to 5.5 cm. in length before they produce secondary branchlets. The cortex is poorly preserved but the polyps seem to be in multiple lateral rows. In this specimen, the scaphoids, which are at most 0.15 mm. in length, have exceptionally high and crest-like collars around the convex side (Fig. 70 a); the symmetrical spindles reach a length of 0.18 mm. (Fig. 71 c); and the anthocodial rods 0.11 mm. (Fig. 71 d). The dry specimen is pale, cream-yellow.

MCZ 5082 is an extremely fragmentary specimen. Its scaphoids (Fig. 71 e) have strongly developed, crest-like collars similar to those of USNM 50212. The anthocodial rods are of similar size but more slender (Fig. 71 g). Color of the dry colony, pale violet.

MCZ 5083 is a small colony about 14 cm. in height, complete with base. It is branched up to the third order; the simple lateral twigs are slender, about 1.0 mm.

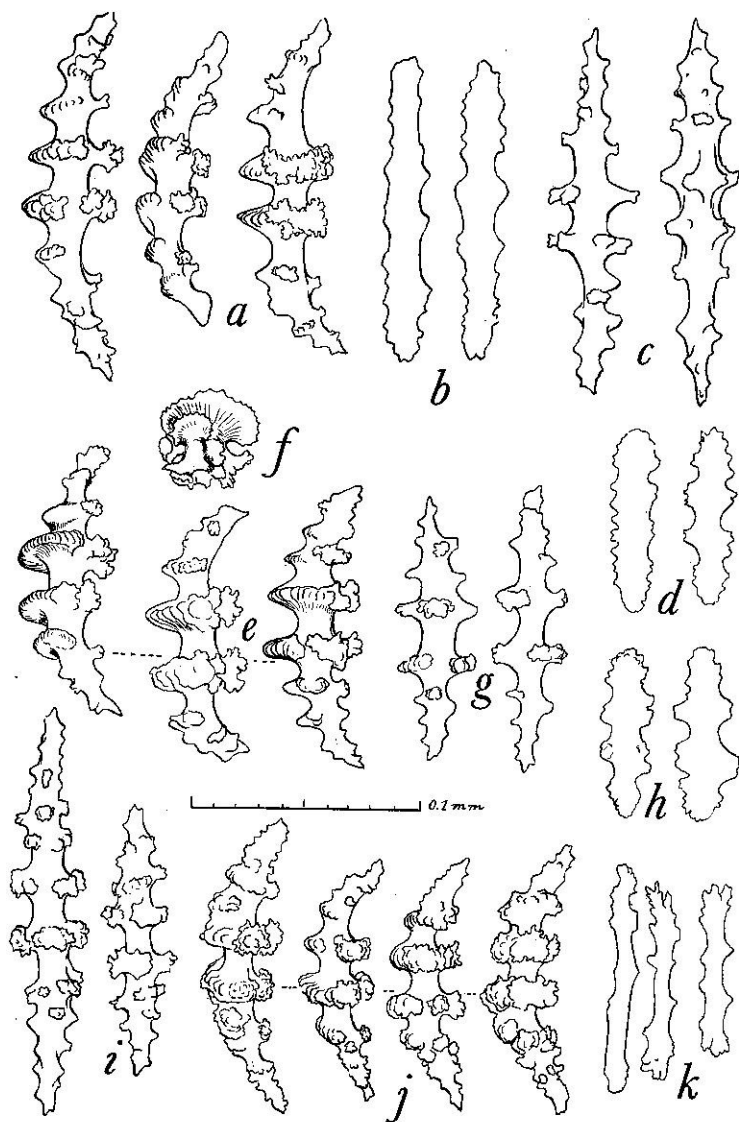


FIGURE 72. *Pseudopterogorgia bipinnata* (Verrill), spicules. *a-c*, of a specimen from Nassau (USNM 14513): *a*, scaphoids; *b*, anthocodial rods; *c*, spindles. *d-h*, of a specimen from off Rodriguez Key, Florida: *d* and *h*, anthocodial rods; *e*, scaphoids; *f*, end view of scaphoid; *g*, spindles. *i-k*, of a specimen from Old Providence (USNM 44149): *i*, spindles; *j*, scaphoids; *k*, anthocodial rods. (All figures drawn to the same scale.)

wide and up to 45 mm. long. The branchlets lie in one plane but a few of the larger branches stray from the principal plane of the colony. The scaphoids reach a length of 0.13 mm. and have thick collars on their convex side; the spindles are of typical form and reach a length of 0.15 mm. The anthocodial rods are up to 0.09 mm. long. The dry colony is yellowish white; the spicules are almost colorless.

72 **Pseudopterogorgia kallos** (Bielschowsky), 1918

(Fig. 73)

*Pterogorgia kallos* BIELSCHOWSKY 1918, p. 62.

*Pterogorgia kallos*, KÜKENTHAL 1919, p. 919. (Tortugas, Bird Key Riff in 22–23 m. Tiefe.)

*Pterogorgia kallos*, BIELSCHOWSKY 1929, p. 217, fig. 39, pl. 4 fig. 22. (Tortugas, Bird Key Riff.)

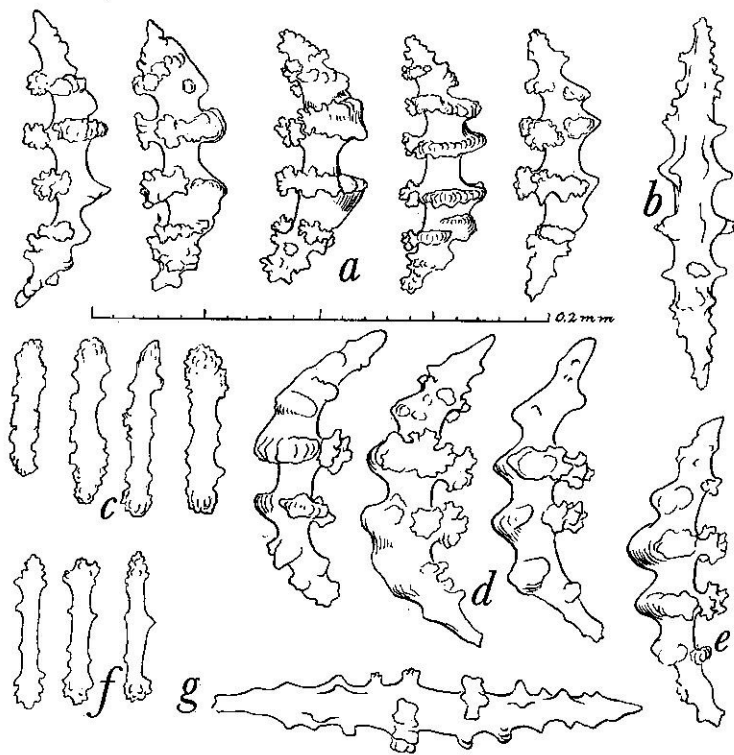


FIGURE 73. *Pseudopterogorgia kallos* (Bielschowsky), spicules. *a-c*, of a specimen from Florida (USNM 50215): *a*, scaphoids; *b*, spindle; *c*, anthocodial rods. *d-g*, of a specimen from Cuba (MCZ 3981): *d-e*, scaphoids; *f*, anthocodial rods; *g*, spindle. (All figures drawn to the same scale.)

**Diagnosis.** Plumose colonies with crowded branchlets not strictly in one plane and arising at an angle of  $45^\circ$  or less. Scaphoids commonly with the space between the transverse crests of the convex side filled in. Anthocodial rods narrow, up to 0.08 mm. long.

**Material.** A fragmentary specimen from FLORIDA, probably from the vicinity of Miami at Bache Shoal or Triumph Reef (USNM 50215), and a fragment from CUBA, probably north coast (MCZ 3981).

**Distribution.** Florida Keys, Dry Tortugas, and Cuba.

**Remarks.** The West Indian collections that I have examined contain two specimens of this species, one from Florida and one from Cuba. They are alike in their plumose form, with the twigs more closely spaced (4 mm. or less) than in *P. bipinnata*, not strictly in one plane, not strictly opposite, and ascending more sharply ( $45^\circ$  or less) than is usual in *P. bipinnata* ( $55^\circ$ – $70^\circ$ ). In the specimen from Florida, some of the unbranched twigs are as long as 7 cm., but 3–4 cm. is usual. The longest unbranched twigs of the Cuban specimen are about 4.5 cm., with 2.5–3.5 cm. usual. In both specimens the twigs are nearly cylindrical, the polyps arranged bilaterally in multiple series separated by a narrow naked tract along front and back of twigs. No calyces are formed and the polyps are completely retracted. The spiculation of the two colonies is very similar. The scaphoids of both show a tendency to fill in the spaces between the collars of the convex side except for the median waist, giving them a coarse appearance. They are at most about 0.14 mm. long in the Cuban specimen (Fig. 73 d, e), 0.13 mm. in the one from Florida (Fig. 73 a). The spindles of both agree in form, but are slightly larger in the Cuban example (Fig. 73 g). The anthocodial rods are small, slender, and have distinctly enlarged and tuberculate ends, a condition not observed in the material of *bipinnata*. In the Cuban specimen, which has larger cortical sclerites, the anthocodial rods (Fig. 73 f) reach a length of 0.068 mm.; in the Floridian specimen they may be as long as 0.075 mm. (Fig. 73 c). The Cuban specimen is yellow, the one from Florida grayish brown with purplish tinges; both are dry.

*Pseudopterogorgia kallos* is very close to the shrubby examples of *P. bipinnata* but can, in summary, be recognized by: (1) the bushy habit of growth, with steeply ascending twigs not strictly in one plane and not always opposite; (2) the scaphoids with the spaces between the crests of the convex side filled in except for the median constriction; and (3) the short anthocodial rods with noticeably clubbed ends.

### 73 *Pseudopterogorgia rigida* (Bielschowsky), 1929

(Fig. 74; Pl. IX fig. 1)

*Pterogorgia acerosa*, var. *rigida* BIELSCHOWSKY 1929, p. 212, fig. 36, pl. 5 fig. 24. (Kingston, Jamaica; Barbados.)

*Pterogorgia americana*, DEICHMANN 1936, p. 196, pl. 21 figs. 29–32. (Florida.)  
not *Gorgonia americana* Gmelin 1791, p. 3799.

*Antillogorgia americana*, BAYER 1952, p. 185. (Big Marco Pass, Florida.)

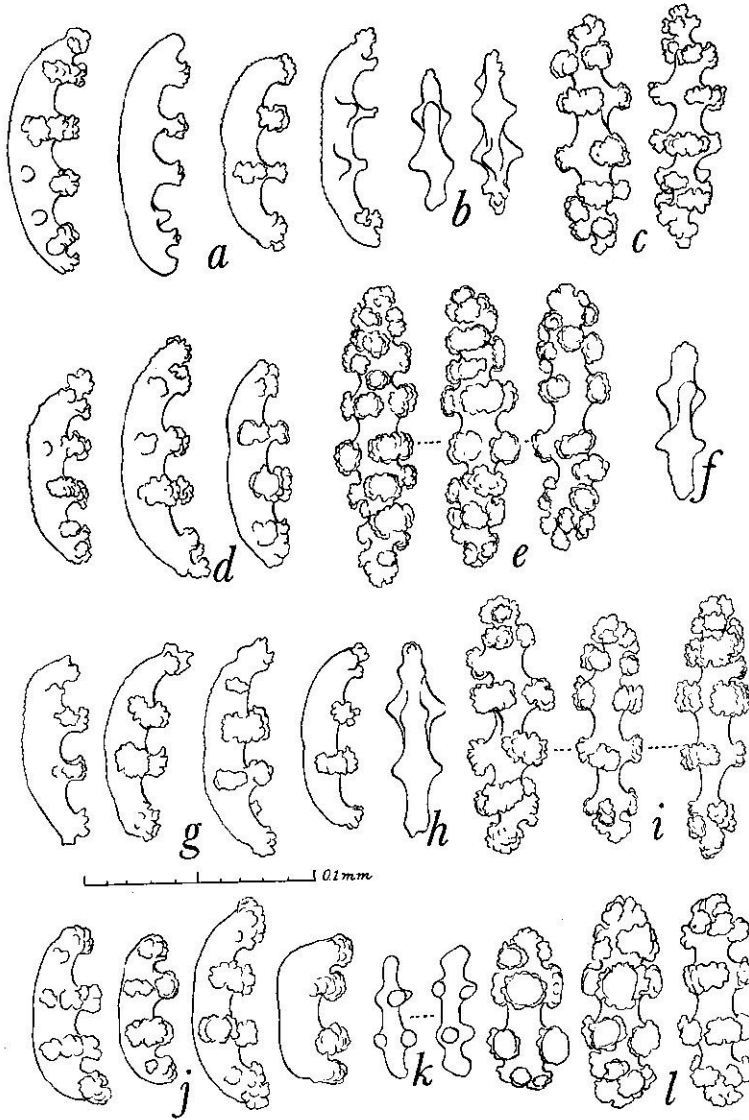


FIGURE 74. *Pseudopterogorgia rigida* (Bielschowsky), spicules. *a-c*, of a specimen from southwest Florida (USNM 44225): *a*, scaphoids; *b*, octoradiate rods from polyps; *c*, spindles. *d-f*, of a specimen from Biscayne Key (50210): *d*, scaphoids; *e*, spindles; *f*, octoradiate rod from polyp. *g-i*, of a specimen from the Dry Tortugas: *g*, scaphoids; *h*, octoradiate rod from polyp; *i*, spindles. *j-l*, of a specimen from Cuba (50209): *j*, scaphoids; *k*, octoradiate rods from polyps; *l*, spindles. (All figures drawn to the same scale.)

Diagnosis. Large, plumose colonies; polyps in biserial multiple rows. Scaphoids blunt, with terminal clusters of tubercles and smooth convex profile; spindles blunt; no flat rods in anthocodiae.

Material. Single USNM specimens: from FLORIDA, off Biscayne Key, in 16-34 feet of water (50210); west of Big Marco Pass, 6.5 fms. (44225); the DRY TORTUGAS (50211); and CUBA, Tarara Beach (50209).

Distribution. Southern Florida and the Keys; Greater Antilles incl. Jamaica; Lesser Antilles.

Remarks. This is the species that Miss DEICHMANN in her monograph called *Pterogorgia americana*. She has subsequently suggested to me (*in litt.*) that the real *americana*, based upon ELLIS & SOLANDER's plate 14, figure 3 (1786), is the species with rather flat branchlets, often exsert polyps, and acute, echinulate scaphoids, and, with Miss DEICHMANN's permission, I adopt that treatment here. The present species, which has smooth, blunt scaphoids and round branchlets was first recognizably described and figured by BIELSCHOWSKY under the name *Pterogorgia acerosa* var. *rigida* and that name, elevated to specific rank, is here employed.

*Pseudopterogorgia rigida* has a very distinctive spiculation including smooth, blunt scaphoids (Fig. 74 a, d, g, j) and stubby spindles (Fig. 74 c, e, i, l). Its polyps have a few small octoradiate rods (Figs. 74 b, f, h, k) but no flat rods. In external form the colonies are quite variable, but the branchlets usually are almost cylindrical, with the polyps in multiple rows along the sides (Pl. IX fig. 1).

This appears to be an uncommon species. It is not represented in material I have seen from the southern part of the Antilles.

#### 74 *Pseudopterogorgia blanquillensis* (Stiasny), 1941

(Fig. 75 a-c)

*Pterogorgia blanquillensis* STIASNY 1941d, p. 113, fig. D, pl. 2 figs. 13-14. (Blanquilla, Porto del Jaque.)

Diagnosis. Plumose colonies; polyps in single or multiple bilateral rows. Scaphoids blunt, convex profile with low, transverse ridges and commonly echinulate; spindles blunt; no flat rods in anthocodiae.

Material. A fragment of the type, from BLANQUILLA, Playa del Jaque, sandy debris, 4 m. deep, sta. 1213, 22.VII.1936 (Leiden Museum).

Remarks. In spiculation, *Pseudopterogorgia blanquillensis* with its blunt spindles and scaphoids with warty ends resembles *P. rigida*, of which it may prove to be a synonym. The colonies are typical 'ostrich plumes' with branchlets up to 12 cm.

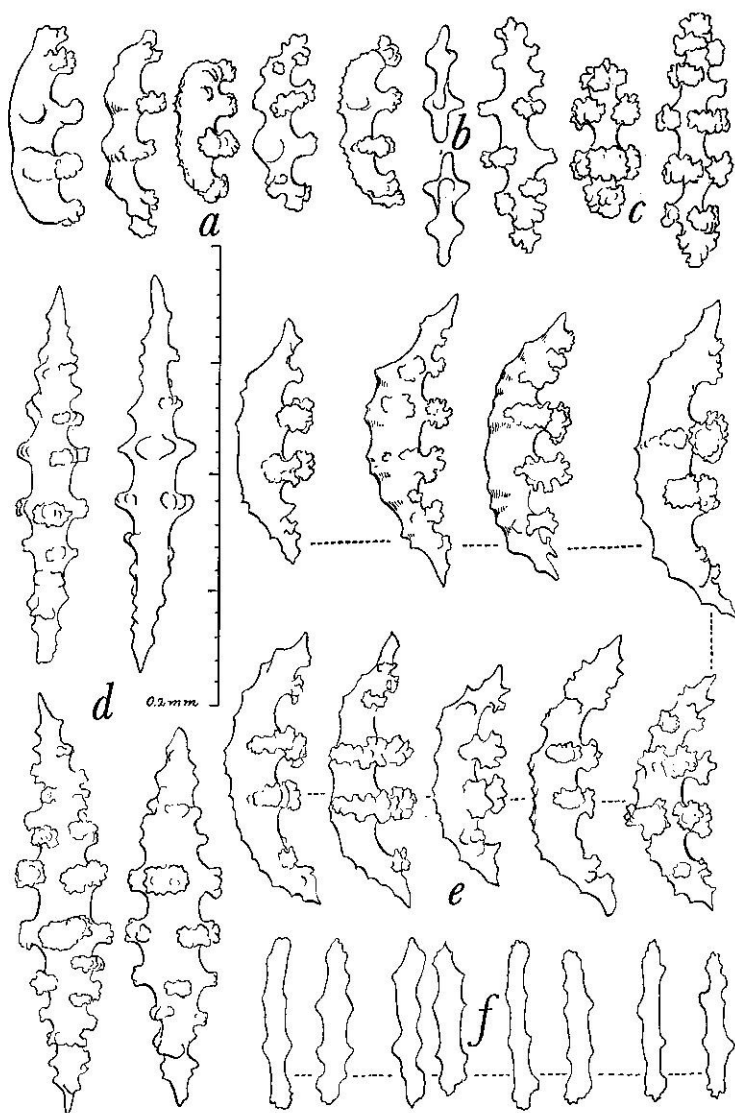


FIGURE 75. *Pseudopterogorgia blanquillensis* (Stiasny), spicules of the holotype from Blanquilla (Leiden Museum); *a*, scaphoids; *b*, octoradiate rods from polyps; *c*, spindles. *Pseudopterogorgia hummelincki* spec. nov., spicules of the holotype from Anguilla (USNM 50203): *d*, spindles; *e*, scaphoids; *f*, anthocodial rods. (All figures drawn to the same scale.)

in length. The two original specimens were both quite small for the genus, some species of which attain considerable size. Whether *P. blanquillensis* represents a small species, young colonies, or specimens growing in an unfavorable environment cannot be determined from the existing material. However, I am temporarily maintaining it as a distinct species in which the scaphoids are echinulate and transversely ridged on the convex side, in contrast with *P. rigida* in which they are smooth.

## 75 *Pseudopterogorgia acerosa* (Pallas), 1766

(Fig. 76; Pl. IX fig. 3)

- Gorgonia acerosa* PALLAS 1766, p. 172. (Mare Americanum, Mediterraneum.)  
*Gorgonia setosa* ESPER 1791, 2, p. 66, pl. 17. ("Von den südlichen amerikanischen Küsten, besonders von den Inseln Jamaica und Curassao.")  
*Gorgonia acerosa*, ESPER 1792, 2, p. 106, pl. 31.  
*Pterogorgia pinnata*, MILNE EDWARDS & HAIME 1857, 1, p. 168. (Antilles.)  
 not *Gorgonia pinnata* LINNAEUS 1758, p. 802. (O. Asiatico.)  
*Pterogorgia bipinnata*, BIELSCHOWSKY 1929, p. 213, fig. 37, pl. 4 fig. 21. (Barbados.)  
 not *Pterogorgia bipinnata* VERRILL 1864b, p. 31.  
*Pterogorgia acerosa*, forma *typica* and forma *arbuscula* BIELSCHOWSKY 1929, p. 209, figs. 32-34, pl. 4 figs. 19-20. (Kingston, St. Thomas, Tortugas, Barbados.)  
 not *Pterogorgia acerosa*, var. *elastica* BIELSCHOWSKY 1929, p. 210, fig. 35, pl. 5 fig. 23. [= *Pseudopterogorgia americana* (Gmelin).]  
 not *Pterogorgia acerosa*, var. *rigida* BIELSCHOWSKY 1929, p. 212, fig. 36, pl. 5 fig. 24. [= *Pseudopterogorgia rigida* (Bielschowsky).]  
*Pterogorgia acerosa*, DEICHMANN 1936, p. 198, pl. 21 figs. 17-20. (Florida and Hayti.)  
*Pterogorgia ellisiana*, DEICHMANN 1936, p. 199, pl. 21 figs. 21-24. (Florida and Cuba.)  
 not *Pterogorgia ellisiana* MILNE EDWARDS & HAIME 1857, 1, p. 169. [= *Pseudopterogorgia americana* (Gmelin).]  
*Pterogorgia acerosa*, var. *elastica*, STIASNY 1941d, p. 112. (Los Frailes.)

**Diagnosis.** Large, plumose colonies; surface not slimy in life. Scaphoids smooth or finely echinulate, weakly curved, acute, less than 0.18 mm. in length; spindles acute; anthocodiae with delicate, flat rods.

**Material.** From Dr. Hummelinck's collection: CURAÇAO, Knip Baai, on perpendicular cliff, 1 m., sta. 1017, 8.I.1949, specimen in alcohol (USNM 50447). Santa Marta Bay, sandy bottom, 3.4 m., J. H. Stock, 12.X.1958 (Amsterdam). Piscadera, inner bay near turtle hatchery, sandy bottom, 3 m., J. H. Stock, 6.I.1959 (51305; Amsterdam). Valentijnbaai, 4 m., J. H. Stock, 2.XII. 1958 (51306; Amsterdam). BONAIRE, Kralendijk, Hotel Zeebad, sandy coral debris, 2.5 m., 24.II.1949, dry spec. (USNM 50208) and 2 branches in alc. (USNM 50449); 4 m., 12.IV.1955, dry colony (USNM 51313). LOS FRAILES, Puerto Real, sandy debris, 3-4 m., sta. 1214, 18.VI. 1936, dry fragments, part of the material studied by Stiasny (1941, p. 112)



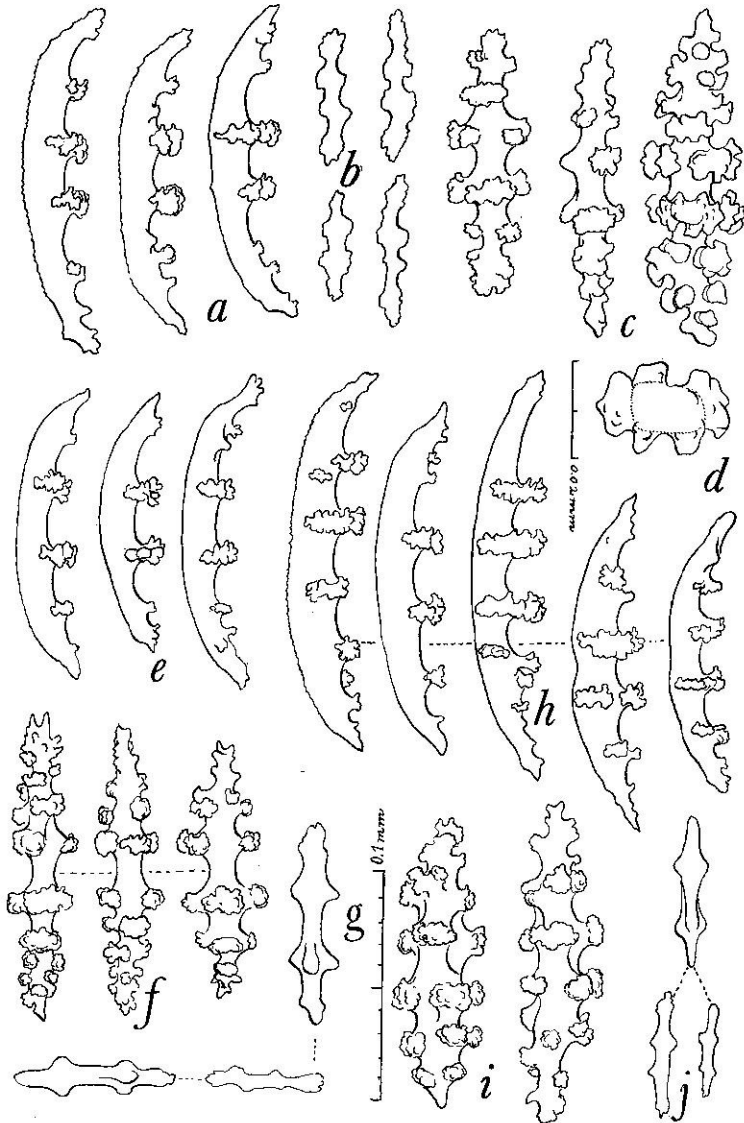


FIGURE 76. *Pseudopteroorgia acerosa* (Pallas), spicules. *a-d*, of a specimen from Bonaire (USNM 50208): *a*, scaphoids; *b*, anthocodial rods; *c*, spindles; *d*, single tubercle of spindle. *e-g*, of a specimen from Caesar's Creek, Florida (53614): *e*, scaphoids; *f*, spindles; *g*, flat rod and octoradiate rods from anthocodiae. *h-j*, of a specimen from the west coast of Florida (6914): *h*, scaphoids; *i*, spindles; *j*, octoradiate rods and flat rods from anthocodiae. (All figures drawn to the same scale except *d*, to which the 0.02 mm. scale applies.)

(USNM 50414). ST. BARTHÉLEMY, La Fourche island, rocky beach, 2.5 m., sta. 1124, 2.VI.1949, large dry spec. (USNM 50754) and branches in alc. (USNM 50446).

In addition to the above, a great many USNM specimens, including the west coast of FLORIDA (6914, 49754, 50402), the Florida Keys and TORTUGAS (50097, 50236, 50241, 50450, 50674, 50732); MEXICO, Gulf of Campêche (49942), Blanquilla Reef off Cabo Rojo (50917), Arrecife Alacranes, Yucatan (51436, 51437, 51461); BAHAMAS (50547); HISPANIOLA, Haiti (4075); JAMAICA (33099), Pigeon Island (51400), Port Royal Cays (51363, 51399, 51401-51403); MONTSERRAT, Fox Bay (51418); GUADELOUPE (44055); DOMINICA (50335); ARUBA (50658), and OLD PROVIDENCE (33617).

**Distribution.** Bermuda, south and west Florida, Florida Keys, Bahamas, Gulf of Mexico, Caribbean Islands, Antilles.

**Ecology.** Abundant along the Florida Keys at depths of 3 feet or more (at low tide); commonly associated with *Pseudopterogorgia americana*, *Pterogorgia anceps*, *Plexaurella dichotoma*, and *Muvicea atlantica*. Often host of the snails *Simnia* and *Cyphoma*, the shrimp *Tozeuma*, and the basket-star *Astrophyton*.

**Remarks.** This is one of the two common West Indian sea-plumes. It is characterized by its acute, slender, gently curved, smooth or nearly smooth scaphoids (Fig. 76 a, e, h). The spindles are acute (Fig. 76 c, f, i), and there are delicate, flat rods in the polyps (Fig. 76 b, g, j) along with the sparse, octoradiate rods.

Many specimens show a tendency to form long, drooping branchlets very widely spaced along the stems. Such specimens were identified as *Pterogorgia ellisiana* by DEICHMANN (1936), but *P. ellisiana* is synonymous with *Pseudopterogorgia americana* (Gmelin) as the citation of ELLIS & SOLANDER's plate 14, figure 3 in the original synonymy suggests. An examination of spicules from a sample of *P. ellisiana* that KÖLLIKER sent to VERRILL from Paris confirms this view. The more openly branched specimens seem to differ in no essential from the denser ones, and there is no justification for retaining names for the many small variations.

## 76 *Pseudopterogorgia americana* (Gmelin), 1791

Fig. 77; Pl. IX fig. 2, XIX)

*Gorgonia pinnata*, ELLIS & SOLANDER 1786, p. 87, pl. 14 fig. 3. (West Indies.)

not *Gorgonia pinnata* LINNAEUS 1758, p. 802.

*Gorgonia americana* GMELIN 1791, p. 3799. (Habitat in mari American mediam alluente frequens.)

*Pterogorgia ellisiana* MILNE EDWARDS & HAIME 1857, I, p. 169. (Guadeloupe.)

not *Pterogorgia americana*, DEICHMANN 1936, p. 196, pl. 21 figs. 29-32. [= *Pseudopterogorgia rigida* (Bielschowsky).]

**Diagnosis.** Large, plumose colonies; surface very slimy in life. Scaphoids strongly curved, the sharp ends often recurved outward, convex profile distinctly echinulate; spindles acute; no flat rods in anthocodiae.

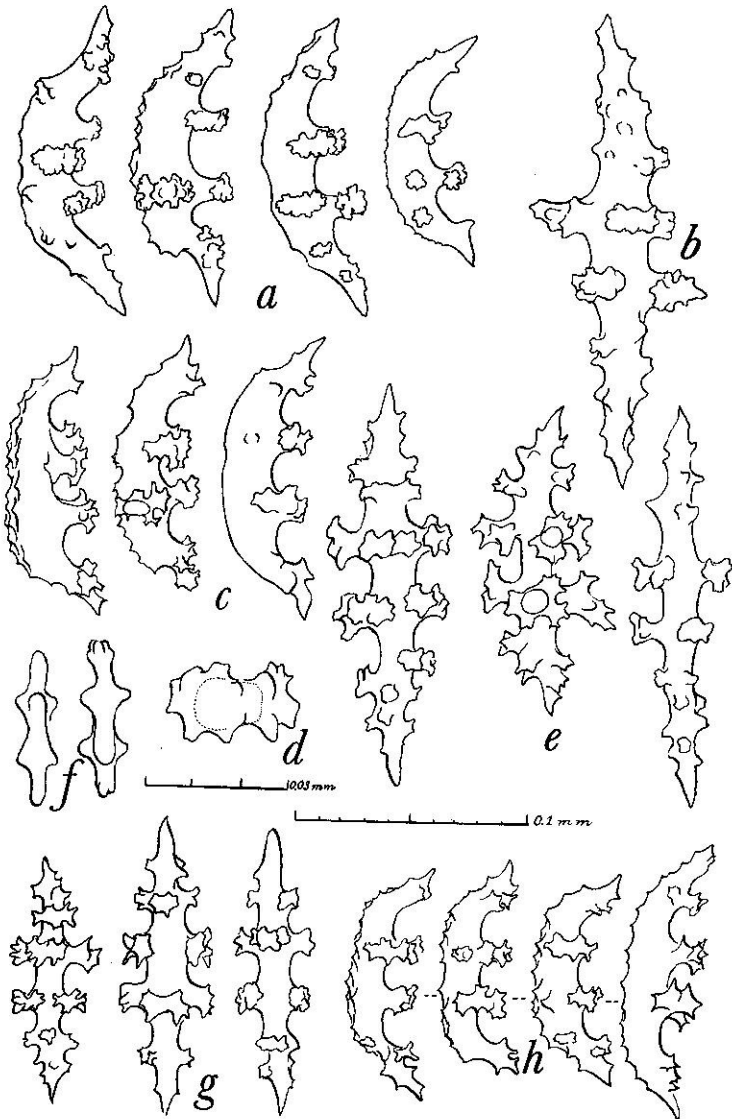


FIGURE 77. *Pseudopterogorgia americana* (Gmelin), spicules. *a-b*, of a specimen from Bermuda (USNM 50207): *a*, scaphoids; *b*, spindle. *c-e*, of a specimen from Bonaire (50206): *c*, scaphoids; *d*, tubercle of scaphoid; *e*, spindles. *f-h*, of a specimen from St. Thomas (50205): *f*, octoradiate rods from polyps; *g*, spindles; *h*, scaphoids. (All figures drawn to the same scale except *d*, to which the 0.03 mm. scale applies.)

**Material.** The following USNM lots from Dr. Hummelinck's collection: BONAIRE, Kralendijk roadstead, on two covered buoys, cleaned 20 months before, 0-1.5 m., sta. 1053, 21.IX. 1948, 4 branches in alcohol (50748). Kralendijk, Hotel Zeebad, sandy coral debris, 2.5 m., 24.II.1949, 1 complete dry specimen (50206). Lac, sandy reef with debris, 1-2 m., sta. 1068a, 1.X.1948, 3 branches in alc. (50445, 50749). ISLOTE AVES, sandy western shore, about 20 m., 12.V.1949, branch in alc. (50750). Also collected by J. H. Stock on CURAÇAO: Playa Chikitoe, sandy reef, 4 m., 23.XI.1958 (51307); Santa Marta Baai, Acropora reef, 3 m., 8.X.1958 (Amsterdam).

In addition to the above, numerous USNM specimens, from various localities: BERMUDA (50207, 50676); FLORIDA Keys and TORTUGAS (50391, 50608, 50673); BAHAMAS (33053, 50238, 50262, 50722, 50729); JAMAICA (7540), Port Antonio (51366, 51367), Old Harbour Bay (51365), Pigeon Island (51405), Port Royal Cays (51404); ST. THOMAS (50205); SABA Bank (50334); ST. CHRISTOPHER (50332); ANTIGUA, off Black's Point (51421); ST. LUCIA, south of Marigot Bay (51420); BARBADOS (50237); TOBAGO, Milford Bay (51419); Curaçao (50661); ARUBA (50662); MEXICO, Isla Sacrificios, Veracruz (51442, 51457).

#### Distribution. Bermuda, Florida Keys, Bahamas, Antilles.

**Ecology.** In the Florida Keys, *P. americana* occurs together with *P. acerosa* both in shallow water along the seaward shore and in deeper water along the outer reefs.

**Remarks.** Distinct differences in spiculation serve to distinguish *Pseudoptero-gorgia americana* from *P. acerosa*. The scaphoids have a characteristic profile, with the convex side usually echinulate, that is best expressed in the illustrations give herewith (Fig. 77 a, c, h), and the spindles are large and ornately sculptured (Fig. 77 b, e, g). Moreover, *P. americana* seems never to have any of the flattened antho-cordial rods that are always present in *acerosa*.

In the field, *P. americana* can usually be distinguished from *acerosa* by its slimy surface and its ability to produce great quantities of thick mucus in the container in which it is carried. Because of this secretion, the branches usually stick together in drying and the specimens so treated have a most unattractive aspect. When preserved in spirit, the polyps, which contract slowly, are usually fixed in a more or less expanded condition even without narcotization. This characteristic no doubt accounts for the beautifully expanded specimen that ELLIS & SOLANDER illustrate. The alcoholic specimens obtained by Dr. HUMMELINCK are similarly expanded.

In the laboratory, samples prepared for spicule study break down very slowly and with great difficulty in sodium hypochlorite solution. A freshly made and unwashed spicule preparation shows vast numbers of zooxanthellae, which resist solution in sodium hypochlorite - many more, in fact, than can ever be seen in preparations of *P. acerosa* and *rigida*. It appears that there is a correlation between the production of mucus, the resistance of the mesogloea to solution in sodium hypochlorite, and the abundance of symbiotic algae.

#### 77 *Pseudoptero-gorgia hummelincki* spec. nov.

(Fig. 75 d-f; Pl. VIII figs. 4-5)

**Diagnosis.** Colonies small, spread in one plane; branching

pinnate; branches occasionally subdivided to the third order. Lateral twigs not strictly in one plane, cylindrical, terminally blunt, ascending, up to 30 mm. long but commonly only 15 or 20 mm., and 1.5–2.0 mm. in diameter. Polyps fully retractile, in a multiple row along two sides of the twigs, separated by narrow naked tracts front and back. Scaphoids moderately curved, echinulate, terminally acute, up to 0.15 mm. in length. Spindles acute, with a median girdle, about 0.19 mm. in length. The flat tentacular rods are narrow, blunt, 0.07–0.08 mm. in length. Color of dry colonies creamy white or pale lemon yellow, with purple tinge at the base.

Description. The type is a colony 12.5 cm. in height, flabellate, pinnately branched (Pl. VIII fig. 5). The main stem gives off five major branches that are secondarily branched, and several others that show new lateral twigs. The unbranched twigs are not strictly in one plane, 2.5–3.0 mm. apart, up to about 30 mm. in length and 2.0 mm. in diameter. Even the tiny twigs at the distal part of the main stem have the same diameter. The twigs are cylindrical, blunt, and have a rather stiff appearance; they arise from the branches at angles from 45° to 50° and curve gently upward. The cortex is quite thick; the polyps withdraw into it completely without leaving any sign of calyces. The polyps occupy two broad bands along the sides of the twigs; between them is a narrow naked tract (marking the course of the large longitudinal canal) which joins with the system of longitudinal grooves (indicating the stem canals) on the main branches. The cortical spicules include scaphoids up to about 0.14 mm. in length, which have acute ends and distinctly echinulate convex profile (Fig. 75 e). An occasional, rather blunt scaphoid may be found, but the predominant type is acute. There also are long, acute spindles, situated chiefly in the axial sheath, which reach a length of 0.19 mm. (Fig. 75 d); they have a median girdle separating the two central whorls of tubercles. The anthocodiae are armed with flat rods, which are slender, with a few obtuse marginal processes (Fig. 75 f). The cortical spicules are pale yellow or colorless; part of those in the axial sheath are violet. The colony is pale lemon yellow, tinged with violet at the base.

A paratype from the same station is like the holotype in all essential

features. It is 20 cm. tall, spread in one plane, with short lateral twigs of the same size and interval as in the holotype and likewise not strictly in one plane. Some of the lateral twigs have developed into strong branches with pinnate twigs of their own. The spiculation is identical with that of the type. The colony is cream white, tinged with violet toward the base.

Material. ANGUILLA, Upper Prickly Pear Island, P. Wagenaar Hummelinck coll., 17.VI.1949 (holotype, USNM 50203, paratype 50204).

Distribution. Known only from the type locality.

Remarks. In growth form, *Pseudopterogorgia hummelincki* resembles the *bipinnata* group of species but may readily be distinguished from them by the scaphoids, which lack any trace of high, transverse crests around the convex side. The spicules of *P. hummelincki* are similar to those of *americana*, which has quite a different growth form.

## 78      *Pseudopterogorgia elisabethae* spec. nov.

(Fig. 78; Pl. VIII fig. 2)

not *Pterogorgia bipinnata*, var. *sparsiramosa* BIELSCHOWSKY 1929, p. 215, pl. 5 fig. 26. [= *Pseudopterogorgia acerosa*.]  
*Pterogorgia sparsiramosa*, DEICHMANN 1936, p. 197. (West Indies.)

Diagnosis. Colonies pinnately branched; twigs in one plane, 3.5 to 10 mm. apart (average, 6 mm.), flattened, 5 cm. long and 1.5–2.0 mm. wide, the polyps in single or alternating double series along the edges. Scaphoids coarsely pointed, smooth or slightly echinulate on the convex profile, often with a median waist, reaching a length of 0.225 mm.; spindles up to 0.24 mm.; anthocodial rods 0.18 mm.

Description. The holotype is a complete colony 26 cm. tall. The main stem, which is 4 mm. in maximum diameter, gives off several lateral branches, some of them stunted, some of ordinary length, and two large ones that are further subdivided and form the major part of the colony (Pl. VIII fig. 2). The simple lateral twigs, which arise roughly in one plane, are flattened, about 2 mm. wide and as much as 5 cm. long; they originate at angles of from 40° to 45°, at intervals of 5–10 mm. The polyps are arranged chiefly

in double rows along the two edges of the branches, becoming uniserial only near the twig tips. The cortex contains coarsely pointed scaphoids with smooth or slightly echinulate convex profile, that reach or somewhat exceed a length of 0.2 mm. (Fig. 78 a). There

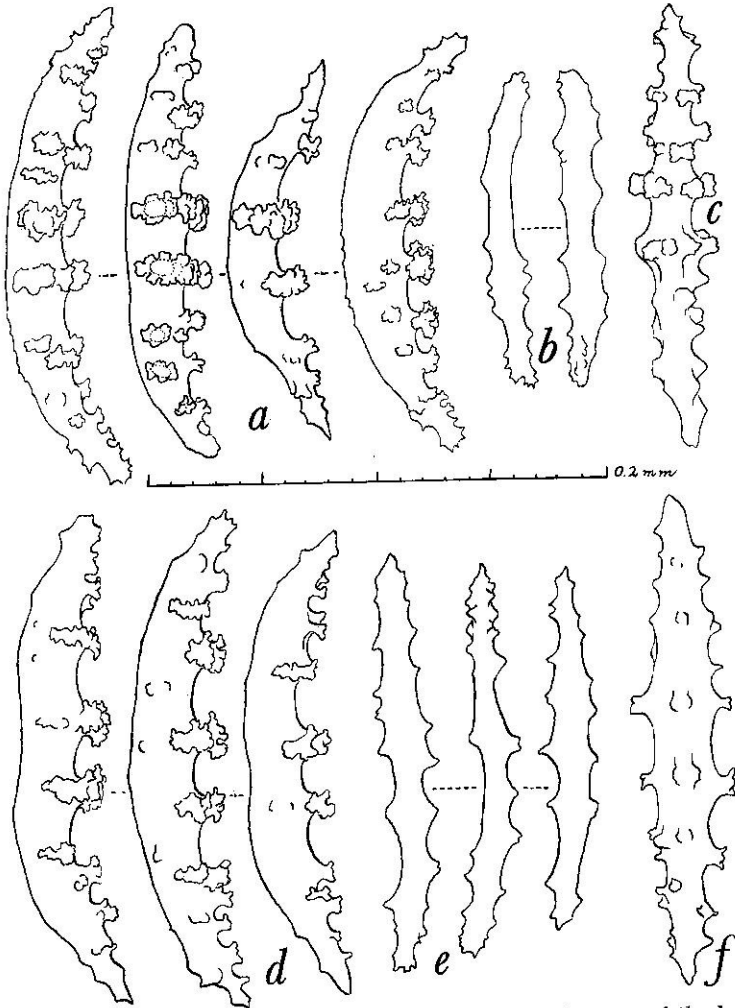


FIGURE 78. *Pseudopteroorgia elisabethae* spec. nov., spicules. *a-c*, of the holotype from Cuba (USNM 34679): *a*, scaphoids; *b*, anthocodial rods; *c*, spindle. *d-f*, of a paratype (50068): *d*, scaphoids; *e*, anthocodial rods; *f*, spindle. (All figures drawn to the same scale.)

are also simple spindles of the usual type (Fig. 78 c). The anthocodiae have a good armature of flat rods up to 0.14 mm. long (Fig. 78 b). The color of the colony in alcohol is deep cadmium yellow; the axis is nearly black in the older parts; spicules pale yellow.

One of the paratypes is only a branch of a large colony; it is 10 cm. high, branched in a regular pinnate manner with the twigs in one plane. The twigs are up to 5 cm. in length, flattened, 1.5–2.0 mm. wide, with polyps in alternating double series along the edges. One of the branches bears secondary and tertiary branchlets. The polyps are incompletely retracted but do not form projecting calyces. The scaphoids are large, acute, echinulate or smooth on the convex side, usually with a distinct median constriction, the largest observed was 0.025 mm. long. The regular spindles are of the ordinary type and reach a length of 0.24 mm. The anthocodial armature consists of slender, flattened rods up to 0.15 mm. long. The colony in alcohol is pale violet, polyps whitish.

The other paratype, received from the Museum of Comparative Zoölogy, is a stout branch about 15. cm. long. The longest branchlets reach a length of 4.5 cm. and are about 2 mm. wide, with polyps in alternating double rows along the edges; the anthocodiae are incompletely retracted. The main stem canals, numbering one to three on each side, are conspicuously visible as dark streaks. The scaphoids are bluntly pointed, with a smooth or only slightly irregular convex profile having a median constriction, and reaching a length of 0.22 mm. (Fig. 78 d). The spindles are of the usual kind (Fig. 78 f) and of the same length as the scaphoids. The anthocodial rods are larger than in the type, reaching 0.18 mm. (Fig. 78 e). The colony is yellow in alcohol.

**Material.** Holotype from CUBA, Bahia Honda, 2–12 fms., J. B. Henderson and Paul Bartsch coll., Tomas Barrera Exp., sta. 15, 4–5.VI.1914 (USNM 34679). A paratype from FLORIDA, east of Cape Florida, Biscayne Key, 30 fms., F. M. Bayer, 29.II.1948 (USNM 50235); one dry specimen from NEW PROVIDENCE, Conrad Limbaugh, 1956 (USNM 50560); also one specimen labelled 'West Indies', received from the Museum of Comparative Zoölogy (MCZ 5083) through the kindness of Dr. Elisabeth Deichmann (USNM 50068).

**Distribution.** Bahamas, Florida Keys; Cuba.



Remarks. The distinguishing features of *Pseudopterogorgia elisabethae* are its short, stout branchlets, large, moderately pointed scaphoids with nearly or quite smooth convex surface, and large anthocodial rods. The colonies may be either yellow or purple.

79 ***Pseudopterogorgia albatrossae* spec. nov.**

(Fig. 79; Pl. VIII fig. 1)

Diagnosis. Pinnate colonies with flexible branchlets up to 12 cm. long. Scaphoids slender, moderately curved, echinulate, bluntly pointed, reaching a length of 0.25 mm. Anthocodial rods 0.15 mm. long.

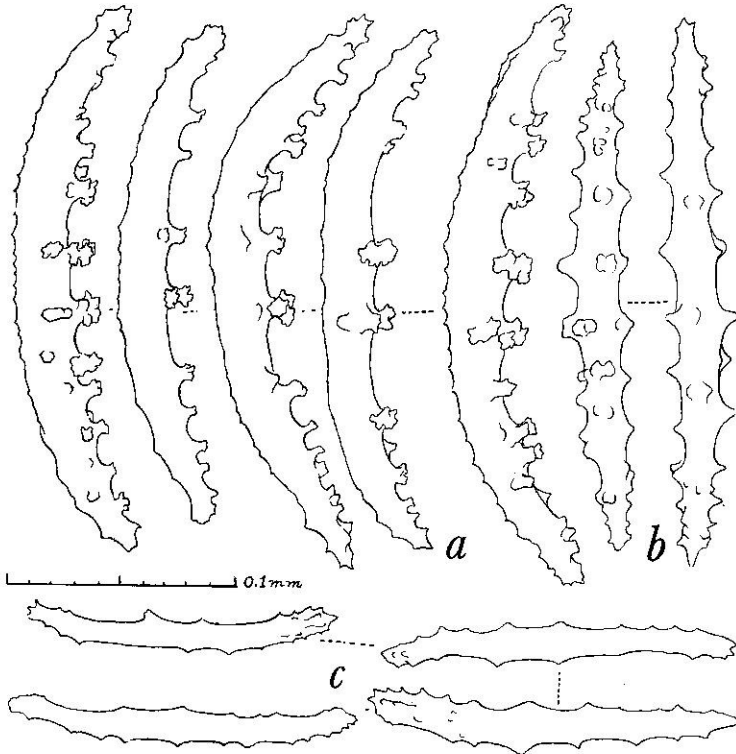


FIGURE 79. *Pseudopterogorgia albatrossae* spec. nov., spicules of the holotype from between Jamaica and Haiti (USNM 50233): *a*, scaphoids; *b*, spindles; *c*, anthocodial rods. (All figures drawn to the same scale.)

**Description.** The type is a complete colony about 40 cm. tall. The main trunk, which has a maximum diameter of about 5 mm. just above the base, is rather short and crooked, evidently deformed. The major part of the colony derives from two of the lateral branches, which have numerous long, flexible pinnate branches arising in one plane. These are mostly 5–15 mm. apart, 2 mm. wide, and as much as 12 cm. long; they are long and drooping, and the upper part of the colony is generally quite supple. The polyps are fully retractile but are preserved more or less exsert over most of the colony so that there appear to be calyces in an irregularly alternating double row along each edge of the branchlets. The cortex contains long, arcuate scaphoids with moderately echinulate convex profile, the largest reaching a length of 0.25 mm. (Fig. 79 a). The simple spindles of the deeper layer of rind (Fig. 79 b) attain a length almost equal to that of the scaphoids. The anthocodiae are well-armed with flat rods of the usual shape, up to 0.15 mm. long (Fig. 79 c). The color of the colony in alcohol is pale brown, with a tinge of violet on the main branches. Here the dark colored horny axis can be seen through the translucent rind, and several dark, longitudinal streaks mark the course of the main stem canals.

**Material.** Holotype, from the north end of Albatross Bank between JAMAICA and Haiti, 17°44'05" North, 75°39'00" West, 23 fms., coral and broken shell, *Albatross* sta. 2138, 29.II.1884 (USNM 50233). A second specimen from the same station (USNM 50234). A third one from St. JOHN, outer ridge 6 mi. s.e., 200 feet, T. Chess, 13.I.1960 (USNM 51750).

**Distribution.** Albatross Bank; St. John.

**Ecology.** The type specimen is infested with barnacles that form galls, and there are four small ophiuroids entwined around the branchlets. The second specimen has similar barnacles and ophiuroids and, besides, two small crinoids clinging to its branches.

**Remarks.** The second specimen from the type locality is similar to the holotype in general appearance and spiculation, but its scaphoids are more sharply echinulate. They are of the same size and shape as those of the type, and do not have the very regular, arcuate curve and acute ends to be seen in the scaphoids of *Pseudopterogorgia navia*.

80

***Pseudopterogorgia navia* spec. nov.**

(Fig. 80; Pl. VIII fig. 7)

**Diagnosis.** Pinnate colonies with flexible branchlets up to

6.5 cm. long. Scaphoids arcuate, sharply pointed, conspicuously echinulate, 0.26 mm. long. Anthocodial rods up to 0.18 mm. long.

Description. The holotype is a flexible, drooping colony about 20 cm. in height (Pl. VIII fig. 7). It is pinnately branched in one plane, the lower branches being likewise branched. The terminal branchlets arise at intervals of 10–25 mm. and are about 6 cm. long when fully developed. The uppermost six or seven of them decrease in length, the youngest being about 1.5 cm. long. The branchlets are distinctly flattened, 0.5–0.75 mm. in width, and bear the polyps biserially. The rind may be a little elevated near the polyps but no calyces are formed. The anthocodiae are mostly exsert in the preserved specimen, perhaps because the heavy armature of flat rods 'en chevron' (Fig. 80 b) hindered retraction or rendered it unnecessary. The cortical sclerites are huge scaphoids attaining a length of 0.26 mm., and acute spindles of about the same size. The scaphoids are arcuate, parenthesis-like, and very sharply echinulate on the convex surface (Fig. 80 c). The spindles are also sculptured with spinous projections (Fig. 80 d). The bases of the tentacles contain flat rods up to 0.18 mm. in length, arranged 'en chevron' (Fig. 80 a).

The collections of the Museum of Comparative Zoölogy contain a specimen that is referable to this species. It is young, only about 13 cm. in height, with none of the lateral branchlets further subdivided. The longest branchlets are about 5 cm. in length, flattened, 1.0–1.5 mm. wide, with the polyps biserially arranged in an alternating row along each edge. Almost all of the polyps are exsert so that the anthocodiae with their strong armature are clearly visible. The cortex contains arcuate, echinulate scaphoids reaching a length of 0.24 mm. (Fig. 80 f), and straight spindles as much as 0.27 mm. length (Fig. 80 e). The anthocodial rods (Fig. 80 g) are practically identical in shape and size with those observed in the type.

The holotype is white, with colorless spicules; the small specimen from the Museum of Comparative Zoölogy is light purple, with clear, pale violet spicules.

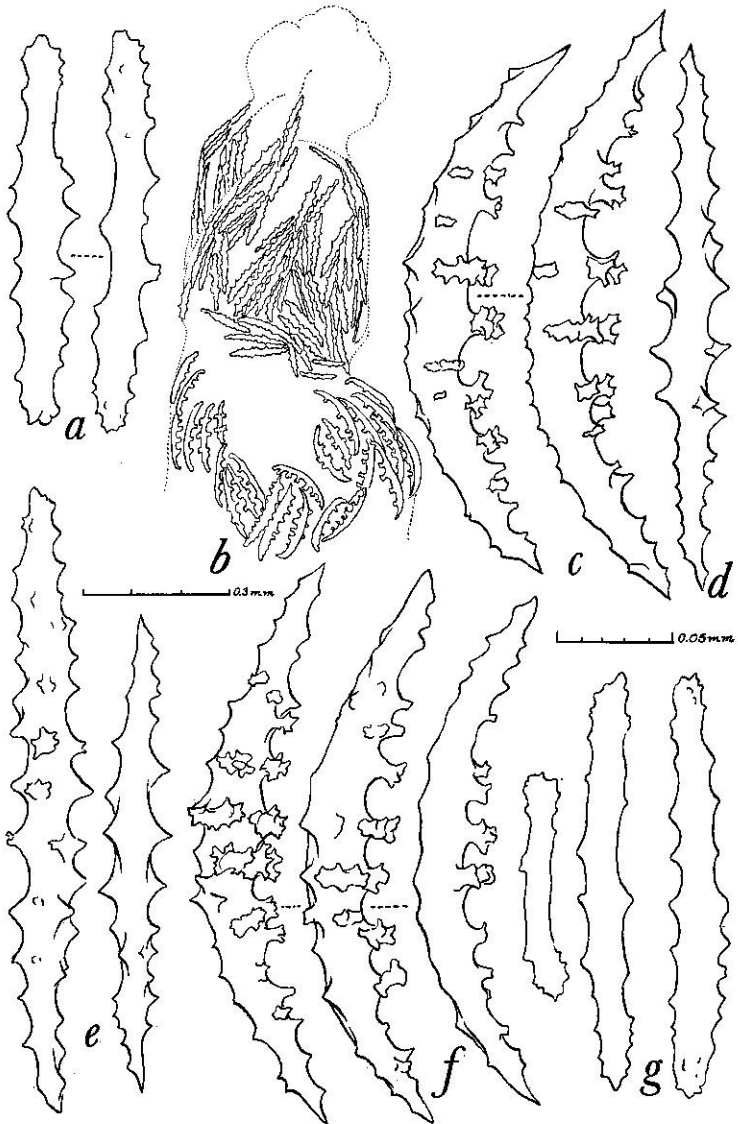


FIGURE 80. *Pseudopterogorgia navia* spec. nov., spicules. *a-d*, of the holotype from Hispaniola (USNM 50070): *a*, anthocodial rods; *b*, anthocodial spiculation; *c*, scaphoids; *d*, spindle. *e-g*, of the paratype: *e*, spindles; *f*, scaphoids; *g*, anthocodial rods. (All figures drawn to the same scale except *b*, to which the 0.3 mm. scale applies.)

**Material.** Holotype from the north coast of HISPANIOLA, 19°10'35" North, 69°20'45" West, 15 fms., Johnson-Smithsonian Exp., *Caroline* sta. 51, 16.II.1933 (USNM 50070). Paratype from BAHAMAS, off Orange Key, 9 fms., Pourtales Gulf Stream Explorations, cast no. 2, 1.IV.1869 (MCZ 5047).

**Distribution.** Bahamas and Greater Antilles.

**Remarks.** The two specimens described above, while differing somewhat in superficial appearance, agree so well as to spiculation that they must be considered as representatives of the same species. The size and form of the scaphoids distinguish this species from all others heretofore described.

### 81 ***Pseudopterogorgia hystrix* spec. nov.**

(Fig. 81; Pl. XI figs. 2-3)

**Diagnosis.** Pinnate colonies with slender branchlets up to 12 cm. long. Scaphoids sharply echinulate, many of them with the ends recurved outward, reaching a length of 0.25 mm. Anthocodial rods up to 0.15 mm. in length.

**Description.** The holotype is a regularly pinnate colony about 35 cm. tall, with the base of attachment. The lateral branchlets, which are about 1.5 mm. wide and reach a length of 12 cm., arise at intervals of 10-20 mm. and at angles of 45°-60°. The polyps are biserial, with a strong anthocodial armature but without projecting calyces. The cortex contains echinulate scaphoids (Fig. 81 a, b) up to 0.25 mm. long, with their ends very sharp and often recurved outward; the tubercles of the concave side are tall and spinous, extending around the spicule laterally as sharp ridges or acute spines. The straight spindles are slender, acute, and often exceed a length of 0.2 mm. (Fig. 81 d). The anthocodial rods reach a length of 0.15 mm. and are of conventional form (Fig. 81 c). The colony is pale gray in alcohol, the spicules colorless.

**Material.** From the south end of the Tongue of the Ocean, GREAT BAHAMA BANK, 23°34'00" North, 76°33'00" West, 36 fms., bottom 74.2°F, *Albatross* sta. 2649, 12.IV.1886 (holotype USNM 50385, paratype 50386.)

**Distribution.** Known only from the type locality.

**Ecology.** *Pseudopterogorgia hystrix* appears to be one of a non-reef assemblage made up of deep-water representatives of the typical reef genera. Also collected

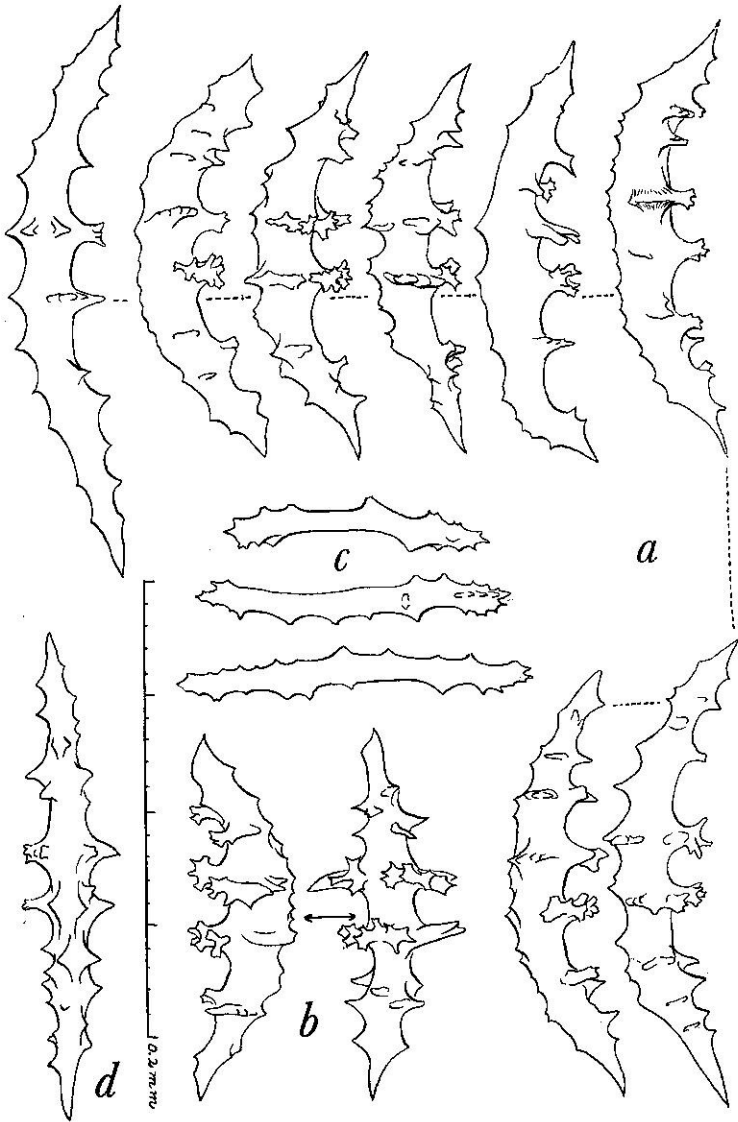


FIGURE 81. *Pseudopterogorgia hystrix* spec. nov., spicules of the holotype from the Great Bahama Bank (USNM 50385): *a*, scaphoids; *b*, two views of the same scaphoid; *c*, anthocodial rods; *d*, spindle. (All figures drawn to the same scale.)

at the same station were *Plexaura nina* and *Eunicea pinta*, both new species related to common reef-dwelling forms.

Remarks. The spicules of *Pseudopterogorgia hystrix* are even more spinose than are those of *P. navia*, and the very sharp ends of the scaphoids are recurved outward as in *P. americana*. Only the longest of the scaphoids equal in size those of *P. navia*; the majority measure 0.18–0.20 mm.

The tissues of *Pseudopterogorgia hystrix* contain abundant zooxanthellae and show a resistance to sodium hypochlorite like that noted in *P. americana*, but to a lesser degree.

The most distinctive feature of *P. hystrix* is the conspicuous and acute sculpturing of the scaphoids, which are shaped like those of *P. americana*.

## 82 ***Pseudopterogorgia marcgravii* spec. nov.**

(Fig. 82)

Diagnosis. Small colonies, under 10 cm. tall, very sparsely branched in a pinnate manner, sometimes unbranched. Polyps biserial, usually alternate, forming prominent calyces. Spicules including acute scaphoids with irregular convex profile, and symmetrical spindles. Anthocodiae with flat rods expanded at the ends.

Description. The type is a nearly complete colony about 5 cm. tall (Fig. 82 a). The main stem, which is 0.75 mm. in diameter, gives off five pinnate lateral branches, two on one side, widely separated, three on the other, close together; the longest of these is about 35 mm. long and 0.5 mm. in diameter. All the branches originate at an angle of about 60°, except for one that is not normal. The polyps are 2–4 mm. apart, biserial, and form moderately to strongly projecting calyces (Fig. 82 b). They are absent from the proximal half of the main stem. The cortical spicules are chiefly scaphoids with the convex profile irregularly serrated (Fig. 82 c) and symmetrical spindles of conventional form (Fig. 82 d). The spicules of the calycular walls (Fig. 82 c–d) may be somewhat longer than those of the stem rind (Fig. 82 e–f) but otherwise are not different. The anthocodiae contain short, flat rodlets with expanded ends and peculiar, granular sculpture (Fig. 82 g). The colony in alcohol is pale brown, almost white; the spicules are colorless.

The several paratypes are either simple or have one or two branches. The calyces are prominent and biserial, but they often incline alternately toward front and back of the colony. The antho-

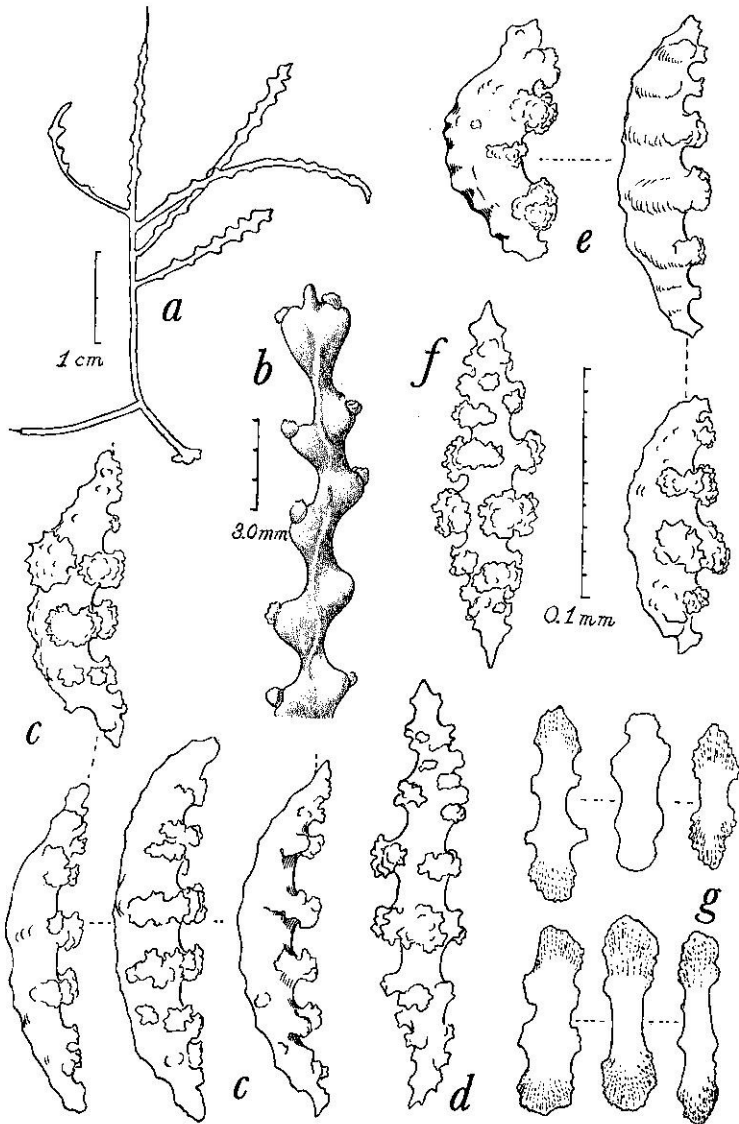


FIGURE 82. *Pseudopterogorgia marcgravii* spec. nov., the holotype from Brazil (USNM 50228): *a*, the entire colony; *b*, branch tip; *c*, scaphoids from the calycular walls; *d*, spindle from the calycular walls; *e*, scaphoids from the stem rind; *f*, spindle from stem rind; *g*, flat rods from anthocodiae. (Enlargement of *a* and *b* as indicated by scales; all spicules drawn to the same scale, shown to the right of *f*.)



codiae are often preserved exsert. The spiculation is uniformly like that of the type. The color is nearly white, with a tinge of purple toward the base in some specimens.

Material. BRAZIL, off Parahyba do Norte (João Pessoa), 6°59'30" South, 34°47'60" West, 20 fms., bottom 79°F, *Albatross* sta. 2758, 16.XII.1887 (holotype USNM 50228, 17 paratypes 50229).

Distribution. Known only from the type locality.

Remarks. *Pseudopterogorgia marcgravi* differs from other members of the genus in its dwarf growth form and prominent calyces. Its rude scaphoids and peculiar anthocodial rods are unlike other members of the genus. It is also easily distinguished from small colonies or branches of *Phyllogorgia dilatata*, which have thick branches with pore-like apertures on all sides.

### Genus *Gorgonia* Linnaeus, 1758

*Gorgonia* LINNAEUS 1758, p. 800. (Type species, *Gorgonia flabellum* L., by subsequent designation: VERRILL 1868a, p. 386.)

*Rhipidigorgia* VALENCIENNES 1855, p. 13. (Type species, *Rhipidigorgia flabellum* (L.), by subsequent designation: VERRILL 1868a, p. 385.)

*Gorgonia*, BAYER 1951, p. 93.

Diagnosis. Net-formed gorgoniids with scaphoid spicules.

Distribution. Bermuda and south Florida to Curaçao: endemic West Indian.

Remarks. Among the sea-fans of the West Indian region there is always a noticeable variation in color, size of meshes, flattening of branches, and form of spicules. The extremes of variation may differ from one another to a marked degree and, in the absence of large suites of specimens, could be considered morphologically distinct species. It may have been such variants that led LINNAEUS to name, in the 10th edition of his *Systema Naturae*, two species of sea-fan: (1) the common Venus' Fan, *Gorgonia flabellum*; and (2) *Gorgonia ventalina*, of which he said (p. 801): "Differt haec a G. flabello solum ramis non versus ramulos, sed a lateribus exterioribus compressis," and then explained that from the published figures he could not decide to which of the two species the various synonyms applied.

When a large suite of specimens of the common sea-fan is examined with care, it will be observed that many specimens do, indeed, have the branches flattened in the plane of branching, as LINNAEUS described for *G. ventalina* ("a lateribus exterioribus compressis"), and not at right angles to it ("non versus ramulos [compressis]"). It seems logical that such specimens, with branches 'externally compressed,' are true *ventalina* as LINNAEUS understood it. It remains only to demonstrate that this form can be separated from *flabellum* on valid taxonomic grounds.

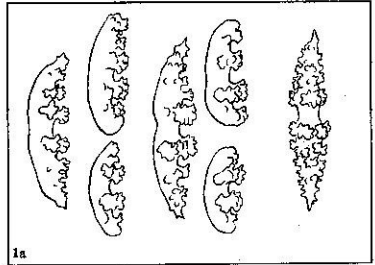
It is, I think, quite clear that PALLAS' *Gorgonia ventilabrum*, in which LINNAEUS' *G. ventalina* was erroneously included, is not the same species, nor is ESPER's *G. ventalina*. It obviously was ESPER's figure that led BIELSCHOWSKY to identify a small, reddish purple sea-fan of the Panamic province as *G. ventalina*, but in spite of the fact that it may be the species that ESPER figured, it certainly has nothing to do with LINNAEUS' original *ventalina*.

In the West Indies there are four species of sea-fans with anastomosing branches, three of them belonging to the genus *Gorgonia*.

## KEY 21

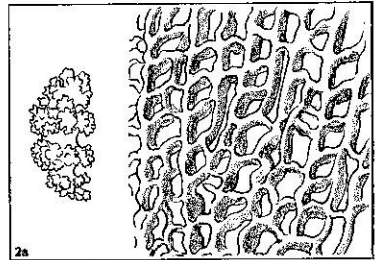
ILLUSTRATED KEY TO THE SPECIES OF *Gorgonia*

- 1a. Convex profile of scaphoids smooth. Branches usually not strongly flattened at right angles to plane of the fan: *Gorgonia mariae* spec. nov.

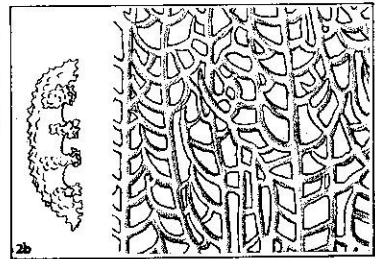


- 1b. Convex profile of scaphoids noticeably sculptured; perfectly smooth scaphoids not present: 2

- 2a. Convex profile of many scaphoids with tuberculate sculpture. Ascending and connecting branches strongly flattened at right angles to the plane of the fan. Anthocodial rods 0.05–0.08 mm. long: *Gorgonia flabellum* Linnaeus



- 2b. Convex profile of scaphoids with echinulate sculpture, but never with complex tubercles. Ascending branches inconspicuously flattened at right angles to plane of the fan or not at all; connecting branches flattened in plane of fan. Anthocodial rods 0.065–0.10 mm. long: *Gorgonia ventalina* Linnaeus



***Gorgonia flabellum* Linnaeus, 1758**  
**forma *flabellum***

(Fig. 83; Pl. X fig. 2)

- Frutex marinus elegantissimus* CLUSIUS 1605, p. 120, woodcut. (Ex India Orientali.)  
*Planta coralli natura* CERUTUS 1622, p. 16, coppercut. (Ex Americano Oceano.)  
*Flabellum Veneris* ELLIS 1755, p. 61, pl. 26 fig. A. (West-Indies.)  
*Gorgonia Flabellum* LINNAEUS 1758, p. 801. (Habitat in O. Indico.)  
*Rhipidigorgia flabellum*, VALENCIENNES 1855, p. 13.  
*Rhipidigorgia [sic] flabellum*, DUCHASSAING & MICHELOTTI 1860, p. 33. (Antilles.)  
*Gorgonia flabellum*, BAYER 1951, p. 93, fig. 1. (CERUTUS' fig. reproduced.)

**Diagnosis.** *Gorgonia* with ascending branches and connecting branchlets strongly compressed at right angles to the plane of the fan; no free branchlets arising from the surface of the fan. Scaphoids commonly with complex tubercles on convex side (Fig. 83 c, d, h). Anthocodial rods usually 0.05–0.06 mm. long, rarely longer (Fig. 83 a, f, g). Color, grayish white or pale lavender; sometimes deep yellow.

**Material.** From Dr. Hummelinck's collection in the USNM: BONAIRE, Punt Vierkant, sandy reef, 1 m., sta. 1059a, 26.III.1955, dry fragment (51345). Lac, cast ashore, 25.II.1949, 2 dry specimens (50220). ANGUILLA, north of Sandy Ground, rocky beach behind sandy reef, 1.5 m., sta. 1142, 19.VI.1949, complete dry colony (51344). Upper Prickly Pear Island, cast ashore, 17.VI.1949, 4 dry spec. (50223).

From the same Museum: a large number of specimens from several localities including NEW PROVIDENCE, Nassau (14365), Long Key (14369), WATLING'S ISLAND (San Salvador, Bahamas) (14400); HISPANIOLA, Haiti (50217, 50730); MEXICO, Mujeres Hbr., Quintana Roo (51756–51758), Cozumel Island (51766), Bahía de la Ascension, Quintana Roo (51767), B. de la Espiritu Santo, Quintana Roo (51765).

**Distribution.** Abundant in the Bahamas, becoming scarce to the south through the Lesser Antilles; apparently absent from Bermuda and uncommon in Florida.

**Ecology.** In the Florida Keys, neither *Gorgonia flabellum* nor *G. ventalina* occurs near the shore, but only in deeper water on lagoonal reef patches and along the outer reefs.

In certain situations, probably where current patterns are unusual, individuals of *G. flabellum* may produce numerous lateral branchlets from one or both faces of the flabellum. This ecophenotype was given the name *occatoria* by MILNE EDWARDS & HAIME (1857). Such a form apparently does not occur in *G. ventalina*, which, however, may produce some small accessory fans in much the same manner.

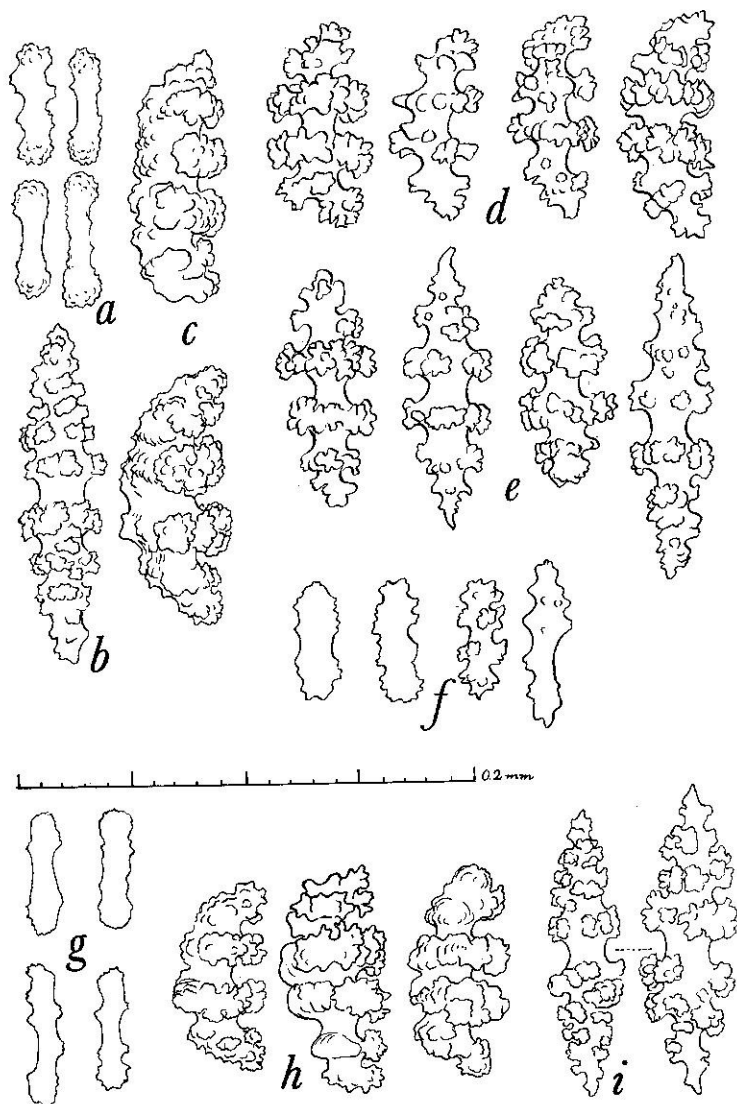


FIGURE 83. *Gorgonia flabellum* Linnaeus, typical form spicules. *a-c*, of a specimen from Trinidad (USNM 14400): *a*, anthocodial rods; *b*, spindle; *c*, scaphoids. *d-f*, of a specimen from Nassau (14365): *d*, scaphoids; *e*, spindles; *f*, anthocodial rods. *g-i*, of a specimen from Long Key, New Providence (14369): *g*, anthocodial rods; *h*, scaphoids; *i*, spindles. (All figures drawn to the same scale.)