

ZOOLOGY.—*Additional records of Western Atlantic octocorals.* FREDERICK M. BAYER, U. S. National Museum.

(Received April 23, 1957)

Since the publication of my paper recording a number of species of Octocorallia from the Gulf of Mexico (1952), several additions and corrections have come to light, thanks chiefly to the work of the U. S. Fish and Wildlife Service *m/v Oregon* and the interest of Stewart Springer and Harvey Bullis. I take this opportunity to place this information on record.

Exploratory trawlings upon the shrimp grounds in the Gulf of Mexico have yielded several interesting sea-pens, a group not well known in the Gulf of Mexico. These are described and figured below, together with a list of new records of Gorgonacea.

Order PENNATULACEA

Family PROTOPTILIDAE

*Protoptilum thomsonii* Kölliker

Fig. 1b

*Protoptilum Thomsonii* Kölliker, Abh. Senckenb. Naturf. Ges. 8: 195, pl. 24, figs. 220-222. 1872.

*Protoptilum thomsoni* Jungersen, Ingolf-Exped. 5 (1): 52, pl. 1, figs. 4-8 (Danish ed.). 1904.

*Protoptilum thomsoni* Bayer, Journ. Washington Acad. Sci. 42: 189. 1952.

The specimens before me agree with Kölliker's description in all essentials except size, and they are in excellent conformity with Jungersen's later description and figures. They do not, however, agree with the key characterization given by Deichmann (1936, p. 264: "anthocodia with no spicules in the body wall") which, furthermore, is in contradiction to Jungersen's description.

The largest specimen is basally incomplete, lacking stalk entirely. The part preserved is 30.5 cm in length, with nearly round, naked axis 3 mm in diameter projecting another 1 cm. The distal tip is recurved just as shown by Jungersen. The rhachis has a maximum diameter of 6-7 mm; the autozooids occur in 3 irregular rows on each side of the rhachis and are further oriented in more or less transverse or oblique rows. The adherent, apically directed calyces show only a vague suggestion of 2 or 3 marginal teeth. The autozooids are exsert and have spicules in

bands on the 3 abaxial tentacles, extending downward on the body wall between the septa. Except for a dorsal track about 2 mm wide, the entire surface of the rhachis between the autozooid calyces is occupied with siphonozooids. Near the naked dorsal track the siphonozooids are arranged in quincunxial order between the autozooid calyces, but opposite them the siphonozooids are crowded and irregularly distributed. The colony is very pale flesh-color, the colored spicules being only faintly pink.

The other specimens collected by the *Oregon* agree with the above in all significant features. All are fragmentary, lacking both apex and stalk. They are of smaller size than the specimen described, the smallest having a major diameter of about 3 mm. The autozooids show some variation in spiculation, some specimens having the rows of needles in the tentacles extending down the body wall between the septa either as narrow bands or spreading out to cover the body wall completely. All 8 tentacles may have strong spiculation. Many of the spicules in the autozooid calyces and rhachis are pink or red, imparting an over-all reddish color to the colonies.

Fragments of *Protoptilum* were obtained at two stations off Puerto Rico by the Johnson-Smithsonian Deepsea Expedition. They are too small to be determined with any great assurance but probably represent *P. thomsonii*.

*Type locality*.—North Atlantic, lat. 36° 37' N., long. 7° 38' W., 322 fathoms; *Porcupine* Expedition, 1869.

*Records*.—Gulf of Mexico, off Alabama and Louisiana (Bayer, 1952). Now reported off the coast of Texas: 27° 01.4' N., 96° 16.8' W., 200-280 fathoms, *Oregon* station 548, April 8, 1952; also 27° 03' N., 96° 16' W., 210 fathoms, *Oregon* station 1093, June 4, 1954.

Family VIRGULARIIDAE

*Virgularia presbytes* Bayer

*Virgularia mirabilis* Bayer, Journ. Washington Acad. Sci. 42: 189. 1952.

*Virgularia presbytes* Bayer, Journ. Washington Acad. Sci. 45: 295, figs. 1, 2a-3e. 1955.

This species has been previously recorded from localities from Corpus Christi, Tex., to

Mobile, Ala., and from the east coast of Florida north of Cape Canaveral. Since 1955 it has been collected at the following additional localities: Off Jacksonville, Fla., 30° 13' N., 80° 41' W., 15-16 fathoms, *Pelican* station 33, April 23, 1956; off Jacksonville, Fla., 30° 04' N., 80° 23' W., 25 fathoms, *Bowers* station 30, March 9, 1956; south of Cape Fear, N. C., 33° 19' N.,

78° 07' W., 17 fathoms, *Bowers* station 59, March 17, 1956.

The specimens from the above localities are in full accord with the description published in 1955.

The distribution of this species in the northern Gulf of Mexico and along the Atlantic coast conforms with what I have called the "Carolin-

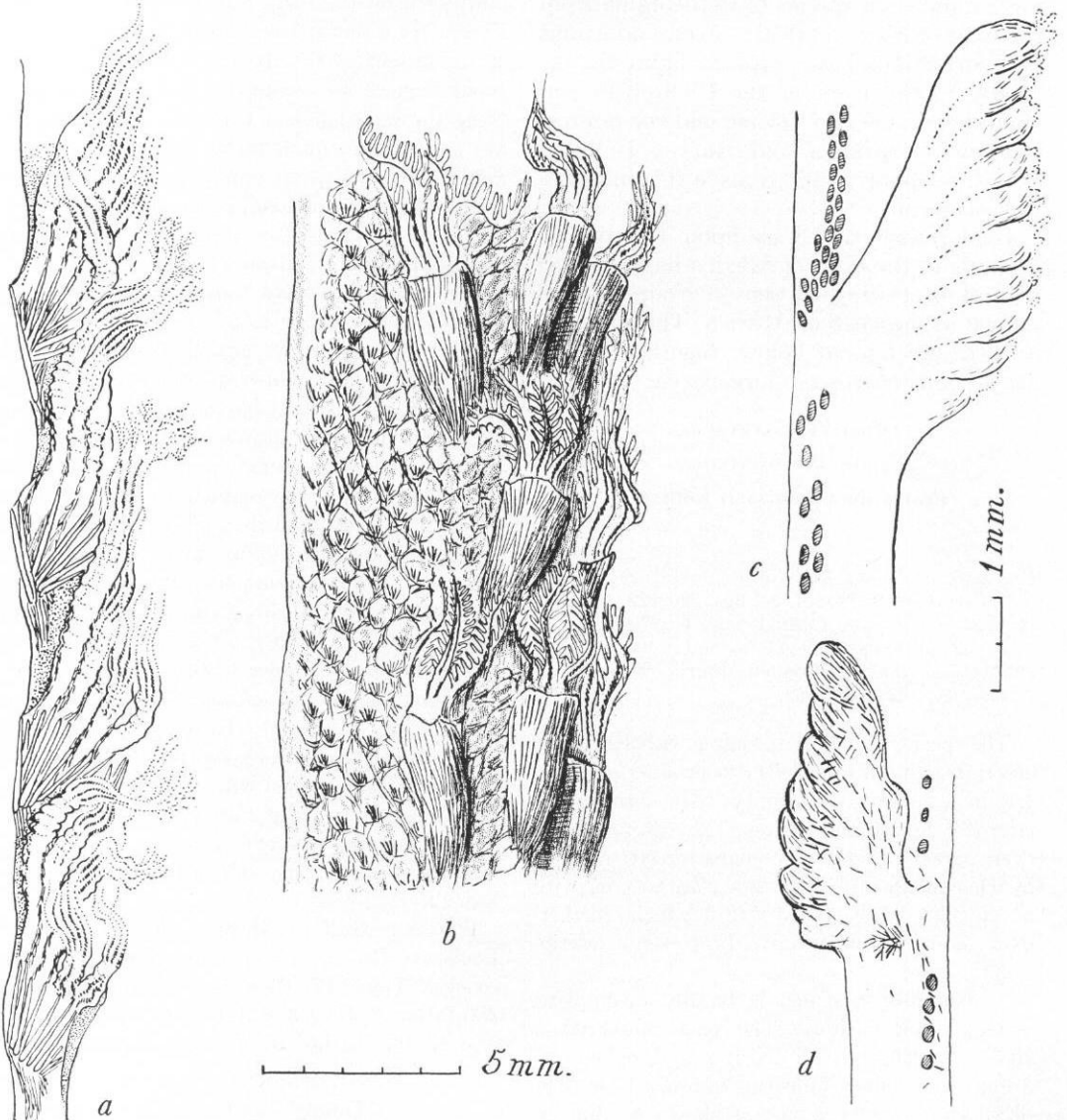


FIG. 1.—*a*, *Stylatula elegans* (Daniellssen), lateral view showing four polyp-leaves; *b*, *Protoptilum thomsonii* Kölliker, lateral view of part of rhachis showing distribution of siphonozooids and autozooids; *c*, *Acanthoptilum oligacis*, n. sp., polyp-leaf and adjacent rhachis showing arrangement of siphonozooids and distribution of spicules in autozooids; *d*, *Acanthoptilum agassizii* Kölliker, polyp-leaf and adjacent rhachis showing arrangement of siphonozooids and distribution of spicules in autozooids. (5-mm scale applies to *a* and *b*; 1-mm scale to *c-d*.)

ian" pattern. If the fossil specimens from the Tertiary of Trinidad are specifically identical, as I have suggested, the species was formerly distributed more widely than present records indicate. Such may prove still to be the case when careful collecting is done in the West Indies.

***Stylatula antillarum* K lliker**

*Stylatula antillarum* K lliker, Abh. Senckenb. Naturf. Ges. 7: 568. 1872.

K lliker's type, from the Paris Museum, had 9 leaves in 20 mm of rhachis; at least 26 polyps (autozooids) in each leaf, arranged in a single row; calyces 0.24–0.30 mm broad, containing calcareous needles; a spicular plate (beneath the leaves) containing 7 or 8 large needles, smaller than in *S. darwini* but still well developed. The sizes of spicules from various regions of the type are given in the table below, compared with measurements of spicules from specimens taken in the Gulf of Mexico by the *Oregon*.

	K�lliker's type		<i>Oregon</i> specimens	
	Length (mm)	Width (mm)	Length (mm)	Width (mm)
Large needles of spicular plate .....	1.8–2.4	0.12–0.20	1.8–2.0	0.25–0.30
Smaller needles of spicular plate.....	0.44–0.60	0.055–0.066	0.6–1.0	0.035–0.06
Needles of autozooid calyces.....	0.11–0.13	0.011–0.016	0.17–0.25	0.015

The present specimens are referable to *Stylatula antillarum* but differ from K lliker's material in some regards. The specimens before me have only 4–6 leaves in 20 mm of rhachis (compared with 9 in the type). There are 8–12 large needles in the spicular plate, more numerous and stouter than in the type. The smaller needles of the plate and those of the calyces and tentacles also are somewhat larger. The tentacles are filled with small needles, which extend into the pinules.

Neither of the species of *Stylatula* with widely spaced leaves (*elegans* and *brasiliensis*) has so many polyps in each leaf. Of the species with needles in the tentacles, only *S. lacazii* and *S. antillarum* have as high a number of polyps in the leaves as the present specimens. The spicular plate of *S. lacazii* is much weaker than in the material now under consideration, which consequently agrees most closely with *Stylatula antillarum*. When numerous specimens from several

West Indian and South American localities are available for a study of individual and geographical variation, the status of the various described species may be clarified.

*Type locality*.—"Antilles" (Paris Museum).

*Records*.—Off Cape San Blas, Fla.: 29° 30.9' N., 86° 10.6' W., 55 fathoms; *Oregon* station 604, July 12, 1952. Off Mississippi Delta: 28° 55' W., 100 fathoms; *Oregon* station 1421, September 23, 1955.

***Stylatula elegans* (Danielssens)**

Fig. 1a

*Virgularia elegans* Danielssens, Forh. Vid. Selsk. Christiania (1859): 277. 1860.

*Stylatula elegans* Deichmann, Mem. Mus. Comp. Zool. 53: 270. 1936.

A number of fragmentary specimens, mostly 10–12 cm in length and lacking both apex and stalk, were taken in 180 fathoms off Cape Canaveral, Fla., by the *Pelican*.

The polyp-leaves are openly spaced and regularly paired, 3 or 4 pairs in 2 cm of rhachis; a conspicuous spicular fan containing 10–12 large needles supports each leaf. The leaves consist of 3–7 large, well-separated autozooids. In each leaf the autozooid nearest the naked dorsal tract is longest, as much as 7 mm long in preserved material. A band of needles occurs in the tentacle backs and for some distance down the polyp body. In the proximal part of the leaves, where the autozooids are fused together, conspicuous bands of spicules follow the lines of fusion between the autozooids and merge with the spicules of the supporting fan. The siphonozooids occur laterally on the rhachis in triangular clusters above each polyp-leaf (i.e., in the axils) and are thus hidden from view.

The features noted above agree well with K lliker's description of the species except for the somewhat larger number of needles in the supporting fan or plate, and the presence of spicules on the polyp-bodies. Deichmann (1936, p. 270) does not mention spicules in the polyp-bodies, but notes about ten needles in the supporting fan. A specimen dredged south of Cape Fear by the *Albatross* has spicules in the polyp-bodies, but another, from off Chesapeake Bay, lacks them. Specimens from Japan lack the body spicules and consequently agree precisely with the typical form.

*Type locality*.—Off Molde, Norway, 25–50 meters.

*Records.*—West Atlantic. Off Cape Canaveral, Fla.: 28° 22' N., 79° 53' W., 180 fathoms; *Pelican* station 13, March 11, 1956. South of Cape Fear, N. C.: 32° 53' 00" N., 77° 53' 00" W., 99 fathoms; *Albatross* station 2313, January 5, 1885. Off Chesapeake Bay: 37° 59' 30" N., 73° 48' 40" W., 444 fathoms, *Albatross* station 2171, July 20, 1884.

East Pacific. Entrance to Port Heda, Honshu, North 49°, east 1.9 miles, 161–167 fathoms; *Albatross* station 3737, May 17, 1900. (Not recorded from Japan by Balss, 1910, or by Nutting, 1912.)

#### Genus *Acanthoptilum* Kölliker

The genus *Acanthoptilum* includes long, slender sea-pens with well-formed polyp-leaves consisting of completely or mostly fused autozooids decreasing in length dorsoventrally; siphonozooids in single or multiple rows on each side of the dorsal tract, between the autozooid leaves. Spiculation weak to moderate, in the form of needles and, in some species, biscuit-shaped platelets. In most species a cluster of needles at the base of each leaf represents the supporting fan or spicular plate found in the allied genus *Stylatula*.

Two species of *Acanthoptilum* are described from the western Atlantic, namely, *A. pourtalesii* Kölliker and *A. agassizii* Kölliker. The latter of these is represented in the *Oregon* collection. Also present is a specimen of *Acanthoptilum* that differs in specific characters from both described species and which must, at least for the present, be considered as a third western Atlantic species.

*Type species.*—*Acanthoptilum pourtalesii* Kölliker, by subsequent designation, Kükenthal, 1915.

#### *Acanthoptilum agassizii* Kölliker

Fig. 1d

*Acanthoptilum agassizii* Kölliker, Abh. Senckenb. Naturf. Ges. 7: 572, pl. 18, fig. 156; pl. 19, fig. 157. 1872.

Five specimens dredged off Pensacola, Fla., agree in the main with Kölliker's original description. Discrepancies are attributable to the larger size of the present material. They range in length from 20 to 38 cm, compared with 17.5 cm in Kölliker's specimen. The maximum length of the leaves is about 4 mm, width at base about

1 mm; autozooids 7. In the smallest specimen the leaves are about 2.5 mm long and have only 5 autozooids. The polyp-leaves of all the specimens are conspicuously but moderately spiculate. Abundant needles are longitudinally disposed in the calycular part of the autozooids, somewhat less numerous in the leaf proper; spicules are more numerous along the dorsal edge of the leaves; at the base of the leaves is a clump of needles representing the spicular plate. No biscuit-shaped sclerites are present. The siphonozooids occur below each leaf in a single row along the dorsal side of the rhachis. A few small needles occur in the vicinity of the siphonozooids, but not to the extent reported by Kölliker.

*Type locality.*—Off Carysfort Reef, Fla., 35 fathoms; L. F. de Pourtales, March 21, 1869.

*Records.*—Off Pensacola, Fla.: 29° 41' N., 87° 11' W., 100 fathoms; *Oregon* station 1558, June 21, 1956.

#### *Acanthoptilum oligacis*, n. sp.

Fig. 1e

A large specimen, broken in two places and missing a small part of the proximal end, measures 111 cm in length. The fully formed polyp-leaves are 4–5 mm long, alternating on the rhachis, 4–5 mm apart (closest basally and apically). Leaves consisting of 10 autozooids almost completely fused. Spiculation weak, consisting of a few needles longitudinally disposed in the calycular part of the autozooids. No spicules in the middle and basal parts of the leaves; no trace of a basal cluster of needles. Siphonozooids in a double row on each side of the dorsal tract, between the leaves; immediately above each leaf the rows may irregularly increase to 3. In the rhachis there are slightly constricted, slipper- or biscuit-shaped platelets very sparsely distributed. Axis round, white, smooth.

*Holotype.*—U.S.N.M. 50561: Gulf of Mexico, off Mississippi Delta: 28° 17' N., 89° 55' W., 100 fathoms; *Oregon* station 1421, September 23, 1955.

*Remarks.*—The type of *A. oligacis*, n. sp. much resembles the specimens of *A. agassizii* just described but is a great deal larger. It is characterized by the generally weak spiculation and complete absence of the clumps of needles in the leaf bases, and siphonozooids in double rows. *A. pourtalesii*, which has its siphonozooids

in double rows, has strong groups of needles that form a good supporting fan below each leaf, and only 5 or 6 autozooids in the leaves.

Order GORGONACEA

Family ANTHOTHELIDAE

*Anthopodium rubens* Verrill

Gulf of Mexico: East Bank, 30 miles off Freeport, Tex. Collected by divers in about 5 fathoms depth, June 4, 1956. Received from Robert H. Parker and Willis G. Hewatt. This is a new record for the Gulf of Mexico and represents the rediscovery of a species "lost" for 84 years. It will be redescribed in detail in a subsequent paper.

Family ACANTHOGORGIIDAE

*Acanthogorgia schrammi* (Duchassaing and Michelotti)

Gulf of Mexico: Campeche Bank, west of Yucatán Peninsula: 21° 17' N., 91° 18' W., 20 fathoms (exceptionally shallow); *Oregon* station 1048, May 13, 1954. East of Mississippi Delta: 29° 06' N., 88° 19' W., 260 fathoms; *Oregon* station 1283, March 13, 1955.

Family PARAMURICEIDAE

*Bebruce grandis* Deichmann

Gulf of Mexico: West of Cape San Blas, Fla.: 29° 30.9' N., 86° 10.6' W., 55 fathoms; *Oregon* station 604, July 12, 1952. South of Galveston, Tex.: 27° 57.4' N., 94° 54' W., 50 fathoms; *Oregon* station 539, April 16, 1952.

*Echinomuricea atlantica* (Johnson)

Fig. 2

Gulf of Mexico: Off Pensacola, Fla.: 29° 41' N., 87° 11' W., 100 fathoms; *Oregon* station 1558, June 21, 1956.

*Placogorgia mirabilis* Deichmann

Gulf of Mexico: South of Cape San Blas, Fla.: 28° 55' N., 85° 07' W., 29 fathoms; *Oregon* station 892, March 7, 1954.

Straits of Florida. NW. of Cay Sal Bank: 24° 03' N., 80° 30' W., 150 fathoms; *Oregon* station 1349, July 1955.

*Scleracis guadalupensis* (Duchassaing and Michelotti)

Gulf of Mexico: South of Cape San Blas, Fla.: 28° 50' N., 85° 00' W., 28 fathoms; *Oregon* sta-

tion 897, March 7, 1954. South of Mobile, Alabama: 29° 26' N., 87° 33' W., 41-42 fathoms; *Oregon* station 793, June 9, 1953.

*Swiftia exserta* (Ellis and Solander)

Gulf of Mexico: Off Sarasota, Fla., Robert H. Stewart. [Haul b-170.]

*Thesea grandiflora grandiflora* Deichmann

Gulf of Mexico: West of Cape San Blas, Fla.: 29° 30.9' N., 86° 10.6' W., 55 fathoms; *Oregon* station 604, July 12, 1952.

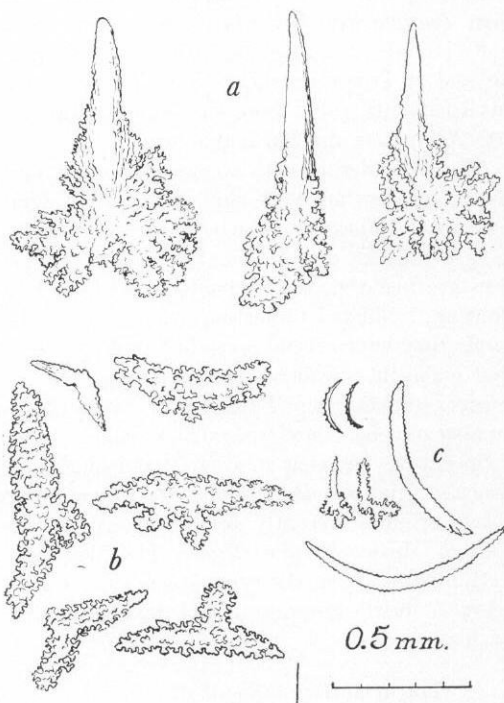


FIG. 2.—*Echinomuricea atlantica* (Johnson): Spicules of: a, Calyx walls; b, cortex; c, anthocodia. (All figures at same magnification.)

*Thesea grandiflora rugulosa* Deichmann

Gulf of Mexico: West of Cape San Blas, Fla.: 29° 30.9' N., 86° 10.6' W., 55 fathoms, *Oregon* station 604, July 12, 1952.

*Thesea hebes* Deichmann

Straits of Yucatán: NE. of Cape Catoche, Yucatán: 22° 40.2' N., 86° 36.6' W., 206 fathoms; *Oregon* station 590, April 19, 1950.

**Thesea plana** Deichmann

Gulf of Mexico: South of Cape San Blas, Fla.: 28° 55' N., 85° 07' W., 29 fathoms; *Oregon* station 892, March 7, 1954.

Genus **Trachymuricea** Deichmann

The genus *Trachymuricea* was established by E. Deichmann (1936:132) to include Pourtalès' *Acanthogorgia hirta* (type species) and Broch's *Paramuricea kükenthali*. The type species is known from Bahia Honda, Florida Keys, and is recorded from *Blake* stations 166 and 176 off Barbados, although the latter specimens are lost. *Paramuricea kükenthali* Broch was originally recorded from the lower littoral and upper abyssal of Trondhjemsfjord, Norway, and later by Aurivillius (1931) from the same locality, in 100–250 meters and 300–350 meters.

The rind sclerites with a conical or pyramidal central process are very similar in form to the spicules of *Villogorgia*, which, however, regularly have 4 rootlike projections. The calycular sclerites are fusiform, longitudinally placed, with a slanting, lacinated projection, whereas in *Villogorgia* they have several spreading root processes that make the spicules wider than long. *Trachymuricea* differs from *Paramuricea* in its large number of collaret and opercular spicules.

Specimens agreeing in every particular with Broch's original description of *Paramuricea kükenthali* have recently been collected in the Gulf of Mexico by the *Oregon*. They are perfectly distinct from the type species, and I give below a brief description and figures of the spicules.

**Trachymuricea kükenthali** (Broch)

Fig. 3

Colonies much broken. Branching irregular, lateral, but mostly in one plane, straggling. Largest stems about 5 mm in diameter, end twigs 3 mm. Axis woody, rather fragile because of the abundant loculation of the cortex and unusually wide, soft medula. Coenecyeme thin, with a thin inner layer and a thicker outer layer; outer layer containing irregularly fusiform sclerites, many of them with a single, central, prickly, pyramidal process. The inner layer is poor in spicules, none of which have the central process. The calyces are about 1.5 mm tall; with the contacted anthocodiae, 3–4 mm. They are widely

separated, irregularly scattered, and more numerous at the twig tips which therefore appear somewhat clavate. The calycular walls contain fusiform sclerites with a terminal or subterminal, slanting projection. The anthocodiae have numerous rows of curved, transversely placed spindles in the collaret, and many bent "hockey-stick" rods *en chevron* in each tentacle base. Alternating with the 8 opercular segments are 8 rows of small rods lying along the septal insertions.

*Type locality*.—Trondhjemsfjord, Norway; in lower littoral and upper abyssal.

*Record*.—Gulf of Mexico. Off Mississippi Delta: 29° 06' N., 88° 19' W., 260 fathoms; *Oregon* station 1283, March 13, 1955.

*Color in life*.—"Hell rosa" (Broch); no record of the life colors of the specimens from *Oregon* station 1283.

*Remarks*.—The bottom temperature was 50.7°F. Collected at the same time were *Acanthogorgia schrammi* (Duchassaing and Michelotti) and a large, arborescent antipatharian.

**Trachymuricea hirta** (Portalès)

Gulf of Mexico: South of Cape San Blas, Fla.: 28° 55' N., 85° 07' W., 29 fathoms; *Oregon* station 892, March 7, 1954. This species differs from *T. kükenthali* (Broch) in its more slender branches, smaller calyces, and rougher projecting processes of rind and calyx sclerites.

**Villogorgia nigrescens** Duchassaing and Michelotti

Gulf of Mexico: West of Cape San Blas, Fla.: 29° 30.9' N., 86° 10.6' W., 55 fathoms; *Oregon* station 604, July 19, 1952.

## Family ELLISELLIDAE

I have already discussed the nomenclatural difficulties of the "Gorgonellidae" (1955) and altered the familial designation to Ellisellidae. The West Indian representatives of this family belong to the genera *Ellisella* (= *Scirpearia* of many authors) *Nicella*, and *Riisea*. The genus *Junceella* has been reported from the area (Duchassaing and Michelotti; Wright and Studer; Toepflitz) but probably in error. A specimen reported below (*Ellisella grandis*) suggests a possible source of this error.

There is probably no family of Gorgonacea

more sharply defined than the Ellisellidae or one whose species are more difficult to recognize. It is therefore insufficient to offer locality records for any particular species without a documentary basis for the identification. Deichmann's monograph (1936) illustrates the spicules of the

species known from the Western Atlantic and forms the basis for the present determinations. The spicules illustrating the species reported herein are drawn at the same magnification used by Miss Deichmann, so as to facilitate direct comparison of my drawings with hers.

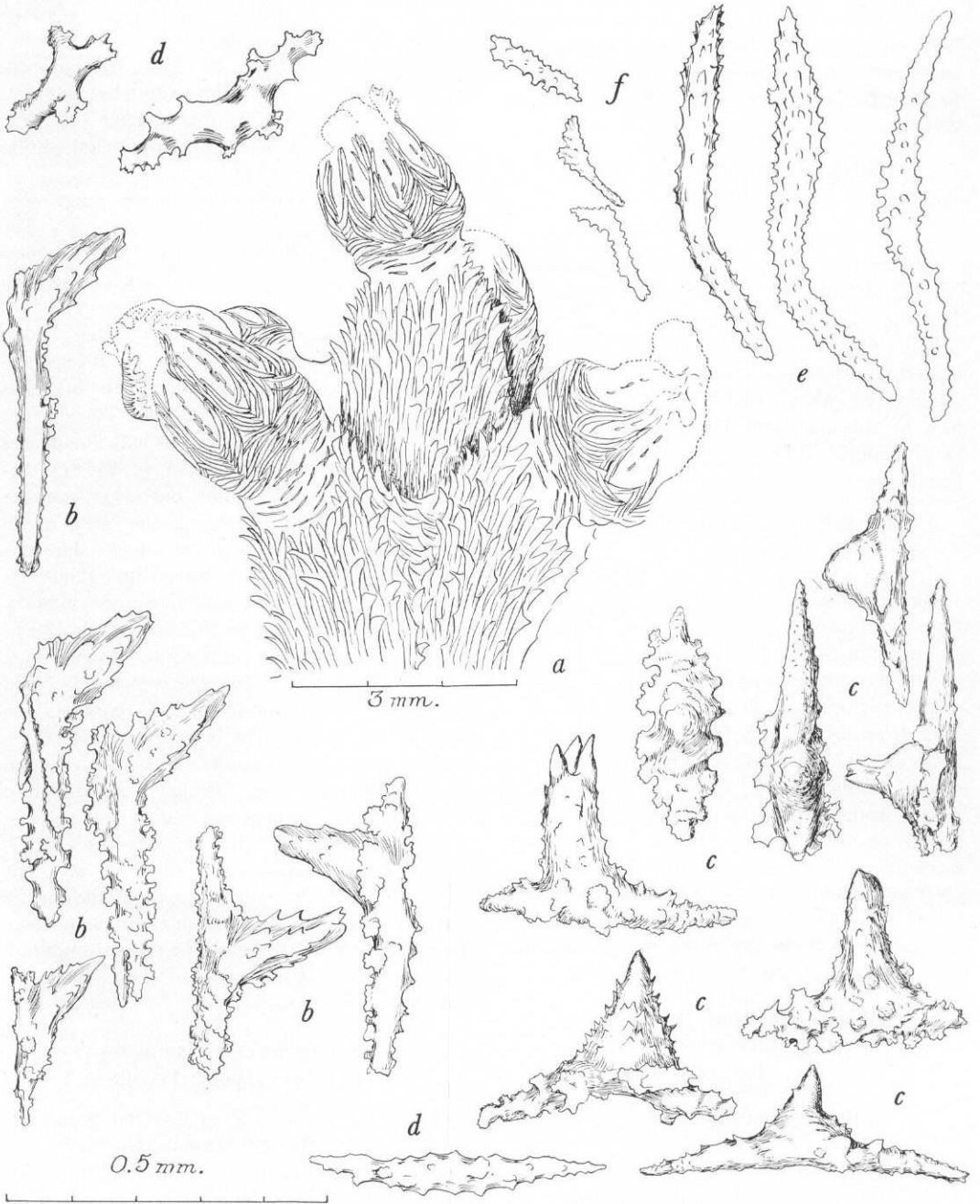


FIG. 3.—*Trachymuricea küenthali* (Broch): a, Tip of branch showing calyces and exsert anthocodiae; b, asymmetrical calycular thorn-scales; c, thorn-scales of stem rind; d, simple spindle and irregular bodies of inner cortex; e, spicules of operculum; f, spicules of tentacles. (0.5-mm scale applies to b-f.)

***Ellisella atlantica*** (Toeplitz)

Fig. 4a

Gulf of Mexico: South of Terrebonne Bay, La.: 28° 06' N., 91° 02' W., 29 fathoms; *Oregon* station 1416, September 21, 1955.

The calyces are prominent, irregularly biserial, more or less upturned. Color (in alcohol) dark orange with yellowish or whitish calyces, as reported by Deichmann; spicules in agreement with her figures (1936:206, pl. 24, figs. 20-28a).

***Ellisella barbadensis*** (Duchassaing and Michelotti)

Fig. 4b

Gulf of Mexico: South of Mobile, Ala.: 29° 26' N., 87° 33' W., 41-42 fathoms; *Oregon* station 793, June 9, 1953.

The calyces are 1.5-2.0 mm tall, biserial, upturned, and more or less appressed. Color (dry) orange, the calyces slightly paler than the surface of the rind. Spicules in agreement with Deichmann's illustrations (1936:208, pl. 24, figs. 1-19).

***Ellisella elongata*** (Pallas)

Fig. 4e-f

Gulf of Mexico: Off Fort Walton, Fla., 13-14 fathoms; Frank Lyman, June 3-4, 1947. West of Cape San Blas, Fla.: 29° 33' N., 86° 13.2' W., 60 fathoms; *Oregon* station 603, July 12, 1952.

The two colonies from the northern Gulf of Mexico are identical both in external form and in details of spiculation. They are branched several times near the base, sending up long, nearly straight, rather stiff branches. The calyces are placed in lateral bands of 2 or 3, usually retracted as low mounds. The spicules are in good agreement with Deichmann's illustration, but the double clubs are slightly larger than in her specimens (1936:212, p. 24, figs. 46-48). The rind is reddish orange, the calyces yellow.

***Ellisella funiculina*** (Duchassaing and Michelotti)

Fig. 4g

Gulf of Mexico: South of Pensacola, Fla.: 29° 41' N., 87° 11' W., 100 fathoms; *Oregon* station 1558, June 21, 1956.

The colonies are slender, with cylindrical calyces placed biserially. Color (in alcohol) white.

Spicules in agreement with Deichmann's illustration (1936:210, pl. 24, figs. 29-36).

***Ellisella grandis*** (Verrill)

Fig. 4e-d

Caribbean Sea: South east of Jamaica: 17° 44' 05" N., 75° 39' 00" W., 23 fathoms; *Albatross* station 2138, February 29, 1883.

Lesser Antilles: Barbados: Cable station east, south by east, Paynes Bay Church northeast, offshore  $\frac{3}{4}$  mile; 35-75 fathoms, sand and rock; University of Iowa Barbados-Antigua Expedition station 78, June 3, 1918.

Two records extend the known range considerably southward into the West Indies. The specimen from *Albatross* station 2138 is incomplete, consisting of a large branch with two bifurcations. The calyces are placed in 2 or 3 rows along the two sides of the branches; in the lower part of the specimen they are tall and tubular, but toward the end of one of the branches they are contracted to low hillocks. The spicules (Fig. 4, c) are in close agreement with the figures given by Deichmann (1936:214, pl. 24, figs. 42-45). The specimen from Barbados consists of three fragments, including the base, of an apparently unbranched young colony; the calyces are contracted to low warts throughout. Its spicules (Fig. 4, d) are consistently asymmetrical, a tendency noted in this species by Deichmann, but otherwise like those of the type. Wright and Studer's *Juncella barbadensis* could have been such a specimen of *E. grandis*. The colonies are very similar in appearance to those of *E. elongata*, with a tendency to branch several times, producing long, straight end-branches; the color is dark orange-red with yellow calyces. Miss Deichmann has already suggested that *E. grandis* might be a synonym of *E. elongata*, but has noted that the calycular rods of the former seem always to be longer than those of *elongata*. This feature is noted also in the present material, which indicates that the two forms should be maintained separately.

## Family CHRYSOGORGIIDAE

***Radicipes gracilis*** (Verrill)

Nicholas Channel: SE. of Cay Sal Bank: 22° 55' N., 79° 16' W., 240 fathoms; *Oregon* station 1341, July 1955. There are a number of records in the U. S. National Museum from localities off Georges Bank, Nantucket, and Block Island in



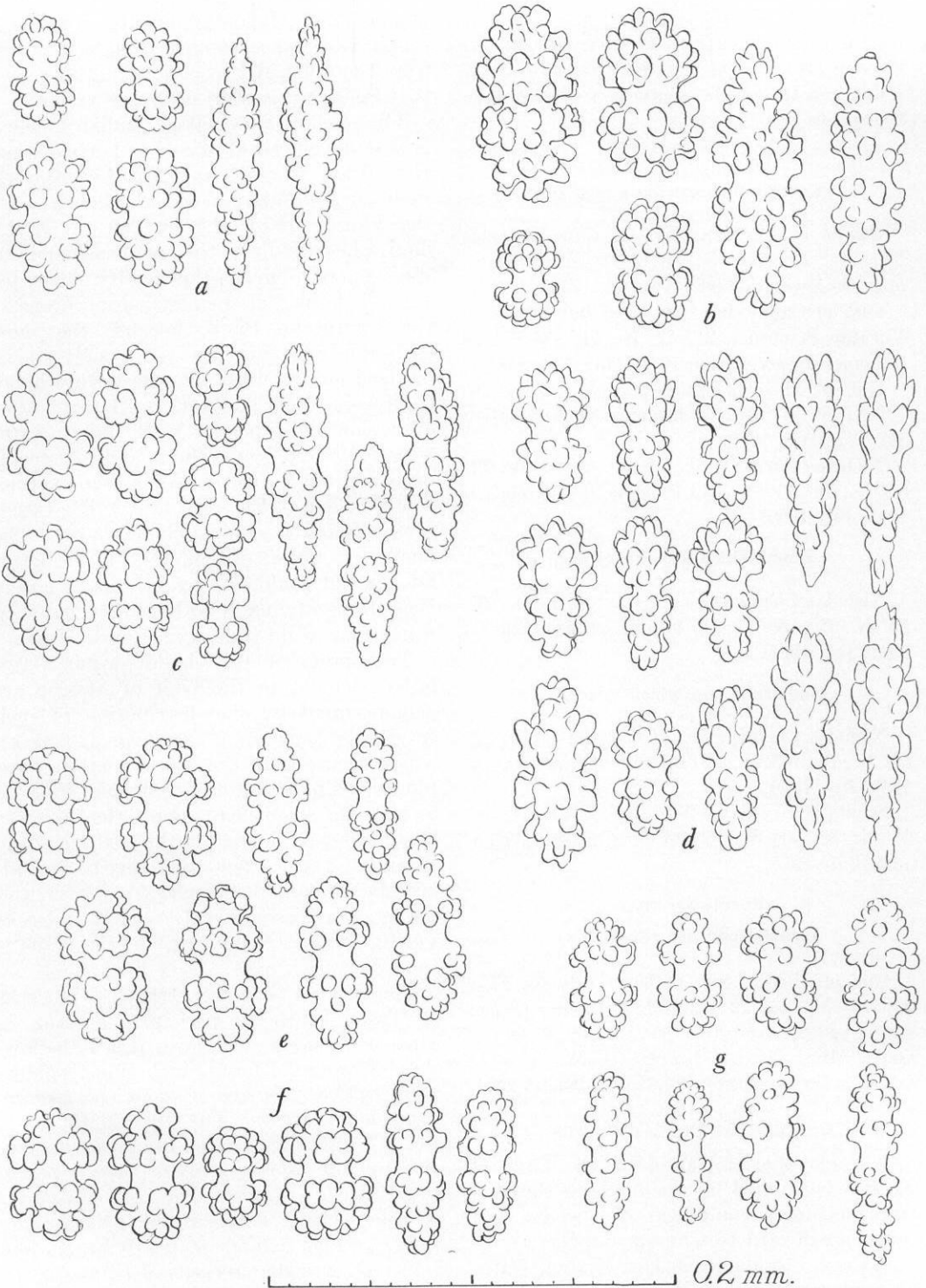


FIG. 4.—Spicules of: a, *Ellisella atlantica* (Toeplitz); b, *Ellisella barbadensis* (Duchassaing and Michelotti); c, *Ellisella grandis* (Verrill); d, *Ellisella grandis* (Verrill), specimen with asymmetrical spicules; e, *Ellisella elongata* (Pallas), specimen from Fort Walton, Fla.; f, *Ellisella elongata* (Pallas), specimen from Oregon station 603; g, *Ellisella funiculina* (Duchassaing and Michelotti).

depths from 858 to 1,813 fathoms; also two records from off northern Florida, 270 and 273 fathoms. The present material, from off Cay Sal Bank, constitutes the southernmost record for the species.

Family PRIMNOIDAE

*Callogorgia verticillata* (Pallas)

Straits of Yucatán: NE. of Cape Catoche, Yucatán: 22° 40.2' N., 86° 36.6' W., 206 fathoms; *Oregon* station 590, April 19, 1950.

Gulf of Campeche: Campeche Bank, west of Yucatán Peninsula: 21° 17' N., 91° 18' W., 20 fathoms; *Oregon* station 1048, May 13, 1954.

Gulf of Mexico: South of Mobile, Ala.: 29° 12' N., 88° 34' W., 32 fathoms; *Oregon* station 817, August 5, 1953.

Nicholas Channel: SE. of Cay Sal Bank: 22° 55' N., 79° 16' W., 240 fathoms, *Oregon* station 1341, July 1955.

*Plumarella goësi* Aurivillius

Nicholas Channel: SE. of Cay Sal Bank: 22° 55' N., 79° 16' W., 240 fathoms; *Oregon* station 1341, July 1955.

*Plumarella pourtalesii* (Verrill)

Nicholas Channel: SE. of Cay Sal Bank: 22° 55' N., 79° 16' W., 240 fathoms; *Oregon* station 1341, July 1955.

Straits of Florida: NW. of Cay Sal Bank: 24° 03' N., 80° 30' W., 150 fathoms; *Oregon* station 1349, July 1955.

Family ISIDIDAE

*Acanella eburnea* (Pourtales)

Gulf of Mexico: SW. of Dry Tortugas, Fla.: 24° 16' N., 83° 22' W., 375 fathoms; *Oregon* station 1019, April 16, 1954. South of Pascagoula, Miss.: 29° 01' N., 88° 24' W., 355-475 fathoms; *Oregon* station 640, September 19, 1954.

ZOOGEOGRAPHICAL REMARKS

The alcyonarian fauna of the Gulf of Mexico is divided into a northern shallow-water element comprised of species that range northward to Chesapeake Bay, skipping south Florida, a southern shallow-water element made up of West Indian species, and a widespread deep-water element representing an extension of the Caribbean-West

Indian fauna. Below about 100 fathoms, a number of species appear that are known from the north Atlantic or belong to genera that flourish in cooler, northern waters.

The shallow water West Indian element is best developed at the Dry Tortugas and Key West, where many Antillean species, such as *Antillogorgia acerosa*, flourish. On the Florida Bank the number of species diminishes rapidly to the northward and few species persist beyond the vicinity of Tampa. Little is known of the alcyonarian fauna of the Campeche Bank, because the most favorable bottoms are too rough to be dredged and so must be collected by hand. Collectors do not go there. It is known, however, that the typically West Indian *Antillogorgia acerosa* occurs there, and so it seems probable that the other shallow-water species would belong to the same fauna. The extent of the fauna is completely unknown. The northwest coast of Cuba is little better known, but it almost certainly has a purely West Indian fauna in both shallow and deep water just as do the lower Florida Keys.

The limits of the shallow-water Carolinian element in the Gulf of Mexico are demonstrated by the distribution of such species as *Leptogorgia virgulata* (Lamarek), which occurs from the Texas coast to west Florida, skipping most of peninsular Florida, to reoccur somewhere along the Atlantic coast and extend north to the latitude of the Virginia Capes. A few other species, including *Muricea pendula*, *Lophogorgia hebes*, and the newly rediscovered *Anthopodium rubens* Verrill, follow this pattern, but the fauna is not a very rich one.

The western Gulf coast, that is, the coast of Texas south to perhaps Veracruz in Mexico, so far as is known has a shallow-water Carolinian fauna, including *Anthopodium rubens*, *Muricea pendula*, *Leptogorgia virgulata*, *L. setacea*, and *Lophogorgia hebes*, and a deeper-water West Indian fauna represented by *Bebryce grandis*, *Thesea plana*, and *Ellisella atlantica*. The only sea-pansy on the coast of Texas seems to be *Renilla mülleri*, which extends south to Brazil, and I am not sure that records of *R. reniformis* from any part of the Gulf are correct. Additional dredging between 25 and 200 fathoms should reveal a larger fauna, which I antici-

pate will be largely or entirely West Indian.

The appearance of *Trachymuricea kükenthali* in the northern Gulf of Mexico is a matter of considerable interest. The type locality and all subsequent records, until now, are in Norway. *Protoptilum thomsonii*, which is also not rare in this region, likewise was first described from the north Atlantic.

#### OCTOCORALLIA OF THE TORTUGAS

Shallow-water, down to about 24 fathoms.

##### West Indian species:

*Briareum asbestinum*  
*Muricea muricata*  
*Muricea laxa*  
*Eunicea mammosa*  
*Eunicea calyculata*  
*Eunicea tourneforti*  
*Plexaura flexuosa*  
*Plexaura porosa*  
*Plexaurella dichotoma*  
*Plexaurella nutans* (= *kunzei*)  
*Antillogorgia acerosa*  
*Antillogorgia rigida* (= *americana* non Gmel.)  
*Antillogorgia bipinnata*  
*Gorgonia flabellum*  
*Pterogorgia anceps*  
*Pterogorgia citrina*  
*Pterogorgia guadalupensis*

Deep-water species, deeper than 25 fathoms.

##### West Indian species:

*Telesto sanguinea*  
*Telesto flavula*  
*Diodogorgia nodulifera*  
*Iciligorgia schrammi*  
*Bebryce cinerea*  
*Echinomuricea atlantica*  
*Placogorgia mirabilis*  
*Placogorgia tenuis*  
*Scleracis guadalupensis*  
*Scleracis petrosa*  
*Thesea citrina*  
*Thesea grandiflora*  
*Thesea plana*  
*Thesea rugosa*  
*Thesea solitaria*  
*Villogorgia nigrescens*  
*Nicella guadalupensis*  
*Ellisella barbadensis*  
*Ellisella funiculata*  
*Ellisella grandis*  
*Plumarella pourtalesii*  
*Callogorgia verticillata*  
*Chrysogorgia desbonni*  
*Chrysogorgia elegans*  
*Trichogorgia viola*  
*Acanella eburnea*  
*Primnois humilis*  
*Stylatula elegans*

OCTOCORALLIA OF THE FLORIDA WEST COAST  
 Shallow water, down to about 25 fathoms.

##### Carolinian species (with southern limit):

*Telesto sanguinea* (Tortugas)  
*Leptogorgia virgulata* (Sanibel I.)  
*Lophogorgia hebes* (Key West)

##### West Indian species (with northern limit):

*Plexaura porosa* (Tampa)  
*Plexaurella nutans* (Tampa)  
*Antillogorgia acerosa* (Tampa)  
*Antillogorgia rigida* (Marco)  
*Pterogorgia anceps* (Tampa)

Deeper water, more than 25 fathoms. (Paucity of species probably due to inadequate collecting.)

*Acanella eburnea*  
*Leptogorgia euryale*  
*Leptogorgia medusa*

#### OCTOCORALLIA OF THE NORTHERN GULF OF MEXICO FROM CAPE SAN BLAS, FLORIDA, TO THE TEXAS COAST

Shallow water, down to about 25 fathoms.

##### Carolinian species:

*Telesto flavula*  
*Telesto sanguinea*  
*Muricea pendula*  
*Leptogorgia virgulata*  
*Leptogorgia setacea*  
*Lophogorgia hebes*  
*Virgularia presbytes*

##### West Indian species:

*Thesea plana* (Unusually shallow)  
*Renilla mülleri*  
 Deeper than 25 fathoms.

##### West Indian species:

*Acanthogorgia schrammi*  
*Bebryce grandis*  
*Echinomuricea atlantica*  
*Scleracis guadalupensis*  
*Placogorgia mirabilis*  
*Swiftia exserta*  
*Swiftia casta*  
*Thesea grandiflora grandiflora*  
*Thesea grandiflora rugulosa*  
 [*Thesea plana* presumably occurs]  
*Villogorgia nigrescens*  
*Ellisella elongata*  
*Ellisella atlantica*  
*Callogorgia verticillata*  
*Leptogorgia stheno*  
*Leptogorgia euryale*  
*Leptogorgia medusa*

Warm-water representatives of northern genera:

- Trachymuricea kukenthalii*\*
- Acanella eburnea*
- Funiculina quadrangularis*\*
- Protoptilum thomsonii*\*
- Acanthoptilum agassizii*
- Acanthoptilum oligacis* n. sp.
- Stylatula antillarum*

\* Species known from north Atlantic.

OCTOCORALLIA OF THE TEXAS COAST

Shallow water, down to about 25 fathoms:

- Anthopodium rubens*
- Muricea pendula*
- Leptogorgia virgulata*
- Leptogorgia setacea*
- Lophogorgia hebes*
- Renilla mülleri*
- Virgularia presbytes*

Deeper than 25 fathoms:

- Bebruce grandis*
- Chrysogorgia elegans*
- Protoptilum thomsonii*

OREGON STATIONS AT WHICH OCTOCORALLIA WERE COLLECTED AND THE SPECIES RECORDED FROM EACH

- 126. *Protoptilum thomsonii* Kölliker.
- 274. *Renilla mülleri* Kölliker.
- 295. *Muricea pendula* Verrill; *Leptogorgia virgulata* Lamareck.
- 314. *Protoptilum thomsonii* Kölliker.
- 436. *Antillogorgia acerosa* (Pallas).
- 489. *Acanella eburnea* (Pourtalès); *Chrysogorgia* sp.
- 534. *Anthothela* sp.
- 537. *Thesea plana* Deichmann.
- 539. *Bebruce grandis* Deichmann.
- 548. *Chrysogorgia elegans* (Verrill); *Protoptilum thomsonii* Kölliker.
- 549. *Chrysogorgia elegans* (Verrill).
- 590. *Thesea hebes* Deichmann; *Callogorgia verticillata* (Pallas).
- 603. *Ellisella elongata* (Pallas).
- 604. *Bebruce grandis* Deichmann; *Thesea grandiflora* Deichmann; *Thesea grandiflora rugulosa* Deichmann; *Villogorgia nigrescens* Duchassaing & Michelotti; *Stylatula antillarum* Kölliker.
- 640. *Acanella eburnea* (Pourtalès).
- 793. *Scleracis guadalupensis* (Duchassaing and Michelotti); *Ellisella atlantica* (Toeplitz).
- 817. *Callogorgia verticillata* (Pallas).
- 889. *Telesto sanguinea* Deichmann.
- 892. *Telesto sanguinea* Deichmann; *Placogorgia mirabilis* Deichmann; *Thesea plana* Deichmann; *Trachymuricea hirta* (Pourtalès).

- 897. *Scleracis guadalupensis* (Duchassaing and Michelotti).
- 944. *Leptogorgia stheno* (Bayer).
- 945. *Leptogorgia stheno* (Bayer).
- 1003. *Plexaurella nutans* (Duchassaing and Michelotti).
- 1004. *Telesto riisei* (Duchassaing and Michelotti); *Antillogorgia acerosa* (Pallas); *Eunicea* sp.
- 1019. *Acanella eburnea* (Pourtalès).
- 1047. *Muricea elongata* Lamouroux.
- 1048. *Acanthogorgia schrammi* (Duchassaing and Michelotti); *Callogorgia verticillata* (Pallas).
- 1093. *Protoptilum thomsonii* Kölliker.
- 1283. *Acanthogorgia schrammi* (Duchassaing and Michelotti); *Trachymuricea kukenthalii* (Broch).
- 1328. *Plumarella pourtalesii* (Verrill).
- 1341. *Radicipes gracilis* (Verrill); *Plumarella goësi* Aurivillius; *Callogorgia verticillata* (Pallas).
- 1343. *Plumarella pourtalesii* (Verrill); *Callogorgia verticillata* (Pallas).
- 1349. *Placogorgia mirabilis* Deichmann; *Plumarella pourtalesii* (Verrill).
- 1416. *Ellisella atlantica* (Toeplitz).
- 1421. *Stylatula antillarum* Kölliker.
- 1558. *Acanthoptilum agassizii* Kölliker.

REFERENCES

AURIVILLIUS, MAGNUS. *The gorgonarians from Dr. Sixten Bock's expedition to Japan and Bonin Islands 1914*. Kungl. Svenska Vet.-Akad. Handl. (3) **9** (4): 1-337, 65 figs., 6 pls. 1931.

BAYER, FREDERICK M. *New western Atlantic records of octocorals (Coelenterata: Anthozoa), with descriptions of three new species*. Journ. Washington Acad. Sci. **42** (6): 183-189, 1 fig. 1952.

———. *Remarkably preserved fossil sea-pens and their Recent counterparts*. Journ. Washington Acad. Sci. **45** (9): 294-300, 2 figs. 1955.

———. *Contributions to the nomenclature, systematics, and morphology of the Octocorallia*. Proc. U. S. Nat. Mus. **105**: 207-220, 8 pls. 1955.

DANIELSSEN, D. C. Forh. Vid.-Selsk. Christiania (1859): 251. 1860.

DEICHMANN, ELISABETH. *The Alcyonaria of the western part of the Atlantic Ocean*. Mem. Mus. Comp. Zool. **53**: 1-317, 37 pls. 1936.

JUNGERSEN, H. F. E. *Pennatulida*. Den Danske Ingolf-Expedition **5** (1): 1-91, 3 pls. 1904.

KÖLLIKER, A. *Anatomisch-systematische Beschreibung der Alcyonarien. Erste Abtheilung: Die Pennatuliden*. Abh. Senckenb. Naturf. Ges. **7**: 111-225; 487-602; **8**: 85-275, 24 pls. 1870-1872.

SPRINGER, STEWART, and BULLIS, HARVEY R., JR. *Collections by the Oregon in the Gulf of Mexico*. U. S. Dept. Interior, Fish and Wildlife Serv., Spec. Sci. Rep.: Fisheries No. 196. 1956. [Contains complete data for Oregon stations 1 through 1429, as well as lists of the Crustacea, mollusks, and fishes collected 1950-1955.]