ZOOLOGY.—*Further remarks on the geographical distribution of Gorgoniidae.*

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(Received November 17, 1958)

In my paper of 1953 on the zoogeography and evolution in the octocorallian family Gorgoniidae, I advanced the proposition that the closely related group of gorgoniid genera characterized by scaphoid spicules is an adaptive offshoot of the mainstream of gorgoniid development produced in response to altered environmental conditions resulting from cessation of interoceanic communication across the Isthmus of Panama toward the end of the Miocene time. One of the premises upon which this theory depends was that the "scaphoid genera" of gorgoniids are endemic in the Caribbean region. Except for *Pterogorgia peruana* Stiasny, said to be from Callao, and four species of *Pseudopterogorgia* from the East Indies and Australia, no species have been reported outside the West Indian area, and I disposed of these exceptions by considering *P. peruana* to be a West Indian species with incorrect locality data, and the species of *Pseudopterogorgia* to be species of *Leptogorgia* with somewhat bent spindles erroneously interpreted as scaphoids. I had seen neither *P. peruana* nor any *Pseudopterogorgia*, and the collections of gorgonians in the U.S. National Museum contained no "scaphoid species" from the west coast of the Americas nor from the East Indies.

During the course of studies conducted in European museums, made possible by the assistance of the Biology Branch of the Office of Naval Research through a program with the American Institute of Biological Sciences, I was able to examine part of Stiasny's type of *Pterogorgia peruana* and a specimen of *Pseudopterogorgia oppositipinna parvispiculata* Bielschowsky from Amboina, contained in the collections of the Rijksmuseum van Natuurlijke Historie at Leiden. Even though the locality datum of *P. peruana* is still open to question—the species has not turned up in subsequent collections from South America—it is certainly not identical with any of the known West Indian species; it agrees in most particulars with *Pseudoterogorgia australiensis* (Ridley). Moreover, the spicules of *Pseudopterogorgia*, as revealed by a specimen from Amboina, are without doubt genuine scaphoids and not bent spindles as the literature once led me to believe.

These observations mean that (1) "scaphoid species" of Gorgoniidae do occur in the Indo-Pacific; (2) "scaphoid genera" are not restricted to the Caribbean region and probably came into being while Atlantic-Pacific intercommunication still existed; and (3) the Indo-Pacific species of *Pseudopterogorgia* are generically inseparable from the West Indian *Pterogorgia*, a name that I replaced with *Antillogorgia* for reasons stated in 1951 (p. 97). The generic name *Pseudopterogorgia* obviously takes precedence over *Antillogorgia*, which is a junior subjective synonym.

I will now show by means of a few figures that the scaphoid spicules are not sufficiently different in Atlantic and Indo-Pacific species to warrant generic separation. In Fig. 1 is shown a typical scaphoid of *Gorgonia acerosa* Pallas, type species of *Antillogorgia*; in Fig. 2, a scaphoid typical of *Gorgonia americana* Gmelin; in Fig. 3, a blunt scaphoid characteristic of *Pterogorgia rigida* Bielschowsky; in Fig. 4, a blunt, undulated scaphoid of *Pterogorgia blanquillensis* Stiasny; in Fig. 5, a similar blunt, undulated scaphoid from *Pseudopterogorgia oppositipinna parvispiculata* Bielschowsky; in Fig. 6, a scaphoid of *Pterogorgia peruana* Stiasny; and in Fig. 7, an acute, strongly undulated scaphoid of *Pterogorgia bipinnata* Verrill.

It is quite clear that the only distinguishing characteristic of *Pseudopterogorgia*—the 2–4 belted scaphoids "deren zugespitzte Enden mit ähnlichen, nicht regelmässig angeordneten Warzen besetzt sind" (Kükenthal 1924, p. 355)—is found also in West Indian *Antillogorgia*. From this it is clear that the correct generic name for the plumose, scaphoid-bearing gorgoniids of both Atlantic and Indo-Pacific is **Pseudo-**

pterogorgia Kükenthal, 1919, with the following synonymy:

Gorgonia (part) Pallas, 1766, Elench. Zooph.: 160.
Pterogorgia (part) Ehrenberg, 1834, Abh. Akad. Wiss. Berlin 1832 (pt. 1): 368.
Pseudopterogorgia Kükenthal, 1919, Ergebn. Tiefsee-Exped. **13**(2): 854. [Type species, *Pseudopterogorgia australiensis* (Ridley), by original designation.]
Antillogorgia Bayer, 1951, Journ. Washington Acad. Sci. **41**: 97. [Type species, *Gorgonia acerosa* Pallas, by original designation.]

Diagnosis.—Plumose, pinnate gorgoniids with no trace of anastomosis of the branchlets. Cortical spicules predominately scaphoids in the outer layer and straight, belted spindles in the axial sheath. Anthocodial armature strong, weak, or absent, when present consisting of flat rods with scalloped edges.

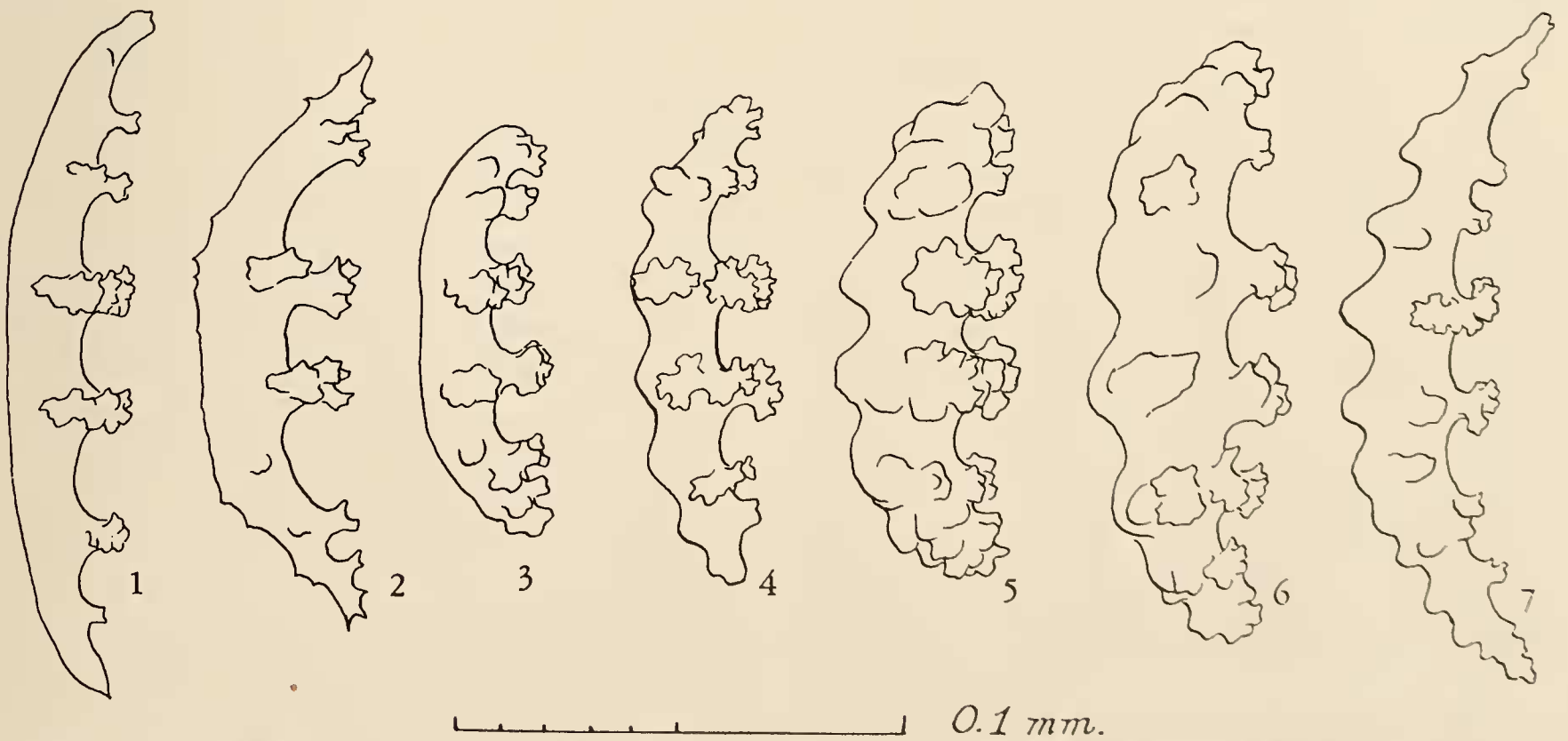
Remarks.—It will be noted in the seven figures given herewith that four of the scaphoids, those belonging to *bipinnata, blanquillensis, oppositipinna parvispiculata,* and *peruana,* are sculptured with broad, rounded ridges across the convex side, whereas such ridges are absent from the scaphoids of *acerosa, americana* and *rigida,* in which the ornamentation of the convex side is reduced to a few prickles or suppressed entirely. This character of smooth or slightly prickly scaphoids is shared by all Caribbean species of *Pseudopterogorgia* except *P. bipinnata* (Verrill), the closely related and perhaps identical *kallos* (Bielschowsky), and *blanquillensis* (Stiasny). Unfortunately, the examination of a large number of specimens of various species discloses intergradation between these scaphoid types. Occasionally, some of the blunt scaphoids of *P. rigida* have low ridges across the convex side, and in *P. blanquillensis* a few are practically smooth. It appears that all of these variations are simply progressive phases in the development of a trend begun with the unilaterally spinose spindles of *Leptogorgia.*

If the ornamentation of the convex side of the scaphoids is used as a basis for dividing *Pseudopterogorgia* into two subgenera, then the original zoogeographic proposition may retain some degree of validity since no species with smooth scaphoids has yet been discovered outside the West Indian region. The subgenus with ridged scaphoids, found chiefly in the Indo-Pacific, is represented in the Atlantic by two or three rather uncommon species.

For the convenience of those who may wish to extend recognition to these two groups of species, subgenera are defined for them as follows:

Genus **Pseudopterogorgia** Kükenthal, 1919
Subgenus **Pseudopterogorgia** Kükenthal, s.s.

Diagnosis.—The transverse girdles of tubercles on the scaphoids are developed across the



FIGS. 1–7.—Scaphoid spicules of *Pseudopterogorgia* species: 1, *Pseudopterogorgia acerosa* (Pallas); 2, *P. americana* (Gmelin); 3, *P. rigida* (Bielschowsky); 4, *P. blanquillensis* (Stiasny); 5, *P. oppositipinna parvispiculata* Bielschowsky; 6, *P. peruana* (Stiasny); 7, *P. bipinnata* (Verrill).

convex side of the sclerites as blunt, rounded ridges.

Distribution.—Four species and one subspecies in the East Indies, Philippine Islands and Australia; two, possibly three, in the tropical western Atlantic.

Subgenus **Antillogorgia** Bayer, 1951

Diagnosis.—Transverse girdles entirely suppressed on the convex side of the scaphoids, which may be completely smooth or somewhat prickly.

Distribution.—Nine species in the tropical western Atlantic.

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HITCH-HIKERS OF THE SEA

There are sea hitch-hikers.

This group of curious fishes—the remoras, or disk-fishes, which ride about attached to other marine animals by disks that act like suction cups—is being subjected to a specialized study by Dr. E. A. Lachner, associate curator of fishes of the Smithsonian Institution. These remoras, tropical and semitropical and found around the world, have been the subject of much legendry throughout history. In early 16th-century woodcut maps they were pictured as "ship stoppers," with grotesque groups of four or five attached to the hulls of ships and holding them motionless. They were considered responsible for the so-called dead calms sometimes encountered by sailing ships. Even now their ways of life and the evolution of their curious suction disks are little understood. Dr. Lachner is asking fishermen and others who may encounter them to send him as many details as possible—the hitch-hiker itself and a photograph or description of the species of animal to which it is attached. He is making an exhaustive search of literature for as many accounts, anecdotal and otherwise, as possible.

The remoras become hitch-hikers when but very tiny creatures. At this size they are sometimes referred to as "louse fishes," perhaps because they resemble lice in their habit of creeping into the gill chambers of such fishes as the barracuda, the manta ray, or the sailfish. Some remoras reach a length of 3 feet and ride about on giant sharks, sea bass, and other large hosts. Others appear to be quite selective in their choice of transportation. Dr. Lachner is especially interested in this aspect of their life. One remora is found only on marine mammals, as whales and porpoises. Another species, for example, will ride only on the swordfish, the sailfish, or the marlin.

So far as known the remoras do not injure their probably unwitting hosts. Their only purpose seems to be to get rides, although when the whole story is known this may turn out to be a much more complex procedure, Dr. Lachner believes. Some authors think they may render a service by feeding on minute organisms that infest the hosts. It is likely, he believes, that the hitch-hiker rides to localities which are their own as well as their hosts' feeding or breeding grounds.

The young have clusters of exceptionally large, hooked, and backward-directed teeth on the lower jaw. These may be used to secure their holds on their hosts before the suction cup becomes fully developed. The suction disk is an