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THE FORAMINIFERAL GENUS HALYPHYSEMA AND TWO NEW TROPICAL PACIFIC SPECIES

By Alfred R. Loeblich, Jr.

The peculiar foraminiferal genus *Halyphysema*, originally described by Bowerbank from the coast of England as a sponge, is redescribed and refigured, and a lectotype designated for the type species. Two new species from the tropical Pacific, *H. harryi* from Ifaluk Atoll, Caroline Islands, and *H. bayeri* from the Palau Islands are described. The genus is without doubt abundantly represented in shallow tropical waters of the Pacific, but is generally overlooked by students of Foraminifera because collecting necessitates a detailed search of coralline rocks and other substrata for "colonies." Rarely will such a form be obtained in dredged material. The present paper extends the geographic range of the genus into the Central Pacific area.

The writer is indebted to Dr. Robert R. Harry, research director of George Vanderbilt Foundation, Stanford University, Calif., and to Mr. Frederick M. Bayer of the U. S. National Museum for their interest and enthusiasm in collecting this material, especially as it is far from their own special interest.

Genus *Halyphysema* Bowerbank, 1862

Halyphysema Bowerbank, Philos. Trans. Roy. Soc. London, vol. 152, p. 1105, 1862.

Type species: *Halyphysema tumanowiczii* Bowerbank, 1862. Fixed by monotypy.

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DESCRIPTION: Test attached, commonly to bryozoans, hydrozoans, or other substrata, and consisting of a spreading basal expansion with a later erect conical or club-shaped portion formed by the single chamber, in some species the chamber may bifurcate; wall agglutinated, that of the basal expansion fine grained and including small fragments of sponge spicules, erect portion commonly more coarsely grained with very numerous, elongate spicules incorporated into the wall and alined in the direction of growth of the test; aperture terminal, commonly rounded, obscured by the clustering of spicules.

REMARKS: *Halyphysema* differs from *Dendronina* Heron-Allen and Earland in having a single conical chamber, instead of an arborescent, branching, nonseptate tube following the development of the basal expansion.

***Halyphysema tumanowiczii* Bowerbank**

PLATE 1, FIGURES 1, 2

Halyphysema tumanowiczii Bowerbank, Phil. Trans. Roy. Soc. London, vol. 152, p. 1105, pl. 73, fig. 3, 1862.

Squamulina scopula Carter, Ann. Mag. Nat. Hist., ser. 4, vol. 5, p. 310, pl. 4, figs. 1–11, 1870.

DESCRIPTION: Test attached, forming a series of hemispherical bases, each of which gives rise to a single clavate chamber; wall agglutinated, with small sand grains and spicules in the basal expansion, clavate chambers in large part composed of sponge spicules, their long axes paralleling the surface, elongate sponge spicules clustered around the distal end of the clavate chambers giving the test a bristling appearance; aperture terminal, not visible, obscured by the cluster of spicules.

Length of chamber of lectotype 1.10 mm., breadth of basal expansion 0.25 mm.

REMARKS: This species was originally described as a sponge and later was renamed *Squamulina scopula* by Carter (1870), who thought

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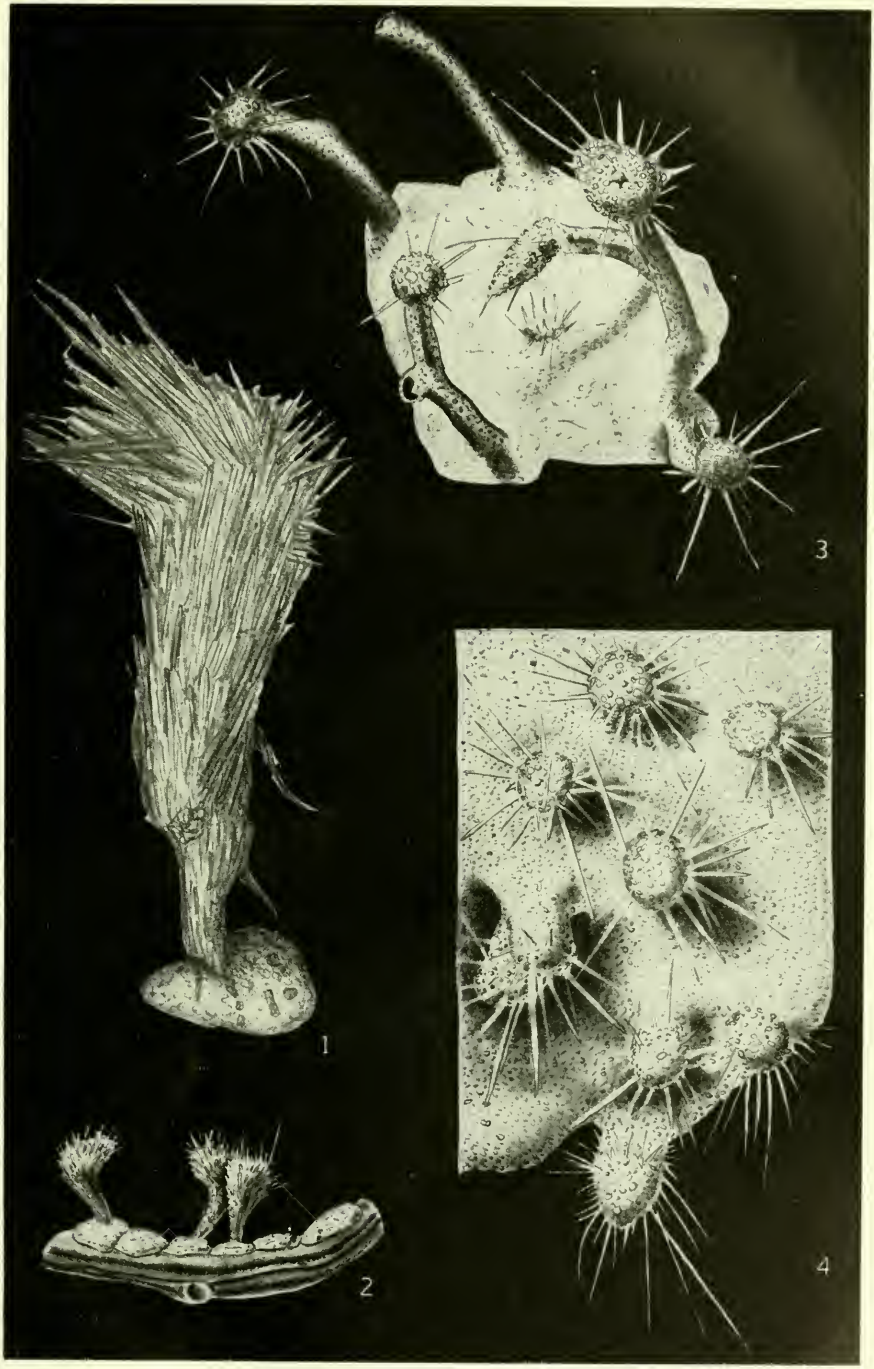
EXPLANATION OF PLATE 1

FIGURE 1.—*Halyphysema tumanowiczii;* side view of lectotype (BMNH ZF3652) showing flaring shape of chamber and wall composed largely of sponge spicules. (× 85.)

FIGURE 2.—*Halyphysema tumanowiczii;* side view of several paratypes showing small hemispherical basal expansions, each with an individual chamber. The chambers have been broken from some of the expansions, but scars show they were formerly present. From the Recent, off England. (× 25.)

FIGURE 3.—*Halyphysema bayeri,* new species; holotype (USNM P5901) showing spreading, sheetlike basal expansion and long, slender, flexible chambers that commonly bifurcate near their distal ends. From the Recent, Palau Islands. (× 25.)

FIGURE 4.—*Halyphysema harryi,* new species; holotype (USNM P5900) showing spreading sheetlike basal expansion and low, nearly cylindrical chambers. From the Recent, Ifaluk Atoll, Caroline Islands. (× 25.)



Halyphysema tumanowiczii; H. bayeri, new species; and *H. harryi*, new species. For explanation see facing page. All figures are camera lucida drawings. Figure 1 is by Helen N. Loeblich, and figures 2–4 are by Lawrence B. Isham, scientific illustrator at the Smithsonian Institution.

that this would remove the species from consideration as a sponge! It is not congeneric with *Squamulina* Schultze, however, as the latter is a calcareous imperforate form. Carter's specific name is a junior synonym of that of Bowerbank.

TYPES AND OCCURRENCE: Specimens figured are from the original types in the British Museum (BMNH ZF3652), lectotype from Recent beach debris at Hastings, County Sussex, England.

Halyphysema bayeri, new species

PLATE 1, FIGURE 3

DESCRIPTION: Test attached, in the type specimens encrusting on an alcyonarian base, forming a broad, thin, basal expansion from which arise one to six or more individual, erect, flexible, slender chambers that are expanded and knob-shaped at their distal end and commonly may bifurcate near their distal end; wall agglutinated, thin, 0.02 mm. in diameter in erect chambers, that of basal expansion and erect chambers composed of small sand grains and fragmentary sponge spicules in a groundmass of fine grains, spicules oriented with long axes paralleling the surface, elongate sponge spicules incorporated around the apertures at the terminal end of the erect chambers; aperture terminal, 0.08 mm. in diameter.

Diameter of individual chambers at distal end ranges from 0.23 to 0.38 mm., diameter at midlength of erect chamber ranges from 0.10 to 0.13 mm. Distance between chambers ranges from 0.28 to 1.30 mm.

REMARKS: *Halyphysema bayeri*, new species, differs from *H. harryi*, new species, from Ifaluk Atoll, Caroline Islands, in possessing chambers that are much more slender, flexible, and elongate. It is similar in general appearance to *H. advena* Cushman described from the Tortugas, but is smaller in size. The present species has a tendency for the individual chambers to bifurcate near their distal part, and the base is sheet-like instead of forming small hemispherical masses as in *H. advena* Cushman.

The species is named in honor of Frederick M. Bayer, zoologist, U. S. National Museum, in recognition of his contributions to the knowledge of the Pacific atolls.

TYPES AND OCCURRENCE: Holotype (USNM P5901) from eel-grass, sand, and coral flat in Geruherugairu-suidô, between Kaibakku Island and Kogai-hantô of Auluptagel, Iwayama Bay, Palau Islands. U. S. Hydrographic Office chart 6076, 2d ed., 1944, lat. 7°19′12″ N., long. 134°29′37″ E. Depth 0–3 feet. Collected by Frederick M. Bayer and Robert R. Harry, 1955.

Halyphysema harryi, new species

PLATE 1, FIGURE 4

DESCRIPTION: Test attached, on coralline-algal rock, forming a broad, spreading basal expansion from which arise individual erect, clavate-shaped, single chambers, rarely narrowing to a fusiform shape or more rarely low and blister-like, may bifurcate near the distal end; wall agglutinated, relatively thick, 0.03 mm. in diameter in erect chambers, that of basal expansion and single chambers including fine grains of sand and fragmentary sponge spicules, their long axes paralleling the surface, elongate sponge spicules incorporated at the terminal ends of the chambers giving a bristling appearance; aperture terminal, not observed on specimens examined due to small size and the obscuring by the terminal spicules.

Diameter of individual chambers ranges from 0.15 to 0.40 mm. Distance between chambers varies from 0.20 to 0.70 mm.

REMARKS: *Halyphysema harryi*, new species, differs from *H. tumanowiczii* Bowerbank in possessing individual chambers that are usually lower and of equal diameter throughout length and in the tendency to develop a broad, spreading, basal expansion from which rises many chambers, instead of a small hemispherical base from which arises a single chamber.

The specific name is in honor of Robert R. Harry, research director at George Vanderbilt Foundation, Stanford University, Calif., in recognition of his interest and devotion to studies of Pacific marine life.

TYPES AND OCCURRENCE: Holotype (USNM P5900) from the underside of élang (boulder flat) boulders, south end Falarik Island, Ifaluk Atoll, Caroline Islands. Collected Oct. 31, 1953, by Frederick M. Bayer.

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