

NOTES

A SECOND RECORD OF A RARE SIPHONOPHORE *EPIBULIA RITTERIANA* HAECKEL 1888

During a survey by the National Marine Fisheries Service research vessel *David Starr Jordan*, a siphonophore, *Epibulia ritteriana* Haeckel, of the family Epibuliidae, was collected in a neuston haul on July 10, 1971, at 0225 to 0246 hr, PST, in the northeast Pacific Ocean at lat 37°20'N, long 135°00'W. The only other record of this species was one specimen, described by Haeckel (1888), collected off Ceylon in 1882 during the *Challenger* Expedition. Evidence of the worldwide distribution is typical of most species of siphonophores.

Haeckel's identification was refuted by Totton and Bargmann (1965) who stated several reasons for their disagreement, the most important being that Haeckel had described a ring of palpons under the float which they said was a character not typical of the suborder Cystonectae. Totton and Bargmann (1965) stated further that the suborder included only the families Physalidae and Rhizophysidae; the Epibuliidae were considered "species inquirendae." They concluded that Haeckel's description was based on "an incompletely examined specimen of *Athorybia rosacea*," and "that Haeckel's figure is unrealistic and idealized though beautifully executed," and in their opinion, "if such animals existed no doubt one will be found again." They also disagreed with unillustrated descriptions of two species of Epibuliidae, one *Rhizophysa chamissomis* by Eysenhardt (1821) and the other *Epibulia erythrophysa* by Brandt (1835). It was my good fortune to collect and observe the living cystonect, described and illustrated here, which I have identified as *E. ritteriana* by reference to Haeckel's drawings and description. Haeckel's specimen is identical with mine, except that the gastrozooids in his illustration have larger and more conspicuous mouths. I have also collected specimens of *Athorybia rosacea*, identified by direct observation and comparison

with drawings by Totton and Bargmann (1965). Outstanding characters of *A. rosacea* are the shape of the pneumatophore and large and distinct bracts arranged in several layers. My specimen of *E. ritteriana* showed no evidence of bracts, nor scars or spaces where bracts could be attached. I believe, therefore, that the two species are not to be confused and that *Epibulia* does in fact exist, *ergo*, the family Epibuliidae.

The rarity of records for this family of cystonects may be attributed in part to the fact that as surface floating organisms they exist in a stratum seldom sampled by plankton tows because most "net time" is subsurface.

Description of *Epibulia ritteriana*

The complete corm of this Cystonectae is about 25 mm high and 20 mm in diameter, after preserved in 5% solution of formaldehyde (Figure 1). The whole colony presented brilliant shades of pink. The large ovate, almost spheric pneumatophore was coral red (light red) with the apical pore (with a sphincter) surrounded by a purple pigmentation, still visible after preservation. The crown of palpons around the float (young gastrozooids) and the siphons (gastrozooids) appeared rose, and the latter presented a purple spot near the end. Tentacles and tentilla were yellowish, the gonodendra bright red and purple.

The colony appears arranged as follows: pneumatophore and siphosome. The siphosome presents the palpons at the part closer to the pneumatophore, and the siphons at the other end, with the tentacles attached at the base; and the gonodendra distributed between the siphons.

The pneumatophore or top float is filled with gas, probably carbon monoxide as it is the case in other siphonophores (Pickwell, Barham, and Wilton, 1964). The pneumatophore is an ovate chitinous case, 8 mm \times 10 mm in size. According to Haeckel (1888) the size of the pneumatophore ranged from 10 mm \times 12 mm in the expanded stage to a spheroid of 3 to 4 mm after

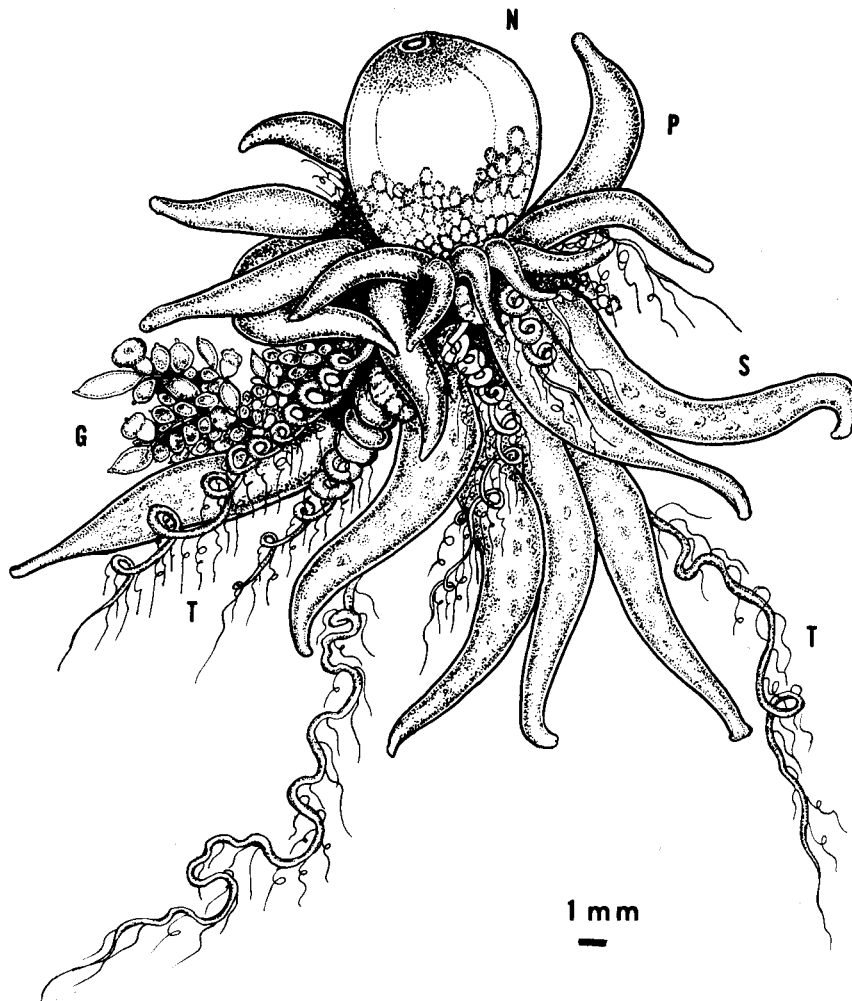


FIGURE 1.—*Epibulia ritteriana* Haeckel (1888), drawn from the specimen described in this paper. Key to the above is: N - pneumatophore, P - palpons, S - siphons or gastrozooids, T - tentacles with the tentilla, G - gonodendra.

the emission of the gas through the apical pore. The structure of the pneumatophore, according to Haeckel (1888) includes the pneumatocodon or outer wall of the pneumatophore, which is separated from the inner wall, or pneumatosac, pneumatocyst or air sac, which contains the gas gland; and the hypocystic villi (giant cells) protrude from the air sac into the pericystic space. The apical pore is closed by the stigmatis sphincter (ring muscle).

The siphosome is a short cone or ovate bladder, coiled, which Haeckel (1888) described as the "dextrotropic turning of a spire."

The palpons (feelers or testers) are slender, cylindrical tubes, smaller than the siphons, with a thick muscular wall. They connect into the vascular trunk, and the outer end is armed with cnidocysts. The palpons are consequently then both sensory and protective organs.

The siphons or gastrozooids are large feeding polyps, 15 mm to 20 mm long, rod-shaped tubes of thick muscular wall. The largest part is the stomach with the hepatic villi, and the outer opening a muscular proboscis. The opening of the mouth may be expanded in a kind of disc or sucker, divided into several lobes. Haeckel's illustrations (1888) presented the gastrozooids with extremely large and expanded mouth. A long single contractile tentacle is attached at the base of each siphon.

The tentacle arising from the base of each gastrozoid consists of a long cylindrical tube reaching to 80 mm or more than 100 mm long when fully extended. The tentacles are long, contractile, and branched along their whole length, which is covered laterally by the single branched tentilla. The tentilla are short, thin, contractile filaments. Both tentacles and tentilla are covered with nematocysts. The concave side of each tentillum has sensitive papillae, and the convex side is armed with cnidocysts. Twisted masses of tentacles and tentilla form thick bunches, difficult to disentangle.

The gonodendra are attached by a short pedicle to the periphery of the vesicular trunk, between the palpons and the siphons or gastrozooids. The gonostyle is branched, and each branch has at the end a gonopalpo and a medusoid gynophore (female gonophore) and below a bunch of roundish androphores (male gonophores) resembling altogether miniature clusters of grapes.

Epibuliidae float at the surface of the waters, using the pneumatophore, swimming mainly by the coordinated movements of the palpons, and siphons. *E. ritteriana* adopts a vertical position in the water, and the colony drifts and twists at the surface of the sea, with the pneumatophore at the top, floating at the surface, and the tentacles shortened or extended deep into the waters like fishing lines, with the gastrozooids actively searching for food.

It is possible that *Cystalia monogastrica* Haeckel (1888) may be a juvenile stage of *Epibulia ritteriana*.

The scarcity of *E. ritteriana* is probably only apparent, due to the factors previously explained. Studies on the distribution of these highly predatory animals would be of interest, when related to the distribution of some fish larvae. These Cystonectae may feed voraciously on epiplanktonic animals, mainly on those inhabiting the uppermost layers of the epiplanktonic domain (Clupeidae, Engraulidae, and other fish larvae), which would suffer heavily under this active predation.

Acknowledgments

I want to express my deep appreciation to Dr. E. H. Ahlstrom, for his advice and encouragement to prepare this work, for his interest and time devoted in reading the manuscript, and for his constructive suggestions. My appreciation is also extended to D. Kramer for his valuable editorial assistance.

Literature Cited

- BRANDT, J. F.
1835. Polypus, Acalephas, Discophoras e Siphonophoras, nec non Echinodermata continens. Prodrum descriptionis animalium ab H. Mer-tensio is orbis terrarum circumnavigatione Obser-varum 1:1-76.
- EYSENHARDT, K. W.
1821. Ueber die Seeblasen. Nova Acta Leopold. Carol. 10:375-422.
- HAECKEL, E.
1888. Report on the Siphonophorae collected by H.M.S. Challenger during the years 1873-76. Rep. Sci. Results Voyages H.M.S. Challenger, Zool. 28, 380 p.
- PICKWELL, G. W., E. G. BARHAM, AND J. W. WILTON.
1964. Carbon monoxide production in a bathy-pelagic siphonophora. Science (Wash., D.C.) 144: 860-862.
- TOTTON, A. K., M. E. BARGMANN.
1965. A synopsis of siphonophora. Br. Mus. (Nat. Hist.), Lond., 230 p. + 40 plates.

A. ALVARINO

National Marine Fisheries Service
Southwest Fisheries Center
La Jolla, CA 92037