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THE OCCURRENCE OF THE REMARKABLE SCYPHOZOAN,
Deepstaria enigmatica, IN THE GULF OF MEXICO AND
SOME OBSERVATIONS ON CNIDARIAN SYMBIONTS

by

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On 8 July 1965 one damaged specimen of the remarkable scyphozoan, *Deepstaria enigmatica* Russell 1967, was taken in the course of a sampling program conducted by the Department of Oceanography, Texas A&M University in a ten-foot Issacs-Kidd midwater trawl in the Yucatan Basin. The trawl was put into water at Lat. 19° 58' N, Long. 85° 14' W. This is the first report of *Deepstaria* in the Atlantic region. This medusa is otherwise known only from the Pacific Ocean where it has been captured by slurp gun from the submersible *Deepstar* over the San Diego Trench and has been taken in midwater trawls by the Scripps Institution of Oceanography Mid-Pacific Expedition (Barham and Pickwell 1969 and Russell 1967).

The present specimen, although badly torn, is clearly recognizable as *D. enigmatica*. The anastomosing canal lattice has the characteristic pattern described by Russell. The medusa is a deep purple-blue in color and appears to have had a diameter in excess of 70 cm. The mesogloea is 18 mm. thick near the center of the disc. Oral arms are not discernible and portions of the disc are considerably distorted by local extreme contraction. Fragments of female gonadal material are attached to parts of the subumbrellar surface. These gonadal fragments, too small to permit any observations on gross gonad morphology, contain zygotes in various stages of early cleavage. Ova and zygotes are small (c. 100 microns diameter) and have very little, if any, yolk. The depth at which this jellyfish was taken cannot be stated with any certainty since the collecting device fished from the surface to a depth of 2400 m., no "at depth" closing device having been used.

The occurrence of this unique scyphomedusan in the Gulf of Mexico constitutes a considerable range extension. Closer examination of midwater trawl samples from other regions and more extensive sampling will probably lead to the discovery of more specimens of *Deepstaria* from other areas. I strongly suspect that *D. enigmatica* may have a circumglobal distribution in tropical and subtropical waters. As is the case with many oceanic organisms, the zoogeographic dis-

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tribution of *Deepstaria* can probably be correlated with intensity of sampling and workers who can identify it.

Barham and Pickwell discuss a commensal or symbiotic association between the giant parasitic isopod *Anuropus* and *Deepstaria*. Photographs taken by *Deepstar* show one of these isopods clinging to the subumbrellar surface at the time of capture. Barham and Pickwell state that the medusa "did not pulsate or show normal swimming movements. Instead the medusa appeared flaccid and seemed to be floating passively." Russell noted the absence of stomach, epithelial lining and parts of the coronal muscle, and suggested the possibility the medusa was moribund at the time of capture. Taking into account the occurrence of nematocysts in the stomachs of some anuropids (as reported by Menzies and Dow 1958 and cited by Barham and Pickwell) Barham and Pickwell suggested that the isopod feeds on the jellyfish, incapacitates medusa movement and creates a "floating protective environment," which they state is a process that stops "somewhat short of the reduction of salps and pyrosomes into thin-walled houses by the well known amphipod, *Phronima sedenteria*." It should be noted that Barham and Pickwell did not demonstrate nematocysts in the stomach contents of the *Anuropus* in association with *Deepstaria*. While the isopod may be traveling on an athenic host or is actually a true parasite of *Deepstaria* there are no criteria for establishing just what can be considered normal swimming movement for this medusa, if indeed it normally does generate swimming movements. I find it difficult to believe that *Anuropus* incapacitates the medusa since my own personal and published observations (Phillips, Burke and Keener 1969) indicate that medusae can serve as hosts for a wide variety of crustaceans and other metazoans without incapacitation. In actual fact the moribund state will render an organism prey for a wide range of animals which would not normally attack it, as may possibly be the case for *Deepstaria*.

Additionally, it is exceedingly dubious that *Phronima* invades salps or pyrosomes and converts them into thin-walled houses. The structure of the amphipod house bears little semblance of that of any tunicate and the resemblance is a superficial one at best according to Leo Berner, Jr., (personal communication). It is much more likely that a *Phronima* secretes its own domicile. Examination of *Phronima* houses evinces no evidence of zooids of any type ever having been embedded in the gelatinous matrix. There is also a very striking correlation between house proportions and amphipod size, a situation that would not be so well defined if the *Phronima* did not secrete it.

Symbiotic relationships between Scyphozoa and other metazoans are very common. Pickwell and Barham cite seven such relationships and their list can be considerably lengthened. Fish-jellyfish associations are probably the best known (Mansueti 1963 and Phillips, Burke and Keener 1969) and many are known that involve Crustacea and

medusae (Gutsell 1928 and Phillips, Burke and Keener 1969). It should be noted that there are trematode and cestode parasites of medusae (Dollfus 1931 and Stunkard 1969) as well as vermiform parasites of unknown phyletic affinities which are commonly found in some rhizostomes (Moestafa and McConnaughey 1966 and Phillips and Levin, in prep.). I have also found on very rare occasions hyperiid amphipods embedded in the mesogloea of two species of calyphoran siphonophores (*Diphyes dispar* and *Chelophyes appendiculata*). Metazoan parasites or symbionts of Cnidaria are not at all rare; they are merely seldom looked for and even less seldom investigated.

It remains to be seen whether or not life cycle completion in *Anuropus* is dependent on cnidarian hosts. Data presented by Barham and Pickwell regarding the association between *Anuropus* and *Deepstaria* are insufficient for drawing conclusions.

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