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## An Enigmatic Gorgonian Remnant

By HANS G. KUGLER<sup>1)</sup>

In the geological collections from Indonesia at the Natural History Museum, Basel, there are some recent molluscan specimens which J. J. PANNEKOEK VAN RHEDEN collected at the coast of Sumbawa. Among this material is a single left valve of a *Chama* with four barrel-shaped, segmented structures, arranged in a row (Pl. 1, Fig. 1). The partial mold of a fifth segmented structure can be recognized with the longitudinal, slightly curved ribs still visible (Pl. 1, Fig. 3 and 5). During the growing of the *Chama* layers of its shell partly enclosed the segments, hence one has to assume that the shell attached itself to the segmented structures prior to having been broken off and considerably worn by wave action. The growth of the *Chama* over the segmented structures is also indicated by three slightly bulbous elevations inside the valve.

Dr. PETER JUNG and the author showed the specimen to various zoologists and palaeontologists but none was able to give us a satisfactory identification, and so it was sent to Dr. HARRY S. LADD of US National Museum at Washington. Dr. LADD, being himself baffled, submitted the specimen to a number of specialists only to receive suggestions such as possibly a larger Foraminiferum (*Actinocyclina*), bryozoan, sponge or mollusk, etc., and definite denials from specialists on these groups. Dr. LADD finally approached Dr. F. M. BAYER of the University of Miami, who wrote him the following letter:

"The *Chama* shell is attached to the axis of a holaxonian gorgonian genus *Isis*, perhaps even *Isis hippuris* LINNAEUS (Fam. Isididae). In life, the calcareous segments are connected by horny nodes of somewhat smaller diameter, and as these are very tough the structure may remain intact for a long time after death of the coral. The size of this specimen indicates that it comes from near the base and probably was upright when the *Chama* attached to it.

There are gorgonians with jointed axes in two suborders, *Holaxonia* and *Scleraxonia*. In the latter, the flexible nodes are filled with spicules and the calcareous segments are made of solidly fused spicules (genera such as *Parisis*, *Melitodes*, *Acabaria*, etc.). Evidence of this spicular structure should remain in a fossil, and I can see none in this specimen. Hence, I conclude that it belongs to the *Holaxonia*, where the nodes are purely horny and the internodes are crystalline  $\text{CaCO}_3$ . *Isis* is the best bet, and it still lives in the reef environment throughout the area where the fossil was found."

Consultation with the Treatise on Invertebrate Paleontology by RAYMOND C. MOORE shows that EUGENIA MONTANARO-GALLITELLI treated the section

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*Trachypsammiacea* of the *Octocorallia*. On p. F227 one finds in Figure 161 drawings of two internodes of a decorticated axis of *Isis hippuris* 4 to  $5\frac{1}{2}$  mm long and almost 2 mm thick. These two internodes are connected with a horny node about  $\frac{1}{4}$  mm long. The singular third internode is about  $6\frac{1}{2}$  mm long and  $1\frac{3}{4}$  mm thick. These drawings have very little similarity with our specimen from Sumbawa, hence a short description of our specimen appears to be justified, in which opinion Dr. LADD also concurs.

The best illustration of an *Isis* which could be found is in JEAN PIVETEAU's *Traité de Paléontologie*, Vol. 1, Pl. 9, Fig. 9, where a branching colony of unknown origin is depicted. Compared with our specimen it has fewer of the curved ribs, which are also much coarser. No size is given of the figure, but if the eight internodes of one of the two branches are of about the same size as our specimen than the depicted specimen could have been 10 cm long, hence high enough for a *Chama* to attach itself, and during its growth gradually and partially embrace the lower internodes.

*Isis* sp.

Of the four internodes remaining of the former axis we removed the last one. Prior to cutting it up it was 9 mm high and 11 mm thick. The slightly curved ribs of the outer wall form a collar-like rim on the upper and lower part of the internode. There are about 36 ribs.

Of these 2 to 4 ribs coalesce and form 12 to 16 major ribs which join in a knob giving the whole an umbrella-like aspect. These umbrella-shaped basal plates, fortified by the collar-like rim, are the foot-holds of the horny nodes, which in our specimen seem to have been about 2 mm high.

The lowest internode was cut into five slices. One slice was completely dissolved in hydrochloric acid. Two slices were used for thin slides and one was polished.

The polished surface is the underside of the umbrella-like basal plate. It shows the very centre of the axis to be formed by 8 symmetrically arranged septa-like rays (Pl. 2, Fig. 1, and Pl. 3, upper part).

The thin slide shows the centre of the axis to be star-like with almost symmetrically arranged ribs (Pl. 2, Fig. 2, and Pl. 3, lower part).

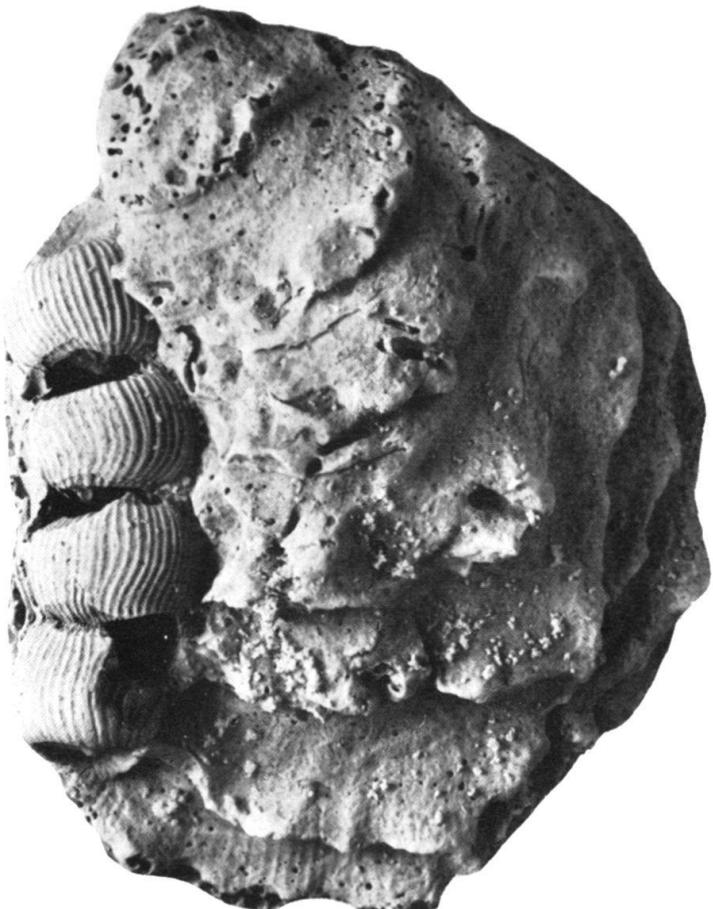
Concluding one may state that more thoroughly investigated axes of *Gorgonacea* are of greater use to the palaeontologist than the rarely preserved spicules.

#### Acknowledgments

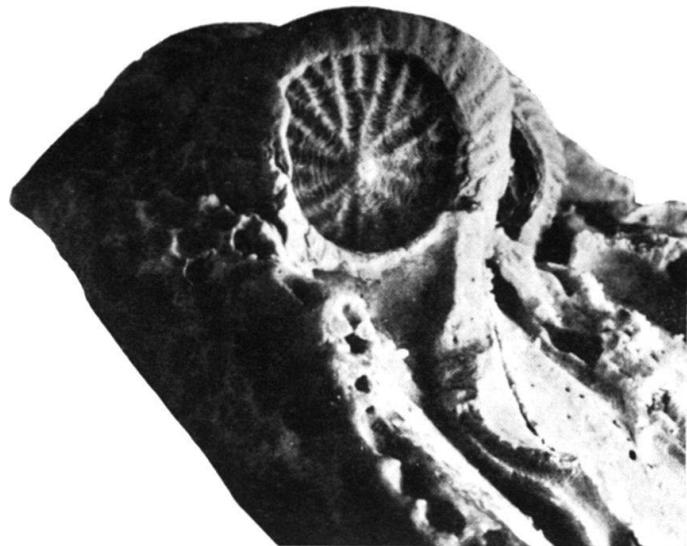
Thanks are expressed to Mr. R. PANCHAUD for cutting the segment, to Mr. W. VOGT for preparing the thin slides and to Mr. W. SUTER for making the photographs. Above all I wish to thank Dr. HARRY S. LADD for the trouble he took on my behalf.

#### Plate I

|        |   |
|--------|---|
| Fig. 1 | <i>Chama</i> with umbo on top and with four internodes of the axial structure of <i>Isis</i> sp.<br>Enlargement $1\frac{1}{2} \times$ . |
| Fig. 2 | Bottom plate of lowest internode with layers of the shell embracing part of it. Enlargement $3 \times$ .                                |
| Fig. 3 | Front view of four internodes with mold of fifth on top. Enlargement $1\frac{1}{2} \times$ .  |
| Fig. 4 | Backview of four internodes. Enlargement $1\frac{1}{2} \times$ .  |
| Fig. 5 | Top plate of first internode with mold of a fifth internode. Enlargement $3 \times$ .   |



1



2



3



4

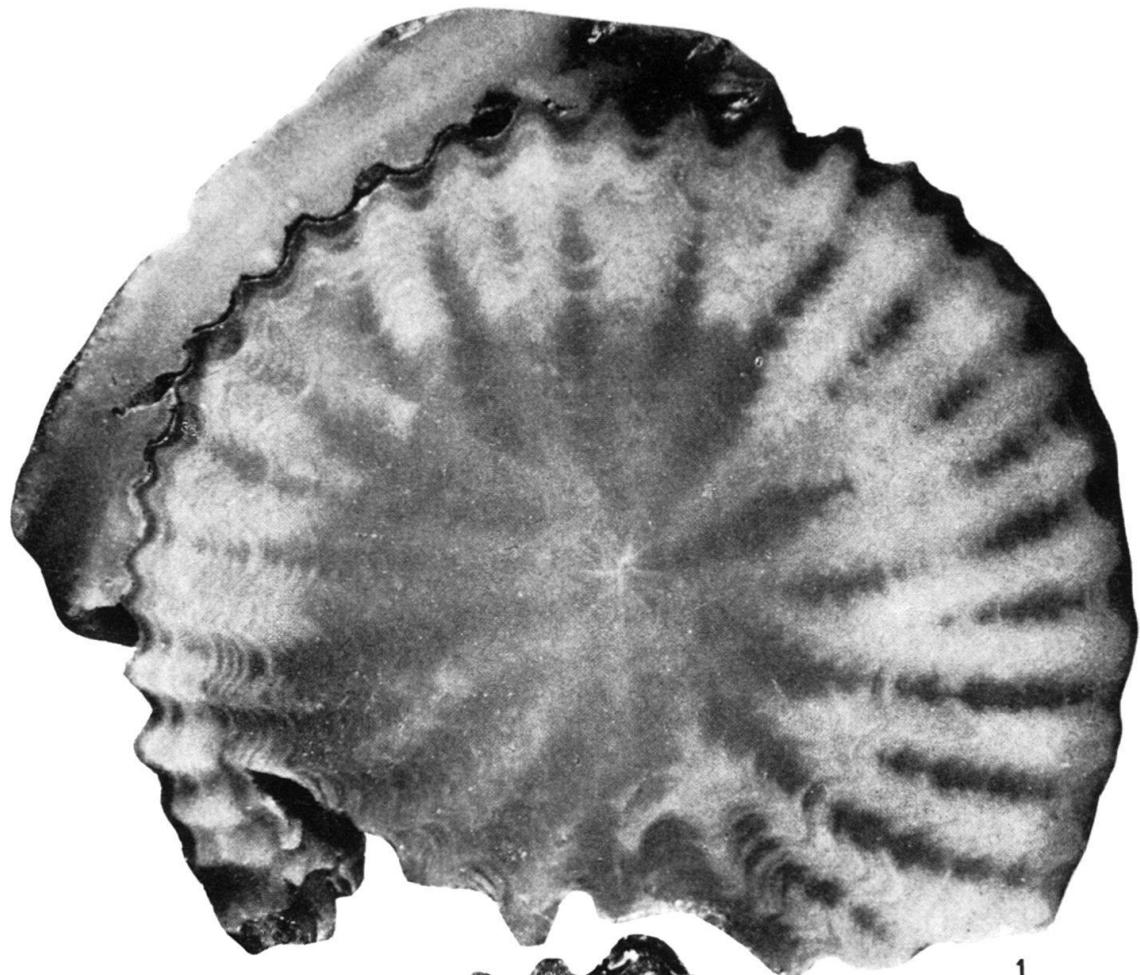


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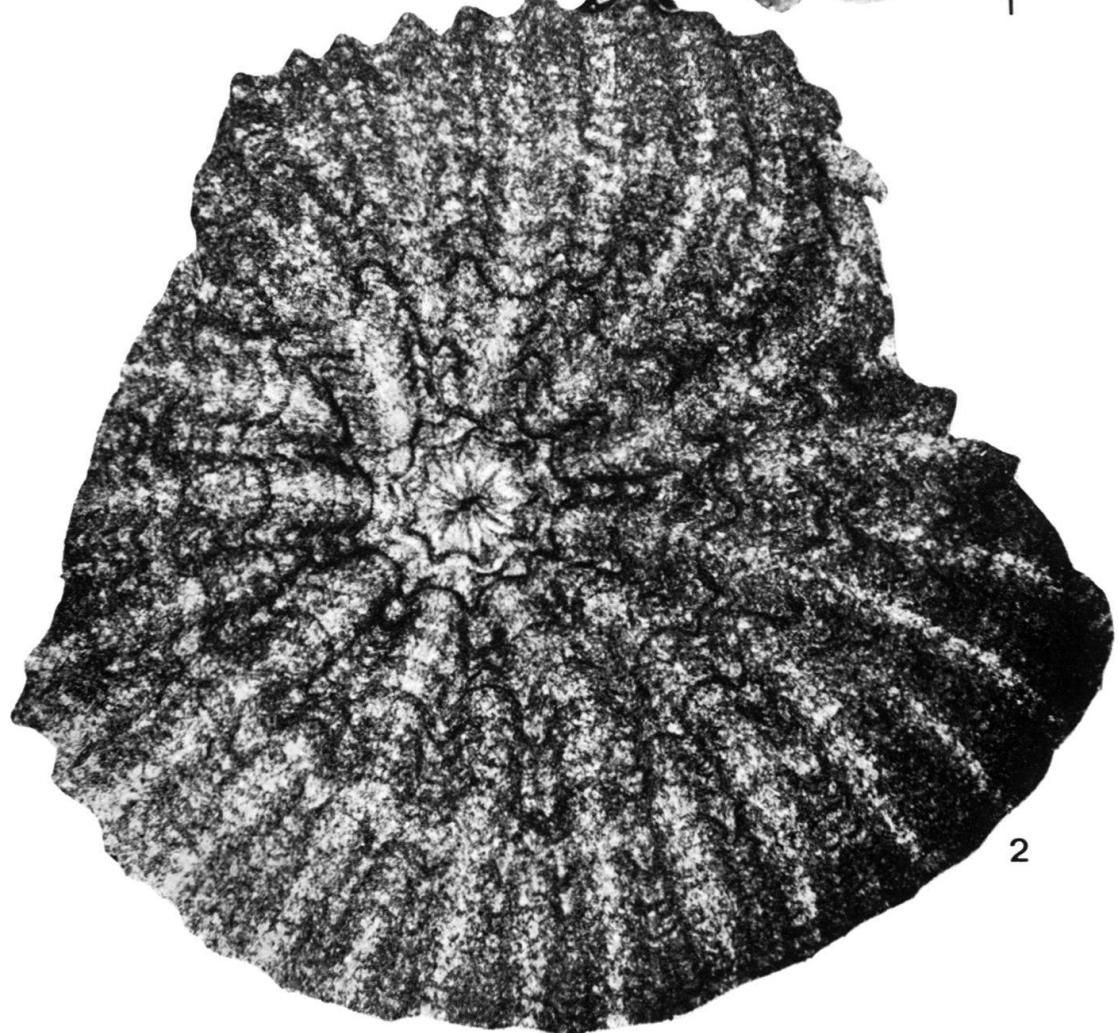
## Plate II

Fig. 1 Polished surface of a slice of the lowest internode showing a section of the partly embracing *Chama*. Central core showing eight rays. Ribs with coral-like arrangement of inter-septa. Enlargement 10 $\times$ .

Fig. 2 Thin slide of a slice of the lowest internode showing an almost symmetrical arrangement of the septa-like ribs. Enlargement 10 $\times$ .



1



2

### **Plate III**

Upper figure: Part of Pl. 2, Fig. 1. Enlargement 30 $\times$ .

Lower figure: Central part of Pl. 2, Fig. 2. Enlargement 30 $\times$ .

