GUIVILLEA ALABASTRINA (WATSON, 1882), AN ABYSSAL VOLUTID (GASTROPODA: MOLLUSCA)

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Guivillea alabastrina (Watson, 1882)

Wyvillea alabastrina Watson, 1882: 332; Fischer 1883: 605.
Voluta alabastrina, Sowerby 1887: 304, pl. 18, 169.
Guivillea alabastrina, Watson 1886: 261, pl. 15, 2; Pelseneer 1888: 3, pl. 1, 1 and 2; Thiele 1912: 264; Thiele 1929: 346; Smith 1942: 19, pl. 20, 138; Wenz 1943 (edition 1960-61): 1326, fig. 3769; Barnard 1960: 398; Powell 1960: 156 (pars); Anon. 1961, pl. 4 C; Clarke 1962: 27; Barnard 1963: 429, fig. 5; Shikama & Horikoshi 1963: 99, fig. 146; Clench & Turner 1964: 164; Shikama 1967: 30; Dance 1969: 38; Weaver & duPont 1970: 47, pl. 8 C, D; Kensley 1973: 186, fig. 700.
Pseudocymbium, Cossmann 1899: 108.
Guivillea, Pelseneer 1906: 165; Pilsbry & Olsson 1954: 290.

St. 217, Mozambique Channel (14°20′S, 45°09′E), 3390 m, 27 Feb. 1951. Gear: HOT. Bottom: Globigerina ooze. Bottom temp.: 1.6°C. – 1 specimen.

Watson (1882) described a new genus and species of a volutid gastropod, *Wyvillea alabastrina,* based on a single specimen obtained by the Challenger Expedition. It was dredged at St. 147, 46°16′S, 48°27′E, Antarctic Ocean, at a depth of about 3000 m. The shell was described in some detail. The soft parts were only dealt with cursorily "as Professor Huxley has undertaken the dissection and full representation of it in all its parts" (op. cit., p. 332). In the remarks following the description Watson (p. 334) states that "of all the mollusks got by the expedition, this is certainly the most valuable." He also mentions that the shell is badly damaged, "looked like a wreck." The first description is not accompanied by any figure. Watson (1886) repeated his description and remarks unaltered with the exception that the remarks on Huxley's at that time forthcoming report on the anatomy were as follows: "the dissections and full representation of it in all its parts is to be supplied elsewhere." Watson's second description is followed by a figure of the shell without the fractures mentioned. They do show up quite clearly on the color photograph of the shell published by Weaver & duPont (1970). The report on the anatomy was published by Pelseneer (1888).

In reply to my inquiry to the British Museum (Nat. Hist.) about the type specimen I was informed by Mr. K. Thomas of the Zoology Department (letter dated 28 Sept. 1972) that the restored shell is extant but the soft parts could not be located and are assumed to have been lost.

Melvill & Standen (1907) reported the finding of a live specimen of *G. alabastrina* obtained by the Scottish National Antarctic Expedition at 62°10′S, 41°20′W (not at 60°10′S as stated by the authors), Antarctic Ocean, at 3246 m. Melvill & Standen gave neither description nor figure of the specimen, which is in the Royal Scottish Museum, Edinburgh (Reg. no. 1921. 143. 671). Mr. D. Heppell of the RSM answered my inquiry concerning the specimen by calling my attention to the fact that it appeared to differ from the figure of Weaver & duPont (1970), and said he doubted whether the two specimens actually belong to the same species (letter dated 15 Dec. 1972). The specimen was borrowed for re-examination. It measures about 39 × 16 mm and has about 3½ whorls. Obviously a large part of the anterior part of the fragile shell has been broken off. The soft parts are dry, protruding from the shell. Heppell's assump-

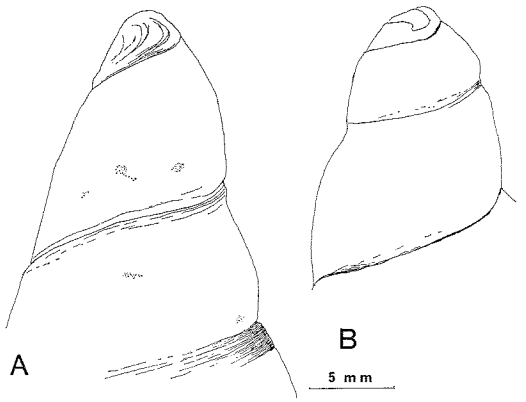

Fig. 1. Apices of A. *Guivillea alabastrina,* "Galathea" specimen; B. Volutid, MELVILL & STANDEN (1907).

tion proved correct and the specimen is possibly an undescribed abyssal volutid. The following differences were observed:

1) The shape of the apex (Fig. 1).
2) MELVILL & STANDEN's specimen has a well-developed olive brown periostracum, while *G. alabastrina* is without periostracum and the shell surface has a sandpaper-like texture.
3) *G. alabastrina* has spiral cords in the concave sutural region. Such are absent in MELVILL & STANDEN's specimen, which is not concave at the suture.

BARNARD (1960, 1963) recorded the finding of four worn and broken shells and some fragments of *G. alabastrina* at five stations off S. Africa at depths ranging from about 2700 to about 3200 m. One nearly complete shell from this material was figured in "Report of the South African Museum" (Anon. 1961). I have examined BARNARD's material (kept in the South African Museum, Cape Town) and found it conspecific with the present specimen.

Description of the "Galathea" specimen:

The shell (Pl. 18, 1) is fusiform, fragile, semi-transparent and very light in weight. About five whorls are present and the body whorl forms about 80 % of the total length. The protoconch is large, but owing to corrosion neither the sculpture nor its limit towards the teleoconch can be observed. The spire of the teleoconch has somewhat scalariform whorls which are slightly concave at the suture. The aperture is large. The outer lip and the distal part of the anterior canal are damaged. The teleoconch is corroded and most of the finer sculpture has disappeared; in several places, however, a granulose sandpaper-like texture can be seen (mentioned also by WEAVER & DUPONT 1970). Two or threee spiral cords are present at the suture. The body whorl has a fine spiral sculpture. One spiral line emerging at the insertion of the outer lip is somewhat more distinct than the remaining ones, and in some places irregular axial growth lines can be seen. No columellar folds are present. The parietal wall has a glossy, semitransparent callus with fine, curved lines demarcating earlier lateral edges of the callus.

The foot, which is heavily contracted and laterally folded, is large and muscular with a broad sole and has a total length of about 73 mm. The postero-dorsal part has a distinct median edge. No operculum is present. The penis (Fig. 2A) is very large and stout; the distal end is flattened, forming a distinct edge. The was deferens is closed. Three cephalic lobes are present of which the median one between the tentacles is considerably smaller than the lateral ones. The latter are of approximately equal size, fan shaped with curved and somewhat irregular lateral edges. They are located immediately posterior to the tentacles, which are relatively small, cylindrical and pointed (Fig. 2). No trace of eyes can be observed. The proboscis is cylindrical and stout (Fig. 2). The mantle is smooth. The siphon (Fig. 3), obviously heavily contracted, is stout and muscular, with two well-developed, equal-sized basal lobes. The left lobe is ventrally flattened while the right one is laterally compressed. The external soft parts are without any trace of pigmentation.

The proboscis and the anterior part of the oesophagus are muscular. The two racemose salivary glands are large and compact. Owing to maceration the tubular salivary glands could not be observed in their full extension, but enough could be seen to ascertain that they are connected with the racemose glands. The ducts of the tubular glands run anteriorly, opening into the anteriormost part of the oesophagus. Between the racemose glands and the nerve ring the oesophagus expands into a distinctly marked thin-walled bulb (? valve of Leiblein). Posterior to the nerve ring the convolute, rather voluminous, gland of Leiblein is imbedded in connective tissue. The stomach is strongly folded.

The radula (Pl. 18, 2-5) is uniserial and tricuspid, the cusps being arranged in one plane. The central cusp is the larger and on its oral surface it has a well-defined concavity which extends from the base about two thirds the distance to the tip. The lateral cusps do not have a corresponding concavity. The lateral edges of the central cusp are slightly convex,

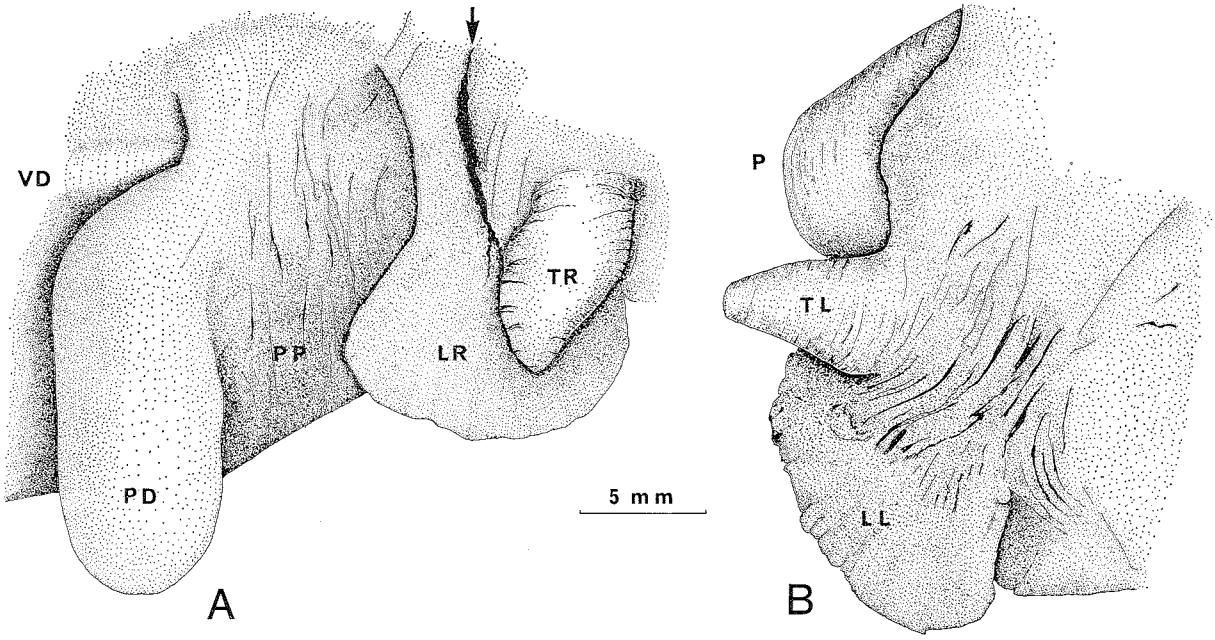

Fig. 2. *Guivillea alabastrina,* "Galathea" specimen. – A. Lateral view of the right anterior part of the body; B. Lateral view of the left anterior part of the body. – LL, left cephalic lobe; LR, right cephalic lobe; PD, distal part of penis; PP, proximal part of penis; P, proboscis; TL, left tentacle; TR, right tentacle; VD, vas deferens. Arrow: radial fold due to contraction.

those of the lateral cusps are straight or slightly concave. The anterior teeth show distinct signs of wear. The breadth of a tooth is about 0.7 mm.

Comparison with the holotype:

As the type has not been seen by the author, the following comparison is therefore based on the figures already referred to. The type is larger than the "Galathea" specimen, and has a more developed parietal callus and a distinct curvature on the middle of the visible part of the columella. WATSON (1882, 1886) states that no trace of eyes exists. PELSENEER (1888) states that eyes are present and form two symmetrical projections at the external base of the tentacles. The right eye is distinctly shown in the rather schematical overall figure of the external anatomy and another figure shows a sagittal section of one eye. The eye is described and discussed in some detail and it is concluded that it is rudimentary. PELSENEER (1906) states that *Guivillea* has no eyes. In the present specimen nothing indicates the presence of even rudimentary eyes. Since the soft parts of the type examined by PELSENEER could not be found, the problem can not be solved.

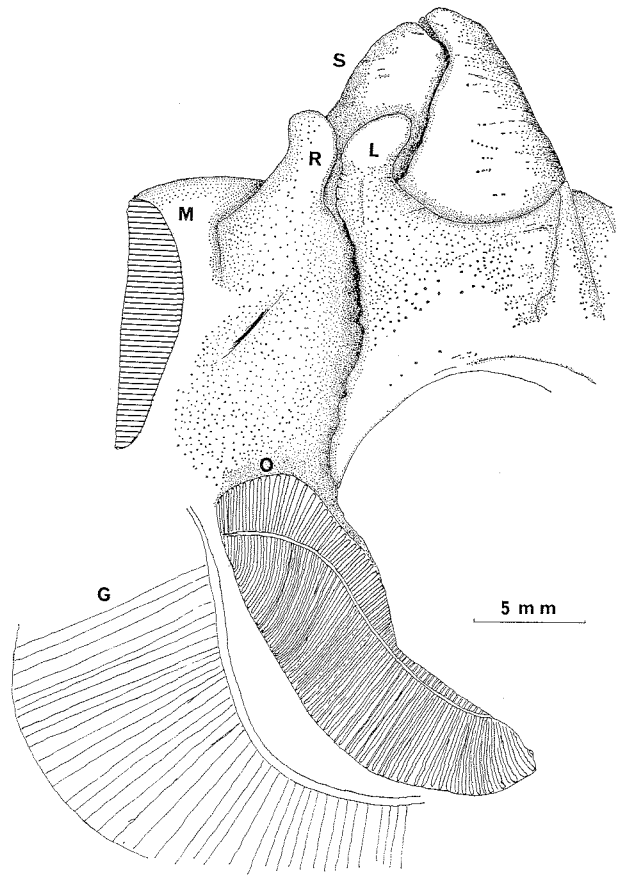

Fig. 3. *Guivillea alabastrina,* "Galathea" specimen. – Ventral view of siphon and part of the mantle skirt. – G. gill; M, mantle edge; O, osphradium; L, left basal lobe; R, right basal lobe; S, siphon.

Size: The table shows some dimensions in mm of the two known specimens:

	Holotype	"Galathea"
Length	168	145
Breadth	82	64
Body whorl	137	115
Aperture	108	83

G. alabastrina seems to be easily the largest abyssal gastropod known. However, the species does not appear to be particularly large for the subfamily. WEAVER & DUPONT (1970) indicate size or size range of the individual species. The largest species among the 28 species assigned to the subfamily has a length of 450 mm and six species attain lengths exceeding 200 mm; ten species are known to attain lengths in excess of *G. alabastrina*. The dimensions given by WEAVER & DUPONT are often based on few or a single shell. The above comparison of size is therefore only a very crude indication.

Taxonomic notes and assignment:

WATSON (1886) discovered that the generic name *Wyvillea* was preoccupied and emended it to *Guivillea*. COSSMANN (1899) noted the unavailability of *Wyvillea* and apparently unaware of the change proposed by WATSON, proposed the generic name *Pseudocymbium*.

HIRASE (1934, p. 82, pl. 112, 9) with some doubt referred *Voluta uniplicata* Sowerby, 1900, to *Guivillea*. HIRASE's assignment has not been followed by subsequent workers (see WEAVER & DUPONT 1970, p. 45). So far the genus only contains its type species.

WATSON (1882, 1886) referred *Guivillea* to the Volutidae without comments, basing his assignment mainly on shell characters. COSSMANN (1899) doubted WATSON's assignment, but gave no reason for his doubt or attempted any re-assignment. All other authors have included the genus in the Volutidae.

THIELE (1929) and WENZ (1938) referred *Guivillea* to the subfamily Volutinae. PILSBRY & OLSSON (1954) listed *Guivillea* under the heading "Of Uncertain Position"; they made no comments on the genus and did not list any specific name. SHIKAMA (1967) referred *Guivillea* to the subfamily Fulgorariinae Pilsbry & Olsson, 1954. WEAVER & DUPONT (1970) followed this assignment.

The assignments referred to are based mainly on shell characters and on the figure of the external of the soft parts in PELSENEER (1888).

The present study confirms WATSON's original assignment of the genus to the family Volutidae. It also shows that *Guivillea* should be included in the subfamily Zidoninae H. & A. Adams, 1853, as characterized by CLENCH & TURNER (1964, p. 147, pls. 82 and 83), on the basis of the following characters: 1) radula, 2) basal lobes of the siphon, 3) condition of the two pairs of salivary glands.

None of the Volutidae studied by CLENCH & TURNER has the oesophagus bulb (? valve of Leiblein), observed in the present species.

Notes on distribution (based on information in WEAVER & DUPONT 1970):

The subfamily Zidoninae comprises 29 species (including *Guivillea*) showing a characteristic distributional pattern of the genera:

Alcithoe, Pachymelon and *Teremelon* (containing 13 species) are endemic for the New Zealand shelf (including the Chatham Rise).

Zidona and *Adelomelon* (8 species) are endemic for the Patagonian shelf, some of the species extending northwards to 23°-25°S.

Harpulina (two species) is known only from the waters round Ceylon and the southernmost part of India.

Provocator contains two widely separated species; one occurs on the Patagonian shelf while the other species is confined to the Kerguelen Rise.

Coltonia (monotypic) is restricted to the southwestern Australian waters.

Arctomelon has two widely separated species, viz., one living off Alaska and the other one in the abyssal zone of the Gulf of Panama.

Most genera and species occur in the southern hemisphere, notably in the widely separate regions: the Patagonian shelf and the New Zealand shelf. Only one genus with two species can be regarded as tropical shallow water forms. One species only is northern (N. Pacific).

More than half of the species of the subfamily occur in the sublittoral zone (depths from 3-4 m to 200-400 m), and a few species occur in the shallow-most part of the bathyal zone to depths between 600 and 800 m. No member of the Zidoninae is known from depths between 800 and about 3000 m.

The abyssal Volutidae: Besides *Guivillea alabastrina* and the possibly undescribed volutid from the Antarctic already referred to, two species of the family are known from the abyssal zone: 1) *Arctomelon benthalis* Dall, 1896, has been recorded

from the Gulf of Panama at 3058 m depth. It is known from the type specimen only. DALL does not mention the soft parts but the absence of an operculum is recorded. 2) *Tractolira sparta* Dall, 1896. WEAVER & DUPONT (1970) assigned the monotypic genus to the subfamily Odontocymbiolinae on the basis of radula characters. ROKOP (1972) summarized the distribution of the species: five stations in the eastern Pacific at depths from 2900 to 4000 m.

Acknowledgments

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SUMMARY

A specimen of the largest known abyssal gastropod *Guivillea alabastrina* (Watson) is described. The genus is assigned to the subfamily Zidoninae on the basis of anatomical and radula characters. A specimen referred to *G. alabastrina* by MELVILL & STANDEN (1907) has been re-examined. The assignment proved erroneous, and the specimen is possibly an undescribed species. The present specimen is the second on record, and in addition shells and fragments are known from five records. The distributional pattern of the subfamily is reviewed and notes on the known abyssal Volutidae are given.

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* not seen by the author.

Issued 15. Dec. 1973. (600. 160).

PLATE 18

Guivillea alabastrina. "Galathea" specimen.

Fig. 1. Shell. × 1/1.
Fig. 2. Tooth from the posterior part of the radula; aboral view.
Fig. 3. Teeth from the posterior part of the radula; oral view.
Fig. 4. Teeth from the anterior part of the radula; oral view.
Fig. 5. Radula teeth; left side view.