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The Foraminiferal Genus *Yaberinella* Vaughan 1928, Remarks on its Species and on its Systematic Position

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New material from various localities in Jamaica was prepared in order to determine and to compare the foraminiferal fauna associated with *Charactosuchus kugleri* Berg (1969, p. 731). Sections of microspheric *Y. jamaicensis* and better pictures of *Y. trelawniensis* may help to characterize the two species better and to see their relationships to other foraminiferal groups in a new light.

Genus *Yaberinella* VAUGHAN 1928
(Generotype *Y. jamaicensis* VAUGHAN 1928)

Generic characters:

Porcellaneous Foraminifera with a planispiral, peneroplid arrangement of the chambers. In microspheric forms, the shell may become discoidal, with an annular growth of the chambers.

The proloculus of the megalospheric generation consists of a thin, simple wall surrounding a spherical embryo. There is a single opening with a short «goulot» similar to megalospheric larger Alveolinids. The opening is often positioned out of the equatorial plane.

The microspheric proloculus has not been observed but must be extremely small. The nepiont is very small and badly preserved (text fig. 1, pl. II fig. 1). The only specimen sectioned in an approximately equatorial plane shows an arrangement of chambers which can hardly be interpreted otherwise than as slightly tangential, longitudinal section of a tiny Miliolid, followed by a three chambered, first regular whorl. Unfortunately, no detail of the structure in the embryonic chambers is conserved.

The structure of mature chambers has been analysed recently by R. LEHMANN (1961, p. 656): Small, longitudinal tubes are arranged in a single layer under the outer surface of the shell. They are oriented in the direction of shell growth, in annular chambers radially. In the median part of the shell larger tubes are oriented obliquely to the growth direction, alternating their inclination from one layer to the next one.

The tubes are connected at each crossing by a large passage vertical in respect to the growth direction. Smaller vertical passages connect the oblique tube system with the smaller, longitudinal tubes under the lateral surfaces.

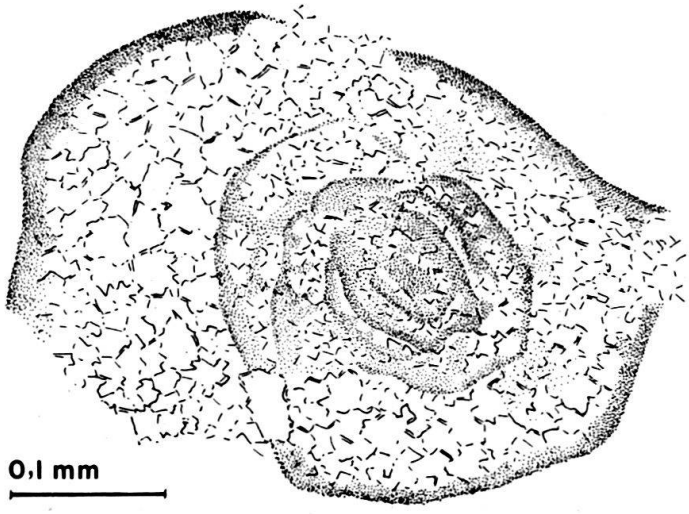

Fig. 1. First whorls in recrystallized shell of microspheric *Yaberinella jamaicensis* figured on plate I. The equatorial section is not perfectly centered. The visible intersections are interpreted as a slightly tangential section of an embryo with miliolid coils having two chambers per whorl followed by a regular, three chambered whorl. The last two chambered whorls of the embryo seem to show structural elements. NMB locality 10970. Naturhistorisches Museum Basel No. C 26201.

The septal face is much reduced showing some analogies with the structure of *Cisalveolina*. The material is not sufficiently preserved to analyse all structural details at the peripheral margin of the septal face but the sections show clearly the existence of structural complications.

Yaberinella jamaicensis VAUGHAN 1928

(pl. I; pl. II, figs. 1, 2, 4; pls. III, IV; text figs. 1, 2)

1928 *Yaberinella jamaicensis* Vaughan T. W. (p. 7; pls. 4, 5).

1961 *Yaberinella jamaicensis* Vaughan. Lehmann R. (p. 656; text figs. 43–46; pl. 13; pl. 14, figs. 1–3).

Specific characters:

Megalospheric forms planispiral, more or less involute in the adult stages, with comparatively loose coils forming about 3 whorls. Last whorl with 8–10 chambers. Diameter of megalosphere 0.5–1 mm (12 specimens measured). Average diameter of the tubes in the median plane of the shell 0.03–0.05 mm in the last chambers. The direction of the tubes is rather constant, the tubes comparatively regular.

The microspheric forms (text fig. 2; pl. I) are getting discoidal and evolute after $3–3^1/_2$ regular whorls.

Yaberinella trelawniensis VAUGHAN 1929

(pl. II, fig. 3; pl. V)

1929 *Yaberinella trelawniensis* Vaughan T. W. (p. 373, pl. 39, fig. 1).

?1937 *Fabularia* (?) sp. Hanzawa S. (p. 113, pl. 20, fig. 7).

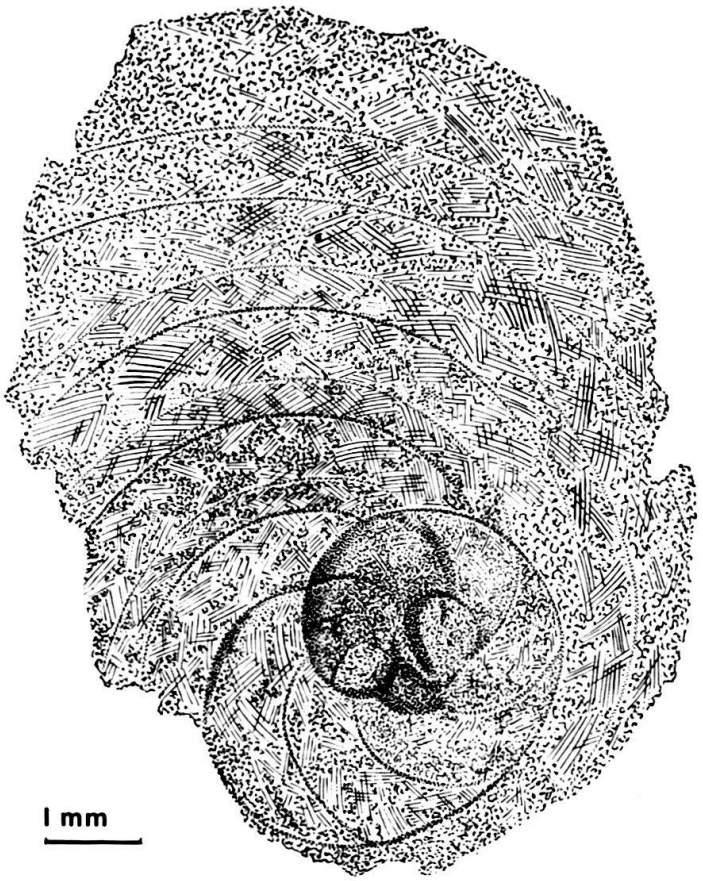

Fig. 2. *Yaberinella jamaicensis* VAUGHAN 1928. Microspheric form, equatorial section, not centered. × 10. NMB locality 10970. Naturhistorisches Museum Basel No. C 26202.

Specific characters:

Megalospheric forms planispiral, completely involute, with comparatively tight coils forming about 3 whorls. Last whorl with 6–7 chambers. Diameter of megalosphere 0.25–0.4 mm (8 specimens measured). Average diameter of the tubes in the median plane of the shell 0.05–0.1 mm. The direction of the tubes is rather inconstant, the criss-cross pattern less regular and less evident than in *Y. jamaicensis*.

The microspheric form was not found in the material at our disposal. Hanzawas microspheric specimen (1937, pl. 20, fig. 7) might correspond to this species. The whorl as seen in the almost axial section is much tighter than the one observed in microspheric specimens of *Y. jamaicensis*.

Y. trelawniensis occurs in a lower stratigraphic horizon than *Y. jamaicensis* in the material examined. Both species may be useful stratigraphic markers.

INTERPRETATION OF THE MORPHOLOGY

The systematic position of a genus of Larger Foraminifera depends on the hierarchy of morphologic characters used for classification. In Larger Foraminifera the functional morphology is utterly unknown, the comparative morphology is only in its beginning and the complex morphological structures of many genera and groups of species are insufficiently defined. The classification adopted today (LOEBLICH &

TAPPAN 1964) must be, therefore, very unstable and often arbitrary. *Yaberinella* is no exception from this rule.

Although the recrystallized shells of *Yaberinella* had been described first as arenaceous, the porcellaneous nature of the walls is no more discussed today. The planispiral to discoidal arrangement of the chambers and the presence of more than two chambers per whorl account for the present position of the genus within the family *Soritidae* EHRENBERG 1839. The characters of the microspheric and megalospheric embryos, the milioline, irregular windings of the first whorls in B-forms and the absence of a typical flexostyle in the A-generation show in my opinion the miliolid origin of the genus. If the chamber arrangement is considered a less important character than the nature of the embryo, the genus must be classified within the *Miliolidae* EHRENBERG 1839.

The milioline microspheric embryo gives us a clue to the interpretation of the peculiar structure of the adult chambers. Another milioline genus, *Fabularia*, has a similar system of tubes piercing the milioline Basal Layer. The tubes are connected in a similar way by passages and a similar layer of subepidermal, longitudinal tubes or attics develops in *Fabularia*. The arrangement of the two chambers in the fabularian whorl is planispiral in megalospheric and in the adult part of microspheric forms (HOTTINGER, LEHMANN & SCHAUB 1964, p. 642, Pl. V). The basic difference between the structures of the spherical to ovoid compressed *Fabularia* and the operculinid to discoidal *Yaberinella* consists in the sometimes irregular but mostly parallel arrangement of the median tubes in microspheric *Fabularia* and in the oblique, layerwise crossing tubes of *Yaberinella*. The irregular structure of the comparatively primitive species *Y. trelawniensis* points at a common origin.

The genus *Yaberinella* would therefore be placed best in the subfamily *Fabulariidae* EHRENBERG 1839. The crosswise arrangement of the tubes would be a generic character of the same rank as the alternating or aligned arrangement of Alveolinid septula.

Although tubes in the milioline Basal Layer are by no means homologous with crosswise arranged stolon systems (intercameral foramina!), the peculiar arrangement may have common biological origins and functions (HOTTINGER 1967, p. 21, fig. 6): The crosswise flow of protoplasma seems to favour an early development (ontogenetically and/or phylogenetically) of discoidal shapes in Larger Foraminifera, independent of their systematic relationships. Conical forms like *Orbitolina*, planispiral forms in many porcellaneous groups and some orbitoïdal forms with crossed stolons all tend to discoidal shape. This hypothesis though cannot be proved as long as Larger Foraminifera have not been investigated under living conditions.

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Plate I

Yaberinella jamaicensis VAUGHAN 1928. Microspheric form, equatorial section. × 20. NMB locality 10970. Naturhistorisches Museum Basel No. C26201.

All figured specimens from Central Jamaica. Naturhistorisches Museum Basel (NMB) localities 10961 = Spice Grove, 10969 and 10970 = Dump area; see previous note in this volume: ROBINSON E. (1969); Eclogae geol. Helv. *62*/2.

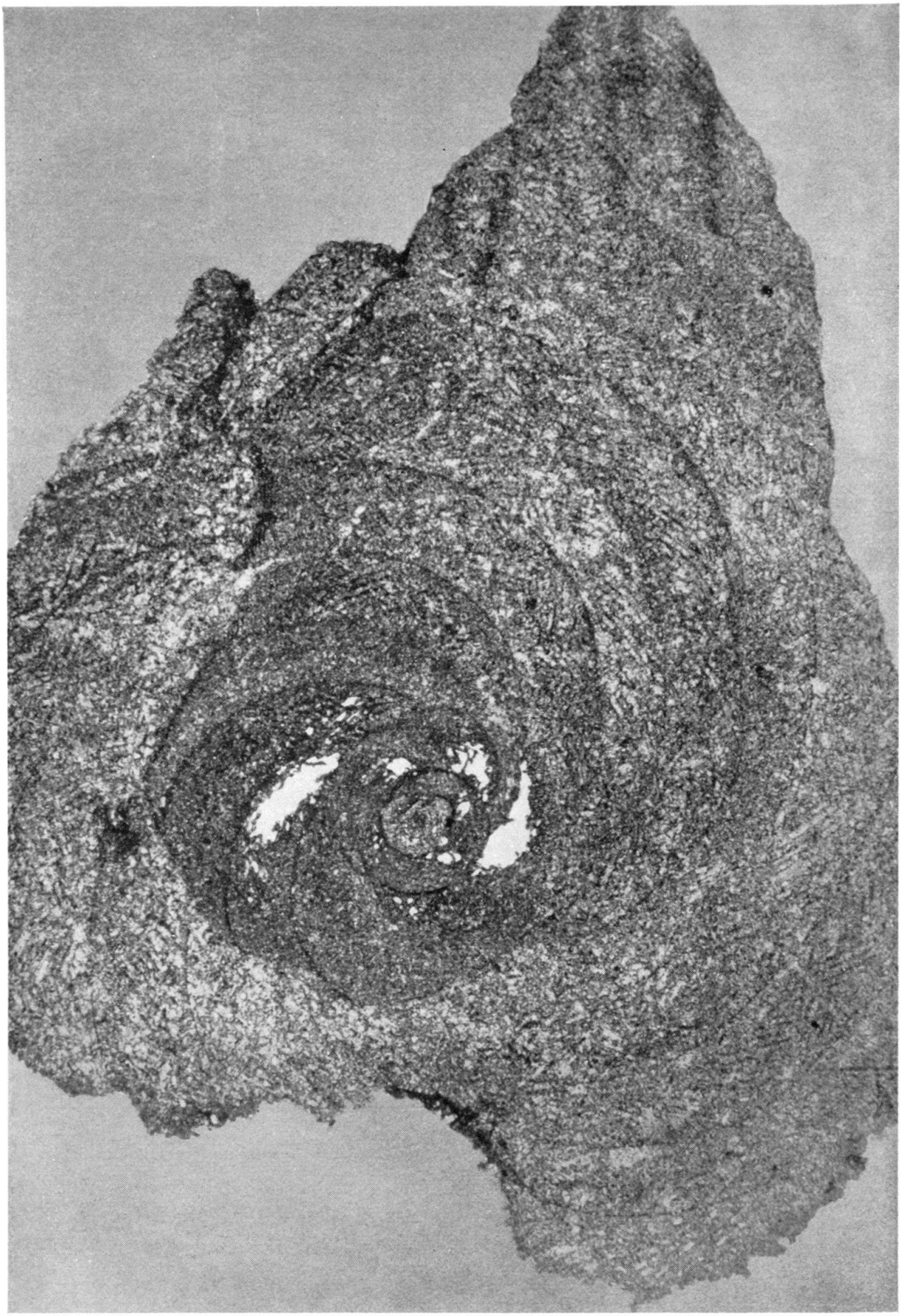


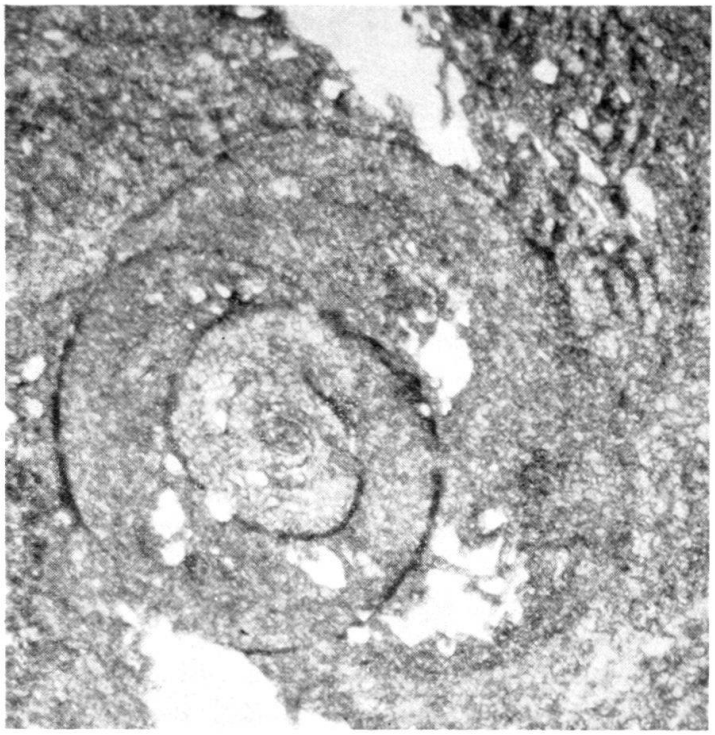
Plate II

Fig. 1 *Yaberinella jamaicensis* VAUGHAN 1928. Microspheric form, equatorial section. × 50. Detail of the specimen figured on plate I. NMB locality 10970. Naturhistorisches Museum Basel No. C26201.

Fig. 2 *Yaberinella jamaicensis* VAUGHAN 1928. Megalospheric specimen, axial section. × 20. NMB locality 10970. Naturhistorisches Museum Basel No. C26203.

Fig. 3 *Yaberinella trelawniensis* VAUGHAN 1929. Megalospheric specimen, axial section. × 20. NMB locality 10969. Naturhistorisches Museum Basel No. C26204.

Fig. 4 *Yaberinella jamaicensis* VAUGHAN 1928. Megalospheric specimen, equatorial section. × 20. NMB locality 10970. Naturhistorisches Museum Basel No. C26205a.



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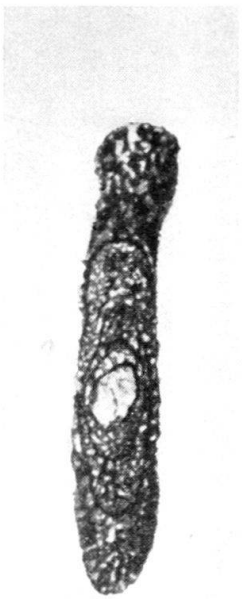

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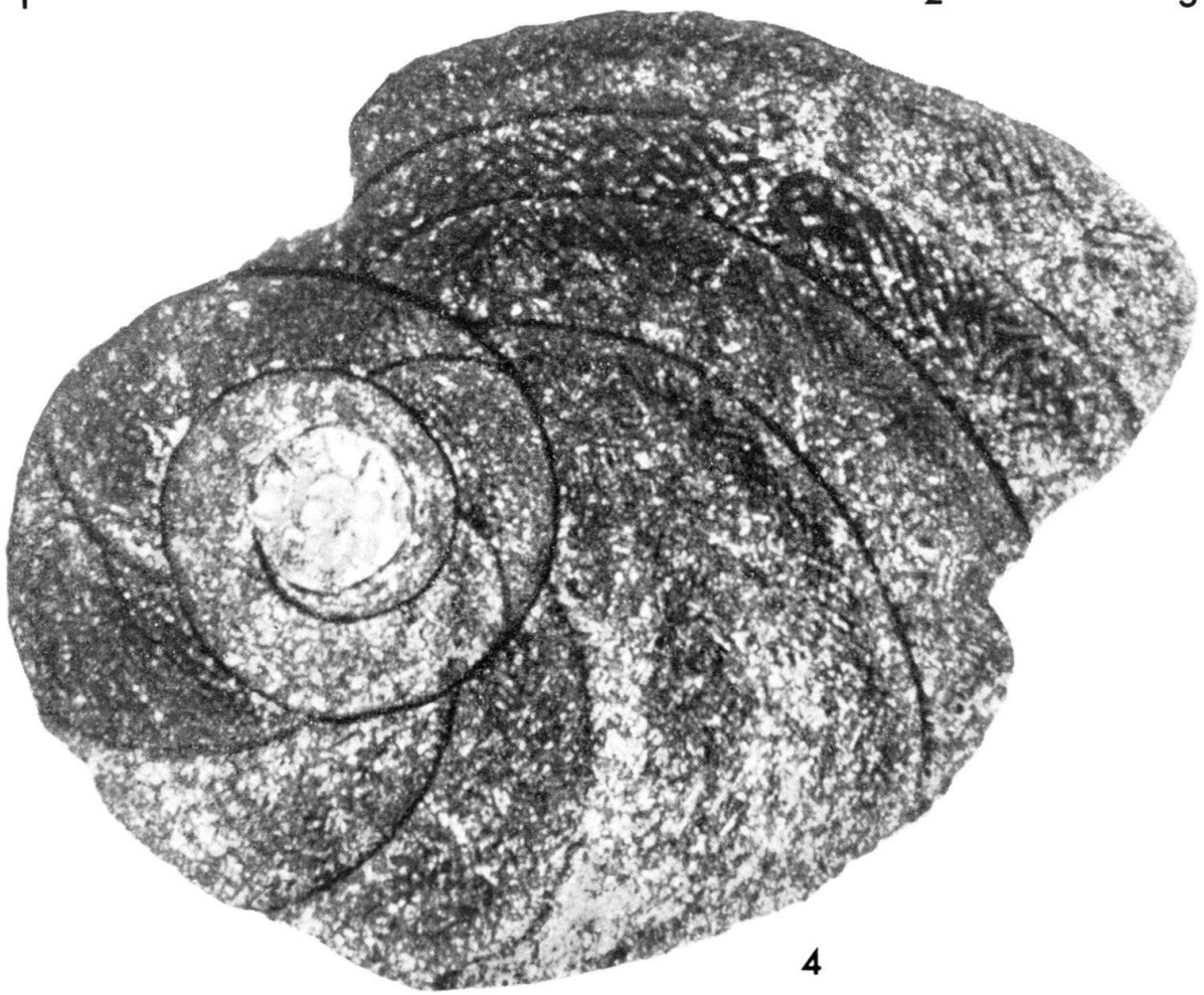

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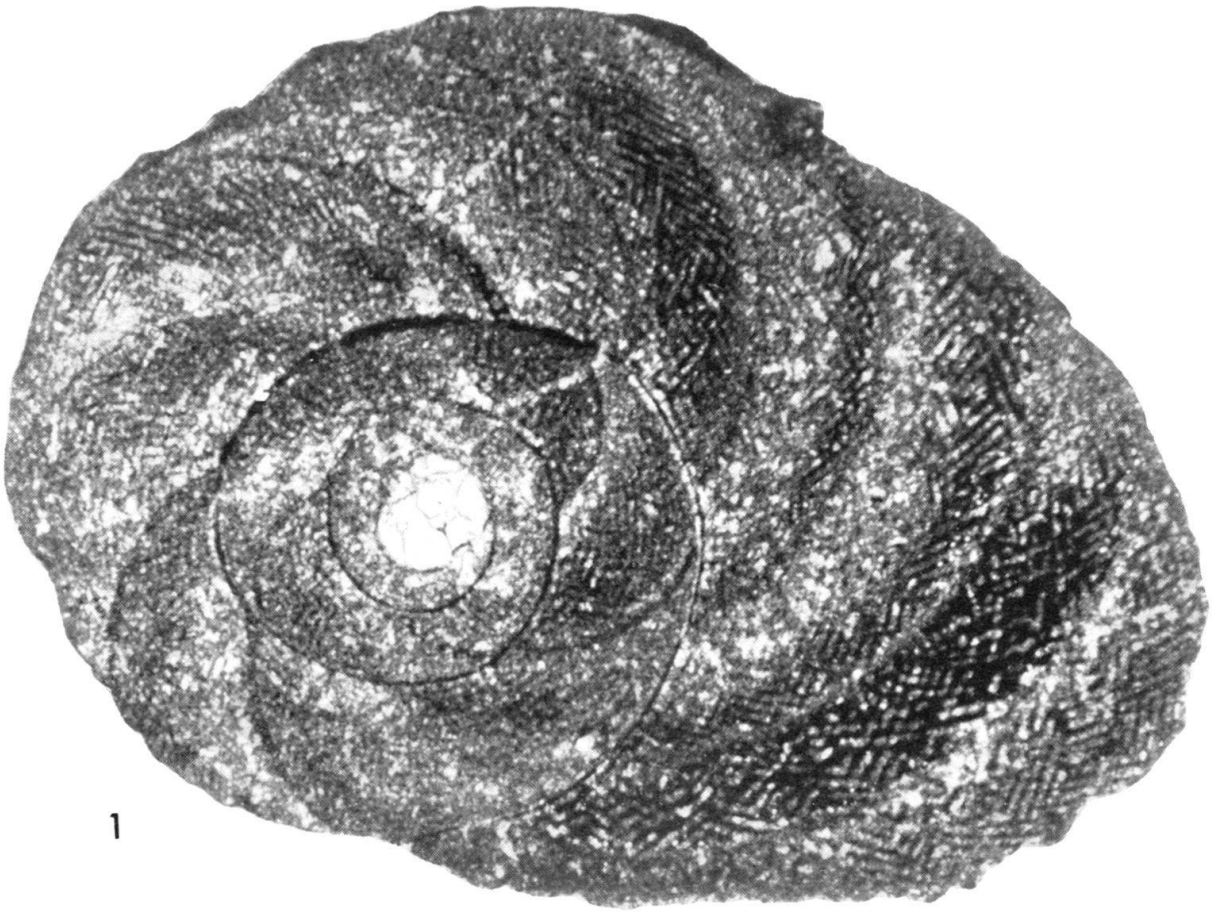
Plate III

Yaberinella jamaicensis VAUGHAN 1928. Large, megalospheric specimens, equatorial sections. × 20. NMB locality 10970. Naturhistorisches Museum Basel Nos. C 26205 b (Fig. 1), C 26206 b (Fig. 2).



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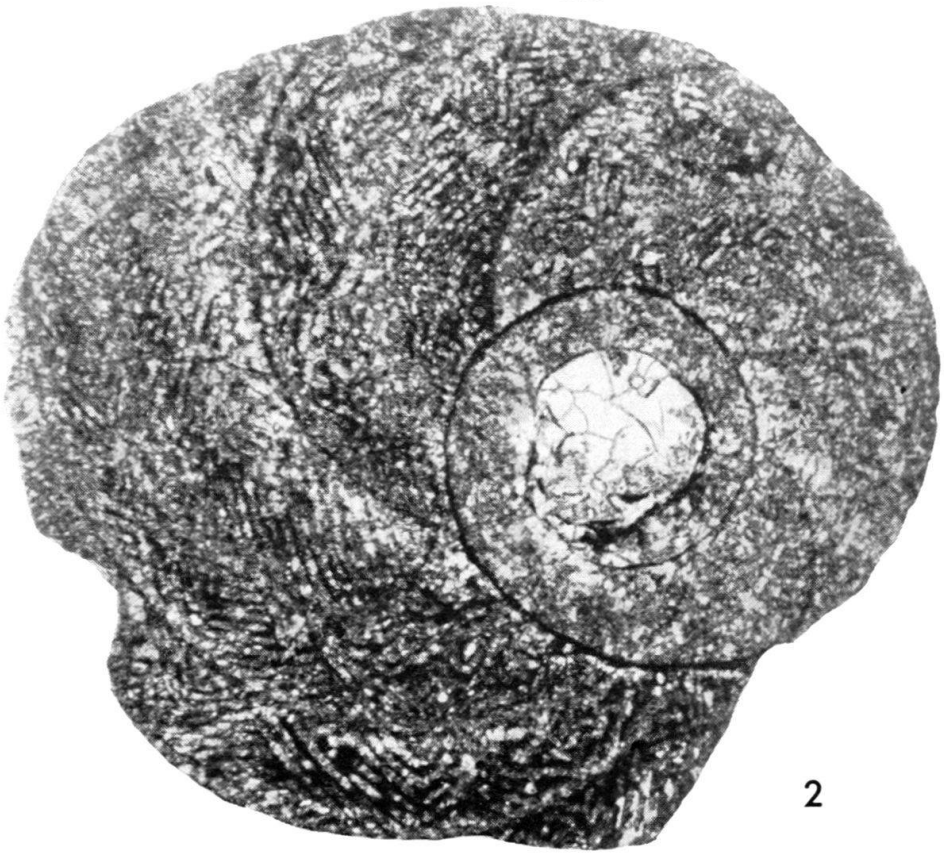

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Plate IV

Yaberinella jamaicensis VAUGHAN 1928. Smaller, megalospheric specimens, equatorial sections. × 20.

Figs. 1, 3 — NMB locality 10961. Naturhistorisches Museum Basel Nos. C26207a (Fig. 1), C26207b (Fig. 3).

Fig. 2 — NMB locality 10970. Naturhistorisches Museum Basel No. C26208d.

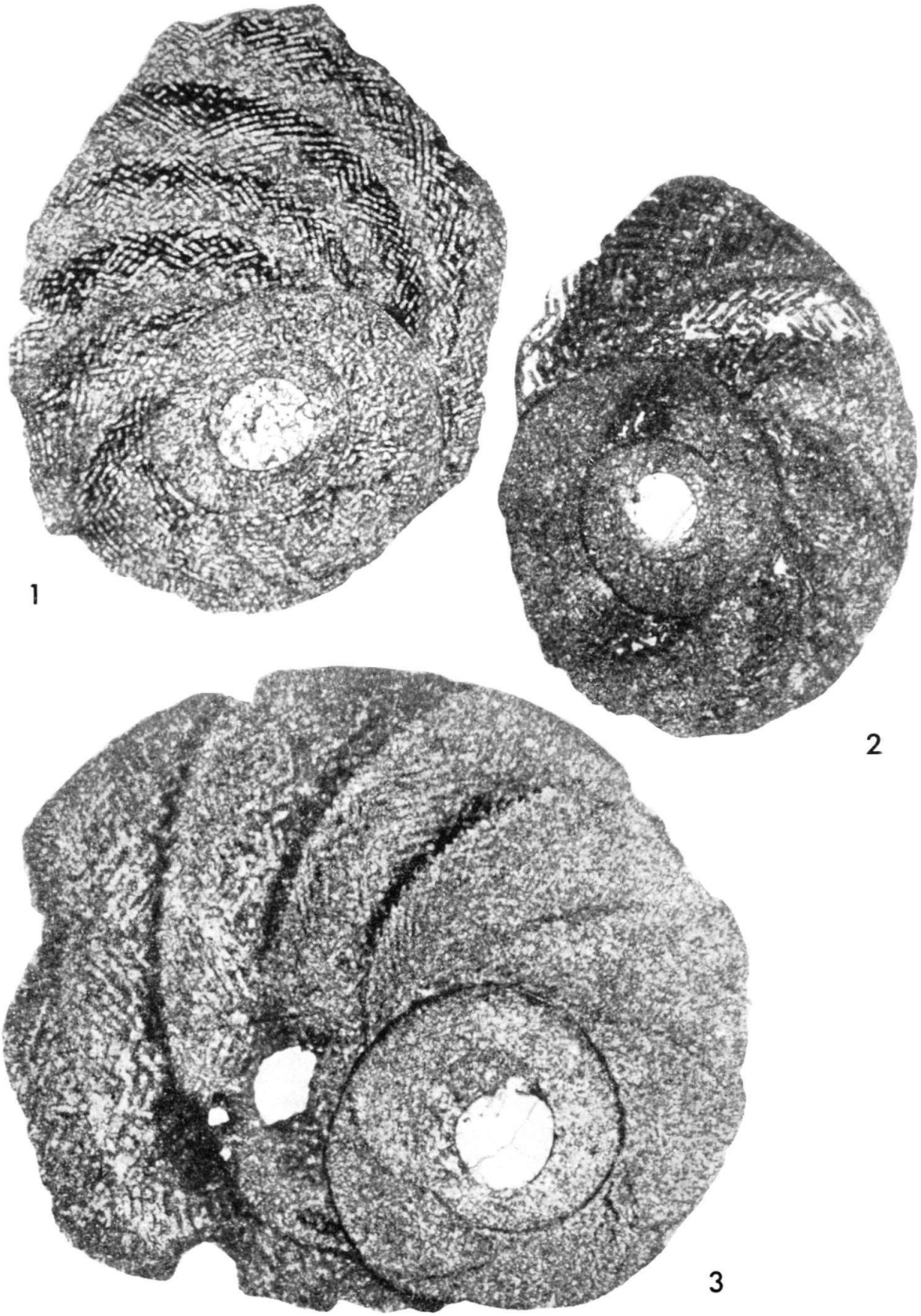
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Plate V

Yaberinella trelawniensis VAUGHAN 1929. Megalospheric specimens, equatorial sections. × 20. All specimens from NMB locality 10969.

Fig. 1 Naturhistorisches Museum Basel No. C26209c.

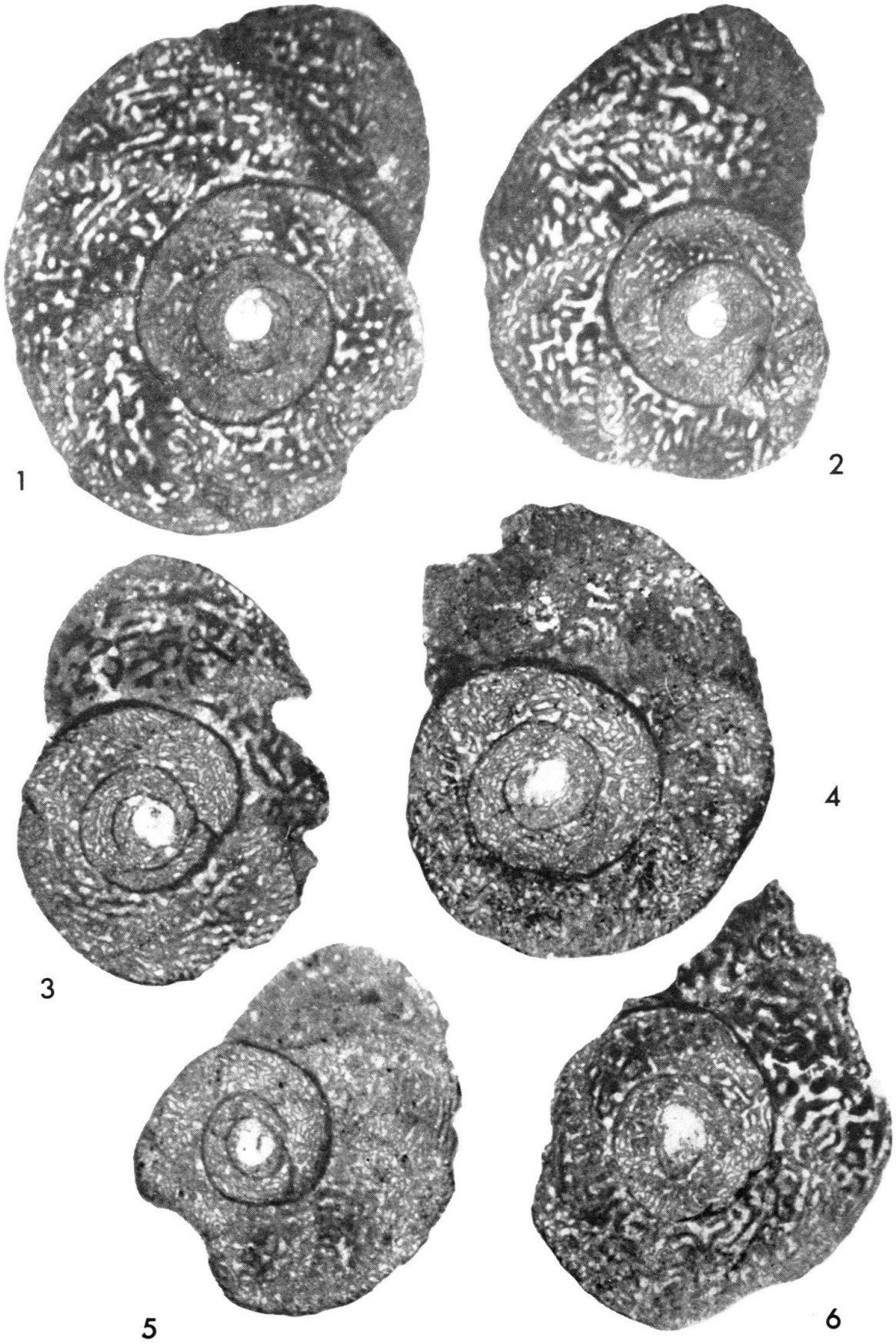
Fig. 2 Naturhistorisches Museum Basel No. C26209d.

Fig. 3 Naturhistorisches Museum Basel No. C26210a.

Fig. 4 Naturhistorisches Museum Basel No. C26210d.

Fig. 5 Naturhistorisches Museum Basel No. C26210b.

Fig. 6 Naturhistorisches Museum Basel No. C26210c.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