



New tabulate coral from the Tournaisian of the Dębnik Anticline, Poland

Aleksander NOWIŃSKI, Mikołaj K. ZAPALSKI



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Verolites polonicus sp.n. (Tabulata, Syringoporida) from the Lower Carboniferous (Upper Tournaisian, Lower Caninia — C₁) of the Silesia-Cracow Upland (Dębnik Anticline, Czatkowice quarry) is described and illustrated. This is the third species of the poorly known genus *Verolites* Tchudinova. The new species differs from the type species (*V. rarus* Tchudinova) in subcerioidal structure of corallum composed of prismatic corallites with smaller and undifferentiated diameters, greater number of connecting pores of smaller diameters, very rare connecting tubes, lack of connecting platforms, and more strongly developed spines on tabulae.

Aleksander Nowiński, Institute of Palaeobiology, Polish Academy of Sciences, Twarda 51/55, PL-00-818 Warszawa, Poland; Mikołaj K. Zapalski, Faculty of Geology, Warsaw University, Żwirki i Wigury 93, PL-02-089 Warszawa, Poland (received: May 5, 1999; accepted: June 20, 1999).

Key words: Silesia-Cracow Upland, Dębnik Anticline, Late Tournaisian, Tabulata, Syringoporida, *Verolites polonicus* sp.n., morphology.

INTRODUCTION

Verolites polonicus sp.n. described in this paper has been assigned to the poorly known genus *Verolites* (family Thecostegitidae, order Syringoporida), established by I. I. Tchudinova (1975). This genus is characterized by the following features: fascicular or subcerioidal corallum composed of prismatic or cylindro-prismatic corallites with thin and uneven walls, the presence of three types of connecting elements (abundant pores, rare tubes and platforms), very numerous and strongly funnel-shaped tabulae exhibiting a peculiar arrangement and densely filling the whole space of corallites, as well as lack of a separate axial canal.

The described and illustrated material (two almost complete skeletons of colony) comes from Lower Carboniferous deposits (Upper Tournaisian) of the Silesia-Cracow Upland (Dębnik Anticline, Czatkowice quarry) and has been collected by the co-author of this paper — M. K. Zapalski, who is a student of Faculty of Geology of the University of Warsaw.

The skeletons of colony of *Verolites polonicus* sp.n. are very well preserved. 10 thin sections, 2 polished sections and a series of imprints on a celuloïd film have been prepared in order to follow the blastogeny process.

The present work was carried out in the Institute of Palaeobiology of the Polish Academy of Sciences, Warszawa, abbreviated as ZPAL, where the collection is housed.

DESCRIPTION

Class **Anthozoa**

Subclass **Tabulata**

Order **Syringoporida** Sokolov, 1962

Family **Thecostegitidae** de Fromentel, 1861

Genus *Verolites* Tchudinova, 1975

Type species: *Verolites rarus* Tchudinova, 1975; Lower Carboniferous, Tournaisian (simorinsky horizon, C); Central Kazakhstan, Asia

D i a g n o s i s : I. I. Tchudinova (1975), see also I. I. Tchudinova (1986).

R e m a r k s . — Genus *Verolites* was established by I. I. Tchudinova (1975) basing upon one species — *V. rarus*

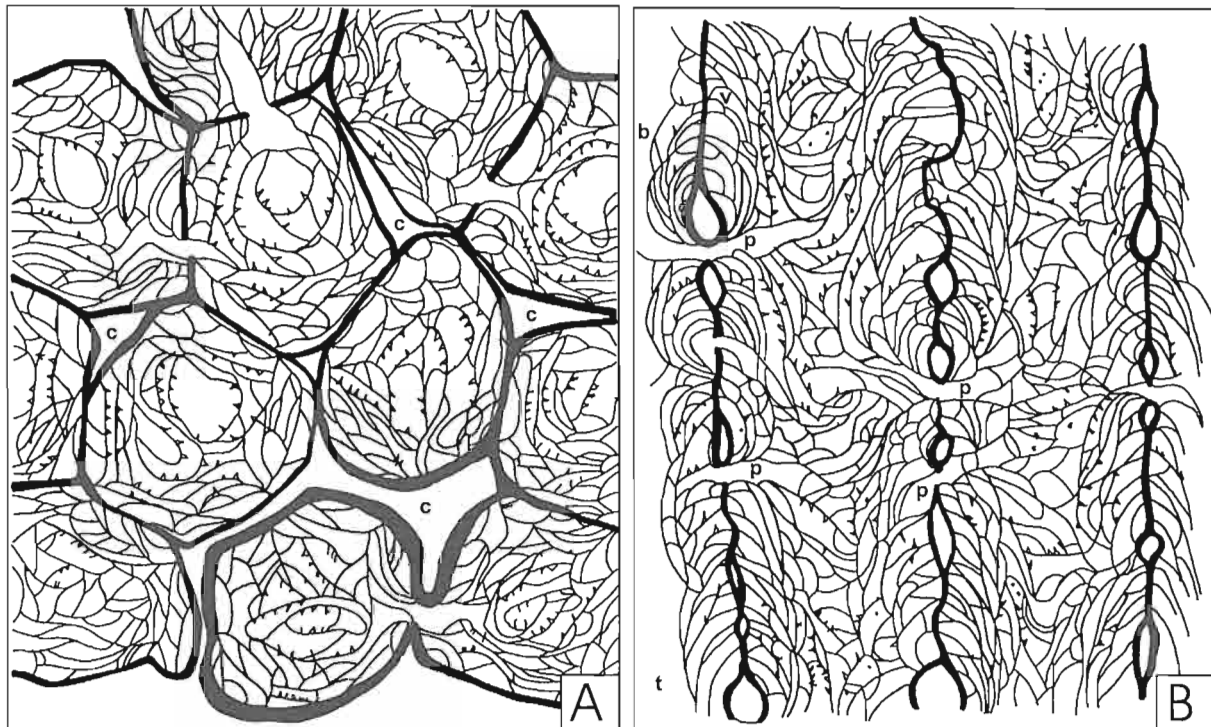


Fig. 1. *Verolites polonicus* sp.n., ZPAL.T.XXIII/1 — holotype; Silesia-Cracow Upland, Dębnik Anticline (Czatkowice quarry); Lower Carboniferous, Late Tournaisian (Lower Caninia — C₁); A — transverse section through fragment of a corallum, x 8, B — longitudinal section through fragment of a corallum, x 8

b — bunches of tabulae, c — crevice between corallites, p — connecting pore, t — tabula, v — vesicular tissue

Tchudinova, 1975 — represented by 16 well preserved skeletons of colony. At present the genus *Verolites* contains (apart of the type species — *V. rarus*) the species *Verolites* sp. (skeleton of one colony) described from the Visean of Belgium (F. Tournour, 1989). *Verolites polonicus* sp.n. from the Upper Tournaisian of the Dębnik Anticline, described in this paper, is the third species belonging to the genus.

Representatives of the genus *Verolites* are characterized by the following features: fascicular or subcerioidal corallum composed of prismatic or cylindro-prismatic (locally cylindrical) corallites; deep and funnel-shaped calices; thin, uneven and twisted corallite walls with fibro-lamellar microstructure; presence of three types of connecting elements: abundant pores, rarer short tubes and platforms (I. I. Tchudinova, 1986); very numerous and strongly funnel-shaped tabulae filling the entire space of corallites; occurrence of visceral zone at corallite walls, composed of small tabulae; lack of a separate axial canal; presence or lack of septal spines and spines on tabulae; vegetative reproduction through intracalicular extra-visceral budding.

This genus differs from other genera of the family Thecostegitidae in the following features: subcerioidal structure of corallum; distinctly prismatic, more rarely cylindro-prismatic corallites; deep funnel-shaped and very long tabulae densely

arranged within the whole space of tube of corallite. Morphology and the arrangement of tabulae in *Verolites* specimens resemble those from some Permo-Carboniferous species of the genus *Roemeripora* I. Kraicz (1934) (see F. Heritsch, 1939; A. Nowiński, 1991), the more so as the tabulae of *Verolites*, located close to pores and connecting tubes, are arranged to form bunches of tabulae characteristic of representatives of the genus *Roemeripora*. A strong differentiation of corallites diameter of *Verolites* (observed in transverse sections across corallum), which was considered by I. I. Tchudinova (1975, 1986) to be a diagnostic feature for the genus, seems to be only the effect of frequent budding of young individuals.

Representatives of the genus *Verolites* show the highest similarity (within the family Thecostegitidae) to representatives of the genus *Ortholites* Tchudinova (I. I. Tchudinova, 1975, 1986). This similarity is expressed by the presence of irregularly arranged connecting elements (pores, more rarely tubes and platforms), development and morphology of septal apparatus (spines), and the presence of spines on tabulae.

Quality features of the after-described skeletons of colony of *Verolites polonicus* sp.n. thoroughly correspond to the features characteristic of the genus *Verolites*.

Verolites polonicus sp.n.
(Figs. 1A, B; Pl. I, II)

Holotype: Specimen ZPAL.T.XXII/1 (Figs. 1A, B; Pl. I)

Type horizon: Lower Carboniferous, Late Tournaisian (Lower Caninia — C1).

Type locality: Silesia-Cracow Upland, Dębnik Anticline (Czatkowice quarry).

Derivation of the name: *polonicus* [Lat.] — from Poland.

Diagnosis: subcerioidal corallum composed of prismatic or cylindro-prismatic corallites, 2.8–3.5 mm in diameter. Deep, funnel-shaped calices. Walls of corallites uneven, twisted, 0.05–0.12 mm thick, with lamellar microstructure. Numerous connecting pores, 0.3–0.4 mm in diameter, 1.3–2.0 mm spaced in vertical section. Connecting tubes very short, very rare. Connecting platforms do not occur. Tabulae very numerous, densely arranged, deep funnel-shaped. Septal spine and axial canal are absent. Numerous spines on tabulae.

Material. Two almost complete, very well preserved coralla (ZPAL.T.XXII/1–2) from the Upper Tournaisian of the Dębnik Anticline (Czatkowice quarry).

Description. — Subcerioidal coralla, irregularly hemispherical, from 40 to 50 mm in diameter. Long prismatic, infrequently cylindro-prismatic corallites, straight and radially arranged. Thecal contact of corallites is incomplete. Transverse sections across corallum reveal numerous, occasionally broad fractures or irregular spaces separating some of walls or wall fragments of neighbouring corallites (Fig. 1A; Pl. I, Fig. 1). Longitudinal sections across corallum show a number of breaks in contacts between walls of neighbouring corallites, which result from their intense folding (Fig. 1B; Pl. I, Fig. 2). Deep, funnel-shaped calices, polygonal with rounded edges in a transverse section, 3.0–3.5 mm in diameter (Pl. I, Fig. 3). In transverse sections corallites are more or less regularly polygonal (pentagonal and hexagonal, sometimes tetragonal) or polygonal and rounded, 2.2–3.6 mm in diameter, most frequently — 2.8–3.6 mm, scarcely polygonal and elongated, dimensions 2.0–3.2 x 3.0–4.0 mm, most frequently — 2.4–3.0 x 3.2–3.8 mm (Pl. I, Fig. 1; Pl. II, Fig. 1). Walls of corallites are thin, uneven, with varying thickness ranging from 0.04 to 0.2 mm, most frequently — 0.05–0.12 mm, vertically twisted. Microstructure of walls is fibro-lamellar. Epithecium very thin, poorly marked, best developed on walls without thecal contact. It exhibits distinct growth ridges (wrinkles) or rings. Connecting elements in a form of pores and tubes. Platforms connecting corallites do not occur. Abundant connecting pores, round, 0.3–0.4 mm in diameter, 1.3–2.0 mm spaced in vertical section, occurring in both walls and angles of corallites (Pl. II, Figs. 1, 2). Connecting tubes are very short and very rare, about 0.4 mm in diameter, spaced in vertical section like in the case of pores. Tabulae are very abundant, densely arranged, thin and thickened, deep funnel-shaped, long, and they entirely fill the inner part of corallites. In a peripheral, near-wall zone of corallites, small, convex tabulae form a narrow, discontinuous zone of vesicular tissue (Fig. 1B; Pl. II, Fig. 3). Septal spines do not occur. Large, cone-shaped, very abundant spines cover upper surfaces of funnel-shaped tabulae. Locally they are arranged in regular rows, 0.2–0.4 mm

spaced (Pl. II, Fig. 3). Axial canal is not marked. Vegetative reproduction took place through intracalicular extravisceral budding. Young individuals budded from side swellings on calice walls of maternal individuals.

Remarks. — *Verolites polonicus* sp. n. differs from the type species (*V. rarus* Tchudinova) in the following features: subcerioidal (not fascicular) structure of corallum composed of prismatic or rarely cylindro-prismatic corallites; polygonal transverse sections of corallites with poorly differentiated and much smaller diameters; thinner walls of corallites; greater number of connecting pores of smaller diameters and longer vertical distances between each other; lack of connecting platforms; very well developed spines on tabulae.

Similarity of the new species to the type species is expressed by its size and morphology of corallum, morphology of calices, uneven and twisted walls of corallites, very numerous deep, funnel-shaped and densely arranged tabulae, presence of vesicular tissue close to walls of corallites, and lack of axial canal.

The new species differs from *Verolites* sp. from the Upper Viséan of Belgium (F. Tournéur, 1989) in the following features: subcerioidal (not fascicular) structure of corallum composed of prismatic (not cylindrical) corallites; polygonal (not oval) corallites in transverse sections, with slightly greater diameters; pores of much smaller diameters and longer vertical distances between each other, irregularly arranged; thinner walls of corallites; lack of septal spines; thinner deep funnel-shaped tabulae; lack of a separate axial canal; presence of visceral zone close to walls of corallites.

Features in common for these three species are as follows: size of corallum, similar diameters of corallites, very short and rare connecting tubes, lamellar microstructure of corallite walls, presence of spines on tabulae, presence of tabulae arranged to form bunches close to pores and connecting tubes, and lack of connecting platforms.

CONCLUSIONS

The presence of the genus *Verolites* in the Upper Tournaisian of Poland, known from Central Asia and Belgium, confirms palaeogeographical connections of coral fauna (first of all *Rugosa*) between the North England and Russian Provinces at that time (E. Poty, 1981). A distinct differentiation of species characteristics (together with significant similarities) among representatives of the genus *Verolites* seems to be justified in their broad stratigraphic range (*V. rarus* — Lower Tournaisian, *V. polonicus* — Upper Tournaisian, *V. sp.* — Upper Viséan).

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NOWY TABULAT (ANTHOZOA) Z TURNEJU ANTYKLINY DĘBNIKA

Streszczenie

Opisano i zilustrowano *Verolites polonicus* sp.n. (Tabulata, Syringoporida) z dolnego karbonu Wyżyny Śląsko-Krakowskiej (antyklina Dębniaka, kamieniołom Czatkowice). Jest to trzeci gatunek mało poznanego rodzaju *Verolites* Tchudinova. Nowy gatunek różni się od gatunku typowego (*V. rarus* Tchudinova) subcerooidalną strukturą corallum złożonego z przyrmaty-

cznych koralitów o mniejszych i niezróżnicowanych średnicach, liczniejszymi porami łączącymi o mniejszych średnicach, bardzo rzadkimi rurkami łączącymi, brakiem platform łączących i silniej rozwiniętymi kolcami na denkach.

EXPLANATIONS OF PLATES

PLATE I

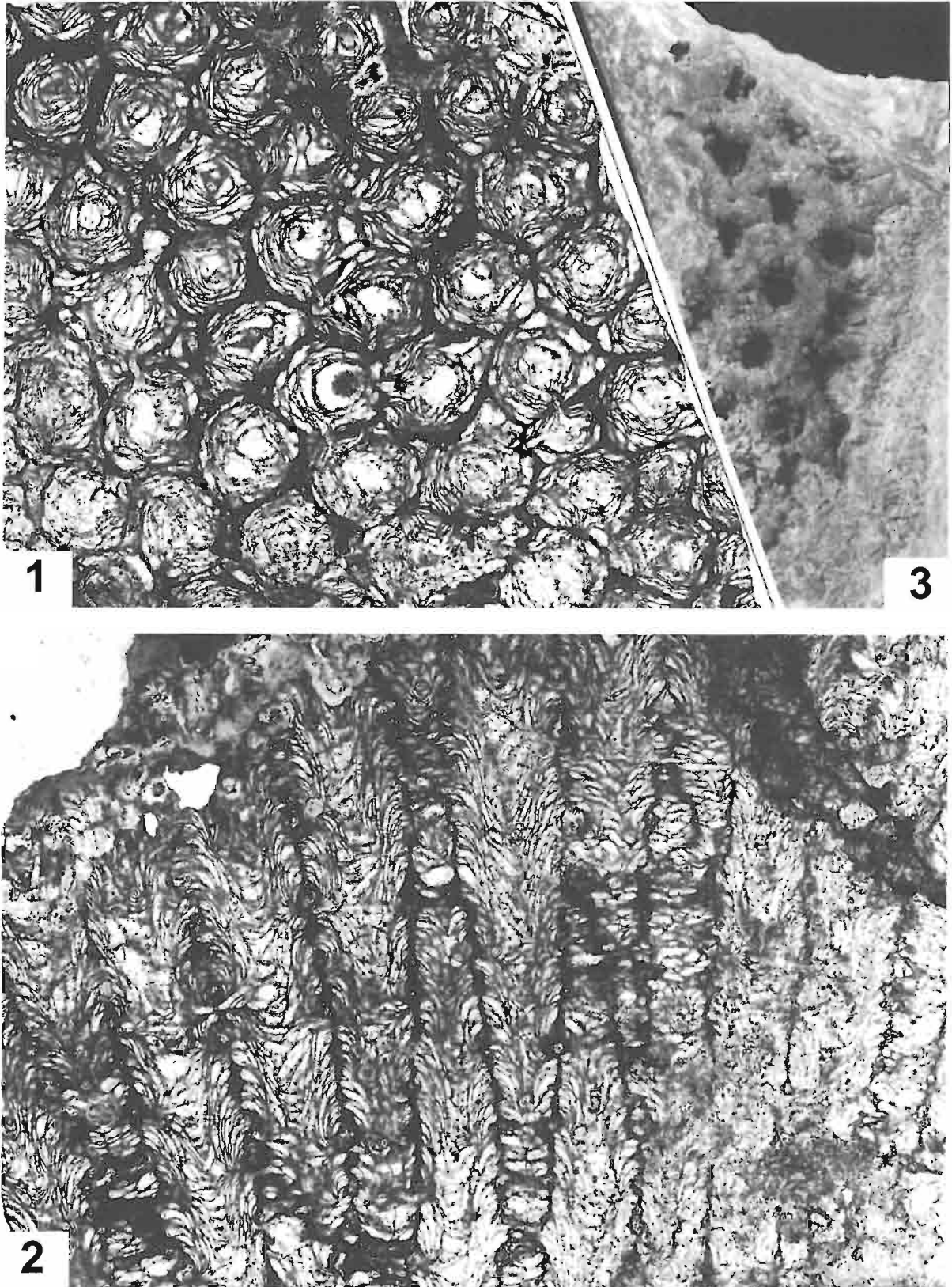
Figs. 1–3. *Verolites polonicus* sp.n.

Fig. 1 — transverse section through central part of corallum, x 5; Fig. 2 — longitudinal section through central part of corallum, x 5; Fig. 3 — naturally skeletonized calice surface of corallum, x 4; holotype (ZPAL.T.XXII/1); Silesia-Cracow Upland, Dębniak Anticline (Czatkowice quarry); Lower Carboniferous, Late Tournaisian (Lower Caninia — C₁)

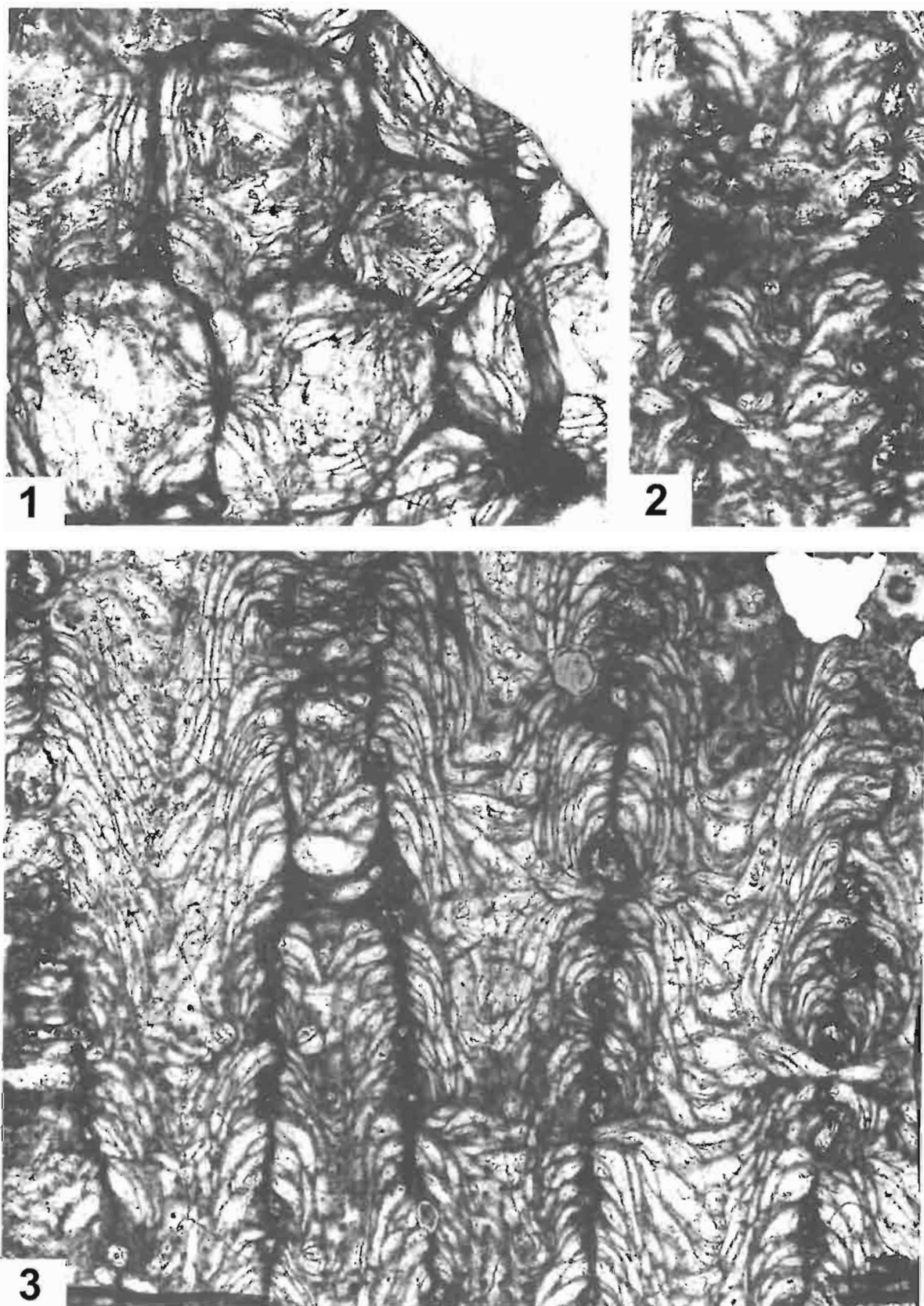
PLATE II

Figs. 1–3. *Verolites polonicus* sp.n.

Fig. 1 — transverse section across corallum with connecting pores at edges of faces of prisms visible, x 12, ZPAL.T.XXII/2; Fig. 2 — longitudinal section across corallum with wall pores visible, x 12, ZPAL.T.XXII/2; Fig. 3 — longitudinal section across central part of corallum showing morphology and arrangement of tabulae as well as spines on tabulae, x 12, holotype (ZPAL.T.XXII/1); Silesia-Cracow Upland, Dębniak Anticline (Czatkowice quarry); Lower Carboniferous, Late Tournaisian (Lower Caninia — C₁)



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