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## THE DEVONIAN TABULATA OF THE SOUTHERN PART OF THE ŚWIĘTOKRZYSKIE (HOLY CROSS) MTS., POLAND

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Seventeen species of the Tabulata, including four new species and one new subspecies, have been described from the Givetian and Frasnian deposits of the Żerniki IG-1 borehole in the southern part of the Świętokrzyskie (Holy Cross) Mountains. The Givetian and Frasnian assemblages of Żerniki differ in their small taxonomic differentiation and in specific spectrum from assemblages found in other part of the Holy Cross Mts., Cracow Region and Lublin Region. As compared with coeval assemblages of Western (the Ardennes) and Eastern (the Urals, the East-European Platform) Europe, the Givetian and Frasnian assemblages under discussion are transitional in character.

**Key words:** Tabulata, Upper Devonian, Poland.

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### INTRODUCTION

The Żerniki IG-1 borehole is 1213 m deep. It does not reach the bottom of the Devonian deposits. The whole Devonian complex, which amounts to 631.35 m in thickness, is composed of carbonates, limestones and calcareous-dolomitic deposits. Givetian (432 m thick) and Frasnian (199.35 m thick) deposits are represented in the borehole (stratigraphy — after Pawłowska, in press).

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The collection, 69 specimens (colonies) and 105 microscopic sections, is housed at the Geological Institute of Warsaw (abbreviated as IG).

CHARACTERISTIC OF THE DEVONIAN DEPOSITS OF THE ŻERNIKI  
IG-1 BOREHOLE

The Devonian in the Żerniki IG-1 (fig. 1) is represented mostly by microcrystalline, compact, dark- and light-gray limestones, dark- and light-gray organogenic limestones with macro- and microfaunal detritus, thick intercalations of fine-grained, compact, light-gray dolomitic limestones and dolomites.

*The Givetian.* — (1) Hard, compact, fine-grained, gray and yellowish limestones, with stromatoporoids, tabulates, rugosa, brachiopods, bivalves, crinoids and foraminifers, intercalated with marly limestones and marls containing the *Amphipora*; (2) Secondarily occurring light-gray, fine-grained organogenic limestones with fauna similar in composition to that of the compact limestones; (3) Dark- and light-gray, fine-grained, compact, dolomitic limestones with corals (tabulates and rugosa) and stromatoporoids (*Amphipora* and *Stromatopora*); (4) Brecciated limestones and calcareous breccia; (5) Dolomites.

*The Frasnian.* — (1) Light- and dark-gray, locally cherry-colored, fine-grained, compact limestones with rugosa, stromatoporoids (*Amphipora* and *Stromatopora*), tabulates, brachiopods, gastropods, bivalves and mostly foraminiferal fauna; (2) Light- and dark-gray, fine-grained, organogenic limestones with corals (rugosa and tabulates) and stromatoporoids and intercalations of gray amphiporal limestones; (3) Secondarily occurring dolomitic limestones and dolomites.

The stromatoporoids and rugosa are predominant in the Devonian profile of the Żerniki IG-1 borehole. Less numerous are tabulates, brachiopods, gastropods, bivalves, crinoids (stems) and foraminifers.

## CORAL-BEARING LIMESTONES AND THEIR FAUNA

The Tabulata occur only in some depths of this profile and are, on the whole, well preserved. They mostly form large, complete colonies and, less frequently, are broken (mostly of the branched type), and very rarely are crushed.

*The Givetian.* — The Tabulata occur here mostly in two horizons: (1) in the middle part of the Givetian profile, in a complex of gray, fine-grained organogenic limestones 16.7 m in thickness (at a depth of 1,047—1,063.7 m) and (2) in its top part, in gray-red, compact, fine-grained limestones 16.6 m in thickness (at a depth of 784.8 m, fig. 1). In the former of the two horizons, the Tabulata are represented mostly by the families Alveolitidae, Coenitidae and Auloporidae. Branched colonies (*Thamnopora*, *Scoliopora*, *Egosiella* and *Aulopora*) prevail numerically over massive ones (*Alveolites*, *Caliopora*). The following eight species (fig. 1) make up

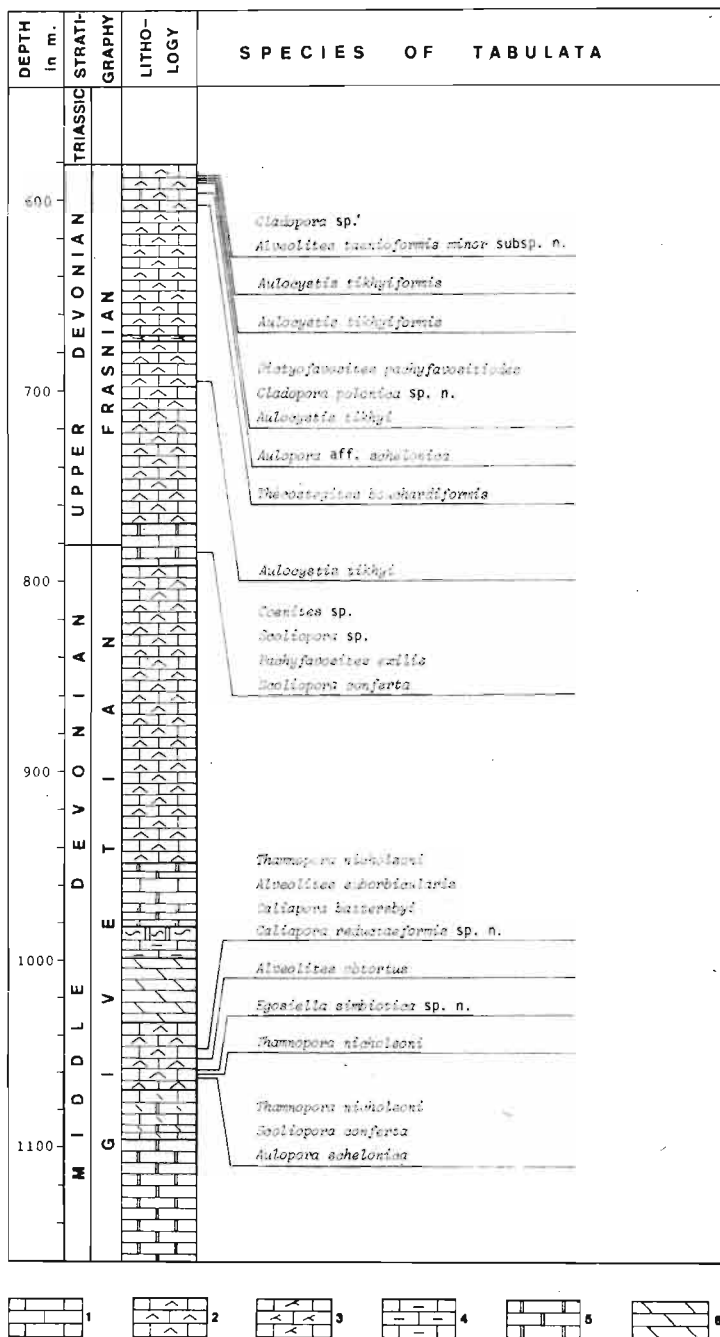


Fig. 1. Distribution of Tabulata in the Givetian and Frasnian of the Žerniki IG-borehole.

1 microcrystalline limestone, 2 organogenic coral-stromatoporoid limestone,

3 *Amphipora* limestone, 4 marly limestone and marls, 5 dolomite, 6 limestone breccia.

this assemblage: *Thamnopora nicholsoni*, *Alveolites obtortus*, *A. suborbicularis*, *Caliopora battersbyi*, *C. reductaeformis* sp. n., *Scoliopora conferta*, *Egosiella simbiotica* sp. n. and *Aulopora schelonica*. In the latter horizon, the Tabulata are represented by the families Pachyfavositidae and Coenitidae. The colonies are here very numerous, but only four species are abundantly represented, that is, *Pachyfavosites exilis*, *Scoliopora conferta*, *Scoliopora* sp. and *Coenites* sp. and, in contrast to the colonies of the first horizon, represent only branched and digital forms (fig. 1).

In both horizons, the Tabulata are accompanied by numerous branched and massive stromatoporoids mostly of the genera *Actinostroma* (*A. cf. bifarium* and *A. sp.*), *Amphipora* (*A. ramosa*), *Clathrocoilona*, *Idiostroma*, *Stachyodes*, *Stromatopora* (*S. minutitexta*) (J. Kaźmierczak, oral communication), as well as few rugosans, brachiopods, crinoids (stems) and foraminifers.

In addition to new (*Caliopora reductaeformis* sp. n., *Egosiella simbiotica* sp. n.) and cosmopolitan species of a considerable vertical range (*Alveolites obtortus*, *A. suborbicularis*), the stratigraphic situation of this part of profile is well defined by the Givetian assemblage of Tabulata. Of particular importance are here such species, known exclusively from the Givetian, as *Pachyfavosites exilis*, *Scoliopora conferta*, *Thamnopora nicholsoni* and *Caliopora battersbyi*.

*The Frasnian.* — The tabulates occur here in two horizons: (1) in a complex of fine-grained and compact limestones 31 m in thickness (at a depth of 695.2 m) in the middle part of the Frasnian profile and (2) in fine-grained, compact, gray limestones 15.75 m in thickness (at a depth of 586.75—602.5 m) in the top part of this profile. The most abundant are they in the uppermost part near the contact with the Frasnian (fig. 1). In the first horizon the few tabulates occur almost exclusively as ramose colonies of the genus *Aulocystis* (*A. tikhyi* and other indeterminate species of this genus) and *Aulopora*. In the second horizon, the abundant tabulates are represented mostly by the families Pachyporidae, Alveolitidae and Aulocystidae. The assemblage includes the following species (fig. 1): *Dictyofavosites pachyfavositoides*, *Cladopora polonica* sp. n., *Cladopora* sp., *Alveolites taenioformis minor* subsp. n., *Thecostegites bouchardiformis* sp. n., *Aulocystis tikhyi*, *A. tikhyiformis* and *Aulopora* aff. *schelonica*. In contrast to the Givetian, the Frasnian tabulate assemblage display a vast predominance of massive (*Dictyofavosites* and *Alveolites*) and dendroid (*Thecostegites* and *Aulocystis* which do not occur in the Givetian) colonies over branching colonies (*Cladopora*) which occur here only subordinately.

In the two Frasnian horizons, tabulates are accompanied by abundant branching and massive stromatoporoids mostly of the genera *Actinostroma* (*A. crassepilatum*, *A. stellulatum*), *Clathrocoilina*, *Parallepora* (*P. kudobensis*), *Stromatopora* (*S. aff. cooperi*), *Amphipora* (J. Kaźmierczak,

oral communication), as well as by few tetracorals (*Phillipsastraea*, *Aristophyllum*), brachiopods, gastropods (*Pleurotomaria*, *Loxonema*), bivalves and foraminifers.

Apart from new species (*Cladopora polonica* sp. n.) and those having a large vertical range (*Alveolites taeniformis*), the stratigraphic situation of this part of profile is well defined by the Frasnian assemblage of the Tabulata. Of importance are here such species, known exclusively from the Frasnian, as *Dictyofavosites pachyfavositoides*, *Aulocystis tikhyi*, *A. tikhyiformis* and *Thecostegites bouchardiformis* sp. n., the last-named closely related with the Frasnian species *T. bouchardi* (Michelin).

*Remarks on the Tabulata assemblages.* — As compared with coeval Tabulata assemblages from other localities in Poland (the northern and southern parts of the Holy Cross Mts., the Cracow and Lublin regions), the assemblages under consideration are less differentiated taxonomically and different specifically (table 1, Stasińska 1953, 1958, Nowiński 1976, Stasińska and Nowiński 1976, 1978). Apart from cosmopolitan species such as *Alveolites suborbicularis* and *Caliapora battersbyi*, as well as new ones, only few common species occur in both the Givetian and Frasnian of Żerniki. They include: *Dictyofavosites pachyfavositoides* and *Cladopora* sp., a form similar to *C. gracilis* (Salée), which are common of the Frasnian of Żerniki and the Cracow Region (fig. 1; table 1; Nowiński 1976); *Alveolites taeniformis minor* subsp. n. (closely related with *A. taeniformis taeniformis* Schlüter), common of Żerniki, the Holy Cross Mts. and the Cracow Region; *Aulocystis tikhyiformis*, common of Żerniki and the Lublin Region.

The transitional character of Poland's tabulate fauna between Western and Eastern Europe is confirmed by new data obtained from Żerniki in the Holy Cross Mts.

Elements known from the Ardennes, Belgium, Ural, USSR and from several localities in Poland (Stasińska 1953, 1958a; Nowiński 1976), that is, *Thamnopora nicholsoni*, *Alveolites suborbicularis*, *A. obtortus* and *Caliapora battersbyi* occur here in the Givetian. Such Ural species, so far never recorded from Poland, as *Pachyfavosites exilis*, *Scoliopora conferta* and *Aulopora schelonica* also occur in this locality. *Caliapora reductaeformis* sp. n. display a close relationship with *C. reducta* from the Givetian of the Urals. Two cosmopolitan species of a considerable vertical range, *Alveolites suborbicularis* and *A. obtortus*, occurring in the Frasnian of Belgium, are known, in Poland and the Urals, only from the Givetian (Lecompte 1933, 1936, 1939; Sokolov 1950, 1952; Yanet 1972).

The Frasnian tabulate fauna in Żerniki is similar to that from the Ardennes and the East European Platform. This similarity depends not so much on the occurrence of identical species, as on the fact that the Żerniki species are similar, or related to the species characteristic to the Ardennes and the Urals. For example, West-European in character are

Table 1

Distribution of Tabulata in the Givetian (G) and Frasnian (F) of Poland

| SPECIES   | LOCATION<br>STRATIGRAPHY |        |                                    |        |               |        |               |        |
|---|--------------------------|--------|------------------------------------|--------|---------------|--------|---------------|--------|
|   | S of the Holy Cross Mts. |        | other parts of the Holy Cross Mts. |        | Cracow region |        | Lublin region |        |
|   | 1<br>G                   | 2<br>F | 3<br>G                             | 4<br>F | 5<br>G        | 6<br>F | 7<br>G        | 8<br>F |
| <i>Favosites goldfussi</i> d'Orbigny                    |                          |        | +                                  |        |               |        | +             |        |
| <i>Dictyofavosites pachyfavositoidea</i> Nowiński       |                          | +      |                                    |        |               |        | +             |        |
| <i>Pachyfavosites exilis</i> Sokolov                    | +                        |        |                                    |        |               |        |               |        |
| <i>Roemerolites lublinensis</i> Stasińska et Nowiński   |                          |        |                                    |        |               |        |               | +      |
| <i>Thamnopora alta</i> (Tchernychev)                    |                          |        |                                    |        |               |        | +             |        |
| <i>Thamnopora boloniensis</i> (Gosset)                  |                          |        |                                    | +      | +             |        | +             |        |
| <i>Thamnopora cervicornis</i> (de Blainville)           |                          |        | +                                  |        |               |        | +             |        |
| <i>Thamnopora nicholsoni</i> (Frech)                    | +                        |        |                                    |        |               |        |               |        |
| <i>Thamnopora reticulata legibilis</i> Sokolov          |                          |        |                                    |        |               |        | +             |        |
| <i>Thamnopora reticulata reticulata</i> (de Blainville) |                          |        | +                                  |        |               |        | +             |        |
| <i>Thamnopora striatoporoides</i> Nowiński              |                          |        |                                    |        | +             |        |               |        |
| <i>Gracilopora polonica</i> Stasińska et Nowiński       |                          |        |                                    |        |               |        |               | +      |
| <i>Gracilopora vermicularis</i> (Mc Coy)                |                          |        |                                    |        |               |        |               | +      |
| <i>Cladopora gracilis</i> (Salée)                       |                          |        |                                    |        |               | +      |               |        |
| <i>Cladopora polonica</i> sp. n.                        |                          | +      |                                    |        |               |        |               |        |
| <i>Cladopora</i> sp.                                    |                          | +      |                                    |        |               |        |               |        |
| <i>Alveolites complanatus</i> Lecompte                  |                          |        |                                    | +      |               |        |               |        |
| <i>Alveolites duponti</i> Lecompte                      |                          |        |                                    |        |               |        | +             |        |
| <i>Alveolites fornicatus</i> Schlüter                   |                          |        |                                    | +      |               |        |               |        |
| <i>Alveolites</i> cf. <i>fornicatus</i> Schlüter        |                          |        |                                    | +      |               |        |               |        |
| <i>Alveolites intermixtus</i> Lecompte                  |                          |        |                                    | +      |               |        |               | +      |
| <i>Alveolites maillieui</i> Salée                       |                          |        |                                    | +      |               |        | +             |        |
| <i>Alveolites multiperforatus</i> Salée                 |                          |        |                                    | +      |               |        |               |        |
| <i>Alveolites obtortus</i> Lecompte                     | +                        |        |                                    | +      |               |        |               |        |
| <i>Alveolites parvus</i> Lecompte                       |                          |        |                                    | +      |               |        | +             |        |
| <i>Alveolites smithi</i> Lecompte                       |                          |        |                                    | +      |               |        |               |        |
| <i>Alveolites suborbicularis</i> Lamarck                | +                        |        |                                    | +      | +             |        | +             |        |
| <i>Alveolites taenioformis taenioformis</i> Schlüter    |                          |        |                                    | +      |               |        | +             |        |
| <i>Alveolites taenioformis minor</i> subsp. n.          | +                        |        |                                    |        |               |        |               |        |
| <i>Alveolites tenuissimus</i> Salée                     |                          |        |                                    | +      |               |        |               |        |
| <i>Alveolitella fecunda</i> (Salée)                     |                          |        |                                    | +      |               |        |               |        |
| <i>Alveolitella rachaniensis</i> Stasińska et Nowiński  |                          |        |                                    |        |               |        |               | +      |
| <i>Alveolitella ramosa</i> (F.A. Roemer)                |                          |        |                                    |        |               | +      |               |        |
| <i>Alveolitella xarispinosa</i> Nowiński                |                          |        |                                    |        |               | +      |               |        |
| <i>Crassialveolites crassus</i> (Lecompte)              |                          |        |                                    | +      |               |        | +             |        |
| <i>Crassialveolites polonicus</i> Nowiński              |                          |        |                                    |        | +             |        |               |        |
| <i>Caliopora battersbyi</i> (Milne-Edwards et Haime)    | +                        |        |                                    |        | +             |        | +             |        |
| <i>Caliopora reductaeformis</i> sp. n.                  | +                        |        |                                    |        |               |        |               |        |
| <i>Coenites laminosa</i> Gürich                         |                          |        | +                                  |        |               |        | +             |        |
| <i>Coenites variabilis</i> Sokolov                      |                          |        |                                    |        |               |        |               | +      |
| <i>Placocoenites escharoides</i> (Steininger)           |                          |        | +                                  |        |               |        |               |        |
| <i>Placocoenites medius</i> (Lecompte)                  |                          |        |                                    |        | +             |        |               |        |
| <i>Egosiella simbiotica</i> sp. n.                      | +                        |        |                                    |        |               |        |               |        |
| <i>Scoliopora conferta</i> Ermakova                     | +                        |        |                                    |        |               |        |               |        |
| <i>Scoliopora denticulata</i> (Milne-Edwards et Haime)  |                          |        |                                    |        | +             |        | +             |        |
| <i>Scoliopora</i> aff. <i>muricata</i> Tchudinova       |                          |        |                                    |        | +             |        |               |        |
| <i>Natalophyllum dubiensis</i> Nowiński                 |                          |        |                                    |        | +             |        |               |        |
| <i>Natalophyllum giveticum</i> Raduguin                 |                          |        |                                    |        | +             |        |               |        |

|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--|---|---|---|---|---|---|---|---|
| <i>Tyrganolites eugeni</i> Tchernychev               |   |   |   |   | + |   |   |   |
| <i>Tyrganolites frasnianus</i> Nowiński              |   |   |   |   |   | + |   |   |
| <i>Syringopora</i> sp.                               |   |   |   |   | + |   |   |   |
| <i>Syringella polonica</i> Nowiński                  |   |   |   | + |   |   |   |   |
| <i>Thecostegites bouchardi</i> (Michelin)            |   |   |   |   |   |   |   | + |
| <i>Thecostegites bouchardi formis</i> sp. n.         |   | + |   |   |   |   |   |   |
| <i>Thecostegites evlanensis</i> Ermakova             |   |   |   |   |   |   |   | + |
| <i>Thecostegites maior</i> Lecompte                  |   |   |   |   |   |   |   | + |
| <i>Aulopora lata</i> Lecompte                        |   |   | + |   |   |   |   |   |
| <i>Aulopora lataeformis</i> Stasińska                |   |   | + |   |   |   |   |   |
| <i>Aulopora schelonica</i> Tchernychev               | + |   |   |   |   |   |   |   |
| <i>Aulopora</i> aff. <i>schelonica</i> Tchernychev   |   | + |   |   |   |   |   |   |
| <i>Aulopora serpens maior</i> Goldfuss               |   |   | + |   |   |   |   |   |
| <i>Aulopora</i> sp.                                  |   |   |   |   |   | + |   |   |
| <i>Mastopora spicata</i> (Goldfuss)                  |   |   |   |   |   |   |   |   |
| <i>Aulocystis tikhyi</i> Sokolov                     |   | + |   |   |   |   |   |   |
| <i>Aulocystis tikhyiformis</i> Stasińska et Nowiński |   | + |   |   |   |   |   | + |
| <i>Grabaulites jurkovicensis</i> Stasińska           |   |   | + |   |   |   |   |   |
| <i>Grabaulites skalensis</i> Stasińska               |   |   | + |   |   |   |   |   |
| <i>Aulocystella devonica</i> Stasińska et Nowiński   |   |   |   |   |   |   |   | + |

G - Givetian F - Frasnian

*Cladopora* sp., similar to *C. gracilis*, *Alveolites taenioformis minor* subsp. n., similar to *A. taenioformis taenioformis* and *Thecostegites bouchardi formis* sp. n., similar to *T. bouchardi*. Common with those occurring in the East-European Platform are *Aulocystis tikhyi*, typical of the East-European Platform, *A. thikhyiformis*, related, with *A. tikhyi* and *Aulopora* aff. *schelonica*.

The occurrence of *Pachyfavosites exilis*, *Thamnopora nicholsoni*, *Scoliopora conferta* and *Aulopora schelonica* has not previously been recorded in Poland.

#### DESCRIPTIONS OF SPECIES

Order **Favositida** Sokolov, 1962

Suborder **Favositina** Sokolov, 1950

Family **Favositidae** Dana, 1846

Subfamily **Favositinae** Dana, 1846

Genus *Pachyfavosites* Sokolov, 1952

*Pachyfavosites exilis* Sokolov, 1952

(pl. 37: 1a, b)

1952. *Favosites* (*Pachyfavosites*) *exilis* Sokolov: 50, pl. 11: 5, 6.

1959. *Pachyfavosites exilis* Sokolov; Dubatolov: 62, pl. 17: 9a, b.

1959. *Pachyfavosites exilis* Sokolov; Yanet: 105, pl. 48: 2.

*Diagnosis*. — See Dubatolov, 1959.

*Material*. — Two almost complete colonies from a depth of 784.8 m (IG T80/1, 2).

*Dimensions* (in mm):

|                               |                      |
|-------------------------------|----------------------|
| diameter of a colony          | 9.0—14.0             |
| diameter of corallites        | (0.4)0.5—0.7(1.0)    |
| thickness of a corallite wall |                      |
| in axial zone                 | (0.08)0.1—0.12(0.15) |
| in peripheral zone            | 0.15—0.25            |

|                                 |                   |
|---------------------------------|-------------------|
| diameter of connecting pores    | 0.2               |
| spaces between connecting pores | (0.7)0.8—1.0(1.3) |
| spaces between tabulae          | (0.1)0.2—0.3(0.5) |

*Description.*—Colonies elongate or digital, circular or suboval in transverse section. In the axial zone, corallites arranged parallel to the axis of colony, in the peripheral zone they bend and, gently arcuate, come out perpendicularly to its surface. Calices polygonal in transverse section, shallow, with strongly rounded edges. Corallites irregularly polygonal and elongate in transverse section. Lumen strongly narrowed, circular or oval in transverse section. Corallite walls very thick, without a secondary stereoplasmatic thickening, of radial-fibrous microstructure. Median line dark, discontinuous, occurring only in the axial zone of colony. Pores circular, arranged in single rows on corallite walls. Tabulae numerous, thin, horizontal, or, infrequently, slanting, straight or, sometimes, bent and incomplete. Septal apparatus not recorded (fig. 2a, b).

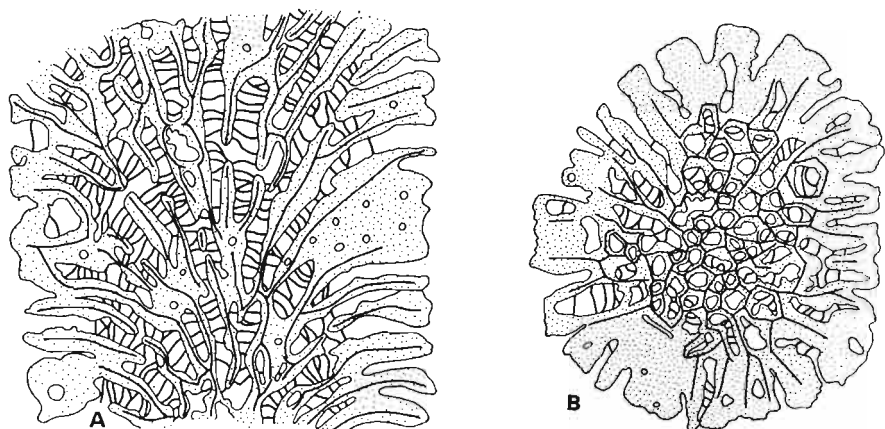


Fig. 2. *Pachyfavosites exilis* Sokolov, 1952, Upper Givetian, Żerniki IG-1 depth 784.8 m. Specimen IG T80/1: A longitudinal section, B transversal section:  $\times 5$ .

*Remarks.*—The colonies examined differ from all other known colonies of this species in considerably more spaced pores and more closely distributed tabulae. In addition, they differ from colonies, described from the Eifelian of the east Uralian slopes (Yanet 1959) and the Lower Givetian of Central Ural (Sokolov 1952), in thinner corallite walls, from a colony from the Lower Eifelian of the Kuznetsk Basin (Dubatalov 1959) in thinner walls and the lack of septal apparatus.

*Distribution.*—Lower Eifelian through Lower Givetian: USSR (Ural, Kuznetsk Basin). Upper Givetian: Poland (Holy Cross Mts.—Żerniki IG-1 borehole).

### Subfamily **Emmonsiinae** Lecompte, 1952

Genus *Dictyofavosites* Tchernychev, 1951 (emend. Mironova, 1957)

*Dictyofavosites pachyfavositoides* Nowiński, 1976

(pl. 36: 1, 2)

1976. *Squameofavosites* (*Dictyofavosites*) *pachyfavositoides* Nowiński: 44, pl. 1: 4, pl. 2: 2a, b, 3a, b, text-figs. 12A, B.

*Diagnosis.*— See Nowiński 1976.



*Material.*—Two large fragmentary colonies from a depth of 590.20 m and 590.25 m.

Dimensions (in mm):

|                                 |                      |
|---------------------------------|----------------------|
| diameter of a colony            | to 80                |
| diameter of corallites          | (0.4)0.5—0.6(0.7)    |
| thickness of a corallite wall   | (0.3)0.04—0.05(0.06) |
| diameter of connecting pores    | 0.2                  |
| spaces between connecting pores | 0.6—0.8              |

*Remarks.*—*Dictyofavosites* was formerly classified by Dubatolov (1969) and the present co-author (Nowiński 1976) as a subgenus of the genus *Squameofavosites*. The difficulties involved in the classification of this group of the Tabulata result from an insufficient knowledge of it and from the fact that the representatives of *Dictyofavosites* display characters transitional between several genera. In the general structure of colony and shape of corallites, they are similar to the genus *Favosites*, in the distribution of septa on equal levels in adjacent corallites—to *Hattonia*, in the thickness of corallite walls and size and distribution of connecting pores—to *Pachyfavosites*, in the structure of septal apparatus—to *Emmonsia* and in the type of the wall microstructure, size and distribution of connecting pores and development of septal apparatus—to *Squameofavosites*.

The earlier opinions that the genus *Dictyofavosites* should be acknowledged as a separate genus of the subfamily *Emmonsiniæ* Lecompte (Mironova 1957, 1960; Sokolov 1962; Dubatolov 1950, 1963, 1969; Tong-Dzuy Thomh 1967) have been confirmed by the present writers recent studies on the basis of such features as the development of radial elements in the form of squamules and spines (which can be, however, completely or partially reduced), distribution of connecting pores over the walls and corners of corallites, as well as the distribution of tabulae in adjacent corallites mostly on an equal level.

The colonies of Żerniki differ from those described from the Frasnian of the Cracow Region (Nowiński 1976) in a somewhat smaller diameter of corallites, polygonal and rounded transverse section of lumen, thinner walls and strongly developed septal spines.

*Distribution.*—Middle through Upper Frasnian: Poland (Cracow Region; Holy Cross Mts.—Żerniki IG-1 borehole).

Suborder **Thamnoporina** Sokolov, 1962

Family **Pachyporidae** Gerth, 1921

Subfamily **Thamnoporinae** Sokolov, 1950

Genus *Thamnopora* Steininger, 1831

*Thamnopora nicholsoni* (Frech, 1885)

(pl. 38: 2, 3, 4)

1879. *Pachypora cervicornis* Nicholson (part.): 82, pl. 4: 3.

1885. *Favosites nicholsoni* Frech: 104.

1959. *Thamnopora nicholsoni* (Frech); Dubatolov: 108, pl. 13: 13a, b (here synonymy).

1972. *Thamnopora nicholsoni* (Frech); Yanet: 59, pl. 18: 1.

*Diagnosis.*—See Dubatolov 1959.

*Material.*—Three large branches from depths of 1,047 m, 1,061.4 m and 1,063 m (IG T80/5—7).

## Dimensions (in mm):

|                                 |          |
|---------------------------------|----------|
| diameter of a colony            | 9.0—10.0 |
| diameter of corallites          |          |
| in axial zone                   | 0.6—1.2  |
| in peripheral                   | 1.2—1.5  |
| thickness of a corallite wall   |          |
| in axial zone                   | 0.1—0.1  |
| in peripheral zone              | 0.4—0.7  |
| diameter of connecting pores    | 0.15—0.2 |
| spaces between connecting pores | 1.0—1.4  |

*Remarks.* — As compared with colonies coming from the area of the USSR, the colonies of Żerniki display the following differences: (1) from those of the Kuznetsk Basin (Dubatolov 1959) in smaller diameters of connecting pores and less strongly developed septal apparatus and (2) from those of the Givetian of Ural (Yanet 1972) — in smaller diameters of corallites and thinner corallite walls in the peripheral part of branch, as well as in widely spaced pores. As compared with colonies from the Givetian of North Viet-Nam (Tong-Dzuy Thanh 1967), they differ in the presence of the septal apparatus.

*Distribution.* — Middle Devonian (Givetian): Western Europe; USSR (Volhynia, Ural, Kuznetsk Basin); North Viet-Nam. Givetian: Poland (Holy Cross Mts. — Żerniki IG-1 borehole).

Subfamily **Pachyporinae** Gerth, 1921Genus *Cladopora* Hall, 1851*Cladopora polonica* sp. n.

(pl. 37: 2a, b, 3)

*Holotype:* Specimen No IG/8; pl. 37: 2a, b.

*Type horizon:* Upper Frasnian.

*Type locality:* Żerniki IG-1 borehole, depth 590.2 m, Holy Cross Mts.

*Diagnosis.* — Colonies branching, 3—4.5 mm in diameter. Corallites circular and oval in transverse section, 0.4—0.5 mm in diameter in axial and to 0.6—0.7 mm in peripheral zone of branch. Corallite walls 0.05—0.08 mm thick in axial and 0.1—0.2 mm in peripheral zone. Connecting pores widely spaced, 0.12—0.15 mm in diameter; distributed vertically at 0.7—1.7 mm intervals. Tabulae widely spaced, thin, straight and slightly oblique, distributed at 0.3—0.8 mm intervals. Septal apparatus not recorded.

*Material.* — Twelve, well-preserved branches coming from a depth of 590.2 mm (IG T80/8—27).

## Dimensions (in mm):

|                                  |                   |
|----------------------------------|-------------------|
| diameter of a colony             | (3.0)3.4—4.0(4.5) |
| diameter of corallites           |                   |
| in axial zone                    | 0.4—0.5           |
| in peripheral zone               | 0.6—0.7           |
| diameter of the visceral chamber | 0.2—0.3           |
| thickness of a corallite wall    |                   |
| in axial zone                    | 0.05—0.08         |
| in peripheral zone               | 0.1—0.2           |
| diameter of connecting pores     | 0.12—0.15         |
| spaces between connecting pores  | (0.5)0.7—1.0(1.1) |
| spaces between tabulae           | 0.3—0.5(0.8)      |

*Description.*—Colonies branching. Branches long, tortuously bent, slightly flattened, infrequently straight and cylindrical; branching dichotomous, rare. Corallites small, distributed in a fanwise manner at the axis and emerging at an angle of about  $45^\circ$  to the surface, circular, oval or polygonal in transverse section. Calices deep, slightly conical, polygonal subcircular in outline and having sharp edges. Lumen circular or oval in transverse section. Corallite walls of indistinctly radial-fibrous microstructure. Median line thin, dark, discontinuous. Connecting pores circular, widely spaced. Tabulae widely spaced, thin, straight or slightly bent, perpendicular or slightly oblique to corallite walls. Septal spines not recorded (fig. 3a, b).

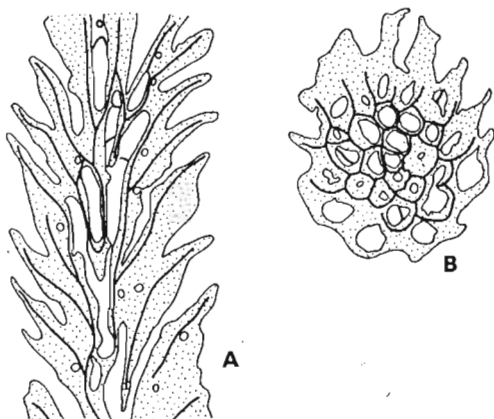


Fig. 3. *Cladopora polonica* sp. n., Upper Frasnian, Żerniki IG-1, depth 590.2 m. Specimen IG T80/8: A longitudinal section, B transversal section;  $\times 6.5$ .

*Remarks.*—*Cladopora polonica* sp. n. displays a considerable similarity to two species, *C. cylindrocellularis* Dubatolov, described from the Eifelian of the Kuznetsk Basin and eastern Ural (Dubatolov 1956, 1959, 1962; Tchudinova 1959) and *C. bella* Mironova, described from the Silurian of Salair (Mironova 1961). The new species differs, however, from *C. cylindrocellularis* in larger diameters of its branches, more regular transverse sections of corallites, thinner corallite walls in the axial zone of colony and smaller diameters of connecting pores. From *C. bella*, it differs in smaller diameters of corallites in the axial and peripheral zones of branches, thinner corallite walls in the two zones, larger diameters of connecting pores and more strongly developed tabulae.

*Distribution.*—Upper Frasnian: Poland (Holy Cross Mts.—Żerniki IG-1 borehole).

*Cladopora* sp.  
(pl. 38: 1a, b)

*Material.*—Poorly preserved fragments of two colonies from a depth of 586.77 m (IG T80/28, 29).

Dimensions (in mm):

|                                 |           |
|---------------------------------|-----------|
| diameter of colony              | 1.6—2.8   |
| diameter of corallites          | 0.2—0.4   |
| thickness of a corallite wall   |           |
| in axial zone                   | 0.05—0.07 |
| in peripheral zone              | 0.1—0.2   |
| diameter of connecting pores    | 0.05—0.08 |
| spaces between connecting pores | 0.4—0.5   |

*Description.* — Colonies branching, branches very fine, slightly arcuate, circular or suboval in transverse section. Corallites small, arcuately bending from the axis, opening at a right angle to the surface. Corallites irregularly polygonal and sub-circular in transverse section. Lumen subcircular and oval. Wall of a radial fibrous microstructure thickened by a secondary layer of stereoplasm. Median line thin, dark, discontinuous, poorly visible. Connecting pores few, circular. Tabulae very rare, thin, straight or very slightly bent, horizontal. Septal spines not recorded.

*Remarks.* — Due to a poor state of preservation and small fragments of colony, it is impossible to determine accurately the species. The specimens of *Cladopora* sp. described above is similar to *C. gracilis* Lecompte, described from the Frasnian of Belgium (Lecompte 1939), from the Frasnian Western Ural (Sokolov 1952), from the Eifelian of the Holy Cross Mts. (Stasińska 1958) and from the Frasnian of the Cracow Region (Nowiński 1976). It differs, however, from this species in having somewhat thinner corallite walls and less strongly developed tabulae.

*Distribution.* — Frasnian: Poland (Holy Cross Mts. — Żerniki IG-1 borehole).

### Suborder Alveolitine Sokolov, 1950

#### Family Alveolitidae Duncan, 1872

#### Genus *Alveolites* Lamarck, 1801

#### *Alveolites obtortus* Lecompte, 1939

1939. *Alveolites obtortus* Lecompte: 42, pl. 6: 4—7.

1953. *Alveolites obtortus* Lecompte; Stasińska: 231, pl. 3: 4.

1959. *Alveolites obtortus* Lecompte; Dubatolov: 144, pl. 48: 3a, b, 4a, b (here synonymy).

*Material.* — Large, well preserved fragments of three colonies from a depth of 1,052.6 m (IG T80/30—32).

Dimensions (in mm):

|                                 |                         |
|---------------------------------|-------------------------|
| diameter of corallites          | 0.5—0.6(0.7)            |
| dimensions of corallites        | 0.2—0.6 × 0.6—0.9       |
| thickness of a corallite wall   | 0.02—0.04 and 0.08—0.15 |
| diameter of connecting pores    | 0.12—0.15               |
| spaces between connecting pores | 0.5—0.8                 |
| spaces between tabulae          | (0.1)0.2—0.4(0.5)       |

*Remarks.* — The colonies here described from the Givetian differ from those from the Lower Frasnian (Stasińska 1953) in a variable thickness of corallite walls (groups of thin-walled, 0.02—0.04 mm, corallites arranged in a pinnate manner in the colony, occur in various places of the colony) and in septal apparatus formed of numerous fine and needlelike spines. From the colonies from the Frasnian of Belgium (Lecompte 1939) they differ only in a stronger differentiation of corallite diameter. From the Frasnian colonies of the Kuznetsk Basin (Dubatolov 1959) they differ in somewhat larger diameters of corallites and connecting pores, as well as a more strongly developed septal apparatus. From the Givetian of Ural, described as *Crassialveolites obtortus* (Yanet 1972), they differ in more circular shape of corallite transverse section, thinner corallite walls and wider spaces between connecting pores and tabulae.

*Distribution.* — Givetian: Poland (Holy Cross Mts. — Żerniki IG-1 borehole). Frasnian: Belgium (Dinant); Poland (Holy Cross Mts., Sudetes); USSR (Kuznetsk Basin); Viet-Nam.

*Alveolites suborbicularis* Lamarck, 1801

1801. *Alveolites suborbicularis* Lamarck: 375.

1976. *Alveolites suborbicularis* Lamarck; Nowiński: 39, pl. 9: 1a—c, 2 (here synonymy).

*Material.*—Large, well preserved fragments of two colonies from a depth of 1,047 m (IG T80/33, 34).

*Dimensions* (in mm):

|                               |                         |
|-------------------------------|-------------------------|
| dimensions of corallites      | 0.4—0.6 × 0.7—0.9       |
| thickness of a corallite wall | 0.01—0.05 and 0.07—0.15 |
| diameter of connecting pores  | 0.1—0.15                |
| spaces between tabulae        | (0.1)0.3—0.5(0.7)       |

*Remarks.*—The colonies of Żerniki differ from those described from the Givetian of the Cracow Region (Nowiński 1976), in having groups of thin-walled corallites and less spaced pores and tabulae.

*Distribution.*—Givetian through Frasnian: cosmopolitan.

*Alveolites taenioformis* Schlüter, 1889*Alveolites taenioformis* minor subsp. n.

(pl. 36: 3, 4)

*Holotyp:* Specimen No IG/37; pl. 36: 3.

*Type horizon:* Upper Frasnian.

*Type locality:* Holy Cross Mts., Żerniki IG-1 borehole, depth 586.75—586.77 m.

*Derivation of the name:* *minor*—displaying smaller dimensions of colonies and corallites than those in *A. taenioformis* Schlüter.

*Diagnosis.*—Colonies flat, corallites 0.15—0.2 × 0.3—0.4 mm. Thickness of corallite walls 0.02—0.05 mm. Connecting pores rare, 0.08—0.1 mm in diameter, their vertical spaces 0.7—0.9 mm. Tabulae very rare, spaced at 0.3—0.5 mm intervals.

*Material.*—Large, well preserved fragments of three colonies from depth of 586.75 mm and 586.77 m (IG T80/35—37).

*Dimensions* (in mm):

|                                 |                       |
|---------------------------------|-----------------------|
| dimensions of corallites        | 0.15—0.2 × 0.1—0.4    |
| thickness of a corallite wall   | (0.01)0.02—0.05(0.06) |
| diameter of connecting pores    | 0.08—0.1              |
| spaces between connecting pores | 0.7—0.9               |
| spaces between tabulae          | 0.3—0.5               |

*Description.*—Small, flattened massive colonies, composed of long, thick-walled, arcuate corallite opening strongly obliquely to the surface of colony. Corallites very small, strongly elliptical in transverse section. Corallite walls of radial-fibrous microstructure. Median line dark, poorly visible. Connecting pores rare, fine. Tabulae very rare, thin, straight or bent in a meniscus-like manner. Septal apparatus invisible.

*Remarks.*—The new subspecies differs from *Alveolites taenioformis taenioformis* Schlüter, described from the Givetian of Poland (Holy Cross Mts.), Belgium (the Ardennes) and the USSR (Ural), as well as from the Lower Frasnian of Poland (Cracow Region) (Schlüter 1889, Sobolev 1904, 1909; Lecompte 1939; Sokolov 1950, 1952; Stasińska 1958; Nowiński 1976) in proportionally smaller dimensions of almost

all morphological elements of its skeleton: corallite and pore diameters, pore density and wall thickness.

*Distribution.*— Upper Frasnian: Poland (Holy Cross Mts.—Żerniki IG-1 borehole).

### Genus *Caliapora* Schlüter, 1889

#### *Caliapora battersbyi* (Milne-Edwards et Haime, 1851)

1851. *Alveolites battersbyi* Milne-Edwards et Haime: 257.

1939. *Caliapora battersbyi* (Milne-Edwards et Haime); Lecompte: 136, pl. 19: 1—7 (here synonymy).

1976. *Caliapora battersbyi* (Milne-Edwards et Haime); Nowiński: 68, pl. 11: 1 a—c, 2 (here synonymy).

*Material.*— Well preserved fragments of two colonies from a depth of 1,047.5 m (IG T80/38, 39).

Dimensions (in mm):

|                                 |                     |
|---------------------------------|---------------------|
| diameter of corallites          | (0.6)0.8—0.9(1.0)   |
| thickness of a corallite wall   | (0.05)0.1—0.15(0.3) |
| diameter of connecting pores    | 0.2—0.25            |
| spaces between connecting pores | 0.7                 |
| spaces between tabulae          | 0.1—0.5             |

*Remarks.*— The colonies of *Caliapora battersbyi* of Żerniki differ from those from the Givetian of the Cracow Region (Nowiński 1976) in the lack of oval pores and smaller spaces between tabulae. From the colonies of other regions of Poland (northern Poland—Miastko 1 borehole, Lublin Region—Plusy IG-1 borehole) (Stasińska 1969; Stasińska and Nowiński 1976) and those from the Givetian of Belgium (Lecompte 1939), the colonies described differ in larger diameters of pores, distributed at larger intervals.

*Distribution.*— Givetian: Poland (Holy Cross Mts.—Jurkowice, Żerniki IG-1 borehole; Cracow Region—Siedlec; North Poland—Miastko 1 borehole; Lublin Region—Plusy IG-1 borehole); Great Britain; Belgium (Ardennes).

#### *Caliapora reductaeformis* sp. n.

(pl. 39: 1a, b)

*Holotype:* Specimen No IG/40; pl. 39: 1a, b.

*Type horizon:* Givetian.

*Type locality:* Holy Cross Mts., Żerniki IG-1 borehole, depth 1,047.0 m.

*Derivation of the name:* *reductaeformis*— similar to *Caliapora reducta* Yanet, 1972.

*Diagnosis.*— Colonies digital in shape, to 30 mm in diameter; corallites irregularly polygonal in transverse section and 0.7—1.1 mm in diameter. Corallite walls 0.1—0.2 mm in thickness. Septal squamae rare, large, obtuse. Connecting pores 0.2—0.3 mm in diameter, spaced vertically at 0.7—0.9 mm intervals. Tabulae horizontal and oblique, spaced at 0.2—0.5 mm intervals.

*Material.*— One, almost complete, well preserved colony from a depth of 1,047 m.

Dimensions (in mm):

|                               |                     |
|-------------------------------|---------------------|
| diameter of corallites        | (0.5)0.7—1.1(1.3)   |
| thickness of a corallite wall | (0.05)0.1—0.2(0.25) |

|                                 |                   |
|---------------------------------|-------------------|
| diameter of connecting pores    | 0.2—0.3           |
| spaces between connecting pores | 0.7—0.9           |
| spaces between tabulae          | (0.1)0.2—0.5(0.7) |

*Description.* — Colony digital, circular in transverse section, 30 mm in diameter. Corallites long, arcuate, pinnately extending from the axis of colony and perpendicularly opening on its surface. Corallites irregularly polygonal in transverse section. Lumen irregularly oval. Calyces deep, irregularly polygonal, with blunted edges. Corallite walls variable in thickness; microstructure radial-fibrous. Median line dark, wide. Septal squamae rare, large, thick, blunt. Connecting pores numerous, large, circular. Tabulae numerous, thin, horizontal and oblique, straight and arcuate, locally incomplete, attached to septal squamae and passing through connecting pores, to adjacent corallites (fig. 4a, b).

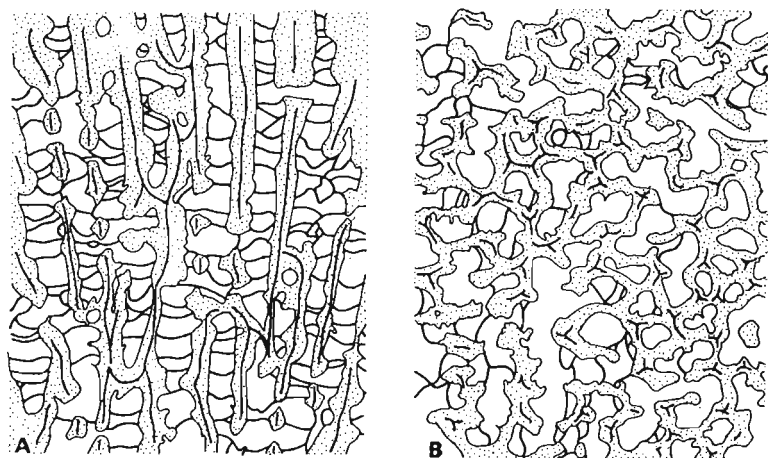


Fig. 4. *Caliopora reductaeformis* sp. n., Givetian, Żerniki IG-1, depth 1047.0 m. Specimen IG T80/40: A longitudinal section, B transversal section;  $\times 6.5$ .

*Remarks.* — *Caliopora reductaeformis* sp. n. is similar to *C. reducta* Yanet, of the Givetian of Ural (Yanet 1972) in the corallite and pore dimensions and in density of tabulae. It differs from *C. reducta* in thinner corallite walls, more spaced pores and less strongly developed septal apparatus which, in the Ural species, has more septal spines than squamae. It differs from *C. battersbyi* (Milne-Edwards et Haime) in a larger diameter of connecting pores, distributed at larger intervals and in a somewhat larger diameter of corallites having thicker walls.

*Distribution.* — Givetian: Poland (Holy Cross Mts. — Żerniki IG-1 borehole).

**Family Coenitidae Sardeson, 1896**  
**Subfamily Coenitinae Sardeson, 1896**  
**Genus *Scoliopora* Lang, Smith and Thomas, 1940**  
*Scoliopora conferta* Ermakova, 1960  
(pl. 38: 5, 6a, b)

1960. *Scoliopora conferta* Ermakova: 81, pl. 4: 14—17.

1972. *Scoliopora conferta* Ermakova; Yanet: 95, pl. 33: 1.

*Diagnosis.* — See Ermakova 1960.

*Material.*—Two almost complete, well preserved colonies from depths 784.8 m and 1,063.7 m (IG Z80/41, 42).

Dimensions (in mm):

|                                 |                                      |
|---------------------------------|--------------------------------------|
| diameter of a colony            | 5.0—9.0                              |
| diameter of corallites          | 0.4—0.6 and $0.4—0.5 \times 0.5—0.8$ |
| thickness of a corallite wall   |                                      |
| in axial zone                   | 0.1—0.15                             |
| in peripheral zone              | 0.2—0.3                              |
| diameter of connecting pores    | 0.1—0.12                             |
| spaces between connecting pores | 1.1—1.5                              |
| spaces between tabulae          | (0.1)0.3—0.6(0.8)                    |

*Description.*—Colonies branching. Branches cylindrical, sometimes dichotomously branching or laterally fused. Axial zone of colony wide, not separated, occupying about a half of the branch diameter. Corallites thin-walled in both the axial and peripheral zone of colony, gently arcuate, and emerging perpendicularly to the surface. They are polygonal, circular and elongate in transverse sections and have a narrow, oval lumen. Calyces polygonal, elongate, deep, with blunt edges. Corallite walls of radial-fibrous microstructure. Median line dark, discontinuous, poorly visible. Connecting pores rare, fine, round. Septal spines rare, weakly developed, occurring only in the peripheral zone of colony and in calices. Tabulae rare, thin, straight or slightly bent, horizontal and oblique.

*Remarks.*—Colonies from Żerniki differ from those of Bashkiria (Ermakova 1960) in more numerous connecting pores and, from Uralian colonies (Yanet 1972), in a smaller diameter of connecting pores and smaller density of tabulae.

*Distribution.*—Givetian: Poland (Holy Cross Mts.—Żerniki IG-1 borehole); USSR (Bashkiria, Ural).

### Genus *Egosiella* Dubatolov in Sokolov, 1955

#### *Egosiella symbiotica* sp. n.

(pl. 40: 1a, b, 2)

*Holotype:* Specimen No IG/43; pl. 40 1a, b.

*Type horizon:* Givetian.

*Type locality:* Holy Cross Mts., Żerniki IG-1 borehole, depth 1,059.3 m.

*Derivation of the name:* *symbiotica*—in the walls of corallites are present numerous tubes of worms.

*Diagnosis.*—Branches dichotomous and anastomosing, 5.5—6.5 mm in diameter. Corallites irregularly polygonal and circular in transverse section, 0.45—0.55 mm in diameter, or elongate and  $0.45—0.6 \times 0.7—0.9$  mm. Corallite walls 0.05—0.1 mm thick in axial and 0.15—0.25 mm in peripheral zone of colony. Connecting pores rare, 0.1—0.15 mm in diameter, spaced at about 1 mm. Tabulae rare, thin, straight, spaced at 0.2—1 mm intervals. Septal apparatus does not occur.

*Material.*—Sixteen well preserved branches from a depth of 1,059.3 m (IG T80/43—58).

Dimensions (in mm):

|                          |                           |
|--------------------------|---------------------------|
| diameter of a colony     | 5.5—8.0                   |
| diameter of corallites   | (0.3)0.45—0.55(0.6)       |
| dimensions of corallites | 0.45—0.6 $\times$ 0.7—0.9 |
| spaces between calices   | 0.5—0.6                   |



|                                 |           |
|---------------------------------|-----------|
| thickness of a corallite wall   |           |
| in axial zone                   | 0.05—0.1  |
| in peripheral zone              | 0.15—0.25 |
| diameter of connecting pores    | 0.1—0.15  |
| spaces between connecting pores | 1.0       |
| spaces between tabulae          | 0.2—1.0   |

*Description.* — Colonies branching. Branches long, cylindrical or flattened, dichotomous and anastomosing, frequently arranged in one plane, composed of few corallites. In the axial zone of branch, corallites are long and irregularly polygonal (tetra- to hexagonal) and circular or elongate in transverse section. In transverse section lumen subcircular at the center or of alveolites-like shape in the peripheral zone of colony. In the peripheral zone, corallites are mildly arcuate, and emerge on the surface at an angle of  $60^{\circ}$ — $80^{\circ}$ . Corallite apertures narrowed, round, oval, sometimes strongly elongated and comma-shaped. Corallite walls thick, with an indistinctly visible radial-fibrous microstructure. Median line indistinct. Connecting pores few, fine, oval. Tabulae rare, thin, straight or slightly bent. Septal apparatus does not occur. Numerous tubes of presumably symbiotic worms occur in the walls of corallites and in calices (fig. 5a, b).

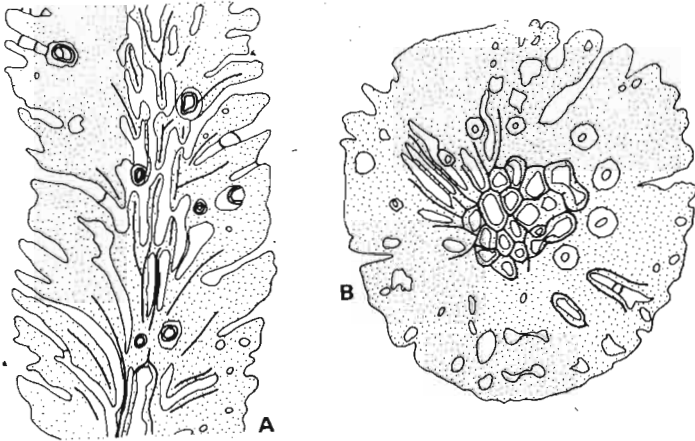


Fig. 5. *Egosiella symbiotica* sp. n., Givetian, Žerniki IG-1, depth 1.059.3 m. Specimen IG T80/46: A longitudinal section, B transversal section;  $\times 6.5$ .

*Remarks.* — *Egosiella symbiotica* sp. n. differs from other species in a ratio of the number of corallites to the branch diameter. In almost all of the eighteen known species of the genus *Egosiella*, the branches are composed of a large number of fine corallites the diameter of which increases in various species proportionally to a diameter increase of branches, whereas quite an opposite phenomenon is observed in the new species. Branches, with a diameter relatively large for *Egosiella*, contain a small number of fine, thick-walled corallites.

The new species is most similar to *E. ganinensis* Mironova from the Lower Emsian of the Altai Mts. (Mironova 1974). The two species are similar in diameter of branches and visceral chambers, thickness of walls, diameter of connecting pores and in a lack of septal apparatus. The new species differs, however, from *E. ganinensis* Mironova in larger corallite diameters and in a less acute angle of corallite emerging to the surface. From a similar Eifelian species, *E. inventa* Tchudinova, of the Kuznetsk Basin (Tchudinova 1964), the new species differs in a larger corallite diameter, smaller wall thickness in the peripheral zone, more spaced pores

and tabulae and, finally, in a complete lack of septal apparatus. From the type species *E. safonoviensis* Dubatolov, from the Givetian of Salair (Kuznetsk Basin) and Tarbagatai (Sokolov 1955; Dubatolov 1955, 1959; Scharkova 1963), the new species differs in smaller diameters of branches, thinner corallite walls in both the axial and peripheral zone, smaller density of tabulae and lack of septal apparatus. Other characters, including diameters of corallites, are similar in the two species.

*Distribution.* — Givetian: Poland (Holy Cross Mts. — Żerniki IG-1 borehole).

Order **Syringoporida** Sokolov, 1962

Family **Thecostegitidae** Sokolov, 1950

Genus *Thecostegites* Milne-Edwards et Haime, 1849

*Thecostegites bouchardiformis* sp. n.

(pl. 39: 2a, b)

*Holotype:* Specimen No IG/59; pl. 39: 2a, b.

*Type horizon:* Middle Frasnian.

*Type locality:* Holy Cross Mts., Żerniki IG-1 borehole, depth 602.5 m.

*Derivation of the name:* *bouchardiformis* — similar to *Thecostegites bouchardi* (Michelin).

*Diagnosis.* — Colonies oval, to 50 mm in diameter. Corallites long, spaced at 0.1–0.5 mm intervals, circular in transverse section, 1.0–1.1 mm in diameter. Corallite walls 0.1–0.2 mm thick. Connecting elements, 0.4–0.5 mm thick, spaced at 1.5–2.5 mm intervals. Tabulae numerous, strongly concave and syringoporoidal in character. Axial channel long, 0.3–0.4 mm in diameter, medially situated. Septal spines thick, widely spaced.

*Material.* — A large, well preserved fragmentary colony from a depth of 602.5 m.

Dimensions (in mm):

|                                    |                    |
|------------------------------------|--------------------|
| spaces between corallites          | (0.1)0.3–0.4(0.5)  |
| diameter of corallites             | (0.9)1.0–1.1(1.2)  |
| thickness of a corallite wall      | (0.05)0.1–0.2(0.3) |
| thickness of connecting elements   | 0.4–0.5            |
| spaces between connecting elements | (1.0)1.5–2.5(3.0)  |
| diameter of connecting canals      | 0.2–0.35           |
| diameter of an axial canal         | 0.3–0.4            |

*Description.* — Colonies oval, dendroid, to 50 mm in diameter. Corallites long, cylindrical, slightly tortuous, parallel to each other or arranged slightly radially. Some corallites contact each other, with their walls. Calices shallow, somewhat funnel-shaped U-shaped in transverse section, with strongly blunted edges and diameter approaching that of corallites. Corallites regularly circular or slightly oval in transverse section. Walls display a concentric-lamellar microstructure of the syringoporoidal type. Epitheca thin, dark, slightly separated. Connecting elements irregularly spaced, sometimes occurring at the same level in a few adjacent corallites and, in some few parts of colony, resembling short connecting tubes. Septal spines rare, large, thick, sometimes thorn-like, arranged in several vertical rows. Tabulae numerous, thin and thickened, strongly concave, frequently funnel-shaped and of the syringoporoidal type. They form a medially situated, zig-zag or sinusoidal channel, circular or oval in transverse section (fig. 6a, b).

*Remarks.* — *Thecostegites bouchardiformis* sp. n. is most similar to *T. bouchardi* (Michelin), described from the Frasnian of France, Belgium, the USSR (Central Devonian Field) and Lublin Region in Poland (Michelin 1847; d'Orbigny

1850; Milne-Edwards and Haime 1851; Lecompte 1939; Sokolov 1952; Stasińska and Nowiński 1978). The two species have similarly spaced corallites, similar wall thickness and diameters of connecting channels. The new species differs, however, from *T. bouchardi* (Michelin) in thinner and more spaced connecting elements,



Fig. 6. *Thecostegites bouchardiformis* sp. n., Frasnian, Żerniki IG-1, depth 602.5 m. Specimen IG T80/59: A longitudinal section, B transversal section;  $\times 6.5$ .

less developed septal apparatus, syringopora-like tabulae and in well developed, medially situated axial channel.

*Distribution.* — Middle Frasnian: Poland (Holy Cross Mts. — Żerniki IG-1 borehole).

### Order *Auloporida* Sokolov, 1962

#### Family *Auloporidae* Milne-Edwards et Haime, 1851

#### Genus *Aulopora* Goldfuss, 1829

#### *Aulopora schelonica* Tchernychev, 1941

(pl. 40: 3)

1886. *Aulopora tubaeformis* Goldfuss; Venukov: 14 (part.).

1941. *Aulopora schelonica* Tchernychev: 119, pl. 2: 3.

1952. *Aulopora schelonica* Tchernychev; Sokolov: 128, pl. 39: 2—5.

1958. *Aulopora schelonica* Tchernychev; Ermakova: 28, pl. 1: 1.

*Diagnosis.* — See Tchernychev 1941.

*Material.* — Small, well preserved fragments of two colonies from a depth of 595.3 m (IG T80/60, 61).

Dimensions (in mm):

|                               |                   |
|-------------------------------|-------------------|
| length of corallites          | 6.0—8.0           |
| diameter of a calice          | 2.0               |
| thickness of a corallite wall | (0.4)0.5—0.8(0.9) |

*Description.* — Colonies branching, creeping over the substrate. In the initial stage of growth, corallites grow horizontally and, subsequently, abruptly turn up. Corallites conical, circular or somewhat oval in transverse section. Corallite walls thick, with a concentric lamellar microstructure of the syringoporoïdal type. Epitheca, thick, radial in microstructure. Septal spines numerous, large, thick, deeply

embedded in the stereoplasm of corallite walls. Tabulae few, thick and thin, strongly oblique and horizontal, meniscus-like.

*Distribution.*—Givetian: Poland (Holy Cross Mts.—Żerniki IG-1 borehole). Frasnian: USSR (Central Devonian Field).

*Aulopora* aff. *schelonica* Tchernychev, 1941  
(pl. 40: 4)

1958. *Aulopora* aff. *schelonica* Tchernychev; Ermakova: 30, pl. 1: 1—2.

*Material.*—Small, poorly preserved fragments of two colonies from a depth of 1,063 mm (IG T80/62, 63).

Dimensions (in mm):

|                               |               |
|-------------------------------|---------------|
| length of corallites          | 3.0—4.0       |
| diameter of calices           | 1.3—1.5(2.0)  |
| thickness of a corallite wall | 0.25—0.4(0.5) |

*Description.*—Colonies branching, creeping over the substrate. Corallites conical, circular or slightly oval in transverse section. Wall microstructure concentric-lamellar. Epitheca not distinguished. Septal spines very rare, short, thick, deeply embedded in the stereoplasm of corallite walls. Tabulae rare, mostly horizontal and meniscus-like.

*Remarks.*—*Aulopora* aff. *schelonica* Tchernychev differs from *A. schelonica* in its smaller length and shorter diameter of corallites having thinner walls.

*Distribution.*—Upper Frasnian: Poland (Holy Cross Mts.—Żerniki IG-1 borehole). Frasnian: USSR (Central Devonian Field).

Family **Aulocystidae** Sokolov, 1950

Genus *Aulocystis* Schlüter, 1885

*Aulocystis tikhvi* Sokolov, 1952

(pl. 41: 1)

1952. *Aulocystis tikhvi* Sokolov; Sokolov: 157, pl. 40: 4—6.

*Diagnosis.*—See Sokolov 1952.

*Material.*—Large, well preserved fragments of three colonies from depths 590.25 m and 695.20 m (IG T80/64—66).

Dimensions (in mm):

|                               |                                  |
|-------------------------------|----------------------------------|
| spaces between corallites     | (0.0)0.7—2.0(2.5)                |
| diameter of round corallites  | (1.2)1.5—1.8(2.0)                |
| dimensions of oval corallites | (1.2)1.4—1.6(1.8) × 1.8—2.0(2.8) |
| thickness of a corallite wall | 0.2—0.4                          |

*Description.*—Colonies irregular, dendroid, composed of short, cylindrical, sometimes slightly bent and flattened corallites of the syringoporoidal type. Corallites loose, sometimes touching each other by their lateral walls, dichotomously branching. They are circular or oval in transverse section and have relatively thick walls composed of two layers of stereoplasm. The inner layer directly enveloping the visceral chamber of corallite is very thin and radial-fibrous in microstructure. The outer, thick layer is fibrous, with a concentric-lamellar system of fibers of the type observed in the genera *Multithecopora* or *Syringopora*. Epitheca very thin, dark, discontinuous. Calices deep, funnel-shaped, sometimes straight, with sharp edges frequently bent outward. Connecting tubes do not occur. Axial channel

indistinct, irregular in diameter, situated, mostly eccentrically, in the tube of corallite. It occurs very rarely. Tabulae numerous, thick and thin, strongly tortuous and oblique, frequently funnel-shaped, sometimes vertical. Septal spines do not occur.

*Remarks.*—The colonies described differ from that from the Frasnian of the Voronezh District (Sokolov 1952) in shape of corallites—circular or oval in transverse section, smaller density of corallites, thicker and bilaminar in structure corallite walls. Such a bilaminar wall structure is very rarely observed in syringoporphs and auloporids, for example, in some species from the Lower Permian of Spitsbergen, which normally have a unilaminar wall and epitheca.

*Distribution.*—Frasnian: Poland (Holy Cross Mts.—Żerniki IG-1 borehole); USSR (Central Devonian Field).

*Aulocystis tikhyiformis* Stasińska et Nowiński, 1978

(pl. 41: 2)

1978. *Aulocystis tikhyiformis* Stasińska and Nowiński: 212, pl. 24: 1—3.

*Diagnosis.*—Stasińska and Nowiński 1978.

*Material.*—Well preserved fragments of three colonies from depths of 588.2 m and 589.6 m (IG T80/67—69).

Dimensions (in mm):

|                               |                    |
|-------------------------------|--------------------|
| spaces between corallites     | (0.0)0.2—0.8(1.6)  |
| diameter of corallites        | (1.0)1.2—1.5(1.6)  |
| thickness of a corallite wall | (0.15)0.2—0.4(0.5) |

*Description.*—See Stasińska and Nowiński 1978.

*Distribution.*—Frasnian (Lublin Region—Tyszowce IG-2 borehole, Holy Cross Mts.—Żerniki IG-1 borehole).

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RÓŻA KULICKA I ALEKSANDER NOWIŃSKI

DEWOŃSKIE TABULATA Z POŁUDNIOWEJ CZĘŚCI GÓR ŚWIĘTOKRZYSKICH,  
POLSKA*Streszczenie*

Praca zawiera wyniki badań nad dewońskimi (żywet-fran) koralowcami Tabulata, pochodzącymi z profilu otworu wiertniczego Żerniki IG-1, odwierconego w płd. części Gór Świętokrzyskich na terenie wsi Żerniki. Osady dewonu Żernik wykształcone są w facji wapiennej i wapienno-dolomitycznej i obok Tabulata zawierają zarówno w żywocie jak i we franie liczną faunę Stromatoporoidea i Rugosa.

W żywocie Tabulata występują w dwu poziomach: w środkowej i w stropowej jego części i reprezentowane są głównie przez kolonie gałązkowe i gałązkowo-palczaste. We franie występują również w środkowej i w stropowej części. Przewagę stanowią tu kolonie masywne i krzaczaste.

Opisano 17 gatunków Tabulata (w tym 4 nowe gatunki: *Cladopora polonica* sp. n., *Caliopora reductaeformis* sp. n., *Egosiella symbiotica* sp. n., *Thecostegites bouchardiiformis* sp. n. i jeden podgatunek: *Alveolites taenioformis minor* subsp. n.).

W porównaniu z równowiekowymi zespołami Tabulata innych regionów Polski (płn. i płd. część Gór Świętokrzyskich, Region krakowski, Region lubelski), Tabulata z Żernik są mniej zróżnicowane taksonomicznie i są od nich gatunkowo odmienne. Mimo to całkowicie potwierdzają charakter przejściowy fauny tabulatowej Polski między Europą zachodnią i wschodnią.

Obecność w Polsce następujących gatunków: *Pachyfavosites exilis*, *Thamnopora nicholsoni*, *Scoliopora conferta*, *Aulopora schelonica* nie była dotychczas notowana.

## EXPLANATION OF PLATES 36—41

All specimens from Żerniki, Holy Cross Mts.

## Plate 36

*Dictyofavosites pachyfavositoides* Nowiński, 1976

1. Longitudinal section,  $\times 5$ ; IG T80/3, depth 590.20 m.
2. Cross section,  $\times 5$ ; IG T80/4, depth 590.25 m.

*Alveolites taenioformis minor* subsp. n.

3. Longitudinal section,  $\times 10$ ; holotype IG T80/37, depth 586.77 m.
4. Longitudinal and cross sections,  $\times 10$ ; IG T80/36, depth 586.75 m.

## Plate 37

*Pachyfavosites exilis* Sokolov, 1952

1. a Longitudinal section,  $\times 5$ ; b cross section,  $\times 5$ ; IG T80/1, depth 784.80 m.

*Cladopora polonica* sp. n.

2. a Longitudinal section,  $\times 5$ ; b cross section,  $\times 5$ ; holotype IG T80/8, depth 590.20 m.
3. Cross section of fused branches of a colony,  $\times 5$ ; IG T80/10, depth 590.20 m.

## Plate 38

*Cladopora* sp.

1. a Longitudinal section,  $\times 10$ ; b cross section,  $\times 10$ ; IG T80/28, depth 586.77 m.

*Thamnopora nicholsoni* (Frech, 1885)

2. Cross section,  $\times 5$ ; IG T80/5, depth 1.047,0 m.
3. Longitudinal section through axial part of a colony,  $\times 5$ ; IG T80/7, depth 1.061,40 m.
4. Tangential section of calices,  $\times 10$ ; IG T80/6, depth 1,061.4 m.

*Scoliopora conferta* Ermakova, 1960

5. Longitudinal section through axial part of a colony,  $\times 5$ ; IG T80/41, depth 784.80 m.
6. a Longitudinal section,  $\times 5$ ; b cross section,  $\times 5$ ; IG T80/42, depth 1,063.70 m.

## Plate 39

*Caliapora reductaeformis* sp. n.

1. a Longitudinal section,  $\times 5$ ; b cross section,  $\times 5$ ; holotype IG T80/40, depth 1.047.0 m.

*Thecostegites bouchardiformis* sp. n.

2. a Longitudinal section,  $\times 8$ ; b cross section,  $\times 8$ ; holotype IG T80/59, depth 602.50 m.

## Plate 40

*Egosiella symbiotica* sp. n.

1. a Cross section,  $\times 5$ ; b longitudinal section,  $\times 8$ ; holotype IG T80/43, depth 1,059.30 m.
2. Anastomosing branches in cross section,  $\times 5$ ; IG T80/56, depth 1,059.30 m.

*Aulopora schelonica* Tchernychev, 1941

3. Longitudinal and cross sections,  $\times 5$ ; IG T80/60, depth 595.30 m.

*Aulopora* aff. *schelonica* Tchernychev, 1941

4. Longitudinal section,  $\times 8$ ; IF T80/62, depth 1,063.0 m.

## Plate 41

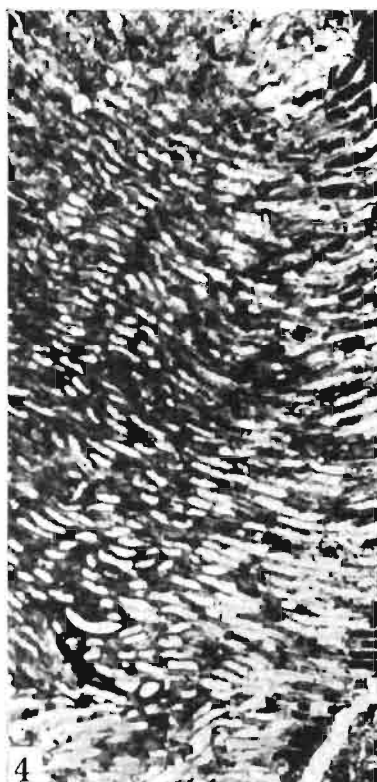
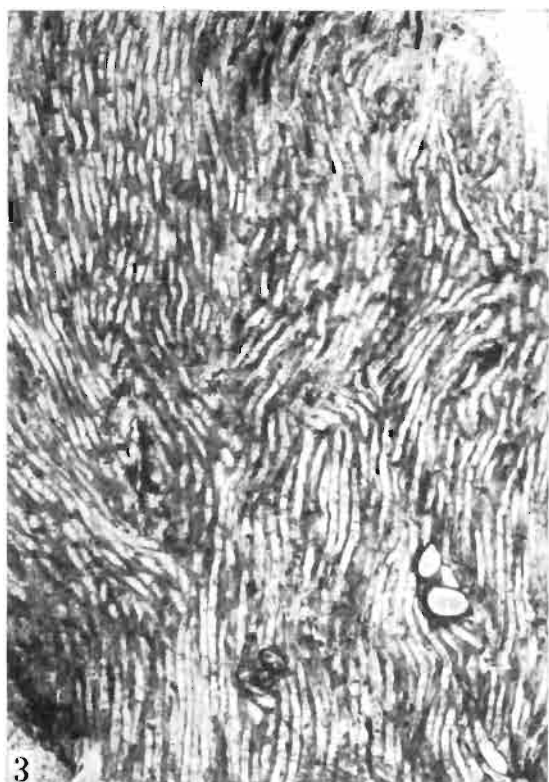
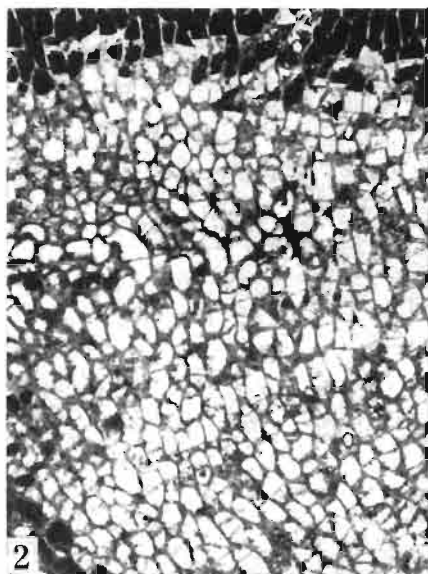
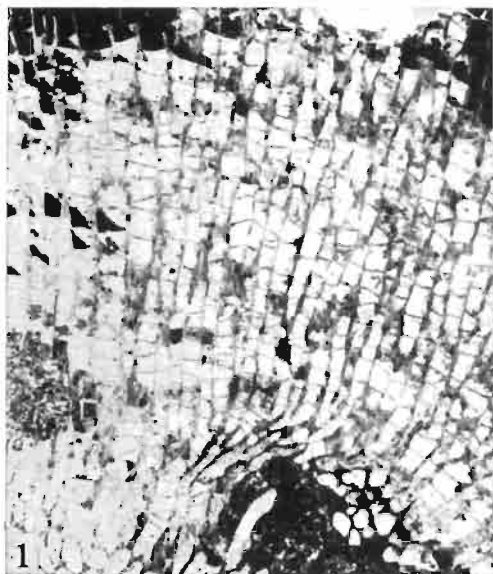
*Aulocystis tikhyi* Sokolov, 1952

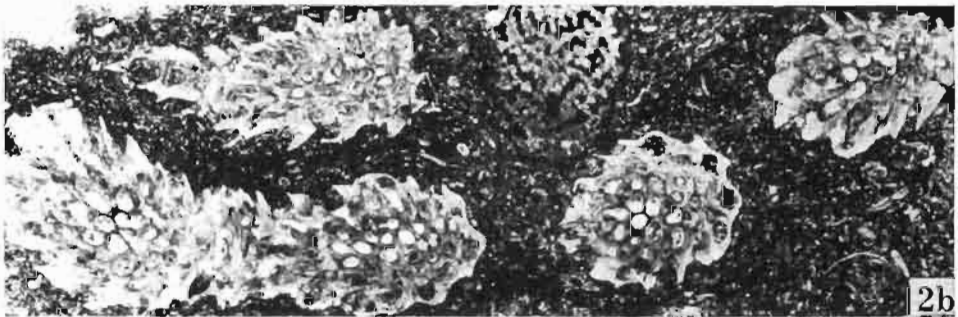
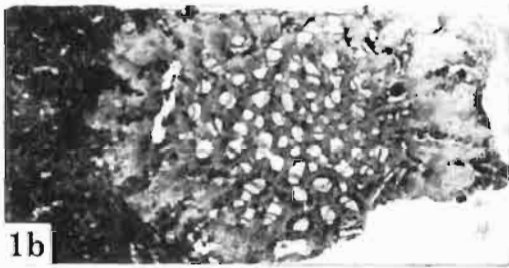
1. Longitudinal and cross sections,  $\times 5$ ; IG T80/66, depth 695.20 m.

*Aulocystis tikhyiformis* Stasińska et Nowiński, 1978

2. Longitudinal and cross sections,  $\times 5$ ; IG T80/68, depth 588.20 m.

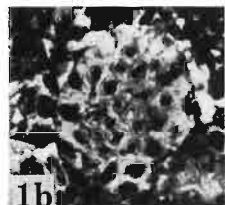








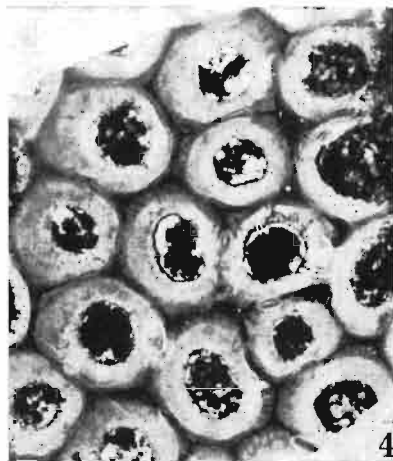
1a



1b



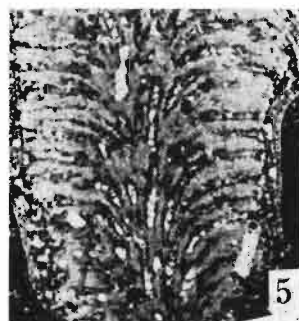
3



4



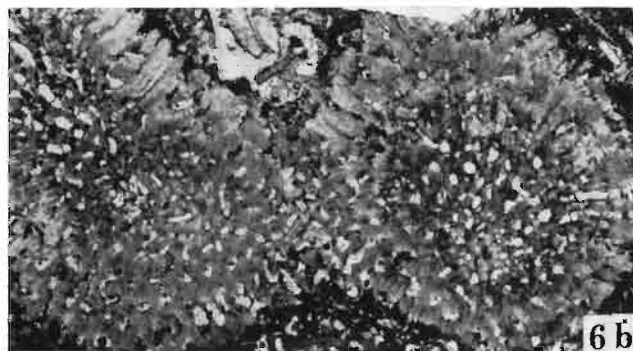
2



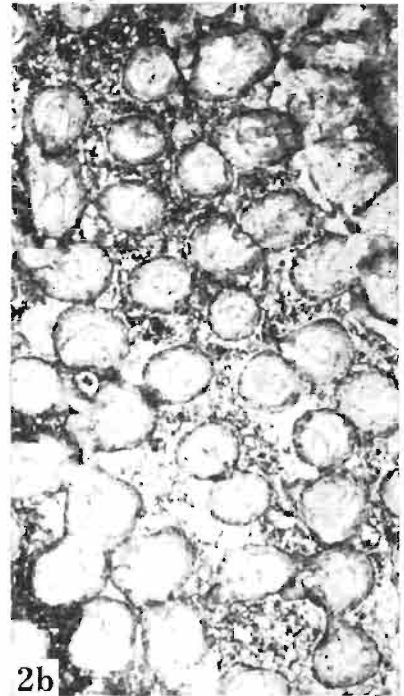
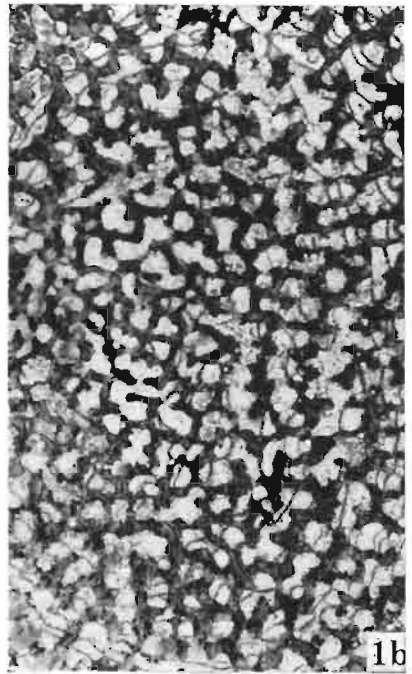
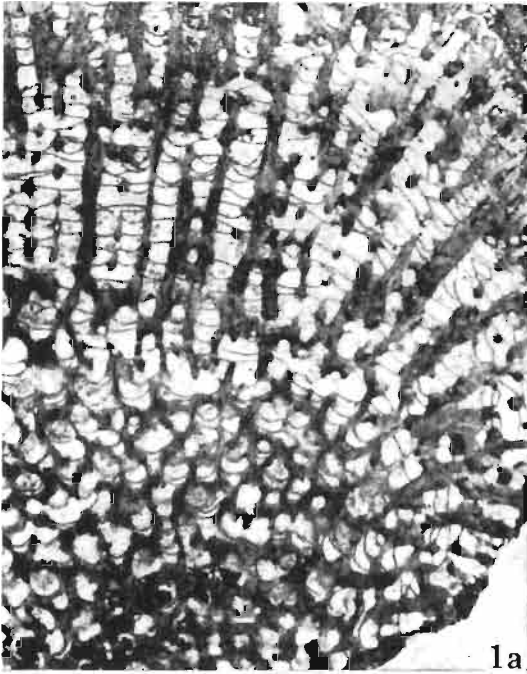
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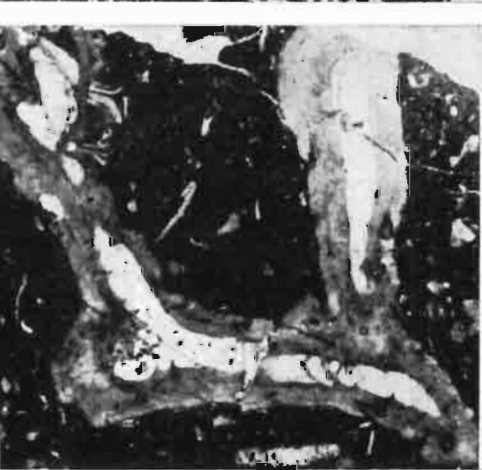
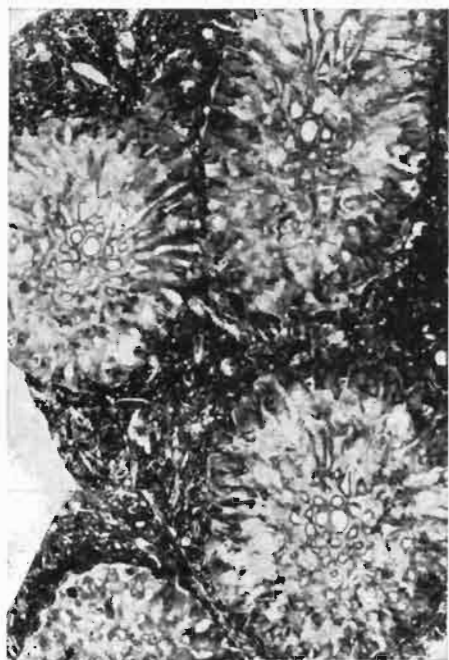
6a

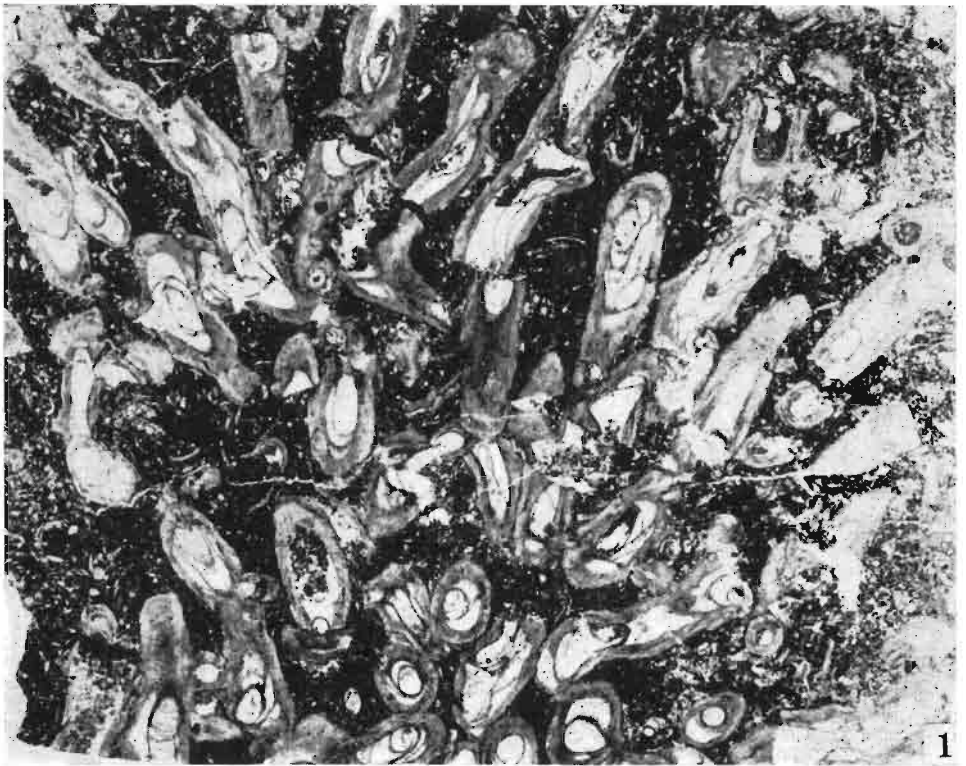


6b

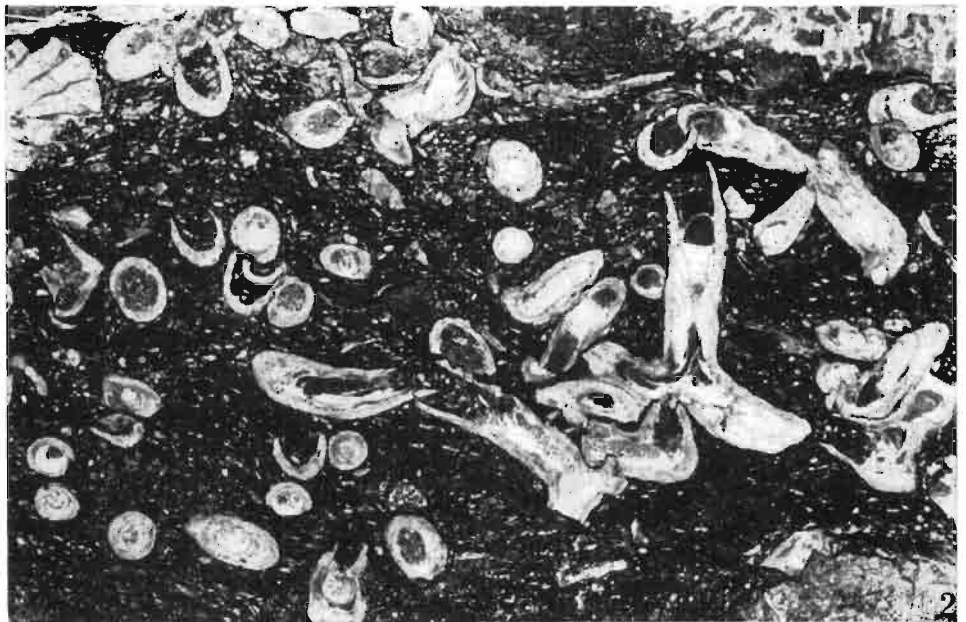








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