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Triassic foraminifer assemblages in the Choč nappe of the Tatra Mts

ABSTRACT: Stratigraphically important foraminifer assemblages were found in limestones of the Choč nappe in the Tatra Mts. The assemblage from Wielkie Koryciska, comprising *Ammobaculites* cf. *radstadtensis* Kristan-Tollmann, *Calcitornella?* sp., *Hemigordius?* *chialingchiangensis* (Ho), *Trochammina almtalensis* Koehn-Zaninetti, *Turritellella mesotriassica* Koehn-Zaninetti, indicates Upper Anisian (Illyrian) age. The assemblage from Małe Koryciska, comprising *Involutina communis* (Kristan), *I. tenuis* (Kristan), *I. impressa* (Kristan-Tollmann), *I. gaschei* (Koehn-Zaninetti & Brönnimann), *Planinvolvula deflexa* Leischner, *Trocholina crassa* Kristan, *T. permodiscoides* Oberhauser, and *Triasina hantkeni* Majzon, indicates Upper Rhaetian age.

INTRODUCTION

The authors studied the limestones locally intercalating Mid-Triassic dolomites of the Choč nappe, exposed along western slopes of the Chochołowska Valley in the western part of the Tatra Mts (cf. Fig. 1). The stratigraphic and tectonic setting of these limestones was hitherto uncertain (cf. Zawidzka 1970, 1971, 1972). The rich foraminifer assemblages recently found therein enabled the authors to define more precisely stratigraphic position of the limestones, which may be of remarkable importance for explanation of highly complex tectonic structure of this area.

ANISIAN FORAMINIFERS FROM WIELKIE KORYCISKA

The limestones from the Wielkie Koryciska (3 in Fig. 1) occur as small tectonic slices scattered along the overthrust of the Koryciska unit of the Choč nappe (*a* in Fig. 1). Lithological features and macro- and microfaunal characteristics of these limestones are similar to those of the Partnach Beds. The Wielkie Koryciska limestones are represented by biocalcirudites and biocalcarenites (Pl. 2, Figs 1—2) with marly shale in-

tercalations (cf. Zawidzka 1972). Except for foraminifers, no stratigraphically important microfaunas (e.g. conodonts) were found, whereas fish teeth and scales are quite common. Abundance of plant detritus is typical, particularly for those parts of rocks in which the contribution of other bioclasts decreases. *Frondicularia woodwardi* (Pl. 1, Figs 8—9 and Pl. 2, Fig. 2) is a rock-building element of the limestones and some marly shales. Besides the latter species, the foraminifer assemblage comprises (cf. Pl. 1, Figs. 1—15):

Agathammina cf. *austroalpina* Kristan-Tollmann & Tollmann, 1964

Ammobaculites cf. *radstadtensis* Kristan-Tollmann, 1964

Calcitornella? sp.

Diplotremina? sp.

Endothyra kuepperi Oberhauser, 1960

Glomospira sp.

Hemigordius? *chialingchiangensis* (Ho, 1959)

Meandrospira sp.

Trochammina almtalensis Koehn-Zaninetti, 1969

Turritellella mesotriasica Koehn-Zaninetti, 1969

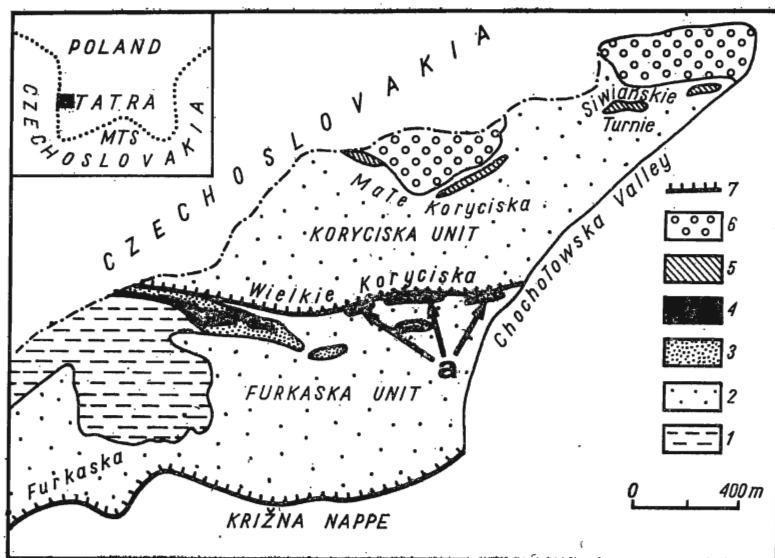


Fig. 1

Geological sketch-map of the investigated area (inset shows its position in the Tatra Mts), as presented in the previous report (Zawidzka 1972, Text-fig. 1); arrowed (a) are the tectonic slices at the Wielkie Koryciska overthrust

1 Reifling limestones, 2 Anisian/Ladinian dolomites, 3 Upper Anisian (Illyrian) Partnach Beds (sampled for foraminifers), 4 Anisian/Ladinian shales, 5 Rhaetian/Liassic limestones at Małe Koryciska and Carnian/Norian/Rhaetian limestones at Siwiańskie Turnie (sampled for foraminifers), 6 Eocene conglomerates, 7 boundaries of tectonic units

The presented foraminifer assemblage indicates Upper Anisian (Illyrian) age (cf. Koehn-Zaninetti 1969).

RHAETIAN FORAMINIFERS FROM
SIWIAŃSKIE TURNIE AND MAŁE KORYCISKA

Rhaetian limestones occur as isolated blocks within dolomites which are regarded to be of Mid-Triassic age on the slopes of Siwiańskie Turnie (5 in Fig. 1) and at the boundary with the transgressive Eocene at Małe Koryciska (5 in Fig. 1; cf. Zawadzka 1972). These limestones yield *Rhaetina gregaria* (Suess), *Thecosmilia clathrata* (Emmrich) and *Cyathocoenia* sp.

In the Rhaetian of Siwiańskie Turnie and Małe Koryciska organo-detrital brachiopod-coral limestones with ooids are the most important lithological type. Among detrital components crinoid stems and brachiopod fragments predominate. These rocks may be classified as biosparites (Pl. 3, Figs 3—4), although bioosparites (Pl. 3, Fig. 1) and biointrasparites (Pl. 3, Fig. 2) are quite common. Besides bioclasts, represented by brachiopod, pelecypod, gastropod, and echinoderm fragments, single algae of the family Solenoporaceae and spores *Globochaete tatrica* Radwański (cf. Pl. 6, Fig. 7a—b; and Radwański 1968, Pl. 7, Figs 1—6) are quite common but, generally, foraminifers are the prevailing microfaunal elements (cf. Pls 3—6). The foraminifer assemblage comprises:

Agathammina austroalpina Kristan-Tollmann & Tollmann, 1964

Diploremmina sp.

Endothyra? sp.

Frondicularia woodwardi Howchin

Glomospirella sp.

Involutina communis (Kristan, 1957)

I. aff. communis (Kristan, 1957)

I. gaschei (Koehn-Zaninetti & Brönnimann, 1968)

I. cf. gaschei (Koehn-Zaninetti & Brönnimann, 1968)

I. impressa (Kristan-Tollmann, 1964)

I. cf. impressa (Kristan-Tollmann, 1964)

I. muranica Jendrejáková, 1972

I. cf. muranica Jendrejáková, 1972

I. tenuis (Kristan, 1957)

I. cf. tenuis (Kristan, 1957)

Nodosaria sp.

Planinivoluta deflexa Leischner, 1961

Triasina hantkeni Majzon, 1954

Trochammina alpina Kristan-Tollmann, 1964

Trocholina acuta Oberhauser, 1964

T. crassa Kristan, 1957

T. permodiscoides Oberhauser, 1964

The representatives of the species *Triasina hantkeni* Majzon (cf. Pl. 3, Figs 1—4 and Pl. 6, Figs 3—4) indicate Upper Rhaetian age of the assemblage (zone with *Triasina hantkeni* — cf. Salaj 1969a, b; Gaździcki 1970, 1974). Some limestone blocks from Siwiańskie Turnie, hitherto considered to be of Rhaetian age, actually represent an inversed succession of the Carnian, Norian and presumably Lower Rhaetian. This is evidenced (cf. Jendrejáková 1970) by numerous *Triasina hantkeni* occurring at the base of these limestone blocks, and Ammodiscidae, Dustominidae and Endothyridae recorded in their upper parts (Pl. 4, Fig. 5a—b).

COMPARATIVE REMARKS

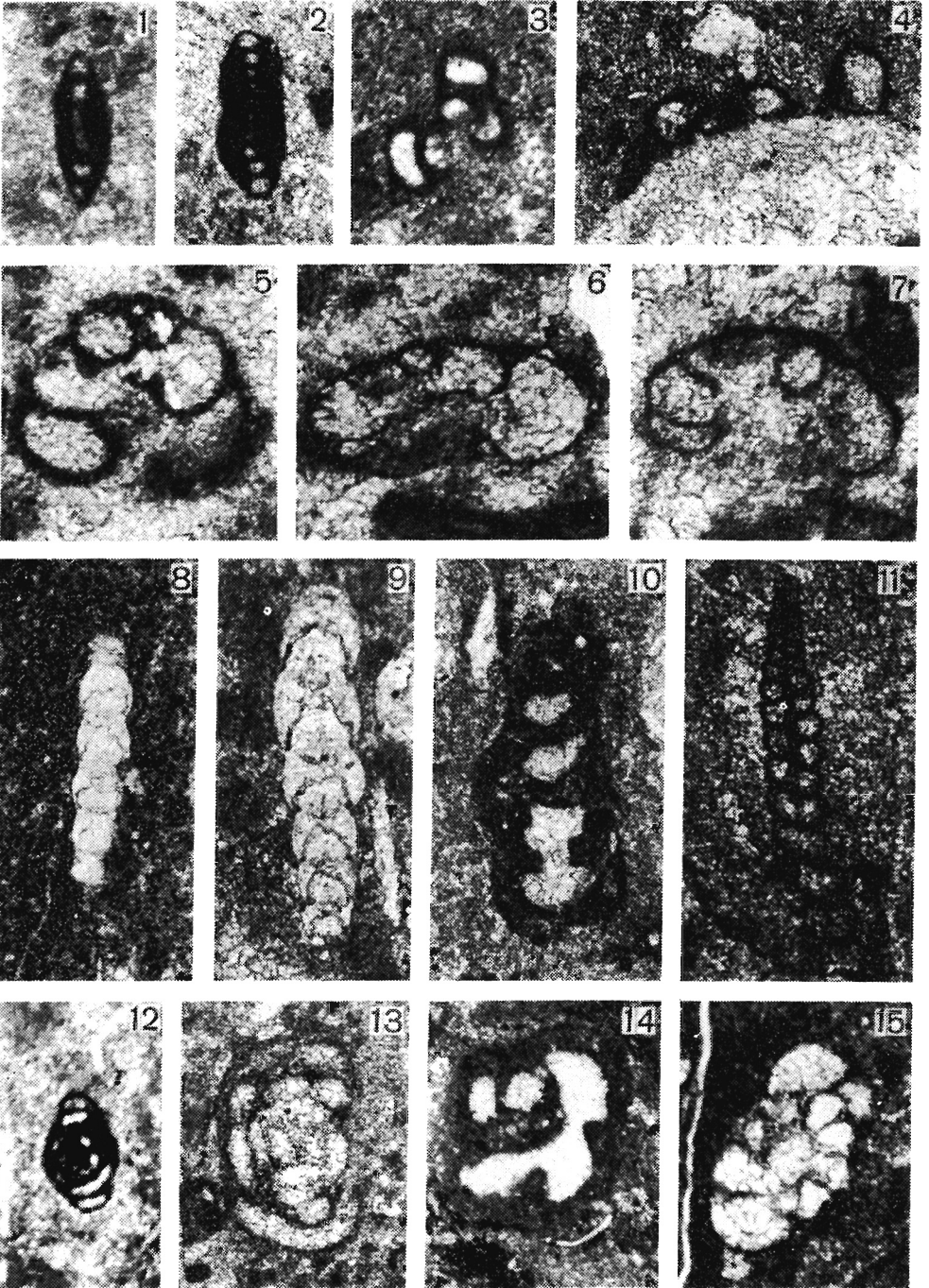
The foraminifer assemblage from Wielkie Koryciska closely resembles those recorded in different regions of the Alpine-Carpathian geosyncline, viz. in the Dinarides and eastern Asia (Ho 1959; Pantić 1967, 1970; Salaj & al. 1967; Dimitrijević & al. 1968; Salaj 1969a, b; Koehn-Zaninetti 1969; Premoli Silva 1971; Urošević 1971; Baud & al. 1971; Zaninetti & al. 1972; Scholz 1972). These assemblages are characteristic of Upper Anisian (Illyrian) age, and are recorded for the first time in the Polish Tatra Mts.

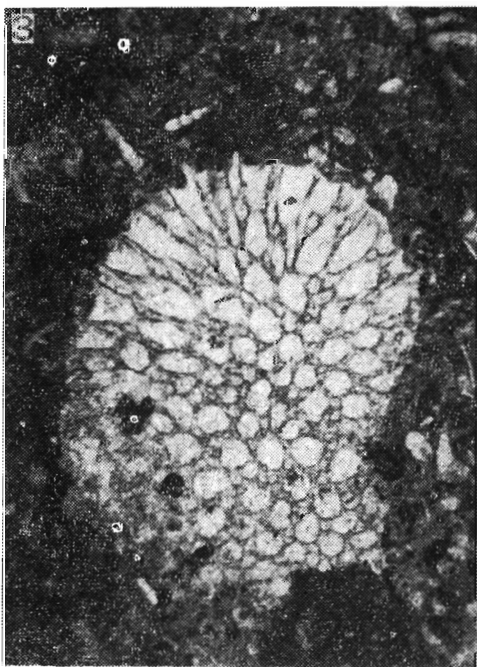
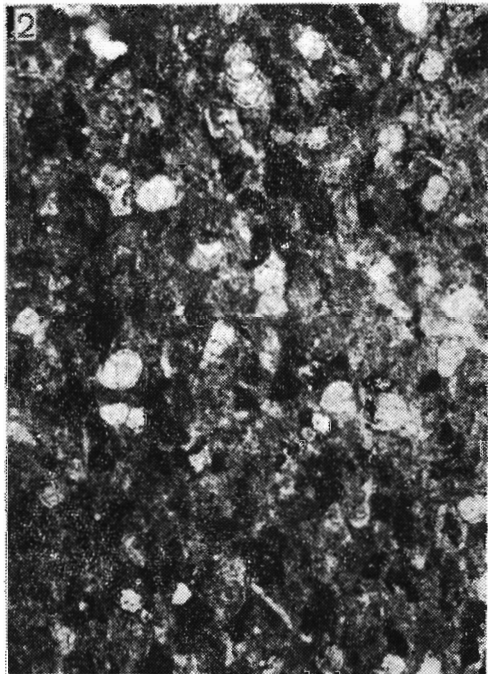
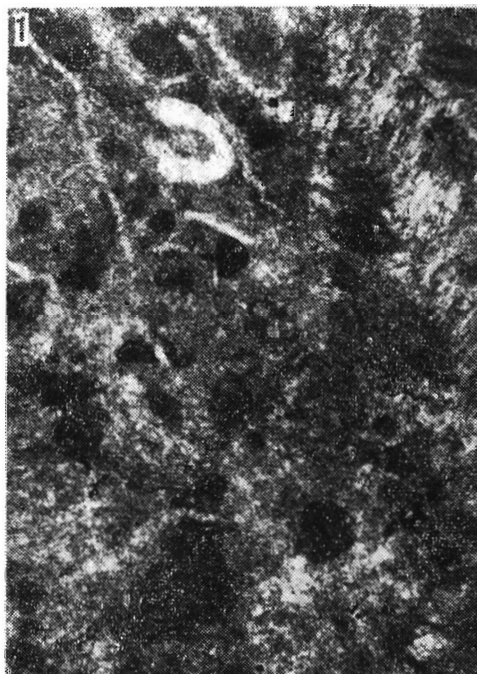
The foraminifer associations of the Rhaetian of Siwiańskie Turnie and Małe Koryciska are characterized by the predominance of large benthic foraminifers of the family Involutinidae Bütschli which are of remarkable importance for the Upper Triassic stratigraphy in the Alpine-Carpathian geosyncline and south-western Asia (Hagn 1955; Leischner 1961; Kristan-Tollmann 1962, 1963, 1964a, b, c, 1970; Kristan-Tollmann & Tollmann 1964; Cros & Neumann 1964; Bosellini & Broglio Loriga 1965; Fuganti & Mosna 1966; Fabricius 1966; Mišik 1966; Pantić 1967, Salaj 1969a, b; Brönnimann & al. 1970; Urošević & Anđelković

PLATE 1

Upper Anisian (Illyrian) Partnach Beds at Wielkie Koryciska

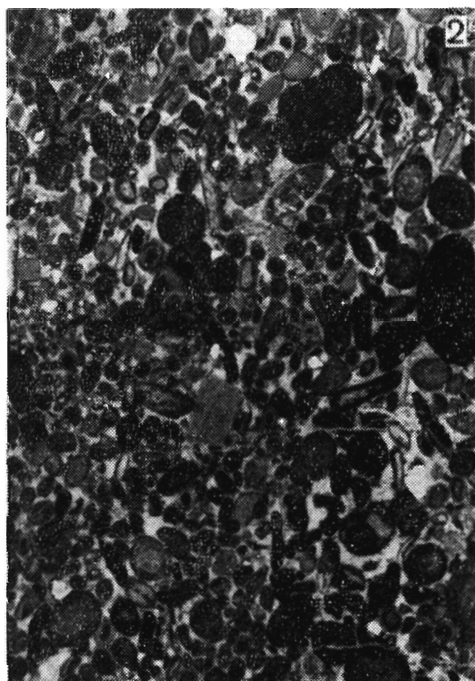
- 1-2 — *Hemigordius? chialingchiangensis* (Ho), × 80.
- 3-4 — *Calcitornella? sp.*, × 80.
- 5-7 — *Trochammina almtalensis* Koehn-Zaninetti, × 70.
- 8-9 — *Frondicularia woodwardi* Howchin, × 80.
- 10 — *Ammobaculites cf. radstadtensis* Kristan-Tollmann, × 70.
- 11 — *Turritellella mesotriassica* Koehn-Zaninetti, × 110.
- 12 — *Glomospira sp.*, × 50.
- 13 — *Glomospira sp.*, × 70.
- 14 — *Endothyra kuepperi* Oberhauser, × 70.
- 15 — *Diploremina? sp.*, × 70.





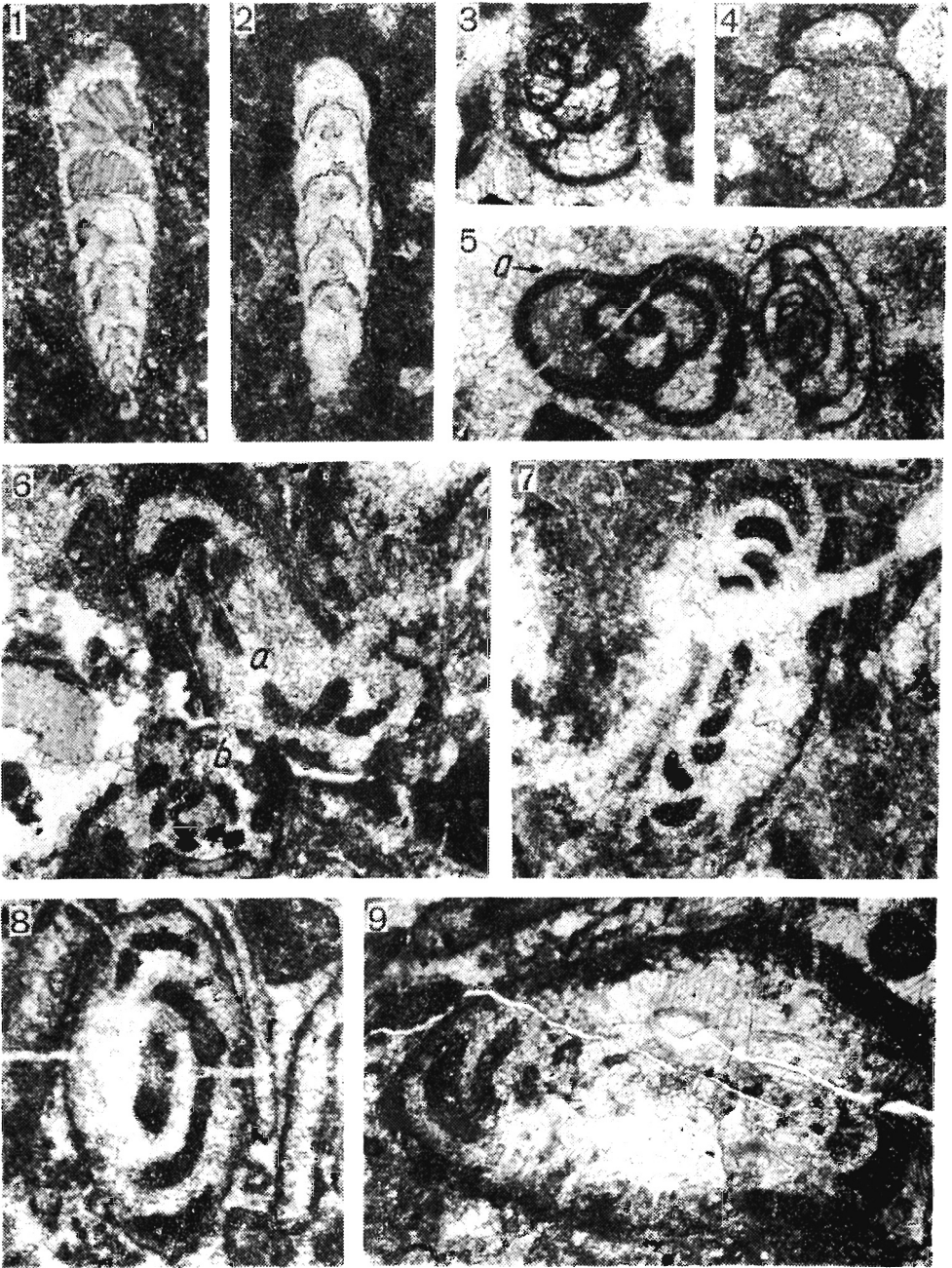
Upper Anisian (Illyrian) Partnach Beds at Wickie Koryciska

- 1 — Biocalcarene with *Hemigordius? chiaolingchiangensis* (Ho), $\times 60$
- 2 — Biocalcarene with *Frondicularia woodwardi* Howchin, $\times 60$.
- 3 — Bryozoan colony, $\times 20$.
- 4 — *Solenopora* sp., $\times 20$.



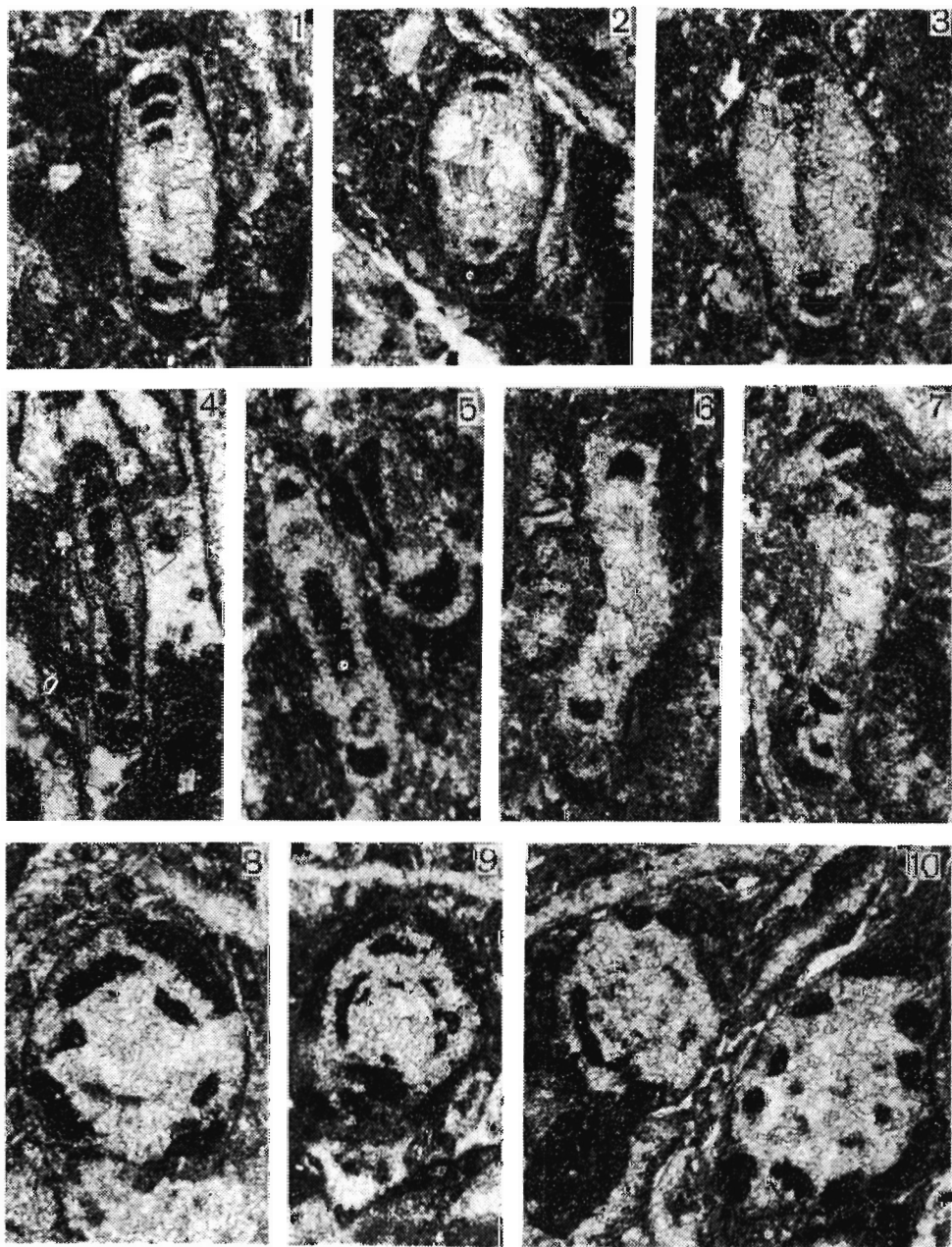
Upper Rhaetian at Siwiańskie Turnie

- 1 — Sparry, crinoid-brachiopod limestone with *Triasina hantkeni* Majzon; X 8.
 2 — Sparry, crinoid-oolitic limestone with intraclasts and *Triasina hantkeni* Majzon; X 8.
 3-4 — Assemblage of *Triasina hantkeni* Majzon and various *Involutina* and *Trocholina* in organodetrital-oolitic limestone; X 10.



Upper Rhaetian at Siwiańskie Turnie

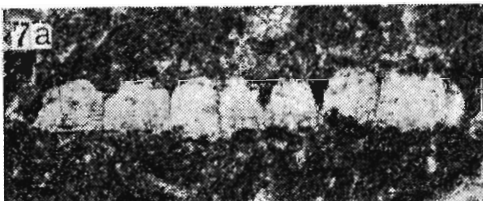
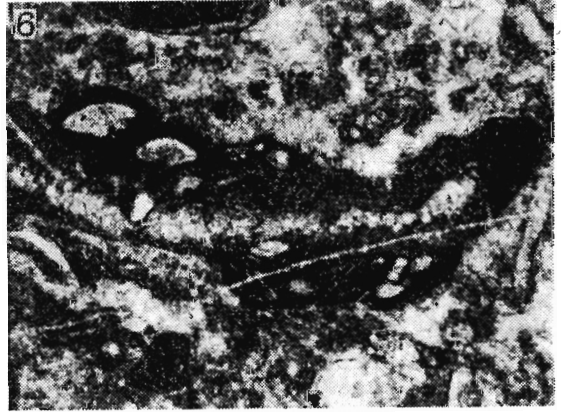
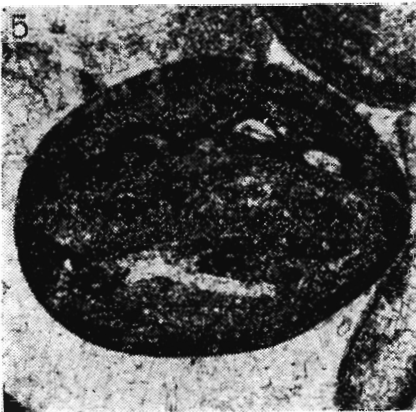
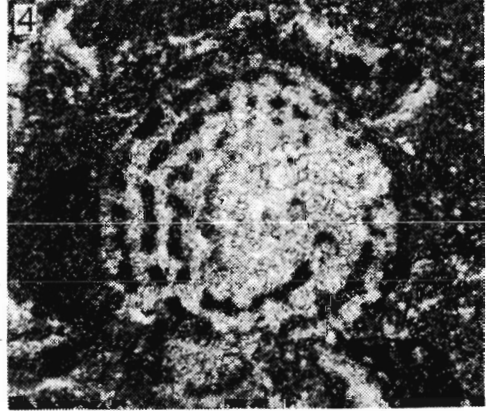
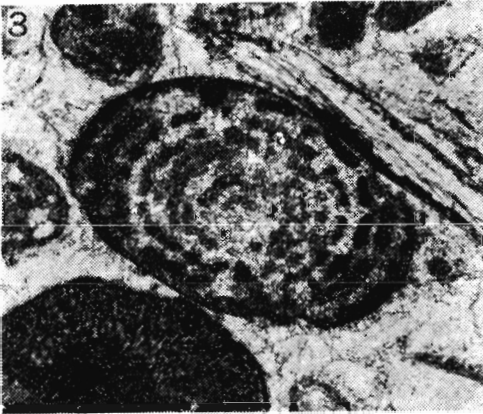
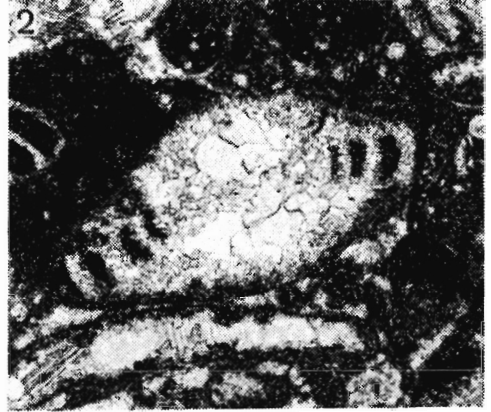
1 — *Nodosaria* sp., $\times 100$; 2 — *Fronicularia woodwardi* Howchin, $\times 100$; 3 — *Trochammina alpina* Kristan-Tollmann, $\times 70$; 4 — *Diptotremina* sp., $\times 50$; 5a — *Endothyra?* sp., 5b *Glomospirella* sp. ($\times 50$) from the supposed Carnian or Norian; 6a — *Involutina* cf. *impresa* (Kristan-Tollmann), 6b *Involutina* cf. *gaschei* (Koehn-Zaninetti & Brönnimann), $\times 55$; 7 — *involutina impressa* (Kristan-Tollmann), $\times 55$; 8 — *Involutina muranica* Jendrejáková, $\times 50$; 9 — *Involutina* cf. *muranica* Jendrejáková, $\times 50$



Upper Rhaelian at Siwiańskie Turnie

1-3 — *Involutina* aff. *communis* (Kristan); 4-5 — *Involutina tenuis* (Kristan); 6-7 — *Involutina* cf. *tenuis* (Kristan); 8-9 — *Involutina gaschei* (Koehn-Zaninetti & Brönnimann); 10 — *Involutina* cf. *gaschei* (Koehn-Zaninetti & Brönnimann)

All photographs are X 55



1970; Papp & Turnovsky 1970; Hohenegger & Lobitzer 1971; Jendrejáková 1970, 1972; Brönnimann & al. 1972).

The Rhaetian of the Choč nappe from the Polish Tatra Mts most closely resembles that of the Križna nappe (Guzik 1959, Gaździcki 1974), developed in mixed, Swabian-Carpathian facies (Goetel 1917). Comparisons of the Siwiańskie Turnie and Małe Koryciska sections with more complete profiles of the Križna Rhaetian in the Tatra Mts (Pálenica Lendacka, Široké sedlo, Javorina, Mały Kopieniec, Mała Świnica, Dolina Lejowa) show that the former primarily represent the Upper Rhaetian (zone with *Triasina hantkeni*) whereas the facial development in both nappic zones is the same (cf. Goetel 1917; Čepek 1970; Gaździcki 1970, 1971, 1974). The Choč Rhaetian from Hybe (Kössen facies) in Slovakia does not correspond to any of Križna Rhaetian facies from the Tatra Mts (Goetel 1917, Koutek 1927, Mahel & Kochanová 1962, Bystrický & Biely 1966, Kochanová 1967). At Hybe, the Upper Rhaetian (zone with *Triasina hantkeni*) is missing, and only the Lower Rhaetian with "*Angulodiscus*" *pokornyi* and *Glomospirella friedli* (cf. Salaj 1969a, b, Salaj & Stranik 1970, Gaździcki 1974) is well evidenced.

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PLATE 6

Upper Rhaetian at Siwiańskie Turnie

- 1 — *Trocholina crassa* Kristan.
2 — *Trocholina permodiscoides* Oberhauser.
3-4 — *Triasina hantkeni* Majzon.
5-6 — *Planinivoluta deflexa* Leischner.
7a — *Globochaete tatrica* Radwański, 7b — the same under crossed nicols.

All photographs are × 55

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TRIASOWE ZESPOŁY OTWORNICOWE Z WAPIENI PŁASZCZOWINY CHOCHAŃSKIEJ TATR

(Streszczenie)

W wapiennych ogniwach triasu zachodniej części płaszczowiny chochańskiej Tatr Polskich (por. fig. 1) stwierdzono obecność stosunkowo bogatych zespołów otwornicowych górnego anizyku (illiru) oraz retyku (vide pl. 1—6).

Zespół anizyjski znaleziony w Wielkich Koryciskach, a pochodzący z odpowiedników facjalnych warstw z Partnach, zawiera m.in. *Trochammima almtalensis* Koehn-Zaninetti, *Hemigordius? chialingchiangensis* (Ho), *Ammobaculites* cf. *radstadtensis* Kristan-Tollmann oraz *Turritellella mesotriasica* Koehn-Zaninetti. Zespół taki jest charakterystyczny dla osadów górnego anizyku w całej geosynklinie alpejsko-karpackiej (por. Pantić 1967; Salaj, Biely & Bystrický 1967; Salaj 1969a; Kohen-Zaninetti 1969; Premoli Silva 1971; Urošević 1971; Baud, Zaninetti & Brönnimann 1971; Zaninetti, Brönnimann & Baud 1972).

Retycki zespół zawierający m.in. *Involutina communis* (Kristan), *I. tenuis* (Kristan), *I. impressa* (Kristan-Tollmann), *I. gaschei* (Koehn-Zaninetti & Brönnimann), *Trocholima crassa* Kristan, *T. permodiscoides* Oberhauser, *Planiiinvoluta deflexa* Leischner oraz *Triasina hantkeni* Majzon, a występujący w Siwiańskich Turniach i Małych Koryciskach, wskazuje na retyk górny, zonę z *Triasina hantkeni* (por. Salaj 1969a, b; Gaździcki 1970, 1974). Fakt występowania na tym obszarze w stratygraficznie niżej leżących ogniwach przedstawicieli rodzin Duostominidae, Endothyridae oraz Ammodiscidae, mimo braku wyraźnych form indeksowych, wskazywać może na obecność tutaj także dolnego retyku oraz noryku i karniku.

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