Triassic Foraminifers of the West Carpathians

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Contents

Introduction

As to the paleogeographical-tectonical history of the Alpine – Carpathian sedimentation zone, the Trias is a significant stage in the history of the Mesozoic. So particular attention was paid to stratigraphy of the Trias and the initial researches were based on macrofauna (ammonites, lamellibranchiates, gastropods, brachiopods, corals). Stratigraphical data were precised by the results of the study of algae, mostly dasycladaceans. In the past two decades microbiostratigraphical researches were based upon foraminifers, conodonts and pollen.

The authors present here microbiostratigraphical and zonal division of the Trias according to foraminifers. Particular attention is paid to correlation of foraminiferal zones with other fossil groups, mostly ammonites, algae and conodonts. The results of microbiostratigraphical researches in the West Carpathians are correlated with the data on other parts of the Tethyd region.

In the second part the authors present the existing results of paleontological study. They describe all so far identified taxa from the West Carpathians, mainly foraminifers (274 species, 30 of them being new) and microfossils of the group incertae sedis (21 species) representing 100 genera ranged in a modified system. Systematic treatment of the individual taxa was based on works by A. R. LOEBLICH, Jr.–H. TAPPAN (1964), E. KRISTAN–TOLLMANN (1960, 1964c), R. OBERHAUSER (1960, 1964), L. ZANINETTI (1976a), we respect to the systems of J. CUSHMAN (1950), V. POKORNÝ (1958), D. N. RAUSER–CHERNOUSOVA–A. V. FURSENKO (edit.; Osnovy paleontologii, 1959). Not all taxa were paleontologically treated in detail, because the authors could only identify them according to sections which were insufficient for their detailed description. For paleontological description most valuable are free species separated from limestones because they may be compared to sections in thin section from the same place.

This work is based on our own material and on materials offered by RNDr. JÁN BYSTRICKÝ, DrSc., RNDr. ANTON BIELY, CSc., Acad. MICHAL MAHEĽ, RNDr. JOZEF MICHALÍK, CSc., RNDr. JÁN MELLO, CSc., RNDr. JOZEF HANÁČEK, for which we would fain offer our heartiest thanks here. We are particularly obliged to RNDr. JÁN BYSTRICKÝ, DrSc. of the Slovak Academy of Sci. who offered us not only material from the individual stratigraphically evidenced levels from various types of facies but also valuable information and comments indispensable for our stratigraphical conclusions.

We remark that the presented results of the authors also coincide with the UNESCO programme of investigation of the Mediterranean Triassic.

We are equally grateful to RNDr. VIERA GAŠPARIKOVÁ, CSc. and RNDr. OTÍLIA JENDREJÁKOVÁ, CSc., for the review of this work.

We are deeply indebted to our colleague RNDr. Dana Boórová who undertook tedious and exacting task of preparing the list of fossils.

We also want express our gratitude to all our colleagues for valuable advice and technical aid in realization of this work.

Basical tectonical division of the West Carpathians*

The West Carpathians represent a fold-nappe system formed in the course of the Alpine folding. There, however, still are elements of older fold systems, mostly Variscan and Caledonian, on its outer margin, in core mountain ranges in its southern part, and in the Slovenské rudohorie (ore mountains).

Triassic, Jurassic and Lower Cretaceous movements in the earth crust of the West Carpathians did not result in fold systems. During several folding phases between the Turonian and Neogene times nappes formed in all Carpathian zones. The entire folding, beginning from Middle Cretaceous and ending in the Pliocene, is denoted as Alpine folding. The Alpine folding (Laramide and Savian-Styrian) in the Czechoslovak Carpathians resulted in three main, intensely folded belts: the outer belt- which is actually the Flysch Belt, the southern narrow belt with a particular structure, denoted as the Klippen Belt (the inner Klippen Belt, the Pieniny Klippen Belt), and the southernmost belt denoted as the Inner West Carpathians.

On the basis of this division the following zones were distinguished (D. ANDRUSOV–J. BYSTRICKÝ–O. FUSÁN 1973) in the Czechoslovak Carpathians (Fig. 1, 2):

1. The foreland of the Carpathians, mainly the Bohemian Massif.
2. The Carpathian foredeep with Neogene molasse-like filling.
3. The Flysch Belt, folded at the end of Paleogene (Savian) and at the beginning of Neogene (Styrian) times, consists mostly of Cretaceous and Paleogene formations.
4. The Klippen Belt, folded at the end of Cretaceous and re-folded at the end of Paleogene times, consists partly of Triassic, mostly of Jurassic and Cretaceous sediments.

On the basis of different facies and stratigraphical range in the Jurassic and the Cretaceous the following two principal partial tectonic units have been distinguished in the Klippen Belt (D. ANDRUSOV 1959, J. SALAJ–O. SAMUEL 1966; A. BEGAN 1969): a – the Czorstyn Unit, b – the Pieniny (Kysuca Unit and several transitional facies between them.

The Manín Zone is a particular depositional zone, variably interpreted from the view of its tectonic position (cf. D. ANDRUSOV 1959, J. SALAJ–O. SAMUEL 1966, A. BEGAN 1969, M.

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* This part is based mainly on D. ANDRUSOV's (1959, 1968) works and Regional Geology of ČSSR (M. MAHEĽ et al. 1967; or T. BUDAY et al. 1967). The description of the Trias is based on latest works by J. BYSTRICKÝ (1982, 1983), M. MAHEĽ (1978, 1979a, b, 1980, 1981a, b) and J. MICHALÍK (1974, 1977, 1978, 1980). In this chapter the new opinion of one of us (J. SALAJ 1982) of different tectonic interpretation of the Nedzov and Strážov nappes is not taken in account.

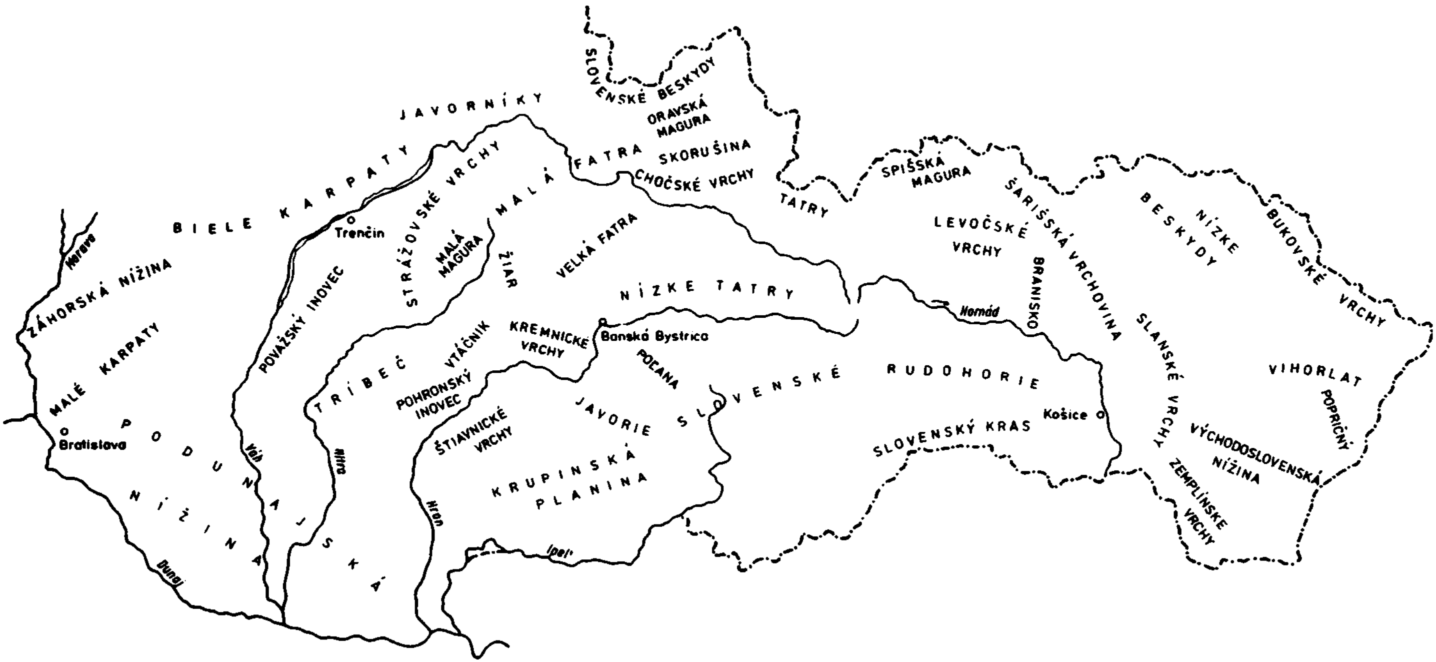


Fig. 1. Orographic division of the Slovak part of the West Carpathians (after D. ANDRUSOV, O. FUSÁN, J. BYSTRICKÝ 1973)

MAHEĽ 1979, M. RAKÚS 1977). Some authors regarded it as an integral part of the Klippen Belt, the others as a particular zone situated on the southern side of the Klippen Belt and on the northern side of the Tatricum. Like in the Klippen Belt also in the Manín Unit the following partial units have been distinguished on the basis of different Jurassic and Cretaceous facies: a – the Klape Unit, b – the Manín Unit, c – the Kostelec Unit.

5. The inner West Carpathians zone with mediterranean nappes. It is a Paleogene tectonic unit, only slightly affected by the Savian folding, so there are meganticlines, mainly in its northern part. In the core of the meganticlines are crystalline complexes and the Paleozoic, surrounded by the Mesozoic. The Mesozoic rests partly in a normal position upon older formations, and is partly covered by the Mesozoic, overthrust from the S to the N in the form of extensive pre-Senonian nappes (D. ANDRUSOV–J. BYSTRICKÝ–O. FUSÁN 1973). The meganticlines are separated from one another by megasynclines with the Paleogene or Senonian and Neogene in their core.

There are following pre-Senonian Units in the zone: a – the Tatricum (Tatrides); b – the Fatricum; c – the Veporicum (Veporides); d – Hronicum; e – the Gemericum (Gemerides); f – the Silicicum.

In the first three main units are mostly intensely metamorphosed complexes of the Paleozoic, perhaps also Precambrian crystalline complexes overlain unconformably by the Late Paleozoic and transgressive Mesozoic (Lower Trias – Cretaceous).

The Tatricum. This unit comprises crystalline complexes of core mountain ranges, the overlying Mesozoic and in places also the Late Paleozoic. The Mesozoic bed sequence is frequently interrupted in the Upper Trias.

The Fatricum. It comprises two nappes – a lower one, locally present – the Vysoká nappe, and an intricate, extensive one – the Krížna nappe. The bed sequence is continuous from the Lower Trias to the Cenomanian. The Krížna nappe comprises more partial nappes and digitations, present in all core mountains. Crystalline complexes and the Permian (Verrucano) are infrequent (Staré Hory). The native area of the Fatricum is S of the Ďumbier Massif. Formerly all nappe elements thrust over the Tatricum were denoted as Subtatran nappes (the Subtatricum). The lower Subtatran (Krížna) nappe corresponds to the Fatricum.

The Veporicum. It comprises the crystalline complexes between the Čertovica line and the Lubeník-Margecany line as well as the Late Paleozoic and Mesozoic resting normally upon the crystalline complexes and partly metamorphosed. There are four tectonic zones distinguished in the Veporicum: a – the Ľubietová zone; b – the Kraklová zone; c – the Kráľová hoľa zone; d – the Kohút zone.

The Hronicum. It comprises Carboniferous, Permian and Mesozoic (Trias-Neocomian) formations, thrust over a great distance. They rest as tectonic outliers upon the Tatricum, Fatricum and the Veporicum. Pre-Middle Carboniferous crystalline complexes are missing in the bed sequence. There are two facies distinguished in the Hronicum: the Čierny Váh facies with dolomites dominant in the Middle Trias, the Carnian without any thicker Lunz Member; and the Biely Váh facies with dominant Reifling limestones in the Middle Trias and with thick Lunz Member in the Carnian. Besides the facies division, we also distinguish two main nappes in the Hronicum: a – the Šturec nappe with dominant Čierny Váh facies; b – Choč nappe with dominant Triassic Biely Váh facies. In some places the nappes are in tectonic position above each other. The native area of the Hronicum is S of the Veporicum.

The Gemericum is mostly composed of Paleozoic rocks. It is in the Slovenské Rudohorie (ore mountains; Fig. 1).

The Silicicum. The Mesozoic is mostly in the Galmus zone in the north and in the Slovak Karst in the south. The Mesozoic is mostly represented by the Trias, characterized by the

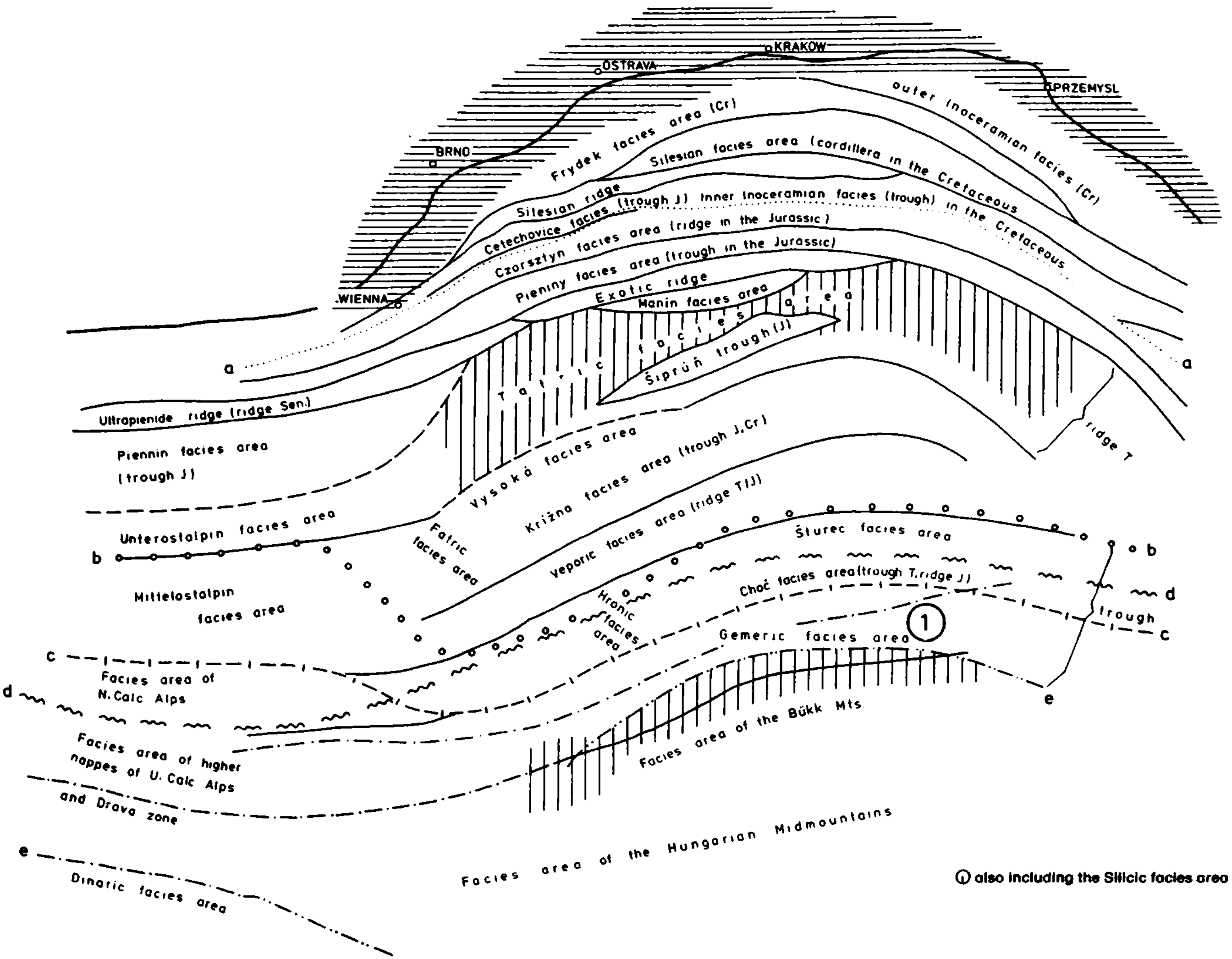


Fig. 2 Facies scheme of the West Carpathians in the Mesozoic (after D. ANDRUSOV, O. FUSÁN, J. BYSTRICKÝ 1973)

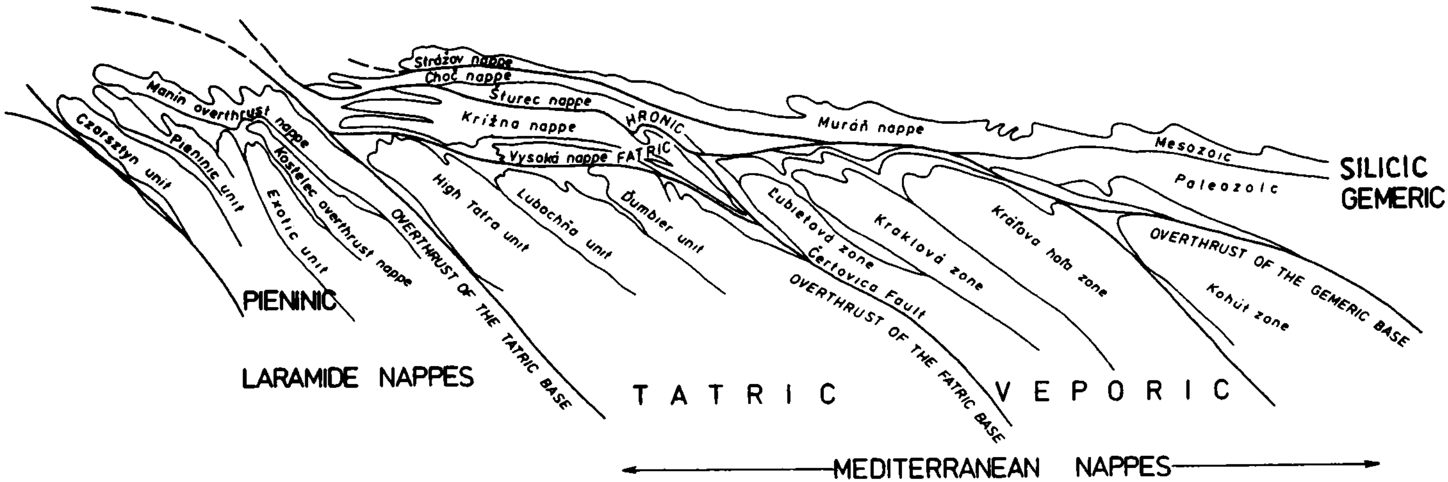


Fig. 3 Scheme of post-Paleogene units of the West Carpathians (after D. ANDRUSOV, O. FUSÁN, J. BYSTRICKÝ 1973)

facies of light limestones and dolomites (Steinalm, Wetterstein, Tisovec, Furmanec, Dachstein) and by the deposits of the Hallstatt facies.

The nappes rest mostly upon the Hronicum (the Strážov nappe and the Drienok nappe) and they consist mainly of the Trias. Formerly they were denoted as the Upper Subtatricum (the Strážov nappe a. o.). Lithostratigraphical history of these nappes is resemblant to that in the Silicicum, so they are outliers of a nappe originating from the same sedimentation area as the Silicicum.

The sedimentation area of the Silicicum is not unambiguously defined. According to the existing opinions the Mesozoic of the present Silicicum is a part of the Gemericum. When the Triassic age of a part of the Meliata Group was determined, then its nappe position in relation to the basement (Gemericum) was proved. Some authors place its original sedimentation area on the southern side of the Gemericum and others on the northern part. This is why its position is not marked in the enclosed facies and tectonic scheme (Fig. 2 and 3).

6. The Bükk zone is in Hungary. Recently some authors ranged the Meliata Group to this zone and denoted it as the Bukovicum.

The pre-Senonian nappe system is overlain by Senonian-Neogene sedimentary and volcanogenic formations representative of different sedimentation cycles.

Basical features of lithostratigraphical history of Inner Carpathian Trias

Following is a brief characteristic (fide J. BYSTRICKÝ 1983) of the lithofacies and stratigraphical history of the Trias of the main units in the Inner Carpathians (Fig. 4 and 6).

Trias in the West Carpathians rests transgressively and unconformably almost in all the above mentioned tectonic units formed in the Mediterranean folding phase. In places with the missing Permian the Lower Trias rests usually immediately Upon the Early Paleozoic or crystalline complex.

In the foreland of the West Carpathians and partly beneath the northern part of the Flysch zone in Poland is a germanotypical Trias. In the Czechoslovak part of the Flysch Belt there are not even Triassic pebbles. The Trias might, howewer, had been there, only it was removed by erosion.

In the Klape tectonic unit (J. SALAJ–O. SAMUEL 1966, A. BEGAN et al. 1982) the Triassic formation is represented by isolated occurrences of dolomites, Carnian limestones, and by a variegated schist formation including layers of quartzites and gypsum lenses (Carpathian Keuper), by a Rhaetian formation of dark marly schists alternating with darkgrey limestone banks. In Middle Cretaceous and Upper Cretaceous conglomerates of the Klape unit (cf. K. BORZA 1962, 1966, A. BEGAN–K. BORZA–J. SALAJ–O. SAMUEL 1965, M. MIŠÍK–M. SÝKORA 1981) the Trias formation is only represented in the form of pebbles of variegated quartzites (Lower Trias), grey and white limestones with dasycladaceans and foraminifers (Anisian, Ladinian), and Norian and Rhaetian limestones.

There is a more complete Lower and Middle Triassic bed sequence only in a klippe near Haligovce, belonging to the Manín tectonic unit. There are grey-green schists and limestones ranged to the Campilian, and Middle Triassic limestones and dolomites.

Lower Trias

In the main tectonic units of the Inner West Carpathians (the Tatricum, Fatricum, Veporicum, partly the Hronicum) the Lower Trias commences with basal, partly conglomeratic quartzites. They resemble to Alpine basal quartzites, denoted as the "Semmering-quartzite" in the Alps. In the area of the main tectonic units is a higher Lower Triassic formation of variegated schists with intercalations of sandstones. Sometimes it is denoted as the Werfenian formation (schists). The schists in its top part are more marly and contain layers of dolomites and limestones with occasional Campilian fauna like *Costatoria costata* (ZENK.). In the Silicicum the Lower Triassic quartzite is missing. There are local conglomerates (Slovenský

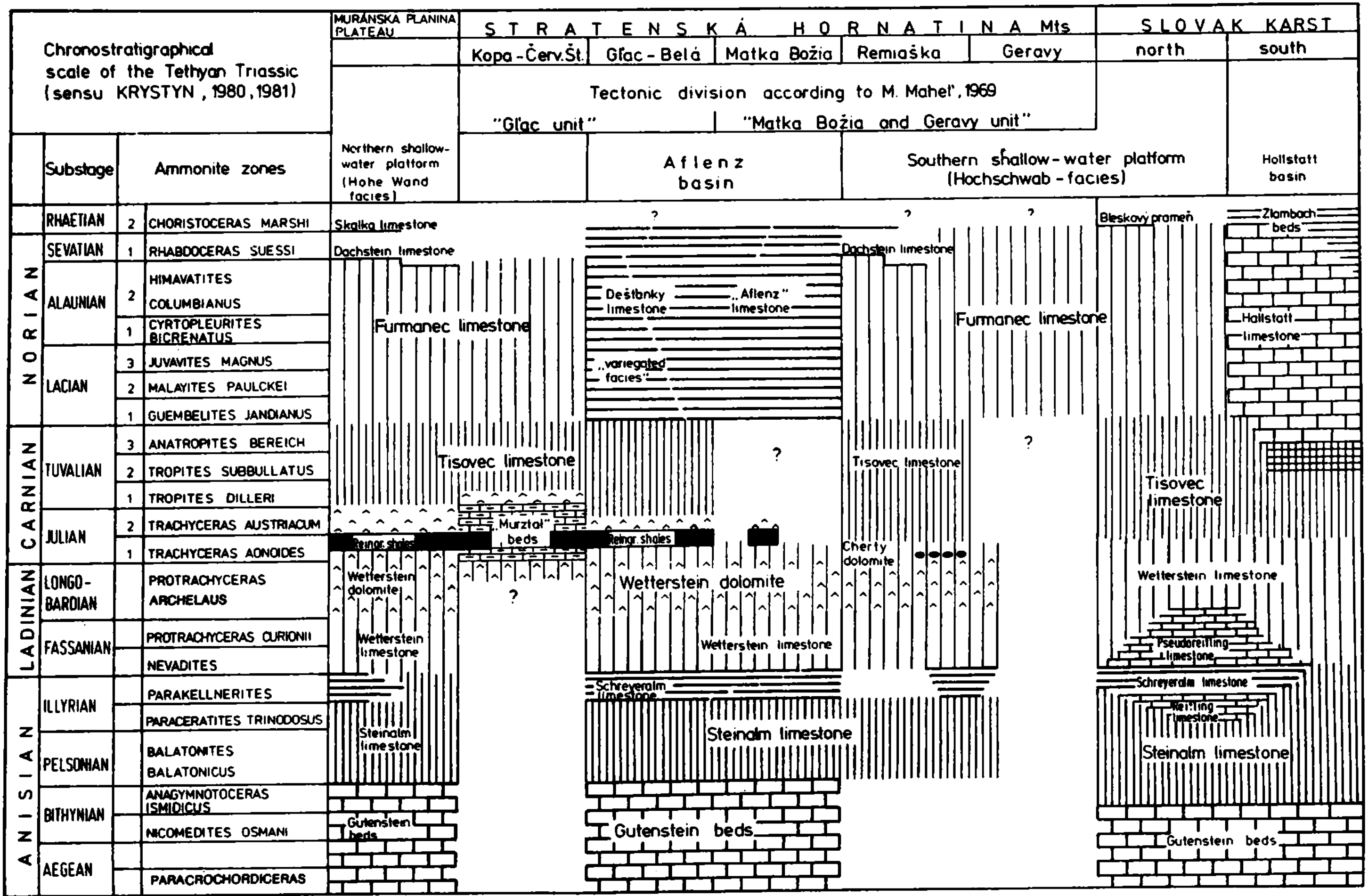


Fig. 4 Stratigraphic and facial division of the Stratenská hornatina Mts. Triassic (after J. BYSTRICKÝ, O. JENDREJÁKOVÁ, J. PAPŠOVÁ 1982)

raj) and mostly a formation of variegated sandstones and schists of a considerable thickness, containing Seissian fauna including the significant form of *Claraia clarai* (EMMR.). It is more marly in the upper part, and contains already Campilian fauna (ammonites), *Neoschyrodus constatus* (MÜNST.), *Costatoria costata* (ZENK.), a. o. The uppermost formation of the Silicic Lower Trias and partly of the Hronicum is a formation of green-grey and grey marly schists alternating with banks of grey-green and dark-grey limestones with typical Campilian fauna: ammonites, *Costatoria costata* (ZENK.), *Neoschyrodus costatus* (MÜNST.) a. o. Grey and red bank oolitic limestones identic with the "Gastropoden-oolite" of Eastern Alps occur locally in the southern part of the Silicicum as a conspicuous layer in a Lower Campilian formation of variegated schists and limestones.

Volcanic rocks in the Lower Trias are represented by Campilian quartz porphyries.

Middle Trias

It is mostly limestone-dolomitic, with different bed sequence in different tectonic units. In the Tatricum of the Tatra Mts., at the base of the Middle Trias are the so-called basal breccias overlain by grey limestones fading out both laterally and vertically in dolomites. In places the limestones are dark and "vermicular" (Würmlikalk of Eastern Alps). Grey limestones contain Pelsonian – Illyrian dasycladaceans, occasional segments and entire stems of crinoides *Dadocrinus grundeli* LANG, *Dadocrinus* cf. *gracilis* MEYER. In other parts of the Tatricum the differentiation of dark limestones and grey dolomites is much more conspicuous. As a rule, the Middle Trias commences with a formation of dark bank limestones of the Gutenstein type or dark massive limestones of the Annaberg type, higher up replaced by a formation of grey bank dolomites. At the base of the dark bank limestones there are in places (the Nízke Tatry Mts.) gastropods (*Natica stanensis* PICHLER); dolomites (the Tríbeč Mts.) contain Anisian dasycladaceans with *Physoporella dissita* (GUEMB.), PIA and Ladinian *Diplopora annulata* (SCHAFH.) – Malá Fatra Mts.

Similar Middle Triassic bed sequence is in the Fatricum (mainly in the Krížna nappe), only the dolomite formation contains local layers of dark bank limestones. The age of the individual sequences is documented by dasycladacean fauna and flora. They indicate that dark (Gutenstein) limestones extend in place only to the Pelsonian (*Decurtella decurtata* GIER.), elsewhere to the Illyrian (*Diplopora annulatissima* PIA) and that the overlying dolomites commence either in the Pelsonian (*Diplopora hexaster* PIA, *Physoporella dissita* GUEMB.; PIA) or as late as the Ladinian – *Diplopora philosophi* (PIA) – in the lowermost layer of dark limestones in the formation of dolomites.

In the Veporicum the Middle Trias with a similar bed sequence is metamorphosed. In partial tectonic units of the Hronicum the Middle Trias commences though with dark (Gutenstein) limestones or dolomites (Gutenstein dolomites) but the Upper part of the Middle Trias is facies – differentiated to a considerable extent. In the Choč nappe, above the Gutenstein limestones (*Physoporella dissita* GÜMB PIA) are Pelsonian dolomites (*Physoporella pauciforata* (GUEMB.) PIA and their varieties, *Physoporella dissita* (GÜMB.) – Ramsau dolomites, followed by dark bank nodular limestones with cherts – the Reifling limestones commence in the Illyrian (*Piarorhynchia trinodosi* (BITTNER) and extend in places to the Cordevolian [*Monophyllites aonis* (MOYS)], elsewhere only to the Langobardian. In this case they are overlain by bioherm Cordevolian Raming limestones (brachiopods, corals, sponges, crabs, echinoderms, ostracods), partly as lateral equivalent. In the lower part of the Reifling limestones (the Choč Mts.) are local red and pink bank limestones resemblant to Schreyeralm

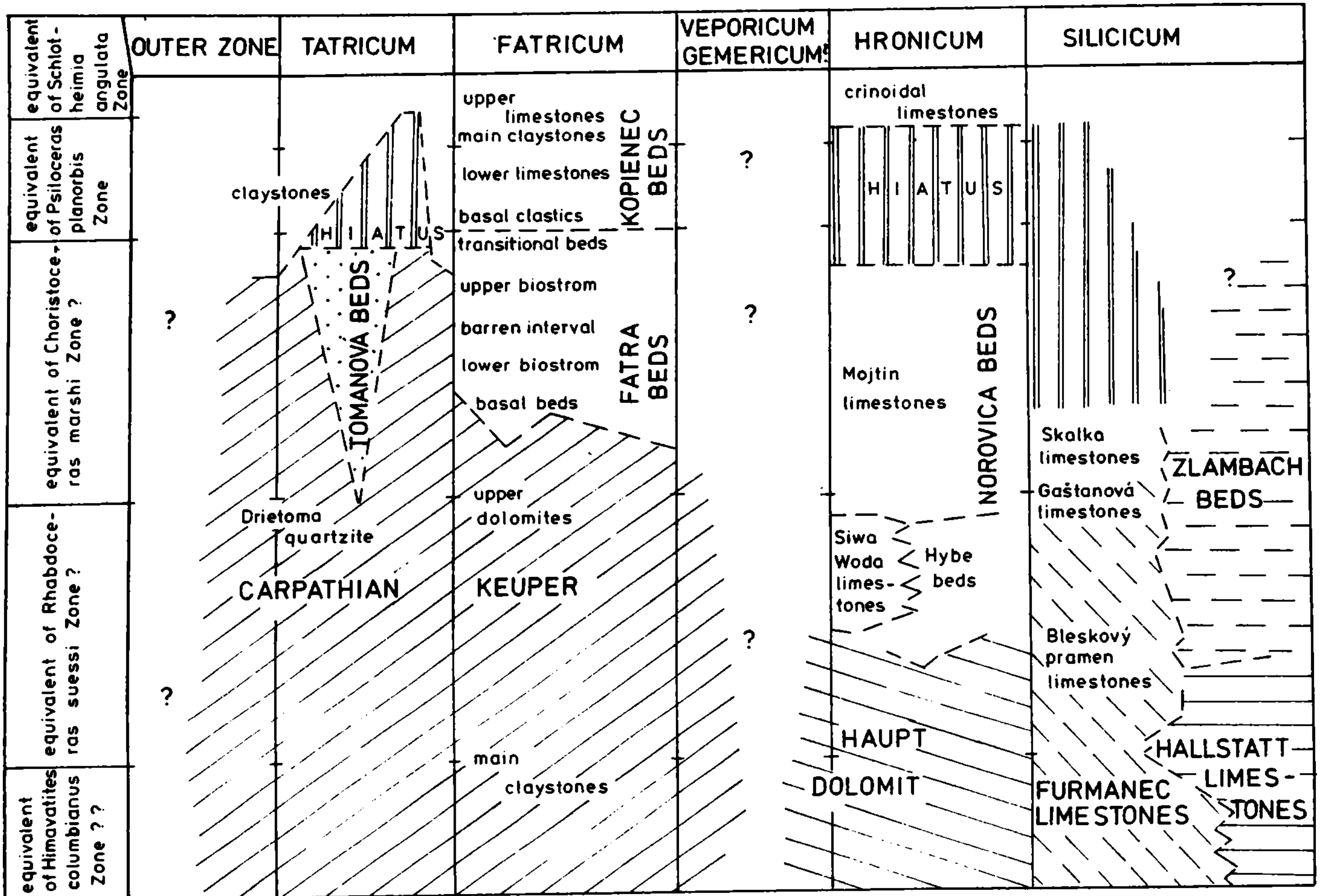


Fig. 5 Uppermost Triassic lithostratigraphy of the West Carpathian units (after J. MICHALÍK 1980)

limestones of the Slovak Karst. In the Šturec nappe the bed sequence is more monotonous. The Gutenstein and Annaberg limestones (containing physoporelles) are overlain by a thick dolomite sequence commencing in the Upper Anisian, extending through the Ladinian to the Cordevolian. It consists of dolomites with plentiful dasycladaceans [*Diplopora annulata* (SCHAFH.)], formerly denoted – like the Anisian dolomites in the Choč nappe – as the Choč dolomites or Carpathian dolomites (cf. the terms).

The Silicicum Middle Trias is characterized by light massive limestones of the Wetterstein type. The Middle Trias commences with the Gutenstein limestones (Slovak Karst) or Gutenstein dolomites (Slovenský raj Mts., Muránska plošina plateau); higher up are Pelsonian to Illyrian light massive limestones, followed by light Ladinian massive limestones. Although light massive limestones in the Silicic partial tectonic units had the same development, their stratigraphical range is considerably variable. Light massive limestones are frequently replaced by light dolomites. The light limestones (Pelsonian – Illyrian) are denoted as Steinalm limestones (or Steinalm dolomites), the Ladinian limestones – as Wetterstein limestones (dolomites). Middle Triassic light massive limestones form an extensive reef complex comprising the reef, lagoonal a. o. facies areas, distinguished on the basis of lithological and biofacies criteria. Formerly, when the mutual relations among the individual facies of the Wetterstein limestones were not known, the limestones were regarded as stratigraphically significant (to variable extent) and denoted by various names (Veterník limestones, Havraník limestones, Nedzov limestones, Teutloporella limestones).

Since the Steinalm limestones and dolomites differ from the Wetterstein limestones and dolomites only in age, it is hard to distinguish them macroscopically. In places (mostly in the Slovak Karst, partly in the Muránska plošina plateau) are lithologically different sequences. They are either Schreyeralm limestones (Upper Illyrian) and dark bank limestones with occasional dark cherts (resemblant to un-nodular Reifling limestones) with a layer of tuffs and tuffites (Fassanian) at the base (Fig. 6).

Upper Trias

It is ofter absent in the Tatricum of the Tatra Mts., since there were unintensive movements (Early Cimmerian phase) between the Middle Trias and Lower Lias. Elsewhere the Upper Trias is in the Carpathian Keuper facies and is overlain by the so-called Tomanov beds, regarded as continental Rhaetian facies. In other parts of the Tatricum the Upper Trias is mainly represented by the Carpathian Keuper, overlain transgressively by the basal Lias, and in places by Rhaetian dark-grey limestones (the Strážovské vrchy Mts.).

In the Fatricum the Upper Trias is mostly represented by the Carpathian Keuper (Norian) and dark schists or dark limestones of the Rhaetian marine facies. In some places the dolomites (Cordevolian) are overlain in turn by thinner Lunz Member, then by a dolomite layer (Hauptdolomite) and finally by a Carpathian Keuper formation. According to lithofacies and faunal assemblage, the Rhaetian comprises the Shwab facies (dominant schists with lamellibranchiates) and the Carpathian facies (dark bank limestones with dominant brachiopods*). Frequent are also mixed Schwab-Carpathian facies. There is a similar bed sequence in the Veporic Upper Trias, only the entire formation is metamorphosed and Rhaetian marine sediments are mostly absent.

* This type of facies is denoted as the Fatra Member by J. MICHALÍK 1974, or J. MICHALÍK–O. JENDREJÁKOVÁ–K. BORZA (1979). In their overlier he also distinguished the Kopienica Member composed of basal clastics, the lower and upper clastics being separated by a claystone layer (cf. J. MICHALÍK 1980, p. 195, Pl. 2).

In the main tectonic unit of the Hronicum is facies differentiation among partial units. As already mentioned, in the Choč nappe the Cordevolian is in the facies of Reifling or Raming limestones. They are followed by dark slab-like marly schists – the so-called Aon beds, or by a thick formation of sandstones and schists – the Julian Lunz Member [*Carnites floridus* (Wulfen)]. As a rule, the Lunz member is overlain in turn by the Hauptdolomite (Hauptdolomite of Eastern Alps) with megalodonts, corals, dasycladaceans at the base (reef, lagoonal facies, according to which it is ranged to the Tuvalian. The most part of the Hauptdolomite is Norian. In its overlier are local light bank, partly brecciated limestones (Dachstein limestones) and then the Kössen Member. Since the Dachstein limestones and the Kössen Member are on the surface only at scarce localities on the northern slope of the Nízke Tatry Mts., we do not know the entire stratigraphical range of the Hauptdolomite everywhere*.

In the Šturec nappe the Upper Trias is represented mainly by dolomites, since the Lunz Member and occasional grey Opponitz limestones in its overlier are rudimentary and thin. In the overlier of the Hauptdolomite are grey limestones of different facies. They are Rhaetian but their spatial distribution is limited to few localities.

There is a particular Upper Trias facies in the Silicicum and in its partial tectonic units. The main tectonic unit is characterized by light massive limestones extending from the Cordevolian to the Uppermost part of the Norian and by their lateral equivalents – light bank limestones (Dachstein limestones), red and nodular limestones (Hallstatt limestones), dark bank cherty limestones (Aflenz limestones), dark marls and marly limestones (Zlambach beds). These Upper Triassic facies are mainly in the undisplaced part of the Silicic Mesozoic (Slovak Karst, Stratenská hornatina) and in the Muráň nappe (Muránska plošina). In the northern part of the Muráň nappe, mainly in outliers of the Strážov nappe, the Upper Trias is partly represented by light massive limestones in the Carnian (Strážovská hornatina) or by grey and light bank limestones of the Norian (Dachstein limestones – the Malé Karpaty Mts.); mainly by the Hauptdolomite, overlain in places by various limestones (light, grey, pinkish, yelowish), containing Rhaetian fauna.

* In the Hronicum of Nízke Tatry Mts., in the overlier of the Dachstein limestone is a facies resemblant to the Kössen Member denoted by J. Michalík (1974) as the Hybe Member (Upper Rhaetian). Their equivalent in the Vysoké Tatry (High Tatra) Mts. are the Sivá voda limestones (cf. J. Michalík 1980, p. 195, pl. 2). In contrast to that, in the Strážovské vrchy Mts., in the overlier of the Hauptdolomite are limestones with *Triasina hantkeni* Majzon, denoted as the Norovice Member by A. Gaździcki–J. Michalík (1980; Fig. 5).

Microbiostratigraphical division of Trias of the West Carpathians

Lower Trias

In Tatro-Veporicum of the West Carpathians the Lower and/or the Upper "Seissian" is transgressive (detrital), and therefore improper for microbiostratigraphic studies.

The situation is different in the Slov. Karst where the Permian sediments are overlain by variegated sandstone-schistose formation containing the species *Pseudomonotis* sp. and *Claraia clarae* (EMMR.), ranged by K. BALOGH (1950) to the "Seissian" (= Griensbachian – Lower Dienerian; sensu G. PISA 1974); whereas J. BYSTRICKÝ (1964) refers it to higher parts of the "Seissian" to the lowermost "Campilian" (Upper Diener – Spathian). According to M. MAHEĽ (1954), M. MAHEĽ–J. VOZÁR (1971) the described formation developed gradually from subjacent conglomerates and Permian sandstones. Its boundary (with the "Campilian", like for example in the Bakony Forest and in Southern Alps where is a border "gastropodenoolit" horizon, is missing in the Slov. Karst according to J. BYSTRICKÝ (1964). In our country the Campilian and Seissian sediments pass continuously into each other. In the Gemericum the gastropod oolite with the species *Natiria subtilistriata globulina* FRECH is represented by reddish oolitic limestones of the Lowermost "Campilian". Actually, the horizon may be correlated with the horizon of gastropod oolite from the surroundings of the lake Balaton (cf. E. VÉGH-NEUBRAND 1972). Microfauna from the oolite limestones – biosparite (sample Nr 10 – Rakovnica) is represented by the species *Glomospirella ? triphonensis* BAUD, ZANINETTI et BROENNIMANN, *Arenovidalina chialingchiangensis* HO, *Meandrospira cheni* (HO) and *Schubertella* sp. (J. SALAJ 1978). According to its composition the fauna could be older, so we cannot exclude its secondary occurrence. It is because except microfauna in the binding matrix the individual forms either occur in pebbles or form the cores of oolites. In the Gemericum the above described oolites ocur for example at the village Rožňavské Bystré (see profile by J. BYSTRICKÝ in J. BYSTRICKÝ–A. BIELY 1966).

These gastropod oolites are also interesting from the view of paleogeography. They occur in Turkey and Iran on the contact between the Lower and Upper "Seissian" whereas in Dinarides, Eastern Alps, in the Bakony Forest on the contact between "Seissian" and "Campilian", around Balaton and in the Slov. Karst their age is Lower Campilian. Such horizons are in South-Tirolian Alps in the lowermost parts of the Lower Trias with *Cyclogyra mahajeri* BROENNIMANN, ZANINETTI et BOZORGNIA and *"Spirorbis" phlyctaena* BROENNIMANN et ZANINETTI (see W. RESCH 1979). These forms are so far unknown in the West Carpathians.

It is difficult to parallelize the horizons of gastropod oolites (and other biozonal schemes) with newly defined chronostratigraphical Lower Triassic units, because of insufficient data on various fossil groups and their biozones within the stages or substages. According to G. PISA (1974) and W. RESCH (1979) the Lower Diener corresponds to the top parts of the "Seissian" whereas the Upper Diener – to the lowermost "Campilian". These authors range a large gastropod oolite horizon to the Diener in South-Tirolian Dolomites. According to this division, the gastropod oolite horizon of the Silicicum should correspond to the Upper Diener, since its Lower Campilian age was proved unambiguously. According to H. ZAPFE (1974), however, the gastropod oolite horizon should be ranged to the Smithian. It is more logical, because the "Campilian" fauna occurred first in the Smithian (biozone *Euflemingites romunderi* and *Wasatchites tardus*), as shown by the author in his correlation table. In accordance with this interpretation, in the Silicicum the sediments formerly referred to as Lower Campilian (calcareous sandstones with the mentioned gastropod oolite horizon) correspond to the Smithian. Their age is proved by plentiful Lower Campilian fauna (J. BYSTRICKÝ 1964, J. BYSTRICKÝ–A. BIELY 1966; p. 47), mainly *Neoschyrodus costatus* (MÜNST.), *Neoschyrodus laevigatus* (ALB.), a o. K. BUDUROV–E. TRIFONOVA (1974) correlate the Lower Campilian formation (= Smithian) in Bulgaria with the conodont biozone *Neospathodus triangularis*.

The age of the Upper Campilian schists in the West Carpathians is proved by rich ammonite fauna from the Silicicum and the Hronicum (J. BYSTRICKÝ–A. BIELY 1966; V. KOLLÁROVÁ-ANDRUSOVOVÁ–J. BYSTRICKÝ 1974). It is the fauna of the biozone *Tirolites cassianus*.

So the Upper Campilian schists should only correspond to the Lower Spathian (various species of the genus *Columbites* and *Tirolites*), since the species of the genus *Subcolumbites* and *Neopopanoceras haugi*, characteristic of the Upper Spathian have not been found in our country. The Upper Campilian beds correlated with the Spathian are generally characterized by the biozone *Neospathodus homeri* (H. KOZUR–H. MOSTLER 1972, K. BUDUROV–E. TRIFONOVA 1974) as regards conodonts.

Zone *Arenovidalina chialingchiangensis* (Partial-range zone)

From microbiostratigraphical view, in the West-Carpathian Lower Trias the biozone *Arenovidalina chialingchiangensis* (J. SALAJ 1978) can be distinguished. It has the character of a regional partial-range biozone. Its lower boundary cannot be defined exactly because of unfavourable facies conditions.

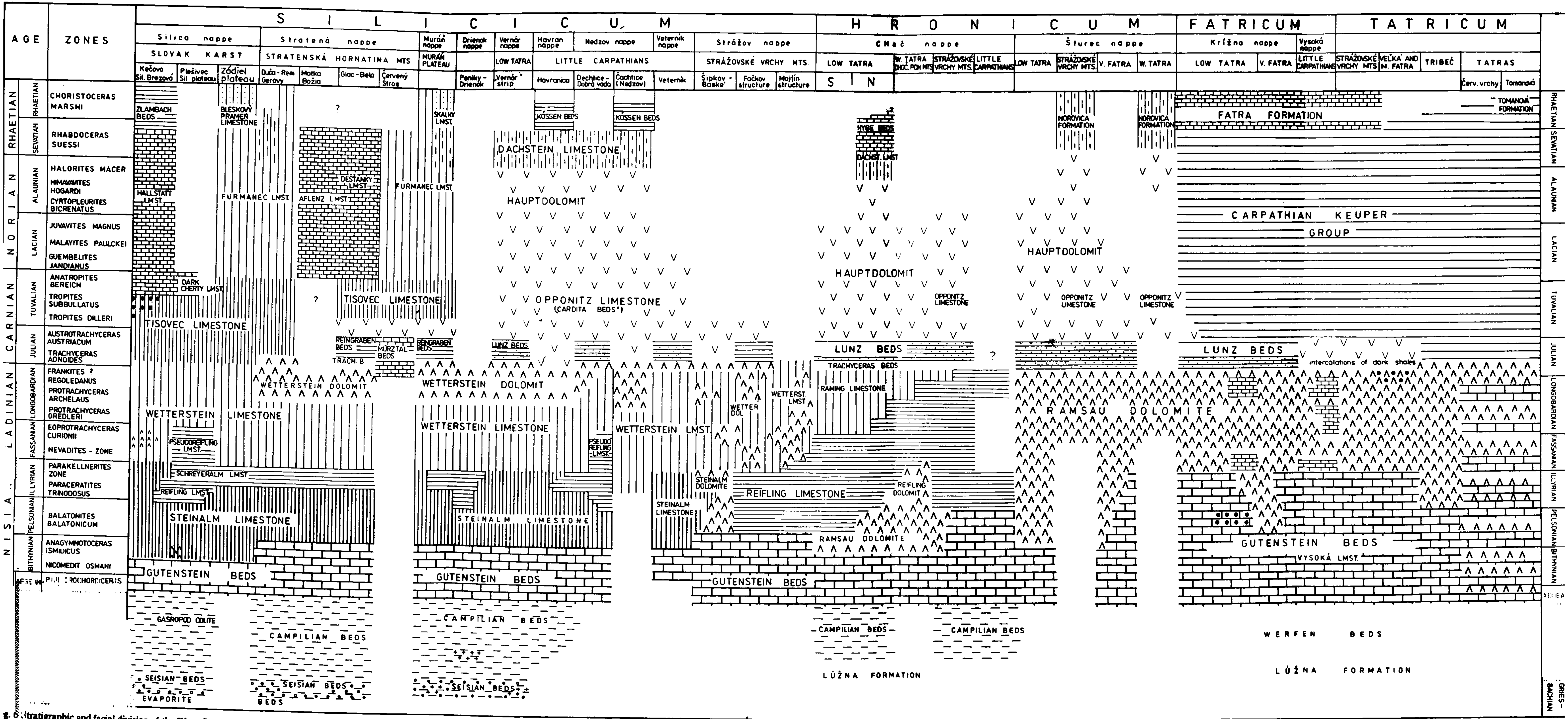
The upper boundary is characterized by the presence of Anisian species *Meandrospira insolita* (HO) and *Meandrospira deformata* SALAJ.

In Tethyd regions (Turkey, L. ZANINETTI–Z. DAGER 1978; Iran, P. BROENNIMANN–L. ZANINETTI–F. BOZORGNIA 1972; Alps, V. RESCH 1979), the Lower Seissian formation is indicated by the species *Cyclogyra mahajeri* BROENNIMANN, ZANINETTI et BOZORGNIA and *Rectocornuspira kalhori* BROENNIMANN, ZANINETTI et BOZORGNIA.

Subzone *Meandrospira cheni* (Interval-range zone)

The upper layers of the Seissian to the lowermost Campilian are characterized by the partial-range subzone *Meandrospira cheni*. Its lower boundary cannot be exactly defined so far whereas the upper boundary is defined by the first appearance of the species *Meandrospira pusilla* (HO).

The subzone is distinguished on the basis of microfauna from the Silicicum (locality Honce, formerly Genč) from the lowermost "Campilian" (= Smithian) red oolite limestones characterized by *Neoschyrodus costatus* (MÜNST.) and *Neoschyrodus laevigatus* (ALB.), (J.



g. 6 Stratigraphic and facial division of the West Carpathians Triassic (after J. BYSTRICKÝ 1983)

SALAJ–A. BIELY–J. BYSTRICKÝ 1967b), and from the same horizon at the locality Rakovnica as well as from the Nízke Tatry Mts. (the confluent of Čierny Váh r. and Šuňavský potok brook; beds with *Costatoria costata* ZENK).

It is to be noticed that *Meandrospira pusila* (HO) quoted by W. RESCH (1979) from the gastropod oolite from the Dolomites in South Tirolia corresponds actually to the species *Meandrospira cheni* (HO).

Subzone *Meandrospira pusilla* (Interval-range zone)

In the upper part of the biozone *Arenovidalina chialinghiangensis* one of us (J. SALAJ 1978) distinguished the subzone *Meandrospira pusilla*. It has the nature of a partial-range subzone and is indicative of the Upper Campilian. The lower boundary is characterized by the first occurrence of the species *Meandrospira pusilla* (HO) and the upper one by *Meandrospira insolita* (HO) and *Meandrospira deformata* SALAJ.

Microfauna of the subzone *Meandrospira pusilla* is defined from the Upper Campilian beds (Spath) with *Tirolites* sp. from the cut of the railway between Červená Skala and Švermovo (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967a, b).

In the West Carpathians the formerly described subzone was defined as the zone *Meandrospira iulia* (J. SALAJ 1969a). The index species of this zone was originally described within the newly defined genus *Citaella* (PREMOLI SILVA). This genus is a synonym of the genus *Meandrospira* LOEBLICH and TAPPAN 1946, as mentioned by V. KOCHANSKY-DEVIDÉ et S. PANTIĆ (1966). They described the species *Meandrospira iulia* (PREMOLI SILVA) from Campilian sediments of the Dinarides together with *Ammodiscus incertus* (d'ORBIGNY) and *Frondicularia woodwardi* HOWCHIN. A monoassemblage of the species *Meandrospira iulia* (PREMOLI SILVA) was described – besides from the "Campilian" of the West Carpathians (J. SALAJ–A. BIELY et J. BYSTRICKÝ 1967a, b) – also from the "Campilian" of the South Tunisian mountains Djeffara (J. SALAJ 1969c). There are contradictory opinions about taxonomic position of this species. As early as 1969 (c) J. SALAJ pointed out that *Meandrospira iulia* (PREMOLI SILVA) is a synonym of either the species *Meandrospira cheni* (HO) or *Meandrospira flosculiformis* (HO). *Meandrospira cheni* (HO) with 1 1/2 whorls is phylogenetically older and differs from the younger species *Meandrospira flosculiformis* (HO) with 3–3 1/2 whorls. Because of its large proloculus the latter is regarded as a synonym of the "Upper Campilian" – Anisian species *Meandrospira pusilla* (HO) – form A which developed from the species *Meandrospira cheni* (HO); Fig. 7. This is why the zone *Meandrospira iulia* was renamed to the biozone *Meandrospira pusilla* which is in accordance with the opinions of many authors (P. BROENNIMANN–L. ZANINETTI–A. MOSHTAGHIAN–H. HUBER 1973; A. BAUD–P. BROENNIMANN–L. ZANINETTI 1974; L. ZANINETTI–P. BROENNIMANN 1974; Z. DAGER–L. ZANINETTI 1976; G. STAMPELI–L. ZANINETTI–P. BROENNIMANN–C. JENNY-DESHUSSES–B. STAMPELI-VUILLE 1976; L. ZANINETTI–Z. DAGER 1978; A. BERCZI-MAKK 1976; E. TRIFONOVA 1978a and L. ZANINETTI 1976a). We, however, do not agree with the opinion of P. BROENNIMANN–L. ZANINETTI–A. MOSHTAGHIAN–H. HUBER (1973), L. ZANINETTI (1976a) and A. BERCZI-MAKK (1976) who regard the holotypes of two substantially different species *Meandrospira cheni* (HO) and *Meandrospira insolita* (HO) as the synonym of *Meandrospira pusilla* (HO).

The assemblage of "Campilian" foraminifers is very poor in the West Carpathians. L. ZANINETTI–Z. DÁGER (1978) found a comparatively rich assemblage of foraminifers (Smithian to Lower Spath) of the "Campilian", evidenced by both macrofauna and conodonts, on the Kocaeli peninsula from Turkey. They are represented by the species *Meandrospira pusilla* (HO), *Cyclogyra ? mahajeri* BROENNIMANN, ZANINETTI et BOZORGNIA, *Glomospira* *silensis* DÅGER, *Glomospirella schengi* HO, *Ammodiscus parapriscus* HO and *Calcitornella gebzeensis* DÅGER. A "Campilian" assemblage, represented by the biozone *Meandrospira pusilla* is described from Hungary by A. BERCZI-MAKK (1976); *Meandrospira pusilla* (HO), *Ammodiscus* sp., *Earlandia tintinniformis* (MIŠÍK), *Cyclogyra* cf. *mahajeri* BROENNIMANN, ZANINETTI et BOZORGNIA, *Glomospirella* sp. and microgastropods *Spirorbis phlyctaena* BROENNIMANN et ZANINETTI. Some specimens depicted by L. ZANINETTI, like *Meandrospira pusilla* (HO) belong to the species *Meandrospira cheni* (HO) (pl. 1, fig. 6, 9; pl. 2, fig. 5, 7, 8; pl. 3, fig. 6, 9).

The richest foraminiferal assemblage was found in the "Campilian" of the Balkan (E. TRIFONOVA 1977, 1978a) where the lower part of the upper "Scythian" or the lower "Campilian" corresponds to the biozone *Meandrospira pusilla* (regarded as the Acma-zone in a reduced sense). According to E. TRIFONOVA the biozone *Meandrospira pusilla* is characterized by mass occurrence of the species *Meandrospira pusilla* (HO) and by the absence of the species *"Hemigordius" chialingchiangensis* (HO) and *Meandrospira? deformata* SALAJ. According to E. TRIFONOVA (1978a) the zone *Nodosaria shablensis* (Range-zone) corresponds to the upper part of the Upper Scythian, or to the Upper Campilian. The lower part of the zone is represented by the subzone *"Hemigordius" chialingchiangensis – Nodosinella rostrata* (range-subzone), formerly defined as Anisian Acma-zone *"Hemigordius" chialingchiangensis* by E. TRIFONOVA in P. MICHAILOVA-JOVTCHEVA–E. TRIFONOVA 1965.

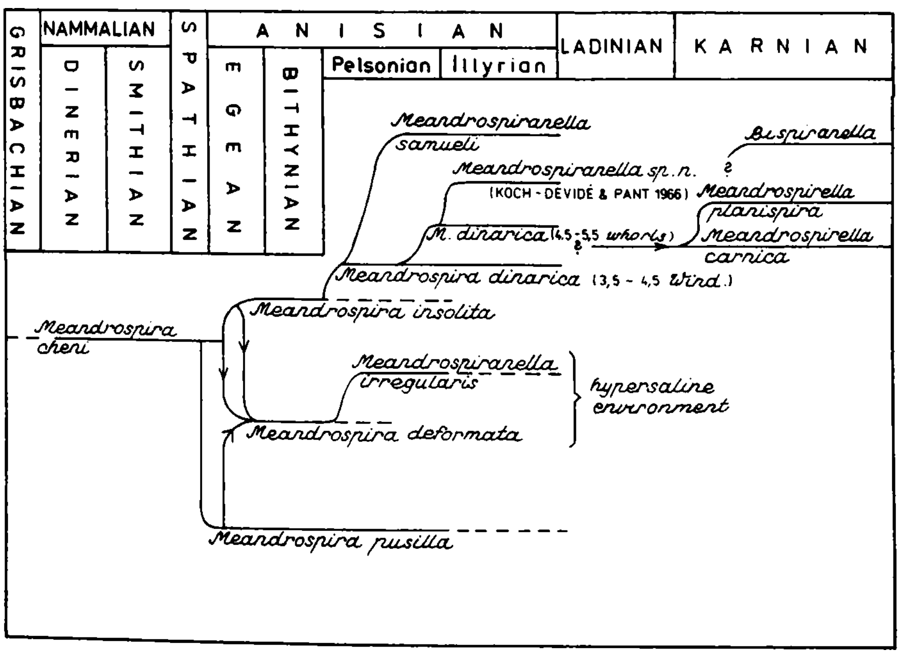


Fig. 7 Phylogenetic development of individual representatives of the genera *Meandrospira* LOEBLICH et TAPPAN, 1946; *Meandrospiranella* SALAJ, 1967 emend. SALAJ, 1969; *Meandrospirella* ORAVECZNÉ-SCHEFFER, 1969 emend. and *Bispiranella* SAMUEL, SALAJ et BORZA, 1981 of the family *Fischerinidae* MILLET, 1898

Anisian

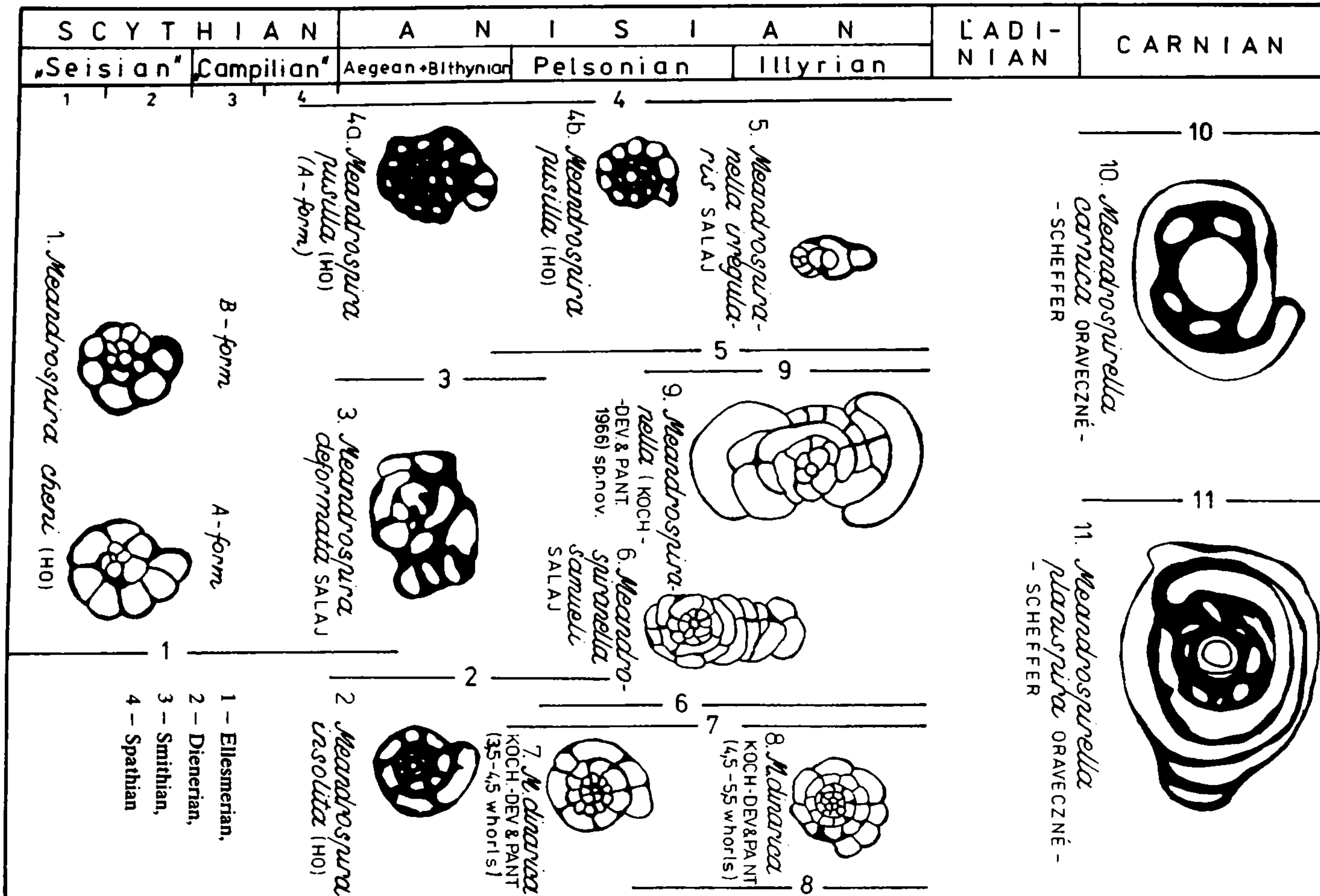
Lower Anisian ("hydaps") sediments in the West Carpathians are mostly represented by Gutenstein limestones, generally poor in fauna. So the exact application of newly defined two stages of the Lower Anisian (cf. R. ASSERETO 1974), namely Aegean (the lower substage) and the Bithynian (the higher understage) is extremely difficult. Recently A. BUJNOVSKÝ–M. POLÁK (1979) found the species *Costatoria* sp. and *Neritaria stanensis* (PICHLER) in the Tatricum of the Nízke Tatry and so the area may be ranged to the Aegean. No foraminifers, neither conodonts were found there.

Middle (Pelsonian) – Upper Anisian (Illyrian) are characterized by typical platform limestones with plentiful algae and foraminifers. The age of the limestones is proved by the species found on many localities (see Tab. I, J. SALAJ–A. BIELY–J. BYSTRICKÝ, 1967a). The Pelsonian-Lower Illyrian are characterized by the algal assemblage of *Physoporella paucifo-rata* (GUEMBEL), *Physoporella dissita* (GUEMBEL), *Diplopora hexaster* PIA and *Oligoporella pilosa* PIA (V. KOLLÁROVÁ-ANDRUSOVOVÁ–J. BYSTRICKÝ 1974). Plentiful Middle and Upper Anisian foraminifers usually occur with the about mentioned algal assemblage.

Among foraminifers the representatives of the genus *Meandrospira* LOEBLICH et TAPPAN, (Fig. 7, 8) are significant for stratigraphical division of the Anisian, and the representatives of the genus *Pilammina* PANTIĆ and *Pilamminella* SALAJ – for the division of the Anisian – Carnian. *Meandrospira pusilla* (HO) passing from the Uppermost "Campilian" (Upper Spathian) to the Lower Anisian is typical of the Lower Anisian. At the base of the Anisian also *Meandrospira insolita* (HO) appears. Later on in the course of the Anisian other significant forms appear like *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ, *Pilammina densa* PANTIĆ, and *Permodiscus pragsoides* OBERHAUSER – in the Uppermost Anisian. A more complete list of Lower-Middle Triassic foraminifers so far identified in the West Carpathians according to their vertical distribution is in Fig. 9.

Besides that, in the Lower Illyrian of the Malé Karpaty Mts. are also foraminifers indicative of a deep-sea (pelagic) environment. For example Reifling limestones (locality Hurtovec; Fig. 10) contained an assemblage with the species *Turritellella mesotriassica* KOEHN-ZANINETTI and *Ophthalmidium tricki* (LANGE). Particular attention should be paid to an assemblage from Reifling limestones (characterized by plentiful macrofauna; cf. M. KOCHANOVÁ 1979, V. ANDRUSOVOVÁ; in M. KOCHANOVÁ 1979) from the level *Paraceratites trinodosus* (W. of B. M. 466,0 – Plavecký Peter), represented by the species *Ammodiscus* sp., *Ophthalmidium tricki* (LANGE), *O. exiguum* KOEHN-ZANINETTI, *Nodobacularia cylindriformis* n. sp., *Lituotu-ba carpathica* n. sp. and *Nubecularia vujisici* UROŠEVIĆ et GAŹDZICKI – this one being particularly abundant.

We have also studied nodosaroid foraminifers. In Bulgaria (E. TRIFONOVA 1978a, b) the stratigraphical division of the "Scythian" – Lower Anisian is based on them. In the West Carpathians they are plentiful in the Lower Illyrian facies of Reifling limestones. In the area of Gombasek (Fig. 10), in a level (sample Nr. G-3) from which R. MOCK (1971, p. 251) described a rich conodont assemblage including *Gondolella excelsa* (MOSHER) is a characte-ristic microfauna from which the foraminifers are represented by the species *Calcitornella elongata* CUSHMAN et WATTERS, Dentalina excellens STYK, *Dentalina hoi* TRIFONOVA, *Dentalina subsiliqua* FRANKE, *Protonodosaria globifrondina* CIVRIEUX et DESSAUVAGIE, *Nodosaria trifonovae* n. sp., *Nodosaria primitiva* KUEBLER et ZWINGLI, *Nodosaria ordinata* TRIFONOVA, *Nodosaria* aff. *prima* D'ORBIGNY, *Nodosaria liratella* TAPPAN, *Pseudonodosaria*


SCYTHIAN
ANISIAN
LADINIAN
CARNIAN
„Seisian"
„Campilian"
Aegean+Bithynian
Pelsonian
Illyrian
1. Meandrospira cheni (HO)
B-form
A-form
2. Meandrospira insolita (HO)
3. Meandrospira deformata SALAJ
4a. Meandrospira pusilla (HO) (A-form)
4b. Meandrospira pusilla (HO)
5. Meandrospiranella irregularis SALAJ
6. Meandrospiranella samueli SALAJ
7. M. dinarica KOCH-DEV & PANT (3,5-4,5 whorls)
8. M. dinarica KOCH-DEV & PANT (4,5-5,5 whorls)
9. Meandrospiranella (KOCH-DEV & PANT. 1966) sp.nov.
10. Meandrospirella carnica ORAVECZNÉ-SCHEFFER
11. Meandrospirella planispira ORAVECZNÉ-SCHEFFER
1 – Ellesmerian,
2 – Dienerian,
3 – Smithian,
4 – Spathian

striatoclavata SPANDEL, *Frondina permica* CIVRIEUX et DESSAUVAGIE, *Frondinodosaria semiornata* (REUSS), *Frondinodosaria pyrula* CIVRIEUX et DESSAUVAGIE, *Nodosinella libera* TRIFONOVA, *Nodosinella siliqua* TRIFONOVA, *Nodosinella rostrata* TRIFONOVA, *Austrocolomia marschalli* OBERHAUSER, *Austrocolomia ploechingeri* OBERHAUSER, *Earlandinita elongata* SALAJ, *Geinitzinita pupoides* (NORVANG), *Geinitzinita oberhauseri* OIVRIEUX et DESSAUVAGIE, *Geinitzina postcarbonica* SPANDEL a *Ichtyolaria primitiva* CIVRIEUX et DESSAUVAGIE.

Ostracodes, mainly sculptured (J. SALAJ 1983), are represented by the species here: *Healdia anisica* KOZUR, *Bairdiolites compactus* KRISTAN-TOLLMANN, *Bairdiacypris anisica* KOZUR, *Bairdia finalyi* MEHES, *Caratobairdia longispinosa* KOZUR, *Praemacrocypris* MOCKI KOZUR, *Spinocypris* cf. *vulgaris* KOZUR, *Triebelina* (*Triebelina*) *martinssoni* KOZUR, *Triebelina* (*T.*) *kristanae praecursor* KOZUR, *Triebelina* (*T.*) *muelleri* KOZUR, *Triebelina* (*Mirabairdia*) *spinosa* KOZUR, *Triebelina* (*M.*) *pernodosa gemerica* KOZUR, *Triebelina* (*M.*) *pernodosa illyrica* KOZUR and *Acanthoscapha boschi interrupta* KOZUR.

Basing on foraminifers, we can distinguish five zones in the Anisian, namely: *Meandrospira insolita*, *Meandrospira deformata*, *Meandrospira dinarica*, *Pilammina densa* and *Permodiscus pragsoides*. The first two zones are alternant and coeval. The zone *Meandrospira insolita* is characteristic of an environment with more-or-less normal salinity whereas the coeval zone *Meandrospira deformata* is characteristic of a more saline environment. The zone *Permodiscus pragsoides* (= the uppermost part of the zone *Pilammina densa*; Upper Illyrian), is partly equivalent and may be regarded as the subzone of the zone *Pilammina densa*.

At the zonal division of the Anisian of the West Carpathians we took in consideration the division of the Upper Anisian in the Alps (L. ZANINETTI–P. BROENNIMANN–A. BAUD 1972a, b) and the Balkan (E. TRIFONOVA, 1978a). The relationships among the zones are shown in Fig. 9.

Zone *Meandrospira insolita* (Interval-range zone)

It was defined by J. SALAJ (1969a) in the Gemericum. As already mentioned, it is associated with the environment of more-or less normal salinity. In this environment the Gutenstein limestones with very scarce foraminifers deposited. Beside scarce species, characteristic of the described zone, and *Tolypammina gregaria* WENDT and *Calcitornella* div. sp., *Meandrospira deformata* SALAJ occurs. Its lower boundary is characterized by the first appearances of *Meandrospira insolita* (HO) and *M. deformata* SALAJ. The upper boundary is defined by the first appearance of *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ. Foraminiferal assemblages of the zone are generally poor in our country.

The described zone was evidenced on several localities from the lower part of the Gutenstein limestones in the vicinity of Drienky from the basement of Middle Anisian – Pelsonian limestones in the Brezovské Karpaty Mts. (N of Dobrá Voda; cf. J. SALAJ–A. BIELY–J. BYSTRICKÝ 1976b), and from the lower part of Gutenstein limestones in the profile Hurtovec (sample Nr. MK-2L), studied by J. MELLO from the lithofacies viewpoint). According to the existing lithostratigraphical data, the lower part of the Gutenstein limestones corresponds generally to the Lower Anisian. It is in accordance with the data from E. TRIFONOVA (1972b) about the Lower Anisian species *Meandrospira insolita* (HO).

Fig. 8 Vertical range of individual species of the genus *Meandrospira* LOEBLICH et TAPPAN 1946; *Meandrospiranella* SALAJ, 1967 emend. SALAJ, 1969 and Meandrospirella Oraveczné-Scheffer, 1969 emend. in the Triassic of the West Carpathians

Zone *Meandrospira deformata* (Interval-range zone)

Although in the Silicicum the sedimentation was associated with an environment of more-or-less normal salinity, in other parts of the West Carpathians the Lower Anisian Gutenstein limestones deposited on extensive shallows (M. MIŠÍK 1972). In some areas, mainly in marginal (Tatric) parts, in the area of the former sedimentation zone of the Krížna and Choč tectonic units (J. Salaj–M. Polák 1978) a hypersaline environment formed. Such an environment is also known from the Lower Anisian of NW Bulgaria (E. TRIFONOVA 1979) and of the Opole Silesia; (the Gogolin beds of the German Muschelkalk) where it is characterized by the presence of the species *Meandrospira deformata* SALAJ (J. GLAZEK–J. TRAMMER–K. ZAWIDZKA 1973) determined the zone *Meandrospira deformata* in hypersaline environment. The zone was fully accepted by J. SALAJ–M. POLÁK (1978) for the Lower Anisian hypersaline environment in the Tatro-Veporicum.

The lack of fauna in the Lower Anisian (Aegean) on the Kocaeli peninsula in Turkey (L. ZANINETTI–Z. DAGER 1978), most likely due to analogous paleogeographical conditions was also stated.

The coeval Lower Anisian zones *Meandrospira insolita* and *Meandrospira deformata* correspond most likely to the Lower Anisian conodont zone *Gondolella ? aegaea*, defined by H. KOZUR–A. MOSTLER (1972).

Zone *Meandrospira dinarica* (Interval-range zone)

The lower border of the zone is characterized by the first appearances of *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ. The upper border was defined by (cf. J. SALAJ 1969a) the first appearances of *Pilimmina densa* PANTIĆ. The described zone (like the successive zone *Pilammina densa*) or foraminiferal assemblages with *Meandrospira dinarica* KOCHANSKI-DEVIDÉ et PANTIĆ and *Pilammina densa* PANTIĆ were generally accepted for the division of the Anisian, for example in the Dinarides (S. PANTIĆ 1965, 1967a, b; V. KOCHANSKI-DEVIDÉ–S. PANTIĆ 1966), in the Alps (L. KOEHN–L. ZANINETTI 1969; I. PREMOLI SILVA 1971), in the Balkan (E. TRIFONOVA–G. ČATALOV, 1975; E. TRIFONOVA 1978a) and the Opole Silesia (J. GŁAZEK–J. TRAMMER–K. ZAWIDZKA 1973). There, however, are differences in opinions about stratigraphical position of the two zones, mainly because of different vertical distribution of characteristic species of the zones. It must be due to different paleoecological conditions in different areas. If we take in consideration that the species *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ developed from the species *Meandrospira insolita* (HO) on the contact between the Lower and the Middle Anisian, then our corrected data on its occurrences also in the Middle and Upper Anisian are in good accordance with the opinions of other authors (O. JENDREJÁKOVÁ 1973; J. GŁAZEK–J. TRAMMER–K. ZAWIDZKA 1973; E. TRIFONOVA 1978a; A. BAUD–L. ZANINETTI–P. BROENNIMANN 1971; L. ZANINETTI–P. BROENNIMANN–A. BAUD 1972a, b). J. PREMOLI-SILVA (1971) quoted probable occurrence of the species in the Lower Anisian. According to her the Lower Anisian species *Meandrospira insolita* (HO) could be a synonym of the species *M. dinarica* KOCHANSKI-DEVIDÉ et PANTIĆ. The species was also found in the Lower Anisian of the Kocaeli peninsula (Turkey) by L. ZANINETTI–Z. DAĞER (1978, p. 100). But these authors range also forms with less whorls to this species whereas we regard them as an independent taxon (*M. insolita*). On the other hand, they, however admit, that *M. dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ developed from *M. pusilla* (HO) which we consider as an ancestral form of the above mentioned polemic taxon *M. insolita* (HO). In connection with this problem, the authors mentioned write: "Now we can say that some Upper Anisian specimens differ in morphology from their oldest representatives *Meandrospira dinarica*. A large shell with plentiful whorls (L. ZANINETTI–P. BROENNIMANN–A. BAUD (1972, pl. 7, Fig. 1) – could really correspond to one of the progressive development stages of the species". So these authors actually admit the existence of two morphologically different forms (from various stratigraphical levels) within the species *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ. In this way L. ZANINETTI–Z. DAĞER (1978) explain why the primitive forms of *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ (in our conception *M. insolita* HO) appeared sooner than in the Alpine-Carpathian area in the Dinarides and on the Balkan. According to the authors quoted the different stratigraphical range can also be caused by gradual migration of benthic foraminifers westward from the eastern Tethyd provinces.

Although in the West Carpathians no conodonts have so far been found in the Lower Pelsonian, the described zone may be correlated with the conodont zone *Gondolella regale* – according to investigations by K. BUDUROV–E. TRIFONOVA 1974; E. TRIFONOVA (1978a) – which is generally correlated with the Lower Pelsonian.

Zone *Pilammina densa* (*Acma* zone)

The zone was formerly described from the West Carpathians and later modified by J. SALAJ (1976, 1978). According to data presented by K. BORZA (1971) who quoted the species *Pilammina densa* PANTIĆ from the Lower Anisian, J. SALAJ (1979) correlated the zone (as a total-range zone) with the entire Anisian. Since the stratigraphical position of the locality described by K. BORZA (1. c.) is disputable (cf. J. GLAZEK–J. TRAMMER–K. ZAWIDZKA 1978; J. HANÁČEK 1976), it should be revised. For this reason the zone *Pilammina densa* is revised to the *Acma* zone. Its lower boundary is defined by the first appearance of the species *Pilammina densa* PANTIĆ in the Western Carpathians, whereas the upper boundary is defined by the first appearance of *Pilamminella gemerica* SALAJ, as well as by the extinction of *Pilammina densa* PANTIĆ and *Pilamminella grandis* (SALAJ). Opinions about the first appearance of the species *Pilammina* (*Glomospira*) *densa* PANTIĆ are contradictory as well. L. ZANINETTI–Z. DAĞER (1978) quoted it from the Lower Anisian (Aegean) of the Kocaeli peninsula where the deposition of platform limestones proceeded in that time. Higher up the species (neither *P. grandis* SALAJ) does not occur because of intense paleogeographic changes (formation of pelagic facies). Besides the above mentioned problematic occurrence, the species *Pilammina densa* PANTIĆ occurs in the Middle to Upper Pelsonian and Illyrian in our country. The lower boundary of the occurrences, was proved in the vicinity of Silická Brezová (Slovak Karst). There in the middle part of Steinalm limestones occurs the species *Pilammina densa* PANTIĆ together with *Physoporella pauciforata sulcata* BYSTRICKÝ (sample Nr. SB-I-11; profile Silická Brezová, studied by J. MELLO). In the overlier of these species were plentiful conodonts characteristic of the Upper Pelsonian zone *Micoraella kockeli* (G. KALISKÁ 1980).

The Upper Pelsonian and Illyrian age of the zone *Pilammina densa* in the West Carpathians is doubtless. It was parallelized with algae, macrofauna and conodonts by J. BYSTRICKÝ et al. (1973). It is very important for biostratigraphical correlation, that in the Upper Illyrian of the Plešivecká planina (plain) (B. M. 851,1 m Štít – 844,1 m) there are rich assemblages (from J. MELLO'S material) with dominant species of *Pilammina densa* PANTIĆ (J. SALAJ 1967). In dark, platy limestone J. BYSTRICKÝ (1967) found an Upper Illyrian Ammonite *Ptychites acutus* MOJS. and R. MOCK (1971, p. 255) plentiful conodonts: *Dichodella alternata* MOSHER, *Enantiognathus petraeviridis* (HUCKRIEDE), *E. ziegleri* (DIEBEL), *Gondolella excelsa* (MOSHER), *Hibbardella lautissima* (HUCKRIEDE), *Hindeodella* (*Metaprioniodus*) *suevica* (Tatge), *Lonchodina hungarica* KOZUR et MOSTLER, *L. posterognathus* (MOSHER), *Neoplectospathodus muelleri* KOZUR et MOSTLER, *Ozarkodina tortilis* TATGE, *Priniodina (Cypridodella) muelleri* (TATGE) and *P. (C.) venusta* (HUCKRIEDE).

The upper border of the occurrence of *Pilammina densa* PANTIĆ and of the zone *Pilammina densa* PANTIĆ in the sense of the original opinion by J. SALAJ–A. BIELY–J. BYSTRICKÝ (1967a, b) was placed on the Anisian/Ladinian boundary. According to later results (O. JENDREJÁKOVÁ 1973, K. BUDUROV–3. TRIFONOVA 1974, A. GAŹDZICKI–J. TRAMMER–K. ZAWIDZKA 1975, Z. BELKA–A. GAŹDZICKI 1976) the species *Pilammina (Glomospira) densa* PANTIĆ does not occur in the Upper Illyrian, so the zone *Pilammina (Glomospira) densa* does not comprise the Upper Illyrian. Although sporadically, the species occurs in the Silicicum in the uppermost layers of the Illyrian (cf. J. SALAJ 1978, p. 114, pl. 1, fig. 6) together with *Diplopora annulatissima* (PIA) which is in accordance with the opinion of E. TRIFONOVA (1978a). She too placed the upper limit of the occurrence of this species on the Anisian/Ladinian boundary. The existing data show that in the Silicicum and Tatroveporicum (mainly in the Choč nappe) the species *Pilammina densa* PANTIĆ need not be present all over the lowermost and uppermost parts of the Anisian. This concerns lagoonal facies and facies deposited in deep-sea environment. In the uppermost Anisian – basal Ladinian the deep-sea depositional environment is represented by the Reifling or pseudo-Reifling facies (the Uppermost Anisian – the Lowermost Ladinian).

From microfacies viewpoint there are mainly biopelmicrites to sparites with abundant filaments or with radiolarians, rare are also layers of intrabiocalcarenites with crinoids (e. g. in the Strážovské vrchy Mts., J. HANÁČEK 1976). From foraminifers are found here: *Turritellella mesotriassica* KOEHN-ZANINETTI, *Earlandia amplimuralis* (PANTIĆ), *E. gracilis* (PANTIĆ), *E. tintiniformis* (MIŠÍK), *Agathammina judicariensis* PREMOLI SILVA. In organo-detrital layers in the lower part (Illyrian) of the Reifling limestones, representing allodapic turbidite limestones, are found *Pilammina densa* PANTIĆ and *Permodiscus pragsoides* OBERHAUSER.

Zone *Permodiscus pragsoides* (Interval-range zone)

The zone was for the first time determined in the Lower Ladinian by J. SALAJ (1978). Since there are new results of investigations, it is necessary to revise its stratigraphical position because it represents only the Uppermost Anisian (perhaps only Illyrian). This opinion is also supported by the occurrence of the species *Permodiscus pragsoides* OBERHAUSER in an assemblage with *Pilammina densa* PANTIĆ, *Diplopora annulatissima* and *Diplopora annulata* in the Strážovské hory Mts. (J. HANÁČEK 1976). According to this interpretation the zone is partly alternant with the zone *Pilammina densa*, or it may be defined as a subzone of the zone *Pilammina densa*.

The species *Permodiscus pragsoides* OBERHAUSER occurs in the West Carpathians sporadically with the species *Pilammina densa* PANTIĆ or alone. Interesting are its mass occurrences in the Upper Anisian of the Dinarides (P. BROENNIMANN–J. P. CADET–L. ZANINETTI 1973).

The lower border of the zone is characterized by the first appearances of *Permodiscus pragsoides* OBERHAUSER and the upper is defined by the extinction of *Pilammina densa* PANTIĆ and *Pilamminella grandis* (SALAJ) and by the first appearances of *Pilamminella gemerica* (SALAJ).

Ladinian

It is very difficult to define this stage on the basis of foraminifers. Our investigations show that the species *Pilammina densa* PANTIĆ, *Pilamminella grandis* SALAJ, *Meandrospira dinarica* KOCHANSKY–DEVIDÉ et PANTIĆ *and Meandrospiranella samueli* SALAJ do not pass over to the Ladinian.

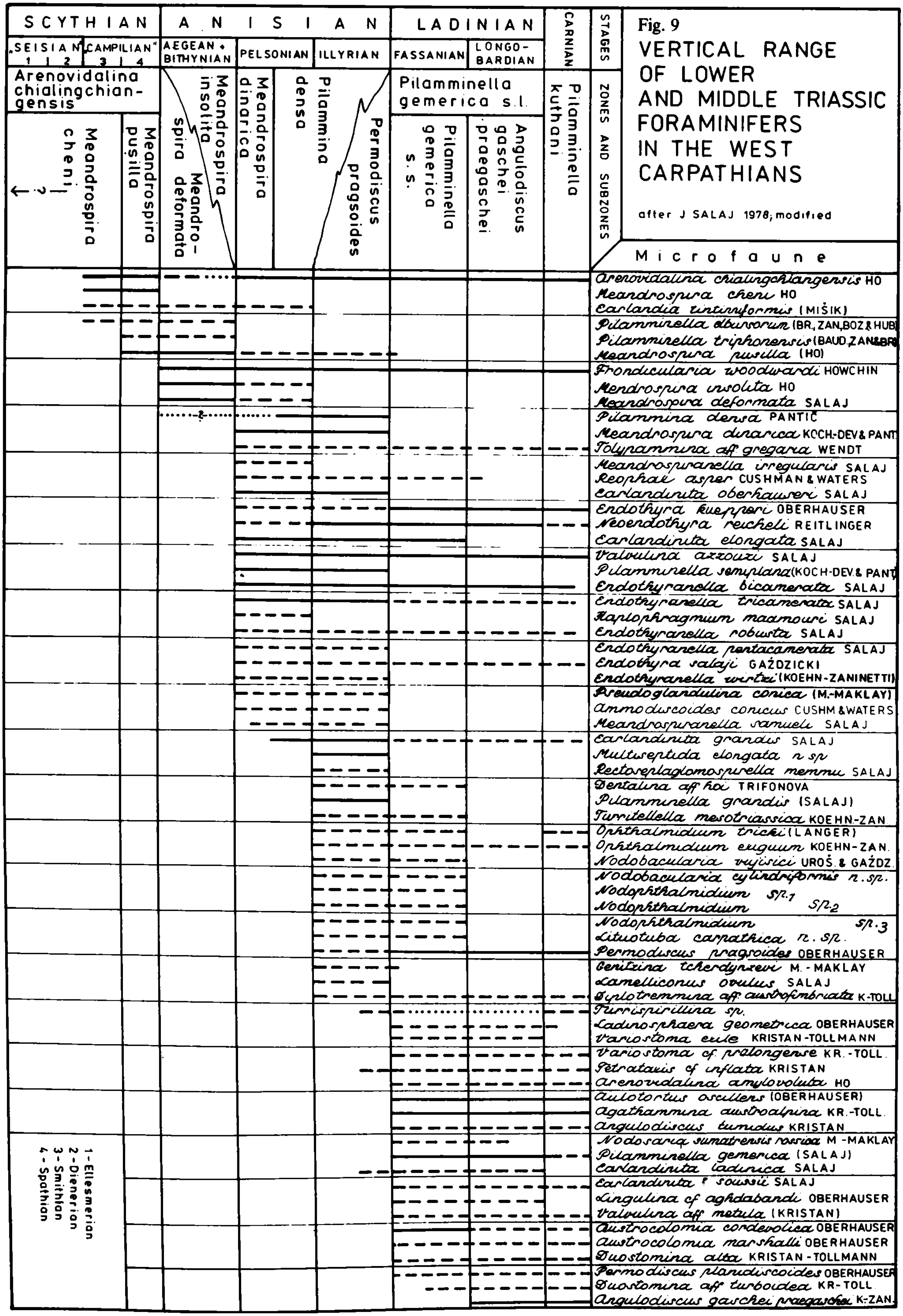


Fig. 9 VERTICAL RANGE OF LOWER AND MIDDLE TRIASSIC FORAMINIFERS IN THE WEST CARPATHIANS

after J SALAJ 1978, modified

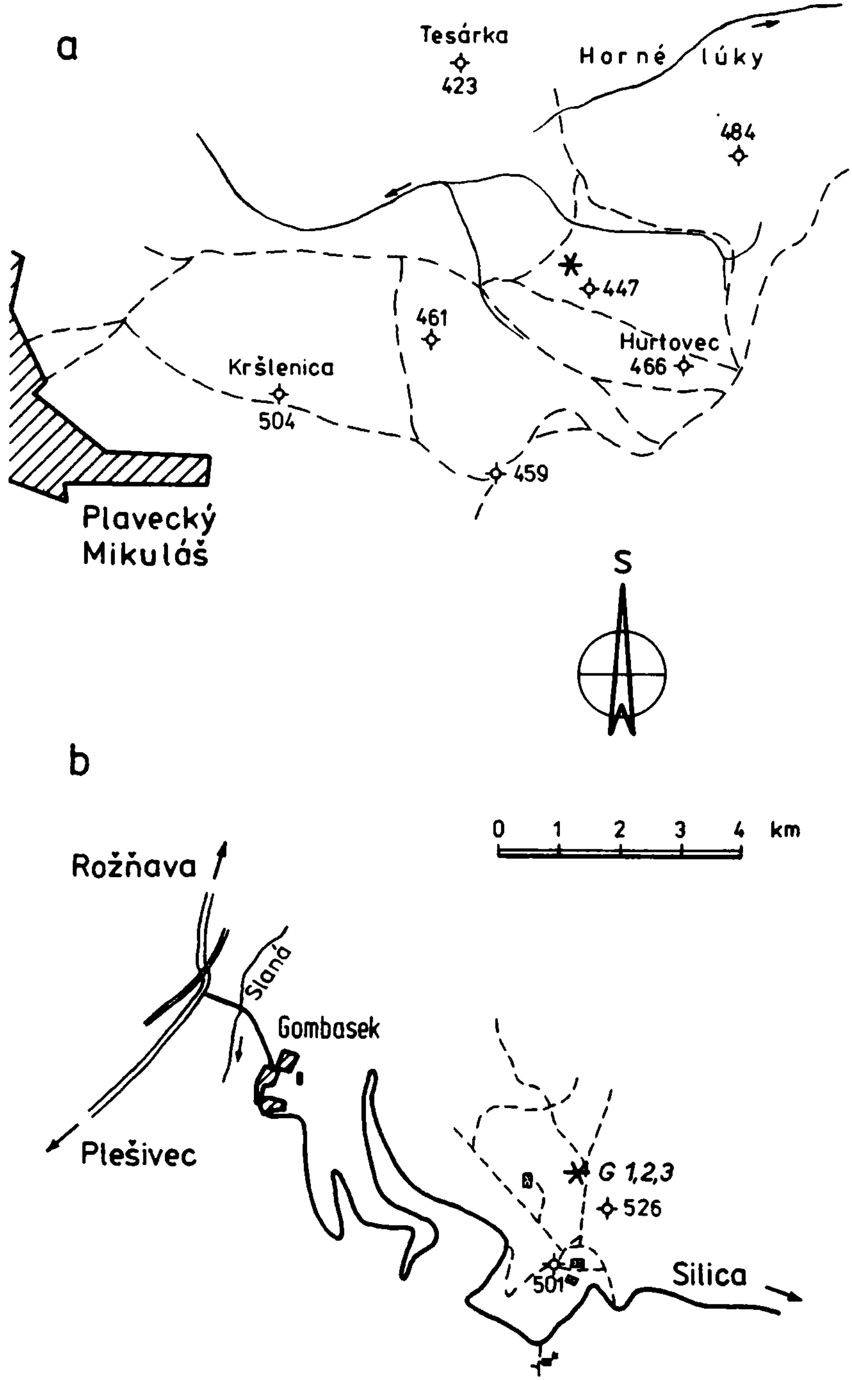


Fig. 10 Sketch-map of the find of Illyrian foraminifers from the localities: a – Hurtovec, b – Gombasek

The existing biostratigraphical data on the Ladinian of the West Carpathians show that Wetterstein limestones of the platform reef-forming facies type are dominant there. Facies of this type are rather poor in macrofauna (cf. J. BYSTRICKÝ et al. 1973); *Diplopora annulata* SCHAFHAULT and *Diplopora annulatissima* PIA, or *Teutloporella herculea* (STOPPANI) PIA. The limestones with the algae contain- besides *Permodiscus pragsoides* OBERHAUSER, *Aulotortus sinuosus* WEYNSCHENK – also the index species of the Ladinian zone of the same name – *Pilamminella gemerica*. Intermediary facies between reefs and basinal sediments are very poor in foraminifers and algae. Such type of facies is described by J. MELLO (1977) who described sporadically occurring foraminifers and the following assemblage: *Plexoramea cerebriformis* MELLO, *Ladinella porata* OTT, *Tubiphytes obscurus* MASLOV, *Thaumatoporella parvovesiculifera* (RAIN.), *Baccinella floriformis* PANTIĆ and *Bacinella ordinata* PANTIĆ. The latter is ascribed a narrow age diapason. In the Illyrian it occurs together with *Endothyranella wirzi* (KOEHN-ZANINETTI).

J. SALAJ (1979) distinguished the zone *Pilamminella gemerica* (s. l.) with two subzones: *Pilamminella gemerica* (s. s.) and *Angulodiscus gaschei praegaschei*, in the Ladinian.

Zone *Pilamminella gemerica*, s. l. (Interval-range zone)

Its lower border is defined by the first appearance of the species *Pilamminella gemerica* (SALAJ), its upper border is characterized by *Pilamminella kuthani* (SALAJ) and *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI et BROENNIMANN. The zone is correlated with the Fassanian and Langobardian.

Subzone *Pilamminella gemerica* s. s. (Interval-range zone)

Its lower border is defined by the first appearance of *Pilamminella gemerica* (SALAJ) and by the extinction of *Pilamminella grandis* (SALAJ). The upper border is determined by the first occurrence of the species *Angulodiscus gaschei praegaschei* KOEHN-ZANINETTI. Foraminiferal assemblage of the described subzone comprises mainly the species: *Permodiscus pragsoides* OBERHAUSER, *P. oscillens* (OBERHAUSER), *P. planidiscoides* OBERHAUSER and *Pilamminella gemerica* (SALAJ). We correlate it to the Fassanian. In respect of conodont zonation it may correspond to the zone *Gondolella mombergensis* (sensu K. BUDUROV–E. TRIFONOVA 1974). We prefer this zone to H. KOZUR'S (1972) zone *Gladigondolella tethydis* because its index species [*G. tethydis* (HUCKRIEDE)] also occurs in the Illyrian (cf. R. MOCK 1971; A. GAŹDZICKI–O. E. SMIT 1977).

Assemblages of this subzone were also studied in the Malé Karpaty (profile Javorinka, B. M. 561,0 m; studied by M. MELLO). The basal part of Wetterstein limestones (sample MK-120, MK-123, MK-124) overlying the Reifling limestones, contains foraminifers *Pilamminella gemerica* (SALAJ) and *Earlandia amplimuralis* (PANTIĆ). Higher up (samples MK-123, MK-124) are also the species *Permodiscus pragsoides* OBERHAUSER, *Earlandinita grandis* SALAJ, *Earlandinita oberhauseri* SALAJ and *Diplotremmina astrofimbriata* KRISTAN-TOLLMANN. From algae in theses samples only *Thaumatoporella parvovesiculifera* (RAIN.) was described.

The Wetterstein and Raming limestones overlying the Reifling limestones in the area of Silická Brezová are rich in microfauna and algae. In the overlier of tuffites (profile SB-I studied by J. MELLO) the following microfauna was found: *Permodiscus pragsoides* OBERHAUSER, *Valvulina azzouzi* SALAJ, *Agathammina austroalpina* KRISTAN–TOLLMANN et TOLLMANN and *Arenovidalina chialingchiangensis* HO. Algae are represented by the species (Nr. SB I/28) *Thaumatoporella parvovesiculifera* (RAIN.) and *Diplopora annulata* (SCHAFH.).

Some metres higher (SB I/29) are foraminifers *Pilamminella gemerica* (SALAJ), *Permodiscus sinuosus* (OBERHAUSER), *Endothyra kuepperi* OBERHAUSER, *Arenovidalina chialingchiangensis* HO, *Tolypammina gregaria* WENDT and *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, and algae *Gyroporella ampliforata* GUEMBEL and *Thaumatoporella parvovesiculifera* (RAIN.).

Subzone *Angulodiscus gaschei praegaschei* (Interval-range subzone)

Its lower border is defined by the first occurrences of *Angulodiscus gaschei praegaschei* (KOEHN-ZANINETTI). The Upper border is characterized by the first occurrences of *Pilamminella kuthani* SALAJ.

Significant species of this subzone like *Angulodiscus gaschei praegaschei* KOEHN-ZANINETTI, *Pilamminella gemerica* (SALAJ) pass over to the Carnian where the latter extincts. Their occurrence in the Carnian (mainly in the Cordevolian) was proved by diplopores *Andrusoporella duplicata* (PIA) whose first occurrence is generally quoted from the Cordevolian (J. BYSTRICKÝ et al. 1973)

This subzone is correlated to the Longobardian, to which – according to conodont biozonation – the following zones correspond in the Balkan: *Metapolygnathus mungoensis* (= Lower Langobardian) and *Gondolella foliata* (Upper Longobardian, K. BUDUROV–E. TRIFONOVA 1974). Their stratigraphical position was documented also by macrofauna. This interpretation is in accordance with the data by H. KOZUR (1971) according to which the Langobardian is characterized by the species *Metapolygnathus mungoensis* (DIEBEL). The relation of this subzone to the Longobardian in the West Carpathians is proved biostratigraphically on more localities. On a locality 1200 m E of Silická Brezová studied in detail by K. BORZA (1973) the Wetterstein limestones contain the algae *Teutloporella herculea* (STOPP.) with the assemblage indicative of the described subzone.

As regards foraminiferal assemblage of the subzone, many samples from the Silicicum (loc. Budikovany) contain besides *Permodiscus pragsoides* OBERHAUSER also species of the subfamily Permodiscinae SALAJ: *Aulotortus oscillens* (OBERHAUSER), *Lamelliconus eomesozoicus* (OBERHAUSER), *Angulodiscus gaschei praegaschei* KOEHN-ZANINETTI) together with extremely plentiful *Pilamminella gemerica* (SALAJ).

O. JENDREJÁKOVÁ (1973) presented in a stratigraphical table the representatives of *Involutinidae* BUETSCHLI 1880 emend. ZANINETTI 1969 (Permodiscinae in our classification) beginning from the basal Carnian (Cordevolian). It is in contradiction to the text (p. 120) where it is admitted that in higher levels of the Wetterstein limestones (probably Uppermost Longobardian-Cordevolian) of the Slovak Karst with *Teutloporella herculea* (STOPPANI) appeared the first representatives of involute foraminifers. The authoress evidently based it upon the occurrence of *Teutloporella herculea* (STOPPANI) which is present practically over the entire Ladinian without the species *Andrusoporella duplicata* (PIA) (cf. J. BYSTRICKÝ 1964).

Lamelliconuses – with the exception of *Lamelliconus* sp. are represented in the Longobardian by sporadical species *Lamelliconus procerus* (LIEBUS) and *Lamelliconus* ex gr. *biconvexus* (OBERHAUSER). Representatives of the genus *Lamelliconus* PILLER 1978 occur mainly in the Cordevolian, less in the Lower Julian.

The West-Carpathian subzone *Angulodiscus gaschei praegaschei* is correlated to the subzone *Lamelliconus* (= *Trocholina*) *biconvexus-Turritellella mesotriassica*, defined by E. TRIFONOVA (1978b) in the Balkan. The assemblage of plentiful lamelliconuses characterizes the Upper Ladinian deep-sea facies represented by limestone-marly and marly sedimentation, especially in the Alps (R. OBERHAUSER 1957, 1960) and in the Balkan (E. TRIFONOVA

1978b). Red nodular limestones with "*Turritellella*" *mesotriassica* KRISTAN-TOLLMANN (L. ZANINETTI–Z. DAĜER 1978) correspond to the Ladinian pelagic facies on the Kocaeli peninsula.

According to L. ZANINETTI (1976) lamelliconuses (= trocholines) are scarce in the Upper Ladinian. Besides from the West Carpathians Austrian Alps and Dinarides they are also in Turkey and Iran. P. BROENNIMANN–L. ZANINETTI–A. MOSHTAGHIAN–H. HUBER (1974) found a rich Ladinian–Carnian foraminiferal assemblage of the subfamily Permodiscinae (Involutinidae) from the Espakh formation. A. GAŻDZICKI–O. E. SMIT (1977) describe the following Ladinian foraminifers from the East and Southeast Assia, Malayan peninsula: *Earlandia amplimuralis* (PANTIĆ), *Earlandia gracilis* (PANTIĆ), *Agathammina? iranica* ZANINETTI, *Pilamminella* (*Glomospirella*) *gemerica* (SALAJ) and *Earlandinita soussii* SALAJ.

Ladinian representatives of the subfamily *Permodiscinae* nov. subfam. occur in the Trias of the East-Tunisian platform (J. SALAJ 1978). They were identified in the material from borehole CB-1 on Cap Bon where the facies of German Trias is interfingered with the Alpine platform facies with plentiful *Permodiscus pragsoides* OBERHAUSER with *Lamelliconus multispirus* (OBERHAUSER). Besides that in the Deffara Mts. (South Tunisia – North Tripolitania) is the Upper Ladinian – Lower Carnian facies with "trocholines" (CH. GLINTZBOECKEL 1956, J. SALAJ 1969) represented by *Lamelliconus biconvexus* (OBERHAUSER) and *Lamelliconus ventroplanus* (OBERHAUSER).

From the Ladinian of the Alps they quote – for the first time – plankton foraminifers denoted as "globigerines of Trias". They belong to the genus *Diplotremmina* KRISTAN-TOLLMANN, *Kollmannita* FUCHS and *Oberhauserella* FUCHS, mostly studied by R. OBERHAUSER (1960), E. KRISTAN-TOLLMANN (1960, 1964c, 1966), W. FUCHS (1967, 1970) and L. ZANINETTI (1977a). The following species are known from the Ladinian – Lower Carnian: *Diplotremnina multifimbriata* FUCHS, *Kollmanita cordevolica* FUCHS, *Kollmannita diplotreminaeformis* FUCHS, *Kollmanita gemmaeformis* FUCHS, *Kollmannita ladinica* (OBERHAUSER), *Kollmannita multiloculata* FUCHS, *Kollmannita praelidinica* FUCHS, *Kollmannita tirolica* FUCHS, *Oberhauserella mesotriassica* (OBERHAUSER). In the Ladinian of the West Carpathians only the representatives of the genus *Diplotremmina* (div. sp.) have been found so far.

Besides in the Austrian Alps, the Triassic "globigerines" also occur in the Ladinian of the Balkan. There they were described by E. TRIFONOVA (1978b). The zonation by E. TRIFONOVA is particularly significant for not only the West Carpathians, but also for interregional correlation, because there are foraminifers typical of both the platform reef-forming limestones and of deep-see to pelagic facies. And the foraminiferal zone may be correlated with the conodont zones there. The Ladinian is defined by the zone *Pilammina* (*Glomospira*) *densa* – *Turritellella mesotriassica*. Its lower border is characterized by the extinction of the species *Pilammina* (*Glomospira*) *densa* PANTIĆ, *Pilamminella* (*Glomospirella*) *grandis* (SALAJ), *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ and by the first occurrences of *Pachyphloides oberhauseri* SELLIER de CIVRIEUX et DESSAUVAGIE, *Pseudonodosaria obconica* (REUSS), *Plagiographa tornata* KRISTAN-TOLLMANN, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, *Agathammina? iranica* ZANINETTI, BROENNIMANN, BOZORGNIA et HUBER and *Austrocolomia marschalli* OBERHAUSER. The upper border is characterized by exinction of the species *Turritellella mesotriassica* KOEHN-ZANINETTI, *Duostommina alta* KRISTAN-TOLLMANN and *Planiinvoluta mesotriassica* BAUD, ZANINETTI et BROENNIMANN.

The lower part of the zone is characterized by the interval subzone *Pilamminella* (*Glomospirella*) *grandis*-*Lamelliconus* (*Trocholina*) *biconvexus biconvexus*. The upper boundary is defined by the first occurrences of *Lamelliconus biconvexus biconvexus* (with

Lamelliconus procerus are local occurrences of *Ladinosphaera geometrica* OBERHAUSER and *Agathamminoides spiroloculiformis* (ORAVECZNÉ-SCHEFFER) (J. SALAJ 1978, pl. 5, fig. 2), *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, *Endothyra kuepperi* OBERHAUSER. Also in marly limestones of the Lunz Member in the borehole Šaštín-10 specimens of the species *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLM. were identified.

In the overlier of the Reifling limestones of the Choč nappe are "Aonian" beds of the zone *Trachyceras aonoides*. From the beds on the localities Svarín and Turík (defined by *Monophyllites simonyi* HAUER) described were foraminifers (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967b, J. SALAJ–O. JENDREJÁKOVÁ 1967, J. BYSTRICKÝ et al. 1973, corresponding to our subzone *Lamelliconus procerus*. They are represented by the species *Lamelliconus multispirus* (OBERHAUSER), *Lamelliconus ventroplanus* (OBERHAUSER), *Lamelliconus procerus* (LIEBUS), *Rhizammina eulimbata* KRISTAN-TOLLMANN, *Nodosaria apheiloculata aglabra* KRISTAN-TOLLMANN, *Endothyra keupperi* OBERHAUSER, *Endothyra austrotriadica* OBERHAUSER, *Spirillina* aff. *filiformis* (REUSS), *Variostoma pralongense* KRISTAN-TOLLMANN and *Duostommina alta* KRISTAN.

Representatives of the species *Lamelliconus procerus* (LIEBUS) also occur in the Cordevolian of the Slovak Karst (e. g. locality of the quarry Gombasek) in a facies of Wetterstein limestones containing *Teutloporella herculea* (STOPPANI) and *Andrusoporella duplicata* (PIA). Foraminifers are represented by *Variostoma cochlea* KRISTAN, *Trochammina almtalensis* KOEHN-ZANINETTI, *Pilamminella gemerica* (SALAJ), *Permodiscus pragsoides* OBERHAUSER, *Aulotortus sinuosus* WEYNSCHENK, *Angulodiscus gaschei praegaschei* KOEHN-ZANINETTI, *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI and *Duostommina alta* KRISTAN.

Besides that, the Wetterstein limestones (Cordevolian-Julian) containing *Andrusoporella duplicata* (PIA) also the species *Pilamminella* (*Glomospira*) *kuthani* (SALAJ 1967, in J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967) (cf. J. BYSTRICKÝ et al. 1973) was found M. MIŠÍK–K. BORZA (1976): also described the following significant species from the Silicicum (the area of Silická Brezová): *Meandrospira* cf. *carnica* ORAVECZNÉ-SCHEFFER, *Austrocolomia marschalli* (OBERHAUSER) and *Ophthalmidium* cf. *triadicum* (KRISTAN). The assemblage may be correlated with the assemblage from the Carnian of Hungary described by A. ORAVECZNÉ-SCHEFFER (1968): *Cyclogyra pachygyra* (GUEMBEL), *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, *Agathammina spiroloculiformis* ORAVECZNÉ-SCHEFFER, *Meandrospira karnica* ORAVECZNÉ-SCHEFFER, *Meandrospiranella* (?) *planispira* ORAVECZNÉ-SCHEFFER, *Calcitornella elongata* CUSHMAN et WATERS, *Calcitornella heathi* CUSHMAN et WATERS, *Calcitornella baconica* ORAVECZNÉ-SCHEFFER, *Ophthalmidium triadicum* (KRISTAN) and *Ophthalmidium fusiformis* (TRIFONOVA).

The Tisovec limestones of the (Julian–Tuvalian) Muránska and Silická planina (plateaus) contain many assemblages of foraminifers with the species *Pilamminella kuthani* (SALAJ) and *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI et BROENNIMANN. They were studied in detail by O. JENDREJÁKOVÁ (1970, 1972, 1973).

Recently O. SAMUEL–J. SALAJ–K. BORZA (1981) described two new species among these foraminifers: *Bispiranella subcarinata* and *Bispiranella ovata* (= *Galeanella ? broennimanni* ALTINER et ZANINETTI 1981, cf. L. ZANINETTI–D. ALTINER 1981, p. 42).

The study of foraminifers from the Tisovec limestones is important for correlation with conodonts. R. MOCK (1971) described a rich conodont assemblage from the limestones containing *Styrites* cf. *tropitiformis* MOJS., from the vicinity of Silická Brezová. The assemblage is represented by the species *Enantiognathus ziegleri* (DIEBEL), *Gondolella navicula* HUCKRIEDE and *G. polynathiformis* BUDUROV et STEFANOV. On the basis of the assemblage the limestones are ranged to the Middle Carnian. Latter on H. KOZUR–R. MOCK (1974) ranged them to the Tuvalian according to holothurian skeletons.

A. GAŹDZICKI–H. KOZUR–R. MOCK–J. TRAMMER (1978, p. 353–355) described a rich assemblage of foraminifers from the Carnian Korytnica limestones, defined and examined for macrofauna by A. BUJNOVSKÝ–M. KOCHANOVÁ–J. PEVNÝ (1975). We complemented the assemblage with the species *Lamelliconus biconvexus* (OBERHAUSER) and *Lamelliconus multispirus* (OBERHAUSER).

Foraminiferal assemblages of the subzone (or zone) *Lamelliconus procerus* with abundant *Lamelliconus biconvexus* (OBERHAUSER) also occur in Yugoslavia (W. RESCH 1966), South Tunisia (J. SALAJ 1969c), in German (Muschelkalk) and alpine facies. Among foraminifers the species *Lamelliconus multispirus* (OBERHAUSER) and *Pilamminella kuthani* (SALAJ) dominate.

Zone *Rakusia oberhauseri* (Interval-range subzone)

In the West Carpathians the Upper Carnian (Tuvalian) was characterized first by the subzone *Aulotortus broennimanni* (J. SALAJ 1969a), then by the zone *Aulotortus sinuosus* (J. SALAJ 1978). There were some difficulties in using the synonymous zones, because the index species *Aulotortus sinuosus* WEYNSCHENK appeared much earlier, i. e. in the course of the Ladinian. This is why the zone cannot be applied. According to personal information by O. JENDREJÁKOVÁ, the species *Rakusia oberhauseri* SALAJ appeared already in the Upper Carnian. J. SALAJ (1969a, 1978) regarded it as the index species of the Norian zone of the same name. In one case the species occurred together with *Pilamminella kuthani* (SALAJ), so we range the zone as a partial-range subzone to the Upper Carnian (Tuvalian). Its lower border is defined by the first appearance of the species *Rakusia oberhauseri* SALAJ. *Pilamminella kuthani* (SALAJ) also occurs in the zone. The upper border is defined by the first appearance of *Semiinvoluta clari* KRISTAN.

Recently E. JABLONSKÝ (1973), K. BORZA–O. SAMUEL (1977a, b; 1978); O. SAMUEL–K. BORZA (1981), O. SAMUEL–J. SALAJ–K. BORZA (1981) described an interesting group from the Carnian of the West Carpathians. They presented stratigraphical, taxonomic and phylogenetic characteristic of the group *Paratintinnina* BORZA et SAMUEL, *Amphoporella* BORZA et SAMUEL, *Spiriamphorella* BORZA et SAMUEL, *Urnulinella* BORZA et SAMUEL, *Pseudocucurbita* BORZA et SAMUEL, *Paraophthalmidium* SAMUEL et BORZA, *Cucurbita* JABLONSKÝ which either belongs among incertae sedis or its systematic position is interpreted in different ways. Some of them belong doubtlessly to foraminifers, others are partly related to Fungi. The problem is discussed in detail in the systematic part (p. 155). Here it is to be mentioned that most taxa described as *Paratintinnina* BORZA et SAMUEL, *Pseudocucurbita* BORZA et SAMUEL, *Amphorella* BORZA et SAMUEL (partim), *Urnulinella* BORZA et SAMUEL occur in shallow-water and near-reef sediments. They most likely belong to sessile forms with the test resistant to recrystallization.

Norian

The Norian and the Rhaetian are divided here according to J. WIEDMANN (1974), J. WIEDMANN–F. FABRICIUS–L. KRYSTYN–J. REITNER–M. ULRICHS (1979), and E. KRISTAN-TOLLMANN–A. TOLLMANN–A. HAMEDANI (1979). So the Lacian is understood as the Lower Norian, nad the Alaunian as the Upper Norian. The Sevatian (Zone *Rhabdoceras suessi*) formerly regarded as the Upper Norian in agreement with A. TOLLMANN (1978, p. 176) is now regarded as the Lower Rhaetian whereas the zone *Choristoceras marshi* – formerly referred to as the Rhaetian – corresponds to the Upper Rhaetian (Fig. 11).

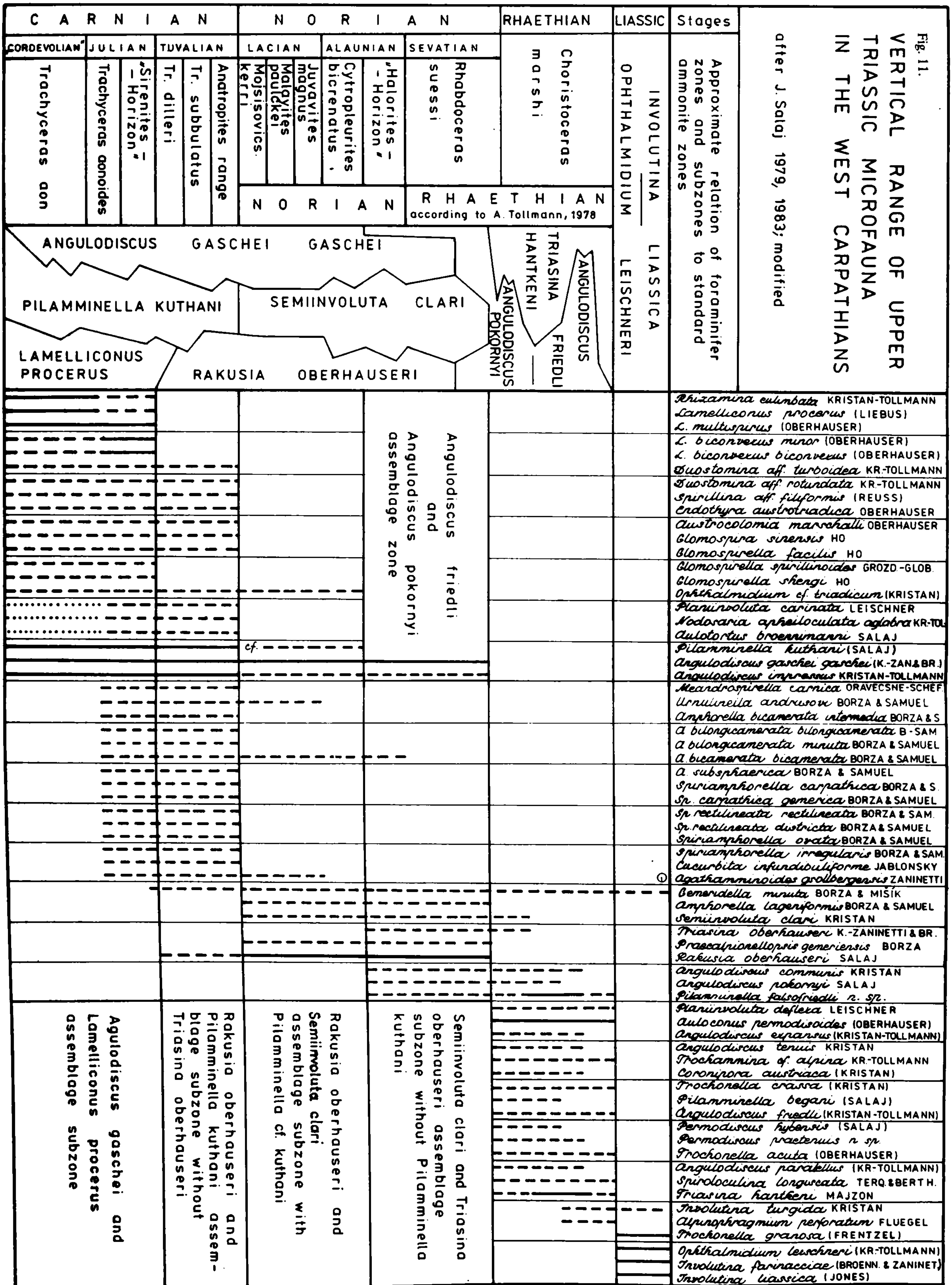


Fig. 11. VERTICAL RANGE OF UPPER TRIASSIC MICROFAUNA IN THE WEST CARPATHIANS after J. Salaj 1979, 1983; modified

① (Synonym of *A. spiroloculiformis* ORAVECZNÉ–SCHEFFER).

The Lacian and Lower Alaunian are in the facies of light-coloured massive (Furmanec) limestones. It contains foraminifers (J. BYSTRICKÝ et al. 1973, p. 74–75) of the nov. subfamily *Permodiscinae*. Most significant are *Rakusia oberhauseri* SALAJ and *Pilamminella* (*Glomospira*) cf. *kuthani* (SALAJ). There are also scarce *Ophthalmidium triadicum* KRISTAN-TOLLMANN, *Agathammina austroalpina* KRISTAN-TOLLMAN et TOLLMANN, *Diplotremmina astrofimbriata* KRISTAN-TOLLMANN and *Diplotremmina* aff. *subangulata* KRISTAN-TOLLMANN. They are indicative of deep-sea environment as also proved by thin-walled involute foraminifers of subfamily Permodiscinae and by conodonts found by R. MOCK (1971): *Enantiognathus ziegleri* (DIEBEL), *Gondolella navicula hallstattensis* (MOSHER), *Gondolella navicula* HUCKRIEDE, *Hindeodella* (*Metaprioniodus*) *suevica* (TATGE), *Neohindeodella dropla* (SPASOV et GANEV), *Ozarkodina tortillis* TATGE, *Prionodina excavata* MOSHER, *Prioniodina* (*Cypridodella*) *muelleri* (TATGE) and *Metapolygnathus abneptis* (HUCKRIEDE).

The species *Gondolella navicula hallstattensis* (MOSHER) is indicative of the Lower Norian age of the Furmanec limestones. This opinion is reasoned also by ammonites of Zone *Cyrtopleurites biscrenatus* and of algae (e. g. *Heteroporella carpatica* BYSTRICKÝ) indicative of the Lower Alaunian age of the upper part of the Tisovec limestones (J. BYSTRICKÝ et al. 1973, V. KOLLÁROVÁ-ANDRUSOVOVÁ–J. BYSTRICKÝ 1974).

It is to be noticed that it is the type area of the Zone *Rakusia oberhauseri* (J. SALAJ 1969a). O. JENDREJÁKOVÁ found the species as early as the Upper Carnian (Tuvalian), so we define the zone – as mentioned in the preceding chapter – as the partial-range zone *Rakusia oberhauseri* of the Tuvalian only. The total-range Zone *Rakusia oberhauseri* would range from the Upper Carnian (Tuvalian) to the Lower Rhaetian (Sevatian p. p.) since there are scarce occurrences of *Rakusia oberhauseri* SALAJ with *Rhaetavicula contorta* (PORTL.) in the Sevatian.

Zone *Rakusia oberhauseri* (Total-range zone)

The study of the upper parts of the Tisovec- and Furmanec limestones in the *Rakusia oberhauseri* total-range zone shows that microbiostratigraphical interpretation can be based on the following foraminiferal assemblages:

a) *Rakusia oberhauseri* SALAJ and *Pilamminella kuthani* (SALAJ) without *Triasina oberhauseri* KOEHN-ZANINETTI et BROENNIMANN and *Semiinvoluta clari* KRISTAN would only characterize the Tuvalian (*Rakusia oberhauseri* partial-range zone).

b) *Rakusia oberhauseri* SALAJ, *Pilamminella* cf. *kuthani* (SALAJ) and *Semiinvoluta clari* KRISTAN would define the Lacian-Lower Alaunian. Here it is to be mentioned that the Lower Norian form *Pilamminella* cf. *kuthani* SALAJ) differs in its greater size and more whorls from *Pilamminella kuthani* (SALAJ) occurring in the Carnian only.

c) *Rakusia oberhauseri* SALAJ with *Triasina oberhauseri* KOEHN-ZANINETTI et BRÓENNIMANN and *Semiinvoluta* clari KRISTAN without *Pilamminella kuthani* (SALAJ) within the zone *Angulodiscus pokornyi* and *Angulodiscus friedli* defines the Upper Alaunian – Lower Sevatian (bottom part of Lower Rhaetian).

The species *Triasina oberhauseri* KOEHN-ZANINETTI et BROENNIMANN and *Rakusia oberhauseri* SALAJ were found in the lower parts of light-grey and dark-grey massive platy Furmanec limestones in the Stratenská hornatina Mts. (localities Geravy, Suchý vrch) with *Halorella amphitona* (BRONN). *Thecosmilia defilippi* (STOPPANI) a. o. (J. BYSTRICKÝ et al. 1973). There and on other localities of the Stratenská hornatina Mts. (J. BYSTRICKÝ et al. 1973, p. 63) also plentiful foraminiferal assemblages were found.

Zone *Semiinvoluta clari* (Interval-range zone)

It corresponds to the Lacian and Alaunian, i. e. the entire Norian. It is characteristic of the Choč nappe of the Nízke Tatry Mts. (the cut of railway to Hyby). This zone defined by J. SALAJ 1969) is characterized by the first occurrences of *Semiinvoluta clari* KRISTAN. The upper border is characterized by the first occurrences of *Angulodiscus pokornyi* SALAJ, *Angulodiscus friedli* KRISTAN-TOLLMANN. A foraminiferal assemblage with *Semiinvoluta clari* and *Triasina oberhauseri* and *Angulodiscus friedli* KRISTAN-TOLLMANN, *Angulodiscus pokornyi* SALAJ is from the lower part of the Dachstein limestones (loc. Veľká Lúka, Červená skala) with *Neomegalodus complanatus* (GUEMBEL). In their lower part in the Muránska plošina (plateau), approximately on the Sevatian (= Lower Rhaetian)–Upper Alaunian boundary are intercalations of Hallstatt limestones with *Monotis salinaria* BR. (V. KOLLÁROVÁ-ANDRUSOVOVÁ–J. BYSTRICKÝ 1974). The level is underlied by the Dachstein limestones correlated with the Upper Alaunian "halorite horizon" (V. ANDRUSOVOVÁ-KOLLÁROVÁ–J. BYSTRICKÝ 1974), containing also *Gyroporella vesiculifera* GUEMBEL (K. BORZA 1973, Pl. XVII, thin-section 35). Among foraminifers were *Triasina oberhauseri* KOEHN-ZANINETTI, *Angulodiscus friedli* KRISTAN-TOLMANN and *Angulodiscus pokornyi* SALAJ characterizing the basal part of the zone *Angulodiscus pokornyi – Angulodiscus friedli.*

A considerably great part of the zone *Semiinvoluta clari* (without *Triasina oberhauseri* KOEHN–ZANINETTI) is in the Hauptdolomite in a railroad cut. The lowermost Tuvalian, parts of Hauptdolomite are fossilless. Higher up (column 70, A samples 24, a, b, c, d, e) in the dolomites are thin beds of intrabiopelmicrite and intrabiopeloomicrite. They contain – besides *Praecalpionellopsis gemeriensis* BORZA and coprolites *Parafavreina thoronetensis* BROENNIMANN–CARON et ZANINETTI – microfauna of *Frondicularia woodwardi* HOWCHIN, *Trochammina almtalensis* KOEHN-ZANINETTI, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, *Rakusia oberhauseri* SALAJ and *Semiinvoluta clari* KRISTAN, as well as thin- and smooth-walled ostracods, difficult to define exactly.

Since *Semiinvoluta clari* KRISTAN does not occur in Upper Carnian limestones, the foraminiferal assemblage is referred to as Lower Norian (Lacian).

About 40 m higher up (column 69, samples 25a, b, d, e) there are intrabio- and intrabiopelmicrites, sparites, sparites in Hauptdolomite. Among intraclasts is abundant aleuritic clastic quartz indicative of the Keuper facies tapering out in Hauptdolomite. There are scarce *Parafreina thoronetensis* BROENNIMANN, CARON et ZANINETTI, filaments from thin-walled lamellibranchiates, ostracods; rare gastropodsand crinoids.

The uppermost part of hauptdolomite (between columns 67 and 63) shows the following bed sequence:

At column 67 (samples 26a, b, c, d) are intrabiopelmicrite and sparite layers in dolomites and contain algae represented by *Gyroporella vesiculifera* GUEMBEL, fragments of crinoids, and scarce foraminifers: *Frondicularia woodwardi* Howchin, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, *Angulodiscus gaschei* KOEHN-ZANINETTI et BROENNIMANN and *Auloconus permodiscoides* OBERHAUSER which apears for the first time in that level. It is correlated with the Lower Alaunian (*Cyrtopl. biscrenatus* zone) with *Heteroporella* div. sp. (V. KOLLÁROVÁ-ANDRUSOVOVÁ et J. BYSTRICKÝ 1974).

At colum 65 there are megalodont breccias in Hauptdolomite. No microfauna was found in this bed sequence.

In the top parts of Hauptdolomite (comumn 63), in the basement of Dachstein limestones (thin-sections 63–28, 2a$_1$, a$_2$; 28–2a; 28–2; 63 b; 63, in intrabiopelmicrites are scarce algae *Thaumatoporella parvovesiculifera* (RAIN.), *Gyroporella vesiculifera* GUEMBEL. Foraminifers are represented by: *Frondicularia woodwardi* HOWCHIN, *Problematicum F* BORZA, *Trochammina almtalensis* KOEHN-ZANINETTI, *Angulodiscus* cf. *gaschei* KOEHN-ZANINETTI et BROENNIMANN. Thin- and smooth-walled ostracods also occur sporadically.

Since *Triasina oberhauseri* KOEHN-ZANINETTI does not occur with *Semiinvoluta clari* KRISTAN but later, we abandon the zone *Semiinvoluta clari* – *Triasina oberhauseri*, defined by J. SALAJ (1978) and keep to the zone *Semiinvoluta clari* as a Interval-range zone, defined by J. SALAJ 1969a).

The uppermost Norian (Upper Alaunian p. p.) to the Lower Rhaetian (Sevatian p. p.) is defined by the zone *Angulodiscus pokornyi* – *Angulodiscus friedli* in which also *Triasina oberhauseri* KOEHN-ZANINETTI appears beginning with its base (Fig. 12).

The Norian of the West Carpathians and of the entire Tethyd region is characterized by the explosive development of the genera of the nov. subfamily *Permodiscinae* (or family *Involutinidae* BUETSCHLI 1880). They were described in rich assemblages from various parts of Tethys (cf. L. ZANINETTI 1976a). Nodosaroid foraminifers, significant for stratigraphy are represented by *Austrocolomia canaliculata* (KRISTAN-TOLLMANN) in the norian.

Occasional nodosaroid foraminifers were found in the Norian of the Hallstatt limestones in the Slovak Karst. A rich foraminiferal assemblage from Hallstatt limestones was described by M. MIŠÍK – K. BORZA (1976): *Tolypammina gregaria* WENDT, *Planiinvoluta carinata* LEISCHNER, *Planiinvoluta deflexa* LEISCHNER, *Agathammina austroalpina* KRISTAN-TOLLMANN-–TOLLMANN, *Austrocolomia marschalli* OBERHAUSER and *Neoendothyra* cf. *reicheli* REITLINGER. In other microfacies are *Cadosina* cf. *fusca* WANNER and *Praecalpionellopsis gemeriensis* BORZA.

The facies of the Hallstatt limestones was studied in detail and stratigraphically divided on the basis of conodonts (H. KOZUR – R. MOCK 1971, 1972) and holothurian skelets (H. KOZUR – R. MOCK 1974). We did not found foraminifers on localities of conodonts of the zone *M. Spatulatus* and holothurian skelets. Only A. GAŹDZICKI – H. KOZUR – R. MOCK (1979) described the species *Glomospira* sp., *Glomospirella ?* sp., *Tolypammina* sp., *Trochammina alpina* KRISTAN-TOLLMANN, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, "*Vidalina*" sp., *Nodosaria ordinata* TRIFONOVA and *Nodosaria* sp.

Among rotaloid foraminifers significant for the Norian are *Variostoma crassum* KRISTAN-TOLLMANN and *Variostoma catilliforme* described by E. KRISTAN-TOLLMANN (1960) from Eastern Alps.

E. TRIFONOVA (1962) described interesting microfauna from Stará planina (plateau) different from microfauna of other regions. The species are: *Reophax tzankovi* TRIFONOVA, *Involutina rara* TRIFONOVA, *Tolypammina discoidea* TRIFONOVA, *Verneuilinoides mauretii* (TERQUEM), *Gaudryina triassica* TRIFONOVA, *Spirophthalmidium lucidum* TRIFONOVA, *Trochammina ? angulata* TRIFONOVA, *Trochammina balcanica* TRIFONOVA, *Trochammina ? helicta* TAPPAN, *Spirillina gurgitata* TAPPAN.

Rhaetian

Among the first publications significant for the Rhaetian microbiostratigraphy, most important is that by E. KRISTAN-TOLLMANN (1964a, c), describing a Lower Rhaetian foraminiferal assemblage with the species *Angulodiscus* (*Glomospirella*) friedli KRISTAN and an Upper Rhaetian foraminiferal assemblage including *Triasina hantkeni* MAJZON. A unique assemblage of free foraminifers was found in the Zlambach marls (1964c). The first one of the publications served as basis for the zonation of the Rhaetian in the West Carpathians where J. SALAJ (1969a) distinguished and modified (J. SALAJ 1978) two zones.

Zone *Angulodiscus pokornyi* – *Angulodiscus friedli* (Interval-range zone)

The zone resulted from the connection of two zones described by J. SALAJ (1969a), namely the Upper Norian zone *Angulodiscus pokornyi* and the Lower Rhaetian zone *"Glomospirella" friedli*. The zone was also mentioned by A. GAŻDZICKI (1974) but in a different stratigraphical sense from that by J. SALAJ in 1978 (Uppermost Norian-Lower Rhaetian). As a total-range zone it corresponds to the Uppermost Alaunian and the entire Rhaetian. As already mentioned, also the *Triasina oberhauseri* KOEHN-ZANINETTI appears in the zone.

The foraminiferal assemblage of this zone occurs in the Furmanec (Sevatian) limestones of the locality Bleskový prameň spring with plentiful macrofauna and microfauna (O. JENDREJÁKOVÁ 1970, J. BYSTRICKÝ et al. 1973, J. BYSTRICKÝ 1975, A. GAŻDZICKI–H. KOZUR–R. MOCK 1979). The prevalent part of the formation ecidently belongs to the Zone *Angulodiscus pokornyi* – *Angulodiscus friedli*. Here it should be mentioned that there are some difficulties in zonation of the locality because of the deep-sea facies. So the species *Angulodiscus friedli* KRISTAN and *Angulodiscus pokornyi* SALAJ, characteristic of the lagoonal environment, have not been found there so far. Besides foraminifers presented by J. BYSTRICKÝ et al. (1973, p. 55) and O. JENDREJÁKOVÁ (1970) the significant miliolid foraminifers are represented by *Quinqueloculina nucleiformis* KRISTAN-TOLLMANN. In the uppermost layers of the sequence (dark-grey organodetrital limestones) corresponding to the zone *Rhabdoceras suessi*, the species *Triasina hantkeni* MAJZON appears for the first time.

In the Silicicum, the Upper Alaunian (halorite horizon p. p.) and the Lower Rhaetian (Sevatian) in a facies of Dachstein limestones (biomicrites and biosparites) are characterized by foraminifers of the zone *Angulodiscus pokornyi* – *Angulodiscus friedli* (locality Veľká Lúka; Červená Skala – Muránska planina plateau).

This zone is also in the Choč nappe of the Nízke Tatry Mts. on the locality Hyby (cut of railway) and the foraminifers of this zone are presented in Fig. 11.

Zone *Triasina hantkeni* (Total-range zone)

In the sense of J. SALAJ (1978) the zone corresponds to the uppermost part of the Lower – Upper Rhaetian. Its lower and upper boundary are characterized by vertical distribution of *Triasina hantkeni* MAJZON. According to A. GAŻDZICKI (1974, 1978a, b) the zone does not extend to the uppermost parts of the Rhaetian.

In the Tatricum and the Fatricum (D. ANDRUSOV–O. FUSÁN–J. BYSTRICKÝ 1973) it may be caused by changes in ecological conditions indicative of the Lower Liassic detrital sedimentation. As regards the first appearance of *Triasina hantkeni* MAJZON, according to J. SALAJ (1978) its border is in the upper part of the Lower Rhaetic. A. GAŻDZICKI (1978c) presented valuable data about the presence of Lower Rhaetian conodonts of the species *Misikella posthernsteini* KOZUR et MOCK in the Choč nappe of the Vysoké Tatry (high Tatra Mts.). If the species *Misikella posthernsteini* KOZUR et MOCK really occurred only in the lower part of the ammonite zone *Choristoceras marshi*, there would be no doubts about the lower border of *Triasina hantkeni*. But according to J. BYSTRICKÝ (1975), *Triasina hantkeni* MAJZON also occurs in the Upper Sevatian conodont zone *Misikella hernsteini* and in the Sevatian ammonite zone *Choristoceras marshi*.

In respect of correlation with conodont zones significant is the presence of *Triasina hantkeni* in the Kössen beds at Hybe (J. BYSTRICKÝ 1975, p. 188) in the overlier of the Dachstein limestones. They contained plentiful foraminifera and ostracod fauna (J. SALAJ–O. JENDREJÁKOVÁ 1967, J. BYSTRICKÝ 1975) and (formation 10 – rhythmically alternant marls and banking organodetrital limestones; J. BYSTRICKÝ 1975, p. 188) also conodont

Misikella (= *Spathognathodus*) *hernsteini* (MOSTLER) (cf. J. MICHALÍK 1973, p. 201. 211) and *Rhaetites* cf. *reticus* (CLARK) regarded as characteristic of the zone *Rhabdoceras suessi* (J. BYSTRICKÝ 1975, p. 191) corresponding to the Sevatian.

According to A. GAŹDZICKI–H. KOZUR–R. MOCK (1979) the formation corresponds to the stratigraphical level of the species *Misikella posthernsteini* KOZUR et MOCK i. e. the lower part of the zone *Choristoceras marshi*. According to the existing results (cf. A. GAŹDZICKI–J. MICHALÍK–E. PLANDEROVÁ–M. SÝKORA 1979) the species *Triasina hantkeni* Majzon appears in the first time in the Fatricum during the Rhaetian (overlying the Carpathian Keuper).

Equally significant is information by J. BYSTRICKÝ–O. JENDREJÁKOVÁ (1977) about *Triasina hantkeni* MAJZON occurring in the Gemericum in a formation with *Rhabdoceras suessi* (locality Bleskový prameň spring). If we consider the data presented by E. VÉGH-NEUBRANDT (1972) on the occurrence of the species *Triasina hantkeni* MAJZON in Hungarian Dachstein limestones with *Rhabdoceras suessi* or from the boundary of zones *Rhabdoceras suessi* – *Choristoceras marshi*, then there is no doubt about the age diapason of the zone *Triasina hantkeni* ranging from the uppermost part of the zone *Rhabdoceras suessi* to the entire zone *Choristoceras marshi*. So the total-range zone *Triasina hantkeni* is more-or-less coeval with the middle and the upper parts of the total-range zone *Angulodiscus pokornyi* – *Angulodiscus friedli*.

For microbiostratigraphy of the Rhaetian with *Triassina hantkeni* MAJZON the description of a horizon with smaller representatives of the genus *Glomospira* RZEHAK, 1885 and the genus *Glomospirella* PLUMMER 1945 is very important. J. MICHALIK–O. JENDREJÁKOVÁ K. BORZA (1979) described new species from the horizon: *Glomospira inconstans, Glomospira inflata, Glomospirella fatrica, Glomospirella minima* and *Glomospirella paucispira*. Besides the new species there are also *Glomospira sinensis* HO, *Glomospirella shengi* HO and *Glomospirella facilis* HO. An assemblage with stratigraphically significant species *Angulodiscus* (*Glomospirella*) *friedli* (KRISTAN-TOLLMANN) and *Permodiscus tumidus* (KRISTAN-TOLLMANN) is in the overlier and underlier of this specific horizon. According to the opinion of the authors quoted (p. 71) the explosive evolution of the small glomospire-glomospirelle assemblage was caused by local, for a short time favourable conditions.

The fact that the species *Permodiscus tumidus* (KRISTAN-TOLLMANN) and *Angulodiscus* (*Glomospirella*) *friedli* (KRISTAN-TOLLMANN) occur sporadically in this horizon, supports the opinion that the horizon with small glomospires and glomospirelles corresponds to hypersaline environment. The opinion is also supported by the absence of foraminifers of the nov. subfamily *Permodiscinae* and other groups of foraminifers indicative of an environment with normal salinity (J. SALAJ 1979).

Both total-range zones *Angulodiscus pokornyi-Angulodiscus friedli* and *Triasina hantkeni* overlap each other considerably. They are representative of different paleoecological conditions. In some places, at sea inclusions foraminifers characteristic of environments with more-or-less normal salinity passed into lagoonal environment (zone *Angulodiscus pokornyi* – *Angulodiscus friedli*).

Although the two zones (*Angulodiscus pokornyi* – *Angulodiscus friedli* and *Triasina hantkeni*) have a greater stratigraphical range and overlap considerably, we still can divide microbiostratigraphically the Uppermost Norian (Upper Alaunian) and Rhaetian on the basis of the following foraminiferal assemblages. The Upper Alaunian – Lower Rhaetian is characterized by the foraminiferal assemblage including *Triasina oberhauseri* KOEHN-ZANINETTI et BROENNIMANN (which does not pass over into the Upper Rhaetian) *Pilamminella falsofriedli* n. sp., *Angulodiscus friedli* (KRISTAN), *Semiinvoluta clari* KRISTAN, *Auloconus permodiscoides* (OBERHAUSER) and *Austrocolomia canaliculata* (KRISTAN).

In the course of the Uppermost Sevatian (Lower Rhaetian) *Triasina hantkeni* MAJZON and *Pilamminella begani* (SALAJ) enter the assemblage. *Glomospirella amplificata* KRISTAN-TOLLMANN and *Glomospirella hoi* KRISTAN-TOLLMANN, occurring in the Rhaetian – are synonyms of the species *Pilamminella begani* (SALAJ). In the Upper Rhaetian (zone *Choristoceras marshi*) the species *Trochonella crassa* KRISTAN, *Coronipora austriaca* KRISTAN, *Austrocolomia rhaetica* OBERHAUSER and *Galeanella tollmanni* (KRISTAN) appear.

In the Rhaetian with *Triasina hantkeni* MAJZON, the first involutines appear. They are represented mainly by the species *Involutina turgida* KRISTAN, and they are most frequent in the Lower Liassic zone *Involutina liassica* and *Ophthalmidium leischneri* (Fig. 11).

As regards the zones *Angulodiscus pokornyi* – *Angulodiscus friedli* and *Triasina hantkeni* (or other zones quoted we may state that each of them characterizes different depositional environment with different facies types.

a) According to R. OBERHAUSER–B. PLÖCHINGER (1968), *Triasina hantkeni* MAJZON occurs in the so-called, archaediscid limestone facies together with *Permodiscus*, "*Trocholina*" and *Archaediscus*. The facies contains besides many foraminifers also arenite and rudite components, and the matrix consists of sparitic calcite. J. HOHENEGGER–W. PILLER (1975a) write that within the sedimentation zone of the Dachstein limestones is an algal-foraminiferal-detrital limestone facies with plentiful megalodonts and dasycladaceans (W. PILLER 1976). Deposition proceeded in the depth to 20 m in basins with slightly increased salinity, especially on the inner side (back-reef) of a reef complex (J. HOHENEGGER 1974b). The occurrence of *Triasina hantkeni* MAJZON in intrabiosparites with crinoidal fragments of the locality Bleskový prameň spring indicates deposition in the foreland of a fore-reef zone with turbidites, partly affected by pelagic sedimentation as proved by sporadical ammonites of the species *Rhabdoceras suessi* HAUER.

The tests of foraminifers living in the zone are extremely thick owing to very shallow near-reef environment characterized by increased dynamism.

b) The foraminiferal assemblage with dominant species *Pilamminella falsofriedli* n. sp. and variable occurrence of the species *Angulodiscus pokornyi* SALAJ occurs mostly in biomicrites. It is associated with muddy environments in the central part of the reef plain (M. SARNTHEIN 1967, W. PILLER 1976). Tests of foraminifers from this environment are thin-walled and brittle and this is indicative of very quiet environment in lagoons with increased salinity.

Besides the principal types of facies J. HOHENEGGER–W. PILLER (1975a) distinguished further four types in the inner reef (back-reef) depositional environment of the Upper Triassic Dachstein limestone:

– oolite facies indicative of intensive water turbulence and normal salinity. Among foraminifers the representatives of the genera *Tetrataxis* and *Duostomina* are dominant. *Pilamminella* (*Glomospirella*) proves the allochthonous position of ooides. Primarily the representatives of the subfamily Permodiscinae occurred in the facies;

– oolitic facies with transported and resedimented ooides. Heterogeneous composition of foraminifers facilitates correlation of the facies with the oolite, grapestone and pellet-muddy facies; allochthonous material is represented by pellets, muddy agglomerates and foraminifers. Micritic binder is frequently replaced by microsparite. Pellets and micritic binder are indicative of unintensive water movements and high salinity. There are easily adaptable foraminifers, represented mainly by the genera *Trochammina*, *Agathammina*, *Palaeospiroplectammina* and *Frondicularia*.

Representatives of the subfamily *Permodiscinae* nov. subfam. are mostly absent in these facies. If present, then they are smaller, with thin-walled tests.

The relationships between the Sevatian and the Rhaetian, vertical distribution of foraminifers and zonation of the Norian–Rhaetian are presented in Fig. 12.

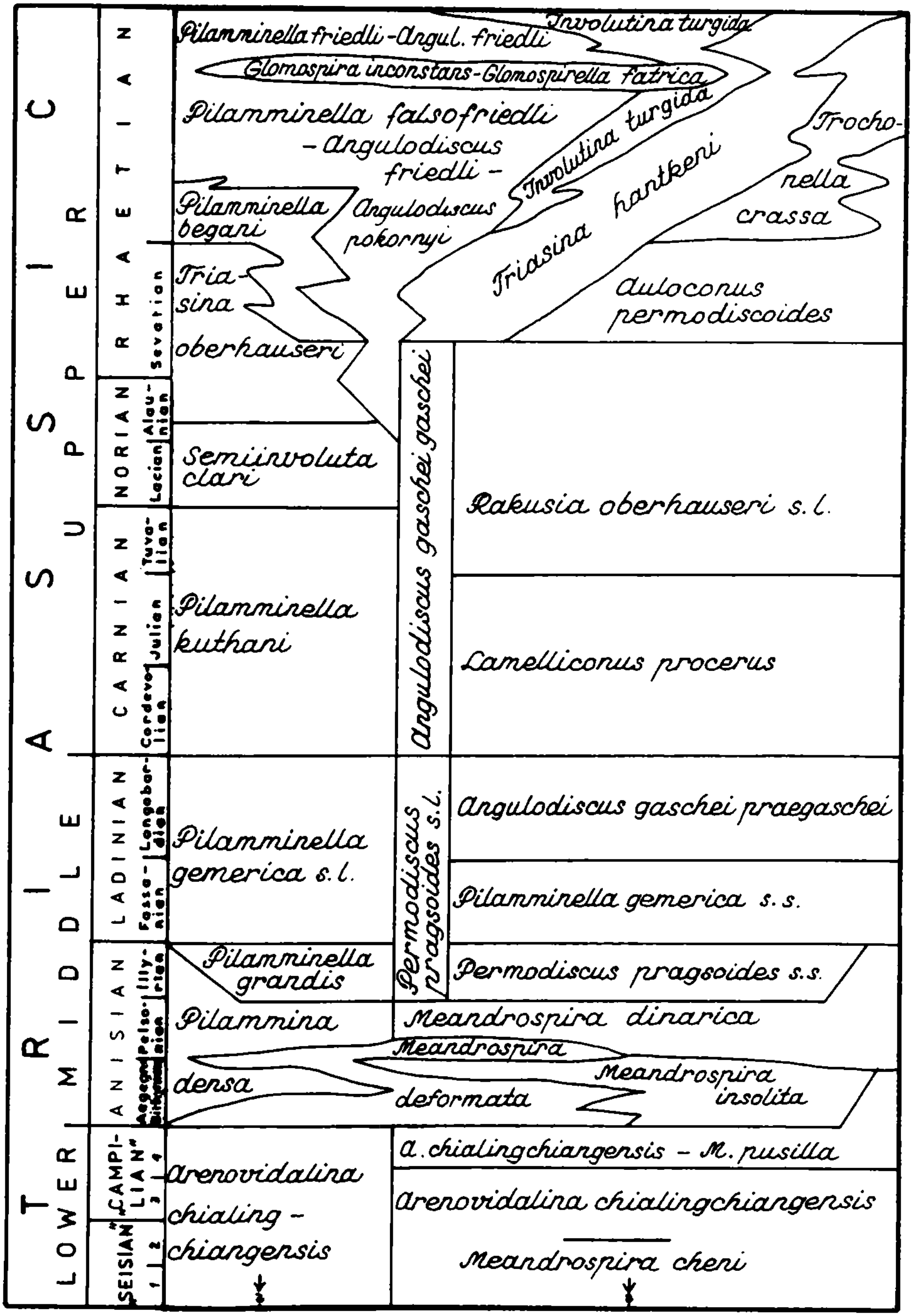


Fig. 12 Schematic table of index species in relation to facies
1 – Ellesmerian, 2 – Dienerian, 3 – Smithian, 4 – Spathian

System of Triassic foraminifers

Astorhizidae **BRADY, 1881**
Rhizamminae **RHUMBLER, 1895**
RHIZAMMINA BRADY, 1879
Rhizammina ramulus **KRISTAN-TOLLMANN, 1964**

Hypocrepininae **RHUMBLER, 1895**
HYPERAMMINA BRADY, 1978
Hyperammina stabilis **KRISTAN-TOLLMANN, 1964**

Ammodiscidae **REUSS, 1862**
Ammodiscinae **REUSS, 1862**
AMMODISCUS REUSS, 1862
Ammodiscus inaequalis **STYK, 1975**
Ammodiscus infimus **STRICKLAND, 1846**
Ammodiscus multivolutus **REITLINGER, 1949**
Ammodiscus parapriscus **HO, 1959**
AMMODISCOIDES CUSHMAN, 1909
Ammodiscoides* aff. *turbinatus **(CUSHMAN, 1909)**
GLOMOSPIRA RZEHAK, 1885
Glomospira inconstans **MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979**
Glomospira inflata **MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979**
Glomospira regularis **LIPINA, 1949**
Glomospira ? sygmoidalis **(RAUSER-CHERNOUSOVA, 1948)**
Glomospira sinensis **HO, 1959**
GLOMOSPIRELLA PLUMMER, 1945
Glomospirella* aff. *ammodiscoides **(RAUSER-CHERNOUSOVA, 1938)**
Glomospirella facilis **HO, 1959**
Glomospirella fatrica **MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979**
Glomospirella minima **MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979**
Glomospirella paucispira **MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979**
Glomospirella schengi **HO, 1959**
Glomospirella* cf. *triphonensis **BAUD, ZANINETTI et BROENNIMANN, 1971**
PILAMMINA PANTIĆ, 1965
Pilammina densa **PANTIĆ, 1965**

PILAMMINELLA SALAJ, 1978
***Pilamminella begani* (SALAJ, 1969)**
***Pilamminella falsofriedli* nov. sp.**
***Pilamminella gemerica* (SALAJ, 1969)**
***Pilamminella grandis* (SALAJ, 1967 in SALAJ, BIELY et BYSTRICKÝ, 1967)**
***Pilamminella kuthani* (SALAJ, 1967 in SALAJ, BIELY et BYSTRICKÝ, 1967)**
***Pilamminella semiplana* (KOCHANSKY-DEVIDÉ et PANTIĆ, 1966)**
TURRITELLELLA RHUMBLER, 1904
"*Turritellella*" *mesotriassica* KOEHN-ZANINETTI, 1968

***Tolypamminae* CUSHMAN, 1928**
TOLYPAMMINA RHUMBLER, 1895
***Tolypammina gregaria* WENDT, 1969**

***Hormosinidae* HAECKEL, 1894**
***Hormosininae* HAECKEL, 1894**
REOPHAX MONTFORT, 1808
***Reophax* aff. *asperus* CUSHMAN et WATERS, 1928**
***Reophax eominutus* KRISTAN-TOLLMANN, 1964**
LITUOTUBA RHUMBLER, 1895
***Lituotuba carpathica* nov. sp.**

***Cribratininae* LOEBLICH et TAPPAN, 1964**
CRIBRATINA SAMPLE, 1932
***Cribratina texana* (CONRAD, in EMORY, 1857)**

***Lituolidae* de BLANVILLE, 1825**
***Cyclammininae* MARIE, 1941**
MESOENDOTHYRA DAIN, 1959 in RAUSER-CHERNOUSOVA–FURSENKO, 1959
Mesoendothyra isjumiana DAIN, 1956 in RAUSER-CHERNOUSOVA–FURSENKO, 1959

***Lituolinae* de BLANVILLE, 1825**
AMMOBACULARIA KRISTAN-TOLLMANN, 1964
***Ammobacularia triloba* KRISTAN-TOLLMANN, 1964**
AMMOBACULITES CUSHMAN, 1910
***Ammobaculites alveolatus* n. sp.**
***Ammobaculites corpulentus* EFIMOVA, 1974**
***Ammobaculites eumorphas* KRISTIAN-TOLLMANN, 1964**
***Ammobaculites hoheneggeri* n. sp.**
***Ammobaculites radstadtensis* KRISTAN-TOLLMANN, 1964**
***Ammobaculites rhaeticus* KRISTAN-TOLLMANN, 1964**
***Ammobaculites zlambachensis* KRISTAN-TOLLMANN, 1964**
HAPLOPHRAGMIUM REUSS, 1860
***Haplophragmium maamouri* SALAJ, 1978**
LABYRINTHINA WEYNSCHENK, 1951
***Labyrinthina falsomirabilis* n. sp.**
SPIROPLECTAMMINA CUSHMAN, 1927
***Spiroplectammina spiralis* n. sp.**

Textulariidae **EHRENBERG, 1838**
Textulariinae **EHRENBERG, 1838**
TEXTULARIA DEFRANCE, 1824 (in de BLAVILLE, 1824)
Textularia exiqua **(SCHWAGER, 1864)**

Pseudobolivininae **WIESNER, 1931**
PSEUDOBOLIVINA WIESNER, 1931
Pseudobolivina globosa **KRISTAN-TOLLMANN, 1973**

Trochamminidae **SCHWAGER, 1877**
Trochammininae **SCHWAGER, 1877**
TROCHAMMININA PARKER et JONES, 1859
Trochammina alpina **KRISTAN-TOLLMANN, 1964**
Trochammina almtalensis **KOEHN-ZANINETTI, 1968**
Trochammina jaunensis **BROENNIMANN et PAGE, 1966**

Ataxophragmiidae **SCHWAGER, 1877**
Verneulininae **CUSHMAN, 1911**
GAUDRYINA d'ORBIGNY in de la SAGRA, 1839
Gaudryina triadica **KRISTAN-TOLLMANN, 1964**
GAUDRYINELLA PLUMMER, 1931
Gaudryinella elegantissima **KRISTAN-TOLLMANN, 1964**
Gaudryinella clavuliformis **TRIFONOVA, 1967**

Valvulininae **BERTHELIN, 1880**
VALVULINA d'ORBIGNY, 1826
Valvulina azzouzi **SALAJ, 1978**
Valvulina metula **(KRISTAN, 1957)**

Caligellidae **REITLINGER, 1959**
CALIGELLA ANTROPOV, 1950
Caligella **aff. *antropovi*** **(LIPINA, 1955)**
Moravamminidae **POKORNÝ, 1951**
Earlandiinae **CUMMINGS, 1951**
EARLANDIA PLUMMER, 1930
Earlandia amplimuralis **(PANTIĆ, 1972)**
Earlandia gracilis **(PANTIĆ, 1972)**
Earlandia tintinniformis (MIŠÍK, 1971)
EARLANDINITA CUMMINGS, 1955
Earlandinita elongata **SALAJ, 1967 in SALAJ, BIELY et BYSTRICKÝ, 1967**
Earlandinita grandis **SALAJ, 1978**
Earlandinita ladinica **SALAJ, 1978**
Earlandinita oberhauseri **SALAJ, 1967 in SALAJ, BIELY et BYSTRICKÝ, 1967**
Earlandinita ? soussi **SALAJ, 1978**

Nodosinellidae **RHUMBLER, 1895**
NODOSINELLA BRADY, 1876

Nodosinella libera **TRIFONOVA, 1967**
Nodosinella rostrata **TRIFONOVA, 1972**
Nodosinella siliqua **TRIFONOVA, 1972**
PACHYPHLOIA LANGE, 1925
Pachyphloia **aff.** ***solida*** **MIKLUCHO-MAKLAY, 1954**
PACHYPHLOIDES SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
Pachyphloides klebelsbergi **(OBERHAUSER, 1960)**
GEINITZINA SPANDEL, 1898
Geinitzina postcarbonica **SPANDEL, 1901**
Geinitzina taurica **SELLIER de CIVRIEUX et DESSAUVAGIE, 1965**
Geinitzina tcherdynzevi **MIKLUCHO-MAKLAY, 1954**
GEINITZINITA SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
Geinitzinita oberhauseri **SELLIER de CIVRIEUX et DESSAUVAGIE, 1965**
Geinitzinita pupoides **(NORVANG, 1957)**

Colaniellidae **FURSENKO, 1959**
MULTISEPTIDA BYKOVA, 1952
Multiseptida? arcata **n. sp.**
Multiseptida elongata **n. sp.**

Ptychocladiidae **ELIAS, 1950**
Stacheiinae **LOEBLICH et TAPPAN, 1961**
PALAEONUBECULARIA REITLINGER, 1950
Palaeonubecularia minuta **BROENNIMANN, ZANINETTI, BOZORGNIA et HUBER, 1972**

Tetrataxidae **GELLOWAY, 1933**
DUOTAXIS KRISTAN, 1954
Duotaxis birmanica **ZANINETTI et BROENNIMANN (in BROENNIMANN, WHITTAKER et ZANINETTI, 1979)**
TETRATAXIS EHRENBERGER, 1854
Tetrataxis **humilis KRISTAN, 1957**
Tetrataxis inflata **KRISTAN, 1957**
Tetrataxis nana **KRISTAN-TOLLMANN, 1964**

Endothyridae **BRADY, 1884**
Endothyrinae **BRADY, 1884**
ENDOTHYRA PHILLIPS, 1846
Endothyra austrotriadica **OBERHAUSER, 1960**
Endothyra badouxi **ZANINETTI et BROENNIMANN (in ZANINETTI, BROENNIMANN et BAUD, 1972)**
Endothyra brassica **(TRIFONOVA, 1978)**
Endothyra elegans **n. sp.**
Endothyra gruenbachensis **OBERHAUSER, 1960**
Endothyra keupperi **OBERHAUSER, 1960**
Endothyra **aff.** ***obturata*** **BROENNIMANN et ZANINETTI, 1972**
Endothyra salaji **GAŹDZICKI, TRAMMER et ZAWIDZKA, 1975**
NEOENDOTHYRA REITLINGER, 1965
Neoendothyra reicheli **REITLINGER, 1965**

ENDOTHYRANELLA GALLOWAY et HARLTON (in GALLOWAY et RYNIKER, 1930)
Endothyranella alpina **ZANINETTI et BROENNIMANN (in ZANINETTI, BROENNIMANN et BAUD, 1972)**
Endothyranella armstrongi **PLUMMER, 1944**
Endothyranella bicamerata **SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ**

Endothyranella lombardi **ZANINETTI et BROENNIMANN, 1972 (in ZANINETTI, BROENNIMANN et BAUD, 1972)**
Endothyranella pentacamerata **SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967)**
Endothyranella robusta **SALAJ, 1978**
Endothyranella tricamerata **SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967)**
Endothyranella wirtzi **(KOEHN-ZANINETTI, 1969)**
PARAENDOTHYRA CHERNYSCHEVA, 1040
Paraendothyra **cf.** ***nalivkini*** **CHERNYSCHEVA, 1940**
RECTOSEPTAGLOMOSPIRANELLA REITLINGER, 1961
Rectoseptaglomospiranella memmii **SALAJ, 1978**

Haplophragmellinae **REITLINGER, 1959**
HAPLOPHRAGMELLA RAUSER-CHERNOUSOVA et REITLINGER, 1936 (in RAUSCHER-CHERNOUSOVA, BELYAEV et REITLINGER, 1936)
Haplophragmella **aff.** ***irregularis*** **(RAUSER-CHERNOUSOVA, 1948)**
HAPLOPHRAGMINA REITLINGER, 1950
Haplophragmina **aff.** ***kashirica*** **REITLINGER, 1950**
KLUBOVELLA LEBEDEVA, 1956
Klubovella **cf.** ***konensis*** **LEBEDEVA, 1956**

Endothyranopsinae **REITLINGER, 1958**
ENDOTHYRANOPSIS CUMMINGS, 1955
Endothyranopsis **cf.** ***crassa*** **(BRADY, in MOORE, 1870)**
GLYPHOSTOMELLA CUSHMAN et WATERS, 1928
Glyphostomella*?** **aff.** ***triloculina **(CUSHMAN et WATERS, 1927)**

Fischerinidae **MILLET, 1898**
Cyclogyrinae **LOEBLICH et TAPPAN, 1961**
AGATHAMMINA NEUMAYER, 1887
Agathammina austroalpina **KRISTAN-TOLLMANN et TOLLMANN, 1964**
Agathammina parafusiformis **n. sp.**
Agathammina judicariensis **PREMOLI SILVA, 1971**
Agathammina multispira **n. sp.**
MEANDROSPIRA LOEBLICH et TAPPAN, 1946
Meandrospira deformata **SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967)**
Meandrospira dinarica **KOCHANSKY-DEVIDÉ et PANTIĆ, 1966**
Meandrospira cheni **(HO, 1959) emend.**

Meandrospira insolita **(HO, 1959) emend.**
Meandrospira pusilla **(HO, 1959) emend.**
MEANDROSPIRANELLA SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967) emend. SALAJ, 1969
Meandrospiranella irregularis **SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967)**
Meandrospiraranella samueli **SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967)**
MEANDROSPIRELLA ORAVECZNE-SCHEFFER, 1968, emend.
Meandrospirella carnica **(ORAVECZNE-SCHEFFER, 1968)**
Meandrospirella planispira **ORAVECZNE-SCHEFFER, 1968**
BISPIRANELLA SAMUEL, SALAJ et BORZA, 1981
Bispiranella subcarinata **SAMUEL, SALAJ et BORZA, 1981**
Bispiranella ovata **SAMUEL, SALAJ et BORZA, 1981**

Calcivertellinae LOEBLICH et TAPPAN, 1964

CALCITORNELLA CUSHMAN et WATERS, 1928
Calcitornella elongata **CUSHMAN et WATERS, 1928**
Calcitornella gebzeensis **DAĠER, 1978**
PLANIINVOLUTA LEISCHNER, 1961
Planiinvoluta carinata **LEISCHNER, 1961**
Planiinvoluta deflexa **LEISCHNER, 1961**
Planiinvoluta irregularis **n. sp.**
Planiinvoluta regularis **n. sp.**

Nubeculariidae JONES, 1875

Opththalmidiinae WIESNER, 1920

ARENOVIDALINA HO, 1959
Arenovidalina amylovoluta **HO, 1959**
Arenovidalina chialingchiangensis **HO, 1959**
KARABURUNIA LANGER, 1968
Karaburunia rendeli **LANGER, 1968**
PARAOPHTHALMIDIUM SAMUEL et BORZA, 1981
Paraophthalmidium carpaticum **SAMUEL et BORZA, 1981**
Paraophthalmidium salaji **SAMUEL et BORZA, 1981**
OPHTHALMIDIUM KUEBLER et ZWINGLI, 1870
Ophthalmidium carinatum **(LEISCHNER, 1961)**
Ophthalmidium exiguum **KOEHN-ZANINETTI, 1968**
Ophthalmidium fusiformis **(TRIFONOVA, 1961)**
Ophthalmidium iranicum **(BROENNIMANN, ZANINETTI, BOZORGNIA et HUBER, 1973)**
Ophthalmidium cf. leischneri **(KRISTAN-TOLLMANN, 1962)**
Ophthalmidium lucidum **(TRIFONOVA, 1962)**
Ophthalmidium tori **ZANINETTI et BROENNIMANN, 1959**
Ophthalmidium triadicum **(KRISTAN, 1957)**
Ophthalmidium tricki **(LANGER, 1961)**

Spiroloculininae WIESNER, 1920

SPIROLOCULINA d'ORBIGNY, 1826

Spiroloculina longiscata **TERQUEM et BERTHELIN, 1975**
Spiroloculina praecursor **OBERHAUSER, 1960**

Nodobaculariinae **CUSHMAN, 1927**
NODOBACULARIA RHUMBLER, 1895
Nodobacularia cylindriformis **n. sp.**
Nodobacularia vujisići **UROŠEVIĆ et GAŹDZICKI, 1977**
NODOPHTHALMIDIUM MACFAYDEN, 1939
Nodophthalmidium sp. 1
Nodophthalmidium sp. 2
Nodophthalmidium sp. 3

Miliolidae **EHRENBERG, 1839**
Quinqueloculininae **CUSHMAN, 1917**
AGATHAMMINOIDES ZANINETTI, 1969
Agathamminoides spiroloculiformis **(ORAVECZNE-SCHEFFER, 1968)**
QUINQUELOCULINA d'ORBIGNY, 1826
Quinqueloculina nucleiformis **KRISTAN-TOLLMANN, 1964**
TRILOCULINA d'ORBIGNY, 1826
Triloculina raibliana **GUEMBEL, 1869**
PALAEOMILIOLINA LOEBLICH et TAPPAN, 1964
Palaeomiliolina occulta **(ANTONOVA, 1958)**
SIGMOILINA SCHLUMBERGER, 1887
Sigmoilina schaeferae **ZANINETTI, ALTINER, DAĠER et DUCRET**
Sigmoilina multicamerata **n. sp.**
Sigmoilina triadica **LANGER, 1968**
Sigmoilina excentrica **n. sp.**

Milioliporidae **BROENNIMANN et ZANINETTI (in BROENNIMANN, ZANINETTI, BOZORGNIA, DASHTI et MOSHTAGHIAN, 1971)**
MILIOLIPORA BROENNIMANN et ZANINETTI (in BROENNIMAN, ZANINETTI, BOZORGNIA, DASHTI et MOSHTAGHIAN, 1971)
Miliopora cuvillieri **BROENNIMANN et ZANINETTI (in BROENNIMANN, ZANINETTI, BOZORGNIA, DASHTI et MOSHTAGHIAN, 1971)**
OPHTHALMIPORA ZANINETTI et BROENNIMANN, 1972
Ophthalmipora falsoexiguum **n. sp.**
GALEANELLA KRISTAN, 1958 emend. ZANINETTI et BROENNIMANN, 1973 (in BROENNIMANN, CADET, RICOU et ZANINETTI, 1973)
Galeanella panticae **ZANINETTI et BROENNIMANN, 1973 (in BROENNIMANN, CADET, RICOU et ZANINETTI, 1973)**

Nodosariidae **EHRENBERG, 1838**
NODOSARIA LAMARCK, 1812
Nodosaria apheilocula aglabra **KRISTAN-TOLLMANN, 1964**
Nodosaria **cf.** ***dipartita*** **KRISTAN-TOLLMANN, 1964**
Nodosaria liratella **TAPPAN, 1951**
Nodosaria mirabilis caucasica **KIKLUCHO-MAKLAY, 1954**
Nodosaria nitida elongata **FRANKE, 1936**

Nodosaria nitidana **BRAND, 1937**
Nodosaria ordinata **TRIFONOVA, 1965**
Nodosaria **aff.** ***prima*** **d'ORBIGNY, 1850**
Nodosaria shablensis **TRIFONOVA, 1978**
Nodosaria trifonovae **n. sp.**
RECTOGLANDULINA LOEBLICH et TAPPAN, 1955
Rectoglandulina **aff.** ***polyarthra*** **KRISTAN-TOLLMANN, 1964**
Rectoglandulina **cf.** ***tenuis*** **(BORNEMANN, 1854)**
DENTALINA RISSO, 1826
Dentalina **aff.** ***cassiana*** **GUEMBEL, 1869**
Dentalina curva **LABUS, 1944**
Dentalina **aff.** ***excellens*** **STYK, 1975**
Dentalina hoi **TRIFONOVA, 1967**
Dentalina subsiliqua **FRANKE, 1936**
PSEUDONODOSARIA BROOMGAART, 1949
Pseudonodosaria gemerica **n. sp.**
Pseudonodosaria gombaseli **n. sp.**
Pseudonodosaria primitiva **KUBLER et ZWINGLI, 1866**
Pseudonodosaria striatoclevata **(SPANDEL, 1901)**
Pseudonodosaria vulgata multicamerata **(KRISTAN-TOLLMANN, 1964)**
LENTICULINA LAMARCK, 1804
Lenticulina (Lenticulina) acutiangulata **(TERQUEM, 1864)**
Lenticulina (Lenticulina) excavata **(TERQUEM, 1864)**
Lenticulina (Lenticulina) subquadrata **TERQUEM, 1866**
ASTACOLUS MONTFORT, 1808
Lenticulina (Astacolus) inquisita **(TERQUEM, 1870)**
Lenticulina (Astacolus) manutina manutina **(d'ORBIGNY, 1849)**
Lenticulina (Astacolus) pediaca **(TAPPAN, 1955)**
PLANULARIA DEFLANDRE, 1824
Lenticulina (Planularia) filosa **(TERQUEM, 1866)**
ROBULOIDES REICHEL, 1945
Robuloides **aff.** ***lens*** **REICHEL, 1945**
Robuloides **cf.** ***orientalis*** **(MIKLUCHO-MAKLAY, 1959)**
LINGULINA d'ORBIGNY, 1826
Lingulina essayana **DEECKE, 1886**
FRONDICULARIA DEFRANCE, 1826
Frondicularia borealis **TAPPAN, 1951**
Frondicularia **cf.** ***eulimbata*** **KRISTAN-TOLLMANN, 1964**
Frondicularia gerkei **KRISTAN-TOLLMANN, 1964**
Frondicularia rhaetica **KRISTAN-TOLLMANN, 1964**
Frondicularia woodwardi **HOWCHIN, 1895**
Frondicularia xiphoidea **KRISTAN-TOLLMANN, 1964**
FALSOPALMULA BARTENSTEIN, 1948
Falsopalmula arignota **KRISTAN-TOLLMANN, 1964**
FRONDINA SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
Frondina permica **SELLIER de CIVRIEUX et DESSAUVAGIE, 1965**
FRONDINODOSARIA SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
Frondinodosaria pyrula **SELLIER de CIVRIEUX et DESSAUVAGIE, 1965**

Frondinodosaria semiornata **(Reuss, 1863)**
PROTONODOSARIA Gerke, 1959
Protonodosaria globifrondina **Sellier de Civrieux et Dessauvagie, 1965**
ICHTYOLARIA Wedekind, 1935
Ichtyoloria primitiva **Sellier de Civrieux et Dessauvagie, 1965**
AUSTROCOLOMIA Oberhauser, 1960
Austrocolomia canaliculata **Kristan-Tollmann, 1964**
Austrocolomia cordevolica **Oberhauser, 1967**
Austrocolomia marshalli **Oberhauser, 1960**
Austrocolomia ploechingeri **Oberhauser, 1960**
Austrocolomia primitiva **n. sp.**
GRILLINA Kristan-Tollmann, 1964
Grillina grilli **Kristan-Tollmann, 1964**
PSEUDOGLANDULINA Cushman, 1929
Pseudoglandulina conica **Miklucho-Maklay, 1954**

Spirillinidae **Reuss, 1862**
Spirillininae **Reuss, 1862**
TURRISPIRILLINA Cushman, 1927
Turrispirillina carpathorumana **Turculet, 1970**
Turrispirillina minima **Pantić, 1967**
Turrispirillina prealpina **Zaninetti et Broennimann, 1976**

Archaediscidae **Cushman, 1928**
Permodiscinae **nov. subfam.**
PERMODISCUS Dutkevich in Chernyscheva, 1948
Permodiscus eomesozoicus **(Oberhauser, 1957)**
Permodiscus hybensis **(Salaj, 1967, in Salaj, Biely et Bystrický, 1967)**
Permodiscus macrostomus **(Kristan, 1957)**
Permodiscus minutus **(Koehn-Zaninetti, 1969)**
Permodiscus planidiscoides **Oberhauser, 1964**
Permodiscus praecommunis **n. sp.**
Permodiscus praeimpressus **n. sp.**
Permodiscus praetenuis **n. sp.**
Permodiscus subsphaericus **n. sp.**
Permodiscus pragsoides **Oberhauser, 1964**
AULOCONUS Piller, 1978
Auloconus permodiscoides **(Oberhauser, 1964)**
AULOTORTUS Weynschenk, 1956
Aulotortus broennimanni **Salaj, 1967, in Salaj, Biely et Bystrický, 1967**
Aulotortus oscillens **(Oberhauser, 1957)**
Aulotortus sinuosus **Weynschenk, 1956**
RAKUSIA Salaj, 1967, in Salaj, Biely et Bystrický, 1967, emend. Salaj, 1969
Rakusia oberhauseri **Salaj, 1967, in Salaj, Biely et Bystrický, 1967, emend. Salaj, 1969**

***Rakusia ploechingeri* n. sp.**
ANGULODISCUS KRISTAN, 1957, emend. SALAJ, 1975
***Angulodiscus communis* KRISTAN, 1957**
***Angulodiscus expansus* (KRISTAN-TOLLMANN, 1964)**
***Angulodiscus falsotumidus* n. sp.**
***Angulodiscus friedli* (KRISTAN-TOLLMANN, 1962)**
***Angulodiscus gaschei gaschei* KOEHN-ZANINETTI et BROENNIMANN, 1968**
***Angulodiscus gaschei praegaschei* (KOEHN-ZANINETTI, 1968)**
***Angulodiscus glomospirelloides* n. sp.**
***Angulodiscus impressus* KRISTAN, 1957**
***Angulodiscus paralellus* (KRISTAN-TOLLMANN, 1964)**
***Angulodiscus pokornyi* SALAJ, 1967, in SALAJ, BIELY et BYSTRICKÝ, 1967**
***Angulodiscus tenuis* KRISTAN, 1957**
SEMIINVOLUTA KRISTAN, 1957
***Semiinvoluta clari* KRISTAN, 1957**
***Semiinvoluta verrucosa* TOLLMANN et KRISTAN-TOLLMANN, 1970**
CORONIPORA KRISTAN, 1958
***Coronipora austriaca* (KRISTAN, 1957)**
LAMELLICONUS PILLER, 1978
***Lamelliconus biconvexus biconvexus* (OBERHAUSER, 1957)**
***Lamelliconus cordevolicus* (OBERHAUSER, 1964)**
***Lamelliconus multispirus* (OBERHAUSER, 1957)**
***Lamelliconus ovulus* SALAJ, 1967, in SALAJ, BIELY et BYSTRICKÝ, 1967, emend.**
***Lamelliconus procerus* (LIEBUS, 1942)**
***Lamelliconus ventroplanus* (OBERHAUSER, 1957)**
***Lamelliconus turris* (FRENTZEN, 1941)**
TRIASINA MAJZON, 1954
***Triasina hantkeni* MAJZON, 1954**
***Triasina oberhauseri* KOEHN-ZANINETTI et BROENNIMANN, 1968**

***Involutininae* BUETSCHLI, 1880**
INVOLUTINA BUETSCHLI, 1880
***Involutina liassica* (JONES, 1853)**
***Involutina turgida* KRISTAN, 1957**
TROCHONELLA KRISTAN, 1957
***Trochonella acuta* (OBERHAUSER, 1964)**
***Trochonella crassa* (KRISTAN, 1957)**
***Trochonella granosa* FRENTZEN, 1941**
***Trochonella laevis* (KRISTAN, 1957)**
***Trochonella permodiscoides* (OBERHAUSER, 1964)**

***Oberhauserellidae* FUCHS, 1970**
OBERHAUSERELLA FUCHS, 1967
***Oberhauserella alta* FUCHS, 1967**
***Oberhauserella ovata* FUCHS, 1967**

Oberhauserella quadrilobata **FUCHS, 1967**
Oberhauserella rhaetica **(KRISTAN-TOLLMANN, 1964)**

Variostomatidae KRISTAN-TOLLMANN, nomen correctum LOEBLICH et TAPPAN, 1964

DIPLOTREMMINA KRISTAN-TOLLMANN, 1960
Diplotremmina altoconica **KRISTAN-TOLLMANN, 1973**
Diplotremmina astrofimbriata **KRISTAN-TOLLMANN, 1960**
Diplotremmina subangulata **KRISTAN-TOLLMANN, 1960**
DUOSTOMINA KRISTAN-TOLLMANN, 1960
Duostomina alta **KRISTAN-TOLLMANN, 1960**
Duostomina magna **TRIFONOVA, 1974**
Duostomina rotundata **KRISTAN-TOLLMANN, 1960**
Duostomina **aff.** ***turboidea*** **KRISTAN-TOLLMANN, 1960**
VARIOSTOMA KRISTAN-TOLLMANN, 1960
Variostoma acutoangulata **KRISTAN-TOLLMANN, 1973**
Variostoma catilliforme **KRISTAN-TOLLMANN, 1960**
Variostoma cochlea **KRISTAN-TOLLMANN, 1960**
Variostoma crassum **KRISTAN-TOLLMANN, 1960**
Variostoma pralongense **KRISTAN-TOLLMANN, 1960**

Incertae sedis

LADINOSPHAERA OBERHAUSER, 1960
Ladinosphaera geometrica **OBERHAUSER, 1960**
PARATINTINNINA BORZA et SAMUEL, 1977
Paratintinnina tulipaformis **BORZA et SAMUEL, 1977**
CUCURBITA JABLONSKÝ, 1973
Cucurbita infundibuliformis **JABLONSKÝ, 1973**
PSEUDOCUCURBITA BORZA et SAMUEL, 1978
Pseudocucurbita globosa **BORZA et SAMUEL, 1978**
Pseudocucurbita subglobosa **BORZA et SAMUEL, 1978**
Pseudocucurbita campanulaformis **BORZA et SAMUEL, 1978**
Pseudocucurbita fusani **BORZA et SAMUEL, 1978**
AMPHORELLA BORZA et SAMUEL, 1977
Amphorella bicamerata bicamerata **BORZA et SAMUEL, 1977**
Amphorella bicamerata intermedia **BORZA et SAMUEL, 1977**
Amphorella bilongicamerata bilongicamerata **BORZA et SAMUEL, 1977**
Amphorella bilongicamerata minuta **BORZA et SAMUEL, 1977**
Amphorella lageniformis **BORZA et SAMUEL, 1977**
Amphorella subsphaerica **BORZA et SAMUEL, 1977**
SPIRIAMPHORELLA BORZA et SAMUEL, 1977
Spiriamphorella carpathica carpathica **BORZA et SAMUEL, 1977**
Spiriamphorella carpathica gemerica **BORZA et SAMUEL, 1977**
Spiriamphorella rectilineata rectilineata **BORZA et SAMUEL, 1977**
Spiriamphorella rectilineata districta **BORZA et SAMUEL, 1977**
Spiriamphorella ovata **BORZA et SAMUEL, 1977**
URNULINELLA BORZA et SAMUEL, 1977
Urnulinella andrusovi **BORZA et SAMUEL, 1977**
Urnulinella irregularis **(BORZA et SAMUEL, 1977)**

Systematic description

Astrorhizidae BRADY, 1881
Rhizammiminae RHUMBLER, 1895
RHIZAMMINA BRADY, 1879

Rhizammina ramulus KRISTAN-TOLLMANN, 1964

Fig. 13

1964 *Rhizammina? ramulus* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 24, Taf. 1, Fig. 1–2.
1976 *Rhizammina? ramulus* KRISTAN-TOLLMANN – L. ZANINETTI: Les Foraminifères du Trias etc., p. 87, Pl. 21, Fig. 1–2.

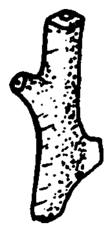


Fig. 13 *Rhizammina ramulus* KRISTAN-TOLLMANN, 1964

Remark: Carpathian specimens are identic with the original description by E. KRISTAN-TOLLMANN (l. c.).

Dimensions: length 0,8–1,0 mm; width 0,16–0,18 mm.

Stratigraphical and geographical range: So far this form is known from the Zlambach Formation of the Austrian Alps. In the West Carpathians the species is scarce in the Kössen Member of the Upper Rhaetian (locality Hybe) in the Nízke Tatry Mts.

Hypocrepininae RHUMBLER, 1895
HYPERAMMINA BRADY, 1878

Hyperammina stabilis KRISTAN-TOLLMANN, 1964

Pl. CXLVI, Fig. 2 (1)

1964 *Hyperammina stabilis* n. sp. – E. KRISTAN-TOLLMANN: die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 25, Taf. 1, Fig. 6–7.

1976 *Hyperammina stabilis* Kristan-Tollmann–L. Zaninetti: Les Foraminifères du Trias etc., 87–88, Pl. 21, Fig. 9 (cum syn.).

Remark: The depicted form is identic with the description of the holotype.

Dimensions: length 1,0–2,4 mm; width 0,35–0,40 mm.

Stratigraphical and geographical range: The species is known from the Anisian formations of the Northern Limestone Alps (M. Franz, 1966), Carnian of the Bakony Mts. in Hungary (A. Oraveczné-Scheffer 1965), from the West Carpathians (J. Salaj–O. Jendrejáková 1966) and from the Rhaetian of the Austrian Eastern Alps (E. Kristan-Tollmann 1964).

Ammodiscidae Reuss, 1862

Ammodiscinae Reuss, 1862

AMMODISCUS Reuss, 1862

Ammodiscus inaequabilis Styk, 1975

Pl. CXLI, Fig. 7

1975 *Ammodiscus inaequabilis* sp. n. – O. Styk: Foraminifera from the Lower and Middle Triassic etc., p. 507, pl. XXXV, fig. 3–4.

Remark: The sporadical specimens of this species are identical with the holotype in illustration and description.

Dimensions: Diameter 0,35 mm, thickness 0,05 mm.

Stratigraphical range: Originally described from the Lower Muschelkalk of Poland. In the West Carpathians it is found in the Lower Illyrian Reifling limestones (Hurtovec).

Ammodiscus cf. *infimus* Strickland, 1846

Pl. CXLVI, Fig. 3 – 1

1964 *Ammodiscus infimus* (Strickland, 1846) – E. Kristan-Tollmann: Die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 32, pl. 8, fig. 6–7 (cum syn.).

Remark: The Carpathian specimens found in the Upper Rhaetian Hybe beds are smaller in their dimensions than the specimens found in the Liassic (spotted marls) of the Czorsztyn Group of the Klippen Belt (Vršatecké Podhradie).

Dimensions: Diameter 0,40, thickness 0,03 mm.

Stratigraphical and geographical distribution: Besides the Rhaetian of the West Carpathians it is also known from the Rhaetian of the Northern Limestone Alps (E. Kristan-Tollmann, 1964).

Ammodiscus multivolutus Reitlinger, 1949

Pl. I, fig. 1; Pl. VI, fig. 1–2

1949 *Ammodiscus multivolutus* n. sp. – E. A. Reitlinger: Melkie foraminifery nižnej časti srednego karbona etc., p. 155–156, fig. 2a–c.

1959 *Ammodiscus multivolutus* Reitlinger–Y. Ho: Triassic foraminifera etc., p. 408, pl. 1, figs. 22–24, pl. 2, figs. 1–2.

Remark: The species is characterized by a small proloculus and by numerous but narrow whorls of deuteroloculum. Other diagnostic characters are identic with the original description.

Dimensions: diameter 0,30–0,35 mm; thickness 0,015 mm.

Stratigraphical and geographical range: The species is described from the Carboniferous of the U.S.S.R. It is known from China (from the drill core from Sheng-teng-shan, SW of Lung-chang, and from an exposure at Li-bi George in the Ho-chuan region) and sporadically from the Anisian and the Carnian of the West Carpathians.

Ammodiscus parapriscus Ho, 1959

Pl. I, fig. 2; Pl. VI, fig. 3–8

1959 *Ammodiscus parapriscus Ho*, sp. nov. Y. Ho: Triassic foraminifera etc., p. 408, pl. II, figs. 3–6.

1976 *Ammodiscus parapriscus* Ho – L. Zaninetti: Les Foraminifères du Trias etc., p. 89, pl. 2, fig. 1–2 (cum syn.).

Remark: The species characteristic is identic with the original complemented description by L. Zaninetti (l. c.)

Dimensions: diameter 0,10–0,15 mm; thickness 0,01 mm.

Stratigraphical and geographical range: Known from the Lower-Middle Trias of Southern China (Ho, 1959), from Northern and Northeastern Iran (L. Zaninetti 1976). In the West Carpathians it occurs in the Anisian (Steinalm limestone) and the Hybe Formation of the Upper Rhaetian.

AMMODISCOIDES Cushman, 1909

Ammodiscoides aff. *turbinatus* (Cushman, 1909)

Pl. VIII, Fig. 1

1909 *Ammodiscus turbinatus* (Cushman, 1909) – A. Loeblich J. et H. Tappan, 1964: Protista-Saccordina, p. C 209–210, Fig. 122, 4a, b.

1967 *Ammodiscoides conicus* Cushman et Waters – J. Salaj, A. Biely et J. Bystrický: Trias-Foraminiferen in den Westkarpaten, Taf. VII, Fig. 5.

Remark: The West-Carpathian specimen with 8–9 whorls is very resemblant to the recent species A. turbinatus (Cushman 1909) described from the Caribean Sea (Recent).

Dimensions: diameter 0,9–1,0 mm; thickness 0,02–0,03 mm.

Stratigraphical and geographical range: It is only known from the Trias of the West Carpathians, namely from the Anisian of the Slovak Karst (locality Berc).

GLOMOSPIRA Rzehak, 1885

Glomospira inconstans Michalík, Jendrejáková et Borza, 1979

Pl. I, fig. 3–7

1979 *Glomospira inconstans* n. sp. – J. Michalík, O. Jendrejáková et K. Borza: Some new Foraminifera – species of the Fatra-Formation etc., p. 78–79, Pl. I, fig. 1–5.

Remark: The small irregular to irregularly triangular or oval test consists of ball-shaped large proloculus and undivided deuteroloculus. The inner 3–4 whorls are coiled more tightly, the two outermore ones are coiled very irregularly. Deuteroloculus becomes gradually larger in ontogeny. The wall is rather thin, formed by microgranular calcite.

Dimensions: diameter 0,13–0,15 mm.

Stratigraphical and geographical range. It occurs in the Fatran Formation of the

Inner Carpathians (Veľká Fatra Mts., Strážovská hornatina Mts.), in the overlier of the Upper Norian-Lower Rhaetian zone *Angulodiscus pokornyi* – *Angulodiscus friedli*, in a glomospire-glomospirelle assemblage associated with organodetrital crinoid-gastropod limestones (calcarenites) deposited in tidal to intertidal zone with high salinity, where foraminifers of the family *Archaediscidae* associated with an environment of normal salinity are practically absent (J. SALAJ 1979).

Glomospira inflata MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979

Pl. I, fig. 8–10

1979 *Glomospira inflata* n. sp. – J. MICHALÍK, O. JENDREJÁKOVÁ et K. BORZA: Some new Foraminifera-species of the Fatra Formation etc., p. 79–80, Pl. 1, figs. 6–8.

Remark: The small irregular to irregularly oval test consists of a sphaerical large proloculus and undivided deuteroloculus. The coiling is clew-like, irregular. The deuteroloculus in the final stage of development is, as a rule, typically broadened. The last two whorls are chamber-like inflated. The test wall consists of microgranular calcite.

Dimensions: diameter 0,20–0,25 mm.

Stratigraphical and geographical range: The species occurs in a glomospire-glomospirelle hypersaline Upper Rhaetian horizon (equivalent to the zone *Triasina hantkeni*) in the Fatran Formation of Veľká Fatra Mts. and Strážovská hornatina Mts.

Glomospira regularis LIPINA, 1949

Pl. I, fig. 11–13

1959 *Glomospira regularis* LIPINA – Y. HO: Triassic Foraminifera from the Chialingchiang limestone etc., p. 410, pl. III, figs. 6–15 (cum syn.).
1965 *Glomospira regularis* LIPINA – S. PANTIĆ: *Pilammina densa* n. gen., n. sp. etc., pl. 4, fig. 7–9.
1973 Glomospira regularis LIPINA – J. GLAZEK, J. TRAMMER et K. ZAWIDZKA: The Alpine microfacies with Glomospira densa etc., pl. 2, fig. 4.

Remark: The species characteristic is identic with the original description, complemented by Y. HO (1959). There is a striking agreement between the Carpathian sediments and the forms depicted by Y. HO (1959).

Dimensions: diameter 0,12–0,15 mm.

Stratigraphical and geographical range: the species is known from the Middle-Upper Trias (T_2^3-3) of China (Shen-teng-shan, SW of Lung-chang), from the Anisian part of Muschelkalk in Central Poland in the Alpine facies with *Pilammina densa*, and from the Anisian of Dinarides. In the West Carpathians this species occurs in a glomospire-glomospirelle hypersaline Upper Rhaetian horizon in the Fatran Formation of Veľká Fatra Mts. and Strážovská hornatina Mts.

Glomospira ? sygmoidalis (RAUSCHER-CHERNOUSOVA, 1948)

Pl. I, fig. 14

1959 *Glomospira ? sygmoidalis* (RAUSER) – Y. HO: Triassic foraminifera from the Chialing limestone etc., p. 411, Pl. IV, figs. 8–13 (cum syn.).
1970 *Glomospira sygmoidalis* (RAUSER) – S. PANTIĆ: Caractèristiques micropaléontologiques etc., pl. 2, fig. 4.

Remark: The species characteristic is comparable with the original description, complemented by Y. HO (1959). The important character of the species is slight irregular coiling of deuteroloculus. The consequent alternating stage is the substantial part of the test.

Dimensions: diameter 0,20–0,25 mm.

Stratigraphical and geographical range: The species is known from the Lower Carboniferous of the U.S.S.R., from the Anisian of Dinarides, from the Middle-Upper Trias of China. In the West Carpathians its isolated occurrences in the Carnian of the Slovak karst.

Glomospira sinensis HO, 1959

Pl. II, fig. –18

1959 *Glomospira sinensis* Ho, sp. nov. – Y. Ho: Triassic foraminifera from the Chialingchiang limestone etc., p. 410, Pl. III, figs. 16–34.

1973 *Glomospira sinensis* Ho – J. GIAZEK, J. TRAMMER et K. ZAWIDZKA: The Alpine microfacies with *Glomospira densa* etc., pl. 2, fig. 1.

1975 *Glomospira sinensis* Ho – A. GAŹDZICKI, J. TRAMMER et K. ZAWIDZKA: Foraminifers from the Muschelkalk etc., pl. 1, figs. 9–11.

1976 *Glomospira sinensis* Ho – L. ZANINETTI: Les Foraminifères du Trias etc., p. 92–93, Pl. 2, fig. 3–10 (cum syn.).

1979 *Glomospira sinensis* Ho – J. MICHALÍK, O. JENDREJÁKOVÁ et K. BORZA: Some new foraminifera-species of the Fatra-Formation etc., p. 80, Pl. I, figs. 8–16.

Remark: The West Carpathian specimens are identic with the original description, only their dimensions are smaller.

Dimensions: diameter 0,23–0,25 mm; thickness 0,11–0,14 mm.

Stratigraphical and geographical range. The Lower and Middle Trias of the Dinarides, the Carpathian-Balkan area, Southern China, Iran and Caucasus. In the West Carpathians it was found in the Carnian of the Silicicum, in the Upper Rhaetian of the Fatran Formation of Veľká Fatra Mts. in a glomospire-glomospirelle assemblage.

GLOMOSPIRELLA PLUMMER, 1945

Glomospirella aff. *ammodiscoides* (RAUSER-CHERNOUSOVA, 1938)

Pl. 1, Fig. 15

1959 *Glomospirella ammodiscoides* (RAUSER) – Y. Ho: Triassic Foraminifera from the Chialingchiang limestone of south Szechuan, p. 413, pl. 5, Fig. 12–19 (cum syn.).

Remark: Its species characters are almost identic with the complemented description by Y. HO (1959). The outer whorls are wider than the inner. In equatorial profile the last 2–3 whorls of the oscillation stage are visible. Carpathian specimens are smaller than those from China and Soviet Union.

Dimensions: diameter 0,20–0,25 mm, thickness 0,03 mm.

Stratigraphical and geographical range: Soviet Union, Middle-Upper Trias of South China; in the West Carpathians it occurs in the Norian (Furmanec limestones) of the Muráň plateau.

Glomospirella facilis HO, 1959

Pl. II, fig. 9–16

1959 *Glomospirella facilis* Ho sp. nov. – Y. Ho: Triassic foraminifera from the Chialingchiang limestone etc., p. 414, Pl. 6, figs. 8–12.

1976 *Glomospirella facilis* Ho – L. ZANINETTI: Les Foraminifères du Trias etc., p. 95, Pl. 2, fig. 18 (cum syn.).

1979 *Glomospirella facilis* Ho – J. MICHALÍK, O. JENDREJÁKOVÁ et K. BORZA: Some new Foraminifera-species of the Fatra-Formation etc., p. 80, Pl. II, figs. 1–5.

1979 *Glomospirella* aff. *facilis* Ho – J. MICHALÍK, O. JENDREJÁKOVÁ et K. BORZA: Some new foraminifera species of the Fatra-Formation etc., p. 80, Pl. II. figs. 6–8.

Remark: The Carpathian forms have most characters in common with the originally described species. They are identic with specimens described by J. MICHALÍK–O. JENDREJÁKOVÁ–K. BORZA (1979).

Dimensions: diameter 0,20–0,25 mm; thickness 0,09–0,10 mm.

Stratigraphical and geographical range: The species is known from the Middle-Upper Trias (T_2^3 – 3) of China, from the Lower-Middle Trias of several parts of the Alps and of Iran (L. ZANINETTI 1976). In the West Carpathians it is in the Ladinian, Carnian (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967b) and in the Upper Rhaetian of the Fatran Formation of the Strážovská hornatina Mts. In accordance with L. ZANINETTI (1976) it is a species characteristic of a less deep sea, of littoral and lagoonal environments.

Glomospirella fatrica MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979

Pl. IV, fig. 1–8

1979 *Glomospirella fatrica* n. sp. – J. MICHALÍK, O. JENDREJÁKOVÁ et K. BORZA: Some new Foraminifera – species of the Fatra Formation etc., p. 82, Pl. II, figs. 9–16.

Remark: The small irregularly oval test is convex in its central part. A relatively thick deuteroloculus has a rather smaller number of whorls (5–6). The deuteroloculus diameter gradually increases, at the last whorl it is more or less stabilized. The first 3–4 whorls are coiled irregularly, the last whorl passes into the planispiral stage. The wall consists of microgranular calcite.

Dimensions: diameter 0,20–0,23 mm; thickness 0,07–0,09 mm.

Stratigraphical and geographical range: In the West Carpathians it is in a glomospire-glomospirelle horizon of the Upper Rhaetian in Strážovská hornatina Mts. and Veľká Fatra Mts.

Glomospirella minima MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979

Pl. IV, fig. 9–16; Pl. V, fig. 1–3

1979 *Glomospirella minima* n. sp. – J. MICHALÍK, O. JENDREJÁKOVÁ et BORZA: Some new Foraminifera – species of the Fatra-Formation etc., p. 84–86, Pl. III, figs. 1–10.

Remark: The small flat oval-shaped proloculus, and 4–6 whorls of deuteroloculus. The initial clew-like stage of deuteroloculus is clearly reduced to 2–3 whorls: their diameter does not exceed 1/4 of the test diameter. The second, sigmoid-planispiral stage has 3–4 whorls: their number depends on the ontogenetic age of individual specimens. The diameter of the whorls increases very rapidly. The wall consists of microgranular calcite. Its thickness in the middle and peripheral parts of test is equal, relativelly small.

Dimensions: diameter 0,20–0,23 mm; thickness 0,06–0,08 mm.

Stratigraphical and geographical range: The species was only found in the West Carpathians, namely in Strážovská hornatina Mts. and in Veľká Fatra Mts. It is in the Upper Rhaetian in a glomospire-glomospirelle horizon, i. e. in the overlier of the zone *Angulodiscus pokornyi – Angulodiscus friedli*.

Glomospirella paucispira MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979

Pl. V, fig. 4–9

1979 *Glomospirella paucispira* n. sp. – J. MICHALÍK, O. JENDREJÁKOVÁ et K. BORZA: Some new Foraminifera-species of the Fatra-Formation etc., p. 86–88, Pl. III, figs. 11–16.

Remark: The small test is elipsoidal in axial section and widely oval to subcircular in equatorial section. It consists of the sphaerical proloculus and undivided deuteroloculus. The deuteroloculus developed in two stages: the initial, clew-like, indirectionally coiled and the second planispiral, sometimes slow alternating stage. The clew-like stage, has as a rule, 3–5 whorls, it is nearly sphaerical and forms 1/2 to 2/3 of the test diameter. The deuteroloculus diameter at the first four whorls is almost stabilized, the fifth and next whorls increase more rapidly. The mouth is simple, terminal. The wall is thin, consisting of microgranular calcite.

Dimensions: diameter 0,18–0,20 mm; thickness 0,06–0,07 mm.

Stratigraphical and geographical range: Some forms of the genus Glomospirella found in the Ladinian-Carnian of the Silicicum, belong most likely to the species *Glomospirella paucispira* (J. MICHALÍK–O. JENDREJÁKOVÁ–K. BORZA 1979). So far the species has only been found in the West Carpathians in the Fatran Formation of Strážovská hornatina Mts. and Veľká Fatra Mts. It is in the glomospire-glomospirelle horizon of the Upper Rhaetian.

Glomospirella shengi HO, 1959

Pl. III, fig. 1–13, fig. 14–16, Pl. V, fig. 10–16

1959 *Glomospirella shengi* Ho sp. nov. – Y. HO: Triassic foraminifera from the Chialingchiang limestone etc., p. 413, Pl. V, figs. 20–25.

1976 *Glomospirella shengi* Ho – L. ZANINETTI: Les Foraminifères du Trias etc., p. 104, Pl. 2, fig. 14–16 (cum syn.).

1979 *Glomospirella shengi* Ho – J. MICHALÍK, O. JENDREJÁKOVÁ et K. BORZA: Some new Foraminifera-species of the Fatra-Formation etc., p. 88, Pl. IV, figs. 1–13 (cum syn.).

1979 *Glomospirella* aff. *shengi* Ho – J. MICHALÍK, O. JENDREJÁKOVÁ et K. BORZA: Ibidem, p. 88–89, Pl. IV, figs. 14–16.

Remark: The species characteristic is identic with the original description, complemented by L. ZANINETTI (1976) and by J. MICHALÍK–O. JENDREJÁKOVÁ–K. BORZA (1979)

Dimensions: diameter 0,12–0,15 mm; thickness 0,05–0,07 mm.

Stratigraphical and geographical range: Lower and Middle Trias of Dinarides, Southern China and Caucasus. In the West Carpathians it is in the Upper Rhaetian of the Fatran Formation of Strážovská hornatina Mts. and Veľká Fatra Mts.

Glomospirella cf. *triphonensis* BAUD, ZANINETTI et BROENNIMANN, 1971

Pl. VI, fig. 13–16

1976 *Glomospirella triphonensis* BAUD, ZANINETTI et BRÖNNIMANN–L. ZANINETTI: Les Foraminifères du Trias etc., p. 104–105, pl. 3, fig. 4, 5, 11 (cum syn.).

1978 *Glomospirella? triphonensis* BAUD, ZANINETTI et BRÖNNIMANN–J. SALAJ: Contribution à la microbiostratigraphie du Trias etc., p. 103, pl. 1, fig. 1b.

Remark: *Glomospirella ? triphonensis* BAUD, ZANINETTI et BROENNIMANN from Campilian beds (J. SALAJ 1978) is identic with the originally described holotype. The species may belong to the genus *Pilamminella* SALAJ 1978. It is sure that the depicted forms occurring in the Rhaetian belong to the genus *Glomospirella* PLUMMER 1945 but they differ from the species *G. triphonensis* BAUD, ZANINETTI et BROENNIMANN in irregularly coiled whorls and a large proloculus, and in their stratigraphical range.

Dimensions: The Anisian form-length 0,28 mm, thickness 0,15 mm; Rhaetian forms--length 0,21–0,30 mm, thickness 0,078–0,14 mm.

Stratigraphical and geographical range: According to L. ZANINETTI (1976) the

Upper Scythian and Anisian of many localities in Central and Southern Europe, Turkey, Caucasus (N. A. EFIMOVA 1974); the Campilian of the Slovak Karst in the West Carpathians.

PILAMMINA PANTIĆ, 1965

Pilammina densa PANTIĆ, 1965

Pl. IX, fig. 1–4

1965 *Pilammina densa* n. sp. – S. PANTIĆ: *Pilammina densa* n. gen. sp., and other Ammodiscidae from the Middle Triassic etc., p. 191–192, pl. I, fig. 1–2, pl. II, fig. 1–9.

1974 *Pilammina semiplana* PANTIĆ – N. A. EFIMOVA: Triasovyje foraminifery severozapadnogo Kavkaza i Predkavkazja. p. 67–68, tab. I, fig. 14.

1975 *Glomospira densa* (PANTIĆ) – A. RAMOVŠ: Kamenotvorna *Glomospira densa* (PANTIĆ) v aniziju pri Konjašici. p. 101–104, text-fig. 3.

1976 *Glomospira densa* (PANTIĆ) – L. ZANINETTI: Les foraminifères du Trias. p. 89–91, Pl. 2, fig. 17, 21. (cum syn.).

1976 *Glomospira densa* (PANTIĆ) – Z. BELKA et A. GAŹDZICKI: Anisian foraminifers the high – tatric series etc. Pl. 1, fig. 15–16.

Remark: Typical, frequently depicted, morphologically well defined, Middle Triassic forms are identic with the original description.

Dimensions: diameter 0,60–0,70 mm.

Stratigraphical and geographical range: The species was described for the first time from the Anisian limestones of the Yougoslavian Dinarides (S. PANTIĆ 1965). It is extremely frequent in the Middle-Upper Anisian of the entire Alpine and Carpathian-Balkan region. In the West Carpathians, *Pilammina densa* (PANTIĆ) is plentiful in the Steinalm limestones of the Slovak Karst. It is a guide fossil of the same zone of the Upper Anisian, defined by J. SALAJ (1969). According to the existing data the vertical range of the Zone is Upper Pelsonian-Illyrian. So it starts occurring in the zone *Meandrospira dinarica* (most likely in its uppermost part). Assemblages with occurrences of *Meandrospira dinarica* KOCHANOVSKY-DEVIDE et PANTIĆ and *Pilammina densa* PANTIĆ should be indicative of the Upper Pelsonian – Lower Illyrian. Such assemblages are known from the Steinalm limestones of the Slovak Karst (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967; see Tab. I Vertikale Verbreitung) and from the Annaberg limestones of the Choč nappe in the Malé Karpaty Mts. (O. JENDREJÁKOVÁ 1973). There they occur with dasycladaceans of the zone *Physoporella pauciforata* (J. BYSTRICKÝ 1977). Assemblages with *Pilammina densa* PANTIĆ without associated forms like *Meandrospira dinarica* a. o. are most likely to indicate only the Lower Illyrian. Assemblages of this type originate from the Reifling limestones (see K. BORZA 1970) whose Lower Illyrian age is indicated by a find of *Piarorhynchia trinodosi*. So far we have no reliable evidence about the species *Pilammina densa* PANTIĆ extending to the Uppermost Anisian. Information by K. BORZA (1970) about the occurrence of *P. Densa* PANTIĆ in the Lower Anisian has not been confirmed so far. Besides from the Alpine and Carpathian-Balkan regions the species *Pilammina densa* PANTIĆ was described from Muschelkalk of Lower Silesia in Poland (J. GIAZEK–J. TRAMMER–K. ZAVIDZKA 1973). In the last time (L. ZANINETTI–Z. DAĜER 1978) the presence of the species *Pilammina densa* (PANTIĆ) throughout the Anisian was confirmed in Turkey.

PILAMMINELLA SALAJ, 1978

Type species: *Pilammina grandis* SALAJ, 1967 (in J. SALAJ, A. BIELY et J. BYSTRICKÝ, p. 123–124, pl. 3, fig. 4).

Diagnosis: Loose, small, agglutinated test, composed of proloculus and undivided deuteroloculum. The first part of deuteroloculum is formed of several whorls whose coiling is typical of the genus *Pilammina* PANTIĆ. After this stage the coiling direction is changed by 90° to form the oscillation stage represented by 2–3 whorls. This stage passes into the planispiral stage comprising one or more (2–5) whorls. In the last two stages the genus differs from *Pilammina* PANTIĆ from which it has developed. The aperture is simple, most likely circular. It is on the end of deuteroloculum.

Stratigraphical and geographical range: Representatives of the Genus are significant index forms of the Upper Anisian-Carnian of the Tethys region.

Pilamminella begani (SALAJ, 1969)

Pl. XV, Fig. 1–6; Pl. CVI, Fig. 2–3

1969 *Angulodiscus begani* nov. sp. – J. SALAJ: Quelques remarques sur les problèmes microbiostratigraphiques du Trias, p. 12–13, Pl. III, Fig. 3, 4.

1970 *Glomospirella hoi* n. sp. – E. KRISTAN-TOLLMANN: Beiträge zur Mikrofauna des rhät III. Foraminiferen etc., p. 10–11, Abb. 6, Fig. 21.

1970 *Glomospirella amplificata* n. sp. – E. KRISTAN-TOLLMANN: Beiträge zur Mikrofauna des Rhät. III. Foraminiferen etc., p. 7–8, Abb. 6, Fig. 22.

Remark: Agglutinate test, spherical proloculus passing into tubular undivided deuteroloculum, 2–3 initial whorls are streptospiral-coiled, the following 1–2 whorls are slightly oscillating, and the last 3–4 whorls are almost planispiral-coiled. Aperture was not found, it might be terminal, simple.

Dimensions: diameter 0,6–0,8 mm; thickness 0,25–0,40 mm.

Stratigraphical and geographical range: In the West Carpathians it is present in the Uppermost Norian-Lower Rhaetian, in the Dachstein limestone facies.

Pilamminella falsofriedli n. sp.

Pl. XV, Fig. 7–12

1970 *Glomospirella friedli* KRISTAN – P. BROENNIMANN, A. POISSON et L. ZANINETTI: L'Unité du Domur Dag (Taurus lycien, Turquie). etc., p. 10–16, Pl. 1, Fig. 4–8, Text-fig. 4 (1–9).

Type species: The holotype depicted in P. BROENNIMANN–A. POISSON et L. ZANINETTI 1970, Text–fig. 4 (1).

Denomination: falso (lat.) = false (*Angulodiscus friedli*).

Type level and type locality: cf. P. BROENNIMANN–A. POISSON et L. ZANINETTI 1970, p. 10–16.

Material: plentiful.

Description: Agglutinate test, spherical proloculus and tubular undivided deuteroloculum, coiled in two plans. The first part with approx. 6 whorls is irregularly coiled, the second-peripheral-part is sigmoid-coiled forming 3–5 planes with 20–25° declination angle. Sigmoid whorls are best visible in diagonal sections.

The central irregular-coiled stage and the sigmoid stage are separated by a whorl of deuteroloculum which is coiled vertically to the axial section plane. As a rule, the last whorl terminates the coiling of the sigmoid state of the deuteroloculum.

The first stage of the described species is almost identic with the coiling stage of the genus *Pilammina* PANTIĆ, 1965; the second-sigmoidal-stage (mainly the last whorls) are similar to the second stage of coiling, characteristic of the genus *Pilamminella* SALAJ, 1978.

Dimensions: diameter 0,3–0,6 mm.

Stratigraphical and geographical range: it is restricted to quiet, lagoonal environment of the Uppermost Norian and Rhaetian (Furmanec and Dachstein limestones).

Pilamminalla gemerica (SALAJ, 1969)

Pl. X, fig. 1–4; Pl. XI, fig. 1–2, 3b, 4b)

1969b *Pilammina gemerica* n. sp. – J. SALAJ: Remarques sur la microbiostratigraphie du Trias., p. 10–12, Pl. II, fig. 1, 2, 3.

1976 *Glomospira gemerica* (SALAJ) – L. ZANINETTI: Les Foraminifères du Trias, p. 91, Pl. 2, fig. 24, 25.

Remark: A large test, irregularly circular to oval in section. It consists of spherical proloculus and undivided tube-shaped deuteroloculum. The streptospiral stage occupies approx. 1/2 to 2/3 of the test diameter. About 5–7 whorls are in the irregular part. In the next stage, deuteroloculum is more-or-less bilaterally symmetrically coiled into 2–3 whorls. The last, planispiral stage forms the only whorl. The diameter of deuteroloculum gradually increases: initial whorls are narrow, tightly coiled, terminal whorls are broader, loosely coiled. There are two types of sections: the first, irregularly oval cross section avoiding the oscillation and the planispiral stages. The second-typical oval passes over all three coiling phases. Recrystallized tests of the first type with wiped-out inner morphology may be confused with the species *Angulodiscus gaschei praegaschei* (KOEHN-ZANINETTI).

Dimensions: diameter 0,55–0,80 mm.

Stratigraphical and geographical range: The species was found in the Wetterstein limestones (Ladinian to Lower Carnian) of the West Carpathians (cf. J. SALAJ 1969b). There are mass occurrences of this index fossil of the subzone of the same name (cf. J. SALAJ 1969), representative of the Ladinian to the Lower Carnian. The species is associated with dasycladacean limestones of the Silicicum. The limestones are of platform type.

Pilamminella grandis (SALAJ, in SALAJ, BIELY et BYSTRICKÝ 1967)

Pl. XII, fig. 1–2

1967 *Pilammina grandis* SALAJ, nov. sp. – J. SALAJ, A. BIELY et J. BYSTRICKÝ: Trias-Foraminiferen in den Westkarpaten, p. 123–124, Taf. 3, Fig. é.

1976 *Glomospirella grandis* (SALAJ) – L. ZANINETTI: Les Foraminifères du Trias. p. 101–102, Pl. 2, Fig. 26 (cum syn.).

1976 *Glomospirella grandis* (SALAJ) – Z. BEIKA et A. GAZDŻINSKI: Anisian foraminifers from the high-tatric series etc. Pl. 1, Fig. 14.

Remark: Diagnosis of the species is identic with its original description. *Pilamminella grandis* belong among morphologically typical, stratigraphically significant Middle and Upper Anisian species.

Dimensions: thickness 0,35–0,45 mm; length 0,85–1,00 mm.

Stratigraphical and geographical range: It was described for the first time from the Upper Anisian of the West Carpathians (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967). It was also found in the Middle-Upper Anisian of the Austrian Alps (L. KOEHN-ZANINETTI 1969, A. PAPP–K. TURNOVSKÝ 1970), from the Swiss Alps (A. BAUD–L. ZANINETTI–P. BRÖNNIMANN 1971), Italian Alps (I. PREMOLI-SILVA 1971), from Hellenides (G. CHRISTODOLOU–S. TSAILA-MONOPOLISL 1972), from the Balkan (Bulgaria; E. TRIFONOVA 1972b), Dinarides (S. PANTIĆ 1970), S. PANTIĆ–J.-P. RAMPNOUX 1972, A. RAMOVS 1972, P. BRÖNNIMANN, J.-P. CADET–L. ZANINETTI 1973), from Muschelkalk of Lower Silesia in Poland (J.

GłAZEK–J. TRAMMER–K. ZAWIDZKA 1973), from the High Tatra Mts. in Poland (Z. BEłKA–A. GAZDŹICKI 1976).

In the West Carpathians it is frequent in Middle-Upper Anisian Steinalm limestones; in the Slovak Karst mostly in the assemblage of *Pilamminella semiplana* (KOCHANSKY-DEVIDÉ et PANTIĆ), *Earlandinita oberhauseri* SALAJ, *Neoendothyra reicheli* REITLINGER, *Endothyranella bicamerata* SALAJ, *Endothyranella tricamerata* SALAJ, *Endothyranella pentacamerata* SALAJ, *Endothyranella wirtzi* (KOEHN-ZANINETTI) and *Variostoma* aff. *exile* KRISTAN-TOLLMANN.

Pilamminella kuthani **(SALAJ, SALAJ, BIELY et BYSTRICKÝ, 1967)**

Pl. XIII, fig. 1–4; Pl. XIV, fig. 1–4, Pl. XLVII, fig. 3b

1967 *Pilammina kuthani* (SALAJ) n. sp. – J. SALAJ, A. BIELY et J. BYSTRICKÝ: Trias- Foraminiferen in den Westkarpaten, p. 124, Taf. III, Fig. 5–6.

1976 *Glomospira kuthani* SALAJ – L. ZANINETTI: Les Foraminifères du Trias. p. 91–92, Pl. 2, Fig. 22–23 (cum syn.).

1976 *Glomospira* sp. – M. MIŠÍK–K. BORZA: Obere Trias bei Silická Brezová, Pl. VII, Fig. 7, 6.

1978 *Pilamminella kuthani* (SALAJ, 1967, in SALAJ, BIELY et BYSTRICKÝ, 1967) – J. SALAJ: Contribution à la microbiostratigraphe du Trias etc., p. 107, Tab. 1.

Remark: Medium-sized test, irregularly oval in axial section.

Composed of spherical proloculus and undivided deuteroloculum. In the initial stage deuteroloculum forms an irregular ball-shaped stage with 4–5 whorls, occupying about 1/3 of the test diameter. The whorls are tightly coiled, the deuteroloculum diameter does not change. The ball stage is followed by the oscillation stage with 2–3 whorls. It is characterized by markedly enlarging deuteroloculum whose whorls appear as inflated "chambers" in section. At the end of ontogeny the deuteroloculum passes into a short planispiral stage (1 whorl). *P. kuthani* and *P. gemerica* are closely related forms and it is difficult to distinguish them, since the number of whorls of the ball and the oscillation stages is variable. They are better distinguishable according to diameter of deuteroloculum of the oscillation and the planispiral parts, which is much greater in *P. kuthani.* Its dimensions are, however, smaller than those of *Pilamminella gemerica.*

Dimensions: diameter 0,60–0,70 mm.

Stratigraphical and geographical range: The species *Pilamminella kuthani* was found in the Tisovec limestones of the Muránska plošina (plateau) and of the Slovak Karst (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967), O. JENDREJÁKOVÁ 1970, M. MIŠÍK–K. BORZA 1976). It belongs among index forms of the Carnian (Cordevolian-Tuvalian) of the West Carpathians. There is biozone *Pilamminella kuthani* (J. SALAJ 1969). *Pilamminella kuthani* is characteristic of platform limestones with dasycladaceans. Besides in the Carnian of the West Carpathians species was also found in Balkan (E. TRIFONOVA 1972).

Pilamminella semiplana **(KOCHANSKY-DEVIDÉ et PANTIĆ, 1966)**

Pl. XII, fig. 3–4

1966 *Pilammina semiplana* n. sp. – V. KOCHANSKY-DÉVIDÉ et S. PANTIĆ: Meandrospira in der unteren et mittleren Trias etc., p. 27, Taf. 1, Fig. 5, Fig. 5–6.

1971 *Glomospirella semiplana* (KOCHANSKY-DÉVIDÉ et PANTIĆ) – I. PREMOLI-SILVA: Foraminiferi anisici della regione Giudicariense, p. 327–328, Pl. 22, fig. 6.

1973 *Glomospirella grandis* (SALAJ, in: SALAJ, BIELY et BYSTRICKÝ) – P. BRÖNNIMANN, J.-P. CADET et L. ZANINETTI: Sur quelques Foraminifères de l'Anisien etc. p. 466–467, Pl. 47, Fig. 1, 2.

1975 *Glomospirella amplificata* KRISTAN-TOLLMANN – A. GAZDZICKI, J. TRAMMER et K. ZAWIDZKA: Foraminifers from the Muschelkalk of southern Poland, Pl. 3, Fig. 1–3, 7.

1976 *Glomospirella semiplana* (KOCHANSKY-DÉVIDÉ et PANTIĆ) – L. ZANINETTI: Les foraminifères du Trias, p. 103–104, Pl. 3, Fig. 1.

Remark: Carpathian forms partly differ from the type species. The test is lenticular flat, slightly convex in its central part. It consists of proloculus and undivided deuteroloculum forming a small ball-like stage. There are only 4–5 whorls in the ball part of our specimens and coiling is less tight. Sometimes the ball is excentrically uplifted. The ball stage is followed by the planispiral stage with 4–5 whorls. Diameter and width of deuteroloculum of the planispiral part do not change and this is another difference between the Carpathian and the typical forms.

In morphology, *Pilamminella semiplana* (KOCHANSKY-DEVIDÉ et PANTIĆ) is related to *P. grandis* (SALAJ), only it is smaller and its ball stage is markedly reduced.

Dimensions: thickness 0,18–0,21 mm; length 0,50–0,70 mm.

Stratigraphical and geographical range: Anisian of Dinarides, West Carpathians, Alps, Balkan.

TURRITELLELLA RHUMBLER, 1904

"Turritellella" mesotriassica KOEHN-ZANINETTI, 1968

Pl. XVI, fig. 1; Pl. CXLII, fig. 3

1976 *"Turritellella" mesotriasica* KOEHN-ZANINETTI, 1968 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 105–106, Pl. 4, Fig. 1, Pl. 8, Fig. 13–19 (cum syn.).

Remark: Carpathian forms are identic with the original description complemented by L. ZANINETTI (1976). It is ranged to the genus *Turritellella* in accordance with L. ZANINETTI (1976), but when its initial stage will be proved as streptospiral or planispiral then it will be necessary to establish a new genus for the species.

Dimensions: length 0,4–0,5 mm, width 0,06–0,07 mm.

Stratigraphical and geographical range: It is an index form of the Upper Anisian-Lower Ladinian of the Alps, Carpathians, Dinarides, Balkan and Caucasus. The species is associated with platform limestones and with sediments of infralittoral zone of normal salinity.

Tolypammininae CUSHMAN, 1928

TOLYPAMMINA RHUMBLER, 1895

Tolypammina gregaria WENDT, 1969

Pl. XVI, Fig. 2–7

1969 *Tolypammina gregaria* n. sp. – J. WENDT: Foraminiferen – "Riffe" etc., p. 186–188, Text-fig. 5a–b, Pl. 2, 1, Fig. 3–5, Pl. 22, Fig. 2–4.

1976 *Tolypammina gregaria* WENDT – L. ZANINETTI: Les Foraminifères du Trias etc., p. 107–108 (cum syn.).

1976 *Tolypammina gregaria* WENDT – M. MIŠÍK et K. BORZA: Obere Trias bei Silická Brezová (Westkarpaten), Taf. XVI, Abb. 1–2.

Remark: A sessile species with a very long, irregularly coiled deuteroloculum which causes considerable variability of the species.

Dimensions: diameter 0,30–0,70 mm.

Stratigraphical and geographical range: The Anisian-Rhaetian of the Carpathian-Balkan region, Alps, Taurides. In the West Carpathians it is most frequent in the Anisian and Norian-Rhaetian (M. Mišík–K. Borza 1976; A. Gaździcki 1974).

Hormosinidae Haeckel, 1894
Hormosininae Haeckel, 1894
REOPHAX Montfort, 1808

Reophax aff. *asperus* Cushman et Waters, 1928
Pl. XIX, Fig. 1; Pl. XLVII, Fig. 2

1928 *Reophax asperus* n. sp. – J. A. Cushman–I. A. Waters: Upper Paleozoic foraminifera etc., p. 37, Tab. 4, Fig. 7.

1978 *Reophax* aff. *asper* Cushman et Waters–J. Salaj: Contribution à la microbiostratigraphie du Trias etc., Pl. 1, Fig. 5.

Remark: A test with large proloculum, four chambers slowly enlarging. Aperture terminal, circular.

Dimensions: height 0,5 mm; maximum width 0,2 mm.

Stratigraphical and geographical range: Upper Paleozoic of Texas, Rhaetian of Austrian Alps; Anisian and Carnian of West Carpathians.

Reophax eominutus Kristan-Tollmann, 1964
Pl. XVII, Fig. 1

1964 *Reophax oeminutus* n. sp. – E. Kristan–Tollmann: Die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 28–29, Fig. 15–19.

1976 *Reophax eominutus* Kristan–Tollmann–L. Zaninetti: Les Foraminifères du Trias etc., p. 108, p. 108, Pl. 21, Fig. 4–6 (cum syn.).

Remark: The Carpathian specimen differs from the original description only in less chambers (4) but it is not excluded that because of a non-ideal section the last chambers were omitted.

Dimensions: length 0,5–0,6 mm, width 0,15–0,18 mm.

Stratigraphical and geographical range: Norian – Rhaetian of Alps and Caucasus. In the West Carpathians it is sporadical in the Norian-Rhaetian (Stratenská hornatina Mts.).

LITUOTUBA Rhumbler, 1895

Lituotuba carpathica n. sp.
Pl. CXLI, fig. 3

1983 *Lituotuba carpathica* n. sp. – J. Salaj: Neue Foraminiferen – Arten aus den Reiflinger Kalken etc., p. 000, pl. 2, fig. 6.

Type species: The holotype depicted in Pl. CXLI, Fig. 3; in the depository of the Dionýz Štúr Institute of Geology, Bratislava, No. Sj. H–1.

Denomination: According to lat. carpathica = West Carpathians.

Type level: The Lower Illyrian limestones (Reifling).

Type locality: Hurtovec, the Malé Karpaty Mts.

Material; 3 specimens.

Description: A loose, agglutinated, bicameral test. Proloculus is globular, deuterolocalus irregular clew-like. It is folded out and slightly elongated in the following stage.

Dimensions: diameter of the initial stage 0,22 mm, length 0,95 mm.

Stratigraphical and geographical range: The Lower Illyrian limestones (Reifling) of the Choč nappe in the Malé Karpaty Mts., (loc. Hurtovec).

Cribratininae LOEBLICH et TAPPAN, 1964

CRIBRATINA SAMPLE, 1932

Cribratina texana (CONRAD, in EMORY, 1857)

Pl. XVII, Fig. 3

1857 *Nodosaria texana* CONRAD – in W. H. EMORY: Report on the United States and Mexican boundary survey etc., p. 159, fide A. R. LOEBLICH, JR. et H. TAPPAN, 1964: Treatise, p. C 220, Fig. 131–3, 4a, b, 5a, b.

Remark: Agglutinate long, uniserial, rectilinear test, with 6 tightly attached chambers, labyrintiate wall. Proloculum and the initial chamber of the studied forms were not included, in the sections. Aperture terminal, cribrate.

Dimensions: length 2,2–2,6 mm, width 0,6–0,7 mm.

Stratigraphical and geographical range: Albian in Texas. In the West Carpathians it occurs scarcely in the Lower Rhaetian (Sevatian).

Lituolidae de BLANVILLE, 1825

Cyclammininae MARIE, 1941

MESOENDOTHYRA DAIN, 1959, gen. n. – in D. M. RAUSER-CERNOUSOVA et FURSENKO, 1959

Mesoendothyra isjumiana DAIN, 1956

Pl. XVII, Fig. 4

1959 *Mesoendothyra isjumiana* DAIN, 1956 – in N. A. VOLOSCHINOVA–E. A. REITLINGER: Otrjad Fusulinida, fide: D. M. RAUSER-CHERNOUSOVA–A. V. FURSENKO, 1959, p. 198, Fig. 177–178.

Remark: Involute-coiled test with initial plectogyroidal coiling. Agglutinate wall.

Dimensions: diameter 0,7–0,8 mm.

Stratigraphical and geographical range: It is scarce in the Carnian of the Slovak Karst. The holotype was described from the Ucrainian Upper Jurassic.

Lituolinae de BLAINVILLE, 1825

AMMOBACULARIA KRISTAN-TOLLMANN, 1964

Ammobacularia triloba KRISTAN-TOLLMANN, 1964

Pl. XVIII, fig. 1–2

1964 *Ammobacularia triloba* n. gen. n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 41, Taf. 7, Fig. 1.

Remark: Large agglutinate test with large spiral and few-cameral stage passes gradually into uniserial stage with three low-arched, broad chambers. A typical character of the genus and species is a slot-like aperture divided in three parts. The section only took two parts.

Dimensions: length 0,8–0,95 mm, width 0,4–0,5 mm.

Stratigraphical and geographical range: in Upper Rhaetian Zlambach marls of the Austrian Alps; in the Carnian of the Slovak Karst in the West Carpathians.

AMMOBACULITES CUSHMAN, 1910

***Ammobaculites alveolatus* n. sp.**

Pl. XVII, fig. 2

Type species: the specimen depicted in Pl. XVII, fig. 2; in the depository of the Geological Institute of the Slovak Academy of Sci., Bratislava; thin section By. 4671.

Denomination: alveolatus (Lat.) = alveolar.

Type level: the Tisovec limestones, Carnian.

Type locality: Silická Brezová (thin section 3/71), Slovak Karst.

Description: Large initial planispiral stage, composed of 3–4 chambers. Uniserial stage consists of 2–3 irregular-shaped chambers. Thick, agglutinate, porous test wall. The aperture is not included in the profile; it might have been terminal.

Dimensions: height 0,82–0,85 mm; width 0,26–0,35 mm.

Stratigraphical and geographical range: scarce in the Carnian of the Slovak Karst.

***Ammobaculites corpulentus* EFIMOVA, 1974**

Pl. XIX, fig. 2

1974 *Ammobaculites corpulentus* EFIMOVA, sp. nov. – N. A. EFIMOVA: Triasovyje foraminifery severo-zapadnogo Kavkaza i Predkavkazja, p. 68, pl. 2, fig. 9–10.

Remark: West Carpathian forms with their coarse-agglutinate test wall structure are identic with the holotype.

Dimensions: width 0,17–0,18 mm, length 0,59–0,60 mm.

Stratigraphical and geographical range: The originally described form comes from Anisian limestones of the Caucasus; the Norian Furmanec limestones of the Stratenská hornatina Mts. in the West Carpathians (sporadical).

***Ammobaculites hoheneggeri* n. sp.**

Pl. XIX, fig. 3

Type species: The holotype depicted in Pl. 19, fig. 3; in the depository of the Geological Institute of the Slovak Academy of Sci., thin section No. Bo. 5286.

Denomination: In honour of the Austrian micropaleontologist dr. JOHANN HOHENEGGER (Institute of Paleontology, University of Vienna).

Type level: Uppermost Norian – Lower Rhaetian Dachstein limestones.

Type locality: The Muránska planina plateau, a cut of road to Veľká Lúka.

Description: Agglutinate test. Planispiral initial stage composed of 5–6 slowly enlarging chambers. The uniserial part of the test consists of four semi-arcuate, slowly enlarging chambers. The test wall of the planispiral stage is thin; that of the uniserial stage is twice so thick. The aperture was not visible in thin section, but it might had been circular, terminal.

Dimensions: diameter of the planispiral stage 0,14 mm, the proximal part of the uniserial stage 0,15 mm; the distal part 0,27 mm; total test height 0,57 mm.

Stratigraphical and geographical range: The Dachstein limestone facies in the Muránska planina plateau.

Ammobaculites eumorphos KRISTAN-TOLLMANN, 1964

Pl. XVIII, Fig. 3

1964 *Ammobaculites eumorphos* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 38–39, Taf. 5, Fig. 3, 4; Taf. 6, Fig. 1–5.

1976 *Ammobaculites eumorphos* KRISTAN-TOLLMAN–L. ZANINETTI: Les Foraminifères du Trias, p. 110, Pl. 21, Fig. 18.

Remark: The morphology of the Carpathian form is identic with the original description.

Dimensions: length 1,9–2,0 mm, width 0,5–0,8 mm.

Stratigraphical and geographical range: Rhaetian of the Austrian Alp (Hohe Wand); scarce in the Carnian of the West Carpathians.

Ammobaculites radstadtensis KRISTAN-TOLLMANN, 1964

Pl. XIX, fig. 4

1964 *Ammobaculites radstadtensis* n. sp. E. KRISTAN-TOLLMANN: Zur Charakteristik triadischer Mikrofaunen. P. 66–73, pl. 74, fig. 13.

1976 *Ammobaculites radstadtensis* KRISTAN-TOLLMANN–L. ZANINETTI: Les Foraminifères du Trias etc., p. 110–111, pl. 24, fig. 17 (cum syn.).

Remark: Carpathian forms are identic with the holotype described from the Austrian Alps.

Dimensions: width 0,14–0,16 mm; height 1,1–1,2 mm.

Stratigraphical and geographical range: According to L. ZANINETTI (l. c.) the Anisian-Carnian of the Swiss, Austrian and Italian Alps, in the Dinarides and in the Caucasus; the Anisian and the Carnian of the West Carpathians.

Ammobaculites rhaeticus KRISTAN-TOLLMANN, 1964

Pl. XVIII, Fig. 4

1964 *Ammobaculites rhaeticus* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 36–37, Taf. 4, Fig. 8–13.

1976 *Ammobaculites rhaeticus* KRISTAN-TOLLMANN–L. ZANINETTI: Les Foraminifères du Trias, p. 111, Pl. 21, Fig. 8.

Remark: The species description is identic with the holotype description. The species is characterized by rectangular chamber profile. There are 8–12 chambers in the uniserial part. The aperture, comparatively broad, circular, is not visible on the last chambers.

Dimensions: length 1,9–2,2 mm; width 0,4–0,45 mm.

Stratigraphical and geographical range: The Rhaetian of the Austrian Alps; the Carnian of the West Carpathians.

Ammobaculites zlambachensis **KRISTAN-TOLLMANN, 1964**

Pl. XX, Fig. 1–3

1964 *Ammobaculites zlambachensis* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 38, Taf. 4, Fig. 5–7.

1976 *Ammobaculites zlambachensis* KRISTAN-TOLLMANN–L. ZANINETTI: Les Foraminifères du Trias, p. 111, Pl. 21, Fig. 8.

Remark: The initial, rather large stage has 4–6 chambers. The uniserial stage in short and consists of 2–4 chambers.

Dimensions: length 0,6–0,7 mm, width 0,26–0,3 mm.

Stratigraphical and geographical range: Rhaetian of the Austrian Alps; the Carnian of the West Carpathians.

HAPLOPHRAGMIUM REUSS, 1860

Haplophragmium maamourii **SALAJ, 1978**

Pl. XLVII, Fig. 1

1978 *Haplophragmium maamourii* n. sp. – J. SALAJ, 1978: Contribution à la microbiostratigraphie du Trias etc., p. 108, Tab. 2, Fig. 9.

Remark: Loose test, agglutinated. The initial streptospiral part of the test consists of 6–8 chambers whereas the rectilinear, uniserial part consists of 7–8 chambers. The chamber wall is rather thick, so the area inside the chambers is narrow and small, semiarch-shaped. Aperture was not found.

Dimensions: Length 1,8–2,0 mm, width 0,4–0,6 mm.

Stratigraphical and geographical range: so far only known in the Anisian (*Meandrospira dinarica* zone) of the West Carpathians.

LABYRINTHINA WEYNSCHENK, 1951

Labyrinthina falsomirabilis **n. sp.**

Pl. XX, fig. 4

Type species: the specimen depicted in Pl. XX, fig. 4; in the repository of the Geological Institute of the Slovak Academy of Sci., Bratislava; thin section By. 4981.

Denomination: falso (Lat.) = false; according to *Labyrinthina mirabilis* WEYNSCHENK, 1951.

Type level: Lower Rhaetian (= Sevatian) organo-detrital limestones.

Type locality: Geravy, Stratenská hornatina Mts.

Description: Elongated subcylindrical test; initial planispiral stage composed of 1–1 1/2 whorl; uniserial stage consisting of 3–4 chambers. The secondary transversal septa in the planispiral stage develop as late as the uniserial stage. There they connect the ultimate 2–3 chambers. Aperture terminal, perhaps cribrate. The species *Labyrinthina falsomirabilis* n. sp. differs from *Labyrinthina mirabilis* WEYNSCHENK, 1951 only in small secondary transversal septa.

Dimensions: planispiral stage diameter 0,17–0,18 mm, height 0,50–0,55 mm, uniserial stage width 0,16–0,21 mm.

Stratigraphical and geographical range: the Lower Rhaetian (Sevatian) of the West Carpathians.

Spiroplectammina spiralis n. sp.
Pl. XX, fig. 5

Type species: the specimen depicted in Pl. XX, fig. 5; in the repository of the Geological Institute of the Slovak Academy of Sci., Bratislava; thin section Bo. 5133.

Denomination: spiralis (Lat.) – spiral.

Type level: Dachstein limestones of the Uppermost Norian-Lower Rhaetian.

Type locality: road cut near Veľká Lúka, the Manín plateau.

Description: The test consists of two stages: the planispiral and the biserial. The planispiral stage consists of 1 1/2 whorl with 5–7 chambers in a whorl. The biserial stage consists of 12–14 alternant, slowly enlarging chambers. Thick, agglutinate test wall. Unidentified aperture (not included in profile).

Dimensions: planispiral stage diameter 0,17–0,18 mm, biserial stage width 0,17–0,28 mm, height 0,67–0,68 mm.

Stratigraphical and geographical range: the Uppermost Norian – Lower Rhaetian, zone *Angulodiscus friedli – Angulodiscus pokornyi*, the West Carpathians, facies of Dachstein limestones.

Textulariidae **EHRENBERG, 1838**
Textulariinae **EHRENBERG, 1838**
TEXTULARIA DEFRANCE (in De BLAINVILLE, 1824)

Textularia exigua **(SCHWAGER, 1864)**
Pl. XIX, fig. 5; Pl. XX, fig. 6; Pl. XXI, fig. 1

1976 *Textularia exigua* (SCHWAGER, 1864) – L. ZANINETTI: Les Foraminifères du Trias etc., p. 112 (cum syn.).

Remark: A symmetrical, biserial test. It has many basical morphological characters in common with the species described as *Textularia exigua* by C. SCHWAGER (l. c.).

Dimensions: width 0,13–0,17 mm; height 0,47–0,50 mm.

Stratigraphical and geographical range: Original description from the Rhaetian Kössen Member of the Tirolian Alps in Austria; the Carnian and the Norian of the West Carpathians.

Pseudobolivininae **WIESNER, 1931**
PSEUDOBOLIVINA WIESNER, 1931

Pseudobolivina globosa **KRISTAN-TOLLMANN, 1973**
Pl. XIX, fig. 6–8, 11, Pl. XXI, fig. 2–3

1976 *Pseudobolivina globosa* KRISTAN-TOLLMANN, 1973 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 113, pl. 22, fig. 8, 10 (cum syn.).

Remark: The species is frequent in the West Carpathians and it is almost identic with the original description.

Dimensions: width 0,08–0,20 mm; height 0,21–0,43 mm.

Stratigraphical and geographical range: the original was described from the Carnian of the Austrian Alps; in the West Carpathians it was found in the Anisian Steinalm limestones, the Carnian Tisovec limestones, the Norian Furmanec limestones and in the facies of the Uppermost Norian-Lower Rhaetian Dachstein limestones.

Trochamminidae SCHWAGER, 1877
Trochammininae SCHWAGER, 1877
TROCHAMMINA PARKER et JONES, 1859

Trochammina alpina KRISTAN-TOLLMANN, 1964

Pl. XIX, fig. 9–10; Pl. XXI, fig. 4–12

1976 *Trochammina alpina* KRISTAN-TOLLMANN, 1964 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 114–115, pl. 14, fig. 10 (cum syn.).

Remark: Morphology of the species, especially the height of its spiral, is fairly variable.

Dimensions: test base diameter 0,17–0,48 mm; height 0,13–0,30 mm.

Stratigraphical and geographical range: According to L. ZANINETTI the species is known from the Ladinian-Carnian of many localities of Middle and Central Europe and of Iran. In the West Carpathians it occurs from the Anisian to the Rhaetian.

Trochammina almtalensis KOEHN-ZANINETTI, 1968

Pl. XXII, fig. 1–12; Pl. XXIII, fig. 1–8; Pl. XXIV, fig. 1–11

1976 *Trochammina almtalensis* KOEHN-ZANINETTI 1968 – L. ZANINETTI: Les Foraminifères der Trias etc., p. 113–114, pl. 14, fig. 1–9; pl. 14, fig. 1–9; pl. 23, fig. 8 (cum syn.).

Remark: The species is very frequent in the West Carpathians. The species description is identic with the original diagnosis.

Dimensions: test base diameter 0,21–0,52 mm; height 0,13–0,45 mm.

Stratigraphical and geographical range: According to L. ZANINETTI (1976) it occurs mostly in the Illyrian-Ladinian? of various areas of Europe and Central Burma. In the West Carpathians it is most frequent in the Carnian-Rhaetian of many tectonic units.

Trochammina jaunensis BROENNIMANN et PAGE, 1966

Pl. XXV, fig. 6–11; Pl. XXVI, fig. 2–3

1976 *Trochammina jaunensis* BROENNIMANN et PAGE, 1966 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 115–116, pl. 23, fig. 4, 5 (cum syn.).

Remark: A low-arched test with a broad base. It consists of 3 whorls.

Dimensions: test base diameter 0,18–0,40 mm, height 0,06–0,20 mm.

Stratigraphical and geographical range: it is known from the Anisian of the Italian Alps (I. PREMOLI SILVA, 1971), and Dinarides (S. PANTIĆ 1972a, 1973), from the Middle – Upper Trias of central Alborz in North Iran, from the Upper Trias of the Swiss and Italian Alps, and Dinarides (L. ZANINETTI, 1976). In the West Carpathians it was found in the facies of the Wetterstein (Cordevolian), the Hallstatt and the Furmanec (Norian) limestones and the Dachstein (Uppermost Norian – Lower Rhaetian) limestones.

Ataxophragmiidae SCHWAGER, 1877
Verneuilininae CUSHMAN, 1911
GAUDRYINA d'ORBIGNY in de la SAGRA, 1839

Gaudryina triadica KRISTAN-TOLLMANN, 1964
Pl. XXV, fig. 1–3; Pl. XXVI, fig. 5

1964 *Gaudryina triadica* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminifer aus den rhätischen Zlambachmergeln etc., p. 47–48, pl. 7, fig. 12.

Remark: The species characteristic is identic with the original description.

Dimensions: width 0,35–0,50 mm, height 0,74–1,30 mm.

Stratigraphical and geographical range: it was originally described from the Rhaetian Zlambach marls of the Austrian Alps. In the West Carpathians the species was found in the Wetterstein (Ladinian), Furmanec (Norian) and Lower Rhaetian (Sevatian) organodetrital dark limestones.

GAUDRYINELLA PLUMMER, 1931

Gaudryinella elegantissima KRISTAN-TOLLMANN, 1964
Pl. XXV, fig. 5; Pl. XXVI, fig. 6

1964 *Gaudryinella elegantissima* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 48–49, pl. 21, fig. 24–26.

Remark: The Uppermost Norian-Lower Rhaetian specimens show in their uniserial stage of the test the indications of chambers alternation, whereas on the Ladinian forms only the uniserial part of the test is well developed. So the Ladinian forms are identic with the original species description.

Dimensions: width 0,16–0,26 mm, height 0,44–0,78 mm.

Stratigraphical and geographical range: The original species was described from the Zlambach marls of the Rhaetian of the Austrian Alps. In the West Carpathians the typical forms only occur in the Ladinian Wetterstein limestones, in the Uppermost Norian – Lower Rhaetian Dachstein facies.

Gaudryinella clavuliformis TRIFONOVA, 1967
Pl. XXV, fig. 4; Pl. XXVI, fig. 4

1976 *Gaudryinella clavuliformis* TRIFONOVA, 1967 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 117, pl. 24, fig. 7, 8 (cum syn.).

Remark: The species description is identic with the original species diagnosis.

Dimensions: width 0,15–0,24 mm, height 0,34–0,52 mm.

Stratigraphical and geographical range: it is known from the Zlambach marls of the Austrian Alps and from the Upper Trias of Bulgaria; in the Ladinian Wetterstein and in the Uppermost Norian-Lower Rhaetian Dachstein limestones.

Valvulininae Berthelin, 1880

VALVULINA d'Orbigny, 1826

Valvulina azzouzi Salaj, 1978

Pl. XXVI, fig. 1; Pl. XXVII, fig. 1–8; Pl. XXVIII, fig. 1–3; Pl. XXIX, fig. 1; Pl. XLVII, fig. 3a, 5, 9

1978 *Valvulina azzouzi* n. sp. – J. Salaj: Contribution à la microbiostratigraphie du Trias etc., p. 108, pl. 2, fig. 4a, 5a, 6.

1974 *Trochammina? alpina* Kristan-Tollmann–P. Broennimann, L. Zaninetti et H. Huber: Foraminifera and microfacies of the Triassic Espahk formation etc., tab. 6, fig. 4, 5, 10, 12, 14, 15, 16, 17.

Remark: A trochospiral, small, agglutinate, loose test with 3 1/2–4 whorls and 3 1/2–4 chambers in each whorl. The test walls are fairly thick. The aperture and its shape were not described because the species is described from more sections of thin sections.

Dimensions: test diameter 0,5–0,7 mm, test height 0,5–0,6 mm.

Stratigraphical and geographical range: In the West Carpathians the species occurred from the Middle Anisian to the Lower Rhaetian. In Iran (Tabas region) it was found in the Norian.

Valvulina metula (Kristan, 1957)

Pl. XXVI, fig. 7–9; Pl. XXVIII, fig. 4–8; Pl. XXIX, fig. 2–4; Pl. CXXXVIII, fig. 3, 5–9.

1976 *Duotaxis metula* Kristan, 1957 – L. Zaninetti: Les Foraminifères du Trias etc., p. 123, pl. 22, fig. 23, 26 (cum syn.).

Remark: A variable species whose diagnosis is in accordance with the original description.

Dimensions: test base diameter 0,22–0,35 mm, height 0,30–0,65 mm.

Stratigraphical and geographical range: it is described from the Rhaetian Zlambach beds of the Austrian Alps. In the West Carpathians it occurs from the Ladinian to the Rhaetian.

Caligellidae Reitlinger, 1959

CALIGELLA Antropov, 1950

Caligella aff. *antropovi* (Lipina, 1955)

Pl. XXXII, fig. 1

1955 *Paracaligella antropovi* n. sp. – O. H. Lipina: Foraminifery turneyskogo yarusa i verkhney chasti devona etc., fide in: D. M. Rauser-Chernousova et A. V. Fursenko, 1959: Osnovy paleontologii, p. 176, fig. 81.

1964 *Caligella antropovi* – A. R. Loeblich, Jr. et H. Tappan: Treatise etc., P. C 316, Fig. 229–5.

1978 *Caligella?* sp. – E. Trifonova: The Foraminifera Zones and Subzones etc., pl. 2, fig. 1.

Remark: The Carpathian specimen differs from the type species described from the Volga-Ural Paleozoic in a sigmoidal small initial stage of the tubular dissected test, elongated in its later stage. The initial stage of the test of the type species is coiled more distinctly. The test wall is calcareous, the aperture is circular and terminal.

Dimensions: length 0,4–0,5 mm, width 0,05–0,06 mm.

Stratigraphical and geographical range: *Caligellá antropovi* (Lipina) is known from the Paleozoic of the Russian Platform and from the Anisian of the Balkan. In the West

Carpathians the similar but scarce species occur in the Uppermost Norian to Lower Rhaetian (Dachstein limestone).

Moravamminidae POKORNÝ, 1951
Earlandiinae CUMMINGS, 1951
EARLANDIA PLUMMER, 1930

Earlandia amplimuralis (PANTIĆ, 1972)
Fig. 14

1976 *Earlandia amplimuralis* (PANTIĆ, 1972) – L. ZANINETTI: Les Foraminifères du Trias etc., p. 119–220, pl. 3, fig. 14–16 (cum syn.).

Remark: A thick-walled test in the form of a cylindrical tubule. The initial chamber is not known.

Dimensions: length 0,47–0,55 mm, width 0,11–0,21 mm.

Stratigraphical and geographical range: the species was described from the Upper Anisian-Ladinian of the Dinarides. In the West Carpathians it occurred in the facies of the Steinalm (Anisian) and Reifling (Upper Anisian–Ladinian) limestones of the Brezovské and Čachtické Karpaty Mts. (A. BEGAN–J. HANÁČEK–J. MELLO–J. SALAJ 1982).

Fig. 14 *Erlandia amplimuralis* (PANTIĆ, 1972)

Fig. 15 *Erlandia gracilis* (PANTIĆ, 1972)

Earlandia gracilis (PANTIĆ, 1972)
Fig. 15

1976 *Earlandia gracilis* (PANTIĆ, 1972) – L. ZANINETTI: Les Foraminifères du Trias etc., p. 120, pl. 3, fig. 17, 21, 22 (cum syn.).

Remark: A thin-walled tubular test, 0,5–0,6 mm long, with the diameter of 0,03–0,05 mm.

Stratigraphical and geographical range: The species is described from the Ladinian of the Dinarides; in the West Carpathians it occurs together with *Earlandia amplimuralis* (PANTIĆ, 1972) in the Steinalm (Anisian) and Reifling limestones (Upper Anisian-Ladinian) of the Brezovské and Čachtické Karpaty Mts. (A. BEGAN–J. HANÁČEK–J. MELLO–J. SALAJ, 1982).

Earlandia tintinniformis **(MIŠÍK, 1971)**

Pl. VII, fig. 3–4

1971 *Aeolisaccus tintinniformis*, n. sp. – M. MIŠÍK: *Aeolisaccus tintinniformis*, n. sp., from the Triassic etc., p. 169–172, pl. 12, fig. 1–6.

1976 *Earlandia tintinniformis* (MIŠÍK, 1971) – L. ZANINETTI: Les Foraminifères du Trias, etc., p. 120–121 (cum syn.).

Remark: The species is identic with the original description of the holotype. It was ranged to the genus *Earlandia* PLUMMER, 1930 by P. BROENNIMANN–L. ZANINETTI–F. BOZORGNIA–H. HUBER (1972).

Dimensions: length 0,18–0,2 mm, width 0,04–0,05 mm.

Stratigraphical and geographical range: Besides the Norian-Rhaetian the species occurs all over the Trias. It is most frequent in the Steinalm (Anisian) and Reifling (Upper Anisian-Ladinian) limestones of the West Carpathians. It is also known from the Dinarides, Alps, Iranides and Burma, and from Muschelkalk of Basse Provence in France (L. ZANINETTI, 1976).

We agree with L. ZANINETTI (1976) about the described species being able of living in various conditions of the meso- and infralittoral areas, in calcarenite-calcirudite reef-forming facies, which are usually rich in Dasycladacea.

EARLANDINITA CUMMINGS, 1955

Earlandinita elongata **SALAJ, 1967 in SALAJ, BIELY et BYSTRICKÝ, 1967**

Pl. XXX, fig. 1–5; Pl. XLVII, fig. 6; Pl. CXLII, fig. 8; Pl. CXLIII, Fig. 2

1967 *Earlandinita elongata* SALAJ, nov. sp. – J. SALAJ–A. BIELY–J. BYSTRICKÝ: Trias Foraminiferen in den Westkarpaten, p. 120, pl. 7, fig. 4.

Description: A loose, extremely elongated, straight uniserial test with 14–16 chambers with terminal aperture on their apical part. The test wall is calcareous, fine granulate.

Dimensions: length 2,1–2,3 mm, width 0,3–0,35 mm.

Stratigraphical and geographical range: In the West Carpathians it is in the Anisian-Carnian of the calcarenite facies of the Silicicum. The facies is rich in Dasycladacea. It is also known from the Dinarides. (S. PANTIĆ et J. P. RAMPNOUX, 1972).

Earlandinita grandis **SALAJ, 1978**

Pl. XXX, fig. 6; Pl. XXXI, fig. 1–2; Pl. XXXII, fig. 2, 5; Pl. XLII, fig. 2, 4

1973 *Endothyranella* sp. – P. BROENNIMANN, J. P. CADET et L. ZANINETTI: Sur quelques foraminifères de l'Anisian etc., pl. 48, fig. 1.

1978 *Earlandinita grandis* n. sp. – J. SALAJ: Contribution à la microbiostratigraphie du Trias etc., p. 14, pl. 3, fig. 2, 4.

Remark: A loose, larger, uniserial test. The proloculus is almost globulous, followed by 5 almost rectangular chambers with slightly rounded corners. The test wall is thicker, calcareous, uniserial, fine granulate. The aperture is large, circular and terminal.

Dimensions: height 1,00–1,2 mm, width 0,40–0,45 mm.

Stratigraphical and geographical range: it was described from the West Carpathians where it occurred from the Middle Anisian to the Carnian.

Earlandinita ladinica SALAJ, 1978

Pl. XXXI, fig. 3–6; Pl. XLVII, fig. 7, 10

1978 *Earlandinita ladinica* n. sp. – J. SALAJ: Contribution à la microbiostratigraphie du Trias de Carpates etc., p. 109, pl. 2, fig. 8.

Remark: A loose uniserial test, composed of 9 almost equal chambers. The test wall is calcareous, simple, thin fine granulate. The aperture is very small, circular and terminal.

Dimensions: height 1,8–1,9 mm; width 0,23–0,25 mm.

Stratigraphical and geographical range: it is scarce in the Anisian-Norian of various tectonic units in the West Carpathians.

Earlandinita oberhauseri SALAJ (in SALAJ, BIELY et BYSTRICKÝ, 1967)

Pl. XXXIII, fig. 1–2; Pl. CXLIII, fig. 1

1967 *Earlandinita oberhauseri* SALAJ, nov. sp. – J. SALAJ, J. BYSTRICKÝ et A. BIELY: Trias-Foraminiferen in der Westkarpaten, p. 120, pl. 1, fig. 4.

Remark: A loose, uniserial test with 8–10 chambers aligned in a straight line. The test wall is calcareous, simple, thin, fine granulate. The aperture is breccia-like, terminal.

Dimensions: length 1,0–1,8 mm, width 0,3–0,35 mm.

Stratigraphical and geographical range: In the West Carpathians the species is known from the Anisian-Carnian of the Silicicum.

Earlandinita ? soussii SALAJ, 1978

Pl. XXXII, fig. 6; Pl. XLII, fig. 3

1978 *Earlandinita soussii* n. sp. – J. SALAJ: Contribution à la microbiostratigraphie du Trias etc., p. 15, pl. 3, fig. 3.

Remark: A loose, uniserial test with 6–7 chambers. The last 2–3 chambers are larger than the other. They are globular. The test wall is thicker, but the alveoles – if primary – cause doubts about the assignment of the species to the genus *Earlandinita* CUMMINGS 1955 and inspire the idea about the possibility of belonging to the genus *Ammobaculites* CUSHMAN 1910, or *Reophax* MONTFORT 1808. The aperture is circular, apical.

Dimensions: width 0,40 mm, height 1,0–1,1 mm.

Stratigraphical and geographical range: It is only known from the Ladinian-Carnian of the West Carpathians, from the area of the Silicicum where it was in the assemblage of foraminifers of the zone *Pilammina densa*.

Nodosinellidae RHUMBLER, 1895
Nodosinellinae RHUMBLER, 1895
NODOSINELLA BRADY, 1876

Nodosinella libera TRIFONOVA, 1967
Pl. XLVI, fig. 1; Pl. LXXXII, fig. 6, Pl. CXLII, fig. 6; Pl. CXLIII, fig. 5, 6

1967 *Nodosinella libera* sp. nov. – E. TRIFONOVA: Some new Triassic Foraminifera etc., p. 2, pl. 1, fig. 4–7.
1978 *Earlandinita libera* (TRIFONOVA) – J. SALAJ: Contribution à la microbiostratigraphie du Trias etc., pl. IV, fig. 2–3.

Remark: The forms ranged to the described species have variable number of chambers (7–16). Other morphological characters are identic with those of the holotype.

Dimensions: length 0.64–2,1 mm, width 0.12–0,4 mm.

Stratigraphical and geographical range: the Anisian-Carnian of the Balkan, the Upper Anisian-Ladinian Reifling and Carnian Tisovec limestones in the West Carpathians.

Nodosinella rostrata TRIFONOVA, 1972
Pl. CXLIV, fig. 3

1972 *Nodosinella rostrata* n. sp. – E. TRIFONOVA: Lower Anisic Foraminifera from Boukhovtzi village, etc., p. 506, pl. 1, fig. 1–4.

Remark: It is a frequent Upper Anisian species whose diagnosis is identic with the original description.

Dimensions: width 0,12 mm, length 0,95–1,2 mm.

Stratigraphical and geographical range: in the Lower Anisian of Bulgaria; the Lower Illyrian Reifling limestones of the West Carpathians.

Nodosinella siliqua TRIFONOVA, 1972
Pl. CXLIV, fig. 2

1972 *Nodosinella siliqua* n. sp. – E. TRIFONOVA: Lower Anisian Foraminifera from Boukhovtzi village, etc., p. 506–507, pl. 1, fig. 5–9.

Remark: The species description is identic with the original description.

Dimensions: width 0,1 mm, length 1,00–1,25 mm.

Stratigraphical and geographical range: the Lower Anisian of Bulgaria, the Lower Illyrian Reifling limestones of the Slovak Karst in the West Carpathians.

PACHYPHLOIA LANGE, 1925

Pachyphloia aff. *solida* MIKLUCHO-MAKLAY, 1954
Pl. LXXX, fig. 1

1954 *Pachyphloia solida* sp. nov. – K. V. MIKLUCHO-MAKLAY: Foraminifery verchnepermskich otloženij etc., p. 49, pl. V, fig. 7.

Remark: Basing on some morphological characters we range the Carpathian forms to the species *Pachyphloia solida*, described from the Upper Permian of the Caucasus.

Dimensions: length 0,38–0,40 mm, width 0,21 mm.

Stratigraphical and geographical range: the Upper Permian of the Caucasus; the Norian Furmanec limestones (W. of Tisovec).

Pachyphloides SELLIER de CIVRIEUX et DESSAUVAGIE, 1965

Pachyphloides klebelsbergi (OBERHAUSER, 1960)

Pl. CXLV, fig. 12

1960 *Lingulina klebelsbergi* nov. sp. – R. OBERHAUSER: Foraminiferen und Mikrofossilien "incertae sedis" etc., p. 34, pl. 4, fig. 8a, b, 10a, 10b, 11a, 11b, 12–15, 16a, 16b, 17, 18, 19a, 19b, 20a, 20b, 22a, 22b.

1965 *Pachyphloides klebelsbergi* (OBERHAUSER), 1960, n. gen. – J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE: Reclassification de quelques Nodosaridae etc., p. 86, pl. XIX, fig. 1–5; pl. XX, fig. 1–4.

Remark: The scarce West Carpathian species is identic with the originally described species.

Dimensions: length 0,68–0,70 mm, width of apical part of test 0,28–0,29 mm.

Stratigraphical and geographical range: the Upper Permian of Turkey, the Ladinian of the Austrian Alps; the Lower illyrian Reifling limestones of the Slovak Karst in the West Carpathians.

GEINITZINA SPANDEL, 1898

Geinitzina postcarbonica SPANDEL, 1901

Pl. CXLII, fig. 12

1965 *Geinitzina postcarbonica* SPANDEL – J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE: Reclassification de quelques Nodosariidae etc., p. 34–35, pl. 1. fig. 1–13, 16, 17, 20–25, 27–30; pl. II, fig. 1–4, 7–10, 13; pl. III, fig. 1–4; pl. VIII, fig. 2.

Remark: There were no differences in test structure between the West Carpathian forms and the Upper Permian forms described by J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE (1965).

Dimensions: length 0,62–0,70 mm, width 0,23–0,24 mm.

Stratigraphical and geographical range: the assemblage of Lower Illyrian foraminifers from the Reifling limestones of the Slovak Karst in the West Carpathians.

Geinitzina taurica SELLIER de CIVRIEUX et DESSAUVAGIE, 1965

Pl. CXLV, fig. 11

1965 *Geinitzina taurica* n. sp. – J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE: Reclassification de quelques Nodosariidae etc., p. 35, pl. 1, fig. 14, 15, 18, 19, 26; pl. II, fig. 11, 12.

Remark: The Triassic forms, ranged to the species *Geinitzina taurica* do not differ from the Permian representatives of the species.

Dimensions: length 0,6–0,7 mm, width 0,16–0,18 mm.

Stratigraphical and geographical range: the Lower Illyrian Reifling limestones of the Slovak Karst in the West Carpathians.

***Geinitzina tcherdynzevi* MIKLUCHO-MAKLAY, 1954**
Pl. VIII, fig. 2

1954 *Geinitzina tcherdynzevi* K. V. MIKLUCHO-MAKLAY, sp. nov. – K. V. MIKLUCHO-MAKLAY: Foraminifery verchnepermskich otloženij etc., p. 30, pl. III, fig. 2.

Remark: The Carpathian specimens are most resemblant to the species *Geinitzina tcherdynzevi* from the Upper Permian of the Caucasus.

Dimensions: length 1,70 mm, width of the apical part 0,92 mm.

Stratigraphical and geographical range: the Anisian of the Slovak Karst in the West Carpathians (sporadical occurrences).

GEINITZINITA SELLIER de CIVRIEUX et DESSAUVAGIE, 1965

***Geinitzinita oberhauseri* SELLIER de CIVRIEUX et DESSAUVAGIE, 1965**
Pl. CXLII, fig. 13

1965 *Geinitzina oberhauseri* n. gen., sp. – J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE: Reclassification de quelques Nodosariidae, particulièrement du Permien au Lias, p. 78–80, pl. XVIII, fig. 1–3; pl. XIX, fig. 9–11.

Remark: The description of the Carpathian forms is identic with the description of the holotype.

Dimensions: length 0,76 mm, width 0,4 mm.

Stratigraphical and geographical range: the species *Geinitzina oberhauseri* SELLIER de CIVRIEUX et DESSAUVAGIE has only been found in the Lower Illyrian reifling limestones of the Slovak Karst.

***Geinitzinita pupoides* (NORVANG, 1957)**
Pl. CXLIV, fig. 11

1965 *Geinitzinita pupoides* (NORVANG) 1957, n. gen. – J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE: Reclassification de quelques Nodosariidae, particulièrement du Permien au Lias, p. 81, pl. X, fig. 7; pl. XX, fig. 6, 7.

Remark: Sporadical specimens of the Carpathians are preliminarily ranged to the above species with which they have most characters in common.

Dimensions: length 0,47 mm, width 0,18 mm.

Stratigraphical and geographical range: the Lower Illyrian Reifling limestones of the Slovak Karst in the West Carpathians.

***Colaniellidae* FURSENKO, 1959**

MULTISEPTIDA BYKOVA, 1952

***Multiseptida ? arcata* n. sp.**
Pl. LXXXIII, fig. 1

1978 *Multiseptida* n. sp.$_2$ – J. SALAJ: Contribution à la microbiostratigraphie du Trias etc., p. 109, Pl. 5, fig. 3.

Type species: the holotype depicted in Pl. LXXXIII, fig. 1; in the repository of the Geological Institute of the Slovak Academy of Sci., thin section By. 2159.

Denomination: according to Lat. arcatus = arcuate.

Type level: the Tisovec limestones (Upper Carnian) with *Rakusia oberhauseri* SALAJ.
Type locality: Muránska planina plateau, Veľká lúka.
Description: The test consists of the proloculus and 2–3 uniserially tightly aligned semi-arcuate chambers. The test is double-walled; the outer wall is calcareous, thick, the inner one is fine, recrystallized, micritic. The aperture, typical of the genus *Multiseptida* BYKOVA 1952, was not included in profiles.
Dimensions: height 0,36 mm, width 0,20 mm.
Stratigraphical and geographical range: the Carnian of the Muránska planina plateau, corresponding to the upper part of the zone *Pilamminella kuthani*.

***Multiseptida elongata* n. sp.**
Pl. LXXXIII, fig. 2

1978 *Multiseptida* n. sp.1 – J. SALAJ: Contribution à la microbiostratigraphie du Trias etc., p. 109, Pl. 4, fig. 1.

Type species: the holotype depicted in Pl. LXXXIII, fig. 2; in the depository of *D. Štúr* Institute of Geol., Bratislava. Thin section No Sj. 2.
Denomination: accord. to Lat. elongatus = elongated
Type horizon: Schreyeralm limestones (Upper Anisian) of *Pilammina densa zone*
Type locality: Slovak Karst, B. M. 851,1 m – Štít.
Material: different sections of 4 specimens.
Description: The test is uniserial, with 10–12 gradually enlarging subspherical chambers. The test wall is recrystallized, micritic. The aperture is typical of the genus: multiseptal genus *Multiseptida*.
Dimensions: height 1,8 mm, width 0,3–0,35 mm.
Stratigraphical and geographical range: The described species was found in the West Carpathians in the Upper Anisian zone *Pilammina densa* in the Silicicum. It is the first find of a representative of the genus *Multiseptida* BYKOVA, 1952 in the Trias. Single species of the genus are known from the Russian Platform Mesozoic.

***Ptychocladiidae* ELIAS, 1950**
***Stacheiinae* LOEBLICH et TAPPAN, 1961**
PALAEONUBECULARIA REITLINGER, 1950

***Palaeonubecularia minuta* BROENNIMANN, ZANINETTI, BOZORGNIA et HUBER, 1972**
Pl. XXXII, fig. 3–4

1972 *Palaeonubecularia minuta* sp. n. – P. BROENNIMANN, L. ZANINETTI, F. BOZORGNIA et H. HUBER: Ammodiscids and Ptychocladiids etc., p. 15, pl. 1, fig. 3, 8, 9, 10–14; pl. 3, fig. 6, 13.
1972 *Palaeonubecularia minuta* BROENNIMANN, ZANINETTI, BOZORGNIA et HUBER – L. ZANINETTI – P. BROENNIMANN – F. BOZORGNIA – H. HUBER: Étude lithologique et micropaléontologique etc., p. 15 pl. 4, fig. 16.
1976 *Palaeonubecularia minuta* BROENNIMANN, ZANINETTI, BOZORGNIA et HUBER – L. ZANINETTI: Les Foraminifères du Trias etc., p. 122.

Remark: The species description is identic with the original description.
Dimensions: diameter 0,27–0,35 mm.
Stratigraphical and geographical range: the Lower – ?Middle Trias of Iran; the Uppermost Norian – Lower Rhaetian, Dachstein limestones facies of the West Carpathians.

Tetrataxidae GALLOWAY, 1933

DUOTAXIS KRISTAN, 1954

Duotaxis birmanica ZANINETTI et BROENNIMANN (in BROENNIMANN, WHITTAKER et ZANINETTI, 1979)

Pl. XXXIII, fig. 3

1976 *Duotaxis birmanica* ZANINETTI et BROENNIMANN – L. ZANINETTI: Les Foraminifères du Trias etc., p. 123 (cum syn.).
1980 *Duotaxis birmanica* ZANINETTI et BROENNIMANN in BROENNIMANN, WHITTAKER et ZANINETTI: Le Trias dans la région de Pinarbasi etc., p. 750, pl. 84, fig. 6, 9, 13, 14.

Remark: A low-arched test coiled in 2–3 whorls, with a larger base.

Dimensions: width 0,50–0,55 mm; height 0,20–0,25 mm.

Stratigraphical and geographical range: the Norian of the East Taurus and of the West Carpathians.

TETRATAXIS EHRENBERG, 1854

Tetrataxis humilis KRISTAN, 1957

Pl. XXXIV, fig. 1; Pl. XXXVII, fig. 1

1957 *Tetrataxis humilis* n. sp. – E. KRISTAN: Ophthalmidiidae und Tetrataxinae etc., p. 292, pl. 27, fig. 1a–c, 2a–c, 3.
1976 *"Tetrataxis" humilis* KRISTAN – L. ZANINETTI: Les Foraminifères du Trias etc., p. 124, pl. 22, fig. 16 (cum syn.).

Remark: The species description is identic with the original description. It is a short trochospiral species. Chambers in the last whorl are keel-shaped on the periphery. It is a significant character of the species, particularly at the examination of thin-sections. On the basis of the character, the species can unambiguously be distinguished from morphologically similar but not keel-shaped species of the families Trochamminidae and Variostomatidae.

Dimensions: Width 0,35–0,50 mm; height 0,10–0,20 mm.

Stratigraphical and geographical range: The Norian and Rhaetian of the Alps and the West Carpathians.

Tetrataxis inflata KRISTAN, 1957

Pl. XXVIII, fig. 9; Pl. XXXIII, fig. 4–7; Pl. XXXIV, fig. 2–7; Pl. XXXV, fig. 1–8; Pl. XXXVI, fig. 1–5; Pl. XXXVII, fig. 2–3, 5

1957 *Tetrataxis inflata* nov. sp. – E. KRISTAN: Ophthalmidiidae und Tetrataxinae etc., p. 293–294, pl. 27, fig. 4.
1975 *Tetrataxis inflata* KRISTAN – J. HOHENEGGER et W. PILLER: Aekologie und systematische Stellung der Foraminiferen etc., pl. 1, fig. g.
1976 *"Tetrataxis" inflata* KRISTAN – L. ZANINETTI: Les Foraminifères du Trias etc., p. 124–125, pl. 22, fig. 17 (cum syn.).

Remark: The species is high-arched, with 3–4 spiral whorls. Chambers of the last whorls form a keel-like rim on the ventral side.

Dimensions: width 0,50–0,55 mm, height 0,45–0,55 mm.

Stratigraphical and geographical range: Anisian-Carnian, Rhaetian of the West Carpathians. In the Anisian to Rhaetian of the Alps.

Tetrataxis nana KRISTAN-TOLLMANN, 1964
Pl. XXXVI, fig. 6–12; Pl. XXXVII, fig. 4; Pl. CXXXVIII, fig. 2; Pl CXXXIX, fig. 1, 2

1964 *Tetrataxis nanus* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 45, pl. 7, fig. 8–9.
1976 *"Tetrataxis" nana* KRISTAN-TOLLMANN – L. ZANINETTI: Les Foraminifères du Trias etc., p. 125, pl. 22, fig. 24, 25; pl. 23, fig. 10, 11.

Remark: A species coiled in a high spiral. The species description is identic with the original description.

Dimensions: width 0,20–0,25 mm, height 0,26–0,30 mm.

Stratigraphical and geographical range: The Rhaetian of the Alps and the Anisian to Rhaetian of the West Carpathians.

Endothyridae BRADY, 1884
Endothyrinae BRADY, 1884
ENDOTHYRA PHILLIPS, 1846

Endothyra austrotriadica OBERHAUSER, 1970
Pl. XXXVII, fig. 6

1960 *Endothyra austrotriadica* nov. sp. – R. OBERHAUSER: Foraminiferen und Mikrofossilien "incertae sedis" etc., p. 15, pl. 3, fig. 16.
1976 *Endothyra austrotriadica* OBERHAUSER – L. ZANINETTI: Les Foraminifères du Trias etc., p. 125, pl. 8, fig. 35a, b.

Remark: The Carpathian forms do not differ in the main morphological characters from the original.

Dimensions: diameter 0,33–0,35 mm.

Stratigraphical and geographical range: The Carnian of the Alps and West Carpathians. Occasional finds in the Norian of the West Carpathians.

Endothyra badouxi ZANINETTI et BROENNIMANN (in ZANINETTI, BROENNIMANN et BAUD, 1972)
Pl. XIV, fig. 4, Pl. XXXVII, fig. 7–9

1972 *Endothyra* n. sp. – L. ZANINETTI, P. BROENNIMANN et A. BAUD: Microfaciès particuliers etc., p. 473–4, pl. 1, fig. 1–8, 9?, 10–18, 19?, 20?, 21, 22, 23?, 24?, 25?, pl. 10, fig. 1–3, 7?, pl. 11, fig. 5–7.
1976 *Endothyra badouxi* ZANINETTI et BROENNIMANN – L. ZANINETTI: Les Foraminifères der Trias etc., p. 125, pl. 4, fig. 5 (cum syn.).

Remark: The scarce forms from the West Carpathians do not differ from the original description in their principal morphological characters.

Dimensions: diameter 0,50–0,70 mm.

Stratigraphical and geographical range: The Upper Anisian of the Alps, the Anisian and the Carnian of the West Carpathians.

Endothyra brassica (TRIFONOVA, 1978)

Pl. XXXVIII, fig. 6–7

1978 *Mesoendothyra brassica* sp. n. – E. TRIFONOVA: New Foraminifera species etc., p. 1151–1153, pl. 1, fig. 4–5.

Remark: The Carpathian specimens differ from the Balkan forms in more oval tests.

Dimensions: diameter 0,50–0,60 mm, thickness 0,30–0,40 mm.

Stratigraphical and geographical range: The species was described from the Fassanian of Bulgaria. It occurs in the Carnian of the West Carpathians.

Endothyra elegans n. sp.

Pl. XXXIX, fig. 1–2

Type species: The holotype depicted in Pl. XXXIX, fig. 2, deposited in the Geological Institute of the Slovak Academy of Sciences; thin section By. 1655.

Denomination: Lat. elegans = nice.

Type level: Carnian Tisovec limestones.

Type locality: Budikovany, Slovak Karst.

Description: The test consists of three whorls. The first small plectogyroidal stage consists of 3, 4 or 5 chambers. The second and third whorls comprise 5–7 chambers, slowly enlarging. The test is thick-walled. The aperture is at the base of the last chamber.

Dimensions: diameter 0,80–1,5.

Stratigraphical and geographical range: In the Carnian Tisovec limestones and Norian Furmanec limestones of the West Carpathians.

Endothyra gruenbachensis OBERHAUSER, 1960

Pl. XXXVII, fig. 10

1960 *Endothyra gruenbachensis* nov. sp. – R. OBERHAUSER: Foraminiferen und Mikrofossilien "incertae sedis" etc., p. 16–16, pl. 3, fig. 15.

1976 *Endothyra gruenbachensis* OBERHAUSER – L. ZANINETTI: Les Foraminifères du Trias etc., p. 126, pl. 8, fig. 36a–c.

Remark: The Carpathian forms do not differ from the original description.

Dimensions: diameter 0,38–0,40 mm.

Stratigraphical and geographical range: The Carnian of the Austrian Alps (Hohe Wand) and West Carpathians.

Endothyra kuepperi OBERHAUSER, 1960

Pl. XXXVIII, fig. 1–2; Pl. XLIII, fig. 4a; Pl. CXLVI, fig. 2 (2)

1960 *Endothyra kuepperi* nov. sp. – R. OBERHAUSER: Foraminifera und Mikrofossilien "incertae sedis" etc., p. 16, pl. 3, fig. 7a–e, 22.

1976 *Endothyra kuepperi* OBERHAUSER – L. ZANINETTI: Les Foraminifères du Trias etc., p. 126–127, pl. 8, fig. 20–25 (cum syn.).

Remark: A significant, frequent species, identic with the original description.

Dimensions: diameter 0,30–0,90 mm.

Stratigraphical and geographical range: The Upper Anisian-Carnian of the Alps, West Carpathians, Dinarides and the Balkan.

Endothyra aff. *obturata* BROENNIMANN et ZANINETTI, 1972
Pl. XXXVIII, fig. 4

1972 *Endothyra obturata* sp. n. – P. BROENNIMANN et L. ZANINETTI: Foraminifera from the basal upper Muschelkalk etc., p. 47–49, pl. 5, fig. 4–7, fig. 11 A–M.
1976 *Endothyra obturata* BROENNIMANN et ZANINETTI – L. ZANINETTI: Les foraminifères du Trias etc., p. 127, pl. 8, fig. 31–34 (cum syn.).

Remark: The atypical section of the Carpathian specimen is most resemblant to the species *Endothyra* aff. *obturata* BROENNIMANN et ZANINETTI.

Dimensions: diameter 0,45–0,50 mm.

Stratigraphical and geographical range: Upper Anisian and Ladinian of the Dinarides, the Upper Muschelkalk of France (Basse-Provençe), the Norian of the Carpathians.

Endothyra salaji GAŹDZICKI (in GAŹDZICKI, TRAMMER et ZAWIDZKA, 1975)
Pl. XXXVIII, fig. 3, 5

1975 *Endothyra salaji* n. sp. – A. GAZDŹICKI–J. TRAMMER–K. ZAWIDZKA: Foraminifers from the Muschelkalk etc., p. 289, pl. 5, fig. 1–6.
1976 *Endothyra salaji* GAZDŹICKI – L. ZANINETTI: Les Foraminifères du Trias etc., p. 127 (non illustrée).

Remark: The enlargement of the last three chambers is an important character of the species.

Dimensions: diameter 0,30–0,50 mm.

Stratigraphical and geographical range: The Upper Muschelkalk of Poland (Opole Silesia); the Pelsonian-Illyrian and the Carnian-Norian of the West Carpathians.

NEOENDOTHYRA REITLINGER, 1965

Neoendothyra reicheli REITLINGER, 1965
Pl. VIII, fig. 4; Pl. XXXIX, fig. 3

1965 *Neoendothyra reicheli* n. sp. – E. A. REITLINGER: Razvitije foraminifer v poznepermskuju i rannetriasovuju epochi etc., p. 61, pl. 1, fig. 6–9.
1967a *Neoendothyra reicheli* REITLINGER – J. SALAJ–A. BIELY–J. BYSTRICKÝ: Trias-Foraminiferen etc., pl. 1, fig. 11.
1970 *Neoendothyra reicheli* REITLINGER – S. PANTIĆ: Caracteristiques micropaléontologiques etc., pl. 2, fig. 6, 7.
1971 *Neoendothyra* cf. *reicheli* REITLINGER – I. PREMOLI-SILVA: Foraminiferi anisici etc., p. 337–338, pl. 27, fig. 2.
1972 *Neoendothyra reicheli* REITLINGER – D. UROŠEVIĆ–Z. RADOVANOVIĆ: Contribution à la connaissence etc., pl. 1, fig. 6.
1976 *Neoendothyra reicheli* REITLINGER – L. ZANINETTI: Les Foraminifères du Trias etc., p. 130 (non ilustrée).

Remark: In respect of systematic position of the genus *Endothyra* REITLINGER, 1965 a revision of its holotype will be necessary, since it is not sure whether it is or is not a synonym of the genus *Endothyra* PHILIPS, 1846 (cf. L. ZANINETTI 1976).

Dimensions: diameter 0,6–1,5 mm.

Stratigraphical and geographical range: the Middle Permian and the Lower Trias of Sumatra and Transcaucasia; the Anisian-Ladinian, partly Carnian of the Dinarides, Alps and Carpathians.

ENDOTHYRANELLA GALLOWAY et HARLTON (in GALLOWAY et RYNIKER, 1930)

Remark: The genus *Endothyranella* GALLOWAY et HARLTON, 1930 is frequent in the West Carpathians, mainly in the Middle and Upper Trias.

Almost each species of the genus *Endothyra* PHILLIPS, 1846 (including *Neoendothyra* REITLINGER, 1965) shows in its phylogenesis the tendency to form the uniserial part of the test, characteristic of the genus *Endothyranella*. So it is difficult to distinguish the representatives of the genera in respect of the phylogenetic lines. Since it is hardly possible to determine the representatives of the genus in thin sections, we present here a key for the species determination.

1. The Endothyra stage of the genus *Endothyranella* characterized by less (1–1 1/2 or 2) whorls with rapidly enlarging chambers. There belong the following species:

Endothyranella bicamerata SALAJ, 1969
Endothyranella tricamerata SALAJ, 1969
Endothyranella robusta SALAJ, 1978

2. The Endothyra stage characterized by more (2–3 1/2) whorls with slowly enlarging chamber. There belong:

Endothyranella armstrongi PLUMMER, 1944
Endothyranella lombardi ZANINETTI et BROENNIMANN, 1972
Endothyranella alpina ZANINETTI et BROENNIMANN, 1972
Endothyranella pentacamerata SALAJ, 1969
Endothyranella wirtzi KOEHN-ZANINETTI, 1968 (with a particular aperture).

Endothyranella alpina ZANINETTI et BROENNIMANN (in ZANINETTI, BROENNIMANN et BAUD, 1972)

Pl. XXXIX, fig. 4, Pl. XL, fig. 1–2

1972 *Endothyranella alpina* ZANINETTI et BROENNIMANN, n. sp. – L. ZANINETTI–P. BROENNIMANN–A. BAUD: Microfaciès particuliers et Foraminifères nouveaux etc., p. 478–479, pl. 3, fig. 23–30; pl. 9, fig. 16–18.

1976 *Endothyranella alpina* ZANINETTI et BROENNIMANN – L. ZANINETTI: Les Foraminifères du Trias etc., p. 127, pl. 4, fig. 7.

Remark: There belong the forms with the Endothyra stage composed of 1 1/2–2 whorls. The uniserial stage consists of 2–4 chambers.

Dimensions: diameter of the initial stage 0,40–0,60 mm, width of uniserial stage 0,13–0,40 mm, height 0,5–1,5 mm.

Stratigraphical and geographical range: the Upper Anisian of the Swiss Préalpes Médianes rigides, the Anisian and Norian of the West Carpathians.

Endothyranella armstrongi PLUMMER, 1944

Pl. XL, fig. 3

1958 *Endothyranella armstrongi* PLUMMER – VL. POKORNÝ: Grundzige der zoologischen Mikropaläontologie, p. 166, Abb. 166.

Remark: The coiled stage consists of one plectogyroid and two planispiral whorls. The last whorl has 9 chambers. The uniserial rectilinear stage consists of three chambers.

Dimensions: diameter of initial stage 0,24–0,25 mm, width of uniserial stage 0,13–0,14 mm, height 0,43–0,45 mm.

Stratigraphical and geographical range: the Upper Carboniferous in Texas, scarcely the Anisian of the West Carpathians.

Endothyranella bicamerata SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967)

Pl. XL, fig. 6; Pl. XLIII, fig. 3a, 4b; Pl. XLIV, fig. 3–4; Pl. XLVII, fig. 8

1967 *Endothyranella bicamerata* SALAJ, n. sp. – J. SALAJ – A. BIELY et J. BYSTRICKÝ: Trias – Foraminiferen etc., p. 121, pl. 1, fig. 15, pl. 2, fig. 2a.
1976 *Endothyranella bicamerata* SALAJ – L. ZANINETTI: Les Foraminifères du Trias etc., p. 128, pl. 4, fig. 12 (cum syn.).
1978 *Endothyranella kocaeliensis* DAĞER – Z. DAĞER: Sur quelques Foraminifères nouveaux du Trias etc., p. 22, pl. 1, fig. 11, 12.

Remark: The species description is in accordance with the original diagnosis.

Dimensions: diameter of initial stage 0,15–0,18 mm, width of uniserial stage 0,38–0,40 mm.

Stratigraphical and geographical range: the Middle Anisian-Ladinian of the Dinarides and the Balkan; the Anisian, Carnian, Norian of the West Carpathians. In the Turkey this species was found in the Lower Anisian.

Endothyranella lombardi ZANINETTI et BROENNIMANN, 1972 (in ZANINETTI, BROENNIMANN et BAUD, 1972)

Pl. XL, fig. 4

1972 *Endothyranella lombardi* ZANINETTI et BROENNIMANN, n. sp. – L. ZANINETTI–P. BROENNIMANN–A. BAUD: Microfaciès particuliers et foraminifères nouveaux etc., p. 475–476, pl. 2, fig. 1–16, 17–26?; pl. 3, fig. 1–20; pl. 9, fig. 2, 3; pl. 10, fig. 4–8; pl. 11, fig. 9–12.
1976 *Endothyranella lombardi* ZANINETTI et BROENNIMANN – L. ZANINETTI: Les Foraminifères du Trias etc., p. 128, pl. 4, fig. 6, 8, 9 (cum syn.).

Remark: The Carpathian forms description are in accordance with the original description.

Dimensions: diameter of initial stage 0,45–0,50 mm, width of uniserial stage 0,35 mm, height 0,75 mm.

Stratigraphical and geographical range: Upper Anisian-Ladinian (?) of the Alps (Préalpes Médianes rigides) and Dinarides. In the West Carpathians it was found in the Upper Anisian.

Endothyranella pentacamerata SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967b)

Pl. XL, fig. 7–9; Pl. XLIII, fig. 2; Pl. XLIV, fig. 1–2

1967 *Endothyranella pentacamerata* SALAJ, nov. sp. – J. SALAJ – A. BIELY–J. BYSTRICKÝ: Trias-Foraminiferen etc., p. 121–122, pl. 1, fig. 10.
1976 *Endothyranella pentacamerata* SALAJ – L. ZANINETTI: Les Foraminifères du Trias etc., p. 128, pl. 4, fig. 10 (cum syn.).

Remark: Calcareous loose test; plectogyroid and planispiral chambers of the Endothyra-stage are arranged in 2–3 whorls. Rectilinear stage, 5–8 chambers. Aperture terminal, simple.

Dimensions: diameter of initial stage 0,20–0,25 mm, width of uniserial stage 0,13–0,15 mm, height 0,50–0,70 mm.

Stratigraphical and geographical range: Upper Anisian-Ladinian of the Dinarides; Anisian, Carnian-Norian of the West Carpathians.

Endothyranella robusta SALAJ, 1978

Pl. XLI, fig. 1, 2; Pl. XLII, fig. 1; Pl. XLIII, fig. 1; Pl. XLVI, fig. 2–4

1978 *Endothyranella robusta* nov. sp. – J. SALAJ: Contribution à la microbiostratigraphie du Trias etc., p. 110, Pl. 3, fig. 1.

Remark: Loose test. The Endothyra-stage consists of a plectogyroid and a planispiral whorls. Each has 5–6 chambers. The uniserial part of the test is rectilinear, composed of 5–6 broader chambers. The test wall is thick, calcareous, granular, considerably recrystallized. The aperture is simple, circular, terminal.

Dimensions: diameter stage 0,35–0,40 mm, width of uniserial stage 0,40–0,50 mm, height 1,20–1,40 mm.

Stratigraphical and geographical range: the Middle Anisian *Meandrospira dinarica* zone of Muráň-plateau in organodetrital algal carcarenites and calcirudites, and the Carnian Tisovec limestones in the West Carpathians.

Endothyranella tricamerata SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967)

Pl. XL, fig. 5, Pl. XLI, fig. 3–4, Pl. XLV, fig. 4

1967 *Endothyranella tricamerata* SALAJ, nov. sp. – J. SALAJ – A. BIELY – J. BYSTRICKÝ: Trias-Foraminiferen etc., p. 121, pl. 1, fig. 9.

1976 *Endothyranella tricamerata* SALAJ – L. ZANINETTI: Les Foraminifères du Trias etc., p. 128, pl. 4, fig. 11 (cum syn.).

Remark: The Endothyra stage consists of 1–1 1/2 whorls, first plectogyroidal, later planispiral, and 3–5 rapidly enlarging chambers. The uniserial rectilinear stage consists of two chambers.

Dimensions: diameter of initial stage 0,40–0,45 mm, width of uniserial stage 0,35 mm, height 0,9–1,5 mm.

Stratigraphical and geographical range: the Anisian-Carnian of the West Carpathians and Dinarides.

Endothyranella wirtzi (KOEHN-ZANINETTI, 1969)

Pl. XLV, fig. 2, 3; Pl. XLVIII, fig. 1; Pl. LXI, fig. 1–4

1969 *Ammobaculites wirtzi*, n. sp. – L. KOEHN-ZANINETTI: Les Foraminifères du Trias de la région de l'almtal etc., p. 36–38, fig. 5 A–D, F–K.

1976 *Endothyranella wirtzi* (KOEHN-ZANINETTI 1968) – L. ZANINETTI: Les Foraminifères du Trias etc., p. 129, pl. 4, fig. 2–4; pl. 8, fig. 26–30 (cum syn.).

1976 *Endothyranella wirtzi* (KOEHN-ZANINETTI) – M. MIŠÍK – K. BORZA: Obere Trias bei Silická Brezová etc., pl. 15, fig. 9.

Remark: The species is characterized by the uniserial stage on the last 2–3 chambers, a terminal aperture with a collar. In this it differs from other representatives of the genus *Endothyranella* and from the morphologically resemblant species *Endothyranella pentacamerata* SALAJ.

–Dimensions: diameter of initial stage 0,18–0,22 mm, width of uniserial stage 0,13–0,15 mm, height 0,50–0,65 mm.

Stratigraphical and geographical range: the Middle-Upper Anisian of the Alpine region, of the Carpathians, Dinarides and the Balkan, scarcely the Ladinian of the West Carpathians. Ladinian forms (Pl. XLVIII, Fig. 1) distinctly differ from Anisian forms in the several-whorls plectogyroid stage as well as in different morphology of chambers of the uniserial stage. There is probably a new subspecies of the species *Endothyranella wirtzi* (KOEHN-ZANINETTI).

PARAENDOTHYRA CHERNYSHEVA, 1940

***Paraendothyra* cf. *nalivkini* CHERNYSHEVA, 1940**

Pl. XLVIII, fig. 3

1940 *Paraendothyra nalivkini* n. sp. – N. E. CHERNYSHEVA: K stratigrafii nizhnego Karbona etc., p. 129, 134, fide, in: D. M. RAUSER-CHERNOUSOVA–A. V. FURSENKO 1959: Osnovy paleontologii, p. 194, text-fig. 160–162.

Remark: The axial section of the recrystallized Carpathian specimen shows its greatest affinity to the species *Paraendothyra nalivkini* CHERNYSHEVA, 1940.

Dimensions: diameter 0,25–0,30 mm.

Stratigraphical and geographical range: the Carboniferous of the Uralian region, sporadically the Trias, isolated find in the Norian of the West Carpathians.

RECTOSEPTAGLOMOSPIRANELLA REITLINGER, 1961

***Rectoseptaglomospiranella memmii* SALAJ, 1978**

Pl. XLVI, fig. 3

1978 *Rectoseptaglomospiranella memmii* n. sp. – J. SALAJ: Contribution à la microbiostratigraphie du Trias etc., p. 110, pl. 4, fig. 4.

Remark: Calcareous, granular, loose test. A part of coiling consists of a plectogyroid and a planispiral whorls each with 5–6 chambers. The uniserial and rectilinear part consists of large, short chambers, divided by septa and connected with a simple, circular, terminal aperture.

Dimensions: diameter of initial stage 0,15 mm; width of uniserial stage 0,14–0,15 mm; height 0,5–0,6 mm.

Stratigraphical and geographical range: the Upper Anisian zone *Pilammina densa* in the West Carpathians.

Haplophragmellinae REITLINGER, 1959

HAPLOPHRAGMELLA RAUSER-CHERNOUSOVA et REITLINGER, 1936 (in RAUSER-CHERNOUSOVA, BELYAEV et REITLINGER, 1936)

***Haplophragmella* aff. *irregularis* (RAUSER-CHERNOUSOVA, 1948)**

Pl. XLVIII, fig. 2

1948 *Endothyrina? irregularis* RAUSER-CHERNOUSOVA; fide A. R. LOEBLICH, JR et H. TAPPAN, 1964: Treatise, etc., p. C 351, fig. 264–2, 3.

Remark: The initial coiled part like with genus *Endothyra* – is recrystallized. The uniserial, rectilinear part consists of 5 chambers. Perforation after cribrate apertures.

Dimensions: width 0,4–0,8 mm, height 1,3–1,4 mm.

Stratigraphical and geographical range: the Visean of the Russian Platform, Trias of the West Carpathians for the first time, and isolatedly the Norian.

HAPLOPHRAGMINA REITLINGER, 1950

***Haplophragmina* aff. *kashirica* REITLINGER, 1950**

Pl. XLVIII, fig. 5

1959 *Haplophragmina* aff. *kashirica* REITLINGER, 1950 (in: RAUSER-CHERNOUSOVA et A. V. FURSENKO, 1959: Osnovy Paleontologii, p. 185, rext-fig. 177).

Remark: The initial Endothyra-stage is recrystallized. The uniserial, rectilinear stage consists of 4 chambers. Indications of cribrate apertures are on the 2nd and 3rd chambers.

Dimensions: width 0,55–0,60 mm, height 1,5–1,6 mm.

Stratigraphical and geographical range: the Moscowian (U.S.S.R.) the Norian of the West Carpathians.

KLUBOVELLA LEBEDEVA, 1956

***Klubovella* cf. *konensis* LEBEDEVA, 1956**

Pl. XLVIII, fig. 6

1956 *Klubovella konensis* n. sp. – N. S. LEBEDEVA: Foraminifery etrehskikh otlozheniy Tengizskoy vpadiny, p. 52; fide A. R. LOEBLICH JR et H. TAPPAN, 1964: Treatise, etc., p. C 352, fig. 264–8.

Remark: The initial plectogyroid part of the test is not included in the section. The next, non-coiled stage is biserial, with irregularly arranged chambers. The test wall is calcareous, granular. The original biserial test wall is not preserved because of recrystallization. The initial simple and the later (multiple) apertures are not included in the section.

Dimensions: width 0,50–0,60 mm, height 2,0 mm.

Stratigraphical and geographical range: the Lower Carboniferous of U.S.S.R., isolated find in the Norian of the West Carpathians.

***Endothyranopsinae* REITLINGER, 1958**

ENDOTHYRANOPSIS CUMMINGS, 1955

***Endothyranopsis* cf. *crassa* (BRADY; in MOORE, 1870)**

Pl. XLVIII, fig. 4, 7

1870 *Involutina crassa* BRADY in MOORE – CH. MOORE: Report on mineral weins in Carboniferous limestone etc., p. 379, 382; fide A. R. LOEBLICH, JR. – H. TAPPAN, 1964: Treatise etc., p. C 352, fig. 266–1,2.

Remark: The profiles of the Carpathian forms show greatest affinity to the species *Endothyranopsis* cf. *crassa* (BRADY; in MOORE, 1870, Fide Cataloge ELLIE et MESSINA, 1940).

Dimensions: diameter 0,95–0,10 mm.

Stratigraphical and geographical range: the Carboniferous of Wales, sporadical in the Carnian and Norian of the West Carpathians.

GLYPHOSTOMELLA CUSHMAN et WATERS, 1928

Glyphostomella aff. *triloculina* (CUSHMAN et WATERS, 1927)

Pl. XLVIII, fig. 8

1927 *Ammochilostema ? triloculina* CUSHMAN et WATERS – J. J. CUSHMAN–J. A. WATERS: Arenaceous Paleozoic Foraminifera from Texas, p. 53; fide A. R. LOEBLICH–H. TAPPAN, 1964: Treatise etc., p. C 353, fig. 270–1a, b, 2a, b.

Remark: The profile of the Carpathian specimen shows most common characters with the species *Glyphostomella triloculina* (CUSHMAN et WATERS).

Dimensions: diameter 0,20–0,22 mm.

Stratigraphical and geographical range: the Paleozoic of Texas; occasionally the Carnian Tisovec limestones of the West Carpathians.

Fischerinidae MILLET, 1898

Cyclogyrinae LOEBLICH et TAPPAN, 1961

AGATHAMMINA NEUMAYER, 1887

Agathammina austroalpina KRISTAN-TOLLMANN et TOLLMANN, 1964

Pl. VII, fig. 6–11, Pl. XLIX, fig. 1–16, Pl. L, fig. 1–6, Pl. CXXIII, 4e

1964 *Agathammina austroalpina* n. sp. – E. KRISTAN-TOLLMANN et A. TOLLMANN: Das mittelostalpine Rhät – Standart profil etc., p. 550–551, pl. 2, fig. 6–17, pl. 5, fig. 8–9.

1967 *Triloculina* sp. – S. PANTIĆ: Triassic microfossils etc., pl. 4, fig. 4.

1968 *Agathammina austroalpina* KRISTAN – A. ORAVECZNÉ-SCHEFFER: A Miliolacea föcsalád etc., p. 90–91, pl. 1, figs. 1–12; pl. č, figs. 11–14.

1972 *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN – D. UROŠEVIĆ et Z. RADOVANOVIĆ: Contribution à la connaissance etc., pl. 2, fig. 5.

1975 *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN – J. HOHENEGGER et W. PILLER: Ökologie und systematische Stellung etc., pl. 1, fig. 2.

1976 *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, 1964 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 131–132, pl. 5, fig. 1, 2, pl. 7, fig. 3–13 (cum syn.).

Remark: The quinqueloculine regular coiling of the tubular undivided deuteroloculum is a characteristic feature. The aperture – if visible – is simple, terminal. The test in cross-section is circular to oval, or triangular with markedly rounded corners, in longitudinal profile thin-elliptical. The test wall is calcareous, uniserial, imperforated, typically porcellaneous.

Dimensions: width 0,12–0,18 mm; height 0,23–0,30 mm.

Stratigraphical and geographical range: Original description from the Rhaetian of the Austrian Alps. Its stratigraphical range is Anisian-Rhaetian where it extinguished. It is a typical Tethyd species, known from the Alps (E. KRISTAN-TOLLMANN et A. TOLLMANN, 1964; L. ZANINETTI, 1976), from the Carpathians (J. SALAJ, A. BIELY et J. BYSTRICKÝ, 1967, A. ORAVECZNÉ-SHEFFER, 1968, O. JENDREJÁKOVÁ, 1973, A. GAZDZICKI et K. ZAWIDZKA, 1973), the Balkan (E. TRIFONOVA, 1972 b), the Dinarides (S. PANTIĆ, 1967, D. UROSEVIĆ et Z. RADOVANOVIĆ, 1972), Taurus, Iran and Burma (L. ZANINETTI, 1976). The species is

Fig. 17 Determination key for distinguishing individual genera and species of the family Fischerinidae according to J. Salaj 1979, modified

Genus	Species	Proloculus	Form	Deuteroloculus	Whorls	Shape of deuterolocum and its type of coiling in relation to axis of coiling	Type of whorl coiling and number of "chambers" in the last spiral whorl or number of whorls in the planispiral type of coiling
Meandrospira Loeblich et Tappan, 1946	*cheni* (Ho, 1959)	small	form A and B	without second stage of coiling	2—2,5 whorls	subcircular, rapidly enlarging, perpendicular coiling	wide whorls, in the last 6—8 "chambers"
	pusilla (Ho, 1959)				2,5—3,5 whorls	circular, slowly enlarging, perpendicular coiling	narrow whorls, in the last 8—10 "chambers"
	insolita (Ho, 1959)					oval shape as a consequence of oblique arrangement, of slowly enlarging deuterolocus to the axis of coiling	narrow, slowly enlarging whorls, in the last 4—7 "chambers"
	dinarica (Kochansky-Devidé et Pantić, 1966)				3,5—5,5 whorls		narrow whorls, in the last 7—10 "chambers"
	deformata (Salaj, in: Salaj, Biely et Bystrický, 1967		form B (macrospherical) unknown		1/2—1,5 whorls mostly irregularly coiled to uncoiled	irregulas shapes as a consequence of irregular coiling	1 narrow whorls, other irregular
Meandrospiranella Salaj, 1967 emend. Salaj, 1969	*samueli* Salaj, in: Salaj, Biely et Bystrický, 1967		form A (microspherical) unknown	rectilinear	spiral stage with 3,5—4,5 whorls and excentric unipolar coiling (4 series)	oval shape as a consequence of deuterolocus obliquely arranged to the coiling axis and gradually enlarging	spiral stage tight, 6—8 rectilinear "chambers" — 4 series with 1—2 "chambers"
	sp. nov. (Kochansky-Devidé et Pantić, 1966)				spiral stage of 4—5 whorls and excentric regular bipolar coiling (2 series)		last whorl of spiral coiling as well as bipolar excentric coiling are irregular
	irregularis Salaj, in: Salaj, Biely et Bystrický, 1967		form B unknown		spiral stage of 1/2—1 whorl and excentric irregular unipolar coiling	irregular shapes as a consequence of irregular coiling	spiral and rectilinear coilings are irregular
Meandrospirella Oraveczné-Scheffer, 1968, emend.	*karnica* (Oraveczné-Scheffer, 1968)	large	form A unknown	planispiral	spiral stage of 1,5—2,5 whorls, planispiral stage of 1 whorl	subcircular, slowly enlarging, perpendicular, then planispiral coiling	1 wide spiral whorl (4—7 "chambers") and 1 planispiral whorl
	planispira Oraveczné-Scheffer, 1968				spiral stage of 1,5—2,5 whorls, planispiral stage of 2—3 whorls	oval, slowly enlarging perpendicular, then planispiral coiling	wide whorls in spiral coiling 6—8 "chambers" in planispiral 2—3 whorls
Bispiranella Samuel, Salaj et Borza, 1981	*ovata* Samuel, Salaj et Borza, 1981	large	form A and B	first planispiral, then perpendicular	first whorl planispiral other ones regularly alternating	subspherical, slowly enlarging and coiled in two planes more or less perpendicular to each other	planispiral whorls are circular, perpendicular whorls are oval and with keel
	subcarinata Samuel, Salaj et Borza, 1981				both types of coiling are alternating more or less regularly		planispiral whorls are circular, perpendicular whorls are oval and without keel

mostly associated with meso- to infralittoral environment, usually with Ammodiscidae and Trochamminidae. It is not associated with the reef facies, so it does not occur in the assemblage with the representatives of the family Involutinidae, only in scarce cases.

Agathammina parafusiformis n. sp.

Pl. L, fig. 7–12

Type species: in Pl. L, fig. 8; in the depository of the Geological Institute of the Slovak Academy of Science in Bratislava, thin section No. Bo. 6380.

Denomination: After lat. fusiformis = spindle-shaped.

Type level: The Furmanec limestone; Norian.

Type locality: W of Tisovec, B. M. 878,5 m.

Material: About 25 specimens in thin sections.

Description: The test is costate, oval in section, lobate, with a spherical proloculus, followed by a deuteroloculum coiled in 2–3 whorls, unsegmented. The section shows five "chambers" in each whorl (the quinqueloculinoid type of structure). The section perpendicular to the coiling axis shows that chambers of the deuteroloculum are semi-arcuate, with ribs in their apical part. The test wall is calcareous, imperforate, strongly recrystallized. The aperture was simple, terminal.

Dimensions: diameter 0,18–0,52 mm.

Stratigraphical and geographical range: The Norian Furmanec limestones and the Lower Rhaetian Dachstein limestones of the Slovak Karst and Muráň plateau.

Agathammina judicariensis PREMOLI SILVA, 1971

Fig. 16

1971 *Agathammina judicariensis* sp. n. – I. PREMOLI SILVA: Foraminiferi Anisici della regione Giudicariense (Trento), p. 343–344, pl. 29, fig. 1, 3, 5, 6.

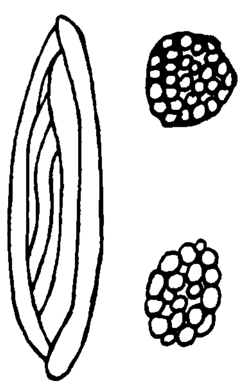


Fig. 16 *Agathammina judicariensies* PREMOLI SILVA, 19

Remark: Carpathian specimens are identic in morphology and description with the specimens described from the zone *Paraceratites binodosus* as *Agathammina judicariensis* PREMOLI SILVA.

Dimensions:
Diameter 0,10–0,13 m,
length 0,40–0,42 mm.

Stratigraphical and geographical range: The Anisian of the Italian Alps and the Balkan (E. TRIFONOVA in L. ZANINETTI 1976); the Upper Anisian Reifling limestones of the Čachtické and Brezovské Karpaty Mts. in the West Carpathians (A. BEGAN, J. HANÁČEK, J. MELLO, J. SALAJ 1982).

Agathammina multispira n. sp.

Pl. L, fig. 13–15

Type species: The specimen in Pl. L, fig. 15; in the depository of the Geological Institute of the Slovak Academy of Science in Bratislava, thin section no. Bo. 5.904.

Denomination: after lat. multispira = multispiral.

Type level: The Dachstein limestone, Uppermost Norian to Lower Rhaetian.

Type locality: Hybe.

Material: about 10 specimens in thin sections.

Description: The test is spherical in the axial section, oval in the longitudinal. A spherical small proloculus is followed in section by a spherical narrow deuteroloculum. In the axial (bevelled) section the deuteroloculum forms 3–4 tightly coiled whorls with five "chambers" in each. In the longitudinal section the test length looks greater than its thickness. The test wall is calcareous, imperforate, strongly recrystallized. It is likely that the aperture was simple, terminal.

Dimensions: diameter 0,12 mm, length 0,20–0,22 mm.

Stratigraphical and geographical range: The Uppermost Norian-Lower Rhaetian Dachstein limestone facies of the Nízke Tatry Mts.

MEANDROSPIRA LOEBLICH et TAPPAN, 1946

Meandrospira deformata SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967)

Pl. LIII, fig. 1–4; Pl. LIV, fig. 1–6

1967 *Meandrospira deformata* SALAJ n. sp. – J. SALAJ, A. BIELY et BYSTRICKÝ: Die Foraminiferen in der Trias etc., p. 122, pl. 2, fig. 3a–d.

1975 *Meandrospira? deformata* SALAJ, 1967 – A. GAZDZICKI, J. TRAMMER et K. ZAWIDZKA: Foraminifers from the Muschelkalk etc., p. 290, pl. 7, fig. 9–16 (cum syn.).

1978 *Meandrospira deformata* SALAJ – J. SALAJ et M. POLÁK: *Meandrospira deformata* SALAJ as change indicator a. o., p. 213–215 pl. 1, fig. 1–9, po. 2, fig. 1–6

Remark: The regular meandrospiral stage of deuteroloculum is very small, almost completely reduced. It is a characteristic feature of the species. This stage is followed by a very irregularly coiled meandrospiral stage of deuteroloculum.

Dimensions: diameter 0,25–0,55 mm.

Stratigraphical and geographical range: West Carpathians – Gutenstein limestones, Lower-Middle Anisian of the mantle unit and the Krížna unit, scarce in the area of Drienok belonging to higher Subtatran nappes. It is absent in a normal saline environment associated with platform shallow-water algal limestones, and in deep-sea sediments. *Meandrospira deformata* SALAJ is also known from the Lower-Middle Anisian Gogolian beds of the German Trias in the Opole Silesia (South Poland). There it is indicative of higher salinity too (A. GAŹDZICKI, J. TRAMMER et K. ZAWIDZKA, 1975). It is also known from Yugoslavia (J. DIMITRIJEVIĆ, S. PANTIĆ, R. RADOIČIĆ et D. STEFANOVSKA, 1968, S. PANTIĆ 1970, D. UROŠEVIĆ 1971), Bulgaria (E. TRIFONOVA 1972a, b, 1978b, 1979) and from Switzerland (Les Préalpes Médianes Rigides, cf. A. BAUD, L. ZANINETTI et P. BROENNIMANN 1972).

In hypersaline environment, in an assemblage of foraminifers the species occurs together with *Glomospirella* and *Nodosinella*, so A. GAŹDZICKI, J. TRAMMER et K. ZAWIDZKA (1975) distinguished a new zone *Meandrospira ? deformata* in Muschelkalk of the German Trias. The lower and upper boundaries are defined by the species *Meandrospira deformata* and *Pilammina densa*. The zone is equivalent to the zones *Meandrospira insolita* and *Meandrospi-*

ra dinarica of the West Carpathians (J. SALAJ 1969a), indicative of the depositional environment with normal salinity in the area of the Alpine Trias of the West Carpathians. During the deposition of the Gutenstein limestones several layers with gypsum, anhydrite and plentiful species *Meandrospira deformata* (J. SALAJ et M. POLÁK 1978) formed in the Lower and Middle Anisian.

Meandrospira dinarica KOCHANSKY-DEVIDÉ et PANTIĆ, 1966

Pl. XLVII, fig. 4, Pl. LI, fig. 1–8, Pl. LII, fig. 1–8

1966 *Meandrospira dinarica* n. sp. – V. KOCHANSKY-DEVIDÉ et S. PANTIĆ: *Meandrospira* u donjem i srednjem triasu etc., p. 21, 26, Taf. III, fig. 9–11, Taf. IV, fig. 1–3, 6–9 (non fig. 4–5 ≐ *Meandrospira insolita*; fig. 10 = *Meandrospiranella samueli*).

1976 *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ 1966 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 133–135, pl. 1, fig. 12–14 (cum syn.).

Remark: A significant, well defined, Middle-Upper Anisian species, associated mostly with Triassic dasycladacean limestones.

Dimensions: diameter 0,34–0,6 mm.

Stratigraphical and geographical range: the species was described for the first time from the Anisian of the Dinarides. It is frequent in the West Carpathians. There in the Middle Anisian the partial-range zone *Meandrospira dinarica* (J. SALAJ 1969a) was distinguished. The species *Meandrospira dinarica* KOCHANOVSKY-DEVIDÉ et PANTIĆ passes also into the Upper Anisian. Besides the Anisian of the Carpathian-Balkan region it was also described from the Hellenides and from Muschelkalk of Low Silesia in Poland (cf. J. GIAZEK, J. TRAMMER et K. ZAWIDZKA 1973). In Asia it was found in Caucasus, Taurus (Turkey) and in Iran (L. ZANINETTI 1976).

Meandrospira cheni (HO, 1959) emend.

Pl. LVI, fig. 1–19

1959 *Trochamminoides cheni* Ho sp. nov. – Y. HO: Triassic foraminifera from the Chialingchiang limestone etc., p. 416, pl. VIII, fig. 16–19.

1959 *Trochamminoides flosculiformis* Ho sp. nov. – Y. HO: Triassic foraminifera etc., p. 416, pl. VIII, fig. 8, 10 (non fig. 6, 7, 9; = *Meandrospira pusilla*).

1959 *Trochamminoides pusillus* Ho sp. nov. – Y. HO: Triassic foraminifera etc., p. 416, pl. VIII, fig. 1, 2.

1964 *Citaella iulia* n. gen., n. sp. – I. PREMOLI SILVA: Citaella iulia n. gen., n. sp. etc., p. 658–663, tab. XLVIII, fig. 1–4, 6–7, 10–12, 14–21 (non fig. 5, 6–9, 13 = *Meandrospira pusilla*), tab. XLIX, fig. 1–20, tab. L, figl 2–6, 7 (pro partim) (non fig. 1, 7 – pro partim = *Meandrospira pusilla*).

1966 *Meandrospira iulia* (PREMOLI SILVA) – V. KOCHANSKY-DEVIDÉ et PANTIĆ. *Meandrospira* u donjem i srednjem triasu etc., p. 20, 25–26. tab. II, fig. 1–7, 10–13, 14 (pro partim), 15 (non fig. 8, 9, 14 (pro partim; = *Meandrospira pusilla*).

1967 *Meandrospira iulia* (PREMOLI SILVA) – J. SALAJ, A. BIELY et J. BYSTRICKÝ: Die Foraminiferen in der Trias etc., pl. 1, fig. 1.

1969 *Meandrospira iulia* (PREMOLI SILVA) – J. SALAJ: Quelques remarques etc., p. 6, pl. 1, fig. 1–2.

1973 *Meandrospira pusilla* (HO) – P. BROENNIMANN, L. ZANINETTI, A. MOSHTAGHIAN et H. HUBER: Foraminifera from the Sorkh shale formation etc., p. 16–17, tab. 4, fig. 1–4, 8–10. 12, 16–17 (non fig. 5–7, 11, 13–15 = M. pusilla).

1974 *Meandrospira pusilla* (HO) – A. BAUD, P. BROENNIMANN et L. ZANINETTI: Sur la présence de *Meandrospira pusilla* (HO) etc., p. 205–210, pl. 30, fig. 1–3, 7.

1975 *Meandrospira iulia* (PREMOLI SILVA) – E. TRIFONOVA et G. ČATALOV: Mikrofaciesi v triaskite karbonatni skali etc., p. 15, pl. 1, fig. 4–5.

Remark: Macrospherical (cf. type species, in Y. HO, 1959; pl. VIII, fig. 16), microspherical (cf. Y. HO 1959, Pl. VIII, fig. 7).

Proloculum passes into deuteroloculum forming distinct meanders arranged in 2–2 1/2 whorls perpendicular to the coiling plane. Deuteroloculum slowly widens and "chambers" in equatorial profile enlarge. In the second, broader whorl are 7–9 chambers larger than those in the first whorl (Fig. 17).

The original description shows that this species is identic with *Citaella iulia* PREMOLI SILVA. But I. PREMOLI SILVA (1964) regards the species *Trochamminoides cheni* HO, *Trochamminoides flosculiformis* HO, *Trochamminoides pusillus* HO, and *Trochamminoides insolitus* as synonyms to the newly defined species and the species described.

V. KOCHANSKY-DEVIDÉ et S. PANTIĆ (1966) were right in ranging these species to the genus *Meandrospira* LOEBLICH et TAPPAN 1946. Later on J. SALAJ, A. BIELY et J. BYSTRICKÝ 1966, 1967) did the same. Besides *Meandrospira iulia* (PREMOLI SILVA) they regarded also *Meandrospira insolita* (HO) and *Meandrospira pusilla* (HO) as independent taxa. Later on J. SALAJ (1969c, p. 6) pointed out to the possibility that the species "*Trochamminoides*" *cheni* HO and "*Trochamminoides*" *flosculiformis* HO may be identic with *Meandrospira iulia* (PREMOLI SILVA). In such case the latter taxon must be the synonym of either the first or the second species. Basing on further studies, J. SALAJ (1978) ranged the species *Meandrospira iulia* (PREMOLI SILVA) to synonymy of the species *Meandrospira cheni* (HO). It was selected as holotype because it was better defined, and so the species *Meandrospira flosculiformis* (HO) became its synonym.

The description and depiction show that the type species *Meandrospira flosculiformis* (HO) represents the macrospheric form of the species *Meandrospira pusilla* (HO). Since the species *Meandrospira insolita* (HO) and *Meandrospira pusilla* (HO) have 3–3 1/2 whorls, they are not regarded as synonyms to the species *Meandrospira cheni* (HO).

Only some depicted forms belonging (including holotype) to the species *Meandrospira iulia* (PREMOLI SILVA) are synonyms to the species *Meandrospira pusilla* (HO). In contrast to this P. BROENNIMANN, L. ZANINETTI, A. MOSHTAGHIAN et H. HUBER (1973, p. 16–17) regard all depicted forms of the species *Citaella iulia* PREMOLI-SILVA and all originally described, depicted forms of *Trochamminoides flosculiformis* HO, *T. cheni* HO and *T. insolitus* HO as synonyms of the species *Meandrospira pusilla* (HO).

Dimensions: diameter 0,12–0,17 mm.

Stratigraphical and geographical range: The Middle Trias of China, the Lower Trias of Italian, Austrian, and Bavarian Alps (PREMOLI SILVA, 1964, 1971); Yugoslavian Dinarides (V. KOCHANSKY-DEVIDÉ et S. PANTIĆ 1966), Slovak West Carpathians (J. SALAJ, A. BIELY et J. BYSTRICKÝ 1967), Iran (L. ZANINETTI, P. BROENNIMANN, P. BOZORGNIA et H. HUBER, 1972; A. BAUD, P. BROENNIMANN et L. ZANINETTI 1974); Bulgarian Balkan (E. TRIFONOVA et G. ČATALOV, 1975), Hellenides, of Pakistan and Causasus (L. ZANINETTI, 1976) and from the East Tunisian Platform (Extrême-Sud Tunisien; J. SALAJ 1969c).

Meandrospira cheni (HO) and *M. pusilla* (HO) are good indicators of detrital coastal facies, of meso-to infralittoral environment of carbonate basement in the time of Upper Scythian-basal Anisian. As a rule, *M. cheni* (HO) is accompanied by the species *Arenovidalina chialingchiangensis* HO. The two species are index forms of the zone *Meandrospira cheni – Arenovidalina chialingchiangensis* defined for the Lower Trias by H. BISMUTH, J. BONNEFOUS, J. M. MASSIN et J. SALAJ (in J. SALAJ 1978). The zone is a modification of the original zone *Meandrospira iulia* defined in the Slovak West Carpathians (SALAJ, 1969a) and of the zone *Hemigordius chialingchiangensis* (defined by P. M. JOVTCHEV et E. TRIFONOVA 1965 in Bulgaria).

Meandrospira insolita (HO, 1959) emend.

Pl. LIV, fig. 7–9, Pl. LV, fig. 19b

1959 *Trochamminoides insolitus* Ho sp. nov. – Y. Ho: Triassic foraminifera from the Chialingchiang limestone etc., p. 416–417, pl. VIII, figs. 11–13 (non fig. 14–15 = *Meandrospira pusilla*).

1967 *Meandrospira insolita* (Ho) – J. SALAJ, A. BIELY et J. BYSTRICKÝ: Trias Foraminiferen etc., p. 130, Tab. 1 (non fig.).

1969 *Meandrospira insolita* (Ho) – J. SALAJ: Essai de zonations dans le Trias etc., p. 123, 125, pl. 1, fig. 2 pro partim (in association with *Meandrospira pusilla* in the centre of the figure).

1972 *Meandrospira insolita* (Ho) – E. TRIFONOVA: Triassic Foraminifera in North-Bulgaria, p. 502, p. 505, p. 507, pl. II, fig. 1.

Remark: The micro-or macrospherical proloculum is followed by slowly enlarging deuteroloculum with meanders diagonal to the coiling plane. So the sections of deuteroloculum look as elongated "chambers" in the coiling plane. They are arranged in 3–3 1/2 tight whorls (Fig. 17).

Dimensions: diameter 0,24–0,3 mm.

Stratigraphical and geographical range: *Meandrospira insolita* (HO) belongs among index species of the Lower-Middle Anisian of meso- to infralittoral environment of the carbonate basement rich in dasycladaceans. The species occurs in the Slovak West Carpathians and in the Balkan (E. TRIFONOVA 1972a, b).

Meandrospira pusilla (HO, 1959) emend.

Pl. LV, fig. 1–18, 19a

1959 *Trochamminoides pusillus* Ho nov. sp. – Y. Ho: Triassic foraminifera etc., p. 416, pl. VII, figs. 18–19 (non pl. VIII, fig. 1, 3–5 = *Meandrospira cheni*, fig. 2 = *Meandrospira insolita*).

1959 *Trochamminoides flosculiformis* Ho nov. sp. – Y. Ho: Ibidem, pl. VIII, fig. 6, 7, 9 (non. pl. VIII, fig. 8–10 = *Meandrospira cheni*).

1959 *Trochamminoides insolitus* Ho nov. sp. – Y. Ho: Ibidem, pl. VIII, figs. 13–15 (non figs. 11–12 = *Meandrospira insolita*).

1964 *Citaella iulia* n. gen., nov. sp. – I. PREMOLI SILVA: *Citaella iulia* n. gen., n. sp. etc., p. 658–633, tab. XLVIII, fig. 5, 8–9, 13 (non fig. 1–4, 6–7, 10–12, 14–21 = *Meandrospira cheni*), tab. L, fig. 1 (pro partim) non fig. 2–6, 7 – pro partim = *Meandrospira cheni*).

1966 *Meandrospira iulia* (PREMOLI SILVA) – V. KOCHANSKY-DEVIDÉ et S. PANTIĆ: *Meandrospira* u donjem i srednjem triasu etc., p. 20, 25–26, tab. III, fig. 8, 9, 14 (pro partim), (non fig. 1–7, 10–13, 14 (pro partim), 15 = *Meandrospira cheni*).

1973 *Meandrospira pusilla* (Ho) – P. BROENNIMANN, L. ZANINETTI, A. MOSHTAGHIAN et H. HUBER: Foraminifera from the Sorkh shale formation etc., p. 16–17, tab. 4, fig. 5–7, 11, 13, 15 (non fig. 1–4, 8, 10, 12, 16–17 = *Meandrospira cheni*).

Remark: The microsferical (= holotype of the species *M. pusilla*) and macrosferical (= holotype of the species *M. flosculiformis*) proloculum pass into deuteroloculum forming meanders (in 3–3(1/2 whorls). Except the last (1–3) meanders they are perpendicular to the coiling plane. The last meanders of the last whorl are diagonal to the coiling plane and so the last 2–3 sections of deuteroloculum form elongated pseudochambers. The diameter of deuterololoculum is small and the "chambers" are small, tight. In the last whorl are 8–10 "chambers".

Dimensions: diameter 0,12–0,18 mm.

Stratigraphical and geographical range: The species was described from the Middle Trias of China. It is in the upper part of the Lower Triassic zone *Meandrospira cheni* – *Arenovidalina chialingchiangensis*, in the Lower Anisian of the Alpine-Carpathian-Balkan region, in the Dinarides and Hellenides. In Asia it was found in Turkey, Iran, Pakistan, Caucasus (L. ZANINETTI 1976). Like *Meandrospira cheni* (HO) also *Meandrospira pusilla* (HO) is a good indicator of coastal detrital facies of the Lower Trias and of the meso- to infralittoral environment with organodetrital dasycladacean limestones of the Lower Anisian.

MEANDROSPIRANELLA SALAJ, 1967 (in: J. SALAJ, A. BIELY et J. BYSTRICKÝ (1967) EMEND. SALAJ, 1969

Meandrospiranella irregularis SALAJ, 1967 (in J. SALAJ, A. BIELY et BYSTRICKÝ, 1967), Tab.-fig. 5, fig. 5.

1967 *Meandrospiranella irregularis* SALAJ, nov. sp. – J. SALAJ, A. BIELY et J. BYSTRICKÝ: Die Foraminiferen in der Trias etc., p. 123, Taf. 3, Fig. 4.
1971 *Meandrospiranella irregularis* SALAJ 1967 – D. UROSEVIC: A survey of Triassic fauna etc., p. 96.
1975 *Meandrospiranella irregularis* SALAJ 1967 – A. GAZDŻICKI, J. TRAMMER et K. ZAWIDZKA: Foraminifers from the Muschelkalk etc., p. 287, 290, pl. 7, fig. 8.

Remark: Meandrospiral stage of deuteroloculum consists of 2–3/5 whorls. Rectilinear stage of deuteroloculum is folded out and the meanders are very irregular.

Dimensions: width 0,35 mm, height 0,65 mm.

Stratigraphical and geographical range: the species *Meandrospiranella irregularis* described from the Anisian of the West Carpathians (J. SALAJ, A. BIELY et J. BYSTRICKÝ 1967; O. JENDREJÁKOVÁ 1973). It occurs in an analogical position in the Dinarides (D. UROŚEVIĆ 1977) and Muschelkalk of South Poland (A. GAŹDZICKI, J. TRAMMER et K. ZAWIDZKA 1975). It is known from a normal hypersaline environment).

Meandrospiranella samueli SALAJ, 1967 (in SALAJ, BIELY et BYSTRICKÝ, 1967) Pl. LVII, fig. 1–5

1967 *Meandrospiranella samuelli* SALAJ, nov. sp. – J. SALAJ, A. BIELY et J. BYSTRICKY: Trias-Foraminiferen in den Westkarpaten, p. 122–123, Taf. 1, fig. 1.
1969 *Meandrospiranella samueli* SALAJ – J. SALAJ: *Meandrospiranella nov. gen. A new Mid-Triassic Foraminifer etc., p. 1294–1295.*
1972 *Meandrospiranella samueli* SALAJ, BIELY et BYSTRICKÝ, 1967 – L. ZANINETTI, P. BROENNIMANN et A. BAUD: Microfacies particuliers et foraminifères nouveaux de l'Anisien supérieur etc., p. 479, pl. VII, fig. 8; pl. X, fig. 13–15.

Remark: Diagnosis of the species is identic with the original description. It is one of stratigraphically significant species of the Middle and Upper Anisian of the Inner Carpathians. It developed from the species *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ (cf. SALAJ 1969b, L. ZANINETTI 1976) from which it differs in a folded out, more-or-less rectilinear stage. Polygenetic relations between the species inspired L. ZANINETTI, P. BROENNIMANN et A. BAUD (1972) to distinguishing the Anisian zone *Meandrospira samueli* (Les Préalpes Médianes Rigides) which seems coeval with the older zone *Meandrospira dinarica*. It is evident that the lower limit of the appearance of the species *Meandrospiranella samueli* SALAJ is higher than that of its ancestral form *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ. Both species pass as far as the successive zone *Pillamina densa* (= GLOMOSPIRA DENSA; cf. L. ZANINETTI, P. BROENNIMANN et A. BAUD, 1972) to extinguish there.

Dimensions: width 0,4–0,5 mm, height 0,55–0,95 mm.

Stratigraphical and geographical range: *Meandrospiranella samueli* SALAJ is characteristic of Anisian platform limestone with Dasycladacea (cf. L. ZANINETTI, 1976). The type species was described from the Anisian limestones with *Physoporella pauciforata* PIA (J. SALAJ, A. BIELY et J. BYSTRICKÝ, 1967) from the area of Krásnohorská Dlhá Lúka (Silica plateau) and Drienok.

MEANDROSPIRELLA ORAVECZNÉ-SCHEFFER 1968, EMEND. SALAJ, 1979

Type species: *Meandrospirella planispira* ORAVECZNÉ-SCHEFFER, 1968 (reillustrated from publication by ORAVECZNÉ-SCHEFFER, 1968; text-fig. 8, fig. 11).

Diagnosis: Agglutinated, two-chamber test. Big proloculus (Form B); oval to subcircular deuteroloculus, first meandrospirally coiled (1,5–2,5 whorls), then planispirally coiled with 1–3 whorls.

Meandrospirella carnica (ORAVECZNÉ-SCHEFFER, 1968)

Fig. 18

1968 *Meandrospira carnica* n. sp. – A. ORAVECZNÉ-SCHEFFER: A Miliolacea föcsalád (Foraminifera) etc., p. 92, tab. 2, fig. 6–12.

1976 *Meandrospira* cf. *carnica* ORAVECZNÉ-SCHEFFER – M. MIŠIK et K. BORZA: Obere Trias bei Silická Brezová (Westkarpaten), Taf. VII, fig. 8 (non fig. 6, 7 = *Pilamminella kuthani*).

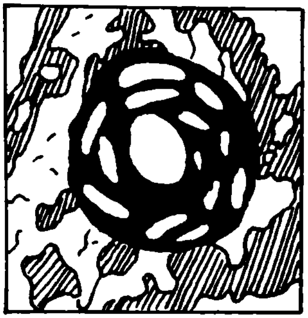


Fig. 18 *Meandrospirella carnica* (ORAVECZNÉ-SCHEFFER, 1968)

Remark: The Carpathian forms are identic with the original description of the type species.

Dimensions: diameter 0,23 mm.

Stratigraphical and geographical range: the Carnian of the Bakony Mts. (*Meandrospira carnica*, borehole Bakonyszücs-1, 1036, 6–1040,5 m), the Carnian of the West Carpathians [in assemblage, with *Pilaminella kuthani* (SALAJ); Silická planina plateau; Silická Brezová].

BISPIRANELLA SAMUEL et BORZA, 1981

Type species: *Bispiranella subcarinata* SAMUEL, SALAJ et BORZA, 1981.

Description: Test free, ovate to fussiform in outline, gently concave in middle parts of both sides. Coiled in two repeated planes, the equatorial and the perpendicular. The periphery of the test is oval or subangular. The wall is calcareous, imperforate. Aperture most probably circular, at the end of deuteroloculum.

Remark: From the phylogenetic standpoint the genus *Bispiranella* displays a great affinity with the species *Meandrospirella planispira* ORAVECZNÉ-SCHEFFER, 1968. The mentioned species is developed in two planes perpendicular to each other. Probably it represents an ancestral form of the genus *Bispiranella*.

Bispiranella subcarinata SAMUEL, SALAJ et BORZA, 1981

Pl. LVIII, fig. 1–3

1981 *Bispiranella subcarinata* nov. sp. – O. SAMUEL, J. SALAJ et K. BORZA: *Bispiranella* nov. gen. (Foraminifera) from Upper Triassic etc., p. 88–89, Pl. 31, Fig. 1–3.

Description: Test free, bicameral. The first chamber (proloculum) is large, subspherical;

passing into the second chamber-tabular, slightly widening (deuteroloculum). The test ist coiled in two several times repeating planes. Initial whorls are planispiral, the next whorl is perpendicular or diagonal to the preceding plane. Other whorls are coiled more or less in the same way as the first 2–3 whorls. The test outline is oval to fusiform; gently concave in the middle. Periphery is oval to subangular. The test is calcareus, imperforate. Circular (most likely) apperture at the end of deuteroloculum.

Dimensions: length 0,4–0,6 mm; thickness 0,16–0,19 mm.

Stratigraphical and geographical range: *Bispiranella subcarinata* SAMUEL, SALAJ et BORZA was found in the Tisovec limestones of Carnian age together with *Bispiranella ovata* SAMUEL, SALAJ et BORZA.

Bispiranella ovata SAMUEL, SALAJ et BORZA, 1981

Pl. LVIII, fig. 4; Pl. LIX, fig. 1–4; Pl. LX, fig. 1–4

1981 *Bispiranella ovata* nov . sp. – O. SAMUEL, J. SALAJ et K. BORZA: *Bispiranella* nov. gen. (Foraminifera) from Upper Triassic etc., p. 89, P. 31, Fig. 4; Pl. 32, Fig. 1–4; Pl. 33, Fig. 1–2.

1981 *Galeanella? broennimanni* sp. n. – D. ALTINER et L. ZANINETTI: Le Trias dans la région de Pinarbasi etc., p. 730–732, Pl. 81, fig. 1–13.

1981 *Galeanella ovata* (SAMUEL, SALAJ et BORZA, 1981) – L. ZANINETTI et D. ALTINER: Les Galéanelles (Foraminifères) et formes apparentées dans le Trias etc., p. 42–43.

Description: Test free, bicameral. The proloculum is subspherical, the deuteroloculum is long, tubular. The test consists of 5–7 "glomospiral" whorls. The first is more-or-less planispiral, the next is dipping at 30–60° to the plane of the former whorls. The test outline is oval; its periphery is oval or subspherical. The test is calcareous, imperforate. The aperture is most probably circular at the end of the deuteroloculum.

Dimensions: length 0,55–0,7 mm; thickness 0,27–0,34 mm.

Stratigraphical and geographical distribution: This species was found in the Tisovec limestones of Carnian in the Muránska planina plateau, and from the Carnian of eastern Taurus, Turkey (D. ALTINER–L. ZANINETTI 1981).

Calcivertellinae LOEBLICH et TAPPAN, 1964

CALCITORNELLA CUSHMAN et WATERS, 1928

Calcitornella elongata CUSHMANN et WATERS, 1928

Pl. CXLII, fig. 1

1928 *Calcitornella elongata* n. sp. – CUSHMAN et WATERS, p. 48, l. 6, fig. 8 (fide ELLIS et MESSINA: Catal. of Foram. 1940).

1962 *Calcitornella elongata* CUSH. et WAT. – E. TRIFONOVA: Foraminiferi ot gornija trias etc., p. 156, Tab. IV, fig. 2–3.

1964 *Calcitornella elongata* CUSHMAN et WATERS – A. R. LOEBLICH, JR. et H. TAPPAN: Protista 2, p. C 443–444, fig. 336/4a, b.

1968 *Calcitornella elongata* CUSHMAN et WATERS – A. ORAVECZNÉ-SCHEFFER: A Miliolacea etc., p. 93, Tab. 3, fig. 2–3.

Remark: A Calcareous imperforate microgranular test. The proloculus is followed by a tubular, irregularly coiled unsegmented deuteroloculum.

Dimensions: length 0,6 mm, width 0,17 mm.

Stratigraphical and geographical range: The originally described species comes from the Texas Carboniferous; it occurs in the Norian of Bulgaria, the Carnian of Hungary; in the Lower Illyrian of the Slovak Karst in the West Carpathians.

Calcitornella gebzeensis DAĜER, 1978

Pl. LXII, fig. 11–12

1978 *Calcitornella gebzeensis* DAĜER – Z. DAĜER: Sur quelques Foraminifères nouveaux du Trias etc., p. 22–23, pl. 1, fig. 5–9, 10.

Remark: Carpathian specimens agree in description and dimensions with *Calcitornella gebzeensis* DAGER.

Dimensions: 0,2–0,25 mm.

Stratigraphical and geographical range: The originally described species comes from the Anisian and Upper Trias of the Kocaeli peninsula (Turkey); the Upper Rhaetian Hybe Formation in the Nízke Tatry Mts.

PLANIINVOLUTA LEISCHNER, 1967

Planiinvoluta carinata LEISCHNER, 1961

Pl. LIX, fig. 5–17, Pl. LXII, fig. 1–2; PL. LXIII, fig. 8–10.

1961 *Planiinvoluta carinata* n. g. n. sp.: LEISCHNER; Zur Kenntnis der Mikrofauna etc., – 11–12, Pl. 10, figs 1–14; pl. 12, figs 6, 7a–8a.

1975 *Planiinvoluta carinata* LEISCHNER – A. GAZDŻICKI–J. TRAMMER–K. ZAWIDZKA: Foraminifers from the Muschelkalk etc., pl. 4, fig. 1.

1976 *Planiinvoluta carinata* LEISCHNER – L. ZANINETTI: Les foraminifères du Trias, p. 139–140, pl. 7, fig. 32–33 (cum syn.).

Remark: A variable sessile species, most frequently stuck to test-and rock fragments, mainly oolites.

The species description is identic with the original description by L. ZANINETTI (1976). Keel-like test margin is a significant diagnostic sign.

Dimensions: diameter 0,17–0,48 mm.

Stratigraphical and geographical range: Middle-Upper Trias, Dogger (R. WERNLI 1971; L. ZANINETTI 1976). It is known from the Austrian, Bavarian Alps, South Jurassic, Central Massif, Central Carpathians, Hellenides and Central Burma. The depicted variable forms are mainly from the Central Carpathian Upper Trias.

Planiinvoluta deflexa LEISCHNER, 1961

Pl. LXII, fig. 3–10

1961 *Planiinvoluta deflexa* n. g. n. sp.; W. LEISCHNER: Zur Kenntnis der Mikrofauna etc., p. 12, pl. 10, figs 7b–8b.

1969 *Planiinvoluta deflexa* LEISCHNER: L. KOEHN-ZANINETTI: Les Foraminifères du Trias etc., p. 60–62, Text-fig. 12 (A–C).

1973 *Planiinvoluta deflexa* LEISCHNER: A GAZDŻICKI et K. ZAWIDZKA: Triassic foraminifer assemblage etc., pl. 6, figs 5–6.

1974 *Planiinvoluta deflexa* LEISCHNER–A. GAZDŻICKI: Rhaetian microfacies etc., p. 57, pl. 43, figs. 4–7.

Remark: The species description is in accordance with the original description complemented by L. KOEHN-ZANINETTI (1969).

Dimensions: diameter 0,10–0,42 mm.

Stratigraphical and geographical range: the Rhaetian of the Alps and the West Carpathians.

Planiinvoluta irregularis n. ssp.
Pl. LXII, fig. 11–13; Pl. LXIII, fig. 1–7.

Type species: The specimen depicted in Pl. LXIII, fig. 1; in the depository of the Geological Institute of the Slovak Academy of Science, Bratislava, thin section No. Bo. 6. 583.

Denomination: irregularis (lat.) = irregular.

Type level: The Hybe Formation, Upper Rhaetian.

Type locality: Hybe.

Description: Sessile, thick-walled, relatively large species, of considerable morphological variability as a consequence of sessile life. Proloculus spherical, rarely observed in sections. The deuteroloculus is coiled in several planispiral or even trochospiral whorls (2–5, or also more), however, irregularly coiled in most cases. The section of the deuteroloculus is circular most often oval to elongated.

Dimensions: Diameter 0,30–0,90 mm; height 0,06–0,18 mm.

Stratigraphical range: In the West Carpathians it is found in the Norian Furmanec and Hallstatt Limestones, then in the uppermost Norian-Lower Rhaetian Dachstein Limestones and Rhaetian Skalky and Bleskový prameň Limestones. It was scarcely found in the Upper Rhaetian Hybe Beds.

Planiinvoluta regularis n. sp.
Pl. LXIV, fig. 1, 3

Type species: The specimen depicted in Pl. LXIV, fig. 1; in the depository of the Geological Institute of the Slovak Academy of Science, Bratislava; thin section No. Bo. 5135.

Denomination: regularis (lat.) = regular.

Type level: The Dachstein limestone, Uppermost Norian to Lower Rhaetian.

Type locality: Veľká Lúka, Muránska planina plateau.

Description: A sessile species. The test consists of 2–3 chambers gradually attaching to one another. The chambers are thick-walled, semiarcuate, mostly fitted to the base formed of test fragments of various organisms.

Dimensions: width (the basal fitting part) 0,40–0,50 mm; height 0,1–0,25 mm.

Stratigraphical and geographical range: The Uppermost Norian – Lower Rhaetian Dachstein limestone facies, the Upper Rhaetian Hybe Formation.

Nubeculariidae Jones, 1875
Ophthalmidiinae Wiesner, 1920
ARENOVIDALINA Ho, 1959

Arenovidalina amylovoluta Ho, 1951
Pl. LXIV, fig. 2, 4–8

1959 *Arenovidalina amylovoluta* Ho sp. nov. – Y. Ho: Triassic Foraminifera from the Chialingchiang limestone etc., p. 415, pl. VII, fig. 10–17.

1976 *Ophthalmidium? amylovolutum* (HO, 1959) – L. ZANINETTI: Le Foraminifères du Trias etc., p. 141, pl. 3, fig. 12, 13 (cum syn.).

Remark: The species is characterized by an intense depression of the central part of the test from both sides.

Dimensions: test diameter 0,19–0,41 mm, thickness 0,06–0,10 mm.

Stratigraphical and geographical range: almost the entire Trias (except the Rhaetian) of the West Carpathians. Like *Arenovidalina chialingchiangensis* HO, 1959 – it occurs in the entire Tethyd region.

Arenovidalina chialingchiangensis HO, 1959

Pl. LXV, fig. 1–20; Pl. LXXII, fig. 6c

1959 *Arenovidalina chialingchiangensis* HO sp. nov. – Triassic Foraminifera from the Chialingchiang limestone etc., p. 415–416, pl. VII, fig. 10–17.

1977 *Ophthalmidium? chialingchiangense* (HO, 1959) – L. ZANINETTI: Les Foraminifères du Trias etc., p. 142–143, pl. 3, fig. 6–10 (cum syn.).

1981 *Ophthalmidium? chialingchiangense* (HO, 1959) – O. SAMUEL–K. BORZA: *Paraophthalmidium* nov. gen. (Foraminifera) the Triassic etc., p. 71, pl. XX, fig. 4.

Remark: The Carpathian forms have most morphological characters in common with the species described by Y. HO (1959) as *Arenovidalina chialingchiangensis.*

Dimensions: diameter 0,16–0,35 mm, thickness 0,04–0,15 mm.

Stratigraphical and geographical range: the Lower-Middle Trias, partly the Norian in the entire Tethyd region.

KARABURUNIA LANGER, 1968

Karaburunia rendeli LANGER, 1968

Pl. LXVI, fig. 1

1968 *Karaburunia rendeli* n. sp. – fide L. ZANINETTI, 1976: Les Foraminifères du Trias etc., p. 141, pl. 5, fig. 15, 16, 19.

Remark: the scarce specimens from the West Carpathians have most characters in common with the species denoted as *Karaburunia rendeli* by W. LANGER (1968).

Dimensions: width 0,32 mm, height 0,65 mm.

Stratigraphical and geographical range: the originally described form came from the Upper Anisian in Turkey; in the West Carpathians it was found in the Norian Furmanec limestones of the Slovak Karst.

PARAOPHTHALMIDIUM SAMUEL et BORZA, 1981

Paraophthalmidium carpaticum SAMUEL et BORZA, 1981

Pl. LXX, fig. 1

1981 *Paraophthalmidium carpaticum* nov. sp. – O. SAMUEL–K. BORZA: *Paraophthalmidium* nov. gen. (Foraminifera) from the Triassic, etc., p. 68, pl. XIX, fig. 4; text-fig. 2 (1a, b).

Remark: Test free, ovate in outline; planispiral-coiled; involute. Number of whorls: 3–4. Axial section shows oscillation of the second and the third whorls from the equatorial coiling plain. The wall is imperforate, calcareous. At the end of the long neck is a circular aperture without tooth, yet with a thick lip occupying 1/2 diameter of the neck.

It differs from the species *Karaburunia rendeli* LANGER, 1968 in planispiral-coiling test and a large lip.

Dimensions: height 0,4 mm, width 0,17 mm, neck width 0,04 mm.

Stratigraphical and geographical range: This species was found in the Tisovec limestones of the Muránska planina plateau.

Paraophthalmidium salaji **SAMUEL et BORZA, 1981**

Pl. LXXI, fig. 1–4

1981 *Paraophthalmidium salaji* nov. sp. – O. SAMUEL–K. BORZA: *Paraophthalmidium* nov. gen. (Foraminifera) from the Triassic, p. 69–71, pl. XIX, fig. 1–3; text-fig. 2 (2).

Remark: Test free, elongated, bottle-shaped; planispiral, evolute.

Number of whorls: 3–4. Axial sections of some forms show slight oscillation in coiling of single whorls. The wall is calcareous, imperforate. The aperture at the end of the long narrowing neck is circular and provided with a thick lip.

It differs from the species *Paraophthalmidium carpaticum* SAMUEL et BORZA, 1981 in evolute coiling, more elongated and laterally flattened (to concave) test.

Dimensions: height 0,37–0,52 mm; width 0,1–0,18 mm, neck width 0,05–0,08 mm.

Stratigraphical and geographical range: So far found in the Tisovec limestones (Carnian) of the Muránska planina plateau and of the Stratenská hornatina Mts.

OPHTHALMIDIUM KUEBLER et ZWINGLI, 1870

Ophthalmidium carinatum **(LEISCHNER, 1961)**

Pl. LXVI, fig. 2–7; Pl. LXVII, fig. 1–8; Pl. LXXII, fig. 6a

1961 *Involutina carinata* n. sp. – W. LEISCHNER: Zur Kenntnis der Mikrofauna und flora etc., p. 10, pl. 2, fig. 15–18; pl. 12, fig. 5

1976 *Ophthalmidium "carinatum"* (LEISCHNER, 1961) – L. ZANINETTI: Les Foraminifères du Trias etc., p. 142, pl. 7, fig. 17–19.

Remark: the Carpathian forms are extremely variable in size. Their principal morphological characters are identic with those of the originally described species.

Dimensions: width 0,09–0,18 mm, height 0,34–0,65 mm.

Stratigraphical and geographical range: the Norian and the Lias of the Austrian Alps, the Dinarides and Taurus (Turkey); in the West Carpathians it belongs among the forms frequent in the Carnian – Rhaetian of all tectonic units of the Inner Carpathians.

Ophthalmidium exiguum **KOEHN-ZANINETTI, 1968**

Pl. LXVII, fig. 9–12; Pl. LXVIII, fig. 1–3; Pl. CXLI, fig. 8

1976 *Ophthalmidium exiguum* Koehn-Zaninetti, 1968 – L. ZANINETTI: Les Foraminifères du Trias, p. 143–144, pl. 7, fig. 20–24 (cum syn.).

Remark: The loose terminal part of the deuteroloculum is a significant morphological character. The species differs from the newly described species *Ophthalmipora falsoexiguum* in the absence of pores, wall thickness and greater size.

Dimensions: width 0,17–0,26 mm; height 0,26–0,43 mm.

Stratigraphical and geographical range: the Ladinian-Carnian of the Northern

Limestone Alps, of the Italian Alps, the Bakony Mts. of Hungary, the Hellenides, the Balkan and the Caucasus; in the Carnian and the Norian of the Slovak Karst.

Ophthalmidium fusiformis (TRIFONOVA, 1962)

Pl. LXIX, fig. 1–2, 6

1962 *Spiroophthalmidium fusiformis* n. sp. – E. TRIFONOVA: Upper Triassic Foraminifera from the surroundings of Kotel etc., p. 170 pl. 4, fig. 4, 5.

1976 *Ophthalmidium fusiforme* (TRIFONOVA, 1961) – L. ZANINETTI: Les Foraminifères du Trias etc., p. 144 (cum syn.).

Remark: The species is characterized by a markedly elongated apical part of the test. The Carpathian forms are identic with the originally described species.

Dimensions: length 0,52–0,60 mm, max. width 0,19–0,35 mm.

Stratigraphical and geographical range: the Carnian and the Norian in the Balkan and in the Bakony Mts. in Hungary; the Carnian and the Norian of the West Carpathians.

Ophthalmidium iranicum (BROENNIMANN, ZANINETTI, BOZORGNIA et HUBER, 1973)

Pl. LXIX, fig. 3, 4

1974 *Agathammina? iranica* ZANINETTI, BROENNIMANN, BOZORGNIA et HUBER, 1973 – P. BROENNIMANN, L. ZANINETTI, A. MOSHTAGHIAN and H. HUBER: Foraminifera and microfacies of the Triassic Espahk Formation etc., p. 30, Pl. 1, fig. 10, 15 (cum syn.).

1981 *Agathammina? iranica* ZANINETTI, BROENNIMANN, BOZORGNIA et HUBER–D. ALTINER et L. ZANINETTI: Le Trias dans la région de Pinarbasi, etc., p. 721, pl. 83, fig. 10?, 14?, 20–22.

Remark: The scarce Carpathian forms have most characters in common with the species described from Iran as *O. iranicum*.

Dimensions: diameter 0,19–0,22 mm.

Stratigraphical and geographical range: scarce in the Norian Furmanec limestones in the West Carpathians.

Ophthalmidium cf. *leischneri* (KRISTAN-TOLLMANN, 1962)

Pl. LXIX, fig. 5

1976 *Ophthalmidium leischneri* (KRISTAN-TOLLMANN, 1962) – L. ZANINETTI: Les Foraminifères du Trias etc., p. 144–145 (cum syn.).

Remark: in the Trias of the West Carpathians were found some forms resemblant to the Rhaetian *O. leischneri*.

Dimensions: diameter 0,16 mm; height 0,75 mm.

Stratigraphical and geographical range: the Rhaetian and the Lias of the Austrian and Italian Alps, the West Carpathians and the Dinarides. A. GAŹDZICKI (1974) regards it as the Liassic index species.

Ophthalmidium lucidum (TRIFONOVA, 1961)

Pl. LXIX, fig. 7–11.

1962 *Spirophthalmidium lucidum* n. sp. – E. TRIFONOVA: Upper Triassic Foraminifera from the surroundings of Kotel etc., sp. 157, pl. 4, fig. 4, 5.

1976 *Ophthalmidium lucidum* (TRIFONOVA, 1961) – L. ZANINETTI: Les Foraminifères du Trias etc., p. 145 (cum syn.).

Remark: It is quite frequent in the Carpathians. Its test structure is identic with that of *O. lucidum* (TRIFONOVA, 1961) from the Balkan.

Dimensions: diameter 0,13–0,20 mm; height 0,30–0,35 mm.

Stratigraphical and geographical range: the Norian and the Rhaetian of the Balkan, the Austrian Alps; it is in an analogous stratigraphical position in various tectonic units of the Inner West Carpathians.

Ophthalmidium tori ZANINETTI et BROENNIMANN, 1969

Pl. VII, fig. 1–5

1969 *Ophthalmidium tori* n. sp. – L. ZANINETTI et P. BROENNIMANN, 1969: Sur la présence d'un Foraminifère nouveau, etc., p. 705–724 fig. 1 F; fig. 2; fig. 3; fig. 5 (8).

1976 *Ophthalmidium tori* ZANINETTI et BROENNIMANN, 1969 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 146, fig. 25–27.

1981 *Ophthalmidium tori* ZANINETTI et BROENNIMANN, 1969 – O. SAMUEL et K. BORZA: *Paraophthalmidium* nov. gen. (Foraminifera) from the Triassic etc., p. 73, pl. XX, fig. 2.

Remark: A typical species whose test structure is practically identic with that of the originally described species.

Dimensions: diameter 0,17–0,25 mm, height 0,30–0,60 mm.

Stratigraphical and geographical range: the Carnian of the Italian Alps; it is frequent in the West Carpathians in the same stratigraphical range as in the Alps.

Ophthalmidium triadicum (KRISTAN, 1957)

Pl. LXVIII, fig. 4–12

1976 *Ophthalmidium triadicum* (KRISTAN, 1957) – L. ZANINETTI, 1976: Les Foraminifères du Trias etc., p. 146–147, pl. 7, fig. 25–27 (cum syn.).

Remark: Bipolar elongation of the test with a distinct peripheral fringe is a characteristic feature of the species.

Dimensions: diameter 0,10–0,20 mm, height 0,26–0,45 mm.

Stratigraphical and geographical range: the Carnian and the Rhaetian of the Bakony Mts. in Hungary; the Rhaetian of the Austrian Alps, Transylvanian Carpathians and the Caucasus; the Carnian (Tisovec limestones) and the Norian (Furmanec limestones) of the Slovak Karst.

Ophthalmidium tricki (LANGER, 1961)

Pl. LXXII, fig. 6b; Pl. CXLI, fig. 11

1968 *Paraophthalmidium (Eoophthalmidium) tricki*, fide: L. ZANINETTI, 1976: Les Foraminifères du Trias etc., p. 147, pl. 5, fig. 17, 18 (cum syn.).

Remark: Morphology of the Carpathian forms and of free specimens from limestones is identic with that of the originally described species.

Dimensions: diameter 0,10–0,15 mm, height 0,30–0,35 mm.

Stratigraphical and geographical range: the Upper Anisian (Illyrian) of Turkey and the Caucasus; the Lower Illyrian of the Choč nappe in the Malé Karpaty Mts., the Carnian of the Slovak Karst.

Nodophthalmidium sp. 1
Pl. CXLI, fig. 6; Pl. CXLII, fig. 3

Stratigraphical and geographical range: The Lower Illyrian Reifling limestones of the Choč nappe in the Malé Karpaty. Mts.

Nodophthalmidium sp. 2
Fig. 19

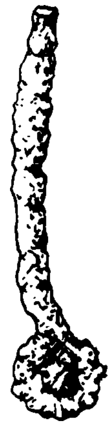


Fig. 19 *Nodophthalmidium* sp. 2 Hurtovec, Lower Illyrian Reifling limestones. Magn. ×70

Stratigraphical and geographical range: the Lower Illyrian Reifling limestones of the Choč nappe in the Malé Karpaty Mts.

Nodophthalmidium sp. 3
Pl. CXLI, fig. 9–10, 12

Remark: The species is extremely frequent.
Stratigraphical and geographical range: the Lower Illyrian limestones (Reifling) of the Choč nappe in the Malé Karpaty Mts.

Spiroloculininae WIESNER, 1920
SPIROLOCULINA d'ORBIGNY, 1826

Spiroloculina longiscata TERQUEM et BERTHELIN, 1875
Pl. LXXV, FIG. 1, 2

1875 *Spiroloculina longiscata* n. sp. – O. TERQUEM–G. BERTHELIN: Études microscopique des Marnes du Lias etc., p. 78, tab. 6, fig. 8–9.
1964 *Spiroloculina longiscata* TERQUEM et BERTHELIN – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambachmergeln etc., p. 61–62, tab. 9, fig. 12.

Remark: The specimens with slim test, whose last chamber is considerably elongated, resemble the type species and are identic with the forms described by E. KRISTAN-TOLLMANN (1964).

Dimensions: width 0,13–0,20 mm, height 0,45–0,50 mm.

Stratigraphical and geographical range: The species was originally described from the Lias of France; it is known from the Rhaetian of the Austrian Alps, in the Carnian Tisovec limestones and the Norian Furmanec limestones of the Slovak Karst, in the West Carpathians.

Spiroloculina praecursor OBERHAUSER, 1960

Pl. LXXIV, fig. 9 (10, 11 – cf.)

1960 *Spiroloculina praecursor* nov. sp. – R. OBERHAUSER: Foraminiferen und Microfossilien "incertae sedis" etc., p. 18–19, pl. 5, fig. 10.

1976 *Spiroloculina ? praecursor* OBERHAUSER, 1960 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 148, pl. 7, fig. 30, 31 (cum syn.).

Remark: Some Carpathian forms ranged to this species are slimmer than the described species, and their chambers are less arcuate (fig. 10, 11).

Dimensions: width 0,20–0,30 mm, height 0,43–0,52 mm.

Stratigraphical and geographical range: the Ladinian-Carnian of the Austrian and Italian Alps, and of the Caucasus; the Carnian-Norian of the Slovak Karst in the West Carpathians.

Nodobaculariinae CUSHMAN, 1927

NODOBACULARIA RHUMBLER, 1895

Nodobacularia cylindriformis n. sp.

Pl. CXLI, fig. 3

1980 *Nodophthalmidium elenae* n. sp., p. p. – D. GEORGHIAN: Note concernant quelques espèces de *Nodophthalmidium* etc., p. 38–39, pl. 2, fig. 1–7; pl. 3, figl 1–2 (non pl. 1, fig. 12–29; pl. II, fig. 7–13 = *Nodobacularia elenae* GEORGHIAN).

Type species: The specimen in Pl. CXLI, fig. 3; in the depository of Dionýz Štúr Institute of Geology, Bratislava, No. Sj. H-1.

Denomination: According to cylindrical shape of the test.

Type level: Reifling limestones; Lower Illyrian.

Type locality: Hurtovec, the Malé Karpaty Mts.

Material: 4 specimens.

Description: A loose test, consisting of cylindrical elongated chambers. The number of chambers is variable (2–5). Chambers in the central part are subspherical or spherical. They are narrowed in the distal part and easily breakable.

The newly described species has no ribs. It shows closest affinity to *Nodobacularia alenae* GEORGHIAN 1980, with ribs (cf. D. GEORGHIAN 1980, Pl. I, Fig. 19–29, Pl. II, Fig. 7–13).

Dimensions: length of the one segment is 0,30–0,37 mm; width 0,06–0,11 mm.

Stratigraphical and geographical range: the Upper Anisian (Lower Illyrian) Reifling limestones of the Choč nappe in the Malé Karpaty Mts.

Nodobacularia vujisići UROŠEVIĆ et GAŹDZICKI, 1977
Pl. CXLI, fig. 1, 2

1977 *Nodobacularia vujisići* nov. sp. – D. UROŠEVIĆ–A. GAZDZICKI: *Nodobacularia vujisići* nov. sp. ladenskog kata etc., p. 97–99, pl. 1, fig. 1–6.
1980 *Nodophthalmidium elenae* nov. sp. – D. GHEORGHIAN: Note concernant quelques espèces de *Nodophthalmidium* etc., p. 38–39, p. 1, fig. 1–11; pl. 2, fig. 1–6; pl. 3, fig. 1–2.

Remark: The Carpathian species are identic with the originally described holotype of the Dinarides.

Dimensions: length 0,7–0,85 mm, width 0,04–0,05 mm; initial stage diameter 0,08 mm.

Stratigraphical and geographical range: ?the Anisian-Ladinian of the Dinarides, of the Rumanian Carpathians, the Upper Anisian of the West Carpathians.

Miliolidae EHRENBERG, 1839
Quinqueloculininae CUSHMAN, 1917
AGATHAMMINOIDES ZANINETTI, 1969

Agathamminoides spiroloculiformis (ORAVECZNÉ-SCHEFFER, 1968)
Pl. VIII, fig. 5a; Pl. LXXII, fig. 7–10

1968 *Agathammina spiroloculiformis* n. sp. – A. ORAVECZNÉ-SCHEFFER: The representatives of the superfamily Miliolacea (Foraminifera) etc., p. 91, pl. 2, fig. 1–5.
1969 *Agathamminoides gsollbergensis* n. sp. – L. ZANINETTI: "*Agathamminoides*" gen. n., un nouveau genre de Foraminifères etc., p. 699, text-fig. 1.
1976 *Agathamminoides spiroloculiformis* (ORAVECZNÉ-SCHEFFER, 1968): L. ZANINETTI: Les Foraminifères du Trias etc., p. 147–148, pl. 5, fig. 10–14, pl. 7, fig. 1, 2 (cum syn.).
1978 *Agathamminoides gsollbergensis* ZANINETTI – J. SALAJ: Contribution à la microbiostratigraphie du Trias etc., p. 122, pl. 5, fig. 2b.

Remark: Description of the Carpathian specimens is identic with the original description.

Dimensions: width 0,17–0,22 mm, height 0,48–0,58 mm.

Stratigraphical and geographical range: the Carnian of the Bakony Mts. in Hungary, of the Italian and Austrian Alps; the Carnian of the Strážovská hornatina Mts., and the Slovak Karst and in the Uppermost Norian-Lower Rhaetian Dachstein limestones of the Muránska planina plateau in the West Carpathians.

QUINQUELOCULINA d'ORBIGNY, 1826

Quinqueloculina nucleiformis KRISTAN-TOLLMANN, 1964
Pl. LXXV, fig. 3–5

1964 *Quinqueloculina nucleiformis* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhaetischen Zlambachmergeln etc., p. 61, pl. 9, fig. 9–11.

Remark: Morphology of the Carpathian specimens is more-or-less identic with that of the holotype.

Dimensions: width 0,17–0,18 mm, height 0,39–0,45 mm.

Stratigraphical and geographical range: originally described from the Rhaetian of the Austrian Alps; sporadically occurring in the Carnian-Norian of the Slovak karst in the West Carpathians.

TRILOCULINA d'ORBIGNY, 1826

Triloculina raibliana **GUEMBEL, 1869**
Pl. LXXV, fig. 6

1869 *Triloculina raibliana* n. sp.: C. W. GUEMBEL: Foraminiferen in den Cassianer und Raibler Schichten, p. 182, pl. 6, fig. 34.

Remark: Although the section of the species is atypical, it can be ranged to the described species according to its basical morphological characters.

Dimensions: width 0,11 mm, height 0,21 mm.

Stratigraphical and geographical range: originally described from the Carnian of the Bavarian Alps, it is in the Rhaetian of the Austrian Alps, and sporadically in the Norian Furmanec limestones of the West Carpathians.

PALAEOMILIOLINA LOEBLICH et TAPPAN, 1964

Palaeomiliolina occulta **(ANTONOVA, 1958)**
Pl. LXXV, fig. 7–8

1958 *Spirophthalmidium occultum* ANTONOVA, 1958 – fide in: A. R. LOEBLICH, JR – H. TAPPAN, 1964: Protista 2. Sarcodina, Chiefly "Thecamoebians and Foraminiferida, p. C 462, Fig. 351–3a, b, c.

Remark: Carpathian specimens are in sections identic with the species *Paleomiliolina occulta* (ANTONOVA 1958) to which they are ranged.

Dimensions: diameter 0,14–0,17 mm, height 0,39–0,45 mm.

Stratigraphical and geographical range: the species was originally described from the Bajocian of the Caucasus; in the West Carpathians it is in the Ladinian of the Slovak Karst and the Rhaetian of the Slovak Karst.

SIGMOILINA SCHLUMBERGER, 1887

Sigmoilina schaeferae **ZANINETTI, ALTINER, DAGER et DUCRET, 1982**
Pl. LXXIII, fig. 1–11

Material: about 20 specimens in thin sections.

Description: The proloculus is followed by sigmoidally arranged chambers. It is well seen in section perpendicular to the coiling axis. The test in the section is pseudo-rhomboidal, with 11–13 enlarging chambers. The last whorl consists of three semi-arcuate chambers. In cross sections and in the axial section the test is elongated, lens-shaped. The chambers are sigmoidally arranged. The test periphery is keel-like. In the section it looks as an acute angle. The test wall is thick, porcellaneous, recrystallized. The sections did not include the aperture.

Dimensions: diameter 0,17–0,30 mm, height 0,20–0,56 mm.

Stratigraphical and geographical range: The Norian of the Slovak Karst.

Sigmoilina multicarinata **n. sp.**
Pl. LXXIV, fig. 3–4

Type species: The specimen in Pl. LXXIV, fig. 3; in the depository of the Geological Institute of the Slovak Academy of Science in Bratislava, thin section No. Bo. 6376.

Denomination: multi (lat.) = many; multicarinata.
Type level: The Furmanec limestones; Norian.
Type locality: W of Tisovec, B. M. 878,5 m.
Description: The section perpendicular to the coiling axis shows sigmoidal arrangement of chambers. The ultimate and the penultimate whorls have two chambers. The test is suboval, elongated, with 4–6 ribs, looking like thorns in section. The test wall is thick, porcellaneous, recrystallized.
The species differs from *Sigmoilina schaeferae* ZAN., ALTINER, DAĞER et DUCRET in smaller size, less whorls and distinct ribs.
Dimensions: diameter 0,17–0,35 mm.
Stratigraphical and geographical range: the Carnian Tisovec limestones and the Norian Furmanec limestones.

Sigmoilina triadica LANGER, 1968

Pl. LXXIV, fig. 5–8

1968 *Sigmoilina ? triadica* LANGER, 1968, fide, in L. ZANINETTI, 1976: Les Foraminifères du Trias, etc., p. 148, pl. 5, fig. 20, 21.

Remark: Carpathian specimens are identic with the original description, only the apical elongated part of the test is not always included in sections. Sigmoidal arrangement of chambers is conspicuous only in some sections, so we range the species to the genus *Sigmoilina* SCHLUMBERGER, 1887.
Dimensions: width 0,13–0,20 mm, height 0,26–0,35 mm.
Stratigraphical and geographical range: the original is from the Upper Anisian of Turkey; in the West Carpathians it is in the Carnian Tisovec limestones and in the Norian Hallstatt limestones of the Slovak Karst.

Sigmoilina ? excentrica n. sp.

Pl. LXXIV, fig. 1–2

Type species: The specimen in Pl. LXXIV, fig. 1; in the depository of the Geological Institute of the Slovak Academy of Science in Bratislava, thin section No. Bo. 5428.
Denomination: according to lat. excentrica = excentric.
Type level: The Furmanec limestones; Norian.
Type locality: Goštanová Muráň plateau.
Material: specimes in thin sections.
Description: A larger proloculus is pollowed by 3–4 excentrically arranged elongated chambers indicative of sigmoidal arrangement.
Dimensions: Width 0,20–0,26 mm, height 0,40–0,54 mm.
Stratigraphical and geographical range: the Norian Furmanec limestones of the Muráň plateau.

Milioliporidae BROENNIMANN et ZANINETTI (in P. BROENNIMANN, L. ZANINETTI, F. BOZORGNIA, G. R. DASHTI et A. MOSHTAGHIAN, 1971)

MILIOLIPORA BROENNIMANN et ZANINETTI (in P. BROENNIMANN, L. ZANINETTI, F. BOZORGNIA, G. R. DASTHI et A. MOSHTAGHIAN, 1971)

Miliolipora cuvillieri **BROENNIMANN et ZANINETTI (in P. BROENNIMANN, L. ZANINETTI, F. BOZORGNIA, G. R. DASHTI et A. MOSHTAGHIAN, 1971)**

Pl. LXXV, fig. 9–10; Pl. LXXVI, fig. 1–4; Pl. LXXVII, fig. 1–8

1971 *Miliolipora cuvillieri* BROENNIMANN et ZANINETTI n. sp. – P. BROENNIMANN, L. ZANINETTI, F. BOZORGNIA, G. R. DASHTI et A. MOSHTAGHIAN: Lithostratigraphy and Foraminifera of the Upper Triassic etc., p. 7–16 pl. 1, fig. 1–12, fig. 4 A–J.

1976 *Miliolipora cuvillieri* BROENNIMANN et ZANINETTI, 1971 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 150–151, Pl. 6, fig. 2–6; 8–11 (cum syn.).

Remark: The species with a conspicuous morphology is well identifiable in all sections. Its diagnosis is identic with the original description.

Dimensions: diameter 0,25–0,35 mm, height 0,47–0,65 mm.

Stratigraphical and geographical range: the Norian-Rhaetian of various regions of the Alps and the Dinarides; the Norian-Rhaetian localities in the West Carpathians, mostly in the Slovak Karst.

OPHTHALMIPORA ZANINETTI et BROENNIMANN, 1972

***Ophthalmipora falsoexiguum* n. sp.**

Pl. LXX, fig. 2–4

1981 *Ophthalmidium exiguum* KOEHN-ZANINETTI, 1969 – O. SAMUEL et K. BORZA: *Paraophthalmidium* nov. gen. (Foraminifera) from the Triassic etc., p. 71, tab. XX, fig. 1–3.

Type species: The specimen in Pl. LXX, fig. 2; in the depository of the Geological Institute of the Slovak Academy of Science in Bratislava, thin section No. Bo. 6303.

Denomination: falso (lat.) – false, and after the species *O. exiguum*.

Type level: The Tisovec limestone; Carnian.

Type locality: Havrania Skala, Stratenská hornatina.

Material: about 10 specimens in various sections.

Description: A loose, bicameral, lens-shaped, slightly elongated test, composed of proloculus and deuteroloculum with coiling like the genus *Ophthalmidium*. 4–6 whorls with two "pseudochambers" in each. The terminal, circular aperture is on the deuteroloculum. The test wall is very thick, perforated – in contrast to the morphologically similar species *Ophthalmidium exiguum* KOEHN-ZANINETTI 1969. The last part of the deuteroloculum in the apical part of the test is free and forms the right angle with the last whorl of the deuteroloculum.

Dimensions: length 0,45–0,8 mm, width 0,25–0,35 mm; width of the apical part of the test with free deuteroloculum 0,43–0,56 mm.

Stratigraphical and geographical range: the Carnian Tisovec limestones of the West Carpathians.

GALEANELLA KRISTAN, 1958 EMEND. ZANINETTI et BROENNIMANN 1973 (in P. BROENNIMANN, J. P. CADET, L.-E. RICOU et L. ZANINETTI, 1973)

***Galeanella panticae* ZANINETTI et BROENNIMANN, 1973 (in P. BROENNIMANN, J. P. CADET, L.-E. RICOU et L. ZANINETTI, 1973)**

Pl. LXXVIII, fig. 1–4; Pl. LXXIX, fig. 1–7

1973 *Galeanella panticae* ZANINETTI et BROENNIMANN n. sp. – P. BROENNIMANN, J.-P. CADET, L.-E. RICOU et L. ZANINETTI: Révision morphologique et émendation du genre triassique *Galeanella* etc., p. 411–435, pl. 2, fig. 1–21, pl. 3, fig. 1–13.

1976 *Galeanella panticae* ZANINETTI et BROENNIMANN, 1973 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 149, pl. 6, fig. 12–17; Pl. 13, fig. 5–10 (cum syn.).

Remark: A variable species with basical morphological characters most resemblant to the originally described species.

Dimensions: diameter 0,40–0,50 mm, height 0,52–0,60 mm.

Stratigraphical and geographical range: the Norian-Rhaetian of various regions of the Alps, the Dinarides, Iran, Turkey (L. ZANINETTI, 1976), the Norian-Lower Rhaetian of Drnava? (Slovak Karst).

Nodosariidae EHRENBERG, 1838

NODOSARIA LAMARCK, 1812

***Nodosaria apheilocula aglabra* KRISTAN-TOLLMANN, 1964**

Pl. CXLVI-2, fig. 2, no. 3, fig. 3, no. 2

1964 *Nodosaria apheilocula* TAPPAN, 1955 subsp. *aglabra* n. ssp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach – mergeln etc., p. 81–82, pl. 14, fig. 16–22.

Remark: A unicameral oval test, elongated in its upper part. The test surface is ornamented with tiny ribs.

Dimensions: width 0,15 mm, length 0,26 mm.

Stratigraphical and geographical range: the Carnian Lunz Member and the Rhaetian Hybe Member (J. SALAJ–O. JENDREJÁKOVÁ, 1967) in the West Carpathians; the Rhaetian of the Austrian Alps.

***Nodosaria* cf. *dipartita* KRISTAN-TOLLMANN, 1964**

Pl. LXXX, fig. 3

1964 *Nodosaria dipartita* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 77, pl. 11, fig. 21.

Remark: In its test outline and narrowed apical part of the test the Carpathian specimen is very similar to the species *Nodosaria dipartita* KRISTAN-TOLLMANN.

Dimensions: width 0,17 mm; length 0,54 mm.

Stratigraphical and geographical range: the Norian Hallstatt limestones of the Slovak Karst in the West Carpathians.

Nodosaria liratella TAPPAN, 1951
Pl. CXLV, fig. 7–8

1951 *Nodosaria liratella* TAPPAN, n. sp. – H. TAPPAN: Foraminifera from the Artic slope of Alaska, p. 11, pl. 3, fig. 17–20.

Remark: A uniserial test conspicuously ornamented with ribs; 6–9 chambers.

Dimensions: width 0,2 mm, length 0,80–0,82 mm.

Stratigraphical and geographical range: the Lower Illyrian Schreyeralm limestones of the Slovak Karst in the West Carpathians.

Nodosaria mirabilis caucasica MIKLUCHO-MAKLAY, 1954
P. LXXX, fig. 4; Pl. LXXXIII, fig. 3, 4

1954 *Nodosaria mirabilis* LIPINA subsp. *caucasica* subsp. nov. – K. V. MIKLUCHO-MAKLAY: Foraminifery verchnepermskich otloženij etc., p. 21–22, pl. 2, fig. 1, 2.

Remark: The Carpathian specimen with horseshoe-shaped chambers in profile is resemblant to the type species described from the Permian of the Caucasus.

Dimensions: width 0,06 mm, length 0,65 mm.

Stratigraphical and geographical range: the Carnian Tisovec limestones of the Slovak Karst in the West Carpathians.

Nodosaria nitida elongata FRANKE, 1936
Pl. LXXX, fig. 2

1964 *Nodosaria nitida* TERQ. *elongata* FRANKE – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 68, pl. 10, fig. 5 (cum syn.).

Remark: The profile of the Carpathian specimen is most resemblant to the form identified as *Nodosaria nitida* TERQ. *elongata* FRANKE by E. KRISTAN-TOLLMANN (1964).

Dimensions: width 0,07 mm, length 0,39 mm.

Stratigraphical and geographical range: the Norian Hallstatt limestones of the Slovak Karst in the West Carpathians.

Nodosaria nitidana BRAND, 1937
Pl. LXXX, fig. 7

1964 *Nodosaria nitidana* BRAND, 1937 – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 67, pl. 10, fig. 1–4 (cum syn.).

Remark: The West-Carpathian forms consist of micro- or macrospherical proloculus and 3–4 slowly enlarging subspherical smooth chambers. In their test morphology they resemble the species described as *Nodosaria nitidana* by BRAND in 1937.

Dimensions: width 0,17 mm, length 0,38 mm.

Stratigraphical and geographical range: the Carnian Tisovec limestones of the Slovak Karst in the West Carpathians.

Nodosaria ordinata TRIFONOVA, 1965
Pl. LXXX, fig. 9, 14; Pl. CXLIV, fig. 10

1965 *Nodosaria ordinata* sp. nov. – E. TRIFONOVA: *Nodosaria ordinata* sp. nov. etc., p. 214, pl. 1, fig. 1–15.

1974 *Nodosaria* cf. *ordinata* TRIFONOVA, 1965 – A. GAŹDZICKI: Rhaetian microfacies, stratigraphy etc., p. 58–59, pl. 39, fig. 8–9.

Remark: in contrast to Upper Triassic forms the Upper Anisian specimens are narrower.

Dimensions: width 0,9 mm, length 1,20–1,25 mm (Anisian forms); width 0,13 mm, length 0,52–0,60 mm (Carnian-Norian forms).

Stratigraphical and geographical range: the Norian of Bulgaria (holotype); the Upper Anisian, Carnian, Norian and the Rhaetian (A. GAŹDZICKI 1974) of the West Carpathians.

Nodosaria aff. *prima* d'ORBIGNY, 1850

Pl. CXLV, fig. 9

1964 *Nodosaria prima* d'ORBIGNY – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach mergeln etc., p. 73, pl. 11, fig. 4–5 (cum syn.).

Remark: The test consists of 4–5 elongated chambers, ornamented with ribs.

Dimensions: width 0,21 mm, length 0,83 mm.

Stratigraphical and geographical range: the Lower Illyrian Schreyeralm limestones of the Slovak Karst in the West Carpathians.

Nodosaria shablensis TRIFONOVA, 1978

Pl. LXXX, fig. 8, Pl. CXLIV, fig. 7

1978a *Nodosaria shablensis* n. sp. – E. TRIFONOVA: New Foraminifera species from the Lower- and Middle Triassic in Bulgaria, p. 1154, pl. 1, fig. 6–8.

1978b *Nodosaria shablensis* TRIFONOVA 1978 – E. TRIFONOVA: The Foraminifera Zones and Subzones in Bulgaria I. Scythian and Anisian, p. 95, pl. 1, fig. 5.

Remark: The Carpathian units, frequent in the Anisian, are identic with the original description and depiction of holotype.

Dimensions: width 0,10–0,12 mm, length 0,54–0,8 mm.

Stratigraphical and geographical range: the Upper Scythian, Lower Anisian (index species) of Bulgaria, the Upper Anisian, the Norian Hallstatt limestones of the Slovak Karst in the West Carpathians.

Nodosaria trifonovae n. sp.

Pl. CXLIV, fig. 1

1962 *Nodosaria* sp. – E. TRIFONOVA: Upper Triassic Foraminifera from the surroudings of Kotel etc., pl. 5, fig. 12.

Type species: The specimen in Pl. CXLIV, fig. 1; in the depository of the D. ŠTÚR Institute of Geology in Bratislava.

Denomination: to the honour of Dr. E. TRIFONOVA of the Bulgaria.

Type level: Reifling limestones of the Lower Illyrian.

Type locality: Gombasek G-3, Slovak Karst.

Material: 5 specimens.

Description: A uniserial test composed of 8–10 chambers. The ribs on chambers form fine rims which in proximal parts of chambers end in free points, partly overlapping the preceding chamber. The aperture is circular, terminal.

Dimensions: length 0,9 mm, width 0,14 mm.

Stratigraphical and geographical range: the Lower Illyrian of the Slovak Karst; the Upper Trias of Bulgaria (E. TRIFONOVA, 1962).

***Rectoglandulina* aff. *polyarthra* KRISTAN-TOLLMANN, 1964**
Pl. LXXX, fig. 12, 13

1964 *Rectoglandulina polyarthra* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 87, pl. 1č, fig. 8–14.

Remark: The Carpathian specimens are well comparable to the species *Rectoglandulina polyarthra* KRISTAN-TOLLMANN, only their test is slightly depressed.

Dimensions: width 0,1 mm, length 0,45–0,60 mm.

Stratigraphical and geographical range: the Norian Furmanec limestones (sporadical occurrence) and the Uppermost Norian-Lower Rhaetian Dachstein limestones of the West Carpathians.

***Rectoglandulina* cf. *tenuis* (BORNEMANN, 1854)**
Pl. LXXX, fig. 11

1964 *Rectoglandulina tenuis* (BORNEMANN, 1854) – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 88–89 (cum syn.).

1978 *Pseudonodosaria* cf. *tenuis* (BORNEMANN, 1854) – E. TRIFONOVA: Foraminifera Zones and Subzones of the Triassic in Bulgaria. II. Ladinian and Carnian, pl. 5, fig. 1.

Remark: The Carpathian specimen of the genus *Rectoglandulina* is only partly comparable to *Rectoglandulina tenuis* (BORNEMANN).

Dimensions: width 0,16 mm, length 0,3 mm.

Stratigraphical and geographical range: the Norian limestones of the Stratenská hornatina Mts. (sporadical) in the West Carpathians.

DENTALINA RISSO, 1826

***Dentalina* aff. *cassiana* GUEMBEL, 1869**
Pl. LXXX, fig. 6

1975 *Dentalina cassiana* GÜMBEL, 1869 – O. STYK: Foraminifera from the Lower and Middle Triassic of Poland, p. 515–516, pl. 36, fig. 6–8 (cum syn.).

Remark: The Carpathian forms resemble partly to the above species, they are, however, uniserial with 4 chambers.

Dimensions: width 0,06 mm, length 0,19 mm.

Stratigraphical and geographical range: sporadical occurrences in the Uppermost Norian-Lower Rhaetian Dachstein limestones of the Muránska planina plateau.

***Dentalina curva* LIEBUS, 1944**
Pl. CXLIII, fig. 3, 4

1970 *Dentalina curva* LIEBUS, 1944 – A. TOLLMANN et E. KRISTAN-TOLLMANN: Geologische und micropaläontologische Untersuchungen etc., p. 125, pl. 7, fig. 22, text-fig. 18, fig. 2–9.

Remark: The test structure of the Carpathian specimens is identic with the original complemented description by A. TOLLMANN–E. KRISTAN-TOLLMANN (1970).

Dimensions: width 0,14–0,16 mm, length 0,5–0,6 mm.

Stratigraphical and geographical range: the Rhaetian of the Austrian Alps, the Lower Illyrian Reifling limestones of the Slovak Karst.

***Dentalina* aff. *excellens* STYK, 1975**
Pl. CXLIV, fig. 4

1975 *Dentalina excellens* sp. n. – O. STYK: Foraminifera from the Lower and Middle Triassic of Poland, p. 516–517, pl. 36, fig. 10.

Remark: The Carpathian specimens differ from the type species in a slimmer test and more chambers.

Dimensions: width 0,08 mm, length 1,3 mm.

Stratigraphical and geographical range: the Lower Muschelkalk of Poland, the Lower Illyrian of the Slovak Karst in the West Carpathians.

***Dentalina hoi* TRIFONOVA, 1967**
Pl. LXXXI, fig. 1; Pl. LXXXIII, fig. 5b; Pl. CXLIV, fig. 6

1967 *Dentalina hoi* sp. nov. – E. TRIFONOVA: Some new Triassic Foraminifera in Bulgaria, p. 7, po. 2, fig. 3–9.

1975 *Dentalina hoi* TRIFONOVA, 1967 – O. STYK: Foraminifera from the Lower and Middle Triassic of Poland, p. 518–519, pl. 36, fig. 14 (cum syn.).

Dimensions: width 0,11–0,14 mm, length 0,65–0,8 mm.

Stratigraphical and geographical range: the Carpathian specimens identic with the type species occur in the Upper Anisian Schreyeralm and Reifling limestones of the Slovak Karst, and in the Dachstein limestones (Hybe) of the Nízke Tatry (Low Tatra) Mts; the Anisian-Norian of Bulgaria (E. TRIFONOVA 1967, 1978a, b).

***Dentalina subsiliqua* FRANKE, 1936**
Pl. CXLIV, fig. 5

1964 *Dentalina subsiliqua* FRANKE, 1936 – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 101, pl. 17, fig. 1–4.

1978 *Dentalina subsiliqua* FRANKE, 1936 – E. TRIFONOVA: Foraminifera Zones and Subzones of the Triassic in Bulgaria. II. Ladinian and Carnian.

Remark: Although variable, the species may be compared with the specimens described from the Austrian Alps and the Balkan.

Dimensions: width 0,10–0,12 mm, length 1,00–1,15 mm.

Stratigraphical and geographical range: the Lower Illyrian Reifling limestone facies in the West Carpathians.

PSEUDONODOSARIA BROOMGAART, 1949

***Pseudonodosaria gemerica* n. sp.**
Pl. CXLV, fig. 6

Type species: The specimen in Pl. CXLV, fig. 6; in the depository of the D. ŠTÚR Institute of Geology in Bratislava.

Denomination: According to the tectonic unit Gemericum.

Type level: Lower Illyrian Reifling limestones.

Type locality: Gombasek G-3, Slovak Karst.

Material: about 20 specimens.

Description: The uniserial test consists of 10–12 subspherical chambers with 12–14 tiny, tightly aligned ribs. In the proximal part of chambers the ribs are usually missing. The aperture is circular, terminal.

Stratigraphical and geographical range: the Lower Illyrian Reifling limestones in the West Carpathians.

Pseudonodosaria gombaseki n. sp.

Pl. CXLV, fig. 1–4

Type species: The specimen in Pl. CXLV, fig. 1; in the depository of the D. ŠTÚR Institute of Geology in Bratislava.

Denomination: According to the type locality Gombasek.

Type level: Lower Illyrian Reifling limestones.

Type locality: Gombasek G-3, Slovak Karst.

Material: about 25 specimens.

Description: The uniserial test consists of 8–11 subspherical chambers, with 18–20 ribs which are missing in the distal parts of the chambers. The ultimate chamber has ribs which are only 2/3 of the chamber height. The aperture is circular, terminal.

Dimensions: length 0,9 mm, width 0,32 mm.

Stratigraphical and geographical range: the Lower Illyrian Reifling limestones of the Slovak Karst in the West Carpathians.

Pseudonodosaria primitiva KUBLER et ZWINGLI, 1866)

Pl. CXLII, fig. 5, Pl. CXLIII, fig. 7

1960 *Nodosaria primitiva* J. KUBLER et H. ZWINGLI–R. OBERHAUSER: Foraminiferen und Mikrofossilien "incertae sedis" etc., p. 25, pl. 6, fig. 4–5 (cum syn.).

Remark: The specimen is most resemblant to the form described as *Nodosaria primitiva* by J. KUBLER–H. ZWINGLI in 1866.

Dimensions: length 0,80–0,1 mm, width 0,30–0,40 mm.

Stratigraphical and geographical range: the Lower Illyrian Reifling limestones in the West Carpathians.

Pseudonodosaria striatoclavata (SPANDEL, 1901)

Pl. LXXX, fig. 5, Pl. CXLV, fig. 5

1977 *Nodosaria striatoclavata* SPANDEL, fide, in: J. HOHENEGGER: Populationsgenetische Deutung des morphologischen Wandels der triassischen Foraminifera *Nodosaria*, p. 199–214, fig. 2.

Remark: The species is markedly costate. The simple circular terminal aperture is indicative of the genus *Pseudonodosaria* BROOMGAART, 1949.

Dimensions: length 0,50–0,65 mm, width 0,17 mm.

Stratigraphical and geographical range: the Ladinian of the Austrian Alps; the Lower Illyrian Reifling limestones, the Carnian Tisovec limestones of the Slovak Karst in the West Carpathians.

Pseudonodosaria vulgata multicamerata (KRISTAN-TOLLMANN, 1964)

Pl. LXXX, fig. 10, 15

1964 *Rectoglandulina vulgata* (BORNEMANN, 1854) subsp. *multicamerata* n. ssp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 83–84, pl. 12, fig. 13–19.

Remark: The Carpathian forms usually consist of 4–5 chambers partly situated on one another, with a distinct micro- and macrospherical proloculus.

Dimensions: length 0,40–0,48 mm, width 0,25–0,27 mm.

Stratigraphical and geographical range: the Hallstatt limestones of the Slovak Karst in the West Carpathians.

LENTICULINA (LENTICULINA) LAMARCK, 1804

Lenticulina (Lenticulina) acutiangulata (TERQUEM, 1866)

Pl. LXXXI, fig. 8

1964 *Lenticulina (Lenticulina) acutiangulata* (TERQUEM, 1864) – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 110, pl. 20, fig. 4–5 (cum syn.).

Remark: The Carpathian specimens are most resemblant to the Alpine forms identified by E. KRISTAN-TOLLMANN (1964) as *Lenticulina (L.) acutiangulata* (TERQUEM, 1866)

Dimensions: diameter 0,33 mm, thickness 0,15 mm.

Stratigraphical and geographical range: similar profiles occur sporadically in the Norian Hallstatt limestones of the Slovak Karst.

Lenticulina (Lenticulina) excavata (TERQUEM, 1864)

Pl. CXLVI, fig. 3, no. 3

1964 *Lenticulina (Lenticulina) excavata* (TERQUEM, 1864) – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 110–111, pl. 20, fig. 6, pl. 21, fig. 6–7 (cum syn.).

Remark: The Carpathian specimens show more similar characters with the species identified as *Lenticulina (L.) excavata* (TERQUEM) by E. KRISTAN-TOLLMANN (1964).

Dimensions: diameter 0,5–0,7 mm.

Stratigraphical and geographical range: specimens smaller than those described from the Rhaetian of the Austrian Alps, occur in the Rhaetian Hybe Member of the West Carpathians.

Lenticulina (Lenticulina) subquadrata TERQUEM, 1866

Pl. LXXXI, fig. 11

1964 *Lenticulina (Lenticulina) subquadrata* (TERQUEM, 1862) – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 109, pl. 19, fig. 1, 2, 13, pl. 20, fig. 1 (cum syn.).

Remark: The described species has a large proloculum with 7–9 chambers. It is smaller than the Alpine Rhaetian forms.

Dimensions: proloculum 0,521 mm, test diameter 0,22 mm.

Stratigraphical and geographical range: the Anisian of the West Carpathians.

ASTACOLUS MONTFORT, 1808

Lenticulina (Astacolus) inquisita (TERQUEM, 1870)
Pl. CXLVI, fig. 3, no. 7

1964 *Lenticulina (Astacolus) inquisita* (TERQUEM, 1870) – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 116, pl. 23, fig. 3, pl. 25, fig. 2 (cum syn.).

Remark: The morphology and stratigraphical position of the Carpathian forms are identic with that of the Alpine forms, described by E. KRISTAN-TOLLMANN (1964).

Dimensions: height 0,40 mm, width 0,14 mm.

Stratigraphical and geographical range: Rhaetian marls (Hybe Member) in the West Carpathians.

Lenticulina (Astacolus) manutina manutina d'ORBIGNY, 1849
Pl. CXLVI, fig. 3, no. 5

1964 *Lenticulina (Astacolus) manutina manutina* d'ORBIGNY, 1849) – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 115, pl. 22, fig. 1–8, pl. 23, fig. 1 (cum syn.).

Remark: The forms are morphologically variable.

Dimensions: width 0,25 mm, height 0,45–0,50 mm.

Stratigraphical and geographical range: The Rhaetian marls (Hybe Member) of the West Carpathians (like in the Austrian Alps).

Lenticulina (Astacolus) pediaca (TAPPAN, 1955)
Pl. CXLVI, fig. 3, no. 6

1964 *Lenticulina (Astacolus) pediaca* (TAPPAN, 1955) – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 117, pl. 24, fig. 4, pl. 27, fig. 2–3 (cum syn.).

Remark: The West-Carpathian specimens are smaller than the holotype and specimens from the Austrian Alps. It may be due to paleoecological conditions.

Dimensions: height 0,26 mm, width 0,14 mm.

Stratigraphical and geographical range: the Rhaetian of the Nízke Tatry (Low Tatra) Mts. in the West Carpathians.

PLANULARIA DEFRANCE, 1824

Lenticulina (Planularia) filosa (TERQUEM, 1866)
Pl. LXXXI, fig. 3

1964 *Lenticulina (Planularia) filosa* (TERQUEM, 1866) – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 130, pl. 23, fig. 5–7 (cum syn.).

Remark: The Carpathian specimens are smaller than the Rhaetian and the Liassic forms.

Dimensions: height 0,34 mm, width 0,085 mm.

Stratigraphical and geographical range: the Anisian of the Slovak Karst in the West Carpathians.

ROBULOIDES REICHEL, 1945

Robuloides aff. *lens* REICHEL, 1945
Pl. LXXXI, fig. 4

1954 *Robuloides lens* REICHEL – K. V. MIKLUCHO-MAKLAY: Foraminifery verchnepermskich otloženij etc., p. 64, tab. 10, fig. 8–11 (cum syn.).
1956 *Robuloides lens* REICHEL, 1945, fide in: J. SIGAL: Otrjad Foraminifery, p. 108, pl. 13, fig. 4.

Remark: The Carpathian specimens have more chambers than the type species.

Dimensions: test diameter 0,40 mm, thickness 0,20 mm.

Stratigraphical and geographical range: the species described is from the Permian (fide J. SIGAL, 1956); in the West Carpathians the species occurs in the Norian Hallstatt limestones of the Slovak Karst.

Robuloides cf. *orientalis* (MIKLUCHO-MAKLAY, 1954)
Pl. LXXXI, fig. 9

1954 *Pararobuloides orientalis* sp. nov. – K. V. MIKLUCHO-MAKLAY: Foraminifery verchnepermskich otloženij etc., p. 65, tab. X, fig. 7.

Remark: The Carpathian specimen differs from the holotype in flattened side walls, more elongated test and smaller size.

Dimensions: diameter 0,52 mm, thickness 0,15 mm.

Stratigraphical and geographical range: the originally described species is from the Upper Permian of the Caucasus; in the West Carpathians it was found in the Norian Hallstatt limestones of the Slovak Karst.

LINGULINA d'ORBIGNY, 1826

Lingulina essayana DEECKE, 1886
Pl. LXXXII, fig. 17

1964 *Lingulina esseyana* DEECKE, 1886 – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 141, tab. 30, fig. 5–7 (cum syn.).

Remark: The Carpathian specimen in its atypical profile is ranged to the species *L. esseyana* DEECKE.

Dimensions: width 0,085 mm, length 0,21 mm.

Stratigraphical and geographical range: the Uppermost Norian to Lower Rhaetian (Dachstein limestones) of the Malé Karpaty Mts. in the West Carpathians.

FRONDICULARIA DEFRANCE, 1826

Frondicularia borealis TAPPAN, 1951
Pl. CXLVI, fig. 3, no. 11

1951 *Lingulina borealis* TAPPAN, n. sp. – H. TAPPAN: Foraminifera from the Artic Slope of Alaska, p. 13, pl. 4, fig. 14–17.
1964 *Frondicularia borealis* (TAPPAN, 1851) – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 143, pl. 30, fig. 13–18.

Remark: The Carpathian specimen are smaller and more slender than the holotype.

Dimensions: length 0,37 mm, width 0,14 mm.

Stratigraphical and geographical range: the described species originated from the Upper Trias of Alaska; in the Rhaetian of the Alps and of the West Carpathians (Hybe).

Frondicularia cf. *eulimbata* KRISTAN-TOLLMANN, 1964

Pl. LXXXI, fig. 15

1964 *Frondicularia eulimbata* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 149–150, pl. 32, fig. 13–14.

Remark: The Carpathian forms differ in some morphological characters from the originally described holotype.

Dimensions: length 0,47 mm, width 0,24 mm.

Stratigraphical and geographical range: the Rhaetian Hybe Member of the Nízke Tatry (Low Tatra) Mts. in the West Carpathians.

Frondicularia gerkei KRISTAN-TOLLMANN, 1964

Pl. CXLVI, fig. 3, no. 9

1964 *Frondicularia gerkei* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 144–145, pl. 30, fig. 19–21 (cum syn.).

1967 *Frondicularia gerkei* KRISTAN-TOLLMANN – J. SALAJ–O. JENDREJÁKOVÁ: Die Foraminiferen aus der Oberen Trias der Westkarpaten, p. 312, pl. XX, fig. 9.

Remark: The description of the Carpathian forms is identic with the original description.

Dimensions: length 0,50–0,65 mm, width 0,15–0,16 mm.

Stratigraphical and geographical range: the Rhaetian Hybe Member of the Nízke Tatry (Low Tatra) Mts. of the West Carpathians.

Frondicularia rhaetica KRISTAN-TOLLMANN, 1964

Pl. LXXXII, fig. 1, Pl. CXLVI, fig. 3, no. 10

1964 *Frondicularia rhaetica* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 146–147.

1967 *Frondicularia rhaetica* KRISTAN-TOLLMANN – J. SALAJ–O. JENDREJÁKOVÁ: Die Foraminiferen aus der Oberen Trias der Westkarpaten, p. 312, pl. XX, fig. 10.

Remark: The species has variable dimensions but its diagnosis is almost identic with the original description.

Dimensions: length 0,19–0,82 mm, width 0,19–0,55 mm.

Stratigraphical and geographical range: the Rhaetian Hybe Member of the Nízke Tatry (Low Tatra Mts.); smaller specimens occur in the Carnian Tisovec Limestones of the Slovak Karst in the West Carpathians.

Frondicularia woodwardi HOWCHIN, 1895

Pl. LXXXII, fig. 2–7, 9–13

1974 *Frondicularia woodwardi* HOWCHIN – A. GAŹDZICKI: Rhaetian microfacies; stratigraphy and facial development in the Tatra Mts., p. 59–60, pl. 39, figs 1–6 (cum syn.).

Remark: It is one of the most frequent species in the Trias of the West Carpathians. It is characterized by variable width and length of the test.

Dimensions: length 0,20–0,55 mm, width 0,02–0,10 mm.

Stratigraphical and geographical range: the Anisian-Rhaetian of all tectonic units in the West Carpathians.

Frondicularia xiphoidea **KRISTAN-TOLLMANN, 1964**
Pl. LXXXII, fig. 8, 14–16

1964 *Frondicularia xiphoidea* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 145–146, pl. 31, fig. 1–6.

Remark: The Carpathian specimens are generally smaller, their inner structure is identic with that of the specimens from the Austrian Alps.

Dimensions: length 0,30–0,40 mm, width 0,14–0,20 mm.

Stratigraphical and geographical range: The Carnian to Norian of the Muráň plateau; the Norian of the Slovak Karst and Stratenská hornatina Mts; the Rhaetian Hybe Member of the Choč nappe in the Nízke Tatry (Low Tatra) Mts. of the West Carpathians.

FALSOPALMULA BARTENSTEIN, 1948

Falsopalmula arignota **KRISTAN-TOLLMANN, 1964**
Pl. CXLVI, fig. 3, no. 8

1964 *Falsopalmula arignota* n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 154–155.

1967 *Falsopalmula arignota* KRISTAN-TOLLMANN – J. SALAJ–O. JENDREJÁKOVÁ: Die Foraminiferen aus der Oberen Trias der Westkarpaten, p. 312, pl. 20, fig. 8.

Remark: Morphologically well identifiable. Its diagnosis is identic with the original description.

Dimensions: length 0,75–1,00 mm, width 0,37–0,4 mm, thickness 0,10 mm.

Stratigraphical and geographical range: the Rhaetian Hybe Member of the West Carpathians; the Rhaetian Zlambach marls of the Austrian Alps.

FRONDINA SELLIER de CIVRIEUX et DESSAUVAGIE, 1965

Frondina permica **SELLIER de CIVRIEUX et DESSAUVAGIE, 1965**
Pl. CXLII, fig. 7

1965 *Frondina permica*, n. gen., n. ssp. – J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE: Reclassification de quelques Nodosariidae etc., p. 59–60, tab. V, fig. 17, 18, 21–23, 26–28, 33; pl. XIV, fig. 5, 8, 12; pl. XVII, fig. 1, 3, 5, 6.

Remark: The species is variable in number and in chamber width which may have secondary causes. The Carpathian forms are most resemblant to the specimen depicted by J. M. SELLIER de CIVRIEUX et T. F. J. DESSAUVAGIE (1965) in Pl. 5, fig. 23.

Dimensions: length 0,5 mm, width 0,16 mm.

Stratigraphical and geographical range: the Upper Permian of Turkey; the Lower Illyrian Reifling limestones of the Slovak Karst in the West Carpathians.

FRONDINODOSARIA SELLIER de CIVRIEUX et DESSAUVAGIE, 1965

Frondinodosaria pyrula **SELLIER de CIVRIEUX et DESSAUVAGIE, 1965**

Pl. CXLIV, fog. 8

1965 *Frondinodosaria pyrula*, n. gen., n. ssp. – J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE: Reclassification de quelques Nodosariidae etc., p. 62–63, pl. V, fig. 35, 38; pl. XVII, fig. 2, pl. XXIII, fig. 3.

Remark: The scarce specimens of the Carpathians differ from the original description in less flattened chambers, so they are not acute in profile – as postulated by the authors of the species (cf. Pl. 23, fig. 3) – but they are subacute to subspherical.

Dimensions: length 0,12–0,13 mm, width 0,12–0,13 mm.

Stratigraphical and geographical range: scarce in the assemblage of free "nodosaroid" foraminifers in the Lower Illyrian Reifling limestones of the Slovak Karst in the West Carpathians.

Frondinodosaria semiornata **(REUSS, 1863)**

Pl. CXLIV, fig. 9

1965 *Frondinodosaria semiornata* (REUSS), fide – J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE: Reclassification de quelques Nodosariidae etc., p. 64, pl. XXIII, fig. 9.

Remark: The Carpathian specimens are finely costate on the surfaces of chambers whereas the type species described from the Gaultian is only costate in the lower parts of chambers.

Dimensions: length 1,1 mm, width 0,14 mm.

Stratigraphical and geographical range: the Lower Illyrian Reifling limestones of the Slovak Karst in the West Carpathians.

PROTONODOSARIA GERKE, 1959

Protonodosaria globifrondina **SELLIER de CIVRIEUX et DESSAUVAGIE, 1965**

Pl. CXLII, fig. 4

1965 *Protonodosaria globifrondina*, n. sp. – J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE: Reclassification de quelques Nodosariidae etc., p. 67, pl. V, fig. 24; pl. IX, fig. 5; pl. XV, fig. 1; pl. XVI, fig. 7.

Remark: The forms ranged to the described species differ from the originally described species in lower, subspherical chambers and variable width of the first 4 chambers.

Dimensions: length 0,58 mm, width in apical part 0,24 mm.

Stratigraphical and geographical range: sporadical in the assemblage of free "nodosaroid" foraminifers in the Lower Illyrian Reifling limestones.

ICHTYOLARIA WEDEKIND, 1935

Ichtyolaria primitiva **SELLIER de CIVRIEUX et DESSAUVAGIE, 1965**

Pl. CXLIV, fig. 12, Pl. CXLV, fig. 10

1965 *Ichtyolaria primitiva*, n. sp. – J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE: Reclassification de quelques Nodosariidae etc., p. 74, pl. V, fig. 30–31.

Remark: The specimens agree in number and shape of chambers with the original description of the unornamented specimen (Pl. V, fig. 30).

Dimensions: length 0,62–1,3 mm, width 0,28–0,62 mm.

Stratigraphical and geographical range: the Lower Illyrian Reifling limestones of the Slovak Karst (scarce occurrence).

AUSTROCOLOMIA OBERHAUSER, 1960

Austrocolomia canaliculata **KRISTAN-TOLLMANN, 1964**

Pl. LXXXI, fig. 2

1964 *Kion canaliculata* n. gen., n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 64–65, Abb. 6, no. 1–2.

1967 *Austrocolomia canaliculata* (KRISTAN) – R. OBERHAUSER: Zum Vorkommen der Foraminiferengattung *Austrocolomia* in der ostalpinen Trias, p. 195, Abb. 1, fig. 1, 4, 5, 6.

Remark: The Carpathian forms are most resemblant to the species described from the Alps by E. KRISTAN-TOLLMANN (1964).

Dimensions: length 0,28–0,80 mm, width 0,19–0,25 mm.

Stratigraphical and geographical range: in contrast to the Alps (cf. R. OBERHAUSER, l. c.) the species appeared as early as the Carnian in the West Carpathians.

Austrocolomia cordevolica **OBERHAUSER, 1967**

Pl. CXLIII, fig. 8, 9

1967 *Austrocolomia cordevolica* n. sp. – R. OBERHAUSER: Zum Vorkommen der Foraminiferengattung *Austrocolomia* in der ostalpinen Trias, p. 195, Abb. 1, fig. 21a, b, c, d. 22a, b; 23a, b; 24a, b.

Remark: The Carpathian specimens are identic with the originally described specimen.

Dimensions: length 0,75–0,85 mm, width 0,20–0,22 mm.

Stratigraphical and geographical range: the Lower Illyrian Reifling limestones of the Slovak Karst; the Ladinian-Lower Carnian of the Alps.

Austrocolomia marschalli **OBERHAUSER, 1960**

Pl. LXXXI, fig. 5, 7, 10, 13; Pl. CXLII, fig. 9; Pl. CXLIII, fig. 11, 12, 13, 14; Pl. CXLVI, fig. 3, no. 12

1960 *Austrocolomia marschalli* nov. gen. nov. sp. – R. OBERHAUSER: Foraminiferen und Mikrofossilien etc., p. 38, pl. 1, fig. 42, 42a, 43, 43a, 44–46, 52.

1967 *Austrocolomia marschalli* OBERHAUSER – R. OBERHAUSER: Zur Vorkommen der Foraminiferengattung *Austrocolomia* in der ostalpinen Trias, p. 196, Abb. 1, fig. 7a, b. 8a, b, 9–20.

Remark: The species is characterized by an angular rim in the central parts of chambers.

Dimensions: length 0,40–0,50 mm; width 0,18–0,25 mm.

Stratigraphical and geographical range: the Upper Anisian-Rhaetian of the West Carpathians; the same stratigraphical position in the Alps, Turkey, a. o.

Austrocolomia ploechingeri **OBERHAUSER, 1960**

Pl. CXLII, fig. 10

1960 *Pseudoglandulina plöchingeri* nov. sp. – R. OBERHAUSER: Foraminiferen und Mikrofossilien "incertae sedis" etc., p. 27–28, pl. 1, fig. 1–41.

Remark: The species description is identic with the original diagnosis. It was ranged to the genus *Austrocolomia* OBERHAUSER 1960, and 1965 by J. M. SELLIER de CIVRIEUX – T. F. J. DESSAUVAGIE.

Dimensions: length 0,70–0,80 mm, width 0,18 mm.

Stratigraphical and geographical range: the Upper Anisian of the Carpathians (sporadical occurrence); the Ladinian and the Carnian of the Alps. According to J. M. SELLIER de CIVRIEUX–T. F. J. DESSAUVAGIE (1965) it appeared as early as the Upper Permian.

Austrocolomia primitiva n. sp.

Pl. CXLIII, fig. 10

Type species: The specimen in Pl. CXLIII, fig. 10; in the depository of the D. ŠTÚR Institute of Geology in Bratislava.

Denomination: primitiva (Lat.) = simple.

Type level: Lower Illyrian Reifling limestones.

Type locality: Gombasek G-3, Slovak Karst.

Material: 5 specimens.

Description: The uniserial test consists of a spherical proloculus and 7–8 subspherical chambers. The species is characterized by the subangular outline of the profile of the central part of chamber, which is typical of the genus *Austrocolomia* OBERHAUSER, 1960. It differs from the above described phylogenetically related species in a fine rim. The aperture is circular, terminal.

Dimensions: length 1,00–1,20 mm, width 0,18–0,19 mm.

Stratigraphical and geographical range: the Lower Illyrian Reifling limestones.

GRILLINA KRISTAN-TOLLMANN, 1964

Grillina grilli KRISTAN-TOLLMANN, 1964

Pl. LXXXI, fig. 6

1964 *Grillina grilli* n. gen. n. sp. – E. KRISTAN-TOLLMANN: Die Foraminiferen aus den rhätischen Zlambach-mergeln etc., p. 65–67, pl. 34, fig. 3–9.

Remark: The sporadical Carpathian specimens are identic with the originally described species.

Dimensions: length 0,17 mm, width of apical part of test 0,16 mm.

Stratigraphical and geographical range: the Rhaetian of the Austrian Alps, the Norian Hallstatt limestones of the Slovak Karst in the West Carpathians.

PSEUDOGLANDULINA CUSHMAN, 1929

Pseudoglandulina conica MIKLUCHO-MAKLAY, 1954

Pl. VIII, fig. 3

1954 *Pseudoglandulina conica* sp. nov. – K. V. MIKLUCHO-MAKLAY: Foraminifery verchnepermskich otloženij etc., p. 37–38, pl. IV, fig. 1, 3.

Remark: The Carpathian forms are ranged to the above species with which they are morphologically identic.

Dimensions: length 0,52 mm, width 0,30 mm.

Stratigraphical and geographical range: the Anisian of the West Carpathians (scarce occurrences); the holotype described was from the Upper Permian of the Caucasus.

TURRISPIRILLINA CUSHMAN, 1927

Turrispirillina carpathorumana TURCULET, 1970
Pl. CXXIX, fig. 1

1976 *Turrispirillina carpatho-rumana* TURCULET, 1970 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 154, pl. 14, fig. 24, 25 (cum syn.).

Remarks: The Carpathian specimen is identical with the holotype in its morphological features.

Dimensions: Width 0,24–0,25 mm, height 0,6 mm.

Stratigraphical and geographical range: Originally described from the Norian of the Rumanian Carpathian (L. ZANINETTI 1976). In the West Carpathians it is found in the facies of the organo-detritic Limestones of the uppermost Norian to Lower Rhaetian.

Turrispirillina minima PANTIĆ, 1967
Pl. LXXXIV, fig. 1–12

1976 *Turrispirillina minima* PANTIĆ, 1967 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 154–155, pl. 23, fig. 1–3 (cum syn.).

Remark: Carpathian specimens are identic with the species *Turrispirillina minima* PANTIĆ.

Dimensions: diameter 0,2–0,4 mm, width 0,07–0,2 mm.

Stratigraphical and geographical range: The Norian-Rhaetian of the Dinarides; the Norian Furmanec limestones, the Uppermost Norian – Lower Rhaetian Dachstein limestones of the Muránska planina plateau in the West Carpathians.

Turrispirillina praealpina ZANINETTI et BROENNIMANN, 1972
in ZANINETTI, BROENNIMANN et BAUD, 1972
Pl. CXXIX, fig. 2–5

1976 *Turrispirillina praealpina* ZANINETTI et BRÖNNIMANN (in ZANINETTI, BRÖNNIMANN et BAUD, 1972) – L. ZANINETTI: Les Foraminifères du Trias etc., p. 155, pl. 14, fig. 26–30.

Remark: Like in the Swiss Alps, also in the West Carpathians the species *Turrispirillina praealpina* is highly variable, particularly in the height of the spiral part of the test. The variability is, however, common within the range of the original species diagnosis.

Dimensions: width of basal part of test 0,30–0,35 mm, height 0,18–0,25 mm.

Stratigraphical and geographical range: The originally described form comes from the Upper Anisian of the Swiss Alps; the Ladinian-Rhaetian of the West Carpathians.

Archaediscidae CUSHMAN, 1928
Archaediscinae CUSHMAN, 1928

Representatives of the family – the Upper Paleozoic genera *Archediscus* BRADY, 1873 and *Brunssia* MICHAILOV, 1939 have not been found in the Trias in our country so far.

Permodiscinae nov. subfamily

The subfamily comprises genera with two layered, unfolded test, without columns. Deuteroloculus is unsegmented, coiling planispiral. Oscillation stage is usually in one or more levels, or ball-like and trochospiral. Only the genus *Triasina* MAJZON, 1954 has a segmented deuteroloculus and a test with supporting columns. The subfamily includes the following genera:

Permodiscus DUTKEVICH in CHERNYSCHEVA, 1948
Auloconus PILLER, 1978
Aulotortus WEYNSCHENK, 1956
Rakusia SALAJ, in SALAJ, BIELY et BYSTRICKÝ, 1967, emend. SALAJ, 1969
Angulodiscus KRISTAN, 1957, emend. SALAJ, 1976
Semiinvoluta KRISTAN, 1957
Coronipora KRISTAN, 1958
Lamelliconus PILLER, 1978
Triasina HANTKEN, 1954

Involutininae BUETSCHLI, 1880

The subfamily can eventually be defined as an independent family. But the proposed system takes in consideration affinity of the Liassic species *Involutina liassica* JONES to the Triassic representatives of the subfamily *Permodiscinae* SALAJ, 1983. They only differ from them in a folded test with columns and in one-layered test.

Involutininae BUETSCHLI, 1880
Involutina BUETSCHLI, 1880
Trochonella KRISTAN, 1957

The most significant and most frequent group of Triassic foraminifers consists of representatives of the nov. family *Permodiscinae*. It is the most thoroughly studied family in the world because most taxa have a narrow stratigraphical range. Detail zonation of the Trias of the West Carpathians (J. SALAJ, 1969, 1978, 1979, A. GAŻDZICKI 1974) was based on this group.

The most primitive planispiral forms of the genus *Permodiscus* DUTKEVICH in CHERNYSHEVA, 1948 are in the whole Trias, whereas the first representatives of the genus *Lamelliconus* PILLER, 1978 appear since the Upper Anisian, and the species of the genus *Aulotortus* WEYSCHENK, 1956 appear since the Carnian (including Cordevolian).

The Norian and the Rhaetian are characterized by the species of the genera *Rakusia* SALAJ, 1967; emend. SALAJ, 1969; *Semiinvoluta* KRISTAN, 1957: *Coronipora* KRISTAN, 1958; *Angulodiscus* KRISTAN, 1957, emend. Salaj, 1976, and by the representatives of the genus *Triasina* MAJZON, 1954. In the Norian and the Rhaetian also appear the representatives of another significant phylogenetic line, namely of the genus *Auloconus* PILLER, 1978. Species of the genera of subfamily Involutininae BUETSCHLI, 1980, *Involutina* BUETSCHLI, 1880 and *Trochonella* KRISTAN, 1957 appear in the Norian and culminate in the Lias.

From the view of phylogenesis the genus *Permodiscus* DUTKEVICH in CHERNYSHEVA, 1948 is a significant ancestral form from which other phylogenetic lines developed.

1. Phylogenetic and taxonomic position of the genera *Lameliconus* PILLER, 1978, *Auloconus* PILLER, 1978, *Trochonella* KRISTAN, 1957 and *Trocholina* PAALZOV, 1922.

L. KOEHN-ZANINETTI (1969) divided Triassic "trocholines" according to test structure into three groups:

a) Anisian-Carnian "small trocholines" with small planispiral tubular deuteroloculus. The spiral stage consists of many tightly aligned whorls (15–20 according to R. OBERHAUSER 1957, 1964). Such forms are represented by the genus *Lamelliconus* PILLER, 1978 including *Lamelliconus ovulus* (SALAJ in J. SALAJ, J. BIELY, J. BYSTRICKÝ 1967), *Lamelliconus biconvexus* (OBERHAUSER) whose test structure has not been described completely so far. The spectrum also comprises the species *Lamelliconus procerus* (LIEBUS).

b) Norian-Rhaetian "larger trocholines" seem unrelated to the Carnian species (cf. Fig. 1,5). They have involute coiling, exceptionally evolute in the adult stage. The last whorl terminated with distinctly rounded apical end observable only on the surface of the last external whorl. The spiral consists of six-seven whorls and the deuteroloculus diameter is large. The umbilical mass of the "trocholines" is large, without pillars. This group of "trocholines" is large, without pillars. This group of "trocholines" is represented by the genus *Auloconus* PILLER, 1978 (Fig. 20).

c) The third group of "trocholines" comprises representatives of the genus *Trochonella* (KRISTAN, 1957) which – in contrast to the former have folded only the basal part of the wall and the pillars. The group is derived from the genus *Involutina* BUETSCHLI and ranged to the subfamily Involutininae.

d) The genus *Trocholina* (PAALZOW, 1922) is ranged to the family Spirillinidae in accordance with BERMÚDEZ (1952).

2. Phylogenetic and taxonomic position of the genus *Aulotortus* WEYNSCHENK, 1956 and *Rakusia* SALAJ, 1967 emend. 1969.

Reprezentatives of the genus *Aulotortus* WEYNSCHENK, 1956 (Carnian-Rhaetian) and *Rakusia* SALAJ, 1967, emend. 1969 (Upper Carnian-Norian) developed from a planispiral form (represented by the genus *Permodiscus*) whose further evolutionary stage shows the change of planispiral coiling to oscillation. Forms with such coiling differ in basical diagnostic characters from the ancestral taxon and they are ranged to the genus *Aulotortus* WEYNSCHENK. Forms with coiling of deuteroloculus of two different modes are ranged to the genus *Rakusia*. Detailed study of factologic material revealed the phylogenetic line *Permodiscus* → *Aulotortus* → *Rakusia* (Fig. 21).

3. Phylogenetic and taxonomic position of the genus *Triasina* MAJZON, 1954.

Segmentation of deuteroloculus of the genus *Permodiscus* DUTKEVICH in CHERNYSHEVA, 1948 is a new element in the evolutionary trend of the genera *Permodiscus* → *Triasina* (cf. R. OBERHAUSER 1964, L. KOEHN-ZANINETTI–P. BRÖNNIMANN, 1968). Basing on variable degree of segmentation and other orthogenetic characters, and of chronology we may distinguish within the generospectrum of the genus *Triasina* a phylogenetic line represented by the ancestral form *Permodiscus pragsoides* OBERHAUSER from which developed transitional forms to the species *Triasina oberhauseri* KOEHN-ZANINETTI et BRÖNNIMANN. Descentral form of this line is *Triasina hantkeni* MAJZON.

4. Phylogenetic and taxonomic position of the orders *Semiinvoluta* KRISTAN, 1957; *Coronipora* KRISTAN, 1957 and *Involutina* BUETSCHLI 1880.

Representatives of the genera *Semiinvoluta* KRISTAN, 1957 and *Coronipora* KRISTAN, 1957 are very frequent in the Norian and Rhaetian. In the course of their evolution the representatives of the genera show new orthogenetic elements in the test structure. The test gets asymmetrically planispiral so that its dorsal and ventral sides can be distinguished, and its walls get thicker (especially on the genus *Coronipora* KRISTAN, 1957).

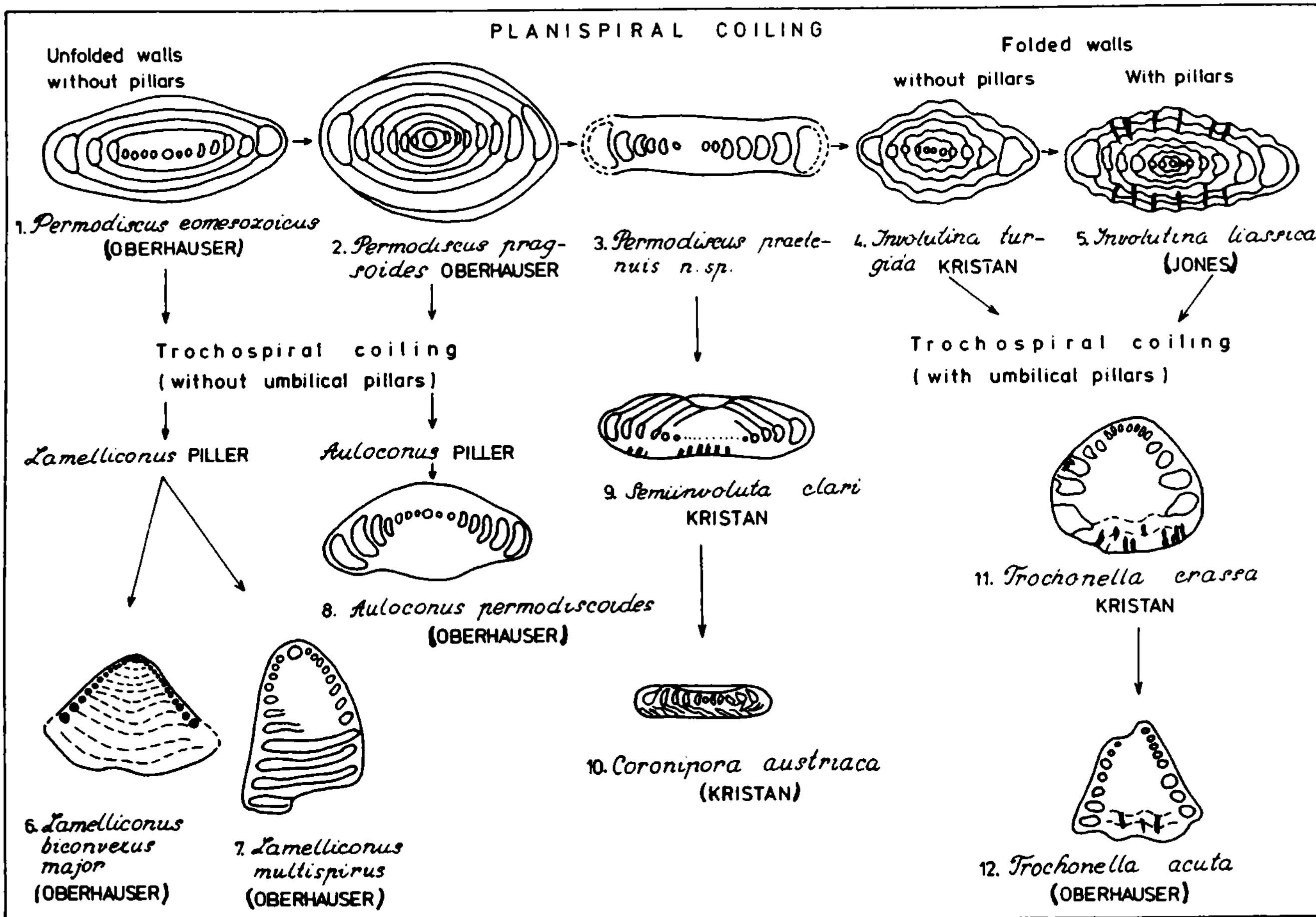


Fig. 20 Phylogenetic development of planispiral and trochospiral genera of the family *Archaediscidae* CUSHMAN, 1928

Symmetrical and planispiral forms with thicker, undulating wall which appear in the Uppermost Rhaetian, are the oldest and most primitive forms of the genus *Involutina* BUETSCHLI, 1880. Such forms are generally ranged to the species *Involutina* ex gr. *liassica* (JONES) whose wall structure differs markedly from other species of individual genera of the nov. subfamily *Permodiscinae*.

5. Phylogenetic and taxonomic position of the genus *Angulodiscus* KRISTAN, 1957 emend. SALAJ, 1976.

This group comprises forms whose oscillation of deuteroloculum commences in its initial stage, immediately after proloculus. Deuteroloculum has irregular to streptospiral coiling. All such forms are ranged to the genus *Angulodiscus* KRISTAN, 1957.

Type species of the genus is *Angulodiscus communis* (KRISTAN 1957, Pl. XXIII, Fig. 1a, b) whose B form is completely planispiral. Gradually new elements appear in the coiling; i. e. the streptospiral stage. According to E. KRISTAN (l. c). this stage can be seen on its form A which remains in the genus *Angulodiscus* KRISTAN 1957 (cf. J. SALAJ 1969, J. HOHENEGGER–W. PILLER 1975). Since the type species of the genus *Angulodiscus* KRISTAN 1957 has the initial streptospiral coiling of deuteroloculum only in form B, it was necessary to emend the species (J. SALAJ 1976). As a complementary species, *Ang. friedli* (KRISTAN-TOLLMANN) was suggested. Its A and B forms have streptospiral deuteroloculum already from the initial stage.

From phylogenetic view, two lines can be distinguished in the genus *Angulodiscus* KRISTAN emend. SALAJ, namely:

a) *Permodiscus tumidus* (KRISTAN-TOLLMANN) → *Angulodiscus falsotumidus* n. sp. → *Angulodiscus pokornyi* SALAJ. This line represents more primitive forms terminated with the oscillation stage.

b) The second evolutionary line is phylogenetically more progressive. In the course of its evolution it gets a complete streptospiral stage of deuteroloculum. The streptospiral stage is morphologically quite different from the analogous stage of the genus *Glomospirella* PLUMMER 1945. This group is characterized by the following line: *Permodiscus pragsoides* OBERHAUSER → *Angulodiscus communis* KRISTAN → *Angulodiscus praetumidus* n. sp. → *Angulodiscus friedli* (KRISTAN-TOLLMANN). It should be mentioned that J. SALAJ (1969) regarded the species *Angulodiscus? gaschei gaschei* KOEHN-ZANINETTI et BRÖNNIMANN as a synonymum to the species *Angulodiscus friedli* (KRISTAN-TOLLMANN). This is also the opinion of J. HOHENEGGER and W. PILLER 1975. Later on J. SALAJ (1979) admitted validity of the species *Angulodiscus gaschei* KOEHN-ZANINETTI et BROENNIMANN. Both morphologically identic species resulted from polyphylitic evolution, and *Aulotortus sinuosus* WEYNSCHENK and *Rakusia oberhauseri* SALAJ are to be regarded as ancestral forms of the species *Angulodiscus gaschei praegaschei* (KOEHN-ZANINETTI) and *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI et BROENNIMANN (Fig. 21).

Subfamilies *Permodiscinae* nov. subfam. are now so well defined that their independent taxonomic position is reasoned without respect to the fact, that L. KOEHN-ZANINETTI (1969) regards most genera as synonyms of the genus *Involutina* BUETSCHLI 1880. The last taxon, when compared to single genera of nov. subfamily *Permodiscinae* had the most complete evolution, so its first appearance is dated to the Uppermost Rhaetian-Hettangian. According to the existing information about the wall structure it is very likely that representatives of the genus *Involutina* BUETSCHLI 1880 have not the double test wall. But it was proved on some specimens of the species *Aulotortus sinuosus* WEYNSCHENK (J. SALAJ, A. BIELY and J. BYSTRICKÝ 1967, Pl. 5, Fig. 4; cf. also L. ZANINETTI–P. BRÖNNIMANN 1965, p. 704), and on a specimen of the species *Semiinvoluta clari* KRISTAN that the test had two walls which confirms taxonomic validity of the two genera mentioned. This is in accordance with the study of L. ZANINETTI–P. BRÖNNIMANN (1966, p. 704), who wrote: "...que notre étude des

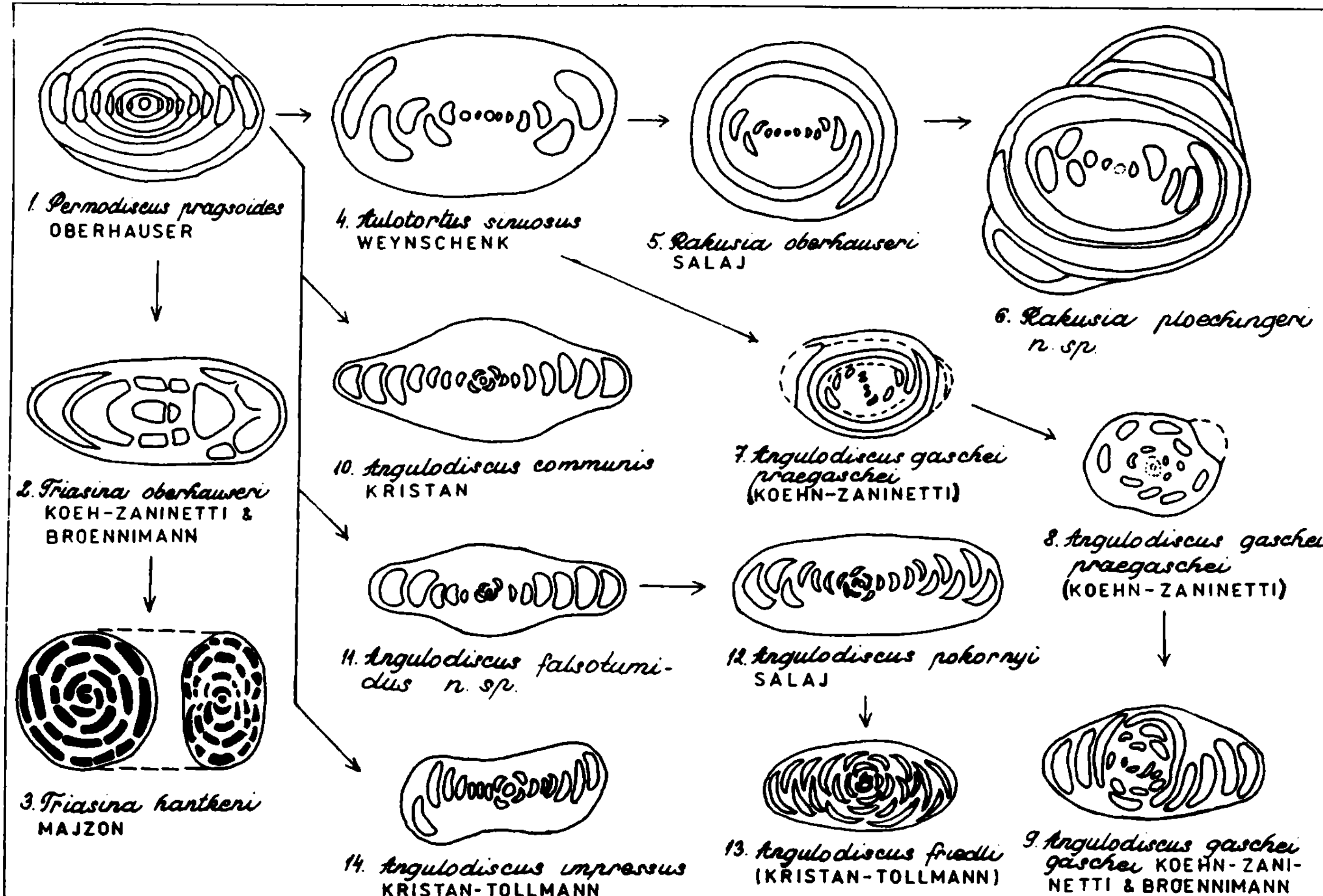


Fig. 21 Phylogenetic development of the genera *Aulotortus* WENSCHENK, 1956; *Rakusia* SALAJ, 1967; *Angulodiscus* KRISTAN, 1957 emend. SALAJ, 1975 and *Triasina* MAJZON, 1954 of family *Archaediscidae* CUSHMAN, 1928

Foraminifères du Trias supérieur nous a montré que l'on peut distinguer des tests à double paroi incontestable; nous avons examiné, par example, grâce à l'obligeance de M. R. OBERHAUSER *Permodiscus pragsoides* OBERHAUSER, 1964, d'âge carnien". So the definition of the nov. subfamily *Permodiscinae* and its indenpendence from the subfamily Involutininae BUETSCHLI 1880 are reasoned.

6. The importance of wall structure and coiling for the classification of Triassic foraminifers of subfamilies Permodiscinae and Involutininae.

The study of well preserved Triassic material from the West Carpathians showed that most genera of the family (except the genus *Involutina* BUETSCHLI 1880) consist of proloculus and deuteroloculus, composed of two layers. For this reason, and from the evolution view, we can see certain time shift in the change of test coiling and so we cannot agree with L. KOEHN-ZANINETTI (1969) who regards the genera *Permodiscus, Aulotortus* and *Rakusia* as synonyms of the genus *Involutina.*

L. KOEHN-ZANINETTI (1969) also ranged another important genus *Angulodiscus* to synonyms of the genus *Glomospirella* PLUMBER 1945, whereas some representatives of the genus like *Angulodiscus friedli* (KRISTAN-TOLLMANN), *Angulodiscus expansus* (KRISTAN-TOLLMANN) and *Angulodiscus paralellus* (KRISTAN-TOLLMANN), formerly ranged to the genus *Glomospirella*, were then ranged either to the genus *Angulodiscus* (J. SALAJ 1969) or *Involutina* (J. HOHENEGGER et W. PILLER 1975a) on the basis of proved hyaline-radial or hyaline-granular layer. This is why J. HOHENEGGER et W. PILLER (1975a) ranged the species *Involutina gaschei* with hyaline-radial layer of test wall to the synonyms of the species *Involutina friedli* (KRISTAN-TOLLMANN), whereas J. SALAJ (1969), basing on morphological resemblance, ranged it first to the synonyms of the species *Angulodiscus friedli* (KRISTAN-TOLLMANN) and only later admitted its species validity on the basis of its polyphylitic evolution. The phylogenetic line of this group of taxa is as follows: *Aulotortus sinuosus* WEYNSCHENK → *Rakusia oberhauseri* SALAJ → *Angulodiscus gaschei praegaschei* (KOEHN-ZANINETTI) → *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI et BROENNIMANN.

Some contradictions in opinions about systematic position of individual genera and species of the family Involutinidae are due to variable recrystallization of tests. So the problem was paid particular attention. Some species of more or less well preserved specimens of genera show that proloculus and deuteroloculum formed of morphologically variable tube, have double wall (J. SALAJ 1978). It consists of an outer, hyaline-radial or hyaline-granular layer, and of an inner, darker, microgranular (inaequigranular) layer. According to L. KOEHN-ZANINETTI (1969) and J. HOHENEGGER et W. PILLER (1975a, b) the inner layer of the genera of this family is absent, but the secondary inner layer can result from micritization.

The inner layer formed simultaneously with protoplasma advancing from deuteroloculum, from which it extended to the inner side of the hyaline-radial or hyaline-granular wall, and later on to the outer side of the preceding whorl. So the outer layer of the last whorl is always single. In the area of deuteroloculum is also an inner darker microgranular layer. It does not exist out of deuteroloculum. So on involute or partly involute forms (e. g. *Semiinvoluta clari*) the individual hyaline-radial or hyaline-granular layers of individual whorls are divided from one another by interstices, so they have no inner microgranular layer. As a rule, the interstices get removed by recrystallization to form a thickened layer with tiny columns on younger forms.

These layers are perfectly folded on the phylogenetically youngest genus *Involutina* BUETSCHLI, 1880. In this, and in probable presence of only one hyaline-radial or hyaline-granular layer, this genus and the genus *Trochonella* KRISTAN, 1952 differ from individual genera of nov. subfamily Permodiscinae.

The genus *Triasina*, on its depicted species *Triasina hantkeni* MAJZON in L. KOEHN-ZANI-

NETTI et P. BRÖNNIMANN (1969; Fig. 5, 6, mainly Fig. 1) shows on its deuteroloculum a thin hyaline-granular layer, fringed on both sides by the inner microgranular layer. The inner layers are connected by columns reinforcing the spherical deuteroloculum, seemingly divided into many chambers by the columns. It means that also this genus, the most advanced one in the subfamily Permodiscinae, has two layers (J. SALAJ 1978).

In accordance with J. HOHENEGGER et W. PILLER (1975a) we range subfamilies Permodiscinae SALAJ, 1983 and Involutininae BUETSCHLI, 1880 to the order Tournayellida HOHENEGGER et PILLER 1975 and to the suborder Spirillina HOHENEGGER et PILLER whose definition is as follows: "the wall structure consists of two layers: the outer hyaline layer and the inner inequigranular layer which get lost in the course of evolution". Conception of this system differs from that of L. ZANINETTI (1976) who denoted the family Involutinidae BUETSCHLI, 1880 as superfamily of the suborder Rotallina DELAGE et HÉRAGARD 1896.

Since the involute Triassic foraminifers were recently studied in detail by L. ZANINETTI (1974), we shall here only present a brief characteristic of genera, and a list and stratigraphical range of the species identified in the West Carpathians.

Archaediscidae CUSHMAN, 1928
Permodiscinae nov. subfamily
PERMODISCUS DUTKEVICH CHERNYSHEVA, 1948

Type species: *Permodiscus vetustus* MIKLUCHO-MAKLAY, 1953

Diagnosis: The test consists of two chambers: the proloculus and the tubular deuteroloculum coiled in a regular planispiral form. The test wall is calcareous, double, perforated, lamellous, microgranular.

Stratigraphical range: Carboniferous-Trias.

The genus comprises the following species:.

Permodiscus eomesozoicus (OBERHAUSER, 1957)

Pl. LXXXVII, fig. 1–7; pl. LXXXVIII, fig. 1–5; pl. LXXXIX, fig. 1–8

1957 *Trocholina* (*Paratrocholina*) *eomesozoica* sp. nov. – R. OBERHAUSER: Ein Vorkommen von *Trocholina* etc., p. 266, pl. XXI, fig. 38–41; Abb. 1, fig. ž, 7.

Stratigraphical range: The Uppermost Norian-Lower Rhaetian facies of the Dachstein limestones in the Nízke Tatry Mts., Muránska planina plateau, Stratenská hornatina Mts. in the West Carpathians.

Permodiscus hybensis (SALAJ; in SALAJ, BIELY et BYSTRICKÝ, 1967)

Pl. XC, fig. 1; Pl. CV, fig. 3

1967 *Arenovidalina hybensis* SALAJ, nov. sp. – J. SALAJ – A. BIELY – J. BYSTRICKÝ: Trias-Foraminiferen in den Westkarpaten, p. 125, pl. 4, fig. 4.

Type species: Pl. CV, fig. 3; paratype: Pl. XC, fig. 1.

Stratigraphical range: the Uppermost Norian – Lower Rhaetian Dachstein limestone facies in the Nízke Tatry Mts.

Permodiscus macrostomus (KRISTAN, 1957)

Pl. XL, fig. 2–4, 6

1957 *Angulodiscus macrostoma* nov. gen. nov. sp. – E. KRISTAN: *Ophthalmidiidae* und *Tetrataxinae* (Foraminifera) etc., p. 279–280, pl. XXIII, fig. 8a, b, c; 9.

Stratigraphical range: the Carnian Tisovec limestones in the Slovak Karst, the Uppermost Norian-Lower Rhaetian Dachstein limestones in the Muránska planina plateau and Norian of the Strážovské vrchy Mts.

Permodiscus minutus (Koehn-Zaninetti, 1969)
Pl. XC, fig. 7–15

1969 *Involutina minuta* n. sp. – L. Koehn-Zaninetti: Les Foraminifères du Trias de la région C Almtal (Haute-Autriche), p. 132–134, text-fig. 40a–e.

Stratigraphical range: the Uppermost Norian – Lower Rhaetian Dachstein limestone facies of the Nízke Tatry Mts. and Muráň plateau in the West Carpathians.

Permodiscus planidiscoides Oberhauser, 1964
Pl. XCI, fig. 1–7; Pl. CVII, fig. 1

1964 *Permodiscus planidiscoides* nov. sp. – R. Oberhauser: Zur Kenntnis der Foraminiferengattungen *Permodiscus*, *Trocholina* und *Triasina* etc., p. 199–200, pl. 1, fig. 11, 15a, b.

Stratigraphical range: The Wetterstein Ladinian limestones of the Brezovské Karpaty Mts. and the Uppermost Norian-Lower Rhaetian Dachstein limestones of the Muránska planina plateau and of the Nízke Tatry Mts.

Permodiscus praecommunis n. sp.
Pl. LXXXV, fig. 1–6; Pl. LXXXVI, fig. 1–6

Type species: The specimen in Pl. LXXXVI, fig. 4; in the depository of the Geological Institute of the Slovak Academy of Science in Bratislava, thin section No. By. 5199.

Denomination: prae (lat.) = preceding (the species *Angulodiscus communis* Kristan, 1957).

Type level: The Uppermost Norian-Lower Rhaetian Dachstein limestones.

Type locality: railway cut, Hybe, the Nízke Tatry. Mts.

Material: plentiful.

Description: The newly defined taxon comprises forms with planispiral deuteroloculum, the species *Angulodiscus communis* Kristan, 1957 comprises forms with oscillation- to clew-shaped initial deuteroloculum (for detail see J. Salaj 1969, 1975, 1978). The species *Permodiscus praecommunis* n. sp. comprises specimens with microspherical (Pl. LXXXVI, fig. 2) and macrospherical proloculus (Pl. LXXXVI, fig. 4–5).

Dimensions: diameter 0,67–0,70 mm, thickness 0,25–0,28 mm.

Stratigraphical range: the Norian Furmanec limestones of the Stratenská hornatina Mts., the Uppermost Norian-Lower Rhaetian of the Muránska planina plateau and the Nízke Tatry Mts. of the West Carpathians.

Permodiscus praeimpressus n. sp.
Pl. XC, fig. 5; Pl. CV, fig. 2c

Type species: The specimen in Pl. CV, fig. 2c; in the depository of the Geological Institute of the Slovak Academy of Science in Bratislava, thin section No. By. 123.

Denomination: prae (Lat.) = preceding (to the species *Angulodiscus impressus* KRISTAN-TOLLMANN, 1964).
Type level: the Upper Carnian Tisovec limestones.
Type locality: Silická Brezová, Slovak Karst.
Material: scarce.
Description: The newly defined species comprises forms with planispiral deuteroloculum in contrast to the phylogenetically younger species *Angulodiscus impressus* KRISTAN-TOLLMANN, 1964, with clew-like initial deuteroloculum. Other morphological characters of the two species are more-or-less identical and many authors range them to one taxon. The newly described species is a phylogenetical ancester of the stratigraphically younger species *Angulodiscus impressus* KRISTAN-TOLLMANN.
Dimensions: diameter 0,38–0,65 mm, thickness 0,08–0,13 mm.
Stratigraphical range: the Wetterstein (Ladinian-Lower Carnian), and the Carnian Tisovec limestones in the West Carpathians.

Permodiscus praetenuis n. sp.

Pl. XCIII, fig. 1–19

Type species: The specimen in Pl. XCIII, fig. 12; in the depository of the Geological Institute of the Slovak Academy of Science in Bratislava, thin section No. Bo. 5137.
Denomination: prae (Lat.) = preceding (to the species *Angulodiscus tenuis* KRISTAN, 1957).
Type level: the Uppermost Norian-Lower Rhaetian Dachstein limestones.
Type locality: Veľká Lúka, the Muránska planina plateau.
Material: plentiful.
Description: In contrast to *Angulodiscus tenuis* KRISTAN 1957 the described taxon comprises forms with planispiral deuteroloculum. The forms have also microspherical (Pl. XCIII, fig. 13) and macrospherical (Pl. XCIII, fig. 12, 15) proloculus. The test is usually flat, partly concave in the central part or slightly convex.
Dimensions: diameter 0,21–0,78 mm, thickness 0,06–0,17 mm.
Stratigraphical range: the Uppermost Norian-Lower Rhaetian Dachstein limestones of the Nízke Tatry Mts. and Muránska planina plateau.

Permodiscus pragsoides OBERHAUSER, 1964

Pl. XI, fig. 3a; Pl. XLIII, fig. 3b; Pl. XCII, fig. 1–6; Pl. CV, fig. 2a

1964 *Permodiscus pragsoides* nov. sp. – R. OBERHAUSER: Zur Kenntnis der Foraminiferengattungen *Permodiscus, Trocholina* und *Triasina* etc., p. 200–201, pl. 1, fig. 10, 12, 13, 14, 16, 17; Pl. 2, fig. 2, 3, 16, 23; Pl. 4, fig. 8, 9.

Stratigraphical range: the Upper Anisian Schreyeralm limestones of the Slovak Karst and Strážovské Karpaty Mts. (scarce), the Ladinian – Lower Carnian limestones of the Slovak Karst, the Brezovské and Čachtické Karpaty Mts., Stratenská hornatina Mts. (more frequent), the Carnian Tisovec and Furmanec limestones of the Slovak Karst and Stratenská hornatina Mts., the Uppermost Norian – Lower Rhaetian Dachstein limestones of the Muránska planina plateau and Nízke Tatry Mts. (plentiful).
It is the most frequent species in the Upper Anisian – Rhaetian in practically all Central Carpathian units.

***Permodiscus subsphericus* n. sp.**

Pl. CV, fig. 1

Type species: The specimen in Pl. CV, fig. 1; in the depository of the Geological Institute of the Slovak Academy of Science in Bratislava, thin section No. By. 1902.

Denomination: sub (Lat.) = almost.

Type level: The Carnian Tisovec limestones.

Type locality: Kunová Teplica, the Plešivecká planina plateau.

Material: scarce.

Description: A large test, subspherical in section, composed of a proloculus and a deuteroloculum coiled in 5–6 whorls. In section the initial part of the deuteroloculum is circular, in the next stage crescentic to semiarcuate, unsegmented. It is an ancestral form of the species *Triasina oberhauseri* KOEHN-ZANINETTI 1968 with coiled segmentation of the deuteroloculum.

Stratigraphical and geographical range: the assemblage with *Pilamminella kuthani* in the Carnian Tisovec limestones in the West Carpathians.

***Permodiscus tumidus* (KRISTAN-TOLLMANN, 1964)**

Pl. XCIV, fig. 1–7; Pl. XCV, fig. 1–7

1964 *Angulodiscus tumidus* n. sp. – E. KRISTAN-TOLLMANN: Zwei characteristische Foraminiferengemeinschaften aus Rhätkalken, p. 141–142, Abb. 3, fig. 1, 5, non fig. 2–4, 6, 7 (= *Angulodiscus falsotumidus* n. sp.).

Stratigraphical range: the Uppermost Norian and Rhaetian of the Nízke Tatry Mts., the Vysoké Tatry Mts., the Muránska planina plateau and the Slovak Karst.

AULOCONUS PILLER, 1978

Type species: *Trocholina permodiscoides* OBERHAUSER, 1964.

The genus comprises a group of the so-called Triassic trocholines, whose origin should be sought among large planispiral forms of the genus Permodiscus, mainly the species *Permodiscus pragsoides* OBERHAUSER, 1964.

***Auloconus permodiscoides* (OBERHAUSER, 1964)**

Pl. XCVI, fig. 1–7; Pl. XCVII, fig. 1–3; Pl. XCVIII, fig. 1–6

1964 *Trocholina permodiscoides* nov. sp. – R. OBERHAUSER: Zur Kenntnis der Foraminiferengattungen *Permodiscus, Trocholina* und *Triasina* etc., p. 207–208, pl. 2, fig. 13, 14, 15, 18, 20, 22; pl. 3, fig. 1.

Stratigraphical range: the Norian Furmanec limestones of the Slovak Karst, the Uppermost Norian – Lower Rhaetian Dachstein limestones of the Muránska planina plateau, the Nízke Tatry Mts., the Čachtické and the Brezovské Karpaty Mts.

AULOTORTUS WEYNSCHENK, 1956

Type species: *Aulotortus sinuosus* WEYNSCHENK, 1956

Diagnosis: A loose, lens-shaped test consists of a small spherical proloculus and undivided tubular planispiral or slightly streptospiral deuteroloculum. Both umbilican areas are filled with secondary sparitic calcite, so only the last whorl is visible on the test periphery. The double wall is calcareous; on the central part of the test are irregular or radial knobs. The aperture is at the end of the tubular chamber. Sometimes its position is asymmetrical.

Stratigraphical range: the Upper Trias.

The following West Carpathian species are ranged to the genus *Aulotortus* WEYNSCHENK, 1956:

Aulotortus broennimanni SALAJ, in SALAJ, BIELY et BYSTRICKÝ, 1967

Pl. XCIX, fig. 1–4; Pl. C, fig. 1–2

1967 *Aulotortus brönnimanni* SALAJ, nov. sp. – J. SALAJ–A. BIELY–J. BYSTRICKÝ: Trias Foraminiferen in den Westkarpaten, p. 127–128, Pl. IV, fig. 3.

1973 *Involutina muranica* n. sp. – O. JENDREJÁKOVÁ: *Involutina muranica* n. sp. in der Oberen Trias der Westkarpaten, p. 197–200, Abb. 1–6.

The thick test wall is indicative of a disquiet depositional environment in a surf fore-reef zone.

Stratigraphical range: the Tisovec and Furmanec limestones of the Slovak Karst, the Muránska planina plateau, the Stratenská hornatina Mts., the Upper Rhaetian Skalka limestones of the Muránska planina plateau.

Aulotortus oscillens (OBERHAUSER, 1957)

Pl. C, fig. 3–6; Pl. CI, fig. 1–5

1964 *Permodiscus pragsoides* var. *oscillens* (OBERHAUSER) – R. Oberhauser: Zur Kenntnis der Foraminiferengattungen *Permodiscus, Trocholina* und *Triasina*, etc., p. 201–202, pl. 2, fig. 1, 4, 12, 17, 19, 21, 24, 25, 26; Pl. 4, fig. 7 (cum syn.).

Stratigraphical range: the Ladinian-Rhaetian in almost all stratigraphical levels of tectonic units of the Inner Carpathians.

Aulotortus sinuosus WEYNSCHENK, 1956

Pl. CII, fig. 1–5; Pl. CIII, fig. 1–3

1956 *Aulotortus sinuosus* nov. gen. n. sp. – R. WEYNSCHENK: Aulotortus, a new genus of Foraminifera etc., p. 26–28, pl. 6, fig. 1.

1956 *Aulotortus sinuosus* WEYNSCHENK, 1956 – L. ZANINETTI–P. BROENNIMANN: Etude morphologique et stratigraphique etc., p. 700–705, fig. 1, pl. 1, fig. 1, 2, 3.

Stratigraphical range: the Upper Trias (Carnian-Rhaetian) of all tectonic units of the Inner Carpathians.

RAKUSIA SALAJ, 1967, emend. SALAJ, 1969, emend.

type species: *Rakusia oberhauseri* SALAJ, 1969

Diagnosis: A calcareous peforated test with a micro- and macrospherical proloculus. The initial part of the deuteroloculum is planispiral, typical of the genus *Permodiscus*; the oscillation stage is characteristic of the genus Aulotortus. The test walls surrounding the whorls of the deuteroloculum form the oval shape of the test in the planispiral and oscillation stages. The test is elongated in the axis of the coiling plane. After the oscillation stage the deuteroloculum changes the coiling orientation and coils perpendicularly to the original planispiral stage. The test walls forming in this stage are concentric, giving the spherical shape to the test. They are divided from one another by interlayer slots. The inner inaequigranular layer is only in the deuteroloculum in the form of the inner epithelium (secretory layers). Owing to recrystallization the layer is only scarcely preserved.

Stratigraphical range: The genus *Rakusia* represents a significant taxon frequent in the Upper Carnian – Lower Rhaetian sediments of the West Carpathians and the Alps.

The following two taxa were distinguished within the genus in the West Carpathians.

Rakusia oberhauseri SALAJ, in SALAJ, BIELY et BYSTRICKÝ, 1967, emend. SALAJ 1969

Pl. CIII, fig. 4–5; Pl. CIV, fig. 1–4; Pl. CV, fig. 2b; Pl. CVIII, fig. 1

1967 *Rakusia oberhauseri* SALAJ nov. sp. – J. SALAJ – A. BIELY – J. BYSTRICKÝ: Trias-Foraminiferen in den Westkarpaten, p. 129, pl. 5, fig. 3.

1969 *Rakusia oberhauseri* SALAJ – J. SALAJ: Essai de zonations dans le Trias des Carpathes occidentales d'après les foraminifères, p. 124.

Stratigraphical range: The Upper Carnian Tisovec limestones of the Slovak Karst and the Muránska planina plateau and the Norian Furmanec limestones of the Stratenská hornatina Mts.

Rakusia ploechingeri n. sp.

Pl. CIV, fig. 5; Pl. CV, fig. 4; Pl. CXIV, fig. 3b

1969 Nov. gen., nov. sp. – J. SALAJ: Quelques remarques sur les problèmes microbiostratigraphiques, pl. III, fig. 2.

Type species: The specimen figured in Pl. CV, fig. 4, in the depository of DIONÝZ ŠTÚR Institute of Geology in Bratislava, thin section no. Sj. 34–21.

Denomination: In honour of B. PLÖCHINGER of the Geologisches Bundesanstalt, Vienna.

Type level: The Uppermost Norian – Lower Rhaetian Dachstein limestone.

Type locality: Červená skala, the Muránska planina plateau.

Material: Scarce.

Description: The deuteroloculum is planispiral in the initial part, oscillation-coiled in the next part (2–3) whorls. The next 1–2 whorls are perpendicular to the preceding stage (characteristic of the species *Rakusia oberhauseri*). The last stage consists of 1–2 whorls declined at 15–20° from the preceding stage characteristic of the species *Rakusia oberhauseri* SALAJ.

Dimensions: diameter 0,50–0,65 mm.

Stratigraphical range: The Uppermost Norian – Lower Rhaetian Dachstein limestones of the Nízke Tatry Mts. and the Muránska planina plateau.

ANGULODISCUS KRISTAN, 1957 emend. SALAJ 1975

Type species: *Angulodiscus communis* KRISTAN 1957

Diagnosis: A test with the initial clew-like stage followed by the planispiral stage. The double wall is calcareous, most frequently recrystallized. The aperture is at the end of the deuteroloculum.

Stratigraphical range: The Upper Trias.

There are many species described within the genus.

The following species were identified in the West Carpathians.

Angulodiscus communis KRISTAN, 1952
Pl. CVIII, fig. 2–5; Pl. CIX, fig. 1–2

1957 *Angulodiscus communis* nov. gen. nov. sp. – E. KRISTAN: Ophthalmidiidae und Tetrataxinae (Foraminifera) etc., p. 278, pl. XXIII, fig. 1a, b, 2, 3, 4a, b, 5, 6, 7).

Stratigraphical range: The Dachstein limestone facies in the Nízke Tatry and the Muránska planina plateau.

Angulodiscus expansus (KRISTAN-TOLLMANN, 1964)
Pl. CIX, fig. 3–4

1964 *Glomospirella expansa* n. sp. – E. KRISTAN-TOLLMANN: Zwei charakteristische Foraminiferengemeinschaften aus Rhätkalken, p. 137–138, Abb. 2, fig. 6–7.

Stratigraphical range: The Uppermost Norian – Lower Rhaetian Dachstein limestone facies of the Nízke Tatry Mts., the Muránska planina plateau and the Čachtické Karpaty Mts.

Angulodiscus falsotumidus n. sp.
Pl. CXXI, fig. 8, 10–12, Pl. CXXII, fig. 1–2

1964 *Angulodiscus tumidus* n. sp. – E. KRISTAN-TOLLMANN: Zwei charakteristische Foraminiferengemeinschaften aus Rhätkalken, p. 141–142, fig. 2–4, 6, 7; non fig. 1, 4 = *Permodiscus tumidus* (KRISTAN-TOLLMANN).

Type species: The specimen depicted by E. KRISTAN-TOLLMANN 1964, Abb. 3, fig. 7.

Denomination: falso (Lat.) = false (*A. tumidus*).

Type level and type locality: cf. E. KRISTAN-TOLLMANN, 1964, p. 141.

Material: plentiful.

Description: A large, bicameral test. The proloculus is spherical, the deuteroloculum is clew-like in the first 2–3 whorls, the next part (3–5 whorls) are planispiral. The aperture is oval. It is at the end of the deuteroloculum. The planispiral ancestral forms correspond to the species *Permodiscus tumidus* (KRISTAN-TOLLMANN 1964).

Dimensions: diameter 0,65–0,75 mm, thickness 0,25–0,30 mm.

Stratigraphical range: The Uppermost Norian – Lower Rhaetian of the Nízke Tatry Mts. and the Muránska planina plateau.

Angulodiscus friedli (KRISTAN-TOLLMANN, 1962)
Pl. CVI, fig. 1c; Pl. CIX, fig. 5–11; Pl. CX, fig. 1–10; Pl. CXI, fig. 1–9; Pl. CXII, fig. 1–4; Pl. CXIII, fig. 1–9; Pl. CXVIII, fig. 2, 4; Pl. CXXIII, fig. 4d

1962 *Glomospirella friedli* n. sp. – E. KRISTAN-TOLLMANN: Stratigraphische wertvolle Foraminiferen etc., p. 229, pl. 1, fig. 1–9; 12–27.

Stratigraphical range: The Uppermost Norian and Rhaetian of the West Carpathians (very frequent). The species occurs practically in all tectonic units of the Inner Carpathians.

Angulodiscus gaschei gaschei KOEHN-ZANINETTI et BROENNIMANN, 1968

Pl. CVI, fig. 4c; Pl. CXIV, fig. 1–5; Pl. CXV, fig. 1–4; Pl. CXVI, fig. 1–9; Pl. CXIX, fig. 2

1968 *Angulodiscus? gaschei*, n. sp. – L. KOEHN-ZANINETTI – P. BROENNIMANN: *Angulodiscus? gaschei* n. sp., un Foraminifère de la Dolomie principale etc., p. 74–79, pl. 1, fig. A–F; pl. II, fig. 17 – F, text-fig. 2 A–G.

Stratigraphical range: The Tisovec, Furmanec and the Dachstein limestones of the tectonic units of the West Carpathians.

Angulogiscus gaschei praegaschei (KOEHN-ZANINETTI, 1968)

Pl. XI, fig. 3c; Pl. CXVII, fig. 1–6; Pl. CXVIII, fig. 1, 3, 5–6; Pl. CXIX, fig. 1, 3, 4

1969 *Involutina gaschei* (KOEHN-ZANINETTI et BROENNIMANN) *praegaschei* n. subsp. – L. KOEHN-ZANINETTI: Les Foraminifères du Trias de la region de l'Almtal C Haute – Autriche), p. 130–131, fig. 39 A–L (cum syn.).

Stratigraphical range: The Upper Ladinian-Norian of all tectonic units in the Inner Carpathians.

Angulodiscus glomospirelloides n. sp.

Pl. CVII, fig. 3

Type species: The specimen figured in Pl. CVII, fig. 3; in the depository of the Geological Institute of the Slovak Academy of Science in Bratislava, thin section No. Bo 6583

Denomination: According to the Latin name of the genus *Glomospirella*.

Type level: The Upper Rhaetian Hybe Formation.

Type locality: The railway cut at Hybe, the Nízke Tatry Mts.

Material: scarce.

Description: A small test, double-walled, the outer wall is calcareous, perforated; the inner wall is dark, inequigranular (microgranular). The proloculus is large; the first 2–3 whorls of the deuteroloculum are clew-like, the other 2–3 whorls are planispiral.

The section of the deuteroloculum is circular to oval. The aperture is evidently represented by the opening at the end of the deuteroloculum.

Dimensions: Proloculus 0,0245 mm, test diameter 0,133 mm, thickness 0,048–0,050 mm.

It is the smallest representative of the genus *Angulodiscus* KRISTAN, 1957 emend. SALAJ 1975. The double-walled test proves that representatives of the nov. subfamily Permodiscinae with double-walled test occur practically all over the Trias.

Stratigraphical range: The Carnian and the Upper Rhaetian Hybe Member in the Nízke Tatry Mts. (scarce occurrences).

Angulodiscus impressus KRISTAN, 1957

Pl. CXX, fig. 1–2, 6

1964 *Angulodiscus impressus* n. sp. – E. KRISTAN-TOLLMANN: Zwei charakteristische Foraminiferengesheinschaften aus Rhätkalken, p. 140, Abb. 2, fig. 11–13.

Stratigraphical range: The Carnian of the Slovak Karst and the Uppermost Norian-Rhaetian organogenic limestones in the Neogene basement of the Vienna Basin (bore hole Láb) and the Uppermost Norian-Lower Rhaetian Dachstein limestones of the Nízke Tatry Mts.

Angulodiscus paralellus (KRISTAN-TOLLMANN, 1964)
Pl. CXX, fig. 3–5, 7–15

1964 *Glomospirella paralella* n. sp. – E. KRISTAN-TOLLMANN: Zwei charakteristische Foraminiferengemeinschaften aus Rhätkalken, p. 138–139, Abb. 2, fig. 8–10.

Stratigraphical range: The Dachstein limestones of the Muránska planina plateau, the Nízke Tatry Mts. and the Čachtické Karpaty Mts.

Angulodiscus pokornyi SALAJ, in SALAJ, BIELY et BYSTRICKÝ, 1967
Pl. CVI, fig. 1a, b; Pl. CXXI, fig. 1–5, 9

1967 *Angulodiscus pokornyi* SALAJ, nov. sp. – J. SALAJ – A. BIELY – J. BYSTRICKÝ: Trias Foraminiferen in den Westkarpaten, p. 128, pl. 7, fig. 4a, b.

Stratigraphical range: The Uppermost Norian-Rhaetian of the Inner Carpathians (frequent occurrences).

Angulodiscus tenuis KRISTAN, 1957
Pl. CXXI, fig. 6–7

1957 *Angulodiscus tenuis* nov. gen. sp. – E. KRISTAN: Ophthalmidiidae und Tetrataxinae (Foraminifera) etc., p. 280, pl. XXII, fig. 18a, b, c.

Stratigraphical range: The Uppermost Norian-Rhaetian of the Nízke Tatry Mts., the Vysoké Tatry Mts., the Strážovská hornatina Mts., the Muráň plateau the Stratenská hornatina Mts., the Čachtické Karpaty Mts.

SEMIINVOLUTA KRISTAN, 1957

Type species: *Semiinvoluta clari* KRISTAN, 1957

Diagnosis: Asymmetrical test with whorls diagonal to the ventral side with umbilical pillars. The dorsal side is slightly convex owing to low-spiral coiled whorls. The double test-wall is calcareous, the aperture is at the end of the tubular chamber.

Stratigraphical range: The Norian-Rhaetian.

Two species of the genus have so far been identified in the West Carpathians.

Semiinvoluta clari, KRISTAN, 1957
Pl. CXXII, fig. 3–5; Pl. CXXIII, fig. 1–3, 4b; Pl. CXXIV, fig. 1

1957 *Semiinvoluta clari* nov. gen. nov. sp. – E. KRISTAN: Ophthalmidiidae und Tetrataxinae (Foraminifera) etc., p. 276–278, pl. XXII, fig. 11a, b, c, 12, 13, 14, 15, 16a, b, c, 17.

Stratigraphical range: The Norian-Lower Rhaetian localities in almost all tectonic units of the Inner Carpathians.

Semiinvoluta aff. _verrucosa_ TOLLMANN et KRISTAN-TOLLMANN, 1970
Pl. CXXIV, fig. 2

1970 *Semiinvoluta verrucosa* n. sp. – A. TOLLMANN – E. KRISTAN-TOLLMANN: Geologische und mikropaläontologische Untersuchungen etc., p. 122, pl. 6, fig. 12–14.

Stratigraphical range: The Lower Rhaetian limestones of the Bleskový prameň spring (sporadical occurrences).

CORONIPORA KRISTAN, 1958

Type species: *Coronella austriaca* KRISTAN, 1957

Diagnosis: A conical test with low-spiral to planispiral deuteroloculum, almost completely involute on the umbilical side, evolute on the dorsal side, kee-like on its periphery. The open aperture is at the end of the deuteroloculum.

Coronipora austriaca **(KRISTAN, 1957)**

Fig. 22

1957 *Coronella austriaca* nov. gen. nov. sp. – E. KRISTAN: Ophthalmidiidae und Tetrataxinae (Foraminifera) etc., p. 281, pl. XXIII, fig. 10a, b, c, 11, 12, 13.

Fig. 22 *Coronipora austriaca* (KRISTAN)
Červená skala, Muráň plateau, Uppermost Norian-Lower Rhaetian Dachstein limestones, thin section no. Sj. 34–21/66.

Stratigraphical range: The Uppermost Norian – Lower Rhaetian Dachstein limestones of the Nízke Tatry Mts. (reported by J. SALAJ, 1969b, p. 20, pl. IV, fig. 1d).

LAMELLICONUS PILLER, 1978

Type species: *Trocholina* (*Trocholina*) *biconvexa* OBERHAUSER, 1957.

Diagnosis: A conical to lens-shaped bicameral test with a spherical proloculus, and a trochospiral tubular deuteroloculum. Double test wall is nonfolded, without pillars. The circular aperture is at the end of the deuteroloculum.

Lamelliconus biconvexus biconvexus **(OBERHAUSER, 1957)**

Pl. CXXVIII, fig. 1

1957 *Trocholina* (*Trocholina*) *biconvexa* sp. nov. – R. OBERHAUSER: Ein Vorkommen von *Trocholina* etc., p. 263, pl. XXI, fig. 26–37, Abb. 1, fig. 3, 4, 5.

Stratigraphical range: The Carnian Lunz Member in the Nízke Tatry Mts. and the Ladinian to Cordevolian Wetterstein limestones of the Strážovská hornatina Mts.

Lamelliconus cordevolicus **(OBERHAUSER, 1964)**

Pl. CXXIV, fig. 8; Pl. CXXVIII, fig. 2

1964 *Trocholina cordevolica* nov. sp. – R. OBERHAUSER: Zur Kenntnis der Foraminiferengattungen *Permodiscus*, *Trocholina* und *Triasina* etc., p. 206, pl. 1, fig. 7, 8a, b, 9a, b.

Stratigraphical range: The Tisovec Carnian limestones of the Slovak Karst in the West Carpathians.

Lamelliconus multispirus (OBERHAUSER, 1957)
Pl. CXXIV, fig. 3–7; Pl. CXXV, fig. 1, 6–7, Pl. CXLVI, fig. 2, no. 4

1957 *Trocholina (Trocholina) multispira* sp. nov. – R. OBERHAUSER: Ein Vorkommen von *Trocholina* etc., p. 261, pl. XX, fig. 1–14, Abb. 1a, 1b.

Stratigraphical range: The Carnian Lunz Member (localities Turík, Svarín) of the Nízke Tatry Mts., the Norian Furmanec limestones of the Stratenská hornatina Mts.

Lamelliconus ovulus SALAJ, in SALAJ, BIELY et BYSTRICKÝ, 1967, emend.
Pl. CVII, fig. 4

1967 *Arenovidalina ovulum* SALAJ n. sp. – J. SALAJ–A. BIELY–J. BYSTRICKÝ: Trias-Foraminiferen in den Westkarpaten, p. 130, pl. V, fig. 1.

Type species: The specimen figured in Pl. CVII, fig. 4, in the depository of the *Dionýz Štúr* Institute of Geology, thin section no. Sj. 205.

Denomination: Latin "ovulum" = egg-shaped, oval.

Type level: The Anisian Steinalm limestones.

Type locality: Dobrá Voda, the Brezovské Karpaty Mts.

Material: scarce.

Description: A small, low-spiral test. The originally double test-wall is recrystallized as well as the proloculus. The initial 3 whorls of the deuterolocum are planispiral, the last two whorls are partly declined from the planispiral plane to the ventral side. The aperture (probably circular) was at the end of the deuteroloculum.

It is the oldest and most primitive representative of the genus *Lamelliconus* PILLER, 1978 developed from smaller forms of *Permodiscus*.

Dimensions: diameter 0,34 mm, height 0,21 mm.

Stratigraphical range: The Middle Upper Anisian Steinalm limestones of the Brezovské Karpaty Mts.

Lamelliconus procerus (LIEBUS, 1942)
Pl. CVII, fig. 2; Pl. CXXV, fig. 2–5

1964 *Trocholina procera* (LIEBUS) – R. OBERHAUSER: Zur Kenntnis der Foraminiferengattungen *Permodiscus*, *Trocholina* und *Triasina* etc., p. 208–209, Abb. 2, fig. 1a, b, 2, 3, 4, Pl. 4, fig. 2, 5 (cum syn.).

Stratigraphical range: The Upper Ladinian-Carnian Wetterstein limestones of the Slovak Karst, the Carnian Lunz Member of the Nízke Tatry Mts. and the Norian Furmanec limestones of the Stratenská hornatina Mts.

Lamelliconus ventroplanus (OBERHAUSER, 1957)
Pl. CXLVI, fig. 2, no. 5

1957 *Trocholina (Trocholina) ventroplana* sp. nov. – R. OBERHAUSER: Ein Vorkommen von Trocholina etc., p. 262–263, pl. XX, fig. 15–23, Abb. 1, fig. 2.

Stratigraphical range: The Carnian Lunz Member of the Strážovská hornatina Mts. and the Nízke Tatry Mts.

Lamelliconus turris (FRENTZEN, 1941)
Pl. CXXVIII, fig. 9

1976 *Trocholina turris* FRENTZEN, 1941 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 180–181, pl. 14, fig. 14, 15; pl. 15, fig. 23.

Stratigraphical range: The Carnian Tisovec limestones of the Slovak Karst (scarce occurrence).

TRIASINA MAJZON, 1954

Type species: *Triasina hantkeni* MAJZON, 1954.

Diagnosis: A loose, spherical, biserial test. The thin hyaline-granular layer at the deuteroloculum is rimmed with the inner dark-coloured microgranular layer on both sides. The inner layers are connected by small pillars fastening the spherical deuteroloculum and dividing it apparently into many chambers.

Stratigraphical range: The Rhaetian.

Only two species have so far been described within the genus.

Triasina hantkeni MAJZON, 1954
Pl. CXXVI, fig. 2–8

1976 *Triasina hantkeni* MAJZON, 1954 – L. ZANINETTI: Les Foraminifères der Trias etc., p. 172–173, pl. 15, fig. 2, 3 (cum syn.).

Stratigraphical range: The Middle-Upper Rhaetian of the West Carpathians, mainly the Nízke and the Vysoké Tatry Mts., the Veľká Fatra Mts., the Strážovská and Stratenská hornatina Mts., the Brezovské and Čachtické Karpaty Mts., the Muránska planina plateau and the Slovak Karst.

Triasina oberhauseri KOEHN-ZANINETTI et BROENNIMANN, 1968
Pl. CXXIII, fig. 4c; Pl. CXXVI, fig. 1

1976 *Triasina oberhauseri* KOEHN-ZANINETTI et BROENNIMANN – L. ZANINETTI: Les Foraminifères du Trias etc., p. 175–176, pl. 14, fig. 23; Pl. 15, fig. 1 (cum syn.).

Stratigraphical range: The Norian-Lower Rhaetian of the Muránska planina plateau, the Nízke Tatry Mts., the Malé Karpaty Mts. (A. KULLMANOVÁ in A. BIELY, J. BYSTRICKÝ, L. MELLO et al. 1980).

Involutininae BUETSCHLI, 1880
INVOLUTINA BUETSCHLI, 1880

Type species: *Nummulites liassicus* JONES, 1853

Diagnosis: The calcareous uniserial test is loose, lens-shaped, bicameral, with a spherical proloculus and tubular planispiral deuteroloculum. The test wall is folded, depressed in places.

Involutina liassica **(JONES, 1853)**
Pl. CXXVII, fig. 1–7

1976 *Involutina liassica* (JONES, 1853) – L. ZANINETTI: Les Foraminifères du Trias, etc., p. 162–163, pl. 9, fig. 5; pl. 15, fig. 23 (cum syn.).

Stratigraphical range: The Lias of the West Carpathians.

Remark: Primitive smaller forms occurring in the Upper Rhaetian are denoted as *Involutina turgida* KRISTAN, 1957.

TROCHONELLA KRISTAN, 1957

Type species: *Trocholina* (*Trochonella*) *crassa* KRISTAN, 1957

Diagnosis: A conical bicameral test with a spherical proloculus and spiral deuterloculum. The test wall on the ventral side is refolded, provided with pillars.

Trochonella acuta **(OBERHAUSER, 1964)**
Fig. 23

1964 *Trocholina acuta* nov. sp. – R. OBERHAUSER: Zur Kenntnis der Foraminiferengattungen *Permodiscus, Trocholina* und *Triasina* etc., p. 202–204, pl. 2, fig. 10, 11a, b, c.

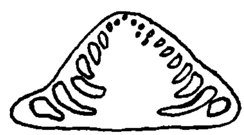


Fig. 23 *Trochonella acuta* (OBERHAUSER)
Hybe, Uppermost Norian-Lower Rhaetian Dachstein limestones, thin section no. Sj. 61/1965. Magn. ×27

Stratigraphical range: The depicted and described form comes from the Uppermost Norian-Lower Rhaetian Dachstein limestone facies of the Nízke Tatry Mts. (J. SALAJ, A. BIELY et J. BYSTRICKÝ 1976b, pl. 1, fig. 5), the Dachstein limestones of the Muránska planina plateau.

Trochonella crassa **(KRISTAN, 1957)**
Pl. CXXVIII, fig. 3–4, 7

1957 *Trocholina* (*Trochonella*) *crassa* nov. subgen. nov. sp. – E. KRISTAN: Ophthalmidiidae und Tetrataxinae (Foraminifera) etc., p. 285–286, pl. XXIV, fig. 5a, b, c; 6, 7, 8, 9, 10, 11.

Stratigraphical range: The Dachstein and Skalka limestones of the Muránska planina plateau and the Nízke Tatry Mts., scarce in the Norian Furmanec limestones of the Slovak Karst.

Trochonella granosa **FRENTZEN, 1941**
Pl. CXXVIII, fig. 5

1976 *Trocholina granosa* FRENTZEN, 1941 – L. ZANINETTI: Les Foraminifères du Trias, etc., p. 177, pl. 10, fig. 24 (cum syn.).

Stratigraphical range: The Furmanec limestones of the Slovak Karst.

Trochonella laevis (KRISTAN, 1957)
Pl. CXXVIII, fig. 6, 8

1957 *Trocholina (Trochonella) laevis* nov. subgen. nov. sp. – E. KRISTAN: Ophthalmidiidae und Tetrataxinae (Foraminifèra) etc., p. 286–288, pl. XXIV, fig. 12a, b, c, 13, 14.

Stratigraphical range: The Uppermost Norian-Lower Rhaetian Dachstein limestone facies of the Nízke Tatry Mts. and the Muránska planina plateau – in the Upper Rhaetian Skalka limestones.

Trochonella permodiscoides (OBERHAUSER, 1964)
Pl. CXXIII, fig. 4a

1976 *Trocholina permodiscoides* OBERHAUSER, 1964 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 178–179, pl. 10, fig. 21; pl. 12, fig. 9–11 (cum syn.).

Stratigraphical range: The Dachstein limestone facies of the Muránska planina plateau, the Stratenská and the Strážovská hornatina Mts., the Brezovské and the Čachtické Karpaty Mts.

Oberhauserellidae FUCHS, 1970
OBERHAUSERELLA FUCHS, 1967

Oberhauserrella alta FUCHS, 1967
Pl. CXXIX, fig. 6

1967 *Oberhauserella alta* n. gen. et n. sp. – W. FUCHS: Über Ursprung und Phylogenie der Trias – "Globigerinen" etc., p. 150–151, pl. 4, fig. 5–6; pl. 5, fig. 3, 7.

Dimensions: diameter 0,24–0,26 mm, height 0,15 MM.

Stratigraphical and geographical range: The Norian Hallstatt limestones of the Slovak Karst in the West Carpathians. The originally described species comes from the Rhaetian of the Austrian Alps.

Oberhauserella ovata FUCHS, 1967
Pl. CXXIX, fig. 7–8

1967 *Oberhauserella ovata* n. gen. et n. sp. – W. FUCHS: Über Ursprung und Phylogenie der Trias – "Globigerinen" etc., p. 154, pl. 4, fig. 7.

Dimensions: diameter 0,10–0,20 MM.

Stratigraphical and geographical range: The Norian Hallstatt limestones of the Slovak Karst (sporadical occurrences). The originally described species comes from the Rhaetian of the Austrian Alps (Hohe Wand).

Oberhauserella quadrilobata FUCHS, 1967
Pl. CXXIX, fig. 9–10

1967 *Oberhauserella quadrilobata* n. gen. et n. sp. – W. FUCHS: Über Ursprung und Phylogenie der Trias – "Globigerinen" etc., p. 150, pl. 3, fig. 3–6; pl. 4, fig. 8; pl. 6, fig. 1, 7.

Dimensions: diameter 0,11–0,15 mm.

Stratigraphical and geographical range: The Norian Hallstatt limestones of the Slovak Karst; the Rhaetian of the Austrian Alps (Hohe Wand).

Oberhauserella rhaetica **(KRISTAN-TOLLMANN, 1964)**
Pl. CXXIX, fig. 12–15

1956 *Oberhauserella rhaetica* (KRISTAN-TOLLMANN, 1964) – W. FUCHS: Über Ursprung und Phylogenie der Trias – "Globigerinen" etc., p. 153, pl. 5, fig. 1 (cum syn.).

Dimensions: diameter 0,12–0,21 mm, height 0,12 mm (max.).

Stratigraphical and geographical range: The Norian Hallstatt limestones of the Slovak Karst, the Norian Furmanec limestones of the Stratenská hornatina Mts. *Oberhauserella rhaetica* (KRISTAN-TOLLMANN) occurs in several localities in the Austrian Alps.

Variostomatidae KRISTAN-TOLLMANN, nomen correctum LOEBLICH et TAPPAN, 1964

DIPLOTREMMINA KRISTAN-TOLLMANN, 1960

Diplotremina altoconica **KRISTAN-TOLLMANN, 1973**
Pl. CXXX, fig. 1–5; Pl. CXXXI, fig. 1, 2

1976 *Diplotremina altoconica* KRISTAN-TOLLMANN, 1973 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 186, pl. 23, fig. 6, 9 (cum syn.).

Dimensions: width 0,21–0,52 mm, height 0,47–0,82 mm.

Stratigraphical and geographical range: The Upper Ladinian and Carnian Wetterstein and Tisovec limestones of the West Carpathians; the species described comes from the Lower Carnian of the Italian Alps (Dolomites).

Diplotremmina astrofimbriata **KRISTAN-TOLLMANN, 1960**
Pl. CXXXI, fig. 3–8

1960 *Diplotremmina astrofimbriata* nov. gen. spec. – E. KRISTAN-TOLLMANN: Rotaliidea (Foraminifera) aus der Trias der Ostalpen, p. 64–65, pl. 14, fig. 1–4.

Dimensions: Diameter 0,20–0,40 mm; max. 0,60 mm, height 0,14–0,21 mm.

Stratigraphical and geographical range: The Ladinian Wetterstein limestones, the Norian Furmanec and Hallstatt limestones of the Slovak Karst, the Carnian Tisovec limestones of the Muránska planina plateau, the Furmanec limestones of the Stratenská hornatina Mts. The originally described species comes from the Cordevolian Cassian Member of the south-Tirolian Dolomites.

Diplotremmina subangulata **KRISTAN-TOLLMANN, 1960**
Pl. CXXXI, fig. 9–13; Pl. CXXXII, fig. 1–3

1960 *Diplotremmina subangulata* nov. gen. nov. sp. – E. KRISTAN-TOLLMANN: Rotaliidea (Foraminifera) aus der Trias der Ostalpen, p. 67–68, pl. 15, fig. 3, 4; pl. 16, fig. 1–5.

Dimensions: diameter 0,21–1,00 mm, height 0,31–0,42 mm.

Stratigraphical and geographical range: The Anisian Steinalm limestones, the Furmanec limestones of the Slovak Karst, the Tisovec, Furmanec and the Dachstein limestones of the Muránska planina plateau and the Stratenská hornatina Mts. in the West Carpathians. The original species described comes from the Rhaetian of the the Austrian Alps.

DUOSTOMINA KRISTAN-TOLLMANN, 1960

***Duostomina alta* KRISTAN-TOLLMANN, 1960**

Pl. XIV, fig. 2b; Pl. CXXXII, fig. 4–7; Pl. CXXXIII, fig. 5; Pl. CXLVI, fig. 1, fig. 2, no. 7

1974 *Duostomina alta* KRISTAN-TOLLMANN, 1960 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 187–188, pl. 17, fig. 2 (cum syn.).

Dimensions: diameter 0,25–0,62 mm.

Stratigraphical and geographical range: The Carnian Lunz Member in the Nízke Tatry Mts., the Cordevolian Wetterstein limestones and the Tisovec limestones of the Slovak Karst, the Uppermost Norian-Lower Rhaetian Dachstein limestones of the Muránska planina plateau.

The originally described form comes from the Cordevolian of the South-Tirolian Dolomites, the Anisian-Ladinian and Carnian localities of the Dinarides, the Balkan, and the Judicarian Alps.

***Duostomina magna* TRIFONOVA, 1974**

Pl. CXXXIV, fig. 1–5; Pl. CXXXV, fig. 1–2

1978 *Duostomina magna* TRIFONOVA, 1974 – A. ORAVECZNÉ SCHEFFER: Middle Triassic microfacies in the lithological log of borehole Szentantalfa-1, p. 207, pl. VI, fig. 5, 9; pl. IX, fig. 1, 2, 4, 5.

Dimensions: width 0,39–0,90 mm, height 0,65–1,0 mm.

Stratigraphical and geographical range: The Ladinian-Carnian of the Slovak Karst and the Norian of the Muráň plateau. The originally described form comes from the Upper Illyrian and Fassanian of Bulgaria. In Hungary it was recorded in the Anisian limestones (the Balaton Highland).

***Duostomina rotundata* KRISTAN-TOLLMANN, 1960**

Pl. CXXXIV, fig. 7, 9; Pl. CXXXV, fig. 3–4

1960 *Duostomina rotundata* nov. gen. nov. spec. – E. KRISTAN-TOLLMANN: Rotaliidea (Foraminifera) aus der Trias der Ostalpen, p. 72–73, pl. 20, fig. 1–5.

Dimensions: width 0,34–0,57 mm, height 0,17–0,24 mm.

Stratigraphical and geographical range: The Norian Furmanec limestones of the Stratenská hornatina Mts. and the Slovak Karst, the Hallstatt limestones of the Slovak Karst (scarce). The originally described form comes from the Carnian of the Styrian Salzkammergut.

***Duostomina* aff. *turboidea* KRISTAN-TOLLMANN, 1960**

Pl. CXXXIII, fig. 1–3; Pl. CXXXV, fig. 5–6

1960 *Duostomina turboidea* nov. gen. spec. – E. KRISTAN-TOLLMANN: Rotaliidea (Foraminifera) aus der Trias der Ostalpen, p. 71–72, pl. 18, fig. 3, 4; pl. 19, fig. 1–9.

Dimensions: width 0,43–0,60 mm, height 0,33–0,47 mm.

Stratigraphical and geographical range: The Rhaetian of the Muránska planina plateau, the Slovak Karst in the West Carpathinas; the Upper Ladinian and the Carnian of the Italian and Austrian Alps.

VARIOSTOMA KRISTAN-TOLLMANN, 1960

Variostoma acutoangulata **KRISTAN-TOLLMANN, 1973**

Pl. CXXXIII, fig. 4, 7

1976 *Variostoma acutoangulata* KRISTAN-TOLLMANN, 1973 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 189, pl. 17, fig. 8 (cum syn.).

Dimensions: width 0,60 mm, height 0,45 mm.

Stratigraphical and geographical range: The Norian Furmanec limestones of the Slovak Karst, the Uppermost Norian-Lower Rhaetian Dachstein limestones of the Muránska planina plateau. The originally described form comes from the Lower Carnian of the Italian Dolomites.

Variostoma catilliforme **KRISTAN-TOLLMANN, 1960**

Pl. CXXXIV, fig. 6, 8; Pl. CXXXV, fig. 7–8; Pl. CXXXVI, fig. 1–6

1960 *Variostoma catilliforme* nov. gen. nov. sp. – E. KRISTAN-TOLLMANN: Rotaliidea (Foraminifera) aus der Trias der Ostalpen, p. 61–62, pl. 10, fig. 5–7; pl. 11, fig. 1–4.

Dimensions: width 0,26–1,0 mm, height 0,14–0,71 mm.

Stratigraphical and geographical range: The Ladinian Wetterstein limestones (the Muráň plateau), the Furmanec limestones (the Slovak Karst, the Stratenská hornatina Mts.), the Norian Hallstatt limestones (the Slovak Karst), the Uppermost Norian-Lower Rhaetian Dachstein limestones of the Stratenská hornatina Mts. and the Muránska planina plateau. The originally described form comes from the Rhaetian of the Austrian alps.

Variostoma cochlea **KRISTAN-TOLLMANN, 1960**

Pl. CXXXVI, fig. 7–8

1976 *Variostoma cochlea* KRISTAN-TOLLMANN, 1960 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 189, pl. 16, fig. 4 (cum syn.).

Dimensions: width 0,65–0,71 mm, height 0,40–0,45 mm.

Stratigraphical and geographical range: The Norian Furmanec limestones of the Muráň plateau; Rhaetian localities in the Austrian Alps.

Variostoma crassum **KRISTAN-TOLLMANN, 1960**

Pl. CXXXVI, fig. 9–11; Pl. CXXXVII, fig. 1–3

1976 *Variostoma crassum* KRISTAN-TOLLMANN, 1960 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 189–190, pl. 16, fig. 2 (cum syn.).

Dimensions: width 0,56–1,19 mm, height 0,26–0,45 mm.

Stratigraphical and geographical range: The Anisian Steinalm limestones and the Carnian Tisovec limestones of the Slovak Karst; the Norian Furmanec limestones of the

Muráň plateau and the Stratenská hornatina Mts. The originally described form comes from the Rhaetian of the Austrian Limestone Alps.

Variostoma pralongense KRISTAN-TOLLMANN, 1960
Pl. CXXXVIII, fig. 4; Pl. CXXXIX, fig. 3–4

1976 *Variostoma pralongense* KRISTAN-TOLLMANN, 1960 – L. ZANINETTI: Les Foraminifères du Trias etc., p. 190, pl. 16, fig. 6 (cum syn.).

Dimensions: width 0,34–0,71 mm, height 0,63–0,83 mm.

Stratigraphical and geographical range: The Ladinian – Lower Carnian Wetterstein limestones and the Carnian Tisovec limestones of the Slovak Karst. The first occurrence was reported from the Lower Carnian of the South-Tirolian Dolomites (E. KRISTAN-TOLLMANN 1960). It is known from the Carnian Reingraben schists in Low Austria (A. TOLLMANN 1976).

Incertae sedis
LADINOSPHAERA OBERHAUSER, 1960

Ladinosphaera geometrica OBERHAUSER, 1960
Pl. VIII, fig. 5b

1960 *Ladinosphaera geometrica* nov. gen. nov. sp. – R. OBERHAUSER: Foraminiferen und Mikrofossilien "incertae sedis" etc., p. 44–45, pl. 5, fig. 11a, b, c, 13.

Remark: The Carpathian specimens are identical with the original illustration and description of the species *Ladinosphaera geometrica* OBERHAUSER.

Dimensions: Diameter 0,2 mm.

Stratigraphical and geographical distribution: Originally described in the Upper Cassian beds. In the West Carpathians it has been found from the Carnian Lunz beds of the Strážovské vrchy Mts.

PARATINTINNINA BORZA ET SAMUEL, 1977

Paratintinnina tintinniformis BORZA et SAMUEL, 1977
Pl. CXLVII, fig. 1–7

1977 *Paratintinnina tintinniformis* nov. sp. – K. BORZA–O. SAMUEL: *Paratintinnina tintinniformis* and *P. tulipaformis* nov. gen. et nov. sp. etc., p. 143–144, Pl. 69, fig. 1–4; Pl. 70, fig. 1.

Remark: A small, pear-shaped, unicameral test. Its diameter is greatest in the approximate middle of its height, then it gets narrower and passes to a low neck. In the distal part of the neck is broad aperture. The neck is funnel-shaped, provided with a thicker flange on its outer periphery (Fig. 3). The flange is slightly concave in its terminal part and its outer periphery surpasses the neck diameter. In the aboral part is a tiny thorn-like caudal projection. It is not preserved on all forms. The test wall is thin, smooth on its outer side. It consists of dark micrite calcite. No chitinose matter was found. Morphological variability of the test is very low, only the test size, length and width of the neck vary slightly. Variable shape and diameter of flange of the forms depicted are due to different test sections.

In its test morpholohy the described species resembles *Cucurbita infundibuliforme* JABLONSKÝ, 1973. Our taxon differs from it in simple test wall in the area of flange and in smooth test surface without irregular projections (except the caudal projection). *Paratintinnina tintinniformis* BORZA et SAMUEL differs from a morphologically resemblant species *Chitinoidella boneti* DOBEN, 1963 mainly in test wall composition (the test of *Chitinoidella boneti* is chitinose), its dimensions which are in average in 2/3 larger (*Chitinoidella boneti* is 55 μ long, 40–50 μ wide), in the structure of the oral part of the test (the structure of the oral part of *Ch. boneti* is typical of the representatives of the group of Tintinnidae), and in their stratigraphical position (Middle Tithonian of *Ch. boneti*). *Paratintinnina tintinniformis* BORZA et SAMUEL had no chitinose admixture in the test. It differs from the genus *Tintinnopsella* in test composition which is hyaline, and its stratigraphical position.

Dimensions in μ: test length 174–247, test width 85–133, flange width 95–150.

Stratigraphical and geographical range: The Carnian Tisovec limestones in the West Carpathians.

Paratintinnina tulipaformis BORZA et SAMUEL, 1977

Pl. CXLVII, fig. 8–10

1977 *Paratintinnina tulipaformis* nov. sp. – K. BORZA–O. SAMUEL: *Paratintinnina tintinniformis* and *P. tulipaformis* nov. gen. et nov. sp. etc., p. 144–145, Pl. 70, fig. 2–4.

Remark: A small, unicameral test, cup-shaped in section, oval in proximal part. The test widens slightly from its proximal part and its greatest width is about 2/3 of its length. In the next part it either gets narrower or the walls are more-or-less parallel. In the distal part is a thicker flange whose width surpasses the test length. In the aboral part of the test no caudal projection was found. The described species differs from *P. tintinniformis* BORZA et SAMUEL by a smaller test, a wider flange and perhaps by the absence of the caudal projection in the proximal part of the test.

Dimensions in μ: test length 115–162, test width 47–78, flange width 165–185.

Stratigraphical and geographical range: The Carnian Tisovec limestones in the West Carpathians.

CUCURBITA JABLONSKÝ, 1973

Cucurbita infundibuliforme JABLONSKÝ, 1973

Pl. CLVII, fig. 7–8

1973 *Cucurbita infundibuliforme* nov. gen. et sp. – E. JABLONSKÝ: Mikroproblematika aus der trias etc., p. 420–423, Pl. 2, fig. 1–4; Pl. 3, fig. 1–6 (partim), non Pl. 3, fig. 4 (= *Amphorella bicamerata bicamerata* BORZA et SAMUEL, 1977).

Remark: Some studied forms show many characters in common with holotype of the species *Cucurbita infundibuliforme* JABLONSKÝ.

Dimensions in μ: test length 214–293, test width 87–113, flange width 293–426.

Stratigraphical and geographical range: Ladinian (?) – Cordevolian – according to E. JABLONSKÝ (l. c.).

PSEUDOCUCURBITA BORZA et SAMUEL, 1978

Pseudocucurbita campanulaformis BORZA et SAMUEL, 1978

Pl. CLVI, fig. 7–8; Pl. CLVII, fig. 1–3

1978 *Pseudocucurbita campanulaformis* nov. sp. – K. BORZA–O. SAMUEL: *Pseudocucurbita* nov. gen. (incertae sedis) from the Upper Trias etc., p. 72, Pl. 1, fig. 7–8; Pl. 2, fig. 1–3.

Remark: A large, unicameral, bell-shaped test. The proximal part of the test is oval to suboval. It widens gently in its distal part to get widest beneath the flange. The flange surpasses by 1/3–1/2 the greatest width of the test. The aperture is wide, terminal. The test wall is thick, getting wider from 1/3 of test length so that it is twice so wide in its distal part in its proximal and the test gets pear-shaped. The wall is smooth, composed of dark micrite calcite. Morphological variability of the test is small, only its size varies slightly. It differs from the above described species of the genus *Pseudocucurbita globosa* and *P. subglobosa* by a greater size and a bell-shaped test.

Dimensions in μ: test length 330–410, test width 200–262, flange width 430–500, test-wall thickness 70–100.

Stratigraphical and geographical range: The Carnian Tisovec limestones of the Slovak Karst.

Pseudocucurbita fusani BORZA et SAMUEL, 1978

Pl. CLVII, fig. 4–6

1978 *Pseudocucurbita fusani* nov. sp. – K. BORZA–O. SAMUEL: *Pseudocucurbita* nov. gen. (incertae sedis) from the Upper Triassic etc., p. 74, Pl. 2, fig. 4–6.

Remark: A large, unicameral bell-shaped test. Proximal part of the test is oval to suboval. It slightly widens toward the distal part. It is widest beneath the flange, surpassing the test diameter by about 2/3 of its width. The aperture is narrow, terminal. The test wall is thick, composed of dark micrite calcite. In the area of the neck the test-wall thickness is sometimes twice so as the thickness in the distal part of the test.

It differs from *Pseudocucurbita campanulaformis* BORZA et SAMUEL by smaller size and test shape. From phylogenetic view it shows affinity to *Cucurbita infundibuliforme* JABLONSKÝ, 1973 (Pl. III, Fig. 2, 3) from which it differs in a thicker test wall with a simple flange.

Dimensions in μ: test length 233–340, test width 83–166, flange width 213–339, test-wall thickness 17–80.

Stratigraphical and geographical range: The Carnian Tisovec limestones of the West Carpathians.

Pseudocucurbita globosa BORZA et SAMUEL, 1978

Pl. CLVI, fig. 1–2

1978 *Pseudocucurbita globosa* nov. sp. – K. BORZA–O. SAMUEL: *Pseudocucurbita* nov. gen. (incertae sedis) from the Upper Triassic etc., p. 69, Pl. 1, fig. 1–2.

Remark: A unicameral, globular test with a wide neck passing into a funnel-shaped flange. The test wall is thick, composed of dark micrite calcite. The proximal part is spherical, circular in profile; it occupies 1/2 of test langth. In the distal part is a neck with a broad flange, exceeding the greatest test diameter. The aperture is large, terminal. The outer and the inner sides of the test wall are smooth. Morphological (variability of the test is low, only the test size and neck width vary slightly. The described taxon differs from the species *Pseudocucurbita subglobosa* BORZA et SAMUEL by a larger test, a thicker wall and spherical shape of the proximal part of the test.

Dimensions in μ: test length 200–290, test width 133–216, flange width 231–400, test-wall thickness 17–25.

Stratigraphical and geographical range: The Carnian Tisovec limestones in the West Carpathians.

Pseudocucurbita subglobosa **BORZA et SAMUEL, 1978**
Pl. CLVI, fig. 3–6

1978 *Pseudocucurbita subglobosa* nov. sp. – K. BORZA–O. SAMUEL: *Pseudocucurbita* nov. gen. (incertae sedis) from the Upper Triassic etc., p. 70, Pl. 1, fig. 3–6.

Remark: A small unicameral test. Its proximal part is subspherical; suboval in profile, without caudal projection. In the distal part it passes into a neck, terminated with a broad funnel-shaped flange, exceeding the greatest test diameter. The aperture is large, terminal. The test wall is thick, smooth on both the inner and the outer sides. It is composed of dark micrite calcite. Morphological variability of the test is low, only the width and length are slightly variable. In some cases two specimens are above each other which is due to their life in clusters, like Fungi. The described species is most resemblant to *Pseudocucurbita globosa* BORZA et SAMUEL from which it differs by a smaller test, a thinner test-wall, subspherical test, and from *Paratintinnina tulipaformis* BORZA et SAMUEL, 1977 mainly by a broad flange and a broad neck.

Dimensions in μ: test length 154–220, test width 57–146, flange width 146–400, test-wall thickness 10–15.

Stratigraphical and geographical range: The Carnian shallow-water (reef) limestone population in the West Carpathians.

AMPHORELLA BORZA et SAMUEL, 1977

Amphorella bicamerata bicamerata **BORZA et SAMUEL, 1977**
Pl. CXLVIII, fig. 1–8

1977 *Amphorella bicamerata bicamerata* nov. ssp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) from the Upper Triassic etc., p. 100–101, Pl. 1, fig. 1–8.

Remark: A small, bicameral test. Its proximal part is oval to suboval; without caudal projection, with a flange in the distal part.

The first chamber is small, spherical or subspherical, occupying approx. 1/5 of the test diameter. Some forms show enlarging first chamber. The test is widest in 1/3 of its height, then it gradually narrows into a neck. The test is circular in profile. In the distal part of the neck is a flange, slightly surpassing the test width. The aperture is wide, terminal. The test wall is fine, thin, smooth on its outer side. It is composed of dark micrite calcite. Morphological variability of the test is low, only the test size, the neck length and width vary slightly. The described species shows greatest affinity to the species *Paratintinnina tintinniformis* BORZA et SAMUEL, 1976, from which it differs by a spherical chamber in the proximal part of the test.

Dimensions in μ: test length 95–192, test width 98–107, flange width 50–115.

Stratigraphical and geographical range: The Carnian Tisovec and sporadically in the Norian Furmanec limestones of the West Carpathians.

Amphorella bicamerata intermedia **BORZA et SAMUEL, 1977**
Pl. CXLVIII, fig. 9–12

1977 *Amphorella bicamerata intermedia* nov. ssp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) from the Upper Triassic etc., p. 102–103, Pl. 1, fig. 9–12.

Remark: A small, oval test, consisting of two chambers. The first one occupies about 2/5 of the test length. It is spherical to subspherical. The second chamber is almost oval. It the distal part it passes into the aperture (terminal), provided with a funnel-shaped flange. It is widest in about 1/3 of the test length. It is circular to subcircular in profile. The proximal part is suboval, with a low caudal projection. The test wall is the same as that of the species *A. bicamerata bicamerata* BORZA et SAMUEL. The flange diameter surpasses the test width. It differs from the nominant diameter surpasses the test width. It differs from the nominant species *A. bicamerata bicamerata* BORZA et SAMUEL by a larger initial chamber, a wider and more elongated neck, and by a low caudal projection.

Dimensions in μ: test length 192–262, test width 113–124, flange width 115–158.

Stratigraphical and geographical range: The Carnian Tisovec limestones of the West Carpathians (in contrast to *A. bicamerata bicamerata*).

Amphorella bilongicamerata bilongicamerata BORZA et SAMUEL, 1977

Pl. CXLVIII, fig. 13–16; Pl. CXLIX, fig. 1

1977 *Amphorella bilongicamerata bilongicamerata* nov. ssp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) form the Upper Triassic etc., p. 104, Pl. 1, fig. 13–16; Pl. 2, fig. 1.

Remark: A small, suboval test. It is widest in 1/2 of its length. It has a low caudal projection in its proximal part and a funnel-like flange in its distal part. The aperture is wide, terminal. The test consists of two elongated chambers of almost equal size. They are spiral-turned around the horizontal axis. The test is subcircular in profile. The test wall is thick, particularly in the place of the twinning of the chambers, and consists of dark micrite calcite.

Dimensions in μ: test length 194–275, test width 112–150, flange width 142–196.

Stratigraphical and geographical range: The Carnian Tisovec limestones of the West Carpathians.

Amphorella bilongicamerata minuta BORZA et SAMUEL, 1977

Pl. CXLIX, fig. 2–5

1977 *Amphorella bilongicamerata minuta* nov. ssp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) from the Upper Triassic etc., p. 104, 105, Pl. 2, fig. 2–5.

Remark: A small, oval to suboval test, consisting of two elongated chambers, turned around the vertical axis. It is widest in 1/4–1/3 of its length. Its shape is suboval to subangular in its proximal part. No caudal projection was observed. The profile of the test is subcircular. It has a funnel-shaped flange in its distal part. The aperture is wide, terminal. The test is thick, composed of dark micrite calcite.

Dimensions in μ: test length 154–185, test width 73–104, flange width 50–96.

Stratigraphical and geographical range: The Carnian Tisovec limestones in the West Carpathians.

Amphorella lageniformis BORZA et SAMUEL, 1977

Pl. CXLIX, fig. 6–9

1977 *Amphorella lageniformis* nov. sp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) etc., p. 106–108, Pl. 2, fig. 6–9.

Remark: A small, elongated oval test, subcircular in profile. It is suboval to subangular in the proximal part. Some forms show indications of a small caudal projection. The test consists of two elongated, slightly turned chambers. The second chamber passes into a longer and narrower neck terminated with a small flange. The aperture is terminal. The test wall consists of dark micrite calcite. The species differs from *Amphorella bilongibicamerata bilongibicamerata* by smaller dimensions, elongated, test, narrow neck and flange.

Dimensions in μ: test length 170–208, test width 85–115, flange width 63–85.
Stratigraphical and geographical range: The Carnian Tisovec limestones, the Norian Furmanec limestones in the West Carpathians.

Amphorella? subsphaerica BORZA et SAMUEL, 1977
Pl. CXLIX, fig. 10–14

1977 *Amphorella subsphaerica* nov. sp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) etc., p. 108–110, Pl. 2, fig. 10–14.

Remark: A spherical to subspherical test, circular or subcircular in profile. It consists of two chambers. The first one is small, elongated, the second is large, embracing the first one. The aperture is small, terminal. The flange is broad, surpassing the test width. No caudal projection. The test wall is thin, composed of dark micrite calcite. It differs from all preceding species of the genus *Amphorella* by its large spherical to subspherical test and a wide, concave flange. It is not quite sure that the species belongs to the genus *Amphorella* BORZA et SAMUEL.

Dimensions in μ: test length 385, test width 309, flange 232, flange width 508.
Stratigraphical and geographical range: The Carnian Tisovec limestones in the West Carpathians.

SPIRIAMPHORELLA BORZA et SAMUEL, 1977

Spiriamphorella carpathica carpathica BORZA et SAMUEL, 1977
Pl. CL, fig. 1–5

1977 *Spiriamphorella carpathica carpathica* nov. ssp. K. BORZA–O. SAMUEL: New genera and species (incertae sedis) etc., p. 110–111, Pl. 3, fig. 1–5.

Remark: A pear-shaped test, subspherical to oval in its proximal part; passing into a wide neck with a small flange, in the distal part. The test is circular to subcircular in profile and consists of two chambers. The first chamber is small, spherical, the second is, tubular, evolute in the juvenile stage. In the initial stage (1–1,5) the tubular chamber enlarges slightly to broaden rapidly in the next stage and pass into the pear-shaped rectilinear stage. In the distal part the test gets narrower and passes into a neck terminated with a small flange. The aperture is wide, terminal. The test wall is dark composed of micrite calcite.

Dimensions in μ: test length 192–234, test width 81–180, flange width 115–154.
Stratigraphical and geographical range: The Carpathian Tisovec limestones of the West Carpathians, an analogous level in the Austrian Northern Limestone Alps (described by S. M. SADATI, 1981).

Spiriamphorella carpathica gemerica BORZA et SAMUEL, 1977
Pl. CL, fig. 8–16; Pl. CLI, fig. 1–3

1977 *Spiriamphorella carpathica gemerica* nov. ssp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) from the Upper Triassic etc., p. 111–112, Pl. 3, fig. 9–16; Pl. 4, fig. 1–2.

Remark: An elongated suboval test; subcircular in profile; subangular to suboval in its proximal part. Forms with subangular proximal part have a small false caudal projection. The juvenile stage is evolute, with 3–4 whorls. The embryonal chamber is small, spherical. The next chamber is tubular, slightly enlarging in the first two whorls to enlarge rapidly in the next and pass into the rectilinear stage. The neck is broad, the aperture is terminal. A funnel-like flange does not surpass the neck width. The equatorial plane of the juvenile stage is diagonal to the vertical axis of the test. The test wall consists of dark micrite calcite and it is thickened in the place of the test twinning.

The form differs from the above described species *Spiriamphorella carpathica carpathica* by a more elongated test, evolute coiling and diagonal juvenile stage to the vertical axis.

Dimensions in μ: test length 232–324, test width 110–180, flange width 85–120.

Stratigraphical and geographical range: The Carnian Tisovec limestones in the West Carpathians.

Spiriamphorella rectilineata rectilineata BORZA et SAMUEL, 1977

Pl. CLI, fig. 4–8

1977 *Spiriamphorella rectilineata rectilineata* nov. ssp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) etc., p. 112–114, Pl. 4, fig. 5–8.

Remark: A pear-shaped test, oval to subangular in its proximal part. The test is widest in about 1/3 of its length. Then it gets narrower and passes into a long, almost cylindrical neck terminated with a flange in the distal part. The aperture is wide, terminal. The juvenile stage consists of 2–3 evolute whorls. The embryonal chamber is small, spherical, the second is tubular, long, evolute in its initial stage. In the first whorl the tubular chamber enlarges slightly, in the second whorl it gets rapidly wider. In the mature stage it passes into a straight line and gets narrow again from 1/3 of the test length. There is a small flange in the distal part. The test wall consists of dark micrite calcite. The species differs from *Spiriamphorella carpathica gemerica* by a more elongated neck and indications of test distriction.

Dimensions in μ: test length 261–359, test width 126–208, flange with 105–142.

Stratigraphical and geographical range: The Carnian Tisovec limestones of the Stratenská hornatina Mts. in the West Carpathians.

Spiriamphorella rectilineata districta BORZA et SAMUEL, 1977

Pl. CLI, fig. 9–12; Pl. CLII, fig. 1–3

1977 *Spiriamphorella rectilineata districta* nov. ssp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) from the Upper Triassic etc., p. 114–116, Pl. 4, fig. 9–11, Po. 5, fig. 1–3.

Remark: A large test, with its spiral part slightly declined from the vertical axis. The proximal part is subangular to angular. Some forms show indications of a false caudal projection. The juvenile part consists of 2,5–3,5 evolute whorls occupying as much as 1/2 test diameter. Some forms have more-or-less symmetrical spiral stage in others it is declined from the vertical axis. In about a half of its length the test is narrowed, with indications of distriction. The neck is long, almost cylindrical, terminated with a conspicuous funnel-shaped flange. The test wall consists of dark micrite calcite. The form differs from the nominant species *Spiriamphorella rectilineata* BORZA et SAMUEL by a larger evolute stage, conspicuous test distriction and a larger size.

Dimensions in μ: test length 540, test width 184, flange width 223.

Stratigraphical and geographical range: The Carnian Tisovec limestones of the Strážovská hornatina Mts. in the West Carpathians.

Spiriamphorella ovata BORZA et SAMUEL, 1977
Pl. CLII, fig. 4–9

1977 *Spiriamphorella ovata* nov. sp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) from the Upper Triassic etc., p. 116. Pl. 5, fig. 4–9.

Remark: An ovoid test, suboval to subangular in its proximal part. The initial stage is evolute, the mature stage is ovoid, straight. The neck is long, narrow, terminated with a larger funnel-like flange. The aperture is wide, terminal. The test wall consists of dark micrite calcite.

The described species resembles in its morphology most to *Amphorella lageniformis* BORZA et SAMUEL. It only differs by the initial evolute stage, a long neck and a wide flange.

Dimensions: test length 446 μ, test width 142 μ, flange width 160 μ

Stratigraphical and geographical range: The Carnian Tisovec limestone, in the Stratenská hornatina Mts. of the West Carpathians.

URNULINELLA BORZA et SAMUEL

Urnulinella andrusovi BORZA et SAMUEL, 1977
Pl. CLIV, fig. 1–6; Pl. CLV, fig. 1–6

1977 *Urnulinella andrusovi* nov. sp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) from the Upper Triassic etc., p. 118–119, Pl. 7, fig. 1–6.

Remark: A pear-shaped, subspherical test; circular to subcircular in profile. The test is subspherical in its proximal part. The distal part terminates with a wide aperture with a thin flange. The width and height of the test are almost equal. The inner part of the test consists of a large, oval (in profile) initial chamber and of 2–3 lateral chambers. The test wall consists of dark micrite calcite.

Dimensions in μ: test length 310, test width 305, flange width 277.

Stratigraphical and geographical range: The Carnian Tisovec limestones of the Stratenská hornatina Mts. in the West Carpathians.

Urnulinella? irregularis (BORZA et SAMUEL, 1977)
Pl. CLIII, fig. 1–8

1977 *Spiriamphorella irregularis* nov. sp. – K. BORZA–O. SAMUEL: New genera and species (incertae sedis) from the Upper Triassic etc., p. 116–118, Pl. 6, fig. 1–8 (part.; non fig. 7–8 = *Galeanella* sp.).

Remark: The test consists of the initial trochospiral stage passing sometimes to irregularly coiled forms. The last chamber is large, pear-shaped. The neck is short, and the flange narrow. The aperture is wide, terminal. The test wall consists of dark micrite calcite. It differs from the preceding species of the genus *Spiriamphorella* BORZA et SAMUEL by a trochospiral, in some cases, irregularly coiled juvenile stage.

Dimensions in μ: test length 508, test width 462, flange width 232.

Stratigraphical and geographical range: The Carnian Tisovec limestones of the Stratenská hornatina Mts. in the West Carpathians.

Remarks: The opinions about systematic and taxonomic positions of the group incertae sedis are contradictory. L. ZANINETTI (1977) ranged the forms, described by K. BORZA–O. SAMUEL (1977a, b) to the following groups, i. e. the species *Amphorella subsphaerica* BORZA et SAMUEL, 1977, *Spiriamphorella irregularis* BORZA et SAMUEL, 1977 and *Urnulinella andrusovi* BORZA et SAMUEL, 1977 are ranged to the synonymy of *Galeanella panticae* ZANINETTI et BROENNIMANN, 1973. She ranges spectrum *Spiriamphorella carpatica* BORZA et SAMUEL and *S. rectilineata* BORZA et SAMUEL, 1958 and she regards *Spiriamphorella ovata* BORZA et SAMUEL, 1977 as a synonymum to *S. districta* BORZA et SAMUEL, 1977. The species

Amphorella bicamerata bicamerata BORZA et SAMUEL, 1977, *A. bicamerata intermedia* BORZA et SAMUEL 1977, *A. bilongicamerata bilongicamerata* BORZA et SAMUEL 1977, *A. bilongicamerata minuta* BORZA et SAMUEL and *A. lageniformis* BORZA et SAMUEL are regarded by L. ZANINETTI as diagonal profiles of *Galeanella ? carpathica* BORZA et SAMUEL 1977 or *G. districta* BORZA et SAMUEL 1977, but some profiles of the above mentioned species may also belong to *Galeanella particae* ZANINETTI et BROENNIMANN.

Although K. BORZA–SAMUEL (1977a, b) ranged some forms of the species *Cucurbita infundibuliformis* JABLONSKÝ 1973 to the species *Amphorella bicamerata bicamerata* BORZA et SAMUEL 1977, they did not abolish the genus and species *Cucurbita infundibuliformis* JABLONSKÝ as recorded erroneously by L. ZANINETTI (1977, p. 1).

D. ALTINER–L. ZANINETTI (1981) or L. ZANINETTI–D. ALTINER (1981) treated the problem again in 1981. They partly modified the opinions about systematic and taxonomic positions of the species described by K. BORZA–O. SAMUEL (l. c.) or O. SAMUEL–J. SALAJ–K. BORZA (1981) from the West Carpathians.

They range the genera *Galeanella* KRISTAN 1958, *Miliolipora* BROENNIMANN et ZANINETTI 1971, *Ophthalmipora* ZANINETTI et BROENNIMANN 1972, ? *Spiriamphorella* BORZA et SAMUEL 1977, ? *"Bispiranella"* SAMUEL, SALAJ et BORZA 1981, to the family of *Milioliporidae* BROENNIMANN et ZANINETTI, 1971, and the genus *Amphorella* BORZA et SAMUEL 1977 (pro parte), *Spiriamphorella* BORZA et SAMUEL 1977, *Pseudocucurbita* BORZA et SAMUEL 1977 and *Bispiranella* SAMUEL, SALAJ et BORZA 1981 are ranged to synonymy of the genus *Galeanella*.

Recently E. FLÜGEL (1981) and S.-M. SADATI (1981) described the species *Spiriamphorella districta* BORZA et SAMUEL 1977 from the Northern Limestone Alps and regarded *Spiriamphorella irregularis* BORZA et SAMUEL 1977 (partim), *S. ovata* BORZA et SAMUEL 1977, *Amphorella bilongicamerata* BORZA et SAMUEL 1977 (partim) as the synonymy of the above species.

L. ZANINETTI–D. ALTINER (1982) ranged the genus *Spiriamphorella* to the family *Milioporidae*, although the test perforation of the genus has still not been proved, as also mentioned by the authors (p. 11) themselves: "Avec doute on peut encore rattacher à cette famille deux genres qui se placent à la limite des Ophthalmidiinae – Milioporidae, *Spiriamphorella*, espèce – type *Spiriamphorella carpathica* BORZA et SAMUEL 1977 a et *"Bispiranella"* espèce type *Bispiranella subcarinata* SAMUEL, SALAJ et BORZA, 1981, et l'attente d'information plus complètes sur la microstructure de la paroi de ces Foraminifères".

Recently we re-examined the forms ranged among "incertae sedis" and our results supported validity of most taxa. For example, the species *Spiriamphorella irregularis* BORZA et SAMUEL 1977 cannot be regarded as synonym to the species *Spiriamphorella districta* BORZA et SAMUEL (1977) because of their substantially different internal structures. The forms of the group *Spiriamphorella* ex. gr. *carpathica* BORZA et SAMUEL 1977 and *Spiriamphorella* ex gr. *rectilineata* BORZA et SAMUEL represent though one "natural spectrum" but they show a tendency toward elongated tests and in younger forms even pseudodistriction (*S. rectilineata districta* BORZA et SAMUEL 1977). This opinion is actually supported by L. ZANINETTI–D. ALTINER–Z. DAGER–B. DUCRET 1982). They regard the last two species and *Amphorella irregularis* BORZA et SAMUEL 1977 as well as *Pseudocucurbita subsphaerica* BORZA et SAMUEL 1977 as independent taxa, only they ranged *A. irregularis* BORZA et SAMUEL 1977 to the genus *Galeanella* KRISTAN 1958. It is to be noticed that we have not observed test-wall perforation on the species *Spiriamphorella irregularis* BORZA et SAMUEL 1977 = *Urnulinella irregularis* BORZA et SAMUEL 1977 (in the sense of the authors of this book), nor on other taxa. Because of imperforate test and the colonial way of living (like Fungi) we do not range the group to the family *Milioliporidae* but we describe it within the group "incertae sedis", since it is not proved reliably that they are foraminifers.

References

ALTINER, D.–ZANINETTI, L. 1981: Le Trias dans la région de Pinarbisi, Taurus oriental, Turquie: unités lithologiques, micropaléontologie, milieux de dépôt. Riv. ital. Paleont., 86, 4, Milano, 78–88.

ANDRUSOV, D. 1959: Geológia československých Karpát II. Vyd. Slov. Akad. Vied, Bratislava, 1–375.

ANDRUSOV, D. 1968: Grundriss der Tektonik der Nördlichen Karpaten. Vyd. Slov. Akad. Vied, Bratislava, 1–188.

ANDRUSOV, D.–BYSTRICKÝ, J.–FUSÁN, O., 1973: Outline of the Structure of the West Carpathians. Guide-book for geol. excursions, Xth Congr. Carp.-Balk. geol. Ass., Vyd. Geol. Úst. D. Štúra, Bratislava, 1–45.

ASSERETO, R. 1974: Aegean and Bythynian. Proposal for two New Anisian Substages. Erdwiss. Komm. Österr. Akad. Wiss., Wien, 23–39.

BALOGH, K. 1950: Az északmagyarországi triasz rétegtana. Föld. közl., Budapest, 7–9.

BALTRES, A. 1975: Der Obere Anis vom Lacul Rosu (Ostkarpaten): Algen, Foraminiferen, Sedimentologie und Diagenese. Guide Micropal. Mésoz.-Ter. Carpat. Roum. G. 14. Europ. Micropal. Coll., Bucuresti, 115–121.

BAUD, A.–ZANINETTI, L.–BROENNIMANN, P. 1971: Les Foraminifères de l'Anisian (Trias moyen) des Préalpes Médianes Rigides (Préalpes romandes, Suisse et Préalpes du Chablais, France). Achr. Sc. Genève, 24, 1, Genève, 73–95.

BAUD, A.–BROENNIMANN, P.–ZANINETTI, L. 1974: Sur le présence de Meandrospira pusilla (HO) (Foraminifère), dans le Trias inférieur de Kuh-e-Ali Bashi, Julfa, NW Iran, Paläont. Z., 48, 2–4, Stuttgart, 205–213.

BEGAN, A. 1969: Geologické pomery bradlového pásma na strednom Považí. Zbor. geol. vied, Západné Karpaty, 11, Geol. Úst. D. Štúra, Bratislava, 55–103.

BEGAN, A.–BORZA, K.–SALAJ, J.–SAMUEL, J. 1982: Geologická mapa Myjavskej pahorkatiny a sev. časti Malých Karpát (Brezovské a Čachtické Karpaty) 1:50 000 a vysvetlivky. Manuskript – archív Geol. Ústav D. Štúra, Bratislava.

BEJKA. Z.-GAŹDZICKI, A. 1976: Anisian foraminifers from the High-Tatric series of the Tatra Mts. Acta geol. pol., 26, 3, Warszawa, 429–437.

BERCZI-MAKK, A. 1972: On the occurrence of Meandrospira iulia (Premoli Silva) (Foraminifera) in the Campilian Tirolites sequence of Mt. Iszka. Földt. közl., Budapest, 336–339.

BERCZI-MAKK, A. 1976: Biostratigraphic significance of the Meandrospira pusilla (Ho) (Foraminifera) and its distribution in Triassic sedimentary rocks in Hungary, as revealed by hydrocarbon exploring. Acta geol. Acad. Sci. hung., 20, 1–2, Budapest, 101–124.

BERMÚDEZ, P. J. 1952: Estudio sistematico de los Foraminiferos rotaliformes. Venezuela Minist. Minas et Hidrocarb., Bull. Geol., 2, 4, Caracas, 1–230.

BIELY, A.–BYSTRICKÝ, J. 1964: Die Dasycladaceen in der Trias der Westkarpaten. Geol. Zborn. Slov. Akad. Vied, 15, 2, Bratislava, 173–188.

BORZA, K. 1962: Petrografický výskum valúnov sedimentárnych hornín kriedových a paleogénnych zlepencov Brezovského pohoria a Myjavskej pahorkatiny. Geol. Zborn. 13, 2, Bratislava, 241–256.

BORZA, K. 1966: Litologicko-petrografický výskum zlepencov bradlového pásma. Petrografia valúnov sedimentárnych hornín. Náuka o Zemi II, Geologica 2, Bratislava, 1–68.

BORZA, K. 1970: Mikrofazies mit Glomospira densa (Pantić) aus der mittleren Trias der Westkarpaten. Geol. Zborn. 21, 1, Bratislava, 175–182.

BORZA, K. 1971: Praecalpionellopsis gemeriensis n. gen. n. sp., aus der oberen Trias der Westkarpaten. Geol. Zborn. Geologica carpathica, 22, 1, Bratislava, 131–135.

BORZA, K. 1973: Litologicko-mikrofaciálny výskum vrchnotriasových vápencov Slovenského krasu a Muránskej plošiny (1971–1972). Manuskript, Geol. Úst. Slov. Akad. Vied, Bratislava.

BORZA, K. 1975: Mikroproblematika aus der Trias der Westkarpaten. Geol. Zborn. Geologica carpathica 26, 2, Bratislava, 199–236.

BORZA, K.–SAMUEL, O. 1977a: New genera and species (Incertace sedis) from the Upper Triassic in the West Carpathians. Geol. Zborn. Geologica carpathica 28, 1, Bratislava, 95–119.

BORZA, K.–SAMUEL, O. 1977b: Paratintinnina tintinniformis and P. tulipaformis nov. gen. et nov. sp. (Incertae sedis) from Upper Triassic limestones of West Carpathians (Czechoslovakia). Západné Karpaty, sér. Paleont. 2–3, Geol. Úst. D. Štúra, Bratislava, 143–150.

BORZA, K.–SAMUEL, O. 1978: Pseudocucurbita n. gen. (Incertace sedis) from the Upper Triassic of the West Carpathians. Geol. Zborn. Geologica carpathica 29, 1, Bratislava, 67–75.

BROENNIMANN, P.–CADET, J.-P.–ZANINETTI, L. 1973a: Sur la présence d'Involutina sinuosa pragsoides (Oberhauser) Foraminifère) dans l'Anisien supérieur probable de Bosnie-Herzégovine méridionale (Yougoslavie). Riv. ital. Paleont., 79, 3, Milano, 301–336.

BROENNIMANN, P.–CADET, J.-P.–ZANINETTI, L. 1973b: Sur quelques foraminifères de l'Anisien (Trias moyen) de Bosnie-Herzégovine méridionale, Yougoslavie. Riv. ital. Paleont., 79, 4, Milano, 461–478.

BROENNIMANN, P.–CADET, J.–P. RICOU, L.-E.–ZANINETTI, L. 1973: Révision morphologique et émendation du genre triassique Galeanella panticae n. sp. (Dinarides yougoslaves et Zagros, Iran). Verh. Geol. Bundesanst., 3, Wien, 411–435.

BROENNIMANN, P.–CHAROLLAIS, J.–KOEHN-ZANINETTI, L.–ROSSET, J. 1969: Découverte de Foraminifères du Trias supérieur dans la klippen des Annes (Haute-Savoie). C. R. Sci. 4, 1, Genève, 89–99.

BROENNIMANN, P.–PAGE, C. 1966: Sur quelques Foraminifères du Trias à le de Jaun (Canton de Fribourg, Suisse). Arch. Sc. Genève, 19, 1, Genève, 83–92.

BROENNIMANN, P.–POISSON, A.–ZANINETTI, L. 1970: L'unité du Domuz Dag (Taurus lycies-Turquie). Microfaciès et Foraminifères du Trias et du Lias. Riv. ital. Paleont., 76, 1, Milano, 1–36.

BROENNIMANN, P.–WHITTAKER, J. E.–ZANINETTI, L. 1975: Triassic foraminiferal biostratigraphy of the Kyaukme-Longtawkno area, Northern Shan States, Burma. Riv. ital., Paleont., 81, 1, Milano, 1–30.

BROENNIMANN, P.–ZANINETTI, L. 1972a: Foraminifera from the basal upper Muschelkalk et Hyeres, western Bassel-Provence, southern France. Riv. ital. Paleont., 78, 1, Milano, 31–64.

BROENNIMANN, P.–ZANINETTI, L. 1972b: On the occurrence of the Sepulid Spirorbis Daudin, 1880 (Annelida, Polychaetina, Sedentarida) in thin sections of Triassic rocks of Europe and Iran. Riv. ital. Paleont., 78, 1, Milano, 67–90.

BROENNIMANN, P.–ZANINETTI, L.–BOZORGNIA, F.–DASHTI, G. R.–MOSHTAGHIAN, A. 1971: Lithostratigraphy and foraminifera of the Upper Triassic Naiband Formation, Iran. Rev., Micropal., 14, 5, Paris, 7–16.

BROENNIMANN, P.–ZANINETTI, L.–BOZORGNIA, F. 1972: Triassic (Skythian) smaller foraminifera from the Elika Formation of the central Alborz, northern Iran, and from the Suisé Formation of the Dolomites northern Italy. Mitt. Ges. Geol. Bergbaust., 21, Innsbruck, 861–884.

BROENNIMANN, P.–ZANINETTI, L.–BOZORGNIA, F.–HUBER, H. 1972: Ammodiscus and Ptychocladdiides (Foraminiferida) from the Triassic Elika Formation, Nessa-Hassan-akdar section, central Albourz, Iran. Riv. ital. Paleont., 78, 1, Milano, 1–28.

BROENNIMANN, P.–ZANINETTI, L.–MOSHTAGHIAN, A.–HUBER, H. 1973: Foraminifera from the Sorkh shale formation of the Tabas area, east-central Iran. Riv. ital. Paleont., 79, 1, Milano, 1–32.

BROENNIMANN, P.–ZANINETTI, L.–MOSHTAGHIAN, A.–HUBER, H. 1974: Foraminifera and microfacies of the Triassic Espahk formation Tabas area, east-central Iran. Riv. ital. Paleont., 80, 1, Milano, 1–48.

BUDAY, T. et al. 1967: Regionální geologie ČSSR 2. Západní Karpaty 2. Vyd. Ústř. Úst. geol., Praha, 1–651.

BUDUROV, K.–PEVNÝ, J. 1970: Über die Anwesenhait von Trias-Conodonten in den Westkarpaten. Geol. Práce, Správy, 51, Geol. Úst. D. Štúra, Bratislava, 195–171.

BUDUROV, K.–STEFANOV, S. 1974: Die Zahnreihen-Conodonten aus der Trias des Geolo-Bardo Gebirges. Bull. Geol. Inst., Ser. Paleont., 23, Sofia, 89–104.

BUDUROV, K.–TRIFONOVA, E. 1974: Die Conodonten und Foraminiferen-Zonen in der Trias des Ostbalkans. Symposium Wien 1973, Österr. Akad. Wiss. Rep., 2, Wien, 57–62.

BUDUROV, K.–STEFANOV, S. 1972: Platform-Conodonten und ihre Zonen in der Mittleren Trias Bulgariens. Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 829–852.

BUJNOVSKÝ, A.–KOCHANOVÁ, M. 1973: Útesy hlavného dolomitu Revúckej doliny a ich megalodontová fauna. Geol. Práce, Správy, 60, Geol. Úst. D. Štúra, Bratislava, 169–195.

BUJNOVSKÝ, A.–KOCHANOVÁ, M.–PEVNÝ, J. 1975: Korytnica limestones – a new litho-stratigraphical unit and its fauna. Geol. Práce, Správy, 63, Geol. Úst. D. Štúra, Bratislava, 21–53.

BUJNOVSKÝ, A.–POLÁK, M. 1979: Korelácia mezozoických litostratigrafických jednotiek Malej Fatry, Veľkej Fatry a SZ časti Nízkych Tatier. Geol. Práce, Správy, 72, Geol. Úst. D. Štúra, Bratislava, 77–96.

BYSTRICKÝ, J. 1964: Slovenský kras. Vyd. Geol. Úst. D. Štúra, Bratislava, 1–204.

BYSTRICKÝ, J. 1965: Übersicht der Stratigraphie und Entwicklung der Trias den Westkarpaten. In: Carpato-Balkan Geol. Assoc. VII. Congr. Sofia, Reports, 1, Sofia, 31–36.

BYSTRICKÝ, J. 1967: Übersicht der Stratigraphie und Entwicklung der Trias in den Westkarpaten. Geol. Zborn. Slov. Akad. Vied. 18, 2, Bratislava, 257–266.

BYSTRICKÝ, J. 1972: Faziesverteilung der mittleren und oberen Trias in den Westkarpaten. Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 289–310.

BYSTRICKÝ, J. et al. 1973: Triassic of the West Carpathians Mts. Guide to Excurs. D, Xth Congr. Carpatho-Balkan Geol. Assoc. Vyd. Geol. Úst. D. Štúra, Bratislava, 1–137.

BYSTRICKÝ, J. 1975: The Kössen Beds in the West Carpathians and the problem of their stratigraphic division. Geol. Zborn. Geologica carpathica, 26, 2, Bratislava, 177–197.

BYSTRICKÝ, J. 1979: Dasycladacea of the Upper Triassic of the Stratenská hornatina mountains (the West Carpathians). Geol. Zborn. Geologica carpathica, 30, 3, Bratislava, 321–340.

BYSTRICKÝ, J. 1982: The Middle and Upper Triassic of the Stratenská hornatina Mts. and their relation to the Triassic of the Slovak Karst Silica nappe (the West Carpathians Mts., Slovakia). Geol. Zborn., Geologica carpathica, 33, 4, Bratislava, 437–462.

BYSTRICKÝ, J. 1983: in Stratigrafický slovník Západných Karpát Slovenska, I, Geol. Ús., D. Štúra, Bratislava (in press).

BYSTRICKÝ, J.–BIELY, A, 1966: Kolokvium über die stratigraphie der Trias. Exkursionführer (Trias der Westkarpaten), Karpato-Balkan. Geol. Assoc., komm. Bratislava, 1–64.

BYSTRICKÝ, J.–JENDREJÁKOVÁ, O. 1977: Die Foraminiferen und Stratigraphie der Obertrias in den Westkarpaten. Manuskript-archív Geol. Ústav, SAV, Bratislava.

BYSTRICKÝ, J.–KOLLÁROVÁ-ANDRUSOVOVÁ, V. 1961: Biostratigraphie du Trias des Karpates occidentales d'après les Dasycladacées et les Ammonoidés. Geol. Práce, Zošit, 60, Geol. Úst. D. Štúra, Bratislava, 107–112.

CHRISTODOULOU, G.–TSAILA-MONOPOLIS, S. 1972: Contribution to the knowledge of the stratigraphy of the Eastern Hellenic Zone. Bull. Geol. Soc., Greece, 9, 1, Athény, 101–118.

COUSIN, M.–NEUMANN, M. 1971: Microfaciès du Lias dans les Préalpes Juliennes occidentales (Frioul, Italie). Rev. Micropaléont., 14, 1, Paris, 35–49.

CROS, P. 1964: Sur les calcaires à Triasina hantkeni Majzon et leur environement stratigraphique dans le massif de la Sella (Dolomites occidentales, Haute Adige). C. R. Somm. Soc. Géol. France, Paris, 1–139.

CUMMINGS, R. H. 1955: Nodosinella Brady, 1876, and associated Upper Palaeozoic genera. Micropaleontology, 2, 3, New York, 221–238.

CUSHMAN, J. A. 1950: Foraminifera, their classification and economic use. Harward University Press, Cambridge, Massachusetts, 1–603.

CUSHMAN, A. J.–WATERS, A. J. 1928: Upper Paleozoic foraminifera from Sutton Country, Texas. Journ. Paleont., 2, Toulsa, 358–371.

DAĞER, Z. 1978: Sur quelques Foraminifères nouveaux du Trias de Kocaeli, Turquie. Not. Lab. Paléont. Univ. Genève, 4, Genève, 21–24.

DAĞER, Z.–ZANINETTI, L. 1976: Sur quelques Foraminifères du Trias inférieur du Taurus oriental, Turquie. C. R. Sc., SPHN, Genève, NS, 10, Genève, 2–3.

DIMITRIJEVIĆ, M.–PANTIĆ, S.–RADOVIĆ, R. –STEFANOVSKA, D. 1968: Lithostratigraphic and biostratigraphic Mesozoic columns in the Gacko-Sutjetska-Drina region. Bull. Inst. Geol. Geoph. Res., s. A, 26, Belgrade, 39–70.

DURDANOVIĆ, Z. 1968: Eine neue Form Trocholina aus den karnischen Ablagerungen südwestlich von Vojsko (Slowenien-Jugoslawien). Geol. Vesn., 21, Zagreb, 105–109.

EFIMOVA, N. A. 1974: Triasovye foraminifery Severo-Zapadnogo Kavkaza s Predkavkazja. Voprosy mikropal., 17, Moskva, 53–84.

FUCHS, W. 1967: Über Ursprung und Phylogenetic der Trias. "Globigerinen" und die Bedeutung dieses Formenkreises für das echte Plankton. Geol. Bundesanst., H. 1, 2, Wien, 135–176.

FUCHS, W. 1970: Eine alpine tiefliassische Foraminiferenfauna von Hernstein in Niederösterreich. Verh. Geol. Bundesanst., 1, Wien, 66–145.

GAŻDZICKI, A. 1970: Triasina Microfacies in the Sub-Tatric Rhaetic of the Tatra Mts. Bull. Acad. Pol., 18, 2, Warszawa, 103–112.

GAŹDZICKI, A. 1971: Megalodon limestones in the Sub-Tatric Rhaetian of the Tatra Mts. Acta geol. pol., 21, 3, Warszawa, 387–398.

GAŻDZICKI, A. 1974: Rhaetian microfacies, stratigraphy and facial development in the Tatra Mts. Acta geol. pol., 24, Warszawa, 17–96.

GAŻDZICKI, A. 1975: Lower Liassic ("Gresten Beds") microfacies and foraminifers from the Tatra Mts. Acta geol. pol., 25, 3, Warszawa, 385–398.

GAŻDZICKI, A. 1978a: Rhaetian – Lower Hettangian foraminifer zonation and the problem of Triassic – Jurassic boundary in the Tatra Mts., West Carpathians. Acta du VI^e Coll. Afr. Micropal., Tunis 1974, Ann. Mines Géol., 28, Tunis, 89–101.

GAŻDZICKI, A. 1978b: Conodonts of the genus Misikella Kozur and Mock, 1974 from the Rhaetian of the Tatra Mts. (West Carpathians). Acta paleont. pol., 23, 3, Warszawa, 341–350.

GAŹDZICKI, A.–GUPTA, V. J. 1981: Triassic Foraminifers Involutinidae from the West Carpathians and Humalayasits stratigraphic and palaeobiogeographic implications. Bull. Ind. Geol. Assoc., 14, 2, Chandigarh, 101–106.

GAŹDZICKI, A.–IWANOW, A. 1976: The Diachronism of the Rhaetic and "Gresten" Beds in the Tatra Mts. (West Carpathians). Bull. Acad. Pol., 24, 2, Warszawa, 117–122.

GAŻDZICKI, A.–KOZUR, H.–MOCK, R.–TRAMMER, J. 1978: Triassic microfossils from the Korytnica limestones at Liptovská Osada (Slovakia). Polonica, 23, 2, Warszawa, 351–373.

GAŹDZICKI, A.–KOZUR, H.–MOCK, R. 1979: The Norian – Rhaetian boundary in the light of micropaleontological data. Geologija – Razprav. poroč., 22, 1, Ljublana, 71–112.

GAŹDZICKI, A.–MICHALÍK, J.–PLANDEROVÁ, E.–SÝKORA, M. 1979: An Upper Triassic – Lower Jurassic sequence in the Krížna nappe (West Tatra mountains, West Carpathians, Czechoslovakia). Západné Karpaty, sér. Geol., 5, Geol. Úst. D. Štúra, Bratislava, 119–148.

GAŻDZICKI, A.–MICHALÍK, J. 1980: Uppermost Triassic sequences of the Choč-nappe (Hronic) in the West Carpathians of Slovakia and Poland. Acta geol. pol., 30, 1, Warszawa, 67–76.

GAŹDZICKI, A.–SMIT, O. E. 1977: Triassic foraminifers from the Lalay Peninsula. Acta geol. pol., 27, 3, Warszawa, 319–332.

GAŹDZIČKI, A.–TRAMMER, J.–ZAWIDZKA, K. 1975: Foraminifers from the Muschelkalk of southern Poland. Acta geol. pol., 25, 2, Warszawa, 285–298.

GAŻDZICKI, A.–ZAWIDZKA, K. 1973: Triassic foraminifers assemblages in the Choč nappe of the Tatra Mts. Acta geol. pol., 23, 3, Warszawa, 483–490.

GHEORGHIAN, D. 1975: Biostratigraphic Data Concerning the Triassic of the Sasca Area (Resita-Moldava, Nouă Zone). D. S. Sedinto, 61, Bucuresti, 51–64.

GHEORGHIAN, D. 1980: Note concernant quelques espèces de Nodophthalmiuin dans le Trias moyen-supérieur de Romanie. D. S. Geol. Geof., 65, 3, Paleont., Bucuresti, 37–41.

GłAZEK, J.–TRAMMER, J.–ZAWIDZKA, K. 1973: The Alpine microfacies with Glomospira densa (Pantić) in the Muschelkalk of Poland and some related paleogeographical and geotectonic problems. Acta geol. pol., 23, 3, Warszawa, 463–482.

GLINTZBOECKEL, Ch. 1956: Présence de Trocholines dans le Trias de Tunisie. C. R. Soc. Géol. France, Paris, 238–240.

GUPTA, V. J.–ZANINETTI, L.–KACHRII, R. K. 1977: Upper Triassic Foraminifers from northeastern Kumaun, Himalaya, India. Riv. Ital. paleont., 83, 1, Milano, 1–20.

Gusić, J. 1975: Upper Triassic and Liassic foraminiferida of Mt. Medvednica, Northern Croatia. Paleont. jugoslavica, 15, Zagreb, 1–45.

Gusić, J.–Babić, L. 1972: Die Mikrofazies und Mikrofauna der Obertrias und des Lias des Medvednica Gebirges (Nordkroatien). Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 327–340.

Gümbel, C. W. 1868: Foraminiferen in den Cassianer und Raibler Schichten. Verh. Geol. Reichsanst., 12, Wien, 275–276.

Hanáček, J. 1976: Nové poznatky o triase strážovského a chočského príkrovu v Strážovskej hornatine. Západné Karpaty, sér. Geol., 1, Geol. Úst. D. Štúra, Bratislava, 125–149.

Ho, J. 1959: Triassic foraminifera from the Chialingchiang Limestone of South Szechuan. Acta paleont., Pékin, 405–418.

Hohenegger, J. 1974a: Zur Anwendung stochastischer Methoden in der Taxonomie oberorischen Nodosarien. Verh. Geol. Bundesanst., 1, Wien, 25–69.

Hohenegger, J. 1974b: Über einfache Gruppierungsmethoden von Fossil-Vergesellschaftungen am Beispiel obertriadischer Foraminiferen. N. Jb. Geol. Paläont., Abh., 146, 3, Stuttgart, 263–297.

Hohenegger, J. 1978: Populationsgenetische Deutung des morphologischen Wandels der Triassischen Foraminifere Nodosaria striatoclavata. Lethaia, 11, Oslo, 199–215.

Hohenegger, J.–Lobitzer, H. 1971: Die Foraminiferen-Verbeiteilung in einem obertriadischen Karbonatplattform-Becken-Komplex der ostlichen Nordlichen Kalkalpen. Verh. Geol. Bundesanst., 3, Wien, 458–485.

Hohenegger, J.–Piller, W. 1975a: Ökologie und systematische Stellung der Foraminiferen im gebankten Dachsteinkalk (Obertrias) des nördlichen Toten Gebirges (Oberösterreich). Palaeogeogr., Palaeoclimat., Palaeoecol., 18, Amsterdam, 241–276.

Hohenegger, J.–Piller, W. 1975b: Diagenetische Veränderungen bei obertriadischen Involutinidae (Foraminifera). N. Jb. Geol. Paläont., Mh., 1, Stuttgart, 26–39.

Hohenegger, J.–Piller, W. 1975c: Wandstrukturen und Grossgliederung der Foraminiferen. Sitz. Akad. Wiss., Math.-Natur., 1, 184, 5, Wien, 67–96.

Hohenegger, J.–Piller, W. 1977a: Die Stellung der Involutinidae der Foraminiferen. N. Jb. Geol. Paläont., Mh., 7, Stuttgart, 407–418.

Hohenegger, J.–Piller, W. 1977b: Über ein Vorkommen von Triasina hantkeni Majzon in Zlambachmergeln (Obertrias). Anz. Österr. Akad. Wiss., Math.-Natur., 2, Wien, 26–31.

Jablonský, E. 1973: Mikroproblematika aus der Trias der Westkarpaten. Geol. Zborn., Geologica carpathica, 24, Bratislava, 415–423.

Jendrejáková, O. 1970: Foraminiferen der oberen Trias des Slowakischen Karsten und des Muráňplateaus. Geol. Zborn., Geologica carpathica, 21, 2, Bratislava, 343–350.

Jendrejáková, O. 1972: Involutina muranica n. sp. in der Oberen Trias der Westkarpaten. Geol. Zborn., Geologica carpathica, 23, Bratislava, 197–207.

Jendrejáková, O. 1973: Foraminiferen aus Dasycladaceen-Fazies der Trias der Westkarpaten. Geol. Zborn., Geologica carpathica, 24, 1, Bratislava, 113–122.

Kaliská, G. 1980: Príspevky k poznaniu triasu južných častí Západných Karpát. Manuskript-archív Geol. Úst. D. Štúra, Bratislava.

Kochanová, M. 1979: Stratigrafia stredného a vrchného triasu s pomocou bivalvií a gastropódov v Slovenskom krase a centrálnych Západných Karpatoch. Manuskript-archív Geol. Úst. D. Štúra, Bratislava.

Kochanová, M.–Mello, J.–Siblik, 1975: Fosílie wettersteinských vápencov Slovenského krasu (lokalita Silička). Geol. Práce, Správy, 63, Geol. Úst. D. Štúra, Bratislava, 55–66.

Kochansky-Devidé, V.–Pantić, Š. 1966: Meandrospira u donjem i srednjem trijasu i neki popratni fosili u Dinaridima. Geol. Vestn., 19, Zagreb, 15–28.

Koehn-Zaninetti, L. 1969: Agathamminoides gen. n., un nouveau genre de Foraminifères du Trias alpin. Riv. Ital. paleont., 75, 4, Milano, 697–704.

Koehn-Zaninetti, 1969: Les Foraminifères du Trias de la région de l'Almtal (Haute-Autriche). Jb. Geol. Bundesanst., 14, Wien, 1–155.

Koehn-Zaninetti, L.–Broennimann, P. 1965: Étude morphologique et stratigraphique de l'espèce type au genre Aulotortus Weynschenk, 1956. Arch. Sci., 18, 3, Genève, 699–705.

Koehn-Zaninetti, L.–Broennimann, P. 1966: De la paroi de Triasina hantkeni Majzon, 1954. C. R. Sc., SPHN Genève, NS, 1, 2, Genève, 83–88.

KOEHN-ZANINETTI, L.–BROENNIMANN, P. 1968: Sur la présence de Foraminifères porcelanés perforés dans le Trias alpin. Riv. Ital. Paleont., 74, 4, Milano, 1057–1062.

KOEHN-ZANINETTI, L.–BROENNIMANN, P. 1968a: Triasina oberhauseri, n. sp., un Foraminifère nouveau de la Dolomie principe des Alpes Calcaires septentrionales (Autriche). Inst. Paléont. Univ. Genève.

KOEHN-ZANINETTI, L.–BROENNIMANN, P. 1968b: Angulodiscus? gaschei, n. sp., un Foraminifère de la Dolomie principale des Alpes Calcaires septentrionales (Autriche). C. R. Sci. SPHN, NS, 2, 1, Genève, 74–80.

KOEHN-ZANINETTI, L.–BROENNIMANN, P.–GALL, J. C. 1969: Description de quelques foraminifères du grés à Voltzia (Buntsandstein supérieur) des Vosges (France). Bull. Serv. carte géol. Alsace et Lorraine, 22, 2, Strassbourg, 121–130.

KOLLÁROVÁ-ANDRUSOVOVÁ, V.–BYSTRICKÝ, J. 1974: Übersicht über den gegenwärtigen Stand der Biostratigraphie der Trias der Westkarpaten. In: Die Stratigr. der Alpinmediter. Trias. Symp., Wien 1973, Wien, 125–136.

KOUTEK, J. 1927: Příspěvek k poznání hybského rhaetu v horním Pováží. Rozpr. Čs. Akad. Věd, Umění, Tř. II, 26, Praha.

KOZUR, H. 1971: Zur Verwertbarkeit von Conodonten, Ostracoden und einigen anderen Mikrofossilien für biostratigraphische und ökologische-fazielle Untersuchungen in der Trias. Geol. Zborn., Geologica carpathica, 22, 1, Bratislava, 105–130.

KOZUR, H. 1972: Vorläufige und Tethyalen Trias sowie einige Bemerkungen zur Stufen und Unterstufengliederung der Trias. Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 361–412.

KOZUR, H.–MOCK, R. 1972: Neue Conodonten aus der Trias Slowakei und ihre stratigraphische Bedeutung. Geol. Paläont. Mitt., 2, 4, Innsbruck, 1–20.

KOZUR, H.–MOCK, R. 1973: Die Bedeutung der Trias-Conodonten für die Stratigraphie und Tektonik der Trias in den Westkarpaten. Geol. Paläont. Mitt., 3, 2, Innsbruck, 1–14.

KOZUR, H.–MOCK, R. 1974a: Die Obergrenze der karnisch Dasycladaceen-Kalke in der Lokalität Silická Brezová (Slowakischer Karst). Věst. Ústř. Úst. Geol., 49, Praha, 223–225.

KOZUR, H.–MOCK, R. 1974b: Zwei neue Conodonten-Arten aus der Trias des Slowakischen Karstes. Čas. mineral. geol., 19, 2, Praha, 135–139.

KOZUR, H.–MOCK, R. 1974c: Holothurien-Skelerite aus der Trias der Slowakei und ihre stratigraphische Bedeutung. Geol. Zborn., Geologica carpathica, 25, 1, Bratislava, 113–143.

KOZUR, H.–MOSTLER, H. 1972: Die Bedeutung der Mikrofossilien für stratigraphische Untersuchungen in der Trias. Mitt. Ges. Geol. Bergaustud., 21, Innsbruck, 341–360.

KRISTAN, E. 1957: Ophthalmidiidae und Tetrataxinae (Foraminifera) aus dem Rhät der Hohen Wand in Nieder-Österreich. Jb. Geol. Bundesast., 100, 2, Wien, 269–298.

KRISTAN, E. 1958: Neue Namen für zwei Foraminiferengattungen aus dem Rhät. Verh. Geol. Bundesanst., 1, Wien, 1–114.

KRISTAN-TOLLMANN, E. 1960: Rotaliidae (Foraminifera) aus der Trias der Ostalpen. Jb. Geol. Bundesanst., 5, Wien, 47–78.

KRISTAN-TOLLMANN, E. 1962: Stratigraphisch wertvolle Foraminiferen aus Obertrias und Liaskalken der voralpinen Fazies bei Wien. Erdoel.-Zeitschr., 78, 4, Wien – Hamburg, 228–233.

KRISTAN-TOLLMANN, E. 1963a: Entwicklungsreihen der Trias-Foraminiferen. Paläont. Z., 37, 1–2, Stuttgart, 147–157.

KRISTAN-TOLLMANN, E. 1964a: Beitrage zur Mikrofauna des Rhät. I. Weitere neue Holothurienskerite aus dem alpinen Rhät. II. Zwei charakteristische Foraminiferengemeischaften aus Rhätkalken. Mitt. Ges. Geol. Bergbaustud, 14, (1963) Wien, 125–147.

KRISTAN-TOLLMANN, E. 1964b: Zur Charakteristik triadischer Mikrofaunen. Paläont. Z., 30, 1–2, Stuttgart, 66–73.

KRISTAN-TOLLMANN, E. 1964c: Die Foraminiferen aus den Rhätischen Zlambachmergeln der Fischerweise bei Ausse im Salzkammergut. Jb. Geol. Bundesanst., 10, Wien, 1–189.

KRISTAN-TOLLMANN, E. 1966: Zum Bau und zur Taxonomie der triadischen Foraminifergattung Duostomina. Ecl. Geol. Helv., 59, 1, Basel, 47–63.

KRISTAN-TOLLMANN, E. 1970: Beiträge zur Mikrofauna des Rhät III, Foraminiferen aus dem Rhät des Königsbergzuges bei Göstling (Nieder-Österreich). Mitt. Ges. Geol. Bergbaustud., 19, Wien, 1–14.

KRISTAN-TOLLMANN, E. 1972: Eine Neue triadische Foraminiferen-Gattung der Saccamminidae. N. Jb. Geol. Paläont. Mh., 9, Stuttgart, 527–537.

KRISTAN-TOLLMANN, E. 1973: Neue sandschalige Foraminiferen aus der alpinen Obertrias. N. Jb. Geol. Paläont., Mh. 7, Stuttgart, 416–428.
KRISTAN-TOLLMANN, E.–TOLLMANN, A. HAMEDANI, A. 1979: Beiträge zur Kenntnis der Trias von Persien. Mitt. Österr. Geol. Ges., 70, Wien, 119–186.
LANGER, W. 1968: Neue Miliolacea (Foram.) aus der mittleren Trias Kleinasiens. Senkenberg. lethaea, 49, Frankfurt a. M., 587–593.
LEISCHNER, W. 1961: Zur Kenntnis der Mikrofaune und – flora der Salzburger Kalkalpen. N. Jb. Geol. Paläont., Abh., 112, 1, Stuttgart, 1–47.
LIPINA, O. A. 1955: Foraminifery turnejskogo jarusa i verchnej časti devona Volgo-Uraľskoj oblasti i zapadnogo sklona prednego Urala. Akad. Nauk SSSR, Inst. Geol. Nauk, Trudy, 163, Moskva, 1–96.
LOEBLICH, A. R., JR.–TAPPAN, 1964: Sarcodina, Chiefly, "Thecamoebians" and Foraminiferida, pt. C of Moore R. C. (Editor). Treatise on Invertebrate Paleontology, Geol. Soc. America, Univ. Kansas, 1–900.
MAHEĽ, M. 1953: Niekoľko stratigraficko-tektonických úvah o gemeridách. Geol. Zborn. 4, 1–2, Bratislava, 255–269.
MAHEĽ, M. 1978: Manínska jednotka – čiastkový príkrov skupiny krížňanského príkrovu. Mineralia slov., 10, 4, Bratislava, 289–309.
MAHEĽ, M. 1979: New geological profiles from various tectonic units of the inner West Carpathians. In: Tektonické profily Západných Karpát. Geol. Úst. D. Štúra, Bratislava, 105–127.
MAHEĽ, M. 1979: Fatric and not Šiprúň, a new view on to the tectonic subdivision and structure of the Tatrides. Mineralia slov., 11, 3, Bratislava, 263–277.
MAHEĽ, M. 1980: Strážovské vrchy – všeobecná charakteristika. In: Materiály XXIII. celoštátnej geol. konf. Slov. geol. spoločnosti, Geol. Úst. D. Štúra, Bratislava, 49–66.
MAHEĽ, M.–VOZÁR, J. 1971: Príspevok k poznaniu permu a triasu severogemeridnej synklinály. Geol. Práce, Správy 56, Geol. Úst. D. Štúra, Bratislava, 47–66.
MAHEĽ, M. et al. 1967: Regionální geologie ČSSR, II, Západní Karpaty, 2. Vyd. Ústř. Úst. geol., Praha, 1–495.
MAJZON, L. 1954: Contribution to the Stratigraphy of the Dachstein Limestone. Acta Geol. Acad. Sci. Hung., 2, Budapest, 243–249.
MASOLI, M. 1966: Rinvenimenti di Meandrospira iulia nel Trias inferiore del Trentino-Alto Adige. St. Trent. Sc. Nat., s. A, 43, 2, Trento, 326–333.
MELLO, J. 1974: Facial Development and Facial Relations of the Slovak Karst Middle and Upper Triassic (West Carpathians, Southern Part of Gemerids). Erd. Komm. Österr. Akad. Wiss., 2, Wien, 147–155.
MELLO, J. 1975: Triassische biothermenalke in östlichen teil des Slowakischen karstes. Geol. zborn., Geologica carpathica, 26, 1, Bratislava, 21–46.
MELLO, J. 1975: Pelagic and reef sediments relations in the Silica Middle Triassic and transitional strata nature (The Slovakian Karst, West Carpathians). Geol. Zborn., Geologica carpathica, 26, 2, Bratislava, 237–252.
MELLO, J. 1976: Facial and Stratigraphic Division of the Wetterstein Limestones in the Czechoslovak part of Dolný vrch Karst Plateau. Geol. Práce, Správy 65, Geol. Úst. D. Štúra, Bratislava, 37–51.
MELLO, J. 1977: Plexoramea cerebriformis n. gen. n. sp. and some other microproblematics and microfossils from Triassic limestone of the West Carpathians. Západné Karpaty, sér. Paleont. 2–3, Geol. Úst. D. Štúra, Bratislava, 189–202.
MELLO, J.–POLÁK, M. 1978: Facial and paleogeographical outline of the West Carpathians Middle Triassic (Illyrian-Langobardian). In Paleogeografický vývoj Západných Karpát, Geol. Úst. D. Štúra, Bratislava, 301–314.
MICHAILOVA-JOVTCHEVA, P.–TRIFONOVA, E. 1965: Les zones Mikrofauniques du Trias et du Crétacé inférieur entre le village Dolen-Dabnik et le Danube. Carp.-Balk. Geol. Assoc., VII. Congr., Rep., 2, 1, Sofia, 37–41.
MICHALÍK, J. 1973: New informations on the character of the Rhaetian at the locality near Hybe (Northern slope of the Tatry Mts., Slovakia). Geol. Práce, Správy 60, Geol. Úst. D. Štúra, Bratislava, 197–212.
MICHALÍK, J. 1974: Zur Paläogeographie der Rhätischen Stufe des W Teiles der Krížna-Decke in der Westkarpaten. Geol. Zborn., Geologica Carpathica, 25, 2, Bratislava, 257–285.

MICHALÍK, J. 1977: Paläogeographische Untersuchungen der Fatra-Schichten des nördlichen Teiles des Fatrikums in der Westkarpaten. Geol. Zborn., Geologica Carpathica, 28, 1, Bratislava, 71–94.

MICHALÍK, J. 1978: To the paleogeographic, paleotectonic and paleoclimatic development of the West Carpathian area in the Uppermost Triassic. In: Paleogeografický vývoj Západných Karpát, Geol. Úst. D. Štúra, Bratislava, 189–211.

MICHALÍK, J. 1979: Paleobiogeography of the Tatra-Formation of the Uppermost Triassic of the West Carpathians. Paleont. konf. 1977, Univ. Karlova, Praha, 25–39.

MICHALÍK, J. 1980: Prečo „rétsky problém" v Západných Karpatoch. Geol. Práce, Správy, 74, Geol. Úst. D. Štúra, Bratislava, 189–204.

MICHALÍK, J.–JENDREJÁKOVÁ, O. 1978: Organism communities and biofacies of the Tatra-Member (Uppermost Triassic, Fatria, Kössen Foramtion) in the West Carpathians. Geol. Zborn., Geologica Carpathica, 29, 1, Bratislava, 113–137.

MICHALÍK, J.–JENDREJÁKOVÁ, O.–BORZA, K. 1979: Some new Foraminifera-species of the Tatra-Formation (Uppermost Triassic) in the West Carpathians. Geol. Zborn., Geologica Carpathica, 30, 1, Bratislava, 61–91.

MIKLUCHO-MAKKLAY, K. V. 1954: Foraminifery verchnepermskich otloženij Severnogo Kavkaza. Trudy vsesojuz. nauč. issled. geol. inst. (VSEGEL), Moskva, 1–163.

MIŠÍK, M. 1966: Microfacies of the Mesozoic and Tertiary limestones of the West Carpathians. Vyd. Slov. Akad. Vied, Bratislava, 1–269.

MIŠÍK, M. 1971: Aeolisaccus tintinniformis n. sp. from the Triassic of the West Carpathians Mts. Geol. Zborn., Geologica Carpathica, 22, 1, Bratislava, 169–172.

MIŠÍK, M. 1972: Lithologische und fazielle Analyse der mittleren Trias der Kerngebirge der Westkarpaten. Acta geol. geogr. Univ. Comen., Geol., 22, Bratislava, 5–154.

MIŠÍK, M.–BORZA, K. 1976: Obere Trias bei Silická Brezová (Westkarpaten). Acta geol. geogr. Univ. Comen, Geol., 30, Bratislava, 5–49.

MIŠÍK, M.–SÝKORA, M. 1981: Pieninský exotický chrbát rekonštruovaný z valúnov karbonátových hornín kriedových zlepencov bradlového pásma a manínskej jednotky. Západné Karpaty, sér. Geol., 7, Geol. Úst. D. Štúra, Bratislava, 7–111.

MOCK, R. 1971: Conodonten aus der Trias der Slowakei und ihre Verwendung in der Stratigraphie. Geol. Zborn., Geologica Carpathica, 22, 2, Bratislava, 241–260.

OBERHAUSER, R. 1956: Neue mesozoische Foraminiferen aus der Türkei. Riv. Klebelsberg-Fest. Mitt. Geol. Ges., 48, Wien, 193–200.

OBERHAUSER, R. 1957: Ein Vorkommen von Trocholina und Paratrocholina in der ostalpinen Trias. Jb. Geol. Bundesanst., 110, 2, Wien, 257–267.

OBERHAUSER, R. 1960: Foraminiferen und Mikrofossilien "incertae sedis" der ladinischen aund karnischen Stufe der Trias aus den Ostalpen und aus Persien. Jb. Geol. Bundesanst., 5, Wien, 5–46.

OBERHAUSER, R. 1963: Eine labyrintische Foraminifere aus der südalpinen Trias. Sond. Verh. Geol. Bund., 1, 2, Innsbruck, 28–33.

OBERHAUSER, R. 1964: Zur Kenntnis der Foraminiferengattungen Permodiscus, Trocholina und Triasina in der alpinen Trias und ihre Einordnung zu den Archaedisciden. Verh. Geol. Bundesanst., 2, Wien, 196–209.

OBERHAUSER, R. 1967: Zum Vorkommen der Foraminiferengattungen Austrocolomia in der ostalpinen Trias. Verh. Geol. Bundesanst., 1–2, Wien, 193–198.

OBERHAUSER, R.–PLÖCHINGER, B. 1968: Das rhätische Foraminiferenkalkvorkommen bei Wopfing (N.–Ö.). Verh. Geol. Bundesanst., 1–2, Wien, 98–104.

ORAVECZNÉ-SCHEFFER, A. 1966: Karni Foraminiferák a Bakony Hegységböl. Magy. áll. földt. Intéz. évi Jelent., a., 1965, Budapest, 181–217.

ORAVECZNÉ-SCHEFFER, A. 1968: A Miliolacea föcsalád (foraminifera) képviselöi a Bakonyszücs-l sz. úrás karni képzödményeiben. Magy. áll. földt. Intéz. Évi Jelent., Budapest, 89–105.

ORAVECZNÉ-SCHEFFER, A. 1972a: Triassic Foraminiferal Assemblages of Stratigraphic Value in Hungary. Jb. Geol. Bund., 19, Budapest, 39–40.

ORAVECZNÉ-SCHEFFER, A. 1972b: Fossil Echinoderms in Hungary's Triassic microfauna. Acta geol. Acad. Sci. hung., 16, Budapest, 281–288.

ORAVECZNÉ-SCHEFFER, A. 1973: Triassic Foraminiferal Assemblages of Stratigraphic Value in Hungary. Öslénytani vit., 21, Budapest, 105–113.

PANTIĆ, Š. 1965: Pilammina densa n. gen., n. sp., and other Ammodiscidae from the Middle Triassic in the Crmnica (Montenegro). Geol. Vesn., 18, B 1, 2, Zagreb, 189–193.

PANTIĆ, Š. 1967a: Micropaleontological characteristics of Middle and Upper Triassic of Tatra Mountain Western Serbia. Bull. inst. Geol. Geoph. Res., s. A, 24–25, Beograd, 245–253.

PANTIĆ, Š. 1967b: Triassic microfossils of northwestern Montenegro. Geol. glasn., 5, Titograd, 89–99.

PANTIĆ, Š. 1968: Turrispirillina minima, n. sp., from dinaric sediments of Triassic age. Bull. Inst. Geol. Geoph. Res., A, 24–25, Beograd, 255–258.

PANTIĆ, Š. 1970: Caractéristiques micropaléontologiques de la colonne triassique de l'anticlinale de Zdrebo (Serbie orientale). Bull. Inst. Geol. Geoph. Res., A, 28, Beograd, 377–385.

PANTIĆ, Š. 1972a: Caractéristique micropaléontologiques et biostratigraphiques des sédiments triassiques carbonatés du puit SB-2 sur le profil du barrage de la centrale hydroélectrique de Mratinje (Montenegro). Vestn. Zav. geol. geof. instr., A, 29–30, Beograd, 271–308.

PANTIĆ, Š. 1972b: First discovery of Triassic microfossils in region of Mučajn, Ovčar, Kablar and Jelica (Western Serbia). Glas. prir. mus., A. 27, Beograd, 223–241.

PANTIĆ, Š. 1972c: Aeolisaccus amplimuralis n. sp. and Aeolisaccus gracilis n. sp. from the Middle of the southeast Dinarides. Glas. Prir. u Beogradu, A, 27, Beograd, 211–217.

PANTIĆ, Š.–MOJSILOVIĆ, S. 1967: Les caractéristiques faciales des sediments triassiques dans les montagnes de Podrinje-Valjevo (Serbie occidentale). Geol. Zborn., Geologica Carpathica, 18, 2, Bratislava, 209, 217.

PANTIĆ, Š.–RAMPNOUX, J. P. 1972: Corcerning the Triassic in the Jugoslavian Inner Dinarides (Southern Serbia, Eastern Montenegro): Microfacies, Microfauna, an attempt to give a Paleogeographic Reconstitution. Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 311–326.

PAPP, A.–TURNOVSKY, K. 1970: Anleitung zur biostratigraphischen Auswertung von Gesteinschliffen (Microfacies Austriaca). Jb. Geol. B-A, 16, Wien, 50 p.

PILLER, W. 1976: Fazies und Lithostratigraphie des gebankten Dachsteinkalkes (Obertrias) am Nordrand des Toten Gebirges (S Grünau) Almtal, Oberösterreich). Mitt. Ges. Geol. Bergbaustud., 23, Wien, 113–152.

PILLER, W. 1978: Involutinicea (Foraminifera) der Trias und des Lias. Beitr. Paläont. Österr., 5, Wien, 1–164.

PISA, G. 1974: Stratigraphische Tabelle der südalpinen Trias (nach Arbeiten von Assereto, Bosellini, Casati, Gaetani, Leonardi, Nardin, Pia und Rossa). Schriftenz, Erdewiss. Komm. Österr. Akad. Wiss., Wien, 1–159.

POKORNÝ, VL. 1958: Grundzuge der zoologischen Mikropaläontologie. Bd. 1 Veb. Deutscher Verlag der Wissenschaften, Berlin, 1–582.

POLÁK, M. 1976: Litológia, mikrofácia a dolomitizácia stredného triasu obalovej série Malej Fatry. Geol. Práce, Správy 65, Geol. Úst. D. Štúra, Bratislava, 163–169.

PREMOLI SILVA, I. 1964: Citaella iulia n. gen., n. sp. del Trias inferiore della Carnia. Riv. Ital. Paleont., 62, 4, Milano, 657–670.

PREMOLI SILVA, I. 1971: Foraminiferi anisici della regione guidicariense (Trento). Riv. Ital. Paleont., 77, 2, Milano, 303–374.

RAMOVS, A. 1968: Meandrospira iulia (Premoli Silva) (Foraminifera) aus den Untertrias-Schichten in Westslovenien und ihre Lebensbedingungen. Neu. Jb. Geol. Paläont. Abh., 131, 1, Stuttgart, 78–81.

RAMOVS, A. 1972: Microfauna der alpinen und voralpinen Trias Sloweniens. Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 413–426.

RAMOVS, A. 1975: Kamenotvorna Glomospira densa (Pantić) v aniziju pri Konjšici, Slovenia. Geol. Rozpr. Poročila, 18, Ljublana, 99–104.

RAUSER-CHERNOUSOVA, D. M.–FURSENKO, V. A. 1959: Osnovy paleontologii. Izdat. Akad. Nauk SSR, Moskva, 1–482.

REITLINGER, E. A. 1949: Melkie foraminifery nižnej časti srednego karbona srednego Urala i Prikamja. Izd. Akad. Nauk SSSR, 6, Moskva.

REITLINGER, E. A. 1965: Dévelopment des Foraminifères aux époques permienne supérieure et triassique sur le territorie transcaucaseien. Voprosy Mikropal., 9, Moskva, 45–70.

RESCH, W. 1966: Micropaleontological Investigration of the Carnian Profile from Helengraben (Jugoslavia). Sond. Verh. Geol. Bundesanst., 3, Innsbruck, 1–77.

RESCH, W. 1972: Statistische Untersuchungen der Foraminiferen-Faunes aus dem Profil Koveskál (W. Ungarn) (Fassan-tieferes Cordevol). Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 513–538.
RESCH, W. 1979: Fazies-Abhängigkeit alpiner Trias-Foraminiferen. Jb. Geol. B-A, 122, 1, Wien, 181–249.
RUGET, CH.–SIGAL, J. 1969: Notes sobre de presenca de genezo Duostomina de Alhama de Granada, España. Rev. Esp. Micropal., 1, 2, Madrid, 237–240.
SADATI, S. M. 1981: Die Hohe Wand: ein obertriadisches Lagunen-Riff am Ostende der Nordlichen Kalkalpen (Nieder-österreich). Facies, 5, Erlangen, 191–264.
SALAJ, J. 1969a: Essai de Zonation dans le Trias des Carpathes Occidentales d'après les Foraminifères. Geol. Práce, Správy 48, Geol. Úst. D. Štúra, Bratislava, 123–128.
SALAJ, J. 1969b: Meandrospiranella nov. gen., a new Middle-Triassic foraminifer from the West Carpathians, Czechoslovakia. Journ. Paleontl., 43, 5, Tulsa, 1294–1295.
SALAJ, J. 1969c: Quelques remarques sur les problèmes microbiostratigraphiques du Trias. Notes Serv. Géol. Tunisie, 31, Tunis, 5–23.
SALAJ, J. 1976: On the phylogeny of Ammodiscidae Rhumbler, 1895, Fischerinidae, Millet, 1898 and Involutinidae Buetschli, 1880 emend. Salaj, Biely and Bystrický, 1967 from the Central Carpathian Triassic of Slovakia. First Int. Symp. Benth. Foram. of Cont. Margins. Part B: Paleoecology and Biostratigraphy Maritime Sediments, Spec. publ. 1, Halifax, 529–536.
SALAJ, J. 1978a: Contribution à la microbiostratigraphie du Trias des Carpates occidentales tchécoslovaques. Act. du VI^{e} Coll. Afr. Micropal., Tunis, 1974, Ann. Mines Géol., 28, Tunis, 103–127.
SALAJ, J. 1978b: Two layered wall structure in Triassic foraminifers of the family Involutinidae. Paleont. konf., 1977, Univ. Karlova, Praha, 183–188.
SALAJ, J. 1979: Mikrobiostratigrafia triasu Západných Karpát Slovenska na základe foraminifer vo vzťahu k triasu tetydnej oblasti. Manuscript. Archív Prír. fak. K. U. Praha.
SALAJ, J. 1982: Mesozoic paleogeographic development in the northwestern part of the West Carpathians of Slovakia. Palaeoecology, Palaeogeography 39, 3–4, Amsterdam, 203–229.
SALAJ, J. 1983: Mikrobiostratigraphie der Trias in den Westkarpaten der Slowakei auf Grund der Foraminiferen und die Beziehung zur Trias des Tethys-Raumes. Paleontographica, Abt., Stuttgart (in press).
SALAJ, J.–BIELY, A.–BYSTRICKÝ, J. 1967a: Die foraminiferen in der Trias der Westkarpaten. Arch. Sci. Genève, 19, 2, Genève, 211–218.
SALAJ, J.–BIELY, A.–BYSTRICKÝ, J. 1967b: Trias-Foraminiferen in den Westkarpaten. Geol. Práce, Správy 42, Geol. Úst. D. Štúra, Bratislava, 119–136.
SALAJ, J.–JENDREJÁKOVÁ, O. 1967: Die Foraminiferen aus der oberen Trias der Westkarpaten. Geol. Zborn., Geologica Carpathica, 18, 2, Bratislava, 311–313.
SALAJ, J.–POLÁK, M. 1978: Meandrospira deformata Salaj ako indikátor zmeny ekologických a paleogeografických podmienok. In: Paleogeografický vývoj Západných Karpát. Geol. Úst. D. Štúra, Bratislava, 213–216.
SALAJ, J.–SAMUEL, O. 1966: Foraminifera der Westkarpaten-Kreide (Slowakei). Vyd. Geol. Úst. D. Štúra, Bratislava, 1–291.
SAMUEL, O.–BORZA, K. 1981: Paraophthalmidium nov. gen. (Foraminifera) from the Triassic of the West Carpathians. Západné Karpaty, Séria Paleont., 6, Bratislava, 65–78.
SAMUEL, O.–BORZA, K.–KÖHLER, E. 1972: Microfauna und Lithostratigraphy of the Paleogene and adjacent Cretaceous of the Middle Váh Valley (West Carpathians). Vyd. Geol. Úst. D. Štúra, Bratislava, 1–246.
SAMUEL, O.–SALAJ, J.–BORZA, K. 1981: Bispiranella nov. gen. (Foraminifera) from Upper Triassic of West Carpathians. Západné Karpaty, Séria Paleont., 6, Bratislava, 87–91.
SÁNDULESCU, M.–TOMESCU, C.–IVA, M. 1976: New Data on the Microfacies and Biostratigraphy of the Rarău Syncline Mesozoic Deposits. D. S. Sedinto., 62, 4, Bucuresti, 167–188.
SARNTHEIN, M. 1967: Versuch einer Rekonstruktion der Mitteltriadischer Paläogeographie um Innsbruck Österreich. Geol. Rundschau, B. 38, Stuttgart, 116–127.
SCHMID, M. E. 1967: Das Genus Austrocolomia Oberhauser, 1966. Verh. Geol. Bundesanst., Wien, 189–192.
SELLIER de CIVRIEUX, J. M.–DESSAUVAGIE, T. F. J. 1965: Reclassification de quelques Nodosaridae,

particulierèment du Permien au Lias. Publ. Inst. Étude. Recher., Min. Turquie, 124, Ankara, 1–178.
SELLIER de CIVRIEUX, J. M. 1969: Tendencias evolutivas de las Nodosariidae e imposibilidae de su interpretación por medio de la ley biogenetica. Rev. españ. Micropal., 1, 1, Madrid, 25–36.
SIGAL, J. 1956: Otrjad Foraminifery, Gostoptexizdat, Leningrad, 1–221.
STAMPFLI, G.–ZANINETTI, L.–BROENNIMANN, P.–JENNY-DESHUSSES, C.–STAMPFLI-VUILLE, B. 1976: Trias de l'Elbruz oriental, Iran, Stratigraphie, Sedimentologie, Micropaléontologie. Riv. Ital. Paleont., 82, 3, Milano, 467–500.
STYK, O. 1975: Foraminifera from the Lower and Middle Triassic of Poland. Acta Paleont. Pol., 20, 4, Warszawa, 501–534.
TAPPAN, H. 1951: Foraminifera from the Artic Slope of Alaska. General Introduction and Part 1, Triassic Foraminifera. U. S. Geol. Surv. Prof. Paper 236-A, Washington, 1–20.
TERQUEM, O.–BERTHELIN, G. 1875: Études microscopique des Marnes du Lias Moyen d'Essey – les – Nancy. Mém. Soc. géol. France, 10, 3, Paris.
TOLLMANN, A. 1978: Bemerkungen zur Frage der Berechtigung der rhätischen Stufe. Schriftenreihe Erdwiss. Komm. Österr. Akad. Wiss., 4, Wien, 175–177.
TOLLMANN, A.–KRISTAN-TOLLMANN, E. 1970: Geologische und mikropaleontologische Untersuchungen im Westabschnitt der Hallstätter Zone in den Ostalpen. Geologica et paleont., 4, Marburg, 87–145.
TOZER, E. T. 1971: Triassic time and ammonoids Problems and proposals. Canad. J. Earth Sci., 8, Ottawa, 989–1031.
TRAMMER, J. 1973: The particular paleogeographical setting of Polish Muschelkalk in the German basin. Neu. Jb. Geol. Paläont., Mh., 9, Stuttgart, 573–575.
TRIFONOVA, E. 1962: Upper Triassic Foraminifera from the surroundings of Kotel, eastern Balkan. Uprave. geol. Proučv., 12, Sofia, 141–170.
TRIFONOVA, E. 1965: Nodosaria ordinata s. nov. ot gornija trias v Blgarja. Rev. Bul. Geol. Soc., 2, Sofia, 213–214.
TRIFONOVA, E. 1967: Some new Triassic Foraminifera in Bulgaria. Ann. Univ. Sofia, 60, 1, Sofia, 1–7.
TRIFONOVA, E. 1972a: Triassic Foraminifera in North-Bulgaria. Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 499–505.
TRIFONOVA, E. 1972b: Lower Anisic Foraminifera from Boukhowtzi village, North-East Bulgaria. Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 505–509.
TRIFONOVA, E. 1974: Foraminiferni danii za stratigrafijata na srednija trias pri gr. Kneža (Severna Blgarja). God. geol.-geogr. fak., 66, 1, Sofia, 25–30.
TRIFONOVA, E. 1977: On the Trocholina (Foraminifera) microfacies from the Triassic in N. E. Bulgaria. Actes du VI[e] Coll. Afr. Micropal., Tunis 1974, Ann. Mines Géol., 28, Tunis, 129–133.
TRIFONOVA, E. 1978a: The Foraminifera Zones and Subzones of the Triassic in Bulgaria. I. Scythian and Anisian. Geol. Balcan, 8, 3, Sofia, 85–104.
TRIFONOVA, E. 1978b: Foraminifera Zones and Subzones of the Triassic in Bulgaria. II. Ladinian and Carnian. Geol. Balcan., 8, 4, Sofia, 49–64.
TRIFONOVA, E. 1979: On the Foraminifera microbiofacies in the Triassic from North Bulgaria. Riv. Ital. Paleont., 85, 3–4, Milano, 781–788.
TRIFONOVA, E.–ČATALOV, G. 1975: Mikrofaciesi v triaskite carbonatni skali of Tetevenskija antiklinorij. I. Kampilien-anisien. Bgl. Akad. Nauk., Paleont., stratigr., litolog., 2, Sofia, 3–16.
TURCULET, I. 1970: Turrispirillina carpathorumana, une espèce nouvelle de Spirillinidae du Trias supérieur de la cuvette de Rarau-Breaza (Carpathes orientales roumaines). Rev. Micropal., 13, 1, Paris, 65–67.
UROŠEVIĆ, D. 1971: A survey of Triassic fauna and flora of Stara Planina Mt. (Carpatho-Balkan Region). Ann. Géol. Péninsule Balkan., Beograd, 95–104.
UROŠEVIĆ, D.–ANDELKOVIĆ, J. 1970: L'étage Rétien dans la montagne de Stara Planina. Vesn. Zav. geol. geofiz. Istraž, 17, 28, Beograd, 301–306.
UROŠEVIĆ, D.–GAŹDZICKI, A. 1977: Nodobacularia vujisici nov. sp. of the Ladinian stage of Carpato-Balkanides (East Serbia). Bull. Mus. Hist. Natur., Sér. A, 32, Beograd, 97–99.
UROŠEVIĆ, D.–RADOVANOVIĆ, Z. 1972: Contribution à connaissance du development des sédiments triasiques dans la gorge d'Ovčar-Kablar. Geol. anali Balk. poluostrova, 37, 2, Beograd, 29–31.
VANGEROV, E. F. 1962: Über Ammodiscus aus dem Zechstein. Paläont. Z., 36, Stuttgart, 125–133.

VÉGH-NEUBRANDT, E. 1972a: Zur Mikrofazies der Campiler Schichten im Balaton-hochland (Ungarn). Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 115–122.

VÉGH-NEUBRANDT, 3. 1972b: Fauna und Faziesverbreitung der Obertrias des Transdanubischen Mittelgebirges. Ann. Univ. Sci. budapestinensis Rolando Eötvös Sect. geol., 15, Budapest, 115–116.

WEIDMANN, M.–ZANINETTI, L. 1974: Quelques données nouvelles sur la série du Mont-Dolin (nappe de la Dent-Blanche, Valais). Ecl. geol. Helv., 67, 3, Basel, 597–603.

WENDT, J. 1969: Foraminiferen "Riffe" im karnischen Hallstätter Kalk des Feuerkogels (Steiemark, Österreich). Paläont. Z., 43, Stuttgart, 177–193.

WERNLI, R. 1972: Les Vidalina du Trias et du Jurassique sontelles des Ophthalmidium (Foraminifères)? Ecl. geol. Helv., 65, 5, Basel, 361–368.

WERNLI, R.–BROENNIMANN, P. 1973: Le Verrucano et le Trias de Taninges (Haute-Savoie, France). Lithologie et Micropaléont. Arch. Sci. Genève, 26, 1, Genève, 79–92.

WEYNSCHENK, R. 1951: Two new Foraminifera from the Dogger and Upper Triassic of the Sonnwend Montains of Tyrol. Paleont., 25, 6. Chicago, 793–795.

WEYNSCHENK, R. 1956: Aulotortus, a new genus of Foraminifera from the Jurassic of Tyrol, Austria. Contr. Cush. Found. Foram. Res., 7, 1, Washington, 26–26.

WIEDMANN, J. 1974: Zum Problem der Definition und Abgrenzung von Obernor (Sevat) und Rhät. Schriftenz. erdwiss. Komm. Österr. Akad. Wiss., 2, Wien, 229–235.

WIEDMANN, J.–FABRICIUS, F.–KRYSTYN, L.–REITNER, J.–URLICHS, M. 1979: Über Umfang und Stellung des Rhaet. Newsl. Stratigr., 8, 2, Berlin – Stuttgart, 133–152.

WICHER, C. A. 1952: Involutina, Trocholina und Vidalina – Fossilien des Riffbereichs. Geol. Jb., 66, Hannover, 257–284.

ZANINETTI, L. 1969: Agathamminoides gen. n. un nouveau genre de Foraminifères du Triasalpen. Riv. Ital. Paleont., 75, 4, Milano, 697–704.

ZANINETTI, L. 1976a: Les Foraminifères du Trias. Essai de synthèse européen et asiatique. Riv. Ital. Paleont., 82, 1, Milano, 1–258.

ZANINETTI, L. 1976b: Involutinacea Buetschli, 1880, nom. transl, une nouvelle super-famille de des Foraminifères du sous-ordre des Rotalina Delage et Hérouard, 1896. C. R. Sci. PSHN Genève, NS 10, 2–3, Genève, 130–132.

ZANINETTI, L. 1977a: La micropaléontologie dans le Trias de France: domaines alpin et provencal Foraminifères, Conodontes, coprolites de Crustacés: inventaire et possibilités de corrélation. Bull. Bur. Rech. Geol. min., 2[e] sér. Sec. 4, 3, Paris, 257–264.

ZANINETTI, L. 1977b: Étude paléontologique du Trias supérieur et du Lias a Champ-Fleuri (Môle), Préalpes médianes (Haute-Savoie, France). Arch. Sci. Genève, 30, 2, Genève, 149–160.

ZANINETTI, L. 1977c: Sur quelques synonymes du genre Galeanella Kristan, 1958, un Foraminifère de la Téthys triasique. Not. Lab. Paleont. Univ. Genève, 2, Genève, 1–3.

ZANINETTI, L.–ALTINER, D. 1981: Les Galéanelles (Foraminifères) et formes apparéntées dans le Trias supérieur de la Téthys. Not. Lab. Paleont. Univ., 8, 4, Genève, 41–44.

ZANINETTI, L.–ALTINER, S. 1982: Les Milioliporidae (Foraminifères triasiques): hypotèse sur leur origene et leur evolution iterative. Rev. Paléobiol., 1, 1, Genève, 7–12.

ZANINETTI, L.–ALTINER, D.–DAĞER, Z.–DUCRET, B. 1982: Les Milioporidae (Foraminifères) dans le Trias supérieur à faciès récifal du Taurus, Turquie I: Proposition pour une nouvelle subdivision. Rev. Paléobiol., 1, 1, Genève, 93–103.

ZANINETTI, L.–ALTINER, D.–DAĞER, Z.–DUCRET, D. 1982: Les Milioporidae (Foraminifères) dans le Trias supérieur à faciès du Taurus, Turquie. II. Microfaunes associées. Rev. Paléobiol., 1, 2, Genève, 105–139.

ZANINETTI, L.–BROENNIMANN, P. 1965: Étude morphologique et stratigraphique de l'espece type du genre Aulotortus Weynschenk, 1956. Arch. Sci. Genève, 18, 3, Genève, 699–705.

ZANINETTI, L.–BROENNIMANN, P. 1969: Sur la présence d'un Foraminifère noveau Ophthalmidium tori sp. n., dans le Carnien supérieur de Vénétio (Italie). Riv. Ital. Paleont., 75, 4, Milano, 705–724.

ZANINETTI, L.–BROENNIMANN, P. 1971: Les effets de recristallisation sur la paroi des Involutinidae (Foraminifères) triasiques. Paläont., 45, 1–2, Stuttgart, 69–74.

ZANINETTI, L.–BROENNIMANN, P. 1972: Ophthalmipora dolominitica gen. n. sp. n., un Foraminifère du Carnien des Dolomites (Milioporidae Broennimann et Zaninetti, 1971). Riv. Ital. Paleont., 78, 4, Milano, 613–620.

ZANINETTI, L.–BROENNIMANN, P. 1974: Étude micropaléontologique comparée des Involutinidae (Foraminifères) des formations triassiques d'Elika, d'Espahk et de Nayband, Iran. Ecl. geol. Helv., 67, 2, Basel, 403–418.

ZANINETTI, L.–BROENNIMANN, P. 1978: Enroulement et structures chez les Involutinidae Buetschli, les Archaediscidae Cushman, et les Hemigordiopsidae Nikitina (Foraminifères). Not. Lab. Paleont. Univ., Genève, 2, Genève, 13–17.

ZANINETTI, L.–BROENNIMANN, P.–BAUD, A. 1972a: Essai de zonation d'après les Foraminifères dans l'Anisien moyen et supérieur des Préalpes médianes rigides (Préalpes romandes, Suisse et Préalpes du Chablais, France). Ecl. geol. Helv., 65, 2, Basel, 343–353.

ZANINETTI, L.–BROENNIMANN, P.–BAUD, A. 1972b: Microfaciès particulièrs et foraminifères nouveaux de l'Anisien supérieur de la coupe du Rothorn (Préalpes médianes rigides, Diemetigtal, Suisse). Mitt. Ges. Geol. Bergbaustud., 21, Innsbruck, 465–498.

ZANINETTI, L.–BROENNIMANN, P.–BOZORGNIA, F.–HUBER, H. 1972: Étude lithologique et micropaléontologique de la formation l'Elika dans la coupe d'Aruh, Alborz central, Iran septentrionale. Arch. Sci. Genève, 25, 2, Genève, 215–249.

ZANINETTI, L.–DAĞER, Z. 1978: Biostratigraphie intégré et paléoécologie du Trias de la péninsule de Kocaeli (Turquie). Eclogae geol. Helv., 71, 1, Basel, 85–104.

ZANINETTI, L.–THIEBAULT, F. 1975: Les Foraminifères du Trias du massif du Taygete. (Péloponnese méridional, Grèce). Arch. Sci. Genève, 28, 2, Genève, 229–236.

ZAPFE, H. 1974: Trias in Österreich. Erdwiss. Komm. Österreich. Akad. Wiss., 2, Wien, 245–251.

Addendum

BIELY, A.–BYSTRICKÝ, J.–MELLO, J. et al. 1980: Problematika hronika a „gemerika“ v Malých Karpatoch a vo viedenskej panve. In: Materiály XXIII. celoštátnej geologickej konferencie SGS. Geol. Úst. D. Štúra, Bratislava, 17–45.

BISMUTH, H.–BONEFOUS, J.–MASSIN, J. M.–SALAJ, J. 1974: Microfacies et microfaunes du Mesozoique et du Tertiaire de Tunisie. Manuscript, Archiv Serv. Geol. Tunisie, Tunis.

FLÜGEL, E. 1981: Paleoecology and facies of Upper Triassic reefs in the Northern Calcareous Alps. SEPM Sp. Pub. No 30. In: European Fossil Reef Models, D. F. Toomey, Ed.). Tulsa, 291–359.

TOLLMANN, A. 1976: Analyse des klassischen nordalpinen Mesozoikums. Franz Deuticke, Wien, 1–580.

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Triasové foraminifery Západných Karpát

Resumé anglického textu

V predloženej práci sa autori zaoberajú mikrobiostratigrafiou triasových sedimentov Západných Karpát na základe štúdia foraminifer a mikrofosílií zo skupiny „incertae sedis".

V paleontologickej časti opisujú všetky doteraz známe taxóny z vyššie spomínaných skupín (vrátane prv publikovaných taxónov). Vzhľadom na to, že v poslednom čase sú triasové foraminifery v celosvetovom meradle intenzívne študované, autori pri opise jednotlivých taxónov (295 druhov z toho 30 nových) obmedzujú sa len na stručný paleontologický opis, stratigrafické a geografické rozšírenie hlavne v Západných Karpatoch. U niektorých stratigraficky významných skupín uvádzajú podrobnejší paleontologický opis, ako aj nové fylogenetické poznatky, ktoré sú zohľadnené v paleontologickom systéme. Použité preň boli hlavne práce A. R. LOEBLICHA, JR–H. TAPPANOVEJ (1964), E. KRISTAN-TOLLMANOVEJ (1960, 1964) a L. ZANINETTIOVEJ (1976). Prehľad systému je uvedený v úvodnej časti (str. 48–58).

V Západných Karpatoch sa prakticky do roku 1966 nerobil výskum triasových foraminifer a zmienky o ich existencii bez bližšieho rodového a druhového určenia sú viac-menej sporadické (J. KOUTEK 1927, M. MIŠÍK 1966). Súviselo to s tým, že v celej tetýdnej oblasti výskum triasových foraminifer sa začal v porovnaní s výskumom foraminifer ostatných útvarov veľmi oneskorene, vlastne až v posledných dvoch desaťročiach (cf. J. SALAJ 1979).

Mikrobiostratigrafie triasu Západných Karpát na základe foraminifer sa dotýkajú práce A. BIELEHO–J. BYSTRICKÉHO (1964), J. BYSTRICKÉHO–A. BIELEHO (1966), O. JENDREJÁKOVEJ (1970, 1972, 1983), J. BYSTRICKÉHO–O. JENDREJÁKOVEJ (1977), J. MICHALÍKA–O. JENDREJÁKOVEJ (1978), J. MICHALÍKA–O. JENDREJÁKOVEJ–K. BORZU (1979), M. MIŠÍKA–K. BORZU (1976), K. BORZU (1970, 1971, 1975, K. BORZU–O. SAMUELA (1977a, b, 1978), A. GAŹDZICKÉHO–J. MICHALÍKA–E. PLANDEROVEJ–M. SÝKORU (1979), O. SAMUEL–K. BORZU (1981), J. SALAJA (1969), J. SALAJA–K. BORZU (1981) a O. SAMUELA–K. BORZU–E. KÖHLERA (1972), z ktorých posledne menovaní autori sa zaoberali štúdiom foraminifer z valúnov kriedových zlepencov.

Z hľadiska taxonomického, ako aj z hľadiska biostratigrafickej korelácie Karpát s rakúskymi Alpami osobitný význam majú práce týchto autorov: E. KRISTAN (1957), E. KRISTAN-TOLLMANN (1960, 1963a, b, 1964a, b, c, 1966, 1972, 1973), R. OBERHAUSER (1956, 1957, 1960, 1963, 1964, 1967), R. OBERHAUSER–B. PLÖCHINGER (1968), W. LEISCHNER (1961), M. E. SCHMID (1967), W. FUCHS (1967, 1970), J. HOHENEGGER–W. PILLER (1975a, b, c, 1977a, b), L. KOEHN-ZANINETTI–P. BROENNIMANN (1968a, b), L. KOEHN-ZANINETTI (1969), W. RESCH (1979). Nemenej významné sú práce, pochádzajúce zo Švajčiarska a Francúzska: P. BROENNIMAN–J. CHAROLLAIS–L. KOEHN-ZANINETTI–J. ROSSET (1969), P. BROENNIMANN–P. PAGE (1966), P. BROENNIMANN–L. ZANINETTI (1972a, b), M. WEIDMANN–L. ZANINETTI (1974), R. WERNLI–P. BROENNIMANN (1973), L. ZANINET-

TI–P. BROENNIMANN–A. BAUD (1972a, b), L. ZANINETTI (1976a, b, 1977a, b, c), resp. z Talianska a dinaríd (P. CROS 1964; O. PREMOLI SILVA 1964, 1971; I. GUŠIĆ 1975; Š. PANTIĆ 1965, 1967a, b, 1972a, b, c, V. KOCHANSKY-DEVIDÉ–Š. PANTIĆ 1966; Š. PANTIĆ–S. MOJSILOVIĆ 1967; Š. PANTIĆ–R. RAMPNOUX 1972; A. RAMOVS 1972; P. BROENNIMANN–L. ZANINETTI–F. BOZORGNIA 1972; W. RESCH 1966; P. BROENNIMANN–J.-P.-CADET–L. ZANINETTI 1973a, b; D. UROŠEVIĆ–A. GAŹDZICKI 1977; D. UROŠEVIĆ–J. ANDELKOVIĆ 1970; Ď. UROŠEVIĆ–Z. RADOVANOVIĆ 1972; L. ZANINETTI–P. BROENNIMANN 1969).

Veľký prínos pre mikrobiostratigrafiu a paleontológiu triasu majú práce z Dolného Sliezska a Vysokých Tatier (A. GAŹDZICKI 1970, 1971, 1974, 1978a, b, A. GAŹDZICKI–A. IWANOW 1976; J. GłAZEK–J. TRAMMER–K. ZAWIDZKA 1973; J. TRAMMER 1973; A. GAŹDZICKI–J. MICHALÍK–E. PLANDEROVÁ–M. SÝKORA 1979), ďalej Maďarska (L. MAJZON 1954; E. VÉGH-NEUBRANDT 1972a, b; A. ORAVECZNÉ-SCHEFFER 1968, 1972a, b; W. RESCH 1972; A. BERCZI-MAKK 1976), z rumunských Karpát (M. SĂNDULESCU–C. TOMESCU–I. IVA 1976; D. GHEORGHIAN 1975, 1980; A. BALTRES (1975), Balkánu (P. MICHAILOVA-JOVTCHEVA–E. TRIFONOVA 1965; E. TRIFONOVA 1962, 1965, 1967, 1974, 1977, 1978a, b), Kaukazu (N. A. EFIMOVA 1974), heleníd (L. ZANINETTI–F. THIEBAULT 1975), tauríd (P. BROENNIMANN–A. POISSON–L. ZANINETTI 1970; L. ZANINETTI–Z. DAĞER 1978), craníd (A. BAUD–P. BROENNIMANN–L. ZANINETTI 1974; P. BROENNIMANN–L. ZANINETTI–F. BOZORGNIA–H. HUBER 1972; P. BROENNIMANN–L. ZANINETTI–A. MOSHTAGHIAN–H. HUBER, 1973, 1974; L. ZANINETTI–P. BROENNIMANN–F. BOZORGNIA–H. HUBER 1972), Himalájí (V. J. GUPTA–L. ZANINETTI–R. K. KACHROO 1977) a Malajska (A. GAŹDZICKI–O. E. SCHMIT 1977).

Pri determinácii jednotlivých taxónov triasových foraminifer, ako aj pri biostratigrafických úvahách sme sa opierali o vyššie uvedené práce, pričom sme prirodzene vychádzali predovšetkým z doterajších stratigrafických poznatkov o Západných Karpatoch. V tejto súvislosti treba poznamenať, že okrem početných prác obsiahnutých hlavne v syntetizujúcich dielach Geológia Československých Karpát II. (D. ANDRUSOV 1959), Regionální geologie ČSSR, sv. 1 (M. MAHEĽ et al., 1967) osobitný význam pre biostratigrafiu triasu majú práce J. BYSTRICKÉHO, o ktoré sa v tejto práci v podstatnej miere opierame.

Mikrobiostratigrafické členenie triasu Západných Karpát

Spodný trias

V tatroveporiku Západných Karpát je spodný, prípadne i vrchný „seis“ transgresívny (detritický), a preto pre mikrobiostratigrafické štúdium nevhodný.

Odlišná situácia je v gemeriku, kde sa v nadloží permských sedimentov vyskytuje pestré pieskovcovo-bridličnaté súvrstvie s druhmi *Pseudomonotis* sp. a *Claraia clarae* (EMMR), ktoré podľa K. BALOGHA (1950) patrí „seisu“ (griesbach – spodný diener; sensu G. PISA 1977), kým podľa výskumov J. BYSTRICKÉHO (1964) patrí vyšším častiam „seisu“ až najspodnejšiemu „kampilu“ (vrchný diener – spat). Podľa M. MAHEĽA (1954a, b), resp. M. MAHEĽA–J. VOZÁRA (1971) sa opísané súvrstvie pozvoľne vyvíja z podložných zlepencov a pieskovcov permu. Jeho ohraničenie voči „kampilu“, tak ako je to napr. v Bakonskom lese a v južných Alpách, kde je vyvinutý hraničný „gastropodenoolit-horizont“, v gemeridách na základe poznatkov J. BYSTRICKÉHO (1964) tento horizont nie je vyvinutý. U nás sedimenty

„seisu i kampilu" prechádzajú do seba plynule. Gastropódový oolit s druhom *Natiria subtilistriata globulina* FRECH v gemeridách reprezentujú červenkasté oolitické vápence a patria najspodnejšiemu „kampilu". Tento horizont môžeme korelovať s horizontom gastropódového oolitu z okolia Balatónu (porov. E. WEGH-NEUBRAND 1972). Mikrofauna z oolitových vápencov – biosparit (vz. č. 10 – Rakovnica), je reprezentovaná druhmi *Glomospirella? triphonensis* BAUD, ZANINETTI et BROENNIMANN, *Arenovidalina chialingchiangensis* HO, *Meandrospira cheni* HO a *Schubertella* sp. (J. SALAJ 1978). Podľa celkového zloženia sa nám zdá, že je staršieho veku, a preto nevylučujeme jej sekundárny výskyt. Usudzujeme na to z toho dôvodu, že okrem mikrofauny v základnej tmeliacej hmote sa jednotlivé formy vyskytujú buď vo valúnikoch, alebo tvoria jadro oolitov. Vyššie opísané oolity sa v opisovanej jednotke vyskytujú napr. pri osade Rozňavské Bystré (porov. profil. J. BYSTRICKÉHO; in J. BYSTRICKÝ–A. BIELY 1966).

Uvedené gastropódové oolity sú pozoruhodné aj z paleogeografického hľadiska. Ako sme už vyššie spomínali, vyskytujú sa v Turecku a Iráne na rozhraní spodného a vrchného „seisu", kým v dinaridách, Východných Alpách a v Bakonskom lese na rozhraní „seisu" a „kampilu" a v oblasti Balatónu a v gemeridách sú až spodnokampilského veku. Takéto horizonty sú ďalej známe z juhotirolských Álp a to z najspodnejších polôh spodného triasu s druhmi *Cyclogyra mahajeri* BROENNIMANN, ZANINETTI et BOZORGNIA a *„Spirorbis" phlyctaena* BROENNIMANN et ZANINETTI (porov. RESCH 1979). Tieto formy v Západných Karpatoch neboli doteraz preukázané.

Paralelizácia horizontov gastropódových oolitov (ale aj iných biozonálnych schém) s novovymedzenými chronostratigrafickými jednotkami spodného triasu naráža na určité ťažkosti v dôsledku nedostatočného rozpracovania rôznych fosílnych skupín a ich biozón v rámci týchto stupňov, resp. podstupňov. Podľa názoru G. PISU (1974), resp. W. RESCHA (1979) spodný diener zodpovedá najvrchnejšej časti „seisu", kým vrchný diener patrí najspodnejšiemu „kampilu". Vyššie citovaní autori do dieneru v juhotirolských dolomitoch začleňujú výrazný gastropódový oolitový horizont. V zmysle tohto členenia by gastropódový oolitový horizont z gemerika zodpovedal vrchnému dieneru, nakoľko jeho spodnokampilský vek bol jednoznačne preukázaný. Podľa H. ZAPFEHO (1974) treba však gastropódový oolitový horizont začleniť do smitu, čo je logickejšie, pretože objavenie „kampilskej" fauny, ako ju uvádza tento autor vo svojej korelačnej tabuľke, je viazané na smit (biozóna *Euflemingites romunderi* a *Wasatchites tardus*). Ak sa prikloníme k tejto interpretácii, smitu v siliciku zodpovedajú sedimenty, ktorým sa podľa staršej nomenklatúry pripisuje spodnokampilský vek (vápnité pieskovce so spomínaným gastropódovým oolitovým horizontom). Vek týchto vrstiev bol preukázaný bohatou spodnokampilskou faunou (J. BYSTRICKÝ 1964, J. BYSTRICKÝ–A. BIELY 1966, str. 47) reprezentovanou hlavne druhmi *Neoschyrodus costatus* MÜNST., *Neoschyrodus laevigatus* (ALB) a i., K. BUDUROV–E. TRIFONOVA (1974) spodnokampilské súvrstvie (smit) v Bulharsku korelujú s konodontovou biozónou *Neospathodus triangularis*.

Vrchnokampilské bridlice sú v Západných Karpatoch doložené z rôznych lokalít gemerika a hronika pomerne bohatou amonitovou faunou (porov. J. BYSTRICKÝ–A. BIELY 1966; V. KOLÁROVÁ-ANDRUSOVOVÁ–J. BYSTRICKÝ 1974) zodpovedajúcou biozóne *Tirolites cassianus*.

Z uvedeného je zrejmé, že súvrstvie vrchnokampilských bridlíc by zodpovedalo iba spodnému spatu (fauna s rôznymi druhmi rodu *Columbites* a *Tirolites*), nakoľko druhy rodu *Subcolumbites* a *Neopopanoceras haugi*, ktoré sú charakteristické pre vrchný spat, neboli doteraz u nás preukázané. Vrstvy kampilu, ktoré dávame do vzťahu so spatom, sú všeobecne podľa konodontovej fauny definované biozónou *Neospathodus homeri* (H. KOZUR–H. MOSTLER 1972; K. BUDUROV–E. TRIFONOVA 1974).

Zóna *Arenovidalina chialingchiangensis* (Partial-range zone)

Z mikrobiostratigrafického hľadiska v spodnom triase Západných Karpát možno vcelku vymedziť biozónu *Arenovidalina chialingchiangensis* (J. SALAJ 1978), ktorá má charakter regionálnej (partial-range) biozóny. Jej spodnú hranicu nie je možné definovať v dôsledku nepriaznivých faciálnych podmienok.

Vrchnú hranicu určuje objavenie aniských druhov *Meandrospira insolita* (HO) a *Meandrospira deformata* SALAJ.

V tetýdnych oblastiach (Turecko, L. ZANINETTI–Z. DAĞER 1978; Irán, P. BROENNIMANN–L. ZANINETTI–F. BOZORGNIA 1972; L. ZANINETTI–P. BROENNIMANN 1974; Álp, V. RESCH 1979) súvrstvie spodného seisu indikujú druhy *Cyclogyra mahajeri* BROENNIMANN, ZANINETTI et BOZORGNIA a *Rectocornuspira kalhori* BROENNIMANN, ZANINETTI et BOZORGNIA.

Podzóna *Meandrospira cheni* (Interval-range zóne)

Vrchné polohy seisu až najspodnejšieho kampilu charakterizuje (partial-range) podzóna *Meandrospira cheni*. Jej spodnú hranicu zatiaľ nie je možné presne definovať, kým vrchnú hranicu určuje prvé objavenie druhu *Meandrospira pusilla* (HO).

Podkladom pre stanovenie tejto podzóny je mikrofauna z gemerika z lokality Honce (starší názov Genč) z červeného oolitového vápenca najspodnejšieho „kampilu" (smitu) preukázaného druhmi *Neoschyrodus costatus* (MÜNST.) a *Neoschyrodus laevigatus* (ALB) (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967b) a z toho istého horizontu z lokality Rakovnica, ako aj z Nízkych Tatier (sútok Čierneho Váhu a Šuňavského potoka; vrstvy s *Costatoria costata* ZENK.).

V tejto súvislosti treba poznamenať, *Meandrospira pusilla* (HO) uvádzaná W. RESCHOM (1979) z gastropódového oolitu z dolomitov južného Tirolska, zodpovedá správne druhu *Meandrospira cheni* (HO).

Podzóna *Meandrospira pusilla* (Interval-range zóne)

V rámci vrchnej časti biozóny *Arenovidalina chialingchiangensis* jeden z autorov (J. SALAJ, l. c.) vymedzil podzónu *Meandrospira pusilla*. Táto má charakter regionálnej (partial-range) podzóny a indikuje vrchný kampil. Spodnú hranicu určuje objavenie druhu *Meandrospira pusilla* (HO), kým vrchnú objavenie druhov *Meandrospira insolita* (HO) a *Meandrospira deformata*.

Mikrofauna podzóny *Meandrospira pusilla* je definovaná z vrchnokampilských vrstiev (spatu) s *Tirolites* sp. zo zárezu železničnej trate medzi Červenou Skalou a Švermovom (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967a, b).

Pôvodne opisovaná podzóna bola v Západných Karpatoch definovaná ako zóna *Meandrospira iulia* (J. SALAJ 1969a). Určujúci druh tejto zóny (*M. iulia*) bol pôvodne opísaný v rámci novostanoveného roku *Citaella* (PREMOLI SILVA). Tento rod je synonymom roku *Menadrospira* LOEBLICH et TAPPAN 1946, tak ako na to upozornili V. KOCHANSKY-DEVIDÉ–Š. PANTIĆ (1966). Uvedené autorky opisujú druh *Meandrospira iulia* (PREMOLI SILVA) z viacerých kampilských sedimentov z dinaríd spolu s *Ammodiscus incertus* (d'ORBIGNY) a *Frondicularia woodwardi* HOWCHIN. Monospoločenstvo druhu *Meandrospira iulia* (PREMOLI SILVA) okrem „kampilu" Západných Karpát (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967a, b) bolo opísané i z „kampilu" juhotuniského pohoria Djeffara (J. SALAJ 1969c). Na taxonomické postavenie tohto druhu sú rozdielne názory. Už v roku 1969 (c) J. SALAJ upozornil, že *Meandrospira iulia* (PREMOLI SILVA) je synonymom buď druhu *Meandrospira cheni* (HO), alebo druhu *Meandrospira flosculiformis* (HO). Druh *Meandrospira cheni* (HO) s jeden a pol až dvoma závitmi je fylogeneticky starší a odlišuje sa od mladšieho druhu *Meandrospira flosculiformis* (HO), ktorý má tri až tri a pol závitov. Posledne menovaný druh vzhľadom na veľké prolokulus považujeme za synonymum „vrchnokampilského" – aniského druhu *Meandrospira pusilla* (HO) – forma A, ktorý sa vyvinul z druhu *Meandrospira cheni* (HO) (obr. 2). Z tohto dôvodu premenovanie zóny *Meandrospira iulia* na biozónu *Meandrospira pusilla* je v súlade s názormi viacerých autorov (P. BROENNIMANN–L. ZANINETTI–A. MOSHTAGHIAN–H. HUBER 1973; A. BAUD–P. BROENNIMANN–L. ZANINETTI 1974; L. ZANINETTI–P. BROENNIMANN 1974; Z. DAĜER–L. ZANINETTI 1976; G. STAMPELI–L. ZANINETTI–P. BROENNIMANN–C. JENNY-DESHUSSES–B. STAMPELI-VUILLE 1976; L. ZANINETTI–Z. DAĜER 1978, A. BERCZI-MAKK 1976; E. TRIFONOVOVA 1978 a L. ZANINETTI 1976a). Nestotožňujeme sa však s názorom autorov: P. BROENNIMANN–L. ZANINETTI–A. MOSHTAGHIAN–H. HUBER (1973), reps. L. ZANINETTI (1976a) a A. BERCZI-MAKK (1976), ktorí považujú holotypy dvoch podstatne odlišných druhov *Meandrospira cheni* (HO) a *Meandrospira insolita* (HO) za synonymum druhu *Meandrospira pusilla* (HO).

Spoločenstvo foraminifer „kampilu" v Západných Karpatoch je veľmi chudobné. Pomerne bohaté spoločenstvo (smit až spodný spat), doložené makrofaunou i konodontmi, uvádzajú z Kocaelského polostrova z Turecka L. ZANINETTI–Z. DAĜER (1978). Reprezentované je druhmi *Meandrospira pusilla* (HO), *Cyclogyra? mahajeri* BROENNIMANN, ZANINETTI et BOZORGNIA, *Glomospira silensis* Z. DAĜER, *Glomospirella schengi* HO, *Ammodiscus parapriscus* HO a *Calcitornella gebzeensis* DAĜER. Asociáciu „kampilu" reprezentovanú biozónou *Meandrospira pusilla* uvádza z Maďarska A. BERCZI-MAKK (1976): *Meandrospira pusilla* (HO), *Ammodiscus* sp., *Earlandia tintinniformis* (MIŠÍK), *Cyclogyra* cf. *mahajeri* BROENNIMANN, ZANINETTI et BOZORGNIA, *Glomospirella* sp. a mikrogastropódov *Spirorbis phlyctaena* BROENNIMANN et ZANINETTI. Poznamenávame, že niektoré jedince vyobrazené touto autorkou, ako *Meandrospira pusilla* (HO), patria druhu *Meandrospira cheni* (HO) (pl. 1, fig. 6, 9; pl. 2, fig. 5, 7, 8; pl. 3, fig. 6, 9).

Najbohatšie spoločenstvo foraminifer je doteraz uvádzané z „kampilu" Balkánu (E. TRIFONOVA 1977, 1978a), kde spodná časť vrchného „skýtu", resp. spodného „kampilu" zodpovedá biozóne *Meandrospira pusilla* (chápaná v redukovanom zmysle ako akma-zóna). Táto biozóna *Meandrospira pusilla* sa podľa spomínanej autorky vyznačuje masovým výskytom druhu *Meandrospira pusilla* (HO) a chýbaním druhu *„Hemigordius" chialingchiangensis* (HO) a *Meandrospira? deformata* SALAJ. Vrchnej časti vrchného skýtu, resp. vrchného kampilu zodpovedá v zmysle E. TRIFONOVEJ (1978c) zóna *Nodosaria shablensis* (range-zone). Spodná časť tejto zóny je reprezentovaná podzónou *„Hemigordius" chialingchiangensis – Nodosinella rostrata* (range-podzóna), ktorá bola pôvodne E. TRIFONOVOVOU (in P. MICHAILOVA-JOVTCHEVA–E. TRIFONOVA 1965) definovaná ako aniská akma-zóna *„Hemigordius" chialingchiangensis*.

Stredný trias

Anis

Spodnoaniské („hydaps") sedimenty sú v Západných Karpatoch reprezentované hlavne gutensteinskými vápencami, ktoré sú všeobecne chudobné na faunu. Preto presná aplikácia novovymedzených dvoch stupňov v spodnom anise (porov. R. ASSERETO 1974), a to egej (spodnejší podstupeň) a bityn (vyšší podstupeň), je veľmi obťažná. A. BUJNOVSKÝ (1972) v tatriku Nízkych Tatier našiel druhy *Costatoria* sp. a *Nerifaria stanensis* (PICHLER), čo umožňuje zaradiť túto časť do egeja. Foraminifery ani konodonty neboli zatiaľ na tejto lokalite preukázané.

Stredný (pelsón) až vrchný anis (ilýr) je charakterizovaný typickými platformovými vápencami, ktoré sú bohaté nielen na riasy, ale i na foraminifery. Ich vek bol preukázaný z početných lokalít (porov. tab. I. in J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967a). Pelsón až spodný ilýr charakterizujú nasledovné spoločenstvo rias: *Physoporella pauciforata* (GUEMBEL), *Physoporella dissita* (GUEMBEL), *Diplopora hexaster* PIA a *Oligoporella pilosa* PIA (porov. V. KOLÁROVÁ-ANDRUSOVOVÁ–J. BYSTRICKÝ 1974). Stredný a vrchný anis je na foraminifery veľmi bohatý. Spravidla sa vyskytujú s vyššie uvedenou asociáciou rias.

Z foraminifer pre stratigrafické členenie anisu sú dôležití zástupcovia rodu *Meandrospira* LOEBLICH et TAPPAN, ďalej pre anis až karn zástupcovia rodu *Pilammina* PANTIĆ a *Pilamminella* SALAJ. Typickou faunou pre spodný anis je *Meandrospira pusilla* (HO), ktorá prechádza z najvrchnejšieho „kampilu" (vrchný spat) do spodného anisu. K tomuto druhu od bázy anisu pristupuje *Meandrospira insolita* (HO). S určitým časovým posunom sa z významnejších foriem v priebehu anisu objavuje *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ, *Pilammina densa* PANTIĆ, v najvyššom anise *Permodiscus pragsoides* OBERHAUSER. Kompletnejší zoznam vertikálneho rozšírenia spodno- až strednotriasových foraminifer doteraz identifikovaných v Západných Karpatoch je uvedený v obr. 10.

Okrem uvedeného typu spoločenstva v spodnom ilýre Malých Karpát sme zistili foraminifery, ktoré nám indikujú hlbšie (pelagické) prostredie. Napr. v reiflinských vápencoch (lokalita Hurtovec; obr. 11) sme identifikovali asociáciu s druhom *Turritellella mesotrissica* KOEHN-ZANINETTI a *Ophthalmidium tricki* (LANGE). Osobitne zaujímavé je spoločenstvo reiflingských vápencov (doložených bohatou makrofaunou; cf. M. KOCHANOVÁ 1979; V. ANDRUSOVOVÁ in M. KOCHANOVÁ 1979) z niva *Paraceratites trinodosus* (západne od k. 466,0 – Plavecký Peter) reprezentované druhmi: *Ammodiscus* sp., *Ophthalmidium tricki* (LANGE), *O. exiguum* KOEHN-ZANINETTI, *Nubecularia vujisici* UROŠEVIĆ et GAŹDZICKI, pričom posledný z nich sa vyskytuje v hojnom množstve.

Osobitnú pozornosť sme v poslednom období venovali štúdiu nodosaroidných foraminifer. V niektorých oblastiach, napr. v Bulharsku (E. TRIFONOVOVÁ 1978a, b) sa výrazne podieľajú na stratigrafickom členení „skýtu" až spodného anisu. Naproti tomu v Západných Karpatoch sa hojne vyskytujú až v spodnom ilýre vo fácii reiflinských vápencov. V oblasti Gombaseku (obr. 4) z polohy (vz. č. G-3), odkiaľ M. MOCK (1971, str. 251) opísal bohatú konodontovú asociáciu s druhom *Gondolella excelsa* (MOSHER, pochádza charakteristická mikrofauna z ktorej foraminifery sú zastúpené nasledovnými druhmi: *Calcitornella elongata* CUSHMAN et WATTERS, *Dentalina excellens* STYK, *Dentalina hoi* TRIFONOVA, *Dentalina subsiliqua* FRANKE, *Protonodosaria globifrondina* CIVRIEUX et DASSAUVAGIE, *Nodosaria trifonovae* n. sp., *Nodosaria primitiva* KUEBLER et ZWINGLI, *Nodosaria ordinata* TRIFONOVA, *Nodosaria* aff. *prima* d'ORBIGNY, *Nodosaria liratella* TAPPAN, *Nodosaria striatoclavata* SPANDEL, *Frondina permica* CIVRIEUX et DESSAUVAGIE, *Frondinodosaria semiornata* (REUSS), *Frondinodosaria pyrula* CIVRIEUX et DESSAUVAGIE, *Nodosinella libera* TRIFONOVA, *Nodosinella siliqua* TRIFONOVA, *Nodosinella rostrata* TRIFONOVA, *Austrocolomia marschalli* OBERHAUSER, *Austrocolomia ploechingeri* OBERHAUSER, *Earlandinita elongata* SALAJ, *Geinizinita pupoides* (NORVANG), *Geinitzinita oberhauseri* CIVRIEUX et DESSAUVAGIE, *Geinitzina postcarbonica* SPANDEL a *Ichtyolaria primitiva* CIVRIEUX et DESSAUVAGIE.

Ostrakódy, hlavne skulptúrované (J. SALAJ 1983), sú reprezentované druhmi: *Healdia anisica* KOZUR, *Bairdiolites compactus* KRISTAN-TOLLMANN, *Bairdiacypris anisica* KOZUR, *Bairdia finalyi* MEHES, *Ceratobairdia longispinosa* KOZUR, *Praemacrocypris mocki* KOZUR, *Spinocypris* cf. *vulgaris* KOZUR, *Triebelina* (*T.*) *martinssoni* KOZUR, *Triebelina* (*T.*) *kristanae praecursor* KOZUR, *Triebelina* (*T.*) muelleri KOZUR, *Triebelina* (*Mirabairdia*) *spinosa* KOZUR, *Triebelina* (*M.*) *prenodosa gemerica* KOZUR, *Triebelina* (*M.*) *pernodosa illyrica* KOZUR a *Acanthoscapha boschi interrupta* KOZUR.

Na základe foraminifer možno v anise vymedziť päť zón: *Meandrospira insolita*, *Meandrospira deformata*, *Meandrospira dinarica*, *Pilammina densa* a *Permodiscus pragsoides*, pričom prvé dve menované zóny sú alternujúce a časove v podstate ekvivalentné. Zóna *Meandrospira insolita* je charakteristická pre prostredie viac-menej s normálnou salinitou, kým jej v čase ekvivalentná zóna *Meandrospira deformata* je typická pre prostredie so zvýšenou salinitou. Čiastočne ekvivalentnou zónou je tiež zóna *Permodiscus pragsoides* (najvyššej časti zóny *Pilammina densa*; vrchný ilýr), prípadne by sme ju mohli považovať za podzónu posledne menovanej zóny.

Pri zonálnom členení anisu Západných Karpát sme prihliadali aj na členenie vrchného anisu v Alpách (L. ZANINETTI–P. BROENNIMANN–A. BAUD 1972a, b) a na Balkáne (E. TRIFONOVA 1978a).

Zóna *Meandrospira insolita* (Interval-range zone)

Zóna *Meandrospira insolita* bola pôvodne definovaná v siliciku J. SALAJOM (1969a). Ako sme už vyššie poznamenali, je viazaná na prostredie viac-menej s normálnou salinitou. V tomto prostredí sa usadzovali gutensteinské vápence s veľmi sporadickým výskytom foraminifer. Okrem vzácnych výskytov rovnomenného druhu opisovanej zóny a druhov *Tolypammina gregaria* WENDT a *Calcitornella* div. sp. sa v pomerne veľkom počte nachádza *Meandrospira deformata* SALAJ. Jej spodnú hranicu určuje prvé objavenie druhov *Meandrospira insolita* (HO) a *Meandrospira deformata* SALAJ. Vrchná hranica je definovaná objavením druhu *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ. Pre úplnosť treba poznamenať, že asociácie foraminifer tejto zóny u nás sú vcelku chudobné.

Opisovaná zóna bola preukázaná z viacerých lokalít zo spodnej časti gutensteinských vápencov z okolia Drienku (porovl A. BIELY–J. SALAJ 1967), ďalej z podložia vápencov strednoaniského až pelsónskeho veku v Brezovských Karpatoch (s. od Dobrej Vody; porov. J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967), ako aj zo spodnej časti gutensteinských vápencov vystupujúcich v profile Hurtovec (vz. č. MK–21), ktorý z litofaciálneho hľadiska študoval J. MELLO. Podľa doterajších litostratigrafických výskumov spodná časť gutensteinských vápencov všeobecne zodpovedá spodnému anisu. Spodnoaniský vek je v súlade s poznatkami E. TRIFONOVEJ (1972b), ktorá druh *Meandrospira insolita* (HO) taktiež uvádza zo spodného anisu.

Zóna *Meandrospira deformata* (Interval-range zone)

I keď v siliciku bola sedimentácia viazaná na prostredie s viac-menej normálnou salinitou, v ostatných častiach Západných Karpát spodnoaniské gutensteinské vápence sa usadzovali v rozsiahlych plytčinách (M. MIŠÍK 1972). V určitých oblastiach sa vytvorilo hypersalinné prostredie, hlavne v okrajových (tatridných) častiach a v priestore zodpovedajúcom pôvodnej sedimentačnej zóne krížňanskej a čiastočne i chočskej tektonickej jednotky (J. SALAJ–M. POLÁK 1978). Pre takého prostredie (známe i zo spodného anisu opolského Sliezska; gogolinské vrstvy germánskeho muschelkalku) je charakteristický druh *Meandrospira deformata* SALAJ. J. GŁAZEK–J. TRAMMER–K. ZAWIDZKA (1973) z neho stanovili zónu *Meandrospira deformata*, ktorú v plnom rozsahu akceptoval J. SALAJ–M. POLÁK (1978) aj pre hypersalinné prostredie spodného anisu tatroveporíd.

Pravdepodobne v dôsledku analogických paleogeografických podmienok nedostatok fauny sa konštatoval v spodnom anise (egeji) i na polostrove Kocaeli v Turecku (L. ZANINETTI–Z. DAĞER 1978).

Obe vekove ekvivalentné spodnoaniské zóny *Meandrospira insolita* a *Meandrospira deformata* pravdepodobne zodpovedajú H. KOZUROM–A. MOSTLEROM (1972) stanovenej spodnoaniskej konodontovej zóne *Gondolella? aegaea*.

Zóna *Meandrospira dinarica* (Interval-range zone)

Jej spodnú hranicu určuje prvé objavenie druhu zóny – *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ. Vrchná hranica bola definovaná (porov. J. SALAJ 1969a) prvým objavením druhu *Pilammina densa* PANTIĆ. Opisovaná zóna (podobne, ako aj nasledujúca sukcesívna zóna *Pilammina densa*), resp. asociácie foraminifer s druhom *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ a *Pilammina* (*Glomospira*) *densa* PANTIĆ boli pre členenie anisu všeobecne akceptované, napr. v dinaridách (Š. PANTIĆ 1965, 1967; V. KOCHANSKY-DEVIDÉ–Š. PANTIĆ 1966), ďalej v Alpách (L. KOEHN-ZANINETTI 1969; I. PREMOLI SILVA 1971), z Balkánu (E. TRIFONOVA–G. ČATALOV 1975; E. TRIFONOVA 1978a) a opolského Sliezska (J. GŁAZEK–J. TRAMMER–K. ZAWIDZKA 1973). Rozdielny je však názor na stratigrafickú pozíciu obidvoch zón, kde hlavný dôvod vidíme v rozdielnom vertikálnom rozšírení charakteristických druhov oboch zón. Táto skutočnosť bola zrejme spôsobená odlišnými paleoekologickými podmienkami v rôznych oblastiach. Ak berieme do úvahy, že druh *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ sa vyvinul z druhu *Meandrospira insolita* (HO) na rozhraní spodného a stredného anisu, naše korigovanie jeho rozšírenia v strednom až vrchnom anise je v úplnom súlade aj s názormi iných autorov (O. JENDREJÁKOVÁ 1973; J. GŁAZEK–J. TRAMMER–K. ZAWIDZKA 1973; E. TRIFONOVOVA 1978a; A. BAUD–L. ZANINETTI–P. BROENNIMANN 1971; L. ZANINETTI–P. BROENNIMANN –A. BAUD 1972a, b). Pravdepodobný výskyt tohto druhu zo spodného anisu uvádza I. PREMOLI SILVA (1971). Z textu vyplýva, že spodnoaniský druh *Meandrospira insolita* (HO) je pravdepodobne synonymom druhu *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ. Tento druh zo spodného anisu Turecka (polostrov Koaceli) uvádza tiež L. ZANINETTI–Z. DAĞER (1978, str. 100). Avšak títo autori druh *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ chápu širšie a pričleňujú k nemu i formy s menším počtom závitov, ktoré my považujeme za samostatný taxón (*Meandrospira insolita*). Na druhej strane však pripúšťajú možnosť, že druh *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ sa vyvinul z druhu *Meandrospira pusilla* (HO), ktorý je podľa nás ancestrálnou formou, vyššie spomínaného polemického taxónu *Meandrospira insolita* (HO). Posledne menovaní autori v súvise s touto problematikou píšu: „Predbežne možno poznamenať, že určité jedince vrchného anisu sa líšia svojou morfológiou od najstarších reprezentantov *Meandrospira dinarica*. Jedna schránka veľkého rozmeru s hojnými závitmi (L. ZANINETTI–P. BROENNIMANN–A. BAUD 1972a, pl. 7, fig. 1) by naozaj mohla zodpovedať jednému pokročilému vývojovému štádiu druhu.". Týmto konštatovaním uvedení autori v skutočnosti pripúšťajú existenciu dvoch morfologicky rozdielnych foriem (z rôznych stratigrafických úrovní) v rámci nimi spomínaného druhu *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ. Vyššie uvedeným názorom L. ZANINETTI–Z. DAĞER (1978) vysvetľujú, prečo sa primitívne formy druhu *Menadrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ (v našom poňatí druh *Meandrospira insolita* HO) objavujú v Turecku skôr ako v alpsko-karpatskej oblasti, v dinaridách a na Balkáne. Podľa názoru uvedených autorov rozdielne stratigrafické rozšírenie tohto druhu môže byť tiež spôsobené postupnou migráciou bentických foraminifer z východných tetýdnych provincií smerom na západ.

Hoci v Západných Karpatoch neboli konodonty zatiaľ v spodnom pelsóne preukázané, na základe výskumov K. BUDUROVA–E. TRIFONOVOVEJ (1974), resp. E. TRIFONOVEJ (1978a) môžeme opisovanú zónu provizórne korelovať s konodontovou zónou *Gondolella regale*, ktorá sa všeobecne dáva do vzťahu so spodným pelsónom.

Zóna *Pilammina densa* (*Acma*-zone)

Táto zóna bola pôvodne opísaná a neskoršie modifikovaná J. SALAJOM (1976, 1978) zo Západných Karpát. Na základe údajov K. BORZU (1971), ktorý uvádza druh *Pilammina densa* PANTIĆ zo spodného anisu, J. SALAJ (1979) dával opisovanú zónu (ako zónu typu total-range) do vzťahu s celým anisom. Nakoľko stratigrafická pozícia lokality opísanej K. BORZOM (l. c.) je diskutabilná (porov. J. GŁAZEK–J. TRAMMER–K. ZAWIDZKA 1973; J. HANÁČEK 1976) treba ju podrobiť revízii. Z týchto dôvodov revidujeme zónu *Pilammina densa* na zónu typu *Acma*. Jej spodnú hranicu určuje prvé overené objavenie druhu *Pilammina densa* PANTIĆ v Západných Karpatoch, kým vrchnú hranicu určuje prvé objavenie druhu *Pilammina gemerica* (SALAJ), ako aj vymretie druhu *Pilammina densa* PANTIĆ a *Pilamminella grandis* (SALAJ). Názory na prvé objavenie druhu *Pilammina* (*Glomospira*) *densa* PANTIĆ nie sú tiež jednotné. L. ZANINETTI–Z. DAĞER (1978) ho uvádzajú zo spodného anisu (egej) polostrova Kocaeli, kde v tomto období prebiehala sedimentácia vápencov platformového typu. Vyššie sa tento druh ani druh *Pilamminella grandis* (SALAJ) nevyskytujú v dôsledku výrazných paleogeografických zmien (vznik pelagickej fácie). Okrem vyššie spomínaného problematického výskytu sa u nás druh *Pilammina densa* PANTIĆ evidentne vyskytuje v strednom až vrchnom pelsóne a ilýre. Spodná hranica výskytu bola preukázaná z okolia Silickej Brezovej (Slovenský kras), kde v strednej časti steinalmských vápencov sa nachádza predmetný druh spolu s druhom *Physoporella pauciforata sulcata* BYSTRICKÝ (vz. č. SB-I-11, profil Silická Brezová študovaný J. MELLOM). Z nadložia vyššie uvedených druhov bola identifikovaná bohatá konodontová fauna zodpovedajúca vrchnopelsónskej zóne *Micoraella kockeli* (G. KALISKÁ 1980).

O vrchnopelsónskom a ilýrskom veku zóny *Pilammina densa* v Západných Karpatoch niet pochybností. Jej paralelizáciu s riasami, makrofaunou a konodontmi urobil J. BYSTRICKÝ et kol. (1973). Z hľadiska biostratigrafickej korelácie dôležitým faktom je, že vo vrchnom ilýre Plešivskej planiny (kóta Štít 851,1 m až kóta 844,1 m) v tmavých lavicovitých vápencoch sa vyskytujú bohaté asociácie (z materiálu J. MELLU) s prevládajúcim druhom *Pilammina densa* PANTIĆ (J. SALAJ 1967). Odtiaľto pochádza i J. BYSTRICKÝM nájdený vrchnoilýrsky amonit *Ptychites acutus* MOJS. Okrem toho z týchto vrstiev pochádza i bohatá konodontová fauna určená R. MOCKOM (1971, str. 255: *Dichodella alternata* MOSHER, *Gondolella excelsa* (MOSHER), *Hibbardella lautissima* (HUCKRIEDE), *Hindeodella* (*Metaprioniodus*) *suevica* (TATGE), *Lonchodina hungarica* KOZUR et MOSTLER, *L. Posterognathus* (MOSHER), *Neoplectospathodus muelleri* KOZUR et MOSTLER, *Ozarkodina tortilis* TATGE, *Priniodina* (*Cypriodonella*) *muelleri* (TATGE) a *P.* (*C.*) *venusta* (HUCKRIEDE).

Vrchná hranica rozšírenia druhu *Pilammina densa* PANTIĆ, ako aj rovnomennej zóny v zmysle pôvodného názoru J. SALAJA–A. BIELEHO–J. BYSTRICKÉHO (1967a, b) bola uvádzaná z rozhrania anisu–ladinu. Podľa novších výskumov viacerých autorov (O. JENDREJÁKOVÁ 1973; K. BUDUROV–E. TRIFONOVA 1974; A. GAŹDZICKI–J. TRAMMER–K. ZAWIDZKA 1975; Z. BELKA–A. GAŹDZICKI 1976) druh *Pilammina* (*Glomospira*) *densa* PANTIĆ sa nevyskytuje vo vrchnom ilýre, to znamená, že zóna *Pilammina* (*Glomospira*) *densa* v ich poňatí nezahrnuje vrchný ilýr. Poznamenávame, že tento druh, i keď len sporadicky vyskytuje sa v gemeriku v najvrchnejších polohách ilýru (porov. J. SALAJ 1978, str. 114, pl. 1, fig. 6) spolu s *Diplopora annulatissima* (PIA), čo je v súlade aj s názorom E. TRIFONOVOVEJ (1978a), ktorá vrchnú hranicu rozšírenia tohto druhu taktiež uvádza z rozhrania dvoch vyššie spomínaných sukcesívnych stupňov. Z doterajších výskumov vyplýva, že lokálne v siliciku, ako aj v tatroveporiku (hlavne v chočskom príkrove) druh *Pilammina densa* PANTIĆ nemusí byť všade v najspodnejších ani v najvrchnejších častiach anisu prítomný. Týka sa to lagunárnych fácií, ako i fácií sedimentujúcich v hlbšom prostredí. Hlbšie sedimentačné prostredie v najvrchnejšom anise – bazálnom ladine reprezentuje reiflinská alebo pseudoreiflinská fácia (najvrchnejší anis – najspodnejší ladin).

Z hľadiska mikrofaciálneho ide hlavne o biopelmikrity až sparity s hojnými filamentmi, prípadne s rádioláriami, vzácne sú i polohy intrabiokalkarenitov s krinoidami (napr. v Strážovských vrchoch, J. HANÁČEK 1976). Z foraminifer sa vyskytujú: *Turritellella mesotriassica* KOEHN-ZANINETTI, *Earlandia amplimuralis* (PANTIĆ), *Earlandia gracilis* (PANTIĆ), *Earlandia tintiniformis* (MIŠÍK), *Agathammina judicariensis* PREMOLI SILVA. V organodetritických polohách spodnej časti reiflinských ilýrskych vápencov reprezentujúcich alodapické turbiditné vápence sa vyskytuje *Pilammina densa* PANTIĆ a *Permodiscus pragsoides* OBERHAUSER.

Zóna *Permodiscus pragsoides* (Interval-range zone)

Pôvodne túto zónu stanovil J. SALAJ (1978) pre spodný ladin. Na základe nových výskumov je potrebné revidovať jej stratigrafickú pozíciu v tom zmysle, že reprezentuje len najvyšší anis (pravdepodobne len ilýr). V prospech tohto názoru hovorí aj výskyt druhu *Permodiscus pragsoides* OBERHAUSER v asociácii s druhom *Pilammina densa* PANTIĆ spolu s *Diplopora annulatissima* a *Diplopora annulata* v Strážovských vrchoch (J. HANÁČEK 1976). Podľa tejto interpretácie opisovaná zóna čiastočne alternuje zónu *Pilammina densa*, prípadne môže byť v rámci nej vyčlenená ako podzóna.

Druh *Permodiscus pragsoides* OBERHAUSER sa v Západných Karpatoch vyskytuje sporadicky, a to buď v asociácii s druhom *Pilammina densa* PANTIĆ, alebo sám. Je pozoruhodné, že vo vrchnom anise dinaríd (P. BROENNIMANN–J.-P. CADET–L. ZANINETTI 1973) sa vyskytuje masove.

Ladin

Na základe foraminifer je tento stupeň najťažšie definovateľný. Podľa našich doterajších výskumov sa nám javí, že druhy *Pilammina densa* PANTIĆ, *Pilamminella grandis* (SALAJ), *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ a *Meandrospiranella samueli* SALAJ do ladinu neprechádzajú.

Podľa doterajších biostratigrafických výskumov v ladine Západných Karpát sú vyvinuté hlavne wettersteinské vápence, platformového rífotvorného faciálneho typu. Tento typ fácie je u nás vcelku na makrofaunu veľmi chudobný (porov. J. BYSTRICKÝ et al. 1973). Preto ladinské foraminifery boli pôvodne študované iba z lokalít doložených riasami (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967b; J. BYSTRICKÝ et al. 1973): *Diplopora annulata* SCHAFHAULT a *Diplopora annulatissima* PIA, resp. *Teutloporella herculea* (STOPPANI) PIA. Vo vápencoch s vyššie uvedenými druhmi rias sa popri druhoch *Permodiscus pragsoides* OBERHAUSER, *Aulotortus sinuosus* WEYNSCHENK vyskytuje i určujúci druh rovnomennej zóny ladinu – *Pilamminella gemerica*. Na foraminifery a riasy sú veľmi chudobné prechodné fácie medzi rífmi a panvovými sedimentmi. Takýto typ fácie opisuje J. MELLO (1977), ktorý okrem sporadicky sa vyskytujúcich foraminifer uvádza nasledovnú asociáciu druhov: *Plexoramea cerebriformis* MELLO, *Ladinella porata* OTT, *Tubiphytes obscurus* MALSOV, *Thaumatoporella parvovesiculifera* (RAIN), *Baccinella floriformis* PANTIĆ a *Bacinella ordinata* PANTIĆ. Z týchto foriem určitú pozornosť si zasluhuje posledne menovaný druh, ktorému sa pripisuje úzke vekové rozpätie. Jeho výskyt v ilýre z foraminifer potvrdzuje aj jeho spoločný výskyt s druhom *Endothyranella wirzi* (KOEHN-ZANINETTI).

V rámci ladinu J. SALAJ (1979) vyčlenil zónu *Pilamminella gemerica* (s. l.) s dvoma podzónami: *Pilamminella gemerica* (s. s.) a *Angulodiscus gaschei praegaschei.*

Zóna *Pilamminella gemerica*, s. l. (Interval-range zone)

Jej spodnú hranicu určuje prvé objavenie druhu *Pilamminella gemerica* (SALAJ), kým vrchnú hranicu *Pilamminella kuthani* (SALAJ) a *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI et BROENNIMANN. Opisovanú zónu dávame do vzťahu s fasanom a longobardom.

Podzóna *Pilamminella gemerica* s. s. (Interval-range subzone)

Jej spodná hranica je definovaná prvým objavením druhu *Pilamminella gemerica* (SALAJ) a vymiznutím druhu *Pilamminella grandis* (SALAJ). Vrchnú hranicu určuje objavenie druhu *Angulodiscus gaschei praegaschei* KOEHN-ZANINETTI. Asociácia foraminifer opísanej podzóny sa skladá hlavne z druhov: *Permodiscus pragsoides* OBERHAUSER, *Permodiscus oscillens* (OBERHAUSER), *Permodiscus planidiscoides* OBERHAUSER a *Pilamminella gemerica* (SALAJ). Kladieme ju do fasanu. Z hľadiska zonácie konodontov, pravdepodobne zodpovedá zóne *Gondolella mombergensis* (sensu K. BUDUROV–E. TRIFONOVA 1974). V tejto súvislosti treba poznamenať, že túto zónu uprednostňujeme pred H. KOZUROVOU (1972) zónou *Gladigondolella tethydis*, ktorej určujúci druh (*G. tethydis* [HUCKRIEDE]) sa vyskytuje aj v ilýre (porov. R. MOCK 1971; A. GAŹDZICKI–O. E. OTT 1977).

Asociácie opisovanej podzóny sme v poslednom čase študovali aj z Malých Karpát (profil Javorinka, kóta 561,0 m). Tu z bazálnej časti wettersteinských vápencov (vz. č. MK-120, MK-123, MK-124), vyskytujúcich sa v tesnom nadloží reiflinských vápencov sme zistili nasledovné druhy foraminifer: *Pilamminella gemerica* (SALAJ), a *Earlandia amplimuralis* PANTIĆ. O niečo vyššie (vz. č. MK-123 a MK-124) sú naviac prítomné druhy *Permodiscus pragsoides* OBERHAUSER, *Earlandinita grandis* SALAJ, *E. oberhauseri* SALAJ a *Diplotremmina astrofibriaca* KRISTAN-TOLLMANN. Vo vzorkách bol preukázaný doteraz len druh *Thaumatoporella parvovesiculifera* (RAIN).

Na mikrofaunu, ako aj riasy sú pomerne bohaté wettersteinské a raminské vápence v nadloží reiflinských vápencov v oblasti Silickej Brezovej, kde v profile SB I (študovanom J. MELLOM) bezprostredne v nadloží tufitov máme preukázanú túto mikrofaunu: *Permodiscus pragsoides* OBERHAUSER, *Valvulina azzouzi* SALAJ, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN a *Arenovidalina chialingchiangensis* HO. Riasy sú reprezentované druhmi (vz. č. SB I/28): *Thaumatoporella parvovesiculifera* (RAIN) a *Diplopora annulata* (SCHAFH.). O niekoľko metrov vyššie (SB I/29) sa vyskytujú foraminifery: *Pilamminella gemerica* (SALAJ), *Permodiscus sinuosus* OBERHAUSER, *Endothyra kuepperi* OBERHAUSER, *Arenovidalina chialingchiangensis* HO, *Tolypammina gregaria* WENDT a *Agathammina austroalpina* KRISTAN-TOLLMANN. Z rias sa tu vyskytujú: *Gyroporella ampliforata* GUEMBEL a *Thaumatoporella parvovesiculifera* (RAIN).

Podzóna *Angulodiscus gaschei praegaschei* (Interval-range subzone)

Jej spodná hranica je definovaná objavením druhu *Angulodiscus gaschei praegaschei* KOEHN-ZANINETTI – Vrchná hranica je definovaná objavením druhu *Pilamminella kuthani* (SALAJ).

Poznamenávame, že významné druhy tejto podzóny *Angulodiscus gaschei praegaschei* KOEHN-ZANINETTI, *Pilamminella gemerica* (SALAJ) prechádzajú až do karnu, v ktorom posledne menovaný druh vymiera. Ich výskyt v karne (hlavne v kordevole) bol preukázaný diplopórami druhu *Andrusoporella duplicata* (PIA), ktorého prvý výskyt sa všeobecne uvádza z kordevolu (J. BYSTRICKÝ et al. 1973).

Túto podzónu kladieme do longobardu, ktorému z hľadiska konodontovej biozonácie zodpovedajú na Balkáne zóny: *Metapolygnathus mungoensis* (spodný longobard) a *Gondolella foliata* (vrchný longobard). Ich stratigrafická pozícia bola dokumentovaná i makrofaunou (K. BUDUROV 1976). Táto interpretácia je v podstate v súlade s poznatkami H. KOZURA (1971), podľa ktorého je pre longobard charakteristický druh *Metapolygnathus mungoensis* (DIEBEL).

Vzťah tejto podzóny k longobardu v Západných Karpatoch je potvrdený z viacerých lokalít. Z lokality 1200 m v. od Silickej Brezovej, detailne študovanej K. BORZOM (1973) sa spolu s asociáciou indikujúcou opisovanú podzónu vyskytuje vo wettersteinských vápencoch rias u *Teutloporella herculea* (STOPPANI).

Pokiaľ ide o asociáciu foraminifer opisovanej podzóny, môžeme konštatovať, že v mnohých vzorkách z gemerika (napr. lokalita Budikovany) okrem *Permodiscus pragsoides* OBERHAUSER sa vyskytujú i ďalšie druhy novej podčeľade *Permodiscinae*: *Aulotortus oscillens* (OBERHAUSER), *Lamelliconus eomesozoicus* (OBERHAUSER), *Angulodiscus gaschei praegaschei* KOEHN-ZANINETTI spolu s druhom *Pilamminella gemerica* (SALAJ), ktorá je zastúpená mimoriadne hojne. V tejto súvislosti treba poznamenať, že O. JENDREJÁKOVÁ (1973) v stratigrafickej tabuľke uvádza zástupcov *Involutinidae* BUETSCHLI 1880 emend. ZANINETTI 1969 (v našej klasifikácii *Permodiscinae*) od bazálneho karnu (kordevolu). Toto tvrdenie je však rozporné s textom (l. c., str. 120), v ktorom pripúšťa, že vo vyšších polohách wettersteinských vápencov (pravdepodobný vek najvyšší longobard kordevol) Slovenského krasu s *Teutloporella herculea* (STOPPANI) sa objavujú prví zástupcovia involútnych foraminifer. Autorka sa zrejme opiera hlavne o výskyt druhu *Teutloporella herculea* (STOPPANI), ktorý sa bez druhu *Andrusoporella duplicata* (PIA) vyskytuje prakticky v priebehu celého ladinu (porov. J. BYSTRICKÝ 1964).

Lamelikónusy (okrem druhu *Lammelliconus* sp. sú v longobarde zastúpené so sporadicky sa vyskytujúcimi druhmi *Lamelliconus procerus* (LIEBUS) a *Lamelliconus* ex. gr. *biconvexus* (OBERHAUSER). Zástupcovia rodu *Lamelliconus* PILLER 1978 sa vyskytujú hlavne v kordevole, menej v spodnom jule.

Západokarpatskú podzónu *Angulodiscus gaschei praegaschei* dávame do vzťahu s podzónou *Lamelliconus* (*Trocholina*) *biconvexa* – *Turritellella mesotriassica*, definovanou E. TRIFONOVOVOU (1978b) na Balkáne. Asociácia hojných lamelikónusov charakterizuje fáciu vrchného ladinu, reprezentovanú vápencovo-slienitou a slienitou sedimentáciou, známou hlavne v Alpách (R. OBERHAUSER 1957, 1960) a na Balkáne (E. TRIFONOVA 1978b). Pelagickej fácii ladinu na polostrove Kocaeli zodpovedajú červené hľuznaté vápence s „*Turritellella*“ *mesotriassica* KOEHN-ZANINETTI (L. ZANINETTI–Z. DAĞER 1978).

Lamelikónusy (trocholíny), ako uvádza L. ZANINETTI (1976), sú vo vrchnom ladine pomerne vzácne. Okrem Západných Karpát, rakúskych Álp a dinaríd sú známe z Turecka a Iránu. Z centrálneho Iránu P. BROENNIMANN–L. ZANINETTI–A. MOSHTAGHIAN–H. HUBER (1974) uvádzajú z formácie Espahk bohaté spoločenstvo foraminifer podčeľade *Permodiscinae* (*Involutinidae*) ladinskokarnského veku. Z východnej a juhovýchodnej Ázie z Malajského polostrova uvádza ladinské foraminifery A. GAŹDZICKI–O. E. SMIT (1977): *Earlandia amplimuralis* (PANTIĆ), *Earlandia gracilis* (PANTIĆ), *Agathammina? iranica* ZANINETTI, *Pilamminella* (*Glomosporella*) *gemerica* (PANTIĆ) a *Earlandinita soussi* SALAJ.

Ladinskí zástupcovia podčeľade *Permodiscinae* nov. subfam. sa vyskytujú v triase východotuniskej platformy (J. SALAJ 1978). Boli identifikované z vrtu CB-1 na Cap Bone (H. BISMUTH–J. BONNEFOUS–J.-M. MASSIN–J. SALAJ 1974), kde do fácie germánskeho triasu prstovite zasahuje alpínska platformová fácia s hojnými zástupcami druhu *Permodiscus pragsoides* OBERHAUSER s *Lamelliconus multispirus* (OBERHAUSER). Okrem toho v pohorí Djefara (južné Tunisko – severná Tripolitánia) je známa vrchnoladinská až spodnokarnská fácia s „trocholínami“ (Ch. GLINTZBOECKEL 1956; J. SALAJ 1969), reprezentovaná druhmi

Lamelliconus biconvexus (OBERHAUSER) a *Lamelliconus ventroplanus* (OBERHAUSER).

Z ladinu Álp sa vôbec po prvýkrát uvádzajú planktónne foraminifery označované ako „globigeríny triasu", patriace rodu *Diplotremmina* KRISTAN-TOLLMANN, *Kollmannita* FUSCH a *Oberhauserella* FUCHS. Študoval ich hlavne R. OBERHAUSER (1960), E. KRISTAN-TOLLMANN (1960, 1964c, 1966), W. FUCHS (1967, 1969) a L. ZANINETTI (1967a). Z ladinu až spodného karnu sú známe nasledovné druhy: *Diplotremmina multifimbriata* FUCHS, *Kollmannita cordevolica* FUCHS, *Kollmannita diplotreminaeformis* FUCHS, *Kollmannita gemmaeformis* FUCHS, *Kollmannita ladinica* (OBERHAUSER), *Kollmannita multiloculata* FUCHS, *Kollmannita praeladinica* FUCHS, *Kollmannita tirolica* FUCHS, *Oberhauserella mesotriassica* (OBERHAUSER), z ktorých zatiaľ v ladine Západných Karpát boli najdení zástupcovia rodu *Diplotremmina* (div. sp.).

Triasové „globigeríny" sa okrem rakúskych Álp sporadicky vyskytujú i v ladine Balkánu, odkiaľ ich opísala E. TRIFONOVOVÁ (1978b). Jej zónovanie má osobitný význam nielen pre Západné Karpaty, ale i pre interregionálnu koreláciu, pretože sa tu vyskytujú foraminifery typické nielen pre platformové rífotvorné vápence, ale i pre hlbšiu až pelargickú fáciu. Naviac foraminiferové zóny môžeme tu korelovať s konodontovými zónami. Ladin je definovaný zónou *Pilamminella* (*Glomospirella*) *densa* – *Turritellella mesotriassica*. Jej spodná hranica je určená vyznievaním druhov *Pilammina* (*Glomospira*) *densa* PANTIĆ, *Pilamminella* (*Glomospirella*) *grandis* (SALAJ), *Meandrospira dinarica* KOCHANSKY-DEVIDÉ et PANTIĆ a výskytom druhov *Pachyphloides oberhauseri* SELLIER de CIVRIEUX et DESSAUVAGIE, *Pseudonodosaria obconica* (REUSS), *Plagiographa tornata* KRISTAN-TOLLMANN, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, *Agathammina? iranica* ZANINETTI, BROENNIMANN, BOZORGNIA et HUBER a *Austrocolomia marschalli* (OBERHAUSER). Vrchná hranica je charakterizovaná vyznievaním druhu *Turritellella mesotriassica* KOEHN-ZANINETTI, *Duostommina alta* KRISTAN-TOLLMANN a *Planiinvoluta mesotriassica* BAUD, ZANINETTI et BROENNIMANN.

Spodná časť tejto zóny je definovaná intervalovou podzónou *Pilamminella* (*Glomospirella*) *grandis* – *Lamelliconus* (*Trocholina*) *biconvexus biconvexus*. Vrchná hranica je definovaná objavením *Lamelliconus biconvexus biconvexus* (s prevahou rôznych druhov roku *Lamelliconus*) a výskytom druhu *Angulodiscus* (*Involutina*) *gaschei praegaschei* KOEHN-ZANINETTI. Lokálne v tejto podzóne dominuje druh *Ophthalmidium exiguum* KOEHN-ZANINETTI. Zodpovedá spodnému ladinu a v podstate je ekvivalentná karpatskej podzóne *Pilamminella gemerica*.

Vrchná časť zóny *Pilamminalla* (*Glomospirella*) *grandis* – *Turritellella mesotriassica* zodpovedá longobardu. Je definovaná intervalovou podzónou *Lamelliconus* (*Trocholina*) *biconvexus biconvexus* – *Turritellella mesotriassica* (E. TRIFONOVA 1978b). Táto podzóna zodpovedá v Západných Karpatoch podzóne *Angulodiscus gaschei praegaschei*..

Bohaté spoločenstvo foraminifer jednotlivých podzón ladinu je uvedené v prílohe E. TRIFONOVOVEJ 1978b, str. 58–59, fig. 1, na ktorú tu odkazujeme. Pre úplnosť poznamenávame, že z planktónnych „globigerín" sa v spodnom ladine vyskytuje *Kollmannita?* sp., kým vo vrchnom ladine *Schmidtia* cf. *inflata* FUCHS a *Oberhauserella mesotriassica* (OBERHAUSER).

Spodnú hranicu zóny určuje výskyt druhu *Permodiscus pragsoides* OBERHAUSER a vrchnú hranicu vymiznutie druhov *Pilammina densa* PANTIĆ a *Pilamminella grandis* (PANTIĆ), ako aj objavenie sa druhu *Pilamminella gemerica* (SALAJ).

Karn

Pre posudzovanie mikrobiostratigrafie karnu je dôležité predovšetkým gemerikum. Kordevol reprezentujú wettersteinské vápence a jul-tuvalsko tisovské vápence. Ich litologicko-stratigrafickou problematikou sa v poslednom čase zaoberal hlavne J. BYSTRICKÝ (1964, 1967, 1972, 1979), J. MELLO (1974, 1975), O. JENDREJÁKOVÁ (1973) a M. MIŠÍK–K. BORZA (1976).

Zóna *Pilamminella kuthani* (Interval-range zone)

Z vyššie spomínanej oblasti je karn doložený makrofaunou i riasami *Dasycladacea*. Vcelku sú karnské sedimenty pomerne bohaté na mikrofaunu (Porov. J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967b, tab. 2; J. SALAJ–A. BIELY 1967; O. JENDREJÁKOVÁ 1973). V roku 1969a J. SALAJ stanovil zónu *Pilamminella kuthani*. Jej spodná hranica je určená nájdením druhu *Pilamminella kuthani* (SALAJ) a druhu *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI et BROENNIMANN. Vrchná hranica je určená vymiznutím druhu *Pilamminella kuthani* SALAJ) a nájdením druhov *Amphorella lageniformis* BORZA et SAMUEL a *Semiinvoluta clari* KRISTAN. Pôvodne J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967b) druh *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI et BROENNIMANN z karnu neuvádzajú. Formy patriace k tomuto druhu nesprávne pričlenili k druhu *Pilammina friedli* (KRISTAN-TOLLMANN), a to z lokalít č. 18 a 20 (tab. 2). Na základe revízie preraďujeme ako formy k druhu *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI et BROENNIMANN. Pre úplnosť poznamenávame, že formy uvádzané z vrchnoladinských wettersteinských vápencov (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967b, tab. 2, lok. č. 5, 7, 9, 10) ako *Pilammina friedli* (KRISTAN-TOLLMANN) patria k druhu *Angulodiscus gaschei praegaschei* KOEHN-ZANINETTI, ktorý sa hojne vyskytuje i v karne. Podľa O. JENDREJÁKOVEJ (1973) v spodnom až strednom karne je hojne zastúpený i druh *Pilamminella* (*Pilammina*) *gemerica* (SALAJ). Sporadicky v spodnom až strednom karne gemerika sa vyskytuje *Lamelliconus procerus* (LIEBUS). V rámci opísanej zóny vymedzujeme podzónu *Lamelliconus procerus* a podzónu *Rakusia oberhauseri*.

Veľmi bohaté spoločenstvo foraminifer karnu je opísané z Balkánu (E. TRIFONOVA 1962, 1978b), kde zonálne členenie je veľmi podobné nášmu členeniu. Karn je tu definovaný zónou *Turritellella mesotriassica* – *Angulodiscus* (*Involutina*) *gaschei praegaschei*. Spodná hranica je stanovená na základe vymiznutia druhu *Turritellella mesotriassica* KOEHN-ZANINETTI, vrchná hranica vymiznutím druhov *Angulodiscus* (*Involutina*) *gaschei pregaschei* KOEHN-ZANINETTI, *Ophthalmidium exiguum* KOEHN-ZANINETTI a *Austrocolomia marschalli* (OBERHAUSER). V tejto zóne E. TRIFONOVOVÁ (1978b) stanovila dve podzóny:

a) Podzónu *Lamelliconus* (*[Trocholina*) *procerus*. Jej hranice zodpovedajú vertikálnemu rozšíreniu druhu *Lamelliconus* (*Trocholina*) *procerus*. Zodpovedá kordevolu a julu (pro partem).

b) Podzóna *Lamelliconus* (*?Trocholina*) *procerus* – *Angulodiscus* (*Involutina*) *gaschei praegaschei*. Jej synonymom je zóna *Nodosaria ordinata*, ktorú definovala E. TRIFONOVOVÁ (in P. MICHAILOVA-JOVTCHEVA–E. TRIFONOVA 1965). Spodná hranica je určená vymiznitím druhu *Lamelliconus* (*?Trocholina*) *procerus* (LIEBUS), zatiaľ čo vrchná hranica je definovaná vymiznutím druhu *Angulodiscus* (*Involutina*) *gaschei praegaschei* (KOEHN-ZANINETTI). Zodpovedá čiastočne julu a tuvalu.

Podľa autorov L. ZANINETTI–Z. DAĞER (1978) miliolidné foraminifery karnu v Turecku sú viazané skôr na hlbšiu (hlavne pelagickú fáciu). Okrem druhu *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN boli u nás tiež zistené miliolidné formy. Veľmi dobre sú preukázané hlavne vo fácii čiernych lastúrnatých, slabo bituminóznych karnských vápencov muschelkalku v okolí Bizerty v Tunisku (J. SALAJ–Š. BAJANÍK 1972), kde boli identifikované nasledovné druhy: *Agathamminoides spiroloculiformis* (ORAVECZNÉ-SCHEFFER), *Ophthalmidium tori* ZANINETTI a *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN. Táto asociácia foraminifer je známa predovšetkým z karnu Severných vápencových Álp Rakúska a Talianska (L. ZANINETTI 1976a).

Podzóna *Lamelliconus procerus* (Total-range subzone)

Spodnú i vrchnú hranicu určuje rovnomenný druh opisovanej podzóny – *Lamelliconus procerus* (LIEBUS). V súvislosti so stanovením spodnej hranice podzóny *Lamelliconus procerus*, ako aj objavením prvých zástupcov rodu *Lamelliconus* PILLER 1978 treba poznamenať, že vysoko špirálne vinutí zástupcovia druhu *Lamelliconus procerus* (LIEBUS) a *Lamelliconus multispirus* (OBERHAUSER) v Západných Karpatoch sa objavujú v kordevole, naproti tomu v Bulharsku *Lamelliconus procerus* (LIEBUS), ako aj iné druhy rodu *Lamelliconus* sú preukázané aj v celom longobarde. Poznamenávame, že v jednom prípade sme *Lamelliconus* aff. *ventroplanus* (OBERHAUSER) zistili vo vrchnom ilýre južne od Plaveckého Podhradia v raštúnskych vápencoch chočského príkrovu spolu s druhom *Mentzelia mentzeli* a *Diplopora annulatissima* (materiál M. MAHEĽA, č. výbrusu 817/65) a *Pilammina densa* PANTIĆ. V druhom prípade druh *Lamelliconus* aff. *ventroplanus* (OBERHAUSER) bol zistený vo fasanských svetlých vápencoch wettersteinského typu na hrade Beckov (materiál M. MAHEĽA, č. výbrusu 796/65 – hradný vŕšok). Vystupujú v nadloží tmavých lavicovitých, hľuzovitých a rohovcových „reiflinských" vápencov, z ktorých H. KOZUR–R. MOCK (1974) určili skelety holotúrií so stratigrafickým rozsahom ilýr – fasan. Najvrchnejšia poloha reiflinských vápencov na hrade Beckov je na základe konodontov jednoznačne fasanského veku (H. KOZUR–R. MOCK 1974, str. 130).

Z doterajšieho štúdia vyplýva, že zástupcovia rodu *Lamelliconus* PILLER 1978 sú viazaní na hlbšiu platformovú zónu (t. j. zónu obsahujúcu ešte riasy) i zónu s hemipelagickou až pelagickou sedimentáciou. Táto skutočnosť dlho ovplyvňovala spoznanie pravej stratigrafickej hodnoty zástupcov spomínaného rodu. Na základe našich štúdií môžeme konštatovať, že ich stratigrafický rozsah je jednoznačne väčší, ako sa im doteraz pripisoval, a to aj napriek tomu, že v longobarde Západných Karpát zástupcovia rodu *Lamelliconus* PILLER neboli doteraz preukázaní.

V súvise s problematikou stratigrafie spodného až stredného karnu u nás treba poznamenať, že labyrintné foraminifery opísané z kordevolu juhoslovanského triasu južného Tirolska (R. OBERHAUSER 1963), reprezentované druhom *Pragsoconulus robustus* OBERHAUSER boli zatiaľ v Západných Karpatoch zistené z rovnakého horizontu len v oblasti Malých Karpát (MK-104/A) v profile Krštenica – Polámané.

Spoločenstvá foraminifer opisovanej podzóny sú reprezentované hlavne zástupcami rodu *Lamelliconus* (*Trocholina*) PILLER 1978 a *Duostomina* KRISTAN-TOLLMANN. Viazané sú hlavne na hlbšiu slienitú a flyšovú fáciu (W. PILLER 1978) lunzských vrstiev chočského príkrovu (J. SALAJ–O. JENDREJÁKOVÁ 1967). V Západných Karpatoch predmetná podzóna bola preukázaná z viacerých oblastí, resp. tektonických jednotiek.

Napríklad v spodnom až strednom karne vo fácii lunzských vrstiev chočského príkrovu (Strážovské vrchy, lokalita Šipkov) vo vrchnej časti zóny *Lamelliconus procerus* sa miestami nachádzajú: *Ladinosphaera geometrica* OBERHAUSER a *Agathamminoides spiroloculiformis* ORAVECZNÉ-SCHEFFER (J. SALAJ 1978, pl. 5, fig. 2), *Agathammina austroalpina*

KRISTAN-TOLLMANN et TOLLMANN *Endothyra kuepperi* OBERHAUSER. Podobne zo slienitých vápencov, tvoriacich polohu v lunzských vrstvách, z vrtu Šaštín-10 boli identifikované početné jedince druhu *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN.

V nadloží reiflinských vápencov chočského príkrovu vystupujú „aonské" vrstvy zóny *Trachyceras aonides*. Z týchto vrstiev na lokalite Svarín, ako aj z vrstiev na lokalite Turík (doloženej i druhom *Monophyllites simonyi* HAUER) boli opísané foraminifery (J. SALAJ–A. BIELY–J. BYSTRICKÝ 1967b; J. SALAJ–O. JENDREJÁKOVÁ 1967; J. BYSTRICKÝ et al. 1973), ktoré zodpovedajú našej podzóne *Lamelliconus procerus*. Sú reprezentované druhmi *Lamelliconus multispirus* (OBERHAUSER), *Lamelliconus ventroplanus* (OBERHAUSER), *Lamelliconus procerus* (LIEBUS), *Rhizammina eulimbata* KRISTAN-TOLLMANN, *Nodosaria apheiloculata aglabra* KRISTAN-TOLLMANN, *Endothyra keupperi* OBERHAUSER, *Endothyra austrotriadica* OBERHAUSER, *Spirillina* aff. *filiformis* (REUSS), *Variostoma pralongense* KRISTAN-TOLLMANN a *Duostommina alta* KRISTAN.

Zástupcovia druhu *Lamelliconus procerus* (LIEBUS) sa vyskytujú aj v kordevole Slovenského krasu (napr. na lokalite kameňolomu Gombasek) vo fácii wettersteinských vápencov s *Teutloporella herculea* (STOPPANI) a *Andrusoporella duplicata* (PIA). Z foraminifer sa tu vyskytujú: *Variostoma cochlea* KRISTAN, *Trochammina almtalensis* KOEHN-ZANINETTI, *Pilamminella gemerica* (SALAJ), *Permodiscus pragsoides* OBERHAUSER, *Aulotortus sinuosus* WEYNSCHENK, *Angulodiscus gaschei praegaschei* KOEHN-ZANINETTI, *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI a *Duostommina alta* KRISTAN.

Okrem toho vo wettersteinských vápencoch (kordevol – jul), v ktorých sa vyskytuje len *Andrusoporella duplicata* (PIA), bol zistený i druh *Pilamminella* (*Glomospira*) *kuthani* (SALAJ in SALAJ, BIELY et BYSTRICKÝ 1967).

Z významnejších foraminifer karnu treba ešte spomenúť druhy, ktoré opisuje zo silicika z oblasti Silickej Brezovej M. MIŠÍK–K. BORZA (1976): *Meandrospira* cf. *carnica* ORAVECZNÉ-SCHEFFER, *Austrocolomia marschalli* (OBERHAUSER) a *Ophthalmidium* cf. *triadicum* (KRISTAN). Túto asociáciu môžeme dávať do vzťahu so spoločenstvom, ktoré z karnu Maďarska opísala A. ORAVECZNÉ-SCHEFFER (1968): *Cyclogyra pachygyra* (GUEMBEL), *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, *Agathammina spiroloculiformis* ORAVECZNÉ-SCHEFFER, *Meandrospira karnica* ORAVECZNÉ-SCHEFFER, *Meandrospiranella*(?) *planispira* ORAVECZNÉ-SCHEFFER, *Calcitornella elongata* CUSHMAN et WATERS, *Calcitortonella heathi* CUSHMAN et WATERS, *Calcitortonella baconica* ORAVECZNÉ-SCHEFFER, *Ophthalmidium triadicum* (KRISTAN) a *Ophthalmidium fusiformis* (TRIFONOVA).

Tisovské vápence Muránskej a Silickej planiny (jul – tuval) sú bohaté na spoločenstvá foraminifer s druhmi *Pilamminella kuthani* (SALAJ) a s *Angulodiscus gaschei gaschei* KOEHN-ZANINETTI et BROENNIMANN. Z hľadiska obsahu foraminifer boli detailne študované O. JENDREJÁKOVOU (1970, 1972, 1973). V poslednom čase O. SAMUEL–J. SALAJ–K. BORZA (1981) z nich opísali dva nové druhy: *Bispiranella subcarinata* a *Bispiranella ovata* (*Galeanella? broennimanni* ALTINER et ZANINETTI 1981; cf. L. ZANINETTI–D. ALTINER 1981, str. 42).

Štúdium foraminifer tisovských vápencov má veľký význam z hľadiska korelácie s konodontmi. V tejto súvislosti poznamenávame, že z vápencov so *Styrites* cf. *tropitiformis* MOJS. z okolia Silickej Brezovej určil R. MOCK (1971) bohatú asociáciu konodontov, reprezentovanú hlavne druhmi *Enantiognathus ziegleri* (DIEBEL), *Gondolella navicula* HUCKRIEDE a *Gondolella polygnathiformis* BUDUROV et STEFANOV, na základe čoho ich zaraďujeme do stredného karnu. Neskoršie podľa skeletov holotúrií začleňuje H. KOZUR–R. MOCK (1974) tieto vápence do tuvalu.

Z karnských korytnických vápencov, definovaných a makropaleontologicky spracovaných A. BUJNOVSKÝM–M. KOCHANOVOU–J. PEVNÝM (1975) opisuje A. GAŹDZICKI–H. HODUR–R. MOCK–J. TRAMMER (1978, str. 353–355) v rámci mikroorganizmov i pomerne bohatú asociáciu foraminifer, ktorú dopĺňame o nálezy druhov *Lamelliconus biconvexus* (OBERHAUSER) a *Lamelliconus multispirus* (OBERHAUSER). Mnohé z foraminifer sú však preplavené z raminských vápencov, ktoré miestami boli vynorené a erodované.

Asociácie foraminifer patriace podzóne (resp. zóne) *Lamelliconus procerus*, s hojnými exemplármi druhu *Lamelliconus biconvexus* (OBERHAUSER) sa vyskytuje v Juhoslávii (W. RESCH 1966) i v južnom Tunisku (J. SALAJ 1969c), v germánskej (muschelkalk) i alpínskej fácii. Z foraminifer (porov. H. BISMUTH–J. BONNEFOUS–J.-M. MASSIN–J. SALAJ 1974) tu prevláda hlavne druh *Lamelliconus multispirus* (OBERHAUSER) spolu s *Pilamminella kuthani* (SALAJ).

Zóna *Rakusia oberhauseri* (Interval-range subzone)

Vrchný karn (tuval) bol v Západných Karpatoch charakterizovaný najprv podzónou *Aulotortus broennimanni* (J. SALAJ 1969a), neskoršie zónou *Aulotorsus sinuosus* (J. SALAJ 1978). Používanie týchto synonymných zón narážalo na určité ťažkosti, pretože určujúci druh *Aulotortus sinuosus* WEYNSCHENK sa začína objavovať oveľa skôr, už v priebehu ladinu. Z tohto dôvodu nemôžeme túto zónu používať. Podľa ústneho oznámenia O. JENDREJÁKOVEJ vo vrchnom karne sa objavuje však druh *Rakusia oberhauseri* SALAJ, ktorý J. SALAJ (1969a, 1978) považoval za určujúci druh pre rovnomennú norickú zónu. V jednom prípade sme našli tento druh spolu s *Pilamminella kuthani* (SALAJ). Z uvedených dôvodov preraďujeme túto zónu ako podzónu typu partial-range do vrchného karnu (tuval). Jej spodnú hranicu určuje prvý nález druhu *Rakusia oberhauseri* SALAJ, pričom druh *Pilamminella kuthani* (SALAJ) sa v tejto zóne tiež vyskytuje. Vrchnú hranicu určuje nález druhov *Semiinvoluta clari* KRISTAN a *Triasina oberhauseri* KOEHN-ZANINETTI et BROENNIMANN.

Pre úplnosť poznamenávame, že v poslednom čase E. JABLONSKÝ (1973), K. BORZA–O. SAMUEL (1977a, b, 1981), O. SAMUEL–K. BORZA (1981(, O. SAMUEL–J. SALAJ–K. BORZA (1981) z karnu Západných Karpát opísali zo stratigrafického, taxonomického i fylogenetického hľadiska veľmi pozoruhodnú skupinu *Paratintinnina* BORZA et SAMUEL, *Amphoporella* BORZA et SAMUEL, *Spiriamphorella* BORZA et SAMUEL, *Urnulinella* BORZA et SAMUEL, *Pseudocucurbita* BORZA et SAMUEL, *Paraophthalmidium* SAMUEL et BORZA, *Cucurbita* JABLONSKY, ktorej systematické postavenie je doteraz buď neisté (incertae sedis), alebo rôzne interpretovateľné. Časť z nich nesporne patrí k foraminiferám, kým druhá časť javí určitú afinitu s hubkami (*Fungi*). Bližšie o tejto problematike sa pojednáva v príslušnej systematickej časti anglického textu (str. 155–163). Poznamenávame, že prevažná väčšina taxónov opísaných ako *Paratintinnina* BORZA et SAMUEL, *Pseudocucurbita* BORZA et SAMUEL, *Amphorella* BORZA et SAMUEL (partim), *Urnulinella* BORZA et SAMUEL sa vyskytuje v plytkovodných a pririfových sedimentoch. S najväčšou pravdepodobnosťou patria k sesílnym formám s dobre odolnou schránkou voči rekryštalizácii.

Norik

Členenie norika a rétu je tu chápané v zmysle J. WIEDMANA (1974), J. WIEDMANA–F. FABRICIUSA–L. KRYSTYNA–J. REITNERA–M. ULRICHSA (1979) a E. KRISTAN-TOLLMANNOVEJ–A. TOLLMANNA–A. HAMEDANIHO (1979). To znamená, že lák je chápaný ako spodný norik a alaun ako vrchný norik. Sevat (zóna *Rhabdoceras suessi*), doteraz chápaný ako vrchný norik, považujeme za spodný rét, zatiaľ čo zóna *Choristoceras marshi*, reprezentujúca doteraz rét zodpovedá vrchnému rétu (obr. 12).

Lák a spodný alaun sú vyvinuté vo fácii svetlých masívnych (furmanských) vápencov. Obsahujú viac-menej priebežné druhy foraminifer (J. BYSTRICKÝ et al. 1973, str. 74–75) novoopísanej podčeľade *Permodiscinae*. Dôležitými z nich sú *Rakusia oberhauseri* SALAJ a *Pilamminella* (*Glomospira*) cf. *kuthani* (SALAJ). Okrem toho sa vzácne vyskytujú druhy *Ophthalmidium triadicum* KRISTAN-TOLLMANN, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, *Diplotremmina astrofimbriata* KRISTAN-TOLLMANN a *Diplotremmina* aff. *subangulata* KRISTAN-TOLLMANN. Ich prítomnosť svedčí skôr o hlbšom prostredí, čo potvrdzuje nielen prítomnosť viac-menej tenkostenných zástupcov involútnych foraminifer podčeľade *Permodiscinae*, ale aj R. MOCKOM (1971) preukázané konodonty zastúpené druhmi *Enantiognathus ziegleri* (Diebel), *Gondolella navicula hallstattensis* (MOSHER), *Gondolella navicula* HUCKRIEDE, *Hindeodella* (*Metaprioniodus*) *spengleri* (HUCKRIEDE), *Hindeodella* (*Metaprioniodus*) *suevica* (TATGE), *Neohindeolla dropla* (SPASOV et GANEV), *Ozakordina tortillis* TATGE, *Prionodina excavata* MOSHER, *Prioniodina* (*Cypridodella*) *muelleri* (TATGE) a *Metapolygnathus abneptis* (HUCKRIEDE).

Druh *Gondolella navicula hallstattensis* (MOSHER) svedčí o spodnonorickom veku furmanských vápencov. V prospech tohto názoru hovorí aj prítomnosť amonitov zóny *Cyrtopleurites biscrenatus*, ako aj rias (napr. *Heteroporella carpatica* BYSTRICKÝ), ktoré nám indikujú až spodnoalaunský vek vrchnej časti tisovských vápencov (J. BYSTRICKÝ et al. 1973; V. KOLLÁROVÁ-ANDRUSOVOVÁ–J. BYSTRICKÝ 1974).

Poznamenávame, že ide o typovú oblasť, kde bola stanovená zóna *Rakusia oberhauseri* (J. SALAJ 1969a). Berúc do úvahy poznatok O. JENDREJÁKOVEJ o výskyte tohto druhu už vo vrchnom karne (tuval), definujeme (ako je uvedené v predošlej kapitole) *Rakusia oberhauseri* ako zónu typu partial-range len pre tuval. Naproti tomu *Rakusia oberhauseri* ako zóna typu total-range by mala rozsah vrchný karn (tuval) až spodný rét (sevat p. p.), nakoľko v sevate sa spolu s druhom *Rhaetavicula contorta* (PORTL.) ojedinele vyskytuje aj *Rakusia oberhauseri* SALAJ.

Zóna *Rakusia oberhauseri* Total-range zone)

Pri štúdiu vrchnej časti tisovských a furmanských vápencov v rámci zóny *Rakusia oberhauseri* môžeme sa v bežnej mikrobiostratigrafickej praxi opierať teoreticky o tieto typy foraminiferových spoločenstiev:

a) *Rakusia oberhauseri* SALAJ a *Pilamminella kuthani* (SALAJ) bez *Triasina oberhauseri* KOEHN-ZANINETTI et BROENNIMANN a *Semiinvoluta clari* KRISTAN by určovala len tuval (partial-range zone *Rakusia oberhauseri*).

b) *Rakusia oberhauseri* SALAJ, *Pilamminella* cf. *kuthani* (SALAJ) a *Semiinvoluta clari* KRISTAN by určovala už lák až spodný alaun. V tejto súvislosti treba poznamenať, že spodnonorická forma *Pilamminella* cf. *kuthani* (SALAJ) sa svojimi väčšími rozmermi a väčším počtom závitov odlišuje od formy *Pilamminella kuthani* (SALAJ), vyskytujúcej sa len v karne.

c) Druh *Rakusia oberhauseri* SALAJ s *Triasina oberhauseri* KOEHN-ZANINETTI et BROENNIMANN a *Semiinvoluta clari* KRISTAN bez *Pilamminella* cf. *kuthani* (SALAJ) už v rámci zóny *Angulodiscus pokornyi* a *Angulodiscus friedli* by určoval vrchný alaun až spodný sevat (spodná časť spodného rétu).

Druhy *Triasina oberhauseri* KOEHN-ZANINETTI et BROENNIMANN a *Rakusia oberhauseri* SALAJ sme preukázali zo spodných polôh svetlo- až tmavosivých masívnych lavicovitých furmanských vápencov Stratenskej hornatiny (lokality Geravy – Suchý vrch) s *Halorella amphitona* (BRONN), *Thecosmilia defilippi* (STOPPANI) a i. (J. BYSTRICKÝ et al. 1973). Odtiaľto, ako aj z iných lokalít Stratenskej hornatiny uvádza J. BYSTRICKÝ et kol. (1973, str. 63) tiež bohaté asociácie foraminifer.

Zóna *Semiinvoluta clari* (Interval-range zone)

Táto zóna zodpovedá láku a alaunu, t. j. celému noriku. Charakterizuje predovšetkým lagunárny vývoj hauptdolomitu, ktorý sme študovali hlavne z chočského príkrovu Nízkych Tatier (zárez trate Hyby). Táto zóna (pôvodne definovaná J. SALAJOM 1969) je charakterizovaná nálezom druhu *Semiinvoluta clari* KRISTAN. Vrchnú hranicu definuje objavenie druhov *Angulodiscus pokornyi* SALAJ, *Angulodiscus friedli* KRISTAN-TOLLMANN. Spoločenstvo foraminifer so *Semiinvoluta clari* a *Triasina oberhauseri* spolu s *Angulodiscus friedli* KRISTAN-TOLLMANN a *Angulodiscus pokornyi* SALAJ máme až zo spodnej časti dachsteinských vápencov (lokalita Veľká lúka a Červená Skala) s *Neomegalodus complanatus* (GUEMBEL). V ich spodnej časti v oblasti Muránskej planiny, približne na rozhraní sevatu (spodný rét) a vrchného alaunu, sú vložky vápencov hallstattského typu s *Monotis salinaria* BR. (V. KOLLÁROVÁ-ANDRUSOVOVÁ–J. BYSTRICKÝ 1974). Pod týmto horizontom sú ešte dachsteinské vápence, ktoré sa dávajú do vzťahu s „haloritovým horizontom" vrchného alaunu (V. KOLLÁROVÁ-ANDRUSOVOVÁ–J. BYSTRICKÝ 1974). Vystupuje tu i *Gyroporella vesiculifera* GUEMBEL (K. BORZA 1973, tab. XVII, výbrus 35). Z foraminifer sme tu určili: *Triasina oberhauseri* KOEHN-ZANINETTI, *Angulodiscus friedli* KRISTAN-TOLLMANN a *Angulodiscus pokornyi* SALAJ, charakterizujúce už bazálnu časť zóny *Angulodiscus pokornyi – Angulodiscus friedli*.

Značná časť zóny *Semiinvoluta clari* (bez *Triasina oberhauseri* KOEHN-ZANINETTI) je zastúpená v hauptdolomite, ktorý v záreze železničnej trate bol študovaný J. SALAJOM–A. BIELYM (1966). Najspodnejšie polohy hauptdolomitu patriace tuvalu, ako sa zdá, sú bezfosílne. Vyššie (stĺp č. 70, vz. č. 24a, b, c, d, e) v dolomitoch sú tenké lavice intrabiopelmikritu až intrabiopeloomikritu, v ktorých okrem *Praecalpionellopsis gemeriensis* BORZA a koprolitov *Parafavreina thoconetensis* BROENNIMANN, CARON et ZANINETTI sa vyskytuje mikrofauna zastúpená druhmi: *Frondicularia woodwardi* HOWCHIN, *Trochammina almtalensis* KOEHN-ZANINETTI, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN *Rakusia oberhauseri* SALAJ a *Semiinvoluta clari* KRISTAN. Prítomné sú i bližšie neurčiteľné tenko a hladkostenné ostrakódy.

Vzhľadom na to, že vo vrchnokarnských vápencoch s *Rakusia oberhauseri* SALAJ sa *Semiinvoluta clari* Kristan nevyskytuje, považujeme uvedené spoločenstvo foraminifer za spodnonorické (lák).

Asi o 40 m vyššie (pri strážnej búdke a stĺpe č. 69, vz. č. 25a, b, d, e) v hauptdolomite sú znova intrabiomikrity až intabiopelmikrity a sparity. Z intraklastov je pozoruhodná prítomnosť značne zastúpeného aleuritického klastického kremeňa, na základe čoho usudzujeme na vyznievanie keuperskej fácie do hauptdolomitu. V tomto horizonte sa vzácne vyskytuje *Parafavreina thoronetensis* BROENNIMANN, CARON et ZANINETTI, filamenty z tenkostenných lamelibranchiátov a ostrakódov, ďalej gastropódy, krinoidy, ktoré sú zastúpené vzácne.

Najvrchnejšia časť haupdolomitu (medzi stĺpom č. 67 a 63) má nasledovný vrstevný sled:

Pri stĺpe č. 67 (druhá strážna búdka, vz. č. 26y, b, c, d, e) polohy intrabiopelmikritov až sparitov, ktoré sú v dolomitoch, obsahujú riasy zastúpené druhom *Gyroporella vesiculifera* GUEMBEL, ďalej úlomky krinoidov a z foraminifer vzácne: *Frondicularia woodwardi* HOWCHIN, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN *Angulodiscus gaschei* KOEHN-ZANINETTI a *Auloconus permodiscoides* (OBERHAUSER), ktorý, ako sa zdá objavuje sa po prvýkrát až v tomto horizonte. Túto polohu dávame do vzťahu so spodným alaunom (*Cyrtopl. biscrenatus* Zone) s *Heteroporella* div. sp. (V. KOLLÁROVÁ-ANDRUSOVOVÁ–J. BYSTRICKÝ 1974).

V hauptdolomite (pri stĺpe č. 65) sa vyskytujú megalodontové brekcie. V tejto časti súvrstvia nebola zistená žiadna mikrofauna.

V najvrchnejších polohách hauptdolomitu (stĺp č. 63) v bezprostrednom podloží dachsteinských vápencov (č. výbrusu 63–28–2a₁, a₂; 28–2a; 28–2; 63b; 63) v intrabiopelmikritoch sa vzácne z rias vyskytujú *Thaumatoporella parvovesiculifera* (RAIN), *Gyroporella vesiculifera* GUEMBEL. Z foraminifer sú prítomné: *Frondicularia woodwardi* HOWCHIN, *problematicum F* BORZA, *Trochammina almtalensis* KOEHN-ZANINETTI, *Angulodiscus* cf. *gaschei* KOEHN-ZANINETTI et BROENNIMANN. Sporadicky sa tiež vyskytujú tenko- a hladkostenné ostrakódy.

Keďže sa *Triasina oberhauseri* KOEHN-ZANINETTI nevyskytuje spolu so *Semiinvoluta clari* KRISTAN hneď, ale až neskôr, upúšťame od zóny *Semiinvoluta clari – Triasina oberhauseri* definovanej J. SALAJOM (1978) a pridržiavame sa, ako je vyššie uvedené, prv J. SALAJOM (1969a) definovanej zóny *Semiinvoluta clari* ako zóny typu partial-range.

Najvrchnejší norik (vrchný alaun p. p.) až spodný rét (sevat p. p.) je definovaný zónou *Angulodiscus pokornyi – Angulodiscus friedli*, v ktorej od jej bázy vystupuje aj *Triasina oberhauseri* KOEHN-ZANINETTI.

Norik Západných Karpát, ako aj celej tetýdnej oblasti sa vyznačuje explozívnym vývojom jednotlivých rodov podčeľade *Permodiscinae* nov. sub. (resp. čeľade *Involutinidae* BUETSCHLI 1880). Bohaté asociácie uvedeného typu boli opísané z rôznych oblastí tetýdy (porov. L. ZANINETTI 1976a). Z nodosáriových pre stratigrafiu významnejších foraminifer, sa v noriku objavuje *Austrocolomia canaliculata* (KRISTAN) (R. OBERHAUSER 1967).

V noriku hallstattských vápencov Slovenského krasu nodosáriové foraminifery sa vyskytujú len ojedinele. Pomerne bohatú asociáciu foraminifer z hallstattských vápencov opisuje M. MIŠÍK-K. BORZA (1976): *Tolypammina gregaria* WENDT, *Planiinvoluta carinata* LEISCHNER, *Planiinvoluta deflexa* LEISCHNER, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, *Austrocolomia marschalli* OBERHAUSER a *Neoendothyra* cf. *reicheli* REITLINGER. Z ostatných mikrofácií je to *Cadosina* cf. *fusca* WANNER a *Praecalpionellopsis gemeriensis* BORZA.

Fácia hallstattských vápencov je však podrobne preskúmaná a stratigraficky rozčlenená na základe konodontov (H. KOZUR–R. MOCK 1971, 1972) i skeletov holotúrií (H. KOZUR–R. MOCK 1974). Z lokalít, z ktorých sú opísané konodonty zóny *M. spatulatus* a skelety holotúrií, nemáme doteraz zistené foraminifery. Jedine A. GAŹDZICKI–H. KOZUR–R. MOCK (1979) z nich uvádzajú druhy: *Glomospira* sp., *Glomospirella* ? sp., *Tolypammina* sp., *Trochammina alpina* KRISTAN-TOLLMANN, *Agathammina austroalpina* KRISTAN-TOLLMANN et TOLLMANN, „*Vidalina*" sp., *Nodosaria ordinata* TRIFONOVA a *Nodosaria* sp.

Z rotáliových foraminifer sú pre norik dôležité druhy: *Variostoma crassum* KRISTAN-TOLLMANN a *Variostoma catilliforme* KRISTAN-TOLLMANN, ktoré z Východných Álp (Pötschentsal beds) opísala KRISTAN-TOLLMANNOVÁ (1960).

Veľmi zaujímavú a od iných oblastí odlišnú norickú mikrofaunu opisuje E. TRIFONOVOVÁ (1962) z oblasti Starej Planiny: *Reophax tzankovi* TRIFONOVA, *Involutina rara* TRIFONOVA, *Tolypammina discoidea* TRIFONOVA, *Verneuilinoides mauretii* (TERQUEM), *Gaudryina triassica* TRIFONOVA, *Spirophthalmidium lucidum* TRIFONOVA, *Trochammina ? angulata* TRIFONOVA, *Trochammina balcanica* TRIFONOVA, *Trochammina ? helicta* TAPPAN, *Spirillina gurgitata* TAPPAN.

Rét

Z prvých pre mikrobiostratigrafiu rétu dôležitých prác treba spomenúť predovšetkým prácu E. KRISTAN-TOLLMANNOVEJ (1964a, c), v ktorej autorka opisuje spodnorétsku asociáciu foraminifer s druhom *Angulodiscus* (*Glomospirella*) *friedli* KRISTAN a z vrchného rétu spoločenstvo foraminifer s *Triasina hantkeni* MAJZON. Za unikátnu asociáciu treba považovať voľné foraminifery zo zlambašských slieňov (1964c). Prvá zo spomínaných prác bola podkladom pre zonálne členenie rétu v Západných Karpatoch, kde J. SALAJ (1969a) vyčlenil a neskoršie modifikoval l. c. (1978) dve zóny.

Zóna *Angulodiscus pokornyi* – *Angulodiscus friedli* (Interval-range zone)

Vznikla zlúčením dvoch zón opísaných J. SALAJOM (1969a), a to vrchnonorickej zóny *Angulodiscus pokornyi* a spodnorétskej zóny „*Glomospirella*" *friedli*. Túto zónu spomína aj A. GAŹDZICKI (1974), avšak v inom stratigrafickom zmysle, ako ju chápal v roku 1978 J. SALAJ (najvrchnejší norik – spodný rét). Ako zóna typu total-range zone *Angulodiscus pokornyi* – *Angulodiscus friedli* zodpovedá najvrchnejšiemu alaunu a celému rétu. Ako sme to už vyššie spomínali, objavuje sa v nej aj druh *Triasina oberhauseri* KOEHN-ZANINETTI.

Spoločenstvo foraminifer tejto zóny sa vyskytuje vo furmanských (sevat) vápencoch lokality Bleskový prameň, ktorá je známa aj bohatým obsahom makrofauny i mikrofauny (O. JENDREJÁKOVÁ 1970; J. BYSTRICKÝ et al. 1973; J. BYSTRICKÝ 1975; A. GAŹDZICKI–H. KOZUR–R. MOCK 1979). Podstatná časť tohto súvrstvia patrí zrejme zóne *Angulodiscus pokornyi* – *Angulodiscus friedli*. Pri zonálnom začlenení tejto lokality narážame však na určité ťažkosti, vyplývajúce z hlbšieho typu fácie. V dôsledku tejto skutočnosti tu doteraz neboli zistené významné druhy opisovanej zóny *Angulodiscus friedli* KRISTAN a *Angulodiscus pokornyi* SALAJ, ktoré sú charakteristické skôr pre lagunárne prostredie. Okrem foraminifer uvádzaných J. BYSTRICKÝM et al. (1973, str. 55) a O. JENDREJÁKOVOU (1970) z významnejších druhov miliolidných foraminifer je tu zastúpený druh *Quinqueloculina nucleiformis* KRISTAN-TOLLMANN. V najvrchnejších polohách tohto súvrstvia (tmavosivé organodetritické vápence) patriacich zóne *Rhabdoceras suessi* sa po prvýkrát vyskytuje *Triasina hantkeni* MAJZON.

V gemeriku je vrchný alaun (haloritový horizont p. p.) a spodný rét (sevat) vo fácii dachsteinských vápencov reprezentovaných biomikritmi a biosparitmi, prípadne oosparitmi charakterizovanými foraminiferami zóny *Angulodiscus pokornyi* – *Angulodiscus friedli* (lokalita Veľká lúka, Červená Skala – Muránska planina).

Túto zónu sme preukázali aj v chočskom príkrove Nízkych Tatier na lokalite Hyby (zárez železničnej trate). Zastúpenie foraminifer tejto zóny podrobnejšie uvádzame v obr. 11 (str. 40).

Zóna *Triasina hantkeni* (Total-range zone)

V zmysle J. SALAJA (1978) zodpovedá najvrchnejšej časti spodného rétu až vrchného rétu. Jej spodná i vrchná hranica sú definované vertikálnym rozšírením druhov *Triasina hantkeni* MAJZON. V zmysle poznatkov A. GAŹDZICKÉHO (1974, 1978a, b) táto zóna nezasahuje do najvrchnejších polôh rétu. Domnievame sa, že v tatriku a fatriku (D. ANDRUSOV–O. FUSÁN–J. BYSTRICKÝ 1973) to môže byť spôsobené zmenou ekologických podmienok indikujúcich detritickú sedimentáciu viazanú na spodný lias. Pokiaľ ide o hranicu prvého výskytu druhu *Triasina hantkeni* MAJZON, J. SALAJ 1978 sa priklonil k názoru, že ju treba umiestniť do vrchnej časti spodného rétu. V tomto smere sú cenné výsledky A. GAŹDZICKÉHO (1978c), ktorý v chočskom príkrove Vysokých Tatier zistil v podloží zóny s *Triasina hantkeni* spodnorétskych konodontov patriacich druhu *Misikella posthernsteini* KOZUR et MOCK. Ak by tento druh skutočne vystupoval iba v spodnej časti amonitovej zóny *Choristoceras marshi*, nebolo by o spodnej hranici zóny *Triasina hantkeni* v pôvodnom chápaní pochýb. *Triasina hantkeni* MAJZON sa však podľa výskumov J. BYSTRICKÉHO (1975) vyskytuje i vo vrchnosevatskej konodontovej zóne *Misikella hernsteini* a taktiež aj v sevatskej amonitovej zóne *Choristoceras marshi.*

Z hľadiska korelácie s konodontovými zónami je dôležitým poznatkom nález druhu *Triasina hantkeni* MAJZON v kössenských vrstvách v Hybe (J. BYSTRICKÝ 1975, str. 188), vystupujúcich v nadloží dachsteinských vápencov. Z týchto vrstiev bola opísaná bohatá foraminiferová a ostrakódová fauna (J. SALAJ–O. JENDREJÁKOVÁ 1967: J. BYSTRICKÝ 1975), ako aj (súvrstvie č. 10 – rytmicky sa striedajúce sliene a lavicovité organodetritické vápence; J. BYSTRICKÝ 1975, str. 188) konodont *Misikella* (= *Spathognathodus*) *hernsteini* (MOSTLER); (cf. J. MICHALÍK 1973, str. 201, 211) a *Rhaetites* cf. *reticus* (CLARK), ktorý je považovaný za charakteristický druh zóny *Rhabdoceras suessi* (J. BYSTRICKÝ 1975, str. 191) zodpovedajúcej sevatu.

Podľa názoru A. GAŹDZICKÉHO–H. KOZURA–R. MOCKA (1979) uvedené súvrstvie zodpovedá stratigrafickej úrovni druhu *Misikella posthernsteini* KOZUR et MOCK, t. j. spodnej časti zóny *Choristoceras marshi.* Podľa doterajších výskumov (porov. A. GAŹDZICKI–J. MICHALÍK–E. PLANDEROVÁ–M. SÝKORA 1979) druh *Triasina hantkeni* MAJZON vo fatriku sa po prvýkrát objavuje v réte (v nadloží karpatského keuperu).

Nemenej dôležitý je aj poznatok J. BYSTRICKÉHO–O. JENDREJÁKOVEJ (1977), podľa ktorých *Triasina hantkeni* MAJZON v siliciku sa vyskytuje v súvrství s *Rhadoceras suessi* (lokalita Bleskový prameň). Ak berieme do úvahy výsledky E. VÉGH-NEUBRANDTOVEJ (1972) o výskyte druhu *Triasina hantkeni* MAJZON v dachsteinských vápencoch Maďarska s *Rhabdoceras suessi* resp. z rozhrania zón *Rhabdoceras suessi – Choristoceras marshi,* niet pochybností, že vekový rozsah zóny *Triasina hantkeni* je najvrchnejšia časť zóny *Rhabdoceras suessi* a celá zóna *Choristoceras marshi.* Z tohto poznatku možno odvodiť, že zóna *Triasina hantkeni* je vekove viac-menej ekvivalentná strednej a vrchnej časti zóny *Angulodiscus pokornyi – Angulodiscus friedli.*

Mimoriadne cenným prínosom pre mikrobiostratigrafiu rétu s *Triasina hantkeni* MAJZON je opísanie horizontu s „drobnými" zástupcami rodu *Glomospira* RZEHAK 1885 a rodu *Glomospirella* PLUMMER 1954, z ktorého J. MICHALÍK–O. JENDREJÁKOVÁ–K. BORZA (1979) opísali nové nasledujúce druhy: *Glomospira inconstans, Glomospira inflata, Glomospirella fatrica, Glomospirella minima* a *Glomospirella paucispira.* Okrem novoopísaných druhov sú tu ešte prítomné: *Glomospira sinensis* HO, *Glomospirella shengi* HO a *Glomospirella facilis* HO. Spoločenstvo so stratigraficky významnými druhmi *Angulodiscus* (*Glomospirella*) *friedli* (KRISTAN-TOLLMANN), a *Permodiscus tumidus* (KRISTAN-TOLLMANN) sa vyskytuje v nadloží i podloží tohto osobitného horizontu. Podľa názoru uvedených autorov explozívny vývoj drobnej glomospírovo-glomospirelovej asociácie bol podmienený miestnymi krátkodobými priaznivými podmienkami.

Ak berieme do úvahy, že druhy *Permodiscus tumidus* (KRISTAN-TOLLMANN) a *Angulodiscus* (*Glomospirella*) *friedli* (KRISTAN-TOLLMANN), sa v tomto horizonte vyskytujú len ojedinele, prikloníme sa k názoru, že horizont s drobnými glomospírami a glomospirelami zodpovedá hypersalinnému prostrediu. V prospech tohto názoru hovorí aj skutočnosť, že tu chýbajú foraminifery podčeľade *Permodiscinae,* ako aj iné skupiny foraminifer, ktoré by nám indikovali prostredie s normálnou salinitou (J. SALAJ 1979).

Z uvedeného vidieť, že obe zóny (ako zóny typu total-range) a to tak *Angulodiscus pokornyi – Angulodiscus friedli,* ako aj *Triasina hantkeni* sa do značnej miery prekrývajú. Zodpovedajú rôznym paleoekologickým podmienkam, pričom lokálne pri morských inklúziách do lagunárneho prostredia (zóna *Angulodiscus pokornyi – Angulodiscus friedli*) prenikli foraminifery, ktoré charakterizujú prostredie s viac-menej normálnou salinitou (zóna *Triasina hantkeni*).

I keď obe zóny (zóna *Angulodiscus pokornyi – Angulodiscus friedli* a zóna *Triasina* *hantkeni*) sú väčšieho stratigrafického rozsahu a do značnej miery sa prekrývajú, predsa na základe doterajších poznatkov môžeme najvrchnejší norik (vrchný alaun) a rét mikrobiostratigraficky rozčleniť na základe nižšie uvedených asociácií foraminifer. Pre vrchný alaun – spodný rét je to asociácia foraminifer s *Triasina oberhauseri* KOEHN-ZANINETTI et BROENNIMANN (ktorá do vrchného rétu neprechádza), *Pilamminella falsofriedli* n. sp., *Angulodiscus friedli* (KRISTAN), *Semiinvoluta clari* KRISTAN, *Auloconus permodiscoides* (OBERHAUSER) a *Austrocolomia canaliculata* (KRISTAN).

Ďalej k tejto asociácii v priebehu najvrchnejšieho sevatu (spodný rét) pristupuje *Triasina hantkeni* MAJZON a *Pilamminella begani* (SALAJ). Synonymom druhu *Pilamminella begani* (SALAJ) je *Glomospirella hoi* KRISTAN-TOLLMANN a *Glomospirella amplificata* KRISTAN-TOLLMANN, ktoré sa podľa E. KRISTAN-TOLLMANNOVEJ (1970) vyskytujú v réte. Vo vrchnom réte (zóna *Choristoceras marshi*) sa objavuje *Trochonella crassa* KRISTAN, *Coronipora austriaca* KRISTAN, *Austrocolomia rhaetica* OBERHAUSER a *Galeanella tollmanni* (KRISTAN).

V priebehu rétu s *Triasina hantkeni* MAJZON sa objavujú prvé involutíny, reprezentované hlavne druhom *Involutina turgida* KRISTAN a najviac zastúpené v spodnoliasovej zóne *Involutina liassica* a *Ophthalmidium leischneri* (obr. 11).

Pokiaľ ide o zóny *Angulodiscus pokornyi* – *Angulodiscus friedli* a zónu *Triasina hantkeni* (resp. ďalšie doteraz uvádzané zóny), môžeme konštatovať, že každá z nich charakterizuje iné sedimentačné prostredie s rozdielnym typom fácií:

a) *Triasina hantkemi* MAJZON ako uvádza R. OBERHAUSER–B. PLÖCHINGER (1968) sa vyskytuje v tzv. archaediscidnej vápencovej fácii spolu s *Permodiscus, Trocholina* a *Archaediscus*. Táto fácia popri vysokom obsahu foraminifer je tvorená arenitovou a ruditovou zložkou, kde základná hmota je tvorená sparitickým kalcitom. J. HOHENEGGER–W. PILLER (1975a) uvádzajú, že v rámci sedimentačnej zóny dachsteinských vápencov ide o riasovo-foraminiferovo-detritickú vápencovú fáciu, kde sa vyskytujú hojné megalodonty a dasykladacey (W. PILLER 1976). Sedimentácia sa uskutočnila v hĺbkach do 20 m v bazénoch s mierne zvýšenou salinitou a to hlavne z vnútornej strany (back-reef) rifového komplexu (J. HOHENEGGER 1974b). V tejto súvislosti treba poznamenať, že v prípade výskytu druhu *Triasina hantkeni* MAJZON v intrabiosparitoch s úlomkami krinoidov na lokalite Bleskový prameň ide o sedimentáciu v prepolí predrifovej zóny s turbiditmi, čiastočne pod vplyvom pelagickej sedimentácie, čo potvrdzujú aj nálezy ojedinelých amonitov druhu *Rhabdoceras suessi* HAUER.

Schránky foraminifer žijúcich v tejto zóna majú pomerne hrubú až veľmi hrubú schránku v dôsledku veľmi plytkého pririfového prostredia, ktoré sa vyznačuje zvýšenou dynamikou.

b) Asociácia foraminifer s prevahou druhu *Pilamminella falsofriedli* n. sp. a s premenlivým zastúpením druhu *Angulodiscus pokornyi* SALAJ sa vyskytuje hlavne v biomikritoch, je viazaná na bahnité prostredie v centrálnej časti rifovej planiny (M. SARNTHEIN 1967; W. PILLER 1976). Schránky foraminifer žijúcich v tomto prostredí sú tenkostenné a krehké, čo svedčí o pokojnom sedimentačnom prostredí v lagúnach so zvýšenou salinitou.

Okrem týchto základných typov fácií J. HOHENEGGER–W. PILLER (1975a) vo vnútornom rifovom sedimentačnom priestore vrchnotriasových dachsteinských vápencov stanovili ešte 4 ďalšie typy:

– Oolitová fácia svedčiaca o silnej vodnej turbulencii a normálnej morskej salinite. Z foraminifer prevládajú zástupcovia normálnej morskej salinite. Z foraminifer prevládajú zástupcovia rodu *Tetrataxis* a *Duostomina*. *Pilamminella* (*Glomospirella*) potvrdzuje alochtónnu pozíciu ooidov. Poznamenávame, že primárne sa v tejto fácii vyskytujú zástupcovia podčeľade *Permodiscinae*.

– Oolitická fácia s transportovanými a preplavenými ooidmi. Heterogénne zloženie foraminifer umožňuje dať túto fáciu do úzkeho vzťahu s oolitovou, grapestónovou a peleto-bahnitou fáciou.

– Grapestónová fácia. Príčinou formovania tejto fácie sú subtidálne riasové telieska a silná vodná turbulencia. Mierne zvýšená salinita umožňuje optimálne podmienky pre rozvoj miliolidných foraminifer (*Miliolipora*, *Quinqueloculina*).

– Peleto-bahnitá fácia. Alochtónny materiál je reprezentovaný peletmi, bahnitými zhlukmi a foraminiferami. Mikritický tmel je často vystriedaný mikrosparitom. Pelety a mikritický tmel svedčia o malých vodných pohyboch a vysokej salinite. Sú tu silne prispôsobivé foraminifery, reprezentované hlavne rodmi *Trochammina*, *Agathammina*, *Palaeospiroplectammina* a *Frondicularia*.

V uvedených fáciách zástupcovia novej podčeľade *Permodiscinae* väčšinou chýbajú. Tam, kde sa vyskytujú, majú tenkostennú schránku a menšie rozmery.

Vzájomný vzťah sevatu a rétu, ako aj vertikálne rozšírenie foraminifer a zonálne členenie norika a rétu je vyjadrené na obr. 11.

Okrem toho v schematickej tabuľke pre trias je uvedené aj rozšírenie určujúcich druhov vo vzťahu k fáciám (obr. 12).

List of fossils

PHOTOGRAPHS
I–CLVII

PLATE I

Fig. 1 *Ammodiscus multivolutus* REITLINGER, 1949
Silická Brezová, sample no. 25, greyish-pink spotted limestones, Carnian, t section no. Bo. 4770.

Fig. 2 *Ammodiscus parapriscus* HO, 1959
Strážovské vrchy Mts., Hireška, sample no 119/23 Fatra Formation, Rhaetia thin section no. Mi. 119/23.

Fig. 3—7 *Glomospira inconstans* MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979
Strážovské vrchy Mts., Hireška, sample no. 119/23 Fatra Formation, Rhaetia thin section no. Mi. 119/23.

Fig. 8—10 *Glomospira inflata* MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979
Veľká Fatra Mts., Hireška, sample no. 119/23. Fatra Formation Rhaetian, thin section no. Mi. 119/23.

Fig. 11—13 *Glomospira regularis* LIPINA, 1949
Veľká Fatra Mts., Ráztoky, sample no. 241/33, Fatra Formation, Rhaetian, thin section no. Mi. 241/33.

Fig. 14 *Glomospira sygmoidalis* (RAUSER — CHERNOUSOVA, 1948)
Slovak karst (Silická Brezová), sample no. 26, greyish-pink spotted limestones, Carnian, thin section no. Bo. 4762.

Fig. 15 *Glomospirella ammodiscoides* (RAUSER — CHERNOUSOVA, 1938)
W from Tisovec, elevation point 878,0, sample no. 25, Furmanec limestone, Norian, thin section no. Bo. 6424.

Magnification: x 115.

Fig. 3—10 reillustrated from publication of J. MICHALÍK — O. JENDREJÁKOVÁ — K. BORZA (1979).

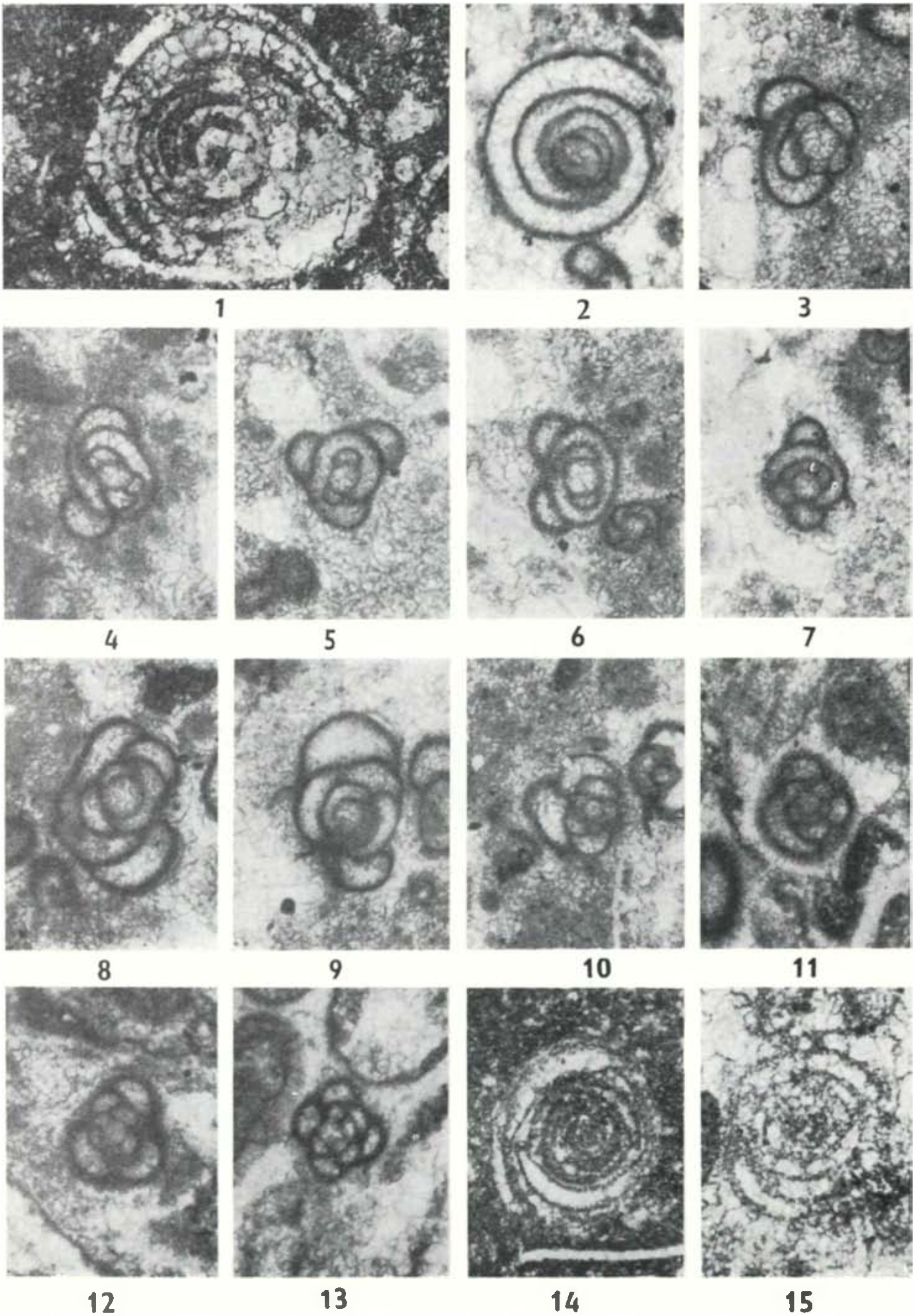
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PLATE II

Fig. 1—8 *Glomospira sinensis* HO, 1959
Veľká Fatra Mts., Ráztoky, sample no. 241/33, Fatra Formation, Rhaetian, t section no. Mi. 241/33.

Fig. 9—16 *Glomospirella facilis* HO, 1959
Strážovské vrchy Mts., Híreška, sample no. 119/23, Fatra Formation, Rhaeti thin section no. Mi. 119/23.

Magnification: x 115.
Fi. 1—16 reillustrated from publication of J. MICHALÍK — O. JENDREJÁKOVÁ K. BORZA (1979).

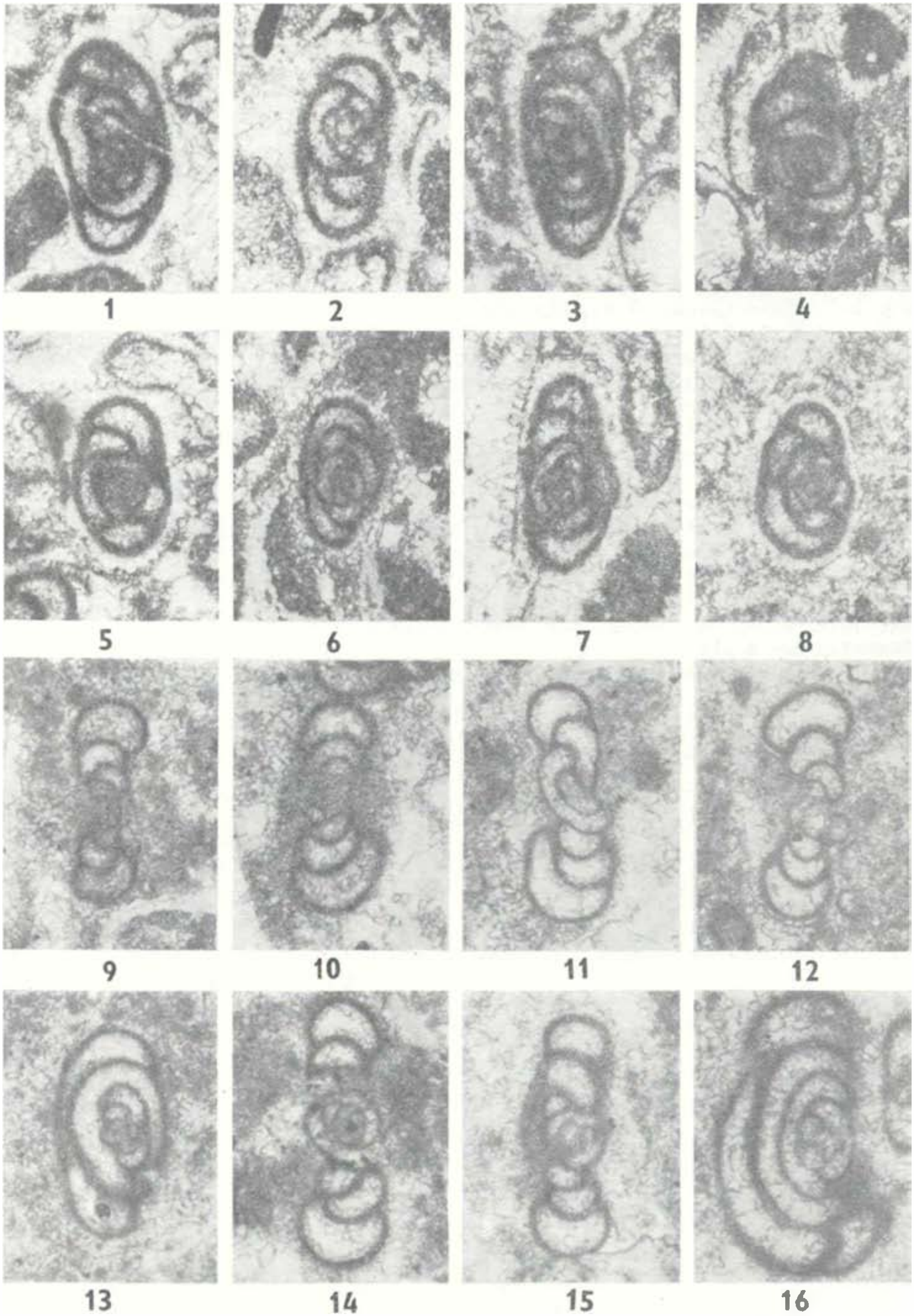
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PLATE III

Fig. 1—13 *Glomospirella shengi* HO, 1959

Fig. 1—2 Veľká Fatra Mts., Ráztoky, sample no. 241/34 Fatra Form n Rhaetian, thin section no. Mi. 241/34.

Fig. 11 Veľká Fatra Mts., Ráztoky, sample no. 241/33, Fatra Forma Rhaetian, thin section no. Mi. 241/33.

Fig. 3—10, 12—13 Strážovské vrchy Mts., Híreška, sample no. 119/23, F Formation, thin section no. Mi. 119/23.

Fig. 14—16 *Glomospirella shengi* HO, 1959

Fig. 14, 16 Strážovské vrchy Mts., Híreška, sample no. 119/23, Fatra Formati Rhaetian, thin section no. Mi. 119/23.

Fig. 15 Veľká Fatra Mts., Ráztoky, sample no. 241/34, Fatra Formation, Rhaeti thin section no. Mi. 241/34.

Magnification: x 115.

Fig. 1—16 reillustrated from publication of J. MICHALÍK — O. JENDREJÁKOVÁ — K. BORZA (1979).

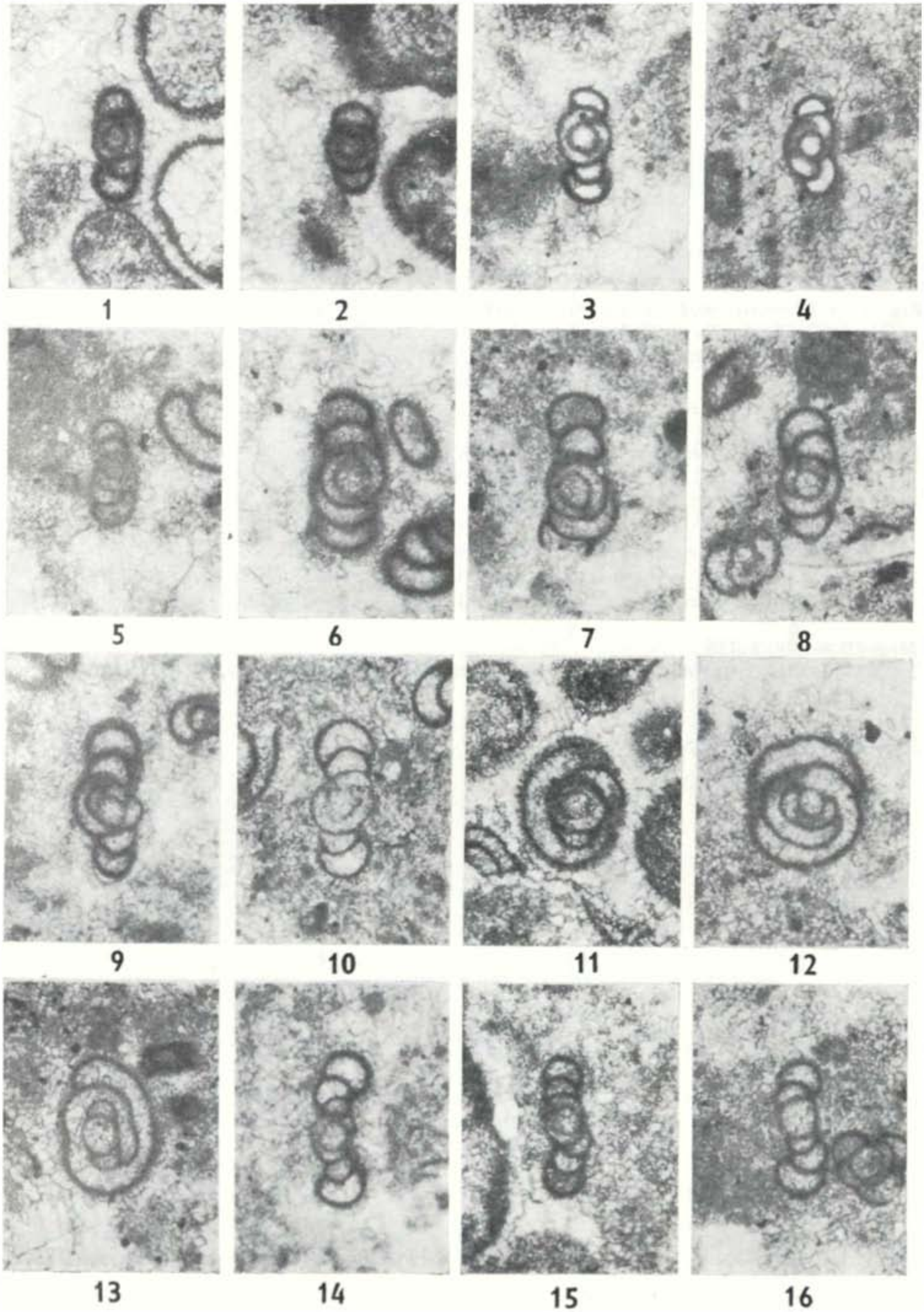
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PLATE IV

Fig. 1—8 *Glomospirella fatrica* MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979
Fig. 1—5, 7—8. Strážovské vrchy Mts., Híreška, sample no. 119/23, Fatra Formation, Rhaetian, thin section no. Mi. 119/23.
Fig. 6, Veľká Fatra Mts., Ráztoky, sample no. 241/33, Fatra Formation, Rhaetian, thin section no. Mi. 241/33.

Fig. 9—16 *Glomospirella minima* MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979
Fig. 9—11, 13. Strážovské vrchy Mts., Híreška, sample no. 119/23 Fatra Formation, Rhaetian, thin section no. Mi. 119/23.
Fig. 12, 14. Veľká Fatra Mts., Ráztoky, sample no. 241/34, Fatra Formation, Rhaetian, thin section no. Mi. 241/34.
Fig. 13, 16. Veľká Fatra Mts., Ráztoky, sample no. 241/33, Fatra Formation, Rhaetian, thin section no. Mi. 241/33.

Magnification: x 115.
Fig. 1—16 reillustrated from publication of J. MICHALÍK — O. JENDREJÁKOVÁ — K. BORZA (1979).

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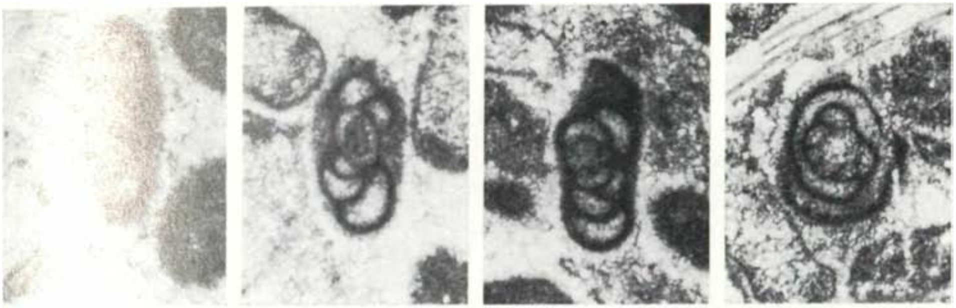
PLATE V

Fig. 1—3 *Glomospirella minima* MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979
Fig. 1—2. Veľká Fatra Mts., Ráztoky, sample no. 241/34, Fatra Forn n, Rhaetian, thin section no. Mi. 241/34.
Fig. 3. Veľká Fatra Mts., Ráztoky, sample no. 241/33, Fatra Formation Rh a, thin section no. Mi. 241/33.

Fig. 4—9 *Glomospirella paucispira* MICHALÍK, JENDREJÁKOVÁ et BORZA, 1979
Fig. 4—5. Veľká Fatra Mts., Ráztoky, sample no. 241/33, Fatra Forma Rhaetian, thin section no. Mi. 241/33.
Frig. 6, 8. Veľká Fatra Mts., Ráztoky, sample no. 241/34, Fatra Format Rhaetian, thin section no. Mi. 241/34.
Fig. 7, 9. Strážovské vrchy Mts., Híreška, sample no. 119/23, Fatra Format Rhaetian, thin section no. Mi. 119/23.

Fig. 10—16 *Glomospirella shengi* HO, 1959
Fig. 10, 12—13, 15—16. Strážovské vrchy Mts., Híreška, sample no. 119 2 Fatra Formation, Rhaetian, thin section no. Mi. 119/23.
Fig. 11. Veľká Fatra Mts., Ráztoky, sample no. 241/33, Fatra Formatic Rhaetian, thin section no. Mi. 241/33.
Fig. 14. Veľká Fatra Mts., Ráztoky, sample no. 241/34, Fatra Formatior thin section no. Mi. 241/34.

Magnification: x 115.
Fig. 1—2, 4—9 reillustrated from publication of J. MICHALÍK — O. JENDREJÁKOVÁ — K. BORZA (1979).



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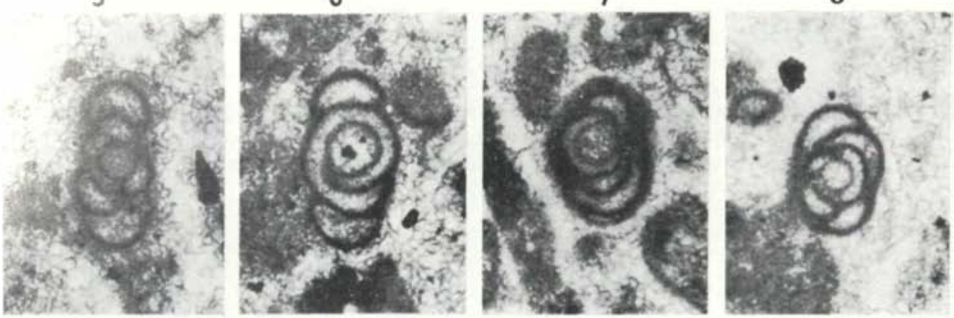

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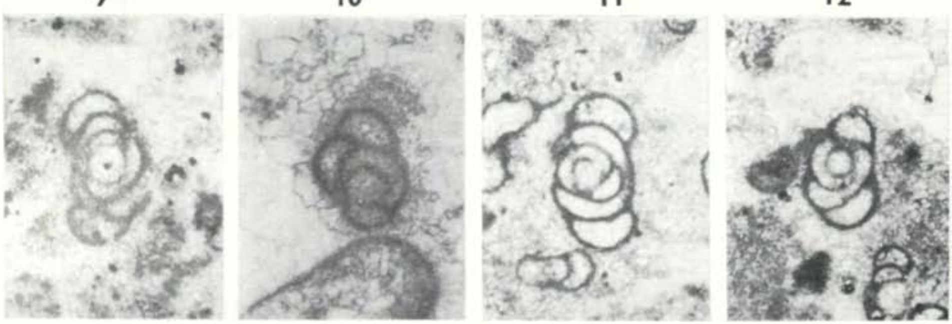

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PLATE VI

Fig. 1—2 *Ammodiscus multivolutus* REITLINGER, 1949
Fig. 1. Strážovská hornatina Mts., Homôlka, Reifling limestone, Anisian, section no. Bo. 6746.
Fig. 2. Silická Brezová, Tisovec limestone, Carnian, thin section no. Bo. 6

Fig. 3—8 *Ammodiscus parapriscus* HO, 1959
Fig. 3, 5—8. Hybe, Hybe Formation, Upper Rhaetian, fig. 3 — thin section Bo. 6583, fig. 5, 7 — thin section no. Bo. 6621, fig. 6 — thin section no. 65 fig. 8 — thin section no. 6584.
Fig. 4. Silická planina plateau, Zakázané, Steinalm limestone, Anisian, th section no. Bo. 6870.

Fig. 9—12 *Ammodiscus* aff. *parapriscus* HO, 1959
Fig. 9, 11. Hybe, Hybe Formation, Upper Rhaetian, fig. 9 — thin section n Bo. 6593, fig. 11 — thin section no. Bo. 6621.
Fig. 10. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5263.

Fig. 13—16 *Glomospirella* cf. *triphonensis* BAUD, ZANINETTI et BROENNIMANN, 197
Hybe, Hybe Formation — Upper Rhaetian, fig. 13 — thin section no. Bo. 6579, fig. 14 — thin section no. Bo. 6595, fig. 15 — thin section no. 6642, fig 16 — thin section no. 6583.

Magnification: x 115.


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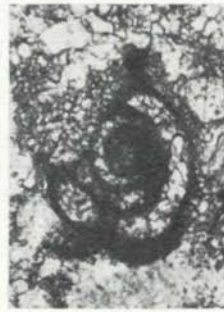
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PLATE VII

Fig. 1—2 *Turrispirillina prealpina* ZANINETTI et BROENNIMANN in ZANINETTI BROENNIMANN et BAUD, 1972
Fig. 1. Silická Brezová, Wetterstein limestone, Ladinian, thin section no. 4724.
Fig. 2 Silická Brezová, Tisovec limestone, Carnian, thin section no. Bo. 4727.

Fig. 3—4 *Earlandia tintinniformis* (MIŠÍK, 1971)
Fig. 3. W of Tisovec, NE of the elevation point Rangaska, Furmanec limeston Norian, thin section no. Bo. 5639.
Fig. 4. Muránska planina plateau, roda-cut to Veľká lúka, Dachstein limeston Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5733.

Fig. 5 *Ophthalmidium tori* ZANINETTI et BROENNIMANN, 1969
Silická planina plateau, Plešivec, sample no. 491/58, Wetterstein limestone Cordevolian, thin section no. By. 1649.

Fig. 6—11 *Agathammina austroalpina* KRISTAN—TOLLMANN et TOLLMANN, 1964
Fig. 6, 8, 10. Malé Karpaty Mts., Plavecký Peter, quarry, Dachstein limestone. Upermost Norian to Lower Rhaetian, thin section no. By. 4649.
Fig. 7. W of Tisovec, Teplica, Furmanec limestone, Norian, thin section no. Bo. 3—361/14.
Fig. 9. Malé Karpaty Mts., Plavecký Peter, quarry, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. By. 4623.
Fig. 10. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uperrmost Norian to Lower Rhaetian, thin section no. Bo. 5162.

Magnification: x 115.

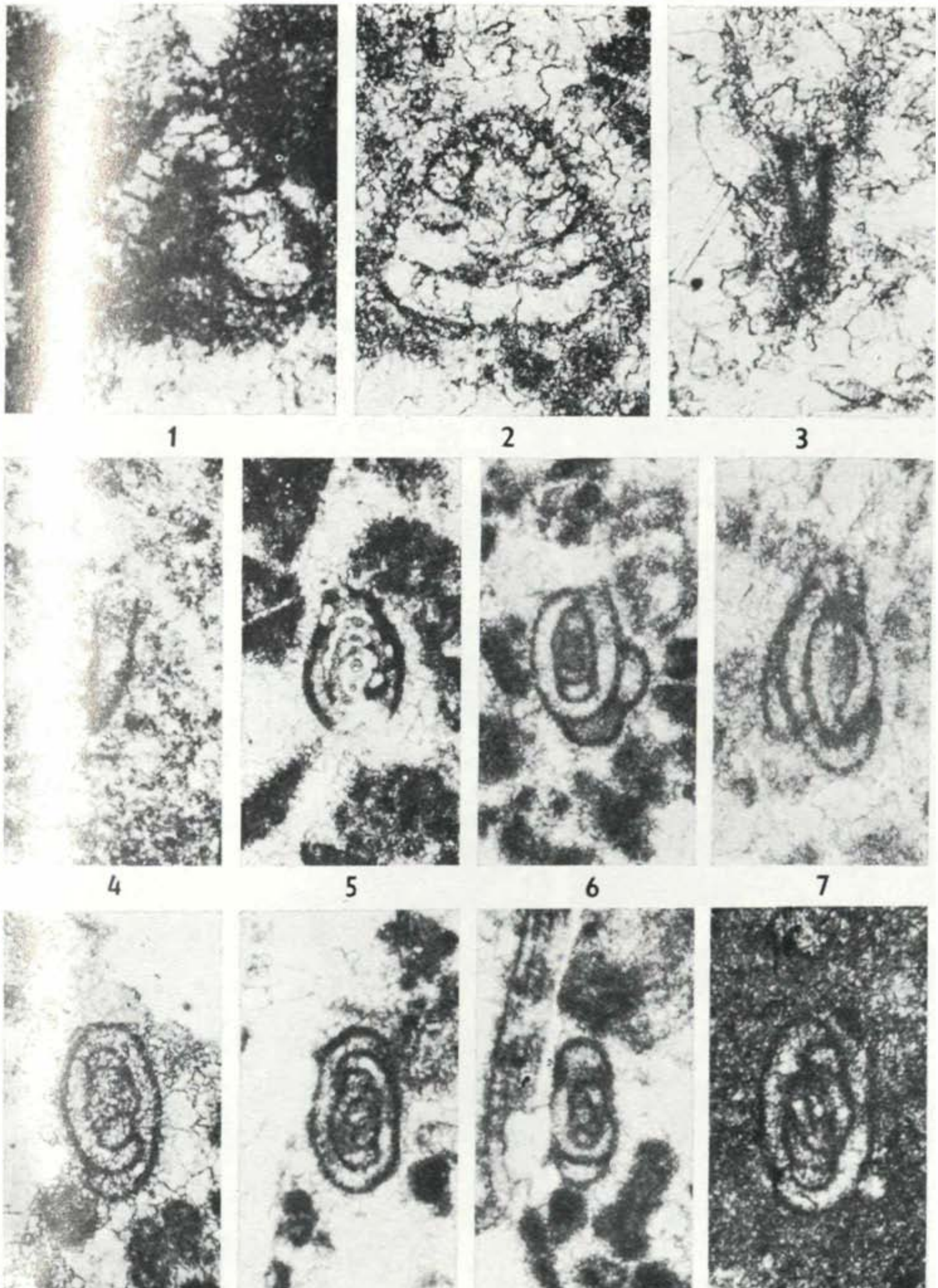
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PLATE VIII

Fig. 1 *Ammodiscoides* aff. *turbinatus* (CUSHMAN, 1909)
Slovak karst, Berc, sample no. 47/57, Steinalm limestone, Anisian, thin s no. By. 825.

Fig. 2 *Geinitzina tcherdynzevi* MIKLUKHO—MAKLAY, 1954
Slovak karst, Plešivec, Steinalm limestone, Anisian, thin section no. By.

Fig. 3 *Pseudoglandulina conica* MIKLUKHO—MAKLAY, 1960
Slovak karst, Jovice, Steinalm limestone, Anisian, thin section no. By (41/56—2).

Fig. 4 *Neoendothyra reicheli* REITLINGER, 1965
Slovan karst, Plešivec, Steinalm limestone, Anisian, thin section no. By. 1

Fig. 5 a — *Agathamminoides spiroloculiformis* (ORAVECZNÉ — SCHEFFER, 1968)
b — *Ladinosphaera ladinica* OBERHAUSER, 1960
Strážovská hornatina Mts., Šípkov, Lunz Formation, Lower Carnian, t section no. Sj. 1052/1962.

Magnification: Fig. 1, 3 x 96, Fig. 2, 4 x 38, Fig. 5 x 90.
Fig. 1—4 reillustrated from the publications of J. SALAJ — A. BIELY — J. BYSTRICK (1967a, b) and Fig. 5 from the publication of J. SALAJ (1978).

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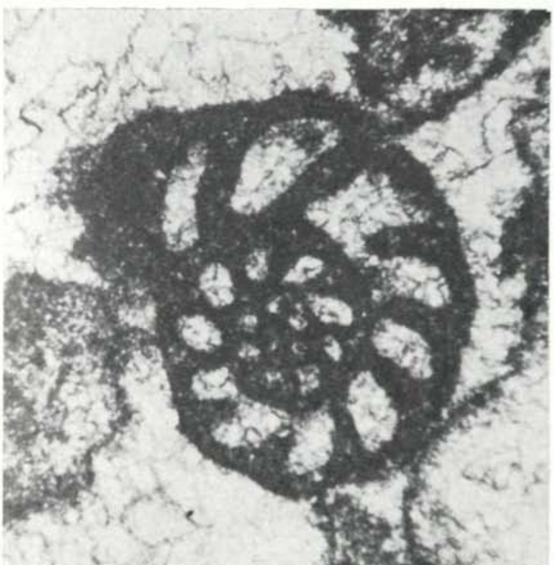

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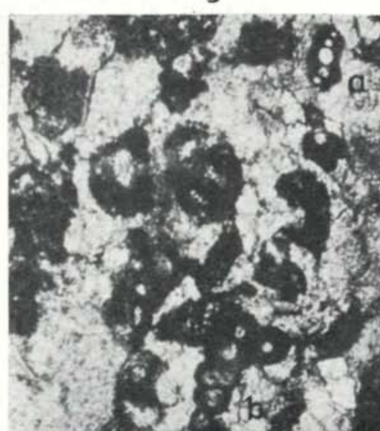

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PLATE IX

Fig. 1—4 *Pilammina densa* PANTIĆ, 1965
Slovak karst NW from Silická Brezová, Guttenstein limestone, Anisian daspian). Fig. 1—2, thin section no. Bo. 3305, Fig. 3, thin section no. Bo. Fig. 4, thin section no. Bo. 3304.

Magnificlation: x 115.

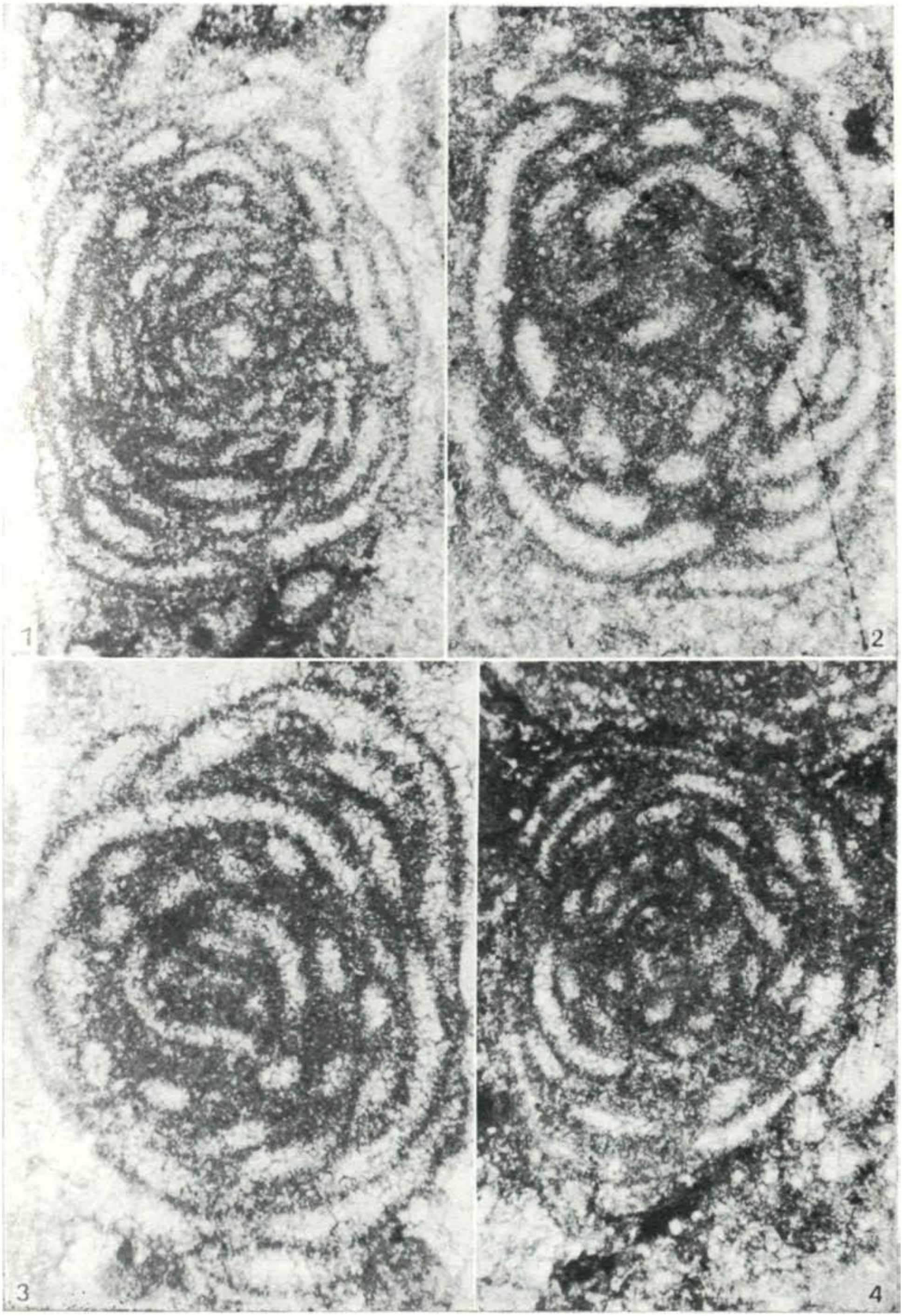
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PLATE X

Fig. 1—4 *Pilamminella gemerica* (SALAJ, 1969)

Fig. 1. Slovak karst, Silická Brezová, sample no. 2b/65, Tisovec limestone wer Carnian, thin section no. By. 2279.

Fig. 2. Type species, Budíkovany, sample no. 20/65, Wetterstein limestone, nian (Julian), thin section no. By. 2463.

Fig. 3. Silická Brezová, sample no. 7, Wetterstein limestone, Ladinian, sa no. Bo. 4723.

Fig. 4. Slovak karst, Budíkovany, Wetterstein limestone, Lower Carnian, section no. By. 2463.

Magnification: Fig. 1—3 x 115, Fig. 4 x 42.
Fig. 1, 2 reillustrated from communication of J. SALAJ (1969b) and fig. 3, 4 f communication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b).

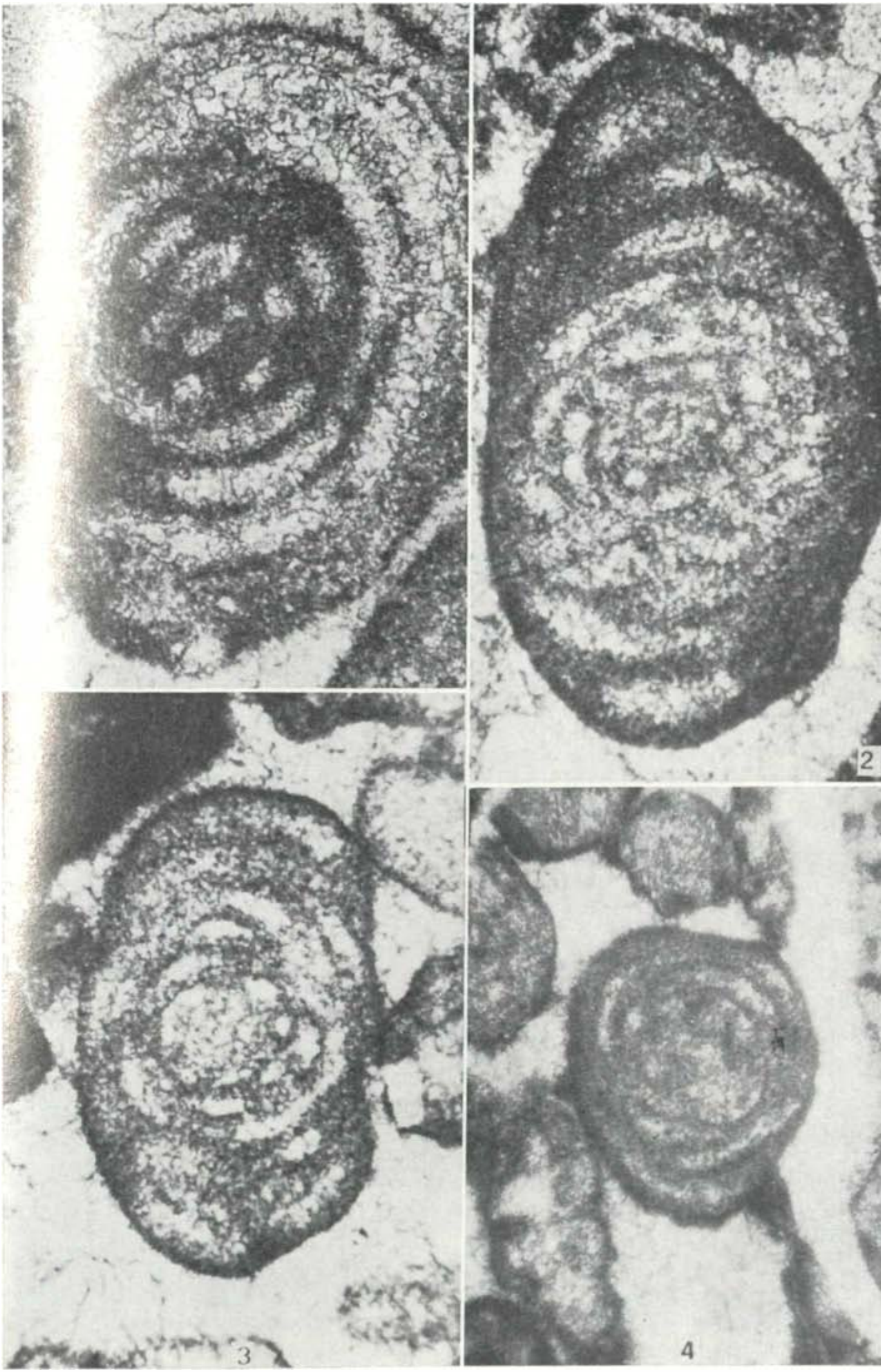
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PLATE XI

Fig. 1 *Pilamminella gemerica* (SALAJ, 1969)
Type species, Plešivec, sample no. 84—1956—1, Wetterstein limestone with *Andrusoporella duplicata* (PIA), Lower Carnian, thin section no. By. 184.

Fig. 2 *Pilamminella gemerica* (SALAJ, 1969)
Muránska planina plateau, Veľká Lúka, Tisovec limestone, Carnian, thin section no. By. 2159.

Fig. 3 a — *Permodiscus pragsoides* OBERHAUSER, 1964
b — *Pilamminella gemerica* (SALAJ, 1969)
c — *Angulodiscus gaschei praegaschei* KOEHN—ZANINETTI, 1969 Budikovany, Wetterstein limestone, Lower Carnian, thin section no. By. 2463.

Fig. 4 a — *Duostomina* aff. *alta* KRISTAN—TOLLMANN, 1960
b — *Pilamminella gemerica* (SALAJ, 1969), Budikovvany, Wetterstein limestone, Lower Carnian, thin section no. By. 2463.

Magnification: Fig. 1 x 90, Fig. 2 x 50, Fig. 3, 4 x 27.
Fig. 1 reillustrated from the publication of J. SALAJ (1969b) and fig. 4 from the publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b).

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PLATE XII

Fig. 1 *Pilamminella grandis* (SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
Type species, Silická Brezová, sample no. 191/58, Steinalm limestone, Anisian, thin section no. By. 1473.
Reillustrated from publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b).

Fig. 2 *Pilamminella grandis* (SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967).
Slovak karst, Silická Brezová, thin section By. 1473.

Fig. 3 *Pilamminella semiplana* (KOCHANSKY — DEVIDÉ et PANTIĆ, 1966).
Slovak karst, Silická Brezová, thin section By. 1473.
Reillustrated from publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1966).

Fig. 4 *Pilamminella semiplana* (KOCHANSKY — DEVIDÉ et PANTIĆ, 1966).
Slovak karst, Silická Brezová, thin section By. 1473.

Magnification: x 115.


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PLATE XIII

Fig. 1—4 *Pilamminella kuthani* (SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967).

Fig. 1. Muránska planina plateau, Veľká Lúka, Tisovec limestone, Carnian, thin section no. By. 2169.

Reillustrated from publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b).

Fig. 2. Slovak karst, Silická Brezová, sample no. 14/71, Tisovec limestone, Carnian, thin section no. By. 5032.

Fig. 3. Plešivecká planina plateau, Ostré vršky, sample no. 10/67, Tisovec limestone, Carnian, thin section no. By. 3068.

Fig. 4. Silická Brezová, sample no. 2/71, Wetterstein limestone, Ladinian—Carnian boundary, thin section no. By. 5031.

Magnification: x 115.

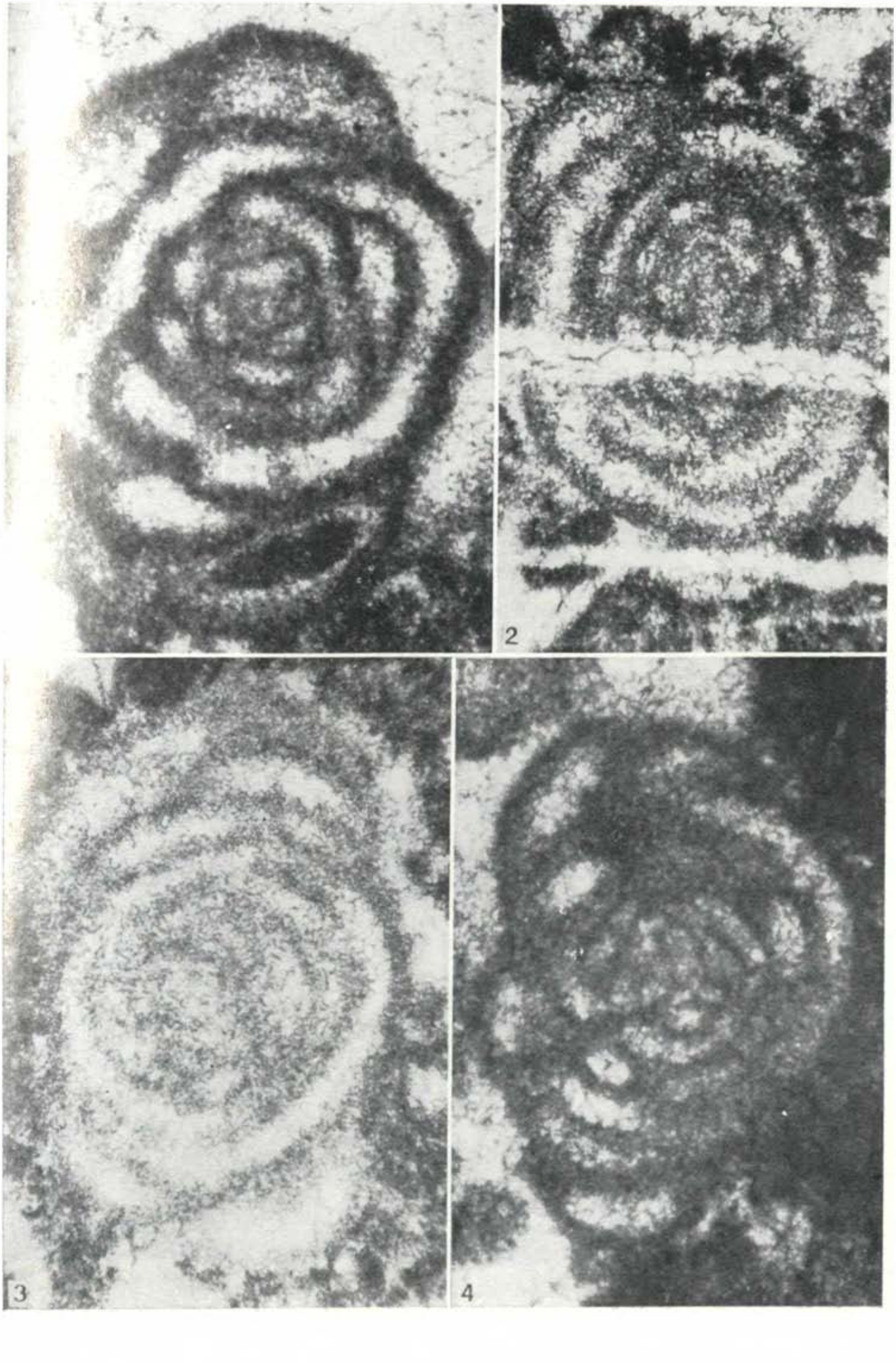
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PLATE XIV

Fig. 1—4 *Pilamminella kuthani* (SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967).

Fig. 1. Type species. Muránska planina plateau, Veľká lúka, Tisovec limestone, Carnian, thin section no. By. 2157.

Fig. 2. a — *Pilamminella kuthani* (SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967); b — *Duostommina alta* KRISTIAN, 1957. Muránska planina plateau, Veľká lúka, Tisovec limestone, Carnian, thin section no. By. 2160.

Fig. 3. Silická Brezová, Tisovec limestone with *Styrites tropidiformis* MOJZ., Carnian, thin section no. By. 2157.

Fig. 4. Muránska planina plateau, Veľká lúka, Tisovec limestone with *Endothyra badouxi* ZANINETTI et BROENNIMANN, 1972, Carnian, thin section no. By. 2129.

Magnification: Fig. 1—4 x 50.
Fig. 1, 2 reillustrated from the publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b, a), fig. 3, 4 from the publications of J. SALAJ (1969, 1978).

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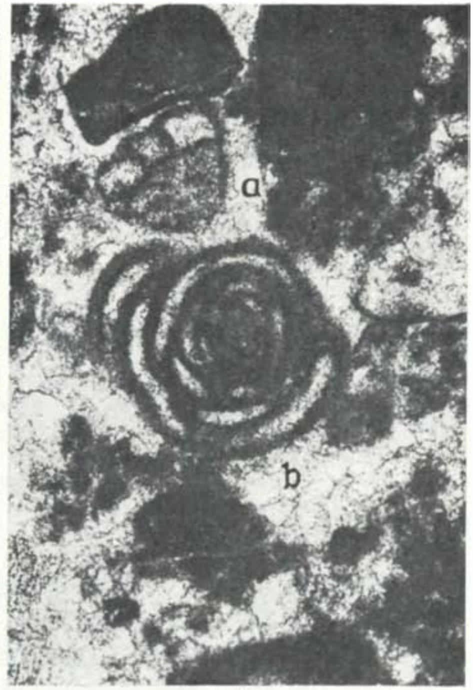

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PLATE XV

Fig. 1—6 *Pilamminella begani* (SALAJ, 1969)

Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian.
Fig. 1. sample no. 30_1 — thin section no. Bo. 5153.
Fig. 2. sample no. 30_4D_4 — thin section no. Bo. 5796.
Fig. 3—4. sample no. 30 — thin section no. Bo. 5152.
Fig. 5—6. sample no. 19 — thin section Bo. 5123.

Fig. 7—12 *Pilamminella falsofriedli* n. sp.

Fig. 7. Hričovské Podhradie, NE from Ostrý vrch, pebble of light-greyish Norian limestone, Conglomerates of Ilerdian, sample no. $8D_1$ — thin section no. Bo. 5589.
Fig. 8, 10, 12. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone of Uppermost Norian to Lower Rhaetian.
Fig. 8. sample no 40_2 — thin section no. Bo. 5206.
Fig. 10. sample no. 22a/73, thin section no. Bo. 5727.
Fig. 12. sample no. $56aD_2$, thin section no. Bo. 5242.
Fig. 9. Tepličné sample no. 29, Furmanec limestone, Norian, thin section no. Bo. 5362.
Fig. 11. Hybe, Dachstein limestone, sample no. 04, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6653.

Magnification: x 115.

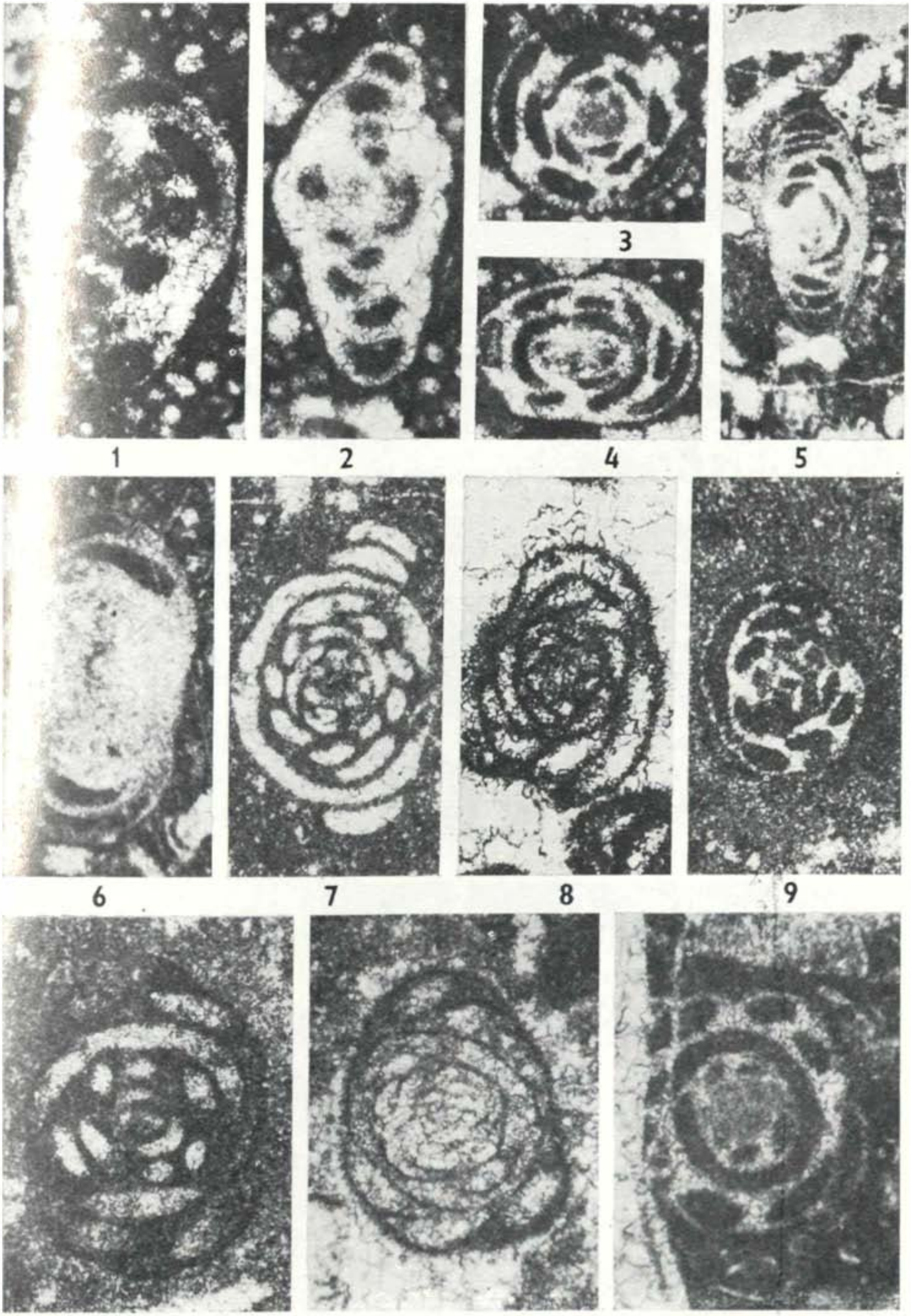
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PLATE XVI

Fig. 1 *Turritellella mesotriassica* KOEHN—ZANINETTI, 1969
W of Babkov, SE of elevation point 633 m, pebble of Upper Anisian Reifling limestone from the Ilerdian conglomerates, thin section no. Bo. 2.

Fig. 2—7 *Tolypammina gregaria* WENDT, 1969
Fig. 2. Hybe, sample no. Sj4, „Kössen" limestone, Upper Rhaetian, thin section no. Bo 5959.
Fig. 3—4, 6—7. Silická Brezová, Hallstatt limestone, Norian.
Fig. 3. sample no. 16, thin section no. Bo. 4820.
Fig. 4. sample no. 18, thin section no. Bo. 4856.
Fig. 6. sample no. 4a/73-III, thin section Bo. 4844.
Fig. 7. sample no. 22b/73, thin section no. Bo. 4785.
Fig. 5. Muránska planina plateau, organo-detrital limestone, Rhaetian, thin section no. Bo. 5190.

Magnification: x 115.

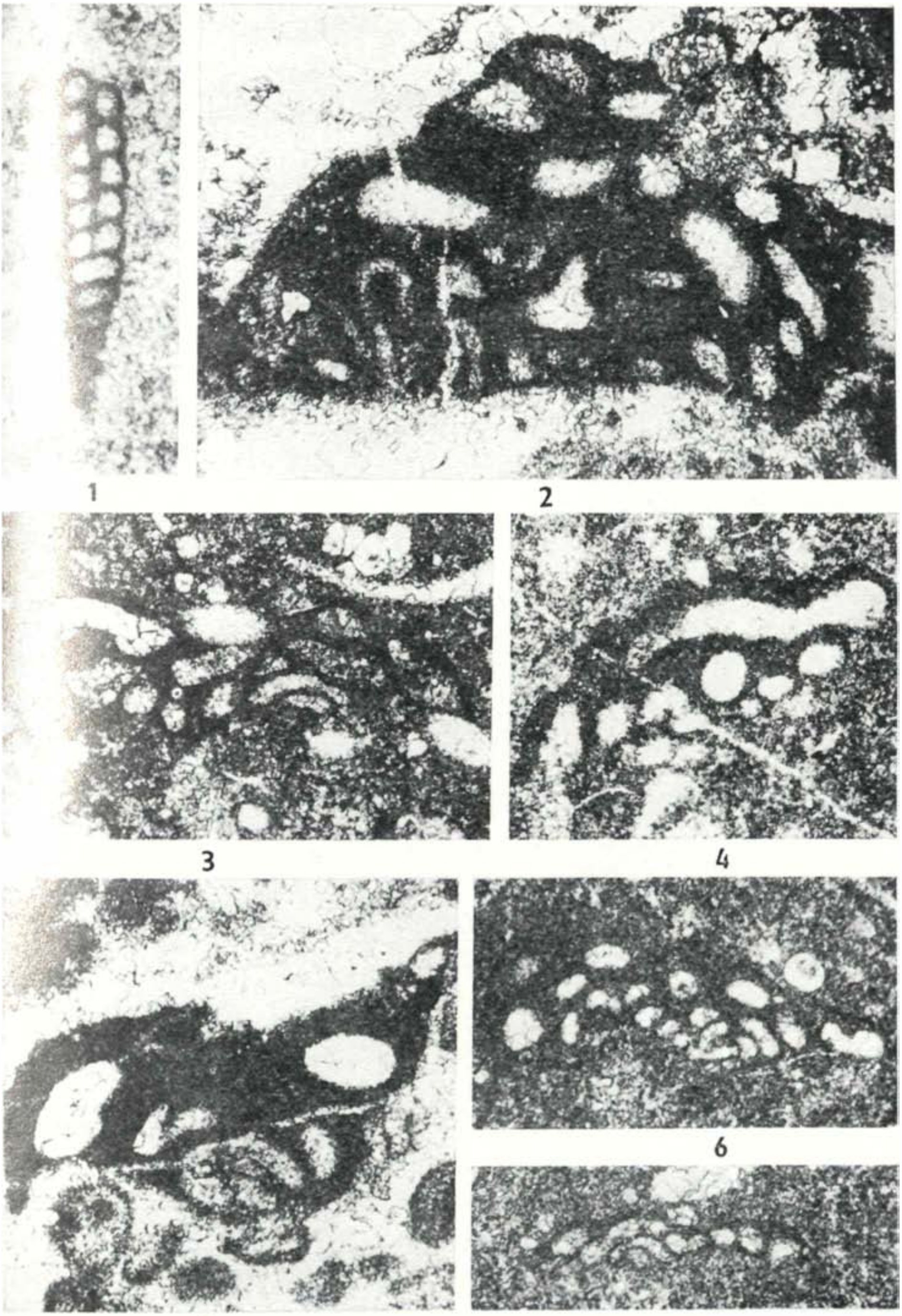
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PLATE XVII

Fig. 1 *Reophax eominutus* KRISTAN—TOLLMANN, 1964
Geravy, sample no. 4c, organogenic limestone Norian to Lower Rhaetian, thin section no. Bo. 6688.

Fig. 2 *Ammobaculites alveolatus* n. sp.
Silická Brezová, sample no 3/71, Tisovec limestone, Lower Carnian, thin section no. By. 4671.

Fig. 3 *Cribratina texana* (CONRAD; in EMORY, 1857)
Drnava, sample no. 1/74i, Bleskový prameň limestone, Sevatian, sample no. By. 1/74i.

Fig. 4 *Mesoendothyra isjumiana* DAIN, 1958
Budíkovany, Tisovec limestone, Carnian, thin section no. By. 1654

Magnification: Fig. 1—2, 4 x 115, Fig. 3 x 42.

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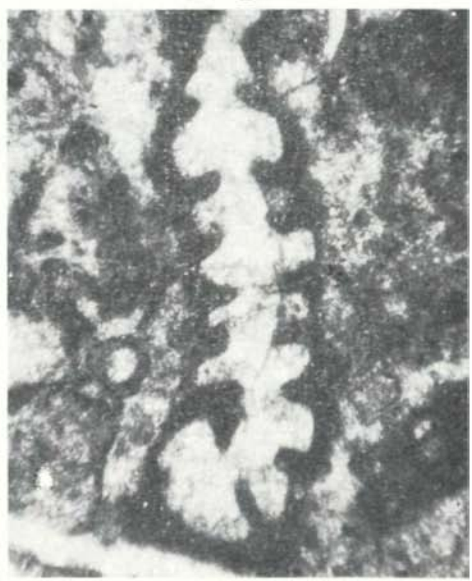

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PLATE XIX

Fig. 1 *Rheophax* aff. *asperus* CUSHMAN et WATERS, 1928
Slovak karst, Silická Brezová, sample no. 12b, Tisovec limestone, Carnian, thin section no. Bo. 4732.

Fig. 2 *Ammobaculites corpulentus* EFIMOVA, 1974
Stratenská hornatina Mts., Holý kameň, sample no. 4, Furmanec limestone, Norian, thin section no. Bo. 6068.

Fig. 3 *Ammobaculites hoheneggeri* n. sp.
Muránska planina plateau, road-cut to Veľká lúka, sample no. 60, Dachstein limestone, Uppermost Norian to Lower Rhaetian, sample no. Bo. 5286.

Fig. 4 *Ammobaculites radstadtensis* KRISTAN—TOLLMANN, 1964
Malé Karpaty Mts., Trstín, sample no. 8/72, dolomite, Lower Ladinian, thin section no. By. 4605.

Fig. 5 *Textularia exigua* (SCHWAGER, 1964)
Muránska planina plateau, sample no. 1/74, Tisovec limestone, Carnian, thin section no. Bo 1/74.

Fig. 6—8, 11 *Pseudobolivina globosa* KRISTAN—TOLLMANN, 1973
Fig. 6. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6124.
Fig. 7. Muránska planina plateau, sample no. 37, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5183.
Fig. 8. Dolka, sample no. 13, Furmanec limestone, Norian, thin section no. Bo. 6924.
Fig. 11. W from Tisovec, Javorová, Furmanec limestone, Norian, thin section no. Bo. 6810.

Fig. 9, 10 *Trochammina alpina* KRISTAN—TOLLMANN, 1964
Fig. 9. Remiaška, Furmanec limestone, Norian, thin section no. Bo. 6435.
Fig. 10. Španie Pole, Wetterstein limestone, Cordevolian, thin section no. By. 2449.

Magnification: x 115.

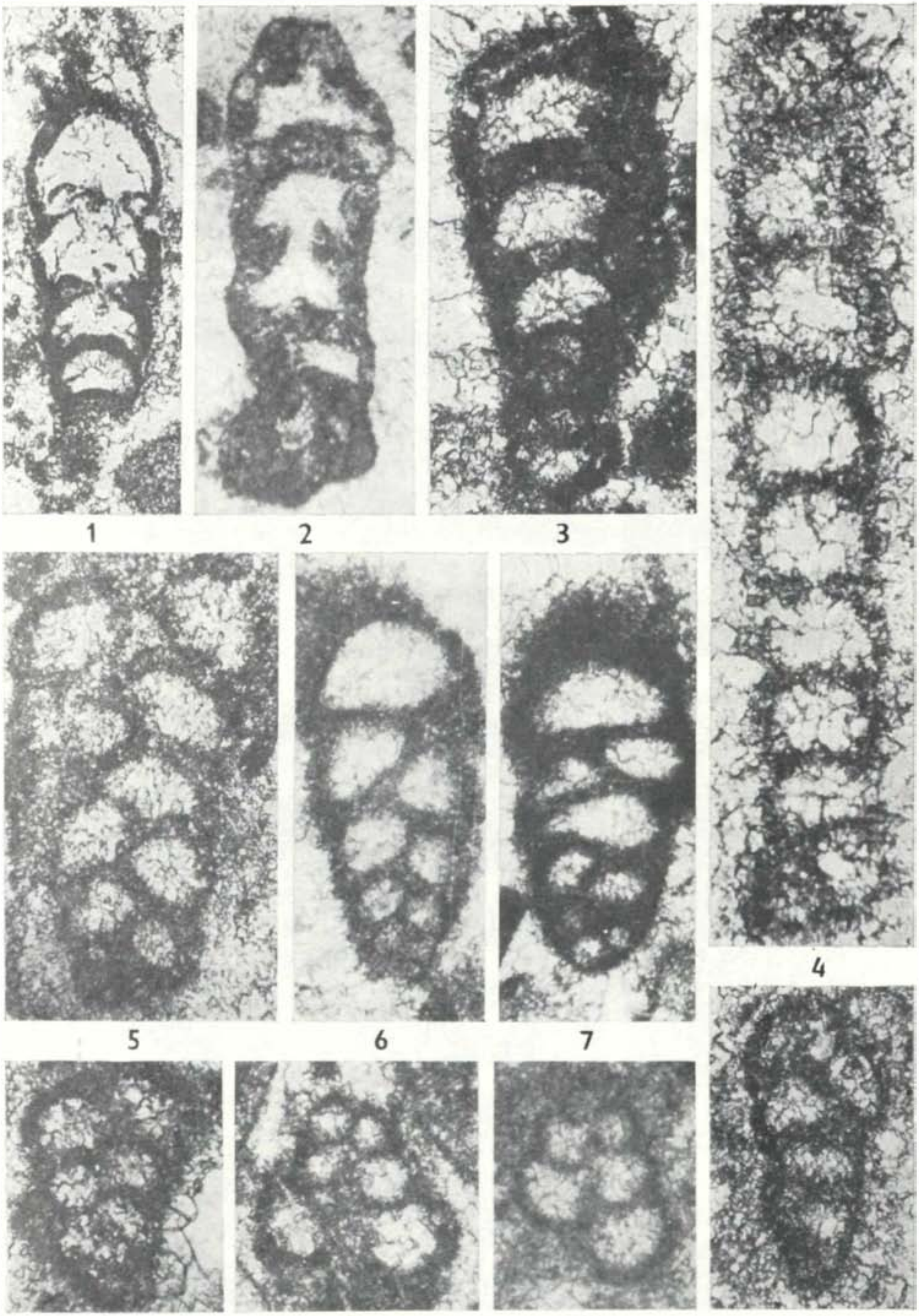
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PLATE XX

Fig. 1—3 *Ammobaculites zlambachensis* KRISTAN—TOLLMANN, 1961

Fig. 1. Muránska planina plateau, Tisovec limestone, Carnian, thin section no. Bo. 6885.

Fig. 2. Silická planina pleteau, Zakázané, Steinalm limestone, Anisian, thin section no. Bo. 6873.

Fig. 3. Westernly of the community Tisovec, saddle E of the elevation point 878,0, Furmanec limestone, Norian, thin section Bo. 6116.

Fig. 4 *Labyrinthina falsomirabilis* n. sp.
Geravy, dark-grey organo-detrital limestone, Uppermost Sevatian, thin section no. By. 4981.

Fig. 5 *Spiroplectammina spiralis* n. sp.
Muránska planina plateau, road-cut to Veľká lúka, sample no. 21_2D_2, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5133.

Fig. 6 *Textularia exigua* (SCHWAGER, 1864)
Stratenská hornatina, cross-roads Stratená-Hrabušice, Tisovec limestone, Carnian, thin section no. B. 5618.

Magnification: x 115.

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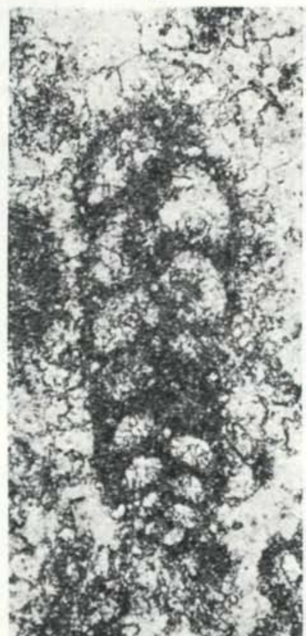

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PLATE XXI

Fig. 1 *Textularia exigua* (SCHWAGER, 1864)
Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5354.

Fig. 2—3 *Pseudobolivina globosa* KRISTAN—TOLLMANN, 1973
Fig. 2. Silická planina plateau, Zakázané, Steinalm limestone, Anisian, thin section no. Bo. 6874.
Fig. 3. Silická Brezová, sample no. 27, Tisovec limestone, Carnian, thin section no. Bo. 4753.

Fig. 4—12 *Trochammina alpina* KRISTAN—TOLLMANN, 1964
Fig. 4. Dolka, Furmanec limestone, Norian, thin section no. Bo. 5056.
Fig. 5, 7. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Rhaetian; fig. 5 — thin section no. Bo. 5174, fig. 7 — thin section no. Bo. 5241.
Fig. 6. Malé Karpaty Mts., Buková, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. By. 5255.
Fig. 8. W of Tisovec elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6373.
Fig. 9. Silická Brezová, Tisovec limestone, Carnian, thin section no. Bo. 6859.
Fig. 10—11. Silická planina plateau, Zakázané, Steinalm limestone, Anisian, thin section no. 6874.
Fig. 12. Silická Brezová, Tisovec limestone Carnian, thin section no. Bo. 4727.

Magnification: x 115.

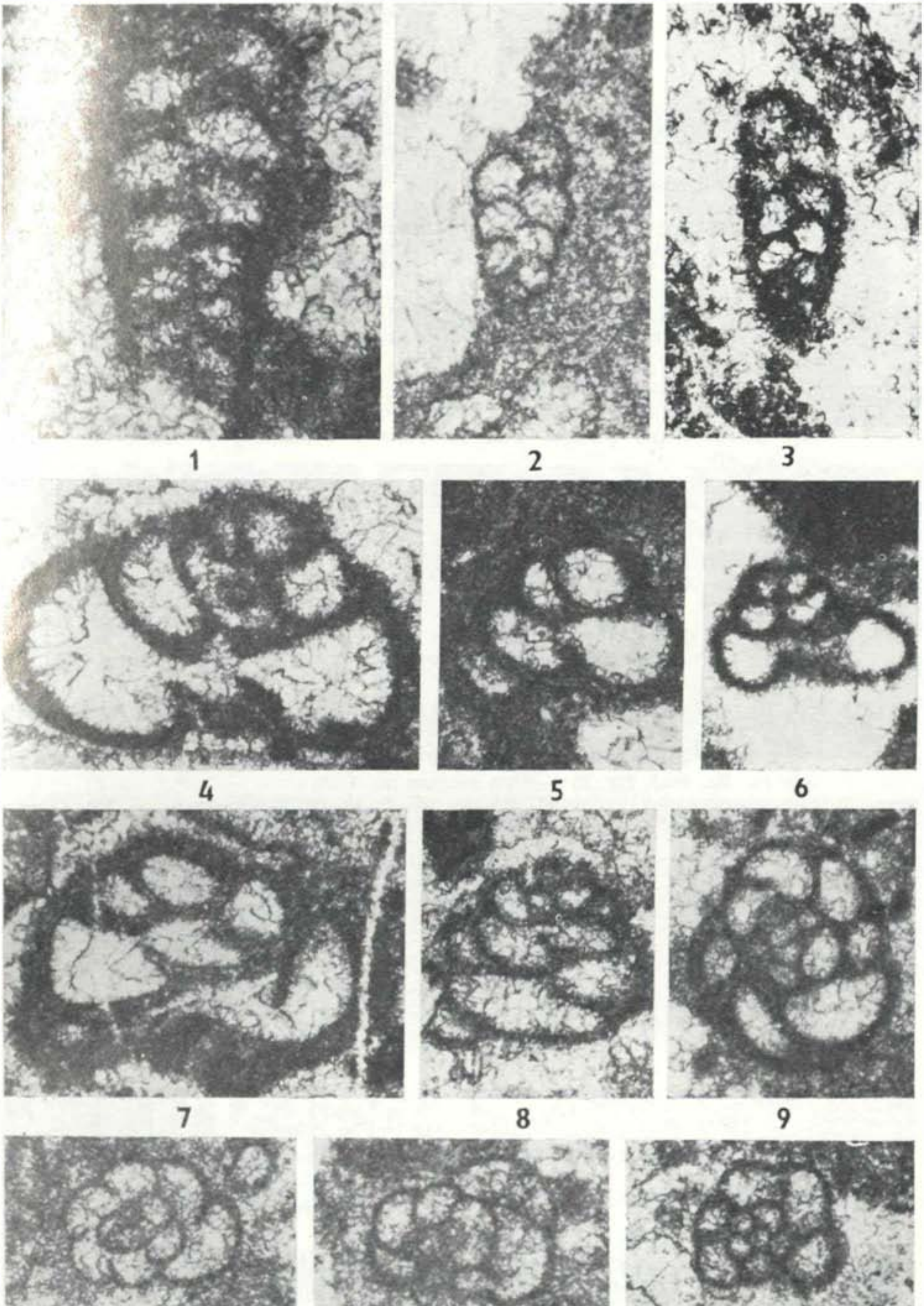
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PLATE XXII

Fig. 1—12 *Trochammina almtalensis* KOEHN—ZANINETTI, 1968

Fig. 1. Plešivecká planina plateau, sample no. 3/67, Tisovec limestone, Carnian thin section no. By. 2002.

Fig. 2. W of Tisovec, NE of Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5629.

Fig. 3. Muránska planina plateau, Tisovec limestone, Carnian, thin section no. Bo. 6167.

Fig. 4. W of Tisovec, Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5637.

Fig. 5. Muránska planina plateau, organogenic limestone, Rhaetian, thin section no. Bo. 5746.

Fig. 6. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6020.

Fig. 7. Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5330.

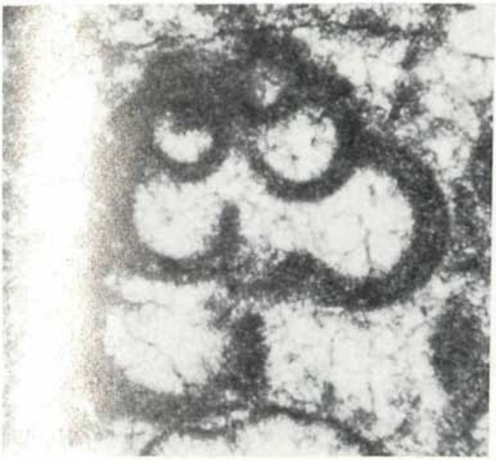
Fig. 8. Drnava, Bleskový prameň limestone, Lower Rhaetian (=Sevatian), thin section no. By. 1/74.

Fig. 9. W of Tisovec, Gošťanová, Furmanec limestone, Norian, thin section no. Bo. 5426.

Fig. 10—11. Silická Brezová, Hallstatt limestone, Norian; fig. 10 — thin section no. Bo. 4815, fig. 11 — thin section no. 4819.

Fig. 12. Muránska planina plateau, Dachstein limestone, Norian, thin section no. 5183.

Magnification: x 115.



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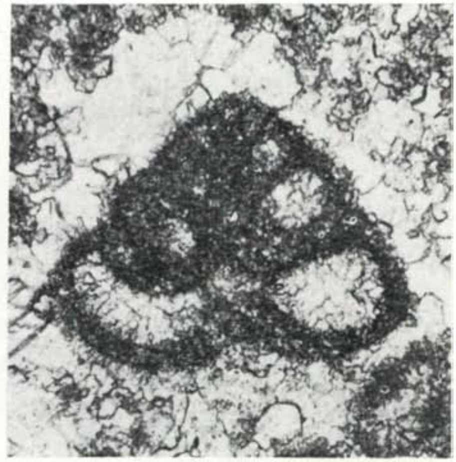

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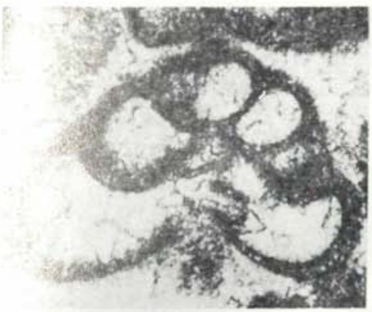

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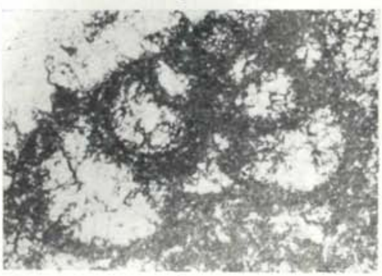

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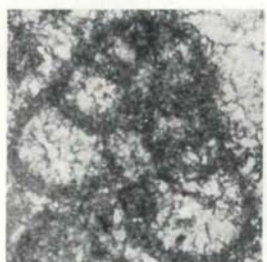

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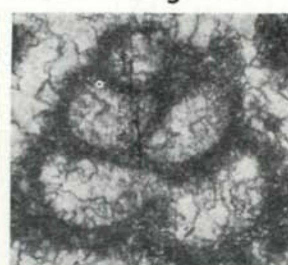

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PLATE XXIII

Fig. 1—8 *Trochammina almtalensis* KOEHN—ZANINETTI, 1968

Fig. 1, 7. W of Tisovec, saddle E of the elevation point 878,0, Furmanec limestone, Norian; fig. 1 — thin section no. Bo. 6417, fig. 7 — thin section no. Bo. 6419.

Fig. 2, 4—5. W of Tisovec elevation point 878,5, Furmanec limestone, Norian; fig. 2 — thin section no. Bo. 6375, fig. 4 — thin section no. Bo. 6373, fig. 5 — thin section no. Bo. 6376.

Fig. 3, 6. Muránska planina plateau, Tisovec limestone, Carnian; fig. 3 — thin section no. Bo. 6186, fig. 6 — thin section no. Bo. 6885.

Fig. 8. Gemerská hôrka, Skalica, Steinalm limestone, Anisian, thin section no. Bo. 6880.

Magnification: x 115.

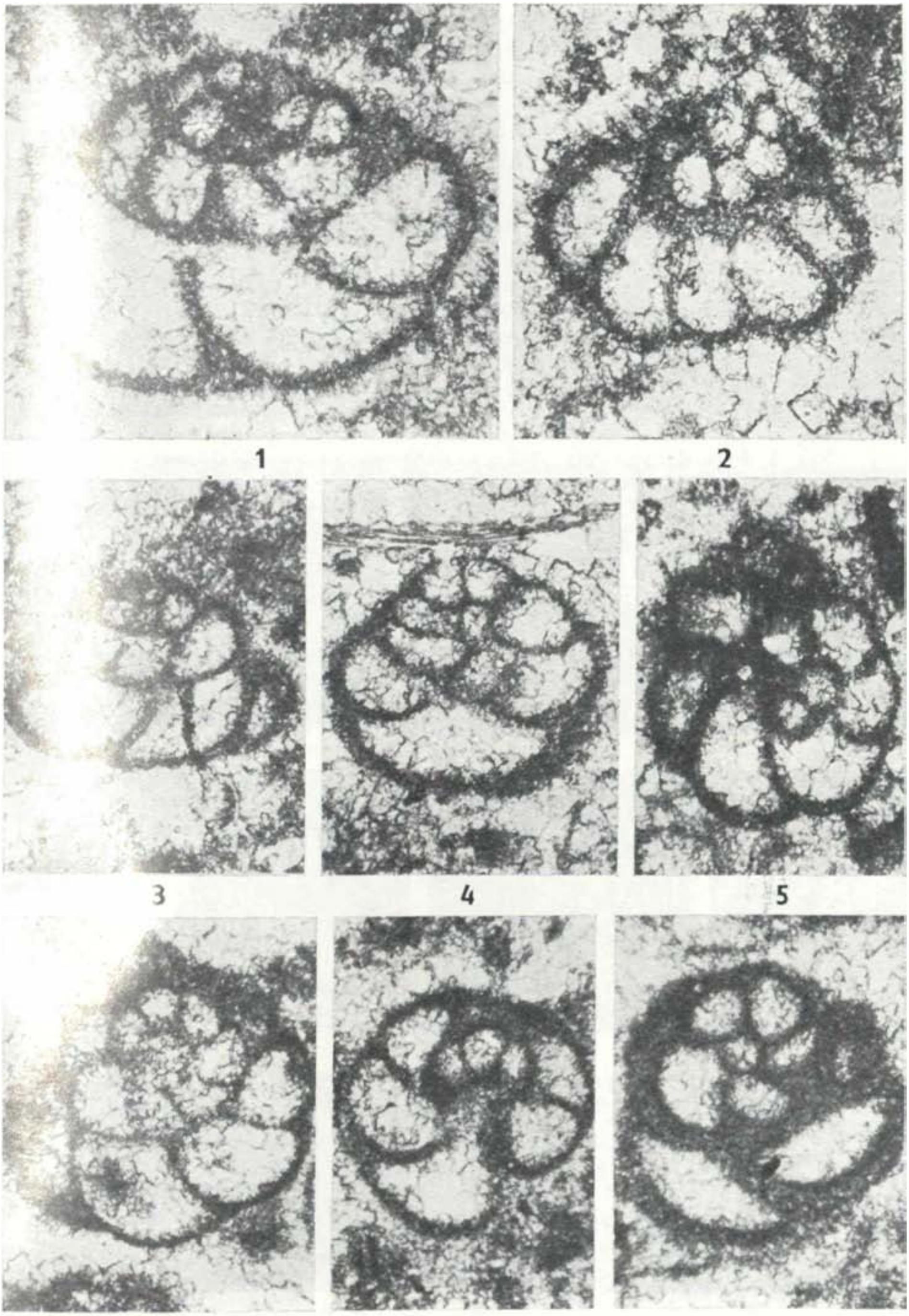
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PLATE XXIV

Fig. 1—11 *Trochammina almtalensis* KOEHN—ZANINETTI, 1968

Fig. 1. Drnava, Bleskový prameň, dark-grey limestone with corals, Lower Rhaetian, thin section no. By. 4630.

Fig. 2. W of Tisovec, Javorová, Furmanec limestone, Norian, thin section no. Bo. 6810.

Fig. 3. Kováčová, Furmanec limestone, Norian, thin section no. Bo. 6732.

Fig. 4. Malé Karpaty Mts., Buková, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. By. 5255.

Fig. 5, 7, 10. W of Tisovec saddle E of the elevation point 878,0, Furmanec limestone, Norian; fig. 5 — thin section no. Bo. 6424, fig 7 — thin section no. Bo. 6851, fig. 10 — thin section no. Bo. 6424.

Fig. 6. Remiaška, dark-grey limestone, Norian, thin section no. Bo. 6131.

Fig. 8. W of Tisovec, Teplica, Tisovec limestone, Carnian, thin section no. Bo. 6551.

Fig. 9. Drnava, Bleskový prameň limestone, Lower Rhaetian (=Sevatian), thin section no. By. 2/74.

Fig. 11. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5187.

Magnification: x 115.

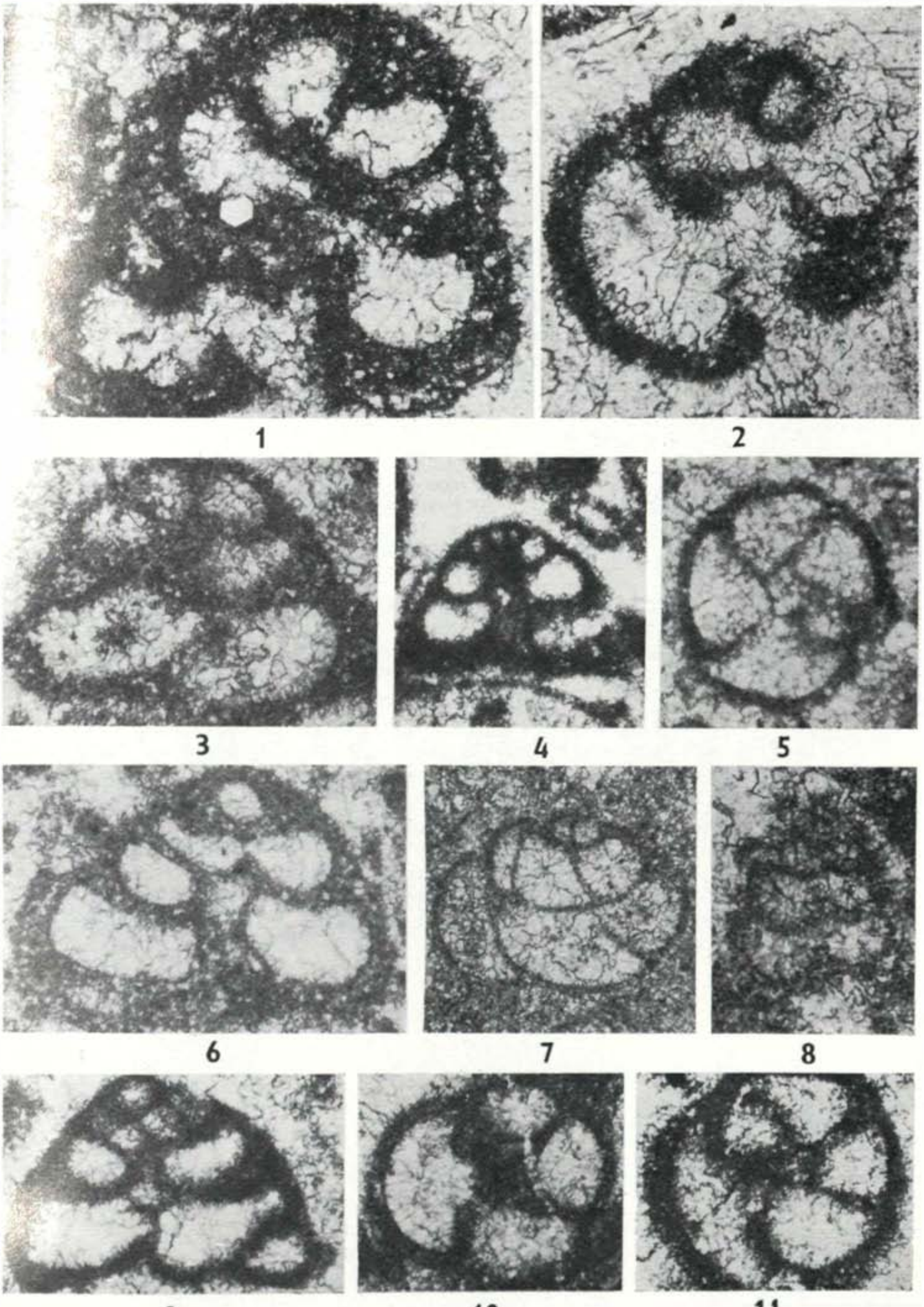
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PLATE XXV

Fig. 1—3 *Gaudryina triadica* KRISTAN—TOLLMANN, 1964
Fig. 1. Strážovská hornatina Mts., Šipkov, sample no. 5/67, Wetterstein limestone, Ladinian, thin section no. By. 3238.
Fig. 2. Drnava, Bleskový prameň limestone, Lower Rhaetian (=Sevatian), thin section no. By. 2/74.
Fig. 3. Drnava, sample no. 2/67, Furmanec limestone, Norian, thin section no. By. 3311.

Fig. 4 *Gaudryinella clavuliformis* TRIFONOVA, 1967
Muránska planina plateau, Predná hora, Tisovec limestone, Carnian, thin section no. 6117.

Fig. 5 *Gaudryinella elegantissima* KRISTAN—TOLLMANN, 1964
E of Silica, Silička, cut of pipe-line, Wetterstein limestone, Ladinian, thin section no. By. 5065.

Fig. 6—11. *Trochammina jaunensis* BROENNIMANN et PAGE, 1966
Fig. 6. Drnava, Furmanec limestone, Norian, thin section no. Bo. 6061.
Fig. 7. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4806.
Fig. 8. Muránska planina plateau, Predná hora, Tisovec limestone, Carnian, thin section no. Bo. 5393.
Fig. 9. W of Tisovec, Goštanová, Furmanec limestone, Norian, thin section no. Bo. 5393.
Fig. 10. Silická Brezová, Tisovec limestone, Carnian, thin section no. Bo. 4732.
Fig. 11. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6023.

Magnification: Fig. 1, 3—11 x 115, Fig. 2 x 42.

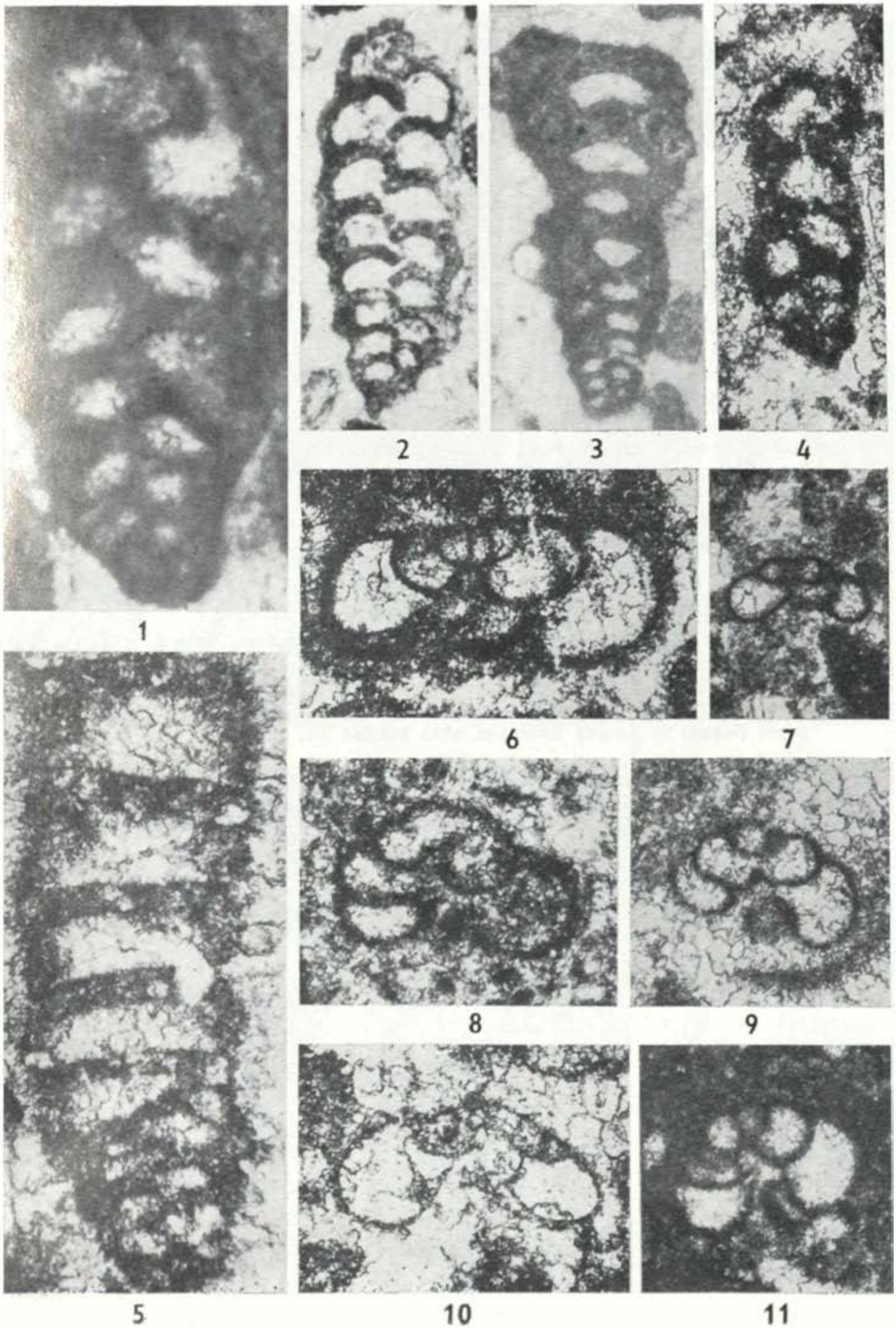
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PLATE XXVI

Fig. 1 *Valvulina azzouzi* SALAJ, 1978
Geravy, dark-grey organogenic limestone, Norian, thin section no. Bo. 6698.

Fig. 2—3 *Trochammina jaunensis* BROENNIMANN et PAGE, 1966
Fig. 2. Strážovská hornatina Mts., sample no. S-400, Wetterstein limestone, Cordevolian, thin section no. By. 3267.
Fig. 3. Malé Karpaty Mts., Plavecký Peter, Dachstein limestone, Uppermost Norian ton Lower Rhaetian, thin section no. By. 4649.

Fig. 4 *Gaudryinella clavuliformis* TRIFONOVA, 1967
Silická planina plateau, Zakázané, Steinalm limestone, Anisian, thin section no Bo. 6870.

Fig. 5 *Gaudryina triadica* KRISTAN—TOLLMANN, 1964
W of Tisovec, Goštanová, Furmanec limestone, Norian, thin section no. 5433.

Fig. 6 *Gaudryinella elegantissima* KRISTAN—TOLLMANN, 1964
Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5153.

Fig. 7—9 *Valvulina metula* (KRISTAN, 1957)
Fig. 8. Drnava, Bleskový prameň limestone, Lower Rhaetian (=Sevatian), thin section no. By. 2/74.
Fig. 8. W of Tisovec, elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6377.
Fig. 9. Geravy, dark-grey organogenic limestone, Norian, thin section no. Bo. 6701.

Magnification: Fig. 1—4, 6—9 x 115, Fig. 5 x 42.

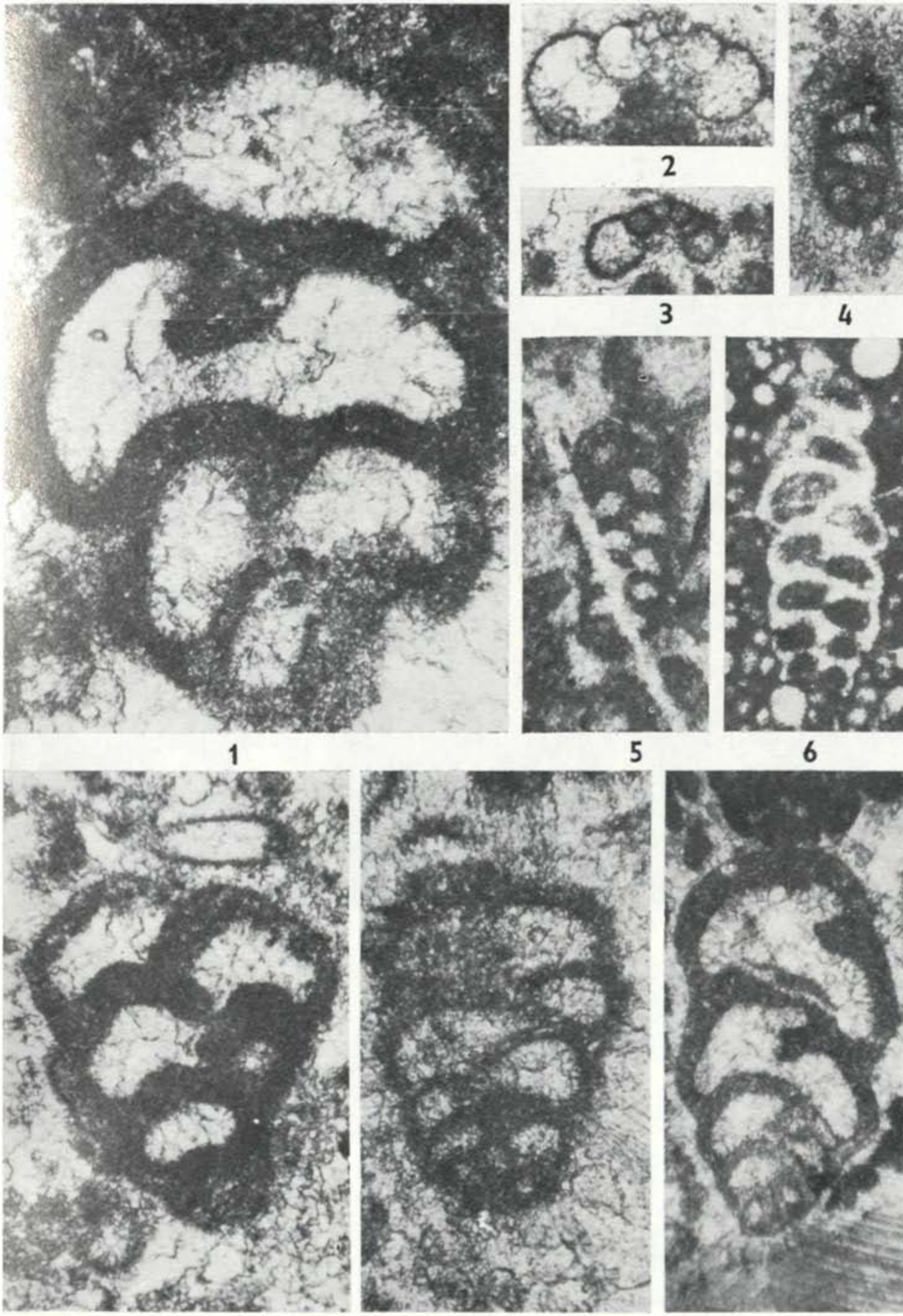
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PLATE XXVII

Fig. 1—8 *Valvulina azzouzi* SALAJ, 1978

Fig. 1. Stratenská hornatina Mts., Furmanec limestone, Norian, thin section no Bo. 6007.

Fig. 2, 7. Plešivecká planina plateau, sample no. 3/67, Tisovec limestone, Carnian; fig. 2 — thin section no. By. 3002, fig. 7 — thin section no. By. 3001.

Fig. 3. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5308.

Fig. 4. W of Tisovec, NE of Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5627.

Fig. 5. W of Tisovec elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6389.

Fig. 6. Silická Brezová, Tisovec limestone, Carnian, thin section no. Bo. 4732.

Fig. 8. W of Tisovec, Teplica, Tisovec limestone, Carnian, thin section no. Bo. 6063.

Magnification: x 115.

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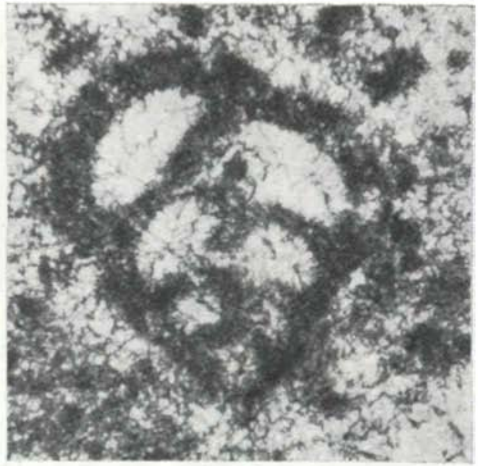

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PLATE XXVIII

Fig. 1—3 *Valvulina azzouzi* SALAJ, 1978

Fig. 1. Silická Brezová, Tisovec limestone, Carnian, thin section no. Bo. 4736

Fig. 2. Plešivecká planina plateau, sample no. 4/67, Tisovec limestone, Carnian thin section no. By. 3004.

Fig. 3. Muránska planina plateau, entry of Veľká lúka, Tisovec limestone, Carnian, thin section no. Bo. 5308.

Fig. 4—8 *Valvulina metula* (KRISTAN, 1957)

Fig. 4. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4815.

Fig. 5. Silická Brezová, greyish-pink limestone, Carnian, thin section no. Bo. 4750.

Fig. 6. Muránska planina plateau, Cigánka, Furmanec limestone, Norian, thin section no. Bo. 6568.

Fig. 7. Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5356.

Fig. 8. Drnava, Bleskový prameň limestone, Lower Rhaetian (=Sevastian), thin section no. By. 2/74$_1$.

Fig. 9 *Tetrataxis inflata* KRISTAN, 1957

Drnava, Bleskový prameň limestone, Lower Rhaetian (=Sevatian), thin section no. By. 3/74$_2$.

Magnification: x 115.

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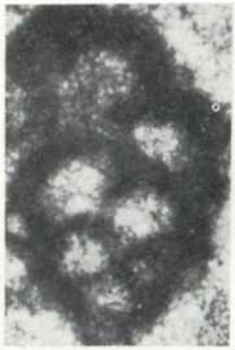

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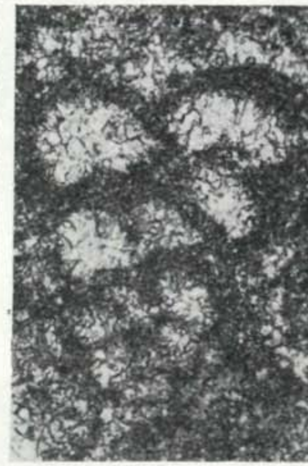

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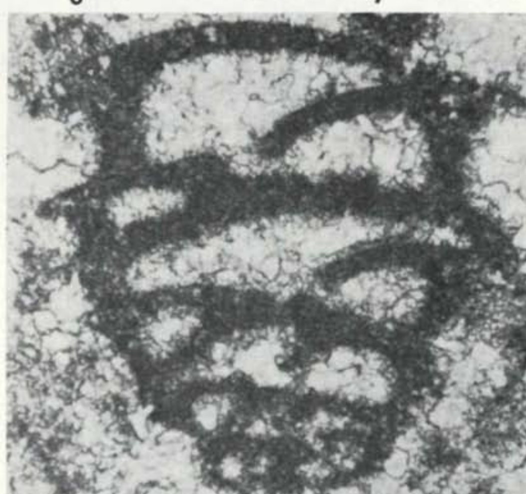

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PLATE XXIX

Fig. 1 *Valvulina azzouzi* SALAJ, 1978
Silická Brezová, Tisovec limestone, Carnian, thin section no. By. 4985.

Fig. 2—4 *Valvulina metula* (KRISTAN, 1957)
Fig. 2. Stratenská hornatina Mts., Remiaška, dark-grey limestone, Norian, thi section no. Bo. 6458.
Fig. 3. Silická Brezová, sample no. 14/71, Tisovec limestones, Carnian, thi section no. By. 4659.
Fig. 4. Geravy, organogenic limestone, Norian, thin section no. Bo. 6669.

Magnification: x 115.

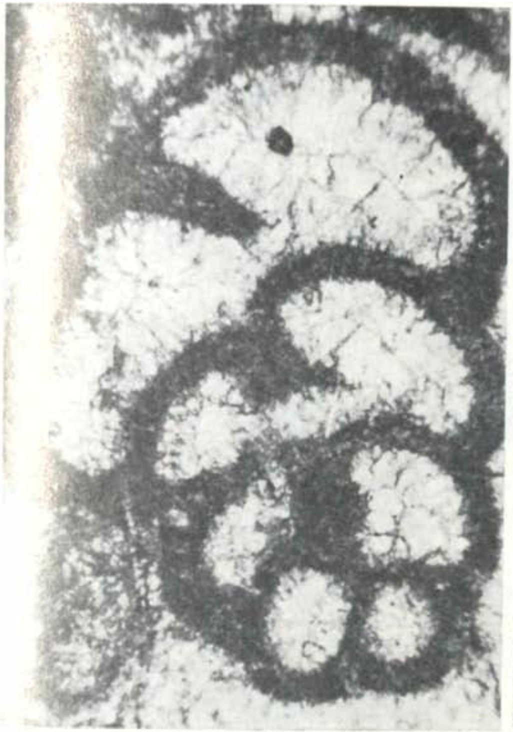

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PLATE XXX

Fig. 1—5 *Earlandinita elongata* SALAJ, 1967

Fig. 1—2. Včeláre, Wetterstein limestone, Ladinian, thin section no. By. 159
Fig. 3. Stratenská hornatina Mts., crossing of Stratenská and Hrabušice road Tisovec limestone, Carnian, thin section no. Bo. 5618.
Fig. 4. Muránska planina plateau, Lopušná, Wetterstein limestone, Ladinian thin section no. Bo. 5567.
Fig. 5. Rožňava, sample no. 13/59, Steinalm limestone, Anisian, thin section no By. 1964.

Fig. 6 *Earlandinita grandis* SALAJ, 1978
Vajarská, Wetterstein limestone, Ladinian, thin section no. By. 5052.

Magnification: Fig. 1, 3, 6 — x 115, Fig. 2, 4—5 — x 42.

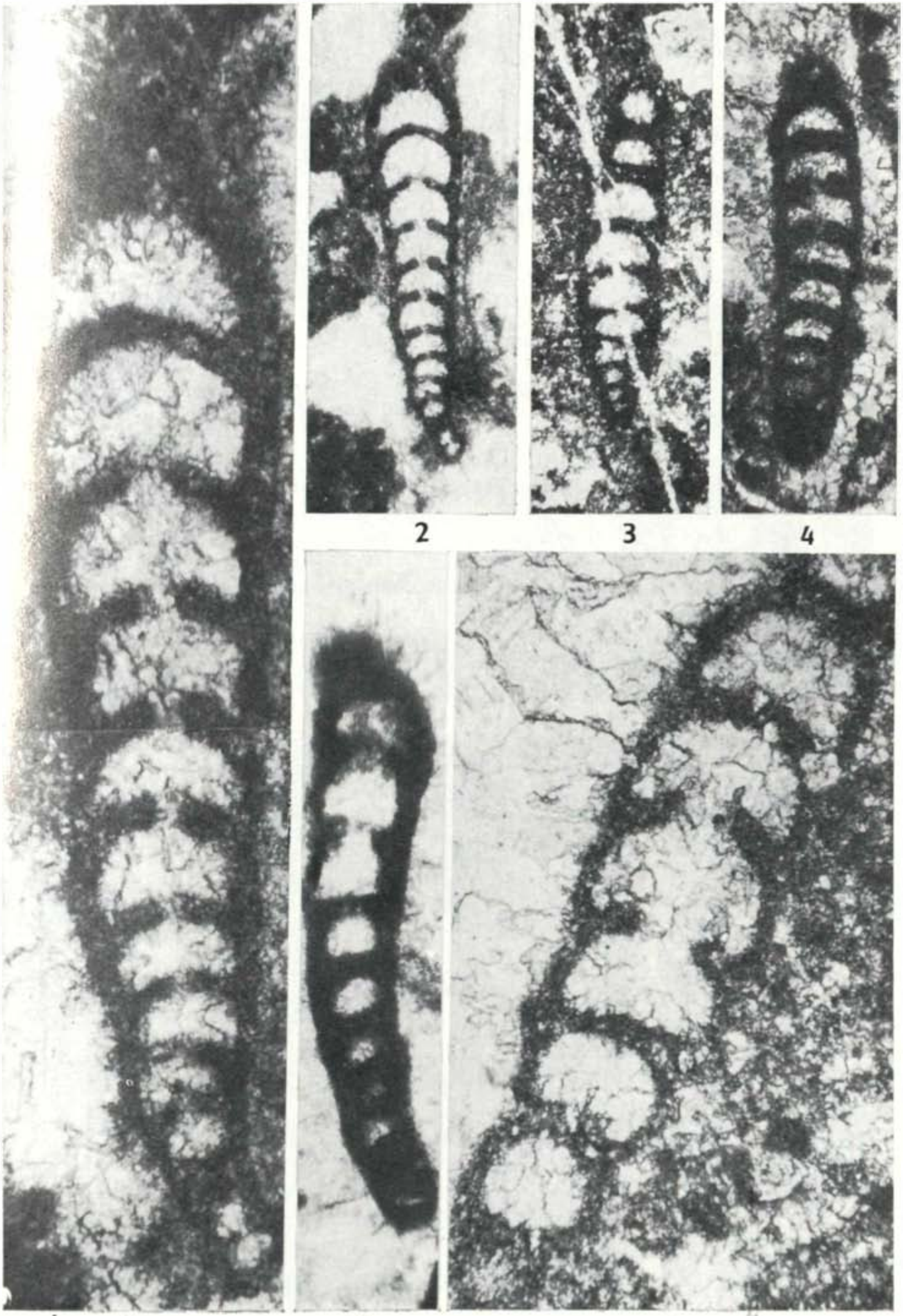

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PLATE XXXI

Fig. 1—2 *Earlandinita grandis* SALAJ, 1978

Fig. 1. Plešivec, Rožkov, sample no. 480/58, Steinalm limestone, Anisian, thin section no. By. 1636.

Fig. 2. Plešivecká planina plateau, sample no. 53/59, Tisovec limestone, Carnian, thin section no. By. 2082.

Fig. 3—6 *Earlandinita ladinica* SALAJ, 1978

Fig. 3. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6008.

Fig. 4. W of Tisovec, saddle E of elevation point 878,0, Furmanec limestone, Norian, thin section no. Bo. 6421.

Fig. 5. Silica, Sample no. 448/58, Steinalm limestone, Anisian, thin section no. By.1609.

Fig. 6. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6020.

Magnification: x 115.

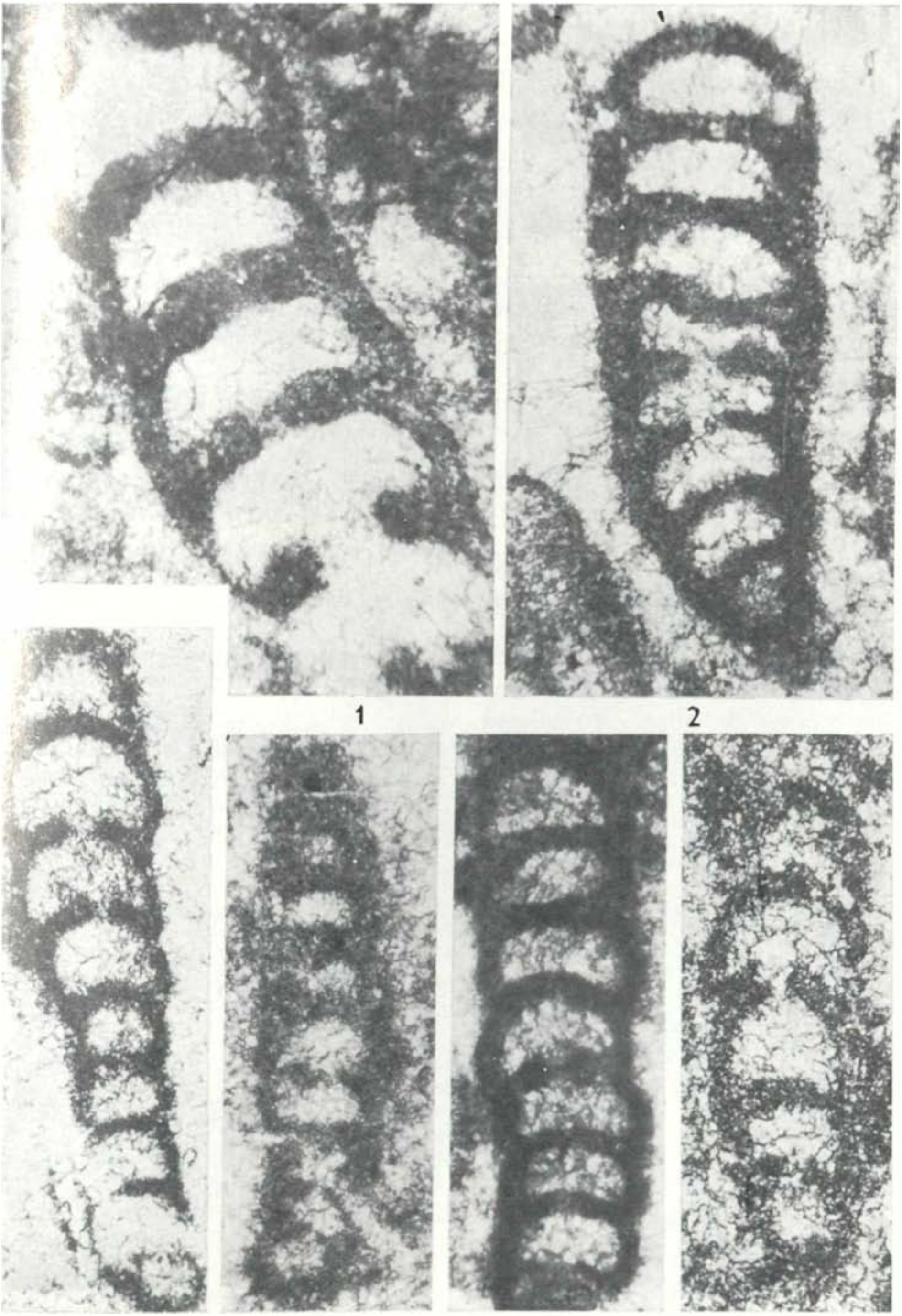

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PLATE XXXII

Fig. 1 *Caligella aff. antropovi* (LIPINA, 1955)
Malé Karpaty Mts., Plavecký Peter, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. By. 4623.

Fig. 2, 5 *Earlandinita grandis* SALAJ, 1978
Fig. 2. Plešivec, Rožkov, sample no. 483/58, Steinalm limestone, Anisian, thin section no. By. 1629.
Fig. 5. Silická planina, Zakázané, Steinalm limestone, Anisian, thin section no Bo. 6873.

Fig. 3—4 *Paleonubecularia minuta* BROENNIMANN, ZANINETTI, BOZORGNIA et HUBER, 1972
Fig. 3. Hybe Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6583.
Fig. 4. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5187.

Fig. 6 *Earlandinita soussi* SALAJ, 1978
Budíkovany, sample no. 15/65, Tisovec limestone, Carnian, thin section no. By. 2272.

Magnification: Fig: 1, 3—6 — x 115, Fig. 2 x 42.

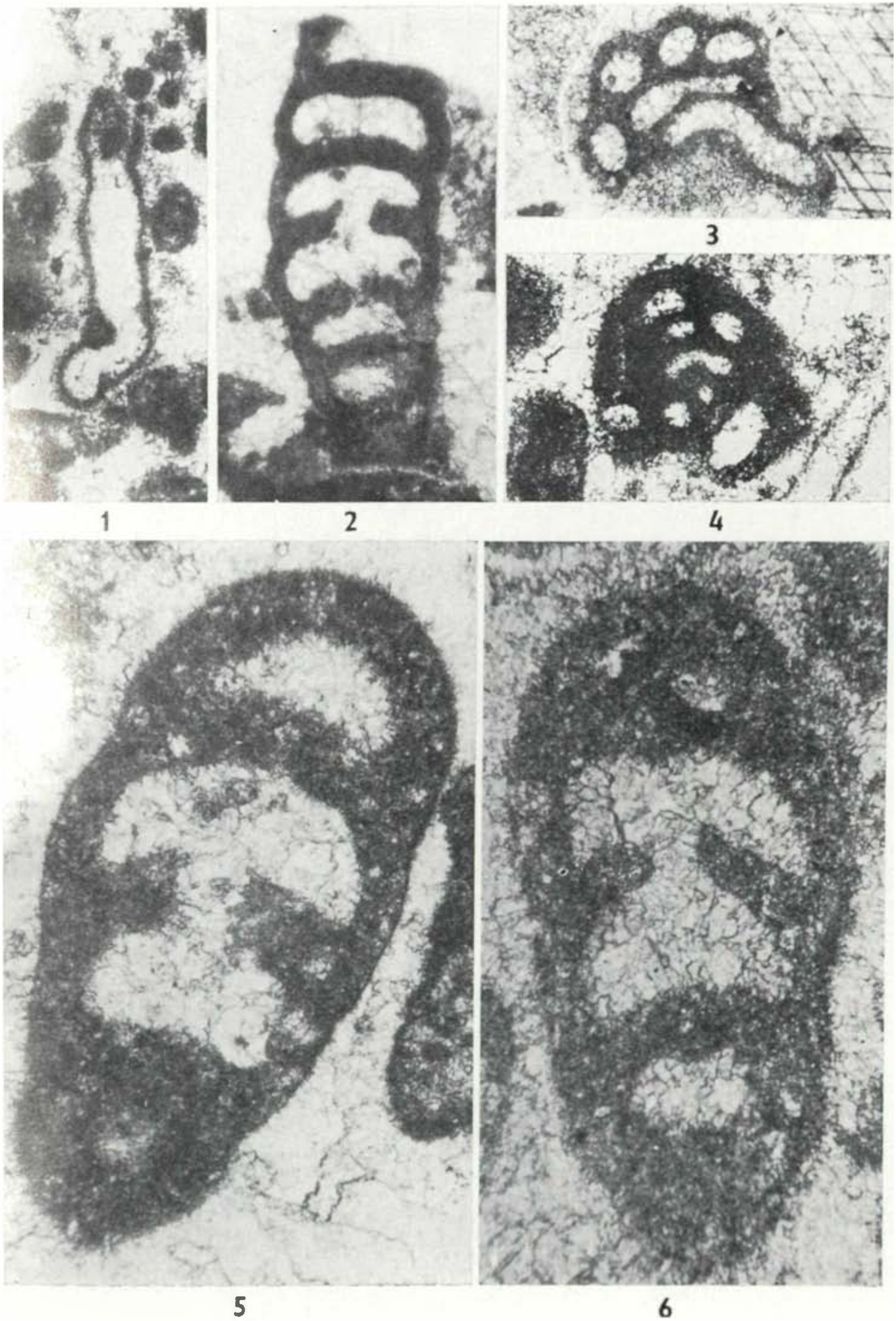
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PLATE XXXIII

Fig. 1—2 *Earlandinita oberhauseri* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 19

Fig. 1. Plešivecká planina plateau, sample no. 14/66, Steinalm limestone sian, thin section no. By. 2856.

Fig. 2. Silická planina plateau, Zakázané, Steinalm limestone, Anisian, section no. Bo. 6038.

Fig. 3 *Duotaxis birmanica* ZANINETTI et BROENNIMANN, 1975.

W of Tisovec, Teplica, Furmanec limestone, Norian, thin, section no. Bo. 5

Fig. 4—7 *Tetrataxis inflata* KRISTIAN, 1957

Fig. 4—5, 7. Drnava, Bleskový prameň, dark limestone, Lower Rhaetian, 4 — thin section no. By. 4633, fig. 5 — thin section no. 3/74i, fig. 7 — t section no. 1/74 By.

Fig. 6. W of Tisovec, Goštanová, Furmanec limestone, Norian, thin section Bo. 5402.

Magnification: Fig. 1, 3—7 x 115, Fig. 2 x 42.

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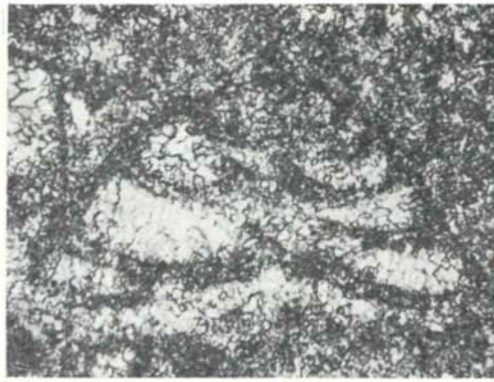

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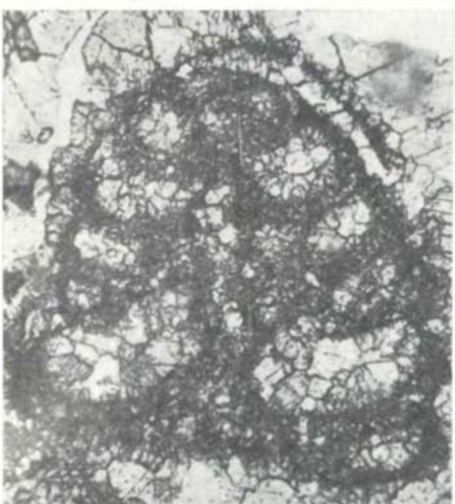

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PLATE XXXIV

Fig. 1 *Tetrataxis humilis* KRISTAN, 1957
Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no Bo. 6023.

Fig. 2—7 *Tetrataxis inflata* KRISTAN, 1957
Fig. 2, 6—7. Drnava, Bleskový prameň (spring), dark limestone, Lowe Rhaetian; fig. 2 — thin section no. By. 3/74₂, fig. 6—7 — thin section no. 1/74₁By.
Fig. 3. Muránska planina plateau, Tesná skala, sample no. 3/67, Furmanec limestone, Norian, thin section no. By. 3185.
Fig. 4. Drnava, Bleskový prameň, dark limestone, Lower Rhaetian, thin section no. Bo. 6062.
Fig. 5. S of Považská Bystrica, pebble of Rhaetian limestone from Paleocene conglomerats, thin section no. Bo. 5579.

Magnification: x 115.

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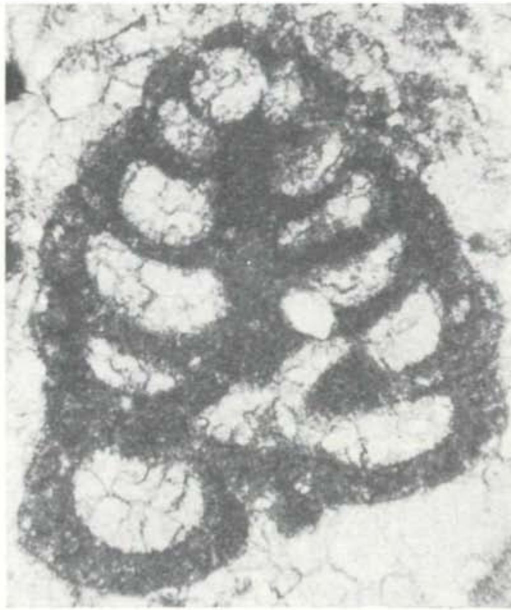

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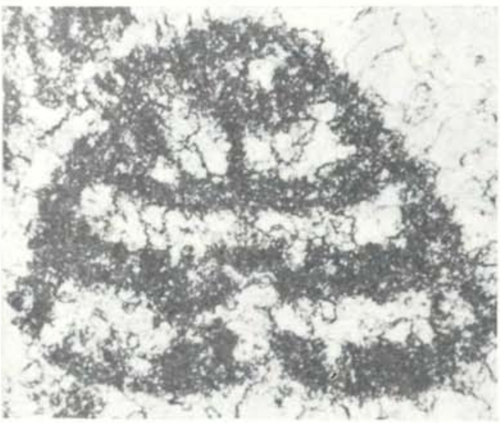

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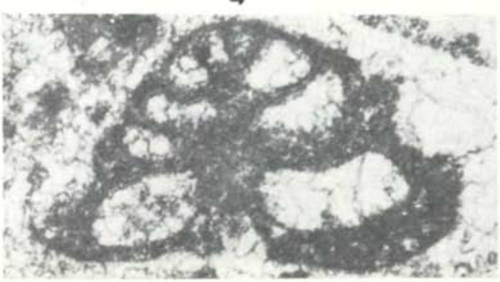

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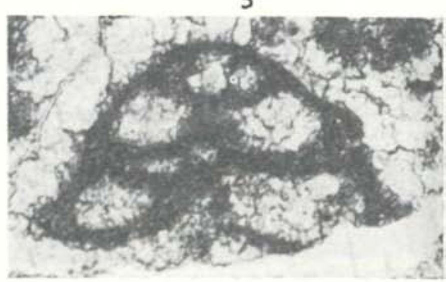

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PLATE XXXV

Fig. 1—8 *Tetrataxis inflata* KRISTAN, 1957

Fig. 1, 3, 5. Drnava, Bleskový prameň (spring), dark limestone, Lower Rhaetian, fig. 1 — thin section no. 2/74I, By. fig. 3, 5 — thin section no. By. 1/74I.

Fig. 2. Muránska planina plateau, Predná hora, Tisovec limestone, Carnian, thin section no. Bo. 6117.

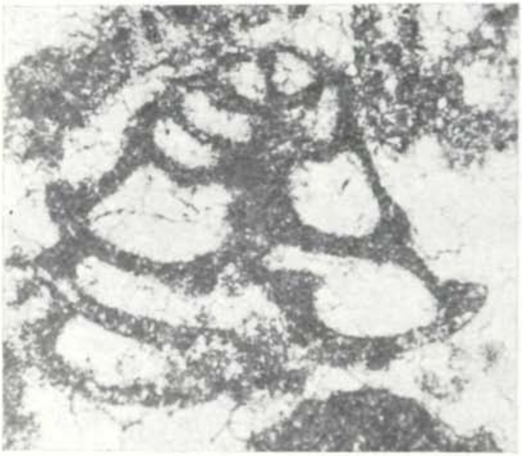
Fig. 4. Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5334.

Fig. 6. Muránska planina plateau, Tesná skala, Furmanec limestone, Norian, thin section no. By. 3185.

Fig. 7. Muránska planina plateau, Tisovec limestone, Carnian, thin section no. Bo. 6186.

Fig. 8. Muránska planina plateau, Furmanec limestone, Norian, thin section no. Bo. 5194.

Magnification: x 115.



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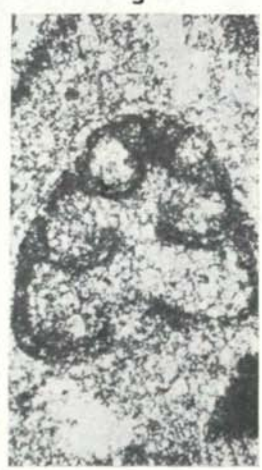

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PLATE XXXVI

Fig. 1—5 *Tetrataxis inflata* KRISTAN, 1957

Fig. 1, 4—5. Drnava, Bleskový prameň, dark limestone, Lower Rhaetian, fig. 1 — thin section no. Bo. 6060, fig. 4 — thin section no. Bo. 6061, fig. 5 — thin section no. By. 2/74.

Fig. 2. Dešťanky, Furmanec limestone, Norian, thin section no. Bo. 6030.

Fig. 3. Muránska planina plateau, organogenic limestone, Rhaetian, thin section no. Bo. 5191.

Fig. 6 *Tetrataxis nana* KRISTAN—TOLLMANN, 1964

Muránska planina plateau, organogenic limestone, Rhaetian, thin section no. Bo. 5183.

Fig. 7—12 *Tetrataxis nana* KRISTAN—TOLLMANN, 1964

Silická planina plateau, Zakázané, Steinalm limestone, Anisian, thin section no. Bo. 6870.

Magnification: x 115.

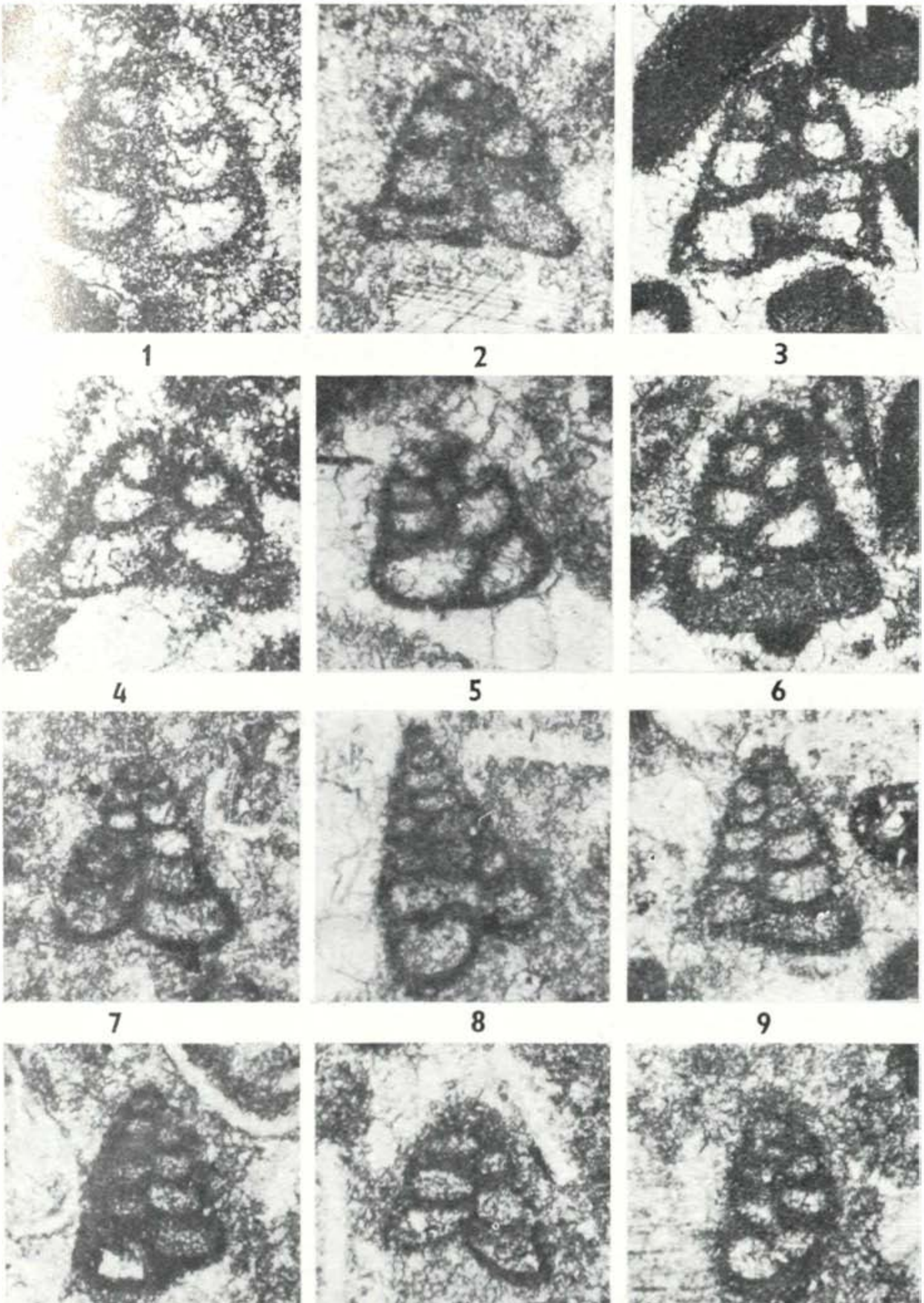
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PLATE XXXVII

Fig. 1 *Tetrataxis humilis* KRISTAN, 1957
W of Tisovec, Furmanec limestone, Norian, thin section no. Bo. 6424.

Fig. 2—3, 5 *Tetrataxis inflata* KRISTAN, 1957
Fig. 2. Kováčová, Furmanec limestone, Norian, thin section no. Bo. 6739.
Fig. 3. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6638.
Fig. 5. Kováčová, Furmanec limestone, Norian, thin section no. Bo. 6736.

Fig. 4 *Tetrataxis nana* KRISTAN—TOLLMANN, 1964
Veľká Fatra Mts., Ráztoky, sample no. 241/36, Fatra Formation, Rhaetian, thin section no. Mi. 241/36.

Fig. 6 *Endothyra austrotriadica* OBERHAUSER, 1960
W of Tisovec, Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5639.

Fig. 7—9 *Endothyra badouxi* ZANINETTI et BROENNIMANN, 1972
Fig. 7. Silická Brezová, sample no. 3/71, Tisovec limestone, Carnian, thin section no. By. 4673.
Fig. 8. Silická planina plateau, Zakázané, Steinalm limestone, Anis, thin section no. Bo. 6875.
Fig. 9. Silická Brezová, Tisovec limestone, Carnian, thin section. no 4742 Bo.

Fig. 10 *Endothyra gruenbachensis* OBERHAUER, 1960
W of Tisovec, Teplica, Tisovec limestone, Carnian, thin section no. Bo. 6063.

Magnification: Fig. 1—6, 8—10 x 115, Fig. 7 x 42.

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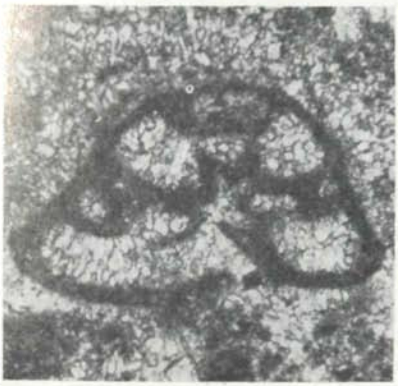

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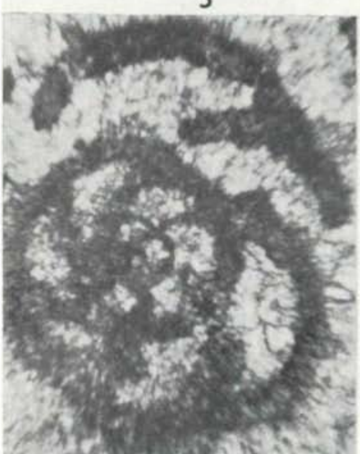

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PLATE XXXVIII

Fig. 1—2 *Endothyra kuepperi* OBERHAUSER, 1960
Fig. 1. Silická Brezová, Wetterstein limestone, Ladinian, thin section no. Bo 4719.
Fig. 2. Muránska planina plateau, Tisovec limestone, Carnian, thin section no Bo. 6883.

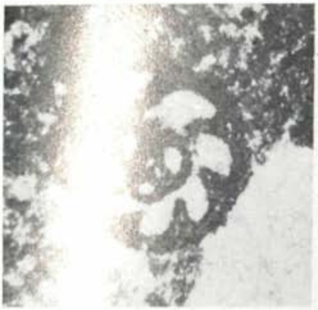
Fig. 3 *Endothyra* aff. *salaji* GAŻDZICKI; in GAŻDZICKI — TRAMMER — ZAWIDZKA, 1975
Muránska planina plateau, Veľká lúka, Tisovec limestone, Carnian, thin section no. 6883.

Fig. 4 *Endothyra* aff. *obturata* BROENNIMANN et ZANINETTI, 1972
Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4776.

Fig. 5 *Endothyra salaji* GAŻDZICKI; in GAŻDZICKI — TRAMMER — ZAWIDZKA, 1975
Stratenská hornatina Mts., Ďolka, Furmanec limestone, Norian, thin section no. Bo. 6006.

Fig. 6—7 *Endothyra brassica* (TRIFONOVA, 1978)
Silická Brezová, Tisovec limestone, Carnian.
Fig. 6 — thin section no. By. 4985.
Fig. 7 — thin section no. Bo. 6859.

Magnification: Fig. 1 x 42; Fig. 2—7 x 115.



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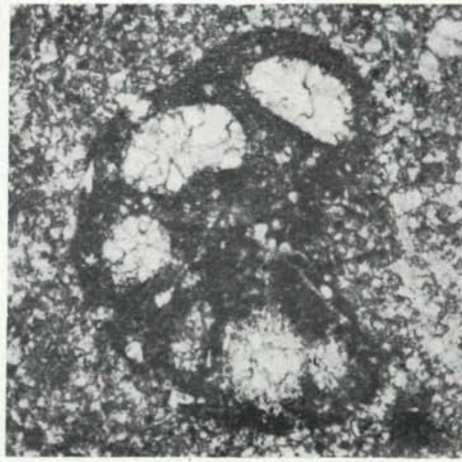

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PLATE XXXIX

Fig. 1—2 *Endothyra elegans* n. sp.

Fig. 1. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, th section no. By. 4656.

Fig. 2. Budíkovany, Tisovec limestone, Carnian, thin section no. By 1655.

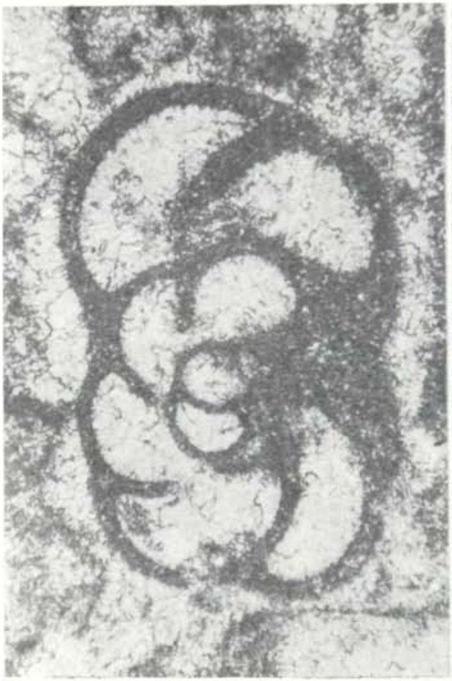
Fig. 3 *Neoendothyra reicheli* REITLINGER, 1965

Gemerská hôrka, Skalica, Steinalm limestone, Anisian, thin section no. Bo. 4

Fig. 4 *Endothyranella alpina* ZANINETTI et BROENNIMANN, 1972

Bore-hole D 27/51 — 70,0 m Drienok, Steinalm limestone, Anisian,

Magnification: Fig. 1, 4 x 42; Fig. 2—3 x 115.



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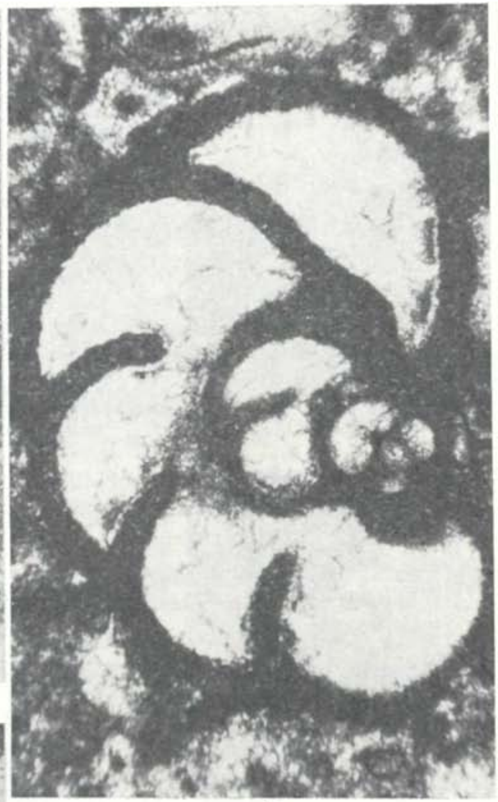

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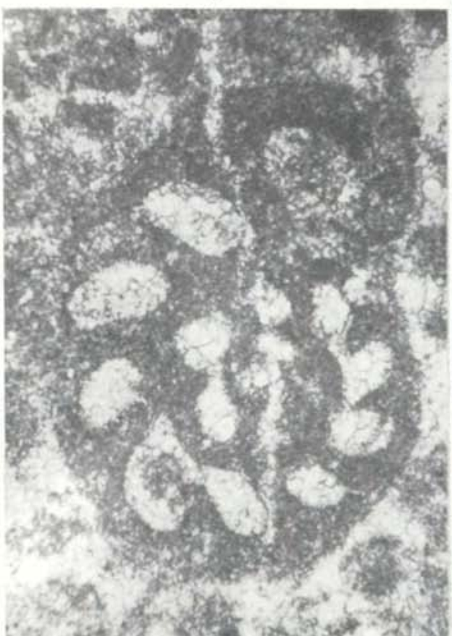

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PLATE XL

Fig. 1—2 *Endothyranella alpina* ZANINETTI et BROENNIMANN, 1972
Fig. 1. Stratenská hornatina Mts. Dolka, Furmanec limestone, Norian, thin section no. Bo. 6932.
Fig. 2. W of Tisovec, elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6366.

Fig. 3 *Endothyranella armstrongi* PLUMMER, 1944
Plešivecká planina plateau, sample no. 70/59, Steinalm limestone, Anisian, thin section no. By. 2856.

Fig. 4 *Endothyranella lombardi* ZANINETTI et BROENNIMANN, 1972
Plešivecká planina plateau, sample no. 70/59, Steialm limestone, Anisian, thin section no. By. 1972.

Fig. 5 *Endothyranella tricamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
Plešivecká planina plateau, sample no. 70/59, Steinalm limestone, Anisian, thin section no. By. 1972.

Fig. 6 *Endothyranella bicamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ 1967
Kováčová, Furmanec limestone, Norian, thin, section no. Bo. 6738.

Fig. 7—9 *Endothyranella pentacamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
Fig. 7. Stratenská hornatina Mts., crossing of Stratená and Hrabušice roads, Tisovec limestone, Carnian, thin section no. Bo. 6287.
Fig. 8. W of Tisovec elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6384.
Fig. 9. Stratenská hornatina Mts., Havrania skala, Tisovec limestone, Carnian, thin section no. Bo. 6277.

Magnification: Fig. 1—3, 6—9 x 115, Fig. 4—5 x 42.

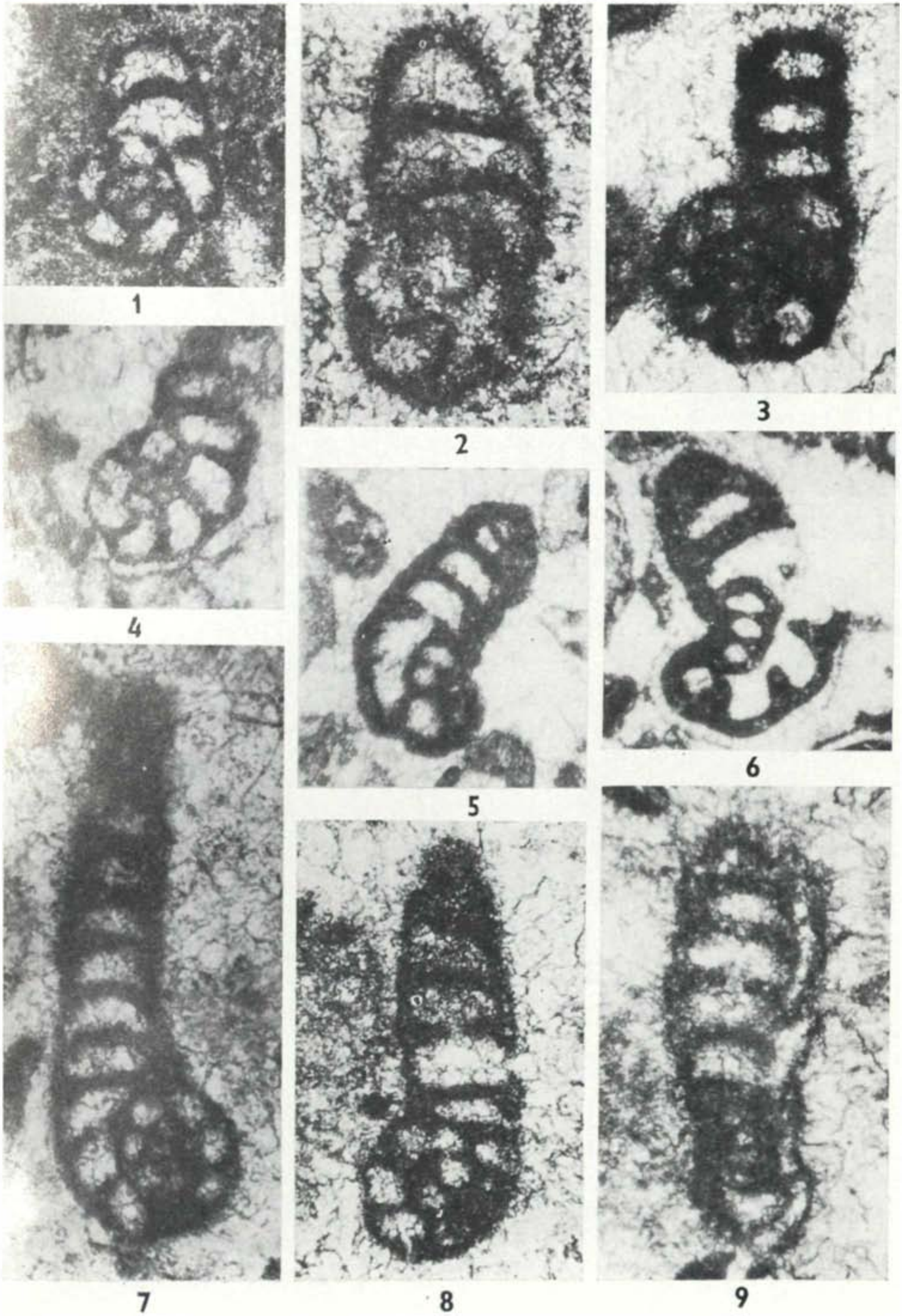
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PLATE XLI

Fig. 1 *Endothyranella robusta* SALAJ, 1978
Silická Brezová, sample no. 14/71, Tisovec, Limestone, Carnian, thin secti
no. By. 5033.

Fig. 2 *Endothyranella* cf. *robusta* SALAJ, 1978
Stratenská hornatina Mts., SW from Havrania skala, Tisovec limestone, Car
nian, thin section no. Bo. 6284.

Fig. 3—4. *Endothyranella tricamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
Fig. 3. Silická planina plateau, Zakázané, Steinalm limestone, Anisian, thin section no. Bo. 6875.
Fig. 4. Plešivecká planina plateau, sample no. 70/59, Steinalm limestone, Anisian, thin section no. By. 1972.

Magnification: Fig. 1—2, 4 x 115, Fig. 3 x 60.


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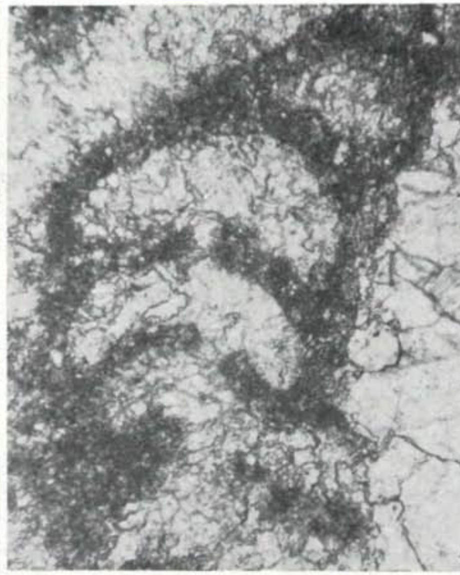
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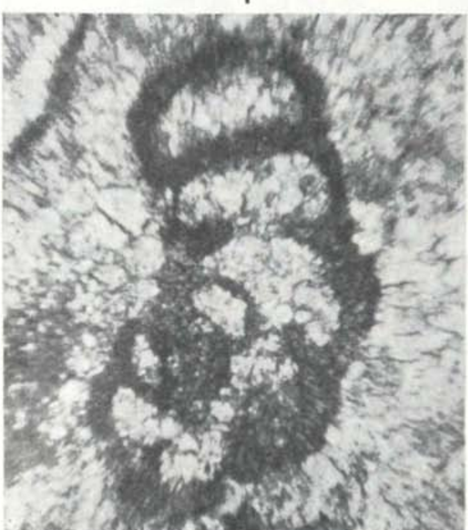
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PLATE XLII

Fig. 1 *Endothyranella robusta* SALAJ, 1978
Type species. Silická planina plateau, Plešivec, Steinalm limestone
Meandrospira dinarica KOCHANSKY—DEVIDÉ et PANTIĆ, Anisian, thin sec
no. By. 1489.

Fig. 2 *Earlandinita grandis* SALAJ, 1978
Type species. Plešivec, sample no. 313/1957, schreyeralm limestone, Up
Anisian, thin section no. By. 820.

Fig. 3 *Earlandinita? soussi* SALAJ, 1978
Type species. Budikovany, Tisovec limestone with *Andrusoporella duplica* and *Andrusoporella brezovica,* Carnian, thin section no. By. 2268.

Fig. 4 *Earlandinita grandis* SALAJ, 1978
Type species. Plešivec, sample no. 163, Steinalm limestone with Anisian, th
section no. By. 844.

Magnification: x 90.

Fig. 1—4 reillustrated from the publication of J. SALAJ (1978).

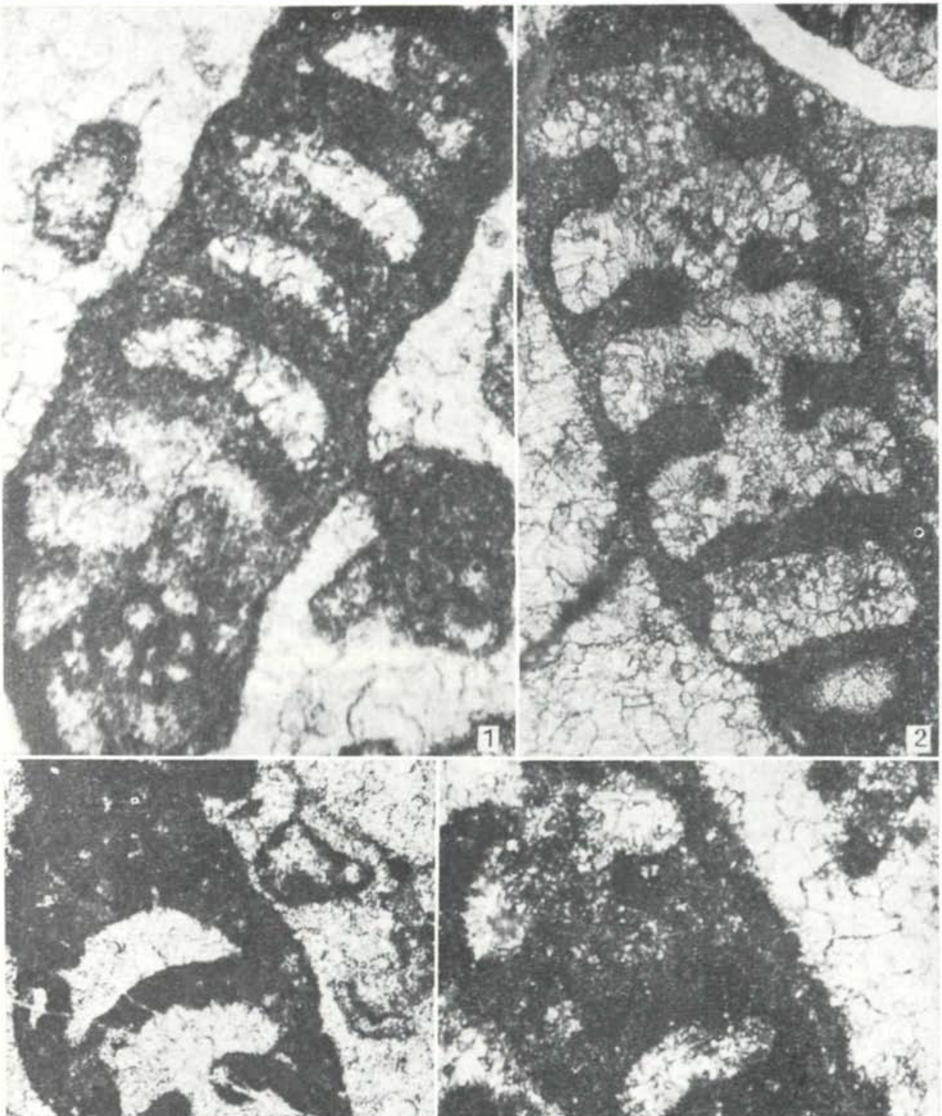
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PLATE XLIII

Fig. 1 *Endothyranella robusta* SALAJ, 1978
Plešivec, Steinalm limestone, Anisian, thin section no. By. 58 (56—5).

Fig. 2 *Endothyranella pentacamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1
Kameňany, sample no. 14/556—1, Steinalm limestone, Anisian, thin section
By. 356.

Fig. 3 a — *Endothyranella bicamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 19
b — *Permodiscus pragsoides* OBERHAUSER, 1964
Silická Brezová, Tisovec limestone, Carnian, thin section no. By. 2276.

Fig. 4 a — *Endothyra kuepperi* OBERHAUSER, 1960
b — *Endothyranella bicamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ
1967
Plešivec Szarosz-szoba, sample no. 76/1956, Schreyeralm limestone, Anisian, thi
section no. By. 162.

Magnification: Fig. 1, 2 x 90, Fig. 3 x 50, Fig. 4 x 27.

Fig. 1, 4, reillustrated from the publications of J. SALAJ (1978) and fig. 2, 3 from the publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967).

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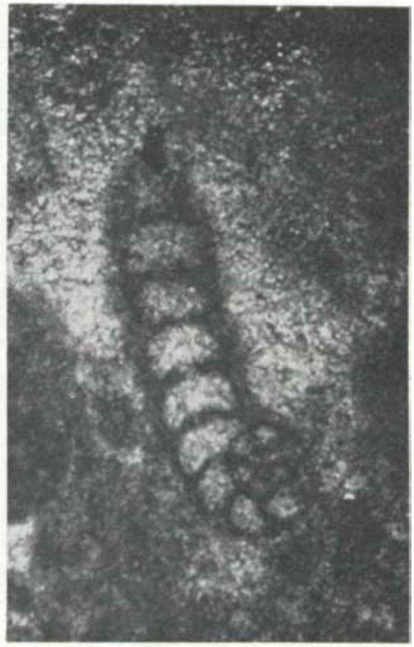

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PLATE XLIV

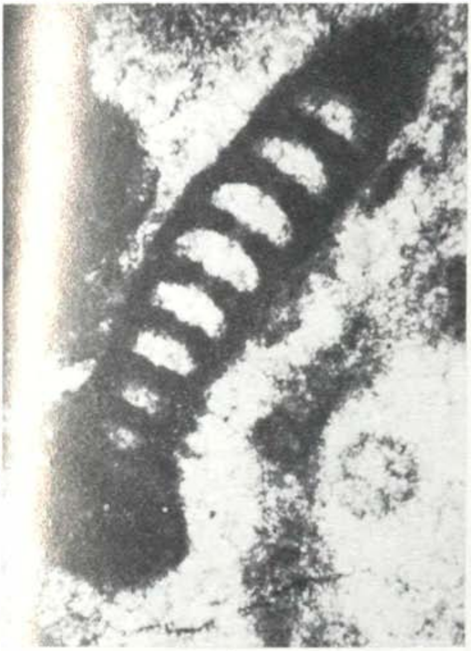
Fig. 1 *Endothyranella pentacamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 196 Plešivec, Steinalm limestone, Anisian, thin section no. By. 41/41/56.

Fig. 2 *Endothyranella pentacamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 196 Plešivec, Steinalm limestone, Anisian, thin section no. By. 875.

Fig. 3 *Endothyranella bicamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967 Plešivec, sample no. 306/57, Steinalm limestone, Anisian, thin section no. By. 818.

Fig. 4 *Endothyranella bicamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967 Plešivec, sample no. 313/57, Steinalm limestone, Anisian, thin section no. By. 821.

Magnification: x 96.



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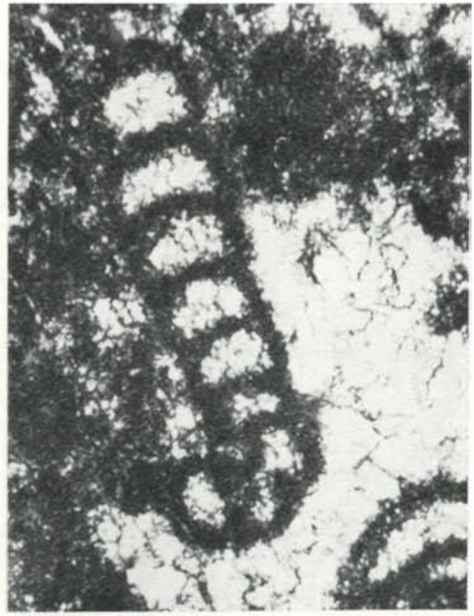

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PLATE XLV

Fig. 1 *Lingulina* sp.
Silická Brezová, Wetterstein limestone, Ladinian, thin section no. Bo. 4866.

Fig. 2—3 Uniserial part of *Endothyranella wirtzi* (KOEHN—ZANINETTI, 1968)
Drienok — Bore-hole (D-27/51, 70,0 m. Steinalm limestone, Anisian.
Fig. 3. Silická planina plateau, Zakázané, Steinalm limestone, Anisian, thin section no. Bo. 6874.

Fig. 4 *Endothyranella tricamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
Rožňava, sample no. 13/59, Steinalm limestone, Anisian, thin section no. By. 1964.

Magnification: x 115.


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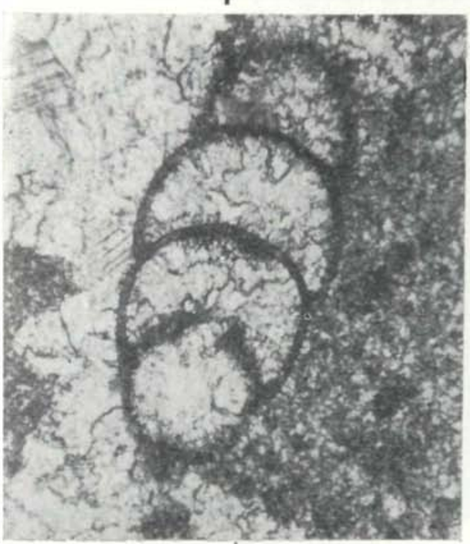
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PLATE XLVI

Fig. 1 *Nodosinella libera* TRIFONOVA, 1967
Fabova hoľa, sample no. 5, Wetterstein limestone with *Pilamminella gemeric* (SALAJ, 1969), Ladinian, thin section no. Sj 2185/66.

Fig. 2 *Endothyranella robusta* SALAJ, 1978
Plešivec, sample no. 89, Steinalm limestone with *Meandrospira dinarica* (KOCHANSKY—DEVIDÉ et PANTIĆ, 1966, Anisian, thin section no. By. 58/56-14.

Fig. 3 *Rectoseptaglomospiranella memmii* SALAJ, 1978
Slovak karst, Hôrka, sample no. 305/57, Steinalm limestone with *Physoporella pauciforata pauciforata, Physoporella pauciforata gemerica, Diplopora,* sp., *Meandrospira insolita* (HO, 1959) and *Meandrospira dinarica* KOCHAŃSKY—DEVIDÉ et PANTIĆ (1960), Anisian, thin section no. By. 816.

Fig. 4 *Endothyranella robusta* SALAJ, 1978
Plešivec, sample no. 58/56-14, Steinalm limestone with *Meandrospira dinarica* KOCHAŃSKY—DEVIDÉ et PANTIĆ, 1966, Anisian, thin section no. By. 184.

Magnification: Fig. 1 x 50, Fig. 2, 3, 4 x 90.

Fig. 1—4 reillustrated from the publication of J. SALAJ (1978).

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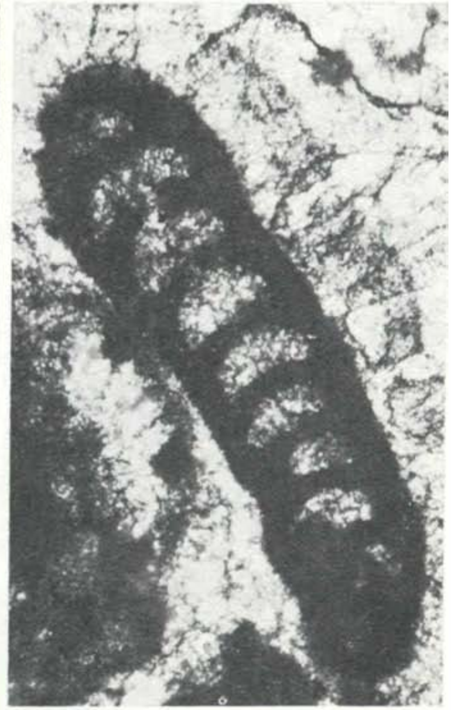

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PLATE XLVII

Fig. 1 *Haplophragmium maamouri* SALAJ, 1978
Type species. Jasov, 2. S slope of Vysoká (W of village Drieňovec). Weterstein limestone with *Teutloporella herculea,* Ladinian, thin section no. 1051.

Fig. 2 *Reophax* aff. *asperus* CUSHMAN et WATERS, 1928
Slovak karst, Krásnohorská Dlhá Lúka, sample no. 509/58, Steinalm limestone with *Physoporella pauciforata and Meandrospiranella samueli* SALAJ, Anisian, thin section no By. 1668.

Fig. 3 a — *Valvulina azzouzi* SALAJ, 1978
a — Type species.
b — *Pilamminella kuthani* (SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967)
Silická Brezová, Tisovec limestone, Carnian, thin section no. By. 2144.

Fig. 4 *Meandrospira dinarica* KOCHANSKY—DEVIDÉ et PANTIĆ, 1966 Krásnohorska Dlhá Lúka, Steinalm limestone, Anisian, thin section no. By. 1668.

Fig. 5 *Valvulina azzouzi* SALAJ, 1978
Plešivec, Steinalm limestone with *Meandrospira dinarica,* Anisian, thin section no. By. 853.

Fig. 6 *Earlandinita elongata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
Type species. Gemerská Hôrka, sample no. 313/57, Steinalm limestone, Anisian, thin section no. By. 820.

Fig. 7 *Earlandinita ladinica* SALAJ, 1978
Type species, Fabova hoľa, 4, sample no. 2190/1966, Wetterstein limestone, Ladinian with *Permodiscus pragsoides,* thin section no. 2190/1966.

Fig. 8 *Endothyranella bicamerata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
Gemerská hôrka, sample no. 313/57, Steinalm limestone, Anisian, thin section no. By. 820.

Fig. 9 *Valvulina azzouzi* SALAJ, 1978
Plešivec, sample no. 151/1 Steinalm limestone with
Meandrospira dinarica KOCHANSKY—DEVIDÉ et PANTIĆ, Anisilan, thin section no. By. 8.

Fig. 10 *Earlandinita ladinica* SALAJ, 1978
Budikovany, sample no. 22, Wetterstein limestone, Ladinian, thin section no. By. 863/61.

Magnification: Fig. 1, 6, 7, 8 x 27, Fig. 10 x 38, Fig. 3, 4, 9 x 50, Fig. 2, 5 x 90.

Fig. 1, 2, 3, 5, 7, 9 reillustrated from the publication of J. SALAJ (1978) and fig. 6, 8 from the publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b).


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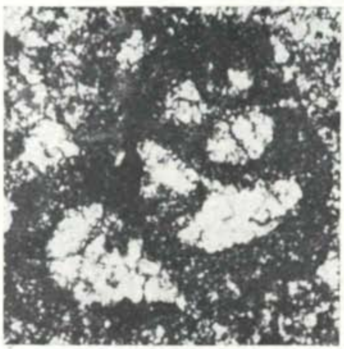
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PLATE XLVIII

Fig. 1 *Endothyranella* aff. *wirtzi* (KOEHN—ZANINETTI, 1968)
Silická Brezová, Wetterstein limestone, Ladinian, thin section no. Bo. 4866.

Fig. 2 *Haplophragmella* aff. *irregularis* RAUSER—CHERNOUSOVA, 1948
W of Tisovec elevation point 878,5 Furmanec limestone, Norian thin section no. Bo. 6371.

Fig. 3 *Paraendothyra* cf. *nalivkini* CHERNISHEVA, 1940
W of Tisovec, Javorová, Furmanec limestone, Norian, thin section no. Bo. 5418.

Fig. 4 *Endotyhranopsis* cf. *crassa* (BRADY in MOORE, 1870)
W of Tisovec, Javorová, Furmanec limestone, Norian, thin section no. Bo. 6810.

Fig. 5 *Haplophragmina* aff. *kashrica* (REITLINGER, 1950)
Geravy, dark-greyish limestone, Uppermost Norian, thin section no. By. 4981.

Fig. 6 *Klubovella* cf. *konensis* LEBEDEVA, 1956
W of Tisovec elevation point 878,5, Furmanec limestone, Norian, thin, section no. Bo. 6357.

Fig. 7 *Endothyranopsis* cf. *crassa* BRADY, in MOORE, 1870
Plešivecká planina plateau, Ostré vŕšky, sample no. 3/71, Tisovec limestone, Carnian, thin section no. By. 4621.

Fig. 8 *Glyphostomella triloculina* (CUSHMAN et WATERS, 1927)
Muránska planina plateau, Veľká lúka, Tisovec limestone, Carnian, thin section no. Bo. S.

Magnification: Fig. 1, 3—4, 8 x 115; Fig. 2, 5—7 x 42.

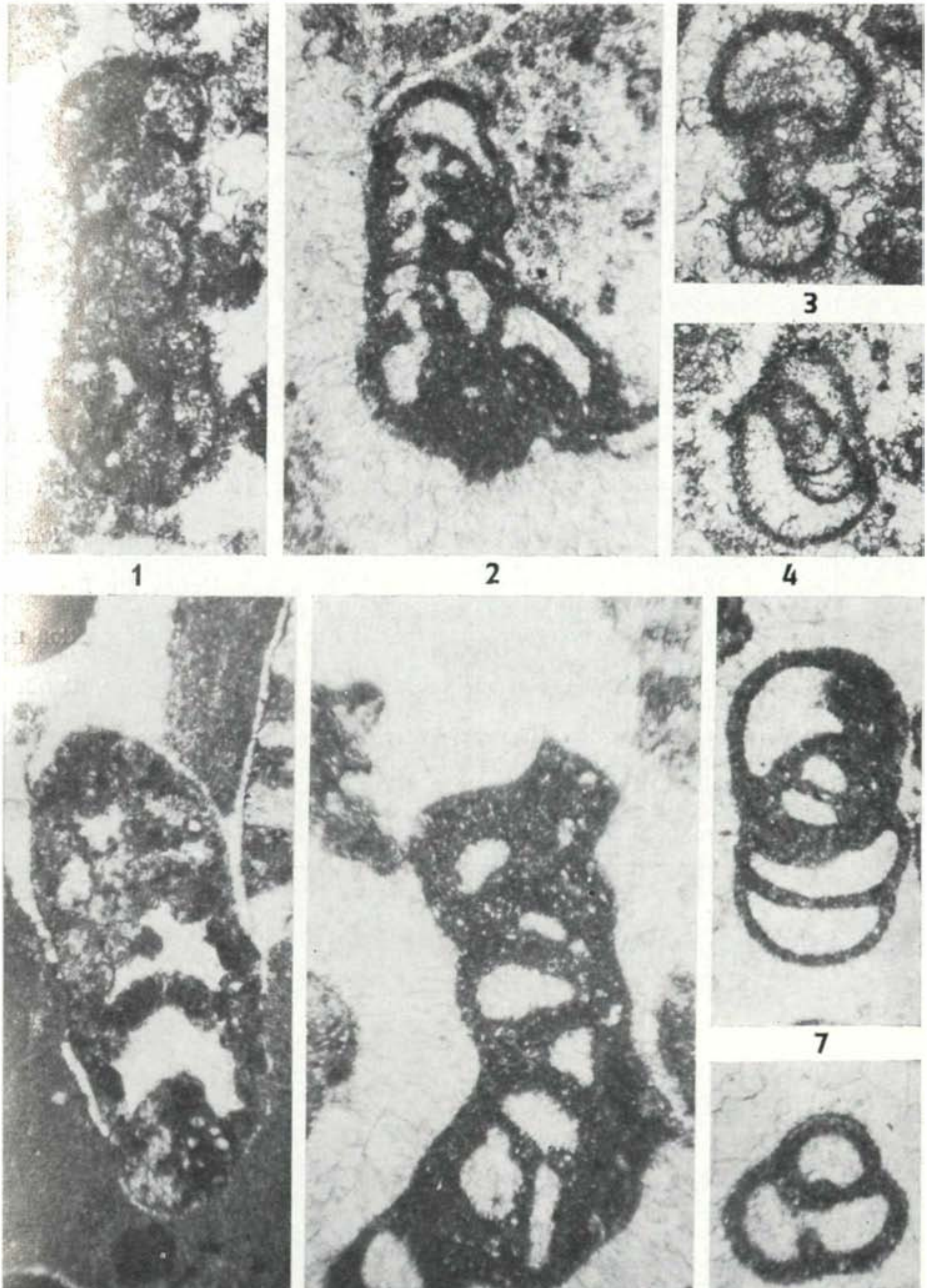
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PLATE XLIX

Fig. 1—16 *Agathammina austroalpina* KRISTAN—TOLLMANN et TOLLMANN, 1964

Fig. 1. W of Tisovec, Hradová, Tisovec limestone, Carnian, thin section no. Bo. 6508.

Fig. 2, 7, 9, 12. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 2 — thin section no. Bo. 5252, fig. 7 — thin section no. Bo. 5288, fig. 9 — thin section no. Bo. 5104, fig. 12 — thin section no. Bo. 5300.

Fig. 3. W of Tisovec, Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5678.

Fig. 4. W of Tisovec, E of elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6355.

Fig. 5, 16. W of Tisovec, Gaštanová, Furmanec limestone, Norian, fig. 5 — thin section no. Bo. 5430, fig. 16 — thin section no. Bo. 5371.

Fig. 6, 11. W of Tisovec, Teplica, Tisovec limestone, Carnian, thin section no. Bo. 6063.

Fig. 8. Muránska planina plateau, Predná hora, Tisovec limestone, Carnian, thin section no. 6113 Bo.

Fig. 10. Malé Karpaty Mts., Plavecký Peter, sample no. 1/72, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. By. 4632.

Fig. 13. Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5357.

Fig. 14. Muránska planina plateau, Veľká lúka, Tisovec limestone, Carnian, thin section no. Bo. 6886.

Fig. 15. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4819.

Magnification: x 115.

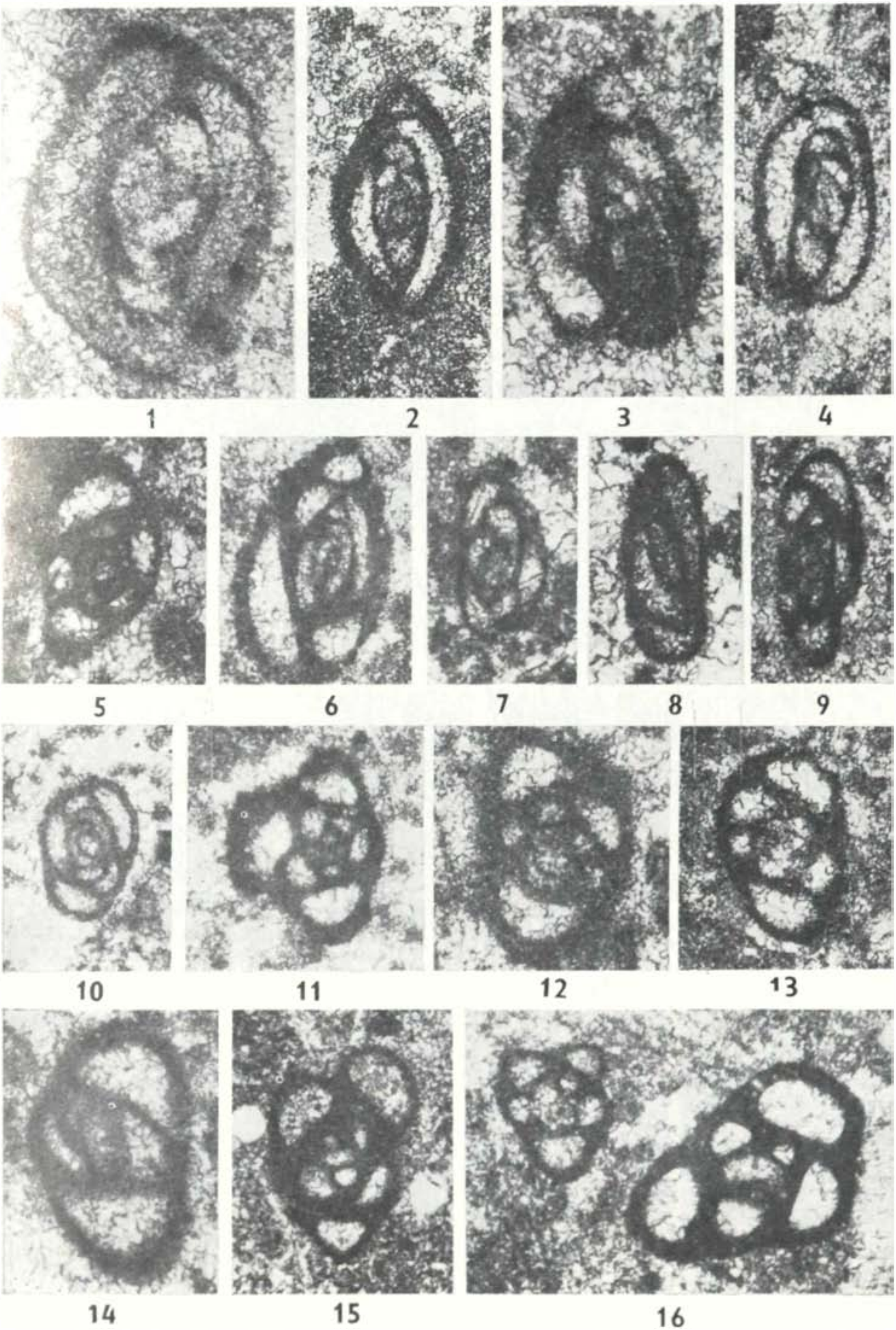
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PLATE L

Fig. 1—6 *Agathammina austroalpina* KRISTAN—TOLLMANN et TOLLMANN, 1964
Fig. 1—2, 4—6. Muránska planina, plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1 — thin section no. Bo. 5283, fig. 2 — thin section no. Bo. 5260, fig. 4 — thin section 5283, fig. 5 — thin section no. Bo. 5269, fig. 6 — thin section no. Bo. 5269.
Fig. 3. Silická Brezová, Wetterstein limestone, Ladinian, thin section no. Bo. 4720.

Fig. 7—12 *Agathammina parafusiformis* n. sp.
Fig. 7, 9. Drnava, Bleskový prameň, dark limestone, Lower Rhaetian; fig. 7 — thin section no. Bo. 6060, fig. 9 — thin section By. 4632.
Fig. 8. Type species W of Tisovec, elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6380.
Fig. 10. Muránska planina plateau, Dachstein limestone to Lower Rhaetian, Uppermost Norian, thin section no. Bo. 5283.
Fig. 11—12. W of Tisovec, Goštanová, Furmanec limestone, Norian, fig. 11 — thin section no. Bo. 5430, fig. 12 — thin section no. Bo. 5378.

Fig. 13—15 *Agathammina multispira* n. sp.
Fig. 13. Jablonové, pebble of Dachstein limestone from Paleocene conglomerates, thin section no. Bo. 5581.
Fig. 14—15. Hybe, Dachstein limestone, Uppermost Norian, to Lower Rhaetian, thin section no. Bo. 5904.
Fig. 14. Type species.

Fig. 16 *Agathammina spiroloculiformis* (ORAVECZNÉ—SCHEFFER, 1972)
Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5922.

Magnification: x 115.






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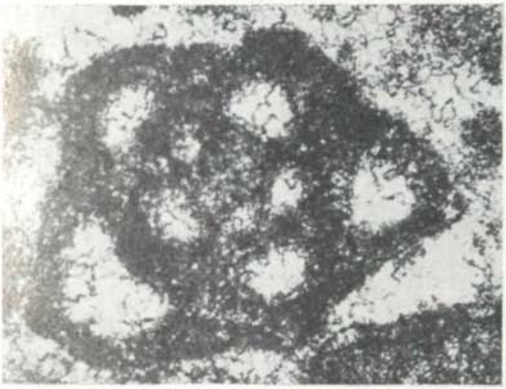
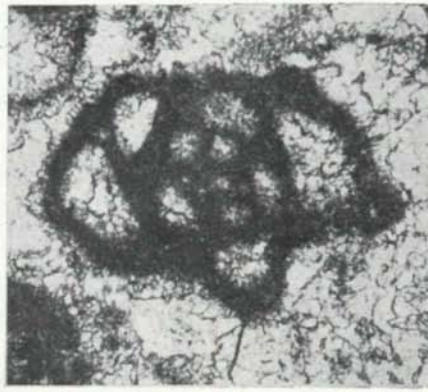

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PLATE LI

Fig. 1—8 *Meandrospira dinarica* KOCHANSKY—DEVIDÉ et PANTIĆ, 1966

Fig. 1, 3—4, 7—8. Silická planina plateau, Zakázané, Steinalm limestone, Anisian; fig. 1, 4 — thin section no. Bo. 6873, fig. 3, 8 — thin section no. Bo. 6874, fig. 7 — thin section no. Bo. 6877.

Fig. 2. Demänovská dolina, Vrbické pleso, Guttenstein limestone of Krížna nappe, Anisian, thin section no. By. 3581.

Fig. 4. Demänová, sample no. 1/65, Guttenstein limestone of Krížna nappe, Anisian, thin section no. By. 2316.

Magnification: x 115.

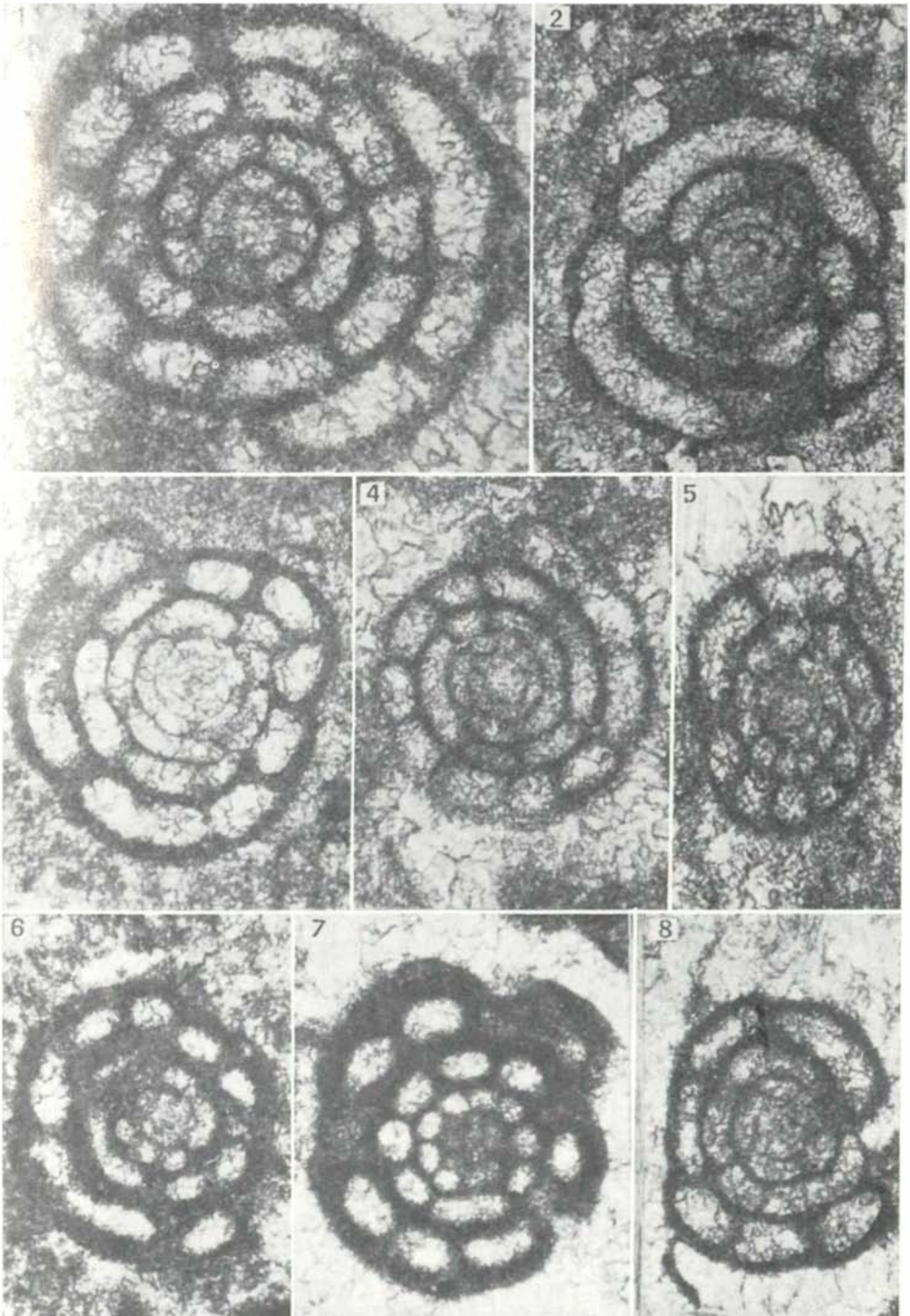
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PLATE LII

Fig. 1—8 *Meandrospira dinarica* KOCHANSKY—DEVIDÉ et PANTIĆ, 1966

Fig. 1, 3, 7. Silická planina plateau, Zakázané, Steinalm limestone, Anisian, fig. 1 — thin section no. Bo. 6877,
fig. 3 — thin section no. Bo. 6876, fig. 7 — thin section no. Bo. 6874.

Fig. 2. Inovec Mts., Pavlusov, Anisian of the Choč nappe, thin section no. Sj. B 3212/61.

Fig. 4. Silická planina Mts., Zakázané, Schreyeralm limestone, Illyrian, thin section no. Bo. 6031.

Fig. 5. Drienok, Bore-hole D 27/51, level 70,0 m, Anisian, Steinalm limestone.

Fig. 6. Gemerská Hôrka, Skalica, Steinalm limestone, Anisian, thin section no. Bo. 6878.

Fig. 8. W of Tisovec, S of Goštanová, Steinalm limestone, Anisian, thin section no. Bo. 5418.

Magnification: x 115.

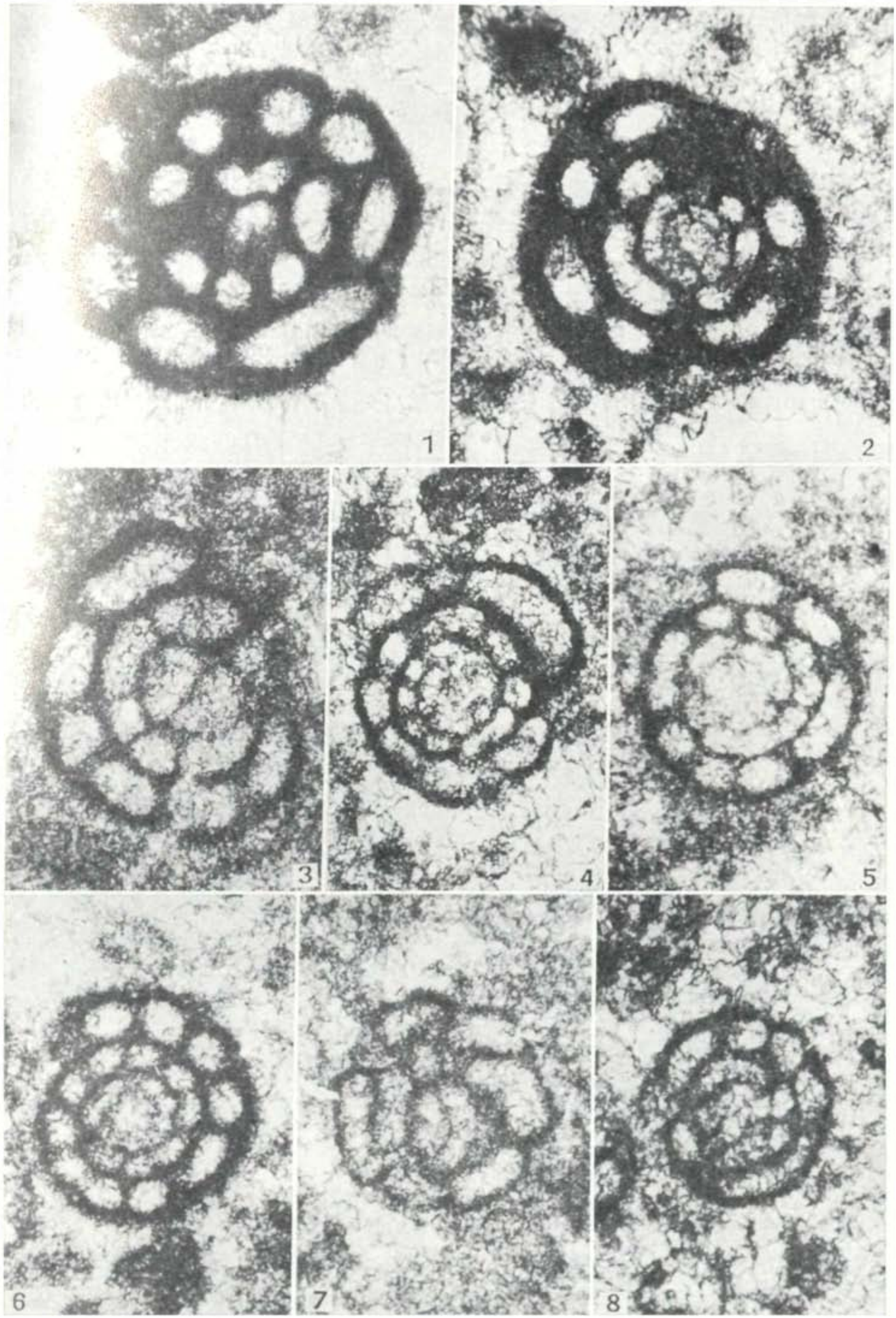
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PLATE LIII

Fig. 1—4 *Meandrospira deformata* SALAJ, 1967
Partizánska Lupča, elevation point Klačov, sample no. 2/65, dark Guttenstein limestone, Anisian, thin section no. 2700. Fig. 4 — Type species.

Fig. 4. reillustrated from the publication J. SALAJ — A. BIELY — J. BYSTRICKÝ, 1967.

Magnification: x 115.


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PLATE LIV

Fig. 1—6 *Meandrospira deformata* SALAJ, 1967

Fig. 1, 3, 5. Partizánska Lupča, elevation point Klačov, sample no. 2/65 dar Guttenstein limestone, Anisian, thin section no. BIELY 2700.

Fig. 2, 4, 6. Veľká Fatra Mts., Belánska dolina, quarry, dolomite of Krížna nappe Anisian, thin section By. 4629.

Fig. 7—9 *Meandrospira insolita* (HO, 1959)

Fig. 7. Drienok, Bore-hole D 27/51, level 70,0 m, Anisian. Steinalm limestone.

Fig. 8. Silická planina plateau, Zakázané, Steinalm limestone, Anisian, thin section no. Bo. 6876.

Fig. 9. Vysoké Tatry Mts., Tatranská kotlina, Bore-hole BTH-1, thin section Sj./Pk. M 3883/59.

Magnification: x 115.

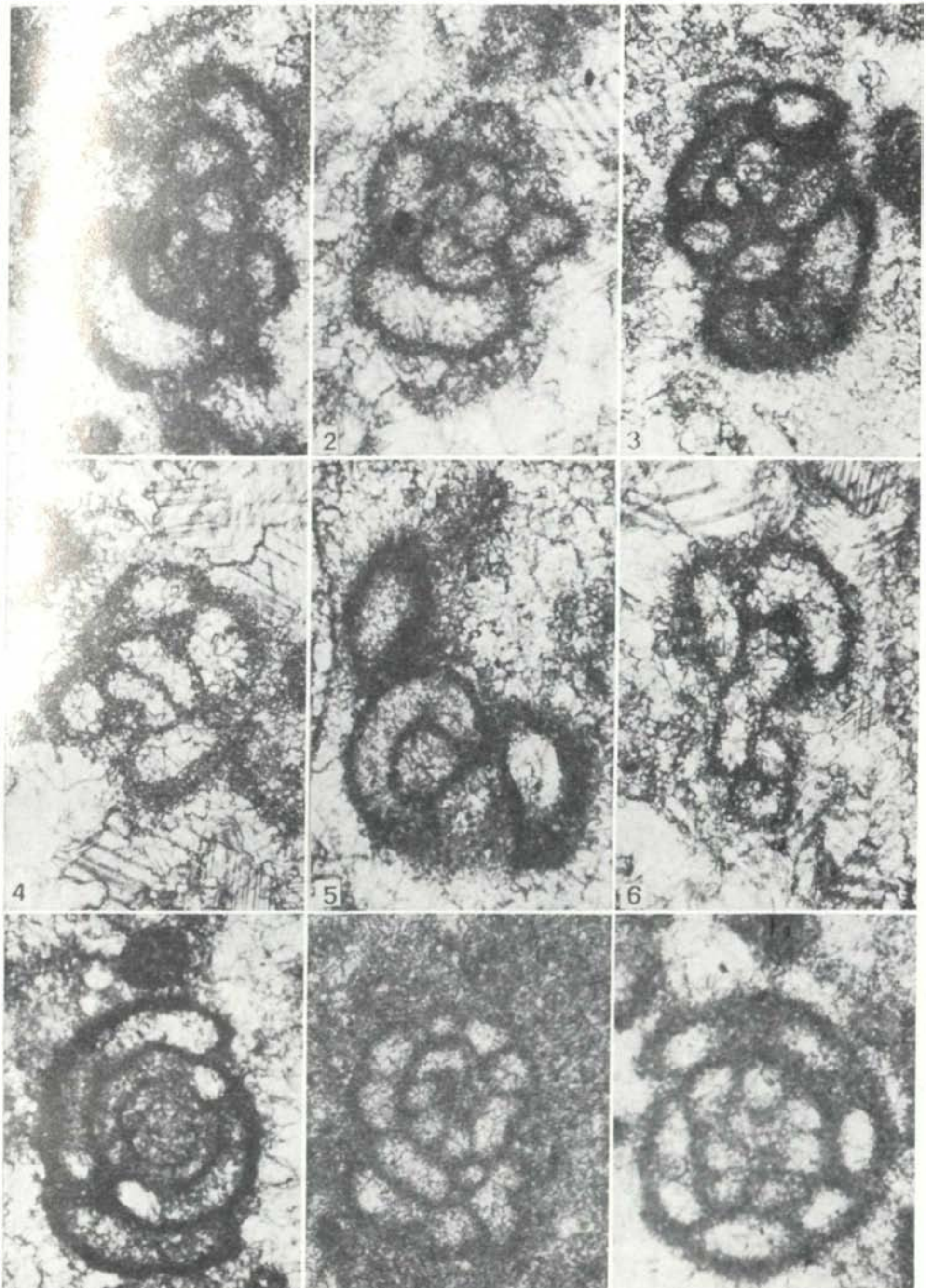
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PLATE LV

Fig. 1—18 *Meandrospira pusilla* (HO, 1959)
Muránska planina plateau, Červená skala, Campilian marlstone, thin section no. R 440 B—167/22.

Fig. 19 *Meandrospira insolita* (HO, 1959) and *Meandrospira pusilla* (HO, 1959)
Poniky 949 — sample no. BB 2/1 — Steinalm limestone, Anisian, thin section By. 227/1967.

Fig. 19 reillustrated from the publication of J. SALAJ (1969)

Magnification: Fig. 1—18 x 115; Fig. 19 x 96.

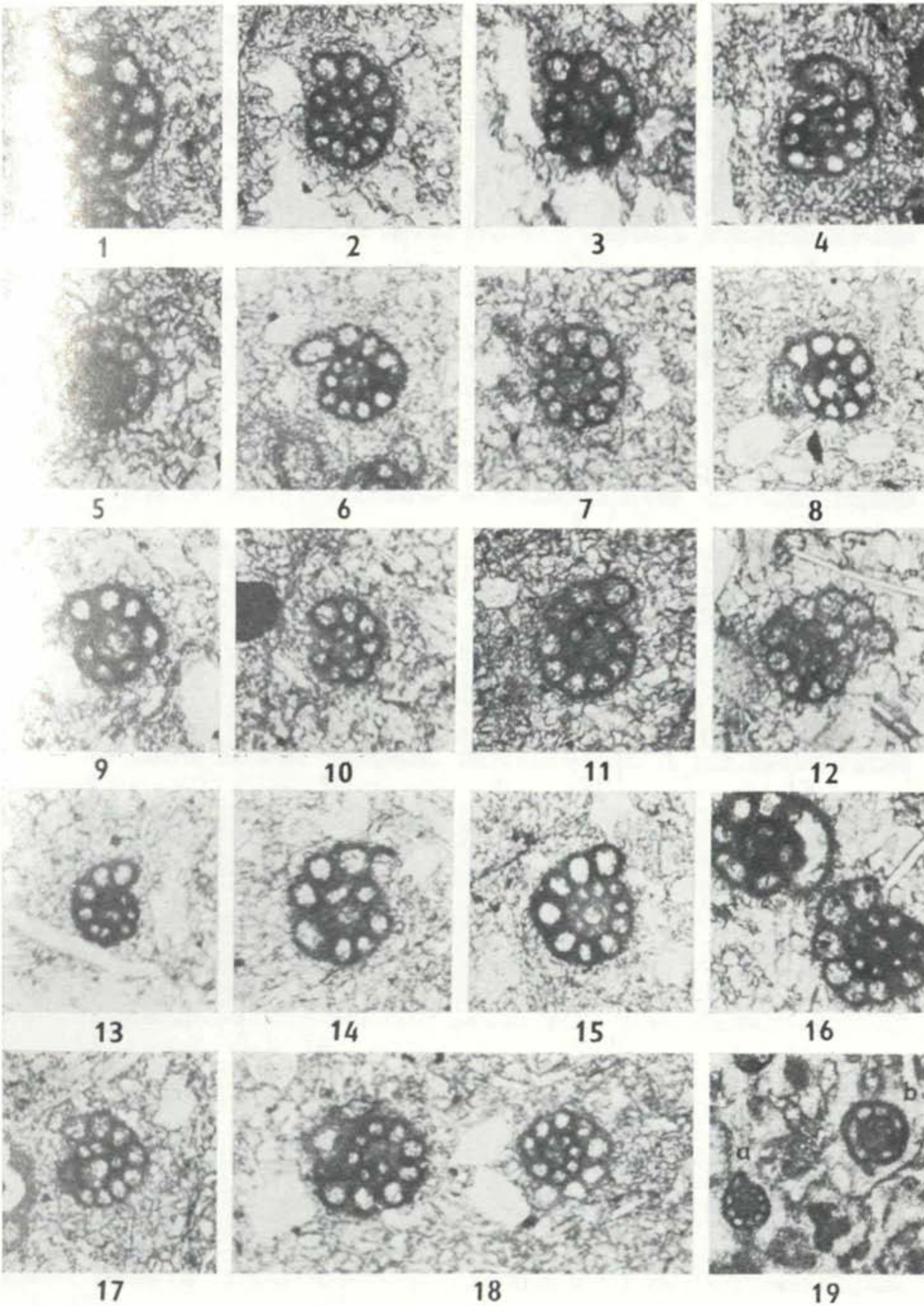
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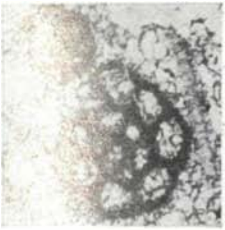
PLATE LVI

Fig. 1—19 *Meandrospira cheni* (HO, 1959)
Muránska planina plateau, Červená Skala, Campilian marlstone, thin sec
no. R 440 B.—167/22.

Magnification: x 115.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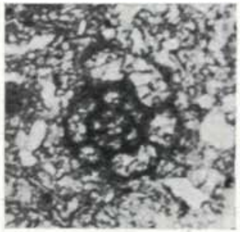
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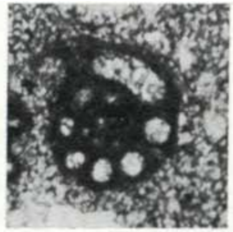
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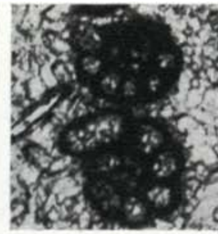
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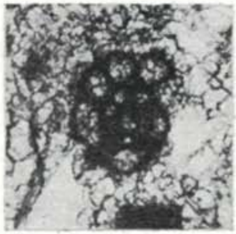
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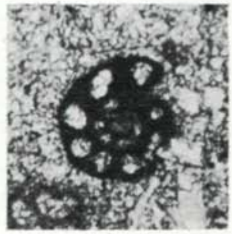
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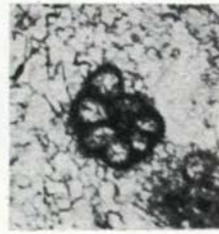
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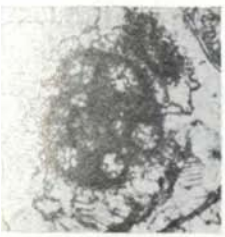
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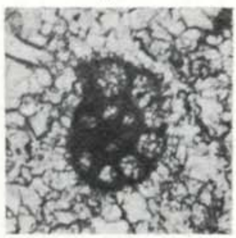
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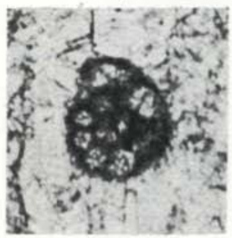
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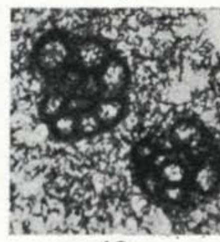
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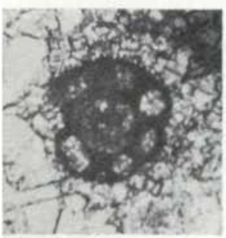
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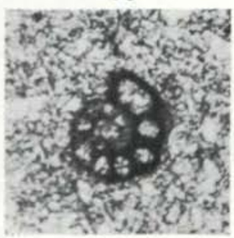
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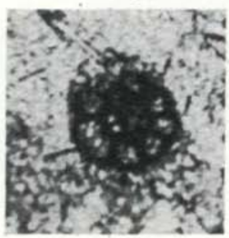
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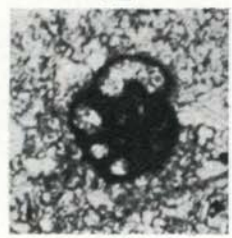
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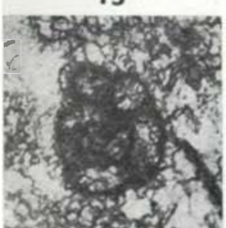
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PLATE LVII

Fig. 1—5 *Meandrospiranella samueli* SALAJ; in: SALAJ, BIELY et BYSTRICKÝ, 1967, emend. SALAJ, 1969

Fig. 1. Type species. Cut of forest path from Soroška to the Silická planina plateau, Steinalm limestone, Anisian, sample no. 509/58 (M 3883/59), thin section no. By. 1668.

Fig. 2, 5. Silická planina plateau, Zakázané, Steinalm limestone, Anisian, fig. 2 — thin section no. Bo. 6877, fig. 5 — thin section no. Bo. 6872.

Fig. 3—4. Drienok, Bore-hole D 27/51, level 70,0 m, Anisian, Steinalm limestone.

Fig. 1 reillustrated from the publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b).

Magnification: x 115.

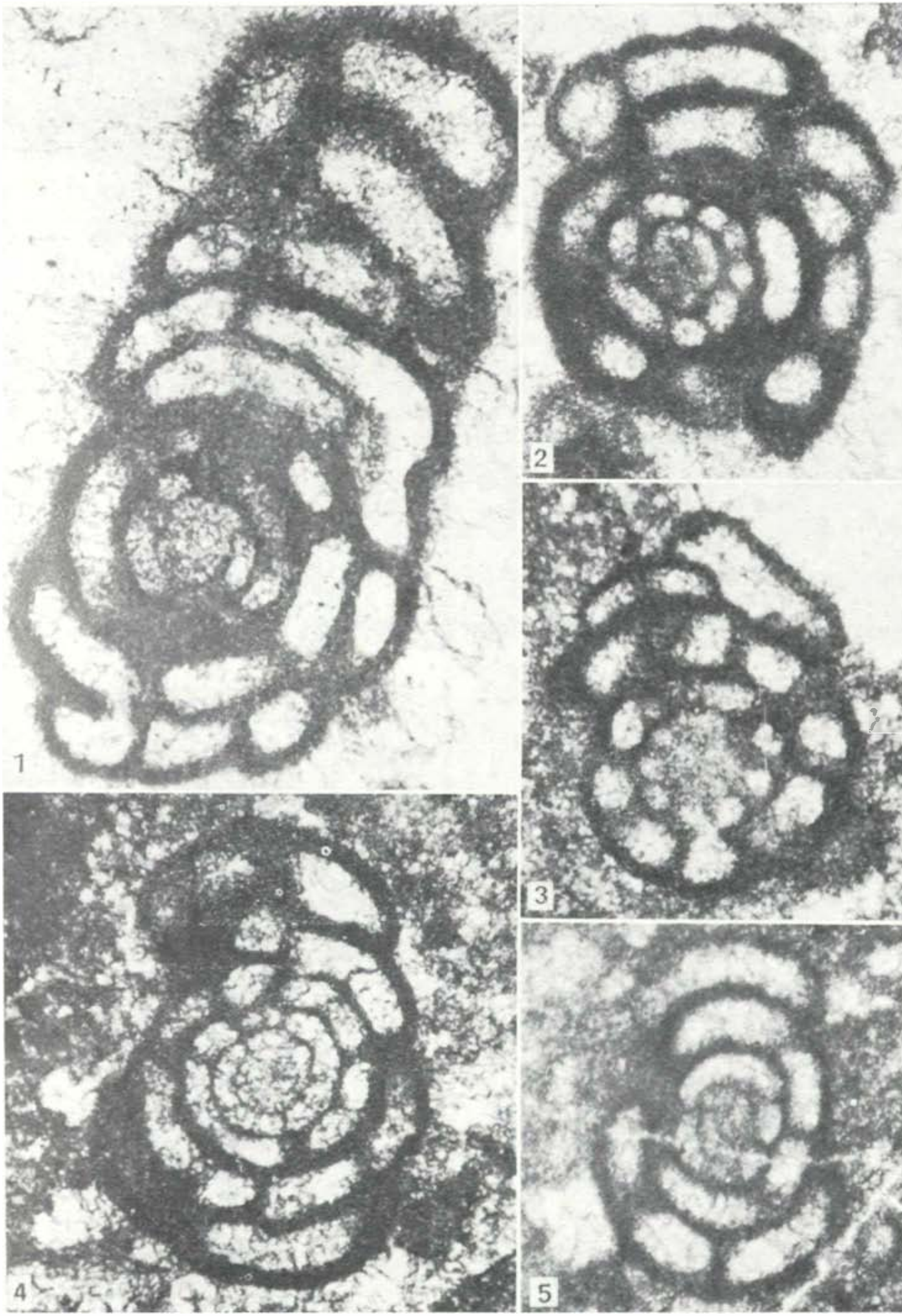
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PLATE LVIII

Fig. 1—3 *Bispiranella subcarinata* SAMUEL, SALAJ et BORZA, 1981
Fig. 1. Muránska planina plateau, Muránska Huta, Tisovec limestone, Carnian, thin section no. Bo. 6524.
Fig. 2—3. Stratenská hornatina Mts., NNW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 2 — thin section no. Bo. 6290, fig. 3 — Type species — thin section no. Bo. 6293.

Fig. 4 *Bispiranella ovata* SAMUEL, SALAJ et BORZA, 1981
Stratenská hornatina Mts., SW of elevation point Havrania skala, Tisovec limestone, Carnian, thin section no. Bo. 6305.

Magnification: x 115.

Fig. 1—4 reillustrated from the publication of O. SAMUEL — J. SALAJ — K. BORZA (1981).

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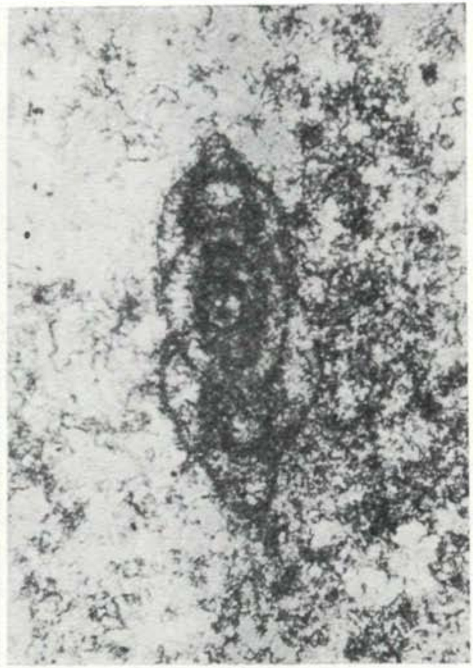

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PLATE LIX

Fig. 1—4 *Bispiranella ovata* SAMUEL, SALAJ et BORZA, 1981
Stratenská hornatina Mts., SW of the elevation point Havrania skala, Tisovec limestone, Carnian, fig. 1 — Type species — thin section no. Bo. 6311, fig. 2 — thin section no. Bo. 6303, fig. 3 — thin section no. Bo. 6305, fig. 4 — thin section no. Bo. 6318.

Magnification: x 115.

Fig. 1—4 reillustrated from the publication of O. SAMUEL — J. SALAJ — K. BORZA (1981).

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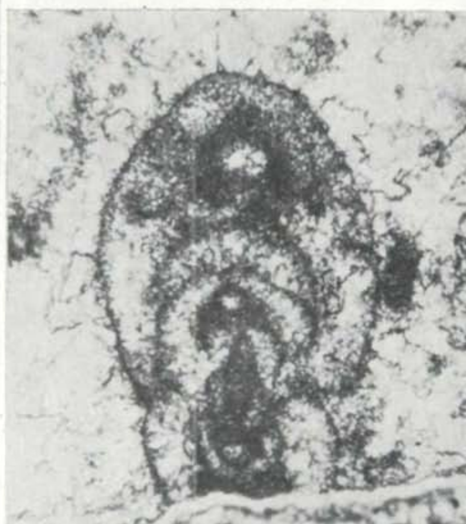

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PLATE LX

Fig. 1—2 *Bispiranella ovata* SAMUEL, SALAJ et BORZA, 1981
Stratenská hornatina Mts., SW of the elevation point Havrania skala, Tisove limestone, Carnian, fig. 1 — thin section no. Bo. 6320, fig. 2 — thin sectio no Bo. 6309.

Fig. 3—4 *Bispiranella ovata* SAMUEL, SALAJ et BORZA, 1981
Stratenská hornatina Mts., SW of the elevation point Havrania skala, Tisove limestone, Carnian, fig. 3 — thin section no. Bo. 6304, fig. 4 — thin sectio no. Bo. 6302.

Magnification: x 115.

Fig. 1—4 reillustrated from the publication of O. SAMUEL — J. SALAJ — K. BORZA (1981).

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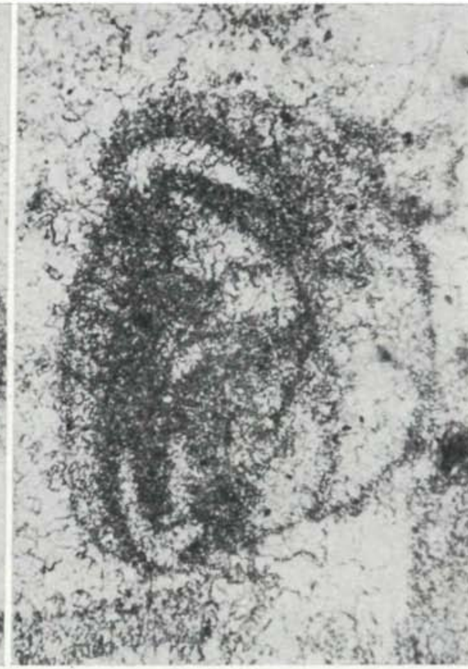

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PLATE LXI

Fig. 1—4 *Endothyranella wirtzi* (KOEHN—ZANINETTI, 1968)

Fig. 1. Silická planina plateau, Zakázané, Schreyeralm limestone, Illyrian, thin section no. Bo. 6031.

Fig. 2—4. Silická planina plateau, Zakázané, steinalm limestone, Anisian; fig. 2, 4 — thin section no. Bo. 6874, fig. 3 — thin section no. Bo. 6873.

Fig. 5—17 *Planiinvoluta carinata* LEISCHNER, 1961

Fig. 5. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4788.

Fig. 6—11, 13, 15—17. Hybe, Hybe Formation, Upper Rhaetian, fig. 6—8, 11, 15—16 — thin section no. Bo. 6593, fig. 9—10, 13, 17 — thin section no. Bo. 6583.

Fig. 12. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6611.

Fig. 14. W of Tisovec, Goštanová, dark limestone, Rhaetian, thin section no. Bo. 5413.

Magnification: x 115.

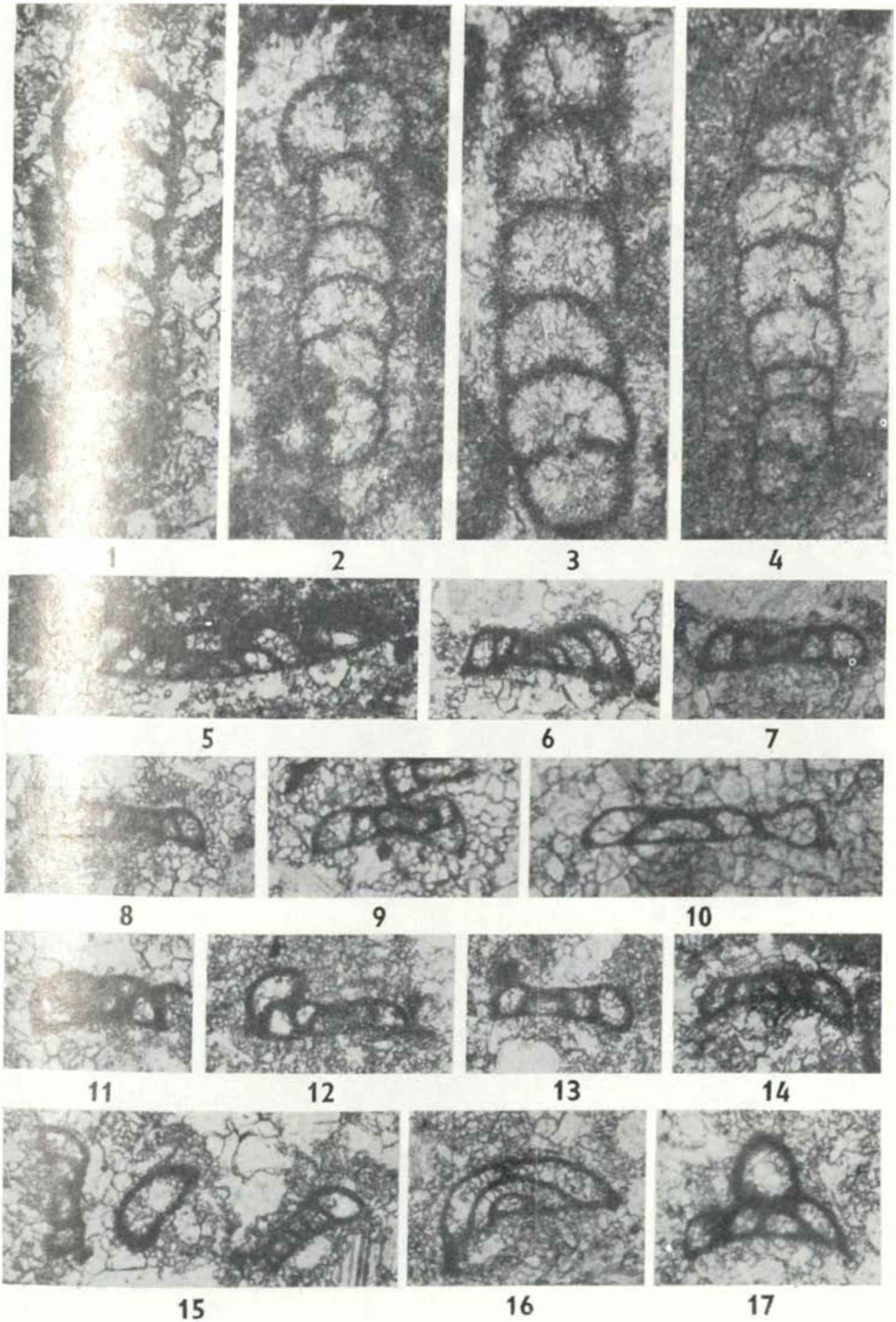
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PLATE LXII

Fig. 1—2 *Planiinvoluta carinata* LEISCHNER, 1961
Fig. 1. Hybe, Hybe Formation, Upper Rhaetian, thin section no. Bo. 6583.
Fig. 2. E of Tisovec, NE of Rangaska, Furmanec limestone, Norian, thin tion no. Bo. 5639.

Fig. 3—4 *Planiinvoluta deflexa* LEISCHNER, 1961
Fig. 3. W of Tisovec, Goštanová, dark limestone, Rhaetian, thin section no. 5413.
Fig. 4. Hybe, Hybe Formation, Upper Rhaetian, thin section no. Bo. 6579.

Fig. 5—6 *Planiinvoluta deflexa* LEISCHNER, 1961
Hybe, Hybe Formation, Upper Rhaetian, thin section no. Bo. 6593.

Fig. 7—10 *Planiinvoluta deflexa* LEISCHNER, 1961
Fig. 7—8, 10. Hybe, Hybe Formation, Upper Rhaetian; fig. 7 — thin section no. Bo. 6604, fig. 8 — thin section no. Bo. 6579, fig. 10 — thin section no. Bo. 6593.
Fig. 9. W of Tisovec, elevation point of Goštanová, dark limestone, Rhaetian, thin section no. Bo. 5406.

Fig. 11—13 *Planiinvoluta irregularis* n. sp.
Fig. 11. Type species, Silická Brezová, Hallstatt limestone, Norian, thin section no. 4812 Bo.
Fig. 12. Muránska planina plateau, Skalka limestone, Rhaetian, thin section no. Bo. 5183.
Fig. 13. E of Tisovec, NE of Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5639.

Magnification: x 115.

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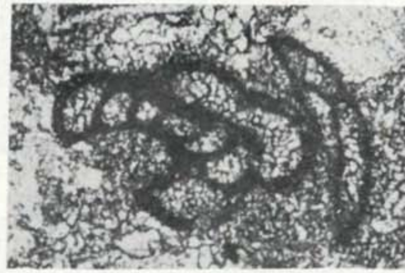

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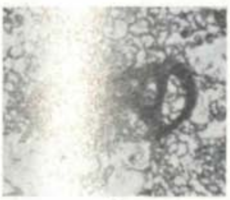

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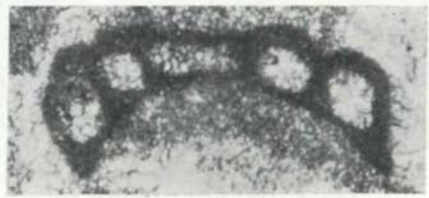

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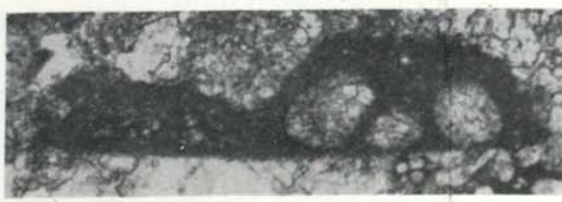

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PLATE LXIII

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Fig. 1—7 *Planiinvoluta irregularis* n. sp.

Fig. 1. Hybe, sample no. 5/74I, Dachstein limestone, Uppermost Norian to Lowe Rhaetian, thin section no. By. 5/74I.

Fig. 2—3. Muránska planina plateau, Skalka limestone, Rhaetian, thin sectio no. Bo. 5190.

Fig. 4. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin sec tion no. Bo. 5994.

Fig. 5. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4812

Fig. 6. Drnava, Bleskov prameň, sample no. 1/74, dark limestone, Lower Rhae tian, thin section no. By. 1/74.

Fig. 7. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5173.

Fig. 8—10 *Planiinvoluta carinata* LEISCHNER, 1961

Fig. 8, 10. Hybe, Hybe Formation, Upper Rhaetian, fig. 8 — Type species, thin section no. Bo. 6581, fig. 10 — thin section no. Bo. 6611.

Fig. 9. Muránska planina plateau, Skalka limestone, Rhaetian, thin section no Bo. 5193.

Fig. 11—12 *Calcitornella gebzeensis* DAGER, 1978

Hybe, Hybe Formation, Upper Rhaetian, fig. 11 — thin section no Bo. 6583, fig. 12 — thin section no. 6603.

Magnification: x 115.

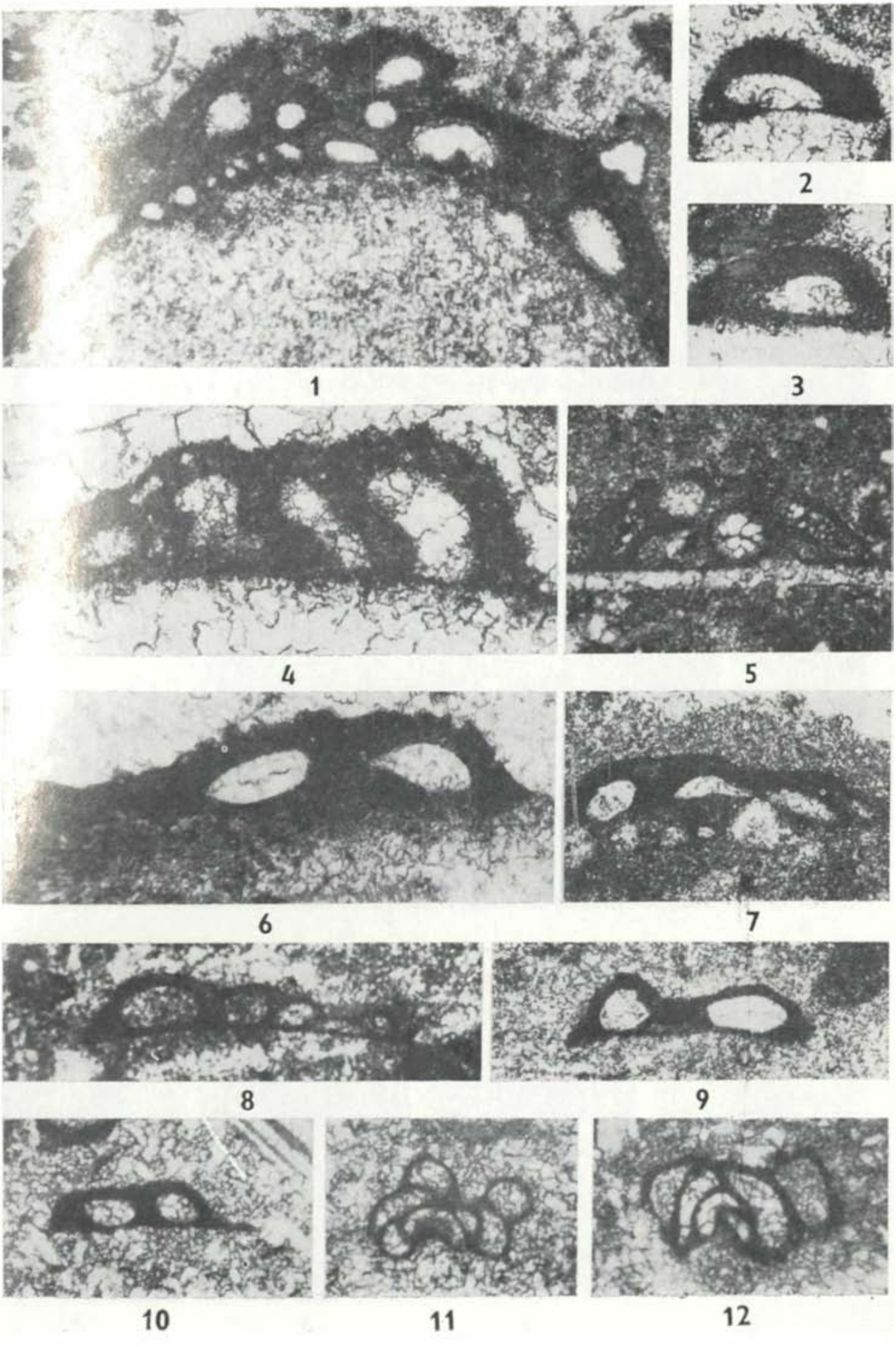
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PLATE LXIV

Fig. 1, 3 *Planiinvoluta regularis* n. sp.
Fig. 1. Type species, Muránska planina plateau, Dachstein limestone, Upp most Norian to Lower Rhaetian, thin section no. Bo. 5135.
Fig. 3. Hybe, Hybe Formation, Upper Rhaetian, thin section no. Bo. 6608.

Fig. 4—8 *Arenovidalina amylovoluta* HO, 1959
Fig. 2, 4, 6. Silická Brezová, light-grey and pink limestone, Carnian, fig. 2 - thin section no. Bo. 4748, fig. 4 — thin section no. Bo. 4747, fig. 6 — thin sec tion no. Bo. 4748.
Fig. 5. W of Tisovec, elevation point 878,5, Furmanec limestone, Norian, thi section no. Bo. 6386.
Fig. 7—8. Silická planina, Zakázané, Steinalm limestone Anisian, thin sectio no. Bo. 6870.

Magnification: x 115.

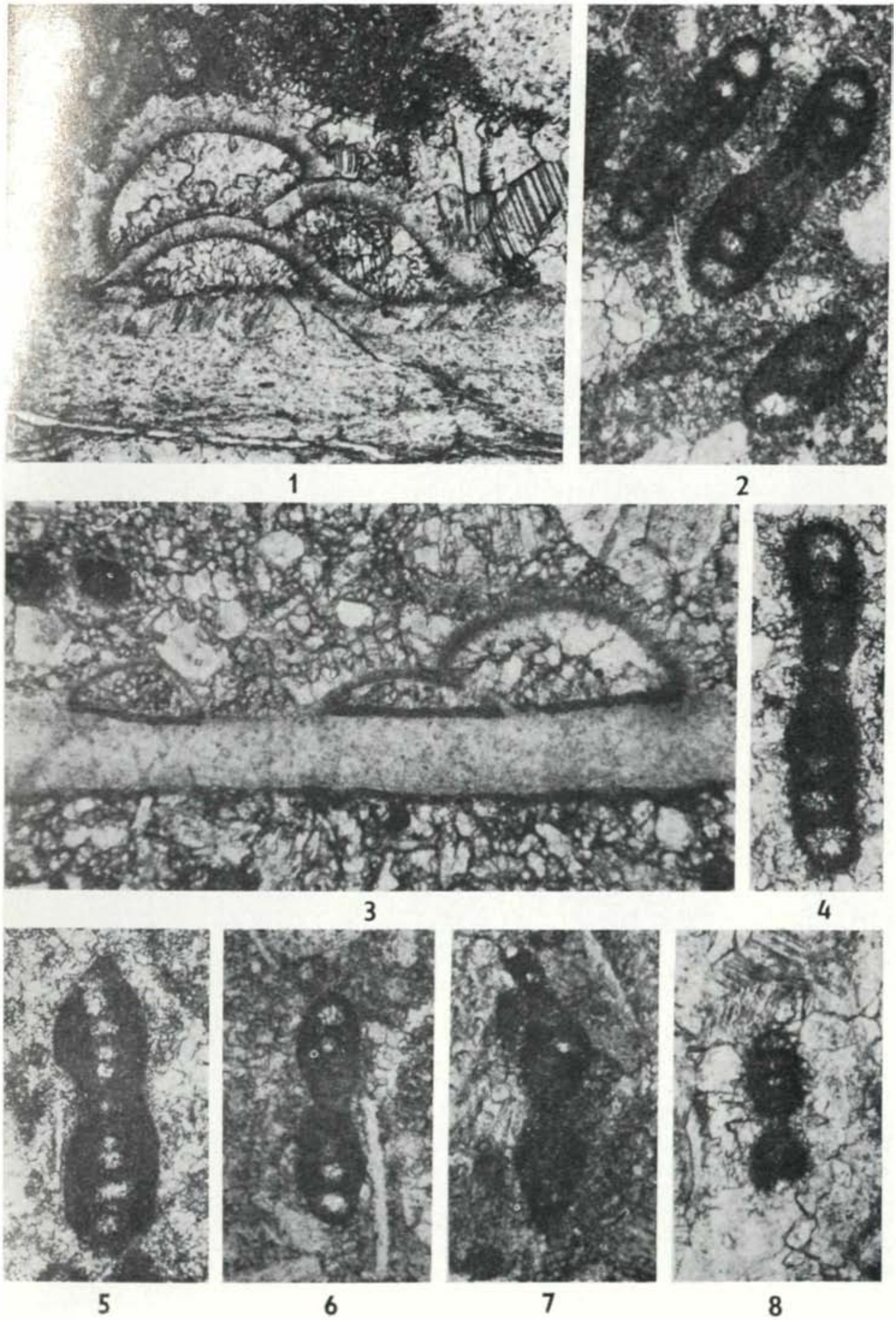
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PLATE LXV

Fig. 1—20 *Arenovidalina chialingchiangensis* HO, 1959

Fig. 1—13, 17. Silická planina plateau, Zakázané, Steinalm limestone, Anis. thin section no. Bo. 6870.

Fig. 14. Homôlka, Reifling limestone, Upper Anisian, thin section no. Bo. 67

Fig. 15. Hybe, Reifling limestone, Upper Anisian, thin section no. Bo. 6656.

Fig. 16. W of Tisovec, elevation point 878,5, Furmanec limestone, Norian, th section no. Bo. 6381.

Fig. 18—19. Remiaška, dark limestone, Norian, thin section no. Bo. 6459.

Fig. 20. Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5361.

Magnification: x 115.

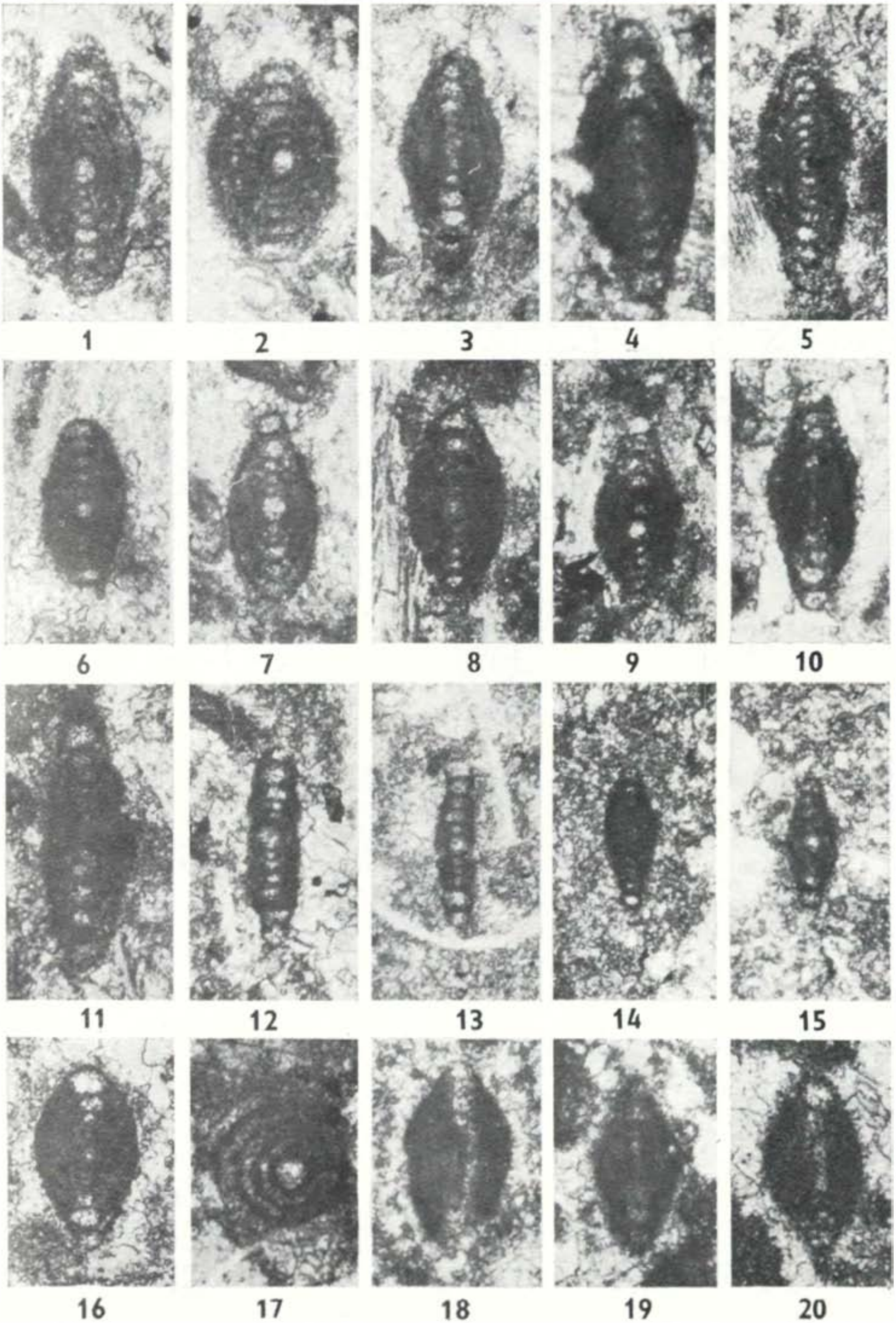
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PLATE LXVI

Fig. 1 *Karaburunia rendeli* LANGER, 1968
W of Tisovec, Javorová, Furmanec limestone, Norian, thin section no. Bo. 6812.

Fig. 2—7 *Ophthalmidium carinatum* (LEISCHNER, 1961)
Fig. 2. Drnava, Bleskový prameň, dark limestone, Lower Rhaetian, thin section no. By. 3/741.
Fig. 3—7. Silická Brezová, light-grey and pink limestones, Carnian, fig. 3 — thin section no. Bo. 4766, fig. 4 — thin section no. Bo. 6860, fig. 5 — thin section no. By. 4973, fig. 6 — thin section no. Bo. 4750, fig. 7 — thin section no. Bo. 4753.

Magnification: x 115.

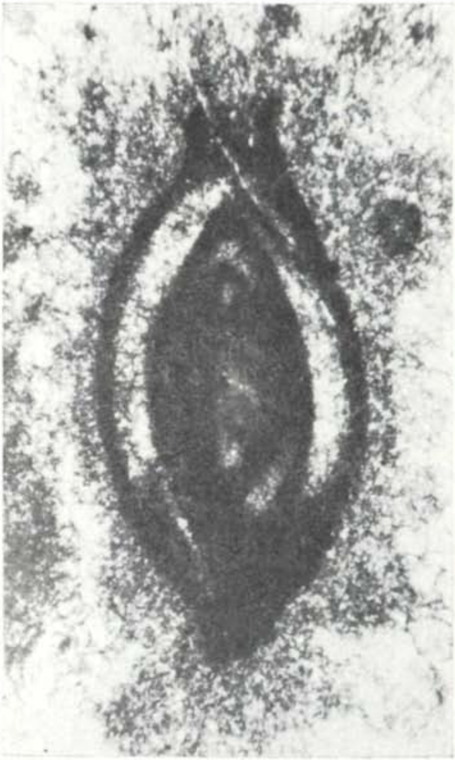

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PLATE LXVII

Fig. 1—8 *Ophthalmidium carinatum* (LEISCHNER, 1961)

Silická Brezová, light-grey and pink limestones Carnian, fig. 1—2, 4 — thin section no. Bo. 4753, fig. 3 — thin section no. Bo. 4752, fig. 5 — thin section no. Bo. 6857, fig. 6 — thin section no. Bo. 4748, fig. 7 — thin section no. Bo. 4758, fig. 8 — thin section no. Bo. 4777.

Fig. 9—12 *Ophthalmidium exiguum* KOEHN—ZANINETTI, 1968

Fig. 9. W of Tisovca, elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6381.

Fig. 10—12. Silická Brezová, light-grey and pink limestones, Carnian, thin section no. Bo. 6857.

Magnification: x 115.

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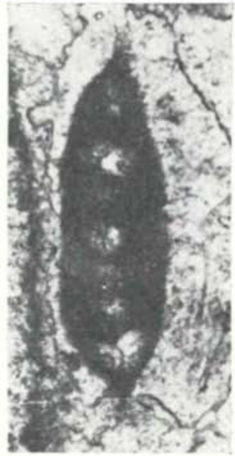

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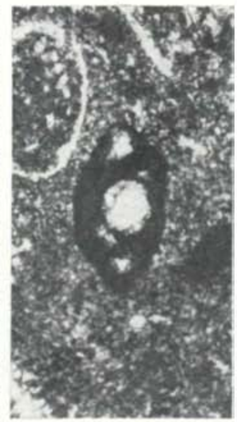

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PLATE LXVIII

Fig. 1—3 *Ophthalmidium exiguum* KOEHN—ZANINETTI, 1968
Silická Brezová, light-grey and pink limestones, Carnian, thin section no. I 6857.

Fig. 4—12 *Ophthalmidium triadicum* (KRISTAN, 1957)
Fig. 4, 6—11. Silická planina plateau, light-grey and pink limestones, Carnia fig. 4, 7 — thin section no. Bo. 4764, fig. 6 — thin section no. Bo. 6857, fig. 8 - thin section no. Bo. 4755, fig. 9, 11 — thin section no. Bo. 4748, fig. 10 — thi section no. 4767.
Fig. 5. W of Tisovec, Hradová, Tisovec limestone, Carnian, thin section no. B 6490.
Fig. 11. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4819

Magnification: x 115.

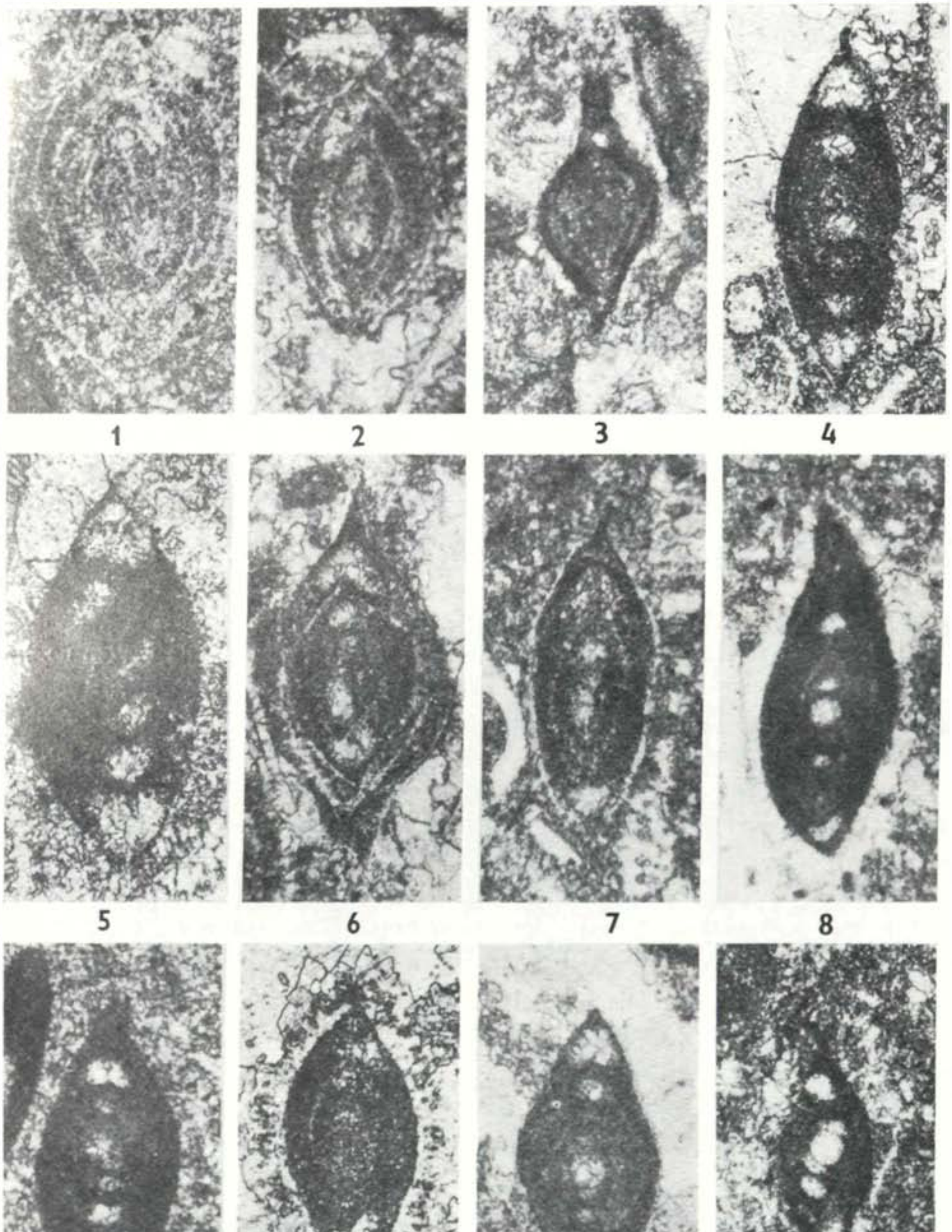
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PLATE LXIX

Fig. 1—2 *Ophthalmidium fusiformis* TRIFONOVA, 1962
Fig. 1. Silická Brezová, light-grey and pink limestones, Carnian, thin section no. Bo. 4750.
Fig. 2. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4836.

Fig. 3—4 *Ophthalmidium iranicum* (BROENNIMANN, ZANINETTI, BOZORGNIA et HUBER, 1972)
Fig. 3. W of Tisovec, elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6355.
Fig. 4. W slope of Dešťanka, light-grey limestone, Norian, thin section no. Bo. 6030.

Fig. 5 *Ophthalmidium* cf. *leischneri* KRISTAN—TOLLMANN, 1964
Drnava, Bleskový prameň, dark limestone, Lower Rhaetian, thin section no. By. $3/74_2$.

Fig. 6 *Ophthalmidium* cf. *fusiformis* (TRIFONOVA, 1961)
Silická Brezová, light-grey and pink limestones, Carnian, thin section no. Bo. 4755.

Fig. 7—11 *Ophthalmidium lucidum* (TRIFONOVA 1961)
Fig. 7. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6628.
Fig. 8. Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5337.
Fig. 9. Remiaška, Furmanec limestone, Norian, thin section no. Bo. 6451.
Fig. 10. W of Tisovec, Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5701
Fig. 11 Muránska planina plateau, Dachstein limestone, Norian, thin section no. Bo. 5137.

Magnification: x 115.


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PLATE LXX

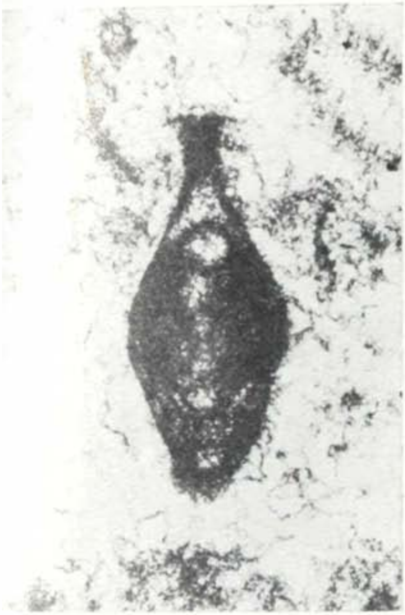
Fig. 1 *Paraophthalmidium carpaticum* SAMUEL et BORZA, 1981
Type species. Muránska planina plateau, Dedov vrch, Tisovec limestone, Ca
nian, thin section no. Bo. 6752.

Fig. 2 *Ophthalmipora falsoexiguum* n. sp.
The species. Stratenská hornatina Mts., Havrania skala, Tisovec limestone, Ca
nian, thin section no. Bo. 6303.

Fig. 3—4 *Ophthalmipora falsoexiguum* n. sp.
Fig. 3. Stratenská hornatina Mts., Havrania skala, Tisovec limestone, Carnian,
thin section no. Bo. 6287.
Fig. 4. Stratenská hornatina Mts., NNW of crossing of roads to Stratená and
Hrabušice, Tisovec limestone, Carnian, thin section no. Bo. 6298.

Magnification: x 115.

Fig. 2, 4 reillustrated from the publication of O. Samuel — K. Borza (1981).



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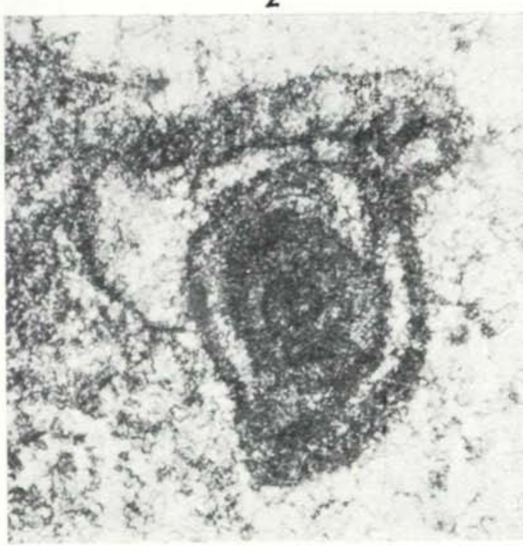

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PLATE LXXI

Fig. 1—4 *Paraophthalmidium salaji* SAMUEL et BORZA, 1981

Fig. 1, 3—4. Stratenská hornatina Mts., NNW of crossing of roads to Straten and Hrabušice, Tisovec limestone, Carnian, fig. 1 — thin section no. Bo. 629(fig. 3 — thin section no. Bo. 6288, fig. 4 — thin section no. Bo. 6297. Fig. 1 – Type species.

Fig. 2. Muránska planina plateau, Dedov vrch, Tisovec limestone, Carnian, thi section no. Bo. 6760.

Magnification: x 115.

Fig. 1—2, 4 reillustrated from the publication of O. Samuel — K. Borza (1981).

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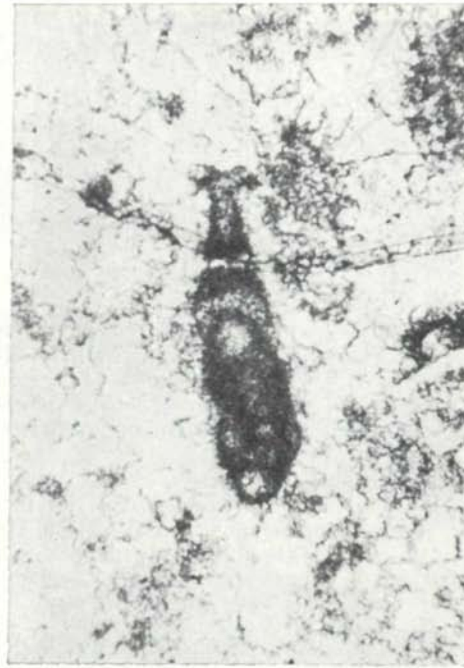

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PLATE LXXII

Fig 1—5 *Ophthalmidium tori* ZANINETTI et BROENNIMANN, 1969
Fig. 1. Silická Brezová, sample no. 8/71, Tisovec limestone, Carnian, thin section no. By. 4973.
Fig. 2—5. Silická Brezová, light-grey and pink limestones, Carnian, fig. 2, thin section no. Bo. 4750, fig. 3 — thin section no. Bo. 4748, fig. 4 — thin section no. Bo. 4758, fig. 5 — thin section no. Bo. 4766.

Fig 6a *Ophthalmidium carinatum* (LEISCHNER, 1961)
6b *Ophthalmidium tricki* (LANGER, 1968)
6c *Arenovidalina chialingchiangensis* HO, 1959
Silická Brezová, light-grey and pink limestones, Carnian, thin section no. Bo. 4750.

Fig. 7—10 *Agathamminoides spiroloculiformis* (ORAVECZNÉ—SCHEFFER, 1968)
Fig. 7—8. Strážovská hornatina Mts., sample no. S-400, Wetterstein limestone, Cordevolian, thin section no. By. 3267.
Fig. 9. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5136.
Fig. 10. Plešivecká planina plateau, sample no. 3/67, Tisovec limestone, Carnian, thin section no. By. 3001.

Magnification: x 115


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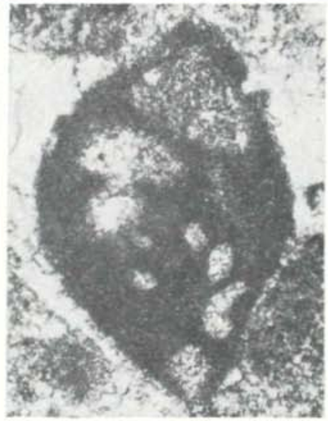
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PLATE LXXIV

Fig. 1—2 *Sigmoilina excentrica* n. sp.
Fig. 1. Type species W of Tisovec, Goštanová, Furmanec limestone, Norian, thin section no. Bo. 5428.
Fig. 2. Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5354.

Fig. 3—4 *Sigmoilina multicarinata* n. sp.
Fig. 3. Type species. W of Tisovec, elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6376.
Fig. 4. Muránska planina plateau, Predná hora, Tisovec limestone, Carnian, thin section no. Bo. 6114.

Fig. 5—8 *Sigmoilina triadica* LANGER, 1968
Fig. 5, 7—8. Silická Brezová, Hallstatt limestone, Norian, fig. 5 — thin section no. Bo. 4819, fig. 7 — thin section no. Bo. 4812, fig. 8 — thin section no. 4838.
Fig. 6. Silická Brezová, pink limestone, Carnian, thin section no. Bo. 6861.

Fig. 9—11 *Spiroloculina praecursor* OBERHAUSER, 1960
Fig. 9. Remiaška, dark limestone, Norian, thin section no. Bo. 6435.
Fig. 10—11. Silická Brezová, light-grey and pink limestones, Carnian, fig. 10 — thin section no. 4767, fig. 11 — thin section no. Bo. 4744.

Magnification: x 115.

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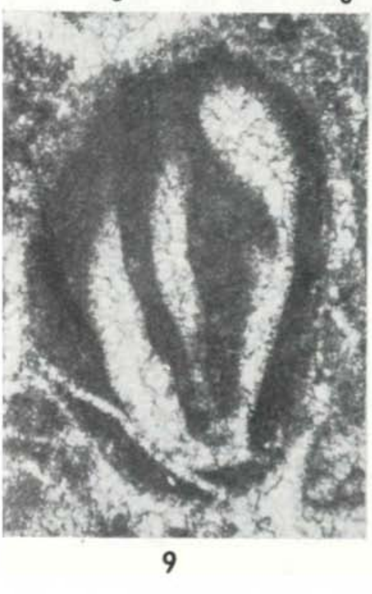

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PLATE LXXV

Fig. 1—2 *Spiroculina longiscata* TEROUEM et BERTHELIN, 1875.
Fig. 1. Silická Brezová, light-grey and pink limestones, Carnian, thin sectio no. Bo. 4750.
Fig. 2. W of Tisovec, NE of Rangaska, Furmanec limestone, Norian, thin section no. 131.

Fig. 3—5 *Quinqueloculina nucleiformis* KRISTAN—TOLLMANN, 1964
Fig. 3. W of Tisovec, elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6382.
Fig. 4. Remiašk'a, Furmanec limestone, Norian, thin section no. Bo. 6435.
Fig. 5. Silická Brezová, Tisovec limestone, Carnian, thin section no. Bo. 4746.

Fig. 6 *Triloculina raibliana* GUEMBEL, 1869
Remiaška, Furmanec limestone. Norian, thin section no. Bo. 6431.

Fig. 7—8 *Paleomiliolina occulta* (ANTONOVA, 1958)
Fig. 7. Plešivec, sample no. 325/58, Wetterstein limestone, Ladinian, thin section no. By. 1661.
Fig. 8. Type species, Drnava, Bleskový prameň, dark limestone, Lower Rhaetian, thin section no. By. 1/741.

Fig. 9—10 *Miliolipora cuvillieri* BROENNIMANN et ZANINETTI, 1971
Fig. 9. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6628.
Fig. 10. Muránsk'a planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5752.

Magnification: x 115.


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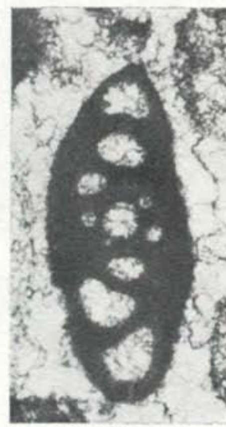
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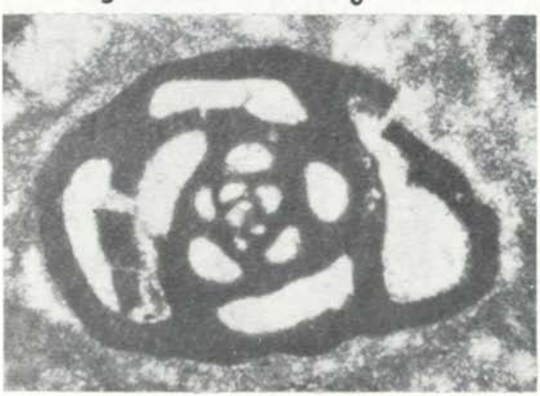
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PLATE LXXVI

Fig. 1—4 *Miliolipora cuvillieri* BROENNIMANN et ZANINETTI, 1971

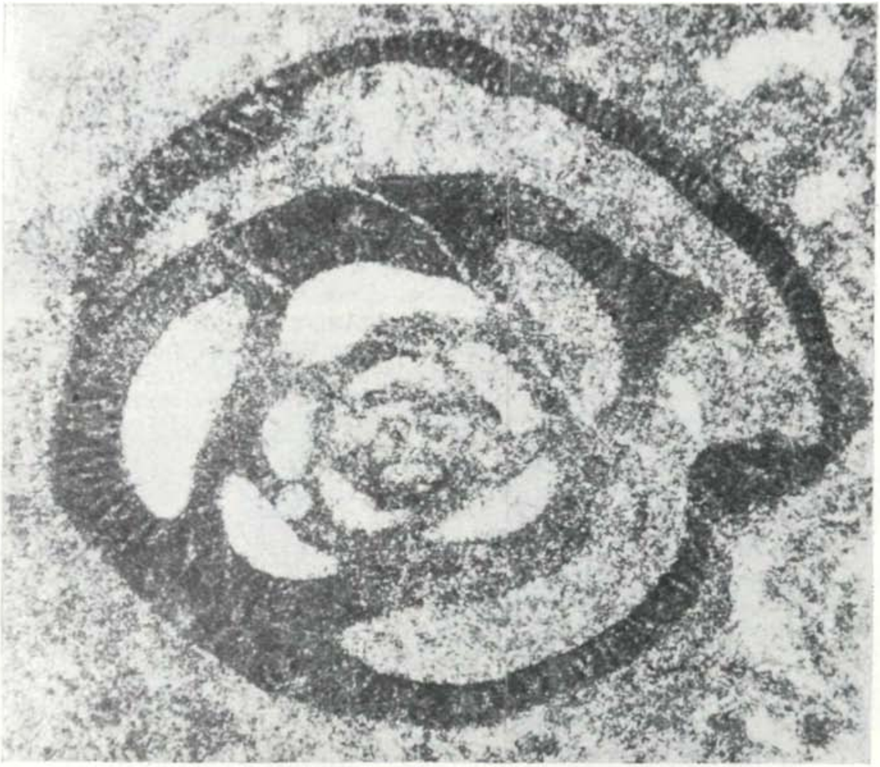
Fig. 1. Muránska planina plateau, Dachstein limestone, Uppermost norian t Lower Rhaetian, thin section no. Bo. 5727.

Fig. 2. Detail of the fig. 1

Fig. 3. Muránska planina plateau, Dachstein limestone, Uppermost Norian t Lower Rhaetian, thin section no. Bo. 5718.

Fig. 4. Detail of the fig. 3.

Magnification: Fig. 1, 3 x 115, Fig. 2, 4 x 285.



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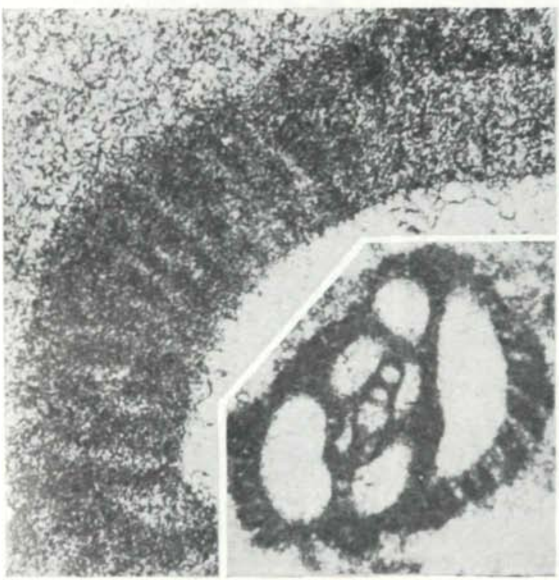

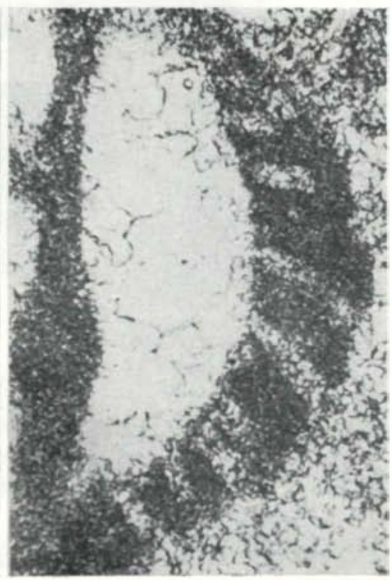

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PLATE LXXVII

Fig. 1—8 *Miliolipora cuvillieri* BROENNIMANN et ZANINETTI, 1971

Fig. 1. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5162.

Fig. 2—8. W of Tisovec W of Gоštanová, Furmanec limestine, Norian, thin section no. Bo. 5429.

Magnification: x 115.


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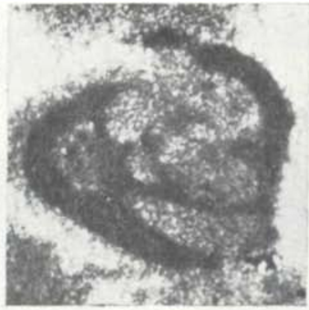
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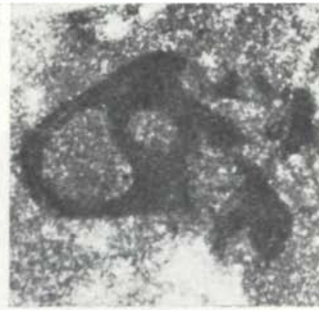
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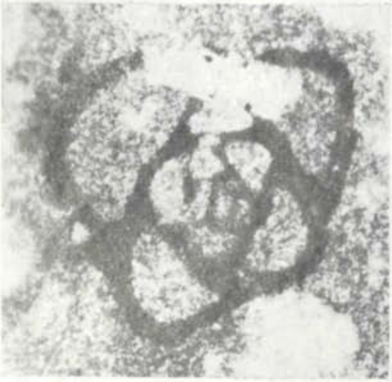
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PLATE LXXVIII

Fig. 1—4 *Galeanella panticae* ZANINETTI et BROENNIMANN, 1973

Fig. 1—2. Drnava, Bleskový prameň, dark-grey limestone, Lower Rhaetian, th section no. By. 3/741.

Fig. 3. Kováčová, Furmanec limestone, Norian, thin section no. Bo. 6740.

Fig. 4. Drnava, Bleskový prameň, dark-grey limestone, Lower Rhaetian, th section no. By. 4633.

Magnification: x 115.

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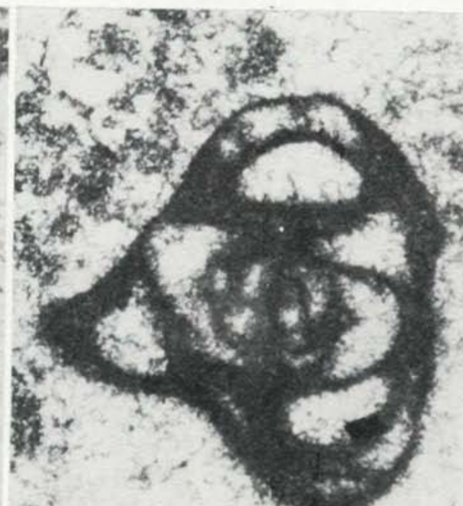

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PLATE LXXIX

Fig. 1—7 *Galeanella panticae* ZANINETTI et BROENNIMANN, 1973

Fig. 1, 7. Drnava, E of the elevation point 426,0, Furmanec limestone, Norian thin section no. Bo. 6770.

Fig. 2—4. Kováčová, Furmanec limestone, Norian, thin section no. Bo. 6740.

Fig. 5—6. Drnava, Bleskový prameň, dark-grey limestone, Lower Rhaetian, thin section no. Bc. 6767.

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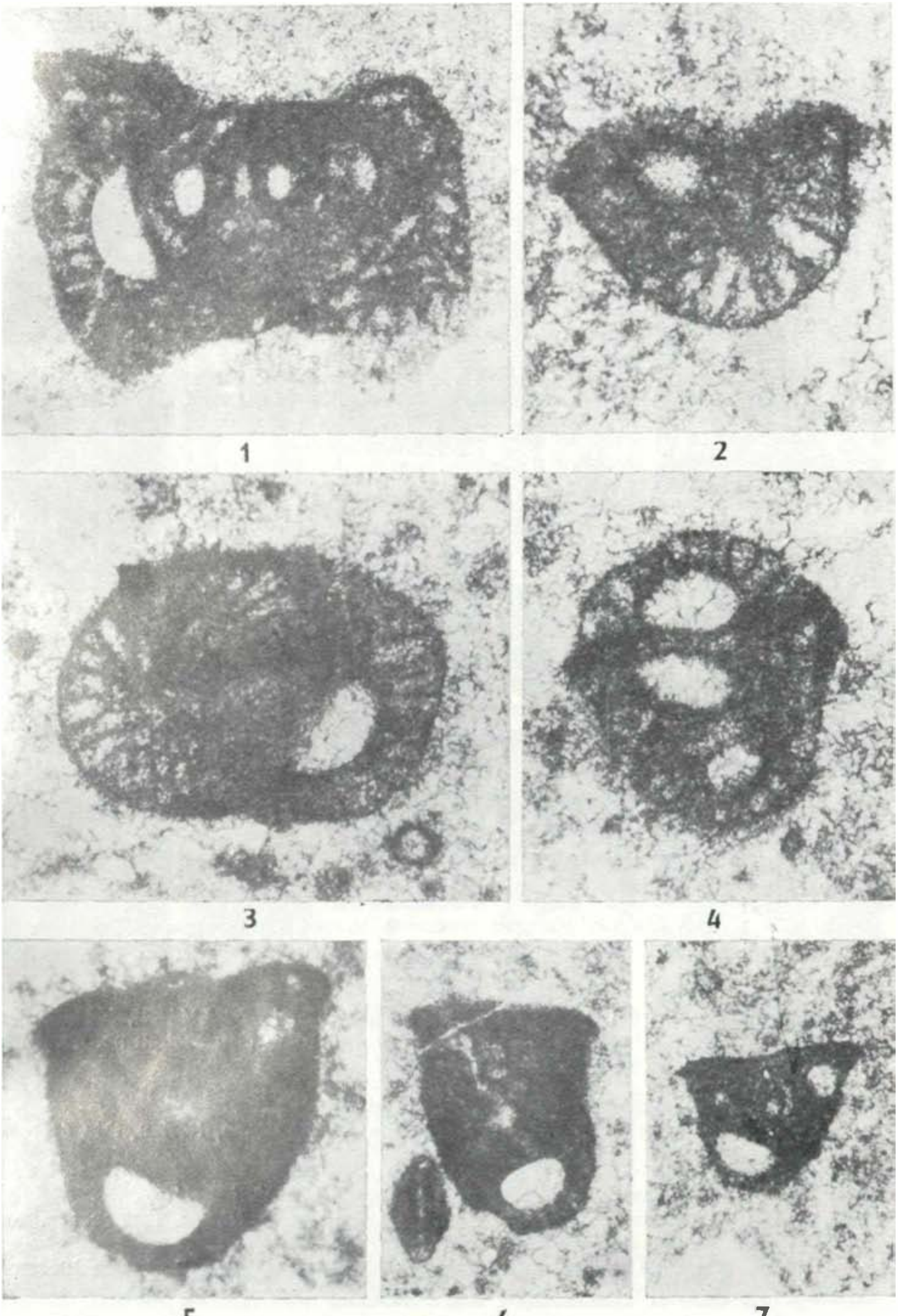
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PLATE LXXX

Fig. 1 *Pachyphloia* aff. *solida* MIKLUCHO — MAKLAY, 1954
W of Tisovec, Rangaska, Furmanec limestone, Norian, thin section no. Bo. 56'

Fig. 2 *Nodosaria nitida elongata* FRANKE, 1936
Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4838.

Fig. 3 *Nodosaria* cf. *dipartita* KRISTAN—TOLLMANN, 1964
Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4853.

Fig. 4 *Nodosaria sumatrensis rossica* MIKLUCHO—MAKLAY, 1954
Silická Brezová, light-grey and pink limestones, Carnian, thin section no. By. 4974.

Fig. 5 *Pseudonodosaria striatoclavata* (SPANDEL, 1901)
Silická Brezová, light-grey and pink limestones, Carnian, thin section no. Bo. 4744.

Fig. 6 *Dentalina* aff. *cassiana* GUEMBEL, 1869
Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5117.

Fig. 7 *Nodosaria nitidana* BRAND, 1937
Silická Brezová, light-grey and pink limestone, Carnian, thin section no. Bo. 4764.

Fig. 8 *Nodosaria* aff. *shablensis* TRIFONOVA, 1972

Fig. 9, 14 *Nodosaria ordinata* TRIFONOVA, 1965
Fig. 9. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4814.
Fig. 14. Silická Brezová, light-grey and pink limestones Carnian, thin section no. Bo. 4753.

Fig. 10, 15 *Pseudonodosaria vulgata multicamerata* KRISTAN—TOLLMANN, 1964
Silická Brezová, Hallstatt limestone, Norian, fig. 10 — thin section no. Bo. 4837, fig. 15 — thin section no. Bo. 4838.

Fig. 11 *Rectoglandulina* cf. *tenuis* (BORNEMANN, 1854)
Stratenská hornatina Mts., Dešťanky, Furmanec limestone, Norian, thin section no. Bo. 6030.

Fig. 12, 13 *Rectoglandulina* aff. *polyarthra* KRISTAN—TOLLMANN. 1964
Fig. 12. W of Tisovec, Gošťanová, Furmanec limestone, Norian, thin section no. Bo. 5384.
Fig. 13. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5148.

Magnification: x 115.


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PLATE LXXXI

Fig. 1 *Dentalina hoi* TRIFONOVA, 1962
Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5963.

Fig. 2 *Austrocolomia canaliculata* (KRISTAN, 1957)
Silická Brezová, light-grey and pink limestone, Carnian, thin section no. Bo. 4746.

Fig. 3 *Lenticulina (Planularia) filosa* (TERQUEM, 1866)
Silická planina plateau, Zakázané, Steinalm limestone, Anisian, thin section no. Bo. 6870.

Fig. 4 *Robuloides* aff. *lens* REICHEL, 1945
Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4773.

Fig. 5, 7, 10, 13 *Austrocolomia marschalli* OBERHAUSER, 1960
Fig. 5. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6624.
Fig. 7. Remiaška, Furmanec limestone, Norian, thin section thin section no. Bo. 6459.
Fig. 10, 13. Silická Brezová, Hallstatt limestone, Norian, fig. 10 — thin section no. 4819, fig. 13 — thin section no. Bo. 4816.

Fig. 6 *Grillina grilli* KRISTAN—TOLLMANN, 1964
Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4820.

Fig. 8 *Lenticulina acutiangulata* (TERQUEM, 1866)
Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4774.

Fig. 9 *Robuloides* cf. *orientalis* (MIKLUKHO—MAKLAY, 1954)
Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4752.

Fig. 11 *Lenticulina (L.) subquadrata* TERQUEM, 1866
Silická planina plateau, Zakázané, Steinalm limestone, Anisian, thin section no. Bo. 6870.

Fig. 12 *Lenticulina (Vaginulinopsis) rectangulata* KRISTAN—TOLLMANN, 1964
Silická Brezová, light-greyish and pink limestones, Carnian, thin section no. Bo. 4747.

Fig. 14 *Lenticulina* sp.
Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4888.

Fig. 15 *Frondicularia* cf. *eulimbata* KRISTAN—TOLLMANN, 1964
Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5118.

Magnification: x 115.

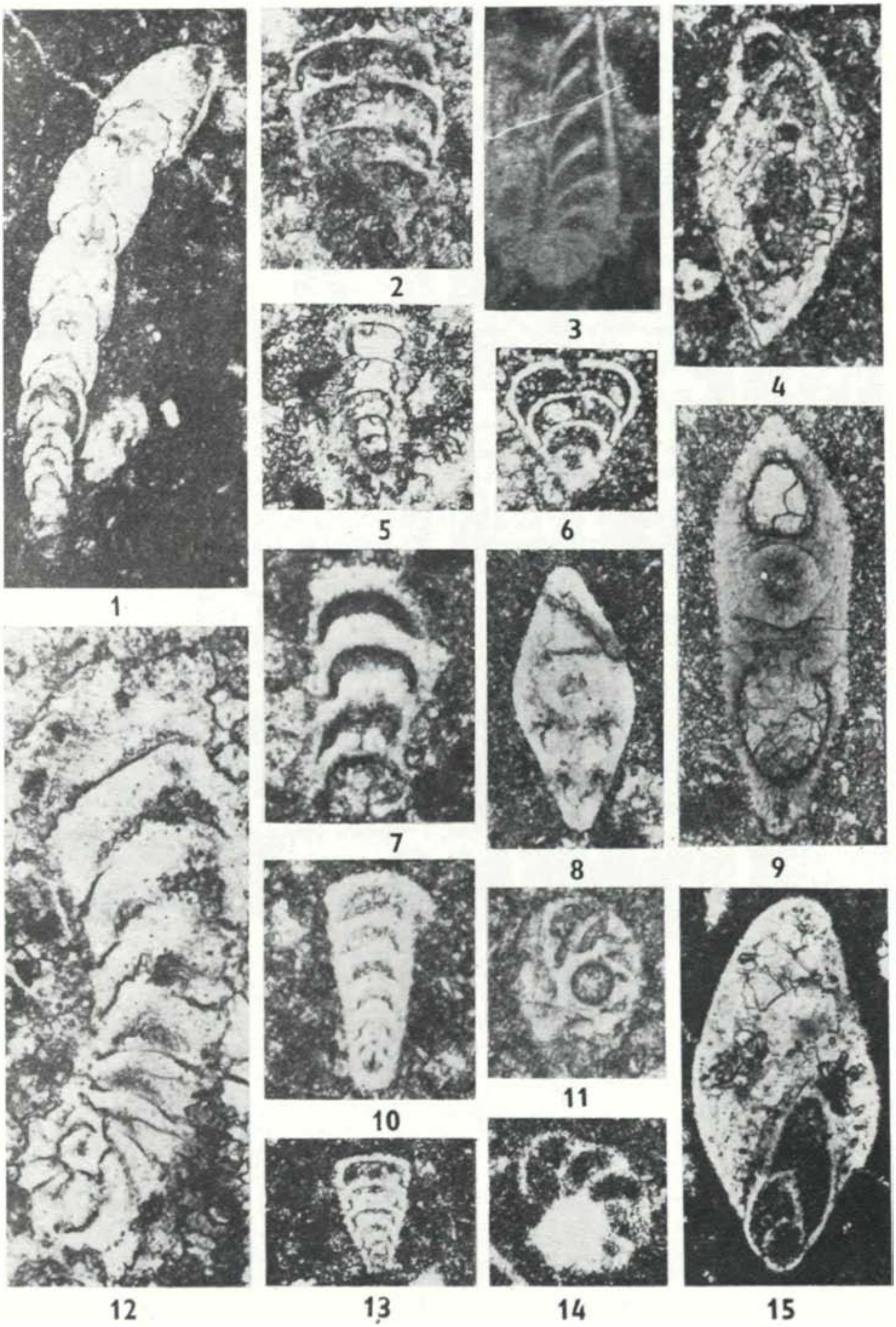
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PLATE LXXXII

Fig. 1 *Frondicularia rhaetica* KRISTAN—TOLLMANN, 1964
Silická Brezová, light-grey and pink limestone, Carnian, thin section no. Bo. 4752.

Fig. 2—7, 9—13 *Frondicularia woodwardi* HOWCHIN, 1895
Fig. 7. Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5348.
Fig. 3—4, 6—7, 10—13. Muránska planina plateau, road-cut Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 3 — thin section no. Bo. 5220, fig. 4 — thin section no. 5249, fig. 6 — thin section no. Bo. 5124, fig. 7 — thin section no. Bo. 5117, fig. 10 — thin section no. Bo. 5229, fig. 11 — thin section no. Bo. 5173, fig. 13 — thin section no. Bo. 5269, fig. 13 — thin section no. Bo. 5125.

Fig. 8, 14—16. *Frondicularia xiphoidea* KRISTAN—TOLLMANN, 1964
Fig. 8. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4790.
Fig. 14. W of Tisovec, NE of Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5631.
Fig. 15. Dešťanky, Furmanec limestone, Norian, thin section no. Bo. 6029.
Fig. 16. Muránska planina plateau, Tisovec limestone, Carnian, thin section no. Bo. 6173.

Fig. 17 *Lingulina essayana* DEECKE, 1886
Malé Karpaty Mts., Plavecký Peter, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. By. 4649

Magnification: x 115.

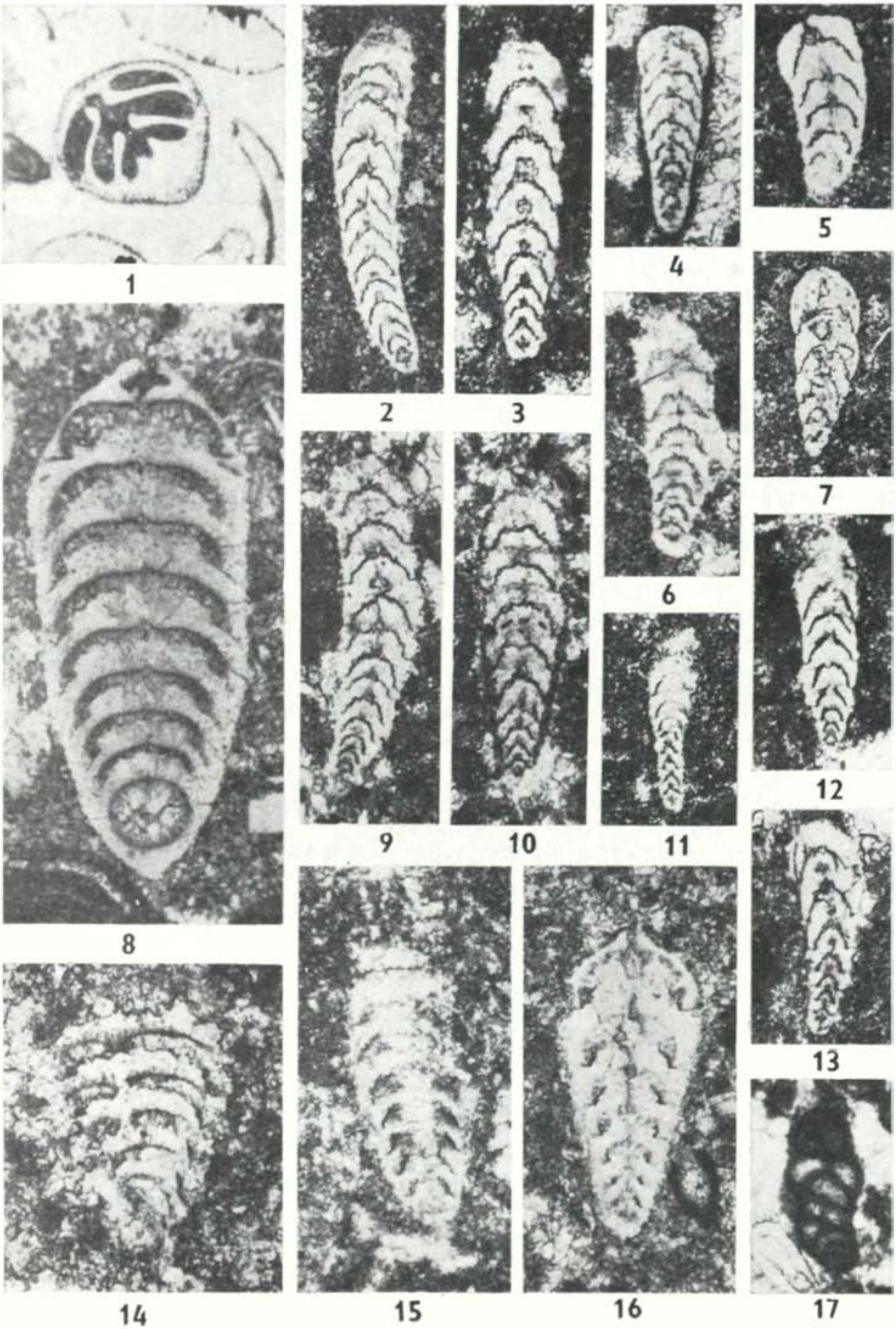
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PLATE LXXXIII

Fig. 1 *Multiseptida arcata* n. sp.
Type species. Muránska planina plateau, Veľká lúka, Tisovec limestone with *Rakusia oberhauseri* SALAJ, Upper Carnian, thin section no. By. 2159.

Fig. 2 *Multiseptida elongata* n. sp.
Type species. Slovak karst, Štít, elevation point 851,1, schreyerslm limestone, Anisian, thin section no. Sj. 2.

Fig. 3, 4 *Nodosaria sumatrensis rossica* MIKLUKHO—MAKLAY, 1960
Španie Pole, Wetterstein limestone, Ladinian, thin section no. By. 378.

Fig. 5 a — *Pilammina densa* PANTIĆ
b — *Dentalina* aff. *hoi* TRIFONOVA, 1967
Plešivecká planina plateau, S of the elevation point Štít (851,1), schreyeralm limestone, Upper Anisian, thin section no. Sj. 21.

Fig. 6 *Nodosinella libera* TRIFONOVA, 1967
Plešivec — sample no. 294, Wetterstein limestone With *Teutloporella herculea* and *Andrusoporella duplicata,* Carnian with *Pilamminella kuthani* (SALAJ), thin section no. By. 1018.

Magnification: Fig. 1, 2, 5 x 50, Fig. 3, 4 x 38, Fig. 6 x 27.

Fig. 1, 2, 5, 6 reillustrated from the publication of J. SALAJ (1978) and Fig. 4 from the publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b).

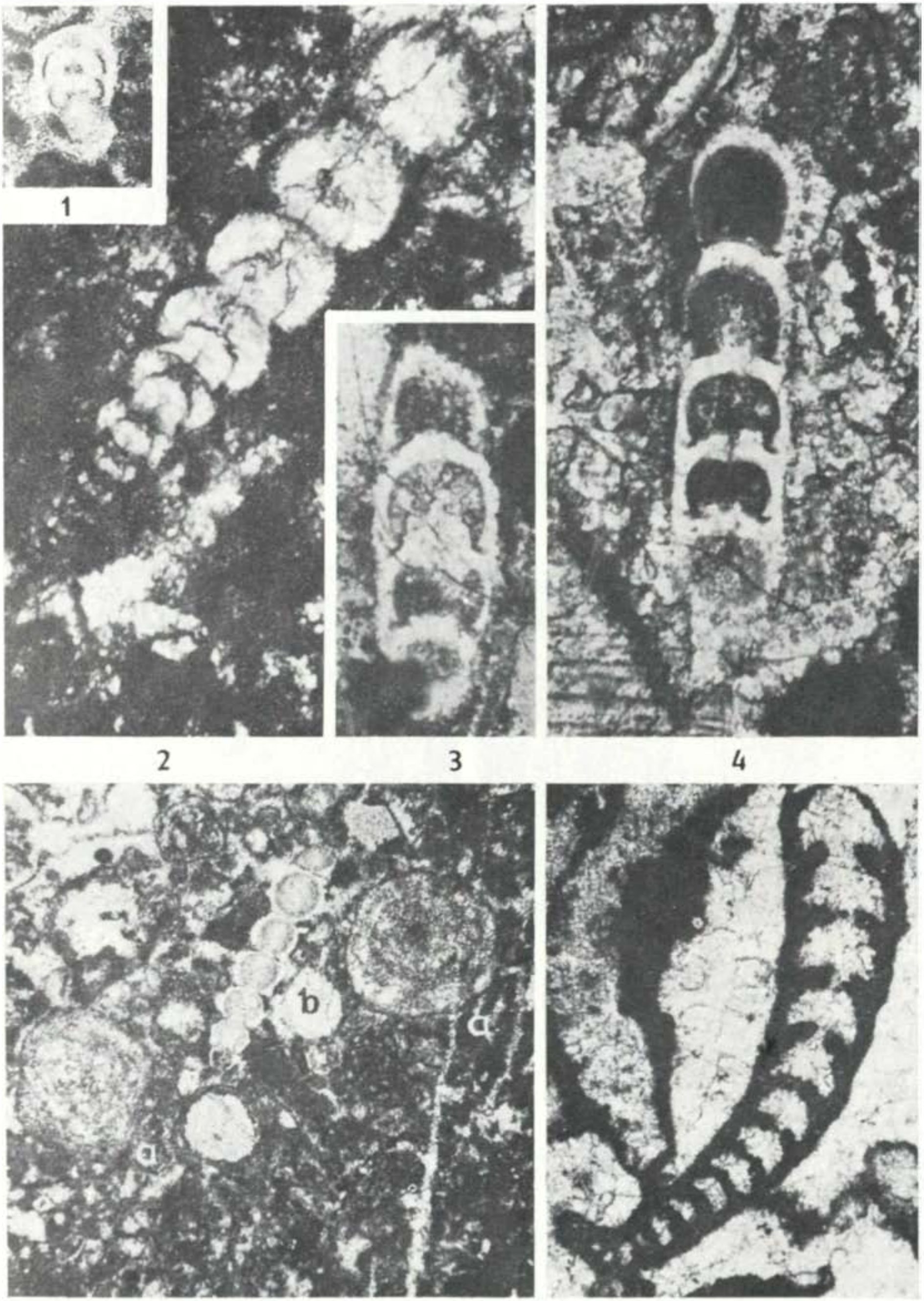
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PLATE LXXXIV

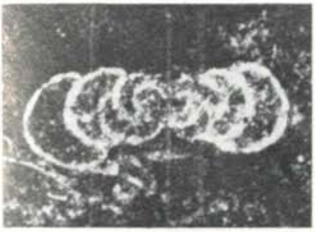
Fig. 1—10 *Turrispirillina minima* PANTIĆ, 1967

Fig. 1—2. Muránska planina plateau, Sample no. 3/58, Dachstein limestone, Uppermost of Norian to Lower Rhaetian, thin section no. By. 1635.

Fig. 3. W of Tisovec, Goštanová, Furmanec limestone, Norian, thin section no. Bo. 5390.

Fig. 4—10. Muránska planina plateau, sample no. 3/58, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. By. 1635.

Magnification: x 115.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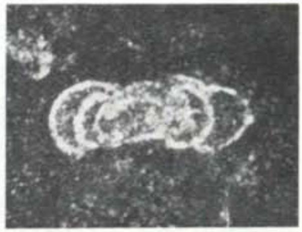
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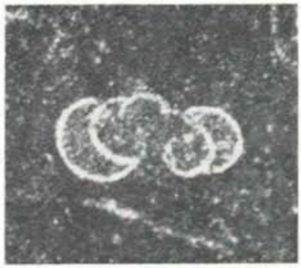
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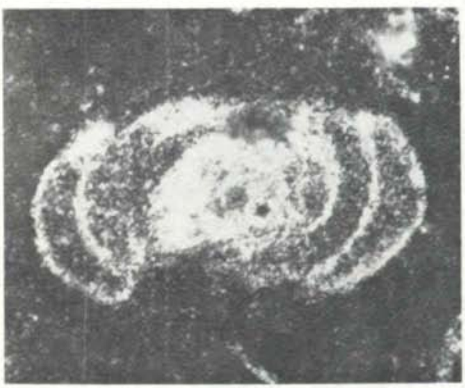
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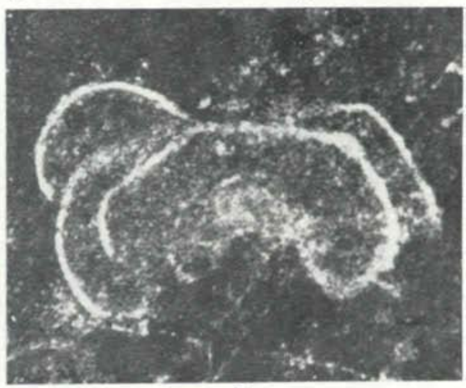
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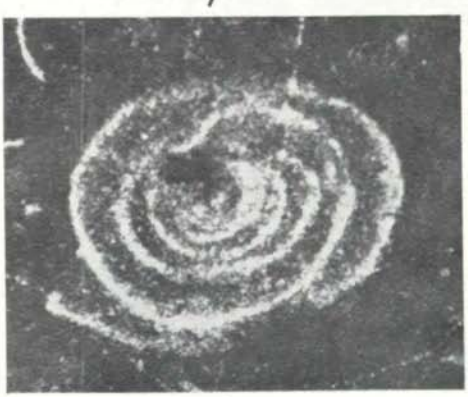
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PLATE LXXXV

Fig. 1—6 *Permodiscus praecommunis* n. sp.

Fig. 1—2, 4—6. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1 — thin section no. Bo. 5241, fig. 2—5 — thin section no. 5123, fig. 4 — thin section no. Bo. 5135, fig. 6 — thin section no. Bo. 5153.

Fig. 3. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 5056.

Magnification: x 115.

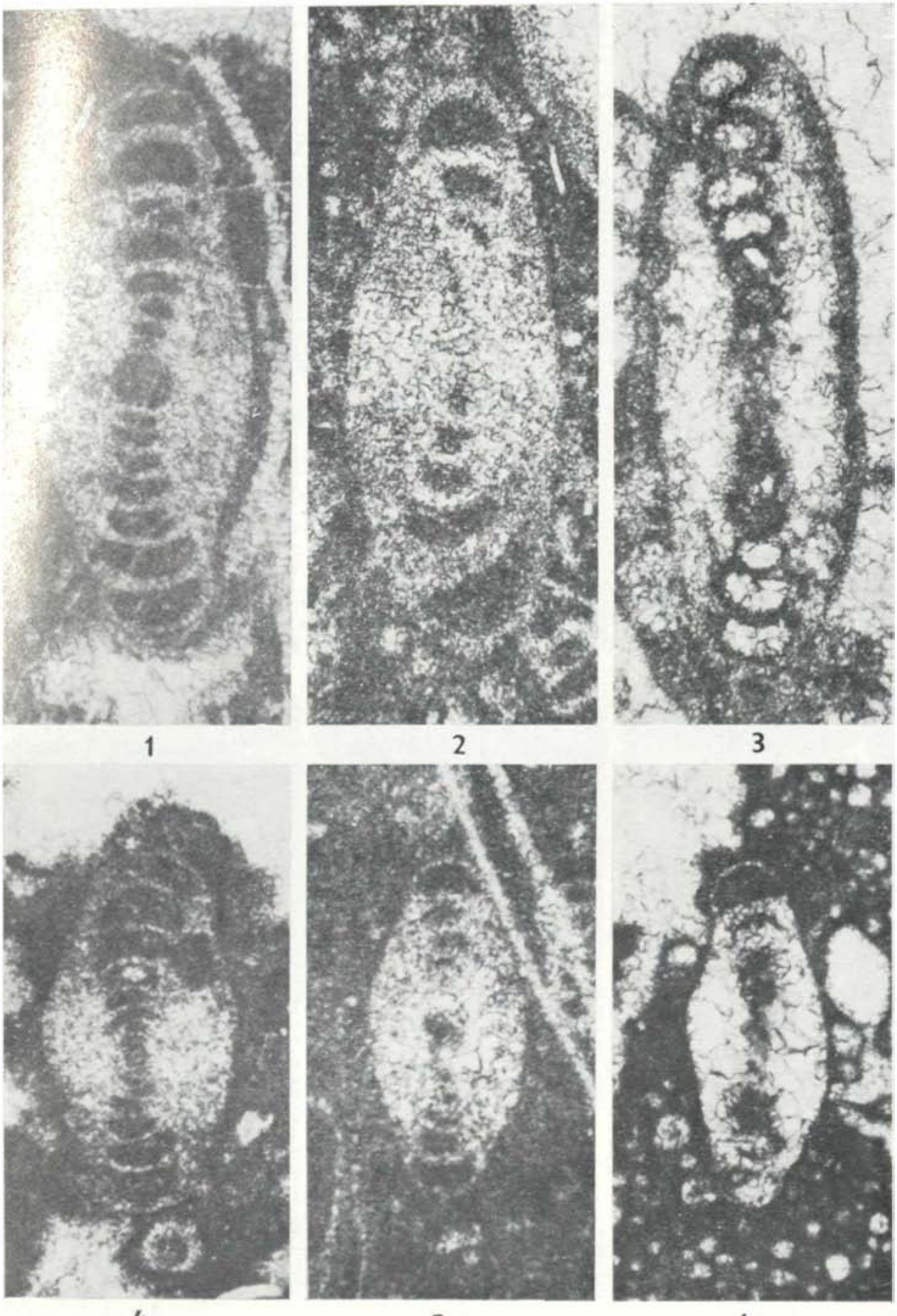

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PLATE LXXXVI

Fig. 1—6 *Permodiscus praecommunis* n. sp.

Fig. 1—3, 5—6. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1—2 — thin section no. Bo. 5271, fig. 3, 6 — thin section no. Bo. 5153, fig. 5 — thin section no. Bo. 5135. Fig. 4. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, sample no. 4/74, thin section no. Bo. 5199.

Magnification: x 115.

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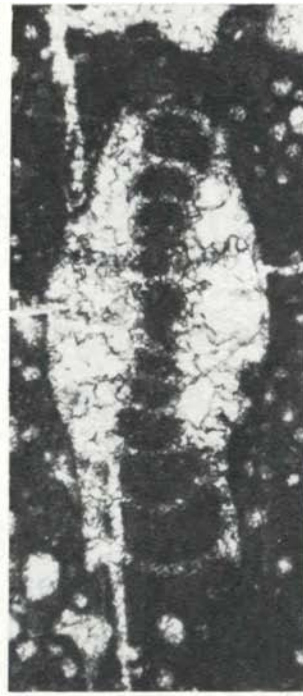

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PLATE LXXXVII

Fig. 1—7 *Permodiscus eomesozoicus* (OBERHAUSER, 1957)

Fig. 1, 5—7. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetia fig. 1, 6 — thin section no. Bo. 6647, fig. 5 — thin section no. By. 5/74, fig. 6 thin section no. By. 5199.

Fig. 2—4. Muránska planina plateau, road-cut to Veľká lúka, Dachstein lime tone, Uppermost Norian to Lower Rhaetian, fig. 2 — thin section no. Bo. 572 fig. 3—4 — thin section no. Bo. 5131.

Magnification: x 115.

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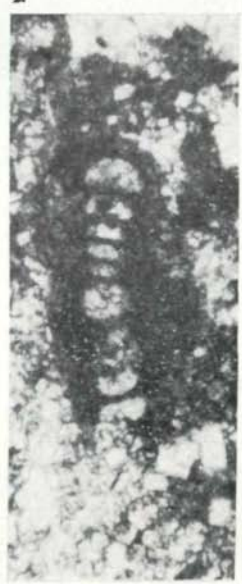

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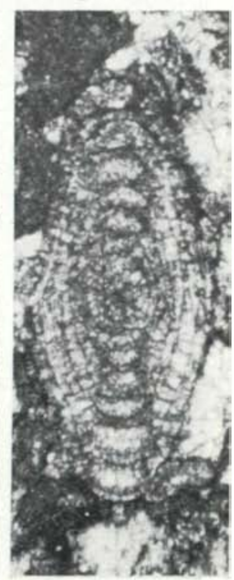

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PLATE LXXXVIII

Fig. 1—5 *Permodiscus eomesozoicus* (OBERHAUSER, 1957)

Fig. 1. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone. Uppermost of Norian to Lower Rhaetian, thin section no. Bo. 5131.

Fig. 2—4. Hybe, Dachstein limestone Uppermost Norian to Lower Rhaetian, fig. 2, 4 — thin section no. Bo. 6647, fig. 3 — thin section no. By. 5/74.

Fig. 5. Geravy, dark-grey limestone, Norian, thin section no. Bo. 6682.

Magnification: x 115.

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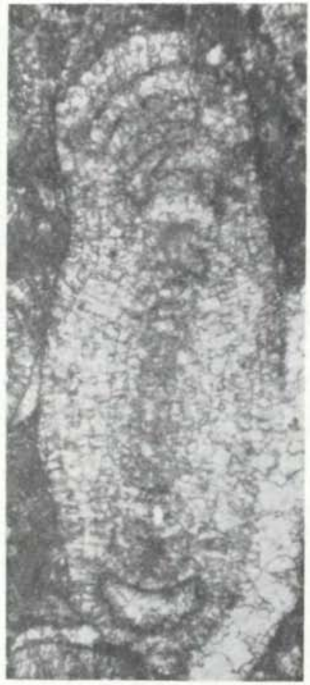

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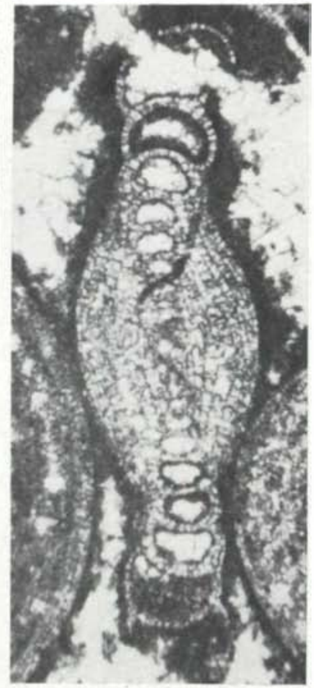

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PLATE LXXXIX

Fig. 1—8 *Permodiscus eomesozoicus* (OBERHAUSER, 1957)

Fig. 1—2. Hybe, Dachstein limestone, Uppermost of Norian to Lower Rhaeti, fig. 1 — thin section no. By. 5/741, fig. 2 — thin section no. Bo. 6648.

Fig. 3—8. Muránska planina plateau, road-cut to Veľká lúka, Norian, fig. 3-8 — thin section no. Bo. 5131, fig. 6—7 — thin section no. By. 5199, fig. 7 thin section no. By. 5198.

Magnification: x 115.

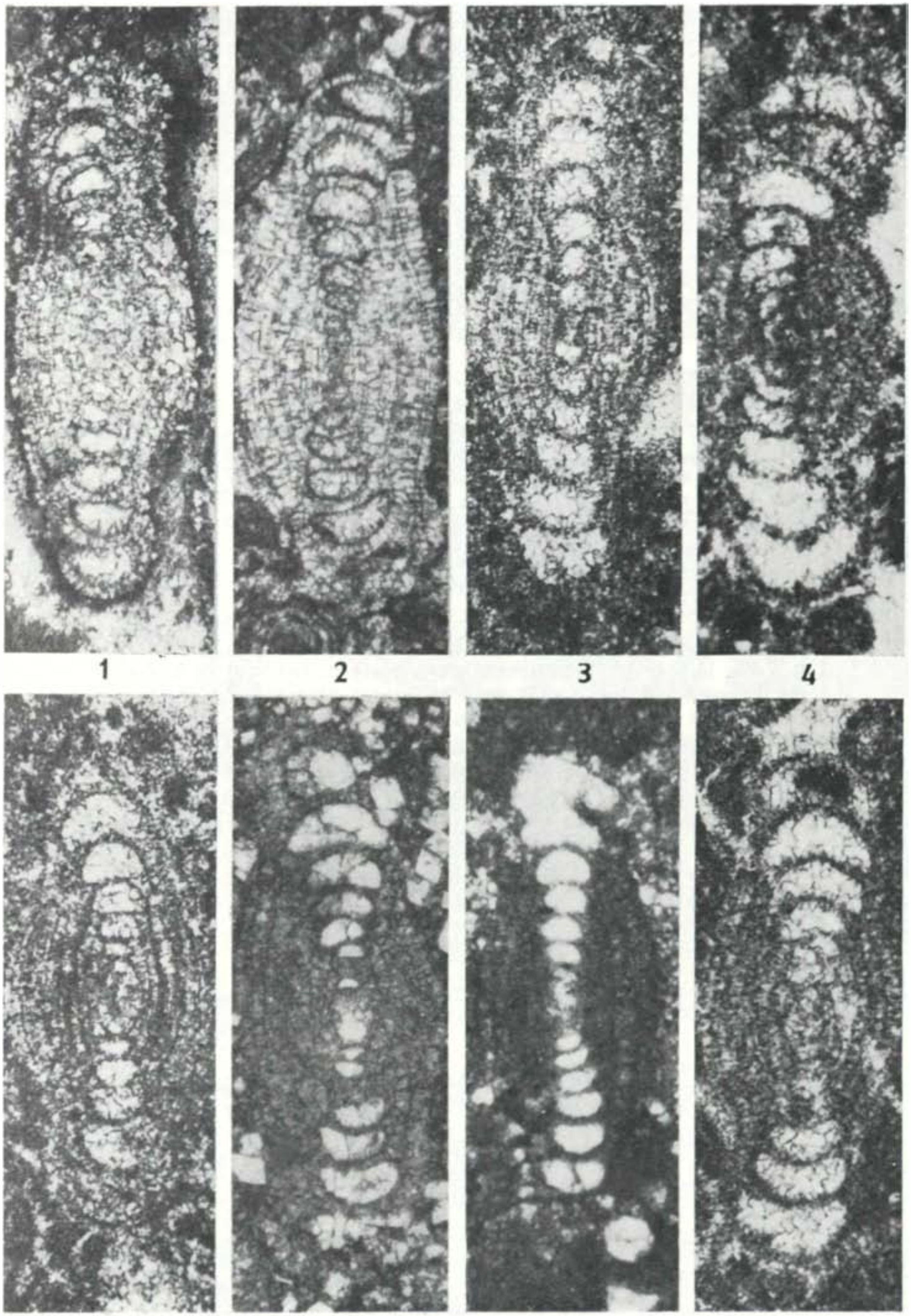

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PLATE XC

Fig. 1 *Permodiscus hybensis* (SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967)
Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin sectio no. Bo. 6643.

Fig. 2—4, 6 *Permodiscus macrostomus* (KRISTAN, 1957)
Fig. 2—4. Muránska planina plateau, road-cut to Veľká lúka, Dachstein li mestone, Uppermost Norian to Lower Rhaetian, fig. 2 — thin section no. Bo 5153, fig. 3—4 — thin section no. Bo. 5156.
Fig. 6. Geravy, dark-grey limestone, Norian, thin section no. Bo. 6679.

Fig. 5 *Permodiscus praeimpressus* nov. sp.
Silická Brezová, sample no. 2/71, Wetterstein limestone, Ladinian — Lower Carnian, thin section no. By. 5031.

Fig. 7—15 *Permodiscus minutus* (KOEHN—ZANINETTI, 1969)
Fig. 7—9, 11, 13—14. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 7—11 — thin section no. 5153, fig. 8 — thin section no. Bo. 5142, fig. 9 — thin section no. Bo. 5796, fig. 13 — thin section no. Bo. 5156, fig. 14 — thin section no. Bo. 5255.
Fig. 10, 12, 15. Hybe, Dachstein limestone, Uppermost, Norian to Lower Rhaetian, fig. 10 — thin section no. Bo. 6647, fig. 12 — thin section no. By 5199, fig. 15 — thin section no. Bo. 6648.

Magnification: x 115.

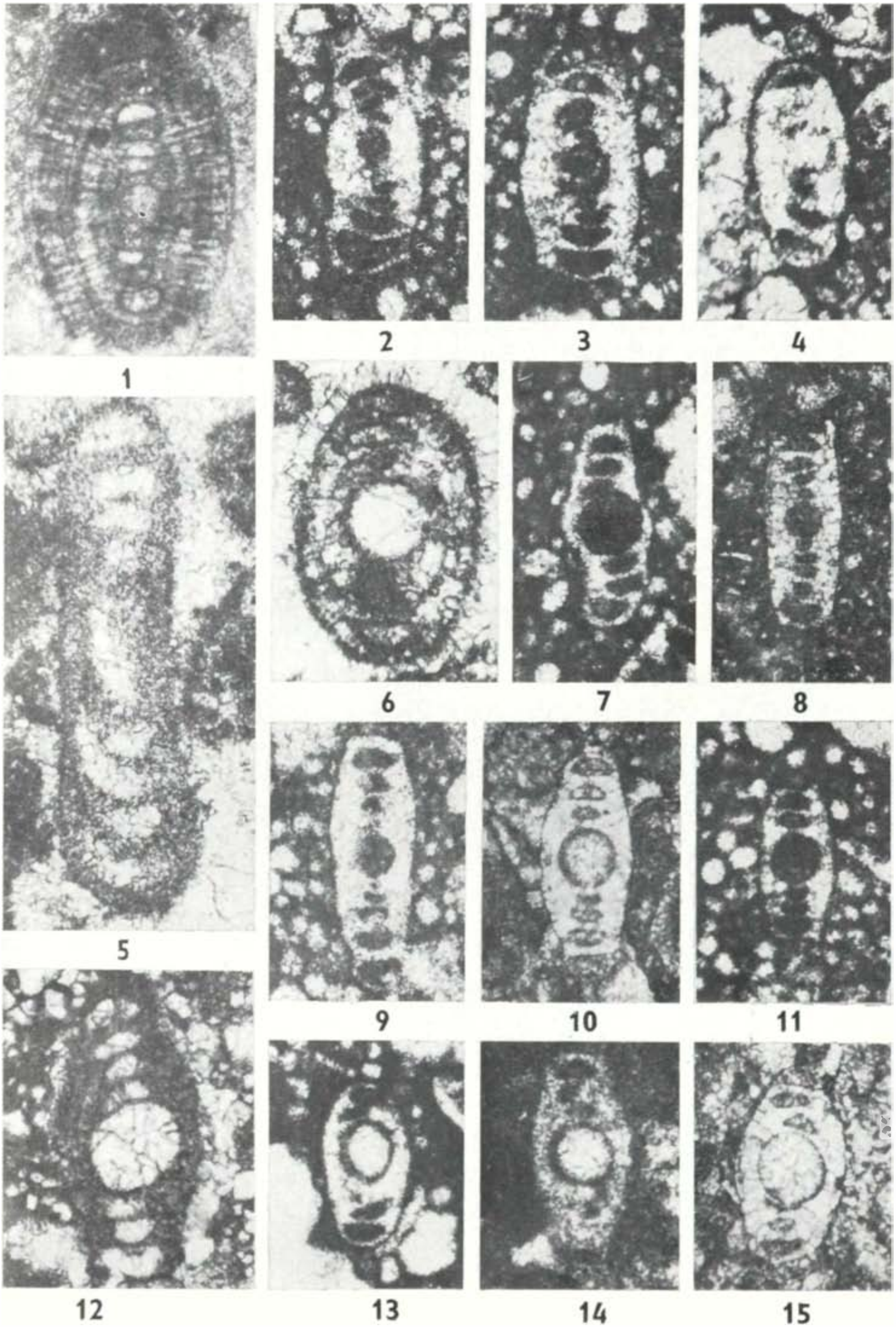
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PLATE XCI

Fig. 1—7 *Permodiscus planidiscoides* OBERHAUSER, 1964

Fig. 1, 5—6. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1 — thin section no. By. 5199, fig. 5—6 — thin section no. By. 5198.

Fig. 2—4, 7. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 2, 4, 7 — thin section no. Bo. 5131, fig. 3 — thin section no. Bo. 6887.

Magnification: x 115.

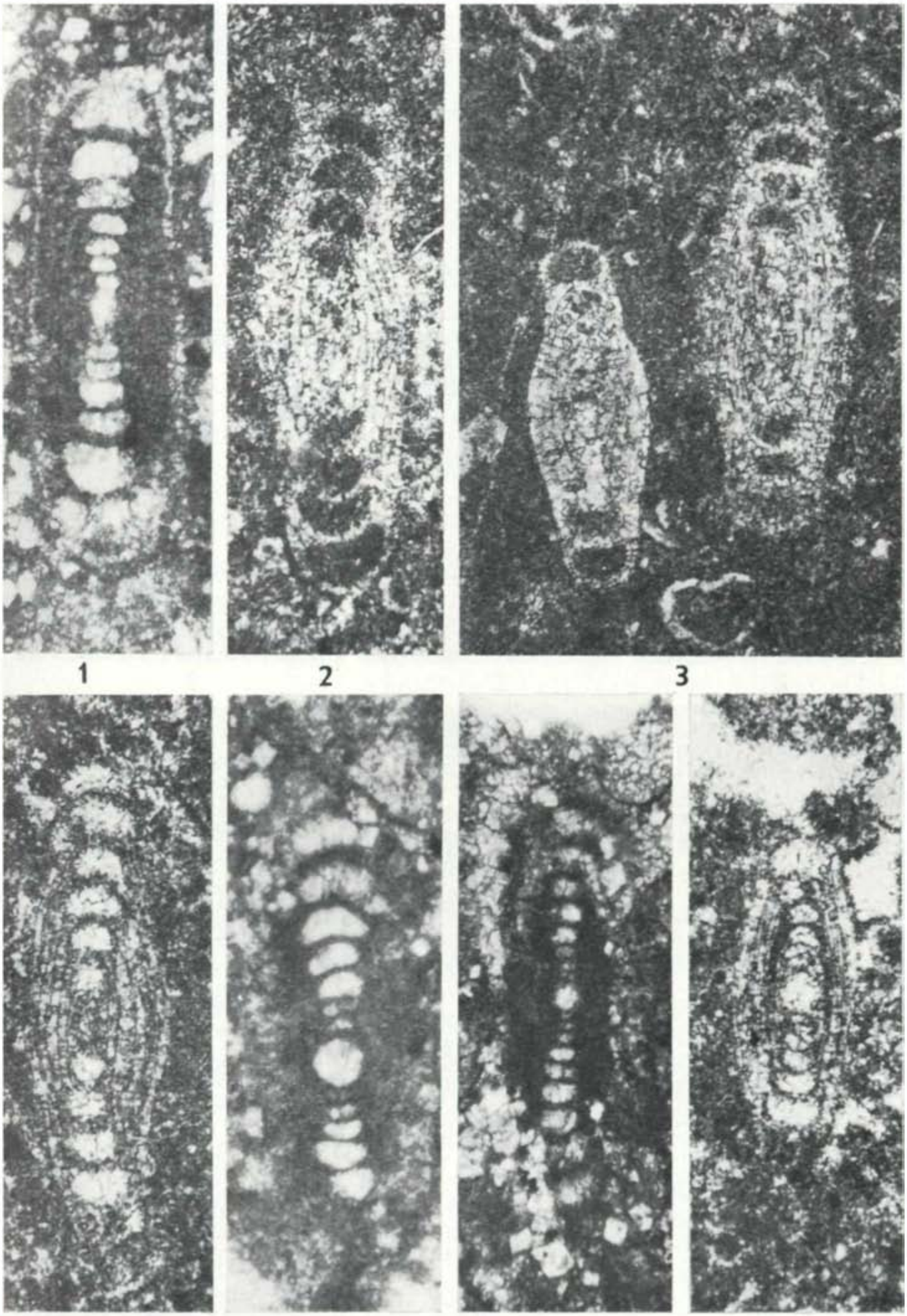
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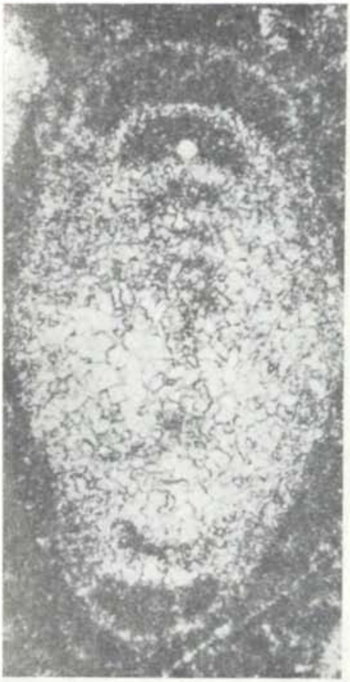
PLATE XCII

Fig. 1—6 *Permodiscus pragsoides* OBERHAUSER, 1964

Fig. 1—3, 5. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1 — thin section no. Bo. 5123, fig. 2 — thin section no. Bo. 5724, fig. 3, 5 — thin section no. Bo. 5271. Fig. 4, 6. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 4 — thin section no. By. 5198, fig. 6 — thin section no. Bo. 6648.

Magnification: x 115.



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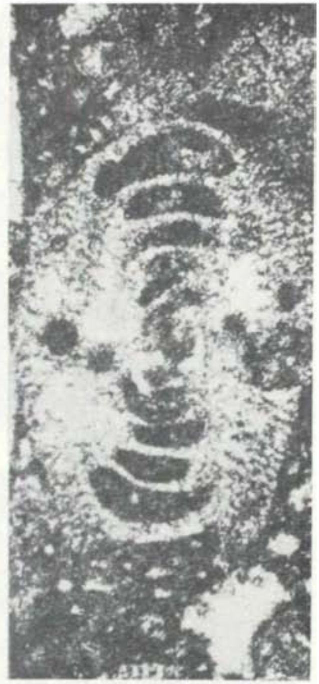

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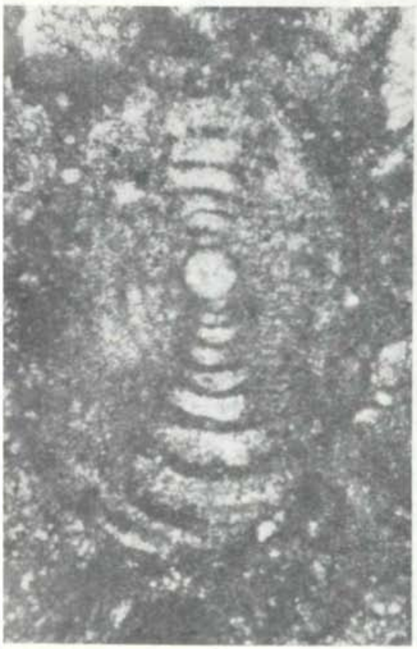

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PLATE XCIII

Fig. 1—19 *Permodiscus praetenuis* n. sp.

Fig. 1, 16. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6647.

Fig. 2—15, 17—19. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 2, 12, 13, 17—19 — thin section no. Bo. 5153, fig. 3, 8 — thin section no. Bo. 5137, fig. 4, 9—10, 15 — thin section no. Bo. 5135, fig. 5, 11, 14 — thin section no. Bo. 5156, fig. 6 — thin section no. Bo. 5274.

Magnification: x 115.

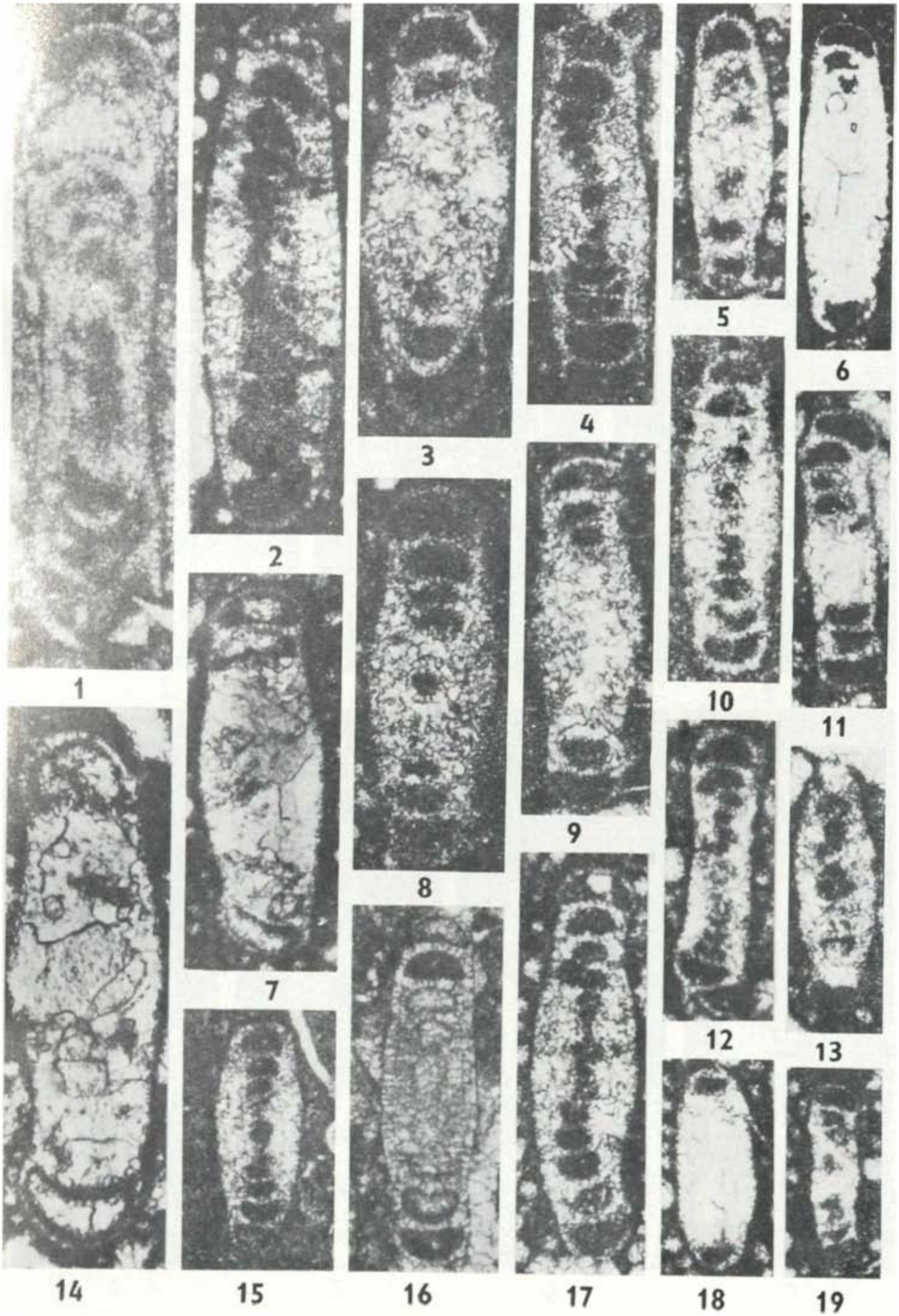
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PLATE XCIV

Fig. 1—7 *Permodiscus praetumidus* n. sp.

Fig. 1. Hybe, Dachstein limestone, Lower Rhaetian, thin section no. Sj. T—
Fig. 2. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thi section no. By. 5198.
Fig. 3. Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5345.
Fig. 4—7. Muránska planina plateau, Dachstein limestone, Uppermost Noria to Lower Rhaetian, fig. 4, 6—7 — thin section no. Bo. 5135, fig. 5 — thin sectio no. Bo. 5750.

Magnification: x 115.

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PLATE XCV

Fig. 1—7 *Permodiscus praetumidus* n. sp.

Fig. 1—3, 5—7. Muránska planina plateau, road-cut to Veľká lúka, Dachste limestone, Uppermost Norian to Lower Rhaetian, fig. 1 — thin section no. I 5156, fig. 2—3, 5—7 — thin section no. Bo. 5135.

Fig. 4. W of Tisovec, Rangaska, Furmanec limestone, Norian, thin section n Bo. 5703.

Magnification: x 115.

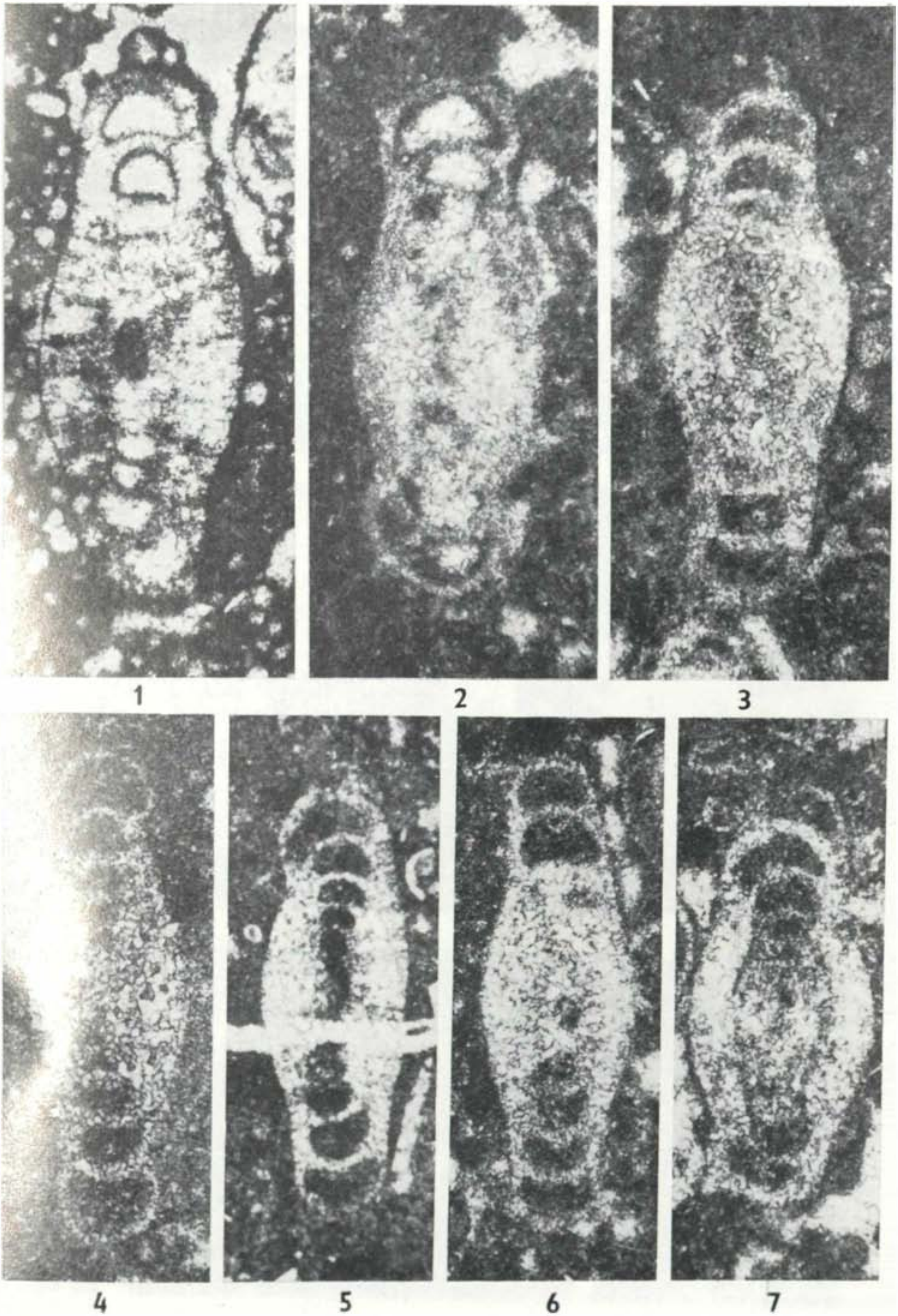
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PLATE XCVI

Fig. 1—7 *Auloconus permodiscoides* (OBERHAUSER, 1964)

Fig. 1—4, 6—7. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1 — thin section no. Bo. 5726, fig. 2 — thin section no. Bo. 5213, fig. 3 — thin section no. Bo. 5132, fig. 4 — thin section no. Bo. 5216, fig. 6 — thin section no. Bo. 5256, fig. 7 — thin section no. Bo. 5134.

Fig. 5. W of Tisovec, Goštanová, Furmanec limestone, Norian, thin section no. Bo. 5365.

Magnification: Fig. 1, 4, 6 x 115, Fig. 2—3, 5, 7 x 42.

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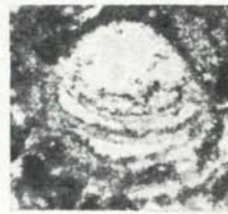

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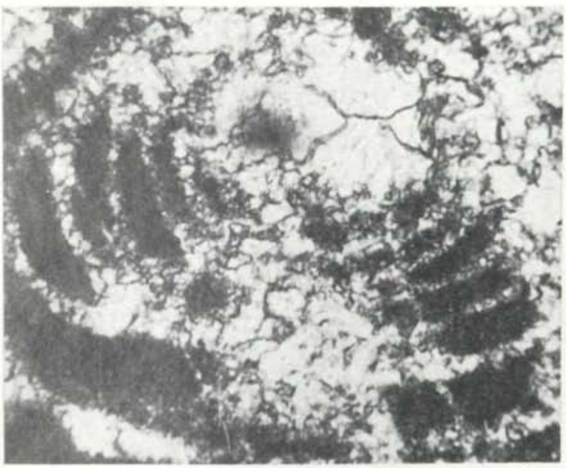

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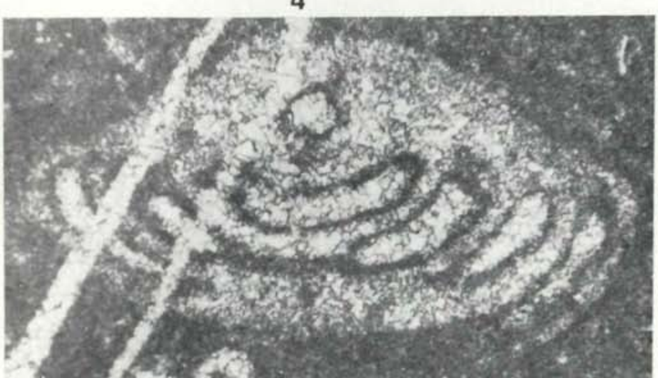

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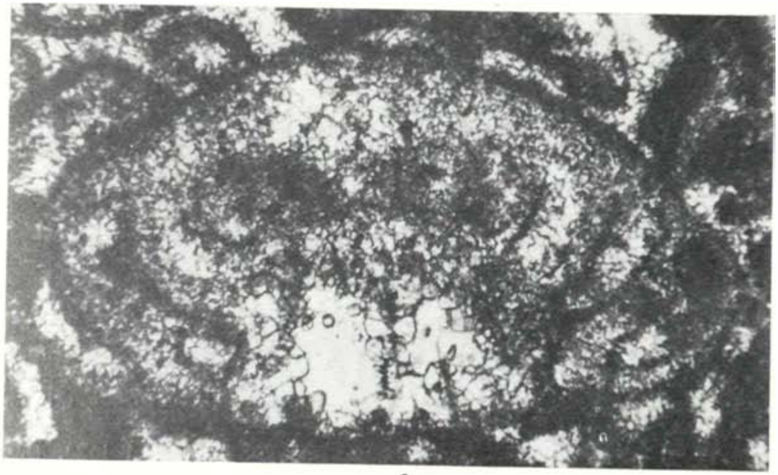
PLATE XCVII

Fig. 1—3 *Auloconus permodiscoides* (OBERHAUSER, 1964)
Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1, 3 — thin section no. Bo. 5132, fig. 2 — thin section no. Bo. 5123.

Magnification: x 115.



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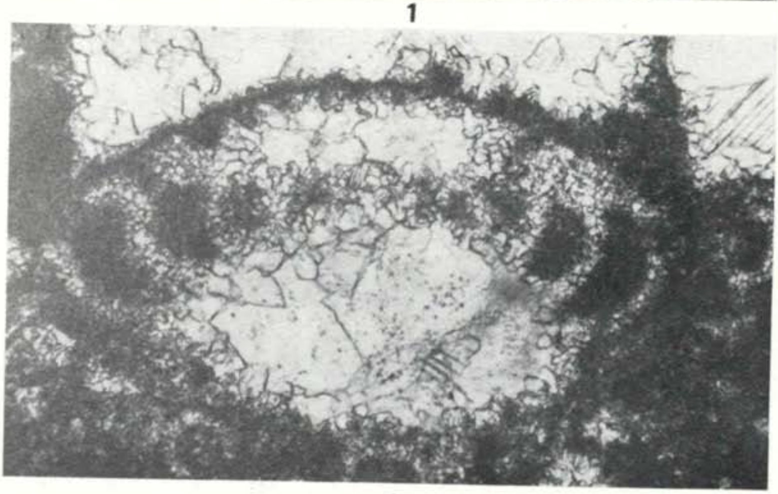

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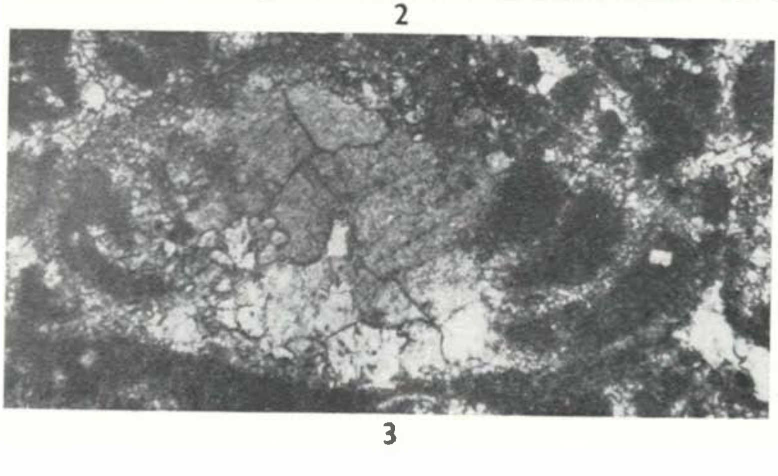

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PLATE XCVIII

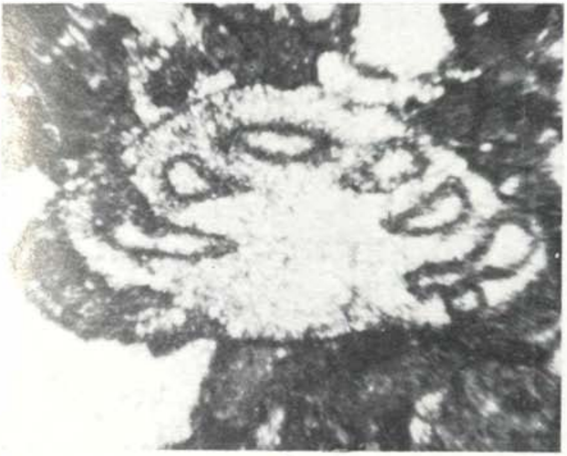
Fig. 1—6 *Auloconus permodiscoides* (OBERHAUSER, 1964)

Fig. 1, 3. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1 — thin section no. Bo. 6647, fig. 3 — thin, section no. Bo. 5965.

Fig. 2. W of Tisovec, Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5667.

Fig. 4—6. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 4 — thin section no. Bo. 5720, fig. 5 — thin section no. Bo. 5132, fig. 6 — thin section no. Bo. 5133.

Magnification: Fig. 1—3 x 115, Fig. 4—6 x 42.



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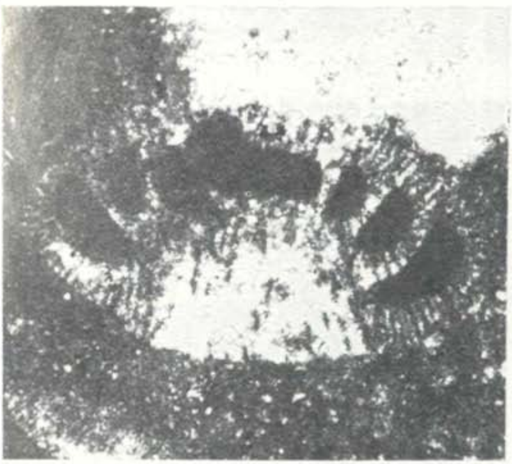

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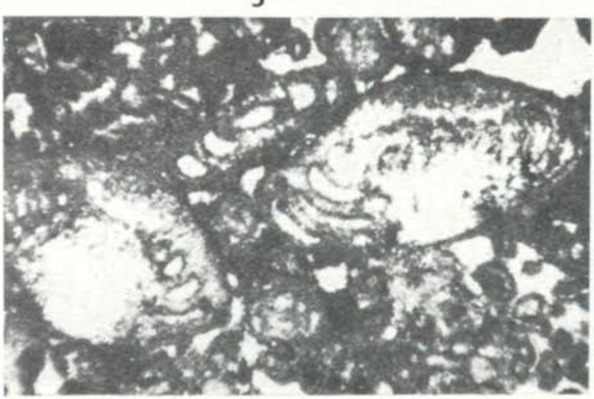

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PLATE XCIX

Fig. 1—4 *Aulotortus broennimanni* SALAJ, 1969

Fig. 1, 4. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, fig. 1 — thin section no. Bo. 6927, fig. 4 — thin section no. Bo. 5989.

Fig. 2. Muránska planina plateau, Skalka limestone, Rhaetian, thin section no. Bo. 5214.

Fig. 3. W of Tisovec, NE of Rangaska, Furmanec limestone, Norian, thin section no. Bo. 6081.

Magnification: x 42.

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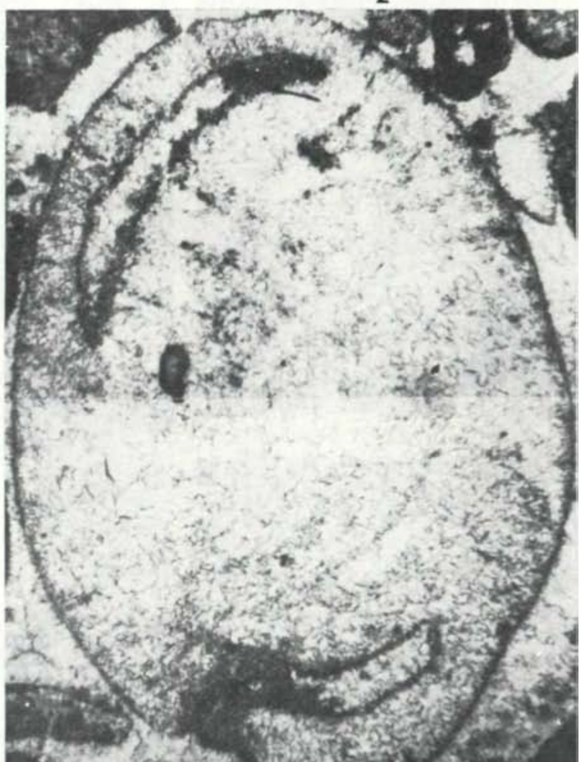

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PLATE C

Fig. 1—2 *Aulotortus broennimanni* SALAJ, 1969

Fig. 1. Muránska planina plateau, road-cut to Veľká lúka, limestone of Skalka, Rhaetian with *Triasina hantkeni* MAJZON, thin section no. By. 3210.

Fig. 2. Type species Muránska planina plateau, Červená Skala, Furmanec limestone, Norian, thin section no. By. 1062.

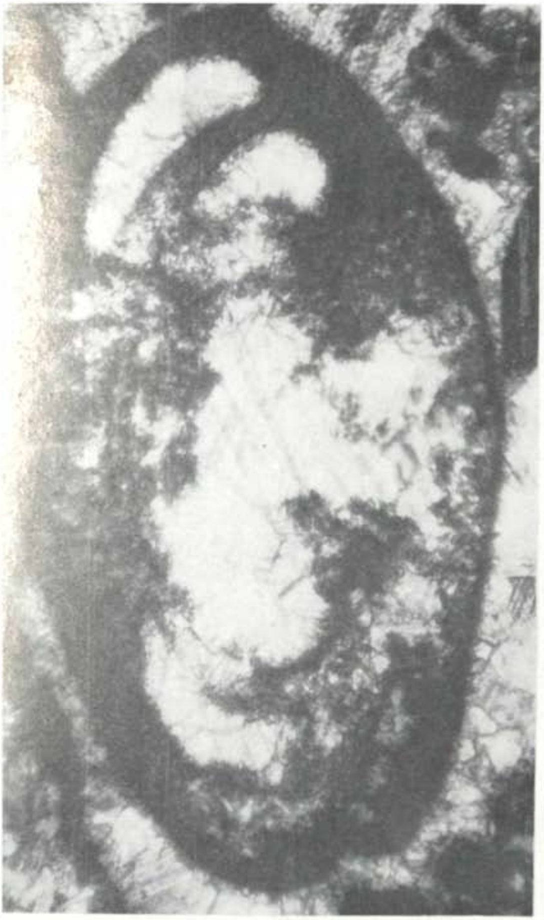
Fig. 3—6 *Aulotortus oscillens* WEYNSCHENK, 1956

Fig. 3, 6. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, fig. 3 — thin section no. Bo. 6922, fig. 6 — thin section no. Bo. 6950.

Fig. 4. Drnava, Bleskový prameň, dark-grey limestone, Lower Rhaetian, thin section no. By. 3/741.

Fig. 5. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5123.

Magnification: Fig. 1—4, 6 — x 42; Fig. 5 — x 80.



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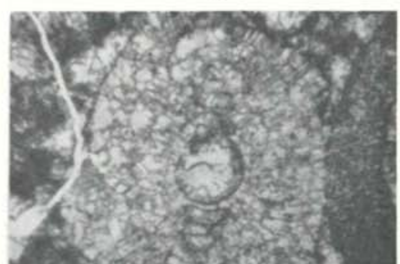

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PLATE CI

Fig. 1—5 *Aulotortus oscillens* WEYNSCHENK, 1956

Fig. 1. Budikovany, sample no. 20/65, Wetterstein limestone, Carnian, thin section no. By. 2463.

Fig. 2—3, 5. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 2 — thin section no. Bo. 5724, fig. 3 — thin section no. Bo. 6888, fig. 5 — thin section no. Bo. 5123.

Fig. 4. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6950.

Magnification: Fig. 1—3, 5 — x 115; Fig. 4 — x 42.

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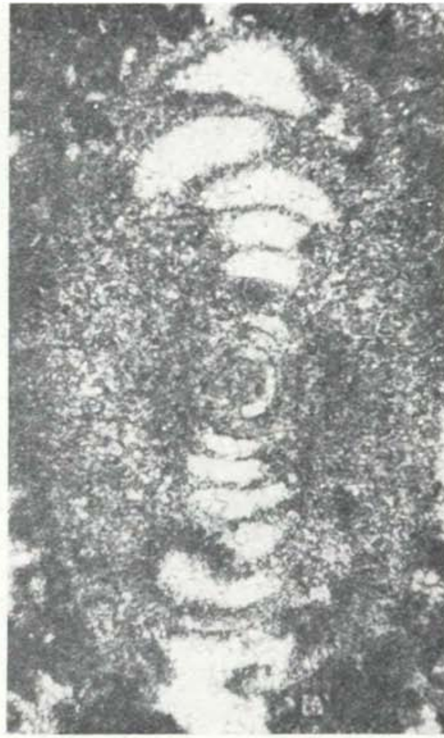

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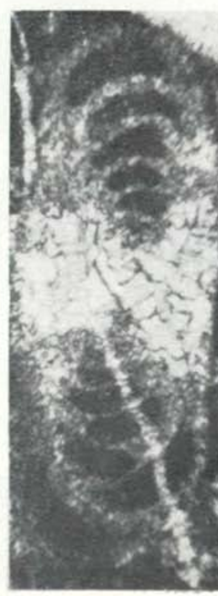

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PLATE CII

Fig. 1—5 *Aulotortus sinuosus* WEYNSCHENK, 1956

Fig. 1. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. By. 4135.

Fig. 2, W of Tisovec, saddle E of the elevation point 878,0, Furmanec limestone, Norian, thin section no. Bo. 6399.

Fig. 3. W of Tisovec, Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5692.

Fig. 4. Geravy, dark-grey limestone, Norian, thin section no. Bo. 6704.

Fig. 5. Bore-hole Láb 115, level 3543—3546 m, light-grey limestone, Norian, thin section no. 877/66.

Magnification: Fig. 1—3 — x 42; Fig. 4—5 x 115.

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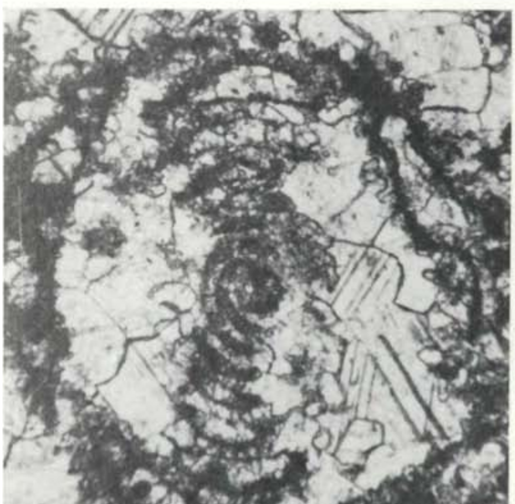

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PLATE CIII

Fig. 1—3 *Aulotortus sinuosus* WEYNSCHENK, 1956

Fig. 1. Muránska planina plateau, Veľká lúka, Tisovec limestone, Carnian, thin section no. By. 2169.

Fig. 2. Silická Brezová, sample no. 3/71, Tisovec limestone, Carnian, thin section no. By. 4967.

Fig. 3. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian — Lower Rhaetian, thin section no. Bo. 5746.

Fig. 4—5 *Rakusia oberhauseri* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967

Fig. 4. Type species, Muránska planina plateau Červená Skala, Tisovec limestone, Norian, thin section no. By. 1062.

Fig. 5. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6011.

Magnification: Fig. 1 x 115, Fig. 2—5 x 42.

Fig. 4. reillustrated from the publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b).

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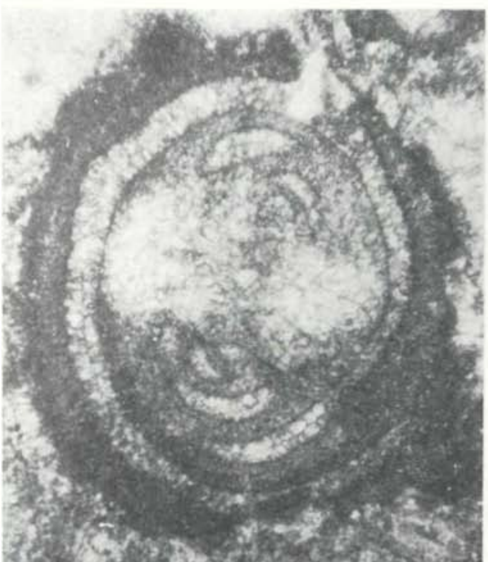

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PLATE CIV

Fig. 1—4 *Rakusia oberhauseri* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
Fig. 1—3. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, fig. 1 — thin section no. By. 4656, fig. 2 — thin section no. Bo. 6020, fig. 3 — thin section no. Bo. 6924.
Fig. 4. Bore-hole Láb 115, level 3543—3546 m, light-grey limestone, Norian, thin section no. 877/66.

Fig. 5 *Rakusia ploechingeri* nov. sp.
Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian, thin section no. Bo. 5271.

Magnification: Fig. 1—3 x 42, Fig. 4—5 x 115.


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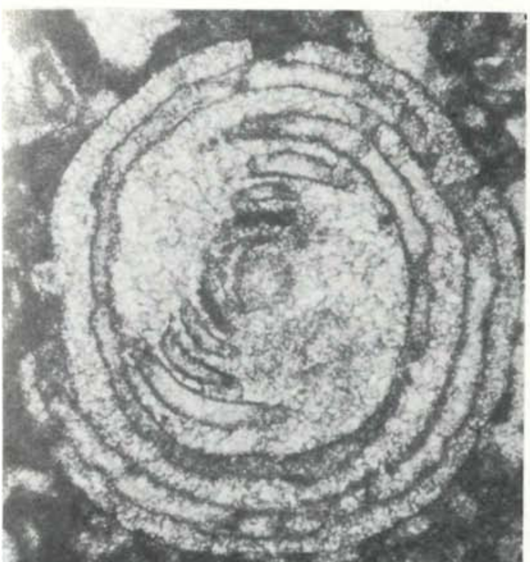
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PLATE CV

Fig. 1 *Permodiscus subsphaericus,* n. sp.
Type species. Transition form to Triasina oberhauseri KOEHN—ZANINETTI, 1968.
Plešivecká planina plateau, Kunova Teplica, Tisovec limestone, Carnian with *Pilamminella kuthani,* thin section no. By. 1902.

Fig. 2 a — *Permodiscus pragsoides* OBERHAUSER, 1964
b — *Rakusia oberhauseri* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
c — *Permodiscus praeimpressus* n. sp.
Silická Brezová, Tisovec limestone, Upper Carnian — *Rakusia oberhauseri* Zone, thin section no. By. 123.

Fig. 3 *Permodiscus hybensis* (SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967)
Type species. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Sj. 4.

Fig. 4 *Rakusia ploechingeri* n. sp.
Type species. Muránska planina plateau, Červená skala, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Sj. 34—21.

Magnification: Fig. 1 x 96, Fig. 2 x 45, Fig. 3 x 140, Fig. 4 x 38.

Fig. 2, 3 reillustrated from the publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967) and fig. 4 from the publication of J. SALAJ (1969b).

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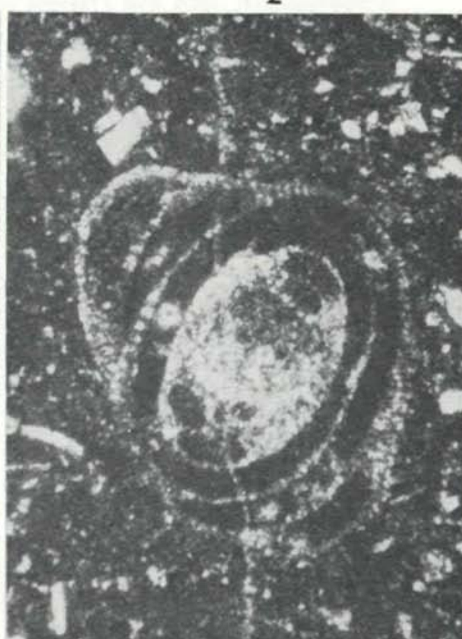

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PLATE CVI

Fig. 1 a, b — *Angulodiscus pokornyi* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
Fig. 1 b Type species.
c — *Angulodiscus friedli* KRISTAN—TOLLMANN, 1960
Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Sj. 4.

Fig. 2 *Pilamminella begani* (SALAJ, 1969)
Muránska planina plateau, Červená skala, Dachstein limestone, Uppermost Norian to Lower Rhaetian, type species. Thin section no. Sj. 34—21.

Fig. 3 *Pilamminella begani* (SALAJ, 1969)
Muránska planina plateau, Červená skala, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Sj. 34—21.

Fig. 4 a — *Earlandia* sp.
b — Transition form between *Permodiscus pragsoides* OBERHAUSER, 1964 and *Triasina oberhauseri* KOEHN—ZANINETTI, 1968
c — *Angulodiscus gaschei gaschei* KOEHN—ZANINETTI et BROENNIMANN, 1968
Muránska planina plateau, Kunová Teplica, Carnian, Tisovec limestone, thin section no. By. 2223.

Magnification: Fig. 1 x 38, Fig. 2, 3 x 97, Fig. 4 x 27.

Fig. 1 reillustrated from the publication of. J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b); Fig. 2—3 from the publication of J. SALAJ (1969b) and Fig. 4 from the publication of J. SALAJ (1978).

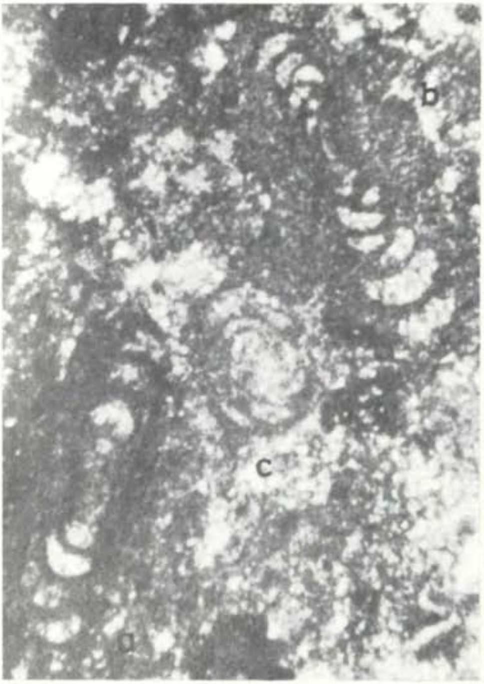

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PLATE CVII

Fig. 1 *Permodiscus planidiscoides* OBERHAUSER, 1964
Brezovské Karpaty Mts., Dobrá Voda, Wetterstein limestone, Ladinian, thin section no. Sj. 218.

Fig. 2 *Lamelliconus procerus* (LIEBUS, 1942)
Silická planina plateau, Gombasek, Wetterstein limestone, Ladinian, thin section no. Sj. 2524.

Fig. 3 *Angulodiscus glomospirelloides* n. sp.
Hybe, Hybe Formation, Rhaetian, thin section no. Bo. 6583.

Fig. 4 *Lamelliconus ovatus* (SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967)
Brezovské Karpaty Mts., Jablonicko-prašnické pohorie, Dobrá Voda, Steinalm limestone, Anisian, thin section no. Sj. 205.

Magnification: Fig. 1 x 27, Fig. 2, 4 x 195, Fig. 3 x 285.

Fig. 1, 2, 4 reillustrated from the publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967b).

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PLATE CVIII

Fig. 1 *Rakusia oberhauseri* SALAJ; in. SALAJ — BIELY — BYSTRICKÝ, 1967
Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6014.

Fig. 2—5 *Angulodiscus communis* KRISTAN, 1957
Fig. 2—4. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian (Sevatian), fig. 2 — thin section no. Bo. 5271, fig. 3—4 — thin section no. Bo. 5153. Fig. 5. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. By. 5199.

Magnification: Fig. 1 — x 42; Fig. 2—5 — x 115.

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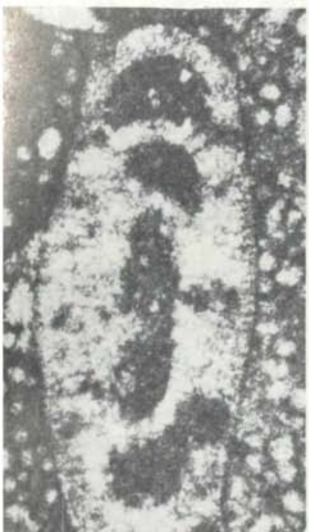

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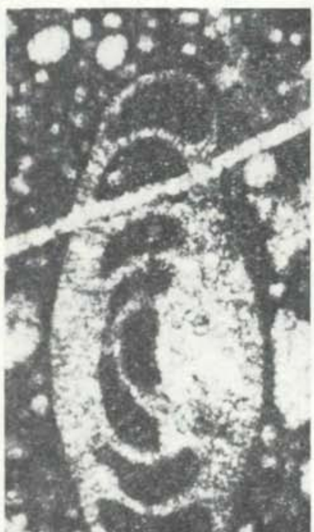

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PLATE CIX

Fig. 1—2 *Angulodiscus communis* KRISTAN, 1957

Fig. 1. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Lower Rhaetian (Sevatian), thin section no. Bo. 6647.

Fig. 2. Hybe, Dachstein limestone, Lower Rhaetian, thin section no. Bo. 6647.

Fig. 3—4 *Angulodiscus expansus* (KRISTAN—TOLLMANN, 1964)

Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian (Sevatian), fig. 3 — thin section no. Bo. 5762, fig. 4 — thin section no. Bo. 5137.

Fig. 5—11 *Angulodiscus friedli* (KRISTAN—TOLLMANN, 1962)

Fig. 5, 11. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 5 — thin section no. Bo. 5185, fig. 11 — thin section no. Bo. 5131.

Fig. 6. Stratenská hornatina Mts., Holý Kameň, Furmanec limestone, Norian, thin section no. Bo. 6089.

Fig. 7—10. Hybe, Dachstein limestone, Lower Rhaetian; fig. 7—8, 10 — thin section no. By. 5199, fig. 9 — thin section no. Sj. no. T—4.

Magnification: x 115.

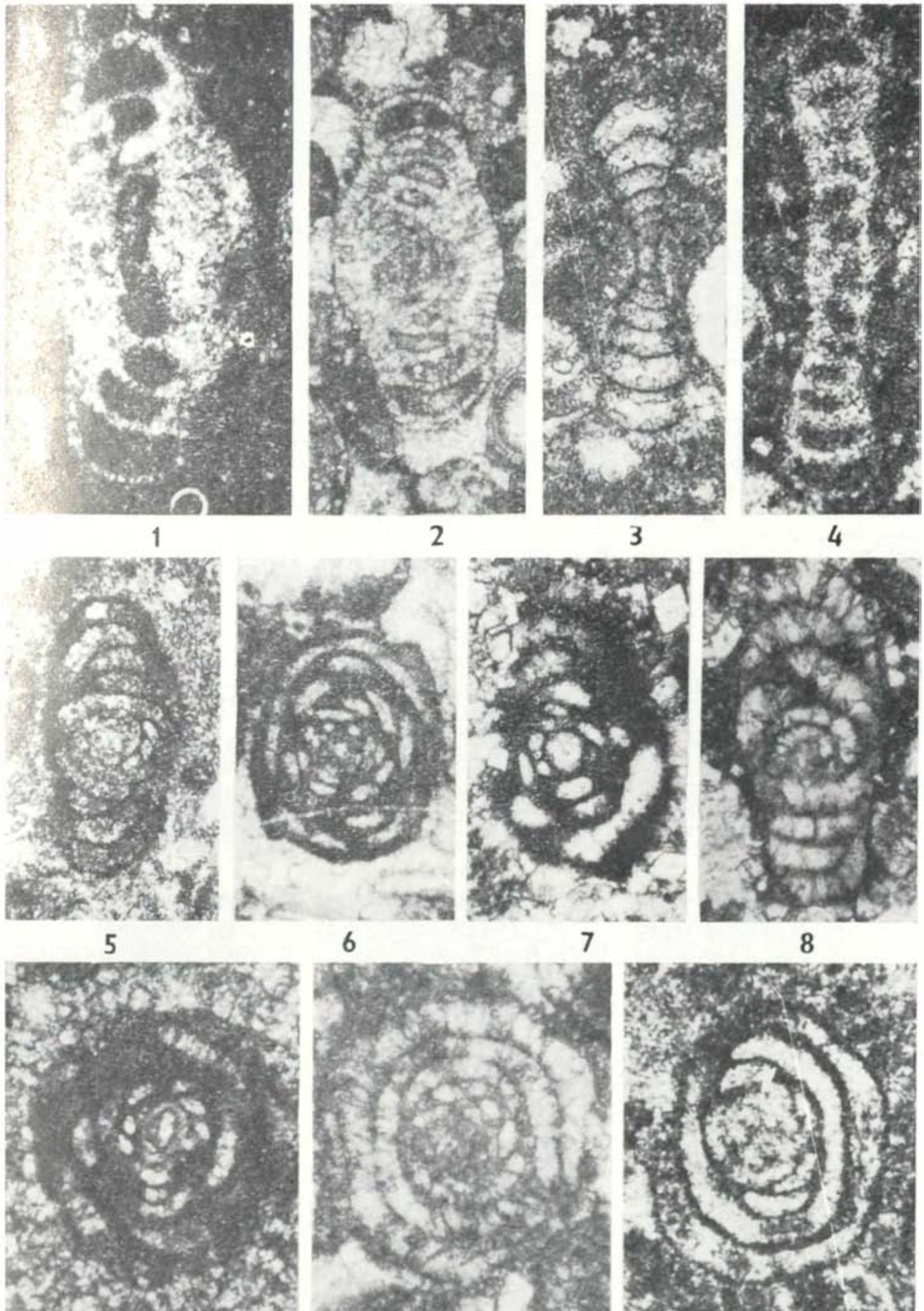
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PLATE CX

Fig. 1—10 *Angulodiscus friedli* (KRISTAN—TOLLMANN, 1962)

Fig. 1. W of Tisovec, Goštanová, Furmanec limestone, Norian, thin section no. Bo. 5390.

Fig. 2, 4—6, 8—10. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1 — thin section no. Bo. 5131, fig. 4 — thin section no. Bo. 5744, fig. 5—6 — thin section no. Bo. 5240, fig. 8 — thin section no. Bo. 5271, fig. 9 — thin section no. Bo. 5137, fig. 10 — thin section no. Bo. 5135.

Magnification: x 115.

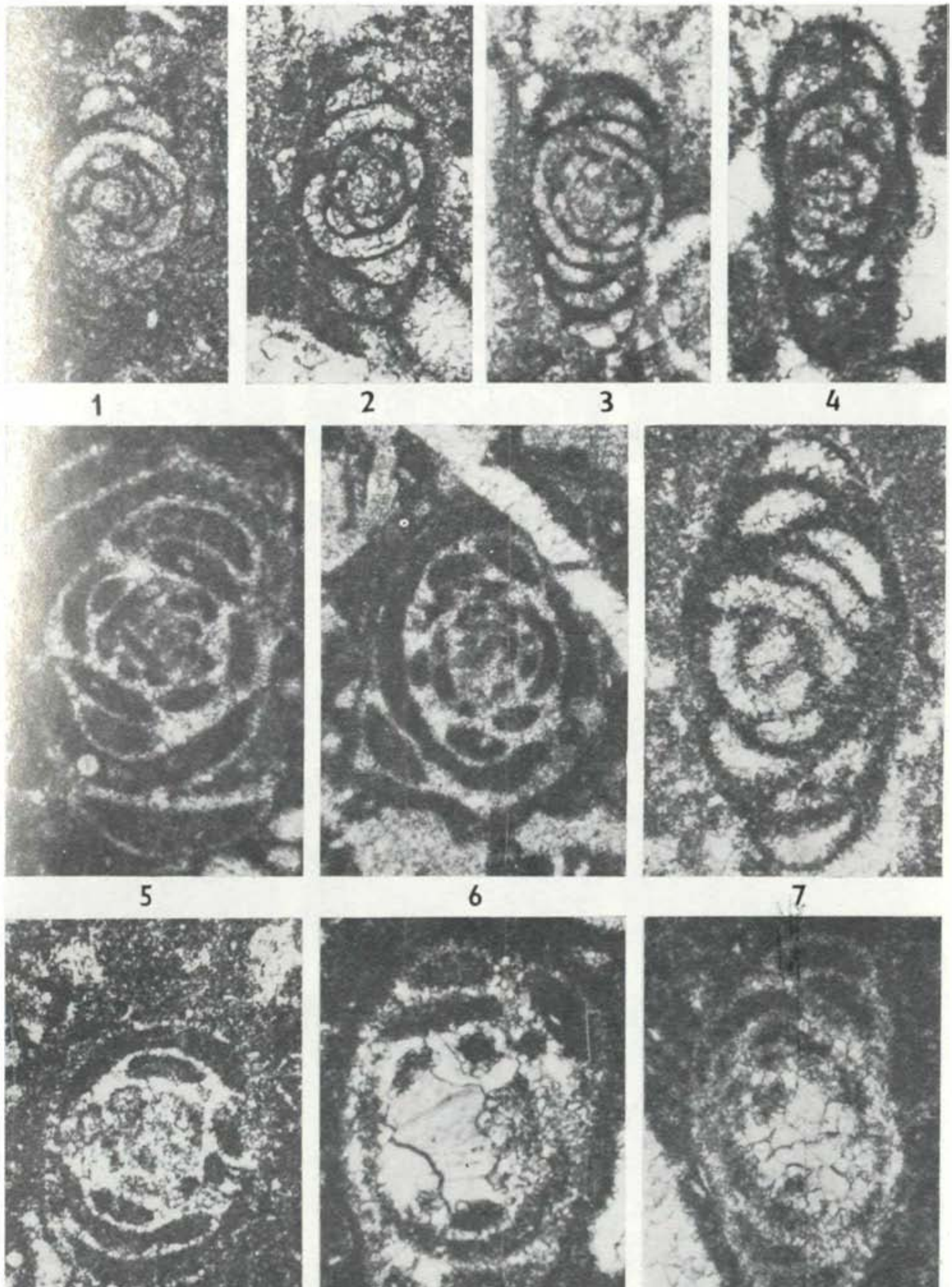
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PLATE CXI

Fig. 1—9 *Angulodiscus friedli* (KRISTAN—TOLLMANN, 1962)
Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1—6, 9 — thin section no. By. 5199, fig. 7—8 — thin section no. By. 5198.

Magnification: x 115.

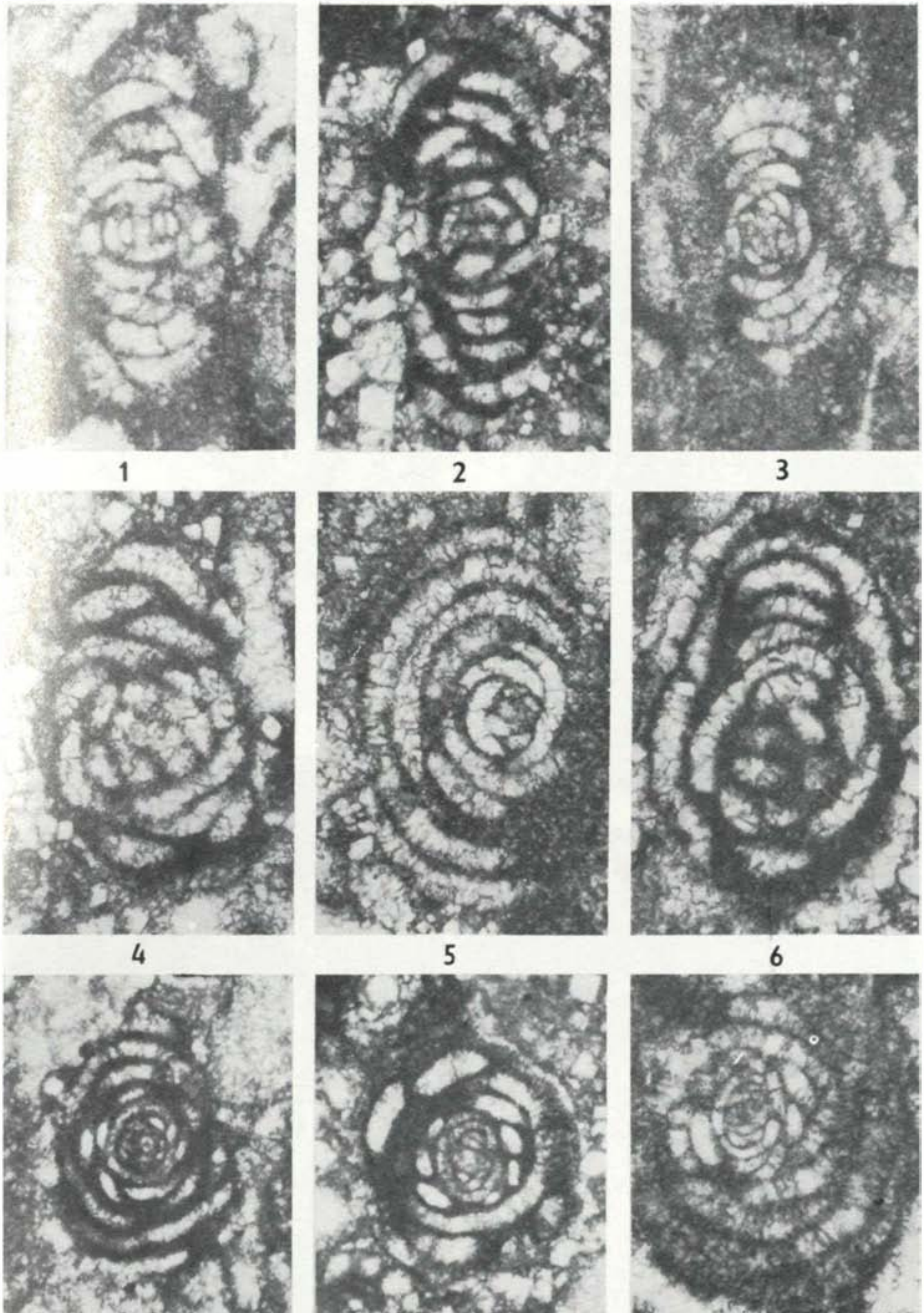
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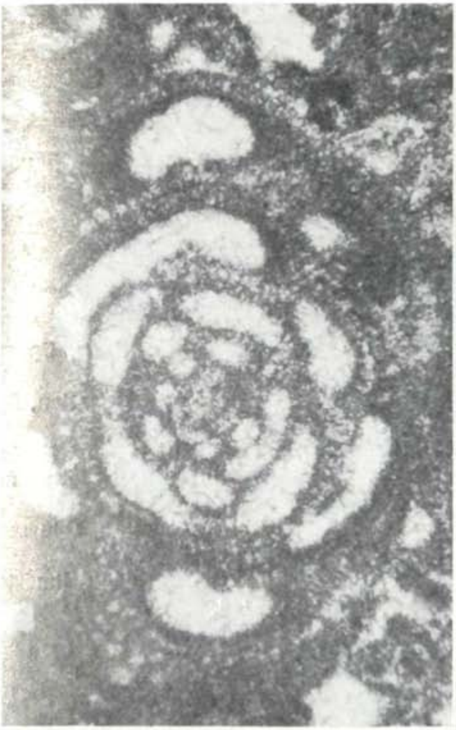
PLATE CXII

Fig. 1—4 *Angulodiscus friedli* (KRISTAN—TOLLMANN, 1962)

Fig. 1—3. Hybe, Dachstein limestone Uppermost Norian to Lower Rhaetian, thin section no. Sj. 4145/66, fig. 2 — detail from the fig. 1.

Fig. 4. Muránska planina plateau, road-cut to Veľká lúka. Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5137.

Magnification: Fig. 1, 3—4 x 115; Fig. 2 x 285.



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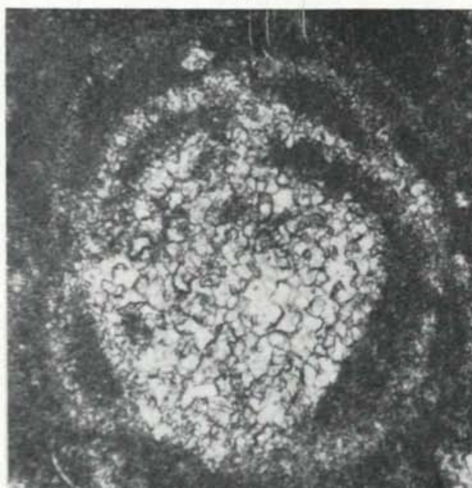

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PLATE CXIII

Fig. 1—9 *Angulodiscus friedli* (KRISTAN—TOLLMANN, 1962)

Fig. 1. Bore-hole Lab-115, depth 3543—3546 m, organogenic limestone, Uppermost Norian to Lower Rhaetian, thin section no. 877/66.

Fig. 2, 6. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 2 — thin section no. Sj. 4156/66, fig. 6 — thin section no. By. 5199.

Fig. 3—5, 9. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 3 — thin section no. 3123, fig. 4—5 — thin section no. Bo. 5135, fig. 9 — thin section no. Bo. 5146.

Fig. 7. Muránska planina plateau, Skalka limestone, Upper Rhaetian, thin section no. Bo. 5569.

Fig. 8. Hričovské Podhradie, NE of Ostrý vrch, pebble of the Dachstein limestone from Ilerdian conglomerates, thin section no. Bo. 5146.

Fig. 2 reillustrated from the publication of J. SALAJ (1978).

Magnification: x 115.

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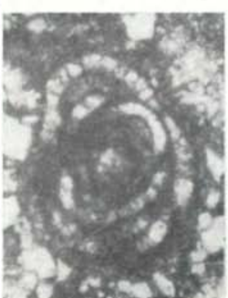

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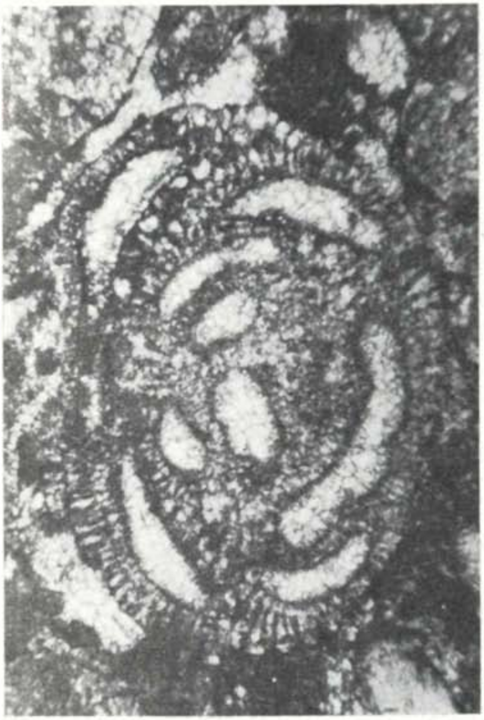
PLATE CXIV

Fig.1—5 *Angulodiscus gaschei gaschei* KOEHN—ZANINETTI et BROENNIMANN, 1968
Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1—3 — thin section no. Bo. 6647, fig. 4—5 — thin section no. Bo. 6648.
On the fig. 3 also *Rakusia ploechingeri* n. sp.

Magnification: x 115.



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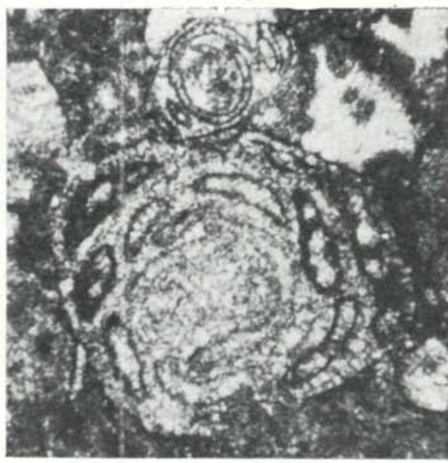

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PLATE CXV

Fig. 1—4 *Angulodiscus gaschei gaschei* KOEHN—ZANINETTI et BROENNIMANN, 1968
Fig. 1, 4. W of Tisovec, Goštanová, Furmanec limestone, Norian, fig. 1 — thin section no. Bo. 5597, fig. 4 — thin section no. Bo. 5375.
Fig. 2. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5123.
Fig. 3. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5897.

Magnification: x 115.

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PLATE CXVI

Fig. 1—9 *Angulodiscus gaschei gaschei* KOEHN—ZANINETTI et BROENNIMANN, 1968
Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian.
Fig. 1 — thin section no. Bo. 5732, fig. 2 — thin section no. Bo. 5240, fig. 3 — thin section no. Bo. 5153, fig. 4—5 — thin section no. Bo. 5271, fig. 6 — thin section no. Bo. 5152, fig. 7—9 — thin section no. Bo. 5123.

Magnification: x 115.

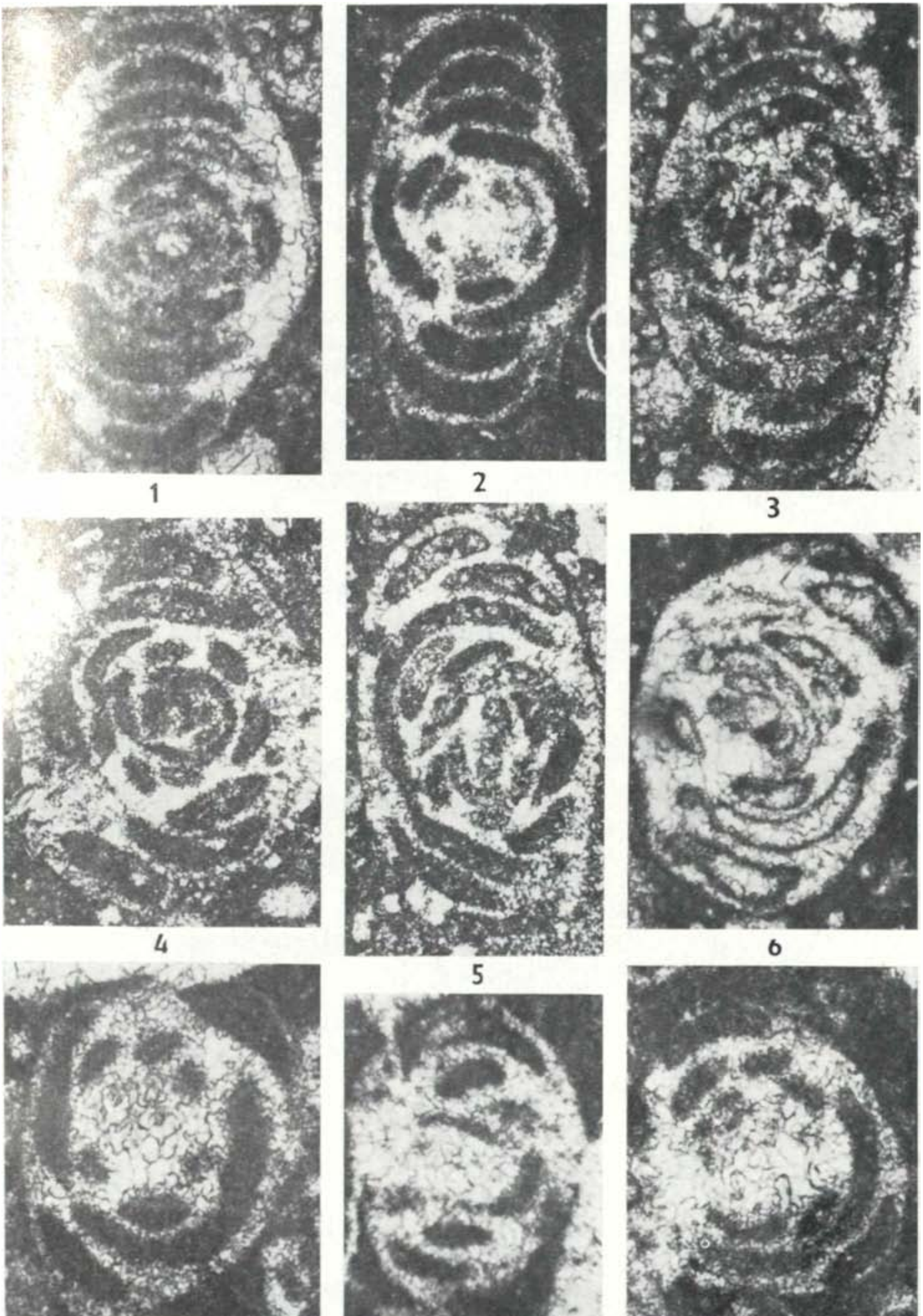
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PLATE CXVII

Fig. 1—6 *Angulodiscus gaschei praegaschei* (KOEHN—ZANINETTI, 1968)
Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, fig. 1—3 — thin section no. Bo. 5989, fig. 4 — thin section no. Bo. 6025, fig. 5 — thin section no. Bo. 6929, fig. 6 — thin section no. Bo. 6922, Exemplares with dick wall — sublitoral facies.

Magnification: x 42.

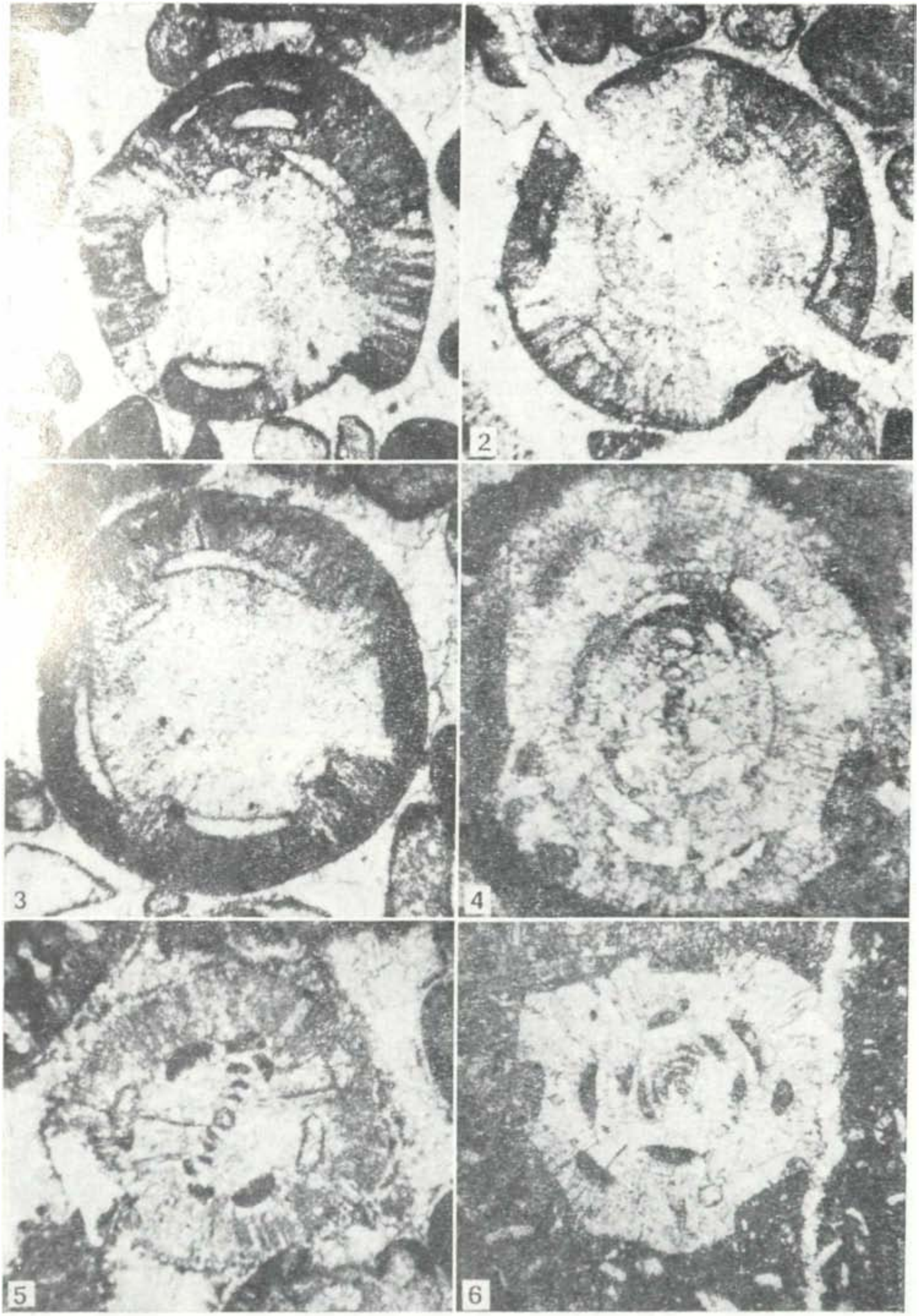
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PLATE CXVIII

Fig. 1, 3, 5—6 *Angulodiscus gaschei praegaschei* (KOEHN—ZANINETTI, 1968)

Fig. 1. Bore-hole Láb—115, depth 3543—3546 m, organogenic limestone, Uppermost Norian to Lower Rhaetian, thin section no. 877/66.

Fig. 3. Plešivecká planina plateau, sample no. 33/59, Tisovec limestone, Carnian, thin section no. By. 1868.

Fig. 5—6. Muránska planina plateau, Skalka limestone, Upper Rhaetian, fig. 5 — thin section no. Bo. 5184, fig. 6 — thin section no. Bo. 5214.

Fig. 2, 4 *Angulodiscus friedli* (KRISTAN—TOLLMANN, 1962)

Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 2 — thin section no. By. 5198, fig. 4 — thin section no. By. 5199.

Magnification: Fig. 1—2, 4 x 115; Fig. 3, 5—6 x 42.

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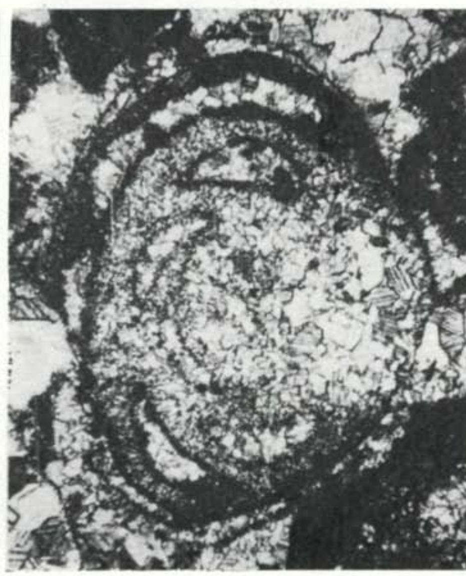

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PLATE CXIX

Fig. 1, 3—4 *Angulodiscus gaschei praegaschei* KOEHN—ZANINETTI, 1968
Fig. 1. Stratenská hornatina Mts., Geravy, organogenic limestone, Norian, thin section no. Bo. 6687.
Fig. 3. Stratenská hornatina Mts., Holý Kameň, Furmanec limestone, Norian, thin section no. Bo. 6095.
Fig. 4. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6026.

Fig. 2 *Angulodiscus gaschei gaschei* KOEHN—ZANINETTI et BROENNIMANN, 1968
Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6658.

Magnification: Fig. 1, 3, 4 x 42; Fig. 2 x 115.

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PLATE CXX

Fig. 1—2, 6 *Angulodiscus impressus* KRISTAN—TOLLMANN, 1964

Fig. 1, 6. Borehole Láb—115, depth 3543—3546 m, organogenic limestone, Uppermost Norian to Lower Rhaetian, thin section no. 877/66.

Fig. 2. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6647.

Fig. 3—5, 7—15 *Angulodiscus paralellus* (KRISTAN—TOLLMANN, 1964)

Fig. 3, 5, 8—11, 13—15. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian; fig. 3 — thin section no. Bo. 5153, fig. 5, 15 — thin section no. Bo. 6887, fig. 8—9 — thin section no. Bo. 5152, fig. 10—11, 13 — thin section no. Bo. 5146, fig. 14 — thin section no. Bo. 5153.

Fig. 7, 12. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 7 — thin section no. By. 5199, fig. 12 — thin section no. Bo. 6647.

Magnification: x 115.


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PLATE CXXI

Fig. 1—5, 9 *Angulodiscus pokornyi* SALAJ; in SALAJ — BIELY — BYSTRICKÝ; 1967
Fig. 1—3, 5, 9. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1, 9 — thin section no. By. 5198, fig. 2—3 — thin section no. By. 5199, fig. 5 — thin section no. No. 5914.
Fig. 4. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5131.

Fig. 6—7 *Angulodiscus tenuis* KRISTAN, 1957
Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 6 — thin section no. Bo. 5133, fig. 7 — thin section no. Bo. 5143.

Fig. 8, 10—12 *Angulodiscus falsotumidus* n. sp.
Fig. 8. Hybe, Dachstein limestone, Uppermost Norian ton Lower Rhaetian, thin section no. Sj. 4152/66.
Fig. 10, 12. Drnava, Bleskový prameň, dark limestone, Lower Rhaetian (Sevatian), fig. 10 — tihn section no. By. 2/741, fig. 12 — thin section no. By. 4633.
Fig. 11. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5135.

Magnification: x 115.

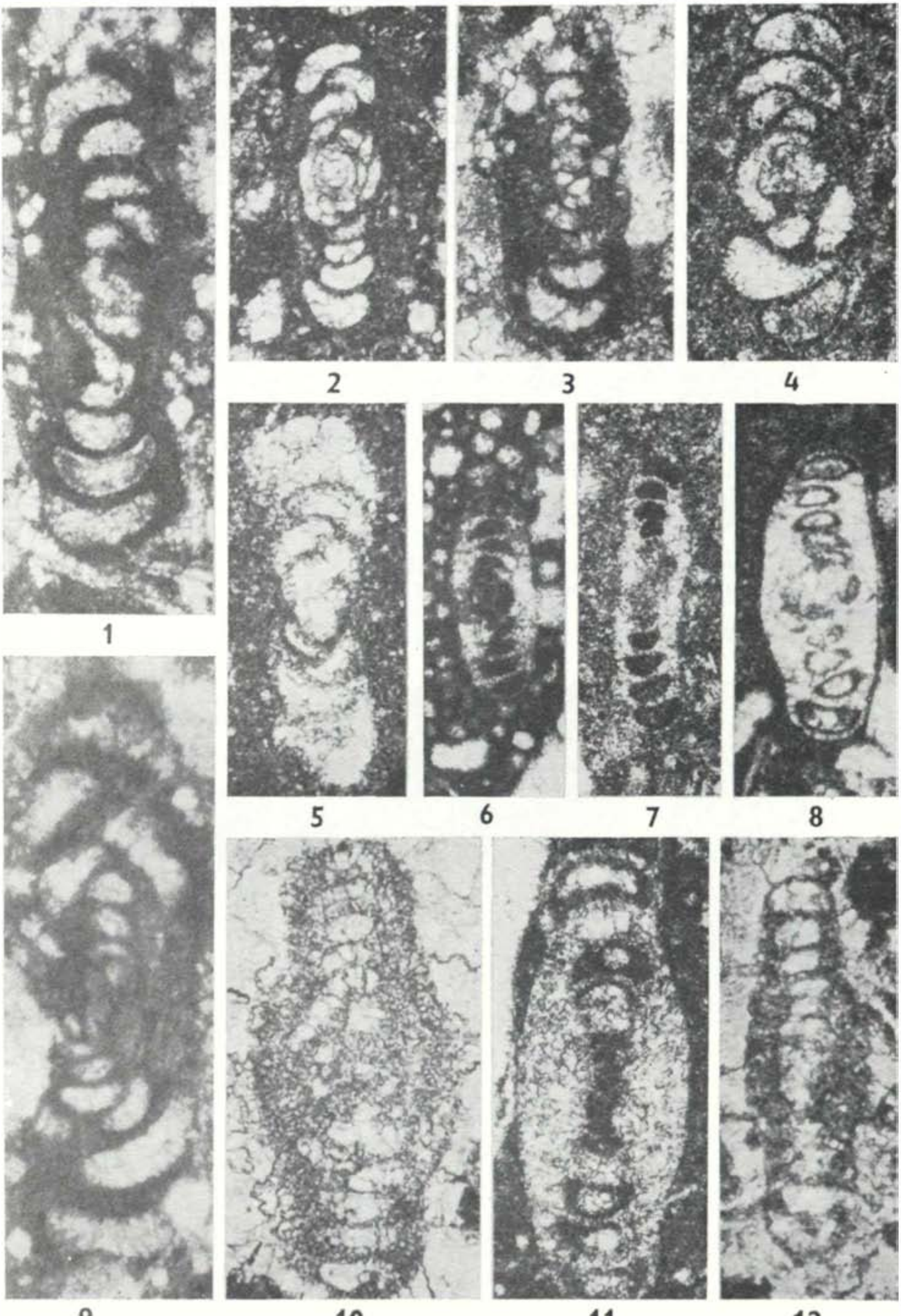
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PLATE CXXII

Fig. 1—2 *Angulodiscus falsotumidus* n. sp.
Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 1 — thin section no. Bo. 5128, fig. 2 — thin section no. Bo. 5240.

Fig. 3—5 *Semiinvoluta clari* KRISTAN, 1957
Fig. 3—4 Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 3 — thin section no. Bo. 6647, fig. 4 — thin section no. Bo. 6648.
Fig. 5. Malá Čierna, pebble of organogenic Dachstein limestone from Paleocene conglomerates, thin section no. Bo. 8.

Fig. 6 *Semiinvoluta* cf. *clari* KRISTAN, 1957
Kováčová, Furmanec limestone, Norian, thin section no. Bo. 6732.

Magnification: x 115.

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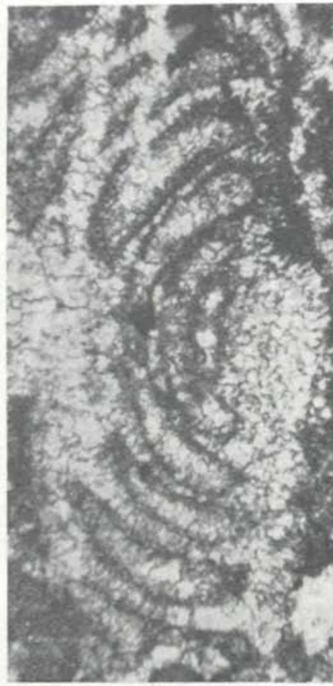

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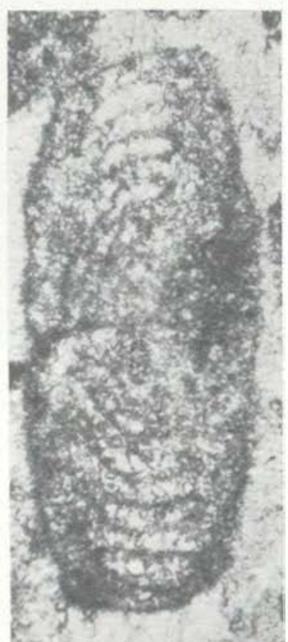

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PLATE CXXIII

Fig. 1—2 *Semiinvoluta clari* KRISTAN, 1957

Fig. 1. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian. Distinctly visible two layered structure of the deuteroloculum. Exept the deuteroloculum the worls are one-layered, separated by interstratal spaces. Thin section no. Sj. 36.

Fig. 2. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Sj. 61—21.

Fig. 3 *Semiinvoluta clari* KRISTAN, 1957
Muránska planina plateau, Červená skala, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Sj. 32/10.

Fig. 4 a — *Trochonella permodiscoides* (OBERHAUSER, 1964)
b — *Semiinvoluta clari* KRISTAN—TOLLMANN, 1957
c — *Triasina oberhauseri* KOEHN—ZANINETTI, 1968
d — *Angulodiscus friedli* (KRISTAN—TOLLMAN, 1962)
e — *Agathammina austroalpina* KRISTAN—TOLLMANN et TOLLMANN, 1964
Muránska planina plateau, Červená skala, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Sj. 34/21.

Magnification: Fig. 1, 2 x 55, Fig. 3 x 97, Fig. 4 x 14

Fig. 1 reillustrated from the publication of J. SALAJ (1976), fig. 2 from the publication of J. SALAJ (1978), fig. 3 from the publication of J. SALAJ (1969a) and fig. 4 from the publication of J. SALAJ — A. BIELY — J. BYSTRICKÝ (1967a).

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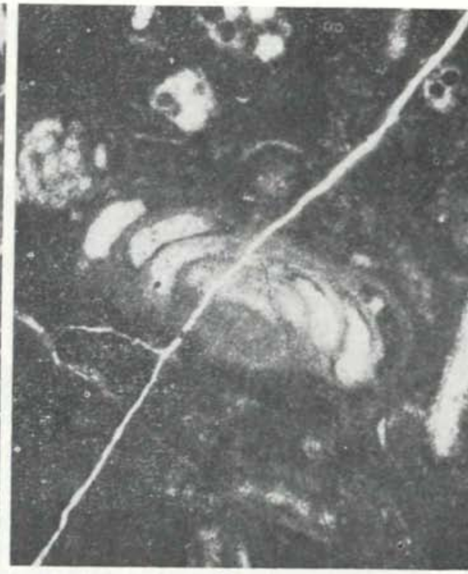

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PLATE CXXIV

Fig. 1 *Semiinvoluta clari* KRISTAN, 1957
Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 5137.

Fig. 2 *Semiinvoluta* aff. *verrucosa* TOLLMANN et KRISTAN—TOLLMANN, 1970
Drnava, Bleskový prameň, dark limestone, Lower Rhaetian (Sevatian), thin section no. By. 1/741.

Fig. 3—7 *Lamelliconus multispirus* (OBERHAUSER, 1957)
Fig. 3—7. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, fig. 3 — thin section no. Bo. 4102, fig. 4 — thin section no. Bo. 6929, fig. 5 — thin section no. Bo. 5969, fig. 6 — thin section no. Bo. 5987, fig. 7 — thin section no. Bo. 6920.

Fig. 8 *Lamelliconus cordevolicus* (OBERHAUSER, 1964)
Silická Brezová, Tisovec limestone, Carnian, thin section no. By. 4967.

Magnification: Fig. 1, 2, 8 x 115; Fig. 3—7 x 42.

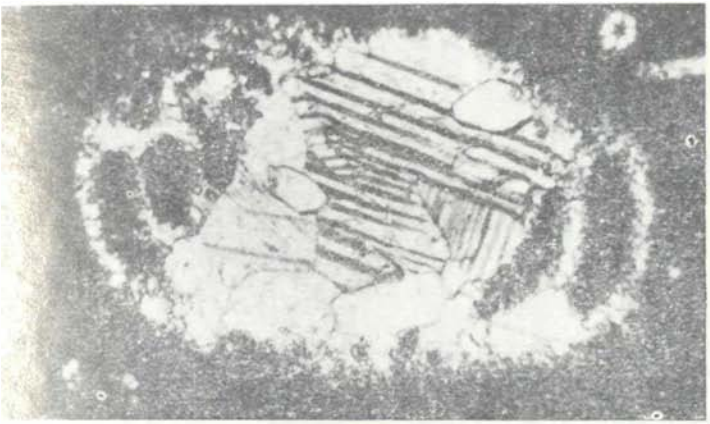

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PLATE CXXV

Fig. 1 *Lamelliconus multispirus* (OBERHAUSER, 1957)
Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section thin section no. Bo. 6014.

Fig. 2—5 *Lamelliconus procerus* (LIEBUS, 1942)
Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, fig. 2, 4 — thin section no. Bo. 6929, fig. 3 — thin section no. Bo. 6025, fig. 5 — thin section no. By. 4134.

Fig. 6—7 *Lamelliconus multispirus* (OBERHAUSER, 1957)
Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, fig. 6 — thin section no. By. 4132, fig. 7 — thin section no. By. 4102.

Magnification: x 42.


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PLATE CXXVI

Fig. 1 *Triasina oberhauseri* KOEHN—ZANINETTI et BROENNIMANN, 1968
Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Sj. 61a.

Fig. 2—8 *Triasina hantkeni* MAJZON, 1954
Fig. 2, 8. Migiinc, Dachstein limestone, Rhaetian, thin section no. By. 4971.
Fig. 3. Hlavina, pebble of Rhaetian organogenic limestone from Cuisian conglomerates, thin section no. Bo. 5588.
Fig. 4. SW of Považská Bystrica, pebble of Rhaetian organogenic limestone from Ilerdian conglomerates, thin section no. Bo. 5579.
Fig. 5. Muránska planina plateau, Skalka limestone, Upper Rhaetian, thin section no. Bo. 5214.
Fig. 6. Malé Karpaty Mts., Buková, Dachstein limestone, Rhaetian, thin section no. By. 5255.
Fig. 7. Drnava, Bleskový prameň, dark limestone, Upper Sevatian, thin section no. By. 1/74.

Fig. 1 reillustrated from the publication of J. SALAJ (1976)

Magnification: Fig.1 x 115; Fig. 2—8 x 42.

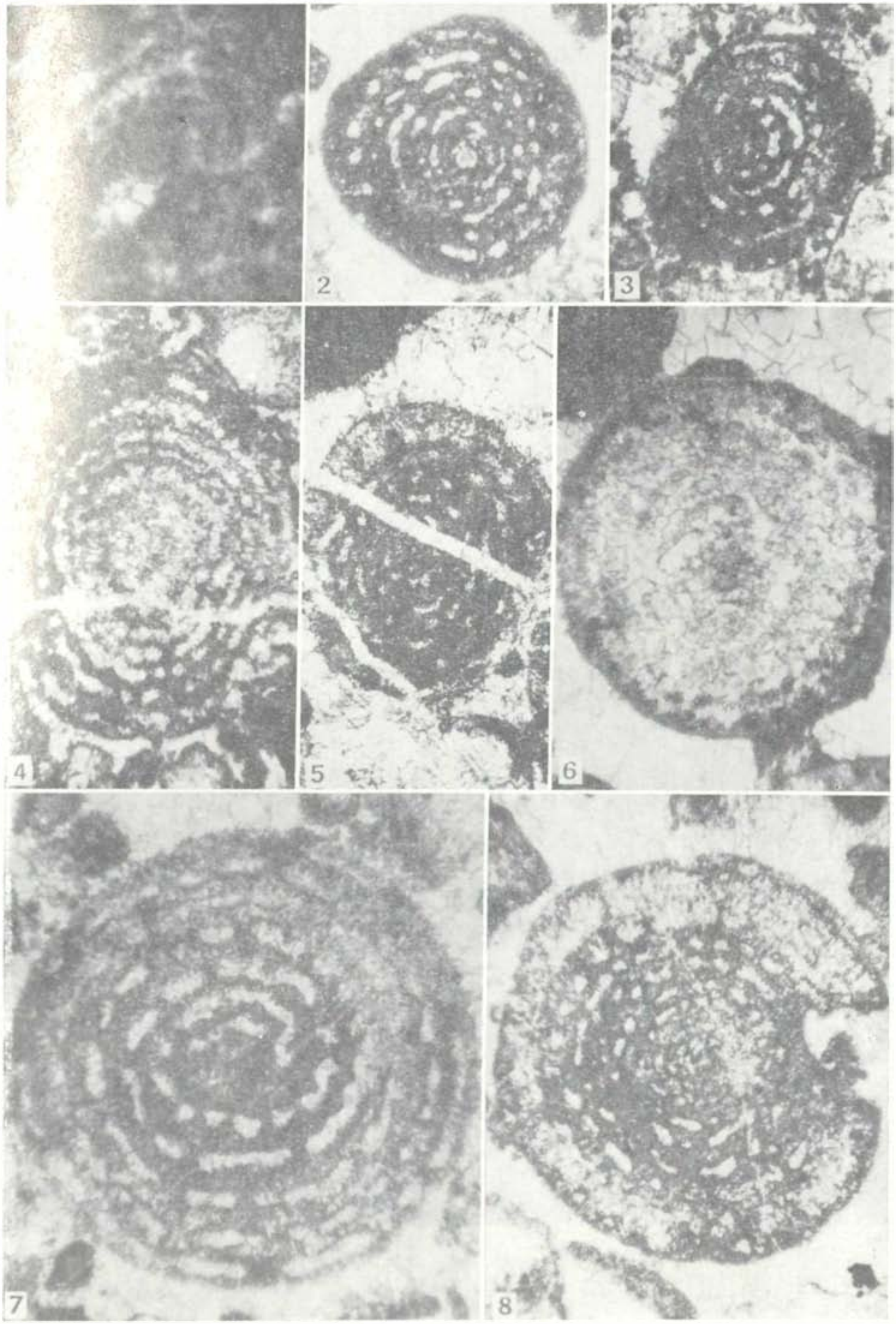
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PLATE CXXVII

Fig. 1—7 *Involutina liassica* (JONES, 1853)
Kováčová, Hierlatz limestone, Lias, thin section no. Bo. 6734.

Magnification: x 115.

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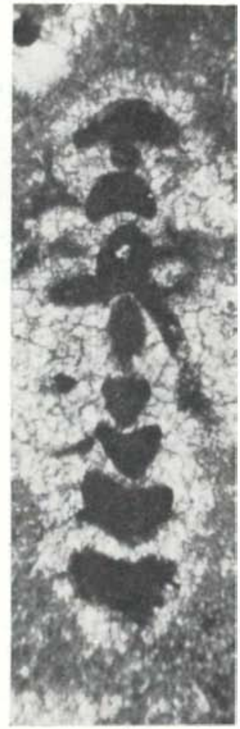

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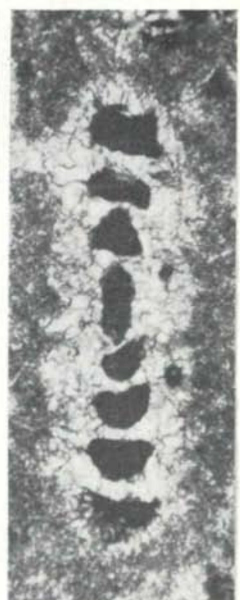

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PLATE CXXVIII

Fig. 1 *Lamelliconus biconvexus* (OBERHAUSER, 1957)
Strážovské pohorie Mts., Šipkov, Wetterstein limestone, Ladinian, thin section no. By. 3238.

Fig. 2 *Lamelliconus cordevolicus* (OBERHAUSER, 1964)
Plešivecká planina plateau, Ostré vŕšky, Wetterstein limestone, Cordevolian, thin section no. By. 2994.

Fig. 3—4, 7 *Trochonella crassa* (KRISTAN, 1957)
Fig. 3. Muránska planina plateau, Skalka limestone, Upper Rhaetian, thin section no. Bo. 5199.
Fig. 4. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6647.
Fig. 7. Drnava, Drienkova hora, Furmanec limestone, Norian, thin section no. By. 3697.

Fig. 5 *Trochonella granosa* FRENTZEN, 1941
Drnava, Drienkova hora, Furmanec limestone, Norian, thin section no. By. 3307.

Fig. 6, 8 *Trochonella laevis* (KRISTAN, 1957)
Fig. 6. Hybe, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6632.
Fig. 8. Muránska planina plateau, Skalka limestone, Upper Rhaetian, thin section no. Bo. 5201.

Fig. 9 *Lamelliconus turris* (FRENTZEN, 1941)
Budikovany, sample no. 11/65, Tisovec limestone, Carnian, thin section no. By. 4013.

Magnification: Fig. 1—8 x 42, Fig. 9 x 115.

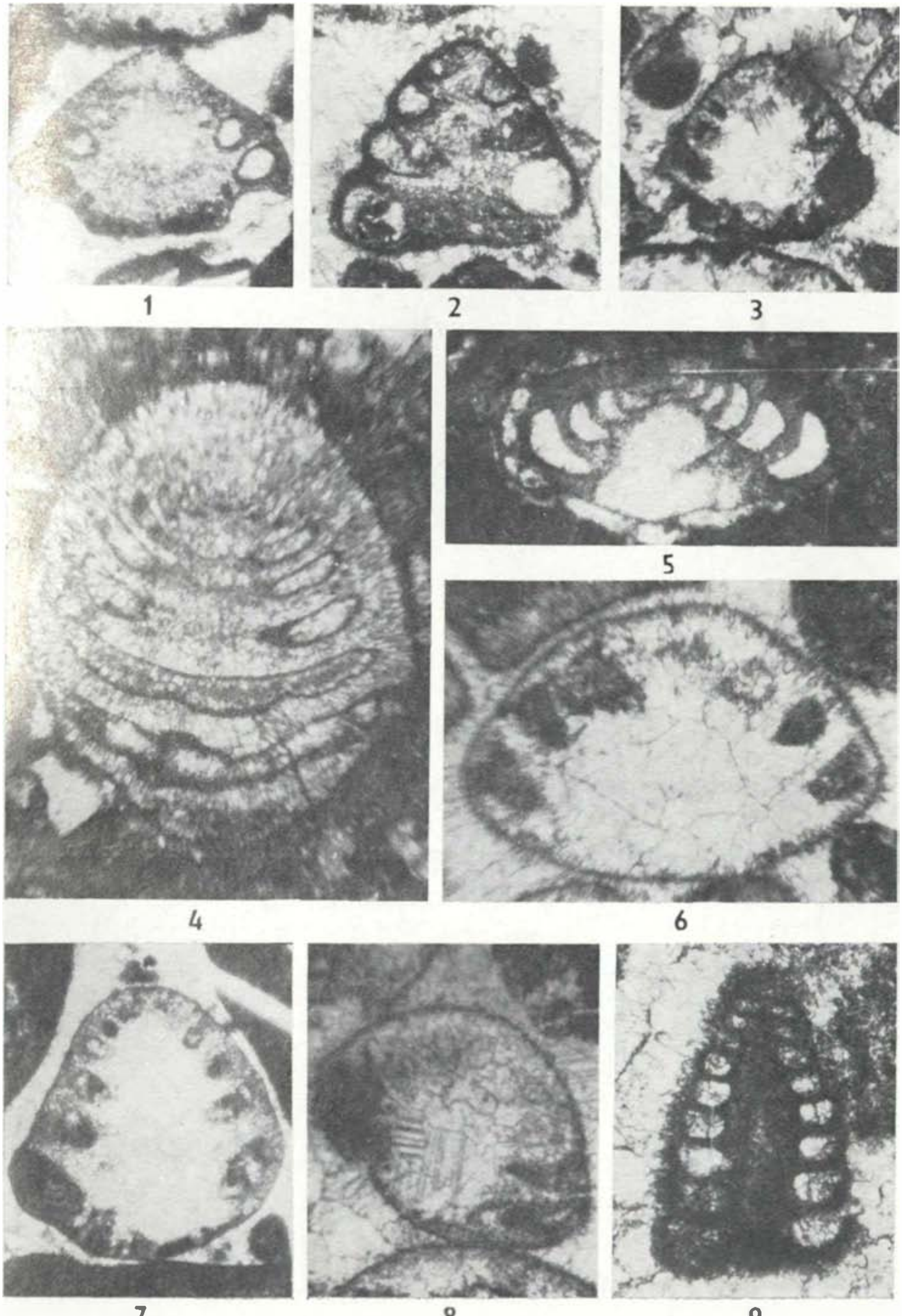

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PLATE CXXIX

Fig. 1 *Turrispirillina carpato-rumana* TURCULET, 1970
Drnava, Bleskový prameň, dark-grey limestone, Lower Rhaetian (Sevatian), thin section no. By. 3/742.

Fig. 2—5 *Turrispirillina prealpina* ZANINETTI et BROENNIMANN; in ZANINETTI, BROENNIMANN et BAND, 1972
Fig. 2. Stratenská hornatina Mts., Geravy, organogenic limestone, Norian, thin section no. Bo. 3/76.
Fig. 3. Drnava, Bleskový prameň, dark-grey limestone, Lower Rhaetian (Sevatian), thin section no. By. 1/74.
Fig. 4. W of Tisovec, Javorová, Furmanec limestone, Norian, thin section no. Bo. 6804.
Fig. 5. Kováčová, Furmanec limestone, Norian, thin section no. Bo. 6739.

Fig. 6 *Oberhauserella alta* FUCHS, 1967
Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4814.

Fig. 7—8 *Oberhauserella ovata* FUCHS, 1967
Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4776.

Fig. 9—10 *Oberhauserella quadrilobota* FUCHS, 1967
Fig. 9. Silická Brezová, Malý Mlynský vrch, Hallstatt limestone, Norian, thin section no. Bo. 4896.
Fig. 10. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4788.

Fig. 11 *Oberhauserella rhaetica* (KRISTAN—TOLLMANN, 1964)
Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6009.

Fig. 12—15 *Oberhauserella rhaetica* (KRISTAN—TOLLMANN, 1964)
Silická Brezová, Hallstatt limestone, Norian, fig. 12 — thin section no. Bo. 4790, fig. 13, 15 — thin section no. Bo. 4787, fig. 14 — thin section no. Bo. 4816.

Magnification: Fig. 1—6, 8—15 x 115, Fig. 7 x 285.

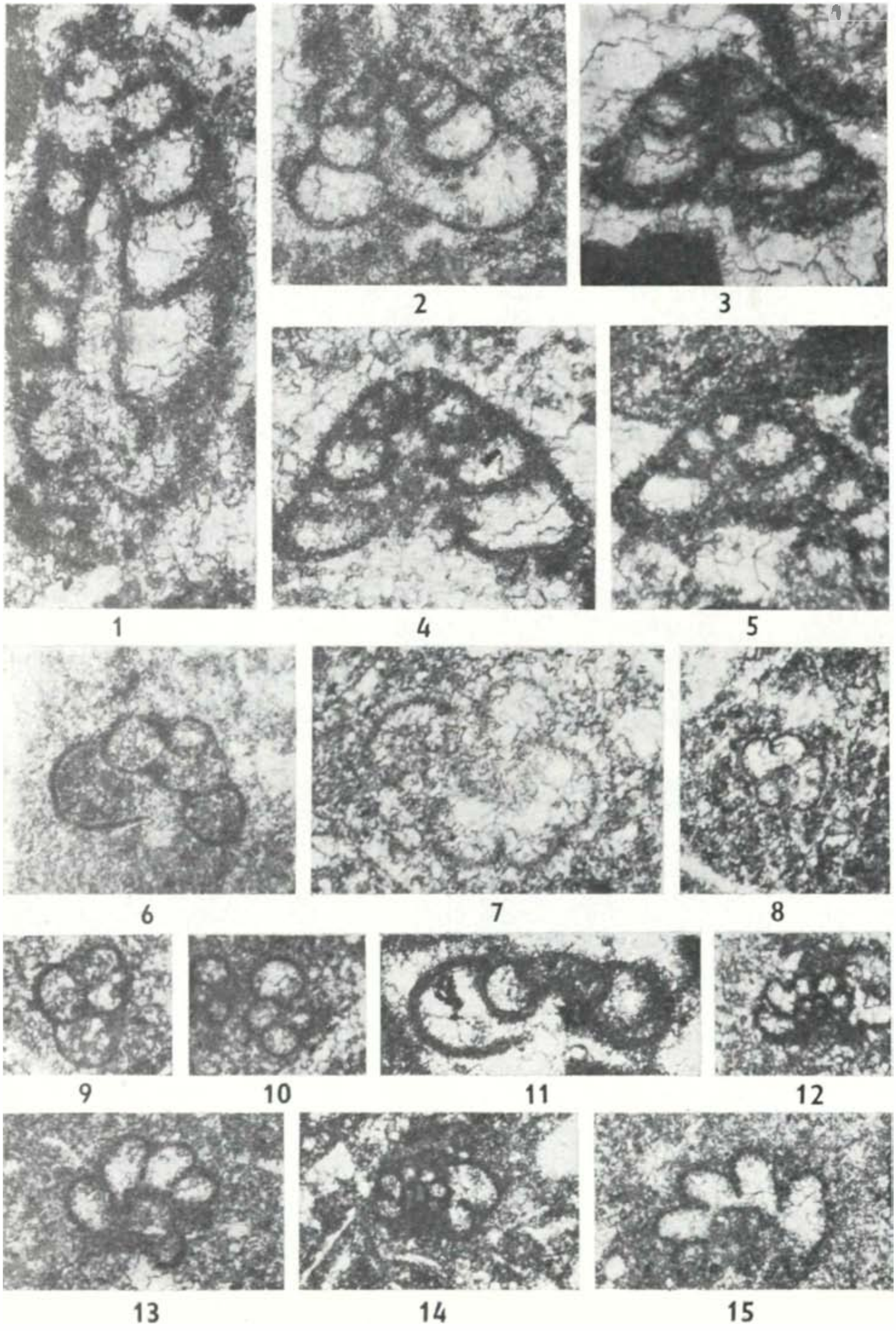
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PLATE CXXX

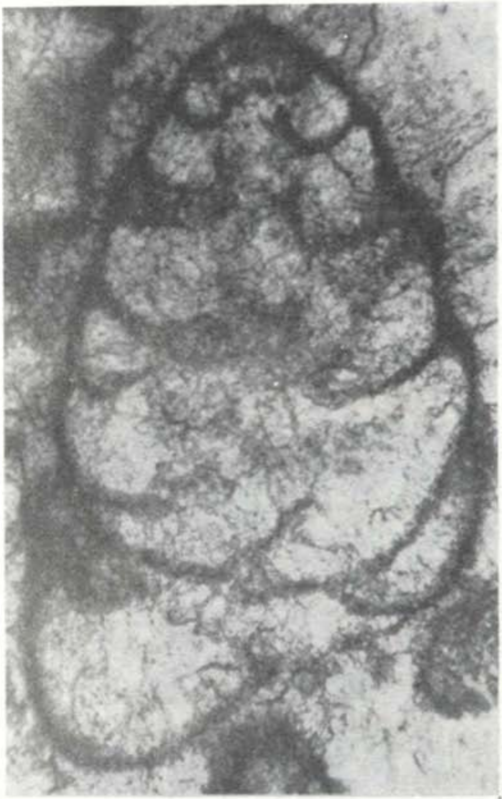
Fig. 1—5 *Diplotremina altoconica* KRISTAN TOLLMANN, 1973

Fig. 1. Plešivecká planina plateau, sample no. 6/67, Tisovec limestone, Carnian, thin section no. By. 2973.

Fig. 2, 5. Silická Brezová, Tisovec limestone, Carnian, fig. 2 — thin section no. By. 4980, fig. 5 — thin section no. Bo. 6857.

Fig. 3—4 Plešivecká planina plateau, Ostré vŕšky, sample no. 12/67, Wetterstein limestone, Uppermost Ladinian, thin section no. By. 2993.

Magnification: x 115.



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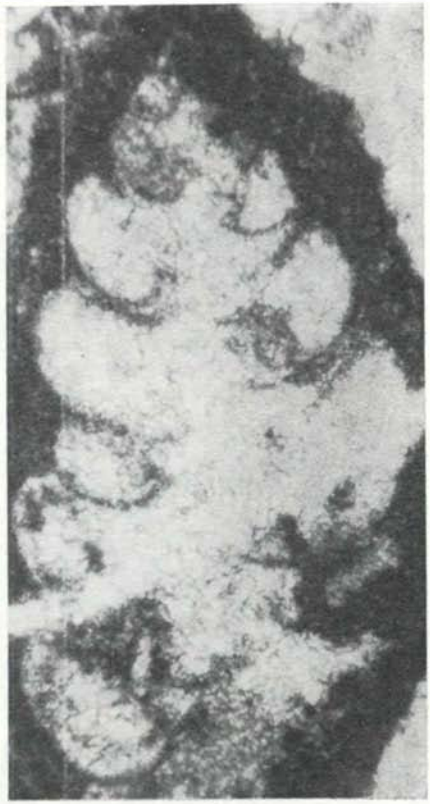

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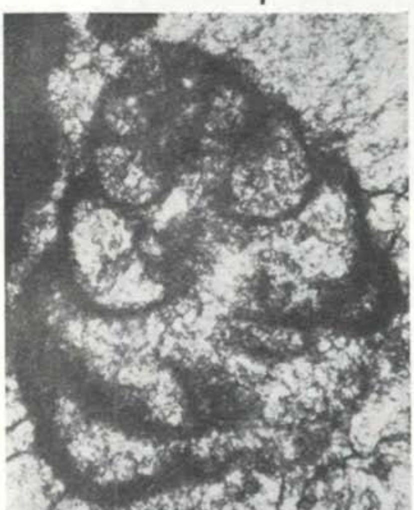

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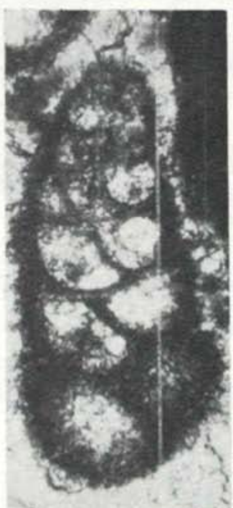

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PLATE CXXXI

Fig. 1—2 *Diplotremina altoconica* KRISTAN—TOLLMANN, 1973

Fig. 1. Plešivecká planina plateau, Holá skala, Tisovec limestone, Carnian, thin section no. By. 2997.

Fig. 2. Slovak karst, Dolný vrch, sample no. 2/71, Wetterstein limestone, Lower Carnian, thin section no. By. 5051.

Fig. 3—8 *Diplotremina astrofimbriata* KRISTAN—TOLLMANN, 1960

Fig. 3, 7. Stratenská hornatina Mts., Dolka Furmanec limestone, Norian, thin section no. Bo. 6006.

Fig. 4. W of Tisovec, E of elevation point 878,0, Furmanec limestone, Norian, thin section no. Bo. 6424.

Fig. 5. Muránska planina plateau, Cigánka, Tisovec limestone, Carnian, thin section. no. Bo. 6563.

Fig. 6. Silická Brezová, Wetterstein limestone, Ladinian, thin section no. Bo. 5592.

Fig. 8. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4815.

Fig. 9—13 *Diplotremina subangulata* KRISTAN—TOLLMANN, 1960

Fig. 9. Silická planina plateau, Steinalm limestone, Anisian, thin section no. Bo. 6874.

Fig. 10, 13. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, fig. 10 — thin section no. Bo. 6023, fig. 13 — thin section no. Bo. 5999.

Fig. 11. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6165.

Fig. 12. W of Tisovec, Teplica, Furmanec limestone, Norian, thin section no. Bo. 5442.

Magnification: Fig. 1—5, 7—9, 2 x 115, Fig. 6, 10—11, 13, x 42.

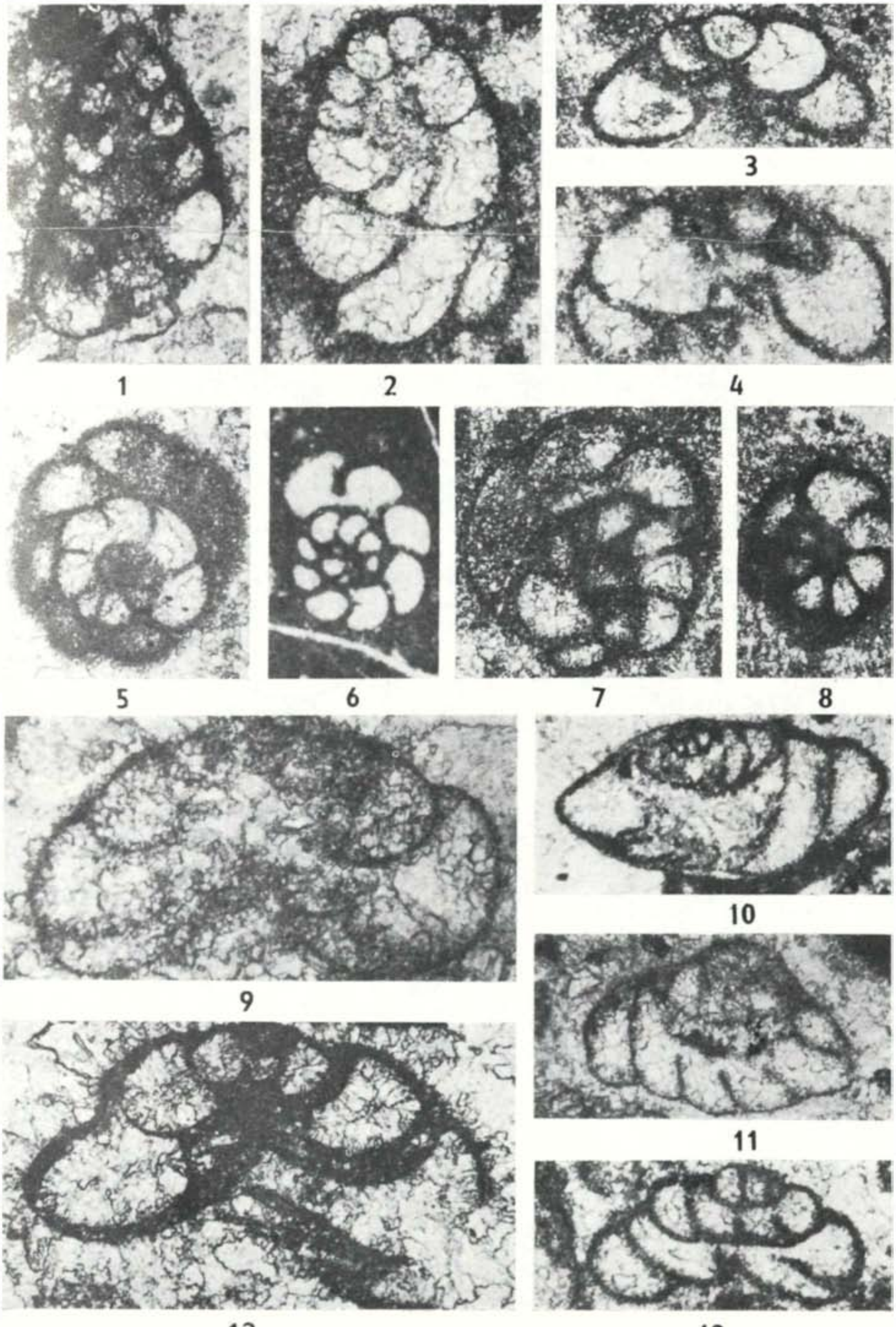
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PLATE CXXXII

Fig. 1—3 *Diplotremina subangulata* KRISTAN—TOLLMANN, 1960

Fig. 1. W of Tisovec, saddle E of elevation point 878,0, Furmanec limestone, Norian, thin section no. Bo. 6422.

Fig. 2. Muránska planina plateau, Predná hora, Tisovec limestone, Carnian, thin section no. Bo. 6114.

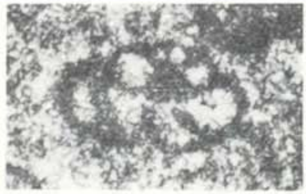
Fig. 3. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6917.

Fig. 4—7 *Duostomina alta* KRISTAN—TOLLMANN, 1960

Fig. 4—5. Muránska planina plateau, Dedov vrch, Tisovec limestone, Carnian, thin section no. Bo. 6182.

Fig. 6—7. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Uppermost Norian to Lower Rhaetian, fig. 6 — thin section no. Bo. 5153, fig. 7 — thin section no. Bo. 5142.

Magnification: Fig. 1—6 x 115, Fig. 7 x 42.



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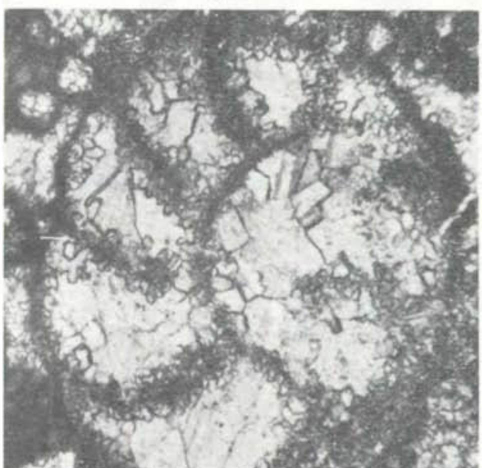

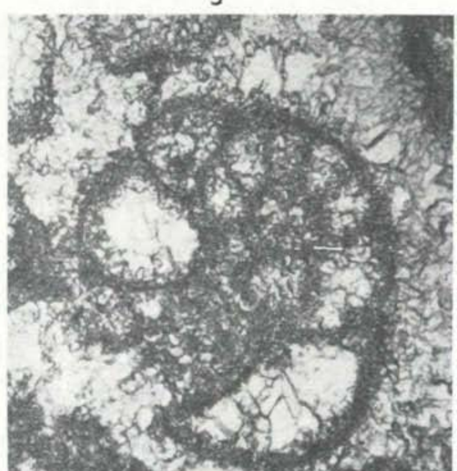

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PLATE CXXXIII

Fig. 1—3 *Duostomina turboidea* KRISTAN—TOLLMANN, 1960

Fig. 1. Muránska planina plateau, Skalka limestone, Upper Rhaetian, thin section no. Bo. 5187.

Fig. 2. Drnava, Bleskový prameň, dark-grey limestone, Lower Rhaetian (Sevatian), thin section no. By. 4632.

Fig. 3. Muránska planina plateau, Predná hora, Tisovec limestone, Carnian, thin section no. Bo. 6117.

Fig. 4, 7 *Variostoma acutoangulata* KRISTAN—TOLLMANN, 1973

Fig. 4. W of Tisovec, Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5334.

Fig. 7. Muránska planina plateau, road-cut to Veľká lúka, Dachstein limestone, Norian, thin section no. Bo. 5236.

Fig. 5 *Duostomina alta* KRISTAN—TOLLMANN, 1960

Silická planina plateau, Plešivec, sample no. 491/58, Wetterstein limestone, Cordevolian, thin section no. By. 1649.

Fig. 6 *Trochammina* sp.

Stratenská hornatina Mts., Furmanec limestone, Norian, thin section no. Bo. 6023.

Magnification: Fig. 1—6 x 115, Fig. 7 x 42.

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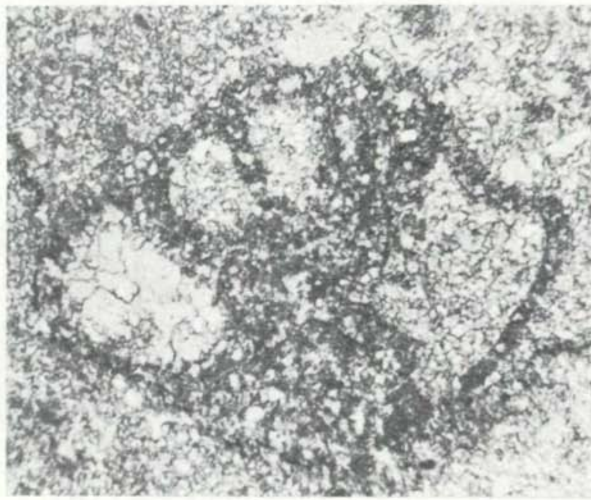

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PLATE CXXXIV

Fig. 1—5 *Duostomina magna* TRIFONOVA, 1974

Fig. 1. Plešivecká planina plateau, sample no. 3/67, Tisovec limestone, Carnian, thin section no. By. 2998.

Fig. 2. Silická Brezová, Wetterstein limestone, Ladinian, thin section no. Bo. 4718.

Fig. 3. Plešivecká planina plateau, Ostré vŕšky, sample no. 12/67, Wetterstein limestone, Uppermost Ladinian, thin section no. By. 2993.

Fig. 4. Včeláre, Wetterstein limestone, Cordevolian, thin section no. By. 1658.

Fig. 5. W of Tisovec, Goštanová, Furmanec limestone, Norian, thin section no. Bo. 5418.

Fig. 6, 8 *Variostoma catalliforme* KRISTAN—TOLLMANN, 1960

Fig. 6. Silická Brezová, Wetterstein limestone, Ladinian, thin section no. Bo. 4722.

Fig. 8. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4797.

Fig. 7, 9 *Duostomina rotundata* KRISTAN—TOLLMAN, 1960

Fig. 7. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6951.

Fig. 9. Silická Brezová, Hallstatt limestone, Norian, thin section no. Bo. 4812.

Magnification: Fig. 1—2, 4—6, 8—9 x 115, Fig. 3, 7 x 42.

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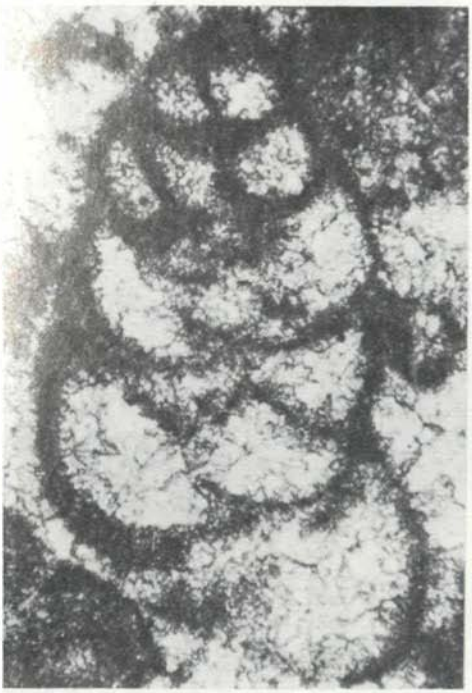

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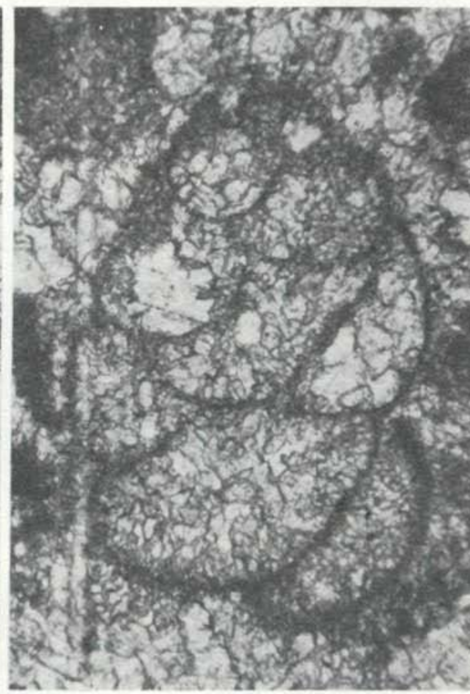

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PLATE CXXXV

Fig. 1—2 *Duostomina magna* TRIFONOVA, 1974
Fig. 1. Budikovany, sample no. 20/65, Wetterstein limestone, Carnian, thin section no. By. 2463.
Fig. 2. Silická Brezová, Wetterstein limestone, Ladinian, thin section no. Bo. 4723.

Fig. 3—4 *Duostomina rotundata* KRISTAN—TOLLMANN, 1960
Fig. 3. W of Tisovec, Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5629.
Fig. 4. Silická planina plateau, Malý Mlynský vrch, Hallstatt limestone, Norian, thin section no. Bo. 4893.

Fig. 5—6 *Duostomina turboidea* KRISTAN—TOLLMANN, 1960
Silická Brezová, Hallstatt limestone, Norian, fig. 5 — thin section no. Bo. 4773, fig. 6 — thin section no. Bo. 4806.

Fig. 7—8 *Variostoma catalliforme* KRISTAN—TOLLMANN, 1960
Fig. 7. Stratenská hornatina, Dolka, Furmanec limestone, Norian, thin section no. Bo. 5988.
Fig. 8. Stratenská hornatina Mts., Geravy, organogenic limestone, Norian, thin section no. Bo. 6711.

Magnification: Fig. 1—4 x 115, Fig. 5—8 x 42.

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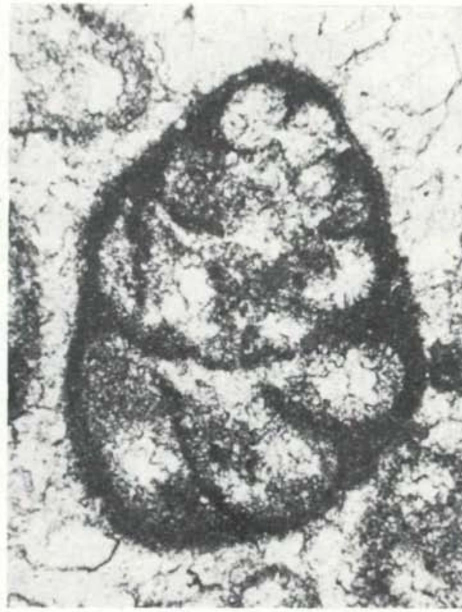

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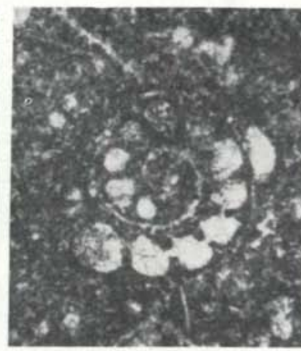

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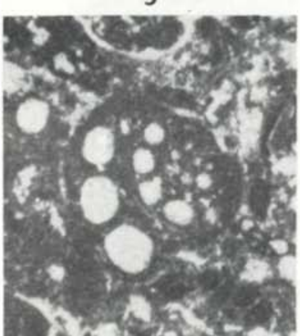

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PLATE CXXXVI

Fig. 1—6 *Variostoma catalliforme* KRISTAN—TOLLMANN, 1960

Fig. 1. Muránska planina plateau, Dachstein limestone, Uppermost Norian to Lower Rhaetian, thin section no. Bo. 6158.

Fig. 2, 4—6. Stratenská hornatina Mts., Geravy, organogenic limestone, Norian, fig. 2 — thin section no. Bo. 6728, fig. 4, 5 — thin section no. Bo. 6698, fig 6 — thin section no. Bo. 6682.

Fig. 3. W of Tisovec, Javorová, Furmanec limestone, Norian, thin section no. Bo. 5446.

Fig. 7—8 *Variostoma cochlea* KRISTAN—TOLLMANN, 1960

Fig. 7. W of Tisovec, Tepličné, Furmanec limestone, Norian, thin section no. Bo. 5355.

Fig. 8. W of Tisovec, Javorová, Furmanec limestone, Norian, thin section no. Bo. 5447.

Fig. 9—11 *Variostoma crassum* KRISTAN—TOLLMANN, 1960

Fig. 9. W of Tisovec, Teplica, Furmanec limestone, Norian, thin section no. Bo. 5440.

Fig. 10, 11. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, fig. 10 thin section no. Bo. 6027, fig. 11. — thin section no. Bo. 6951.

Magnification: Fig. 1—10 x 42, Fig. 11 x 115.


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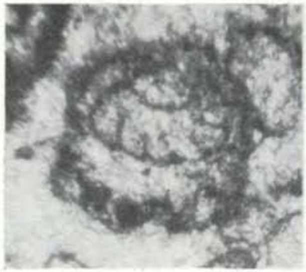
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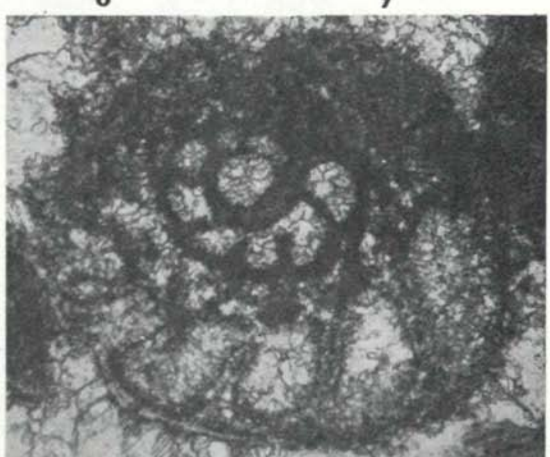
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PLATE CXXXVII

Fig. 1—3 *Variostoma crassum* KRISTAN—TOLLMANN, 1960

Fig. 1. Silická Brezová, sample no. 3/71, Tisovec limestone, Carnian, thin section no. By. 4966.

Fig. 2. Budikovany, sample no. 8/65, Tisovec limestone, Carnian, thin section no. By. 2267.

Fig. 3. Silická planina plateau, Zakázané, Steinalm limestone, Anisian, thin section no. Bo. 6877.

Magnification: x 115.

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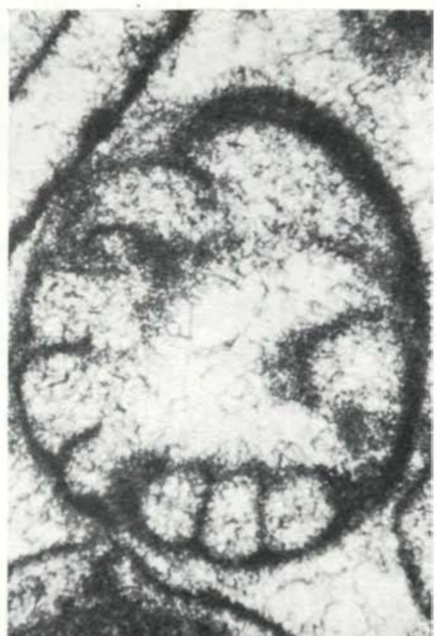

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PLATE CXXXVIII

Fig. 1—2 *Tetrataxis nana* KRISTAN—TOLLMANN, 1960
Fig. 1. W of Tisovec, elevation point 878,5 m, Furmanec limestone, Norian, thin section no. Bo. 6381.
Fig. 2. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, thin section no. Bo. 6008.

Fig. 4 *Variostoma?* aff. *pralongense* KRISTAN—TOLLMANN, 1960
Plešivecká planina plateau, sample no. 3/67, Tisovec limestone, Carnian, thin section no. By. 2.999.

Fig. 3, 5—9 *Valvulina metula* (KRISTAN—TOLLMANN, 1960)
Fig. 3, 6, 9. Muránska planina plateau, Veľká lúka, Tisovec limestone, Carnian, Fig. 3 — thin section no. Bo. 6883, fig. 6 — thin section no. Bo. 6886, fig. 9 — thin section no. Bo. 6904.
Fig. 5, 7—8. Plešivecká planina plateau, semple no. 3/67, Tisovec limestone, Carnian, fig. 5 — thin section no. By. 2998, fig. 7 — thin section no. By. 2998, Fig. 8 — thin section no. By. 3002.

Magnification: Fig. 1—2 x 115, Fig. 3—9 x 42.

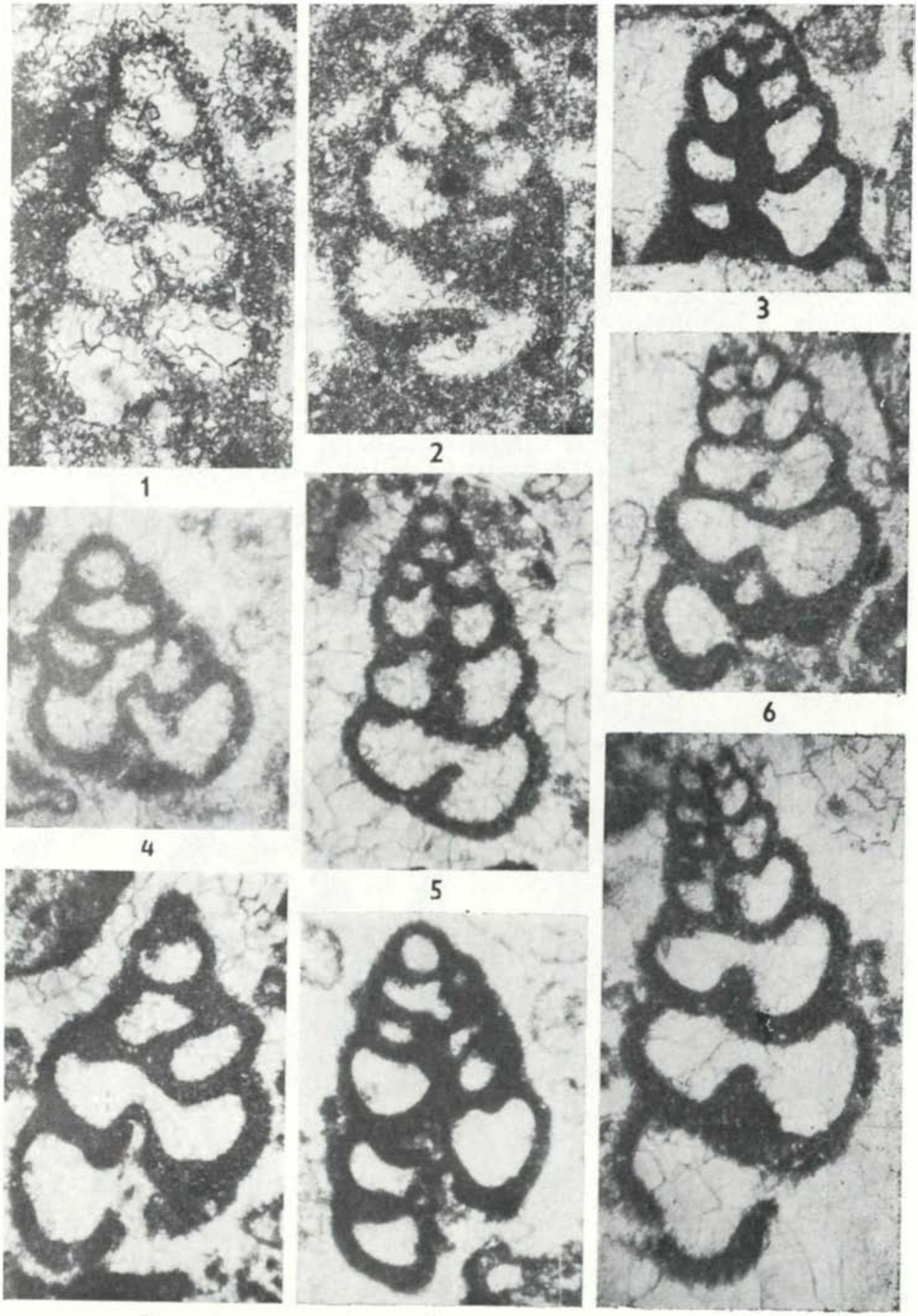
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PLATE CXXXIX

Fig. 1—2 *Tetrataxis nana* KRISTAN—TOLLMANN, 1960

Fig. 1. Španie Pole, Wetterstein limestone, Cordevolian, thin section no. By. 2449.

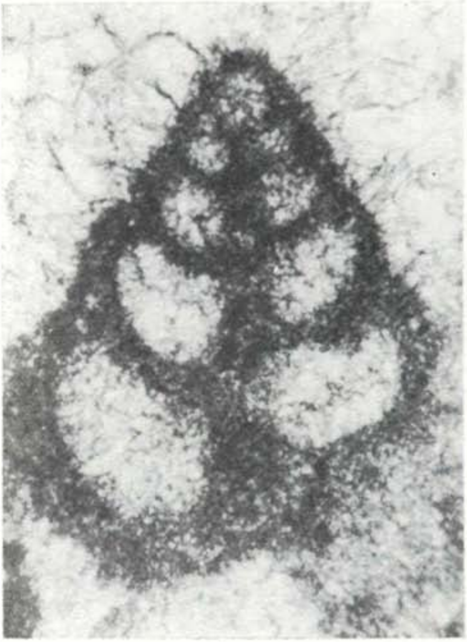
Fig. 2. W of Tisovec, elevation point 878,5, Furmanec limestone, Norian, thin section no. Bo. 6363.

Fig. 3—4 *Variostoma pralongense* KRISTAN—TOLLMANN, 1960

Fig. 3. Silická Brezová, Wetterstein limestone, Ladinian, thin section no. Bo. 4723.

Fig. 4. Silická Brezová, sample no. 7/66, Wetterstein limestone, Ladinian, thin section no. By. 2782.

Magnification: x 115.



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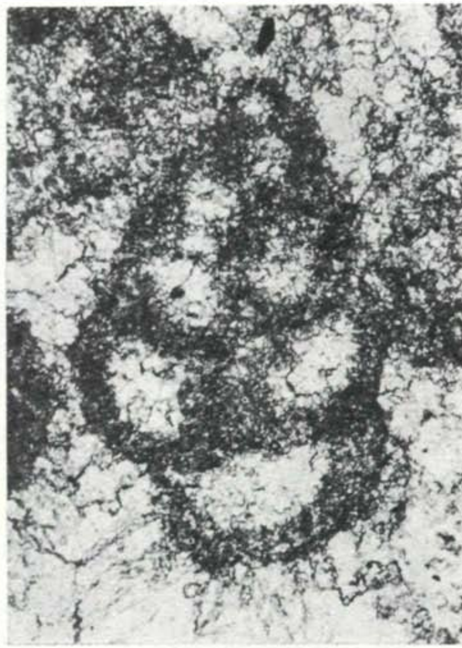

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PLATE CXL

Fig. 1—9 *Tetrataxis aff. nana* KRISTAN—TOLLMANN, 1960

Fig. 1. Silická Brezová, sample no. 9/67, Wetterstein limestone, Lower Carnian, thin section no. By. 3128.

Fig. 2. Silická Brezová, sample no. V-2649/M, Steinalm limestone, Anisian, thin section no. Sj. 1473.

Fig. 4. Silická Brezová, Wetterstein limestone, Ladinian, thin section no. Bo. 4723.

Fig. 6. Stratenská hornatina Mts., Holý Kameň, Furmanec limestone, Norian, thin section no. Bo. 6089.

Fig. 7. W of Tisovec, Teplica, Tisovec limestone, Carnian, thin section no. Bo. 6851.

Fig. 5, 8. Plešivecká planina plateau, sample no. 3/67, Tisovec limestone, Carnian, thin section no. By. 2988.

Fig. 3, 9. Gemerská Hôrka, Skalica, Steinalm limestone, Anisian, thin section no. Bo. 6879.

Magnification: x 115.

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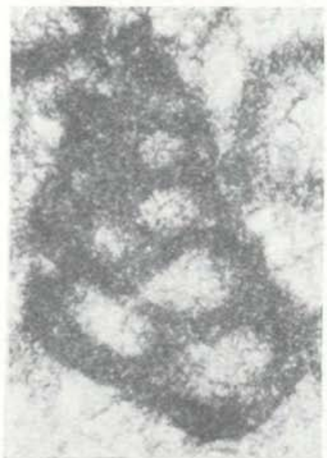

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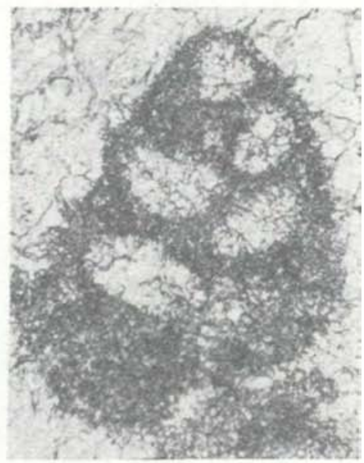

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PLATE CXLI

Fig. 1 *Nodobacularia vujisici* UROŠEVIČ et GAŽDZICKI, 1977
Hurtovec, Lower Illyrian, Reifling limestone of the Choč nappe of the Malé Karpaty Mts. (Little Carpathians).

Fig. 2 *Nodobacularia vujisici* UROŠEVIČ et GAŽDZICKI, 1977
Hurtovec, Lower Illyrian.

Fig. 3 *Nodobacularia cylindriformis* n. sp.
Type species. Hurtovec, Lower Illyrian.

Fig. 4 *Nodophthalmidium cylindriformis* n. sp.
Hurtovec, Lower Illyrian.

Fig. 5 *Lituotuba carpathica* n. sp.
Type species. Hurtovec, Lower Illyrian.

Fig. 6 *Nodophthalmidium* sp.
Hurtovec. Lower Illyrian.

Fig. 7 *Ammodiscus inaequabilis* STYK, 1975
Hurtovec, Lower Illyrian.

Fig. 8 *Ophthalmidium exiguum* KOEHN—ZANINETTI, 1968
Hurtovec, Lower Illyrian.

Fig. 9 *Nodophthalmidium* sp.
Type species. Hurtovec, Lower Illyrian.

Fig. 10 *Nedophthalmidium* sp.
Hurtovec. Lower Illyrian.

Fig. 11 *Ophthalmidium tricki* (LANGER, 1968)
Hurtovec, Lower Illyrian.

Fig. 12 *Nodophthalmidium* sp.
Hurtovec, Lower Illyrian.

Magnification: Fig. 1 x 70, Fig. 2 x 65, Fig. 3, 4, 6 x 130, Fig. 5 x 50, Fig. 7, 9, x 120, Fig. 8, 10, 11 x 170, Fig. 12 x 150.

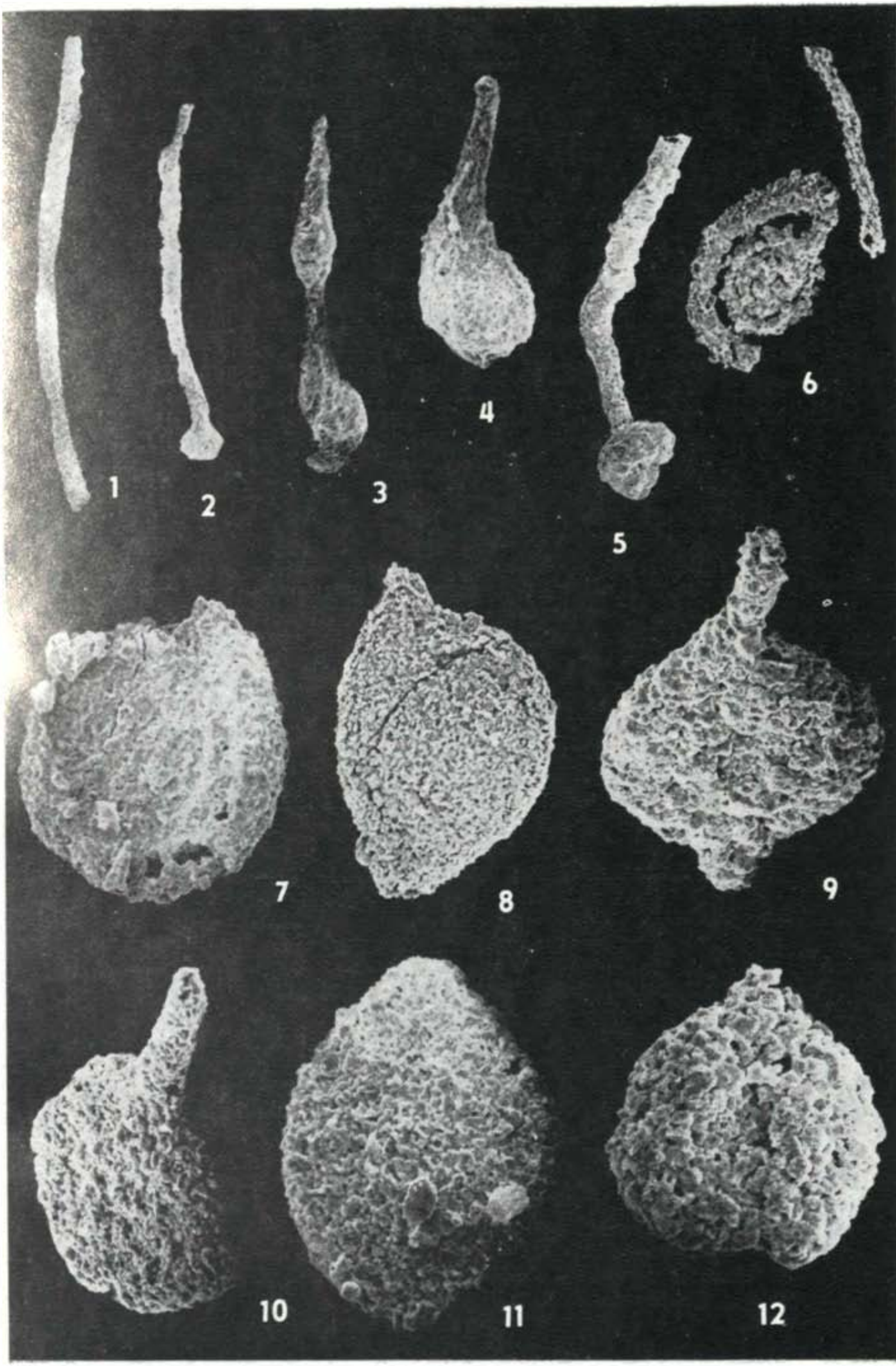
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PLATE CXLII

Fig. 1 *Calcitornella elongata* CUSHMAN et WATTERS, 1928
G 3 — Gombasek Slovak Karst. Lower Illyrian dark Reifling limestones.

Fig. 2 *Turritellella mesotriassica* KOEHN—ZANINETTI, 1969
Hurtovec, Lower Illyrian, Reifling limestones, of the Choč nappen of the Malé Karpaty, Mts.

Fig. 3 *Nodophthalmidium* sp.
Hurtovec, Lower Illyrian.

Fig. 4 *Protonodosaria globifrondina* SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
G 3 — Gombasek, Lower Illyrian.

Fig. 5 *Pseudonodosaria primitiva* (KUEBLER et ZWINGLI, 1866
Hurtovec, Lower Illyrian.

Fig. 6 *Nodosinella libera* TRIFONOVA, 1965
G 3 — Gombasek, Lower Illyrian.

Fig. 7 *Frondina permica* SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
G 3 — Gombasek, Lower Illyrian.

Fig. 8 *Earlandinita elongata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
G 3 — Gombasek, Lower Illyrian.

Fig. 9 *Austrocolomia marschalli* OBERHAUSER, 1960
G 3 — Gombasek, Lower Illyrian.

Fig. 10 *Austrocolomia ploechingeri* OBERHAUSER, 1960
G 3 — Gombasek, Lower Illyrian.

Fig. 11 *Geinitzinita taurica* SELLIER de CIVRIEUX et DESSAUVAGIE, 1965

Fig. 12 *Geinitzina postcarbonica* SPANDEL, 1898
G 3 — Gombasek, Lower Illyrian.

Fig. 13 *Geinitzinita oberhauseri* SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
G 3 — Gombasek, Lower Illyrian.

Magnification: Fig. 1 x 75, Fig. 2, 4, 7, 11 x 90, Fig. 3, 6, 10 x 65, Fig. 5 x 125, Fig. 9 x 120, Fig. 12 x 80, Fig. 13 x 60.

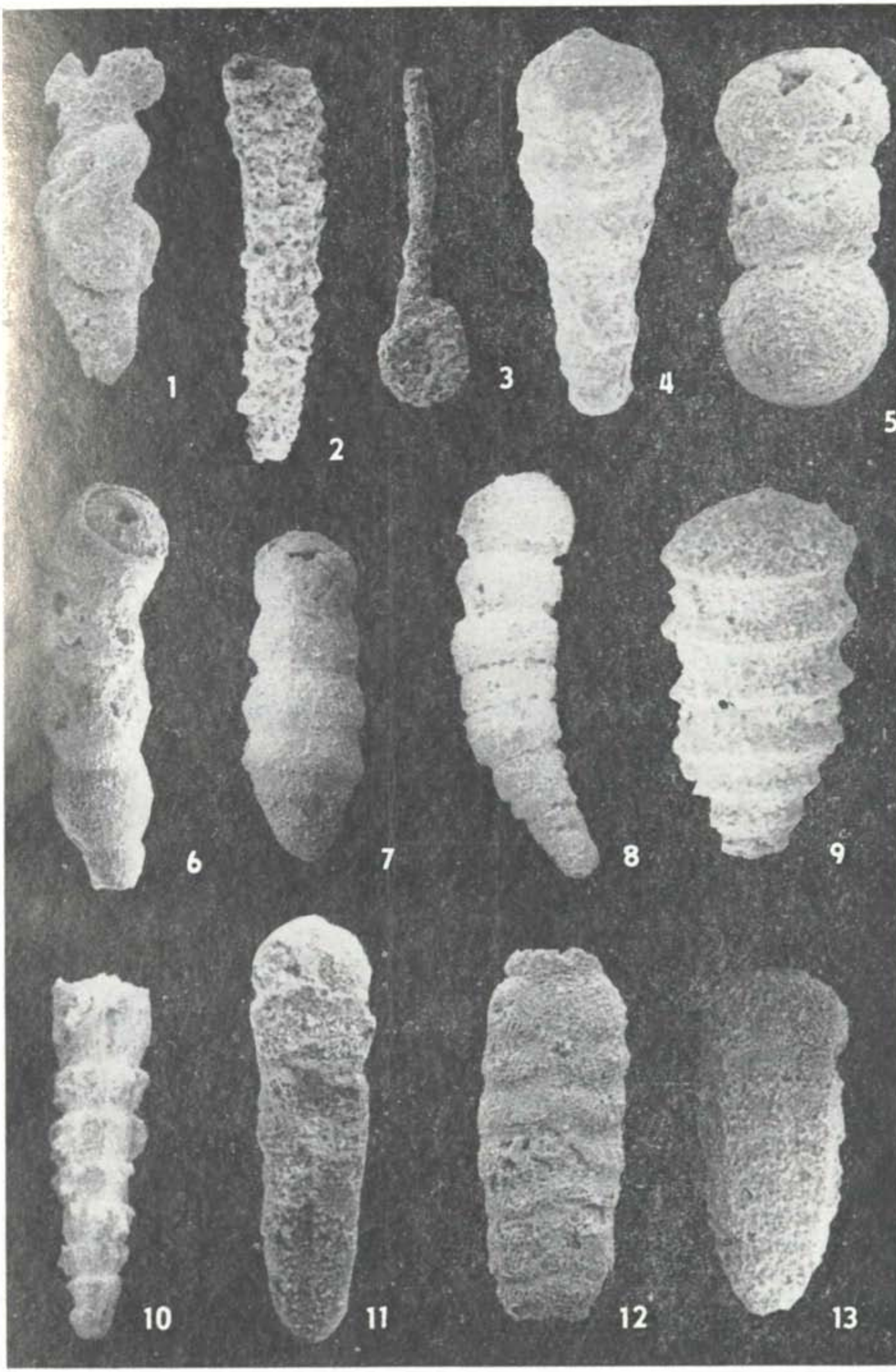
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PLATE CXLIII

Fig. 1 *Earlandinita oberhauseri* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
G 3 — Gombasek, Slovak karst, Lower Illyrian dark Reifling limestones.

Fig. 2 *Earlandinita elongata* SALAJ; in SALAJ — BIELY — BYSTRICKÝ, 1967
G 3 — Gombasek, Lower Illyrian.

Fig. 3 *Dentalina curva* LIEBUS, 1944
G 3 — Gombasek, Lower Illyrian.

Fig. 4 *Dentalina curva* LIEBUS, 1944
G 3 — Gombasek, Lower Illyrian.

Fig. 5 *Nodosinella libera* TRIFONOVA, 1967
G 3 — Gombasek, Lower Illyrian.

Fig. 6 *Nodosinella libera* TRIFONOVA, 1967
Detail G 3 — Gombasek, Lower Illyrian.

Fig. 7 *Pseudonodosaria primitiva* (KUBLER et ZWINGLI, 1866
G 3 — Gombasek, Lower Illyrian.

Fig. 8 *Austrocolomia cordevolica* OBERHAUSER, 1967
G 3 — Gombasek, Lower Illyrian.

Fig. 9 *Austrocolomia cordevolica* OBERHAUSER, 1967
Detail G 3 — Gombasek, Lower Illyrian.

Fig. 10 *Austrocolomia primitiva* n. sp.
Type species. G 3 — Gombasek, Lower Illyrian.

Fig. 11 *Austrocolomia marschalli* OBERHAUSER, 1960
G 3 — Gombasek, Lower Illyrian.

Fig. 12 *Austrocolomia marschalli* OBERHAUSER, 1960
G 3 — Gombasek, Lower Illyrian.

Fig. 13 *Austrocolomia marschalli* OBERHAUSER, 1960
G 3 — Gombasek, Lower Illyrian.

Fig. 14 *Austrocolomia marschalli* OBERHAUSER, 1960
G 3 — Gombasek, Lower Illyrian.

Magnification: Fig. 1, 5, 11, 13 x 70, Fig. 2, 7, 10 x 50, Fig. 3 x 100, Fig. 4 x 110, Fig. 6 x 200, Fig. 8 x 60, Fig. 9 225, Fig. 12, 14 x 80.

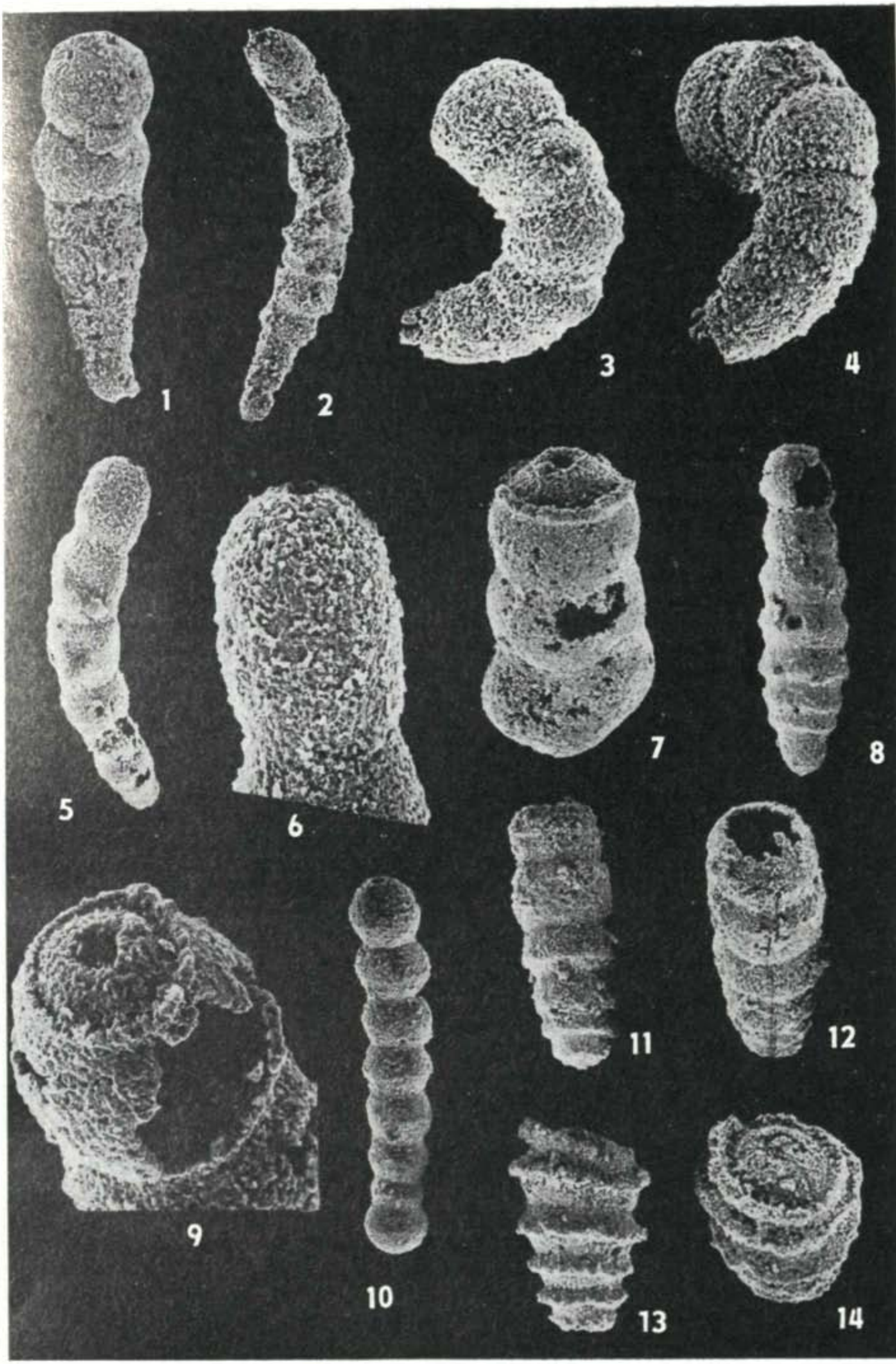

PLATE CXLIV

Fig. 1 *Nodosaria trifonovae* n. sp.
Type species, G 3 — Gombasek, Slovak karst, Lower Illyrian dark Reifling limestones.

Fig. 2 *Nodosinella siliqua* TRIFONOVA, 1972
G 3 — Gombasek, Lower Illyrian.

Fig. 3 *Nodosinella rostrata* TRIFONOVA, 1972
G 3 — Gombasek, Lower Illyrian.

Fig. 4 *Dentalina* aff. *excellens* STYK, 1975
G 3 — Gombasek, Lower Illyrian.

Fig. 5 *Dentalina subsiliqua* FRANKE, 1936
G 3 — Gombasek, Lower Illyrian.

Fig. 6 *Dentalina hoi* TRIFONOVA, 1967
G 3 — Gombasek, Lower Illyrian.

Fig. 7 *Nodosaria schablensis* TRIFONOVA, 1978
G 3 — Gombasek, Lower Illyrian.

Fig. 8 *Frondinodosaria pyrula* SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
G 3 — Gombasek, Lower Illyrian.

Fig. 9 *Frondinodosaria semiornata* (REUSS, 1863)
G 3 — Gombasek, Lower Illyrian.

Fig. 10 *Nodosaria ordinata* (TRIFONOVA, 1965)
G 3 — Gombasek, Lower Illyrian.

Fig. 11 *Geinitzinita pupoides* (NORVANG, 1957)
G 3 — Gombasek, Lower Illyrian.

Fig. 12 *Ichtyolaria primitiva* SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
G 3 — Gombasek, Lower Illyrian.

Magnification: Fig. 1, 2, 3, 5, 7, 9, 10 x 50, Fig. 4, 8, 12 x 40, Fig. 6 x 60, Fig. 11 x 90.

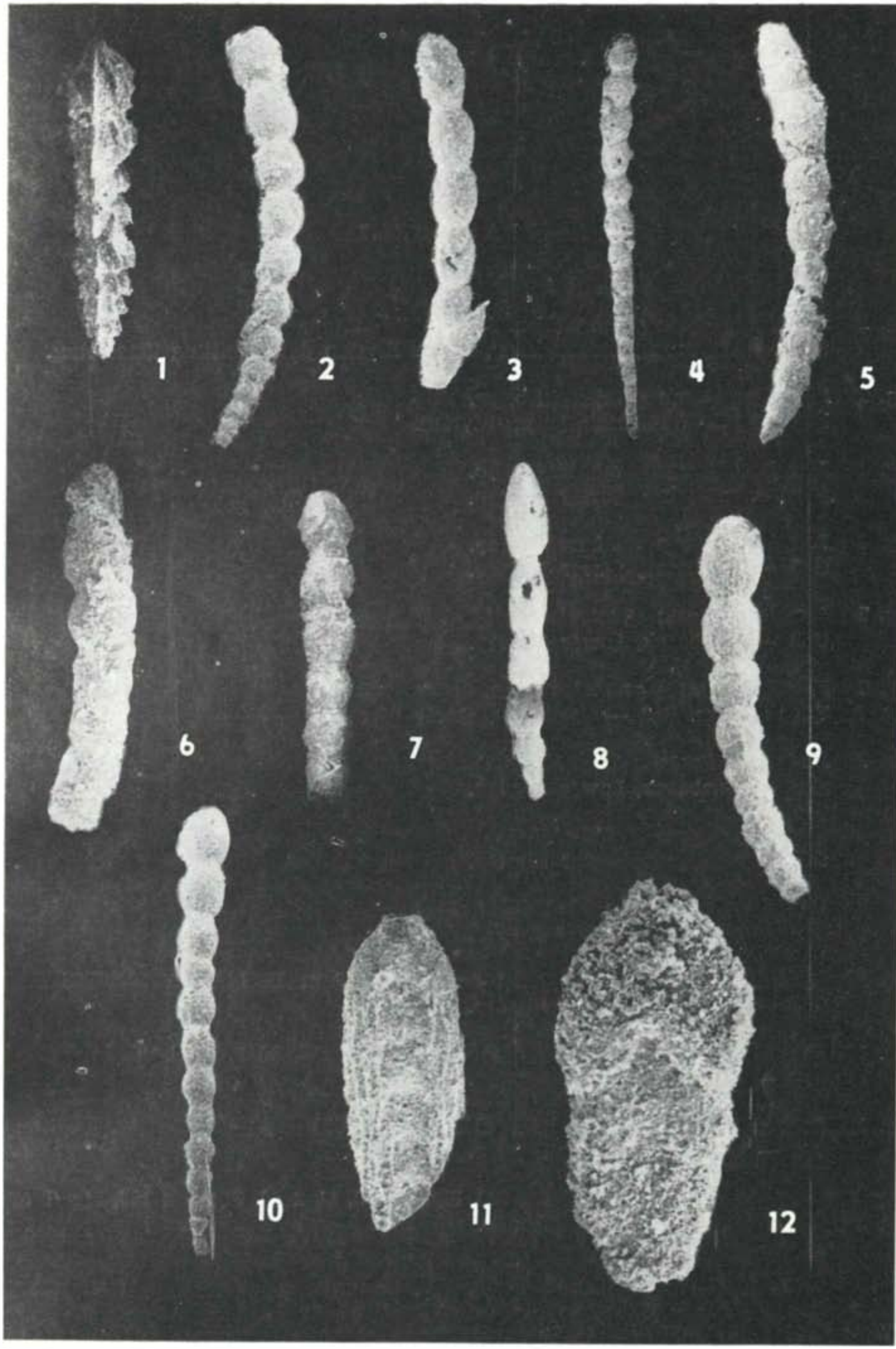
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PLATE CXLV

Fig. 1 *Pseudonodosaria gombaseki* n. sp.
G 3 — Gombasek, Slovak karst, Lower Illyrian dark Reifling limestones.

Fig. 2 *Pseudonodosaria gombaseki* n. sp.
Detil. G 3 — Gombasek, Lower Illyrian.

Fig. 3 *Pseudonodosaria gombaseki* n. sp.
G 3 — Gombasek, Lower Illyrian.

Fig. 4 *Pseudonodosaria gombaseki* n. sp.
G 3 — Gombasek, Lower Illyrian.

Fig. 5 *Pseudonodosaria striatoclavata* (SPANDEL, 1901)
G 3 — Gombasek, Lower Illyrian.

Fig. 6 *Pseudonodosaria gemerica* n. sp.
Type species. G 3 — Gombasek, Lower Illyrian.

Fig. 7 *Nodosaria liratella* TAPPAN, 1951
G 3 — Gombasek, Lower Illyrian.

Fig. 8 *Nodosaria liratella* TAPPAN, 1951
G 3 — Gombasek, Lower Illyrian.

Fig. 9 *Nodosaria* aff. *prima* D'ORBIGNY, 1850
G 3 — Gombasek, Lower Illyrian.

Fig. 10 *Ichtyolaria primitiva* SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
G 3 — Gombasek, Lower Illyrian.

Fig. 11 *Geinitzina taurica* SELLIER de CIVRIEUX et DESSAUVAGIE, 1965
G 3 — Gombasek, Lower Illyrian.

Fig. 12 *Pachyphoides klebelsbergi* (OBERHAUSER, 1960)
G 3 — Gombasek, Lower Illyrian.

Magnification: Fig. 1, 7 x 50, Fig. 2 x 200, Fig. 3, 4, 9, 11 x 60, Fig. 5 x 100, Fig. 5 x 100, Fig. 6 x 40, Fig. 8, 12 x 70, Fig. 10 x 80.

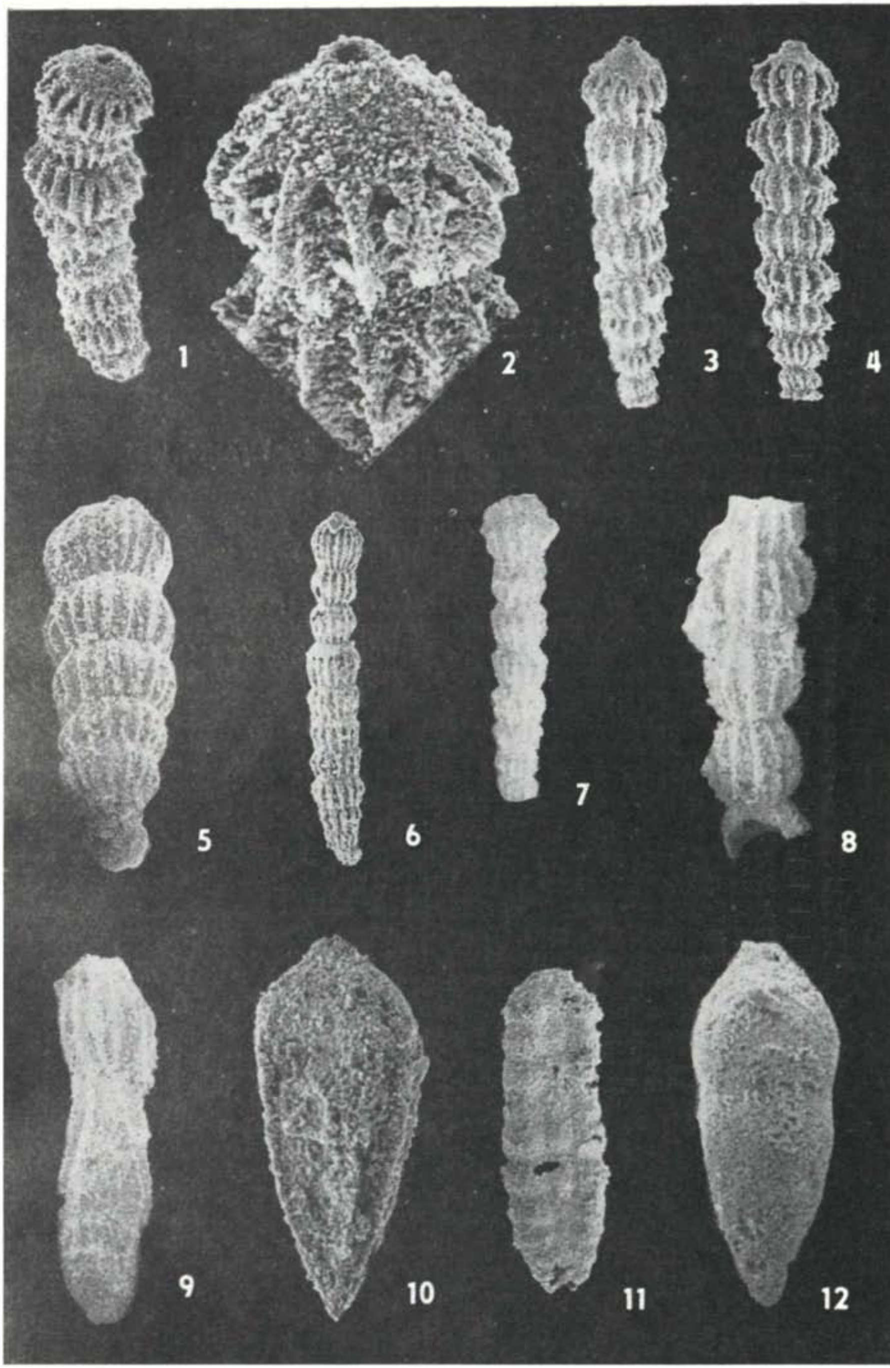
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PLATE CXLVI

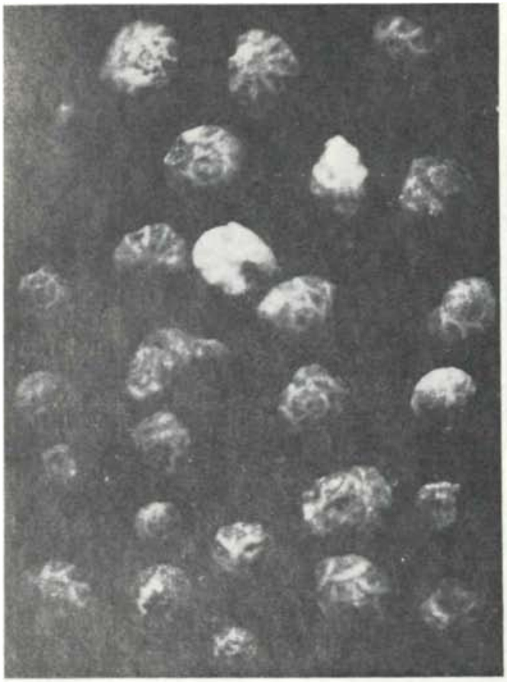
Fig. 1 *Duostomina alta* KRISTAN—TOLLMANN, 1960
Quarry at Turík, Lunz Formation, Lower Carnian.

Fig. 2 1 — *Hyperammina stabilis* KRISTAN—TOLLMAN, 1964,
2 — *Endothyra kuepperi* OBERHAUSER, 1960
3 — *Nodosaria apheilocula aglabra* KRISTAN—TOLLMANN, 1964
4 — *Lamelliconus multispirus* OBERHAUSER, 1957
5 — *Lamelliconus ventroplanus* OBERHAUSER, 1957
6 — *Variostoma exile* KRISTAN—TOLLMANN, 1960
7 — *Duostomina alta* KRISTAN—TOLLMANN, 1960

Fig. 3 1 — *Ammodiscus* cf. *infimus* (STRICKLAND, 1846)
Quarry at Turík, Lunz Formation, Lower Carnian.
2 — *Nodosaria apheilocula aglabra* — KRISTAN —TOLLMANN, 1964
3 — *Lenticulina* (*L*), *excavata* (TERQUEM, 1864)
4 — *Lenticulina* (*L.*) sp.
5 — *Lenticulina (Astacolus) manutina manutina* (D'ORBIGNY, 1849)
6 — *Lenticulina* (*Astacolus*) *pediaca* (TAPPAN, 1955)
7 — *Lenticulina* (*Astacolus*) *inquisita* (TERQUEM, 1870)
8 — *Falsopalmula arignota* KRISTAN—TOLLMANN, 1964
9 — *Frondicularia gerkei* KRISTAN—TOLLMANN, 1964
10 — *Frondicularia rhaetica* KRISTAN—TOLLMAN, 1964
11 — *Frondicularia borealis* (TAPPAN, 1951)
12 — *Austeocolomia marschalli* OBERHAUSER, 1960
13 — *Dyofrondicularia* sp.
14 — *Bairdia deformata* KOLLMANN, 1963
15 — *Parabairdia ploechingeri* KOLLMANN, 1963
16 — *Anisobardia ancta* KOLLMANN, 1963
Hybe, sample no. 3, Hybe Formation, Upper Rhaetian.

Magnification: Fig. 1—3 x 27.

Fig. 1—3 reillustrated from the publication of J. SALAJ — O. JENDREJÁKOVÁ (1967).



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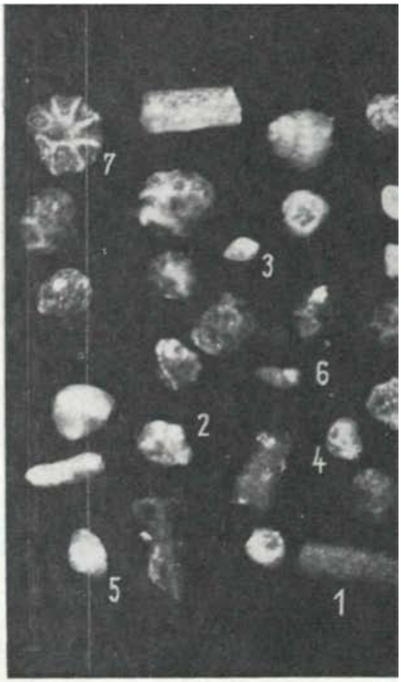

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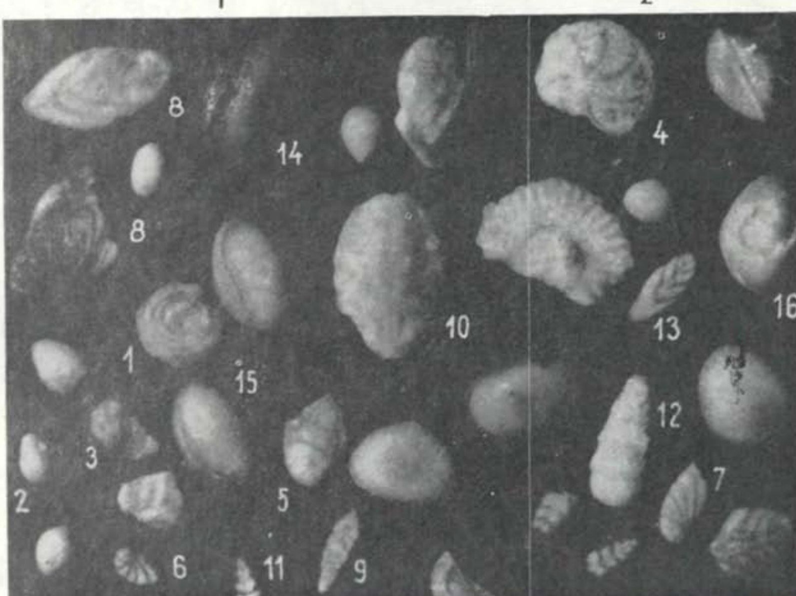

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PLATE CXLVII

Fig. 1—7 *Paratintinnina tintinniformis* BORZA et SAMUEL, 1977

Fig. 1—5. Stratenská hornatina Mts., crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian.

Fig. 1. — Type species, thin section no. Bo. 5604, fig. 2 — thin section no. Bo. 6289, fig 3 — thin section no. Bo. 6296, fig. 4 — thin section no. Bo. 6321, fig. 5 — thin section no. Bo. 6288.

Fig. 6. Muránska planina plateau, Dedov vrch, Tisovec limestone, Carnian, thin section no. Bo. 6761.

Fig. 7. Stratenská hornatina Mts., NNW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, thin section no. 2889/76.

Fig. 8—10 *Paratintinnina tulipaformis* BORZA et SAMUEL, 1957

Stratenská hornatina Mts., crossing of roads Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 8, 10 — thin section no. Bo. 6326, fig. 9 — thin section no. Bo. 6328, Fig. 8 — Type species.

Magnification: x 115.

Fig. 1—2, 4, 8, 10 reillustrated from the publication of K. BORZA — O. SAMUEL (1977b).

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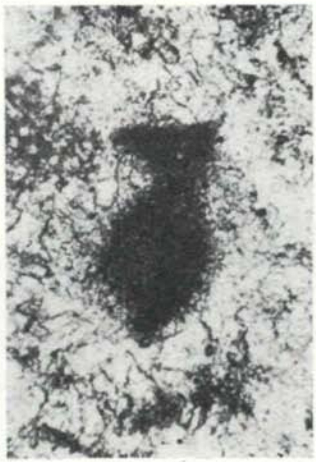

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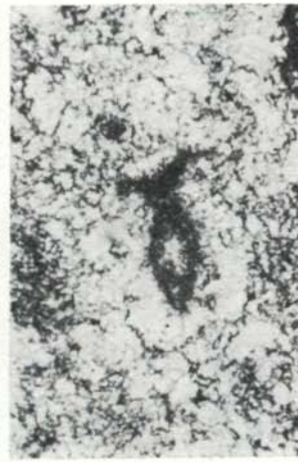

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PLATE CXLVIII

Fig. 1—8 *Amphorella bicamerata bicamerata* BORZA et SAMUEL, 1977
Fig. 1. Type species. W of Tisovec, Rangaska, Furmanec limestone, Norian, thin section no. Bo. 5639.
Fig. 2—5. Stratenská hornatina Mts., crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 2 — thin section no. Bo. 5610, fig. 3—4 — thin section no. Bo. 6299, fig. 5 — thin section no. Bo. 6336.
Fig. 6—7. Stratenská hornatina Mts., SW of elevation point Havrania skala, Tisovec limestone, Carnian, fig 6 — thin section no. Bo. 6277, fig. 7 — thin section no. Bo. 6303.
Fig. 8. Reillustrated from the publication of E. JABLONSKÝ (1973; Pl. 3, fig. 4).

Fig. 9—12 *Amphorella bicamerata intermedia* BORZA et SAMUEL, 1977
Stratenská hornatina Mts., NW of crossing road to Stratená and Hrabušice. Tisovec limestone, Carnian, fig. 9 — Type species, thin section no. Bo. 6297, fig. 10 — thin section no. Bo. 6294, fig. 11 — thin section no. Bo. 6296, fig. 12 — thin section no. Bo. 6298.

Fig. 13—16 *Amphorella bilongicamerata bilongicamerata* BORZA et SAMUEL, 1977
Stratenská hornatina Mts., NW of crossing road to Stratená an Hrabušice, Tisovec limestone, Carnian, fig. 13 — Type species, thin section no. Bo. 6293. fig. 14 — thin section no. Bo. 6292, fig. 15 — thin section no. Bo. 6299, fig. 16 — thin section no. Bo. 6294.

Magnification: x 115.
Fig. 1—16 reillustrated from the publication of K. BORZA — O. SAMUEL (1977a).

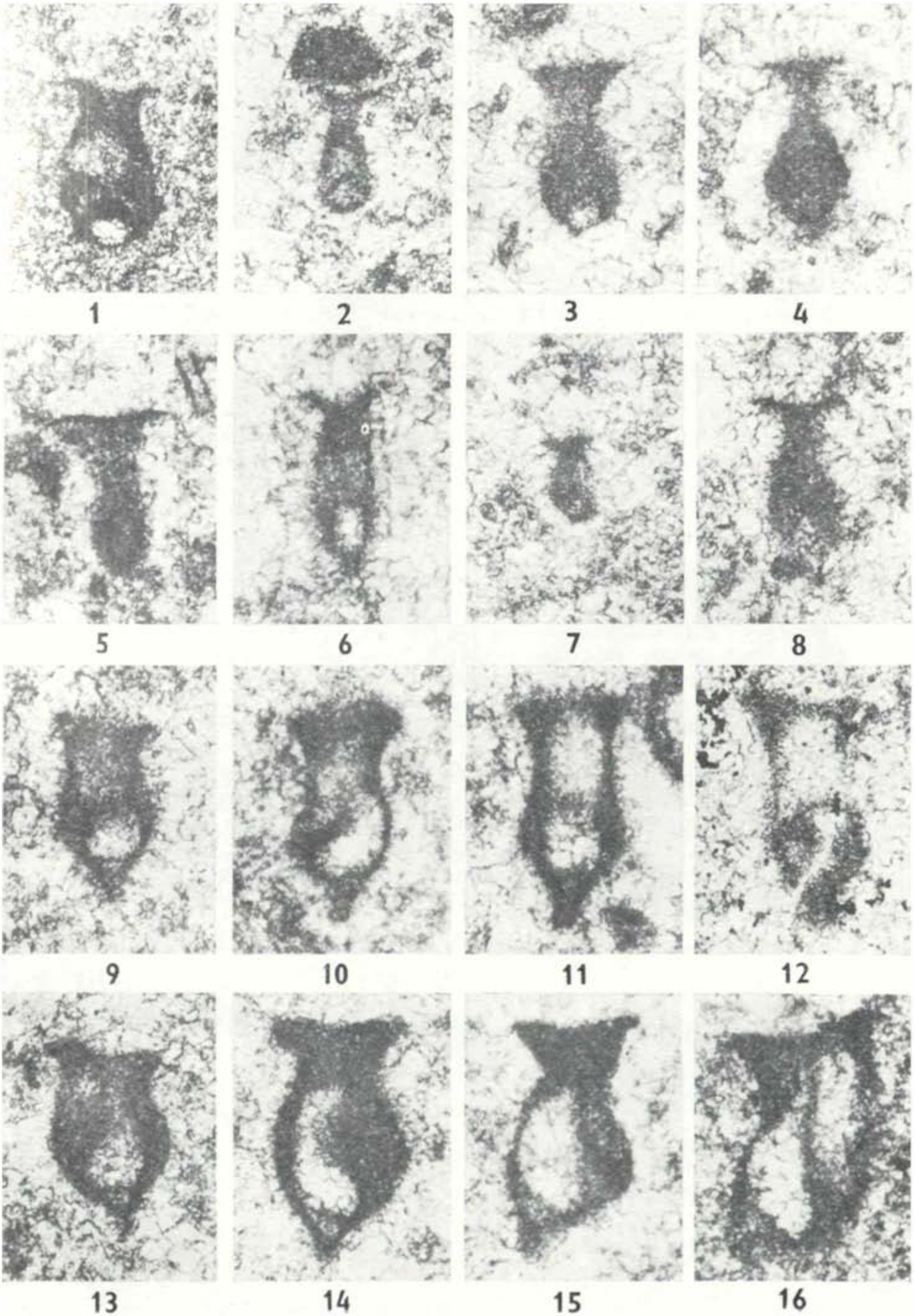
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PLATE CXLIX

Fig. 1 *Amphorella bilongicamerata bilongicamerata* BORZA et SAMUEL, 1977
Stratenská hornatina Mts., NW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, thin section no. Bo. 6291.

Fig. 2—5 *Amphorella bilongicamerata minuta* BORZA et SAMUEL, 1977
Fig. 1, 3. Stratenská hornatina Mts., NW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, thin section no. Bo. 6299.
Fig. 2, 4. Stratenská hornatina Mts., SW of elevation point Havrania skala, Tisovec limestone, Carnian, fig. 2 — Type species, thin section no. Bo. 6303, fig. 4 — thin section no. Bo. 6307.

Fig. 6—9 *Amphorella lageniformis* BORZA et SAMUEL, 1977

Fig. 6—7. Stratenská hornatina Mts., Dolka, Furmanec limestone, Norian, fig. 6 — Type species, thin section no. Bo. 5993, fig. 7 — thin section no. Bo. 5992.
Fig. 8—9. Stratenská hornatina Mts., SW of elevation point Havrania skala, Tisovec limestone, Carnian, fig. 8 — thin section no. Bo. 6307, fig. 9 — thin section no. Bo. 6318.

Fig. 10—14 *Amphorella subsphaerica* BORZA et SAMUEL, 1977
Stratenská hornatina Mts., NW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 10 — Type species, thin section no. Bo. 6327 fig. 11 — thin section no. Bo. 6328, fig. 12 — thin section no. Bo. 6326, fig 13 — thin section no. Bo. 6327, fig. 14 — thin section no. Bo. 6344.

Magnification: x 115.
Fig. 1—13 reillustrated from the publication of K. BORZA — O. SAMUEL (1977a).

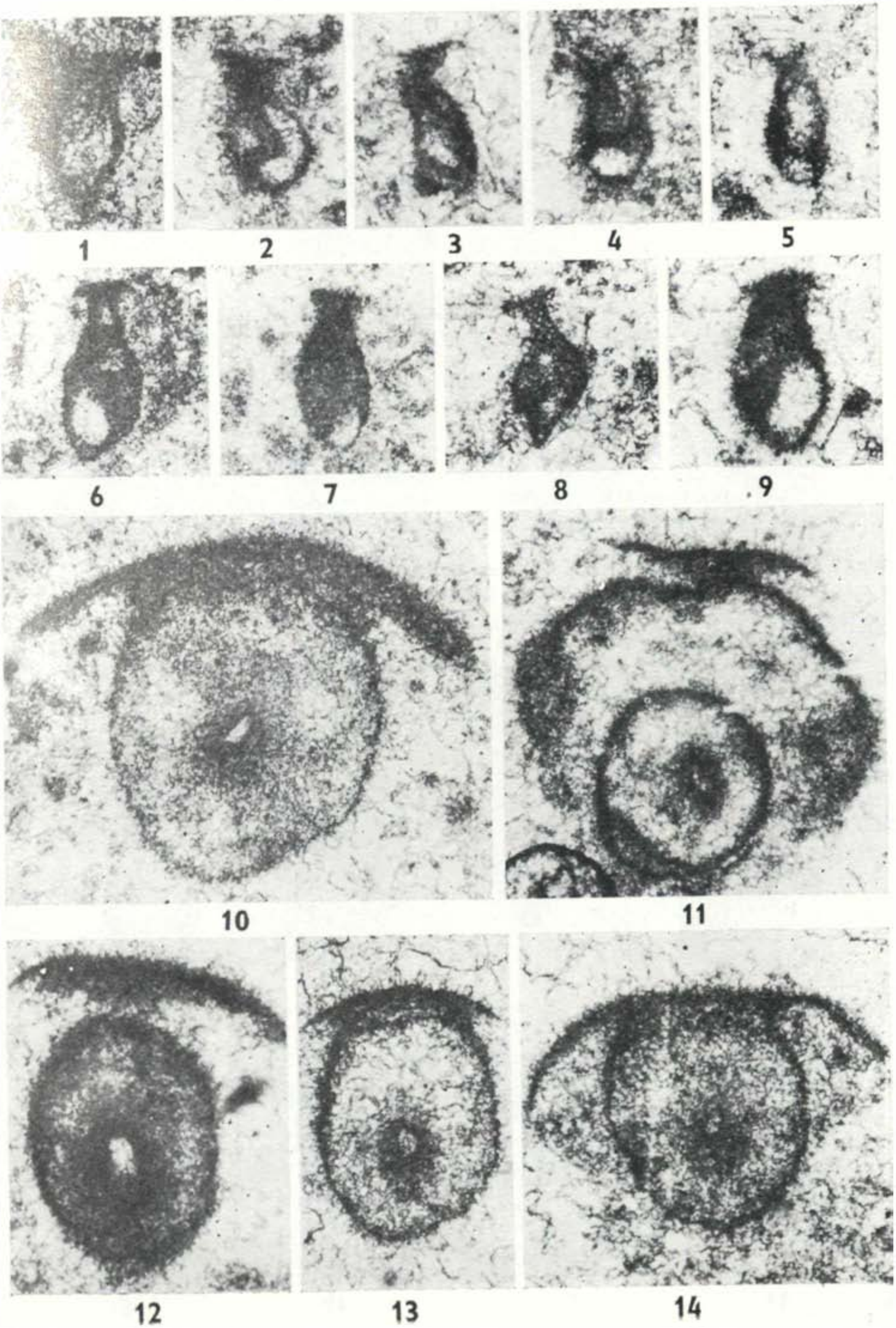

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PLATE CL

Fig. 1—5, 7 *Spiriamphorella carpathica carpathica* BORZA et SAMUEL, 1977
Stratenská hornatina Mts., NW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 1—2 — thin section no. Bo. 6288, fig. 3 — thin section no. Bo. 6297, fig. 4 — thin section no. Bo. 6293, fig. 5 — thin section no. Bo. 6291, fig. 7 — thin section no. 2889/76. Fig. 1 — Type species.

Fig. 6 Intermediary form between *Spiriamphorella carpathica carpathica* BORZA et SAMUEL and *Spiriamphorella carpathica gemerica* BORZA et SAMUEL.
Stratenská hornatina Mts., NW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, thin section no. Bo. 6299.

Fig. 8—16 *Spiriamphorella carpathica gemerica* BORZA et SAMUEL 1977
Fig. 8—13, 15—16. Stratenská hornatina Mts., NW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 8 — thin section no. 2889/76, fig. 9 — Type species, thin section no. Bo. 6293, fig. 10 — thin section no. Bo. 6294, fig. 11, 13, 16 — thin section no. Bo. 6299, fig. 15 — thin section no. Bo. 6296.
Fig. 14. Muránska planina plateau, Muránska Huta, Tisovec limestone, Carnian, thin section no. Bo. 6532.

Magnification: x 115.
Fig. 1—6, 9—11, 13, 15—16 reillustrated from the publication of K. BORZA — O. SAMUEL (1977a).

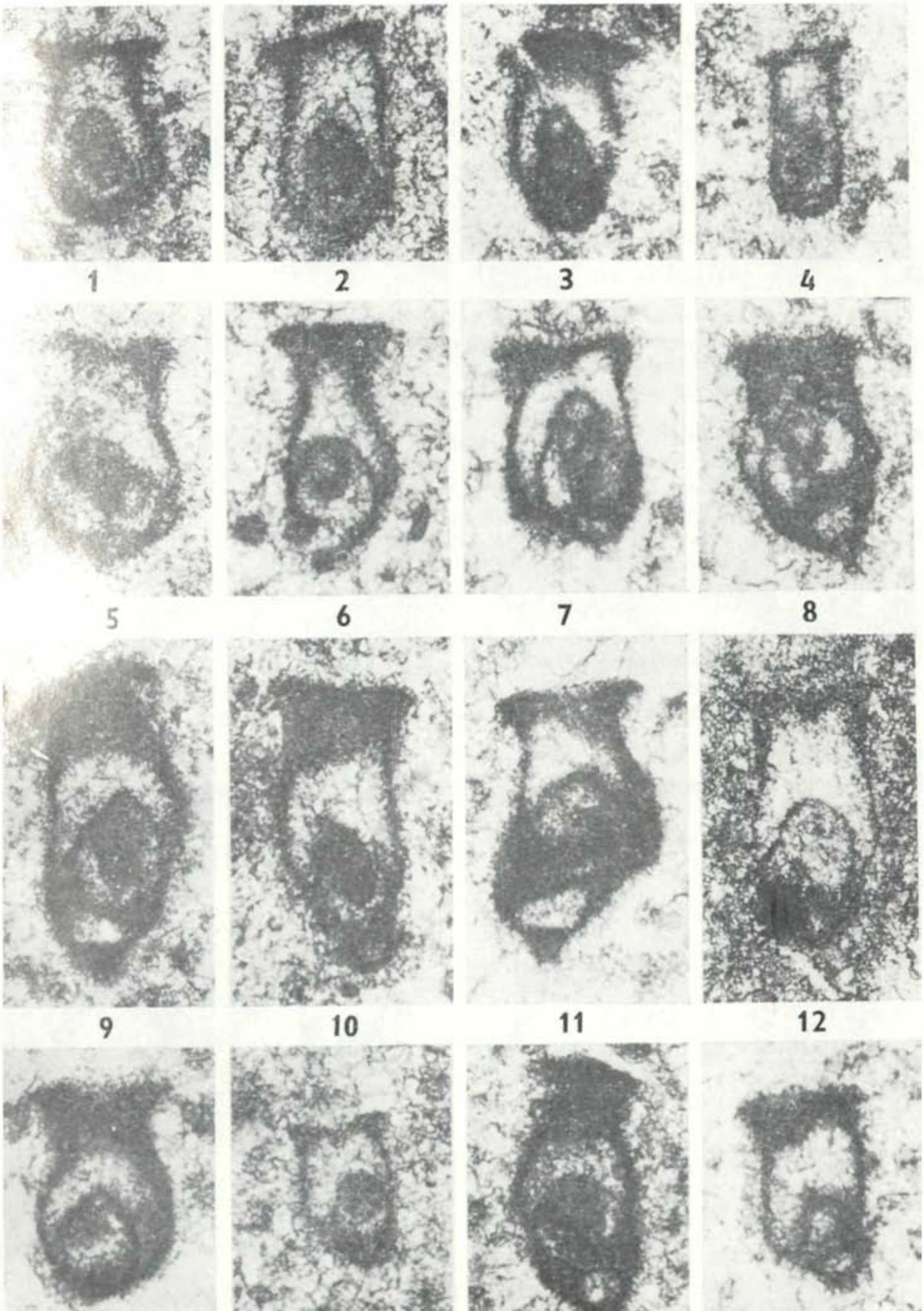
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Fig. 1—3 *Spiriamphorella carpathica gemerica* BORZA et SAMUEL, 1977
Stratenská hornatina Mts., NW of crossing the road to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 1 — thin section no. Bo. 6297, fig. 2 — thin section no. Bo. 6288, fig. 3 — thin section no. 2887/76.

Fig. 4—8 *Spiriamphorella rectilineata rectilineata* BORZA et SAMUEL, 1977
Fig. 4—6, 8. Stratenská hornatina Mts., NW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 4 — thin section no. Bo. 6295, fig. 5 — Type species, thin section no. Bo. 6292, fig. 6 — thin section no. Bo. 6288, fig. 8 — thin section no. Bo. 6299.
Fig. 7. Stratenská hornatina Mts., SW of the elevation point Havrania skala, Tisovec limestone, Carnian, thin section no. Bo. 6309.

Fig. 9—12 *Spiriamphorella rectilineata districa* BORZA et SAMUEL, 1977
Stratenská hornatina Mts., NW of crossing roads to Stratená and Hrabušice, Tisovec limestone Carnian, fig. 9, 10 — thin section no. Bo. 6282, fig. 11 — thin section no. Bo. 6277, fig. 12 — thin section no. 2887/76. Fig. 9 — Type species.

Magnification: x 115.
Fig. 1—2, 4—11, reillustrated from the publication of K. BORZA — O. SAMUEL (1977a).

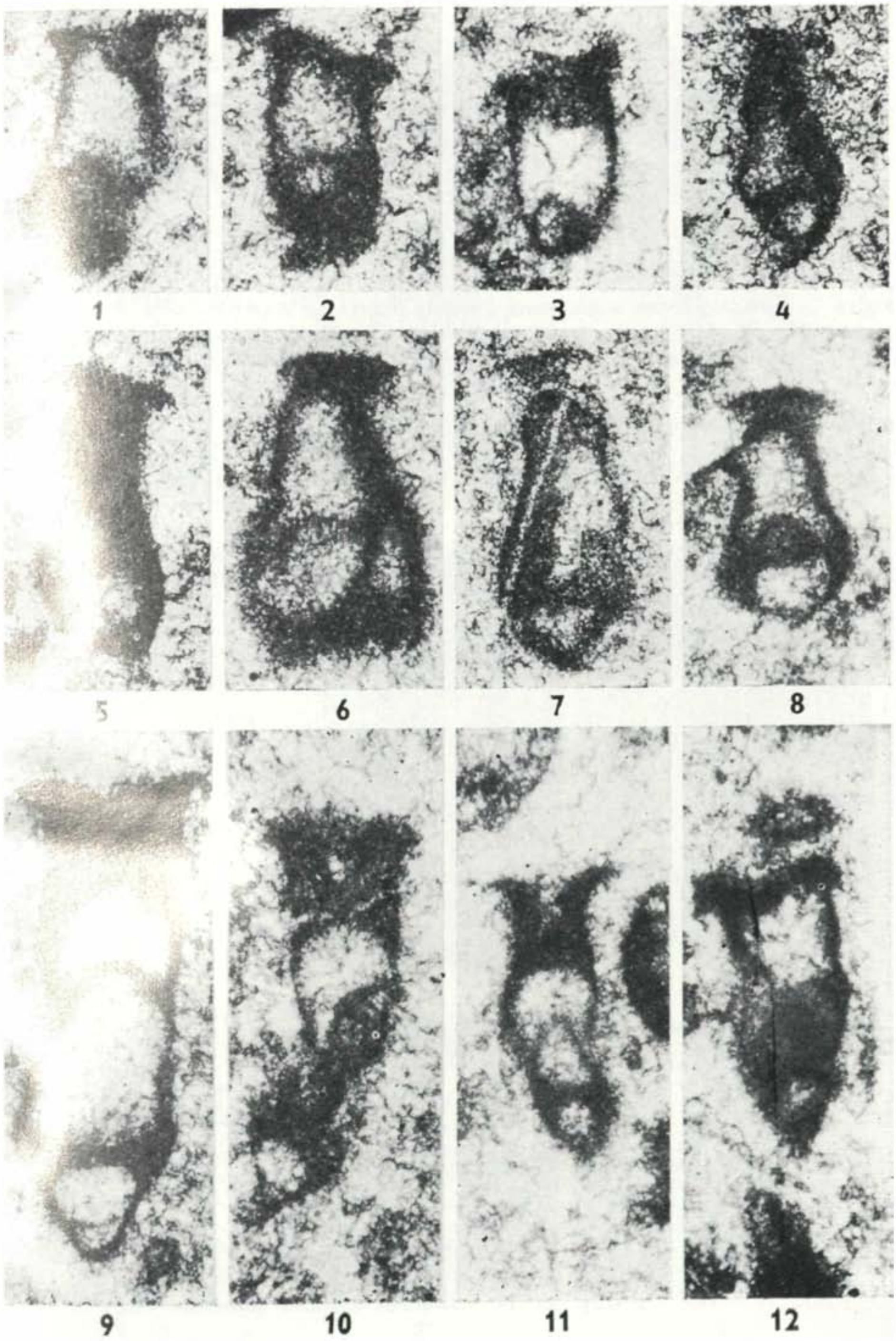
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PLATE CLII

Fig. 1—3 *Spiriamphorella rectilineata districta* BORZA et SAMUEL, 1977
Stratenská hornatina Mts., SW of the elevation point Havrania skala, Tisov limestone, Carnian, fig. 1 — thin section no. Bo. 6301, fig. 2 — thin secti no. Bo. 6310, fig. 3 — thin section no. Bo. 6313.

Fig. 4—9 *Spiriamphorella ovata* BORZA et SAMUEL, 1977
Fig. 4, 6—9. Stratenská hornatina Mts., SW of the elevation point Havrani skala, Tisovec limestone, Carnian, fig. 4 — Type species, thin section no. Bo 6307, fig. 6 — thin section no. Bo. 6317, fig. 7 — thin section no. Bo. 6311, fig 8 — thin section no. Bo. 6305, fig. 9 — thin section no. Bo. 6277.
Fig. 5. Stratenská hornatina Mts., NE of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, thin section no. Bo. 5610.

Magnification: x 115.
Fig. 1—9 reillustrated from the publication of K. BORZA — O. SAMUEL (1977a).


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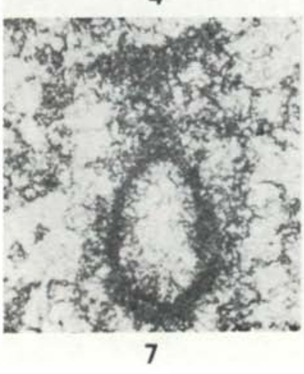
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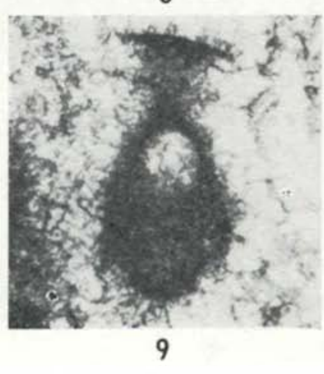
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PLATE CLIII

Fig. 1—8 *Urnulinella irregularis* (BORZA et SAMUEL, 1977)

Fig. 1—4, 6—8. Stratenská hornatina Mts., NW of crossing of roads Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 1 — Type species. Fig. 1, 3, 7 — thin section no. Bo. 6299, fig. 2 — thin section no. Bo. 6327, fig. 4 — thin section no. Bo. 6292, fig. 6 — thin section no. Bo. 6328, fig. 8 — thin section no. Bo. 6289.

Fig. 5. Stratenská hornatina Mts., SW of the elevation point Havrania skala, Tisovec limestone, Carnian, thin section no. Bo. 6311.

Magnification: x 115.
Fig. 1—8 reillustrated from the publication of K. BORZA — O. SAMUEL (1977a).

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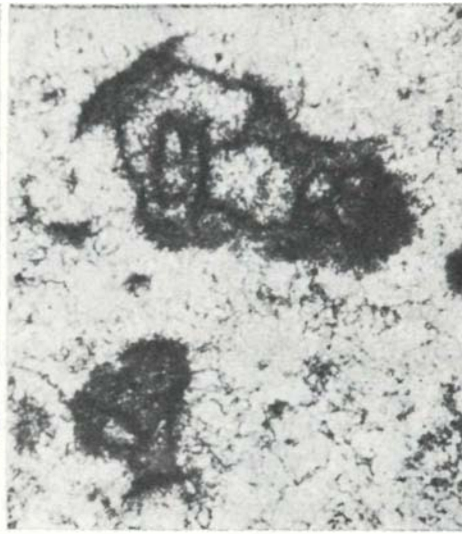

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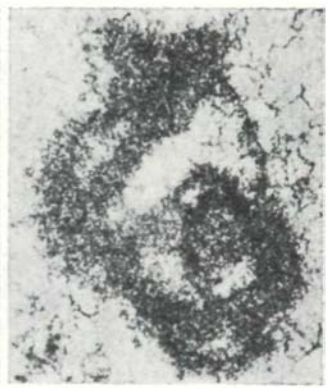

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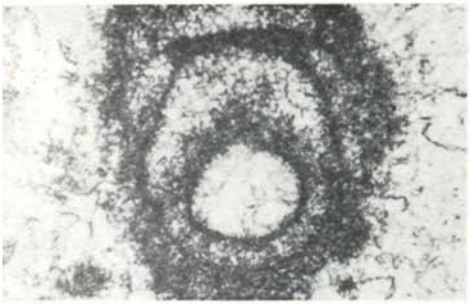
PLATE CLIV

Fig. 1—6 *Urnulinella andrusovi* BORZA et SAMUEL, 1977

Stratenská hornatina Mts., NW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 1—2 thin section. no. Bo. 6347, fig. 3 — thin section no. 2900/76, fig. 4 — thin section no. 6340, fig. 5 — thin section no. Bo. 6343, fig. 6 — thin section no. Bo. 6342.

Magnification: x 115.

Fig. 6 reillustrated from the publication of O. SAMUEL — K. BORZA (1981).



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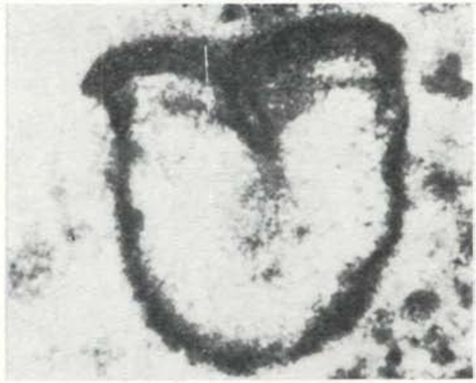

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PLATE CLV

Fig. 1—6 *Urnulinella andrusovi* BORZA et SAMUEL, 1977
Stratenská hornatina Mts., NW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 1 — Type species, thin section no. Bo. 6326, fig. 2, 4 — thin section no. Bo. 6328, fig. 3 — thin section no. Bo. 6343, fig. 5 — thin section no. Bo. 6327, fig. 6 — thin section no. Bo. 6340.

Magnification: x 115.
Fig. 1—2, 4—5 reillustrated from the publication of K. BORZA — O. SAMUEL (1977a).

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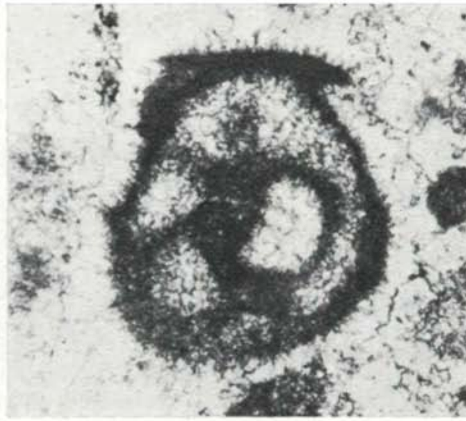

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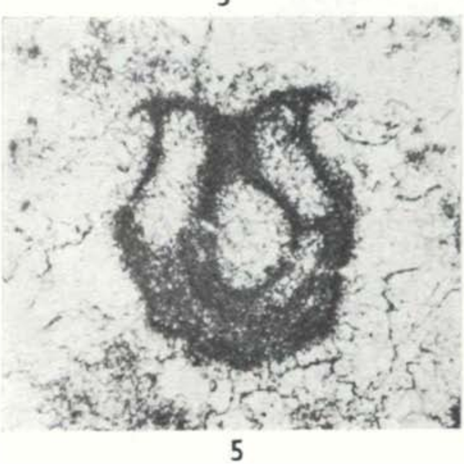

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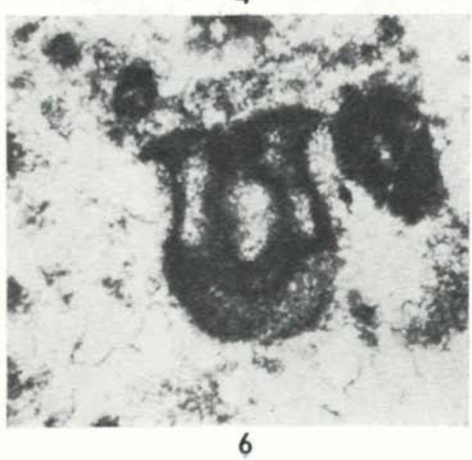

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PLATE CLVI

Fig. 1—2 *Pseudocucurbita globosa* BORZA et SAMUEL, 1978
Stratenská hornatina Mts., NNW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 7 — Type species, thin section no. Bo. 3626, fig. 2 — thin section no. Bo. 6327.

Fig. 3—6 *Pseudocucurbita subglobosa* BORZA et SAMUEL, 1978
Stratenská hornatina Mts., NNW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 3 — Type species, thin section no. Bo. 6348, fig. 4 — thin section no. Bo. 6349, fig. 5 — thin section no. Bo. 6346, fig. 6 — thin section no. Bo. 6347.

Fig. 7—8 *Pseudocucurbita campanulaformis* BORZA et SAMUEL, 1978
Stratenská hornatina Mts., NNW of crossing of roads to Stratená and Hrabušucie, Tisovec limestone, Carnian, fig. 7 — Type species, thin section no. Bo. 6341, fig. 8 — thin section no. Bo. 6340.

Magnification: x 115.
Fig. 1—8 reillustrated from the publication of O. SAMUEL (1978).

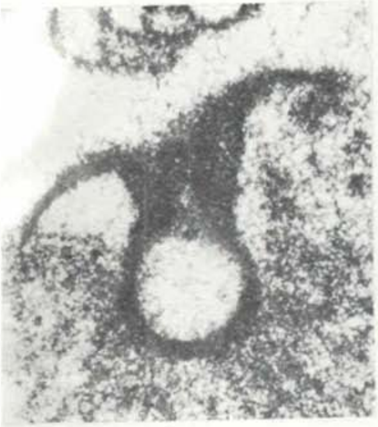

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PLATE CLVII

Fig. 1—3 *Pseudocucurbita campanulaformis* BORZA et SAMUEL, 1978
Stratenská hornatina Mts., NNW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 1 — thin section no. Bo. 6345, fig. 2 — thin section no. Bo. 6348, fig. 3 — thin section no. Bo. 6342.

Fig. 4—6 *Pseudocucurbita fusani* BORZA et SAMUEL, 1978
Stratenská hornatina Mts., NNW of crossing of roads to Stratená and Hrabušice, Tisovec limestone, Carnian, fig. 4 — Type species, thin section no. Bo. 6331, fig. 5 — thin section no. Bo. 6347, fig. 6 — thin section no. Bo. 6326.

Fig. 7—8 *Cucurbita infundibuliformis* JABLONSKÝ, 1973
Nízke Tatry Mts., Liptovská Osada, quarry at the road, about 500 m S of the village, Raming limestone, Cordevolian. Fig. 7 — Type species.

Magnification: x 115.
Fig. 1—6 reillustrated from the publication of K. BORZA — O. SAMUEL (1978) and Fig. 7—8 from the publication of E. JABLONSKÝ (1973).

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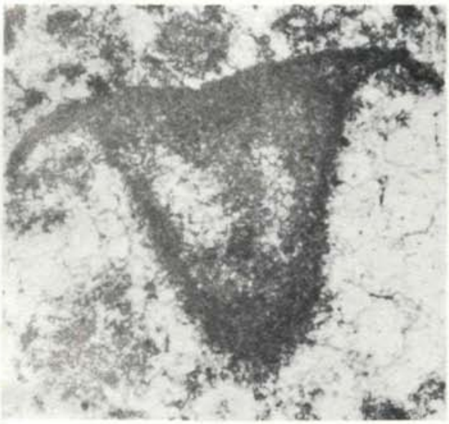

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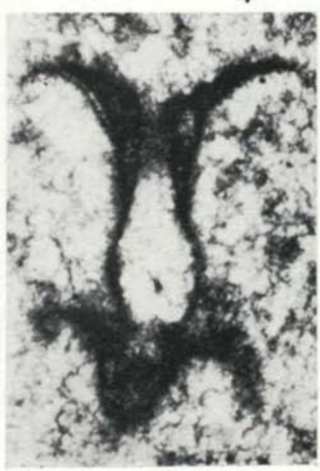

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JOZEF SALAJ — KAROL BORZA — ONDREJ SAMUEL

RIASSIC FORAMINIFERS OF THE WEST CARPATHIANS

Vydal Geologický ústav Dionýza Štúra vo vydavateľskom oprávnení Vedy, vydavateľstva Slovenskej akadémie vied, Bratislava v júli 1983

Vedecká redaktorka: RNDr. Viera Gašpariková, CSc.
Odborná recenzentka: RNDr. Otília Jendrejáková, CSc.
Zodpovedná redaktorka: Irena Bročková
Odborný preklad do angličtiny vykonala: Edita Jassingerová
Prebal a väzbu navrhol: Tibor Hrabovský

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