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PELAGIC AND REEF SEDIMENT RELATIONS OF THE MIDDLE TRIASSIC IN THE SILICA NAPPE AND TRANSITIONAL STRATA NATURE (THE SLOVAK KARST, WEST CARPATHIANS)

(*Fig. 1—5, Pl. 1—4*)

Abstract: The Middle Triassic pelagic sediments of Slovak Karst Silica nappe (the Reifling, Schreyeralm and "Pseudoreifling" Limestones) overlay lagoonal-bank sediments (the Steinalm algal Limestones). As pelagic sediments overlying rocks bioherm limestone facies (the ?Raming or Wetterstein bioherm Limestones) always occur. In the areas of pelagic sediments wedging out, shallow—water transitional type facies can be found. Their remarkable features are echinoderm detritus increased amount and crinoidal-coquinal lenses at places.

Резюме: Среднетриасовые осадки Словацкого карста (рейфлингские, шрейеральмские и „псевдорейфлингские" известняки) являются вышележащими отложениями чем рифогенное плато осадки (штейнальмские известняки). Над пелагическими осадками находятся биогермные фации (?рамингские и ветерштейнские биогермные известняки). В местах латерального выклинивания пелагических осадков находятся переходные фации, которые автор статьи изучал. Их характеристическим знаком является большее количество детритов криноид, в некоторых местах криноидо-лумахеловые слои.

1. *Introduction*

In attempting to reconstruct some parts of the Middle and Upper Triassic Alpino-Carpathian sedimentation area for palinspastic or paleogeographical purposes, the problem of pelagic and reef sediments relations cannot be avoided.

The problem has been topical for several decades and plenty of researchers have treated it. If the Middle Triassic period was mentioned only, because that is present paper dealing with, it was K. Hummel (1928), P. Cros (1968), P. Cros — Ph. Lagny (972), G. Pisa (1974) a. o. in the Southern Alps and K. Leuchs (1947), H. Zapfe (1959), M. Sarnthein (1967), H. Miller (1971), E. Ott (1967, 1972), A. Tollmann (1974) a. o. in the Northern Calcareous Alps.

In the West Carpathian area the problem has been touched upon only generally or marginally (J. Bystrický 1972, J. Bystrický et al. 1973, V. Kollárová — Andrusovová — J. Bystrický 1974, M. Mišík 1970, 1972). A detailed facial study devoted to the topic is lacking so far.

The Middle Triassic reef and or pelagic sediments are to be found in the West Carpathians area only in the Gemeric and Hronic tectonic units (division sensu J. Bystrický in J. Bystrický et al. 1973), i. e. in the Šturec, Choč, Strážov, Veterník, Havranica, Jablonica, Nedzov, Drienok, Muráň and Silica nappes (Fig. 1). Representation and relations of Middle Triassic pelagic and reef sediments are different from one nappe to the another, depending upon position of their original sedimentation areas.

Both pelagic and reef sediments are in a various proportions represented in most of nappes (the Strážov, Veterník, Jablonica, Drienok, Muráň and Silica nappes), in

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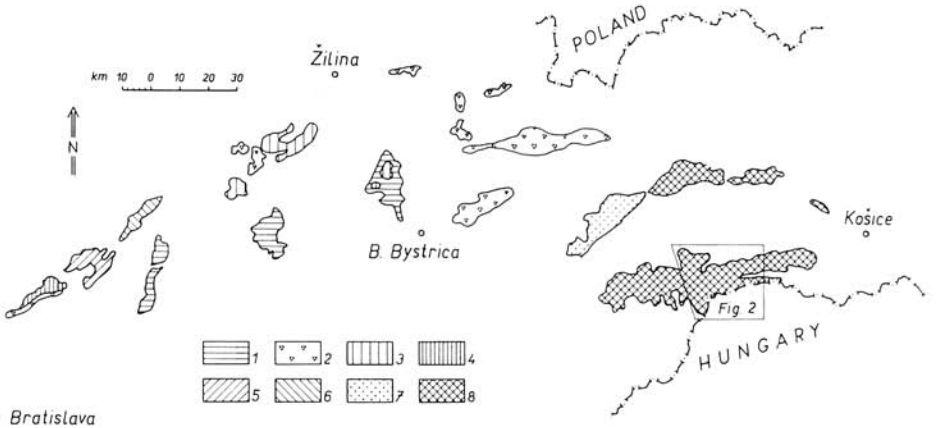

Fig. 1. Distribution of the largest occurrences of Middle Triassic of Hronic and Gemeric nappes. 1 — The Šturec nappe, 2 — The Choč nappe, 3 — The Strážov nappe, 4 — The Veterník and Havranica nappe, 5 — The Jablonica nappe, 6 — The Nedzov nappe, 7 — The Muráň nappe, 8 — The Silica nappe.

some of them pelagic sediments entirely predominate (the Svarín partial nappe of the Choč nappe) and finally, in some of them only reef (or lagoonal) sediments are represented (the Šturec and the Nedzov nappes).

From among the nappes cited, facial study of the Slovak Karst Silica nappe is probably the most detailed one at present. Mainly reef and lagoonal sediments have been studied here in detail (J. Mello 1974, 1975a, 1975b; M. Kochanová — J. Mello — M. Siblík 1975). On pelagic facies only general information is available (J. Bystrický 1964, J. Mello 1974). But the least information is on relations of the both facial groups and on the nature of pelagic-reef transitional strata. The present paper is therefore devoted to the topic with a view to the Middle Triassic period.

II. *Facial relations of the Middle Triassic in the Slovak Karst Silica Nappe*

The Middle Triassic algal bank, bioherm and lagoonal facies in the Slovak Karst Silica nappe are represented by the Steinalm (Pl. I, Fig. 1) and Wetterstein Limestones (Pl. IV, Fig. 4); pelagic facies are represented by the Reifling, Schreyeralm and "Pseudoreifling" Limestones (Pl. II, Fig. 1—3). Their mutual relations and representation differ from place to place and varies between the two extreme profile types. In the first type pelagic sediments are represented to a large extent, in the second they are not present. Gradual transition between both profile types exist in some areas.

One of such areas is the northern part of Silická planina karst plateau in the sector Gombasek (village) — Rakafa (gamekeeper's cottage, Fig. 2). In this sector successive wedging out of pelagic sediments and their transition into algal plain and reef sediments can be observed. Eastward in area of Horný vrch karst plateau, basin type sediments are represented practically only by the isolated small lenses untypically developed amidst the light massive limestones.

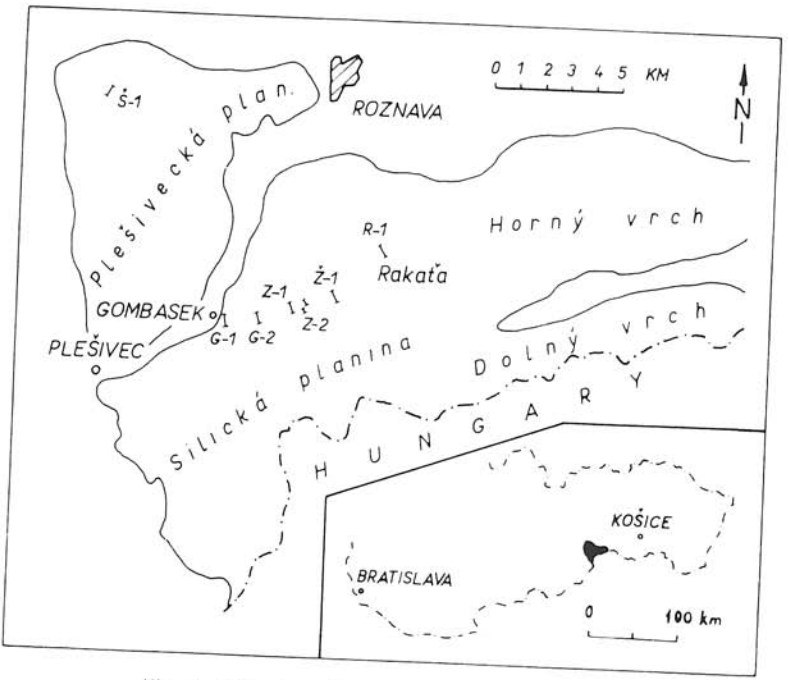

Fig. 2. Situation sketch of the area studied.

In the basin type facies lateral wedging out areas, such strata are often represented, which from the facial point of view can be interpreted as a transitional facies to the algal plains and bioherm sediments (Fig. 3). It refers mainly to the dark-grey micritic and crinoidal limestones Pelsonian-Illyrian in age and the Wetterstein Bedded Lower Ladinian Limestones. In areas with an abundant presence of basin type sediments, the uppermost parts of the "Pseudoreifling" Limestones often coincide to a large extent with limestones that are in more external parts of the West Carpathians (mainly in the Choč nappe) designated as the Raming Limestones (J. Bystrický 1972, J. Bystrický in J. Bystrický et al. 1973, p. 84; E. Jablonský 1973a, 1973b).

Facial changes can be best proved by the set of litological profiles in the above mentioned sector Gombasek — Rakaťa at the Silická planina karst plateau (Fig. 2, Fig. 4). (For purposes of comparison is demonstrated the profile Š-1 from Štít area at Plešivecká planina plateau, as well. Middle Triassic pelagic sediments are here plentifully represented and typically developed).

In western part, in the Gombasek twisting road cuts (the G-1 profile) the proportion of pelagic facies is the most extensive (the Reifling, "Pseudoreifling" and Schreyeralm Limestones), but transitional facies are present as well (the ?Raming and the light Wetterstein Bedded Limestones). In the area southern from the Barazdaláš chasm (the G-2 profile) an increased proportion of transitional facies at the expense of pelagic can be observed; the "Pseudoreifling" Limestones here and eastward (except of small isolated lenses) are not present yet, their place is taken by the Wetterstein Bedded Limestones. Similarly, in the uppermost Anisian the Reifling Limestones have

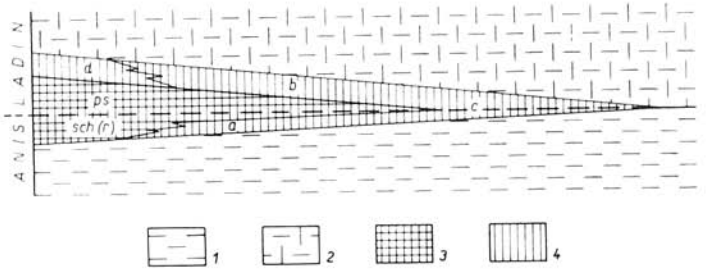

Fig. 3. Transitional facies position scheme in the Middle Triassic of northern part of Silická planina Karst plateau. 1 — The Steinalm algal Limestones, 2 — The Wetterstein Bioherm Limestones, 3 — pelagic sediments (sch — the Schreyeralm Limestones, r — the Reifling Limestones, ps — the "Pseudoreifling" Limestones), 4 — transitional facies (a — dark-grey micritic and crinoid limestones, b — the Wetterstein Bedded Limestones, c — untypical Schreyeralm, resp. "Pseudoreifling" Limestones, d — the ?Raming Limestones).

been almost entirely replaced by transitional facies of dark-grey micritic or crinoidal limestones.

Eastward, in Zakázané hill surroundings north from Silica village (profile Ž-1, Ž-2), pelagic sediments are represented practically only by the Schreyeralm Limestones and by sporadical lenses of the "Pseudoreifling" Limestones. Transitional facies of the Wetterstein Bedded Limestones reaches the maximum extent there. In the underlier transitional facies have been replaced by the Steinalm Limestones with lenses of crinoidal limestones at places (Pl. I. Fig. 2).

Even more eastward, in area south from Žabec hill (profile Ž-1) transitional facies completely predominate (the Wetterstein Bedded Limestones): large intercalations of light massive limestones occur amidst the Schreyeralm Limestones. In the Rakafa area pelagic sediments are not present yet (profile G-1).

III. *Transitional strata nature*

Transitional strata position was outlined in the previous chapter. Their characteristics follow more in detail.

III. A. *Dark-grey micritic and crinoidal Limestones (Pelsonian-Illyrian)*

The limestones are of transitional nature between the Steinalm algal limestones and the Reifling, or Schreyeralm limestones of pelagic type. They are grey to dark-grey, massive, only seldom undistinctly bedded.

For the limestones, as in many cases for transitional types of limestones in general, is characteristic an increased amount of echinoderm detritus and presence of crinoidal-coquinal lenses at places. The lenses have yielded mainly rich brachiopod fauna.

Brachiopods have been collected from the strata at four localities (Table I; Fig. 5). At the locality Nr. 1 (from the Tab. I) ammonites have been found as well (undetermined so far). Foraminiferes, mainly *Glomospira densa* (Pantić), which is by J. Salaj (1969) considered as a leading form of the "*Pilammina*" *densa* zone (Illyrian), are abundant.

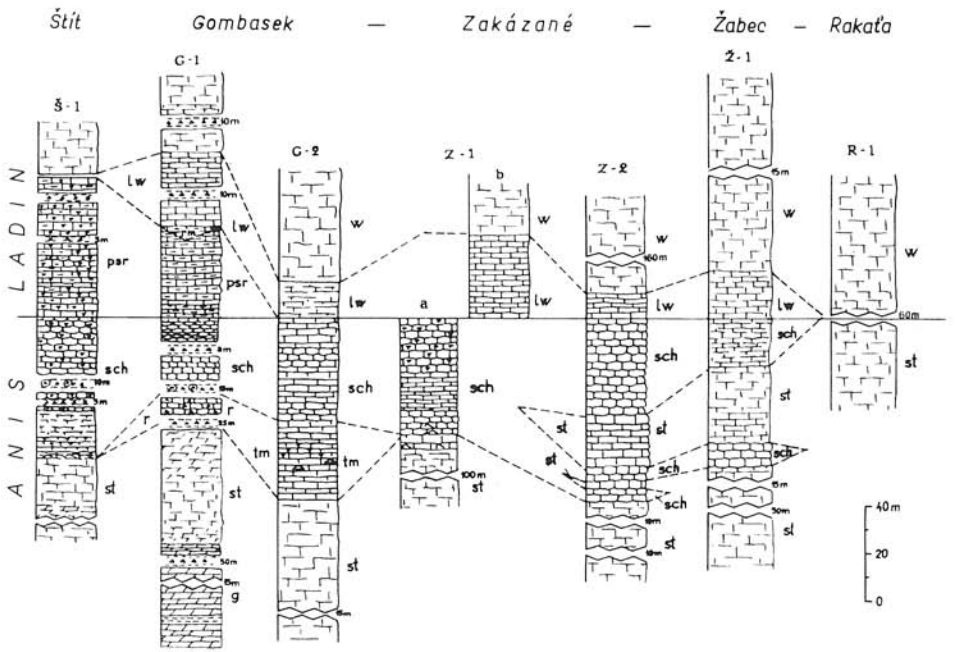

Fig. 4. Litologic profiles of Middle Triassic strata in sector Gombasek — Rakaťa at Silická planina plateau and from Štít area at Plešivecká planina plateau: w — the Wetterstein Bioherm Limestones, lw — the Wetterstein Bedded Limestones, rm — the ?Raming Limestones, psr — the "Pseudoreifling" Limestones, sch — the Schreyeralm Limestones, r — the Reifling Limestones, tm — dark-grey micritic and crinoid limestones, st — the Steinalm Limestones, g — the Gutenstein Limestones and Dolomites.

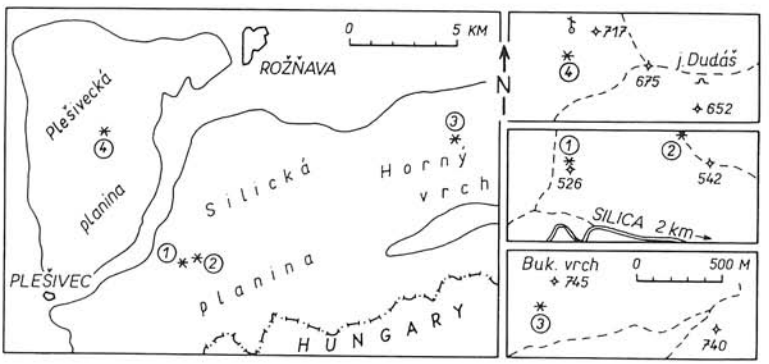

Fig. 5. Geographical situation of brachiopods localities from Tab. I.

But according to an O. Jendrejáková's (1973, p. 118) opinion, this form cannot be regarded as the Upper Anisian leading form since a mass occurence of this form was found out in two different stratigraphical levels.

Occurence of *G. densa* out of the lower horizon (Anatolian) has been reported only from the one locality (the Gutenstein Limestones NW from Silická Brezová: K. Borza 1970). Lower Anisian age of the locality has not been confirmed directly, it was inferred only from a superposition.

In any case, stratigraphical range of *Glomospira densa* zone is recently considered to be broader than in 1969 (J. Glazek — J. Trammer — K. Zawidzka 1973, J. Salaj 1974).

Another foraminiferes have been found in the stratum except of *G. densa* (determined by J. Salaj): *Valvulina sp.*, *Nodosaria armeniensis* Efimova, *Meandrospira sp.*, *Duostomina* sp., *Nevoendothyra reicheli* Reitl.

From the microfacial point of view crinoidal — pellet — bioclastic biosparites (Pl. I, Fig. 3, 4) predominate. High portion of dark afanitic mass shreds (pellets, shreds of problematics, algae, lumps and *?Tubiphytes obscurus*) are present. Echinoderm fragments are often coated by micritic rings, or display syntaxial overgrowths in which fragments of other organisms remains are enclosed.

The described limestones are extended in north-western part of Silická planina karst plateau eastward from Gombasek (in profile G-2 surroundings), at places at Plešivecká planina plateau, as well (south-westernly from elevation point 717 and southward from e. p. 791.1) and Horný vrch karst plateau (south-westernly from Bukový vrch hill). The maximum thickness, cca 40 m they reach at Silická planina plateau eastward from Gombasek (in the area between G-1 and G-2 profiles).

III. B. *The Wetterstein Bedded Limestones (Lower Ladinian)*

These limestones may be regarded as independent litofacial unit which differs by structure and texture both from algal plains and bioherm limestones and from those of pelagic type as well.

Light in colour, the limestones are distinctly bedded (Pl. III, Fig. 1) with average bed thickness of about 30 cm, mostly with even bedding planes. Bioclastic varieties of limestones predominate by far (Pl. III, Fig. 2, 4). Intercalations of rosy micritic limestones resembling the Schreyeralm limestones occur occassionally, mainly in the lower part of profiles. Besides, in Zakázané hill area lenses of dark-grey "Pseudoreifling" Limestones can be found at places.

Algal test fragments (mainly solenoporas), sponges (*Follicatena cautica* Ott), corals (Pl. III, Fig. 4), detritus and even complete stems of crinoids (*Encrinus liliformis* from

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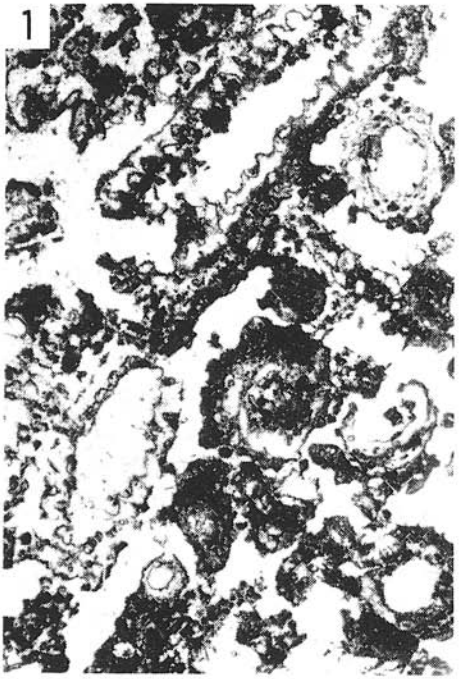
Plate I

Fig. 1. The Steinalm algal Limestone with *Physoporella pauciforata* (Güm b.) Steinm., Silická planina plateau north of Silica (SI-44, 52-193), ×6. Fig. 2. Crinoidal limestone, Lense in the uppermost part of the Steinalm Limestones in immediate underlier of the Schreyeralm Limestones, North of Silica, eastward from Zakázané hill (B-10), ×20. Fig. 3. Crinoidal-pellet biosparit with abundant foraminiferes, Transitional stratum of the dark-grey micritic and crinoid limestones Pelsonian-Illyrian in age, The western edge of Silická planina karst plateae over Gombasek (PI-114, 51-212), ×12. Fig. 2. *Glomospira densa* (Pantić) in crinoidal-pellet limestone (Detto as Fig. 3), ×30.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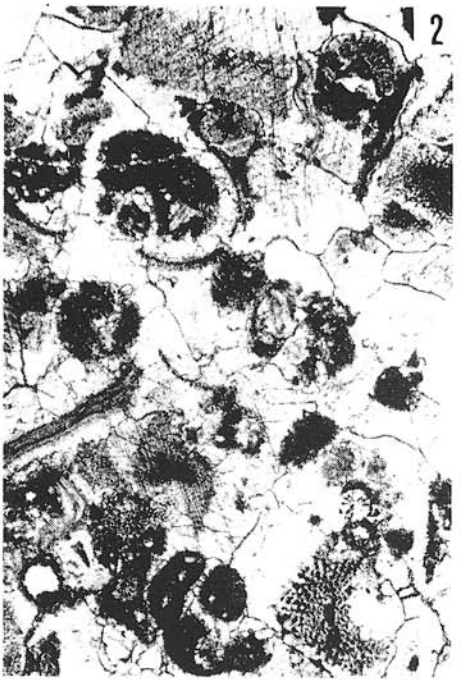
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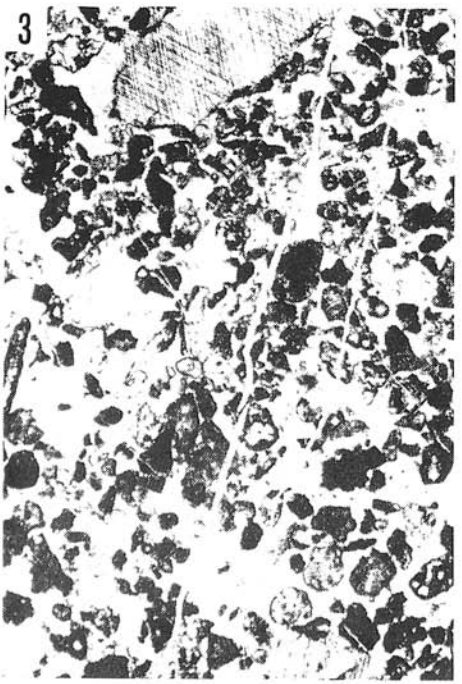
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the nearest east small quarry pit from Zakázané hill), problematics (*Bacinella ordinata* Pantić, "Problematikum" Bystrický 1964) and unidentifying detritus (designated preliminary as "flakes" when composed of dark aphanitic mass, Pl. III, Fig. 2, 3) take part in composition of bioclastic varieties of the Wetterstein Bedded Limestones.

The limestones occur at Silická planina karst plateau, mainly in the surroundings of Gombasek and north of Silica.

The Wetterstein Bedded Limestones overlay either the "Pseudoreifling" (eventually the ?Raming) Limestones (profiles G-1, G-2) or the Schreyeralm Limestones (in the area north from Silica — profiles Z-1, Z-2, Ž-1; here several small quarries have been opened in them). As their immediate overlying rocks, the Wetterstein Bioherm Limestones occur.

Thickness of the Wetterstein Bedded Limestones ranges from 10 to 30 m.

III. C. *The ?Raming Limestones (Ladinian)*

Sedimentation of the Wetterstein Bioherm Limestones in most Slovak Karst Silica nappe areas took place after the "Pseudoreifling" (dark-grey bedded, often cherty) Limestones sedimentation had finished.

The uppermost parts of the "Pseudoreifling" Limestones does not display a pelagic character at many places yet, but a near-reef or a reef one. This type of limestones does not correspond to any till now described lithostratigraphical or lithofacial unit. To avoid introducing a new local name (possibly with improper choose of a type locality) before thorough study of large number of profiles, are these limestones involved here among the ?Raming Limestones.

These limestones are dark-grey to dark, indistinctly bedded, but chiefly are massive without cherts. In contradiction to the "Pseudoreifling" Limestones mostly pelagic in nature (micrites with more or less represented thin shelled bivalvs with pellets and frequent presence of cherts and with poor, undiversified assemblage of organic remains — Pl. II, Fig. 3, 4), represented are mostly bioclastic and more rarely biogenic limestone varietes (Pl. IV, Fig. 3). Within category of bioclastic limestones biosparites entirely prevail.

Bioclasts spectrum, a very rich one, shows explicitly closeness to the reef biotop (mostly fragments of problematics, codiaceans, encrusting organisms and ?sponges). In contradiction to similar biosparites from the overlying Wetterstein Bioherm Limestones, the biosparites under consideration show an increased amount of echinoderm detritus as well as of tiny unidentified detritus ("flakes") and occassionally small intercalations or shreds of pelagic nature.

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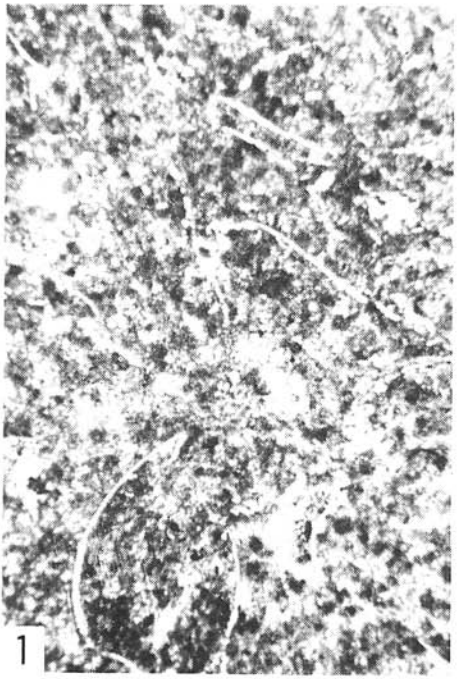
Plate II

Fig. 1. Recrystallized micrit with thin-shelled lamellibranchiates, The Reiflfing Limestones (Illyrian), Gombasek twisting road cut (Pl-II/3-A, 51-258). ×30. Fig. 2. Micrit with abundant fragments of thin-shelled lamellibranchiates, The Schreyeralm Limestone north of Silica village (SI-135, 51-711), ×14. Fig. 3. Irregular (nodular) micrit/biomicrit pattern in the "Pseudoreifling" Limestone NE from Štít at Plešivecká planina plateau (PP-1/16, 51-51), ×14. Fig. 4. Micrit/pellsparit laminar boundary in the transitional area between the "Pseudoreifling" and the ?Raming Limestone, Silická planina plateau, cut of Gombasek twisting road (Pl-II/5-C, 52-476), ×14.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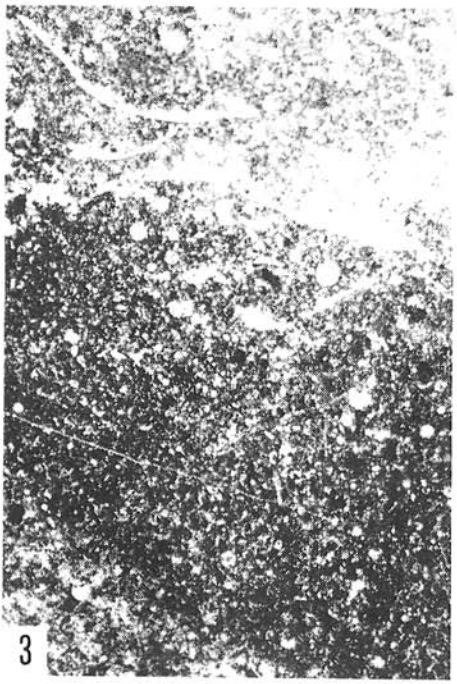
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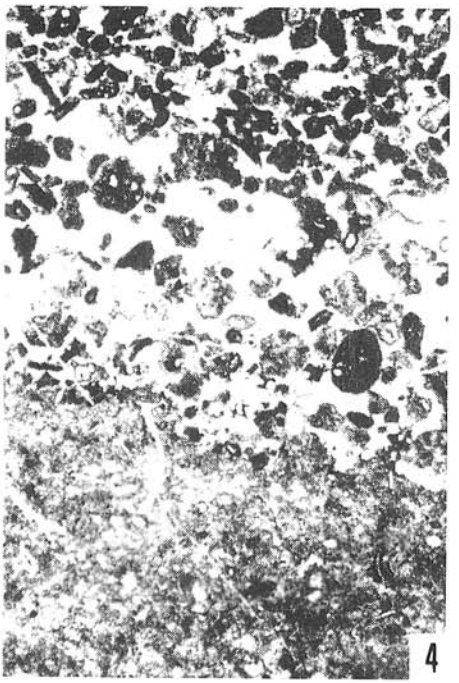
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Limestones of this character have been found between the "Pseudoreifling" and the Wetterstein Limestones chiefly at Silická planina karst plateau north of Silická Brezová village, where they reach thickness of 20—40 or even more metres.

III. D. *Other types of transitional facies*

From among other types of transitional facies can be mentioned untypical Schreyeralm limestones mostly of pellsparitic type (Pl. IV, Fig. 1), with frequent bioclastic intercalations of the Steinalm — Wetterstein limestones nature (Pl. IV, Fig. 2), which occur in the lateral wedging out areas of the Schreyeralm Limestones (profiles Z-2 and Z-1). Untypical Schreyeralm Limestones from Plešivecká and Silická planina karst plateau were reported by J. Bystrický (1964, p. 53), too.

J. Bystrický (l. c.) besides that hinted the existence of other types of Middle Triassic limestones which according to their position and nature are of transitional character. This concerns chiefly of the light crinoidal limestones (Pl. I, Fig. 2), occuring at places in the uppermost parts of the Steinalm Limestones (where they underly immediately the Schreyeralm Limestones) and the light undistinctly bedded limestones with red cherts.

Transitional in nature are the light limestones with *Diplopora annulatissima* from Kečovo vicinity as well. They are interlayering with crinoidal limestones (J. Bystrický 1964, p. 139). The limestones contain besides that small lenses of reddish limestones containing ammonites (J. Bystrický in J. Bystrický et al. 1973, p. 36) and conodonts (B. Mock 1971).

IV. *Environment and paleogeographical setting reconstruction*

Often discussed, but still unsolved problem is that of bathymetry and of paleogeographical significance of alpine Triassic pelagic sediments. They are interpreted either as basin type sediments that originated in sedimentation areas deeper than adjacent bioherms, or they are regarded as horsts sediments in neighbouring reef areas with substantial subsidding (M. Sarnthein 1967, p. 122).

As P. Cros — P. Lagny (1972) have pointed out, pelagic facies do not posses an exact bathymetrical significance. They originated as heteropical equivalents of the reef facies only during periods of tectonic and volcanic stillness. In periods of tectonic activity sedimentological equilibrium was affected; pelagic facies, often with admixture of volcanic or detritic material used to get into superposition on reef complexes.

In Middle Triassic of the Slovak Karst Silica nappe a superposition of pelagic facies on the bioherm one was not observed anywhere, on the other hand, their superposition

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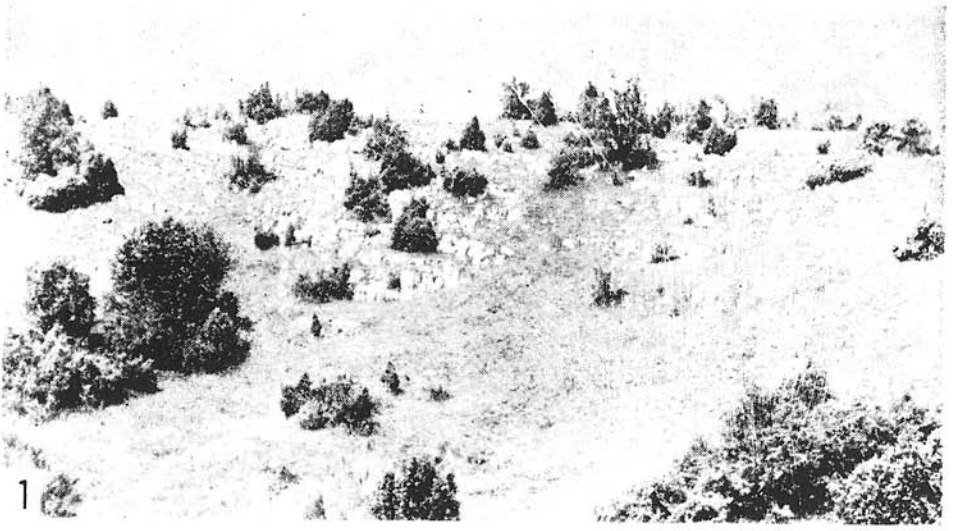
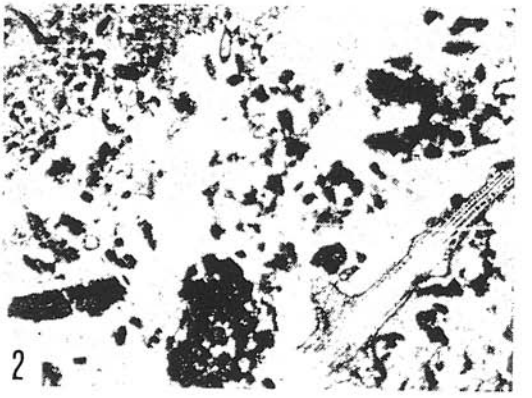
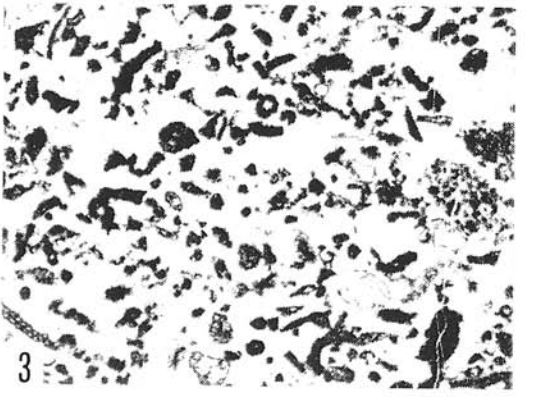
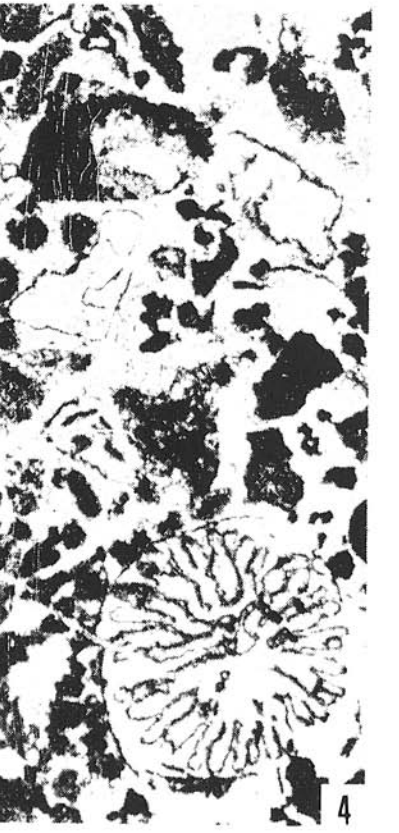
Plate III

Fig. 1. The Wetterstein Bedded Limestones in the area south of Žabec hill at Silická planina plateau. Fig. 2. Bioclastic and brecciated texture of the Wetterstein Bedded Limestone. On the right hand side section of sea urchin spine. Gombasek twisting road cut, Silická planina plateau (Pl-II/6-A, 52-477), ×13. Fig. 3. Texture with "flakes" (a minute unidentifiing detritus composed of dark aphanitic mass) of the Wetterstein Bedded Limestones (Detto as Fig. 3). Fig. 4. Bioclastic texture with solenoporas, ?sponges, and other organic detritus. In lower part cross-section of a corallite from subclass Hexacoralla. The Wetterstein Bedded Limestone. Silická planina plateau, east of Zakázané hill (SI-45, 52-794), ×17.









on algal plains sediments is general (the Steinalm algal Limestones). Sedimentation of pelagic facies "started" with Illyrian (-excelsa zone: cf. B. M o c k 1971). In some areas their coming was abrupt (most frequently red nodular limestones with thin-shelled bivalvs coquinas and ammonites beds, with *Flexoptychites flexuosus*, *Ptychites acutus* etc.), in other areas transitional type sedimentation preceeded.

In the Slovak Karst Silica nappe (as well as in the Strážov, Jablonica, Veterník, Havranica and partly Choč nappes), Middle Triassic pelagic sedimentation is always followed by an bioherm, never by a lagoonal facies.

This fact coincides very well with facial scheme of E. O t t (1972) for Northern Calcareous Alps and for Middle Triassic sediments of Chios-Karaburun Isles. Similar "reef transgression" over pelagic sediments described also P. C r o s — Ph. L a g n y (1972) in Southern Alps.

Mode of pelagic and reef sediments relations in the Slovak Karst studied area indicates slight bathymetric differences. Presence of above characterised transitional facies connecting the two facial groups is characteristic. Their lithologic character, as well as nature of organic remnants give evidence in a favour of not very deep milieu during their origination. E. O t t (1972, p. 255) supposes in similar situation the depth of pelagic sedimentation about 100 m. The depth of transitional facies sedimentation had to be somewhat lesser.

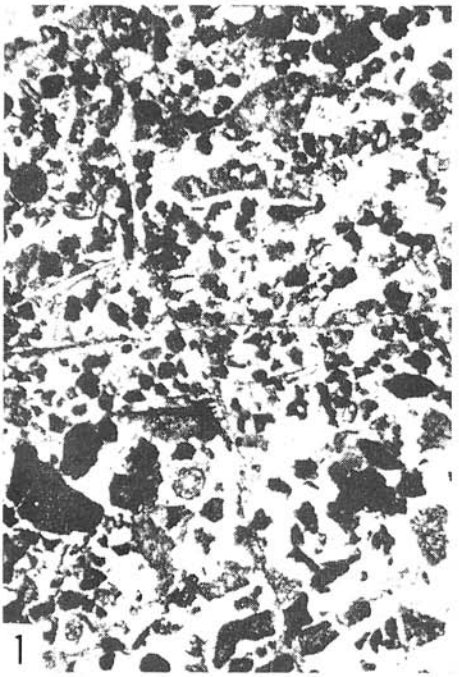
Supposing the reef sediments deposition in 0—10 m below sea level, then from a bathymetric difference of 90—100 m. between profiles R-1/Z-1 (distance 4 km) and R-1/G-1 (distance 7 km) profiles respectively, the dip of the sea bottom results to be about 1°.

Lateral changes and pelagic facies transitions into reef ones are expressive in the Slovak Karst Silica nappe chiefly in the E-W direction. It seems that this fact is not accidental, because similar situation is also in other Gemeric and Hronic nappes. A rough palinspastic reconstruction of their sedimentation area reveals 3 marked "channels" with pelagic sedimentation oriented to N—S (or NW—SE). Their sediments today can be found in the Choč nappe of the Lower Tatra Mts., in the Choč and Strážov nappes of the Strážovská hornatina Mts. and finally in the Choč, Veterník, Havranica and Jablonica nappes in the Malé Karpaty Mts.

These "channels" were separated by lagoonal — ?reef plains, from which have originated the Šturec nappe of the Veľká Fatra and Inovec Mts. and Nedzov nappe of Nedzov Mts.

Plate IV

Fig. 1. Pellet "flake" texture with abundant crinoids and lamellibranchs fragments. The untypical Schreyeralm Limestone, Silická planina plateau, east of Zakázané hill (profile Z-2, SI-136, 51-712). ×12. Fig. 2. Solenoporas-pellet biosparit as an intercalation in the untypical Schreyeralm Limestones in Z-2 profile at Silická planina plateau (SI-138, 52-714). ×12. Fig. 3. The ?Raming Bioherm Limestone with *Tubiphytes obscurus*, with encrusting organisms and with tiny unidentifying organic detritus. Silická planina plateau, NW of Silická Brezová (PI.-688, 51-241). ×14. Fig. 4. Biosparit with "flakes" and sponges (*Follicatena cautica* O t t — the upper right hand corner and with *Colospongia catenulata* O t t — the upper left and lower right hand corners, determined by E. J a b l o n s k ý). The Wetterstein Bioherm Limestone, Silická planina plateau east of Zakázané hill (SI-48, 52-797). ×12.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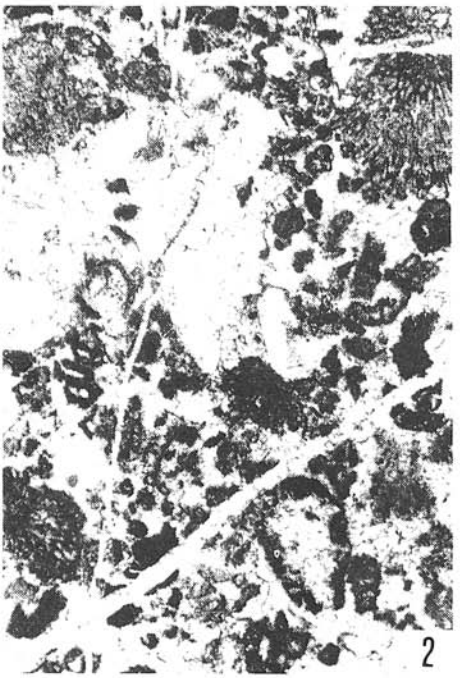
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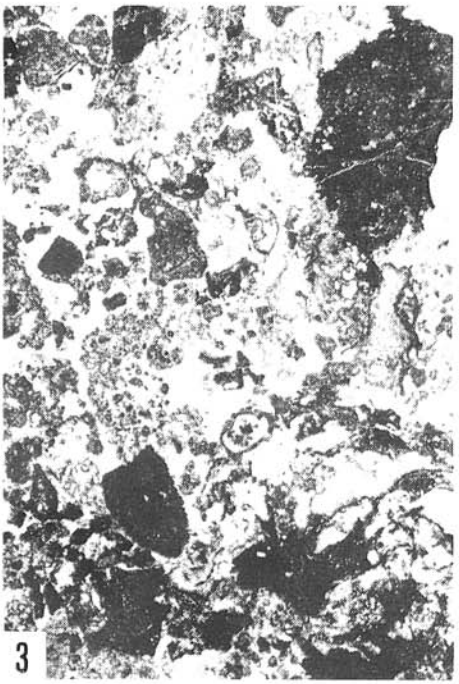
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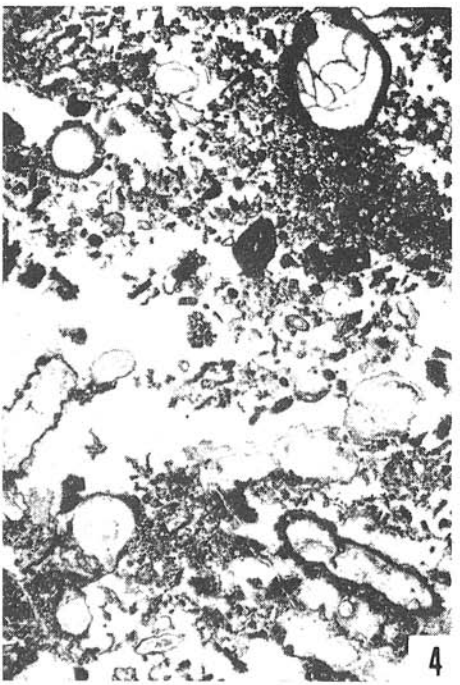
4

Table I.

Localities / Brachiopods	1	2	3	4
Piarorhynchia aff. trinodosi (Bittn., 1890)	x			
„Rhynchonella" mentzeli (Buch., 1843)	cf.		x	
Decurtella (?) illyrica (Bittn., 1903)	cf.		x	x[b]
Coenothyris vulgaris (Schloth., 1820)	cf.		x	
Punctospirella fragilis (Schloth., 1814)	x		x	
Mentzelia mentzeli (Dunk., 1851)	x	x	x	x[a]
Aulacothyris sp.	x		x	
Koeveskalinna koeveskalyensis (Stúr, 1865)	cf.	x	x	x[b]
Pexidella mormorea (Bittn., 1890)			x	x[b]
Norella (?) sp. n.			x	
Spiriferina aff. manca Bittn., 1890			x	
Tetractinella aff. hexagonalis (Bittn., 1890)			x	
„Terebratula" aff. julica Bittn., 1890			x	
Tetractinella trigonella (Schloth., 1820)			x	x[ab]
Spiriferina avarica Bittn., 1890			x	
Spiriferina aff. avarica Bittn., 1890			x	
„Spiriferina" cf. pia Bittn., 1890				x[ab]
Volirhynchia vivida (Bittn., 1890)				x[b]

Brachiopods occurrences in the Pelsonian-Illyrian dark-grey micritic and crinoidal limestones of the Slovak Karst Silica nappe. 1 — Silická planina plateau, 1.5 km eastward from Gombasek (Pl-116, coll. J. Mello, V. Viskup, L. Dugovič, determined by M. Siblík). 2 — Silická planina plateau, 2 km eastward from Gombasek (Pl-382, coll. J. Mello, partly determined by J. Pevný supplemented by M. Siblík). 3 — Horný vrch Karst plateau SW from Bukový vrch (JA — 409, coll. V. Viskup, determined by M. Siblík). 4 — Plešivecká planina plateau, 250 m SW from c. p. 717 (PP-172, coll. J. Mello 1967, M. Siblík 1970, determined by M. Siblík: a — from original collection of J. Mello (M. Siblík 1972, p. 179), b — from M. Siblík's collection).

V. *Conclusions*

In transitional areas between pelagic and reef sediments of the alpine Middle Triassic a number of authors (O. Kraus — P. Schmidt — Thome 1967, H. Miller 1971, E. Ott 1972, M. Sarnthein 1967 a. o.) have ascertained some regularities which are valid in a wide regional scale.

It is above all the superposition and successive expansion of bioherm facies in the direction of (and on expense of) basin type (pelagic) sediments and then existence of such transitional facies which provide evidence for slight bathymetrical differences between reef and pelagic sediments.

These regularities operated in West Carpathians sedimentation area as well (Generic and Hronic sedimentation zones). Middle Triassic pelagic facies are here, however, in contradiction to the Northern Calcareous Alps, for instance, almost exclusively carbonates (the Reifling, Schreyeralm, and "Pseudoreifling" Limestones); transitional

facies nature is therefore specific as well. Their characterization from the Slovak Karst Silica nappe was given above.

Transitional facies are here present not only in the overlier and in lateral transition areas of pelagic sediments, but at places in underlier as well (Fig. 3). An increased amount of echinoderm detritus and crinoidal-coquinal lenses at places are their remarkable features.

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