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DASYCLADACEAE OF THE UPPER TRIASSIC OF THE STRATENSKÁ HORNATINA MOUNTAINS (THE WEST CARPATHIANS).

JÁN BYSTRICKÝ*

(Pl. I—VIII)

Abstract: The article describes dasycladaceae of the Upper Triassic reef complex: *Macroporella spectabilis* Bystr., *Macroporella sturi* Bystr., *Physoporella heraki* Bystr. var *heraki*, *Uragiella supratriasica* Bystr., *Teutloporella* sp., *Heteroporella carpatica* Bystr., *Heteroporella zankli* (Ott) Ott. Besides these species, at present already known from the Western Carpathians, ? *Petrascula aff. illyrica* Sokač et Nikler,? *Petrascula stratenica* sp. nov. and ? *Palaeodasycladus* sp. are described. A new combination of the name *Andrusoporella duplicata* (Pia) Bystrický comb. nov. is introduced.

Резюме: В статье описывается группа дасикладаций верхнетриасового рифового комплекса: *Macroporella spectabilis* Bystr., *Macroporella sturi* Bystr., *Physoporella heraki* Bystr. var. *heraki*, *Uragiella supratriasica* Bystr., *Teutloporella* sp., *Heteroporella carpatica* Bystr., *H. zankli* (Ott) Ott. Кроме этих известных до сих пор в Западных Карпатах видов описываются *Petrasculla aff. illyrica* Sokač et Nikler, ? *Petrascula stratenica* sp. nov. и? *Palaeodasycladus* sp. Приводится также новая комбинация названия *Andrusoporella duplicata (Pia)* Bystr. comb. nov.

Introduction

Reef and pelagic sediments are represented in the Upper Triassic of the Stratenská hornatina mountains. Light-coloured massive limestones of the Upper Carnian (the Tisovec limestone), light-coloured, even dark in their basal parts, massive limestones of the Norian (the Furmanec limestone) and the Dachstein limestone with megalodonts belong to the former. Dark, bedded limestones with cherts containing beds of crinoid limestones after conodonts belonging to the Upper Carnian (they have not been named yet), then dark bedded limestones containing cherts in some parts (? the Aflenz limestones) of the Norian rank to the latter. The typical red bedded limestones — the Hallstatt limestones — are represented only sporadically, on the basis of the dark bedded limestones of the Norian (the profile of the P. 1051.5, SE from the meadow of Belá). Palaeontological content of the above mentioned lithostratigraphical units is little known at present.

A great amount of the data published which supported stratigraphical attribution of these lithostratigraphical units (M. Maheľ, 1957, 1967, 1968) has been proved wrong in the course of our research either owing to a wrong determination or to a wrong location of fossils (J. Bystrický, 1973, 1978).

In this article, I pay attention to the dasycladaceae of the Upper Triassic reef complex in the most western part of the above mountains, in the places of: a) Kopa-Červený Štros, b) Belá-Dešťanky, c) Dolka-Remiaška, d) Vyšná Zá-

* Dr. J. Bystrický, DrSc., Geological institute of the Slovak academy of sciences, 88 625 Bratislava, Dúbravská cesta

hrada. For a more complex review, I also mention the locality of "Krajcová" of the Muráň plateau with abundant representation of *Heteroporella* as well as the locality of Geravy situated in the central part of the Stratenská hornatina mountains. The Dasycladaceae described further, are only a part of the material collected up to the present time. Many of them, especially new, up to now undescribed species of the Triassic are very often represented only by fragments or by rare sections after which it is not possible either to define them or to correlate them with already described genera and species. Foraminifera occurring in thin-sections together with the dasycladaceae will be published in a different article (O. Jendrejáková, in press).

Macroporella spectabilis Bystrický, 1962
Pl. I, Fig. 1–4, Pl. II, Fig. 1–2, 4.

1962 *Macroporella spectabilis* sp. nov. – J. Bystrický, New Dasycladaceae of the Triassic in the Slovak Karst, p. 227, Pl. 3, Fig. 1–3.

Description: The material available so far only from two localities almost completely corresponds with that I described from the Slovak Karst. The thallus is cylindrical, of a distinguished club-shape in the apical part. Phloiophorous branches are oblique to the longitudinal axis and round in their section. Distal ends of the branches can be observed only in few sections; they are vertically pressed, of an elliptical section (Pl. II, Fig. 2). The arrangement of the branches is euspondylic.

In two specimens (out of the total number of 26), a more or less preserved calcareous ring formed by closely each other adhering round bodies occurs (Pl. II, Fig. 4) between the inner wall of the calcareous thallus and the central cavity, but it cannot be found out whether this is a case of cysts or widened and rounded basal ends of the branches.

Occurence: The locality of Remiaška (thin-sections No. 3130, 3133, 3136, 3154, 3155) – the highest part of the Tisovec limestone right in the underlier of dark massive limestones (the Furmanec limestone) with *Heteroporella carpatica* Bystr. The locality of Kopa (thin-sections No. 5427, 5451, 5495–5497, 5552, 5977, 5978) – light grey massive limestones (the Furmanec limestone?) right in the overlier of the Furmanec limestone with *?Petrascula stratenica* sp. nov. and others unidentifiable dasycladaceae.

Measurements of the studied material (in mm):

Locality	D	d	d %D	p_p	p_d
Remiaška	1.555–3.497	1.083–1.902	48.9–65.4	0.033–0.077	0.102–0.180
Kopa	1.561–3.397	0.930–1.977	52.2–67.5	0.033–0.061	0.031–0.183

Explanations to the plates:
Pl. I. *Macroporella spectabilis* Bystrický.
Fig. 1, the locality of Remiaška, thin-sec. No. 3136; Fig. 2, the locality of Kopa, thin-sec. No. 5552; Fig. 3, the locality of Remiaška, thin-sec. No. 3130; Fig. 4, the locality of Remiaška, thin-sec. No. 3133. For measurements see p. 324


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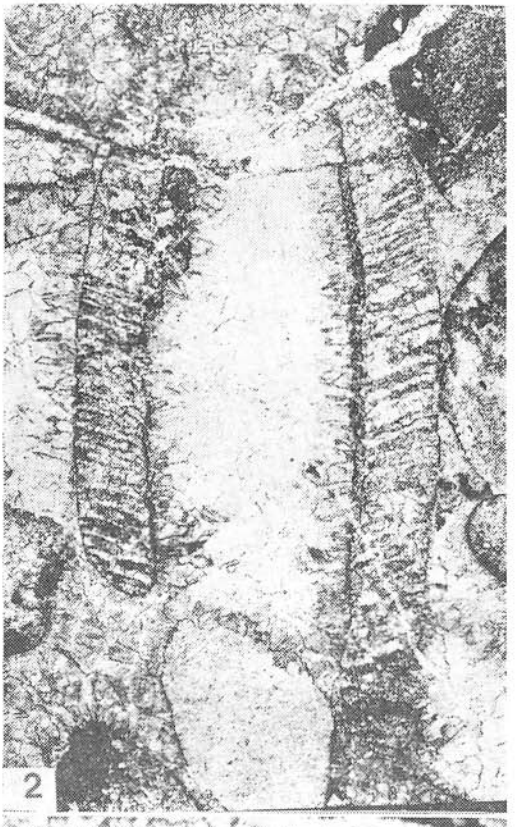
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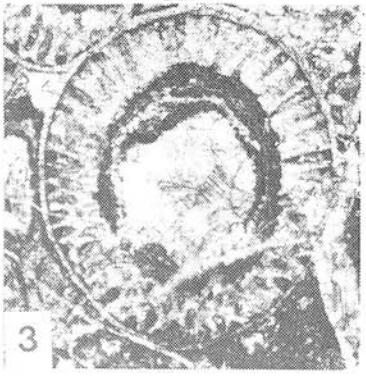
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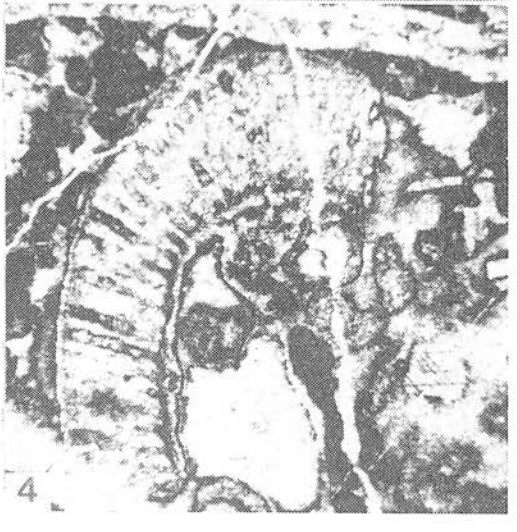
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Measurements of the illustrated specimens (in mm):

thin-sec.	D	d	d %D	p_p	p_d	
3136	2.319	1.388	59.88	0.066	0.155	Pl. I, Fig. 1
5552	3.397	1.944	57.23	0.058	0.150	Pl. I, Fig. 2
3130	2.933	1.788	60.98	0.033	0.138	Pl. I, Fig. 3
3133				0.072	0.105	Pl. I, Fig. 4
5978	2.765	1.388	50.20		0.152	Pl. II, Fig. 1
5451	2.688			0.050	0.144	Pl. II, Fig. 2
5552	2.991	1.713	57.28	0.044	0.138	Pl. II, Fig. 4

Macroporella sturi Bystrický, 1967
Pl. III, Fig. 4, 5

1967 *Macroporella (Pianella) sturi* sp. nov. – J. Bystrický, Die obertradischen Dasycladazeen der Westkarpaten, p. 289, Pl. 2, Fig. 4, Pl. 3, Fig. 1–3, Pl. 4, Fig. 1–3.

Description: This species, although represented only by small, rare fragments, can be easily identified after the phloiophorous type of its branches and their independent calcareous envelope. Independent calcification of the branches can be clearly distinguished after the presence of narrow grooves filled by a dark pigment which surrounding individual branches extend from the outher surface of the thallus to the axial stem.

Occurence: A cut of the field road leading from the saddle Priehyba to the meadows of Vernar. A bed of dark grey crinoid limestones in the sequence of dark bedded limestones with sporadic cherts. After the conodonts gained from the same bed (*Gondolella polygnathiformis* Budurov et Stefanov, *Enantiognathus ziegleri* (Diebel), *Hindeodella suevica* (Tatge) – determ. by L. Krystyn (it is the Tuvalian 1–2.).

Physoporella heraki Bystrický, 1967 var *heraki*
Pl. III, Fig. 6

1967 *Physoporella heraki* sp. nov. – J. Bystrický, Die obertriadischen Dasycladazeen der Westkarpaten, p. 295, Pl. 9, Fig. 1–3, Pl. 10, Fig. 1–4, Pl. 11, Fig. 3–4, Pl. 14, Fig. 5.

Pl. II.

Fig. 1, 2, 4: *Macroporella spectabilis* Bystr. Fig. 1, the locality of Kopa, thin-sec. No. 5978; Fig. 2, the locality of Kopa, thin-sec. No. 5451; Fig. 4, the locality of Kopa, thin-sec. No. 5552. For measurements see p. 324

Fig. 3: *Teutloporella* sp., the locality of Kopa, thin-sec. No. 5964, magnif. about 15.5x; Fig. 5: *Uragiella supratriasica* Bystr., the locality of Kopa, thin-sec. No. 5429, magnif. 20.


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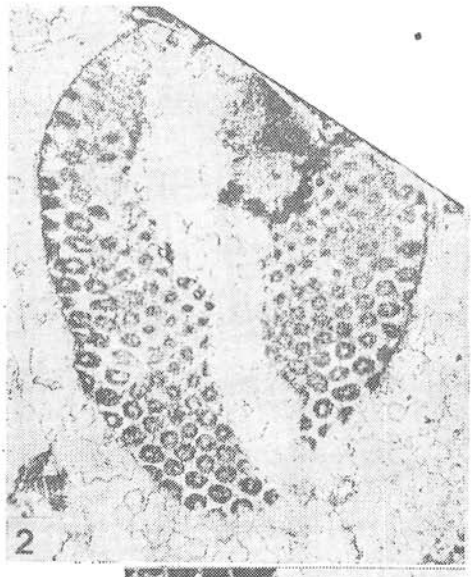
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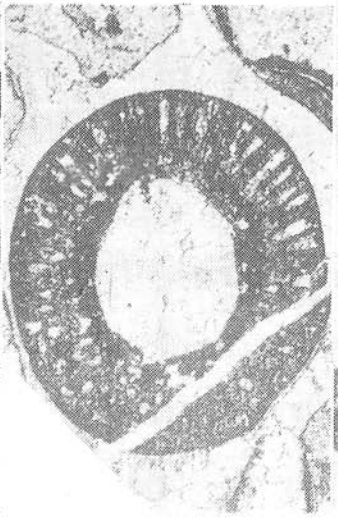

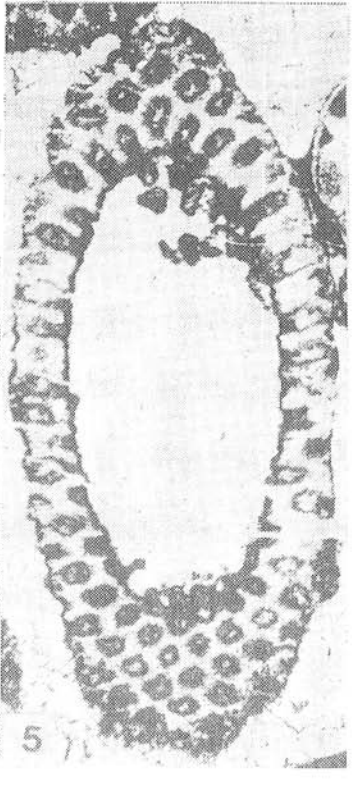
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Description: Fragments of a cylindrical thallus with characteristical piriferous branches arranged into thick, closely above each other placed whorls.
Occurence: The locality of Kopa (thin-sec. No. 5531) – the Tisovec limestone. Together with *Andrusoporella duplicata* (P i a) B y s t r., *Uragiella supratriasica* B y s t r., *Thaumatoporella parvovesiculiferna* (R a i n e r i). The locality of Dešťanky, in a scree of the Tisovec limestone in the valley at the western end of the crest Dešťanky. Together with *Andrusoporella duplicata* (P i a) B y s t r. and fragments of *Teutloporella herculea* (S t o p p.) P i a. The illustrated specimen comes from the same sample and locality as the above mentioned *Macroporella sturi* B y s t r.

Uragiella supratriasica B y s t r i c k ý, 1967
Pl. II, Fig. 5

1967 *Uragiella supratriasica* sp. nov. – J. B y s t r i c k ý, Die obertriadischen Dasycladazeen der Westkarpaten, p. 299, Pl. 12, Fig. 1–3, Pl. 13, Fig. 1–4, Pl. 14, Fig. 1–4.

Description: A cylindrical to slightly club-shaped thallus with branches in one-rowed whorls. The branches are the thickest in the middle part of their length. They differ from the specimens I described from the Slovak Karst only by a smaller thickness of their branches and more frequent occurence of specimens with branches open on their outer side. Such, not quite typical specimens also occurred in the material of the Slovak Karst.
Occurence: The locality of Kopa, a scree of the Tisovec limestone in the valley NW from the P.1073.5, about 300 m from its falling into the river Hnilec. Thin-sec. No. 5428, 5531. Together with *Andrusoporella duplicata* (P i a) B y s t r.

Measurements of the studied material (in mm):

D	d	d %D	$p_{max.}$	h
1.319–2.452	0.788–1.472	45.0–78.8	0.116–0.305	0.122–0.155

Teutloporella sp.
Pl. II, Fig. 3

1967 *Teutloporella* sp. – J. B y s t r i c k ý, Die obertriadischen Dasycladazeen der Westkarpaten, p. 306, Pl. 1. Fig. 1–6.

Pl. III.
Fig. 1–3: *Andrusoporella duplicata* (P i a) B y s t r. Fig. 1, the locality of Kopa, thin-sec. No. 5428, magnif. about 24.6x, Fig. 2: the locality of Vyšná Záhrada, thin-sec. No. 5706, magnif. 14.5x; Fig. 3, the locality of Kopa, thin-sec. No. 5440, magnif. about 19.5x.
Fig. 4–5: *Macroporella sturi* B y s t r. Fig. 4, thin-sec. No. 4248, magnif. 24, Fig. 5, thin-sec. No. 4248, magnif. about 22x.
Fig. 6: *Physoporella heraki* B y s t r. var. *heraki*, thin-sec. No. 4249, magnif. about 14.5x. Fig. 4–6: the locality of Vernar meadows.


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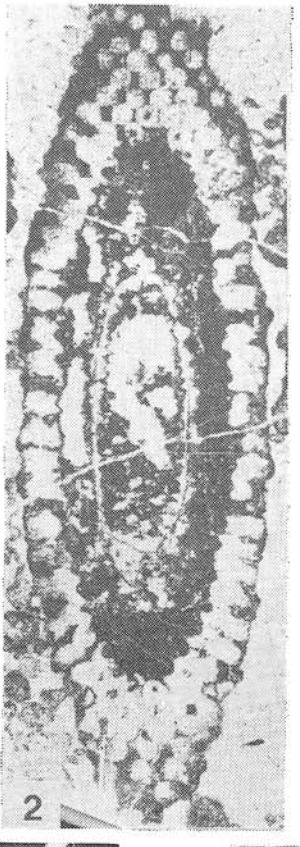
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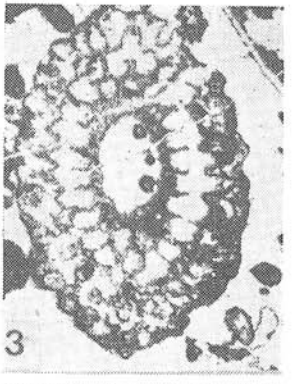
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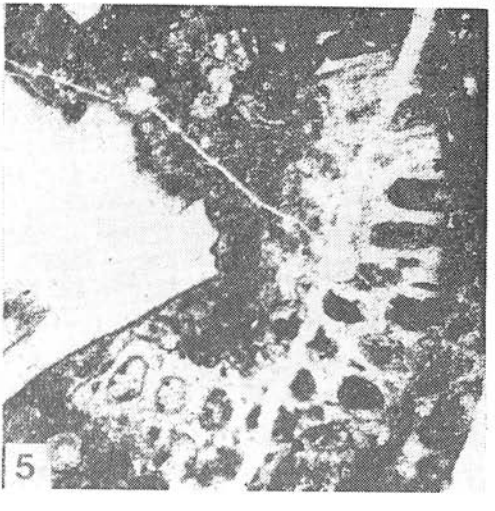
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Description: A simple cylindrical thallus with trichoforous, aspondyllically arranged branches. The branches are oblique, tappering to their outer side very gradually, so that their thickness is the same to about $^2/_3$ of their length. They correspond by the shape of their thallus and branches with the specimens I described from the Furmanec limestone of the Muráň plateau as *Teutloporella* sp. To what extend they can be distinguished from *Teutloporella herculea* (S t o p p.) P i a, will be possible to decide after a biometrical correlation.
Occurence: The locality of Kopa, thin-sec. No. 5930, 5931, 5967–5972, 5950. Light-coloured massive limestones (the Furmanec limestone). Together with ? Petrascula stratenica sp. nov. – the Norian.

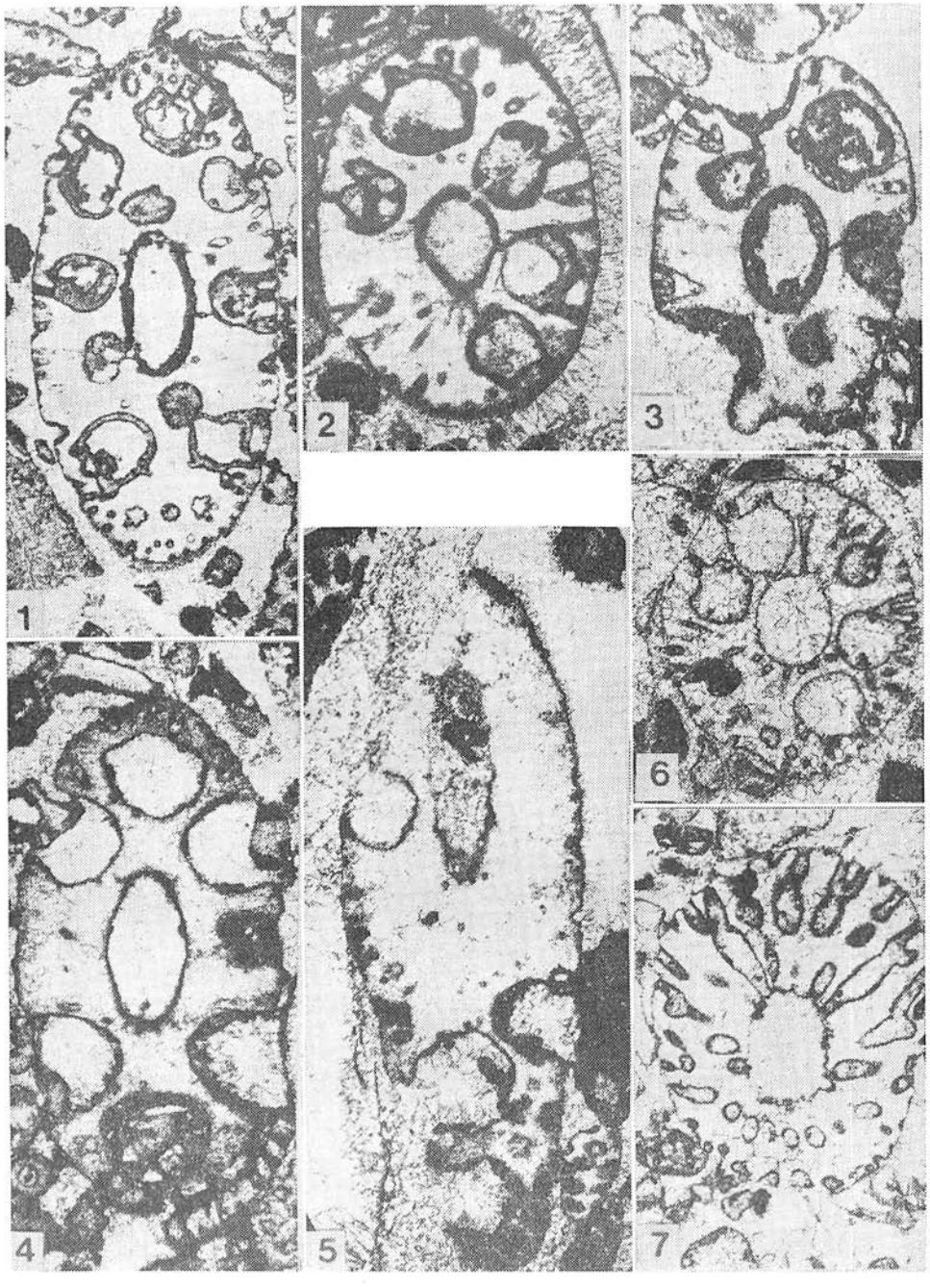
Measurements of the studied material (in mm):

D	d	d %D	p_p
2.305–3.333	0.994–1.666	38.6–50.0	0.102–0.219

Andrusoporella duplicata (P i a) B y s t r i c k ý comb. nov.
Pl. III, Fig. 1–3

1962 *Andrusoporella fusani* sp. nov. – J. B y s t r i c k ý, New Dasycladaceae of the Triassic in the Slovak Karst, p. 231, 237, Pl. 3, Fig. 5–8, Pl. 4, Fig. 1.
Description: On the whole, the specimens by the shape of, their branches fully coresspond with those coming from the Tisovec limestone of the Slovak Karst as well as of the Muráň plateau. Specimens with vesiculiferous and also with phloiophorous endings of the distal parts of their branches are represented, too. Some of them are of considerably thick proximal parts of their branches (Pl. III, Fig. 1), some are of branches with a more or less independent envelope. Their distal parts are usually separated from the envelope of neighboring branches by a fine groove filled with a dark pigment (Pl. III, Fig. 2).
Remark: The nomenclatoric controversy about the correct name of the species (E. O t t, 1968) was solved by P. C. S i l v a (Berkeley, Department of Botany) who in his letter of 20th March, 1977 kindly wrote me as follows:
"As I wrote, if O t t provided a description and illustration and if his dissertation qualifies as effective publication in accordance with the provision of Article 29 of the International Code of Botanical Nomenclature, then the genus must be cited *Poikiloporella* P i a ex E. O t t, 1963. However, if, in your opinion, *Andrusoporella* B y s t r i c k ý, 1962 (the type of its genus) is conspecific with *Oligoporella duplicata* P i a, 1920 (the type of *Poikiloporella* P i a ex

Pl. IV.
Fig. 1–6: *Heteroporella zankli* (O t t) O t t. Fig. 1: thin-sec. No. 5142; Fig. 2: thin-sec. No. 3220; Fig. 3: thin-sec. No. 3212; Fig. 4: thin-sec. No. 3219; Fig. 5: thin-sec. No. 5143; Fig. thin-sec. No. 5576. For measurements see p. 338
Fig. 7: ? *Petrascula aff. illyrica* S o k a č e t N i k l e r. For measurements see p. 333
All thin-sections from the locality of Krajcova, the Muráň plateau.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E. Ott, 1963), it will be seen that the earlier of the two competing generic names would be *Andrusoporella*, while the earlier of the two competing specific epithets would be *duplicata*, so that you should make the new combination *Andrusoporella duplicata* (Pia) Bystrický."

Also in this place, I have to thank to P. C. Silva for this kind solution of the nomenclatoric problem and the letter with the results.

Occurence: The locality of Kopa, a scree of the Tisovec limestone in the valley NW from the P. 1073.5 (thin.-sec. No. 5428, 5531, 5438–5440, 5459): together with *Uragiella supratriasica* Bystr. The locality of Kopa, the Tisovec limestone in a cut of the highway Dobšinská Ľadová jaskyňa – Pusté Pole at the western end of the supporting wall (thin-sec. No. 5467). The locality of Kopa, walls of the Tisovec limestone, South of the P. 1073.5 (thin-sec. No. 5458.) The locality of the meadow Belá and a cut of a game footpath on the SW slope of the P. 1051.5 (thin-sec. No. 5566, 5567). The locality of Dešťanky, a screce of the Tisovec limestone in the valley at the western end of the crest Dešťanky – together with *Physoporella heraki* Bystr. var. *heraki*, *Teutloporella herculea* (Stopp) Pia. The locality of Vyšná Záhrada, the Tisovec limestone, SE from the saddle between the P. 1187.2 and the P. 1197.28 (thin-sec. No 5706).

? *Petrascula stratenica* sp. nov.
Pl. VII, Fig. 1–5, Pl. VIII, Fig. 1–8

Derivation of name: After the name of the Stratenská hornatina.

Type locality and stratotype: NE from the hill Kopa (the P. 1127.2), North from the eastern part of the meadow in the saddle between the P. 1127.2 and the P. 1132.3. Light grey to light-coloured massive limestones (the Furmanec limestone), the Norian.

Holotype: The oblique section through the specimen illustrated in the Pl. VII, Fig. 1. Thin-section No. 5966.

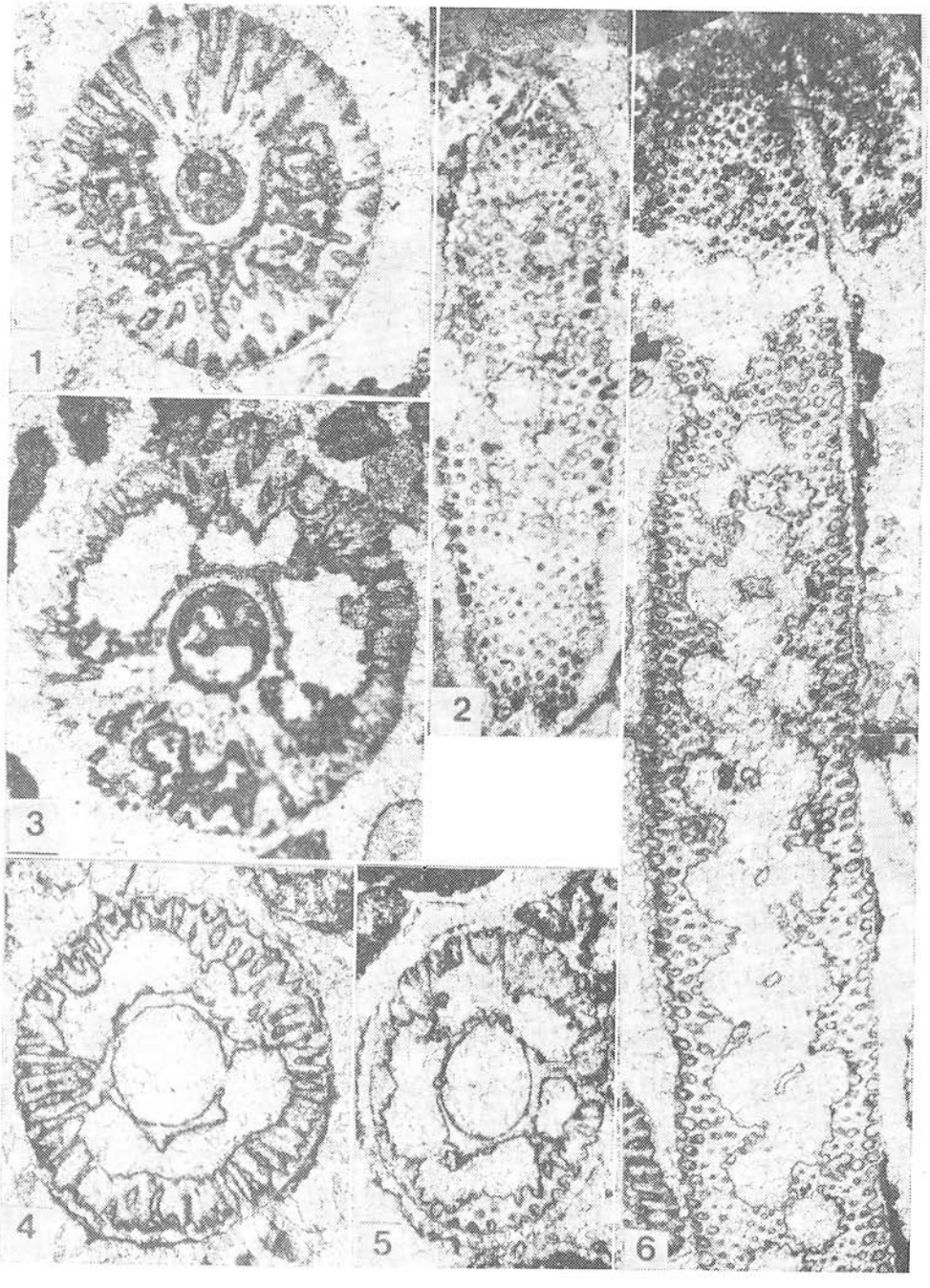
Material: 60 different sections in thin-sections No. 5680, 5681, 5930, 5931, 5949, 5950, 5964–5976. The whole of the thin-section material is deposited in the collection of the Geological Institute of the Slovak Academy of Science, Bratislava (collections: J. Bystrický).

Diagnosis: A cylindrical thallus without any annulation. Branches devided into primary and secondary ones are slightly oblique and arranged in thick whorls (w = 18–20). The whorls of the branches are closely above each other. The primary branches are bag-shaped, their thickness is almost equal all along their length. The secondary branches are short, in clusters (4–5) and open on their outer side. Ratio of the primary branch length to the secondary branch length is in the average 1 : 0.24.

Pl. V.

Fig. 1, 3: *Heteroporella zankli* (Ott) Ott, the locality of Geravy. Fig. 1: thin-sec. No. 5685, Fig. 3: thin-sec. No. 5684. For measurements see p. 338

Fig. 2, 4–6: *Heteroporella carpatica* Bystr. Fig. 2: the locality of Dolka, the quarry, thin-sec. No. 5043; Fig. 4: the locality of Dolka, the quarry, thin-sec. No. 4650; Fig. 5: the locality of Dolka, the quarry, thin-sec. No. 5043; Fig. 6: the locality Dolka, the quarry, thin-sec. No. 4650. For measurements see p. 336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Description: The whole shape of the thallus is very simple. It is a calcareous cylindre of an almost smooth outer surface and a completely smooth inner one, without any annulation. The outer diametre (D) is 1.300–2.311 mm (the mean 1.784), the inner diametre (d) is 0.266–0.555 mm (the mean 4.451). The primary branches communicate with the axial stem by means of a thin stalk (diametre 0.050 mm). They are considerably thick right behind it and this thickness is the same all along their length. They thicken sligthly towards their outer side only in few cases. The maximum thickness of the primary branches (p_1m) varies between 0.177–0.297 mm (the mean 0.233 mm) and their length, variable in the specimen itself, (p_1l) ranges from 0.352 to 0.833 mm (the mean 0.538). The basal part of the primary branches is of a round section, the distal one, due to a strong compression in the whorls, is of an irregular polygonal or rectangular section (Pl. VIII, Fig. 4, 7). A cluster (4–5) of thin and short secondary branches slightly diverging to the outer side stretch es from the distal ends of the primary branches. The diametre of the secondary branches (p_2m) varies in the range of 0.055–0.133 mm (the mean 0.090 mm) and the length in the range of 0.072–0.222 mm (the mean 0.127 mm). The secondary branches get out of the thallus and that is why the shape of their distal ends is unknown and it cannot be inferred they terminated by very thin branches of the third order.

Reproductive organs – cysts – of the primary branches cannot be safely identified in the studied material although round bodies (of the diametre 0.030–0.090 mm) resembling cysts occur in the primary branches of some specimens (Pl. VIII, Fig. 1).

Comparison: These specimens can be best compared with the species *Petrascula heraki* Sokač et Nikler 1969 by the shape of their thallus, the shape and arrangement of their primary and secondary branches. Our material differs from the species not only by smaller measurements, but also by a different ratio of the primary branches length to the length of the secondary branches. Its attribution to the genus *Petrascula* also remains unclear at present.

Occurence: Besides the type locality, it occurs also in the Furmanec limestone of the hill Kopa (the P. 1127,2) (thin-sec. No. 5454, 5493) and in the dark Furmanec limestone of the western slope foot of Remiaška (above the pioneer camp huts) (thin-sec. No. 3664, 3567).

	Petrascula heraki	*?Petrascula stratenica* sp. nov.	
D	1.85–3.33 mm	1.300–2.311 mm	(the mean 1.784 mm)
d	0.37–0.55 mm	0.266–0.555 mm	(the mean 0.451 mm)
d %D	–	16.8–32.3	
h	0.30–0.52 mm		
w	18 – 20	18–20?	
b	5 – 6	4 – 5	
p_1m		0.177–0.297 mm	(the mean 0.233 mm)
p_1l	0.33–0.67 mm	0.352–0.833 mm	(the mean 0.538 mm)
p_2m	–	0.055–0.133 mm	(the mean 0.090 mm)
p_2l	0.29–0.44	0.072–0.222 mm	(the mean 0.126 mm)
P_1l : p_2l	1:0.8, or 1:0.6	1:0.20 or 1:0.26 the mean 1:0.239	

Measurements of the illustrated specimens (in mm):

th. s. No.	D	d	d %D	primary br.		secondary br.		
				p_1m	p_1l	p_2m	p_2l	p
5966	1.944	0.411	21.9	0.227	0.494—0.597	0.105	0.150	Pl. VII, F. 1
5630	1.944	0.388	20.0	0.194		0.072		VII, F. 2a
	1.319	0.388	29.4	0.161		0.080		VII, F. 2b
5968	1.730	0.530	30.6	0.258	0.569—0.700	0.077	0.122—0.138	VII, F. 3
	2.272	0.555	24.4	0.277	0.772	0.133	0.111	VII, F. 4
5930	2.033	0.405	19.9	0.277	0.630	0.116	0.155	VII, F. 5
5975	2.047	0.555	27.1	0.255	0.644	0.097	0.147	VIII, F. 1
5971	2.311	0.508	21.9	0.272	0.755	0.105	0.125	VIII, F. 2
5949	1.666	0.461	27.6	0.230	0.458—0.541	0.069	0.119	VIII, F. 3
5969	1.736	0.347	20.0	0.244	0.555	0.127	0.108	VIII, F. 6

?Petrascula aff. illyrica Sokaš et Nikler, 1969
Pl. IV, Fig. 7

1969 *Petrascula illyrica* Sokač et Nikler – Sokač, B. – Nikler, L., On the species of the genus *Petrascula* from the Liassic of Velebit, p. 111, Pl. IV, Fig. 1–4, Pl. V, Fig. 1–5, Pl. VI, Fig. 1–2

Description: Together with *Heteroporella zankli* (Ott) Ott, an oblique section through one specimen occurs in our material, the shape of whose thallus as well as the shape and arrangement of whose branches resemble the species *Petrascula illyrica* Sokač et Nikler the most. Its primary branches are club-shaped, they are oblique to the axial stem and arranged in one-rowed whorls. Secondary branches stretch from the distal ends of the branches, but their number and arrangement cannot be observed in the section.

Occurence: The Muráň plateau, the Furmanec limestone (thin-sec. No. 5537). the Norian.

Measurements (in mm):

D = 1.597, d = 0.450, p_1p = 0.055, p_1m = 0.180, p_1l = 0.525, p_2m = 0.102, p_2l = 0.300 mm.

Heteroporella carpatica Bystrický, 1967
Pl. V, Fig. 2, 4–6, Pl. VI, Fig. 4

1967 *Heteroporella carpatica* sp. nov. – J. Bystrický, Die obertriadischen Dasycladazeen etc., p. 302, Pl. 15, Fig. 1–5, Pl. 16, Fig. 4.

Description: The specimens I dentify as the species *Heteroporella carpatica* Bystrický do not differ from the original material from the Furmanec limestone (the Norian) of the Muráň plateau. They possess a cylindrical thallus without any annulation. Fertile branches are divided into primary and secondary ones, the sterile branches are not ramified. Sporangia of the fertile branches are almost global, arranged in whorls so close to each other that they very often merge together into a common cavity. The whorls of the sporangia are also very closely above each other and because the arrangement of the

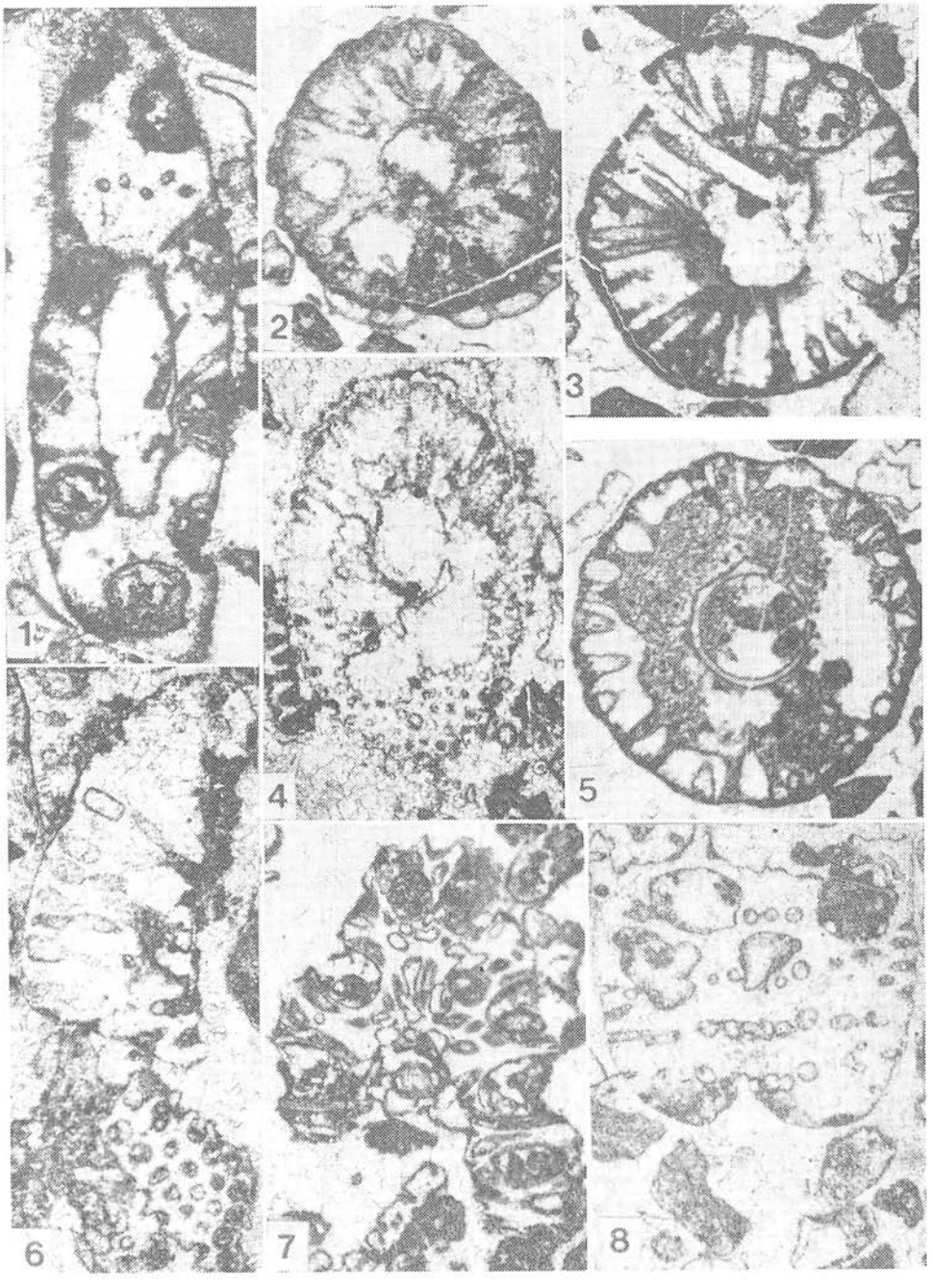
sporangia is alternate in them, the sporangia of one whorl fall partly into grooves between the sporangia of the neighboring whorls. It is obvious that with such an arrangement of the fertile branches there was only a very limited space left for the existence of the sterile branches. They occur only in those parts of the thallus where the sporangia are not completely pressed to each other. Their arrangement is, however, irregular and in most cases cannot be even observed, which is due to the insufficient calcification. Since the distal ends of the sterile branches do not differ in their shape and measurements from the secondary branches stretching from the sporangia, their identification remains, especially in the tangencial sections, problematic (in Pl. V, Fig. 6, sections through the distal ends of the branches arranged into distinguished whorls perpendicular to the axial stem probably correspond with them).

Remarks: E. Ott (1968, 1974) and E. Flügel (1975) take our species for identical with the species *Heteroporella zankli* (Ott) Ott. E. Ott (1968) supposes that the irregular arrangement of the sterile branches is the most improbable (despite that it is documented in illustrations). E. Flügel (l. c.), who proved the existence of the irregular arrangement of the sterile branches in the Western Carpathian material, does not ascribe any taxonomic importance to it and takes the species *Heteroporella carpatica* Bystr. for a "Western Carpathians form" of the species *Heteroporella zankli* (Ott) Ott. I suppose that the shape of the sterile branches as well as their arrangement are the signs after which the both species can be dipferentiated. Further, they differ also in their age. *Heteroporella carpatica* Bystr. appears in the Norian earlier than *Heteroporella zankli* (Ott) Ott. Problematic remain the specimens unramified sterile branches of which are gathered in clusters (Pl. VI, Fig. 2, 3) and the specimens unramified branches of which are arranged into two-rowed whorls and diverge in a way of lining the sporangia (Pl. VI, Fig. 1, 7). The lack of more suitable sections, unfortunately, does not allow to describe these in detail.

Occurence: The quarry at the settlement Dolka, the Furmanec limestone (the Norian), thin-sec. No. 4650, 5041, 5043. Together with *Aciculella nikleri* Bystr., *Aciculella sokaci* Bystr., *Gyroporella aff. vesiculifera* Gümb., *Griphoporella aff. curvata* (Gümb.) Pia, ? *Palaeodasycladus* sp. The locality of Remiaška – dark to black limestones (the Furmanec limestone), of Geravy – the dark Furmanec limestone.

Pl. VI.

Fig. 1: *Heteroporella* sp., the locality of Krajcova, the Muráň plateau, thin-sec. No. 3211, magnif 20, Fig. 2–3: *Heteroporella* sp., the locality of Geravy; Fig. 2: thin-sec. No. 3163, magnif 20. Fig. 3: thin-sec. No. 3162, magnif 20, Fig. 4–5: *Heteroporella carpatica* Bystr., Fig. 4, the locality of Dolka, the quarry, thin-sec. No. 5041, Fig. 5, the locality of Geravy, thin-sec. No. 3163; Fig. 6: ?*Palaeodasycladus* sp., the locality of Dolka, the quarry, thin-sec. No. 4654; Fig. 7: *Heteroporella* sp., the locality of Vyšná Záhrada, thin-sec. No. 5707, magnif 24. Fig. 8: *Heteroporella zankli* (Ott) Ott, the locality of Krajcova, the Muráň plateau, thin-sec. No. 5568.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Measurements of the illustrated species (in mm):

th-s. No.	D	d	d %D	ster.	fertile			h	
				p	spg	spg_2	p_2d		
4650	2.291	0.819	35.75	0.138		0.477	0.136		Pl. V, F. 4
5043	1.711	0.652	38.14		0.436	0.408	0.108		Pl. V, F. 5
5041	1.855	0.511	27.54	0.077	0.605		0.122		Pl. VI, F. 4
5043	—	—	—	0.102	—	—	—	0.369	Pl. V, F. 2
5041	—	—	—	0.144	—	—	—	0.555	Pl. V, F. 6

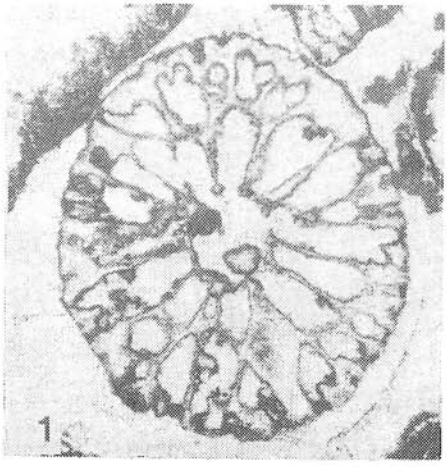
Heteroporella zankli (O t t) O t t, 1968
Pl. IV, Fig. 1–6, Pl. V, Fig. 1, 3, Pl. VI, Fig. 8

1967 *Chinianella zankli* n. sp. – E. O t t, Dasykladaceen (Kalkalgen) aus der nordalpinen Obertrias, p. 219, Pl. 13, Fig. 2, 3, Abb. 1–4
1968 *Heteroporella zankli* (O t t) – E. O t t, Zur Nomenklatur ... etc., p. 258.
Description: The thallus is cylindrical and without any annulation. The inner surface of the calcareous cylindre is completely smooth. Fertile as well as sterile branches are ramified, and the both kinds of the branches form independent whorls more or less perpendicular to the longitudinal axis of the axial stem. The distance between the whorls of the sterile primary branches is often smaller than the thickness of sporangia of the fertile branches, that is why in the tangential section of such a case, the sterile and fertile branches seem to occur in a common whorl (Pl. VI, Fig. 8).

Besides the specimens corresponding with the species *Heteroporella zankli* (O t t) O t t by all their signs, also less typical specimens occur. Their sporangia are open on the outer side (the distal ends of the sporangia and the secondary branches were not calcified?) (Pl. IV, Fig. 4), or there are also specimens with whorls of their sporangia considerably irregularly distant from each other (Pl. IV, Fig. 5) so that quite a large part of their thallus occurs with only ramified sterile branches.

Occurence: The Muráň plateau, the locality of Krajcová, the Furmanec limestone, ? the Upper Norian. Thin-sec. No. 3212, 3219, 3220, 5142, 5143, 5576, 5568, 5537. Together with ? *Petrascula aff. illyrica* S o k a č et N i k l e r and others up to the present time unidentifiable dasycladaceae. The locality of Geravy, West from the upper stop of the funicular, the dark Furmanec limestone, ? the Upper Norian, thin-sec. No. 5685, 5684.

Pl. VII.
Fig. 1–5: ? *Petrascula stratenica* sp. nov. Fig. 1: the holotype, thin-sec. No. 5966. Fig. 2: thin-sec. No. 5680; Fig. 3: thin-sec. No. 5968; Fig. 4: thin-sec. No. 5938: Fig. 5: thin-sec. No. 5930. For measurements see p. 332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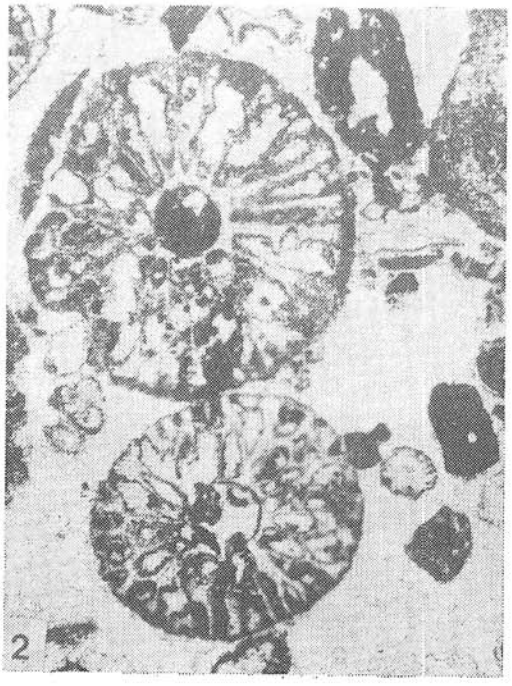
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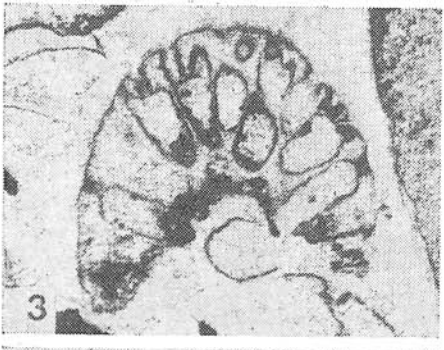
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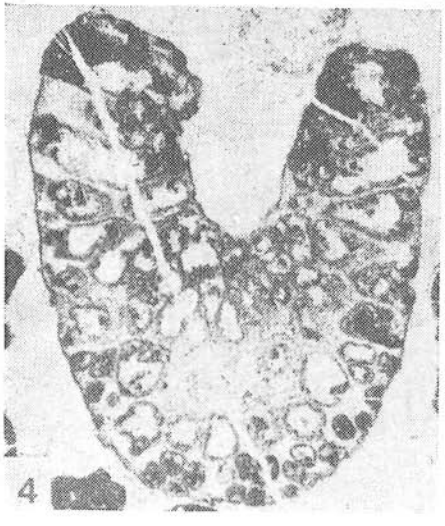
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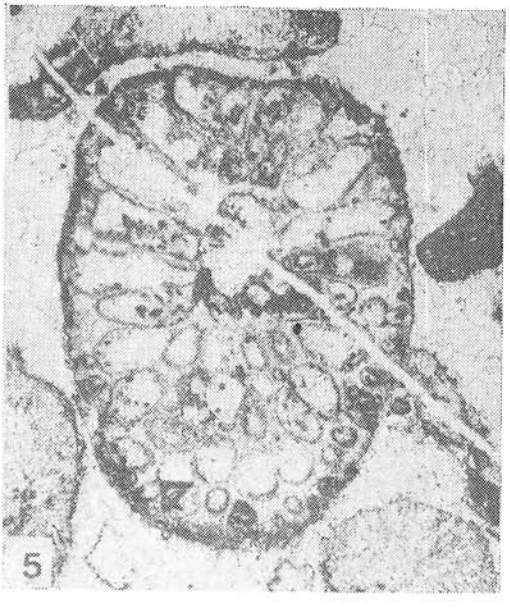
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Measurements of the illustrated specimens (in mm):

th-s. No.	D	d	d %D	sterile br.		fertile br.		h	
				p_1p	p_2	spg	p_2d		
5142	2.333	0.700	30.0		0.069	0.722	0.116		Pl. IV, F. 1
3220	2.022	0.555	27.7	0.055	0.047	0.597	0.122		IV, F. 2
3212	1.900	0.616	32.4		0.050	0.772			IV, F. 3
3219	1.944	0.575	29.5	0.047		0.777	0.069		IV, F. 4
5143	1.388	0.388	24.4	0.041	0.050	0.580			IV, F. 5
5576	1.505	0.391	26.0	0.050	0.041	0.405	0.050		IV, F. 6
5685	1.966	0.433	22.0	0.044	0.066		0.116		V, F. 1
5684	2.222	0.588	26.5	0.055	0.075		0.105		V, F. 3
5568	—	—	—	0.083	0.052	—	—	0.319	VI, F. 8

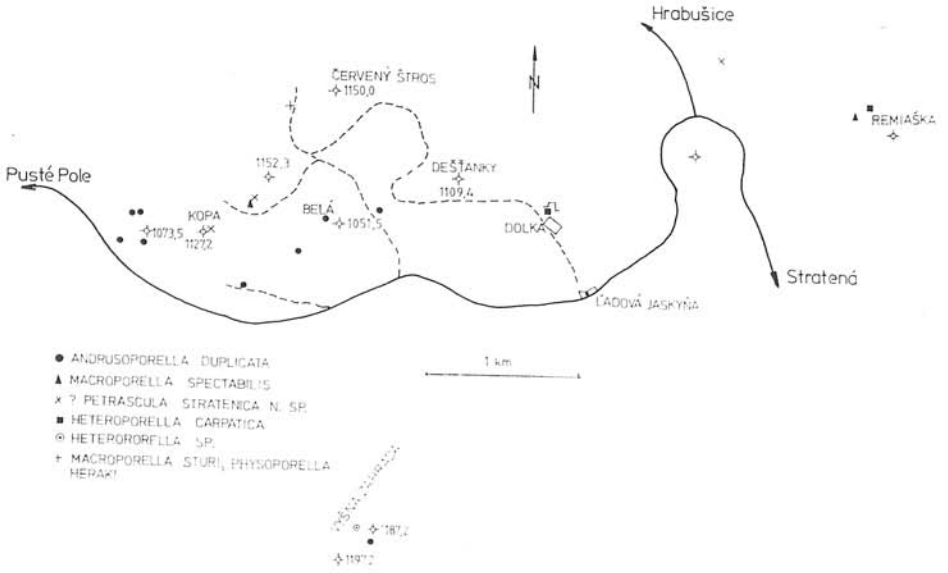

Fig. 1. Localisation of Occurences

? *Palaeodasycladus* sp.
Pl. VI, Fig. 6

Description: Fragments of a thallus wall in which branches ramified into branches of three orders can be observed. The primary branches are short

Pl. VIII.

Fig. 1—8: ? *Petrascula stratenica* sp. nov. Fig. 1: thin-sec. No. 5975; Fig. 2: thin-sec. No. 5971; Fig. 3: thin-sec. No. 5949; Fig. 4: thin-sec. No. 5967; Fig. 5: thin-sec. No. 5971; Fig. 6: thin-sec. No. 5969; Fig. 7: thin-sec. No. 5975; Fig. 8: thin-sec. 5970. For measurements see p. 333


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and ramify into the secondary branches. These diverge outwards. Branches of the third order stretch out of them and extend paralelly and almost perpendicularly to the outer surface of the thallus. Compression of the distal ends of the third order branches is not observed.

Comparison: The shape and the way of the ramification of the branches as well as their measurements resemble the species *Palaedasycladus barrabei* Lebouché et Lémoine the most. Because of the fact that neither the whole shape of the thallus nor the number of the secondary branches falling to a primary branch can be deduced from the fragment, more exact identification of the specimen is not possible.

Occurence: The quarry at the settlement Dolka, the Furmanec limestone (the Norian). Together with *Heteroporella carpatica* Bystr. and other dasycladaceae (see p. 334).

Translated by K. Bystrická

Measurements of the branches (in mm):

	?Palaeodasycladus sp.		*Palaeodasycladus barrabei*	
	diametre	length	diametre	length
primary branch	0.147	1.172	0.12—0.2	0.15—0.2
secondary branch	0.111	0.366	0.07—0.16	0.20—0.3
tertiary branch	0.127	0.277	0.08—0.12	0.15—0.2
the same, behind the compression	—	—	0.07—0.09	0.06—0.1

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