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SEDIMENTOLOGICAL AND PALEONTOLOGICAL ATLAS OF THE LATE FAMENNIAN AND TOURNAISIAN DEPOSITS IN THE OMOLON REGION (NE-USSR) [1]

by

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(4 figures, 3 tables and 52 plates)

RESUME.- En complément à la description concise de la sédimentologie, de la paléoécologie, de la biostratigraphie et du paléomagnétisme des couches du Famennien tardif et du Tournaisien de la région de l'Omolon (NE-USSR), qui a été publiée dans ces Annales en 1983 par K.V. Simakov *et al.,* un atlas sédimentologique et paléontologique des mêmes couches est présenté. Les données publiées dans ces deux papiers constituent les fondements d'études plus détaillées sur les dépôts de la région de l'Omolon qui seront conduites dans les années à venir. En même temps, ils représentent les résultats préliminaires des investigations menées conjointement par une équipe de géologues d'URSS, de Belgique et des Pays-Bas entre 1981 et 1984.

ABSTRACT.- As a complement to the concise description of the sedimentology, paleoecology, biostratigraphy and paleomagnetism of Late Famennian and Tournaisian strata of the Omolon region (NE-USSR) which had been published in these Annales in 1983 by K.V. Simakov *et al.,* a sedimentological and paleontological atlas of the same strata is presented here. The data published in these two papers serve as a basis for more detailed studies on the deposits of the Omolon area, which will be carried out in the forthcoming years. At the same time, these represent the preliminary results of the joint investigations carried out by a team of geologists from the USSR, Belgium and the Netherlands during the period between 1981 and 1984.

CONTENTS

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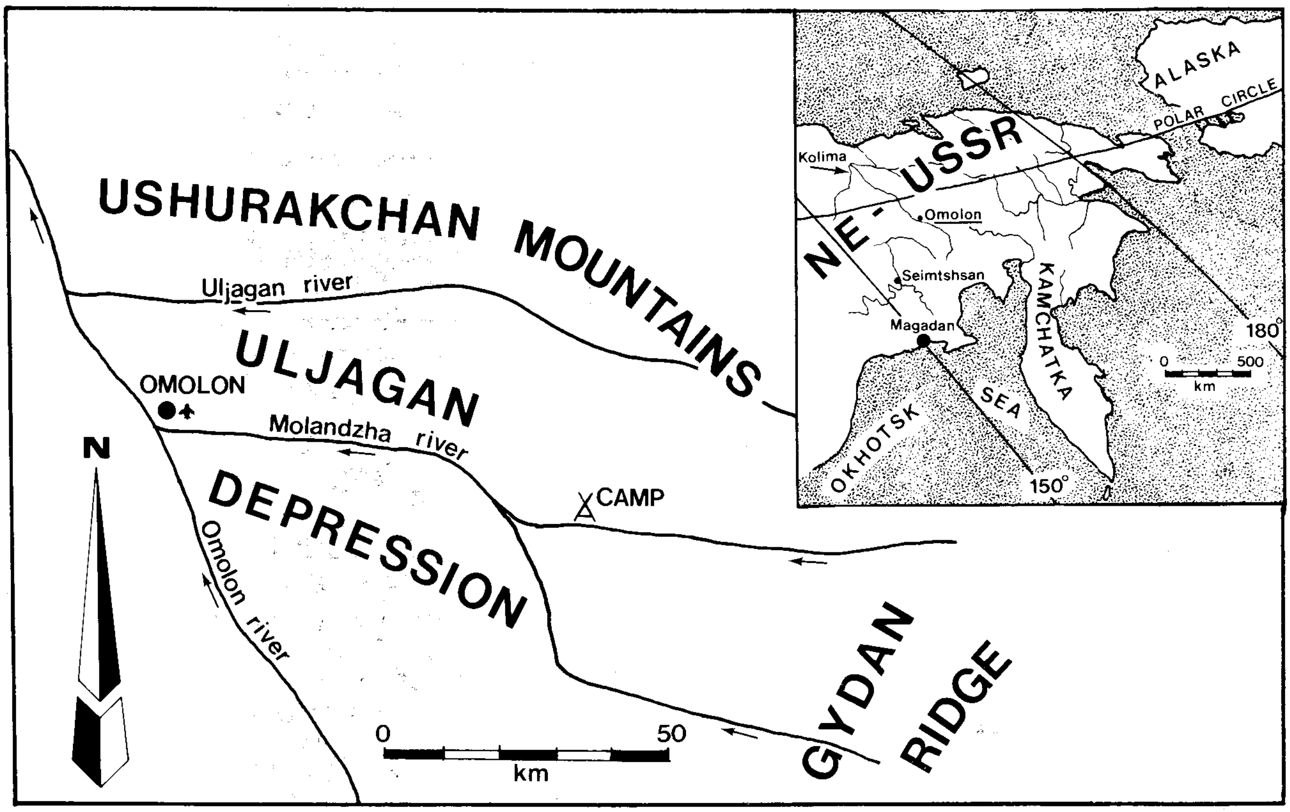
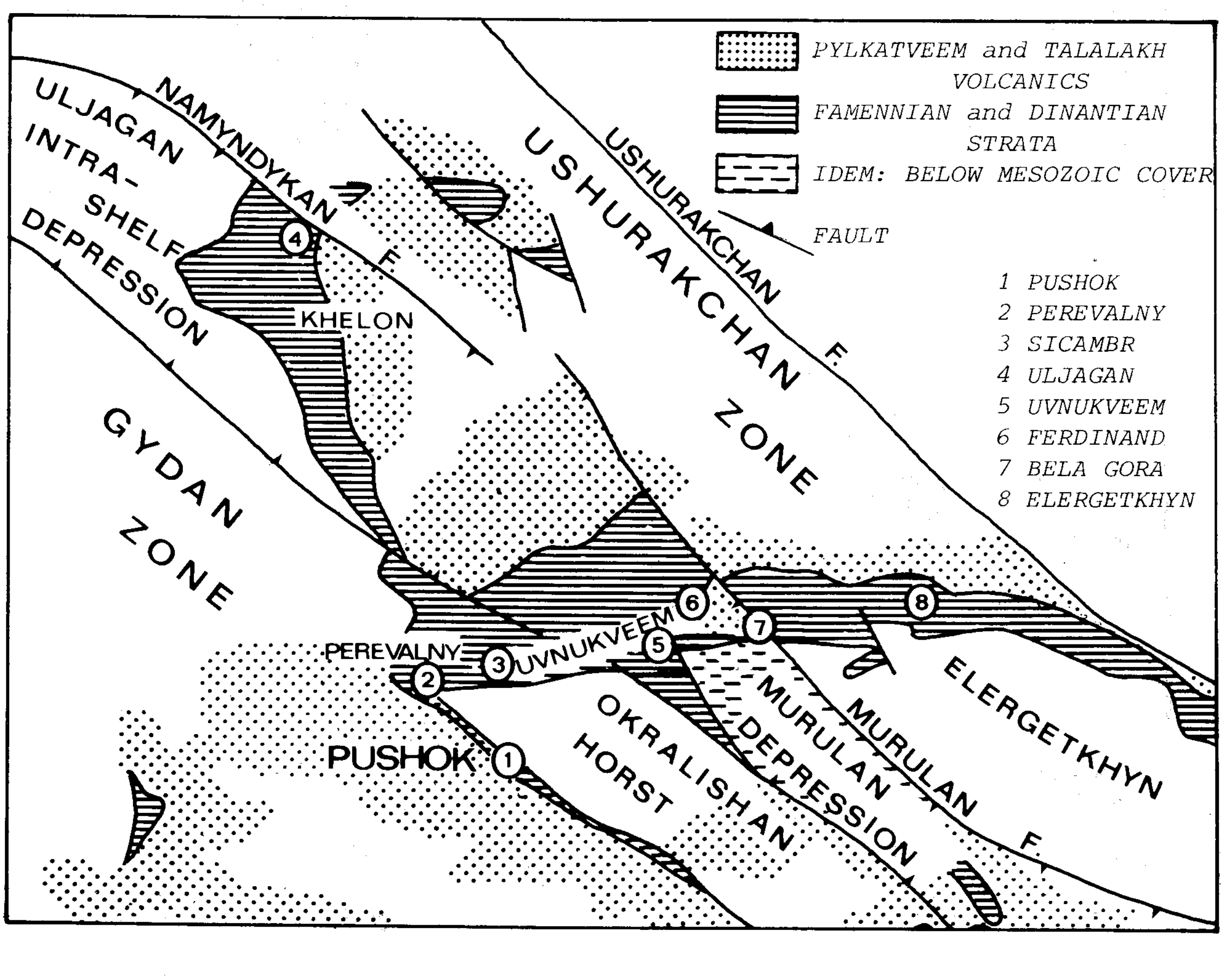


Figure 1.- Location map of study area.



INTRODUCTION (N.A. Shilo & J. Bouckaert)

During the Sixth International Congress on the Carboniferous Stratigraphy and Geology in Sheffield, in September 1967, Dr. Eva Paproth from the Geological Survey of Nordrhein-Westfalen presented a marvellous paper entitled "Die Parallelisierung von Kohlenkalk und Kulm". In that talk she made an effort to achieve the best possible correlation between the lithostratigraphic and biostratigraphic sequences of the Late Famennian and Dinantian in so nearby areas as Great Britain, Belgium and the Federal Republic of Germany (Paproth, 1969).

Certainly, the subject and the problems she dealt with were not new. But through that lecture she was able to stimulate her colleagues in Northwestern Europe to combine their efforts and to improve by multidisciplinary team-work our understanding of the evolution of that part of the world during the Late Famennian and Dinantian.

The enthusiasm triggered by her at that memorable day in Sheffield resulted a.o. in 1983 in the publication an of updated correlation chart between the Carboniferous Limestone deposits of Belgium and the Kulm deposits along the northern borders of the Rhenish Slate Mountains in the Federal Republic of Germany (Paproth, Conil *et al.*, 1983).

This example shows two aspects of geological investigations. On the one hand, the geological history of even neighbouring areas may have been quite different. And on the other, a detailed comparison between such areas is a slow and painful process that can be achieved only through the patient collaboration of geologists specialized in different disciplines.

Figure 2.- Simplified geologic map of the northeastern part of the Omolon Massif, showing distribution of Late Devonian and Tournaisian deposits and location of studied sections. The following locations are indicated :

1. *Pushok (section XV)*
2. *Perevalny Valley ; within a distance of some 8 km there occur a.o. from West to East the sections Entweder (XIII), Oder (XII), Koleso (XI), Skala (X), Verkhnenaled (VII), Nizhnenaled (VI), Povorotny (IV), Beregovoy (III), Ustyevoy (II) and Obratny (I)*
3. *Sikambr (XXIII and M-1/6)*
4. *Uljagan ; (from West to East two sections occur along the southern banks of the Uljagan River : Bazov (XXIV) and Triniti (XXV)*
5. *Uvnukveem (XXII)*
6. *Ferdinand (XXI)*
7. *Bela Gora*
8. *Elergetkhyn ; South of the Elergetkhyn Lakes there occur from North to South the sections Livan (XVI), Gytgynpylgin (XVII) and Karst Mountain (XVIII). Several unnamed sections occur near the Karst Mountain as specified in the chapter on foraminifers and rugose corals.*

⇐

The example also made clear to everybody involved that one has to face not only the differences in deposits and fossil assemblages, but also the differences in schooling, the language barriers (both the differences in natural and in scientific languages), and the differences in experience.

Being aware of the complications which may arise in the correlation of the so-called classical areas for the

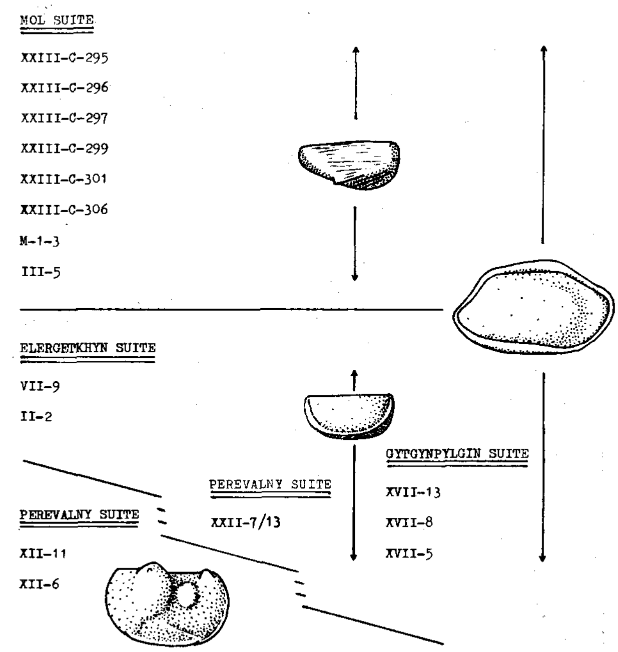


Figure 3.- Comparison of ostracode assemblages in sixteen samples of Upper Famennian to Middle Tournaisian age from the Omolon area (compare plates 46 to 52).
*The assemblages from the Perevalny Suite (*Neioicriodus terminalis *to* Polygnathus obliquicostatus *conodont zones) in the Oder (XII) section are characterized by the virtual absence of Bairdiacea.*
In the sample XII-6 that yielded thousands of ostracodes, the assemblage is predominated by one or more species of Serenida, *whereas* Parapribylites *and* Evlanovia? markusovae *are rather frequent. Presumably,* Serenida *occupied an ecological niche similar to that of the* Paraparchitacea *in many shallow marine, nearshore assemblages of Late Devonian and Carboniferous age as recognized in Europe, North Africa and North America. The ecological niche for* Evlanovia? markusovae *may have been the same as for* Hollinella *or* Copelandella, *which seem to have preferred nearshore environments in the Carboniferous of Europe, North Africa and North America. In the same way, the shape of* Parapribylites *resembles that of* Jordanites, *frequently associated to* Hollinella *in Late Carboniferous assemblages in Europe.*

All the other assemblages are predominated by Bairdiid ostracodes (Bairdia, Acratia, *sometimes* Bairdiacypris) *and* Bairdiocypris, *the strongly ornamented genus* Amphissites *and the small genus* Microcheilinella. *In the Late Famennian to Lower Tournaisian (*Polygnathus obliquicostatus *to* P. lenticularis *conodont zones) deposits of the Gytgynpylgin, Perevalny and Elergetkhyn Suites these are associated with* Kirkbya *sp., whereas these are associated with* Monoceratina simakovae, Pseudomonoceratina? razinae *and* Pribylites? kolesovi *in the Middle Tournaisian Mol Suite samples. Presumably, these assemblages represent an open marine, unstable shelf environment (M.J.M. Bless).*

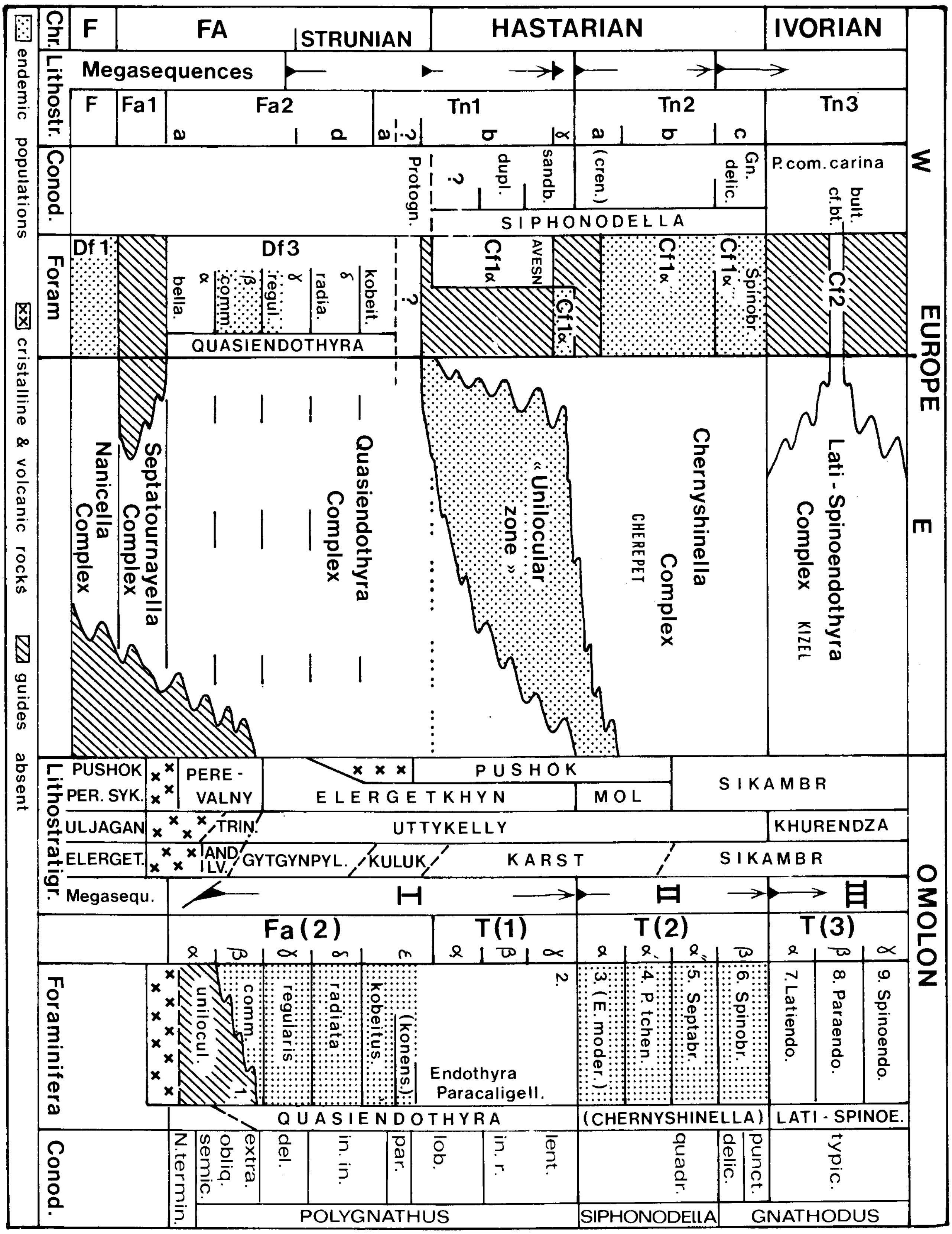


Figure 4.- Correlation of lithostratigraphic and biostratigraphic (conodonts and Foraminifers) zones in Western and Eastern Europe, with those of the Omolon Massif. (After Simakov, Bless et al., *1983, but conodont Omolon local zonation).*

Late Famennian and Dinantian strata, it seemed to be an even greater challenge to work on a comparison between strata of the same age which occur in quite different parts of our globe.

Suggestions for such an international cooperation have been forwarded by Dr. Kirill V. Simakov and Dr. Vera A. Tschigova, when they participated in the International Symposium on Belgian Micropaleontological Limits from the Emsian to the Visean, in Namur 1974 (Bouckaert & Streel, eds., 1974).

These suggestions resulted in two projects. The first one was the 1975 agreement between the Soviet Ministery of Gas and the Belgian Geological Survey for a joint investigation on the Devonian-Carboniferous boundary deposits in Belgium and in the USSR. Between 1975 and 1979, a comparison was made of a.o. the occurrence of conodonts (Tschigova *et al.,* 1979) and ostracodes (Tschigova & Bless, 1976) in both countries.

The second one was the 1979 agreement between the Academia Nauk SSSR and the Belgian Geological Survey in collaboration with the laboratories of micropaleontology and palynology of the Universities of Liège, Leuven and Louvain, for a joint investigation on the Devonian-Carboniferous boundary deposits in the Omolon area (NE - USSR) and in Belgium.

The five years of cooperation established in the 1979 agreement between the Academia Nauk SSSR and the Belgian Geological Survey have now almost been completed. Many problems remain unsolved. And it seems likely that many questions will await for a final answer in the forthcoming years. Yet, a tremendous progress has been made in razing the walls between different schoolings and different experiences.

Soviet geologists have been able to visit a large number of the classical Famennian and Dinantian outcrops in Belgium, and to study the rocks and fossils collected in the field or stored in the Geological Survey of Belgium, in musea or universities. And geologists from Belgium and the Netherlands have benefitted from their visits in 1981 and 1983 to the Omolon area and from the many discussions with their Soviet colleagues in obtaining a better idea of the geology and the inherent complications of that area.

This cooperation has resulted in a number of joint papers on the Omolon area which have been published in Belgium, and on the Belgian area which await publication in the Soviet Union. These show that multidisciplinary and multinational teamwork in geological investigations can help in solving our mutual problems despite linguistical, political or scientific barriers. Both of us are grateful to have this opportunity to express our sincere thanks to the members of the international team which fulfilled so enthusiastically their very important job. We wish to congratulate them with the results obtained thus far. These are of the highest quality and have been achieved in the spirit of friendship and mutual understanding.

We express the hope that the formal end of this project will be the beginning of a longlasting and fruitful cooperation, even if this might be on an informal basis. And we also hope that this fine example of international cooperation and friendship will be followed by other colleagues in other disciplines.

Last but not least, we are gratefully indebted to the Société Géologique de Belgique, who offered the Annales for publishing the results of the studies carried out thus far in the Omolon area (Conil *et al.,* 1982, Simakov *et al.,* 1983, Shilo *et al.,* this paper).

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Table 1.- Distribution of brachiopods in Late Famennian and Tournaisian of Omolon Basin (K.V. Simakov).

Genozones	PLANOPRODUCTUS									SEMIPRODUCTUS								MARGINATIA						DICTYOCLOSTUS	
										SPINOCARINIFERA					ACANTHOCOSTA										
	VALIDOSPIRIFER - EOCHORISTITES					PIRAMIDATO-SPIRIFER				OMOLONOSPIRI-FER			ECTOCHORISTITES					PROSPIRA			PALAEOCHORISTITES - SPIRIFER				
Lones	E.spicatus-G.utahensis			I. hiraetlinae - A. tau						Sp. adunata - U. nikolaevi			Sm. altaicus - Gr. graciosa					P. platy-notus			M.burlingtonensis-P.de sinuatus			T.viminalis-Sp.attenuatus	
Section	XII			VI	II								VII					IV	XXIII			XVIII			
Bed N	8	10-19		10	3	7	8-11		12	14	16	- 24	1-3		5	6	- 18	21	8	10	11	8 - 14		15 - 21	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Leioproductus varispinosus	o	x	x																						
Gastrodotechia utahensis	o	x	x	x	x	x																			
Incomptispirifer minima	o	x	x																						
Euritatospirifer spicatus	o	x	x	x																					
Orbinaria concentrica		o	x																						
Spinulicosta nigerina		o	x																						
Planoproductus hilsboroensis		o	x		x	x																			
Validospirifer validus		o	x	x	x	x																			
Eochoristites protistus		o	x																						
Orbinaria fallax				o	x	x	x	x	x	x	x	x													
Euritatospirifer tionesta				o	x	x	x	x	x																
Athyris tau				o	x	x	x	x	x																
Inceptospirifer hiraetlinae					o	x	x	x	x																
Planoproductus ? plicatostriatus						o	x	x	x	x	x														
Validospirifer insulcifer						o	x	x	x																
Piramidatospirifer juliiformis						o	x	x	x																
Molandispirifer urekchanensis						o	x	x	x	x	x	x													
Planoproductus ? intrastriatus									o	x	x	x													
Spinocarinifera adunata										o	x	x													
Semiproductus lentus										o	x	x	x	x	x	x	x								
Athyris pseudoconcentrica										o	x	x													
Ovatia praelaevicosta											o	x													
Camaratoechia panderi											o	x													
Urekchania nikolaevi											o	x	x	x	x										
Omolonospirifer dadaeformis											o	x													
Skelidorygma medioplicata											o	x	x	x											
Productina sampsoni													o	x	x	x	x								
Spinocarinifera arcuata													o	x	x	x	x								
Molandispirifer molandjaensis													o	x	x	x	x								
Ectochoristites nordicus													o	x	x	x	x								
Ovatia laevicosta														o	x	x	x								
Camaratoechia houteauensis														o	x	x	x								
Graciospirifer omolonensis														o	x	x	x								
Unispirifer mediocris															o	x	x	x	x						
Acanthocosta omolonensis															o	x	x								
Camaratoechia biplex															o	x	x								
Rhytiopora blairi																o	x								
Semiproductus altaicus																o	x								
Rugauris nurensis																o	x								
Avonia inflata																o	x								
Marginatia burlingtonensis																		o	x	x	x	x	x		
Unispirifer taidonensis																		o	x	x	x	x			
Prospira platynotus																		o	x	x					
Brachythyris chouteauensis																		o	x	x	x	x	x		
Spiriferina solidirostris																			o	x	x				
Productina praemargaritacea																				o	x	x			
Marginicinctus wortheni																				o	x	x	x		
Spirifer suavis																				o	x	x			
Sp. karagandae																				o	x	x	x		
Palaeochoristites cinctus																				o	x	x			
Pustula altaica																								o	x
Stegacanthia sibirica																								o	x
Tolmatschoffia robusta																								o	x
T.? viminalis																								o	x
Dictyoclostus deruptus																								o	x
Spirifer attenuatus																								o	x
Prospira ? louisianensis																								o	x
Imbrexia ? hassan																								o	x
Tomiproductus elegantulus																									o

Table 2.- Distribution of conodonts in Late Famennian and Tournaisian of Omolon Basin (M.H. Gagiev).

Standart zones	*Sc. velifer*	*Po. styriacus*	*B. costatus* Low.	*B. costatus* M.-U.	*Protognathodus-Fauna* Low.	*Protognathodus-Fauna* Up.	*S. sulcata*	*S. duplicata*	*S. sandbergi*	*Low. S. crenulata*	*S. isosticha - Up. S. crenulata*	*Gn. typicus*
			S. praesulcata									

Local zones														
	Neoicriodus terminalis	POLYGNATHUS									Siphonodella quadruplicata	GNATHODUS		
		semicostatus	obliquicostatus	extralobatus	delicatus	inornatus inornatus	parapetus	lobatus	inornatus rostratus	lenticularis		delicatus	punctatus	typicus

Section	XII	VI	II	VII	XXIII		XXIV

Samples N	6/1	8/1	10/5	49/6	8	2/2	47/3	21/4	21/7	22/2	7/B	1/4	3/1	5/7	11/2
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Neoicriodus terminalis
Bouckaertodus lacrima
Spathognathodus aff. insita
Icriodus constrictus
Bouckaertodus nodosus
Polygnathus semicostatus
Po. szulczewski
Po. streeli
Po. homoirregularis
Bispathodus stabilis
Spathognathodus strigosus
Jukagiria konovae
Scaphignathus velifer
Fungulodus rotundus
Pelekysgnathus communis
Polygnathus perplexus
Pseudopolygnathus pseudostrigosus
Polygnathus obliquicostatus
Polylophodonta linguiformis
Polygnathus planirostratus
Polylophodonta confluens
Palmatolepis distorta
Polygnathus experplexus
Palmatolepis perlobata postera
Mashkovia simakovi
Polygnathus extralobatus
Palmatolepis perlobata schindewolfi
Pa. perlobata helmsi
Pa. rugosa
Polygnathus delicatulus
Siphonodella cf. praesulcata
Polygnathus inornatus inornatus
Po. znepolensis
Palmatolepis gracilis gracilis
Pseudopolygnathus cf. micropunctatus
Mashkovia similis
Apatognathus varians varians
Ap. varians ethingtoni
Icriodus costatus
Pseudopolygnathus graulichi
Polygnathus parapetus
Pseudopolygnathus dentilineatus
Polygnathus lobatus
Siphonodella sulcata
Polygnathus inornatus rostratus
Omolonognathus planus
Om. transformis
Polygnathus lenticularis
Po. communis communis
Pseudopolygnathus fusiformis
Bispathodus aculeatus aculeatus
B. aculeatus anteposicornis
Icriodus obstinatus
Polygnathus longiposticus
Pseudopolygnathus cf. triangulus inaequalis
Siphonodella quadruplicata
S. obsoleta
Polygnathus lacinatus asymmetricus
Po. lacinatus circaperipherus
Siphonodella sandbergi
Gnathodus delicatus
Spathognathodus abnormis
Sp. cooperi
Elictognathus laceratus
Siphonodella lobata
S. cooperi Mt. 2
S. crenulata
S. isosticha
Polygnathus purus purus
Po. purus subplanus
Po. siphonellus
Pseudopolygnathus triangulus triangulus
Ps. nodomarginatus
Ps. primus
Spathognathodus discertus
Gnathodus punctatus
Hindeodella segaformis
Polygnathus communis carina
Gnathodus typicus
Pseudopolygnathus multistriatus

LITHOSTRATIGRAPHIC SECTIONS (Plates 1 to 7)

(Rudy SWENNEN, Kirill V. SIMAKOV & Raph. CONIL)

The lithological sequences of the most important sections are shown on plates 1 to 7. For the Ustyevoy and Pushok sections a detailed mapping (bed by bed) was performed. For the other sections a generalized lithological sequence is given. A general overlook of the lithological sequences and their correlations is given in Simakov *et al,* 1983 (fig. 7). The legend of the lithological symbols is shown on plate 6.

PLATE 1

PUSHOK AREA : PUSHOK SECTION XV

The Pushok section is badly exposed. Several exposure gaps, as well as faults are present.

Pushok Suite : The base of this Suite was taken in the lowermost outcropping bioclastic limestones (XV-1). The top was taken beneath the first appearance of the oolitic limestones (XV-11).

The lower portion of this Suite consists of biosparites (bioclastic packstone). Two intensively silicified biostromal levels were recognized. The top of these biostromes is characterized by the occurrence of desiccation cracks and silicified nodules, suggesting an extinction of the biostrome (stromatopores and corals) under supratidal, highly saline conditions. Higher upwards (bed 416 and following) a dolostone sequence is present. Within these strata an alternation between :

- coral-enriched dolostones
- finely laminated probably algal dolostones

and - dolostones with silicified anhydrite nodules

was recognized. Similar successions are also present in the debris of the main exposure-gap (hiatus : ± 120 m). Most of the dolostones have a hypido- to xenotopic fabric (plate 11.1). Dedolomitization textures are present (plate 11.2).

At the top of this Suite biosparites (bioclastic packstone ; plate 11.5) and pelbiosparites (pelletic to bioclastic packstone ; plate 11.6) are present.

The lithological sequence suggests that during the lower and middle part oscillating environmental conditions occurred, which ranged from shallow subtidal to supratidal. At the top (bed XV-10), a transgressive trend towards the oolitic strata of the Sikambr Suite is present.

Sikambr Suite : The base of the Suite was taken at the first appearance of oolitic limestones.;

Oosparite to biooosparite (oolitic packstone) with coated grains (plate 11.7). Dolomitization- and dedolomitization-phenomena (plate 11.8) are present, however they occur only in few levels.;

PLATE 1

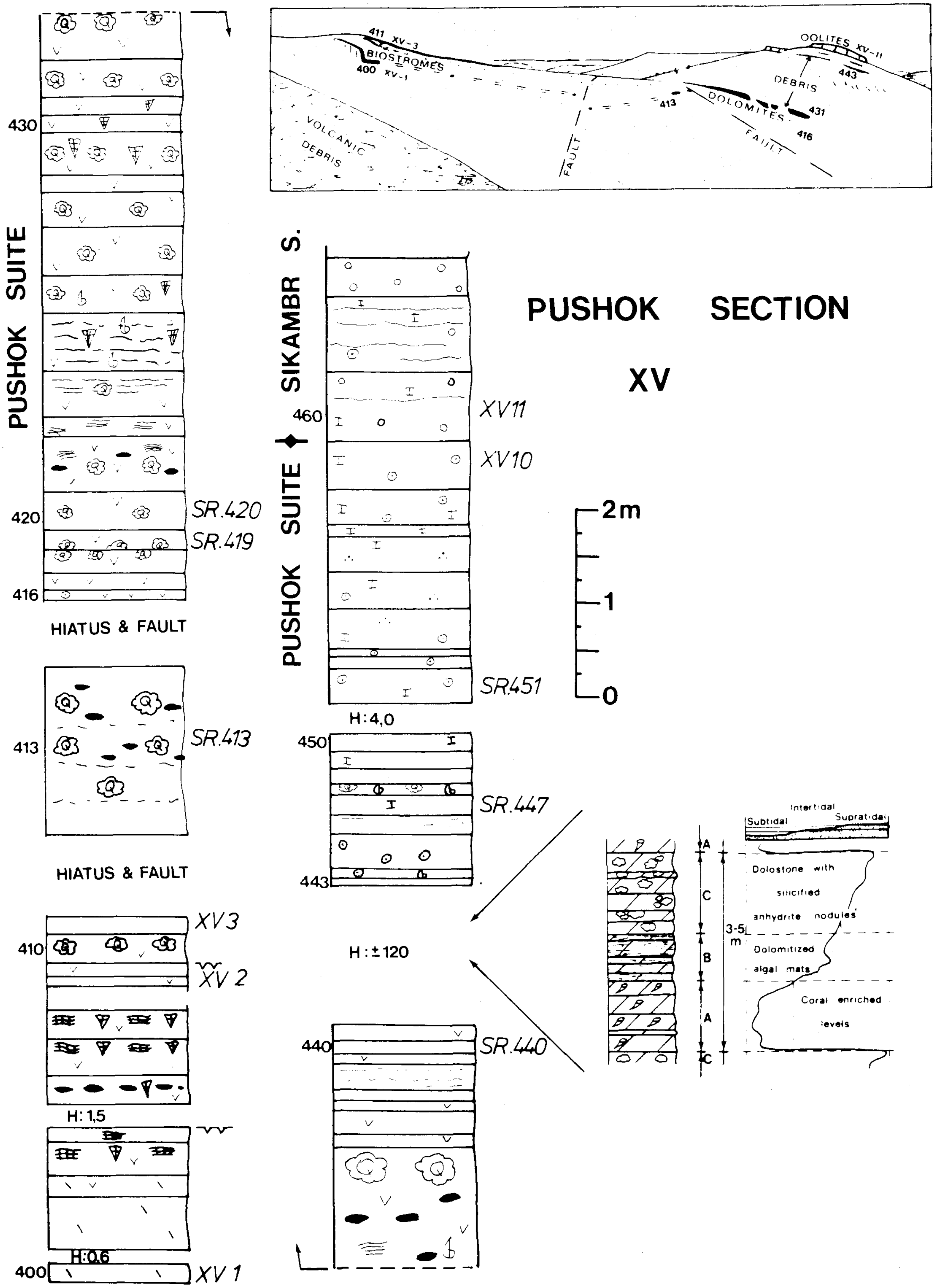

411 XV-3
BIOSTROMES
400 XV-1
VOLCANIC
DEBRIS
FAULT
413
OOLITES XV-11
443
DEBRIS
DOLOMITES
431
416
FAULT
PUSHOK SECTION
XV
PUSHOK SUITE
430
420
416
SR.420
SR.419
HIATUS & FAULT
413
SR.413
HIATUS & FAULT
XV3
410
XV 2
H: 1,5
H:0,6
400
XV 1
SIKAMBR S.
PUSHOK SUITE
460
XV11
XV10
SR451
H:4,0
450
SR.447
443
H:±120
440
SR.440
2m
1
0
Intertidal
Subtidal
Supratidal
A
C
B
A
C
3-5 m
Dolostone with silicified anhydrite nodules
Dolomitized algal mats
Coral enriched levels

PLATE 2

PEREVALNY VALLEY ; ODER SECTION XII

Perevalny Suite : The base of this Suite consists of coarse-grained, reddish, locally gravelitic sandstones. The top-strata are composed by argillaceous limestones.

These strata mainly consist of coarse-grained sandstones and sandstones with nodular carbonate intercalations. Several conglomerate levels, which are composed by volcanogenic clasts, occur (XII-9 and XII-12). Towards the top more fine-grained sandstones and siltstones with nodular carbonate intercalations occur.

These strata presumably were deposited in a shallow-marine nearshore environment. A transgressive trend is present, especially if we correlate these strata with the nodular limestones of the Nizhnenaled section VI.

PEREVALNY VALLEY : NIZHNENALED SECTION VI

Lower Elergetkhyn Suite : The nodular limestones, which characterize the base of this Suite, are badly exposed. They occur in a discontinuous section part, about 16 m below VI-5. The top of this Suite is not reached in this section. Towards the top of this section several small faults occur.

These strata are characterized by the alternation of nodular limestones with shale intercalations and bioclastic argillaceous limestones (argillaceous biomicrite ; bioclastic wackestone : plate 14.7) pointing to a relatively deep marine subtidal environment.

PEREVALNY VALLEY : VERKHNENALED SECTION VII

Upper Elergetkhyn Suite : Neither the base nor the top of this Suite are exposed.

The major part of these strata are composed by bioclastic, intraclastic to pelletic limestones (biomicrite ; bioclastic wackestone : biointrasparite to biopelsparite ; intraclastic to pelletic packstone : plate 14.8). Several horizons contain oncolites, algal mats and red algae (*Parachaetetes garwoodi* Hinde). Cherts are present ; they often form nodular silica crusts or spots (random-cherts), indicating that chertification was incomplete. The uppermost strata are partly to completely dolomitized ; they contain nodular massive cherts.

The massive occurrence of algae clearly points to an intertidal sometimes undeep subtidal environment.

PEREVALNY VALLEY : BEREGOVOY SECTION III

In this composite section the transition between the Elergetkhyn Suite and Mol Suite occurs.

Elergetkhyn Suite : The top of this Suite was taken at the contact of the cherty dolostones with the bioclastic limestones with shale intercalations.

The dolostones often contain silicified corals, crinoids and brachiopods. Chertification (random-cherts and massive cherts) is present all over this section ; these nodules occur only in the middle part of the beds. A close relation with pyritization and possible base-metal mineralization is present, pointing to reducing formation conditions. Towards the top the strata are less intensively dolomitized ; bioturbation textures are present.

These strata probably were deposited in a shallow marine environment, however dolomitization obliterated most of the sedimentary features.

Mol Suite : The base of this Suite, which is exposed in this section, is composed by nodular bioclastic limestones (biosparites with coated grains : bioclastic packstone) with shale intercalations. They often contain cherts (random- and massive cherts). An undeep subtidal depositional environment is most likely.

PLATE 2

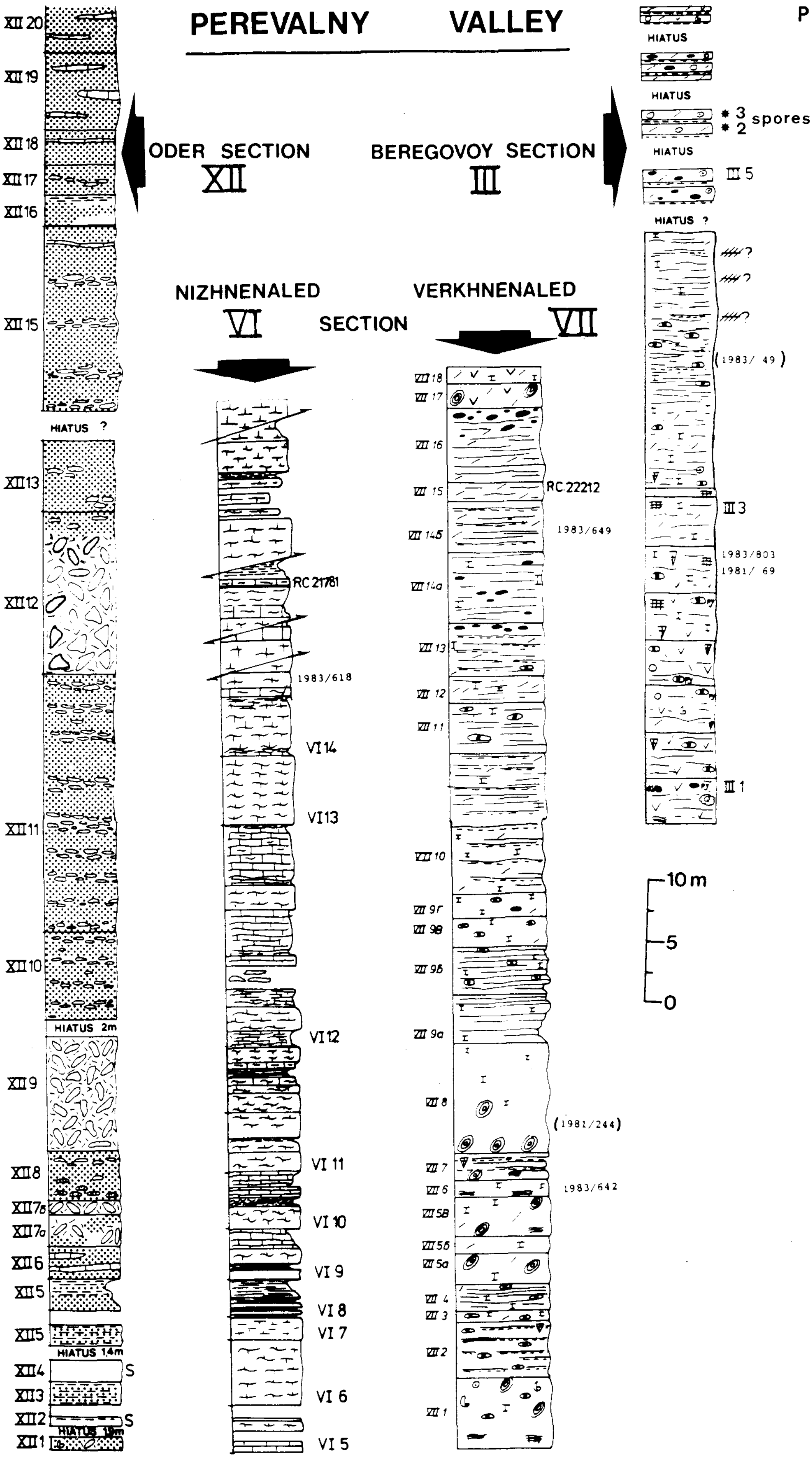

PEREVALNY VALLEY
ODER SECTION XII
BEREGOVOY SECTION III
NIZHNENALED VI
SECTION
VERKHNENALED VII
XII 20
XII 19
XII 18
XII 17
XII 16
XII 15
HIATUS ?
XII 13
XII 12
XII 11
XII 10
HIATUS 2m
XII 9
XII 8
XII 7б
XII 7a
XII 6
XII 5
XII 5
HIATUS 1,4m
XII 4
S
XII 3
XII 2
S
XII 1
HIATUS
RC 21781
1983/618
VI 14
VI 13
VI 12
VI 11
VI 10
VI 9
VI 8
VI 7
VI 6
VI 5
VII 18
VII 17
VII 16
VII 15
RC 22212
VII 14б
1983/649
VII 14a
VII 13
VII 12
VII 11
VII 10
VII 9г
VII 9в
VII 9б
VII 9a
VII 8
(1981/244)
VII 7
VII 6
1983/642
VII 5в
VII 5б
VII 5a
VII 4
VII 3
VII 2
VII 1
HIATUS
HIATUS
* 3
* 2
spores
HIATUS
III 5
HIATUS ?
(1983/ 49)
III 3
1983/803
1981/ 69
III 1
10 m
5
0

PLATE 3

PEREVALNY VALLEY : USTYEVOY SECTION II

Elergetkhyn Suite : In this section neither the base nor the top of this Suite are exposed.

The following lithological sequence was recognized :

- nodular bioclastic limestones (biomicrite to biopelsparite : bioclastic wackestone to packstone ; plate 14.3) (II-1/3 : Bed 1 - 37) ;
- xeno - to hypidiotopic dolostones with silicified layers and nodules (II-4/6 : Bed 38 - 39) ;
- nodular limestones with shale intercalations (intramikrite : mudstone) (II-7/11 : Bed 70 - 105) ;
- xeno - to hypidiotopic dolostones (II-12/14 : Bed 106 - 157 : plate 14.5 and 14.6). At the top of this sequence dolomite nodules which are pseudomorphous after anhydrite nodules occur. Several bentonite horizons are present.
- bioclastic limestones (biopelsparite to biosparite : bioclastic packstone) with shale intercalations (plate 14.4 ; Bed 158 - 278). Towards the top several chert nodules occur.

This sequence points to a relatively deep marine subtidal offshore shelf environment for the nodular limestones and to an intertidal or maybe even supratidal environment for the dolomitic strata. The uppermost part reflects an undeep subtidal depositional environment.

PLATE 3

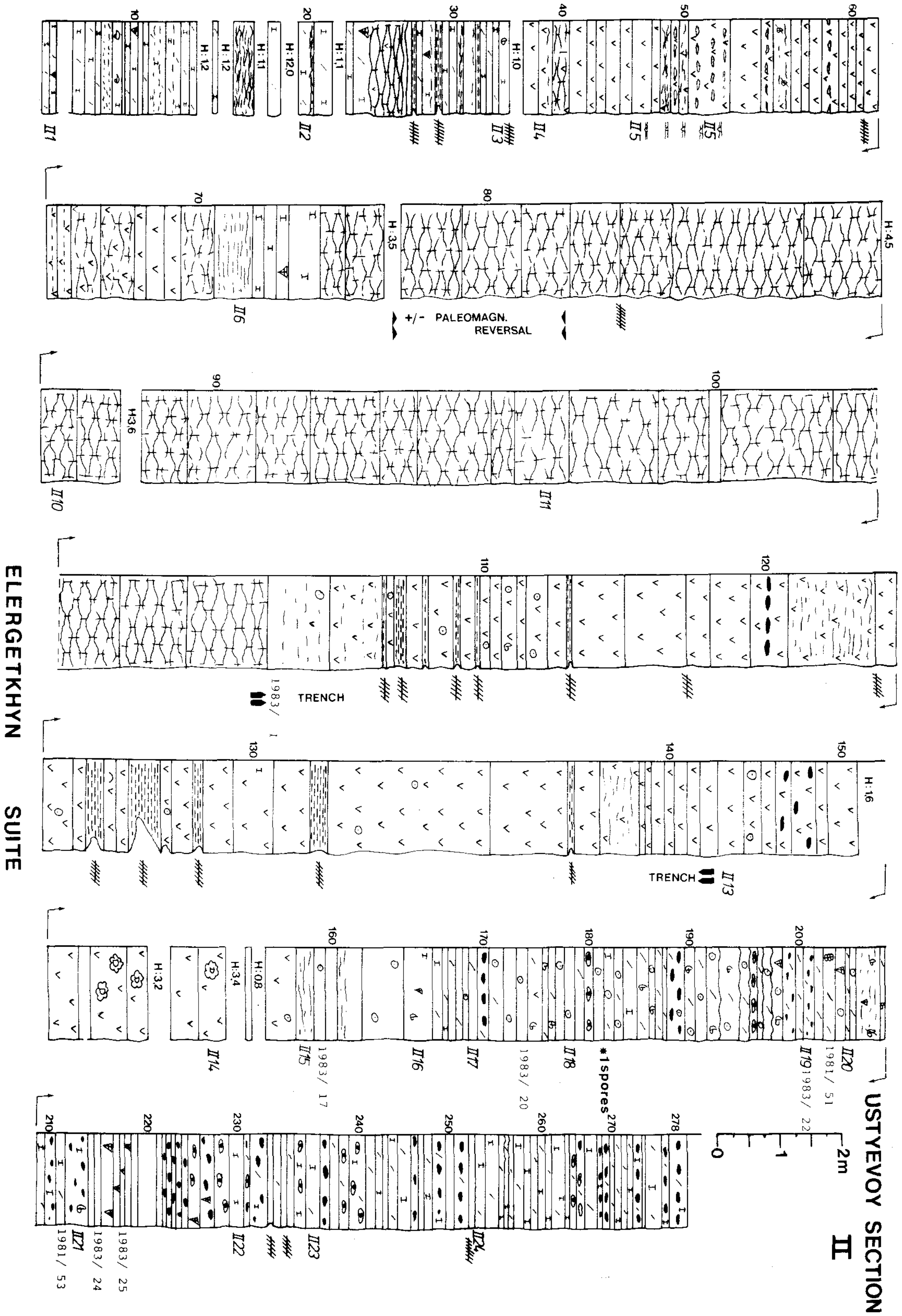

+/- PALEOMAGN. REVERSAL
TRENCH
ELERGETKHYN SUITE
*1 spores
USTYEVOY SECTION
II
2m

PLATE 4

PEREVALNY VALLEY : POVOROTNY SECTION IV

This section is well exposed except the middle part where shallow marine to hypersaline strata are presumed.

Mol Suite : The base is not exposed, the top of this Suite was taken beneath the first appearance of oolitic limestones.
Alternation of thin-bedded and massive bioclastic limestones (biosparite : bioclastic packstone). The occurrence of coated grains is very characteristic for these strata. Minor silicification and/or dolomitization phenomena are present.

Sikambr Suite : The first appearance of oolites was taken as the lowermost boundary of this Suite. The top is not exposed.
The lower part of this Suite is characterized by alternating sequences of the following strata :
- intrasparite to intrabiosparite (intraclastic packstone) ;
- oosparite (oolitic packstone ; plate 10.7) ;
- xeno- to hypidiotopic dolostone with silicified anhydrite nodules.

Several of these minor regressive sequences were recognized (IV-24/36).

The middle part consists of an alternation (plate 8.1) of black fine-grained algal limestones (with or without silicified anhydrite nodules : plate 8.2) and zebra-limestones (plate 8.3). In this section-part palisade calcite rosettes (plate 8.4) which probably are pseudomorphous after selenite occur. Below these alternating strata a limestone breccia is present (IV-37).
This section-part was sampled more in detail (bed by bed). The following sequence was recognized :
- algal micrites with cryptoalgal textures (plate 9.1) in alternation with palisade calcite rosettes (plate 8.4). Within the algal micrites lath-shaped calcite pseudomorphs probably after anhydrite are present. The crystal habitus of the palisade calcite crystals (plate 9.5) suggests that these crystals are pseudomorphous after selenite. Due to the growth of the palisade crystals the algal micrites often are brecciated and updomed (plate 9.6).
- algal micrites with or without silicified anhydrite nodules (plate 8.2). These nodules are often arranged in semi-continuous layers. They are composed by length-slow chalcedony (lutecite and quartzine) and mega-quartz. Small lath-shaped anhydrite crystals are still present in these mega-quartz crystals (plate 9.7) ; sometimes a felted-texture was recognized.
- alternation of zebra-limestones and algal micrites (plate 8.1). In both lithologies silicified anhydrite nodules occur. A genetical relation between both lithologies (i.e. the zebra-limestones are diagenetical recristallisation products of the algal micrites) seems to be present (plate 9.2 and 10.4).

The upper part of this Suite is composed by intrabiosparites (bioclastic to intraclastic packstone) with coated grains (IV-44/55).
This sequence points to a general regressive trend towards the middle part of the Sikambr Suite, with shallow sub- to supratidal restricted sedimentation conditions at the middle part. This is followed by a transgressive sequence with more open marine sedimentation conditions reflecting a slight deepening of the environment.

PLATE 4

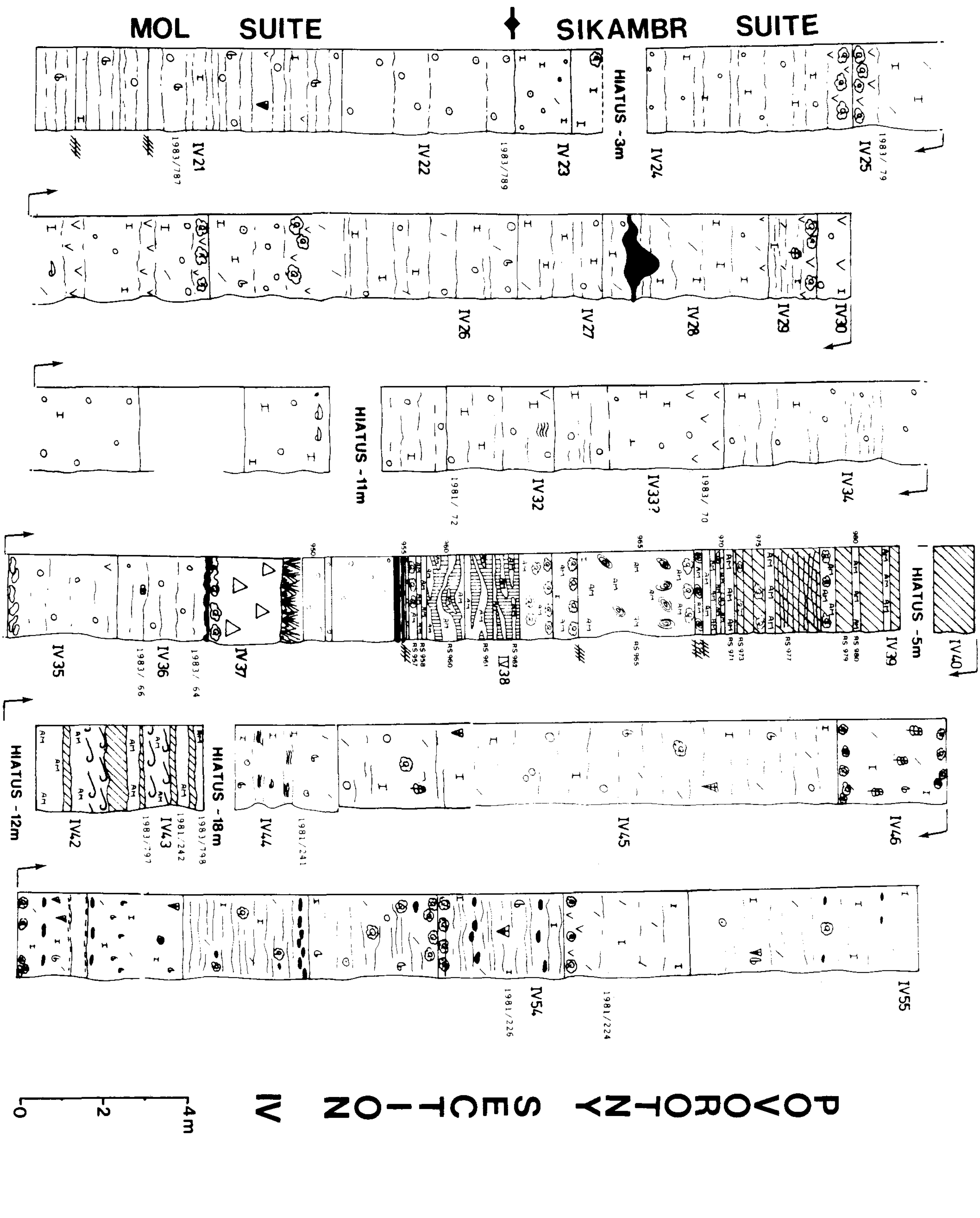

MOL SUITE
SIKAMBR SUITE
HIATUS -3m
IV21
IV22
IV23
IV24
IV25
IV26
IV27
IV28
IV29
IV30
HIATUS -11m
IV32
IV33?
IV34
IV35
IV36
IV37
IV38
IV39
HIATUS -5m
IV40
HIATUS -12m
IV42
IV43
HIATUS -18m
IV44
IV45
IV46
IV54
IV55
POVOROTNY SECTION IV
0
2
4m

PLATE 5

SIKAMBR VALLEY : SIKAMBR SECTION XXIII

This composite section occurs at the northeastern (A) and southeastern (B) side of the Sikambr mountain.

Mol Suite : The base is not present in this section ; the top of this Suite occurs on top of section A and is composed by massive, bioclastic limestones.

Characteristic feature of the lower part of this Suite is the occurrence of nodular limestones with shale intercalations. Cherts and bioclasts are common. Higher upwards these strata are intensively silicified and pyrite occurs. These last mentioned features clearly are related to the occurrence of a diorite dyke. On top of this Suite more massive bio- to intraclast packstone occur. Only few shale intercalations occur in this section part. In the uppermost part biopelsparites (pellitic packstone) occur (plate 12.1) ; few silicified anhydrite nodules are present.

These features clearly indicate a regressive succession with a depositional environment changing from subtidal to intertidal shelf.

Sikambr Suite : The base is well exposed in section A, where oolitic limestones occur. The top is not reached in none of the sections.

Oolitic to intraclastic limestones (oo- to intrasparites : oolitic to intraclastic packstone), which are often dolomitized and silicified. In both cases oolite-phantoms still remain (plate 12.3, 4, 5, 6). Towards the top of section B the dolomitization rate increases. A xenotopic dolostone is formed (plate 12.2). Silicified anhydrite nodules are common in these dolostones.

A regressive trend grading from a turbulent shallow marine subtidal environment to an inter- to supratidal environment is present.

PLATE 5

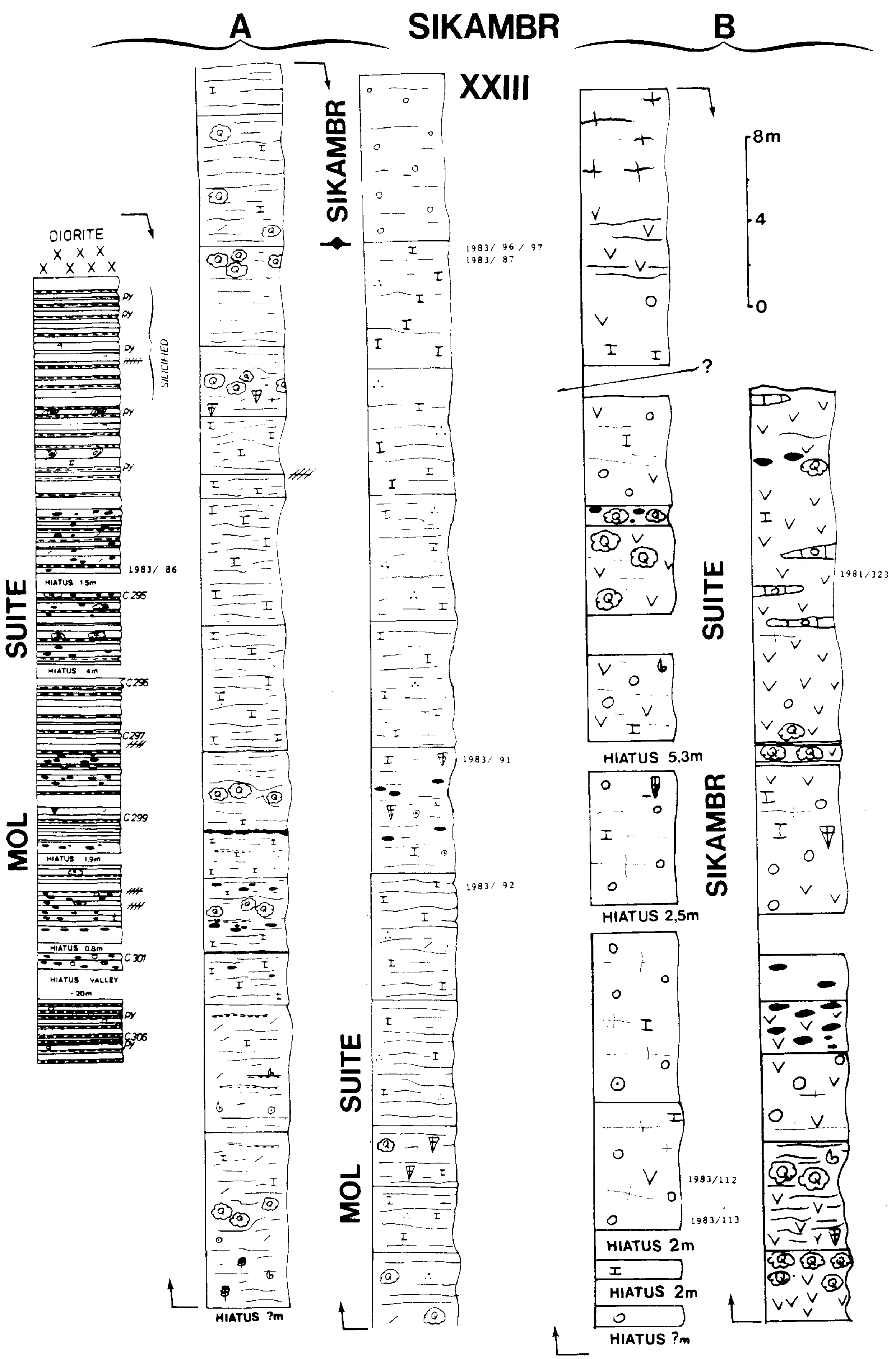

A
SIKAMBR
B
XXIII
SIKAMBR
DIORITE
py
SILICIFIED
1983/ 86
HIATUS 1.5m
C 295
SUITE
HIATUS 4m
C296
C297
C299
MOL
HIATUS 1.9m
HIATUS 0.8m
C 301
HIATUS VALLEY 20m
C306
HIATUS ?m
1983/ 96 / 97
1983/ 87
1983/ 91
1983/ 92
SUITE
MOL
8m
4
0
?
SUITE
1981/323
HIATUS 5,3m
SIKAMBR
HIATUS 2,5m
1983/112
1983/113
HIATUS 2m
HIATUS 2m
HIATUS ?m

PLATE 6

ULJAGAN AREA : TRINITI XXV and BAZOV XXIV SECTIONS

The strata occurring in the Uljagan area are characterized by their uniform lithology.

Triniti Suite : The base of this Suite was taken at the first appearance of (nodular) limestones, which overlay volcanogenic rocks. The top is characterized by nodular limestones, underlaying black silicified shales.

The nodular limestones with shale intercalations are comparable with the "Souverain-Pré" strata of E-Belgium. These strata were deposited in a "relatively deep" subtidal environment.

Uttykelly Suite : Silicified black shales occur from base to top within this Suite.

These black shales are intensively silicified (plate 14.1). Phthanites occur, as well as isolated lenses and nodules of thin bioclastic limestones (biomicrites : bioclastic wackstone). Many dark-grey spots occur within these strata ; they probably originate from annelids (plate 14.1).

Due to the intense silicification most of the sedimentary textures are obliterated. Therefore, it is difficult to receive correct informations concerning the depositional environment. With some reservations, a marine basinal depositional environment is presumed.

Khurendza Suite : In the upper part of the Bazov section, less intensively silicified bioclastic limestones occur ; they characterize the base of this Suite. The top is not exposed.

These strata consist of biomicrites (bioclastic mudstone to wackestone : plate 14.2). They often only yield a hash of bioclastic material. Crinoids, brachiopods and bryozoans occur.

These strata, which occur within a regressive phase, were deposited in a subtidal shelf environment.

ELERGETKHYN AREA : LIVAN XVI and GYTGYNPYLGIN XVII SECTIONS

Andylivan Suite : The base is characterized by the first occurrence of (bioclastic) limestones, which overlay volcanic rocks. The top occurs below the well-bedded silicified limestones with shale intercalations of the Gytgynpylgin Suite. The biosparites (bioclastic packstone) contain brachiopods in life-position, crinoids, stromatoporoids, corals and algae pointing to an open marine subtidal environment.

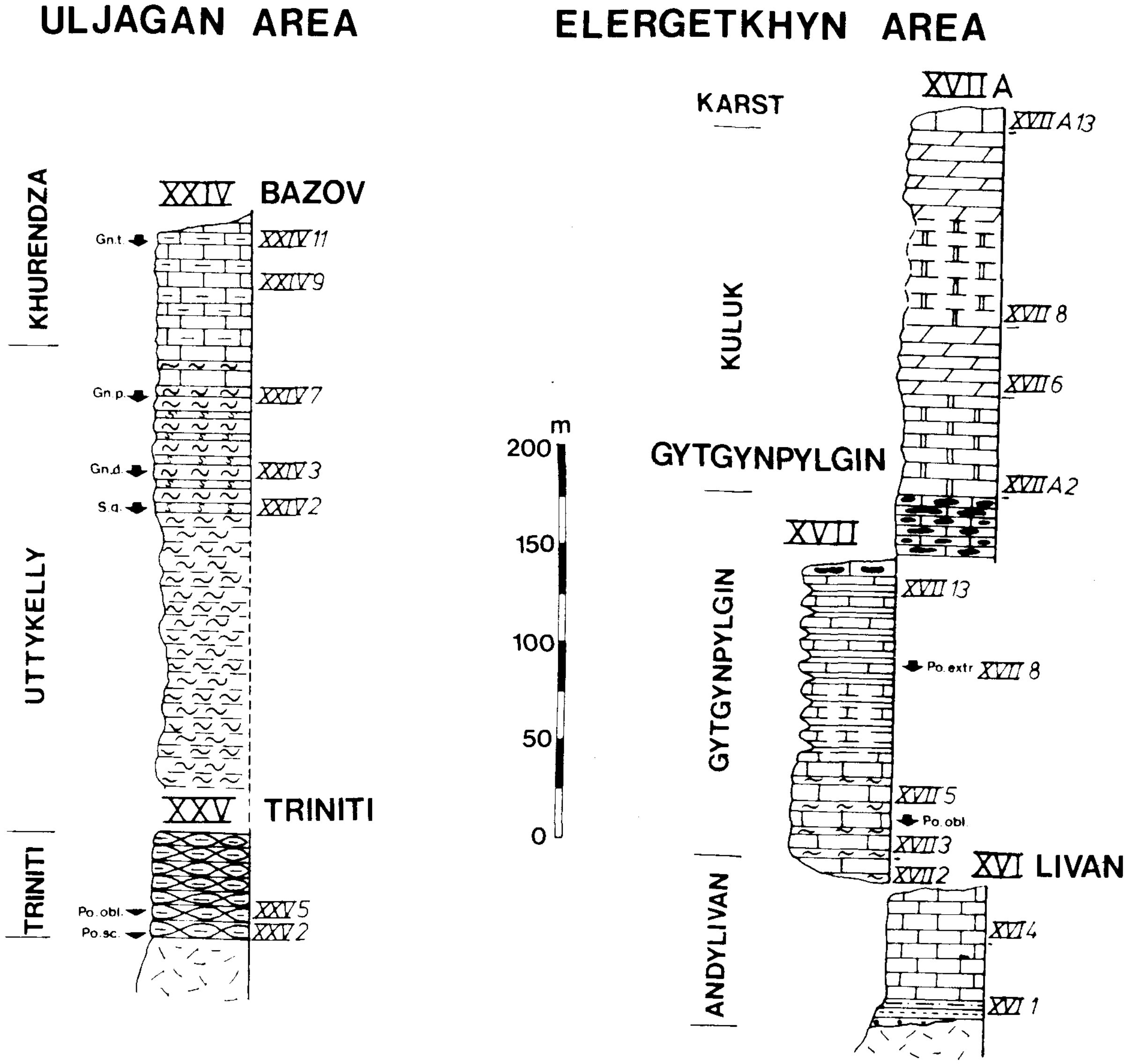
Gytgynpylgin Suite : The base as well as the top of this Suite are characterized by silicified limestones with shale intercalations and cherts respectively.

Uniformly thin-bedded silicified limestones with shale-intercalations occur in the lower part of this Suite. These strata are characterized by "flaser" textures. Pyrite concretions are common. Only very few macrofossils occur. Towards the top there is a clear decrease in shale content. These features point to a relatively deep subtidal environment.

Kuluk Suite : The first appearance of silicified anhydrite nodules within nodular limestones with cherts, characterize the base of this Suite. The top is characterized by red-coloured dolostones. Most important feature of this Suite is the occurrence of hypidiotopic dolostones (plate 13.1). Silicification of anhydrite nodules and chertification phenomena are present. At the top of this section, an evaporitic dolostone collapse breccia occurs.

This sequence clearly is regressive, with a depositional environment ranging from subtidal to inter- / supratidal.

PLATE 6



LEGEND

- : LIMESTONE
- : RESPECTIVELY ALGAL MICRITE AND BIOMICRITE
- : DOLOSTONE
- : DOLOMITIZED LIMESTONE
- : SHALY LIMESTONE
- : NODULAR LIMESTONE WITH SHALE INTERCALATIONS
- : SANDSTONE
- : SANDSTONE WITH NODULAR LIMESTONE INTERCALATIONS
- : SHALE AND/OR CLAY INTERCALATIONS
- : CONGLOMERATES WITH VOLCANOGENIC CLASTS
- : SILICITES (PHTHANITES, etc...)
- : ZEBRA LIMESTONE
- : PALISADE CALCITE
- : LIMESTONE BRECCIA

- / / : BIOCLASTIC (BIOSPARITE)
- : PELLETS
- I : INTRACLASTS
- o o : OOLITES
- : ONCOLITES

- : CORALS
- : STROMATOPORES
- : CRINOIDS
- : ALGAE
- : BRACHIOPODS
- : BROKEN BRACHIOPODS
- : GASTROPODS

- : CHERTS (MASSIVE)
- : CHERTS (RANDOM)
- : DOLOMITIZED ANHYDRITE NODULE
- : SILICIFIED ANHYDRITE NODULE
- PY : PYRITIZATION
- : BENTONITE
- : SILICIFICATION LAYERS
- : SLUMP

PLATE 7

ELERGETKHYN LAKE AREA : KARST MOUNTAIN SECTION XVIIIA

Karst Suite : The lower boundary with the Kuluk Suite is not exposed. The upper boundary (XVIII-7) was taken below the first appearance of oolites, however at this contact a fault was recognized.

Thick-bedded (massive) bioclastic limestones (bioclastic packstone : plate 13.3, 4) with coated grains. Around the crinoid ossicles as well as around the brachiopod shell-fragments a syntaxial overgrowth (rim cement) is present. Foraminifera, algae and algal filaments (*Kamaena* ?) are nearly completely micritized. Detritical quartz grains are absent. Locally oncosparites (oncolitic packstone) occur as for example in XVIII-3. Dolomitization, silicification and chertification phenomena are present ; they occur as scattered spots all over the Suite (plate 13.5).

Due to the presence of an oblique fault, the uppermost strata can only be studied in the western part of this section. However only debris is present. In this "debris level" many silicified and dolomitized anhydrite nodules are present. As in other sections these "hypersaline" levels often are eroded.

The lithological sequence suggests a regressive tendency, grading from subtidal shelf deposits (biosparite) towards intertidal (oncosparite) and/or supratidal sedimentary environments.

Sikambr Suite : The lower boundary (XVIII-8) was taken at the first occurrence of oolitic limestones. The top of this Suite is absent, however only few meters are lacking (XVIII-21).

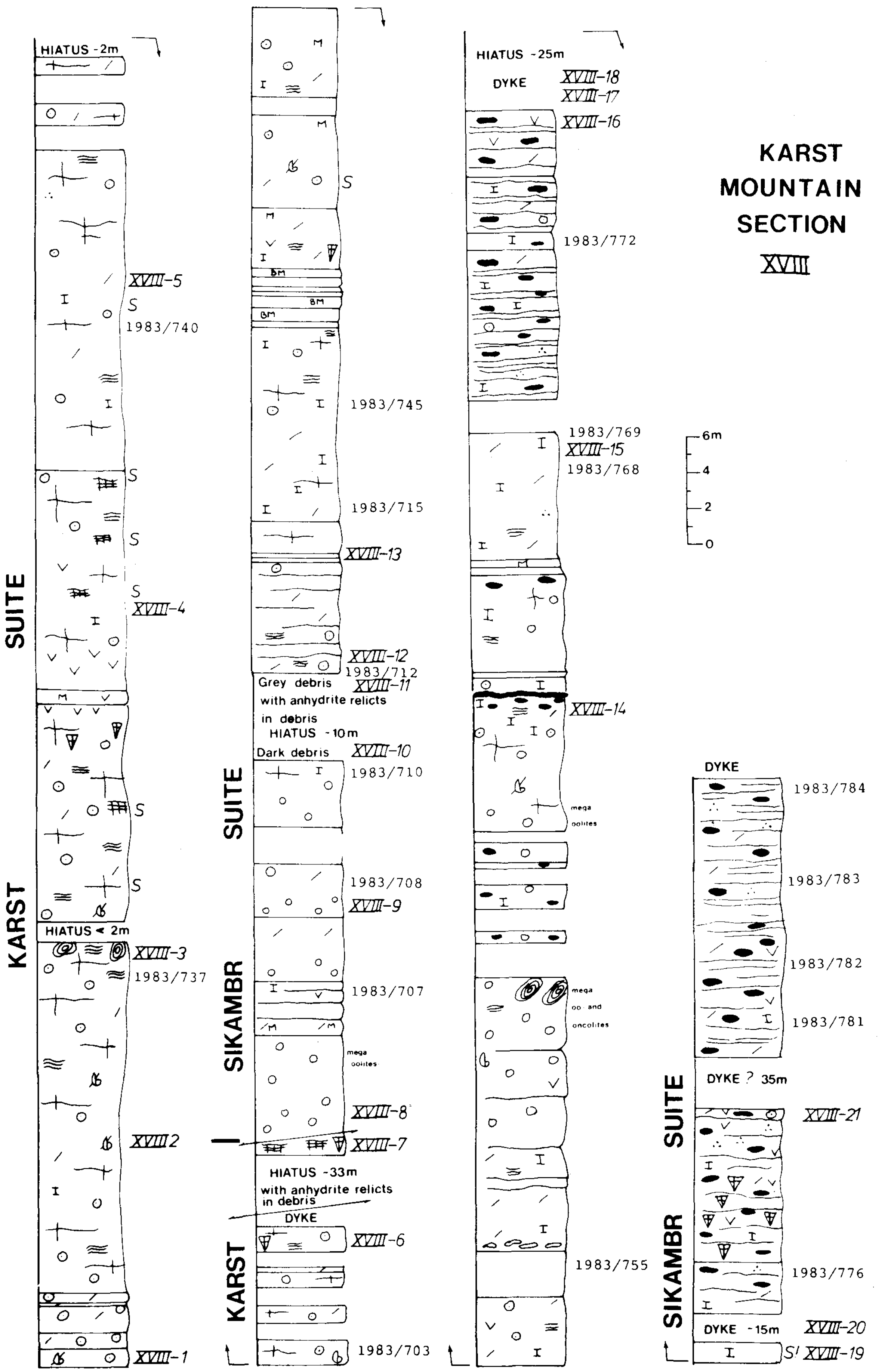
Alternation of oosparite (oolitic packstone : plate 13.6) with intrabiosparite (bioclastic packstone : plate 13.7). Towards the top biopelsparites (pelletic packstone : plate 13.8) occur more frequently. These strata are comparable with those of the Sikambr section XXIII and/or Povorotny section IV. The oolites are often well-developed ; mega-oolites with a diameter up to 4 mm occur (plate 13.6). Most of the bioclasts are coated around crinoids. Sometimes a syntaxial rim cement is present.

Towards the top cherts are common. They can range up to 40 cm in diameter. A relation between these cherts and the occurrence of dykes cannot be excluded. Spots of dolomitization and silicification, mostly occurring together, are scattered over this Suite. A genetic relation between both seems to be present.

In the lower part of this Suite a hiatus (10 m) is present. In this exposure gap many silicified anhydrite nodules occur in the debris.

The lithological sequence suggests a subtidal shallow marine environment, with a small regressive period (near XVIII-11) where anhydrite nodules were formed probably in a supratidal environment.

PLATE 7


KARST MOUNTAIN SECTION XVIII
KARST SUITE
HIATUS -2m
XVIII-5
S
1983/740
XVIII-4
HIATUS < 2m
XVIII-3
1983/737
XVIII 2
XVIII-1
1983/745
1983/715
XVIII-13
XVIII-12
1983/712
Grey debris with anhydrite relicts in debris
XVIII-11
HIATUS -10m
Dark debris
XVIII-10
1983/710
SIKAMBR SUITE
1983/708
XVIII-9
1983/707
mega oolites
XVIII-8
XVIII-7
HIATUS -33m with anhydrite relicts in debris
DYKE
XVIII-6
KARST
1983/703
HIATUS -25m
DYKE
XVIII-18
XVIII-17
XVIII-16
1983/772
1983/769
XVIII-15
1983/768
XVIII-14
mega oolites
mega oo- and oncolites
1983/755
6m
4
2
0
DYKE
1983/784
1983/783
1983/782
1983/781
DYKE ? 35m
XVIII-21
SIKAMBR SUITE
1983/776
DYKE -15m
XVIII-20
S' XVIII-19

LITHOLOGY (plates 8 to 14)

(Rudy SWENNEN & Tanya P. RAZINA)

Most of the figured lithologies are representative for the lithological sequence of a certain section of Suite. Samples have been stored at Leuven (Fysico-chemische geologie, K.U.L.) for the RS-specimens, and at Louvain-la-Neuve (Laboratoire de Paléontologie, U.C.L.) for the RC-specimens. The other samples are deposited in the collections of SVKNII (Magadan).

PLATE 8

POVOROTNY SECTION IV

1. Lithological sequence in the Povorotny-section IV near IV-39. Here an alteration between black fine-grained limestones (with or without silicified anhydrite nodules) (upper part : A) and zebra - limestones (lower part : B) occurs. Sometimes small palisade calcite rosettes occur also in this sequence. Sample 979/980, Povorotny section IV, SIKAMBR SUITE.

2. Black-coloured, finely-laminated algal micrites. In bed 957 many silicified anhydrite nodules occur. They often are arranged in semi-continuous layers. These nodules are characterized by a coalescence structure (chicken-wire-structure). Sample 957/958, Povorotny section IV, SIKAMBR SUITE.

3. Zebra-limestone, which is characterized by an alteration of white coarse-grained layers with fine-grained thin black layers. Typical aspects of these zebra-structures are :
   - A : small teepee-like structures
   - B : small fault-like displacements, which crosscut several layers.

   Sample 977, Povorotny section IV, SIKAMBR SUITE.

4. Alternation of palisade calcite rosettes and algal laminites. Due to the growth of the palisade crystals the algal micrites were brecciated ; a kind of updoming occurs (see also plate 9.6). These palisade crystals show similar features like the "cavoli-cabbage" selenite rosettes of the Solifera Formation of Sicilië. Therefore these palisade calcite rosettes probably are pseudomorphous after selenite. Sample 961, Povorotny section IV, SIKAMBR SUITE.

PLATE 8

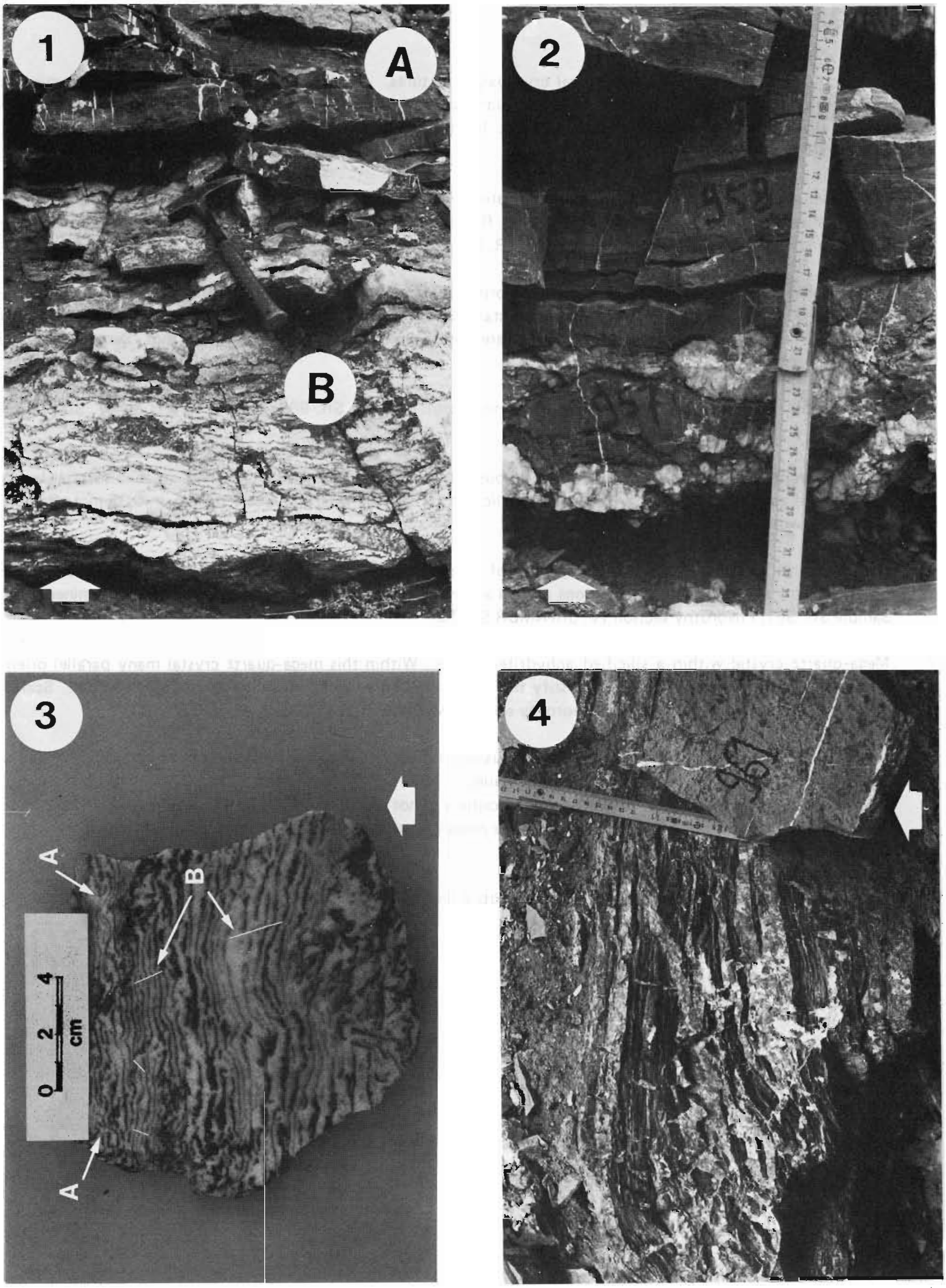


PLATE 9

POVOROTNY SECTION IV

1. Black-coloured algal micrite with typical cryptoalgal textures. These textures are composed by thin micritic filaments of algae, often containing detritical quartz grains. The central cavity is filled by calcite ; two generations can be distinguished (A and B). Scale : 1 cm = 0,35 mm. Sample SR. 971, Povorotny section IV, SIKAMBR SUITE.

2. Brecciated algal micrite with typical fine-laminated cryptoalgal texture. This breccia is cemented by 2 generations of calcite causing a zebroid-like texture. Remark that brecciation occurs preferentially along the dense algal layers. Scale : 1 cm = 1,75 mm. Sample SR. 961, Povorotny section IV, SIKAMBR SUITE.

3. Algal micrite with lath-shaped calcite pseudomorphs probably after anhydrite, reflecting highly saline depositional conditions. Several authigenic quartz crystals (Q) are present. In most of them a detritical quartz grain occurs in the center showing that these grains were used as nuclei. Scale : 1 cm = 0,35 mm. Sample SR. 960, Povorotny section IV, SIKAMBR SUITE.

4. Algal micrite with large oncolites (diameter up to 4 cm). Sample SR. 965, Povorotny section IV, SIKAMBR SUITE.

5. Palisade calcite crystals, probably pseudomorphous after selenite. These crystals grew on micrite algal layers (A). In this case these micrites are intensively silicified (Q = mega-quartz). Scale : 1 cm = 0,35 mm. Sample SR. 962, Povorotny section IV, SIKAMBR SUITE.

6. Updomed algal micrites (A), due to the growth of palisade crystals (P). These palisade crystals which can range up to 20 cm, are zoned. Field relations as well as petrographic features suggest a former selenite mineralogy. Sample SR. 961, Povorotny section IV, SIKAMBR SUITE.

7. Mega-quartz crystal within a silicified anhydrite nodule. Within this mega-quartz crystal many parallel orientated lath-shaped anhydrite relics (A) testify that these nodules originally were composed of anhydrite. Scale : 1 cm = 0,09 mm. Sample SR. 965, Povorotny section IV, SIKAMBR SUITE.

8. Mega-quartz crystals with lath-shaped calcite inclusions, reflecting the following history :
   1. early-diagenetic precipitation of anhydrite nodules.
   2. silicification by chalcedony (length-slow chalcedony : not shown in figure) and mega-quartz. Small lath-shaped anhydrite crystals still remain within the mega-quartz crystals.
   3. dissolution of anhydrite relics.
   4. the remaining cavities are filled up by calcite.

   Scale : 1 cm = 0,35 mm. Sample SR. 973, Povorotny section IV, SIKAMBR SUITE.

PLATE 9

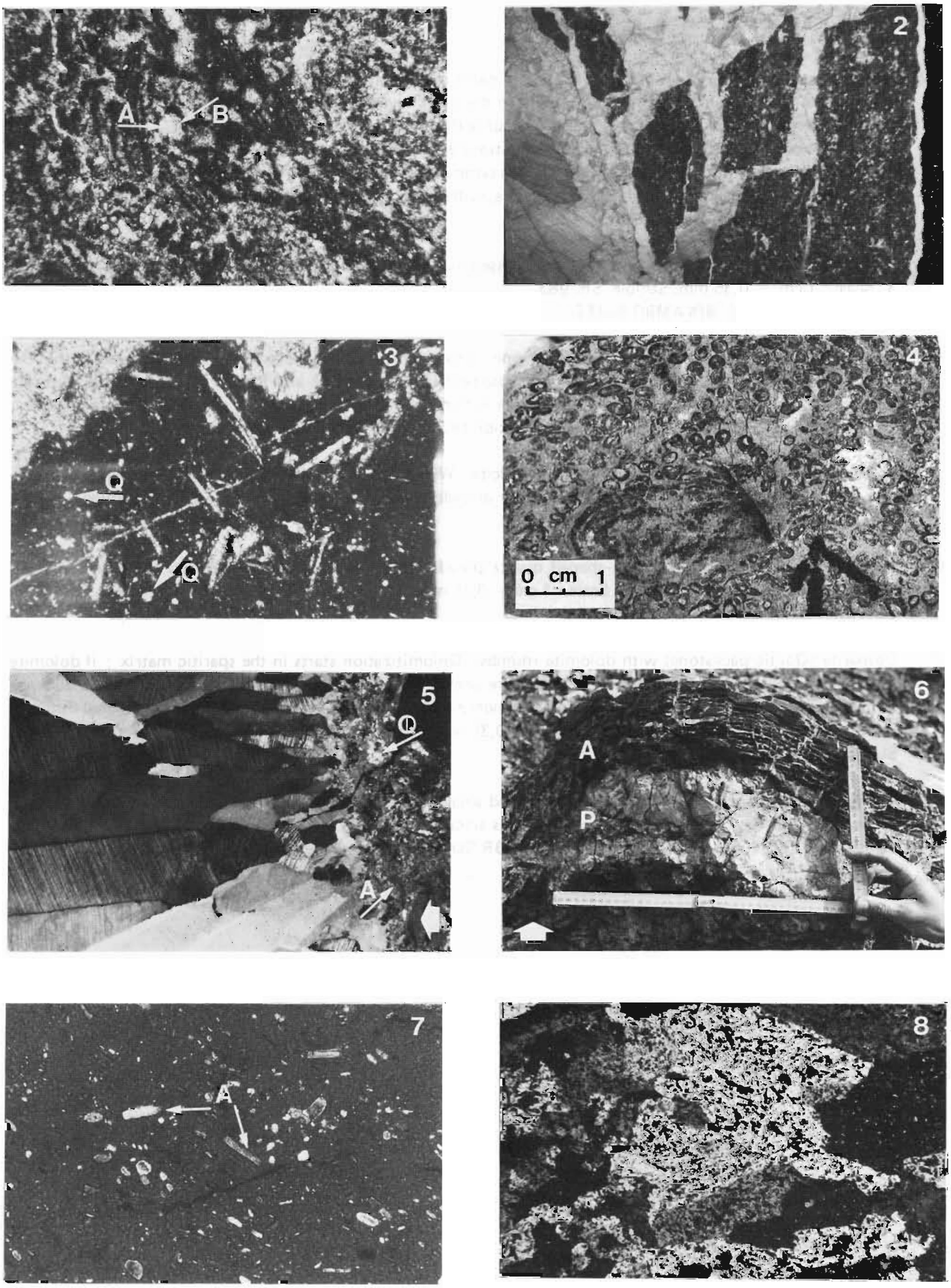


PLATE 10

POVOROTNY SECTION IV

1.2.3. Zebra-textures. Alternation of black finely laminated micrite layers with white coarse-grained calcite. Typical are the small fault-like displacements (F). Within the black layers (A) cryptoalgal textures are present. Sometimes autigenic and detrital quartz crystals (Q) occur within these micrite layers.
Within the coarse-grained layers two calcite generations are present (B and C). They are grouped in a symmetrical arrangement around the cryptoalgal layers (A). This symmetrical arrangement which is of the type ABCBABCBA... indicates a diagenetical origin on the zebra-textures, rather than a sedimentary origin. Otherwise the arrangement should be of the type ABCABCABC . . .
1. Scale : 1 cm = 1,5 mm. Sample SR. 983
2. Scale : 1 cm = 1,5 mm. Sample SR. 983, crossed nicols
3. Scale : 1 cm = 0,35 mm. Sample SR. 983
Povorotny section IV, SIKAMBR SUITE.

4. Contact between algal micrite and zebra-limestone. From this picture it is clear that the black layers within the zebra-limestone are equivalent to the dense cryptoalgal laminations (see also Plate 9, 2). The small fault-like displacements, which are the most typical feature within the zebra-limestones, are clearly present (F). Scale : 1 cm = 1,55 cm. Sample SR. 982, Povorotny section IV, SIKAMBR SUITE.

5. Brecciated algal micrite, cemented by a sparry calcite. Within the overlaying microsparite with cryptoalgal texture several clusters of quartz pseudomorphs after anhydrite occur. Scale : 1 cm = 1,27 mm. Sample SR. 962, Povorotny section IV, SIKAMBR SUITE.

6. Detail of figure 5. Cluster of lath-shaped quartz pseudomorphs after anhydrite. Within the quartz crystals minute anhydrite relics are present. Scale : 1 cm = 0,35 mm. Sample SR. 962, Povorotny section IV, SIKAMBR SUITE.

7. Oosparite (Oolitic packstone) with dolomite rhombs. Dolomitization starts in the sparitic matrix ; if dolomite penetrates into oolites an oolitic phantom texture occurs (P). Typical lithology for the base of the Sikambr Suite. At certain levels within this section the dolomitization has completely transformed the original lithology into a hypidiotopic dolostone. Scale : 1 cm = 0,35 mm. Sample SR. 952, Povorotny section IV, SIKAMBR SUITE.

8. Biomicrite (Bioclastic wackestone) with corals and algal relicts (A). The original sparite infilling of the corals is nearly completely dolomitized (D). Sometimes silicification (S) is also present. Scale : 1 cm = 0,35 mm. Sample RC. 21791, Povorotny section IV, SIKAMBR SUITE ("grand rocher noir") of R. Conil).

PLATE 10

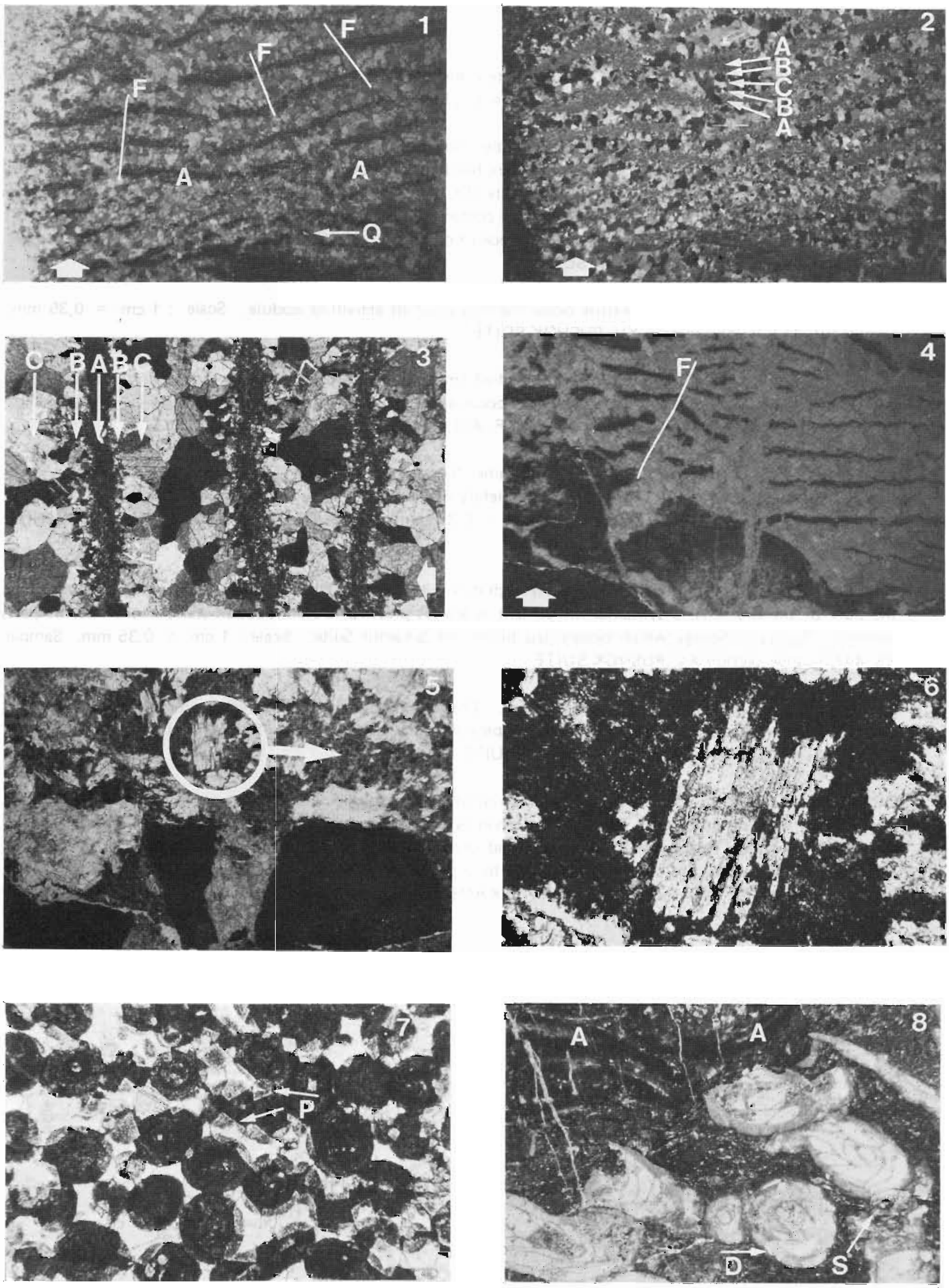


PLATE 11

PUSHOK SECTION XV

1. Hypidio- to xenotopic dolostone. A sparry calcite cement (C) occurs in between the dolomite crystals. Scale : 1 cm = 0,35 mm. Sample SR. 419, Pushok section XV, PUSHOK SUITE.

2. Dedolomitization textures occurring in the hypidio- to xenotopic dolostone. The dedolomitization textures especially occur next to former cavities, which are bordered by euhedral dolomite rhombs (D). These cavities are filled by coarse-grained monocrystalline calcite (C). The calcite, which occurs in the core of the dolomite rhombs (dedolomitization textures), is in optical continuity with the "central-cave" calcite. The dedolomitization textures are often associated by the presence of goethite spots (G). Scale : 1 cm = 0,35 mm. Sample SR. 419, Pushok section XV, PUSHOK SUITE.

3. Mega-quartz crystal with felted texture occurring in a silicified anhydrite nodule. Scale : 1 cm = 0,35 mm. Sample SR. 413, Pushok section XV, PUSHOK SUITE.

4. Small dolomite euhedra occurring within a silicified (mega-quartz and length/slow chalcedony) anhydrite nodule. This texture indicates that dolomitization occurred before silicification. A felted texture is present in the silica phases. Scale : 1 cm = 0,35 mm. Sample SR. 420, Pushok section XV, PUSHOK SUITE.

5. Biosparite (Bioclastic packstone) with coated grains. Most of the bioclasts (foraminifera (F), brachiopod shells (B), echinoids (E), etc. . . .) are partly or completely micritized. Typical lithology of the coral-enriched levels (cf. Simakov *et al.,* 1983, fig. 12). Scale : 1 cm = 0,35 mm. Sample RS. 440, Pushok section XV, PUSHOK SUITE.

6. Pelbiosparite (pelletic to bioclastic packstone) with dolomite rhombs (D). Around the crinoids, which make up the bulk of the bioclasts, a syntaxial rim cement is always present. Dolomitization starts in the micritic parts (pellets). Typical lithology which occurs just below the Sikambr Suite. Scale : 1 cm = 0,35 mm. Sample RS. 447, Pushok section XV, PUSHOK SUITE.

7. Oosparite (Oolitic packstone) with coated grains. These coated grains often develop around (broken) crinoid ossicles. The oolites are completely micritized. Typical lithology of the Sikambr Suite. Scale : 1 cm = 0,35 mm. Sample RS. 471, Pushok section XV, SIKAMBR SUITE.

8. Dedolomitized oosparite (Oolitic packstone). Originally an oosparite with few coated grains (C) was present. These strata were dolomitized. The fact that rhombs occur especially in between ooids, as well as in coated crinoid grains, shows that dolomitization occurred *selectively and* started in the coarse-grained sparite phases. At present these rhombs are completely replaced by a polycrystalline mosaic of calcite crystals. Scale : 1 cm = 0,35 mm. Sample SR. 451, Pushok section XV, SIKAMBR SUITE.

PLATE 11

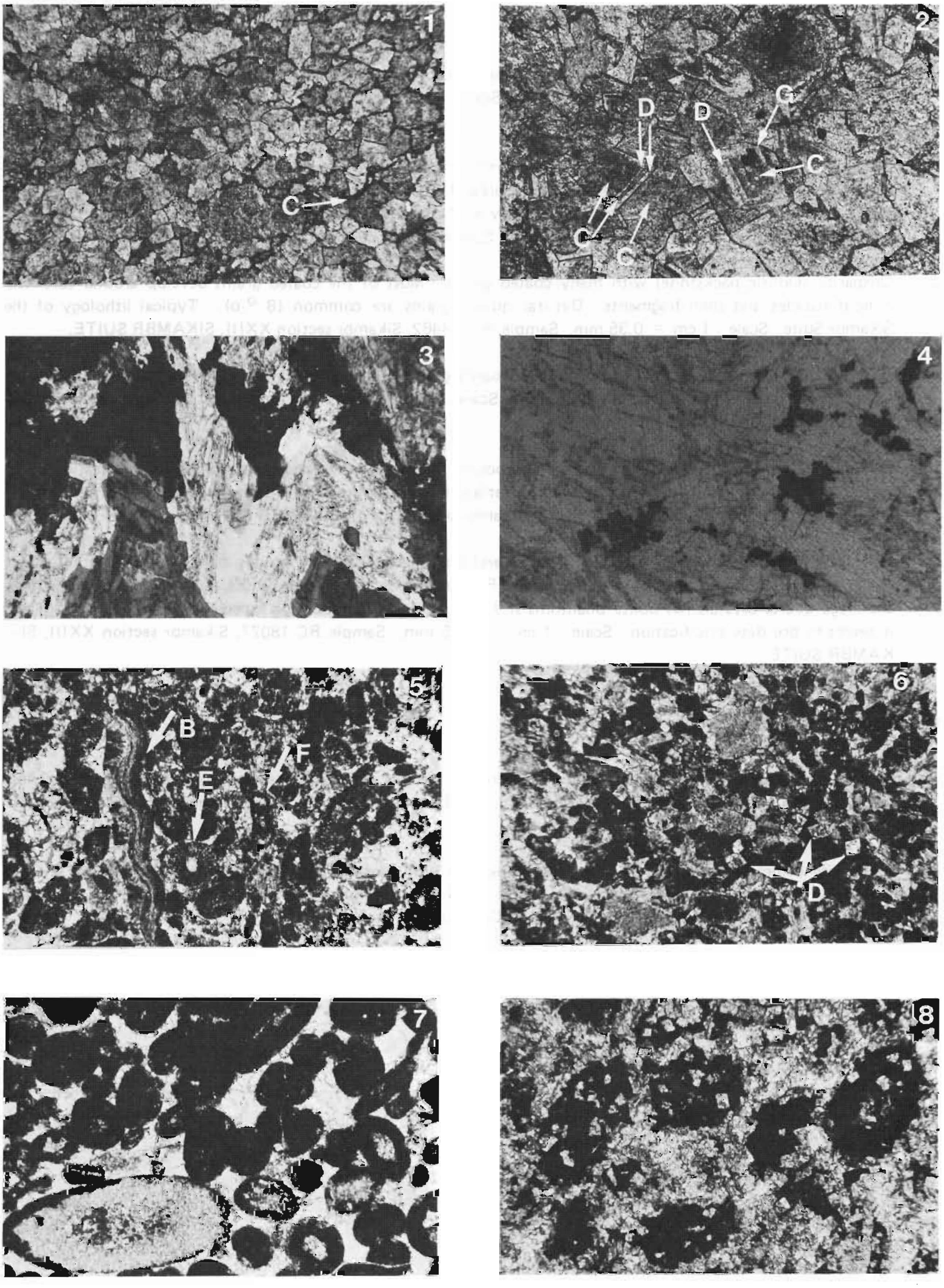


PLATE 12

SIKAMBR SECTION XXIII

1. Biopelsparite (pelletic packstone). Brachiopod shells, (broken) crinoid ossicles and algal fragments are present. Typical lithology just below the Sikambr Suite. Scale : 1 cm = 0,35 mm. Sample RC. 22268, Sikambr section XXIIIB, MOL SUITE.

2. Xenotopic dolostone with calcite remnants occurring in bioclasts. The upper part, which is nearly completely dolomitized, originally was a biopelsparite (see plate 12.1). The lower calcitic part occurs within a gastropod relict. Several zoned dolomite rhombs (R) already are present in this calcite remnant. Scale : 1 cm = 0,35 mm. Sample RC. 22263, Sikambr section XXIIIB, MOL SUITE.

3. Oosparite (Oolitic packstone) with many coated grains. Most of the coated grains develop around (broken) crinoid ossicles and shell-fragments. Detrital quartz grains are common (8 $^{o}/o$). Typical lithology of the Sikambr Suite. Scale : 1 cm = 0,35 mm. Sample RC. 18462, Sikambr section XXIII, SIKAMBR SUITE.

4. Oosparite (Oolitic packstone), sometimes with coated grains. The oolites are completely micritized. Typical lithology of the upper part of the Sikambr Suite. Scale : 1 cm = 0,35 mm. Sample RC. 18465, Sikambr section XXIII, SIKAMBR SUITE.

5. Dolomitized oosparite (Oolitic packstone). The oolites are nearly completely micritized. Dolomitization starts in the sparitic matrix. If dolomite rhombs penetrate into an oolite, a phantom oolite texture is present (P). Scale : 1 cm = 0,17 mm. Sample RC. 18077, Sikambr section XXIII, SIKAMBR SUITE.

6. Oosparite (Oolitic packstone) with silicification and dolomitization. The oolites are nearly completely micritized ; pressure/solution contacts are present)P). Few crinoid ossicles, with a syntaxial rim cement occur. Within the mega-quartz crystals (Q) oolite-phantoms still are visible. Dolomitization especially occurs along stylolites; it seems to pre-date silicification. Scale : 1 cm = 0,35 mm. Sample RC 18077, Sikambr section XXIII, SI– KAMBR SUITE.

ELERGETKHYN AREA

7. Biomicrite (Bioclastic wackestone) with many crinoid ossicles and *Kamaena*-like algal tubes. Some detrital quartz grains ($\sim$ 3 $^{o}/o$) are present. Scale : 1 cm = 0,35 mm. Sample RS. G801, Livan section XVI, ANDYLI-VAN SUITE.

8. Biomicrite (Bioclastic mudstone). Clay - rich limestone with many broken bioclasts (hash) which are laying parallel to the bedding plane. Scale : 1 cm = 0,35 mm. Sample RS. G810, Livan section XVI, boundary between ANDYLIVAN SUITE and GYTGYNPYLGIN SUITE.

PLATE 12

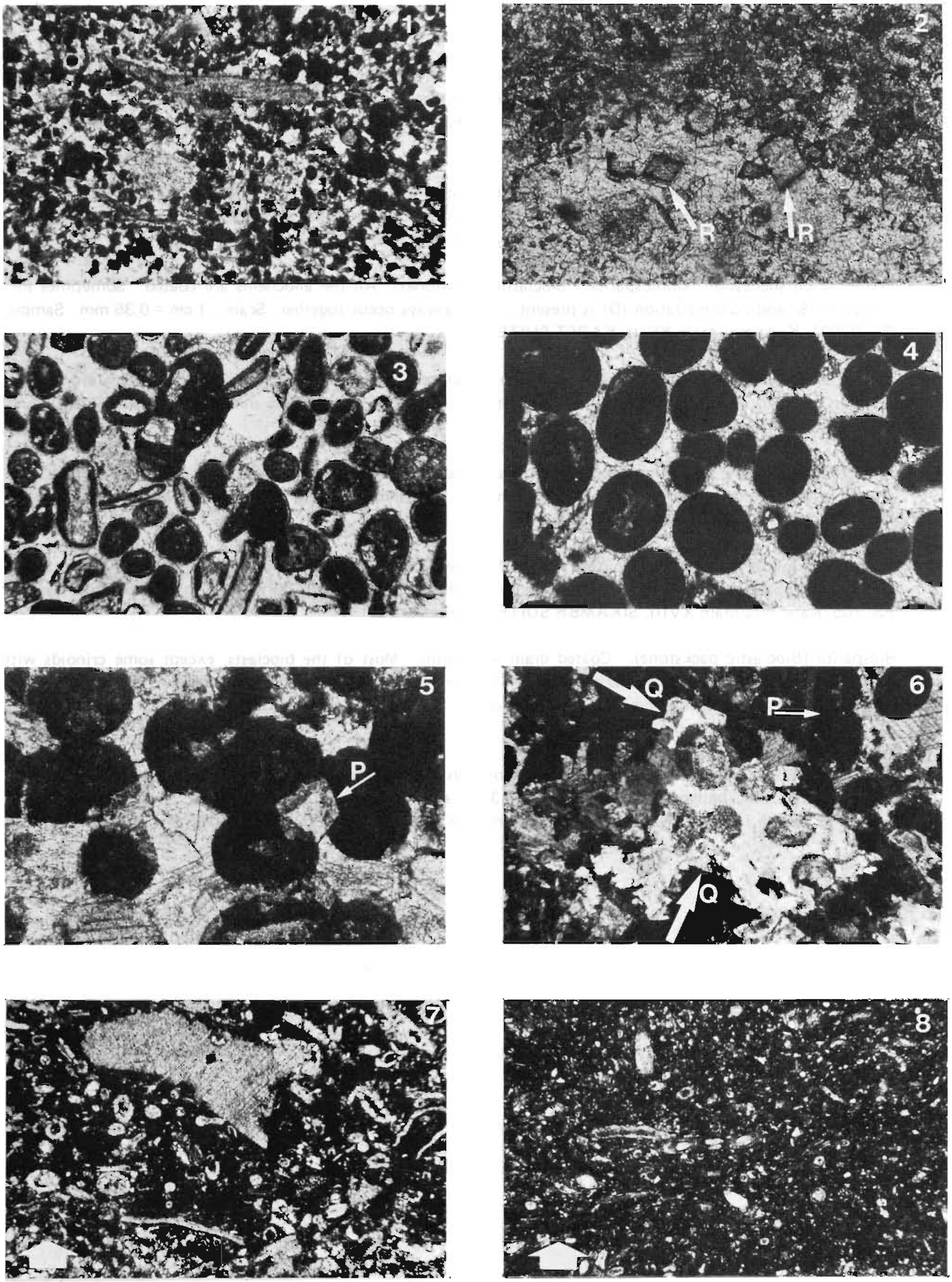


PLATE 13

ELERGETKHYN AREA

1. Hypidiotopic dolostone. Zoned textures are visible ; however they are only slightly pronounced. Features elsewhere within these strata show that dolomitization occurred before the chertification and silicification of anhydrite nodules. Scale : 1 cm = 0,35 mm. Sample RS-K 833.1, Gytgynpylgin section XVIIA, KULUK SUITE.

2. Chert (microcrystalline chalcedony) with ostracode relict which is replaced by length/fast chalcedony. The small dolomite rhombs (D), which occur within the chert, testifie that dolomitization occurred before chertification. Scale : 1 cm = 0,35 mm. Sample RS-K 833.3, Gytgynpylgin section XVIIA, KULUK SUITE.

3. Coated grain succession (Oobiosparite : bioclastic packstone). All the allochems are coated. Sometimes silicification (S) and dolomitization (D) is present ; they always occur together. Scale : 1 cm = 0,35 mm. Sample RC. 22091, Karst mountain XVIII, KARST SUITE.

4. Biosparite (Bioclastic packstone). Intensively recrystallized limestone, with syntaxial overgrowth around the crinoids. The foraminifers are completely micritized. Scale : 1 cm = 0,35 mm. Sample RC. 22051, Karst mountain XVIII, KARST SUITE.

5. Idio- to hypidiotopic dolostone occurring in small lenses, especially near bedding planes. A clotted texture is present within the dolomite crystals. Scale : 1 cm = 0,35 mm. Sample RC. 22250, Karst mountain XVIII, KARST SUITE.

6. Oosparite (Oolitic packstone). Oolites, with a diameter up to 4 mm occur at the base of the Sikambr Suite. Silicification (S) and dolomitization (D) (Idio- to hypidiotopic type) both start in the sparitic cement. Sample RS. 705, Karst mountain XVIII, SIKAMBR SUITE (Lower part).

7. Biosparite (Bioclastic packstone). Coated grain succession. Most of the bioclasts, except some crinoids with syntaxial rim cement, possess a micrite coating. *Kamaena*-like algal tubes are very common. Silicification (S) is present only in the crinoid ossicles. Scale : 1 cm = 0,35 mm. Sample RC. 22105, Karst mountain XVIII, SIKAMBR SUITE (Middle part).

8. Pelsparite (Pelletic packstone) with few crinoid ossicles with syntaxial rim cement. At the top of the Sikambr Suite an alternation between pelsparites (Plate 13, 8) and coated grain strata (Plate 13, 7) is present. Scale : 1 cm = 0,35 mm. Sample RC. 22121, Karst mountain XVIII, SIKAMBR SUITE (Upper part).

PLATE 13

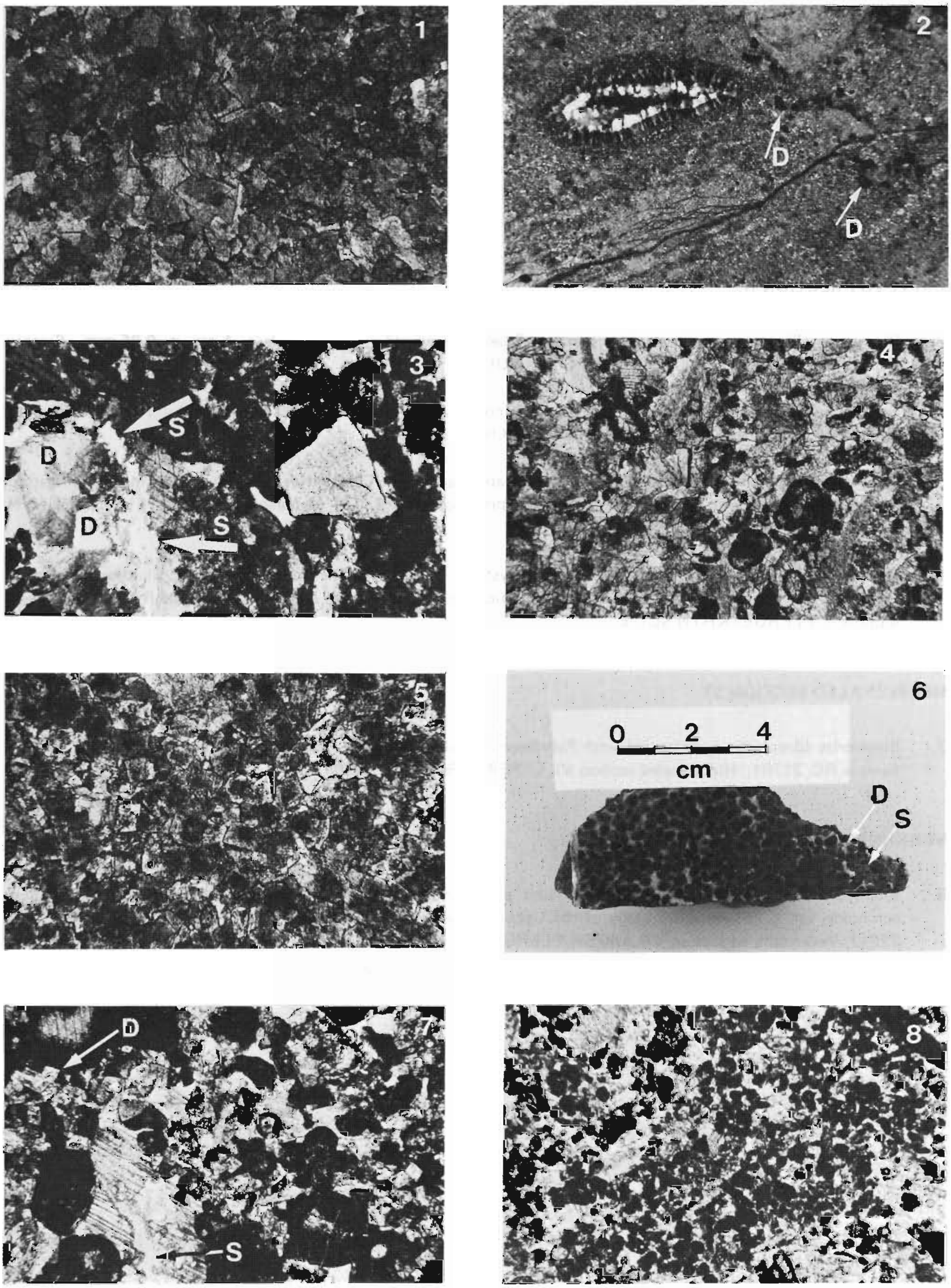


PLATE 14

BAZOV SECTION (XXIV)

1. Intensively silicified (crypto-chalcedony) fine-grained limestone with dark-grey spots (S). These spots probably are annelid traces (burrows). Bed XXIV-3, Bazov section XXIV, UTTYKELLY SUITE.

2. Intensively silicified (crypto-chalcedony) biomicrite (bioclastic mudstone) with few crinoid relics. Within the matrix several detritical quartz grains occur next to components of bioclastic materials. These components are ordered parallel to the bedding plane. Scale : 1 cm = 0,35 mm. Sample RC. 22073, Bazov section XXIV, KHURENDZA SUITE.

USTYEVOY SECTION II

3. Biomicrite (Bioclastic wackstone) with many *Palaeoberesella*-like algae. Scale : 1 cm = 0,35 mm. Sample RS. 104, Ustyevoy section II, ELERGETKHYN SUITE.

4. Biopelsparite (Pelletic packstone) with broken crinoid ossicles and foraminifer tests. Scale : 1 cm = 0,35 mm. Sample RS. 225, Ustyevoy section II, ELERGETKHYN SUITE.

5. Xenotopic dolostone (probably dolomitized intrapelsparite) with clotted texture. Locally small silicification phenomena are present. Scale : 1 cm = 0,35 mm. Sample RS. 121, Ustyevoy section II, ELERGETKHYN SUITE.

6. Hypidiotopic dolostone with zoned dolomite crystals. In between the dolomite crystals, silicification phenomena (S : mega-quartz) occur in the remaining micrite (M). Scale : 1 cm = 0,35 mm. Sample RS. 106, Ustyevoy section II, ELERGETKHYN SUITE.

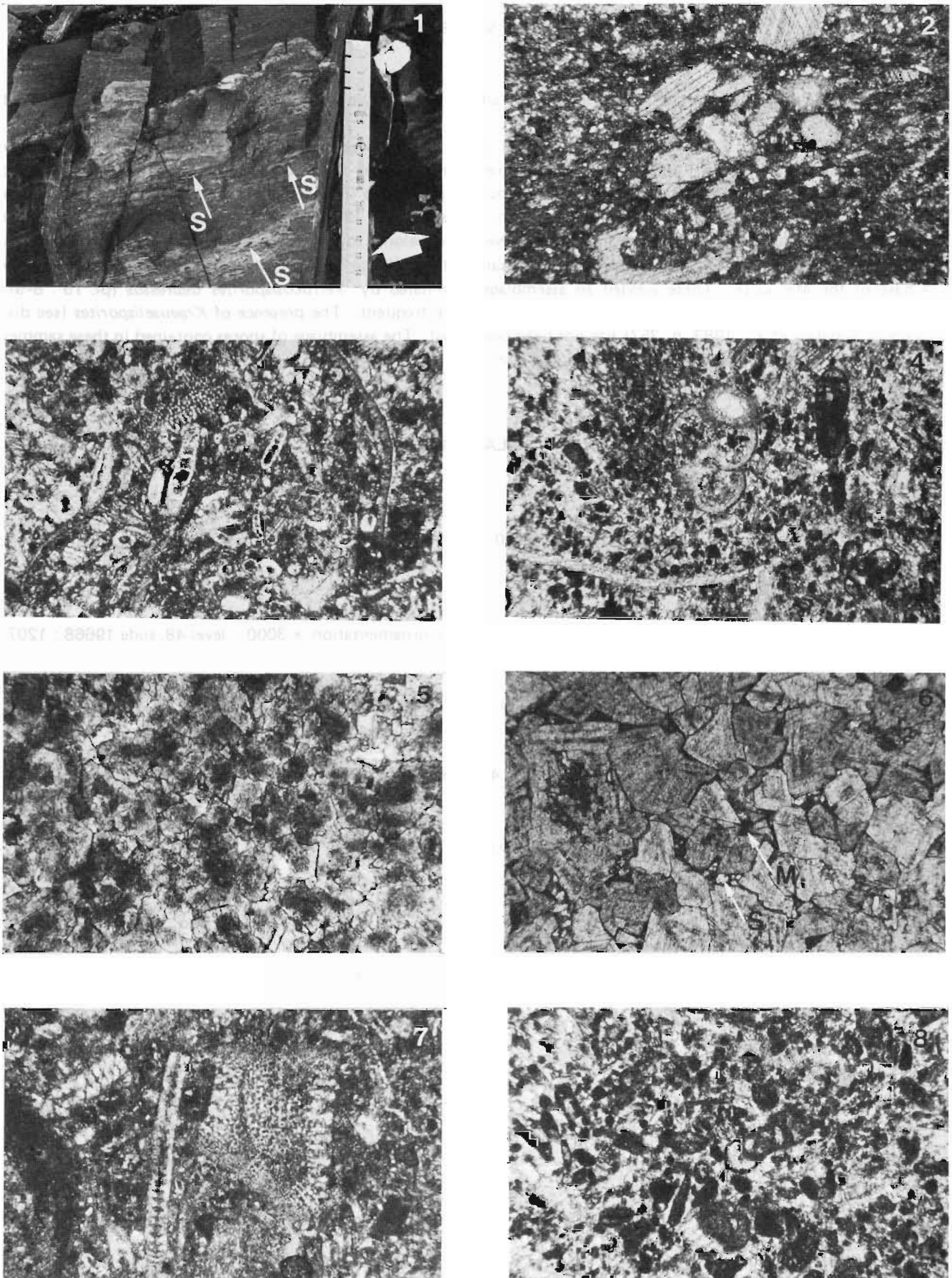
NIZHNENALED SECTION VI

7. Biomicrite (Bioclastic wackestone) with *Paleoberesella*-like algae and crinoid ossicles. Scale : 1 cm = 0,35 mm. Sample RC. 21781, Nizhnenaled section VI, UPPER PEREVALNY SUITE.

VERKHNENALED SECTION VII

8. Biopelsparite (Pelletic packstone) with coated grains (mainly coated crinoid ossicles), micritized foraminifers, echinoids, etc. . . Typical lithology of the Upper Elergetkhyn Suite. Scale : 1 cm = 0,35 mm. Sample RC. 22212, Verkhnenaled section VII, UPPER ELERGETKHYN SUITE.

PLATE 14



MIOSPORES (plate 15)

(M. STREEL)

Three levels (on 52 samples collected in 1981 and 1983) have yielded palynological results. They are located on plates 2 and 3.

The lowest level (1 on pl. 3) was first sampled in 1981 in the Ustyevoy section, below the first *Siphonodella sulcata* occurrence (see Simakov *et al.,* 1983). Another sample from the same level, taken in 1983, has offered more but similar material. The most abundant species is *Verrucosisporites nitidus* (Pl. 15 : 10-11) ; the absence of *Retispora lepidophyta* and *Vallatisporites pusillites* (see discussion, *in* Conil *et al.,* 1982, p. 148) has been confirmed. Therefore we suggest that the assemblage corresponding to this lowest level belongs to the VI Zone (*Verrucosus-incohatus* Zone).

The two other levels (2 and 3 on pl. 2) were sampled in 1983 in the Beregovoy section, a few metres above the base of the Mol suite. These yielded an assemblage dominated by *Verrucosisporites depressus* (pl. 15 : 8-9). *Grandispora echinata* with coarse ornaments (pl. 15 : 1-4) are frequent. The presence of *Kraeuselisporites* (see discussion in Simakov *et al.,* 1983, p. 357) has not been confirmed. The assemblage of spores contained in these samples also belongs to the VI Zone (*Verrucosus-incohatus* Zone).

PLATE 15

1 - 4. *Grandispora echinata* Hacquebard 1957
1. proximal surface ; 2. distal surface ; level 60, slide 19670 : 1084 ; 3. proximal surface ; 4. distal surface ; level 60, slide 19669 : 1333.

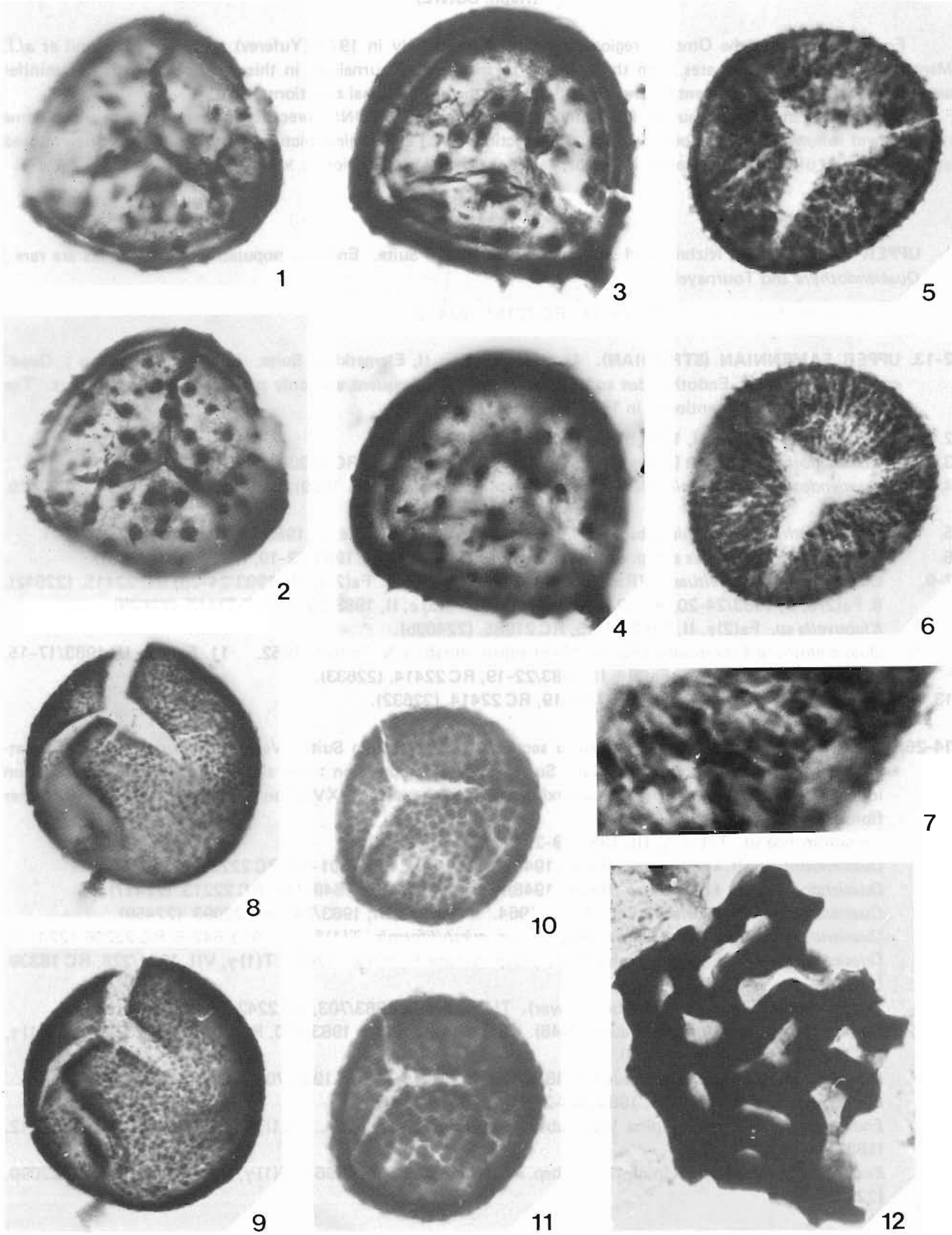
5 - 7. *Raistrickia* sp. *in* Conil *et al.,* 1982, figs. 14-15.
5. proximal surface ; 6. distal surface ; 7. detail of the ornamentation, x 3000 ; level 48, slide 19668 : 1207.

8 - 9. *Verrucosisporites depressus* Winslow 1962
8. proximal surface ; 9. distal surface ; level 60, slide 19669 : 1308.

10-11. *Verrucosisporites nitidus* Playford 1964
10. proximal surface ; 11. distal surface ; level 48, slide 19668 : 0440.

12. *Dictyotriletes* sp.
Fragment of the distal ornamentation ; level 56, slide 19194 : 1174.

PLATE 15



FORAMINIFERA (Plates 16 to 23)

(Raph. CONIL)

Foraminifers from the Omolon region have been figured only in 1979 (Yuferev) and in 1982 (Conil *et al.*). Many shallow marine carbonates from the Strunian to the Upper Tournaisian in this area contain rich Foraminifer assemblages and yield complementary and original data for the international zonations.

Samples collected by the author (1981 or 1983 / sample number CONIL preceded by section number and name of suite, and followed by Soviet bed number). Thin sections (RC.) and original pictures (last number) have been stored at the University of Louvain-la-Neuve, Mercator, Palaeontology. Magnifications : x 75.

PLATE 16

1. UPPER FAMENNIAN. Nizhnenaled section VI, Elergetkhyn Suite. Endemic population : uniloculars are rare ; *Quasiendothyra* and Tournayellidae.

1. *Uslonia* sp. Fa(2)γ, VI, 1983/618-14, RC 22187. (22410).

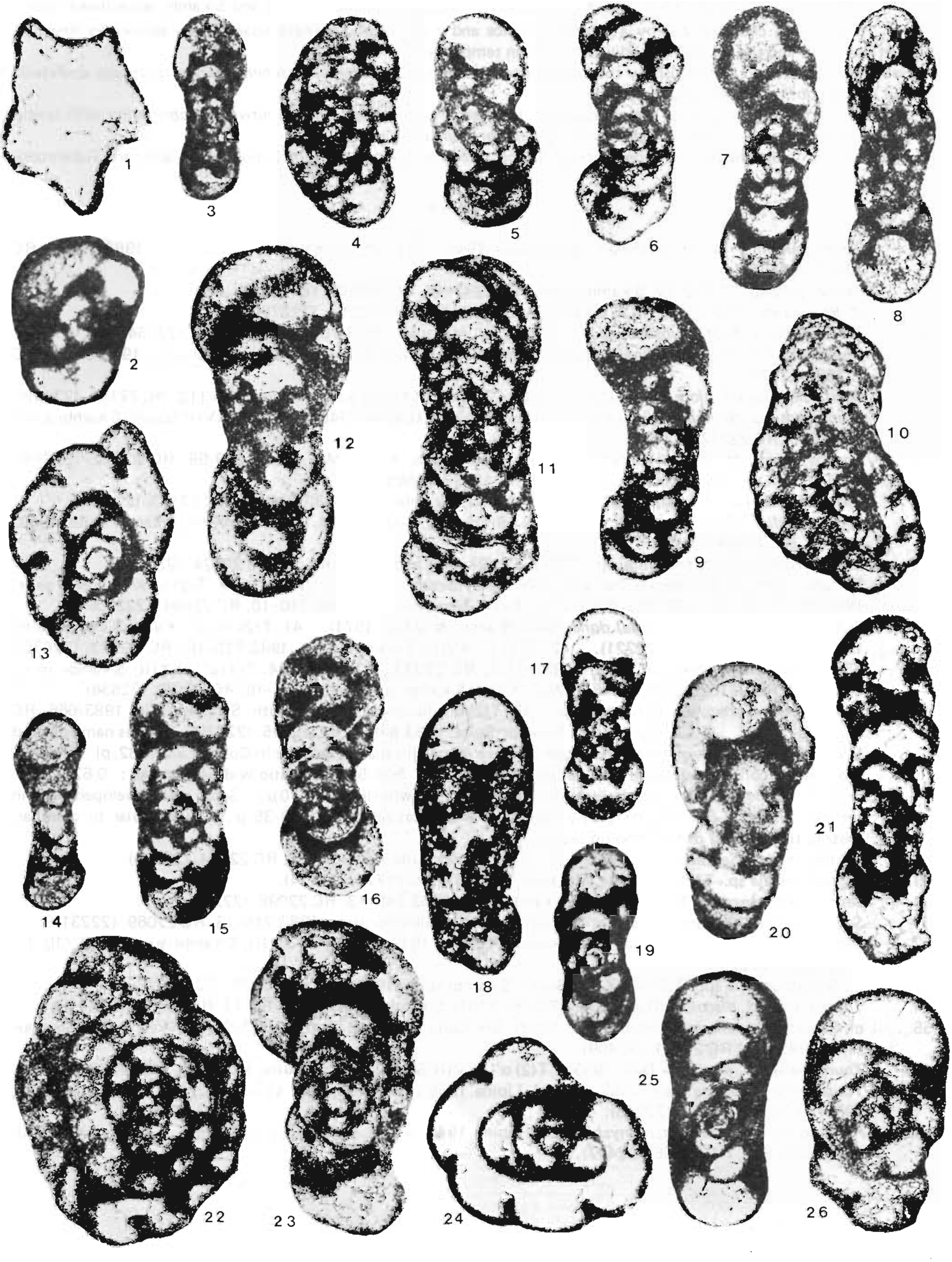
2-13. UPPER FAMENNIAN (STRUNIAN). Ustyevoy section II, Elergetkhyn Suite. Endemic population : *Quasiendothyra* common, Endothyridae and Tournayellidae less frequent and only present in the highest part. The *Pal. tchernyshinensis* mentioned in 1979, fig. 21 is a *Klubovella.*

2. *? Baelenia* sp. Fa(2)ϵ, II, 1981/51-19, RC 18297. (18887).
3. *Quasiendothyra regularis* (Lipina 1955). Fa(2)ϵ, II, 1981/53-19, RC 18300. (18873).
4. *Quasiendothyra communis* (Rauser 1940) subsp. *turbida* (Durkina 1959). Fa(2)δ, II, 1983/1-11, RC 22410. (22627).
5. *Quasiendothyra communis* subsp. *communis* (Rauser 1940). Fa(2)ϵ, II, 1983/25-20, RC 21992. (22467).
6. *Quasiendothyra regularis* subsp. *regularis* Lipina 1955. Fa(2)ϵ, II, 1983/22-19, RC 22414. (22631).
7-9. *Quasiendothyra kobeitusana* (Rauser 1948) subsp. 1. 7. Fa(2)ϵ, II, 1983/24-20, RC 22415. (22642). 8. Fa(2)ϵ, II, 1983/24-20, RC 22416. (22645). 9. Fa(2)ϵ, II, 1983/20-17, RC 22412. (22629).
10. *Klubovella* sp. Fa(2)ϵ, II, 1983/17-15, RC 21985. (22469b).
11-12. *Quasiendothyra kobeitusana* (Rauser 1948) subsp. *mirabilis* N. Tchern. 1952. 11. Fa(2)ϵ, II, 1983/17-15, RC 21985. (22207). 12. Fa(2)ϵ, II, 1983/22-19, RC 22414. (22633).
13. *Endochernella* sp. Fa(2)ϵ, II, 1983/22-19, RC 22414. (22632).

14-26. LOWER TOURNAISIAN. Beregovoy section III, Elergetkhyn Suite. Verkhnenaled section VII, Elergetkhyn Suite. Karst section XVIII, Karst Suite. Endemic population : very similar to the Strunian population in Omolon area, dominated by *Quasiendothyra.* At the section XVIII only, many *Endothyra* with inner fibrous layer.

14. *Septabrunsiina* sp. T(1)β-γ, III, 1981/69-2, RC 18313. (18441).
15. *Quasiendothyra* aff. *kobeitusana* (Rauser 1948). T(1)γ, IV, 1983/801-17, RC 22238. (22407).
16. *Quasiendothyra* aff. *kobeitusana* (Rauser 1948). T(1)γ, VII, 1983/649-14b, RC 22213. (22417).
17. *Quasiendothyra* aff. *substricta* Conil & Lys 1964. T(1)γ, XVIII, 1983/740, RC 22093. (22459).
18. *Quasiendothyra communis* (Rauser 1940) cf. var. *mirabiliformis.* T(1)β, VII, 1983/642-6, RC 22206. (22412).
19. *Quasiendothyra* cf. *regularis* (Lipina 1955) subsp. *radiata* Reitlinger 1961. T(1)γ, VII, 1981/278, RC 18339. (18884).
20. *Quasiendothyra* sp. (very thick fibrous layer). T(1)γ, XVIII, 1983/703, RC 22421. (22644).
21-22. *Quasiendothyra kobeitusana* (Rauser 1948). 21. T(1)γ, XVIII, 1983/740, RC 22093. (22237). 22. T(1)γ, III, 1983/49, RC 21986. (22209).
23. *Quasiendothyra kobeitusana* (Rauser 1948) subsp. 2. T(1)γ, XVIII, 1983/703, RC 22059 (22220).
24. *Endochernella* sp. T(1)γ, III, 1983/803-2, RC 22260. (22397).
25. *Endothyra parakosvensis* Lipina 1955 subsp. *nigra* Conil & Lys 1964. T(1)β-γ, VII, 1981/244, RC 18512. (18871).
26. *Endothyra parakosvensis* Lipina 1955 subsp. *struniana* Conil & Lys 1964. T(1)γ, XVIII, 1983/737, RC 22090. (22235).

PLATE 16



27-108. MIDDLE TOURNAISIAN (Plates 17-20). Povorotny section IV, Mol and Sikambr Suites (lower part). Karst section XVIII, Karst and Sikambr suite (lower part). Sikambr section XXIII, Mol and Sikambr suite (lower part). Unnamed sections XXX and XXXI, Elergetkhyn area. Karst and Sikambr suite (lower part).

Populations characterized by a great abundance and diversity of Tournayellidae. Many species are new and not yet described and the following subdivisions remain temptative :

- Subzone α' is easy to distinguish by the appearance of *Palaeospiroplectammina tchernyshinensis,* usually abundant, and large *Endothyra* ex gr. *parakosvensis.*
- Subzone α'' is characterized by the appearance of *Elergella* (at the base) and primitive *Spinobrunsiina* with lateral callosities and irregular crustae. *Septabrunsiina (Septabrunsiina)* are commun.
- Subzone β is indicated by the appearance of typical *Spinobrunsiina*, with central nodosities, and rare *Tuberendothyra.*

PLATE 17

27. *Parathurammina* ex. gr. *cushmani* Suleimanov 1945. T(2) cf. α', XVIII, Sikambr suite, 1983/708-9, RC 22062. (22466).
28. *Paracaligella* sp. T(2) β, IV, Sikambr suite, 1981/242-42, RC 18510. (18472).
29. cf. *Brunsia* sp. T(2) α''-β, XXX, Sikambr suite, 1983/844, RC 22291. (22376).
30. *Septabrunsiina (Septabrunsiina)* sp. 1. T(2) α', IV, Mol suite, 1983/789-22, RC 22140. (22254).
31. *Septabrunsiina (Septabrunsiina) comblaini* Conil & Lys 1964. T(2) α'', XXX, Sikambr suite, 1983/852-5, RC 22298. (22371).
32. *Chernyshinella* aff. *glomiformis* (Lipina 1948). T(2) α'', XXIII, Sikambr suite, 1983/112, RC 22181. (22418).
33. *Septabrunsiina (Septabrunsiina) krainica* subsp. *krainica* (Lipina 1948). T(2) α', XVIII South, Sikambr suite, 1983/656, RC 22217. (22405).

34-35. *Tournayellina* aff. *beata* (Malakhova, 1956). 34. T(2)α, XXIII, Mol suite, 1983/86, RC 22042. (22218). 35. T(2) β, XXXI, Sikambr suite, 1981/103, RC 18327. (18855).

36. *Granuliferella avonensis* Conil 1979. T(2) α', XVIII, Sikambr suite, 1983/710-10, RC 22423. (22637).
37. *Septabrunsiina (Spinobrunsiina) donetziana* (Brazhn. & Vdov. 1971). T(2) α', XVIII, Sikambr suite, 1983/ 710-10, RC 22064. (22227).
38. *Septabrunsiina (Spinobrunsiina)* sp. T(2) β, IV, Sikambr suite, 1983/64-36, RC 22024. (22212).

39-40. *Septabrunsiina (? Spinobrunsiina)* aff. *donetziana* (Brazhn. & Vdov. 1971). 39. T(2) α, XXIII, Mol suite, 1983/86, RC 22042. (22217). 40. T(2) α', XVIII, Sikambr suite, 1983/710-10, RC 22064. (22225).

41-45. *Septabrunsiina (Spinobrunsiina) donetziana* (Brazhn. & Vdov. 1971). 41. T(2) cf. α', XVIII, Sikambr suite, 1983/708-9, RC 22062. (22221). 42. T(2) α', XVIII, Sikambr suite, 1983/710-10, RC 22423. (22636). 43. T(2) α'', XXX, Sikambr suite, 1983/847-7, RC 22293. (22369). 44. T(2) α'', XXIII, Sikambr suite, 1983/113, RC 22182. (22413). 45. T(2) α', XVIII, Sikambr suite, 1983/710-10, RC 22423. (22638).

46-47. *Septabrunsiina anatolica* Conil nov. sp. 46. T(2) α'', holotype, XVIII South, Sikambr Suite 1983/666, RC 22529. (22939). 47. T(2) α'', XXX, Sikambr Suite, 1983/849-6, RC 22295. (22379). Species name derived from ανατοληκοs (= oriental). Holotype is figure 46 on this plate. Paratype in Conil *et al.* (1982, pl. 1, fig. 18). **Diagnosis** : coiling and shape very irregular. **Diameter** : 500-550 μ. **Ratio width/diameter** : 0,62 - 0,74. 5-6 whorls, dense in the juvenarium, still low in the last whorls (100-110 μ). Septa well developed only in the last whorl, 8-9 chambers gently rounded. Wall relatively thick, 30-35 μ, microgranular to granular. **Distribution** : T(2) of the Omolon region.

48. *Septabrunsiina (Septabrunsiina)* sp. T(2) β, IV, Sikambr suite, 1983/64-36, RC 22024. (22210).
49. *Septabrunsiina* sp. T(2) α'', XXIII, Mol suite, 1983/87, RC 21777. (22114).
50. *Septabrunsiina* sp. 2. T(2) α'', XVIII, Sikambr suite, 1983/745-13, RC 22098. (22238).
51. *Septabrunsiina (Septabrunsiina)* sp. 3. T(2) α'', XVIII, Sikambr suite, 1983/715-13, RC 22069. (22231).
52. *Septabrunsiina (Septabrunsiina)* ex gr. *krainica* (Lipina 1948). T(2) α', XVIII, Sikambr suite, 1983/710-10, RC 22064. (22226).
53. cf. *Septabrunsiina* sp. T(2) α'', XVIII South, Sikambr suite, 1983/670, RC 22230. (22425).
54. *Tournayella* aff. *discoidea* Dain 1953. T(2/3), XVIII, Sikambr suite, 1983/768-14, RC 22119. (22241).
55. cf. *Septatournayella segmentata* (Dain 1953). See Conil & Lys 1977, p. 17. T(2) α'', XVIII South, Sikambr suite, 1983/671, RC 22231, (22409).
56. *Tournayella* aff. *discoidea* Dain 1953. T(2) α'', XVIII South, Sikambr suite, 1983/669, RC 22229. (22416).
57. *Tournayella discoidea* Dain 1953 *maxima* Lipina 1955 (thick wall, large size). T(2) β?, IV, Sikambr suite, 1983/70-36, RC 22030. (22215).
58. *Palaeospiroplectammina tchernyshinensis* (Lipina 1948) subsp. *globata* Lipina 1965. T(2) α', XXIII, Mol suite, 1983/811, RC 22266. (22427).

PLATE 17

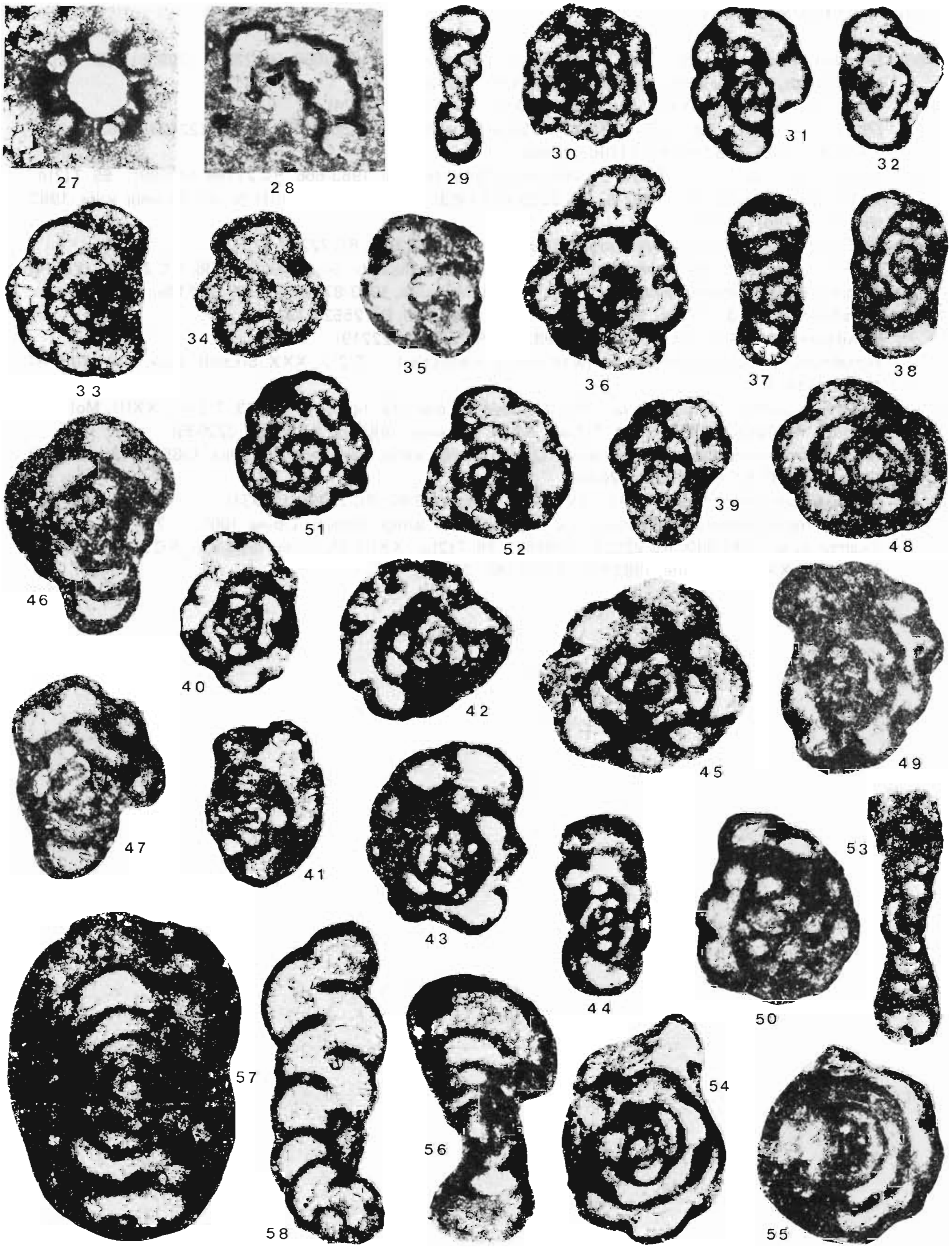

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PLATE 18

MIDDLE TOURNAISIAN

59-60. *Septabrunsiina* sp. 4. 59. T(2) α'', XVIII South, Sikambr suite, 1983/666, RC 22509. (22936). 60. T(2) α'', XVIII South, Sikambr suite, 1983/666, RC 22529. (22942).

61. *Granuliferella.* T(2) α', XXIII, Mol suite, 1983/92, RC 22047. (22224).

62-63. *(?) Endothyra* sp. 62. T(2) α'', XXX, cf. Sikambr suite, 1983/856-4, RC 22302. (22424). 63. T(2) α'', XXIII, Mol suite, 1983/96, RC 21796. (22465).

64-66. *Septabrunsiina* sp. 5. 64. T(2) α'', XVIII South, Sikambr suite, 1983/666, RC 21786. (22099). 65. T(2)α'', XXIII, Sikambr suite, 1983/852-5, RC 22298. (22463). 66. T(2)α'', XVIII South, Sikambr suite, 1983/666, RC 21786. (22100).

67. (?) *Endothyra* sp. T(2)α', XVIII South, Sikambr suite, 1983/687, RC 22246. (22393).

68. *Tuberendothyra* aff. *safanovae* Skipp 1969. T(2)β, IV, Sikambr Suite, 1983/66-36, RC 22026. (22214).

69. *Septabrunsiina (Spinobrunsiina)* sp. T(2)α'', XXIII, Mol suite, 1983/87, RC 21777. (22113b).

70. *Septabrunsiina* sp. 3. T(2)α', XXX, Sikambr suite, 1983/840, RC 25524. (22945).

71. *Endothyra* sp. T(2)α , XXIII, Mol suite, 1983/91, RC 22046. (22219).

72. *Septabrunsiina (Spinobrunsiina)* sp. (with central nodosities). T(2)β, XXX, Sikambr suite, 1981/103, RC 18063. (18417).

73-74. *Endothyra yuferevi* Conil nov. sp. For diagnosis see plate 19, figs 81-84. 73. T(2)α'', XXIII, Mol suite, 1983/86, RC 22417. (22639). 74. T(2)α'', XXIII, Mol suite, 1983/92, RC 22497. (22935).

75. *Palaeospiroplectammina tchernyshinensis* (Lipina 1948) subsp. *rectoseptata* Lipina 1965. T(2)α', XXIII, Mol suite, 1983/92, RC 22420. (22649).

76. *Palaeospiroplectammina* sp. T(2)α', XXIII, Mol suite, 1983/92, RC 22499. (22931).

77-79. *Palaeospiroplectammina tchernyshinensis* (Lipina 1948) subsp. *globata* Lipina 1965. 77. T(2)α', XXX, Sikambr suite, 1983/840, RC 22524. (22946). 78. T(2)α', XXIII, Mol suite, 1983/811, RC 22427. (22648). 79. T(2)α', XXIII, Mol suite, 1983/811, RC 22426. (22643).

PLATE 18

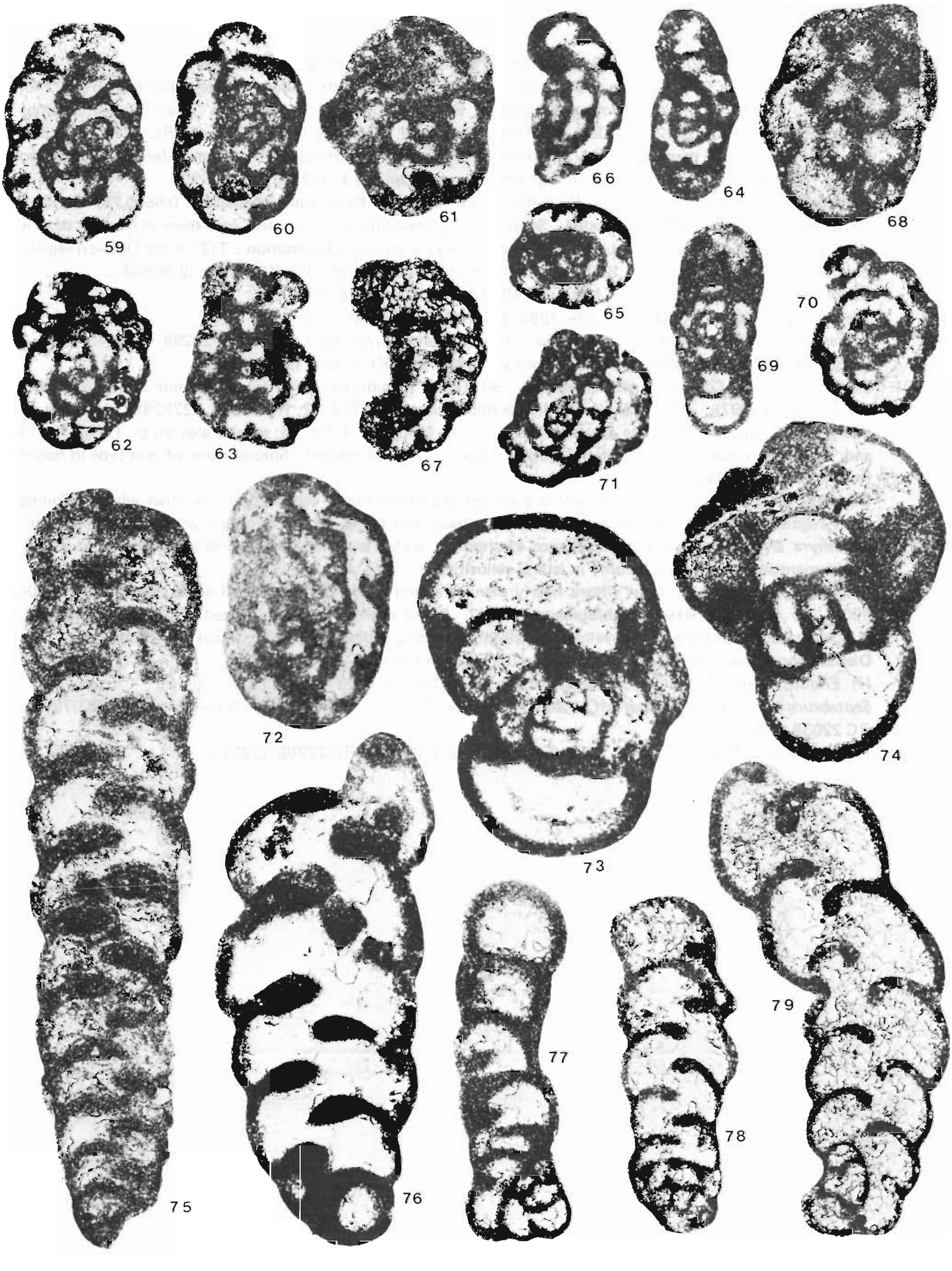


PLATE 19

MIDDLE TOURNAISIAN

80. *Endochernella* sp. T(2) α'', XVIII South, Sikambr suite, 1983/666, RC 21786. (22098).

81-84. *Endothyra yuferevi* Conil nov. sp. 81. T(2) α', Paratype XVIII South, Sikambr suite, 1983/687, RC 22246. (22392). 82. T(2) α'', XXIII, Mol suite, 1983/87, RC 21777. (22117). 83. T(2) α'', XVIII South, Sikambr suite, 1983/661, RC 22222. (22408). 84. T(2) α', Holotype, IV, Mol suite, 1983/787-21, RC 22138. (22253). Species named in the memory of O.V. Yuferev, author of the first study on the foraminifers in the Omolon region. Species also figured on plate 18, figs 73-74, and *in* Conil *et al.* (1982, pl. I, fig. 20).
Diagnosis : coiling very irregular. **Diameter :** 660-870 μ ; **Ratio width/diameter :** 0,66-0,78. 3 1/2 -4 volutions. 6 1/2 -7 chambers rounded. Septa more or less inflated, inclinated, very short in the first whorls. Differs from *End. parakosvensis* Lipina by the very irregular coiling. **Distribution :** T(2) in the Omolon region.

85. *Endothyra parakosvensis* Lipina 1955. T(2) α'', XXIII, Mol suite, 1983/87, RC 22419. (22635a).

86. *Endochernella* sp. T(2) α', XXIII, Mol suite, 1983/92, RC 22499. (22932).

87. *Elergella* sp. T(2) α'', XXIII, Mol suite, 1981/323, RC 18459. (18615).

88. *Septabrunsiina (Spinobrunsiina)* sp. T(2) α'', XXIII, Sikambr suite, 1983/852-5, RC 22298. (22464).

89. *Elergella* sp. T(2) α'', XVIII South, Sikambr suite, 1983/666, RC 22508. (22938).

90-91. *Elergella simakovi* Conil nov. gen. et nov. sp. 90. T(2) α'', Holotype, XVIII South, Sikambr suite, 1983/666, RC 21786. (22097). 91. T(2) α'', XVIII, Sikambr suite, 1983/712-12, RC 22066. (22228). Holotype on this plate, figure 90. Paratype figured *in* Conil *et al.* (1982, pl. I, fig. 15; species also on pl. I, figs 10, 14 and 16). Genus name refers to the Elergetkhyn Lakes (Omolon region). Species name of genotype in honor to K.V. Simakov (Magadan).
Diagnosis of genus : Endothyrinae with a great density of chambers, especially in the inner whorls. Coiling fairly regular, evolute in the last whorls. Aperture basal and single. Wall microgranular. Differs from *Quasi-endothyra* and *Florennella* by the absence of chomata, arches and any kind of central nodosities or spines. Supplementary deposits consist only in lateral callosities.
Diagnosis of species : 2-3 last whorls nearly planispiral and evolute. **Diameter of adult speciments :** 800-950 μ, for 4 whorls. **Ratio width/diameter :** 0,42. 11-12 chambers gently inflated. Septa well developed. Supplementary deposits gently developed. Wall thick, microgranular nearly 25 μ, traces of septum.
Distribution : base of the T(2) α'' subzone in the Omolon region.

92. (?) *Endothyra* sp. T(2) cf. α', XVIII, Karst suite, 1983/707-8, RC 21789. (22101).

93. *Septabrunsiina (Septabrunsiina)* aff. *crassa* (Reitlinger 1961). T(2) α''-β, IV, Sikambr suite, 1983/79-25, RC 22038. (22216).

94. *Endothyra* sp. (1270 μ). T(2) α', XXX, Sikambr suite, 1983/840, RC 22288. (22377).

PLATE 19

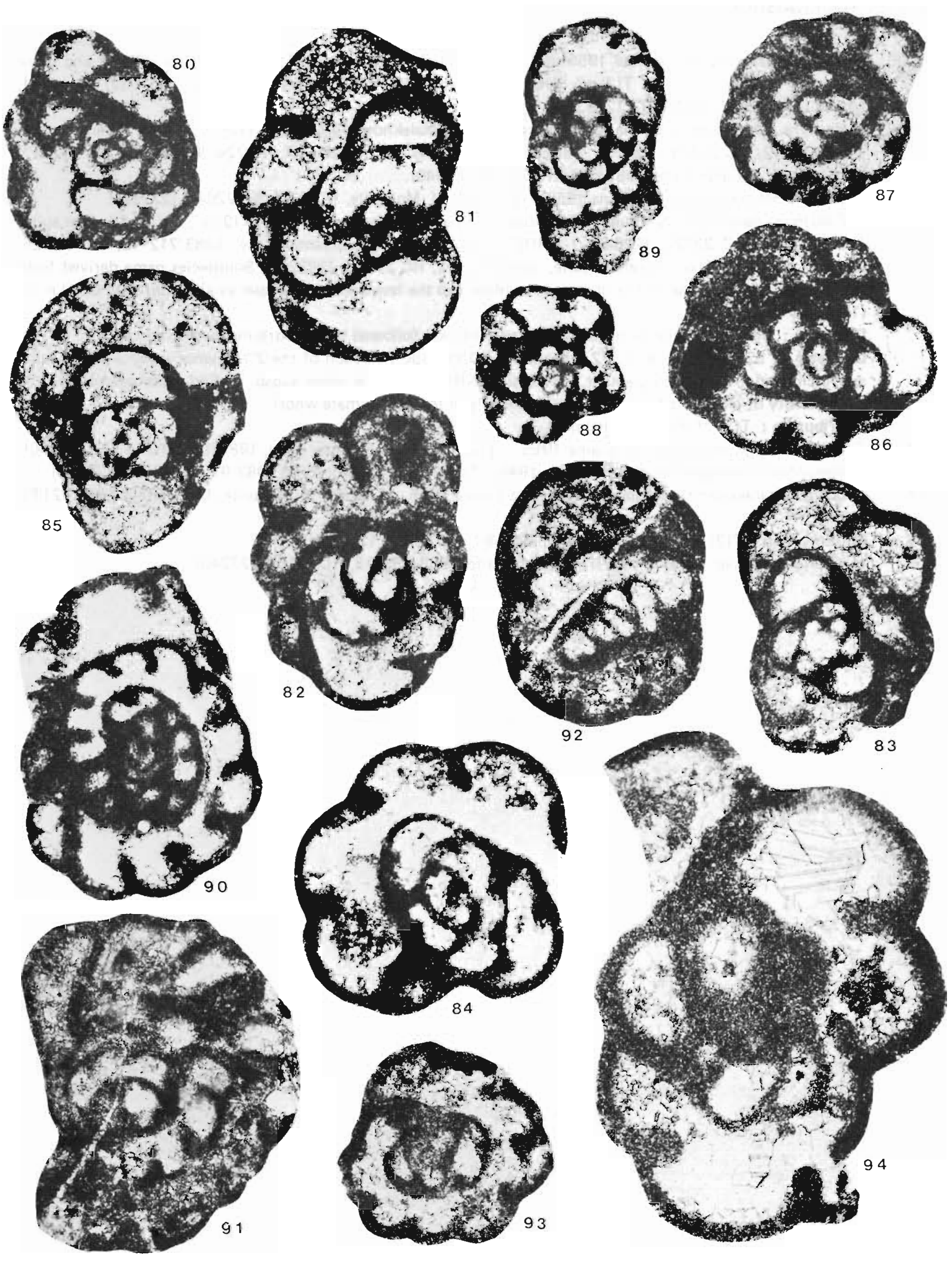


PLATE 20

MIDDLE TOURNAISIAN

95-96. *Endothyra parakosvensis* Lipina 1955 aff. *clavaesepta* Conil & Lys 1967. Chambers less inflated and more numerous (7 $^1/2$ - 8). 95. T(2) α'', XXIII, Mol suite, 1983/87, RC 22494. (22948). 96. T(2) α'', XXIII, Mol suite, 1983/87, RC 22497. (22934).

97-98. *Endothyra parakosvensis* Lipina 1955 subsp. *septima* Malakhova 1966. 97. T(2) α'', XVIII, Sikambr suite, 1983/712-12, RC 22424. (22626). 98. T(2) α'', XXIII, Mol suite, 1983/87, RC 22419. (22634). 99. T(2) α'', XVIII South, Sikambr suite, 1983/666, RC 22529. (22940).

100. *Endothyra* aff. *parakosvensis* Lipina 1955. T(2) α', XXIII, Mol suite, 1983/92, RC 22047. (22222).

101-103. *Endothyra parakosvensis* Lipina 1955 subsp. *decima* Conil nov. subsp. 101. T(2) α'', XVIII, Sikambr suite, 1983/712-12, RC 22425. (22646). 102. T(2) α'', Holotype, Sikambr suite, 1983/712-12, RC 22425. (22647). 103. T(2) α'', Sikambr suite, 1983/712-12, RC 22066. (22229). Subspecies name derived from *decimus* (= ten), because of the up to ten chambers in the last whorls. Subspecies also figured in Conil *et al.* (1982, pl. II, fig. 12).

Diagnosis : small juvenarium elongated, tournayellid like, followed by 2 whorls nearly planispiral.

Diameter : 520-650 μ. 4-4 $^1/2$ whorls. 9-10 chambers in each of the 2 last whorls, septa short, thick and inclinated. Wall microgranular, 25-35 μ. Differs from the other subsp. of *End. parakosvensis* by the great density of chambers for a small size, especially in the penultimate whorl.

Distribution : T(2) of the Omolon region.

104. *Endothyra* ex gr. *parakosvensis* Lipina 1955. T(2) α'', XVIII, Sikambr suite, 1981/168, RC 18378. (18440).

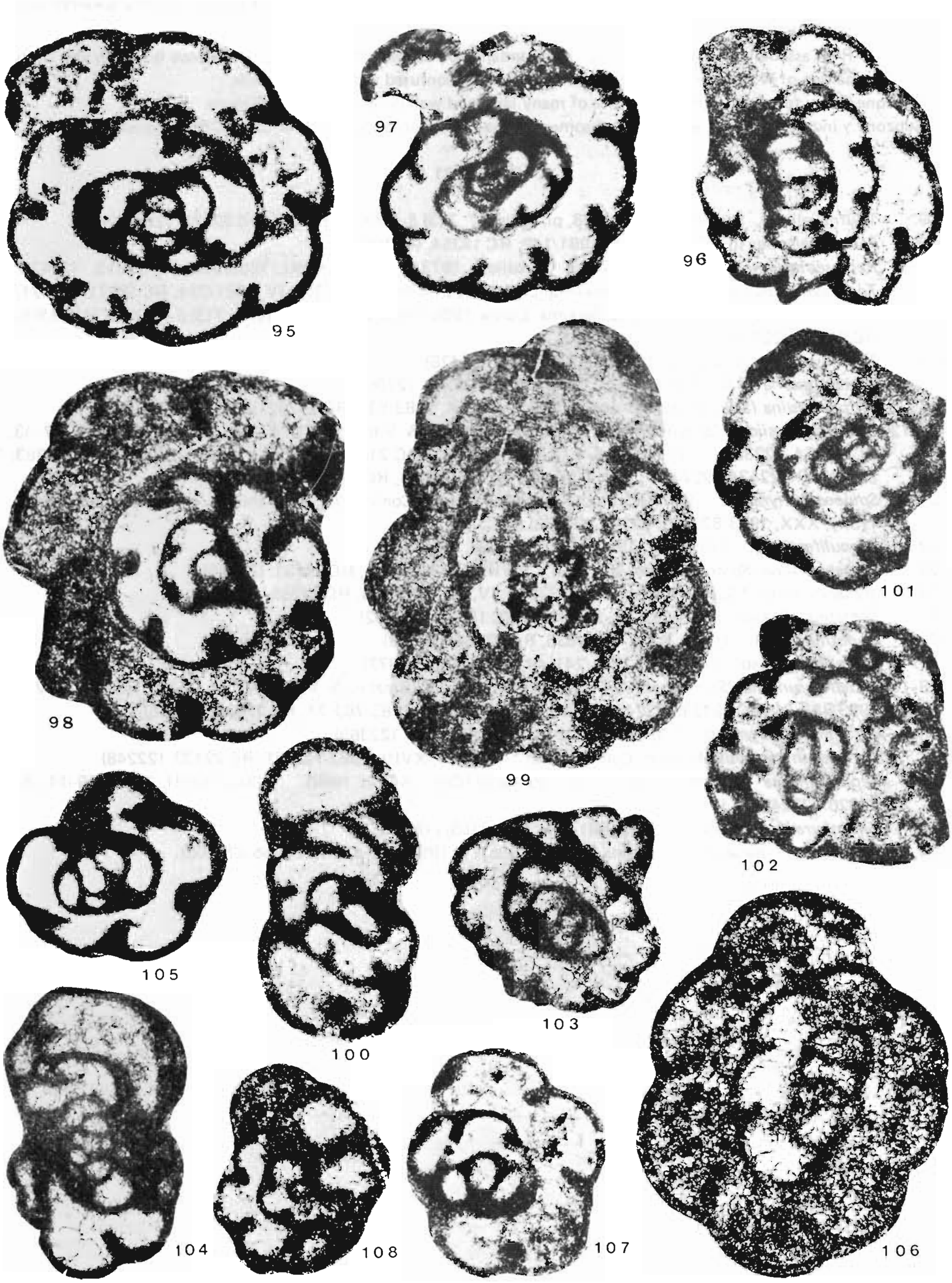
105. *? Granuliferella rjausakensis* Tchernysheva 1940. T(2) α'', XXIII, Mol suite, 1983/97, RC 22168. (22420).

106. *Endothyra parakosvensis* subsp. *parakosvensis* Lipina 1955. T(2) α', IV, Mol suite, 1983/787-21, RC 22138. (22251).

107. *Endothyra* sp. T(2) α'', XXIII, Mol suite, 1983/87, RC 22419. (22635b).

108. cf. *Granuliferella* sp. T(2) α'', XVIII, Sikambr suite, 1983/755-13, RC 22108. (22240).

PLATE 20



109-175. UPPER TOURNAISIAN (Plates 21-23). Povorotny section IV, Sikambr suite. Karst section XVIII. Sikambr suite (upper part). Unnamed sections XXXI and XXX, Elergetkhyn area, Sikambr suite (upper part).

Rich assemblage characterized by the abundance of *Latiendothyranopsis.* This genus is known also in the Upper Tournaisian of W. Europe, where it has sometimes been confused with *Granuliferella.*

- Subzone β easy to trace by the appearance of many large and well developed *Paraendothyra.*
- Subzone γ indicated by the appearance of some new taxa ; *Spinoendothyra, Condrustella, Plectogyranopsis.*

PLATE 21

109. Tournayellidae. See Kimpe *et al.* 1978, pl. 8, fig. 1. T(3) β, XXX, 1983/824, RC 22273. (22430).

110. *Paracaligelloides* sp. T(3)γ, XXX, 1981/142, RC 18354. (18860).

111. *Rectoseptaglomospiranella* cf. *kynensis* Grozdilova 1973. T(3) α, XXXI, 1983/882, RC 22313. (22423).

112. *Tournayella discoidea* Dain 1953 *maxima* Lipina 1955 (thin wall). T(3) β, IV, 1981/224, RC 18071. (18421).

113. *Tournayella discoidea* Dain 1953 *maxima* Lipina 1955 (thick wall, large size). T(3) β-γ, XXX, 1983/831, RC 21792. (22106).

114. *Tournayella* sp. T(3) β, IV, 1981/72, RC 18315. (18428).

115. *Septabrunsiina* sp. 6. T(3) γ, XXX, 1983/836, RC 22284. (22365).

116. *Septabrunsiina (Spinobrunsiina)* sp. 7. T(3) β-γ, XXX, 1983/831, RC 21792. (22105).

117-120. *Septabrunsiina (Spinobrunsiina) donetziana* (Brazhn. & Vdov., 1971). 117. T(3) α, IV, 1983/797-43, RC 22254. (22398). 118. T(3) β-γ, XXX, 1983/831, RC 21792. (22105). 119. T(3) β-γ, XVIII, 1983/784-21, RC 22134. (22249). 120. T(3) α, IV, 1983/797-43, RC 22254. (22399).

121. *Spinoendothyra* sp. Differs from *Spinoend. mitchelli* Conil 1979 by a thicker wall and less chambers. T(3) γ, XXX, 1983/836, RC 22284. (22362).

122. *Granuliferella* sp. T(3) β, IV, 1981/226, RC 18385. (18477).

123. *Septabrunsiina (Spinobrunsiina)* sp. T(3) β, XVIII, 1983/781-21, RC 22131. (22245).

124. *Septabrunsiina (? Spinobrunsiina)* sp. 8. T(3) α, IV, 1983/798-43, RC 22255. (22401).

125. *Septabrunsiina* sp. T(3) α, XXXI, 1981/100, RC 18062. (18402).

126. *Endothyra* sp. 1. T(3) γ, XXX, 1983/836, RC 22284. (22366).

127. *Septabrunsiina* sp. T(3) α, IV, 1981/241-44, RC 18398. (18877).

128-129. *Septabrunsiina (Spinobrunsiina)* sp. 9 aff. *donetziana* (Brazhn. & Vdov. 1971). 128. T(3) β-γ, XVIII, 1983/783-21, RC 22133. (22247). 129. T(3) β-γ, XVIII, 1983/783-21, RC 22132. (22246).

130. cf. *Spinoendothyra* sp. T(3) γ, XXX, 1983/836, RC 22284. (22363).

131. *Latiendothyranopsis* aff. *shiloi* Conil nov. sp. T(3) β-γ, XVIII, 1983/783-21, RC 22133. (22248).

132. *Septabrunsiina (Spinobrunsiina)* ex gr. *implicata* (Conil & Lys 1968). T(3) β, XVIII, 1983/769-14, RC 22120. (22242).

133. *Endothyra* sp. 2. T(3) β, XVIII, 1981/143, RC 18355. (18872).

134. *Endothyra* cf. *parakosvensis* Lipina 1955. T(3) α, IV, 1983/798-43, RC 22255. (22400).

PLATE 21

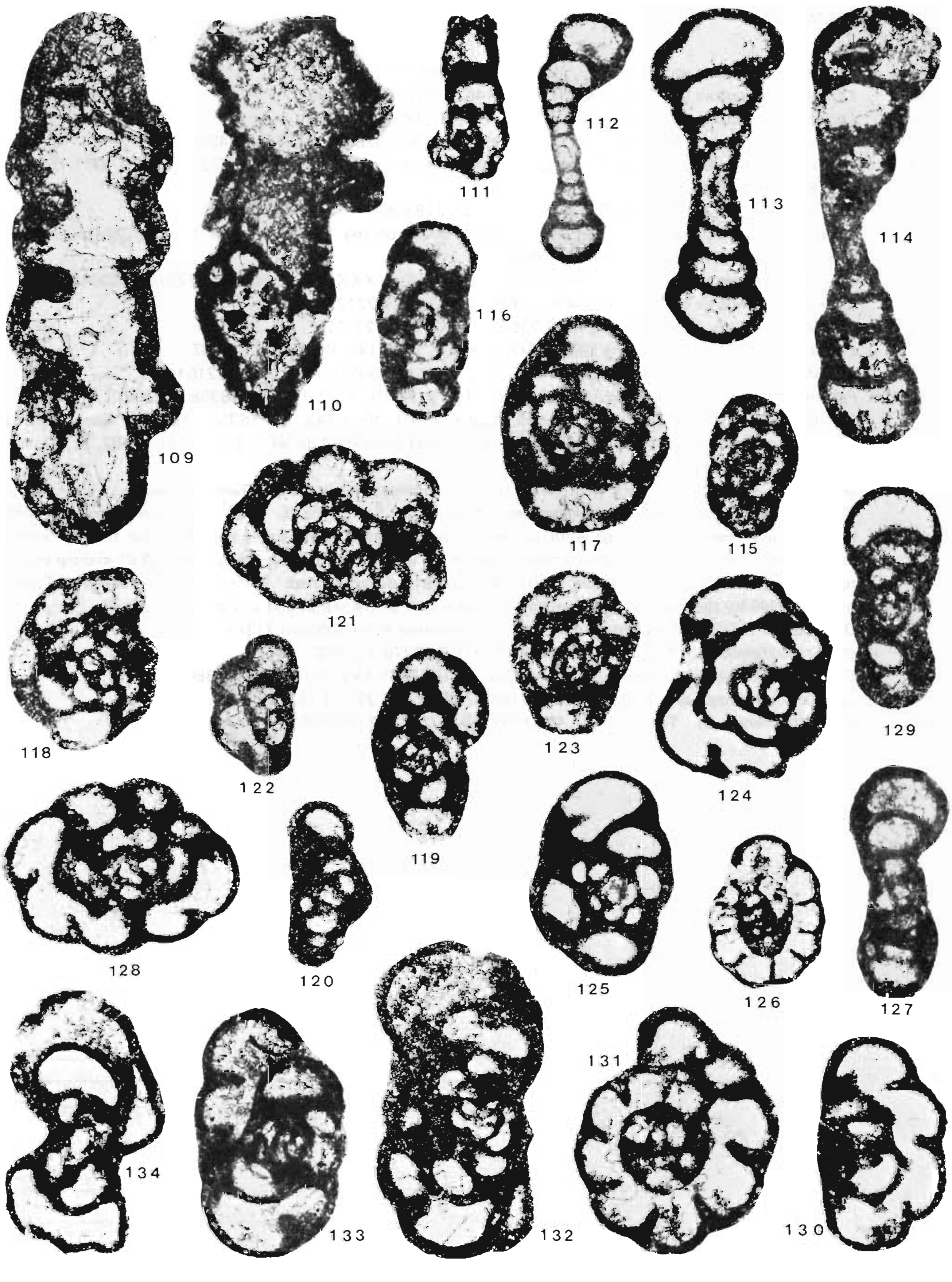

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PLATE 22

UPPER TOURNAISIAN

135. *Latiendothyranopsis* sp. T(3) β, IV, 1981/224, RC 18071. (18420).
136. *Latiendothyranopsis* sp. T(3) β, XVIII, 1981/146, RC 18358. (18393).
137. *Latiendothyranopsis* sp. T(3) α, XVIII, 1981/159, RC 18372. (18435).
138. *Endothyra* aff. *danica* Michelsen 1971. T(3) γ, XXX, 1983/828, RC 22275. (22429).
139. *Latiendothyranopsis shiloi* Conil nov. sp. For diagnosis see plate 23, fig. 162. T(3) β, XVIII, 1981/155-21, RC 18371. (18389).
140. *Endothyra* sp. T(3) β, XVIII, 1981/145, RC 18357. (18385).
141. *Latiendothyranopsis* sp. Specimen with inversion of the coiling. See Conil *et al.* 1981, p. 274, fig.55-57. T(3) α, IV, 1981/241-44, RC 18398. (18874).
142. *Latiendothyranopsis* sp. 1 (small, few chambers). T(3) β-γ, XXXII, 1983/829, RC 22276. (22364).
143. *Latiendothyranopsis* sp. 2. T(3) β, XVIII, 1983/772-14, RC 22123. (22243).
144. (?) *Endothyra* sp. T(3) β, XVIII, 1983/776-19, RC 21790. (22102).
145. *Endothyra* aff. *latispiralis* Lipina 1955. T(3) β, XVIII, 1981/145, RC 18357. (18387).
146. *Septabrunsiina (Spinobrunsiina)* sp. 7. T(3) β-γ, XXXI, 1983/831, RC 21792. (22104).

147-149. *Paraendothyra portentosa* Conil nov. sp. 147. T(3) β, XVIII, 1981/146, RC 18358. (18392). 148. T(3) β, IV, 1981/72, RC 18315. (18427). 149. T(3) β, XVIII, 1981/143, RC 18355. (18415). Species name derived from *portentosus* (= prodigious). Holotype and paratype figured in Conil *et al.* (1982, pl. III, respectively figures 40 and 39).

Diagnosis : perfectly or nearly planispiral, juvenarium sometimes irregular. **Diameter usually** : 1050-1400μ for adult specimens. **Ratio width/diameter** : 0,41-0,47. 3 $^1/2$ whorls. 8-8 $^1/2$ rounded chambers, with bended septa. Height of the last whorl increasing rapidly. Basal barriers very strong, thicker than the septa, rear bended, rounded and inflated at their extremity where they can be 150 μ wide. Wall microgranular to granular, usually 35-50 μ thick, with tectum poorly differenciated. Differs from *Par. nalivkini* Tchernysheva 1940 by the shape of the basal barrier (lower part of the septa) and a relatively thin wall.

Distribution : T(3) β of the Omolon region. Less common in the subzone T(3) γ.

150. cf. *Granuliferella* sp. T(3) β-γ, XXX, 1983/829, RC 22276. (22363).
151. *Endothyra* aff. *latispiralis* Lipina, 1955. T(3) β, XVIII, 1981/145, RC 18357. (18386).
152. *Latiendothyranopsis* sp. T(3) β-γ, XVIII, 1983/784-21, RC 22134. (22250).
153. cf. *Granuliferella* sp. T(3) β, XVIII, 1983/776-19, RC 21790. (22103).

PLATE 22

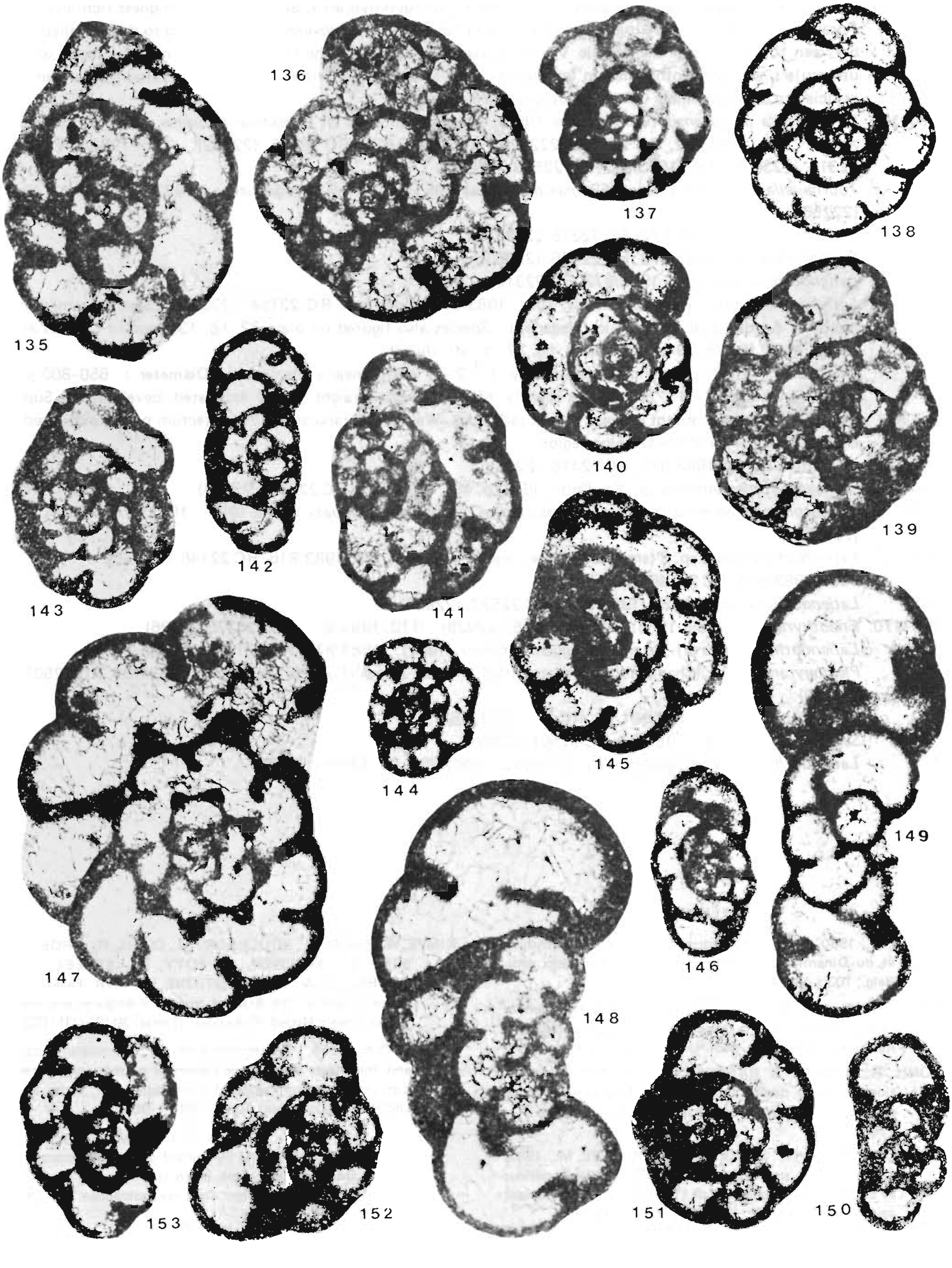

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PLATE 23

154-175. UPPER TOURNAISIAN. Unnamed section XXXI, Elergetkhyn area, Sikambr suite. Highest rich level of Foraminifers : T(3) γ. The passage to the Visean has not been discovered, but according to debris collected between this point and the Middle Visean (Livian), it seems that the transition contains some facies with uniloculars, and some other rich in fenestellids. The Middle Visean, rich in corals, only contains an endemic association of foraminifers (some *Endothyra* and *Tetrataxis*).

154-157. *Condrustella modavensis* (Conil & Lys 1967). Possible ancestor of *Eotextularia diversa,* guide of the Cf3 zone. 154. 1983/872, RC 22156. (22262). 155. 1983/872, RC 22315. (22382). 156. 1983/872, RC 22312. (22387). 157. 1983/872, RC 22526. (22930).

158. *Tournayella discoidea* Dain 1953 *maxima* Lipina 1955 (Thick wall, large size). 1983/818, RC 22148. (22256).

159. *Endothyra* sp. 1. 1983/872, RC 22315. (22381).

160. *Endothyra* sp. 5. 1983/872, RC 22156. (22263).

161. *Latiendothyranopsis* sp. 1983/872, RC 22316. (22389).

162. *Latiendothyranopsis shiloi* Conil nov. sp. 1983/870, Holotype, RC 22154. (22395). Species named in honor to Academician N.A. Shilo (Magadan). Species also figured on plate 22, fig. 139, and *in* Conil *et al.* (1982, pl. II, fig. 28, 29 and 33 ; pl. II, fig. 32 : *L.* aff. *shiloi*).
Diagnosis : small juvenarium followed by 1 $^1/2$ - 2 whorls nearly planispiral. **Diameter :** 650-800 μ. 3 - 3 $^1/2$ whorls. 8 - 8 $^1/2$ chambers slightly inflated. Septa straight, gently inclinated, bevel edged. Supplementary deposits absent of weak lateral callosities. Wall microgranular, 20-25 μ ; tectum poorly expressed.
Distribution : T(3) of the Omolon region.

163. *Endothyra* sp. 4. 1983/872, RC 22316. (22388).

164. *? Palaeospiroplectammina* sp. See Conil, 1980, p. 45. 1983/872, RC 22528. (22924).

165. *Palaeospiroplectammina tchernyshinensis* (Lipina 1948) subsp. *globata* Lipina 1965. 1983/875, RC 22159. (22265).

166-167. *Latiendothyranopsis* sp. 2 (small and dense, regular coiling). 166. 1983/816, RC 22146. (22255). 167. 1983/819, RC 22149. (22258).

168. *Latiendothyranopsis* sp. 3. 1983/872. RC 22527. (22925).

169-170. *Endothyra* sp. 6. 169. 1983/872, RC 22526. (22929). 170. 1983/872, RC 22527. (22926).

171. *Latiendothyranopsis* aff. *menneri* (Bogush & Yuferev 1962). 1983/878, RC 22162. (22267).

172. *Plectogyranopsis* sp. (Chambers less inflated than in *Plect. ampla* (Conil & Lys 1964)). 1981/99, RC 22501. (22950).

173. *Latiendothyranopsis* sp. 1981/99, RC 22500. (22952).

174. *Septabrunsiina* sp. 6. 1981/99, RC 22501. (22949).

175. *Latiendothyranopsis* cf. *grandis* (Lipina 1955). 1983/866, RC 22151. (22260).

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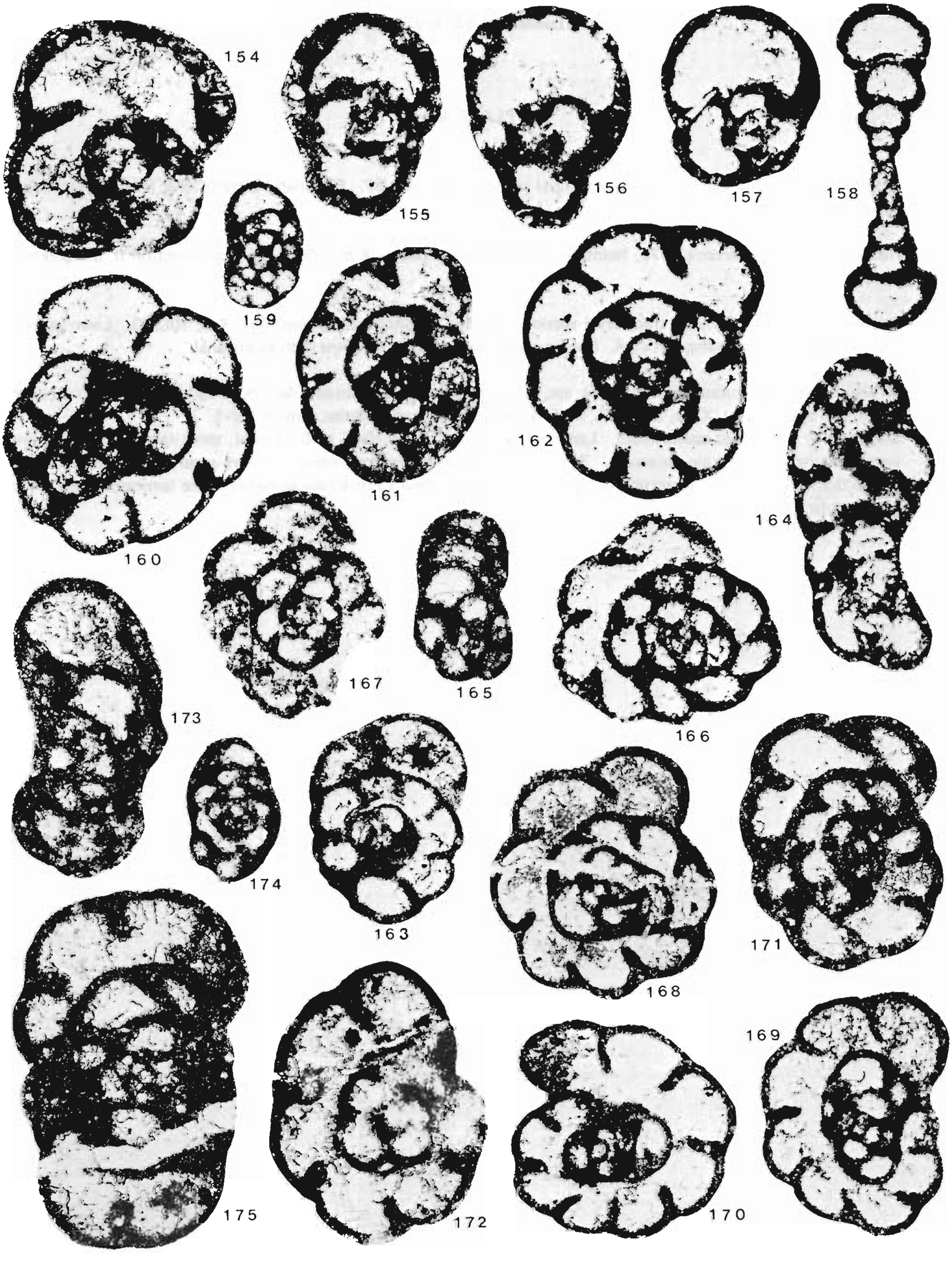
PLATE 23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STROMATOPORES (Plates 24 to 25)

(Ludmila V. SMIRNOVA)

PLATE 24

1. *Rosenella plativesiculosa* Gorsky, longitudinal section, X 5, 10C/87. Ferdinand section XXI, Elergetkhyn Suite, sample XXI-4b.

2. *Rosenella zonalis* Smirnova 1979, holotype, longitudinal section, X 5, 10C/1. Ustyevoy section II, Elergetkhyn Suite, sample II-7.

3. *Stylostroma ramosa* Gorsky, transversal section (3a) and longitudinal section (3b), X 5, 10C/90. Livan section XVI, Andylivan Suite, sample XVI-4. Longitudinal section shows columns with axial canal.

4. *Stromatoporella perplexa* Smirnova nov. sp., holotype, transversal section (4a) and longitudinal section through astrorhizal system (4b), X 10, 10C/104. Pushok section XV, Pushok Suite, sample XV-1.
   Diagnosis : Laminated coenosteum. Laminae continuous, thick (0.15 to 0.25 mm), three-layered, middle zone light-coloured and bearing foramens. Two to three laminae per millimeter. Pillars separated, thick (diameter 0.1 to 0.2 mm). Skeleton tissue porous. Numerous tabulae occur (3 to 4 tabulae between the laminae). Astrorhizae of fascicular type are present.

PLATE 24

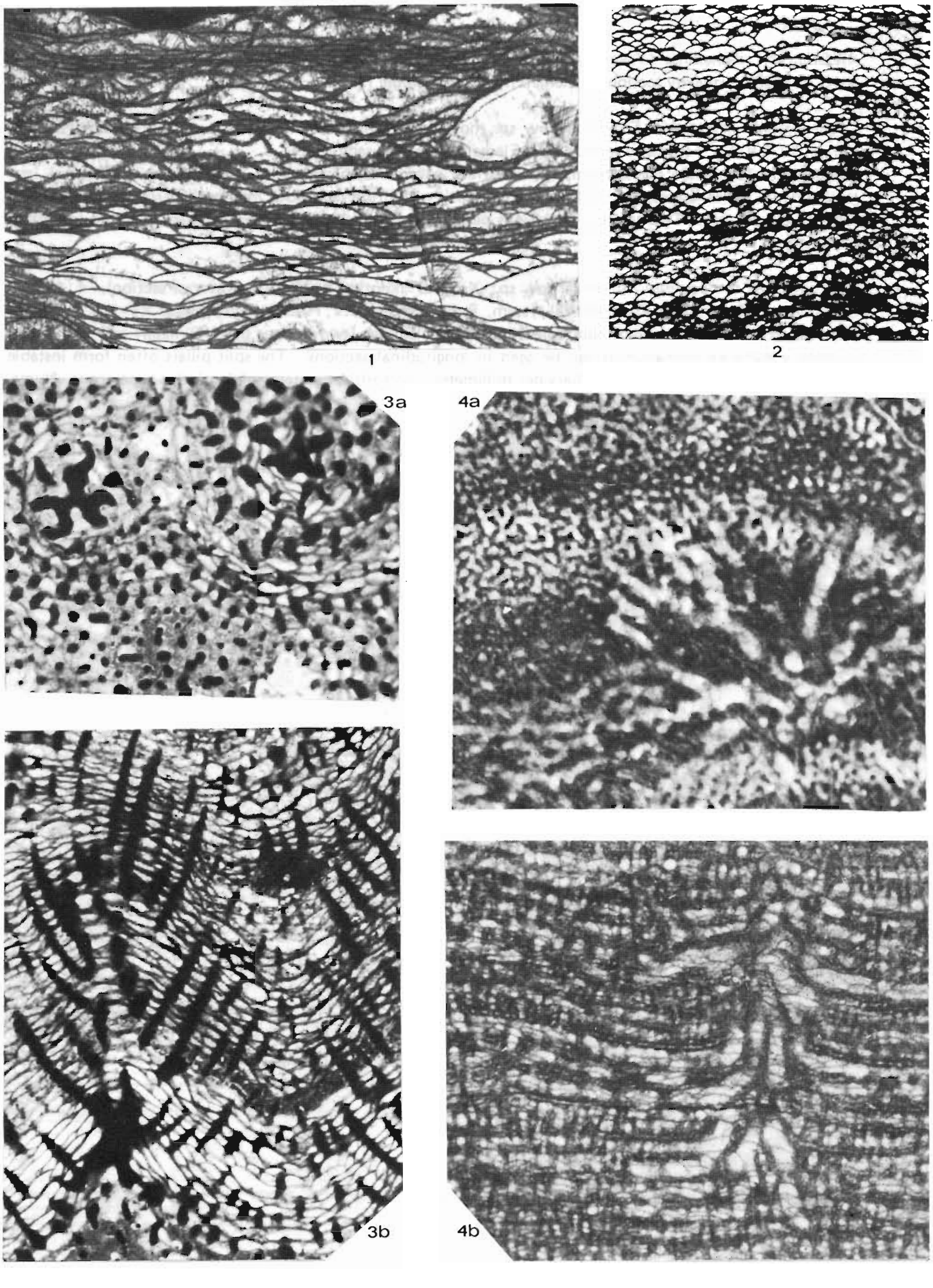


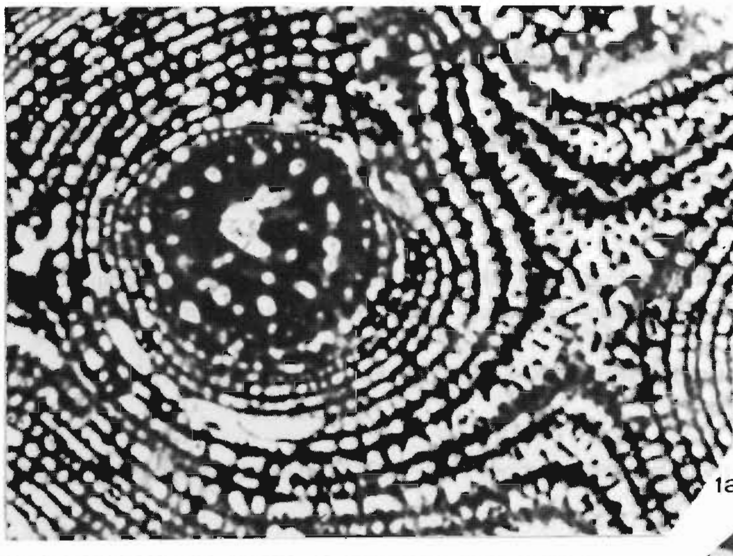
PLATE 25

1. *Atelodictyon mamelonse* (Yavorsky), transversal section (1a) and longitudinal section through column (1b), X 10, 10C/33. Ustyevoy section II, Elergetkhyn Suite, sample II-18.

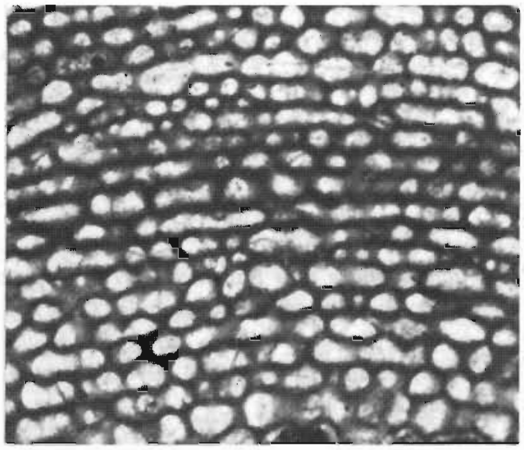
2. *Clathrodictyon tessulatum* Smirnova nov. sp., holotype, transversal section (2a) and longitudinal section (2b), X 10, 10C/82. Ferdinand section XXI, Elergetkhyn Suite, sample XXI-5.
Diagnosis : Laminated coenosteum, upper surface covered with mamelons. Laminae are inflexional, irregularly bent. Three laminae per millimeter. Inflexions within the neighbour interlaminar spaces are placed in chess-board pattern. Two to three inflexions per millimeter. Astrorhizae small, occurring in the centers of mamelons.

3 - 4. *Intexodictyon compositum* Smirnova nov. sp., X 10, 3 : holotype (10C/74, transversal section), 4 : 10C/75 (longitudinal section through astrorhizal system. Pushok section XV, Pushok Suite, sample XV-1.
Diagnosis : Laminated coenosteum consisting of thin laminae (two to four per millimeter) and split pillars forming a complex reticulum as can be seen in longitudinal sections. The split pillars often form instable secondary laminae. Four to five pillars per millimeter. Astrorhizal systems of fascicular type occur. Numerous astrorhizal tabulae.

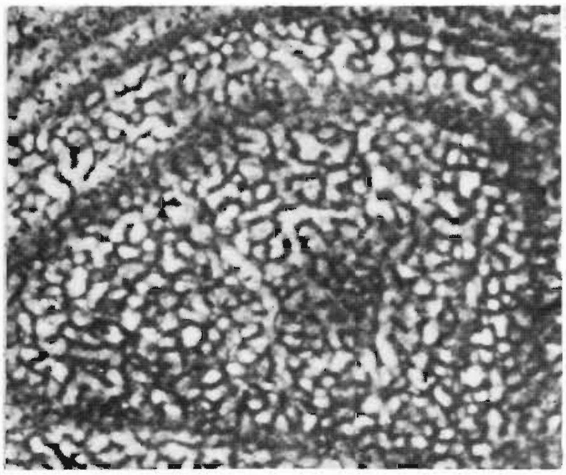
PLATE 25



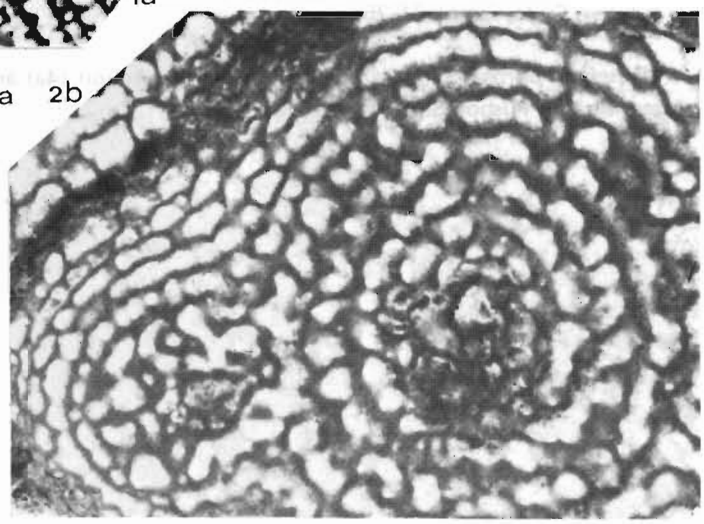
1a



2a



3a



2b

3b

1b

TABULATE CORALS (Plates 26 to 28)

(Ludmila V. SMIRNOVA)

PLATE 26

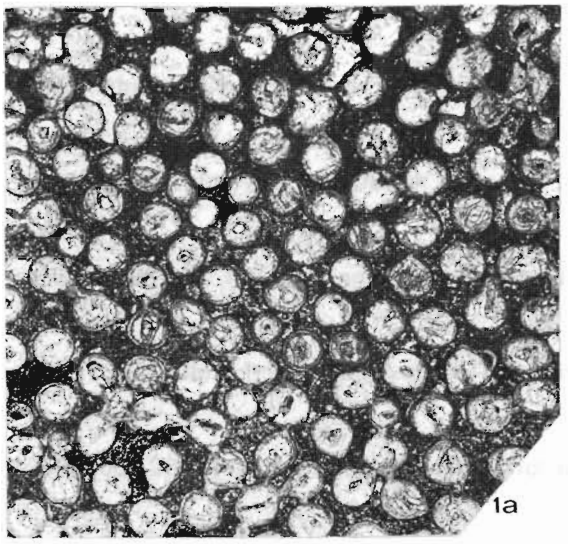
1. *Fuchungopora rara* Smirnova 1979, holotype, transversal section (1a), longitudinal section (1b) and longitudinal section showing connecting tabulae (1c), X 4, 18C/218. Ustyevoy section II, Elergetkhyn Suite, sample II-15.

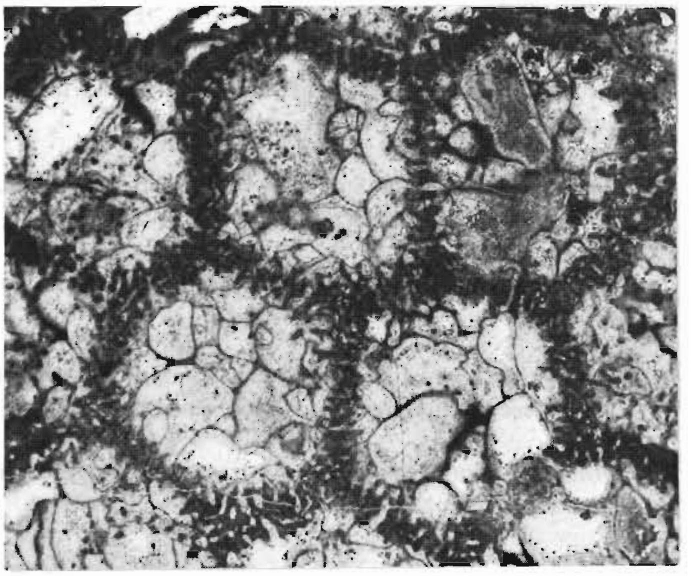
2. *Ortholites solidus* Smirnova 1979, holotype, transversal section, X 4, 18C/209. Povorotny section IV, Elergetkhyn Suite, sample IV-2a.

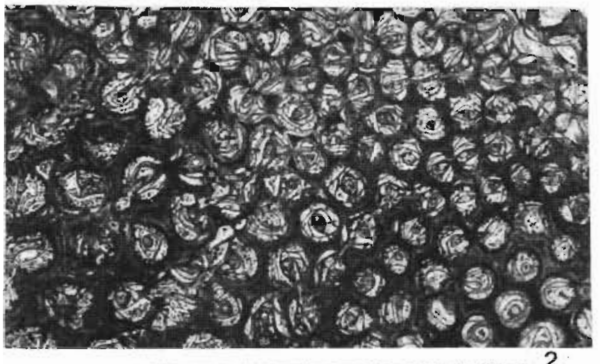
3. *Yavorskia omolonensis* Smirnova 1979, holotype, transversal section, X 4, 18C/73. Ustyevoy section II, Eler–getkhyn Suite, sample II-25.

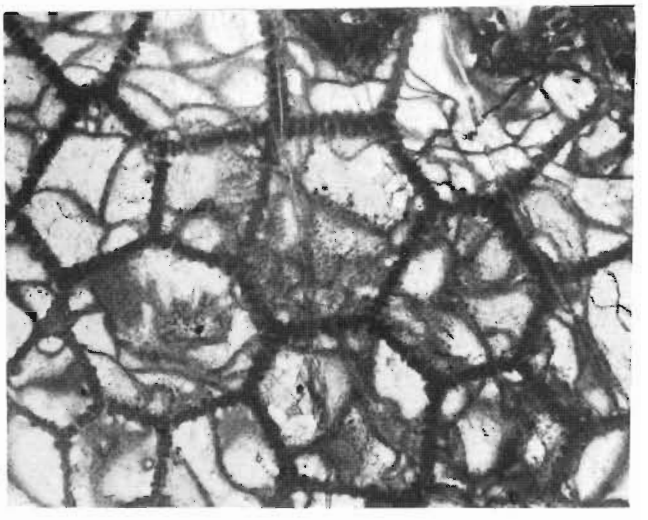
4. *Michelinia porosa* Smirnova 1979, transversal section (4a) and longitudinal section (4b), X 4, 18C/225. Pushok section XV, Pushok Suite, sample XV-4.

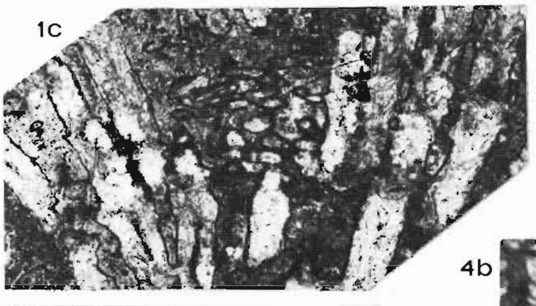
PLATE 26

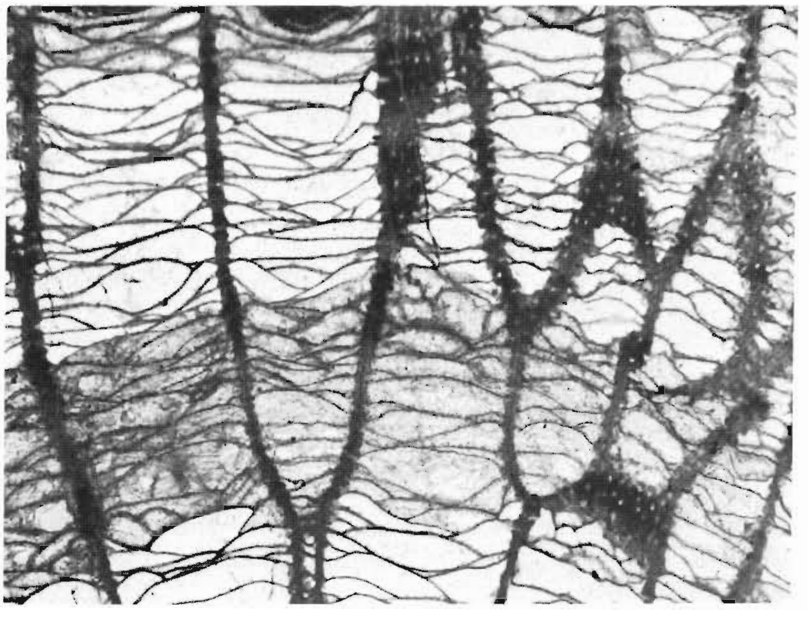

1a

3



2

4a


1c


4b


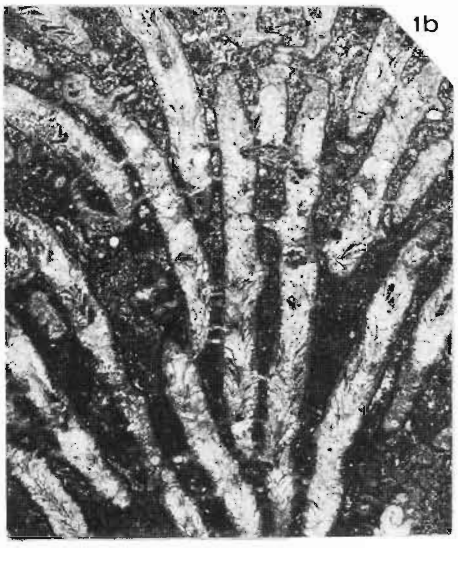
1b


PLATE 27

1. *Thecostegitis* aff. *infundibuliferus* Tchern., transversal section, X 4, 18C/231. Pushok section XV, Pushok Suite, sample XV-4.

2. *Yavorskia omolonensis* Smirnova 1979, holotype, longitudinal section, X 4, 18C/73. Ustyevoy section II, Elergetkhyn Suite, sample II-25.

3. *Roemeripora varia* Smirnova 1979, transversal section (3a) and longitudinal section (3b), X 4, 18C/234. Pushok section XV, Pushok Suite, sample XV-3.

4. *Roemeripora nordica* Smirnova 1979, holotype, transversal section (4a) and longitudinal section (4b), X 4, 18C/46. Obratny section I, Elergetkhyn Suite, sample I-6.

5. *Syringopora conferta* Keyserling, transversal section (5a) and longitudinal section (5b), X 4, 18C/256. Karst Mountain section XVIII, Karst Suite, sample XVIII-6.

PLATE 27

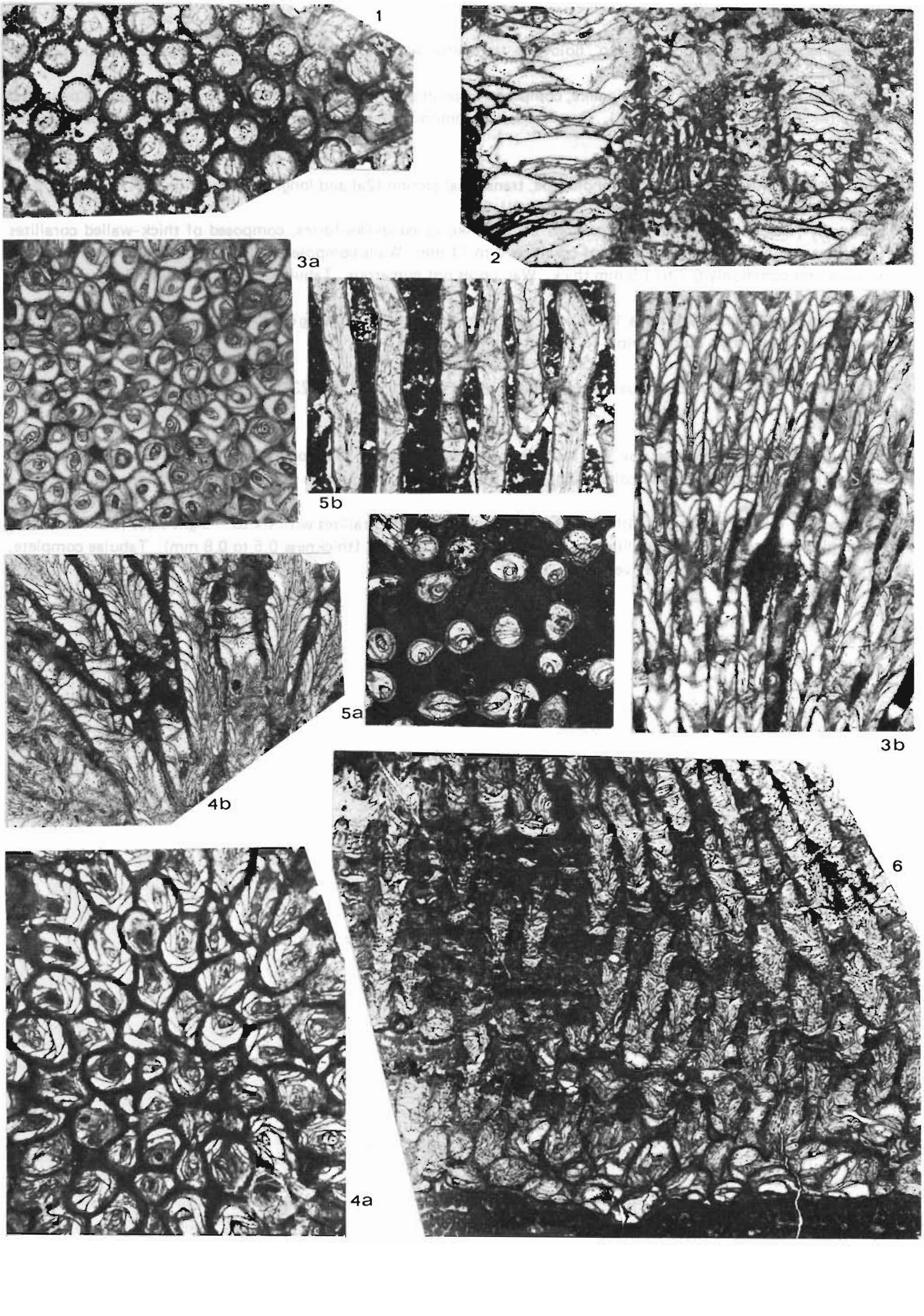


PLATE 28

1. *Michelinia catenata* Smirnova nov. sp., holotype, transversal section, X 2, 18C/275. Karst Mountain section XVIII, Sikambr Suite, sample XVIII-15/18.
   Diagnosis : Polyparia cerioid-chain-like, composed of prismatic (with six to eight sides) and cylindric to prismatic corallites (diameter 6.0 to 9.5 mm). Corallite wall commonly 0.3 to 0.5 mm thick. Pores not numerous. Tabulae incomplete, vesicular.

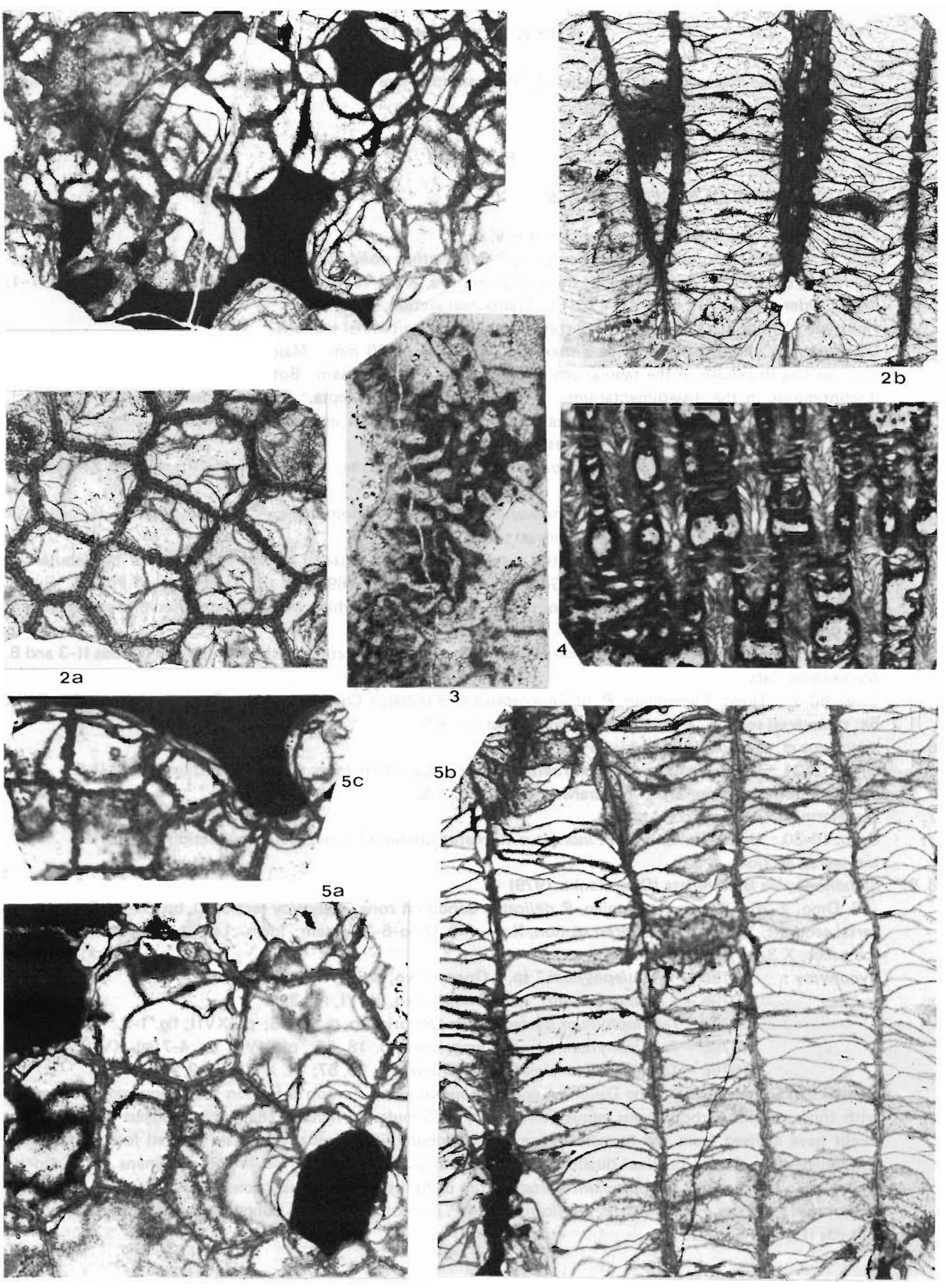
2. *Michelinia costata* Smirnova nov. sp. holotype, transversal section (2a) and longitudinal section (2b), X 2, 18C/270. Karst Mountain section, Karst Suite, sample XVIII-6.
   Diagnosis : Cerioid colonies characterized by cup-like or cone-like forms, composed of thick-walled corallites with seven to eight sides. Diameter of corallites 8 to 11 mm. Walls composed of fused septal node-like ribs. Wall of corallites commonly 0.7 to 1.5 mm thick. Wall pores not numerous. Tabulae incomplete, vesicular.

3. *Yavorskia omolonensis* Smirnova 1979, holotype, transversal section showing detail of wall, X 10, 18C/73. Ustyevoy section II, Elergetkhyn Suite, sample II-25.

4. *Thecostegites* aff. *infundibuliferus* Tchern., longitudinal section, X 4, 18C/231. Pushok section XV, Pushok Suite, sample XV-4.

5. *Michelinia lacunosa* Smirnova nov. sp., holotype, transversal section (5a), longitudinal section (5b) and transversal section in the periphery of the colony (5c), X 2, 18C/266. Karst Mountain section, Sikambr Suite, sample XVIII-15/18.
   Diagnosis : Cerioid polyparia with small lacunae, composed of corallites with six to eight sides (diameter 10 to 14 mm). The walls of the corallites are even or slightly undalated (thickness 0.5 to 0.8 mm). Tabulae complete, slightly curved and incompletely vesicular.

PLATE 28



RUGOSE CORALS (Plates 29 to 35)

(E. POTY & Yu. I. ONOPRIENKO)

The figured specimens are from the collection Poty except those figured pl. 31, fig. 2a, b and pl. 34, fig. 7 which have been stored in the collection Onoprienko.

PLATE 29

1-9. UPPER FAMENNIAN RUGOSE CORALS

1 - 3. *Tabulophyllum simakovi* Poty & Onoprienko nov. sp.
— 1. Omo. 88-3, holotype ; Upper Famennian, *Polygnathus obliquicostatus* Conodont zone; Uvnukveem section XXII, beds XXII - 7/13. 1a, b: transversal sections, X 3 ; 1c: longitudinal section, X 3. — 2. Omo. 77-1; idem ; Oder section XII, beds XII - 10/13. Transversal section, X 3.
Holotype : Omo. 88-3 (see above) ; 2 transversal and 1 longitudinal sections.
Diagnosis : Cylindrical coral with a maximum diameter of 20 mm. Major septa withdrawn from the axis, more or less thickened in the tabularium ; minor septa short or absent. Both the major and minor septa often discontinuous in the dissepimentarium. Maximum of 38 major septa. Cardinal fossula small or indistinct. Dissepiments concentric or/and transeptal, subglobose to elongate in longitudinal section. Tabulae complete or not, usually flat with downturned edges.
Occurrence : Upper Famennian, *P. obliquicostatus* Conodont zone; Uvnukveem XXII and Oder XII sections.

4. *Gorizdronia ?* sp.
Omo. 11-29 ; Upper Famennian, *P. inornatus inornatus* Conodont zone ; Ustyevoy section II, bed II-3. 4a: longitudinal section, X 4 ; 4b: transversal section, X 4.
Remarks : The transversal sections of the specimens resemble those of *Amplexus* except for the tabularium which is more complex, as observed in *Gorizdronia* Różkowska 1969 from the Famennian of Poland. But in the latter genus, the youngest stage of the ontogeny shows an aulos, which we could not observe in our specimens (not preserved).
Occurrence : Upper Famennian, *P. inornatus inornatus* Conodont zone; Ustyevoy section II, beds II-3 and 8.

5. *Nalivkinella ?* sp.
Omo. 50-2 ; Upper Famennian, *P. obliquicostatus/extralobatus* Conodont zones; Gytgynpylgin section XVII. 5a: transversal section, X 6 ; 5b: longitudinal section, X 5.

6. *Amplexus* cf. *coralloides* Sowerby 1814
Omo. 13-21 ; Upper Famennian, *P. inornatus inornatus* Conodont zone; Ustyevoy section II, bed II-8. 6a: longitudinal section, X 5 ; 6b: transversal section, X 5.

7. Undetermined caninoid coral sp. A.
Omo. 10-30 ; Upper Famennian, *P. inornatus inornatus* Conodont zone; Ustyevoy section II, bed II-3. transversal sections, X 3.

8, 9. *Siphonophyllia latetabulata* (Onoprienko 1979)
- 8. Omo. 7-26 ; Upper Famennian, *P. delicatus* Conodont zone; Ustyevoy section II, bed II-1. 8a, b: transversal sections, X 3; 8c: transversal section, X 4. — 9. Omo-6-24 ; idem; idem. Longitudinal section through the calice, X 3.
Synonymy : 1979b – "*Tabulophyllum*" sp. 1 Onoprienko, pl. VI, fig. 1, 2.
1979b – "*Tabulophyllum*" sp. 2 Onoprienko, pl. VI, fig. 3, 4.
1979c – *Tabulophyllum latetabulatum* Onoprienko, p. 17, 56; pl. XVII, fig. 1-3.
1979c – *Tabulophyllum novum* Onoprienko, p. 18, 56; pl. XVII, fig. 4-7; pl. XVIII, fig. 1, 2.
? 1979c – *Tabulophyllum simplex* Onoprienko, p. 19, 57; pl. XVII, fig. 3, 4.
Remarks : Some species of the Devonian genus *Tabulophyllum* Fenton & Fenton 1924 show close similarities with those of the Carboniferous genus *Siphonophyllia* Scouler *in* McCoy 1844 which suggest that the latter might have evolved from the former. However *Siphonophyllia* has usually a better marked fossula and more thickened septa in the cardinal quadrants than *Tabulophyllum,* as observed in the specimens attributed by Onoprienko (1979c) to *Tabulophyllum latetabulatum* or to the synonymous species.
Occurrence : Upper Famennian, *P. duplicatus* and *? P. inornatus inornatus* Conodont zones ; Ustyevoy section II, beds II-1 and ? II-12.

PLATE 29

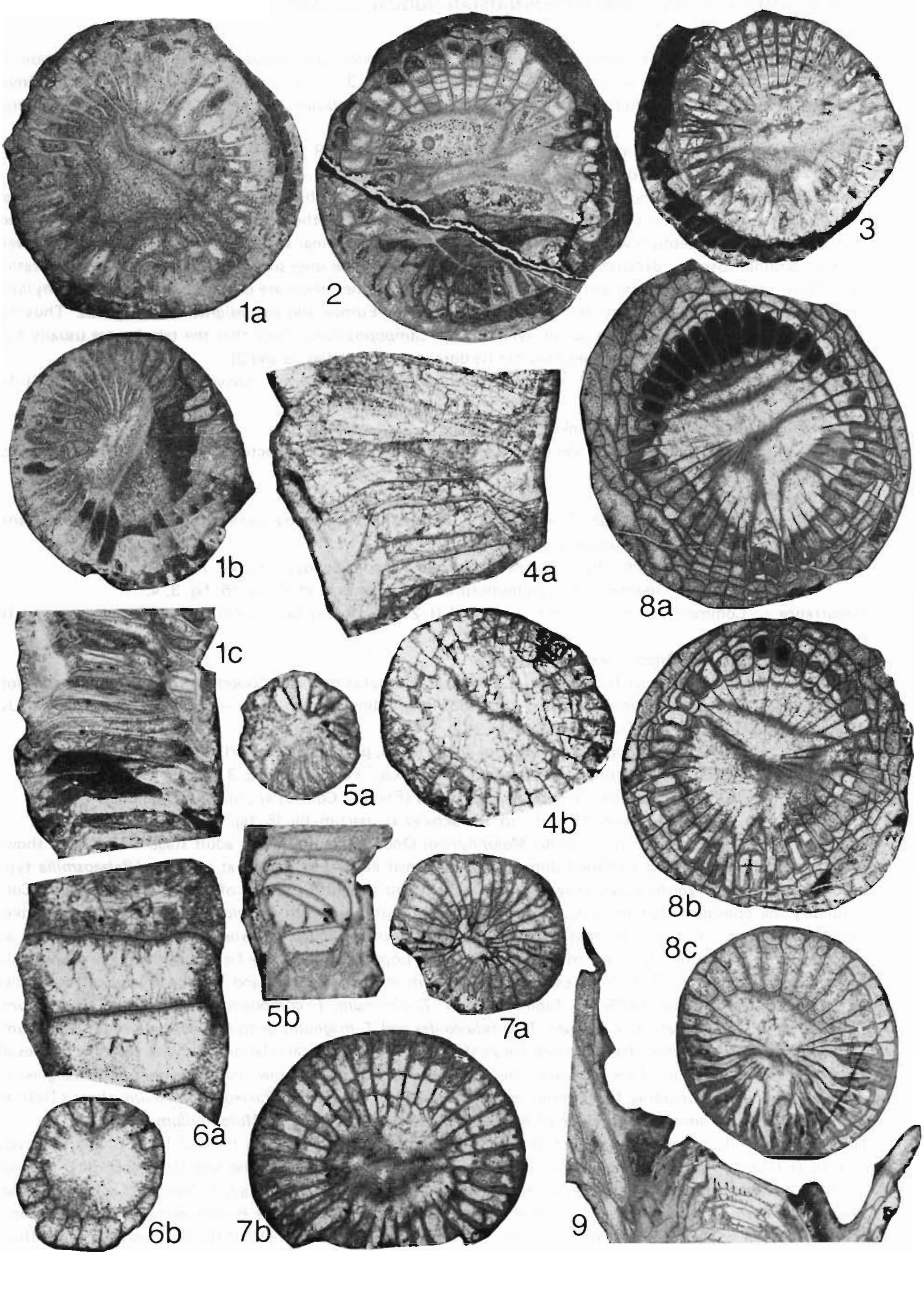


PLATE 30

1-7. UPPER FAMENNIAN AND LOWER TOURNAISIAN RUGOSE CORALS

1 - 3. *Campophyllum cylindricum* (Onoprienko 1979)

– 1. Omo. 19-21 ; Upper Famennian, *Polygnathus inornatus inornatus* Conodont zone ; Ustyevoy section II, bed II-14. 1a: longitudinal section showing domed tabulae, X 3 ; 1b: transversal section, X 3. – 2. Omo. 19-19; idem ; idem. Longitudinal section showing standard flat tabulae, X 3. – 3. Omo. 19-23; idem; idem. Transversal section, X 3.

Synonymy : 1979c – *Protocaninia cylindrica* Onoprienko, p. 25, 58 ; pl. III, fig. 4-11.
1979c – *Protocaninia parva* Onoprienko, p. 27, 58 ; pl. IV, fig. 1-4.

Remarks : According to Onoprienko (1979c), the main characters of his genus *Protocaninia* are a long cardinal septum and a short counter one. However, revision of topotypes of the species of this genus by Poty showed that it is the counter septum which is usually long whereas the cardinal septum is short and situated in a well marked cardinal fossula. Because of these characteristics, and other ones such as the contraclined or contratingent minor septa and the shape and the number of the majors ones, these are closely related to *Campophyllum flexuosum* (Goldfuss 1826) from the "Strunian" of Western Europe and are assigned to that genus. Thus the genus *Protocaninia* seems to be a junior synonym of *Campophyllum.* Note that the tabulae are usually flat with downturned edges but sometimes they can be domed (compare figs 1a and 2).

Occurrence : Upper Famennian, *P. inornatus inornatus* Conodont zone ; Ustyevoy section II, beds II-14 till II-16.

4. *Siphonophyllia latetabulata* (Onoprienko 1979)

Omo. 6-24 ; Upper Famennian, *P. delicatus* Conodont zone ; Ustyevoy section II, bed II-1. Transversal section, X 3.

5. *Tabulophyllum* sp.

Omo. 24-10 ; base of Tournaisian, *P. lobatus* Conodont zone ; Ustyevoy section II, bed II-21. 5a,b: transversal sections, X 3 ; 5c: longitudinal section, X 3.

Synonymy : 1979c – *Trochophyllum annae* Ivanovsky ; Onoprienko, pl. XI, fig. 7, 8.
1983 – Undetermined caninomorphic coral, Simakov *et al.*, pl. 16, fig. 3, 4.

Occurrence : Common and only known in the bed II-21 (*P. lobatus* Con. zone) of the Ustyevoy section II, base of Tournaisian.

6, 7. *Molophyllum magnum* (Onoprienko 1979)

– 6. Omo. 24 bis 14 ; base of Tournaisian, *P. lobatus/P. inornatus rostratus* Conodont zone ; Ustyevoy section II, beds II-21/22. 6a: transversal section, X 2 ; 6b: longitudinal section, X 2. – 7. Omo. 23-3 ; idem ; Ustyevoy section II, bed II-21. Transversal section, X 2.

Synonymy : 1979c – *Tabulophyllum magnum* Onoprienko, p. 22, 57 ; pl. XVII, fig. 5, 6.
1982 – *Tabulophyllum magnum* Onoprienko ; Poty, pl. V, fig. 3.
1982 – *Palaeosmilia ?* aff. *aquisgranensis* (Frech) ; Conil *et al.*, pl. V, fig. 4a, b.
1983 -- "*Tabulophyllum*" sp. Simakov *et al.*, partim, pl. 15, fig. 1.

Remarks : For Onoprienko, in the genus *Molophyllum* Onoprienko 1979, the adult stage of the coral shows incomplete tabulae forming flattened domes with upturned edges and sagged at the axis (*Palaeosmilia* type tabulae) whereas the young stages show more complete tabulae flat at the axis of *Tabulophyllum* type. Consequently, he considers that there is a phylogenetic relationship between *Tabulophyllum* (*sensu* Onoprienko) and *Molophyllum.* But it seems that the presence or absence of tabulae of *Palaeosmilia* type is not really an ontogenetic character but can vary considerably within a population (compare fig. 1 with fig. 2) or even within a single coral. Therefore Poty believes that *Molophyllum* must be enlarged and include several of the species attributed by Onoprienko (1979c) to *Tabulophyllum (T. cincinum, T. compositum, T. directum, T. inclarum, T. solidum, T. tenuiseptatum, T. varium, T. lonsdaleoides* and *T. magnum)* or to *Caninophyllum (C. captiosum, C. gibum* and *C. recurvum).* Indeed, these corals show real morphological relationships with the type species of *Molophyllum.* A revision of the type specimens of these species might show that these should be assigned to only 3 or 4 species (including *M. magnum* and *M. adapertum*). Note that *Palaeosmilia tshumyshensis* Dobroljubova *et al.* 1966 from the Tournaisian of Kuznetsk probably also belongs to *Molophyllum.*

Occurrence : The genus *Molophyllum* Onoprienko (*sensu* Poty) ranges from the bed II-20 of the Ustyevoy section II (Upper Famennian, *P. parapetus* Conodont zone) (may be from the bed II-16 according to Onoprienko) to the bed VII-5 of the Verkhnenaled section VII (Lower Tournaisian, *P. inornatus rostratus* Conodont zone). *Molophyllum magnum* is present in the beds XV-1/2 partim of the Pushok section XV ("Strunian", *Quasiendothyra kobeitusana* Foraminifer zone) and common in the bed II-21 of the Ustyevoy section II (base of Tournaisian, *P. lobatus* Conodont zone).

PLATE 30

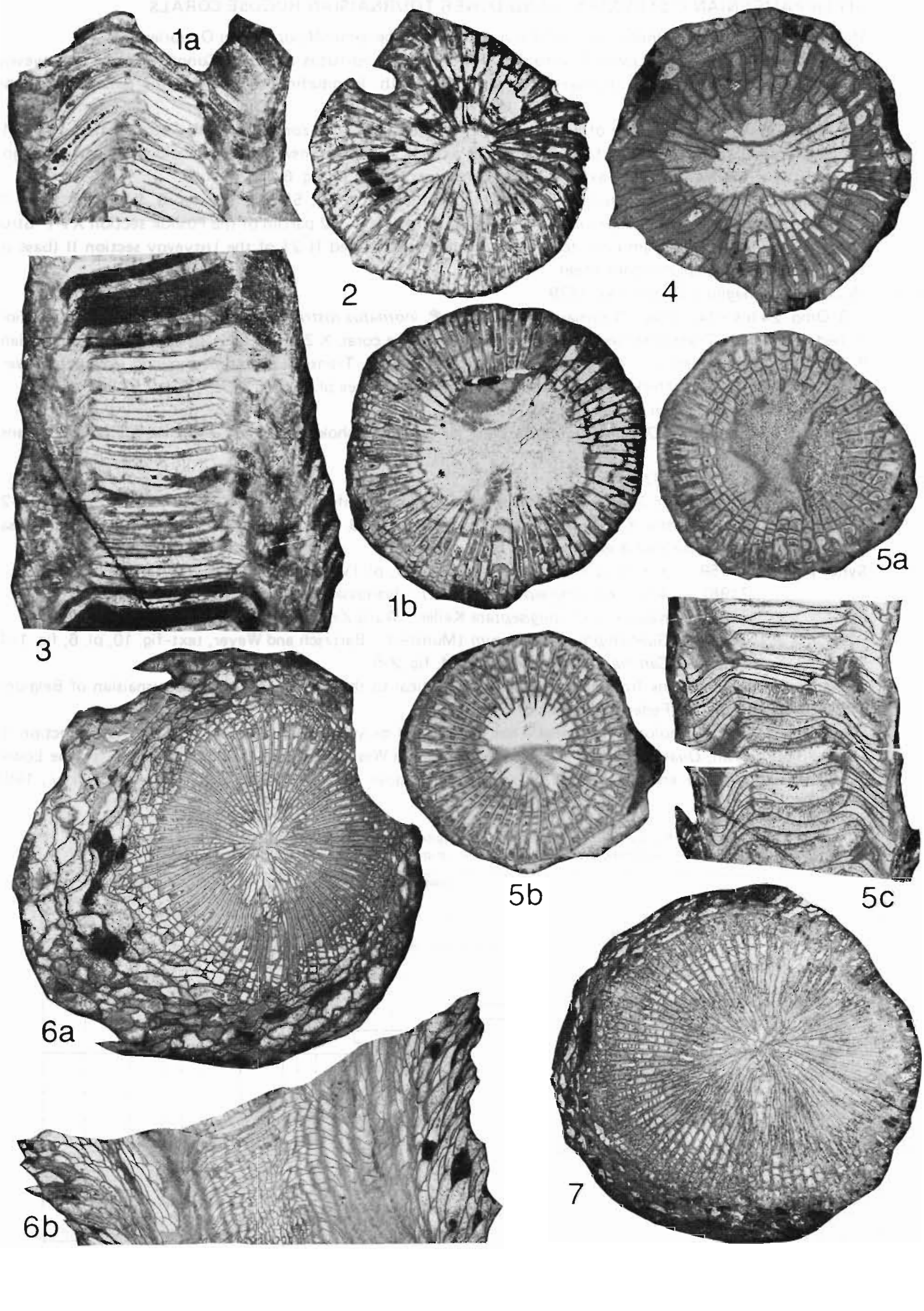


PLATE 31

1-7. UPPER FAMENNIAN ("STRUNIAN") AND LOWER TOURNAISIAN RUGOSE CORALS

1 - 2. *Molophyllum adapertum* Onoprienko 1979 (type species of the genus *Molophyllum* Onoprienko).

– 1. Omo. 24 bis – 12 ; Lower Tournaisian, *P. lobatus/P. inornatus rostratus* Conodont zone ; Ustyevoy section II, beds II-21/22. 1a: transversal section, X 2 ; 1b: longitudinal section showing tabulae flat at the axis, X 2.

– 2. 1408/18, holotype ; base of Tournaisian, *P. lobatus* Conodont zone ; Ustyevoy section II, bed II-21. 2a: longitudinal section showing tabulae sagged at axis, X 2 ; 2b: transversal section showing sinuosus major septa a little withdrawn from the axis, X 2. For comments see pl. 30, fig. 6, 7.

Synonymy : 1979c – *Molophyllum adapertum* Onoprienko, p. 29, 58 ; pl. IV, fig. 8, 9 ; pl. V, fig. 1-3.

Occurrence : *Molophyllum adapertum* is present in the beds XV-1/2 partim of the Pushok section XV ("Strunian", *Q. kobeitusana* Foraminifer zone) and common in the bed II-21 of the Ustyevoy section II (base of Tournaisian, *P. lobatus* Conodont zone).

3, 4. *Molophyllum magnum* Onoprienko 1979

– 3. Omo. 24 bis –14 ; Lower Tournaisian, *P. lobatus/P. inornatus rostratus* Conodont zone ; Ustyevoy section II, beds II-21/22. Transversal sections in young stages of the coral, X 2. – 4. Omo. 24-6 ; base of Tournaisian, *P. lobatus* Conodont zone ; Ustyevoy section II, bed II-21. Transversal section showing irregular convergencies of the end of the thickened major septa. For comments, see pl. 30, fig. 6, 7.

5. *Molophyllum* cf. *adapertum* Onoprienko 1979

Omo. 1-8 ; "Strunian", *Q. kobeitusana* Foraminifer zone ; Pushok section XV, beds XV-1/2 partim. Transversal section, X 2.

6, 7. *Caninia tregaensis* Poty 1982

– 6. Omo. 28-7 ; Lower Tournaisian, *Quasiendothyra* Foraminifer zone ; Beregovoy section III, bed III-2. 6a,b,d: transversal sections, X 3 ; 6c: longitudinal section, X 3. – 7. Omo. 29-1 ; idem ; idem. Transversal section of a specimen without dissepiments, X 3.

Synonymy : ?1959 – *Kassinella longiseptata* Keller, p. 91, pl. IV, fig. 1, 2.
?1967 – *Amplexus longiseptatus* (Keller) ; Ivanovski, p. 38, pl. I, fig. 3, 4.
?1981 – *Kassinella* cf. *longiseptata* Keller ; Wang Zengji, p. 171, pl. I, fig. 4.
1982 – *Guerichiphyllum priscum* (Münster) ; Bartzsch and Weyer, text-fig. 10, pl. 6, fig. 1-4.
1982 – *Caninia tregaensis* Poty, p. 54, fig. 2-5.

Remarks : The specimens from the Omolon are identical to those from the Lower Tournaisian of Belgium, The Netherlands and the Federal Republic of Germany.

Occurrence : In the Omolon, *C. tregaensis* has been found only in the bed III-2 of the Beregovoy section III (Lower Tournaisian, *Quasiendothyra* Foraminifer zone). In Western Europe, it is characteristic for the Lower Tournaisian ("Tn1b") and the typical species of the Rugose Coral zone 1 of Poty (*in* Simakov *et al.,* 1983 and 1984 in Press).

Stratigraphic distribution in the Omolon Region of the Rugose Corals here figured
(—— : observed distribution ; – – – : distribution not exactly determined.

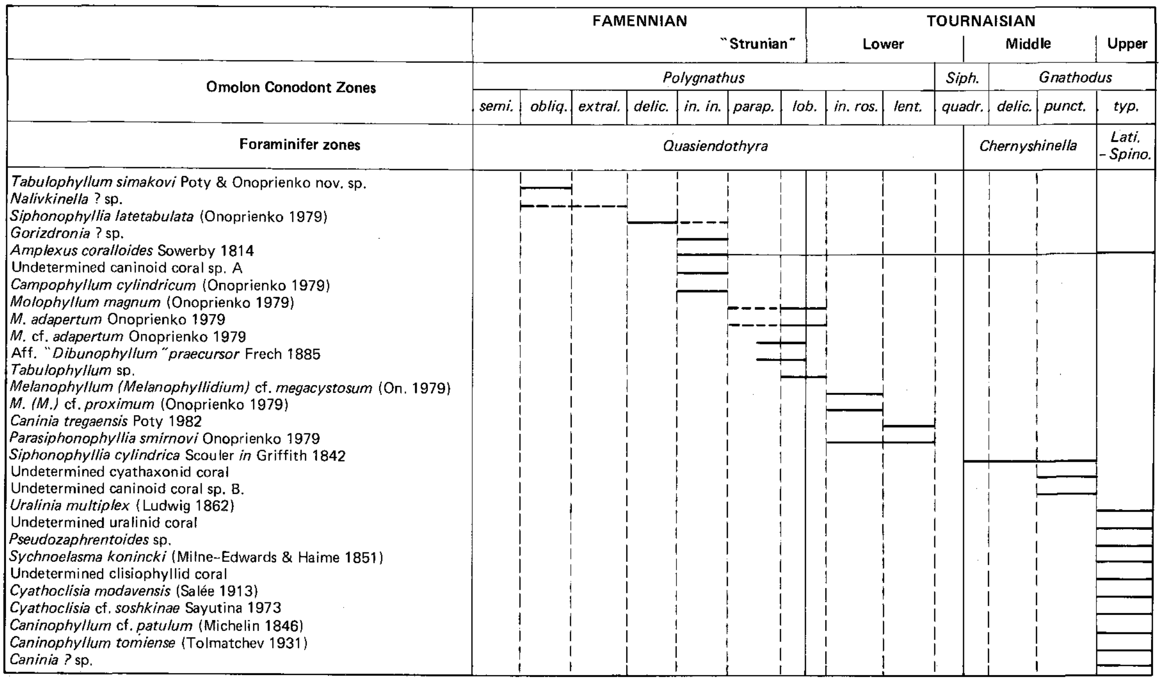


PLATE 31

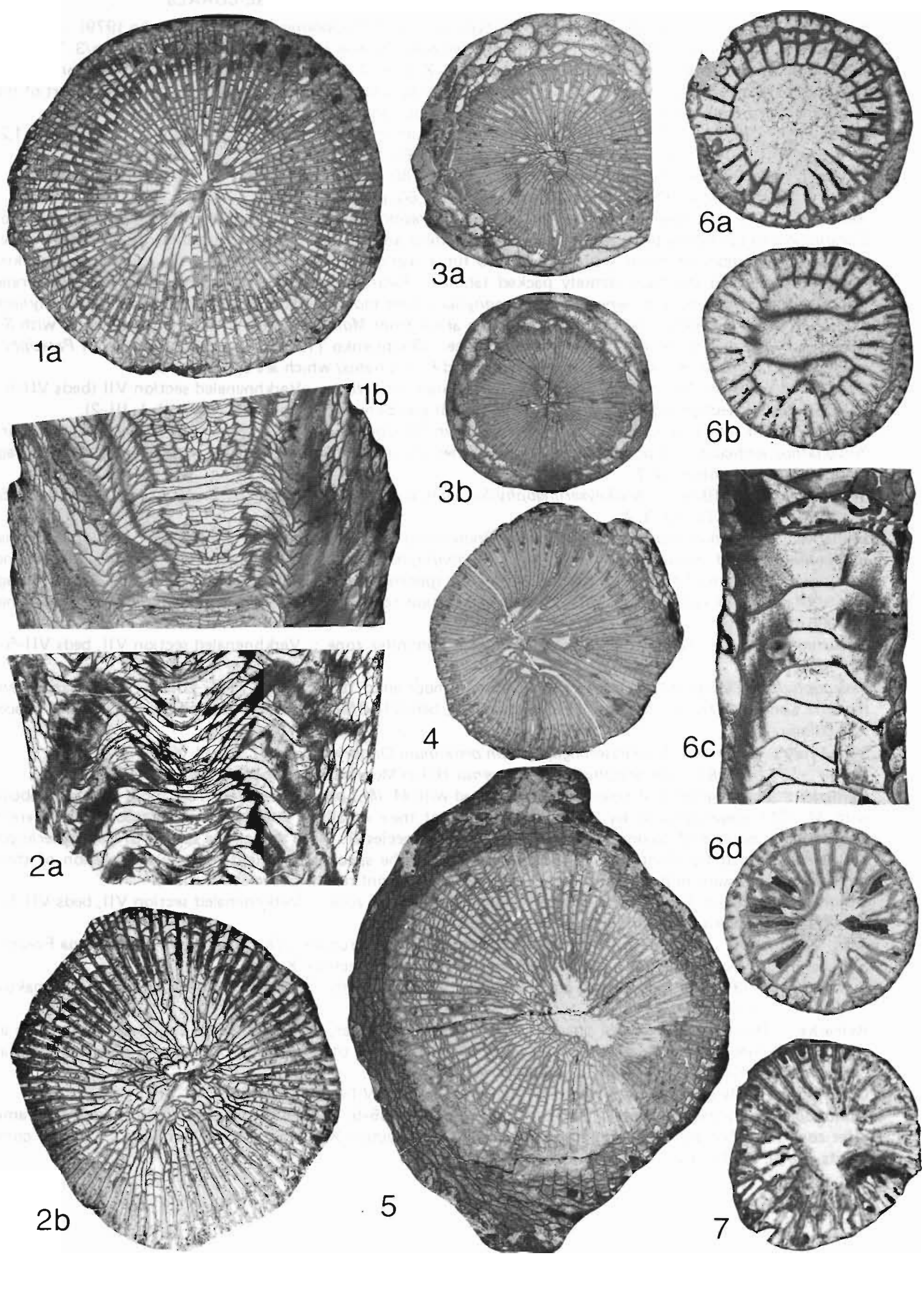


PLATE 32

1-6. UPPER FAMENNIAN ("STRUNIAN") TO MIDDLE TOURNAISIAN RUGOSE CORALS

1, 2. *Parasiphonophyllia smirnovi* Onoprienko 1979 (type species of *Parasiphonophyllia* Onoprienko 1979).– 1. Omo. 2-2; Lower Tournaisian, *Quasiendothyra* Foraminifer zone; Pushok section XV, beds XV-2 partim/3. Transversal section showing the lonsdaleoid dissepimentarium, X 2. – 2. Omo. 27-9; idem; Beregovoy section III, bed III-1. 2a: transversal section of a poorly preserved coral (as usually found) in which the lonsdaleoid part of the dissepimentarium has been abraded, X 1,5; 2b: longitudinal section, X 2.

Synonymy : 1979c – *Parasiphonophyllia smirnovi* Onoprienko, p. 34, 59; pl. VII, figs 2-5; pl. VIII, figs. 1,2;
1979c – *P. excentrica* Onoprienko, p. 36, 60; pl. VII, figs. 6,7.
1979c – *P. crassisepta* Onoprienko, p. 37, 60; pl. VIII, figs. 3-6.
1979c – *P. circinatus* Onoprienko, p. 38, 60; pl. IX, figs 1-3.

Remarks : The specimens attributed to the genus *Parasiphonophyllia* Onoprienko 1979 resemble those of *Siphonophyllia cylindrica* because of their general pattern and their lonsdaleoid dissepiments. But they differ by the large number of major septa (about 100 for a section of 55 mm diameter), the usually well-marked lateral fossulae, and the more densely packed tabulae. *Parasiphonophyllia* shows many morphological relationships with *Molophyllum,* whereas *Siphonophyllia* shows morphological relationships with *Tabulophyllum* s. str. It seems probable that *Parasiphonophyllia* arises from *Molophyllum* and that its resemblance with *Siphonophyllia* is due to an evolutionary convergence. Onoprienko (1979c) described 4 species of *Parasiphonophyllia (P. smirnovi, P. excentrica, P. crassisepta* and *P. circinatus)* which are synonymous.

Occurrence : Lower Tournaisian, *Quasiendothyra* Foraminifer zone ; Verkhnenaled section VII (beds VII-5 - VII-15), Pushok section XV (beds XV-2 partim, XV-3) and Beregovoy section III (beds III-1, III-2).

3. *Melanophyllum (Melanophyllidium)* cf. *megacystosum* (Onoprienko 1979). Omo. 68-1; Lower Tournaisian, *Polygnathus lenticularis* Conodont zone; Verkhnenaled section VII, bed VII-9/10. Transversal section in a fragment of dendroid colony, X 2.

Synonymy : cf. 1979c - *Neokeyserlingophyllum megacystosum* Onoprienko, p. 43,61; pl. XIII, fig. 1-5; pl. XIV, fig. 3, 4.

Remarks : The genus *Neokeyserlingophyllum* Onoprienko 1979 shows the same characteristic major septa, dissepimentarium and deeply sagged tabulae as *Melanophyllum* Gorsky 1951 (*sensu* Kropatcheva, 1966), and is a junior synonym of this genus. Note that all the specimens of *Melanophyllum* collected by Poty are fragments of dendroid colonies and justifiy their attribution to *Melanophyllum (Melanophyllidium)* Kropatcheva 1966.

Occurrence : Lower Tournaisian, *Quasiendothyra* Foraminifer zone ; Verkhnenaled section VII, beds VII-5 - VII-9/10.

4. *Melanophyllum (Melanophyllidium)* cf. *proximum* (Onoprienko 1979). Omo. 71-1; Lower Tournaisian, *P. lenticularis* Conodont zone ; Verkhnenaled section VII, bed VII-8/9. Transversal section in a fragment of phaceloid colony, X 2.

Synonymy : cf. 1979c – *Neokeyserlingophyllum proximum* Onoprienko, p. 47, 62; pl. XVI, fig. 8-11.
1983 – *Melanophyllidium* sp. *sensu* Hill *in* Moore 1981; Simakov *et al.*, pl. 16, fig. 6.

Remarks : The fragments of colony here compared with *M. (M.) proximum* differ from those compared above with *M. (M.) megacystosum* by a smaller diameter of their corallites (maybe they correspond to different stages of the increase of colonies belonging to only one species ?). Note that all the species of *Neokeyserlingophyllum* described by Onoprienko (1979c) resemble to the specimens figured here, but a revision of their holotypes is necessary to precise their exact affinities and to confirm the above attributions.

Occurrence : Lower Tournaisian, *Quasiendothyra* Foraminifer zone ; Verkhnenaled section VII, beds VII-5 - VII-8/9 and Beregovoy section III, undetermined bed.

5. Aff. "*Dibunophyllum*" *praecursor* Frech 1885. Omo. 1-1; "Strunian", *Quasiendothyra kobeitusana* Foraminifer zone; Pushok section XV, bed XV-1/2 partim. Transversal section, X 4.

Synonymy : 1983 – Undescribed coral showing affinities with "*Dibunophyllum*" *praecursor;* Simakov *et al.,* pl. 15, fig. 9.

Remarks : This poorly preserved specimen has the same diameter, number of septa and dissepimentatium as "*Dibunophyllum*" *praecursor* Frech 1885 from the "Strunian" of Western Europe. But it is conical whereas "*D*" *praecursor* is cylindrical, and has a stronger axial structure.

Occurrence : Only one specimen collected in Pushok section XV (see above).

6. *Siphonophyllia cylindrica* Scouler *in* Griffith 1842. Omo. 85-5; Middle Tournaisian, *Chernyshinella* Foraminifer zone (*P. tchernyshinensis* Foram. subzone); Sikambr section XXIII. Transversal section, X 1,5. For comments, see pl. 33, fig. 1,2.

PLATE 32

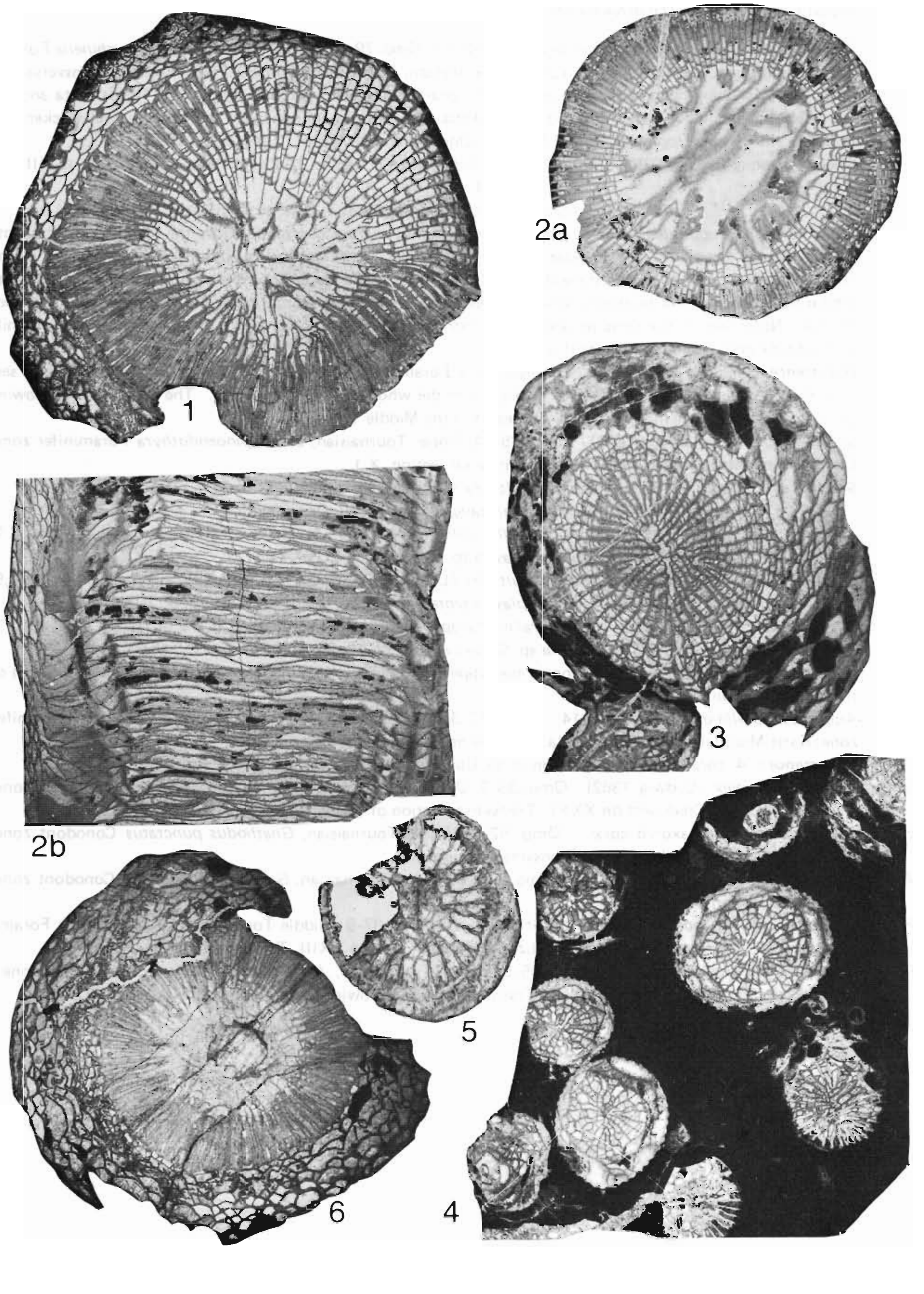


PLATE 33

1 - 9. MIDDLE AND UPPER TOURNAISIAN RUGOSE CORALS

1, 2. *Siphonophyllia cylindrica* Scouler *in* Griffith 1842. – 1. Omo. 79-1; Middle Tournaisian, *Chernyshinella* Foraminifer zone; Sikambr section XXIII. Longitudinal section, X 1.5. – 2. Omo. 80-2; idem; idem. Transversal section, X 1,5, showing a marked "uralinid trend" characterized here by the regression of major septa and the increase of the number of lonsdaleoid dissepiments. It possesses minor septa and weak septal thickenings. Compare with *Neomicroplasma septata* Rogozov; Onoprienko, 1979a, pl. II, fig. 5.

Selected synonymy : 1979a – *Siphonophyllia cylindrica* Scouler *in* McCoy; Onoprienko, p. 23; pl. III, fig. 3, 4; pl. V, fig. 4.
1982 – *Siphonophyllia cylindrica* Scouler *in* Griffith; Conil *et al.*, pl. V, fig.2.

Remarks : *Siphonophyllia cylindrica* sometimes shows a variation characterized by the regression of the septa in the counter quadrants, the increase of their thickenings in the cardinal quadrants, and the increase of the number of the lonsdaleoid dissepiments ("uralinid trend"). These morphotypes of *S. cylindrica* show close similarities with *Uralinia multiplex* which suggest that the genus *Uralinia* might have evolved from *Siphonophyllia*. Note that in the Omolon area, *S. cylindrica* has not been observed in the Upper Tournaisian while *U. multiplex* occurs and develops at this time.

Occurrence : Middle Tournaisian, *Chernyshinella* Foraminifer zone; Sikambr section XXIII and Pushok section XV. In Belgium, *S. cylindrica* l.s. is present in the whole of the Tournaisian. The morphotypes showing an "uralinid trend" are more particularly present in the Middle Tournaisian.

3. *Uralinia multiplex* (Ludwig 1862). Omo. 35-34; Upper Tournaisian, *Lati.-Spinoendothyra* Foraminifer zone; Elergetkhyn South Creek section XXXI. Transversal section, X 1.

Selected synonymy : 1976 – *Uralinia multiplex* (Ludwig); Onoprienko, pl. I, fig. 1, 2; pl. III, fig. 3.
1976 – *Pseudouralinia tangpakouensis* Yü; Onoprienko, pl. I, fig. 3,4.
1976 – *Siphonophyllia cylindrica* Scouler *in* McCoy; Onoprienko, pl. III, fig. 1, 2.
? 1976 – *Neomicroplasma* sp. Onoprienko, pl. IV, fig. 1, 2.
1979a – *Uralinia multiplex* (Ludwig); Onoprienko, p. 20; pl. IV, fig. 3,4; pl. V, fig.2,3,5.
1979a – *Neomicroplasma septata* Rogozov; Onoprienko, p. 26; pl. II, fig. 5, 6.
1979a – *Pseudouralinia tangpakouensis* Yü; Onoprienko, p. 24, pl. III, fig.7; pl.IV, fig. 1.
1983 – *Uralinia* sp. Simakov *et al.*, pl. 15, fig. 10.

Occurrence : *U. multiplex* is common in the Upper Tournaisian (*Lati.- Spinoendothyra* Foraminifer zone) of the Omolon region.

4. *Amplexus coralloides* Sowerby 1814. Omo. 47-33; Upper Tournaisian, *Lati.- Spinoendothyra* Foraminifer zone; Karst Mountain section XVII. 4a: longitudinal section, X 3; 4b: transversal section, X 3.

Occurrence : *A. coralloides* is uncommon in the Upper Tournaisian of the Omolon region.

5. *Uralinia multiplex* (Ludwig 1862). Omo. 35-3; Upper Tournaisian, *Lati.- Spinoendothyra* Foraminifer zone; Elergetkhyn South Creek section XXXI. Transversal section of young stage of a coral.

6. Undetermined Cyathaxonid coral. Omo. 52-3; Middle Tournaisian, *Gnathodus punctatus* Conodont zone; Bazov section XXIV, bed XXIV-7. Transversal section, X 5.

7. Undetermined caninoid coral sp. B. Omo. 52-2; Middle Tournaisian, *Gnathodus punctatus* Conodont zone. Transversal section, X 4.

8. *Siphonophyllia cylindrica* Scouler *in* Griffith 1842. Omo. 87-9; Middle Tournaisian, *Chernyshinella* Foraminifer zone (*P. tchernyshinensis* Foram. subzone); Sikambr section XXIII. Transversal section, X 2.

9. Undetermined uralinid coral. Omo. 35-5; Upper Tournaisian, *Lati.- Spinoendothyra* Foraminifer zone ; Elergetkhyn South Creek section XXXI. Transversal section showing long thickened major septa, X 2.

PLATE 33

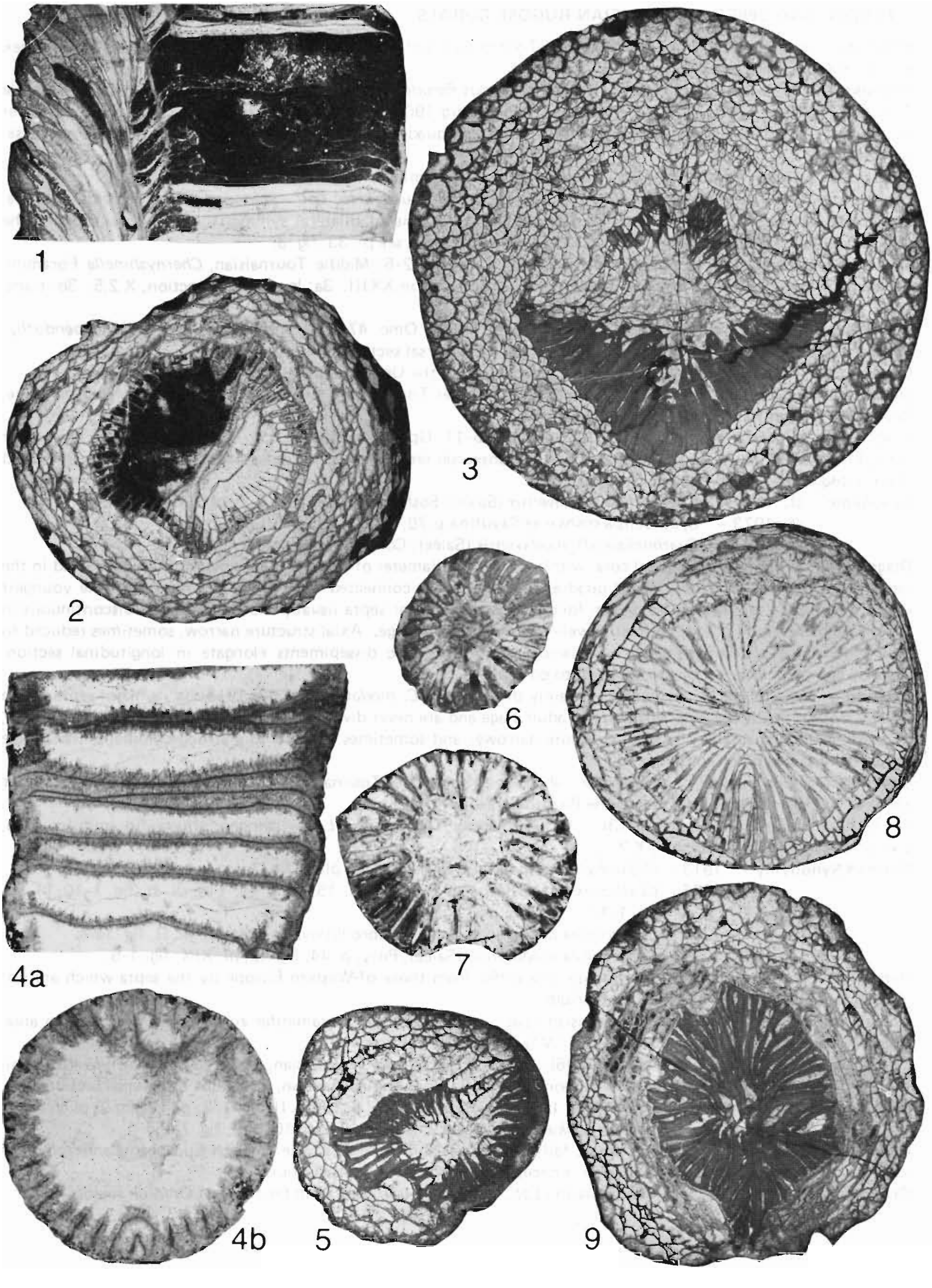


PLATE 34

1 - 8. MIDDLE AND UPPER TOURNAISIAN RUGOSE CORALS

1. *Pseudozaphrentoides* sp. Omo. 35-12; Upper Tournaisian, *Lati.- spinoendothyra* Foraminifer zone; South Creek section XXXI. Transversal section, X 2.
   Remarks : The specimens attributed here to the genus *Pseudozaphrentoides* Stuckenberg 1904 closely resemble *P. juddi* (Thomson 1893) (= *P. inostranzewi* (Stuckenberg 1904)) from the Upper Visean of Eurasia. They differ by the weakness of the septal thickenings in the cardinal quadrants and by the not so common herringbone dissepiments.
   Occurrence : Upper Tournaisian (*Lati.- spinoendothyra* Foraminifer zone) of the Elergetkhyn area.
2. *Uralinia multiplex* (Ludwig 1862). Omo. 64 bis-3; Upper Tournaisian, *Lati.- spinoendothyra* Foraminifer zone; Povorotny section IV. Longitudinal section through the plane of bilateral symmetry of the coral showing the tabulae sloping down to the deep fossula, X 1,5. For comments see pl. 33, fig. 3.
3. *Siphonophyllia cylindrica* Scouler *in* Griffith 1842. Omo. 82-6; Middle Tournaisian, *Chernyshinella* Foraminifer zone (*P. tchernyshinensis* Foram. subzone); Sikambr section XXIII. 3a: longitudinal section, X 2,5; 3b: transversal section, X 2,5. For comments see pl. 33, fig. 1, 2.
4. *Symchnoelasma konincki* (Milne - Edwards & Haime 1851). Omo. 47-32; Upper Tournaisian, *Lati.-spinoendothyra* Foraminifer zone; Karst Mountain section XVIII. Transversal section, X 4.
   Occurrence : Upper Tournaisian of Eurasia. Uncommon in the Upper Tournaisian of the Omolon region.
5. Undetermined Clisiophyllid coral. Omo. 58 bis-10; Upper Tournaisian, *Lati.- spinoendothyra* Foraminifer zone; Povorotny section IV. Transversal section, X 5.
6. *Cyathoclisia* cf. *soshkinae* Sayutina 1973. Omo. 35-17; Upper Tournaisian, *Lati.- spinoendothyra* Foraminifer zone; Elergetkhyn South Creek section XXXI. Transversal section of young stage of the coral showing thickened major septa extending to the axial structure, X 3.
   Synonymy : cf. 1961 – *Cyathoclisia modavensis* (Salée); Soshkina, p. 282; fig. 6, 7; pl. I, fig. 1-7.
   cf. 1973 – *Cyathoclisia soshkinae* Sayutina, p. 70, fig. 13, 14; pl. VI, fig. 7-9.
   1982 – *Cyathoclisia* aff. *modavensis* (Salée); Conil *et al.*, pl. V, fig. 1a,b.
   Diagnosis : Ceratoid to cylindrical coral with a maximum diameter of 45 mm. Septa more or less thickened in the tabularium, especially in the cardinal quadrants. Major septa connected with the axial structure in the youngest stages but usually withdrawn from it in following stages. Minor septa usually short, sometimes discontinuous in the dissepimentarium. Cardinal fossula well-marked but not large. Axial structure narrow, sometimes reduced to a strong columella. Dissepimentarium narrow with concentric dissepiments elongate in longitudinal section. Tabulae complete or a few divided, domed to conical.
   Remarks : *Cyathoclisia* cf. *soshkinae* mainly differs from *C. modavensis* (Salée 1913) by its major septa which usually do not reach the axial structure in adult stage and are never divided longitudinally, its minor septa shorter, its cardinal fossula smaller, its axial structure narrower and sometimes reduced to a strong columella, its tabulae not so divided and often complete.
   Occurrence : *Cyathoclisia* cf. *soshkinae* abounds in the Upper Tournaisian (*Lati.- spinoendothyra* Foraminifer zone) of the Elergetkhyn area; rare in the Povorotny section IV.
7. *Cyathoclisia modavensis* (Salée 1913). 1409/6; Upper Tournaisian, *Lati.- spinoendothyra* Foraminifer zone; Elergetkhyn. Transversal section, X 2.
   Selected Synonymy : 1913 – *Clisiophyllum modavense* Salée, p. 206, pl. V, fig. 3a-c.
   1926 – *Cyathoclisia tabernaculum* Dingwall, p. 15, pl. I, fig. 1-4; pl. II, fig. 1-10, pl. III, fig. 1-10.
   1966 – *Cyathoclisia modavense* (Salée); Dobroljubova *et al.*, p. 42, pl. II, fig. 1a-c.
   1981 – *Cyathoclisia modavensis* (Salée); Poty, p. 44, fig. 42; pl. XIX, fig. 1-5.
   Remarks : The specimens of the Omolon area differ from those of Western Europe by the septa which are not divided longitudinally in the dissepimentarium.
   Occurrence : Rare in the Upper Tournaisian (*Lati.- spinoendothyra* Foraminifer zone) of the Elergetkhyn area. Upper Tournaisian and Lowermost Visean (" V1a ") in Western Europe.
8. *Caninophyllum* cf. *patulum* (Michelin 1846). Omo. 47-8; Upper Tournaisian, *Lati.- spinoendothyra* Foraminifer zone; Elergetkhyn Karst Mountain section XVIII. 8a: longitudinal section, X 2; 8b: transversal section, X 2.
   Synonymy : 1979a – *Bothrophyllum pater* Ivanovsky; Onoprienko, p. 13; pl. II, fig. 1, 2; pl. IV, fig. 2; pl. V, fig. 1.
   ?1979a – *Campophyllum kureikaense* Ivanovsky; Onoprienko, p. 16, pl. I, fig. 7, 8.
   Remarks : These long cylindrical corals fall into the variability range of the Western European *Caninophyllum patulum* auct. But a revision of this latter is necessary to confirm that attribution.
   Occurrence : Common in Upper Tournaisian (*Lati.- spinoendothyra* Foraminifer zone) of Omolon region.

PLATE 34

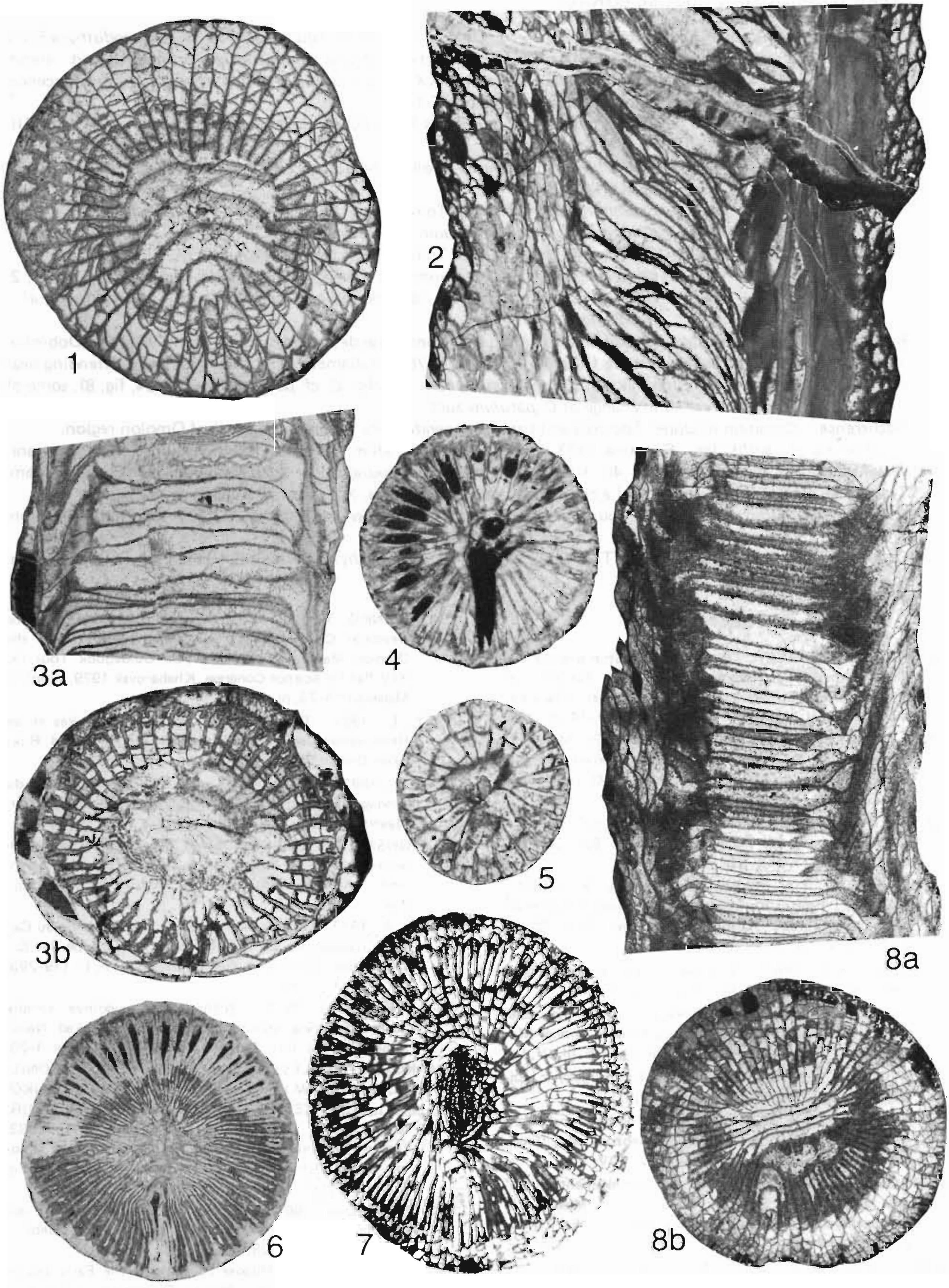


PLATE 35

1-6. UPPER TOURNAISIAN RUGOSE CORALS

1-3. *Caninophyllum tomiense* (Tolmatchev 1931). – 1. Omo. 47-7; Upper Tournaisian, *Lati.- spinoendothyra* Foraminifer zone; Karst Mountain section XVIII. Transversal section showing a marked "keyserlingophylloid" trend. – 2. Omo. 35-11; idem; Elergetkhyn South Creek section XXXI. Longitudinal section showing a rejuvenescence, X 1,5. – 3. Omo. 35-4; idem; idem. Transversal section, X 1,5.

Selected Synonymy : 1961 – *Caninia patula* var. *tomiensis* Tolmatchev; Soshkina, p. 296; pl. II, fig. 8; pl. III, fig. 1-3; pl. IV, fig. 1.
1966 – *Caninophyllum tomiense* (Tolmatchev); Dobroljubova *et al.*, p. 77; pl. X, fig. 1, 2; pl. XI, fig. 1.
1976 – *Caninophyllum tomiense* (Tolmatchev); Onoprienko, pl. II, fig. 1, 3.
1976 – *Keyserlingophyllum obliquum* (Keyserling); Onoprienko, pl. II, fig. 2, 4.
1979a – *Caninophyllum tomiense* (Tolmatchev); Onoprienko, p. 9; pl. III, fig. 5, 6.
1979a – *Keyserlingophyllum obliquum* (Keyserling); Onoprienko, p. 18; pl. III, fig. 1, 2.
1983 – *Caninophyllum* sp. of the "*Caninophyllum patulum* group" Simakov *et al.* ; pl. 16, fig. 5.

Remarks : The Omolon specimens of *C. tomiense* differ from those described by Soshkina (1961) and Dobroljubova *et al.* (1966) by their larger size (reaching commonly 70 mm diameter) and the major septa extending near or at the axis and often grouped like in *Keyserlingophyllum.* As for *C.* cf. *patulum,* (see pl. 34, fig. 8), some of the specimens fall in the variability range of *C. patulum* auct.

Occurrence : Common in Upper Tournaisian (*Lati.- spinoendothyra* Foraminifer zone) of Omolon region.

4, 5. *Cyathoclisia* cf. *soshkinae* Sayutina 1973. – 4. Omo. 47-1; idem; Karst Mountain section XVIII. 4a: transversal section of adult stage, X 2; 4b: transversal section in a young stage, X 2. – 5. Omo. 47-17; idem; idem. Transversal section of young stage of a coral with a strong columella, X 2. For comments, see pl. 34, fig. 6.

6. *Caninia ?* sp. Omo. 47-5; Karst Mountain section XVIII. 6a: transversal section, X 2; 6b: longitudinal section, X 2.

Occurrence : Common in Upper Tournaisian (*Lati.- spinoendothyra* Foraminifer zone) of Omolon region.

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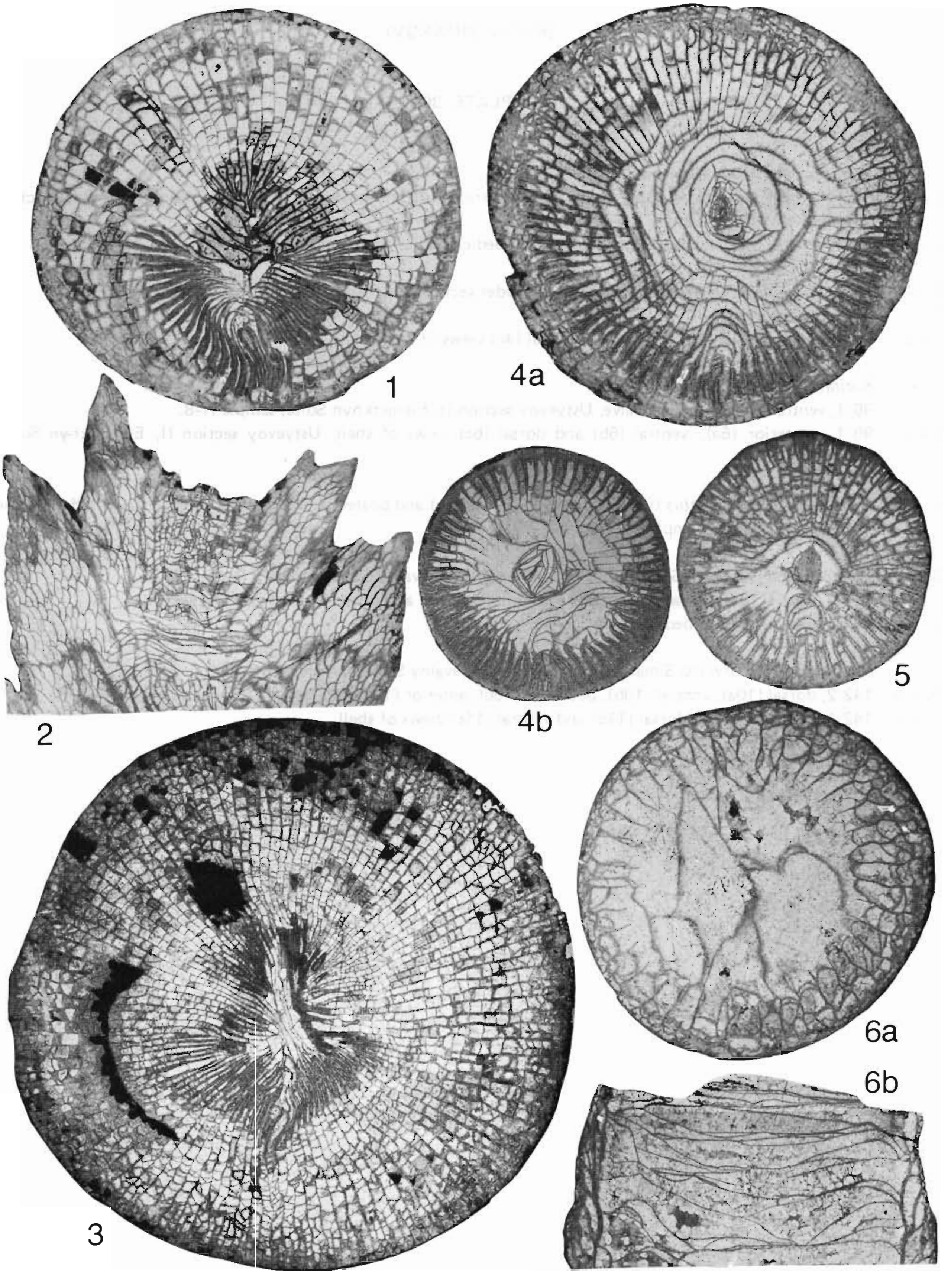
PLATE 35



BRACHIOPODS (Plates 36 to 40; all figures at natural size)

(Kirill V. SIMAKOV)

PLATE 36

1 - 2. *Validospirifer validus* Simakov.
1 a-e. 85/1, ventral (1a), dorsal (1b), lateral (1c), anterior (1d) and posterior (1e) views of holotype, Oder section XII, Perevalny Suite, sample XII-10.
2 a-b. 85/2, ventral (2a) and posterior (2b) views of pedicle valve, Oder section XII, Perevalny Suite, sample XII-15.

3 - 4. *Enchondrospirifer ? semiglobosus* Simakov, Oder section XII, Perevalny Suite, sample XII-10.
3. 97/1, posterior view.
4 a-c. 91/1, posterior (4a), dorsal (4b) and ventral (4c) views of shell.

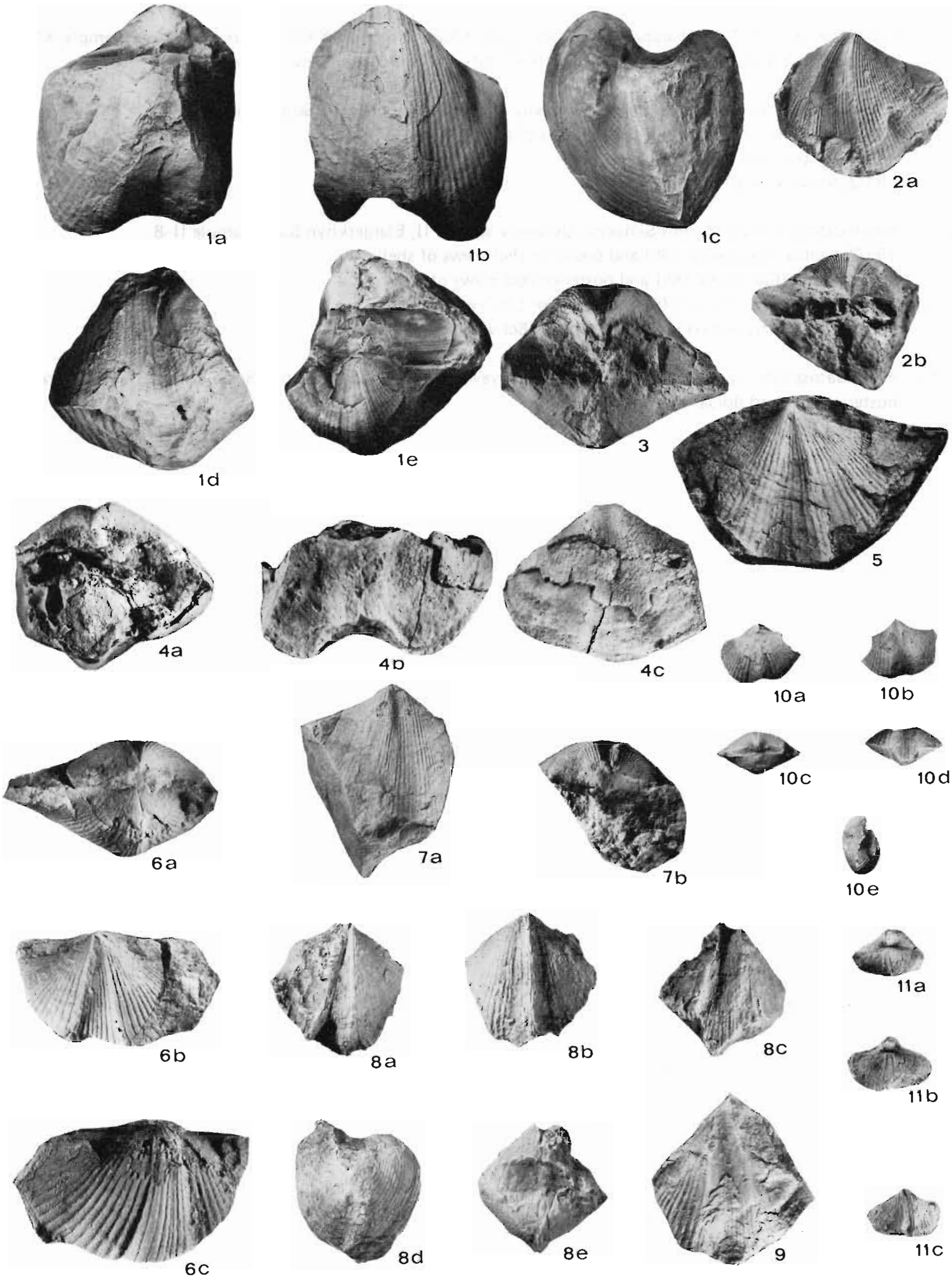
5 - 6. *Euritatospirifer ? tionesta* (Greiner).
5. 96/1, ventral view of pedicle valve, Ustyevoy section II, Elergetkhyn Suite, sample II-8.
6 a-c. 95/1, posterior (6a), ventral (6b) and dorsal (6c) views of shell, Ustyevoy section II, Elergetkhyn Suite, sample II-1.

7. *Euritatospirifer ? spicatus* (Greiner), 153/1, ventral (7a) and posterior (7b) views of pedicle valve, Oder section XII, Perevalny Suite, sample XII-10.

8 - 9. *Validospirifer ? stojani* (Simakov), Oder section XII, Perevalny Suite, sample XII-15.
8 a-e. 147/2, ventral (8a), dorsal (8b), anterior (8c), lateral (8d) and posterior (8e) views of shell.
9. 147/1, ventral view of pedicle valve.

10-11. *Incomptispirifer minima* Simakov, Oder section, Perevalny Suite, sample XII-8.
10 a-e. 142/2, dorsal (10a), ventral (10b), posterior (10c), anterior (10d) and lateral (10e) views of shell.
11 a-c. 142/1, posterior (11a), dorsal (11b) and ventral (11c) views of shell.

PLATE 36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11a
11b
6c
8d
8e
9
11c

PLATE 37

1 a–e. *Piramidatospirifer ? piramidatus* (Simakov), 1, Uvnukveem section XXII, Uvnukveem Suite, sample XXII-3, ventral (1a), dorsal (1b), anterior (1c), posterior (1d) and lateral (1e) views of shell.

2 - 4. *Piramidatospirifer dilatatus* Simakov, Ustyevoy section II, Elergetkhyn Suite, sample II-9.
2 a–b. 154/4, posterior (2a) and ventral (2b) views of pedicle valve.
3. 154/1, ventral view of pedicle valve.
4. 154/3, dorsal view of brachial valve.

5 - 8. *Piramidatospirifer juliiformis* Simakov, Ustyevoy section II, Elergetkhyn Suite, sample II-8.
5 a–c. 155/2, ventral (5a), dorsal (5b) and posterior (5c) views of shell.
6 a–c. 26/1, ventral (6a), dorsal (6b) and posterior (6c) views of shell.
7 a–c. 155/1, ventral (7a), dorsal (7b) and posterior (7c) views of shell.
8 a–c. 26/2, ventral (8a), posterior (8b) and dorsal (8c) views of shell.

9 a–c. *Piramidatospirifer syringospiroides* Simakov, Ustyevoy section II, Elergetkhyn Suite, sample II-10, ventral (9a), posterior (9b) and dorsal (c) views of shell.

PLATE 37

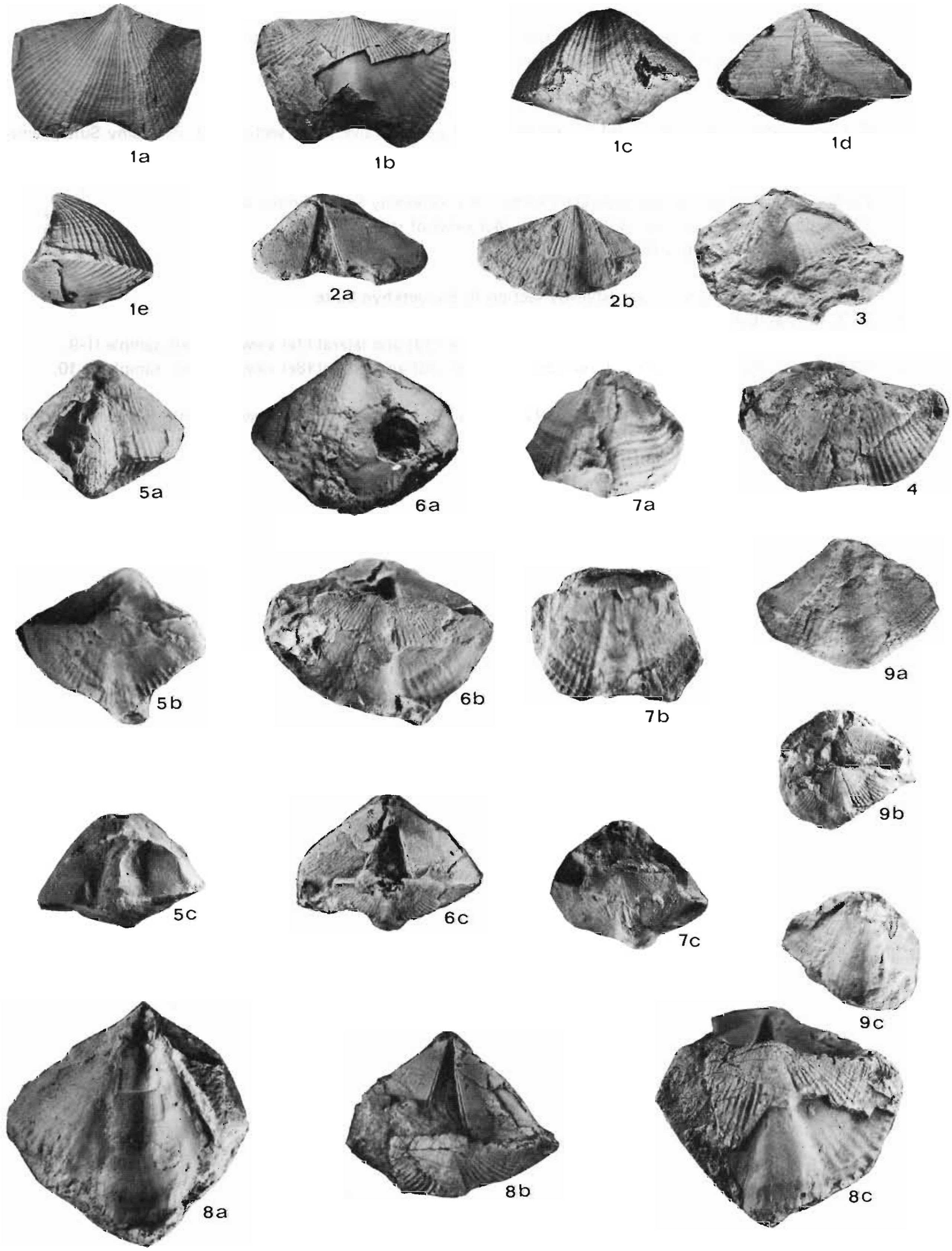

PLATE 38

1 - 2. *Inceptospirifer hiraethlinae* (Crickmay), Ustyevoy section II, Elergetkhyn Suite, sample II-3.
1 a-b. 25/1, ventral (1a) and dorsal (1b) views of shell.
2. 160/2, ventral view of pedicle valve.

3. *Euritatospirifer inermis* (Hall), 94/1, ventral view of pedicle valve, Oder section XII, Perevalny Suite, sample XII-15.

4 - 5. *Eochoristites protistus* (Crickmay), Oder section XII, Perevalny Suite, sample XII-10.
4 a-c. 149/2, posterior (4a), ventral (4b) and dorsal (4c) views of shell.
5. 150/1, ventral view of pedicle valve.

6 - 8. *Validospirifer ? insulcifer* Vas., Ustyevoy section II, Elergetkhyn Suite.
6 a-b. 86/1, ventral (6a) and posterior (6b) views of shell, sample II-8.
7 a-e. 86/2, posterior (7a), dorsal (7b), anterior (7c), ventral (7d) and lateral (7e) views of shell, sample II-9.
8 a-e. 86/3, lateral (8a), anterior (8b), dorsal (8c), posterior (8d) and ventral (8e) views of shell, sample II-10.

9 a-c. *Athyris tau* Nalivkin, 129/3, posterior (9a), ventral (9b) and dorsal (9c) views of shell, Ustyevoy section II, Elergetkhyn Suite, sample II--12.

PLATE 38

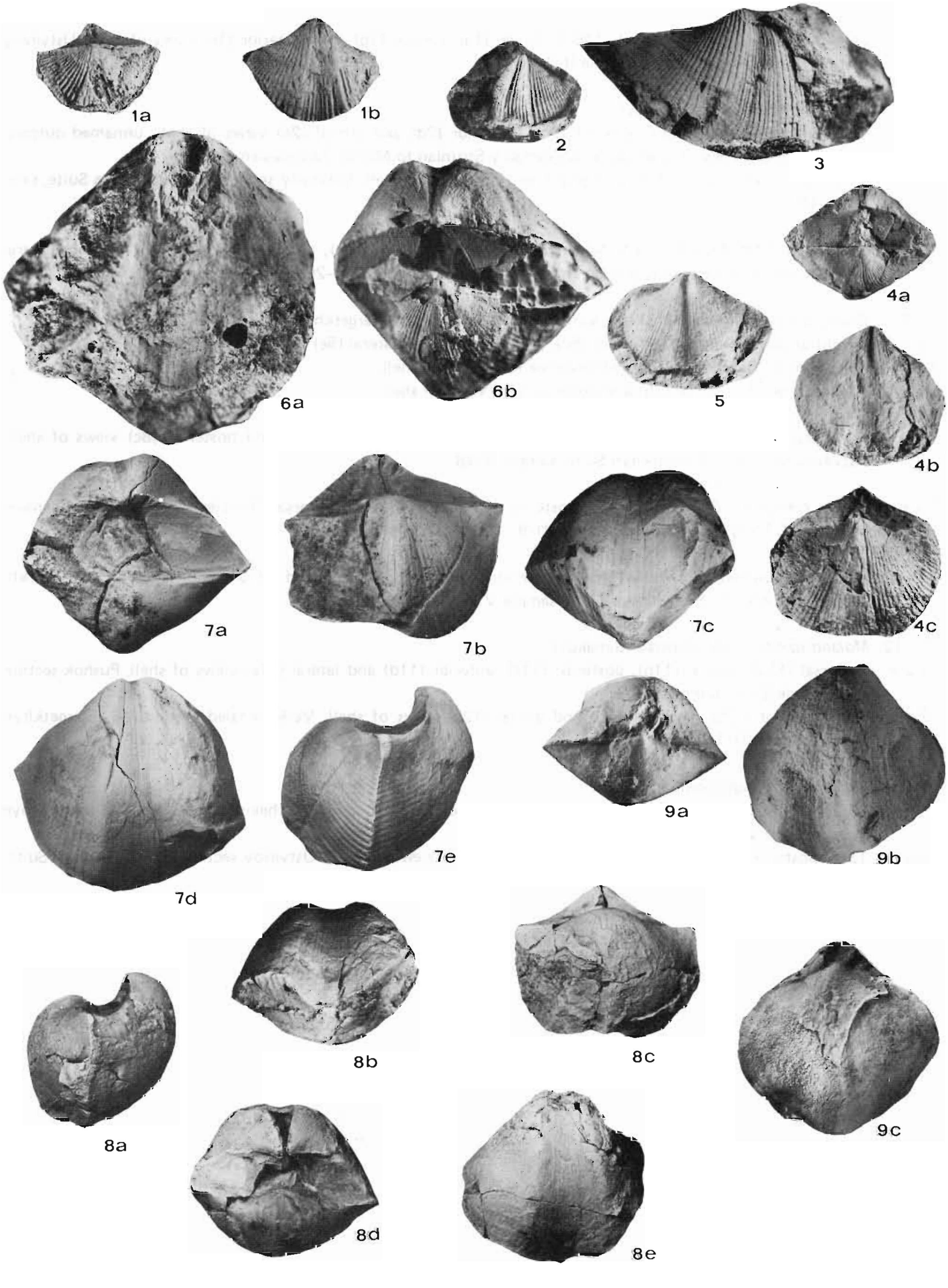

PLATE 39

1 a–c. *Strophopleura ? alta* (Gosselet), 146/1, dorsal (1a), ventral (1b) and posterior (1c) views of shell, Ustyevoy section II, Elergetkhyn Suite, sample II-3.

2 – 3. *Urekchania nikolaevi* (Simakov).
2 a–e. 3, ventral (2a), dorsal (2b), anterior (2c), posterior (2d) and lateral (2e) views of shell, unnamed outcrop in Uvnukveem Valley, Pushok Suite, presumably Strunian to Middle Tournaisian age.
3 a–c. 17/2, ventral (3a), dorsal (3b) and posterior (3c) views of shell, Ustyevoy section II, Elergetkhyn Suite, sample II-19.

4 a–e. *Omolonospirifer dadaeformis* Simakov, 5, ventral (4a), dorsal (4b), anterior (4c), posterior (4d) and lateral (4e) views of shell, Ustyevoy section II, Elergetkhyn Suite, sample II-20.

5 – 7. *Graciospirifer graciosa* (Simakov), Verkhnenaled section VII, Elergetkhyn Suite, sample VII-9.
5 a–e. 6, ventral (5a), dorsal (5b), anterior (5c), posterior (5d) and lateral (5e) views of shell.
6 a–c. 45/2, ventral (6a), dorsal (6b) and posterior (6c) views of shell.
7 a–c. 45/3, ventral (7a), dorsal (7b) and posterior (7c) views of shell.

8 a–c. *Skelidorygma medioplicata* (Martinova), 73/2, dorsal (8a), ventral (8b) and posterior (8c) views of shell, Ustyevoy section II, Elergetkhyn Suite, sample II-18.

9 a–c. *Retsia tykhtensis* Besnosova, 29/2, posterior (9a), ventral (9b) and dorsal (9c) views of shell, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-9.

10 a–c. *Dielasma chouteauensis* Weller, 45/1, posterior (10a), ventral (10b) and dorsal (10c) views of shell, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-4.

11 – 12. *Molandispirifer molandjaensis* (Simakov).
11 a–e. 7, dorsal (11a), ventral (11b), posterior (11c), anterior (11d) and lateral (11e) views of shell, Pushok section XV, Pushok Suite, sample XV-3.
12 a–c. 5/1, posterior (12a), ventral (12b) and dorsal (12c) views of shell, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-7.

13 – 14. *Molandispirifer applanatus* Simakov.
13 a–c. 10/2, ventral (13a), dorsal (13b) and posterior (13c) views of shell, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-5.
14 a–c. 13/4, posterior (14a), dorsal (14b) and ventral (14c) views of shell, Ustyevoy section II, Elergetkhyn Suite, sample II-19.

PLATE 39

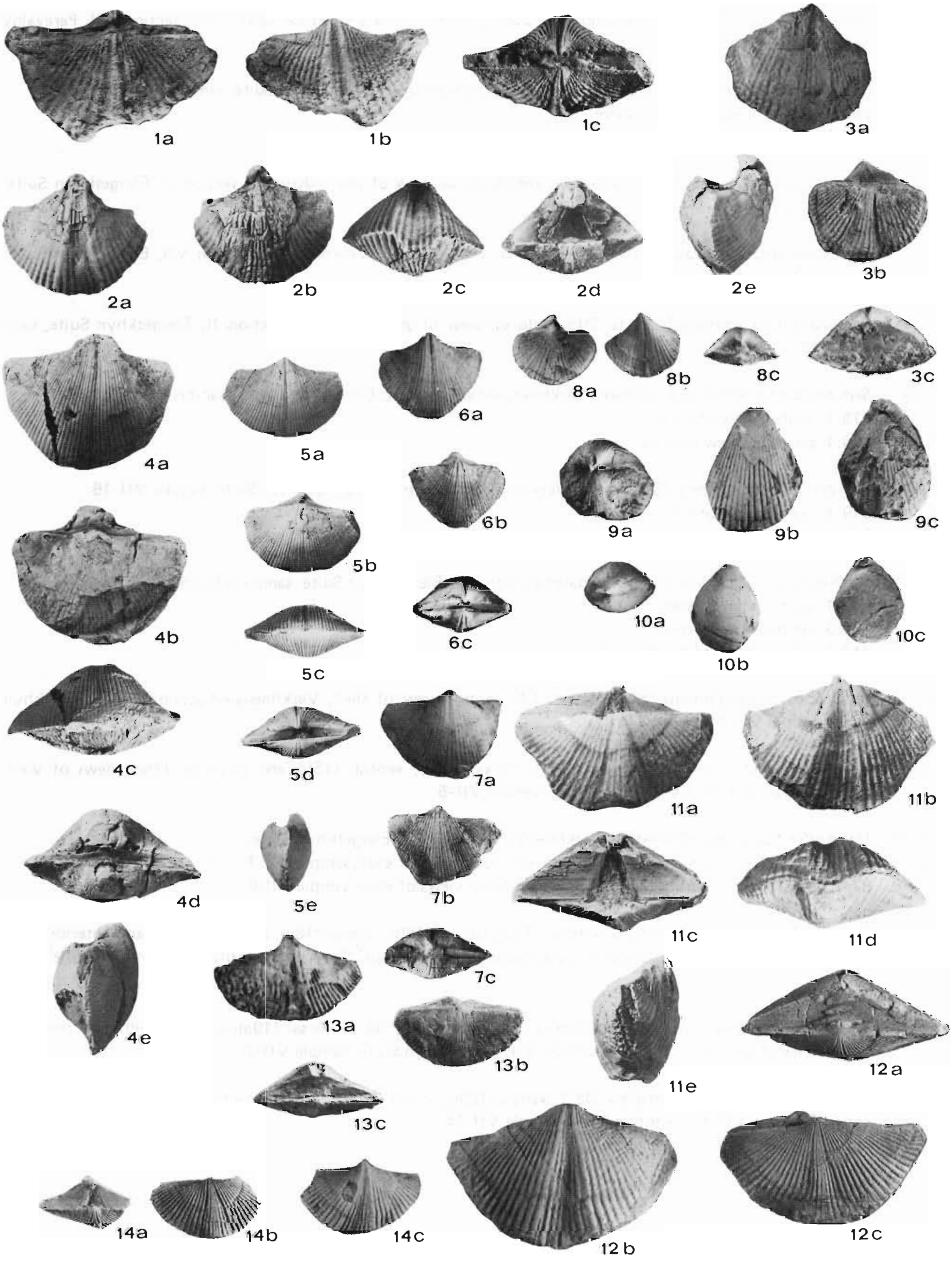
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PLATE 40

1. *Planoproductus hilsboroensis* Stainbrook, 250/1, ventral view of pedicle valve, Oder section XII, Perevalny Suite, sample XII-19.

2 – 3. *Planoproductus ? plicatostriatus* Simakov, Ustyevoy section II, Elergetkhyn Suite, sample II-15.
2. 282/1, ventral view of pedicle valve.
3. 282/2, ventral view of pedicle valve.

4. *Planoproductus ? intrastriatus* Simakov, 286/1, dorsal view of shell, Ustyevoy section II, Elergetkhyn Suite, sample II-21.

5. *Spinocarinifera ? arcuata* (Hall), 305/2, dorsal view of shell, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-5.

6. *Spinocarinifera adunata* Roberts, 295/1, dorsal view of shell, Ustyevoy section II, Elergetkhyn Suite, sample II-18.

7 – 8. *Semiproductus lentus* Bublichenko, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-5.
7. 315/1, ventral view of shell.
8. 314/1, posterior view of shell.

9 – 10. *Semiproductus tykhtensis* Sarytcheva, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-16.
9. 319/1, ventral view of shell.
10. 316/1, posterior view of shell.

11 – 13. *Phithyopora blairi* (Miller), Verkhnenaled section VII, Elergetkhyn Suite, sample VII-16.
11. 309/1, ventral view of shell.
12. 309/3, ventral view of shell.
13. 312/1, interior view of brachial valve.

14. *Acanthocosta omolonensis* Simakov, 323/1, ventral view of shell, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-11.

15 a–c. *Unispirifer mediocris* (Tolmatchov), 35/1, dorsal (15a), ventral (15b) and posterior (15c) views of shell, Verkhnenaled section, Elergetkhyn Suite, sample VII-5.

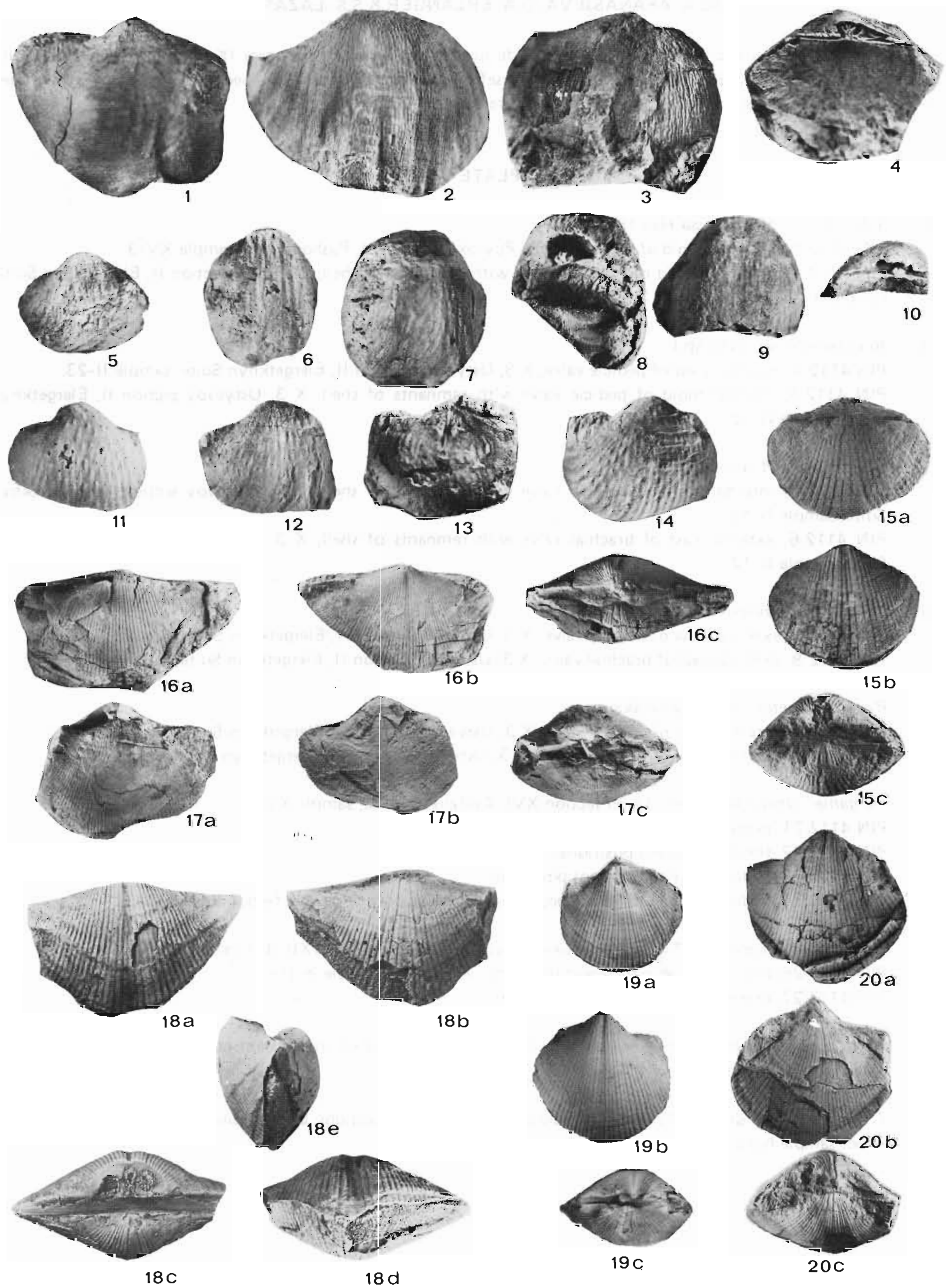
16 – 17 *Unispirifer fluctuosus* (Glenister), Verkhnenaled section VII, Elergetkhyn Suite.
16 a–c. 89/3, dorsal (16a), ventral (16b) and posterior (16c) views of shell, sample VII-7.
17 a–c. 87/1, dorsal (17a), ventral (17b) and posterior (17c) views of shell, sample VII-9.

18 a–e. *Prospira ? platynotus* (Weller), 8, ventral (18a), dorsal (18b), lateral (18c), posterior (18d) and anterior (18e) views of shell, unnamed outcrop in Uvnukveem Valley, Pushok Suite, presumably Strunian to Middle Tournaisian.

19 a–c. *Ectochoristites pseudosuavis* (Krestovnikov & Karpyshev), 36/2, dorsal (19a), ventral (19b) and posterior (19c) views of shell, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-7.

20 a–c. *Ectochoristites nordicus* Simakov, 38/1, ventral (20a), dorsal (20b) and posterior (20c) views of shell, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-14.

PLATE 40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BRACHIOPODS (Plate 41, all figures at natural size unless otherwise indicated)

(G.A. AFANASJEVA, O.A. ERLANGER & S.S. LAZAREV)

The authors wish to express their sincere gratitude to their colleague P. Sartenaer (Koninklijk Belgisch Instituut voor Natuurwetenschappen, Bruseel, Belgium) for his useful remarks and help. The specimens figured here have been stored with the collections of the Paleontological Institute Moscow.

PLATE 41

1 - 2. *Schizophoria* cf. *impressa* Hall 1892.
1. PIN 4112/11, internal mold of brachial valve, Pushok section XV, Pushok Suite, sample XV-3.
2. PIN 4112/12, internal mold of brachial valve with remnants of shell, Ustyevoy section II, Elergetkhyn Suite, sample II-24.

3 - 4. *Retichonetes* sp. (nov. sp.).
3. PIN 4112/4, external view of pedicle valve, X 3, Ustyevoy section II, Elergetkhyn Suite, sample II-23.
4. PIN 4112/5, internal mold of pedicle valve with remnants of shell, X 3, Ustyevoy section II, Elergetkhyn Suite, sample II-12.

5 - 6. *Retichonetes* cf. *armatus* (Rigaux).
5. PIN 4112/1, internal mold of pedicle valve with remnants of shell, X 3, Ustyevoy section II, Elergetkhyn Suite, sample II-11.
6. PIN 4112/6, external cast of brachial valve with remnants of shell, X 3, Ustyevoy section II, Elergetkhyn Suite, sample II-12.

7 - 8. *Plicochonetes svetlanae* Sokolskaja.
7. PIN 4112/9, external view of pedicle valve, X 3, Ustyevoy section II, Elergetkhyn Suite, sample II-24.
8. PIN 4112/8, external cast of brachial valve, X 3, Ustyevoy section II, Elergetkhyn Suite, sample II-24.

9 - 10. *Rugosochonetes injensis* Sokolskaja.
9. PIN 4112/2, external view of pedicle valve, X 3, Ustyevoy section II, Elergetkhyn Suite, sample II-12.
10. PIN 4112/3, external view of brachial valve, X 3, Ustyevoy section II, Elergetkhyn Suite, sample II-12.

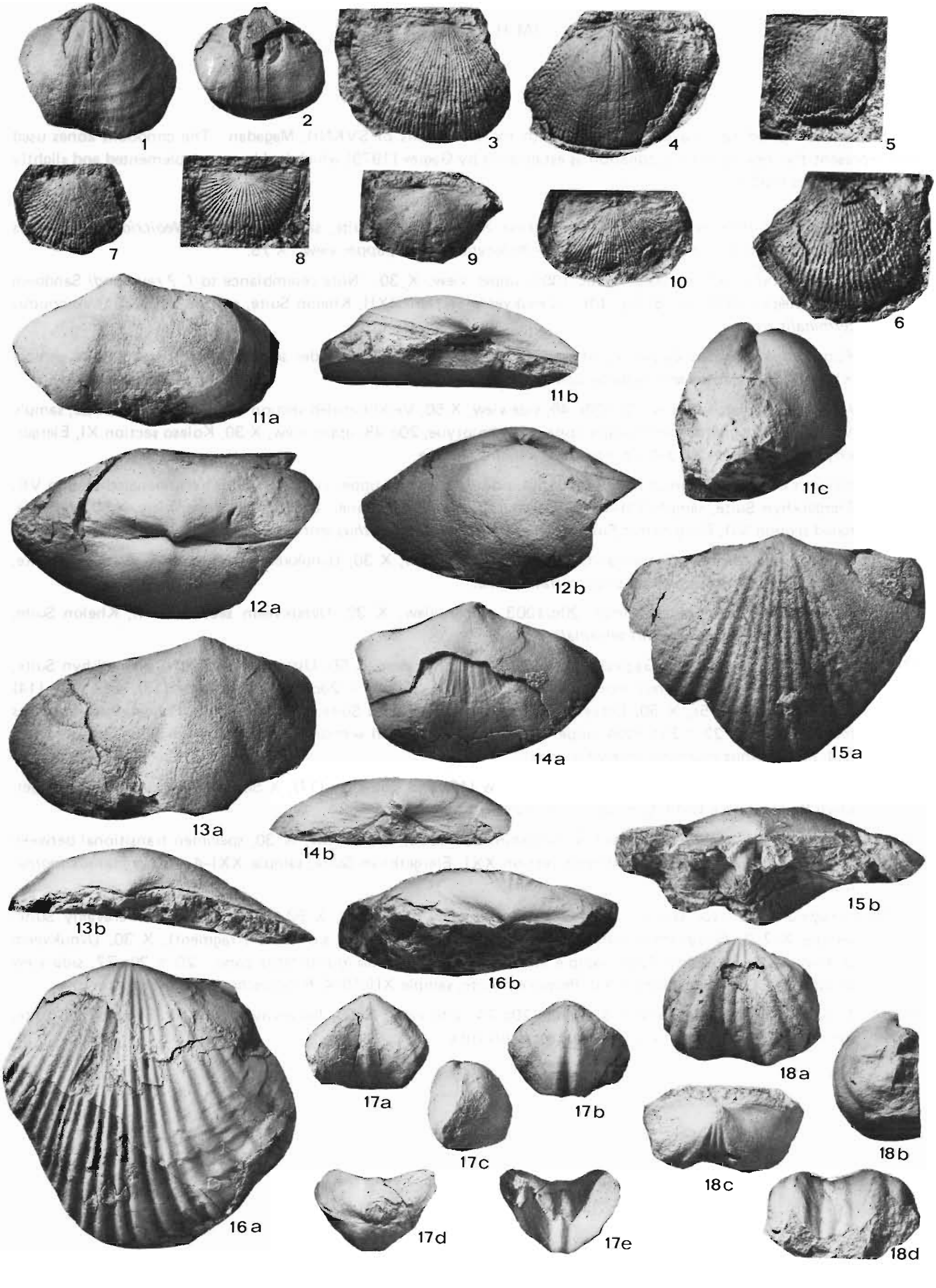
11-14. "*Zigania*" *ursus* (Nalivkin). Livan section XVI, Andylivan Suite, sample XVI-4.
11 a-c. PIN 4112/21, pedicle valve in different positions.
12 a-b. PIN 4112/22, shell in different positions.
13 a-b. PIN 4112/23, pedicle valve in different positions.
14 a-b. PIN 4112/24, pedicle valve in different positions. Anterior part of muscle field visible in 14a.

15-16. "*Zigania*" *novosemelica* Tscherk. Uvnukveem section XXII, sample XXII-3. Upper Famennian.
15 a-b. PIN 4112/26, brachial valve in different positions. Hinge plate visible in 15b.
16 a-b. PIN 4112/27, brachial valve in different positions.

17 a-e. *Megalopterorhynchus* cf. *perchaensis* (Stain.), PIN 4112/28, shell in different positions, Livan section XVI, Andylivan Suite, sample XVI-2.

18 a-d. *Trifidorostellum* sp., PIN 4112/29, pedicle valve in different positions, Uvnukveem section, Upper Famennian. Exact sample horizon unknown.

PLATE 41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18d

CONODONTS (Plates 42 to 45)

(M.H. GAGIEV)

PLATE 42

Specimens figured here have been stored with the collections of SVKNII, Magadan. The conodont zones used here represent the local conodont zonation as established by Gagiev (1979) which had been complemented and slightly altered by Gagiev (1984).

1 - 2. *Neoicriodus terminalis* Gagiev, Oder section XII, Perevalny Suite, sample XII-6-1, *Neoicriodus terminalis* zone. 1 = 20c/35, upper view, X 50. 2 = holotype, 20c/32, upper view, X 75.

3. *Bouckaertodus lacrima* Gagiev, 20c/1001, upper view, X 30. Note resemblance to *I. ? raymondi* Sandberg sensu Ziegler 1979 (pl. 6, fig. 10). Uvnukveem section XXII, Khelon Suite, sample XXII-20, *Neoicriodus terminalis* zone.

4. *Fungulodus rotundus* Gagiev, holotype, 20c/30, lower view, X 50, Oder section XII, Perevalny Suite, sample XII-8-1, *Polygnathus semicostatus* zone.

5, 11. *Icriodus obstinatus* Gagiev. 5 = 20c/46, side view, X 50, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-15-2, *Polygnathus lenticularis* zone. 1 = holotype, 20c/48, upper view, X 30, Koleso section XI, Elergetkhyn Suite, sample XI-3-1, *Polygnathus lenticularis* zone.

6 - 8. *Icriodus costatus* (Thomas). 6-7 = 20c/44, side view (6) and upper view (7), X 50, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-15-2, *Polygnathus lenticularis* zone. 8 = 20c/42, upper view, X 50, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-15-2, *Polygnathus lenticularis* zone.

9. *Icriodus* aff. *cornutus* Sannemann, 20c/1002, upper view, X 30, Uvnukveem section XXII, Perevalny Suite, sample XXII-7, *Polygnathus obliquicostatus* zone.

10. *Icriodus* aff. *constrictus* Thomas, 20c/1003, upper view, X 30, Uvnukveem section XXII, Khelon Suite, sample XXII-20, *Neoicriodus terminalis* zone.

12-15, 22. *Mashkovia simakovi* (Gagiev). 12 = 20c/241, upper view, X 50, Ustyevoy section II, Elergetkhyn Suite, sample II-5-1, *Polygnathus inornatus inornatus* zone. 13-15 = 20c/114, upper view (13), side view (14) and lower view (15), X 50, Ustyevoy section II, Elergetkhyn Suite, sample II-11-2, *Polygnathus inornatus inornatus* zone. 22 = 20c/1004, upper view, X 30, Ferdinand section XXI, Elergetkhyn Suite, sample XXI-5-4, *Polygnathus inornatus inornatus* zone.

16-17. *Mashkovia similis* (Gagiev), 20c/117, lower view (16) and side view (17), X 50, Ustyevoy section II, Elergetkhyn Suite, sample II-11-5, *Polygnathus inornatus inornatus* zone.

23. *Mashkovia* aff. *tamara* Kononova & Pazukhin, 20c/1005, upper view, X 30, specimen transitional between *M. similis* and *M. tamara,* Ferdinand section XXI, Elergetkhyn Suite, sample XXI-4-4, *Polygnathus inornatus inornatus* zone.

18-20. *Jukagiria kononovae* Gagiev. 18 = 20c/76, side view (fragment), X 50, Skala section X, Perevalny Suite, sample X-7-3, *Polygnathus semicostatus* zone. 19 = 20c/1006, side view (fragment), X 30, Uvnukveem section XXII, Perevalny Suite, sample XXII-7, *Polygnathus obliquicostatus* zone. 20 = 20c/77, side view (fragment), X 50, Oder section XII, Perevalny Suite, sample XII-10-4, *Polygnathus semicostatus* zone.

21. *Bispathodus stabilis* (Branson & Mehl), 20c/24, side view, X 50, Ustyevoy section II, Elergetkhyn Suite, sample II-23-8, *Polygnathus inornatus rostratus* zone.

PLATE 42

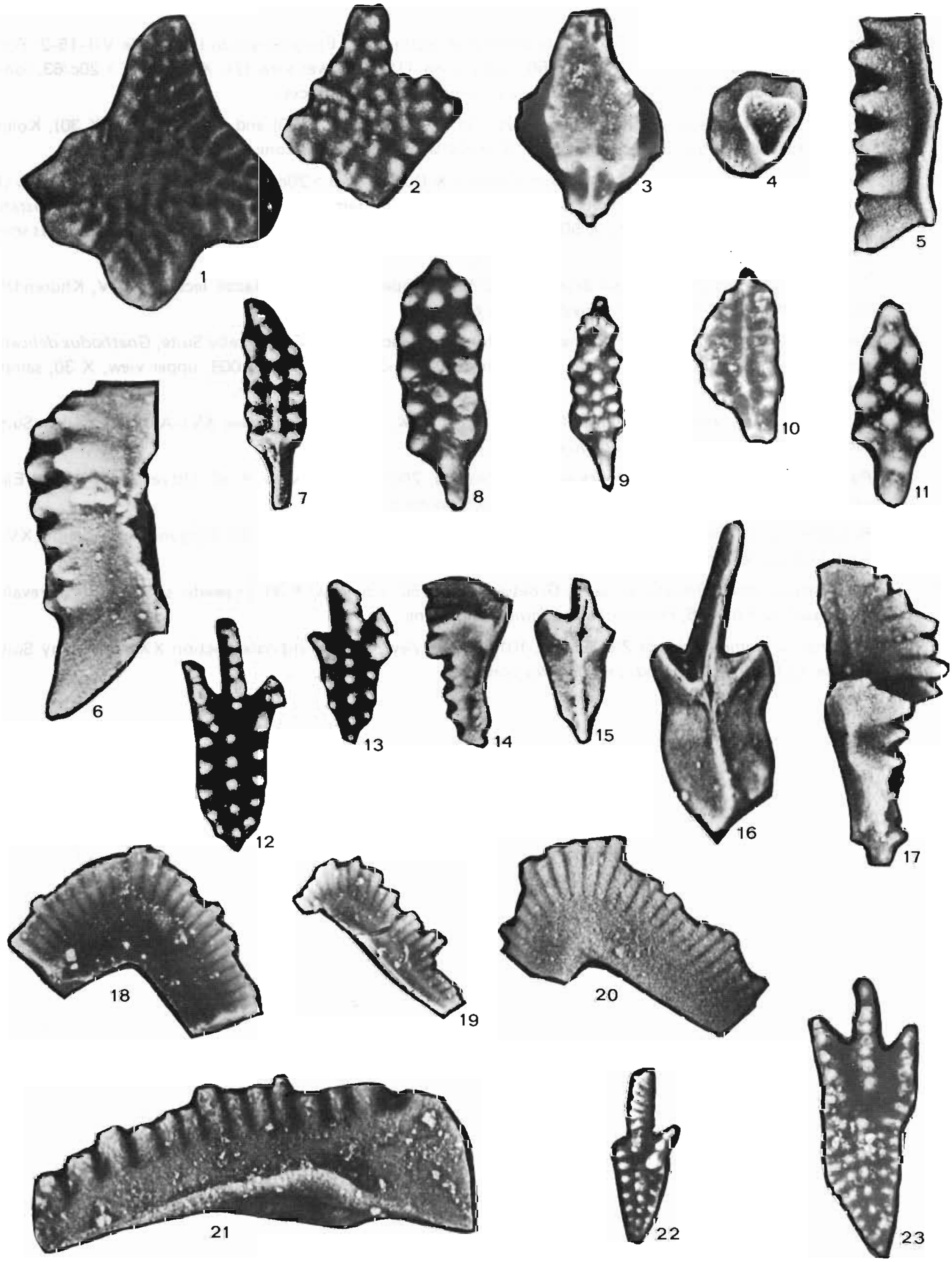


PLATE 43

1-2, 4-5. *Omolonognathus transformis* Gagiev, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-15-2 *Polygnathus lenticularis* zone. 1-2 = 20c/60, upper view (1) and lower view (2), X 50. 4-5 = 20c/63, lower view (4) and upper view (5), X 50, specimen showing regeneration traces.

3, 6. *Omolonognathus planus* Gagiev, holotype, 20c/56, lower view (3, X 50) and upper view (6, X 30), Koleso section XI, Elergetkhyn Suite, sample XI-1-3, *Polygnathus lenticularis* zone.

7-9, 10. *Pseudopolygnathus ?* aff. *pseudostrigosus* (Dreesen & Dusar). 7-9 = 20c/120, upper view (7), lower view (8) and side view (9), X 50, Oder section XII, Perevalny Suite, sample XII-10-6, *Polygnathus obliquicostatus* zone. 10 = 20c/121, side view, X 50, Oder section XII, Perevalny Suite, sample XII-8-5, *Polygnathus semicostatus* zone.

11. *Pseudopolygnathus dentilineatus* Branson, 20c/1007, upper view, X 30, Bazov section XXIV, Khurendzha Suite, sample XXIV-9-6, *Gnathodus punctatus* zone.

12-13. *Pseudopolygnathus marginatus* (Branson & Mehl), Bazov section XXIV, Uttykelly Suite, *Gnathodus delicatus* zone. 12 = 20c/1008, upper view, X 30, sample XXIV-3-2. 13 = 20c/1009, upper view, X 30, sample XXIV-3-6.

14. *Polygnathus* "cf. *diversus*" Helms, 20c/1010, upper view, X 30, Livan section XVI-A, Gytgynpylgin Suite, sample XVI-A-1, *Polygnathus obliquicostatus* zone.

15. *Pseudopolygnathus graulichi* Bouckaert & Groessens, 20c/137, side view, X 50, Ustyevoy section II, Elergetkhyn Suite, sample II-18-7, *Polygnathus parapetus* zone.

16. *Polylophodonta confluens* (Ulrich & Bassler), 20c/1011, upper view, X 30, Gytgynpylgin section XVII, Andylivan Suite, sample XVII-1-1, *Polygnathus semicostatus* zone.

17. *Polygnathus streeli* Dreesen, Dusar & Groessens, 20c/150, side view, X 30, Entweder section XIII, Perevalny Suite, sample XIII-7-6, *Polygnathus obliquicostatus* zone.

18. *Polygnathus homoirregularis* Ziegler, 20c/1012, upper view, X 30, Ferdinand section XXI, Perevalny Suite, sample XXI-2-4, *Polygnathus extralobatus* zone.

PLATE 43

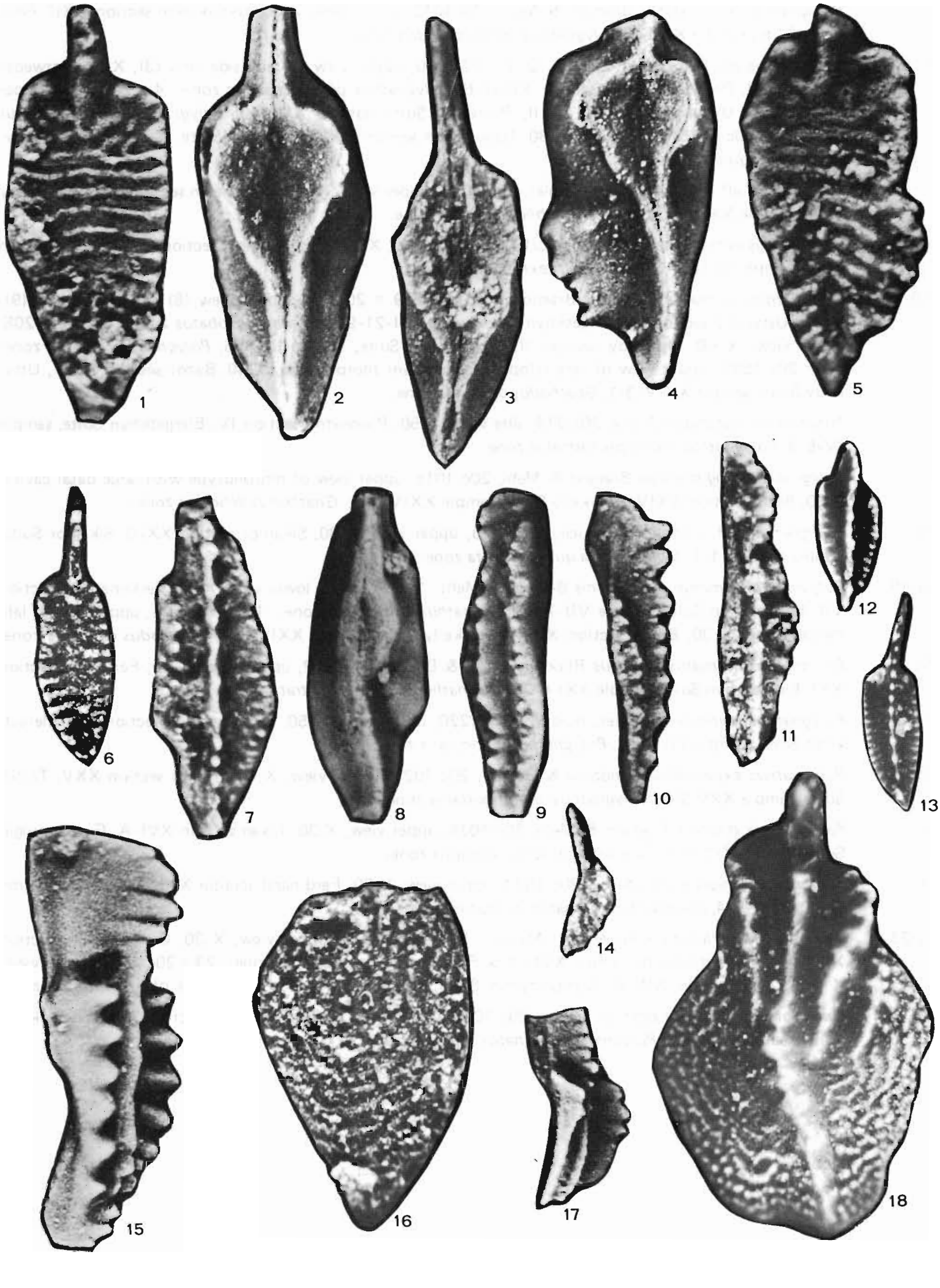


PLATE 44

1. *Polygnathus semicostatus* Branson & Mehl, 20c/1013, upper view, X 30, Uvnukveem section XXII, Perevalny Suite, sample XXII-7, *Polygnathus obliquicostatus* zone.

2-5. *Polygnathus obliquicostatus* Ziegler. 2-3 = 20c/160, upper view (2) and side view (3), X 30, Entweder section XIII, Perevalny Suite, sample XIII-7-6, *Polygnathus obliquicostatus* zone. 4 = 20c/1014, upper view, X 30, Uvnukveem section XXII, Perevalny Suite, sample XXII-13, *Polygnathus obliquicostatus* zone. 5 = 20c/1015, upper view, X 30, Uvnukveem section XXII, Perevalny Suite, sample XXII-7, *Polygnathus obliquicostatus* zone.

6. *Polygnathus* aff. *obliquicostatus* Ziegler, 20c/1016, upper view, X 30, Uvnukveem section XXII, Perevalny Suite, sample XXII-13, *Polygnathus obliquicostatus* zone.

7. *Polygnathus extralobatus* Schäfer, 20c/1017, upper view, X 30, Gytgynpylgin section XVII, Gytgynpylgin Suite, sample XVII-7-1, *Polygnathus extralobatus* zone.

8-9,11,13. *Polygnathus inornatus inornatus* Branson & Mehl. 8-9 = 20c/204, upper view (8) and lower view (9), X 50, Ustyevoy section II, Elergetkhyn Suite, sample II-21-9, *Polygnathus lobatus* zone. 11 = 20c/208, lower view, X 50, Ustyevoy section II, Elergetkhyn Suite, sample II-21-6, *Polygnathus lobatus* zone. 13 = 20c/1019, upper view of late (Upper Tournaisian) morphotype, X 30, Bazov section XXIV, Uttykelly Suite, sample XXIV-3-1, *Gnathodus delicatus* zone.

10. *Polygnathus parapetus* Druce, 20c/218, side view, X 50, Povorotny section IV, Elergetkhyn Suite, sample IV-5-3, *Polygnathus inornatus rostratus* zone.

12. *Polygnathus longiposticus* Branson & Mehl, 20c/1018, upper view of morphotype with large basal cavity, X 30, Bazov section XXIV, Uttykelly Suite, sample XXIV-3-2. *Gnathodus delicatus* zone.

14. *Polygnathus* aff. *siphonellus* Druce, 20c/1020, upper view, X 30, Sikambr section XXIII, Sikambr Suite, sample XXIII-11-1, *Siphonodella quadruplicata* zone.

15-16. *Polygnathus communis communis* Branson & Mehl. 15 = 20c/201, lower view, X 50, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-7-1, *Polygnathus lenticularis* zone. 16 = 20c/1021, upper view of late morphotype, X 30, Bazov section XXIV, Uttykelly Suite, sample XXIV-3-2, *Gnathodus delicatus* zone.

17. *Polygnathus inornatus rostratus* Rhodes, Austin & Druce, 20c/1022, upper view, X 30, Ferdinand section XXI, Elergetkhyn Suite, sample XXI-6-7, *Polygnathus inornatus rostratus* zone.

18. *Polygnathus lenticularis* Gagiev, holotype, 20c/220, upper view, X 50, Verkhnenaled section VII, Elergetkhyn Suite, sample VII-15-2, *Polygnathus lenticularis* zone.

19. *Polygnathus experplexus* Sandberg & Ziegler, 20c/1023, upper view, X 30, Triniti section XXV, Triniti Suite, sample XXV-2-2, *Polygnathus obliquicostatus* zone.

20. *Palmatolepis distorta* Branson & Mehl, 20c/1025, upper view, X 30, Livan section XVI-A, Gytgynpylgin Suite, sample XVI-A-4, *Polygnathus obliquicostatus* zone.

21. *Polygnathus znepolensis* Spasov, 20c/1024, upper view, X 30, Ferdinand section XXI, Elergetkhyn Suite, sample XXI-5-4, *Polygnathus inornatus inornatus* zone.

22-23. *Palmatolepis perlobata schindewolfi* Müller. 22 = 20c/1026, upper view, X 30, Gytgynpylgin section XVII, Gytgynpylgin Suite, sample XVII-4-5, *Polygnathus extralobatus* zone. 23 = 20c/1027, upper view, X 30, Livan section XVI-A, Gytgynpylgin Suite, sample XVI-A-1, *Polygnathus obliquicostatus* zone.

24. *Palmatolepis perlobata postera* Ziegler, 20c/1028, upper view, X 30, Ferdinand section XXI, Elergetkhyn Suite, sample XXI-4-8, *Polygnathus inornatus inornatus* zone.

PLATE 44

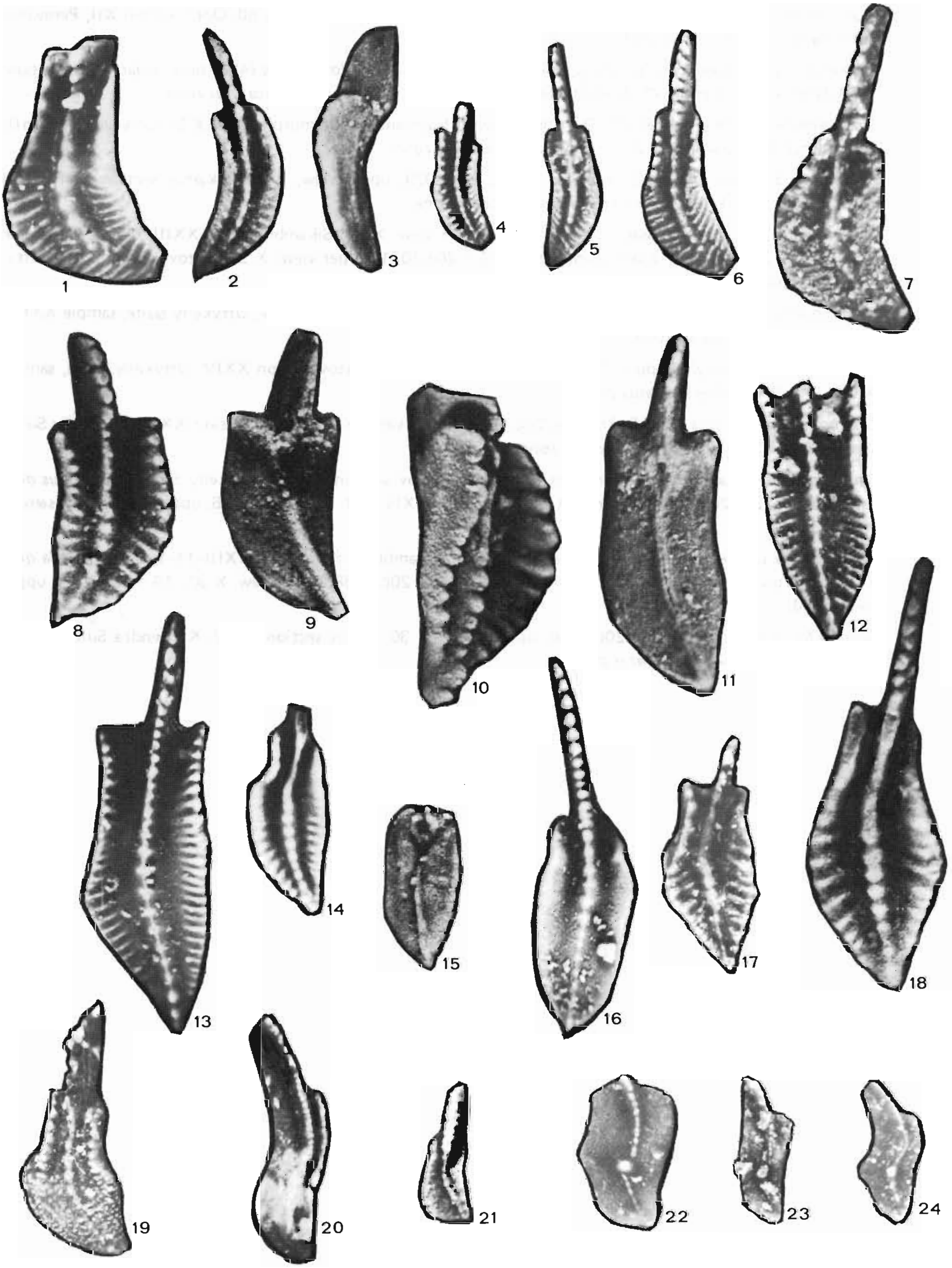


PLATE 45

1-2. *Scaphignathus velifer* Helms, 20c/110, side view (1) and upper view (2), X 50, Oder section XII, Perevalny Suite, sample XII-8-1, *Polygnathus semicostatus* zone.

3-4. *Siphonodella* cf. *praesulcata* Sandberg, 20c/80, upper view (3) and lower view (4) of broken early morphotype, X 50, Nizhnenaled section VI, Perevalny Suite, sample VI-8, *Polygnathus delicatulus* zone.

5. *Siphonodella sulcata* (Huddle), 20c/90, upper view of fragmentary late morphotype, X 50, Ustyevoy section II, Elergetkhyn Suite, sample II-21-7, *Polygnathus lobatus* zone.

6. *Siphonodella quadruplicata* (Branson & Mehl), 20c/1029, upper view, X 30, Sikambr section XXIII, Mol Suite, sample XXIII-1-4, *Siphonodella quadruplicata* zone.

7-8. *Siphonodella* aff. *obsoleta* Hass. 7 = 20c/1030, upper view, X 30, Sikambr section XXIII, Mol Suite, sample XXIII-2-20, *Siphonodella quadruplicata* zone. 8 = 20c/1031, upper view, X 30, Bazov section XXIV, Uttykelly Suite, sample XXIV-3-4, *Gnathodus delicatus* zone.

9. *Siphonodella cooperi* Hass, 20c/1032, upper view, X 30, Bazov section XXIV, Uttykelly Suite, sample XXIV-3-6, *Gnathodus delicatus* zone.

10. *Siphonodella sandbergi* Klapper, 20c/1033, upper view, X 30, Bazov section XXIV, Uttykelly Suite, sample XXIV-3-1, *Gnathodus delicatus* zone.

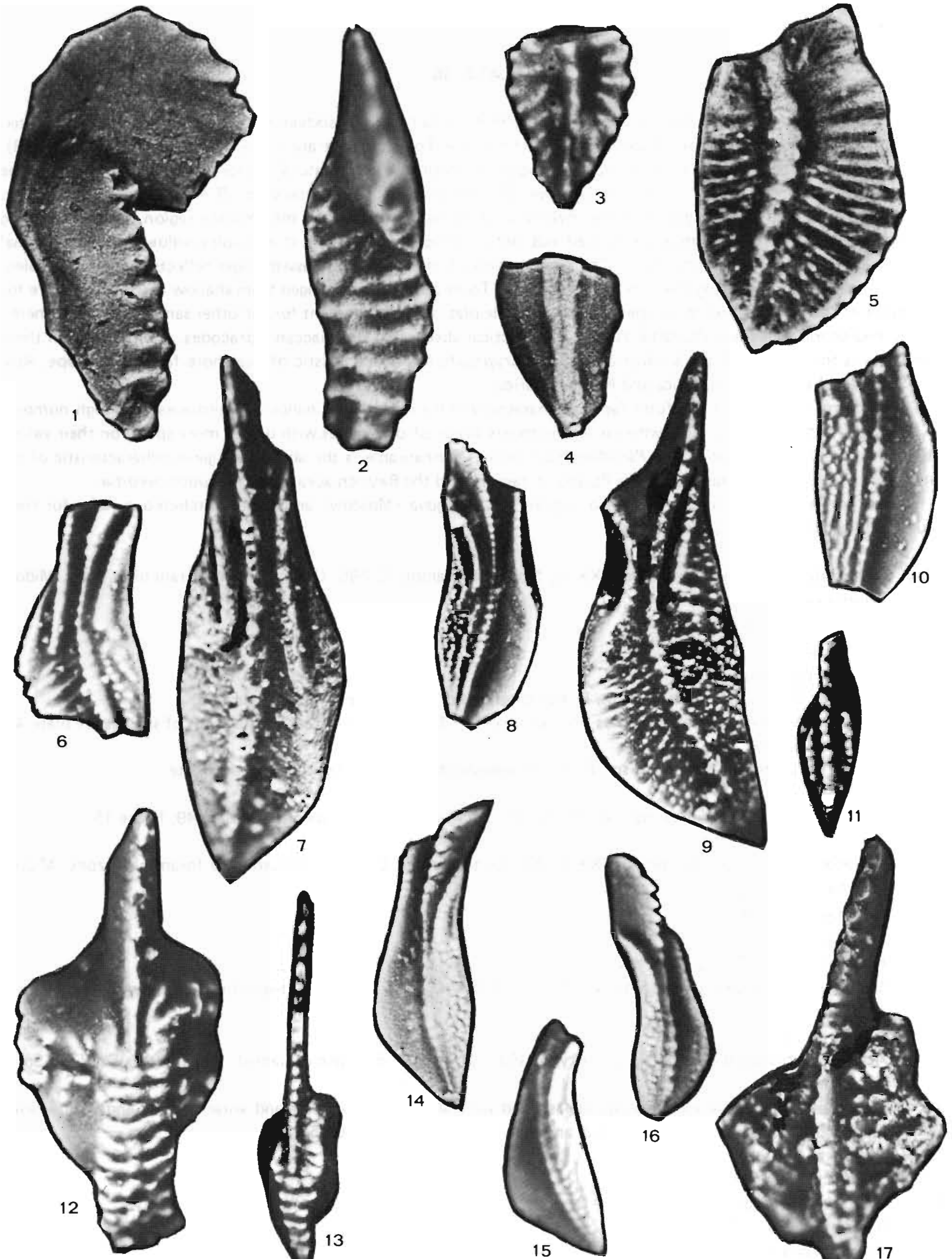
11. *Gnathodus cuneiformis* Mehl & Thomas, 20c/1034, upper view, X 30, Bazov section XXIV, Uttykelly Suite, sample XXIV-3-6, *Gnathodus delicatus* zone.

12-13. *Gnathodus pseudosemiglaber* Thompson & Fellows, Bazov section XXIV, Uttykelly Suite, *Gnathodus delicatus* zone. 12 = 20c/1035, upper view, X 30, sample XXIV-3-1. 13 = 20c/1036, upper view, X 30, sample XXIV-3-2.

14. *Siphonodella obsoleta* Hass, Sikambr section XXIII, Sikambr Suite, sample XXIII-11-1, *Siphonodella quadruplicata* zone. 14 = 20c/1037, upper view, X 30. 15 = 20c/1038, upper view, X 30, 16 = 20c/1039, upper view, X 30.

17. *Gnathodus punctatus* Cooper, 20c/1040, upper view, X 30, Bazov section XXIV, Khurendza Suite, sample XXIV-9-6, *Gnathodus punctatus* zone.

PLATE 45



OSTRACODES (Plates 46 to 52)

(Martin J.M. BLESS)

PLATE 46

This report deals with the silicified ostracode specimens obtained from sixteen samples which had been collected by the author in August 1983 from Upper Famennian to Middle Tournaisian strata in the Omolon region (NE - USSR). The specimens have been stored with the paleontological collections of the Natural History Museum Maastricht. The following abbreviations are used : I = interior of valve, D = dorsal view, V = ventral view, R = right view, L = left view.

The data presented here suggest that the inventory of ostracode species in the Omolon region is far from being completed. Much more work must be carried out before conclusions on the stratigraphic value even for regional correlation purposes can be formulated. The composition of these ostracode assemblages reflects the varying paleoenvironmental conditions during the Late Famennian and Tournaisian, which ranged from shallow marine nearshore for the samples of the Oder section to an open marine, instable platform environment for the other samples discussed here.

The nearshore facies was characterized by the practical absence of Bairdiacean ostracodes. Remarkable in these assemblages is the absence of the Eridostracan genus *Cryptophyllus* characteristic of nearshore facies in Europe, Australia, Southern Asia, Northern Africa and North America.

The open marine, instable platform facies is characterized by the predominance of Bairdiacea, and high numbers of Kirkbyacea and *Microcheilinella,* whereas low numbers occur of ostracodes with one or more spines on their valves, such as *Tricornina, Monoceratina* and *Pseudomonoceratina.* Remarkable is the absence of genera characteristic of the open marine stable platform facies, such as Paraparchitaceans and the Beyrichiacean genus *Pseudoleperditia.*

The author is indebted to his Soviet colleagues V.A. Chigova (Moscow) and N.M. Kotchetkova (Ufa) for their useful remarks and stimulating discussions.

1 - 9. Ostracodes from Sikambr section XXIII, Mol Suite, sample C-295, *Chernyshinella* foraminifer zone, Middle Tournaisian;

1. *Amphissites* sp., R.
2. *Bairdia* sp., L.
3. *Microcheilinella* sp., R.
4. *Microcheilinella shiloi* Bless nov. sp., R. For diagnosis of species see plate 45, figure 13.
5. *Pseudomonoceratina ? razinae* Bless nov. sp., 5a = I, 5b = L, 5c = D. For diagnosis of species see plate 49, figures 18 and 19.
6. *Acratia* cf. *smirnovae* Bless nov. sp., R. For diagnosis of species see figure 16 on this plate.
7. *Bairdia* sp., L.

8 - 9. *Monoceratina simakovi* Bless nov. sp., 8 = L, 9 = R. For diagnosis of species see plate 49, figure 15.

10-22. Ostracodes from Sikambr section XXIII, Mol Suite, sample C-296, *Chernyshinella* foraminifer zone, Middle Tournaisian;

10. *Amphissites* sp., R.
11. *Coryellina* sp., R.
12. Knoxiellidae ?. 12a = L, 12b = V.

13-14. *Monoceratina simakovi* Bless nov. sp., 13 = I, 14a = L, 14b = D. For diagnosis of species see plate 49, figure 15.

15. *Acratia* sp., L.
16. *Acratia smirnovae* Bless nov. sp., holotype, 16a = D, 16b = R. Species named in honour to Dr. L.V. Smirnova, Magadan.
    Diagnosis : Carapace elongate, spindle-shaped with acuminate posterior and anterior ends and striate ornamentation. Striae subparallel to dorsal and ventral margins, Length 0.95 mm.
17. *Acratia* sp., 17a = D, 17b = R.
18. *Bairdiacypris* sp., R.
19. *Microcheilinella* sp., 19a = R, 19b = D.
20. *Bairdia* sp., 20a = D, 20b = R.
21. *Bairdiocypris* sp., L.
22. *Bairdia* sp., R.

PLATE 46

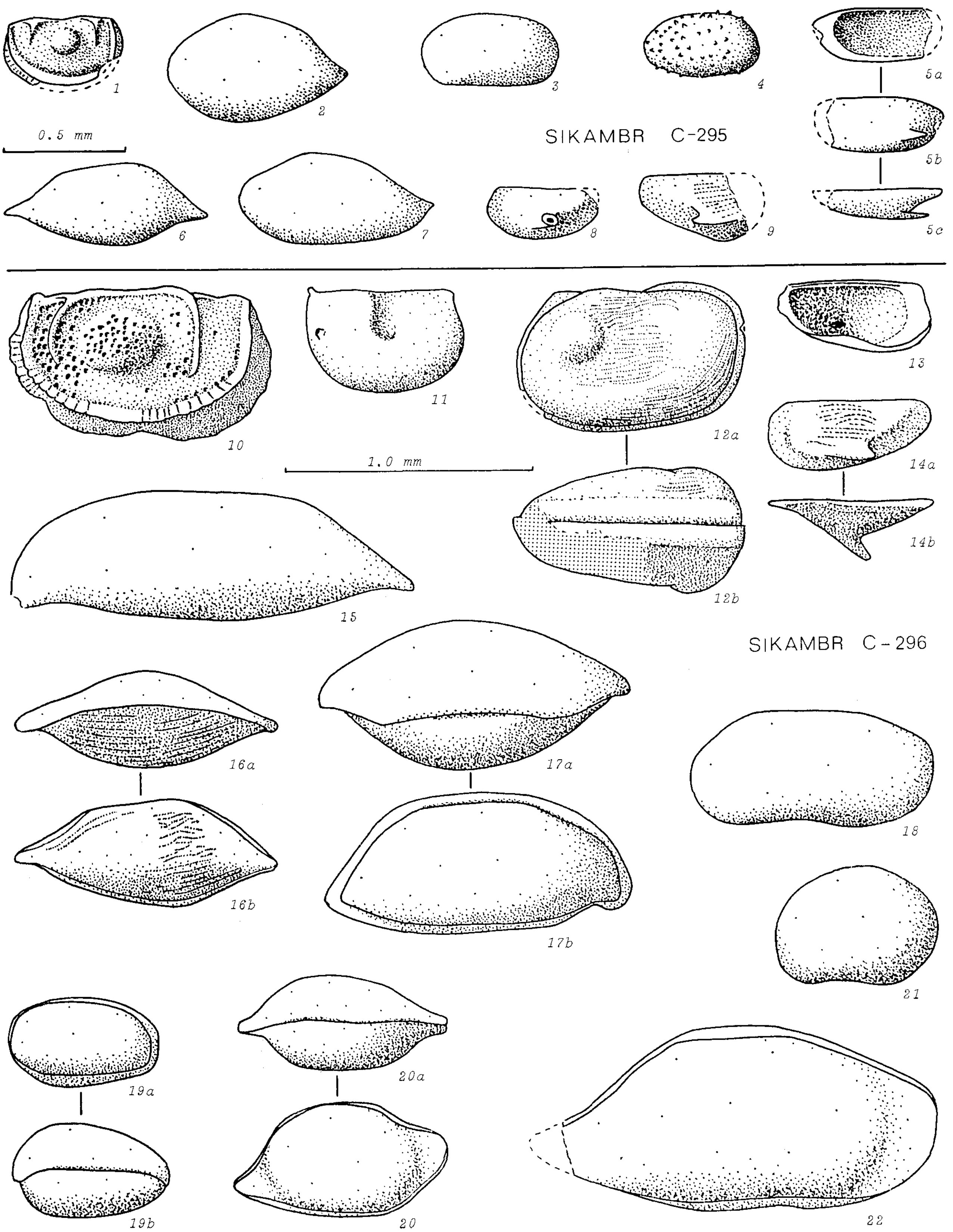

1
2
3
4
5a
0.5 mm
SIKAMBR C-295
5b
6
7
8
9
5c
10
11
12a
13
14a
1.0 mm
14b
15
12b
SIKAMBR C-296
16a
17a
18
16b
17b
21
19a
20a
19b
20
22

PLATE 47

1 - 17. Ostracodes from Sikambr section XXIII, Mol Suite, sample C-297, *Chernyshinella* foraminifer zone, Middle Tournaisian.

1. *Amphissites* sp., R.
2. *Coryellina* sp., R.
3. *Bairdiocypris* sp., L.
4. *Microcheilinella* sp., 4a = D, 4b = R.
5. *Bairdia* sp., 5a = D, 5b = R.
6. *Bairdiacypris* sp., L.
7. *Bairdiocypris* sp., R.,
8. *Acratia* sp., L.
9. *Bairdia* sp., 9a = D, 9b = R.
10. *Baschkirina* sp., R.
11. Geisinidae ?, R.

12-13. *Tricornina* aff. *robusticerata* Blumenstengel 1969, 12a = L, 12b = D, 13a = L, 13b = D.

14-15. *Monoceratina simakovi* Bless nov. sp., 14a = R, 14b = D, 15a = R, 15b = D. For diagnosis of species see plate 49, figure 15.

16. *Berounella* sp., R.
17. *Moorites onoprienkoi* Bless nov. sp., holotype, R. Species named in honour to Dr. Yu. I. Onoprienko, Vladivostok.

    Diagnosis : *Moorites* with smooth rims along end margins. Surface otherwise with fine striate ornamentation. Striae subparallel to dorsal and ventral margins. Subcentral, smooth muscle scar spot faintly visible just behind center. Length 0.68 mm.

PLATE 47

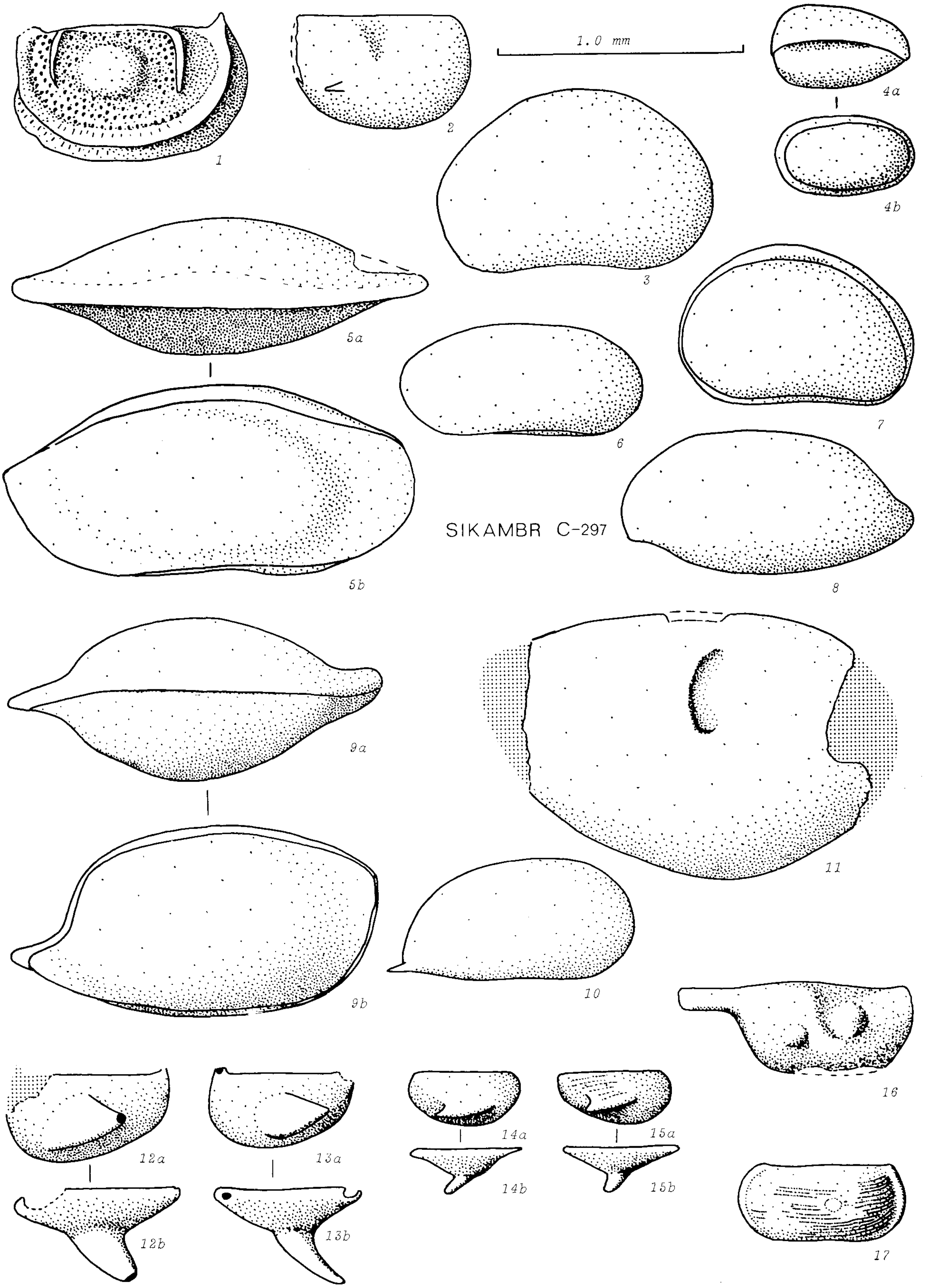

1.0 mm
1
2
3
4a
4b
5a
5b
6
7
8
SIKAMBR C-297
9a
9b
10
11
12a
12b
13a
13b
14a
14b
15a
15b
16
17

PLATE 48

1 - 7. Ostracodes from Sikambr section XXIII, Mol Suite, sample C-299, *Chernyshinella* foraminifer zone, Middle Tournaisian.

1. *Amphissites* cf. *kolymensis* Bushmina 1979, L.

2 - 3. *Pribylites ? kolesovi* Bless nov. sp., holotype (2) and paratype (3), 2a = R, 2b = D, 3a = I, 3b = R, 3c = D. Species named in honour to Dr. Ye. V. Kolesov, Magadan.

Diagnosis : Dorsum straight, cardinal angles obtuse, greatest height anterior, valves rather inflated and with greatest width below mid-height. Presumably bar-and-groove hingement, well-developed calcified inner lamella. Narrow rim along anteroventral margin. Velar ridge merging with anterior margin and ending abruptly in posteroventral area, where valves become more flattened. Very low, inconspicuous node at position of muscle scar.

4. *Acratia* sp., L.

5. *Bairdia* sp., 5a = D, 5b = L.

6 - 7. *Acanthoscapha ?* sp., 6 = R, 7 = R. Valves with rounded anterior end and more acuminate posterior end with flattened, keel-like posteroventral flange.

8 - 16. Ostracodes from Sikambr section XXIII, Mol Suite, sample C-301, *Chernyshinella* foraminifer zone, Middle Tournaisian.

8. *Amphissites* sp., L.

9. *Bairdiocypris* sp., L.

10. *Bairdia* sp., L.

11. *Bairdia* sp., L.

12-14. *Monoceratina simakovi* Bless nov. sp., 12a = R, 12b = D, 13a = R, 13b = D, 14 = L. For diagnosis of species see plate 49, figure 15.

15. *Moorites onoprienkoi* Bless nov. sp., L. For diagnosis of species see plate 2, figure 17.

16. *Microcheilinella* sp., R.

17-25. Ostracodes from Sikambr section XXIII, Mol Suite, sample C-306, *Chernyshinella* foraminifer zone, Middle Tournaisian.

17. *Amphissites* cf. *kolymensis* Bushmina 1979, R.

18. *Coryellina* sp., R.

19-20. *Monoceratina simakovi* Bless nov. sp., 19a = L., 19b = D, 20a = L, 20b = D. For diagnosis of species see plate 49, figure 15.

21. *Bairdiacypris* sp., 21a = D, 21b = R.

22. *Bairdia* sp., R.

23. *Bairdia* sp., R.

24. *Acratia* sp., L.

25. *Microcheilinella* sp., 25a = D, 25b = R.

PLATE 48

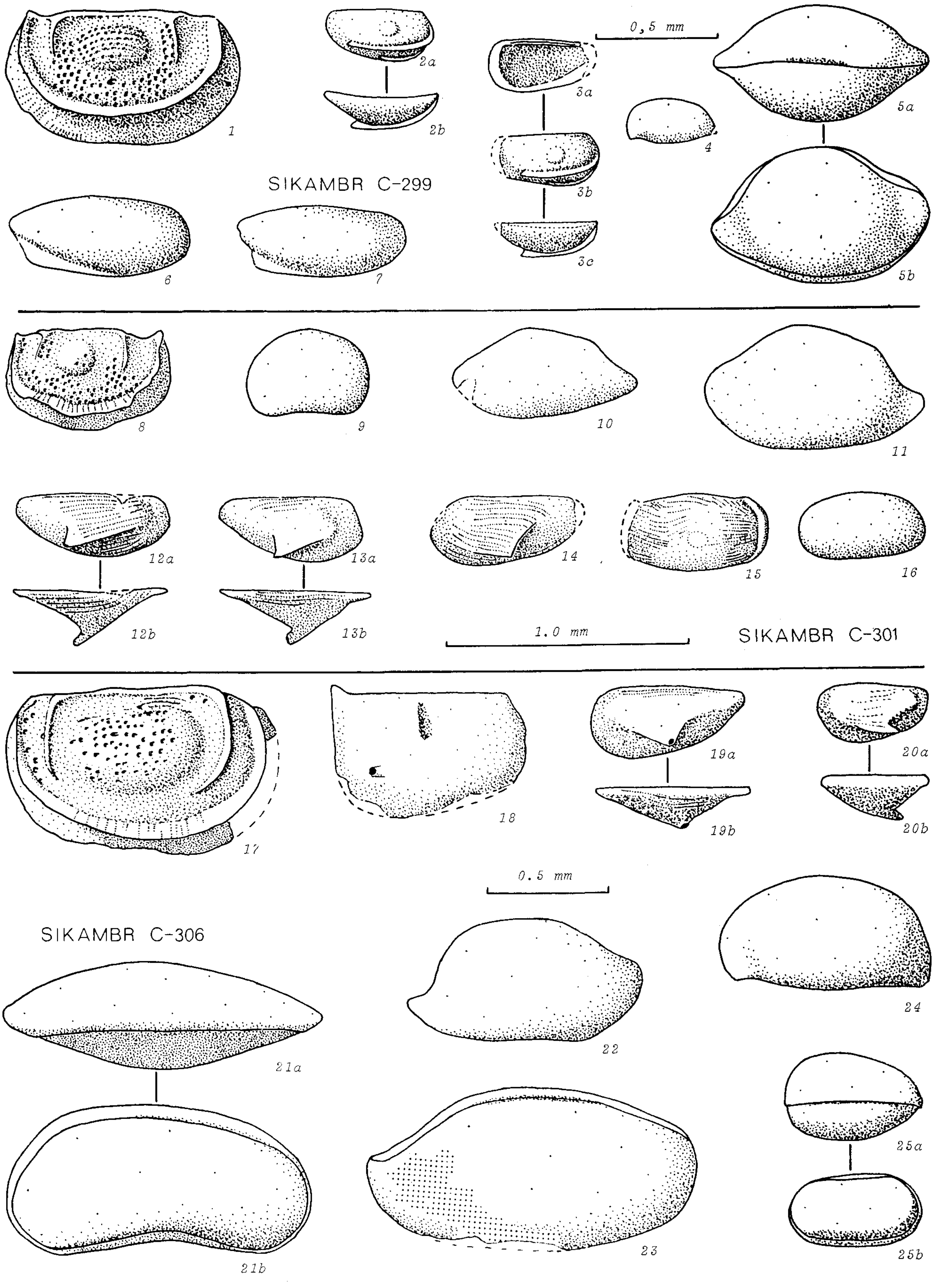

0,5 mm
1
2a
2b
3a
3b
3c
4
5a
5b
SIKAMBR C-299
6
7
8
9
10
11
12a
12b
13a
13b
14
15
16
1.0 mm
SIKAMBR C-301
17
18
19a
19b
20a
20b
0.5 mm
SIKAMBR C-306
21a
21b
22
23
24
25a
25b

PLATE 49

1 - 10. Ostracodes from Sikambr section facing Perevalny Valley on southern slope of Sikambr Mountain, Mol Suite, sample M-1-3, *Chernyshinella* foraminifer zone, Middle Tournaisian.

1. *Amphissites* sp., L.
2. *Bairdia* sp., R.
3. *Bairdia* sp., R.
4. *Berounella* sp., R.
5. *Microcheilinella* sp., R.
6. *Acratia* sp., L.
7. *Pseudomonoceratina ? razinae* Bless nov. sp., 7a = L, 7b = D. For diagnosis of species see figures 18 and 19 on this plate.
8. *Monoceratina* sp., 8a = R, 8b = V.

9 - 10. *Tricornina* aff. *robusticerata* Blumenstengel 1969, 9a = R, 9b = D, 10a = L, 10b = D.

11-19. Ostracodes from Beregovoy section III, Mol Suite, sample III-5, *Chernyshinella* foraminifer zone, Middle Tournaisian.

11. *Amphissites* sp., L.
12. *Microcheilinella* sp., 12a = D, 12b = R. Surface ornamented with some large (broken ?) spines, which might be artefacts.
13. *Microcheilinella shiloi* Bless nov. sp., holotype, 13a = I, 13b = L. Species named in honour to Academician N.A. Shilo, Magadan.

    Diagnosis : Small species of *Microcheilinella* with ornamentation of closely spaced spinules. Valves in dorsal view wedge-shaped with swollen posterior part. Lenght 0.45 mm. At first, it had been thought that these might be steinkerns of *Microcheilinella* with moulds of the pore canals. However, these are normal, silicified valves and carapaces showing the same overlap as other species of the genus. This species is also known from the Upper Famennian of Belgium and from the Upper Visean of Morocco (data based on undescribed material in the collections of the author). In the Omolon area, this species has been recognized in the Upper Famennian of the Gytgynpylgin section (sample XVII-8), as well as in several samples of the Middle Tournaisian Mol Suite (Sikambr and Beregovoy sections).
14. *Berounella* sp., R.
15. *Monoceratina simakovi* Bless nov. sp., holotype, 15a = I, 15b = R, 15c = D. Species named in honour to Dr. K.V. Simakov, Magadan.

    Diagnosis : *Monoceratina* with relatively flattened ends. Bar-and-groove hingement, well-developed calcified inner lamella, lateroventral extension ending in blunt, backward directed spur. Surface with striate ornamentation. Length 1.3 mm. Striate ornamentation resembles that of *Monoceratina sublimis* Polenova 1952 from the Upper Givetian of the Russian Platform. However, the lateral outline of that species is clearly different from *M. simakovi.*
16. *Pribylites ? kolesovi* Bless nov. sp., L. For diagnosis of species see plate 48, figures 2 and 3.
17. *Bairdia* sp., R.

18-19. *Pseudomonoceratina ? razinae* Bless nov. sp., holotype (18) and paratype (19), 18 = R, 19 = L. Species named in honour to Dr. T.P. Razina, Magadan.

Diagnosis : Valves rather elongate in lateral outline, rounded ends, straight dorsum with slightly downward curved posterodorsal margin. Conspicuous posteroventral spine. Rather flattened posteroventral area. Length of holotype 1.0 mm.

PLATE 49

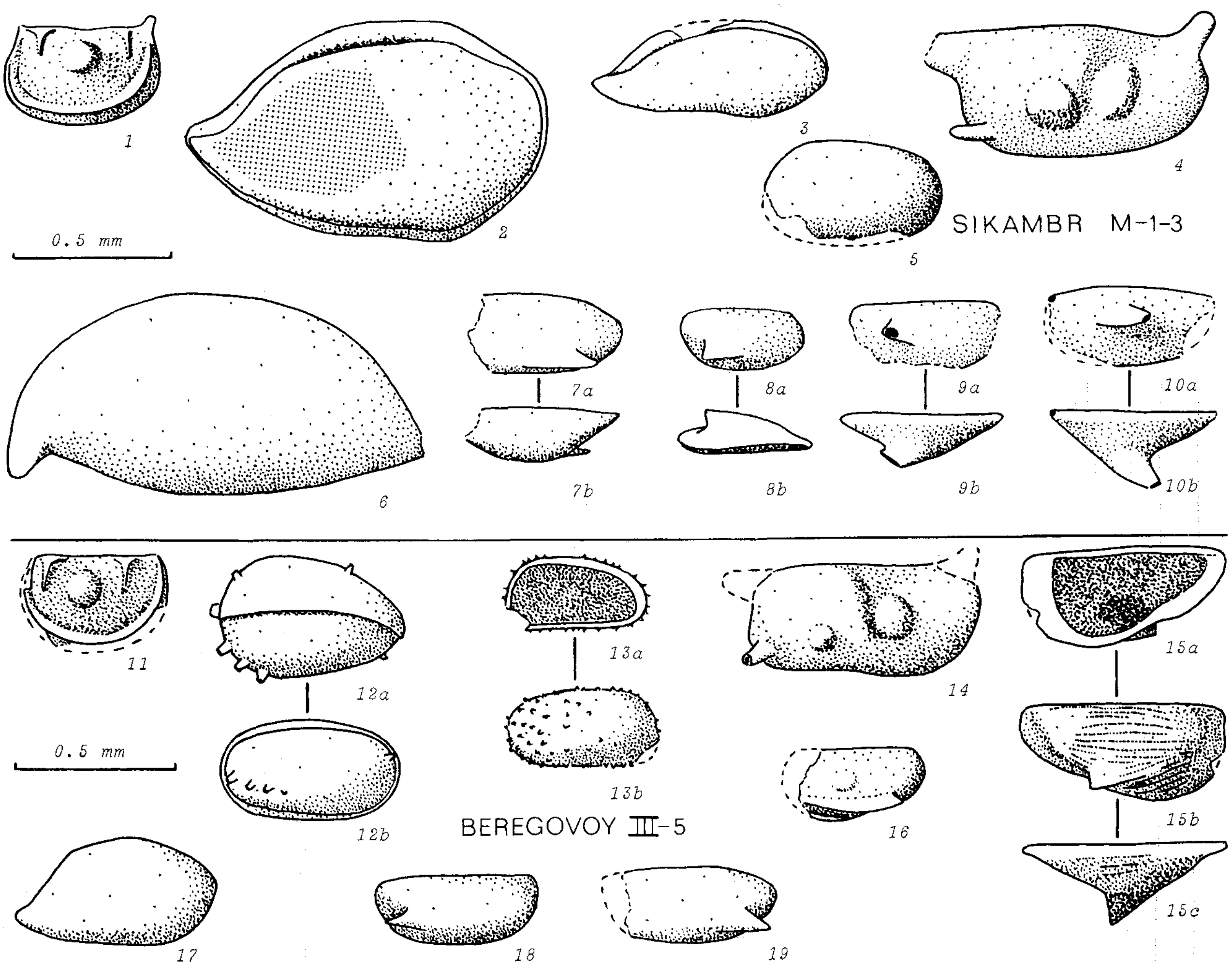

1
2
3
4
5
0.5 mm
SIKAMBR M-1-3
6
7a
7b
8a
8b
9a
9b
10a
10b
11
12a
12b
13a
13b
14
15a
15b
15c
16
0.5 mm
BEREGOVOY III-5
17
18
19

PLATE 50

1 - 10. Ostracodes from Verkhnenaled section VII, Elergetkhyn Suite, sample VII-9b, *Quasiendothyra* foraminifer zone, *Polygnathus lenticularis* conodont zone, Lower Tournaisian.

1. *Polytylites* sp., L.
2. *Kirkbya* sp., L.
3. *Microcheilinella* sp., L.
4. *Aechmina* sp., R. This genus has also been described from the Lower Osagian of the USA and from the uppermost Tournaisian of Libya (cf. Bless & Massa 1982).
5. *Knoxiella* sp., L.
6. *Acratia* sp., L.
7. *Baschkirina* sp., R.
8. *Hollinella* sp., L.
9. *Bairdia* sp., R.
10. *Bairdia* sp., R.

11-28. Ostracodes from Ustyevoy section II, Elergetkhyn Suite, sample II-2-1, *Quasiendothyra* foraminifer zone, *Polygnathus inornatus inornatus* conodont zone, Upper Famennian.

11. *Amphissites* sp., L.
12. *Kirkbya ?* sp., R.
13. *Knoxiella* sp., R.

14-17. *Phlyctiscapha ? procera* (Ivanova 1975), 14 = L, 15 = L, 16 = L, 17 = R.

18. *Kirkbya* sp., L.
19. *Bairdiocypris* sp., L.
20. *Parabairdiacypris* cf. *obtusa* Bushmina 1979, R.
21. *Acratia* sp., 21a = D, 21b = R.
22. *Youngiella ?* sp., R.
23. *Microcheilinella* sp., 23a = D, 23b = R.
24. *Paraberounella ?* sp., 24a = I, 24b = R.
25. *Bairdia* sp., 25a = D, 25b = R.
26. *Bairdia* sp., R.
27. *Bairdia* sp., 27a = D, 27b = R.
28. *Bairdia* sp., 28a = D, 28b = R.

PLATE 50

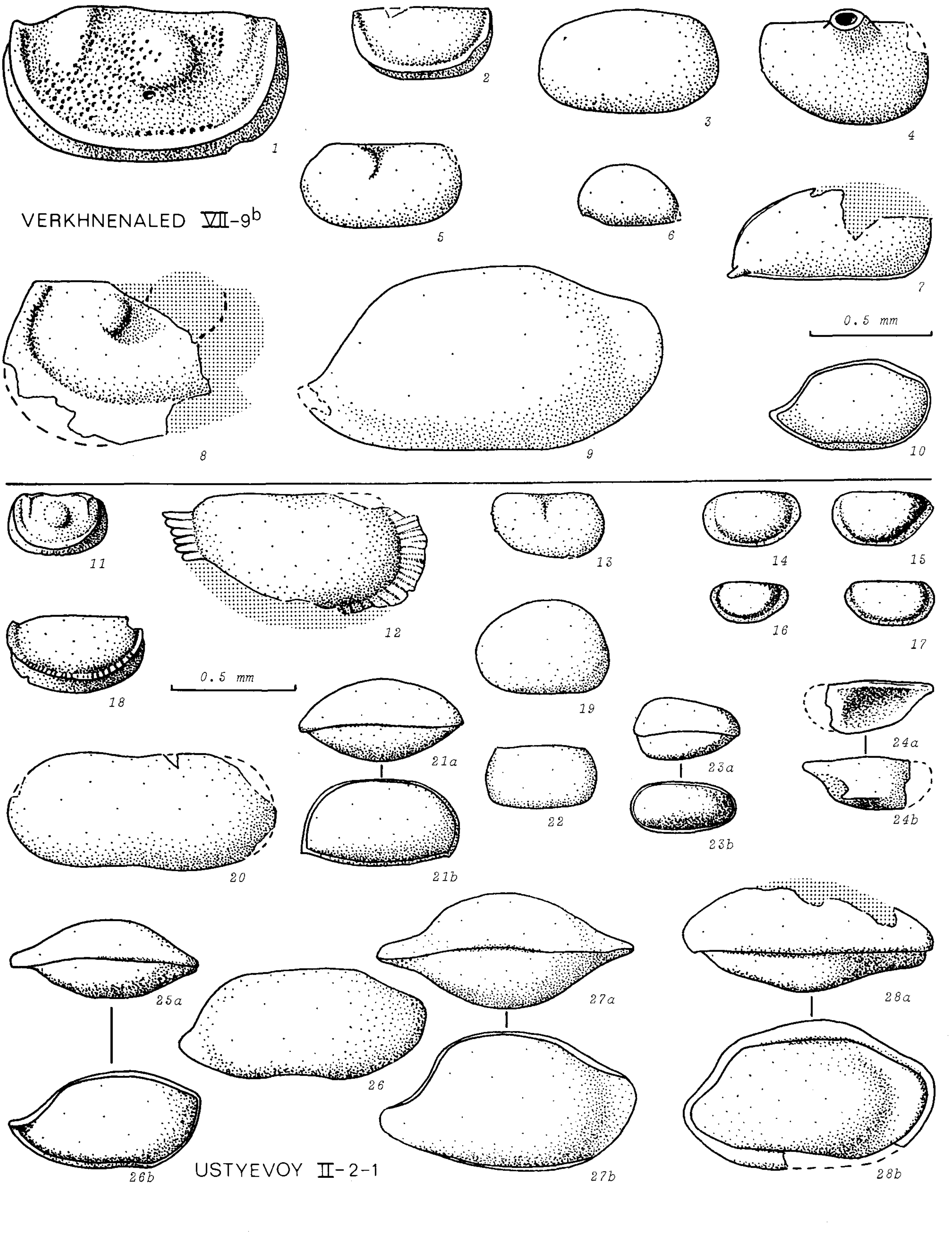

1
2
3
4
5
6
7
VERKHNENALED VII-9b
8
9
0.5 mm
10
11
12
13
14
15
16
17
18
0.5 mm
19
20
21a
21b
22
23a
23b
24a
24b
25a
26
27a
28a
26b
USTYEVOY II-2-1
27b
28b

PLATE 51

1 - 10. Ostracodes from Gytgynpylgin section XVII, Upper Gytgynpylgin Suite, sample XVII-13, *Polygnathus extralobatus* conodont zone, Upper Famennian.

1. *Kirkbya* sp., L.

2 - 3. *Kloedenellitina ?* sp., 2 = L, 3 = R.

4, 7, 10. *Baschkirina* sp., 4 = R, 7 = R, 10 = L.

5. *Microcheilinella* sp., L.

6. *Bairdia* sp., R.

8. *Acratia* sp., L.

9. *Bairdia subretrorsa* Bushmina 1979, R.

11-23. Ostracodes from Gytgynpylgin section XVII, Lower Gytgynpylgin Suite, sample XVII-8, *Polygnathus extralobatus* conodont zone, Upper Famennian.

11. *Kirkbya* sp., L.

12. *Kloedenellitina ?* sp., L.

13. *Tricornina* cf. *ventrocerata* Blumenstengel 1965, L.

14-15. *Monoceratina* sp., 14 = R, 15 = D.

16. *Microcheilinella shiloi* Bless nov. sp., L. For diagnosis of species see plate 49, figure 13.

17. *Acratia* sp., L.

18. *Bairdiocypris* sp., R.

19. *Bairdiocypris* sp., R.

20. *Microcheilinella* sp., R.

21. *Acratia* sp., L.

22. *Bairdia* sp., R.

23. *Bairdia* sp., R.

24-31. Ostracodes from Gytgynpylgin section XVII, Lower Gytgynpylgin Suite, sample XVII-5, *Polygnathus obliquicostatus* conodont zone, Upper Famennian.

24. *Amphissites* sp., L.

25. *Kirkbya* sp., R.

26. *Bairdia* sp., 26a = D, 26b = R.

27. *Monoceratina ?* sp., 27a = R, 27b = V.

28. *Bairdiocypris* sp., R.

29. *Polytylites* cf. *torosus* Bushmina 1979, L.

30. *Microcheilinella* sp., 30a = D, 30b = R.

31. *Baschkirina* sp., R.

PLATE 51

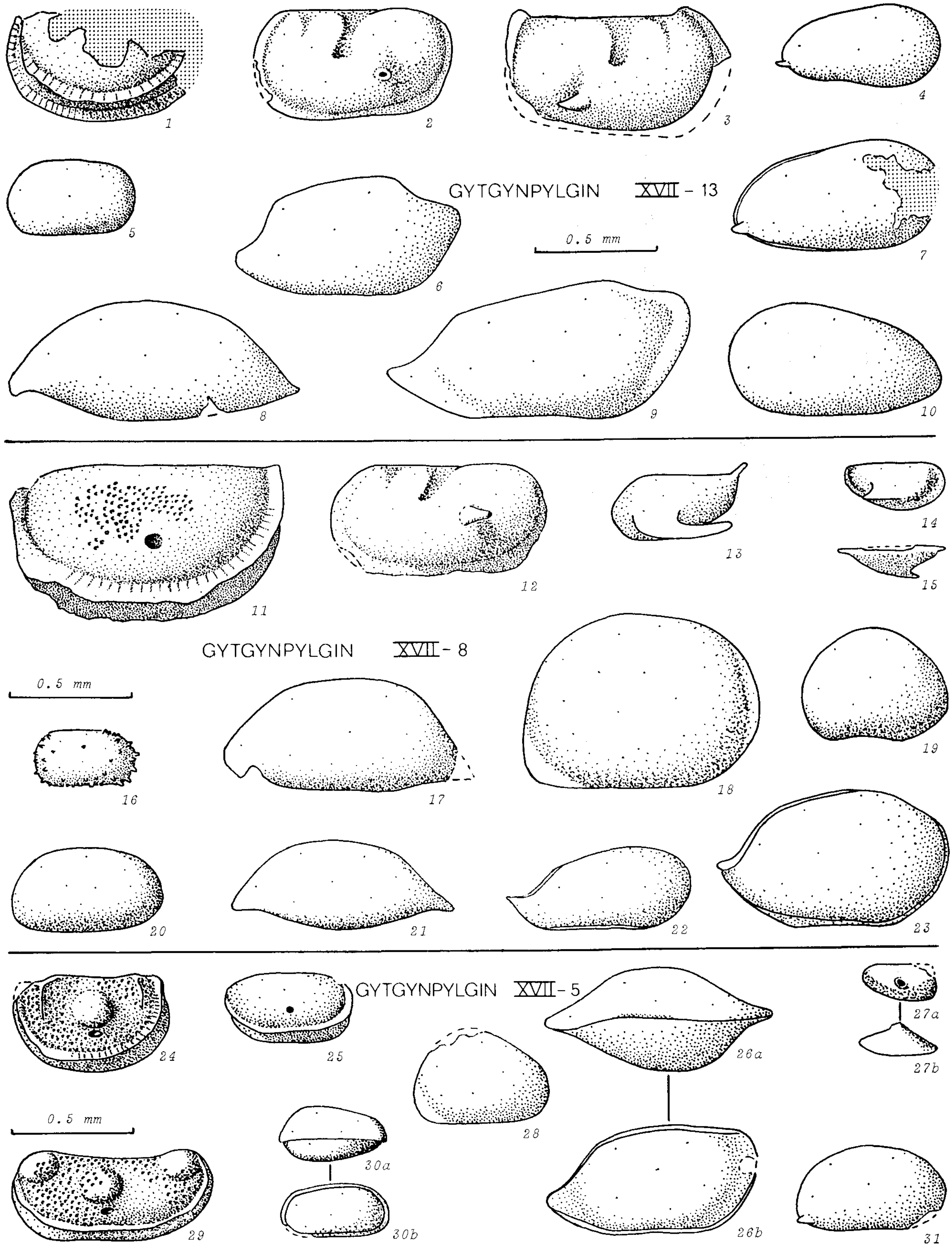

GYTGYNPYLGIN XVII - 13
0.5 mm
1
2
3
4
5
6
7
8
9
10
GYTGYNPYLGIN XVII - 8
0.5 mm
11
12
13
14
15
16
17
18
19
20
21
22
23
GYTGYNPYLGIN XVII - 5
0.5 mm
24
25
26a
26b
27a
27b
28
29
30a
30b
31

PLATE 52

1 - 12. Ostracodes from Uvnukveem section XXII, Perevalny Suite, sample XXII-7/13, *Polygnathus obliquicostatus* conodont zone, Upper Famennian.

1. *Amphissites* sp., R.
2. *Kirkbya* sp., R.
3. *Knoxiella ?* sp., R.

4 - 5. *Phlyctiscapha ? procera* (Ivanova 1975), 4 = L, 5 = R.

6. *Acratia* sp., R.
7. *Orthocypris ?* sp., R.
8. *Gerodia ?* sp., L.
9. *Bairdia* sp., R.
10. *Bairdiocypris* sp., R.
11. *Monoceratina* sp., 11a = L, 11b = D.
12. *Microcheilinella* sp., 12a = D, 12b = R.

13-16. Ostracodes from Oder section XII, Perevalny Suite, sample XII-11, *Polygnathus obliquicostatus* conodont zone, Upper Famennian.

13. *Amphissites* sp., R.
14. *Evlanovia markusovae* Bless nov. sp., R. For diagnosis of species see figures 17 to 20 on this plate.
15. *Parapribylites* sp., R.
16. *Knoxiella* sp., L.

17-22. Ostracodes from Oder section, Perevalny Suite, sample XII-6, *Neoicriodus terminalis* conodont zone, Upper Famennian.

17-20. *Evlanovia ? markusovae* Bless nov. sp., holotype (20) and paratypes (17, 18 and 19), 17 = L, 18 = D, 19 = V, 20 = R. Species named in honour to Dr. V. Markusova, Moscow.
Diagnosis : Straight dorsum, obtuse cardinal angles, rounded ends, straight to slightly sinuous venter. Anterodorsal lobe cusp-like. Second lobe small node, third lobe large and superimposed by small, stout spine with broad base, posteroventral swelling. Narrow but distinct marginal ridge along anterior end and ventral margin, ridge extending to posteroventral margin in right valve and ending gradually below third lobe in left valve. Short ventral velar ridge on right valve. Inconspicuous ridges in ventral area on both valves. Right valve slightly overlapping left valve along free margins. Surface smooth. Length of holotype (including marginal ridge) 0.82 mm.

21. *Parapribylites* sp., 21a = R, 21b = V.
22. *Serenida* sp., 22a = R, 22b = V.

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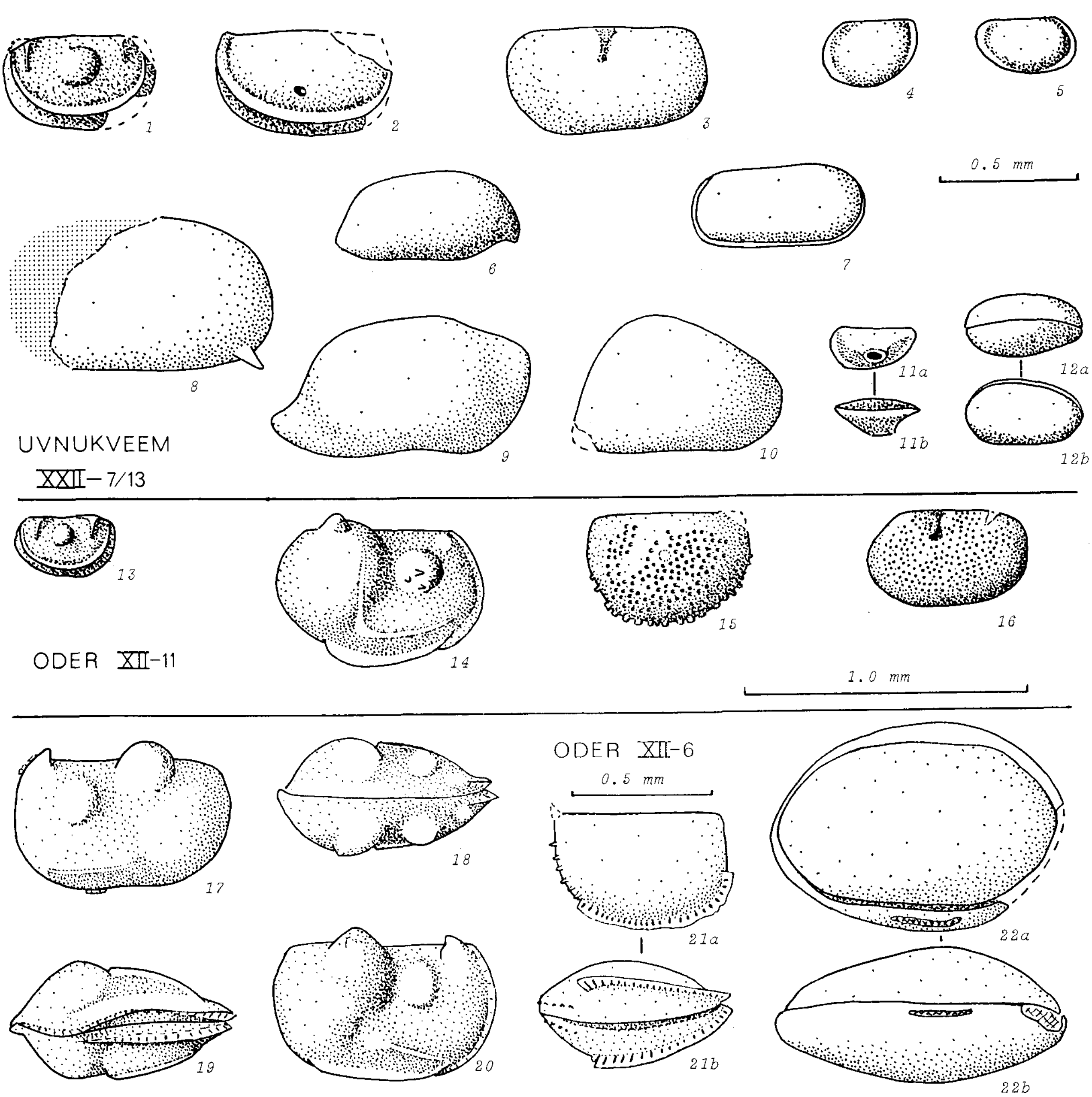
PLATE 52


1
2
3
4
5
0.5 mm
6
7
8
9
10
11a
11b
12a
12b
UVNUKVEEM
XXII–7/13
13
14
15
16
ODER XII-11
1.0 mm
17
18
ODER XII-6
0.5 mm
21a
22a
19
20
21b
22b