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NEW DATA ON THE TRIASSIC FORAMINIFERS OF CRIMEA

Abstract - GALINA P. PRONINA & VALERY JA. VUKS - New Data on the Triassic Foraminifers of Crimea.

A rich foraminifer association has been found in limestone blocks within Jurassic Eskiordin Formation of the Alma river basin of Crimea. The age analysis of this association allows to consider the foraminiferal complex of the blocks as Late Triassic (possibly Late Norian: Alaunian-Sevatian).

Key words: Upper Triassic, Late Norian, Foraminifera, Crimea.

The Lower and the Middle Mesozoic deposits of Crimea are represented by Tavrichian Group (Stratigraphy of the USSR, 1973). It is composed by alternation of mudstones, siltstones, sandstones, gravelstones, sometimes with lenses of limestones. Tavrichian Group is divided into two parts. The lower one belongs to the Upper Triassic, the upper part to the Jurassic Eskiordin Formation. The lower part of the deposits is represented by rhythmical alternation of sandstones, mudstones and siltstones. The age of its is settled as the Upper Triassic on the basis of the finds Carnian and Norian ammonoids and bivalves (ASTAKHOVA, 1968; Stratigraphy of the USSR, 1973).

Eskiordin Formation is represented by alternation of sandstones, mudstones with inclusion of limestones in the lower part. The upper part contains quartzitic sandstones and conglomerates with permian, triassic, liassic lenses of limestone (SCHALIMOV & MIKLUCHO-MAKLAY, 1960; STRAT. DICTIONARY..., 1979).

Late Triassic age of some limestone blocks is settled on the basis Carnian and Norian-Rhaetian brachiopods (DAGIS, 1963; DAGIS & SCHVANOV, 1965) and also ammonoids and bivalves (ASTAKHOVA, 1968).

The first information about the Triassic foraminifers of Crimea is given in VOLOSCHINA'S (1974) and SPASOV'S *et al.* (1977, 1978) works. They are devoted to character of the deposits in the bore hole № 10 in the environs of Evpatoriya town. In the bore hole the foraminifers were found in the carbonaceous terrane composed of microgranual limestones of different colours and calcareous dolomites. Association of foraminifers contains a lot of thin sections of the representatives of the *Glomospira, Glomospirella, Ammobaculites, Earlandia, Paleonubecularia, Globivalvulina?, Meandrospira, Nodosaria* genera, which are bad preserved. The Olenekian age of this association is proved by presence typical conodonts: *Neospathodus triangularis* (BENDER), *Parachirognathus* (STAESCHE), *Hadrodontia aduncа* STAESCHE (SPASOV *et al.*, 1978).

In 1988 the Permian Working Group of VSEGEI tested 11 limestone blocks in Alma river basin of Crimea. Late Triassic foraminifers were discovered in five of them. So far the fauna of foraminifers from limestone blocks was not studied.

All outcrops of Late Triassic limestones are adapted to the time Eskiordin Formation and they lie in fluvial part of the Izvestnyak streamlet inflowing into Alminsk reservoir to the north-west of Drovjanka village (fig. 1). The limestones occur in the form of blocks of the different dimension.

The first limestone outcrop (locality 116) is situated 750 m from issue of the Izvestnyak streamlet on its left bank (fig. 1). This block is 4,5 metres long and two metres heigh. It is composed of bedded lightgrey aphanitic limestones. The assemblage of the foraminifers is represented by *Tolypammina irregularis* (SALAJ, BORZA & SAMUEL), *Malayspirina* ex gr. *alpina* (ZANINETTI & BROENNIMANN), *Guadryina triadica* KRISTAN-TOLLMANN, *Pilamminella gemerica* (SALAJ), «*Calcitornella*» *gebzeensis* DAGER, *Ophthalmidium lucidum* (TRIFONOVA), *O. triadicum* (KRISTAN), *Sigmoilina bystrickyi* SALAJ, BORZA & SAMUEL, *Nodosaria* cf. *dipartita* KRISTAN-TOLLMANN, *N.* sp. *1, Pachyphloides ?* sp., *Pseudonodosaria* cf. *vulgata multicamerata* (KRISTAN-TOLLMANN), *Dentalina zlambachensis* KRISTAN, *Lenticulina rectangula* KRISTAN-TOLLMANN, *Duostomina* spp., *Arenovidalina chialingchiangensis* HO, *Lamelliconus turris* (FRENTZEN), *Coronipora etrusca* (PIRINI), *Semiinvoluta bicarinata* BLAU, *S. clari* KRISTAN. The generic composition of the foraminifers is rather various, but each species is represented by isolates specimens. It usually is characterized for reefs. Involutinids are dominating. *Gaudryina* and *Nodosaria* are most often occured among other groups of the foraminifers. *Ophthalmidium* and *Sigmoilina* are rare.

The largest limestone block (locality 117) is exposed in the form of steep to 1,5 km up along the streamlet from locality 116 (fig. 1). Its dimensions are following: lenght 110 m and height about 50 m. The lower part of the block is covered by vegetation. In the middle part it is represented by macrocrystalline limestones and in the upper one - by pink or grey aphanitic limestones. In the upper part (sample 117/1) the following species occur such as *Tolypammina*

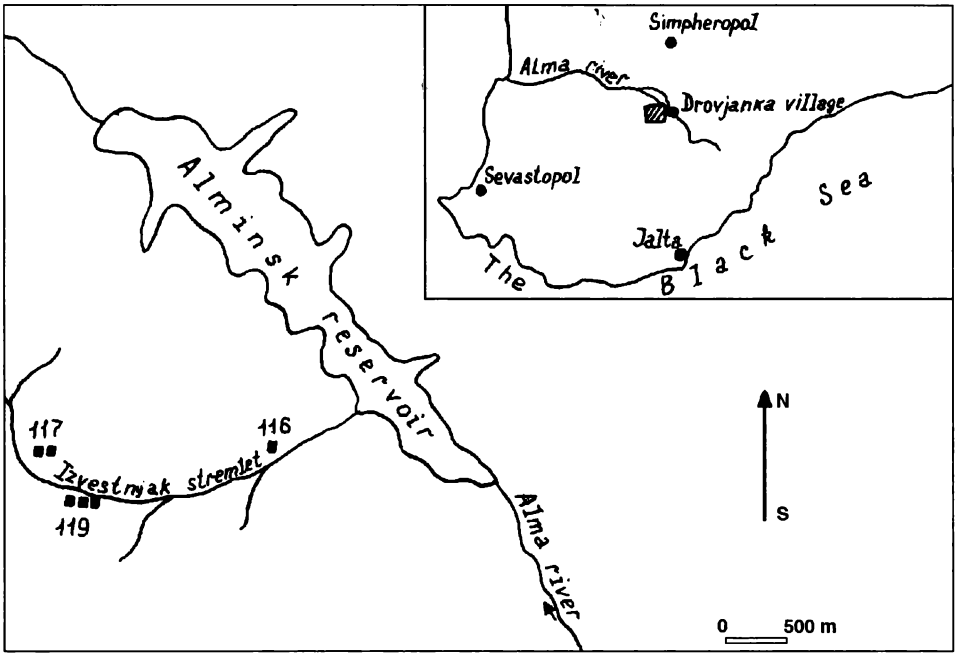

Fig. 1 - Location of the Upper Triassic limestone blocks in the Alma river basin of Crimea.

irregularis (SALAJ, BORZA & SAMUEL), *T. gregaria* WENDT, *Malayspirina* sp., *Endoteba kuepperi* (OBERHAUSER), *Textularia* ex gr. *exigua* (SCHWAGER), *Spiroplectammina spiralis* SALAJ, BORZA & SAMUEL, *Trochammina almtalensis* KOEHN-ZANINETTI, *Duotaxis inflatus* (KRISTAN-TOLLMANN), *Meandrospiranella?* sp., *Nodosaria simplex* (TERQUEM), «*Frondicularia woodwardi*» HOWCHIN, *Austrocolomia* sp., *Lenticulina göttingensis polygonata* (FRANKE), *Duostomia* sp., *Diplotremmina astrofimbriata* KRISTAN-TOLLMANN, *Arenovidalina chialingchiangensis* HO, *Semiinvoluta bicarinata* BLAU, *S. clari* KRISTAN.

The foraminifers are not numerous in this sample. Their generic and specific compositions are monotonous. The agglutinated genera appear such as *Trochammina, Endoteba, Spiroplectammina, Duotaxis.* Involutinids are very rare. Miliolids are quite absent. In the same place in 80 m to the south-west from locality 117/1 the second outcrop of pink aphanitic limestone (height 8 m) is observed. It occurs among of the gritstone with quartz gravel (till 0,5 cm). The sample 117/3 was taken out of this limestone. It includes *Tolypammina irregularis* (SALAJ, BORZA & SAMUEL), *T. gregaria* WENDT, *Ammobaculites* sp., *Duotaxis inflatus* (KRISTAN-TOLLMANN), *Gaudryina triadica* KRISTAN-TOLLMANN, *G. racema* TRIFONOVA, *Planiinvoluta deflexa* LEISCHNER, *Angulodiscus parallelus* (KRISTAN-TOLLMANN),

Arenovidalina chialingchiangensis HO, *A. depressa* (LUPERTO), *Semiinvoluta bicarinata* BLAU, *Nodosaria aff. shablensis* TRIFONOVA, *N.* cf. *elongata* (SALAY, BORZA & SAMUEL), *N.* cf. *angulocamerata* EFIMOVA, *N.* sp. *nov.*, *Astacolus sp.*, *Lenticulina sp.*, *Turrispirillina sp.*, *Ophthalmidium cf. martanum* FARINACCI, *O. carinatum* LEISCHNER, *O. tori* ZANINETTI & BRÖNNIMANN, *O. fusiformis* (TRIFONOVA), *Sigmoilina schaeferae* ZANINETTI, ALTINER, DAGER & DUCRET. In this sample the foraminifers are abundant. Gaudryinas, large nodosarias and lenticulinas, involutinids often occur. Miliolids are represented by very small ophthalmidiums and isolated sigmoilinas.

Three limestone blocks, enclosed in the gritstones and conglomerates of the Eskiordin Formation are exposed in 225 m from locality 117 down the streamlet on the right bank of its (fig. 1). The largest block of them consists of pink crystalline limestone (sample 119/1). Here the following species occur such as *Tolypammina gregaria* WENDT, *Endoteba kuepperi* (OBERHAUSER), *E. austrotriadica* (OBERHAUSER), *Malayspirina bicarinata* (SALAJ), *M. wirtzi* (KOEHN-ZANINETTI), *Trochammina almtalensis* KOEHN-ZANINETTI, *T. jaunensis* BRÖNNIMANN & PAGE, *Duotaxis inflatus* (KRISTAN-TOLLMANN), *D. metula* KRISTAN, *Gaudryina triadica* KRISTAN-TOLLMANN, *G. triassica* TRIFONOVA, *Palaeolituonella meridionalis* (LUPERTO), *Textularia* ex gr. *exiqua* (SCHWAGER), «*Calcitornella*» *gebzeensis* DAGER, *Planiinvoluta carinata* LEISCHNER, *Lamelliconus turris* (FRENTZEN), *L. multispirus* (OBERHAUSER), *Trochonella granosa* FRENTZEN, *Arenovidalina chialingchiangensis* HO, *Coronipora etrusca* (PIRINI), *Semiinvoluta bicarinata* BLAU, *S. clari* KRISTAN, *S. violae* BLAU, *Nodosaria* sp. nov., *Austrocolomia* ex gr. *canaliculata* (KRISTAN-TOLLMANN), *Septalingulina* cf. *tetrasepta* HE & NORLING, *Astacolus* sp., *Lenticulina rectangula* KRISTAN-TOLLMANN, *Ophthalmidium lucidum* (TRIFONOVA), *O. triadicum* (KRISTAN), *O. fusiformis* (TRIFONOVA), *O. exiguum* KOEHN-ZANINETTI, *O. leischneri* (KRISTAN-TOLLMANN), *Sigmoilina bystrickyi* SALAJ, BORZA & SAMUEL, *S. plectospira* (ORAVECZ-SCHEFFER), *Galeanella panticae* ZANINETTI & BRÖENNIMANN, *Miliolipora cuvillieri* BRÖNNIMANN & ZANINETTI, *Ophtalmipora?* sp., *Duostomina* spp. The most rich foraminiferal assemblage is found in this sample. Here the foraminifers are various and are represented by 39 species of 25 genera belonging to 18 families. Miliolids are dominanting, but involutinids and *Endoteba, Malayspirina* are numerous too. There are more various species of *Trochammina, Duotaxis, Guadryina* genera.

The second small block (1 m x 1 m) is represented by grey aphanitic limestone (sample 119/2). It includes *Gaudryina triassica* TRIFONOVA, *Angulodiscus* ex gr. *expansus* (KRISTAN-TOLLMANN), *Coronipora etrusca* (PIRINI), *Semiinvoluta bicarinata* BLAU, *Nodosaria* cf. *elongata* (SALAY, BORZA & SAMUEL), *N. nitida elongata* FRANKE, *Austrocolomia canaliculata* (KRISTAN-TOLLMANN), *A. marschalli* OBERHAUSER, «*Frondicularia woodwardi*» HOWCHIN, *Lenticulina* sp., *Ophthalmidium* cf. *martanum* FARINACCI, *O. fusiformis* (TRIFONOVA), *O.* sp. nov.,

Parophthalmidium sp., *Quinqueloculina? nucleiformis* KRISTAN-TOLLMANN, *Sigmoilina schaeferae* ZANINETTI, ALTINER, DAGER & DUCRET, *S. bystrickyi* SALAJ, BORZA & SAMUEL, *S. plectospira* (ORAVECZ-SCHEFFER). Assemblage of foraminifers is extremely poor and it contains dwarf from the representatives *Opthalmidium* and *Sigmoilina* genera, which often indefinite in thin sections. There are isolated *Nodosaria, Lenticulina*, Austrocolomia too.

The third block consists of pink limestone (sample 119/3). The foraminiferal assemblage is represented by following species: *Tolypammina gregaria* WENDT, *Lamelliconus turris* (FRENTZEN), *Coronipora etrusca* (PIRINI), *Semiinvoluta bicarinata* BLAU, *Nodosaria* sp. *1, Rectoglandulina?* sp., *Lenticulina* sp., *Turrispirillina (?) licia licia* BLAU, *Ophthalmidium lucidum* (TRIFONOVA), *O. leischneri* (KRISTAN-TOLLMANN), *Sigmoilina schaeferae* ZANINETTI, ALTINER, DAGER & DUCRET, *S. bystrickyi* SALAJ, BORZA & SAMUEL, *Miliolipora cuvillieri* BROENNIMANN & ZANINETTI, *Duostomina* spp. This assemblage is more poor than the foraminiferal ones from 116, 117, 119/1 samples. Here the representatives of agglutinated genera (*Endoteba, Malayspirina, Trochammina, Gaudryina* etc.), are absent. Involutinids and duostominids are not numerous. Nodosariids are very rare. Miliolids predominate. Among of them *Sigmoilina* and *Ophthalmidium* are most widespread.

On the whole the foraminiferal assemblages from studied limestone blocks are identical generic and specific composition. Therefore we consider that they belong the same age. Existing characteristic features of each association pronunced in the change of correlation between systematic groups of foraminifers are conditioned by different environmental facies in paleobasin.

The presence of involutinids and miliolids is characterized for the all studied foraminiferal associations. They are of much significance for determination of age of the Lower Mesozoic deposits. Among involutinids species *Lamelliconus turris, Arenovidalina chialingchiangensis, Coronipora etrusca, Semiinvoluta bicarinata, S. clari* are most characteristic. *Arenovidalina chialingchiangensis* have a wide geographic and stratigraphic distribution. This species is known in Tethys everywhere and occurs from the Lower Triassic to Norian inclusive (SALAJ, BORZA & SAMUEL, 1983). *Lamelliconus turris* is characterized for the Upper Triassic (Carnian) - Lower Liassic of the Carpathians, the North Caucasus, the Alps, the Dinarides, Bulgaria and Turkey. *Coronipora etrusca* is known from the Upper Norian-Liassic deposits of Italy, Austria, Hungary. *Semiinvuluta bicarinata* is characterized for Liassic of the Alps and the Carpathians, and *S. clari* for the Norian-Rhaetian deposits of the Alps, the Carpathians, the North Caucasus and the Dinarides. Besides typical forms the foraminiferal assemblage contains isolated *Trochonella granosa, Angulodiscus parallelus* and *A.* ex gr. *expansus*. The first species is known in the Norian-Lower Liassic deposits of the Carpathians, the Alps and the Dinarides. The two species of *Angulodiscus* genus are characterized for Norian-Rhaetian of the Carpathians, the Alps, Greece and Tunis (BLAU,

HAAS, 1991; PRACTICAL MANUAL..., 1991; TRIFONOVA, 1984; VUKS, 1988; ZANINETTI, 1976).

Among miliolids the representatives of the *Ophthalmidium* (8 species) and *Sigmoilina* (3 species) genera are widespread (table 1). The majority of species of *Ophthalmidium* occur in the Carnian-Rhaetian deposits of many regions of the Tethys with the exception *Ophthalmidium leischneri*, which is characterized only for the Rhaetian - Liassic of Austria, the Alps, the Carpathians, the Dinarides, Central Highland of Papua/New Guinea (SALAJ, BORZA, SAMUEL, 1983; KRISTAN-TOLLMANN, 1990).

Sigmoilina bystrickyi and *S. schaeferae* occur in the Norian-Rhaetian of the West Carpathians and Indonesia (Asinepe Limestone) (SALAJ, BORZA, SAMUEL, 1983; AL-SHAIBANI *et al.*, 1983).

Among miliolíporids species *Galeanella panticae* and *Miliolipora cuvillieri* are of much significance for the stratigraphy. They are characterized for the Norian-Rhaetian deposits of the different regions of the Tethys (PRACTICAL..., 1991; TRIFONOVA, 1984; ZANINETTI, 1976).

Among other taxonomic groups of the foraminifers the finds of *Palaeolituonella meridionalis, Septalingulina tetrasepta* and *Turrispirillina* (?) *licia*

Plate I

Fig. 1 - *Endoteba kuepperi* (OBERHAUSER) (N 1/12934).
Fig. 2 - *Malayspirina bicamerata* (ZANINETTI & BROENNIMANN) (N 4/12934)
Fig. 3-4 - *Endoteba austrotriadica* (OBERHAUSER) (3-N 2/12934: 4 - N 3/12934).
Fig. 5 - *Malayspirina wirtzi* (KOEHN-ZANINETTI) (N/12934).
Fig. 6 - *Trochammina jaunensis* BRÖENNIMANN & PAGE (N 6/12934).
Fig. 7 - *Trochammina almtalensis* KOEHN-ZANINETTI (N 7/12934).
Fig. 8 - *Duotaxis inflatus* (KRISTAN-TOLLMANN) (N 8/12934).
Fig. 9 - *Duotaxis metula* KRISTAN (N 9/12934).
Fig. 10 - *Gaudryina triassica* TRIFONOVA (N 10/12934).
Fig. 11 - *Gaudryina triadica* KRISTAN-TOLLMANN (N 11/12934).
Fig. 12 - *Spiroplectammina spiralis* SALAJ, BORZA & SAMUEL (N 12/12934)
Fig. 13 - *Palaeolituonella meridionalis* (LUPERTO) (N 13/12934).
Fig. 14 - *Pilaminella gemerica* SALAJ (N 14(12934)
Fig. 15 - *Lamelliconus turris* (FRENTZEN) (N 15/12934)
Fig. 16, 19. *Semiinvoluta clari* KRISTAN (16-N 16/12934; 19 - N 17/12934).
Fig. 17 - *Coronipora etrusca* (PIRINI) (N 18/12934)
Fig. 18 - *Semiinvoluta* (?) *violae* BLAU (N 19/12934)
Fig. 20 - *Arenovidalina depressa* (LUPERTO) (N 20/12934).
Fig. 21 - *Arenovidalina chialingchiangensis* HO (N 21/12934).

Fig. 1-7, 9, 11, 13, 15-19 - locality 119/1; fig. 10 - locality 119/2; fig. 8, 12, 21 - locality 117/1; fig. 20 - locality 117/3; fig. 14 - locality 116.
1, 2, 6-10, 18, 20-21 - x100; 3-5, 11-17, 19 - x 80.

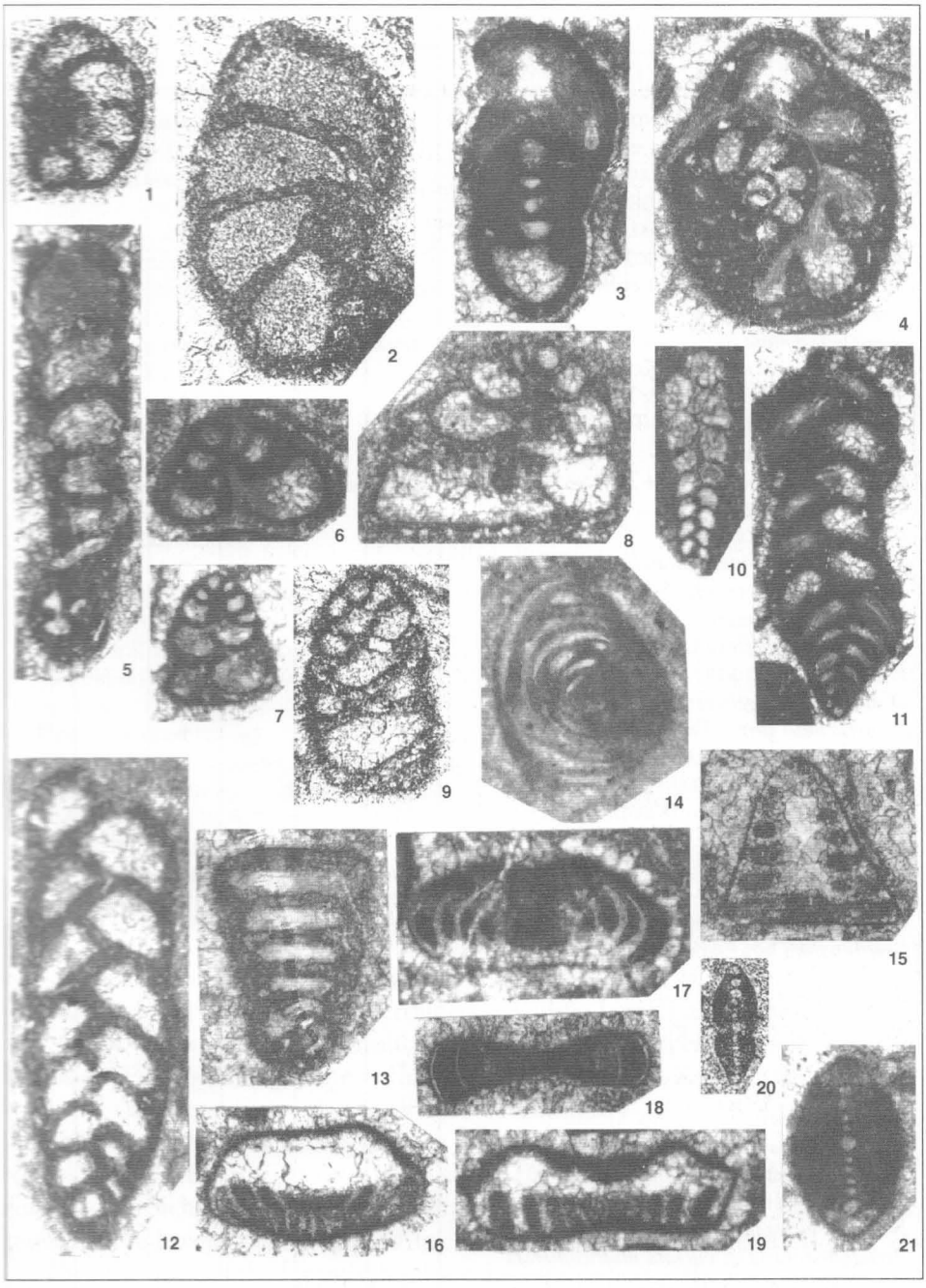

Plate I

Index fossils	Location					
	116	117/1	117/3	119/1	119/2	119/3
Tolypammina gregaria WENDT		+	+	+		+
T. irregularis (SALAJ, BORZA et SAMUEL)	+	+	+			
Endoteba kuepperi (OBERHAUSER)		+		+		
E. austrotriadica (OBERHAUSER)				+		
Malayspirina bicamerata (SALAJ)				+		
M. wirtzi (KOEHN-ZANINETTI)				+		
M. ex gr. *alpina* (ZANINETTI et BRÖNNIMANN)	+					
Ammobaculites sp.			+			
Spiroplectammina spiralis SALAJ, BORZA & SAMUEL		+				
Trochammina almtalensis KOEHN-ZANINETTI		+		+		
T. jaunensis BRÖNNIMANN & PAGE				+		
Duotaxis inflatus (KRISTAN-TOLLMANN)		+	+	+		
D. metula KRISTAN				+		
Gaudryina triadica KRISTAN-TOLLMANN	+		+	+		
G. racema TRIFONOVA			+			
G. triassica TRIFONOVA				+	+	
Palaeolituonella meridionalis (LUPERTO)				+		
Textularia ex gr. *exigua* (SCHWAGER)		+		+		
Pilamminella gemerica SALAJ	+					
Planiinvoluta deflexa LEISCHNER			+			
P. carinata LEISCHNER				+		
«*Calcitornella*» *gebzeensis* DAGER	+			+		
Lamelliconus turris (FRENTZEN)	+			+		+
L. multispirus (OBERHAUSER)				+		
Trochonella granosa FRENTZEN				+		
Angulodiscus parallelus (KRISTAN-TOLLMANN)			+			
A. ex gr. *expansus* (KRISTAN-TOLLMANN)					+	
Arenovidalina chialingchiangensis HO	+	+	+	+		
A. depressa (LUPERTO)			+			
Coronipora etrusca (PIRINI)	+			+	+	+
Semiinvoluta bicarinata BLAU	+	+	+	+	+	+
S. clari KRISTAN	+	+		+		
S. violae BLAU				+		
Nodosaria cf. *dipartita* KRISTAN-TOLLMANN	+					
N. sp. 1	+					+
N. simplex (TERQUEM)		+				
N. aff. shablensis TRIFONOVA			+			
N. cf. *elongata* (SALAJ, BORZA et SAMUEL)			+		+	
N. cf. *angulocamerata* EFIMOVA			+			
N. sp. *nov.*			+	+		
N. nitida elongata FRANKE					+	
Pseudonodosaria cf. vulgata multicamerata (KRISTAN-TOLLMANN)	+					
Pachyphloides (?) sp.	+					

Index fossils	Location					
	116	117/1	117/3	119/1	119/2	119/3
Austrocolomia canaliculata (KRISTAN-TOLLMANN)	+				+	
A. ex gr. *canaliculata* (KRISTAN-TOLLMANN)				+		
A. marchalli OBERHAUSER					+	
«*Frondicularia woodwardi*» HOWCHIN		+			+	
Dentalina zlambachensis KRISTAN	+					
Septalingulina cf. *tetrasepta* HE & NORLING				+		
Astacolus sp.			+	+		
Lenticulina göttingensis polygonata (FRANKE)		+				
L. rectangula KRISTAN-TOLLMANN	+			+		
L. sp.			+		+	+
Turrispirillina (?) *licia licia* BLAU						+
T. sp.			+			
Opthalmidium cf. *martanum* FARINACCI			+		+	
O. lucidum (TRIFONOVA)	+			+		+
O. triadicum (KRISTAN)	+			+		
O. carinatum Leischner			+			
O. tori ZANINETTI & BRÖNNIMANN			+			
O. fusiformis (TRIVONOVA)			+	+	+	
O. exiguum KOEHN-ZANINETTI				+		
O. leischneri (KRISTAN-TOLLMANN)				+		+
O. sp. nov.					+	
Parophthalmidium sp.					+	
Quinqueloculina? nucleiformis KRISTAN-TOLLMANN					+	
Sigmoilina bystrickyi SALAJ, BORZA & SAMUEL	+			+	+	+
S. schaeferae ZANINETTI, ALTINER, DAGER & DUCRET			+		+	+
S. plectospira (ORAVECZ-SCHEFFER)				+	+	
Galeanella panticae ZANINETTI & BRÖNNIMANN				+		

Table 1. Distribution of foraminifers in the Upper Triassic limestone blocks of the Crimea

licia are of interest. The first species was recognized in the «Calcare di Abriola» Formation of Italy whose age is determined as Middle-Late Triassic now (ZANINETTI *et al.*, 1986). This species is known also from the Middle? - Upper Triassic Kocagedik unit of the Pinarbasi area, eastern Taurus, Turkey (ALTINER, ZANINETTI, 1981) and from the Wetterstein reef Limestone of Hungary (BERCZI-MAKK, 1981). *Septalingulina tetrasepta* occurs in Late Norian deposits of Khodz Group of the North-West Caucasus (EFIMOVA, 1975) and in the Rhaetian strata of the Maantang Formation, Sichuan, China (HE, NORLING, 1991). *Turrispirillina* (?) *licia licia* is known in the Lower Liassic of the Alps and Hungary (BLAU, HAAS, 1991).

Thus the most of the foraminiferal species established in the limestone blocks of Crimea occur in the Norian-Rhaetian deposits of the Tethys.

The assemblage of foraminifers of Crimea is the most similar to Late Norian

foraminifers of the Khods Group (Sevatian-Lower Rhaetian) of the North-West Caucasus (EFIMOVA, 1975; PRACTICAL MANUAL, 1991), of the *Miliolipora cuvillieri* standard zone (Lacian-Sevatian) of the Carpathian-Balkan and Hellenic Realm (SALAJ *et al.*, 1988), of the upper part of Kocagedik unit (Norian) of Turkey (ALTINER, ZANINETTI, 1981), of Asinepe Limestone (Norian-Rhaetian) of Seram, Outer Banda Arc, Indonesia (AL-SHAIBANI *et al.*, 1983).

Concerning above mentioned we can consider the age of the foraminiferal assemblage of Crimea either the Norian, or the Rhaetian. However, the species-index of the Rhaetian, *Triasina hantkeni* MAJZON, is absent in the Crimea materials. But arenovidalinas occur in this assemblage. As usually they occur in the deposits not younger than Norian.

This is the reason to consider the age of the foraminiferal assemblage of Crimea limestone blocks rather Late Norian (possibly Alaunian-Sevatian) than Rhaetian although the latter is quite impossible to refute.

Plate II

Fig. 1 - *Nodosaria nitida elongata* FRANKE (N 22/12934).
Fig. 2 - *Nodosaria simplex* (TERQUEM) (N 23/12934).
Fig. 3 - *Austrocolomia marschalli* OBERHAUSER (N 24/12934).
Fig. 4 - *Austrocolomia canaliculata* (KRISTAN-TOLLMANN) (N 25/12934).
Fig. 5 - *Lenticulina göttingensis polygonata* (FRANKE) (N 26/12934).
Fig. 6 - *Lenticulina* sp. (= *Lenticulina* sp. a in KRISTAN-TOLLMANN, 1990) (N 27/12934)
Fig. 7 - *Lenticulina rectangula* KRISTAN-TOLLMANN (N 28/12934).
Fig.8-9 - *Ophthalmidium lucidum* TRIFONOVA (8 - N 29/12934; 9 - N 30/12934).
Fig. 10 - *Ophthalmidium leischneri* KRISTAN-TOLLMANN (N 31/12934).
Fig. 11 - *Ophthalmidium triadicum* (KRISTAN) (N 32/12934).
Fig. 12 - *Ophthalmidium carinatum* (LEISCHNER) (N 33/12934).
Fig. 13 - *Ophthalmidium* ? sp. (=*Neoangulodiscus leischneri* in KRISTAN-TOLLMANN, 1990) (N 34/12934).
Fig. 14-15 - *Ophthalmidium* sp. nov. (14 - N 35/12934; 15 - N 36/12934).
Fig. 16 - *Ophthalmidium* cf. *martanum* FARINACCI (N 37/12934).
Fig. 17 - *Sigmoilina plectospira* (ORAVECZ-SCHEFFER) (N 38/12934).
Fig. 18 - *Sigmoilina bystrickyi* SALAJ, BORZA & SAMUEL (N 39/12934).
Fig. 19 - *Sigmoilina schaeferae* ZANINETTI, ALTINER, DAGER & DUCRET (N 40/12934).
Fig. 20 - *Galeanella panticae* ZANINETTI & BRÖNNIMANN (N 41/12934).
Fig. 21-22 - Miliolipora cuvillieri BRÖNNIMANN & ZANINETTI (21 - N 42/12934; 22 - N 43/12934).
Fig. 23-24 - *Ophthalmipora* (?) sp. (23 - N 44/12934; 24 - N 45/12934).
Fig. 25 - *Duostomina sp.* (N 46/12934).
Fig. 26-27 - *Diplotremina austrofimbriata* KRISTAN-TOLLMANN (N 26 - N 47/12934; 27 - N 48/12934)
Fig. 1,3, 13-16 - locality 119/2; fig. 9, 10, 18 - locality 119/3; fig. 17,20-24 - locality 119/1; fig. 2,5, 26, 27 - locality 117/1; fig. 6, 12, 19 - locality 117/3; fig. 4, 7, 8, 11, 25 - locality 116.
1, 8-16, 18-22 - x 100; 2-7, 17, 23-27 - x 80.

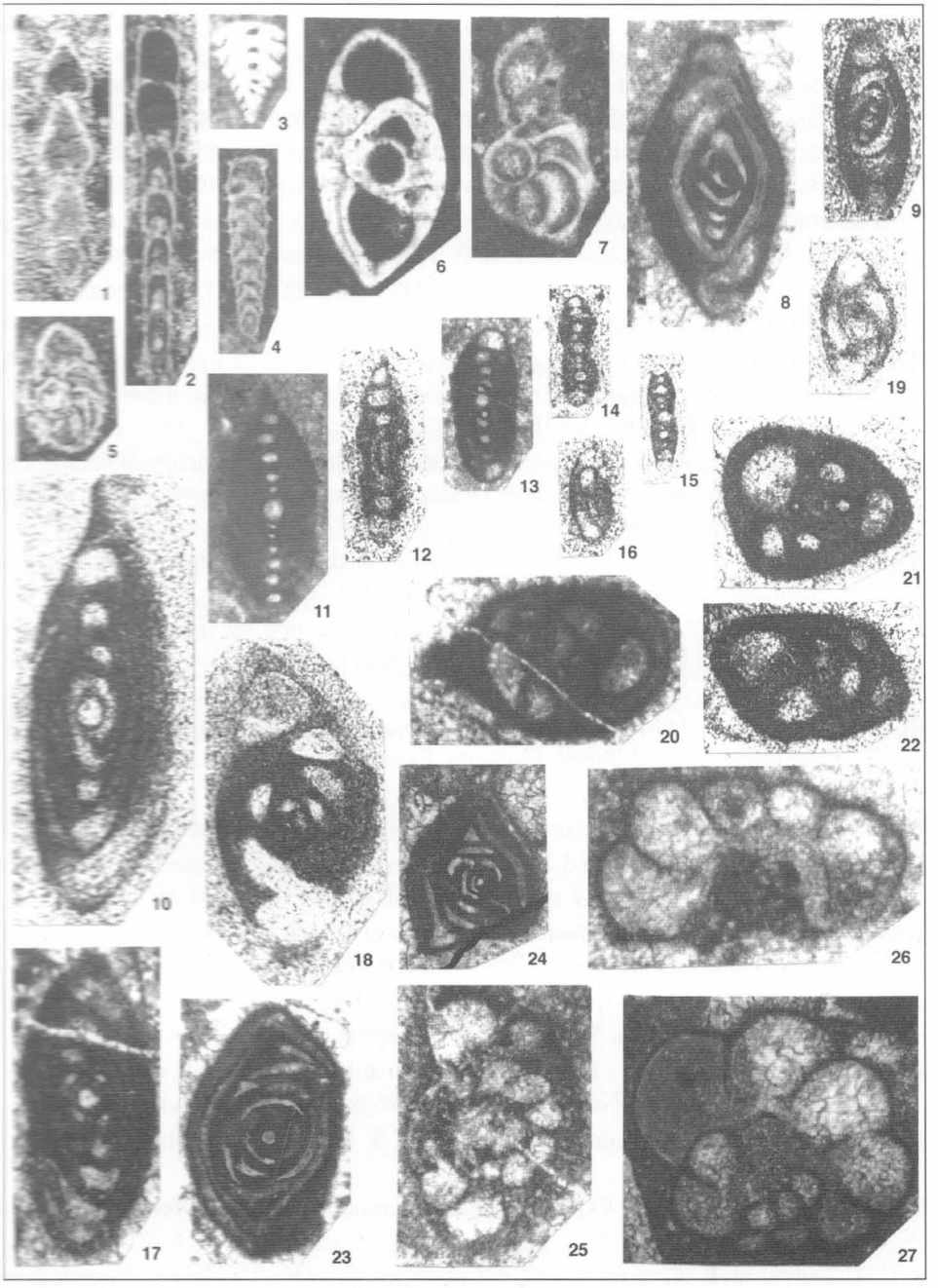

Plate II

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