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FORAMINIFERA FROM THE LOWER AND MIDDLE TRIASSIC
OF POLAND

Abstract.—Description of 36 species of Foraminifera including one species from the Bunter and 35 species from the Lower Muschelkalk of Polish Lowland and Silesia-Cracow Upland is given. Six species are recognized as new. Foraminiferal assemblage is represented chiefly by benthonic species of Nodosariidae family. Planktonic Foraminifera of the genera *Kollmannita* and *Oberhauserella* representing "Globigerina-like" group have also been found. Foraminiferal fauna is most abundant in the south of the area investigated less so in the north-east and scanty in the north-west part of the area. Prevailing faunal elements are those in common with Austria.

INTRODUCTION

The palaeontological studies on Foraminifera from the Triassic in Poland are not numerous. The papers published in this field concern several species of Foraminifera or Ostracoda. Among them contributions of the authors mentioned below are worthy of notice: W. Bielecka, 1956; O. Styk, 1858, 1966, 1972; A. Gaździcki & K. Zawidzka, 1973.

The present paper deals with the results of palaeontological and stratigraphical investigations on Foraminifera from the Bunter and the Lower Muschelkalk. The given foraminiferal assemblage has been investigated as a whole with a view to establish accurately the age of the sediments under study as well as to recognize the species in common with both the boreal and alpine provinces. Out of the 36 species of Foraminifera described altogether six were recognized as new. These are: *Ammodiscus inaequabilis* sp. n., *Astacolus kopiki* sp. n., *Dentalina excelens*:

sp. n., *Marginulina grazynae* sp. n., *Marginulinopsis pozaryskii* sp. n. and *Pseudonodosaria bieleckae* sp. n. The foraminiferal assemblage of the Lower Muschelkalk is mainly represented by benthonic species with calcareous and arenaceous tests. Genera of the Nodosariidae family constitute the major microfaunal element of the above assemblage.

For the purpose of a detailed investigation of Triassic Foraminifera the material from 19 boreholes has been studied, namely, from Kamień Pomorski, Połczyn Zdrój, Gościno, Bartoszyce, Gołdap, Kętrzyn, Nidzica, Olszyny, Elk, Żebrak, Tłuszcz, Ostrów Mazowiecka, Sulechów, Książ, Dobrów 24, Gacki 4, Woźniki, Winowo and Koziegłównki (Text-fig. 1).

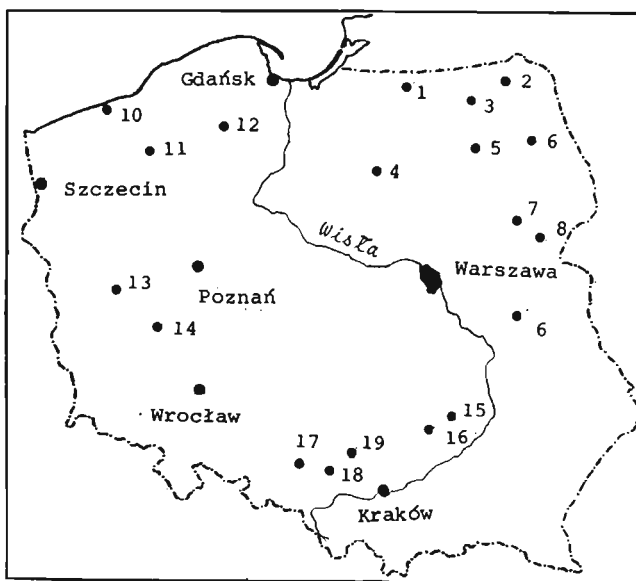


Fig. 1. A sketch map showing distribution of the boreholes from which foraminifers were examined: 1 — Bartoszyce, 2 — Gołdap, 3 — Kętrzyn, 4 — Nidzica, 5 — Olszyny, 6 — Elk, 7 — Żebrak, 8 — Tłuszcz, 9 — Ostrów Mazowiecka, 10 — Kamień Pomorski, 11 — Połczyn Zdrój, 12 — Gościno, 13 — Sulechów, 14 — Książ, 15 — Dobrów 24, 16 — Gacki 4, 17 — Woźniki, 18 — Winowo, 19 — Koziegłównki.

Foraminifera occurring in the Triassic sediments are few in number, with their tests often recrystallized, which makes it impossible to study them in thin sections. Non-recrystallized forms, however, have tests so thin that dipping them into the immersing oil, xylene or, even, plain water, enables to trace distinctly the internal structure of the specimen under study. The specimens described in this paper come from the collection housed in the Geological Institute, Warsaw. The classification used by the author is after A. R. Loeblich & H. Tappan 1964.

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Table 1
ASSEMBLAGES OF THE TRIASSIC FORAMINIFERA OF POLAND

Species	Stratigraphy	Lower Trias			Middle Trias		
		Buntsandstein			Muschelkalk		
		Lower	Middle	Upper Röt	Lower	Middle	Upper
<i>Hyperammina proneptis</i> Schleifer		—	—	—	•		
<i>Ammodiscus inaequabilis</i> sp. n.				•			
<i>Spirillina oberhauseri</i> Styk							
<i>Dentalina transmontana</i> Gümbel							
<i>Liuotuba indistincta</i> (Trifonova)							
<i>Dentalina gerkei</i> Styk							
<i>Dentalina vadaszi</i> Oberhauser				•	•	•	
<i>Dentalina cassiana</i> Gümbel							
<i>Ramulina subcylindrica</i> Styk							
<i>Koltmannita</i> cf. <i>ladinica</i> (Oberhauser)							
<i>Oberhauserella</i> cf. <i>mesotriassica</i> (Oberhauser)							
<i>Nodosaria subprimitiva</i> Gerke							
<i>Dentalina gladioides gladioides</i> Gerke							
<i>Nodosaria raibitana</i> Gümbel							
<i>Pachyphloides triangularis</i> Styk				•	•	•	
<i>Pachyphloides klebelsbergi</i> (Oberhauser)				•	•	•	
<i>Vaginulinopsis</i> sp.							
<i>Trochamminoides antis</i> Styk							
<i>Pseudonodosaria obconica</i> (Reuss)							
<i>Pseudonodosaria bieleckae</i> sp. n.							
<i>Astacolus velum</i> Kristan-Tollmann							
<i>Dentalina hoi</i> Trifonova							
<i>Dentalina exzelens</i> sp.							
<i>Bulloporella collarata</i> Kristan-Tollmann							
<i>Pseudonodosaria levifracta</i> (Kristan-Tollmann)							
<i>Pseudonodosaria polyartha</i> (Kristan-Tollmann)							
<i>Dentalina</i> cf. <i>detornata</i> Schwager							
<i>Astacolus dobroviensis</i> Styk							
<i>Vaginulinopsis economa</i> Kristan-Tollmann							
<i>Marginulinopsis pozaryskii</i> sp. n.							
<i>Marginulina grazynae</i> sp. n.							
<i>Astacolus kopiki</i> sp. n.							
<i>Orithovertella flexuosa</i> Styk							
<i>Geinitzinita oberhauseri</i> Sellier de Civrieux & Dessauvagine							
<i>Frondeolaria gerkei</i> Kristan-Tollmann							
<i>Ophthalmidium granum</i> Styk							

GENERAL PART

SOME DATA ON THE LOWER AND MIDDLE TRIASSIC IN POLAND
(EXCLUDING THE CARPATIANS)

The Bunter. The environmental conditions in the shallow inland sedimentary basin of the Bunter were unfavourable for the development of microfauna. Here occur scanty Ostracoda, the arenaceous forms of the

genus *Hyperammia* being the only Foraminifera recognized. Neither is abundant the microfauna of the calcareous-sandy-oolitic sediments of the Middle Bunter.

The Röt. The development of the microfauna dates back to the Röt when close contacts were established between the inland Middle Europe

Table 2

DISTRIBUTION OF THE FORAMINIFERAL SPECIES IN LOWER BUNTSANDSTEIN AND IN LOWER MUSCHELKALK OF POLAND

Species	Locality																			
	Bartoszyce	Goldap	Ketrzyn	Niżnica	Olszyny	Elk	Zebrak	Thuszcz	Ostrow Mazowiecka	Kamień Pomorski	Polczyn Zdrój	Gościno	Sulechów	Książ	Dobrow 24	Gracki 4	Wozniki	Winowo	Koziegłówek	
<i>Hyperammia proepta</i> Schleifer, 1961	+	+	+	+				+	+											
<i>Ammodiscus inaequabilis</i> sp. n.					+		+						+	+						+
<i>Litotuba indistincta</i> (Trifonova, 1962)						+									+					+
<i>Trochamminoides antis</i> Styk, 1972					+			+												
<i>Orthovertella flexuosa</i> Styk, 1972																				
<i>Ophthalmidium granum</i> Styk, 1972																				
<i>Nodosaria raibliana</i> Gumbel, 1869									+	+	+									
<i>Nodosaria subprimitiva</i> Gerke, 1961								+							+	+	+	+		
<i>Geinitzinita oberhauseri</i> Sellier de Civrieux & Dessauvagie, 1965															+	+	+	+		
<i>Pachyphloides klebelsbergi</i> (Oberhauser, 1960)													+		+	+	+	+		+
<i>Pachyphloides triangularis</i> Styk, 1972															+	+	+	+		+
<i>Astacolus dobroviensis</i> Styk, 1972															+	+	+	+		+
<i>Astacolus kopiki</i> sp. n.									+						+	+	+	+		+
<i>Astacolus velum</i> Kristan-Tollmann, 1964										+					+	+	+	+		+
<i>Dentalina cassiana</i> Gumbel, 1869					+	+	+	+					+		+	+	+	+		+
<i>Dentalina cf. detornata</i> Schwager, 1864													+		+	+	+	+		+
<i>Dentalina excelens</i> sp. n.						+		+					+		+	+	+	+		+
<i>Dentalina gerkei</i> Styk, 1972						+							+		+	+	+	+		+
<i>Dentalina gladioides gladioides</i> Gerke, 1961													+		+	+	+	+		+
<i>Dentalina hoi</i> Trifonova, 1967													+		+	+	+	+		+
<i>Dentalina transmontana</i> Gumbel, 1869						+	+	+		+			+		+	+	+	+		+
<i>Dentalina vadaszi</i> Oberhauser, 1960						+		+			+		+		+	+	+	+		+
<i>Fronidularia cf. gerkei</i> Kristan-Tollmann, 1964													+		+	+	+	+		+
<i>Marginulina grazyna</i> sp. n.						+		+		+			+		+	+	+	+		+
<i>Marginulinopsis pozaryskii</i> sp. n.						+		+		+	+		+		+	+	+	+		+
<i>Pseudonodosaria hieleckae</i> sp. n.						+							+		+	+	+	+		+
<i>Pseudonodosaria levifracta</i> (Kristan-Tollmann, 1964)								+					+		+	+	+	+		+
<i>Pseudonodosaria obconica</i> (Reuss, 1868)													+		+	+	+	+		+
<i>Pseudonodosaria polyartha</i> (Kristan-Tollmann, 1964)						+		+					+		+	+	+	+		+
<i>Vaginulinopsis cocomma</i> Kristan-Tollmann, 1964													+		+	+	+	+		+
<i>Vaginulinopsis</i> sp.													+		+	+	+	+		+
<i>Bullopore? collarata</i> Kristan-Tollmann, 1964													+		+	+	+	+		+
<i>Ramulina subcylindrica</i> Styk, 1972													+		+	+	+	+		+
<i>Spirillina oberhauseri</i> Styk, 1972						+	+	+	+	+	+	+	+	+	+	+	+	+		+
<i>Kollmannita cf. ladinica</i> (Oberhauser, 1960)													+		+	+	+	+		+
<i>Oberhauserella cf. mesotriassica</i> (Oberhauser, 1960)													+		+	+	+	+		+

and the Carpathian Sea. A different and much more abundant microfaunal assemblage was found in the calcareous-marly sediments of the Röt than that occurring in the beds of the Lower Bunter. For the most part it consists of Ostracoda.

The Muschelkalk. The peak of abundance of microfauna is observed in the clayey-silty-marly and marly-calcareous sediments of the Lower Muschelkalk. At that time, due to a steady interconnection between the epicontinental basin and the Carpathian Sea, the Mediterranean fauna pe-

netrates easily into the Middle European basin, while the alpine species appear and predominate in the foraminiferal assemblage. In the Middle Muschelkalk the basin becomes cut off from the open sea and begins to shrink. The advent of the evaporite sedimentation leads to a complete disappearance of the microfauna. The next period in the development of

Table 3
GEOGRAPHICAL DISTRIBUTION OF THE FORAMINIFERAL SPECIES IN THE TRIASSIC

Locality	Polish Lowlands	Caucasus	Siberia	Austria	Bulgaria	Hungary	Alaska	China
Species	Styk 1972, 1974	Efimova 1974	Gerke 1961	Kristan-Tollmann, 1964 Oberhauser 1960	Trifonova 1962, 1967	Oraveczné-Scheffer 1965, 1968	Tappan 1951	Ifo Yen 1953
<i>Hyperammina proneptis</i> Schleifer, 1961	+	-	+	-	-	-	-	-
<i>Ammodiscus inaequabilis</i> sp. n.	+	-	+	-	-	-	-	-
<i>Lituotuba indistincta</i> (Trifonova, 1962)	+	-	-	-	+	-	-	-
<i>Trochamminoides antis</i> Styk, 1972	+	-	-	-	-	-	-	-
<i>Orthisvertella flexuosa</i> Styk, 1972	+	-	-	-	-	-	-	-
<i>Ophthalmidium granum</i> Styk, 1972	+	-	-	-	-	-	-	-
<i>Nodosaria raibliana</i> Gümbel, 1869	+	-	-	+	-	-	-	-
<i>Nodosaria subprimitiva</i> Gerke, 1961	+	+	+	-	-	-	-	-
<i>Geinitzina oberhauseri</i> Sellier de Civrieux & Dessauvagic, 1965	+	-	-	+	-	-	-	-
<i>Pachyphloides klebelsbergi</i> (Oberhauser, 1960)	+	+	-	+	-	+	-	-
<i>Pachyphloides triangularis</i> Styk, 1972	+	-	-	-	-	-	-	-
<i>Astacolus dobroviensis</i> Styk, 1972	+	-	-	-	-	-	-	-
<i>Astacolus kopiki</i> sp. n.	+	-	-	-	-	-	-	-
<i>Astacolus velum</i> Kristan-Tollmann, 1964	+	-	-	+	-	-	-	-
<i>Dentalina cassiana</i> Gümbel, 1869	+	-	-	+	-	-	-	-
<i>Dentalina</i> cf. <i>detornata</i> Schwager, 1864	+	-	-	+	-	-	-	-
<i>Dentalina excelens</i> sp. n.	+	-	-	-	-	-	-	-
<i>Dentalina gerkei</i> Styk, 1972	+	-	-	-	-	-	-	-
<i>Dentalina gladioides gladioides</i> Gerke, 1961	+	-	-	-	-	-	-	-
<i>Dentalina hoi</i> Trifonova, 1967	+	+	-	+	+	-	-	+
<i>Dentalina transmontana</i> Gümbel, 1869	+	-	-	+	-	-	-	-
<i>Dentalina radasi</i> Oberhauser, 1960	+	-	-	+	-	-	-	-
<i>Frandicularia</i> cf. <i>gerkei</i> Kristan-Tollmann, 1964	+	-	+	+	-	-	-	-
<i>Margulinina grazynae</i> sp. n.	+	-	-	-	-	-	-	-
<i>Margulininopsis puzoskii</i> sp. n.	+	-	-	-	-	-	-	-
<i>Pseudonodosaria bielerkai</i> sp. n.	+	-	-	-	-	-	-	-
<i>Pseudonodosaria levifracta</i> (Kristan-Tollmann, 1964)	+	-	-	+	-	-	-	-
<i>Pseudonodosaria obconica</i> (Reuss, 1868)	+	-	+	-	-	+	+	-
<i>Pseudonodosaria polyarthra</i> (Kristan-Tollmann, 1964)	+	-	-	+	-	-	-	-
<i>Vaginulinopsis eocomma</i> Kristan-Tollmann, 1964	+	-	-	-	-	-	-	-
<i>Vaginulinopsis</i> sp.	+	-	-	-	-	-	-	-
<i>Bullopورا? collarata</i> Kristan-Tollmann, 1964	+	-	-	+	-	-	-	-
<i>Ramulina subeylindrica</i> Styk, 1972	+	-	-	-	-	-	-	-
<i>Spirillina oberhauseri</i> Styk, 1972	+	-	+	+	-	-	-	-
<i>Koillmannia</i> cf. <i>ladinica</i> (Oberhauser, 1960)	+	-	-	+	-	-	-	-
<i>Oberhauserella</i> cf. <i>mesotriassica</i> (Oberhauser, 1960)	+	-	-	+	-	-	-	-

the microfauna falls on the Upper Muschelkalk, which is characterized by restoration of the environmental conditions similar to these of the Lower Muschelkalk. The microfaunal assemblage of that period, however, contains no Foraminifera.

The Triassic Foraminifera (Table 1) are represented chiefly by benthonic species with calcareous and arenaceous tests. Genera from the cosmopolitan Nodosariidae family are recognized as the major microfaunal element among Foraminifera. Also occur representatives of the

Spirillinidae, Nubeculariidae, Polymorphinidae, Astrorhizidae, Ammodiscidae, Lituolidae and Fischerinidae families as well as two species of the planktonic Foraminifera from the genera *Kollmannita* and *Oberhausella*, sometimes called the "Globigerina-like" group. The latter have been found in the south-eastern margin of the Holy Cross Mountains (in the vicinity of Staszów). The most abundant microfauna occurs in southern Poland, namely, in the margin of the Holy Cross Mountains and on the Silesia-Cracow upland. Somewhat smaller number of species have been recognized in north-eastern Poland, whereas the Pomeranian swell is characterized by a very scanty microfauna (Table 2).

The foraminiferal assemblage contains species in common with Russia, Bulgaria, Hungary, Austria, Alaska and China. The largest number of common species has been noticed with Austria (Table 3).

SYSTEMATIC PART

Order Foraminifera Eichwald, 1830

Suborder Textulariina Delage & Hérouard, 1896

Superfamily Ammodiscacea Reuss, 1862

Family Astrorhizidae Brady, 1881

Subfamily Hippocrepinae Rhumbler, 1895

Genus *Hyperammina* Brady, 1878

Hyperammina proneptis Schleifer, 1961

(Pl. XXXV, fig. 1—2)

1961. *Hyperammina proneptis* Schleifer, sp. n.; in Gerke, A. A. Gerke, p. 99, pl. 6, figs 1—5.

Material. — 100 specimens, all damaged.

Dimensions (in mm):

Coll. IG Warsaw	No 6219/73/F	No 6220/73/F	No 6221/73/F
Length	0.45	0.66	0.81
Width	0.12	0.21	0.27
Wall thickness	0.02	0.03	0.03

Supplemented description. — Test tubular, open at each end, in parts somewhat flattened with irregular incised outline, cylindrical or slightly inflated towards aperture. Wall made of quartz grains 0.009 to 0.01 mm in size. Aperture shaped as a circular opening. Variation shows up in the length and width of the test as well as in thickness of the wall.

Occurrence. — Poland: Lower Bunter. USSR: Lower Triassic (N Siberia).

Family **Ammodiscidae** Reuss, 1862
 Subfamily **Ammodiscinae** Reuss, 1862
 Genus *Ammodiscus* Reuss, 1862
Ammodiscus inaequabilis sp. n.
 (Pl. XXXV, figs 3—4)

Type specimen: IG Warsaw, No 6222/73/F; pl. XXXV, fig. 3.

Type horizon: Lower Muschelkalk.

Type locality: Dobrów borehole, depth 261.0 m.

Derivation of the name: Lat. *inaequabilis* — irregular.

Diagnosis. — Test small, finely grained, 8 to 10 whorls very narrow except for the last four.

Material. — 25 specimens, some pyritized.

Dimensions (in mm):

	type specimen No 6222/73/F	paratype No 6223/73/F
Coll. IG Warsaw		
Larger diameter	0.30	0.39
Smaller diameter	0.28	0.37
Thickness	0.05	0.07
Width of last whorl	0.03	
Width of penultimate whorl	0.01	

Description. — Test small, initial chamber very small, the second one planispiral, tubular with 8 to 10 whorls. In the earlier part whorls very narrow, hardly identifiable, the last four being much wider with the final whorl twice as wide as the others. Peripheral margin rounded. Test wall built of fine quartz grains. Aperture circular situated at the end of last whorl. Variation shows up in test size, whorl number and in the degree of smoothness of outer margin.

Remarks. — The Polish specimens described are somewhat similar to *Ammodiscus ex gr. asper* (Terquem) in Gerke 1961 (pl. 12, figs 7—10). The former, however, are distinguished by a larger number of whorls, smaller test size, thinner wall of the test and smaller diameter of the last whorl. They are also different from *A. incertus* (d'Orbigny, 1839) in Kristan-Tollmann 1964 (pl. 3, figs 1—2) having a larger number of much narrower test whorls.

Occurrence. — Poland: Lower Muschelkalk.

Subfamily **Tolypammininae** Cushman, 1928Genus *Lituotuba* Rhumbler, 1895*Lituotuba indistincta* (Trifonova, 1962)

(Pl. XXXV, figs 9—13)

1962. *Tolypammina? indistincta* sp. n.; E. Trifonova, p. 148, pl. 3, figs 3—8.*Material.* — 40 specimens some of which are recrystallized.

Dimensions (in mm):

Coll. IG Warsaw	No 6227/73/F	No 6228/73/F
Larger diameter	0.19	0.25
Smaller diameter	0.18	0.18
Thickness	0.12	0.14
Height of rectilinear part	—	0.07
Width of rectilinear part	—	0.07

Supplemented description. — Test free tubular, of irregular shape. At early stage test coils forming a glomus-like *Glomospira* or arranged irregularly in different planes to become rectilinear later. Aperture circular at the open end of test. Wall arenaceous, made of very fine noncalcareous material. Variation found in the type of test coiling *Glomospira*-like or irregular, in different planes.

Occurrence. — Poland: Lower Muschelkalk. Bulgaria: Lower Carnian.Superfamily **Lituolacae** de Blainville, 1825Family **Lituolidae** Blainville, 1825Subfamily **Haplophragmoidinae** Maync, 1925Genus *Trochamminoides* Cushman, 1910*Trochamminoides antis*, Styk, 1972

(Pl. XXXV, figs 5—8)

1972. *Trochamminoides antis* sp. n.; O. Styk, p. 868, pl. 1, figs 1 a, b, c.*Material.* — 250 specimens.

Dimensions (in mm):

Coll. IG Warsaw	No 6201/72/F	No 6202/72/F	No 6203/72/F
Larger diameter	0.14	0.14	0.12
Smaller diameter	0.12	0.10	0.09
Thickness	0.03	0.03	0.03
Diameter of last chamber	0.03	0.03	0.03
Diameter of proloculus	0.01	0.01	0.01

Remarks. — *Trochamminoides antis* is somewhat similar to *Trochamminoides vertens* Tappan 1951 (pl. 2, figs 3, 4) except for a more oval test shape and a smaller number of less convex chambers.

Occurrence. — Poland: Muschelkalk.

Suborder **Miliolina** Delage & Hérouard, 1896

Superfamily **Miliolacea** Ehrenberg, 1839

Family **Fischerinidae** Millet, 1898

Subfamily **Cyclogyrinae** Loeblich & Tappan, 1961

Genus *Orthovertella* Cushman & Waters, 1928

Orthovertella flexuosa Styk, 1972

(Pl. XXXV, figs 14—16)

1972. *Orthovertella flexuosa* sp. n.; O. Styk, p. 868, pl. 1, figs 4—7.

Material. — 20 specimens.

Dimensions (in mm):

Coll. IG Warsaw	No 6204/72/F	No 6205/72/F	No 6206/72/F
Test length	0.36	0.21	0.19
Diameter of spiral part	0.14	0.14	0.12
Diameter of proloculus	0.02	0.02	0.01

Remarks. — *Orthovertella flexuosa* is somewhat similar to *Ammoverrella polygyra* Kristan-Tollman 1964 (pl. 3, fig. 17) differing from it by the smaller number of whorls in the test spiral part.

Occurrence. — Poland: Lower Muschelkalk.

Family **Nubeculariidae** Jones, 1875
 Subfamily **Ophthalmidinae** Wiesher, 1920
 Genus *Ophthalmidium* Kübler & Zwingli, 1870
Ophthalmidium granum Styk, 1972
 (Pl. XXXV, figs 18 a—b)

1972. *Ophthalmidium granum* sp. n.: O. Styk, p. 869, pl. 1, figs 8—9.

Material. — 10 specimens well preserved on the whole.

Dimensions (in mm):

Coll. IG Warsaw	No 6208/72/F	No 6229/73/F	No 6230/73/F
Length	0.25	0.23	0.28
Width	0.10	0.12	0.14
Thickness	0.03	0.05	0.03
Diameter of proloculus	0.01	0.01	0.01
Diameter of last chamber	0.02	0.02	0.02

Remarks. — *Ophthalmidium granum* differs from *Ophthalmidium exiguum* Zaninetti, 1969 (pl. 6, fig. D) in the size and shape of test. *O. granum* has an oval test and smaller number of chambers (4—5), while the test of *O. exiguum* is almost circular and the chambers amount to six.

Occurrence. — Poland: Lower Muschelkalk.

Suborder **Rotalina** Delage & Hérouard, 1896
 Superfamily **Nodosariacea** Ehrenberg, 1838
 Family **Nodosariidae** Ehrenberg, 1838
 Subfamily **Nodosariinae** Ehrenberg, 1838
 Genus *Nodosaria* Lamarck, 1812
Nodosaria raibliana Gümbel, 1869
 (Pl. XXXV, fig. 17)

1869. *Nodosaria raibliana* sp. n.: C. W. Gümbel, p. 181, pl. 6, fig. 28.

Material. — 18 specimens.

Dimensions (in mm):

Coll. IG Warsaw	No 6231/73/F	No 6232/73/F
Length	0.45	0.64
Width	0.14	0.18

Description. — Test composed of circular chambers placed uniserially. Sutures narrow and depressed. Along the test run 16 to 18 elongated costae converging on aperture. The aperture is circular and terminal.

Remarks. — As the entire material under study was set up only of damaged specimens it did not allow to determine accurately the number of chambers. *Nodosaria raibliana* shows some resemblance to *N. raphanistriformis* (Gümbel), but it is distinguished by a more rounded shape of the chambers. As compared to *Nodosaria muensteriana* Gümbel, *N. raibliana* has a greater number of costae.

Occurrence. — Poland: Lower Muschelkalk. Italy: Middle Triassic.

Nodosaria subprimitiva Gerke, 1961
(Pl. XXXV, fig. 19)

1961. *Nodosaria subprimitiva* Gerke sp. n.; A. A. Gerke, p. 173, pl. 20, figs 10, 11.

Material. — 20 specimens.

Dimensions (in mm):

Coll. IG Warsaw	No 6233/73/F	No 6234/73/F	No 6235/73/F
Length	0.23	0.23	0.28
Proloculus height	0.11	0.12	0.14
Proloculus width	0.12	0.14	0.14
Last chamber height	0.12	0.11	0.14
Last chamber width	0.09	0.12	0.10
Number of chambers	2	2	2

Description. — Test elongate uniserial, as a rule, two-chamber. Proloculus spherical, the second chamber somewhat elongated, with indistinct sutures separating the two. Surface smooth. Aperture circular, situated centrally on the slightly elongated apertural surface. Variation insignificant showing up in the second chamber which is more or less elongated.

Remarks. — The Polish specimens under discussion differ from the type two-chamber specimens of A. Gerke 1961 only in their considerably smaller dimensions. *N. subprimitiva* and *N. biloculina* Franke 1936 are distinguished by the shape of their chambers, which in the latter case is ovate.

Occurrence. — Poland: Lower Muschelkalk. The USSR (Northern Siberia): Carnian.

Genus *Geinitzinita* Sellier de Civrieux & Dessauvague, 1965
Geinitzinita oberhauseri Sellier de Civrieux & Dessauvague, 1965
(Pl. XXXV, figs 24—25)

1960. *Frondicularia tenera tenera* (Bornemann); R. Oberhauser, p. 31, pl. 1, figs 47—51.

1960. *Frondicularia ex gr. tenera* (Bornemann); R. Oberhauser, p. 37, pl. 6, figs 9 a, b.

1965. *Geinitzinita oberhauseri* gen. n., sp. n.; J. M. Sellier de Civrieux & T. F. J. Dessauvague, p. 78, pl. 18, figs 1—3, pl. 19, figs 9—11.

Material. — 12 specimens, well preserved on the whole.

Dimensions (in mm):

Coll. IG Warsaw	No 6236/73/F
Length	0.54
Width	0.16
Thickness	0.10
Height of the second chamber	0.03
Height of the last chamber	0.09
Proloculus diameter	0.01
Number of chambers	8

Description. — Test elongate, somewhat flattened, uniserial, composed of 5 to 9 chambers, proloculus very small, spherical, followed by slightly equitant chambers growing higher towards the latest part. Sutures hardly distinct, arcuate. Elliptical aperture situated on the slightly elongated top of last chamber. On test surface there is a notch framed by two oblong costae. Some specimens have peripheral keel, poorly developed and tapering in the middle of last chamber.

Variation is found in the distinction of costae and keel. Test shape also shows some variation, from triangular in young forms to oval in adult specimens.

Remarks. — Compared to the type specimen the Polish material is distinguished by more distinct costae which earlier authors designated as bilateral folds.

Occurrence. — Poland: Lower Muschelkalk. Austria: Ladinian. Turkey: Ladinian.

Genus *Pachyphloides* Sellier de Civrieux & Dessauvagie, 1965

Pachyphloides klebelsbergi (Oberhauser, 1960)

(Pl. XXXV, figs 22—23)

1960. *Lingulina klebelsbergi* sp. n.; R. Oberhauser, p. 34, pl. 4, figs 8—20, 22.
 1965. *Pachyphloides klebelsbergi* (Oberhauser); J. M. Sellier de Civrieux & T. F. J. Dessauvagie, p. 86, pl. 19, figs 1—5; pl. 20, figs 1—4.
 1965. *Fronidularia klebelsbergi* (Oberhauser); A. Oravecne-Scheffer, p. 198, pl. 4, fig. 5.

Material. — 30 specimens.

Dimensions (in mm):

Coll. IG Warsaw	No 6238/73/F	No 6239/73/F	No 6240/73/F
Length	0.36	0.48	0.52
Width	0.12	0.10	0.14
Thickness	0.10	0.09	0.10
Height of the last chamber	0.07	0.09	0.14
Height of the second chamber	0.01	0.01	0.01
Proloculus diameter	0.01	0.009	0.01
Number of chambers	7	8	10

Supplemented description.—Elongate test, uniserial, oval in cross section, with arcuate chambers. Test most convex in the axial part 6 to 12 chambers with proloculus very small, either spherical or slightly elongated. Other chambers low, somewhat equitant, the later ones being much bigger in height. Sutures initially very slightly depressed except for the latest 2 or 3 chambers where the depression is quite distinct. In its axial part test has some thickening. Aperture oval, papillate, situated on the top of last chamber.

Variation is found in the size of test, height of chambers, shape of last chamber which can be more or less elongated, as well as in the distinction of sutures, circular or oval, shape of proloculus and presence or lack of apertural papilla.

Remarks.—The Polish specimens described here resemble the form known as *Lingulina borealis* Tappan 1951. In the opinion of Sellier de Civrieux and Dessauvage 1965, such a resemblance may indicate that these forms are conspecific. The author believes it safer to assign the Polish specimens to *P. klebelsbergi* (Oberhauser) and not to *L. borealis* Tappan because of the more adequate illustration of variation available for the former species.

Occurrence.—Poland: Muschelkalk. Austria: Ladinian. The USSR (the NW Caucasus): Carnian.

Pachypholoides triangularis Styk, 1972

(Pl. XXXV, figs 20—21)

1972. *Pachypholoides triangularis* sp. n.; O. Styk, p. 870, pl. 1, figs 11—12.

Material.—20 specimens, well preserved.

Dimensions (in mm):

Coll. IG Warsaw	No 6211/72/F	No 6212/72/F	No 6306/73/F
Length	0.37	0.39	0.39
Width	0.21	0.25	0.21
Thickness	0.07	0.07	0.07
Proloculus diameter	0.01	0.03	0.03
Height of last chamber	0.09	0.10	0.09
Number of chambers	6	8	8

Remarks.—*Pachypholoides triangularis* differs from *Pachypholoides dracosimilis* (Oberhauser) 1960 in having more depressed sutures and test with incised margin.

Occurrence.—Poland: Lower Muschelkalk.

Genus *Astacolus* Montfort, 1808

Astacolus dobroviensis Styk, 1972

(Pl. XXXVI, figs 1, 2)

1972. *Lenticulina (Astacolus) dobroviensis* sp. n.; O. Styk, p. 869, pl. 1, fig. 10.

Material.—20 specimens.

Dimensions (in mm):

Coll. IG Warsaw	No 6210/72/F	No 6304/73/F	No 6305/73/F
Length	0.19	0.21	0.18
Width	0.10	0.12	0.09
Thickness	0.05	0.07	0.05
Number of chambers	4	4	4

Remarks. — *Astacolus dobroviensis* shows resemblance to *Astacolus matutina informis* (Schwager) 1865 in Kristan-Tollmann 1964, but it is distinguished by the ovate rather than spherical proloculus, smaller number of chambers (four as against seven in *A. matutina informis*) and less elongate test shape. *A. dobroviensis* resembles also *Astacolus* sp. in Kristan-Tollmann 1964, however, the latter has spherical proloculus and the two species have different number of chambers, 4 and 8 respectively.

Occurrence. — Poland: Lower Muschelkalk.

Astacolus kopiki sp. n

(Pl. XXXVI, figs 3—4)

Type specimen: IG Warsaw, No 6241/73/F; pl. XXXVI, fig. 3.

Type horizon: Lower Muschelkalk.

Type locality: Dobrów borehole, depth 251.0 m.

Derivation of the name: named after the Polish micropaleontologist, Janusz Kopik.

Diagnosis. — Test elongate, inflated towards the upper end. Cross section oval. Test composed of 6 to 8 chambers, with proloculus oval and the rest of chambers wide and low. Sutures slightly depressed, oblique. Dorsal margin straight or slightly incised, ventral margin convex.

Material. — 12 specimens, some damaged.

Dimensions (in mm):

Coll. IG Warsaw	type specimen	paratype
	No 6241/73/F	No 6443/73/F
Length	0.37	0.43
Width	0.14	0.10
Thickness	0.09	0.14
Number of chambers	7	8

Description. — Test rather slender becoming wide in the upper part of test rounded in lower part. Six to eight chambers, with proloculus oval; 4 to 5 chambers in the spiral part and 2 or 3 in the rectilinear one. Chambers of the spiral part triangular, later becoming wide and low, fairly convex. Sutures on the initial part flush with the surface, those on the later part depressed and oblique. Dorsal margin almost straight, ventral margin slightly convex. Lateral surface on the test smooth. Aperture circular, situated at the test dorsal margin. Variation is found in the test size and number of chambers as well as in the degree of last chamber inclination towards the spiral part of test.

Remarks. — *Astacolus kopiki* shows resemblance to *A. pediacus* Tappan 1959 but is differentiated from the latter by having a smaller number of chambers.

Occurrence. — Poland: Lower Muschelkalk.

Astacolus velum (Kristan-Tollmann, 1964)

(Pl. XXXVI, fig. 5)

1964. *Lenticulina* (*Astacolus*) *velum* sp. n.; E. Kristan-Tollmann, p. 121, pl. 29, figs 5, 9.

Material. — 15 specimens, well preserved.

Dimensions (in mm):

Coll. IG Warsaw	No 6244/73/F	No 6245/73/F	No 6246/73/F
Length	0.27	0.30	0.36
Width	0.12	0.12	0.16
Thickness	0.09	0.09	0.09
Number of chambers	6	6	8

Supplemented description. — The spiral part of test consists of 4 to 5 chambers, which are flattened and slightly inclined ventrally. Initial chamber oval, situated closer to ventral margin, chambers in the later part triangular. There are 2 or 3 chambers in the rectilinear part of test. The chambers become broader, those at the ventral side show pronounced inclination towards the spiral part. Last chamber strongly convex and higher than the penultimate one. Sutures on the spiral part indistinct, sutures on 2—3 latest chambers depressed. Dorsal margin slightly arcuate, the ventral one concave. Aperture circular, situated at the dorsal margin of the test.

Variation is found in a different number of chambers (6—8) size of test, curvature of its dorsal margin and the degree of convexity in last chamber.

Remarks. — As compared to the type specimen (Kristan-Tollmann 1964) the Polish specimens under study are smaller in size and number of chambers (the type specimen being composed of 10—12 chambers).

Occurrence. — Poland: Lower Muschelkalk. Austria: Upper Triassic.

Genus *Dentalina* Risso, 1826

Dentalina cassiana Gümbel, 1869

(Pl. XXXVI, figs 6—8)

1869. *Dentalina cassiana* sp. n.; C. W. Gümbel, p. 177, pl. 5, fig. 16.

Material. — 35 specimens, on the whole well preserved, though some damaged.

Dimensions (in mm):

Coll. IG Warsaw	No 6247/73/F	No 6248/73/F	No 6249/73/F
Length	0.39	0.39	0.48
Width	0.09	0.10	0.12
Proloculus diameter	0.05	0.07	0.07
Number of chambers	5	4	5

Supplemented description. — Tests uniserial, slightly arcuate, consisting of 4—5 chambers. Proloculus oval ending in a small spine, later chambers fairly convex. The last chamber elongated, slightly deflecting from the test axis. Sutures depressed. Aperture radial, situated at the test dorsal margin.

Variation shows up in the number of chambers (4—5) and the degree of their convexity.

Remarks. — The Polish specimens described are of a smaller size than the Gumbel's ones.

Occurrence. — Poland: Lower Muschelkalk. Italy: Middle Triassic.

Dentalina cf. detornata Schwager, 1864

(Pl. XXXVI, fig. 9)

Material. — 12 specimens, some of them damaged.

Dimensions (in mm):

Coll. IG Warsaw	No 6250/73/F	No 6251/73/F	No 6252/73/F
Length	0.32	0.36	0.41
Width	0.05	0.07	0.09
Proloculus diameter	0.03	0.05	0.03
Number of chambers	5	5	6

Description. — Test slightly arcuate, composed of 5 to 6 chambers with proloculus either oval or triangular. Chambers in the initial part are narrow, later becoming ever broader, higher and more convex. Last chamber elongated and narrower than the two preceding ones. Sutures straight, somewhat incised. Aperture radial, situated at the dorsal side on the elongated top of the last chamber.

Variation is found in the degree of test curvature and in the number of chambers.

Remarks. — The specimens of *Dentalina cf. detornata* differ from the type species (Schwager 1864 in Kristan-Tollmann 1964) in having the chambers of the initial part less distinctly separated.

Occurrence. — Poland: Lower Muschelkalk.

Dentalina excelens sp. n.

(Pl. XXXVI, fig. 10)

Type specimen: IG Warsaw No 6253/73/F; pl. XXXVI, fig. 10.

Type horizon: Lower Muschelkalk.

Type locality: Olszyny borehole, depth 1302.5 m.

Derivation of the name: Lat. *excelens* — uncommon, exceptional.

Diagnosis. — Test narrow, elongate, slightly arcuate, sharply pointed at both ends, having a peculiar cocoon — like penultimate chamber. Aperture radial, situated at the dorsal side. Four to six chambers.

Material. — 15 specimens, some damaged.

Dimensions (in mm):

Coll. IG Warsaw	type specimen	paratype
	No 6253/73/F	No 6254/73/F
Length	0.37	0.37
Height of penultimate chamber	0.09	0.10
Width of penultimate chamber	0.07	0.09
Height of last chamber	0.07	0.07
Width of last chamber	0.05	0.06
Proloculus diameter	0.03	0.03
Number of chambers	6	6

Description. — Proloculus oval, having a more or less pointed end; the second chamber small, narrow; two later chambers somewhat larger, almost globular; penultimate chamber considerably higher and broader, cocoon-like; last chamber much narrower than the penultimae one. Sutures between chambers straight, slightly depressed and quite distinct on the test surface. Aperture radial, situated at the test dorsal side.

Variation is found in the degree of sharpness of the initial part of test, in the size of penultimate chamber and the test curvature.

Remarks. — The species studied is distinguished from all *Dentalina* species known heretofore by a peculiar shape of the penultimate chamber.

Occurrence. — Poland: Lower Muschelkalk.

Dentalina gerkei Styk, 1972

(Pl. XXXVI, fig. 11)

1972. *Dentalina gerkei* sp. n.; O. Styk, p. 870, pl. 1, fig. 13.

Material. — 30 specimens.

Dimensions (in mm):

Coll. IG Warsaw	No 6213/73/F	No 6256/73/F	No 6257/73/F
Length of test	0.36	0.34	0.39
Width of proloculus	0.02	0.02	0.03
Height of proloculus	0.03	0.03	0.03
Width of last chamber	0.07	0.05	0.07
Height of last chamber	0.10	0.07	0.10
Number of chambers	6	6	7

Remarks. — *Dentalina gerkei* most of all resembles *D. subexilis* Gerke 1961 but its chambers are larger and more globular. As against *D. exilis* Franke 1936 it is distinguished by the shape of chambers for the former species features more elongate barrel-like chambers with the ultimate one tapered to a point.

Occurrence. — Poland: Lower Muschelkalk.

Dentalina gladioides gladioides Gerke 1961

(Pl. XXXVI, figs 12, 13)

1961. *Dentalina gladioides* Gerke var. *gladioides* Gerke sp. var. nov.; A. A. Gerke, p. 241, pl. 41, figs 4—5.

Material. — 18 specimens, well preserved.

Dimensions (in mm):

Coll. IG Warsaw	No 6258/73/F	No 6259/73/F	No 6260/73/F
Length	0.28	0.45	0.50
Width	0.09	0.10	0.10
Thickness	0.07	0.09	0.07
Number of chambers	6	8	8

Description. — Test wedge-like, cross section oval, composed of 6—8 chambers with proloculus small spherical ending in a sharp spine bent towards the test ventral part, the later chambers low, their sutures indistinct, the last one thicker and visibly separated from the rest of the test. Sutures oblique, dorsal margin either straight or slightly curved, ventral margin convex. Aperture radial, placed at the test dorsal margin.

Variation shows up in the degree of the dorsal margin convexity and in the test shape, as some specimens are slightly sigmoidal.

Remarks. — The Polish material does not differ basically from the Gerke specimens.

Occurrence. — Poland: Lower Muschelkalk. The USSR (Siberia): Upper Triassic.

Dentalina hoi Trifonova, 1967

(Pl. XXXVI, fig. 14)

1959. *Dentalina* sp.; Ho Yen, p. 417, pl. 8, figs 26—27.
 1964. *Dentalina laevigata* Schwager; E. Kristan-Tollmann, p. 105, pl. 18, fig. 6.
 1967. *Dentalina hoi* sp. n.; E. Trifonova, p. 7, pl. 2, figs 3—9.

Material. — 15 specimens.

Dimensions (in mm):

Coll. IG Warsaw	No 6261/73/F	No 6262/73/F	No 6263/73/F
Length	0.34	0.36	0.46
Width	0.05	0.07	0.10
Number of chambers	6	7	8

Supplemented description. — Narrow, elongate test, crescent-shaped, pointed at both ends. Six to eight chambers. Proloculus oval, in some cases ending in a small spine, followed by 2 or 3 low chambers; in the later part chambers become higher, sutures between them oblique. Aperture radial, situated on the elongated top of the last chamber.

Variation manifests itself in the degree of test curvature, convexity of chambers and distinction of sutures.

Remarks. — The Polish specimens under study have no basic distinctions as compared with Trifonova's material. As against Ho Yen specimens the only difference lies in the smaller number of chambers. They differ from the specimens described as *Dentalina leavigata* Schwager in Kristan-Tollmann 1964 (pl. 18, fig. 6) in the size of chambers and more distinct sutures.

Occurrence. — Poland: Lower Muschelkalk. Bulgaria: Anisian, Carnian. China: Triassic (T^s 2—3).

Dentalina transmontana Gümbel, 1869

(Pl. XXXVI, fig. 15)

1869. *Dentalina transmontana* sp. n.; C. W. Gümbel, p. 177, pl. 5, fig. 17.

Material. — 20 specimens, some damaged.

Dimensions (in mm):

Coll. IG Warsaw	No 6264/73/F	No 6265/73/F	No 6266/73/F
Length	0.45	0.50	0.55
Width	0.10	0.10	0.12
Number of chambers	5	5	6

Supplemented description. — Test slightly arcuate, 5—6 chambers, proloculus oval, later chambers growing larger, and being higher than broad; the last chamber somewhat elongated. Dorsal margin of the test straight, the ventral one slightly incised. Sutures on the initial part straight, later somewhat oblique. Aperture radial, situated at the test dorsal margin.

Variation shows up in test size, number of chambers, in the degree of sharpness of the test initial part and distinction of sutures.

Occurrence. — Poland: Lower Muschelkalk. Austria: Middle Triassic.

Dentalina vadaszi Oberhauser, 1960

(Pl. XXXVI, fig. 16)

1960. *Dentalina vadaszi* sp. n.; R. Oberhauser, p. 23, pl. 3, figs 11, 17, pl. 4, fig. 34.

Material. — 10 damaged specimens composed of 3 to 6 chambers and 1 undamaged specimen with 4 chambers.

Dimensions (in mm):

Coll. IG Warsaw	No 6267/73/F
Length	0.54
Height of proloculus	0.12
Width of proloculus	0.12
Height of the second chamber	0.17
Width of the second chamber	0.10
Number of chambers	4

Description. — Test slightly arcuate. Maximum number of chambers 6 with proloculus spherical somewhat smaller than the second chamber; the later chambers about as high as broad. Sutures distinct and fairly

deep. There are 10 to 12 costae running along the test and disappearing near sutures. Costae on the last chamber do not reach the very end, where the radial aperture is situated.

Variation is found in the number of costae and chambers as well as in the size of specimens. The material under study contains damaged specimens, some of them longer, composed of 4 chambers, some shorter having 5 chambers.

Occurrence. — Poland: Lower Muschelkalk. Austria: Ladinian.

Genus *Frondicularia* Defrance (in d'Orbigny, 1826)

Frondicularia cf. *gerkei* Kristan-Tollmann, 1964

(Pl. XXXVI, fig. 17)

Material. — One specimen intact, 3 damaged.

Dimensions (in mm):

Coll. IG Warsaw	No 6268/73/F
Length	0.50
Width	0.12
Thickness of the test, initial part	0.03
Thickness of the test, latest part	0.07
Number of chambers	7

Description. — Elongate test, flattened. 8—10 chambers. Initial part of test narrow, almost undivided, chambers of later part rather high, equitant sutures depressed. The test surface is covered by very delicate, hardly visible oblong costae. Aperture oval, located centrally on a small papilla.

Remarks. — The Polish material studied differs from *F. gerkei* in having the costae not so distinct and the initial part of test narrower.

Occurrence. — Poland: Lower Muschelkalk. Austria: Upper Triassic.

Genus *Marginulina* d'Orbigny, 1826

Marginulina grazyna, sp. n.

(Pl. XXXVI, figs 18—19)

Type specimen: IG Warsaw No 6270/73/F, pl. XXXVI, fig. 18.

Type horizon: Lower Muschelkalk.

Type locality: Żebrak borehole, depth 1012.8 m.

Derivation of the name: named after the author's daughter, Grażyna.

Diagnosis. — Elongate test, flattened laterally a wedge-like shape, slightly arcuate, composed of 4—6 chamber. Proloculus oval, followed by chambers which are broader than high. Last chamber the largest of all and inflated. Test section oval.

Material. — 25 specimens.

Dimensions (in mm):

	type specimen No 6270/73/F	paratype No 6271/73/F
Coll. IG Warsaw		
Length	0.61	0.31
Width	0.12	0.10
Thickness	0.09	0.09
Proloculus diameter	0.03	—
Height of last chamber	0.18	—
Number of chambers	6	4

Description. — Elongate test of wedge-like shape more or less pointed at both ends. Cross section oval. Four to six chambers with proloculus either ovate or spherical, followed by chambers broader than high. Last chamber convex more elongated, two times as large as the penultimate one. On the initial part sutures hardly distinct, on the later part depressed and oblique. Dorsal margin of the test slightly convex, the ventral one showing tendency to concaveness. Aperture rounded situated at the elongated top of last chamber.

Variation shows up in the degree to which the ends of test are pointed and the dorsal margin is curved.

Remarks. — The specimens described show resemblance to *Marginulina biplicata* Terquem 1864 in Kristan-Tollmann 1964 (pl. 18, fig. 17), though the latter have their dorsal margin straight or slightly concave, whereas the ventral one is somewhat convex. Moreover, the Polish specimens feature a much higher last chamber being more strongly elongated.

Occurrence. — Poland: Lower Muschelkalk.

Genus *Marginulinopsis* Silvestri, 1904*Marginulinopsis pozaryskii*, sp. n.

(Pl. XXXVI, figs 20—21)

Type specimen: IG Warsaw No 6273/73/F, pl. XXXVI, fig. 20.

Type horizon: Lower Muschelkalk.

Type locality: Olszyny borehole, depth 1306.0 m.

Derivation of the name: named after the Polish geologist, professor Władysław Pożaryski.

Diagnosis. — In the initial part test slightly arcuate, composed of 4—7 chambers, with proloculus oval, followed by chambers broader than high; last chamber elongated. Sutures depressed, oblique, ventral margin incised.

Material. — 30 specimens in good state of preservation.

Dimensions (in mm):

	type specimen	paratype
	No 6273/73/F	No 6274/73/F
Coll. IG Warsaw		
Length	0.27	0.30
Width	0.09	0.09
Thickness	0.09	0.09
Proloculus diameter	0.03	0.03
Number of chambers	4	5

Description. — Test elongate, slightly arcuate in the lower part. Cross section oval. Four to seven chambers. Initial curved part containing 2 (more rarely 3) chambers, rectilinear part composed of 2 to 5 chambers. Proloculus oval, having a diameter of 0.02—0.03 mm; chambers of rectilinear part cylindrical, broader than high; last chamber higher and more elongated; sutures oblique. Dorsal margin straight. Aperture radial, situated at the dorsal margin.

Variation shows up in the shape of last chamber, more or less elongated, in the degree of test flattening and in the number of chambers.

Remarks. — The Polish material in the general outline is similar to the specimens of *Marginulina subamica* Gerke 1961 (pl. 50, fig. 4a) from the Lower Liassic of Siberia. The latter, however, have their chambers thicker and arranged in a different way. Besides proloculus of *M. subamica* is circular that of the Polish specimens having an oval shape.

Occurrence. — Poland: Lower Muschelkalk.

Genus *Pseudonodosaria* Boomgaard, 1949*Pseudonodosaria bieleckae* sp. n.

(Pl. XXXVII, figs 1—2)

Type specimen: IG Warsaw No 6279/73/F, pl. XXXVII, fig. 1.

Type horizon: Lower Muschelkalk.

Type locality: Gacki borehole, depth 230.0 m.

Derivation of the name: named after the Polish micropaleontologist Wanda Bielecka.

Diagnosis. — Elongate test, composed of 4 to 6 chambers, proloculus spherical followed by chambers almost as broad as high, the last chamber elongated. Sutures straight, flush with the surface, becoming depressed in the later part.

Material. — 30 specimens, well preserved.

Dimensions (in mm):

	type specimen	paratype
	No 6279/73/F	No 6280/73/F
Coll. IG Warsaw		
Length	0.34	0.27
Width	0.09	0.10
Proloculus diameter	0.07	0.05
Height of last chamber	0.10	0.10
Number of chambers	6	4

Description. — Test uniserial. Proloculus small, spherical, the second chamber broader than high, the later ones almost as broad as high. Sutures straight, flush with the surface, later becoming so depressed as to separate distinctly the two latest chambers. Aperture circular, situated on the top of the last chamber.

Variation manifests itself in the number of chambers and the shape of last chamber, more or less pointed at the end and in some specimens being almost triangular.

Remarks. — The Polish material under study shows resemblance with the specimens described as *Pseudonodosaria turbinata* (Terquem & Berthelin 1875) in Oraveczné 1965, differing from them, however, by the larger number of chambers and less dome-like shape of the last chamber.

Occurrence. — Poland: Lower Muschelkalk.

Pseudonodosaria levifracta (Kristan-Tollmann, 1964)

(Pl. XXXVII, fig. 3)

1964. *Nodosaria levifracta* sp. n.; E. Kristan-Tollmann, p. 69, pl. 10, figs 10—11.

Material. — 6 specimens, well preserved.

Dimensions (in mm):

Coll. IG Warsaw	No 6282/73/F	No 6283/73/F	No 6284/73/F
Length	0.27	0.27	0.28
Width	0.09	0.07	0.09
Proloculus diameter	0.07	0.07	0.07
Height of second chamber	0.03	0.03	0.03
Height of final chamber	0.09	0.099	0.099
Number of chambers	5	5	5

Description. — Uniserial test composed of 3 to 5 chambers, proloculus spherical, the second chamber much smaller and lower, almost rectangular, the later chambers increasing in size. Sutures straight, slightly depressed. Aperture small, circular, situated on the top of last chamber.

Remarks. — The Polish material under study displays no differentiation from the Kristan-Tollmann specimens as far as the shape and number of chambers are concerned. It only differs in having their chambers much smaller in size.

Occurrence. — Poland: Lower Muschelkalk. Austria: Upper Triassic.

Pseudonodosaria obconica (Reuss, 1868)

(Pl. XXXVII, fig. 4)

1868. *Glandulina obconica* Reuss; A. E. Reuss, p. 104, pl. 57, fig. 1 *vide*, B. F. Ellis & A. R. Messina — Catalogue of Foraminifera.

1951. *Pseudoglandulina simpsonensis* Tappan, sp. n.; H. Tappan, p. 12, pl. 3, figs 9—14.

1970. *Rectoglandulina simpsonensis* Tappan; A. Tollmann & E. Kristan-Tollmann, pl. 7, fig. 20 (*cum synonymica*).

Material. — 10 specimens, well preserved.

Dimensions (in mm):

Coll. IG Warsaw	No 6285/73/F	No 6286/73/F	No 6287/73/F
Length	0.28	0.34	0.37
Width	0.12	0.14	0.10
Number of chambers	5	6	8

Description.— Test smooth, inflated at the top and pointed at the base. Cross section oval 4—8 chambers with proloculus small pointed at the end, the later chambers mounted one on top another, broader than high, the last chamber higher than the preceding ones somewhat curved upwards. Sutures slightly depressed, in some cases indistinct, perpendicular to the test axis. Aperture circular situated on the top of last chamber.

Variation is found in the number of chambers and in their elongation.

Remarks.— As compared to the type specimen the Polish material studied shows no basic distinction. It differs from the specimens described by Tappan 1951 as *P. simpsonensis* in nothing but somewhat smaller size.

Occurrence.— Poland: Lower Muschelkalk. Austria: Middle Triassic. Hungary: Carnian. Alaska: Carnian.

Pseudonosaria polyarthra (Kristan-Tollmann, 1964)

(Pl. XXXVII, fig. 5)

1964. *Rectoglandulina polyarthra* sp. n.; E. Kristan-Tollmann, p. 86, pl. 13, fig. 7.

Material.— 20 specimens, well preserved.

Dimensions (in mm):

Coll. IG Warsaw	No 6288/73/F	No 6289/73/F	No 6290/73/F
Length	0.35	0.45	0.46
Width	0.09	0.10	0.10
Height of final chamber	0.09	0.12	0.14
Number of chambers	5	7	7

Description.— Elongate test, composed of 5 to 7 chambers, 2 or 3 initial chambers small, proloculus pointed at the end, the later chambers tubular, the last one high and elongated. Sutures on the initial part straight, flush with the surface, sutures of the later part slightly depressed. Aperture circular, situated at the elongated top of last chamber.

Variation shows up in the number of chambers and more or less distinct sutures.

Remarks.— The specimens under study are much smaller than those described by Kristan-Tollmann.

Occurrence.— Poland: Lower Muschelkalk. Austria: Upper Triassic.

Genus *Vaginulinopsis* Silvestri, 1904*Vaginulinopsis eocomma* Kristan-Tollmann, 1964

(Pl. XXXVII, fig. 6)

1964. *Lenticulina (Vaginulinopsis) eocomma* sp. n.; E. Kristan-Tollmann, p. 122, pl. 27, fig. 13.

Material. — 25 specimens, well preserved.

Dimensions (in mm):

Coll. IG Warsaw	No 6276/73/F	No 6277/73/F	No 6278/73/F
Length	0.21	0.23	0.25
Width	0.12	0.14	0.10
Thickness	0.07	0.09	0.09
Number of chambers	6	6	7

Description. — Test elongate, not too broad, fairly thick. Spiral part well developed, composed of a small proloculus and 4 chambers. Rectilinear part of test contains 2 or 3 chambers. The first two chambers of rectilinear part inclined towards ventral side. The last chamber narrower and less inclined towards the spiral part, distinctly separated. Chambers somewhat convex, which accounts for the ventral margin being slightly incised. Sutures distinct, oblique, depressed. Aperture circular, situated at the test dorsal margin.

Variation manifests itself in the shape of last chamber being more or less elongated. The degree of its convexity also varies making the dorsal margin more or less incised.

Remarks. — The Polish specimens under study differ from those of Kristan-Tollmann in nothing but somewhat smaller dimensions.

Occurrence. — Poland: Lower Muschelkalk. Austria: Upper Triassic.

Vaginulinopsis sp.

(Pl. XXXVII, fig. 7)

Material. — 2 specimens, of which one is damaged.

Dimensions (in mm):

Coll. IG Warsaw	No 6291/73/F
Length	0.36
Width	0.14
Thickness	0.12
Proloculus diameter	0.05
Number of chambers	6

Description. — Elongate test, composed of 4 chambers in the spiral part and 3 chambers in the rectilinear part. Proloculus oval, situated at test ventral margin. The last chamber twice as high as the penultimate one. Dorsal margin rounded in the initial part of test to become incised later. Ventral margin incised. Sutures on the spiral part oblique, later slightly curved. Aperture circular, located on the top of last chamber.

Remarks. — The specimen studied shows some resemblance to *Vaginulinopsis rectangula* Kristan-Tollmann 1964. The latter has a larger number of chambers both in spiral and rectangular parts; moreover, the spiral part is more elongated towards the test ventral margin.

Occurrence. — Poland: Lower Muschelkalk.

Family **Polymorphiniidae** d'Orbigny, 1839
 Subfamily **Webbinellinae** Rhumbler, 1904
 Genus *Bullopora* Quenstedt, 1856
Bullopora ? *collarata* Kristan-Tollmann, 1964
 (Pl. XXXVII, fig. 8)

1964. *Bullopora*? *collarata* sp. n.; E. Kristan-Tollmann, p. 57, pl. 9, figs 4—6.

Material. — 5 specimens.

Dimensions (in mm):

Coll. IG Warsaw	No 6292/73/F
Length	0.21
Width	0.14
Height of final chamber	0.10
Width of final chamber	0.09
Number of chambers	2

Description. — Test free. Chambers ovate, arranged irregularly, separated by necks. Aperture oval, situated on the top of last chamber, besides additional apertures can be seen on other chambers.

Variation shows up in the number of chambers, (from 2 to 4) and the shape of test, ovate or circular.

Occurrence. — Poland: Lower Muschelkalk. Austria: Upper Triassic.

Subfamily **Ramulininae** Brady, 1884
 Genus *Ramulina* Jones, 1875
Ramulina subcylindrica Styk, 1972
 (Pl. XXXVII, figs 9—10)

1972. *Ramulina subcylindrica* sp. n.; O. Styk, p. 871, pl. 1, figs 14—16.

Material. — 30 specimens.

Dimensions (in mm):

Coll. IG Warsaw	No 6214/72/F	No 6293/73/F	No 6294/73/F
Length	0.36	0.32	0.36
Width	0.10	0.12	0.14

Remarks. — The specimens of *Ramulina subcylindrica* Styk differ from *Ramulina spandeli* Paalzow 1917 in the lack of spines and slightly less globular shape of chambers.

Occurrence. — Poland: Lower Muschelkalk.

Family **Spirillinidae** Reuss, 1862
 Subfamily **Spirillininae** Reuss, 1862
 Genus *Spirillina* Ehrenberg, 1843
Spirillina oberhauseri Styk, 1972
 (Pl. XXXVII, figs 11—12)

1972. *Spirillina oberhauseri* sp. n.; O. Styk, p. 871, pl. 2, figs 17—18.

Material. — 150 specimens, well preserved.

Dimensions (in mm):

Coll. IG Warsaw	No 6217/72/F	No 6295/73/F	No 6296/73/F
Larger diameter	0.19	0.23	0.21
Smaller diameter	0.18	0.21	0.19
Thickness	0.05	0.05	0.05
Width of the final whorl	0.03	0.03	0.03
Proloculus diameter	0.01	0.01	0.01

Remarks. — *Spirillina oberhauseri* shows great resemblance to *Spirillina* cf. *filiformis* (Reuss) in Oberhauser 1960. It differs from *Spirillina filiformis* Reuss, 1868 in having a smaller number of whorls, 5 to 7 as against 12 to 13 in Reuss.

Occurrence. — Poland: Lower Muschelkalk.

Genus *Kollmannita* Fuchs, 1967

Type species: *Globigerina ladinica* Oberhauser, 1960.

Kollmannita cf. *ladinica* (Oberhauser, 1960)

(Pl. XXXVII, figs 15—16)

Material. — 20 specimens, some recrystallized, partly filled with pyrite.

Dimensions (in mm):

Coll. IG Warsaw	No 6297/73/F	No 6298/73/F	No 6299/73/F
Test diameter	0.18	0.21	0.25
Thickness	0.09	0.10	0.10

Description. — Test small, with more or less incised outer margin; two flat trochospiral whorls visible from dorsal side. Ventral side slightly concave. On ventral side only 5 chambers are to be seen. Seen from dorsal side, next to circular proloculus, are earlier parts of the test, composed of 7 chambers. Sutures weakly depressed. Aperture fissure-like, situated on ventral side.

Variation not too strong, showing up in insignificant difference in test size.

Remarks. — The specimens described show the greatest resemblance to those of the species *Kollmannita ladinica* (Oberhauser). Considering the fact, that the material under study contains either recrystallized specimens or pyritized cores, it is difficult, however, to establish the original mineral composition of the test, the species of the *Kollmannita* genus having according to W. Fuchs granular hyaline test.

Occurrence. — Poland: Lower Muschelkalk.

Genus *Oberhauserella* Fuchs, 1967

Type species: *Globigerina mesotriassica* Oberhauser, 1960.

Oberhauserella cf. *mesotriassica* (Oberhauser, 1960)

(Pl. XXXVII, figs 13—14)

Material. — 30 specimens, all pyritized.

Dimensions (in mm):

Coll. IG Warsaw	No 6300/73/F	No 6301/73/F	No 6302/73/F
Diameter	0.16	0.18	0.19
Thickness	0.09	0.09	0.12

Description. — Test very small, of circular outline, slightly incised. Outer margin rounded, dorsal surface convex, ventral side concave. Test composed chiefly of 9 chambers, only 4 of them visible from ventral side. Sutures flush with the surface, slightly bent backwards, umbilicus narrow, depressed, aperture fissure-like.

Variation shows up in the test size and height. The material under study comprises specimens from slightly to highly trochospiral.

Remarks. — The material described differs from *O. mesotriassica* in having a higher spiral part of the test.

Occurrence. — Poland: Lower Muschelkalk, until now encountered only in a single borehole, rather uncommon.

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OLGA STYK

OTWORNICE DOLNEGO I ŚRODKOWEGO TRIASU POLSKI POZAKARPACKIEJ

Streszczenie

W pracy przedstawiono wyniki badań otwornic pochodzących z 19 otworów wiertniczych wykonanych przez Instytut Geologiczny na Niżu Polski w latach 1955—1964 (fig. 1). Opracowano 36 gatunków otwornic, w tym 1 gatunek z pstrego piaskowca i 35 gatunków z dolnego wapienia muszlowego (tabela 1). Opisane gatunki należą do 8 rodzin i 21 rodzajów, z czego 25 gatunków należy do rodziny Nodosariidae. Opisano przy tym 6 nowych gatunków: *Ammodiscus inaequalis* sp. n., *Astacolus kopiki* sp. n., *Dentalina excelens* sp. n., *Marginulina grazynae* sp. n., *Marginulinopsis pozaryskii* sp. n., *Pseudonodosaria bieleckae* sp. n.

Zbadane otwornice reprezentowane są głównie przez gatunki bentoniczne o skorpukach wapiennych lub zlepieńcowatych. Przeważają wśród nich przedstawiciele rodziny Nodosariidae z rodzajów *Astacolus*, *Nodosaria*, *Geinitzinita*, *Pachyphloides*, *Dentalina*, *Fronicularia*, *Marginulina*, *Marginulinopsis*, *Pseudonodosaria* i *Vaginulinopsis*. Ponadto występują przedstawiciele rodzin Spirillinidae, Nubeculariidae, Polymor-

phinidae, Astrorhizidae, Ammodiscidae, Lituolidae i Fischerinidae. Otwornice planktoniczne z rodzajów *Kollmannita* i *Oberhauserella* znalezione zostały tylko w jednym rejonie, w południowo-wschodniej części obrzeżenia Gór Świątokrzyskich.

Wśród zbadanych otwornic obserwuje się wspólne gatunki z Rosją (Centralna Syberia i północno-zachodnia część Kaukazu), z Austrią, Bułgarią, Węgrami, z Alaską i z Chinami. Najwięcej jest wspólnych elementów z Austrią (tabela 2). Elementy prowincji medyterańskiej reprezentują *Kollmannita ladinica* i *Oberhauserella mesotriassica*.

Najliczniejsza mikrofauna występuje w południowo-wschodniej części obrzeżenia Gór Świątokrzyskich. Nieco mniej gatunków notuje się w północno-wschodniej Polsce. Najuboższą mikrofaunę stwierdzono w rejonie wału pomorskiego. Opracowanie dotyczące małżoraczków triasowych z omawianego obszaru opublikowane będzie oddzielnie.

ОЛЬГА СТЫК

ФОРАМИНИФЕРЫ НИЖНЕГО И СРЕДНЕГО ТРИАСА ВНЕКАРПАТСКОЙ ПОЛЬШИ

Резюме

В работе представлены результаты изучения фораминифер из керна 19 буровых скважин, пройденных Геологическим институтом на территории Польской низменности в 1955—1964 гг. (фиг. 1). Анализировались 36 видов фораминифер, в том числе 1 вид из пестрого песчаника и 35 видов из нижнего раковинного известняка (табл. 1). Описанные виды принадлежат к 8 семействам и 21 роду, в том числе 25 видов относится к семейству Nodosariidae. Описано 6 новых видов: *Ammodiscus inaequabilis* sp. n., *Astacolus kopiki* sp. n., *Dentalina excelens* sp. n., *Marginulina grazynaе* sp. n., *Marginulinopsis pozaryskii* sp. n., *Pseudonosaria bieleckae* sp. n.

Исследованные фораминиферы представлены, главным образом, бентонными видами с известковыми или агглютинированными раковинками. Преобладают представители семейства Nodosariidae, принадлежащие к родам *Astacolus*, *Nodosaria*, *Geinitzinita*, *Pachyphloides*, *Dentalina*, *Fronicularia*, *Marginulina*, *Marginulinopsis*, *Pseudonodosaria*, *Vaginulinopsis*. Кроме того, встречаются представители семейств Spirillinidae, Nubeculariidae, Polymorphinidae, Astrorhizidae, Ammodiscidae, Lituolidae, Fischerinidae. Планктонные фораминиферы родов *Kollmannita* и *Oberhauserella* были найдены лишь в одном районе — в юго-восточной части обрамления Свентокшиских гор.

В числе изученных видов представлены виды, встречающиеся на территории СССР (Центральная Сибирь, северо-западная часть Кавказа), Австрии, Болгарии, Венгрии, на Аляске и в Китае. Больше всего общих элементов с Австрией (табл. 2). Элементы средиземноморской провинции представлены *Kollmannita ladinica* и *Oberhauserella mesotriassica*.

Самая богатая микрофауна наблюдается в юго-восточной части обрамления Свентокшиских гор. Несколько меньше видов распространено в северо-восточной Польше. Результаты изучения триасовых остракод описанной территории будут опубликованы отдельно.

EXPLANATIONS OF PLATES

Plate XXXV

Hyperammia proneptis Schleifer

Nidzica, depth 2115.0 m, Lower Buntsandstein

Figs 1, 2. Lateral view (IG 6220/73/F, 6221/73/F); $\times 100$.*Ammodiscus inaequalis* sp. n.

Dobrów, depth 261.5 m, Lower Muschelkalk

Figs 3, 4. Lateral view (IG 6222/73/F, 6226/73/F); fig. 3-holotype, fig. 4-paratype; $\times 150$.*Trochamminoides antis* Styk

Gacki, depth 230.4 m, Lower Muschelkalk

Figs 5, 7a, 8. Ventral side; fig. 7b dorsal side (IG 6201/72/F, 6203/72/F); $\times 150$.Fig. 6. Horizontal section (IG 6202/72/F); $\times 150$.*Lituotuba indistincta* (Trifonova)

Żebrak, depth 993.1 m, Lower Muschelkalk

Figs 9—13. Lateral view (IG 6226/73/F — 6228/73/F); $\times 80$.*Orthovertella flexuosa* Styk

Dobrów, depth 251.0 m, Lower Muschelkalk

Figs 14, 15. Lateral view (IG 6204/72/F, 6205/72/F); $\times 80$.Fig. 16. Horizontal section (IG 6206/72/F); $\times 80$.*Nodosaria raibliana* Gümbel

Dobrów, depth 261.0 m, Lower Muschelkalk

Fig. 17. Lateral view (IG 6232/73/F); $\times 100$.*Ophthalmidium granum* Styk

Blizna, depth 1600.0 m, Lower Muschelkalk

Figs 18. a, b frontal view (IG 6208/72/F, 6229/73/F); $\times 100$.

Nodosaria subprimitiva Gerke

- Dobrów, depth 256.6 m, Lower Muschelkalk
 Fig. 19. Lateral view (IG 6233/73/F); $\times 100$.

Pachyphloides triangularis Styk

- Dobrów, depth 251.0 m, Lower Muschelkalk
 Fig. 20. Frontal view, $\times 80$.
 Fig. 21. Frontal view (IG 6211/72/F, 6212/72/F); $\times 100$.

Pachyphloides klebelsbergi (Oberhauser)

- Dobrów, depth 257.5 m, Lower Muschelkalk
 Fig. 22. Frontal view, $\times 80$.
 Fig. 23. Frontal view (IG 6238/73/F, 6240/73/F); $\times 100$.

Geinitzinita oberhauseri Sellier Civrieux & Dessauvagine

- Dobrów, depth 251.0 m, Lower Muschelkalk
 Figs 24, 25. Frontal views (IG 6236/73/F, 6237/73/F); $\times 90$.

Plate XXXVI

Astacolus dobroviensis Styk

- Dobrów, depth 251.0 m, Lower Muschelkalk
 Fig. 1. Lateral view, $\times 100$.
 Fig. 2. Lateral view (IG 6210/72/F); $\times 80$.

Astacolus kopiki sp. n.

- Dobrów, depth 251.0 m, Lower Muschelkalk
 Figs 3, 4. Lateral view (IG 6241/73/F, 6242/73/F); $\times 100$; fig. 3 — holotype, fig. 4 — paratype.

Astacolus velum Kristan-Tollmann

- Dobrów, depth 251.0 m, Lower Muschelkalk
 Fig. 5. Lateral view (IG 6244/73/F); $\times 100$.

Dentalina cassiana Gümbel

- Olszyny, depth 1302.5 m, Lower Muschelkalk
 Figs 6—8. Lateral view (IG 6247/73/F — 6249/73/F); $\times 100$.

Dentalina cf. *detornata* Schwager

- Olszyny, depth 1320.5 m, Lower Muschelkalk
 Fig. 9. Lateral view (IG 6250/73/F); $\times 100$.

Dentalina excelens sp. n.

- Olszyny, depth 1302.5 m, Lower Muschelkalk
 Fig. 10. Lateral view (IG 6253/73/F); $\times 100$.

Dentalina gerkei Styk

- Dobrów, depth 251.0 m, Lower Muschelkalk
 Fig. 11. Lateral view (IG 6213/72/F); $\times 100$.

Dentalina gladioides gladioides Gerke

- Dobrów, depth 256.6 m, Lower Muschelkalk
 Figs 12, 13. Lateral view (IG 6259/73/F, 6260/73/F); $\times 100$.

Dentalina hoi Trifonova

- Fig. 14. Olszyny, depth 1302.5 m, Lower Muschelkalk
Lateral view (IG 6261/73/F); $\times 90$.

Dentalina transmontana Gumbel

- Fig. 15. Olszyny, depth 1302.5 m, Lower Muschelkalk
Lateral view (IG 6264/73/F); $\times 100$.

Dentalina vadaszi Oberhauser

- Fig. 16. Dobrów, depth 257.0 m, Lower Muschelkalk
Lateral view (IG 6267/73/F); $\times 100$.

Fronicularia gerkei Kristan-Tollmann

- Fig. 17. Dobrów, depth 254.5 m, Lower Muschelkalk
Frontal view (IG 6269/73/F); $\times 100$.

Marginulina grazynae sp. n.

- Figs 18, 19. Żebrak, depth 1012.8 m, Lower Muschelkalk
Lateral view (IG 6270/73/F, 6271/73/F); fig. 18—holotype, fig. 19—
paratype; $\times 100$.

Marginulinopsis pozaryskii sp. n.

- Figs 20, 21. Olszyny, depth 1306.0 m, Lower Muschelkalk
Lateral view (IG 6273/73/F, 6274/73/F); fig. 20.—holotype, fig. 21.—
paratype; $\times 100$.

Plate XXXVII

Pseudonodosaria bieleckae sp. n.

- Figs 1, 2. Gacki, depth 230.4 m, Lower Muschelkalk
Frontal view (IG 6279/73/F, 6281/73/F); fig. 1—holotype, fig. 2—
paratype; $\times 90$.

Pseudonodosaria levifracta (Kristan-Tollmann)

- Fig. 3. Dobrów, depth 257.5 m, Lower Muschelkalk
Frontal view (IG 6282/73/F); $\times 100$.

Pseudonodosaria obconica (Reuss)

- Fig. 4. Dobrów, depth 251.0 m, Lower Muschelkalk
Frontal view (IG 6285/73/F); $\times 100$.

Pseudonodosaria polyarthra (Kristan-Tollmann)

- Fig. 5. Olszyny, depth 1302.5 m, Lower Muschelkalk
Frontal view (IG 6288/73/F); $\times 100$.

Vaginulinopsis eocomma Kristan-Tollmann

- Fig. 6. Dobrów, depth 251.0 m, Lower Muschelkalk
Lateral view (IG 6276/73/F); $\times 100$.

Vaginulinopsis sp.

- Fig. 7. Dobrów, depth 251.0 m, Lower Muschelkalk
Lateral view (IG 6291/73/F); $\times 100$.

Bullopore ? collarata Kristan-Tollmann

- Fig. 8. Dobrów, depth 254.0 m, Lower Muschelkalk
Lateral view (IG 6292/73/F); $\times 100$.

Ramulina subcylindrica Styk

Dobrów, depth 257.0 m, Lower Muschelkalk

Figs 9, 10. Frontal view (IG 6214/72/F, 6293/73/F); $\times 80$.*Spirillina oberhauseri* Styk

Dobrów, depth 261.0 m, Lower Muschelkalk

Figs 11, 12. Lateral view (IG 6217/73/F, 6295/73/F); $\times 70$.*Oberhauserella* cf. *mesotriassica* (Oberhauser)

Dobrów, depth 261.0 m, Lower Muschelkalk

Figs 13a, 14b. Dorsal side; figs 13b, 14a. ventral side; fig. 14c — edge view (IG 6399/
/73/F, 6301/73/F); $\times 100$.*Kollmannita* cf. *ladinica* (Oberhauser)

Dobrów, depth 261.0 m, Lower Muschelkalk

Fig. 15a. Ventral side, fig. 15b. — dorsal side (IG 6297/73/F); $\times 100$.Fig. 16. Dorsal side (IG 6299/73/F); $\times 100$.

