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REVISION OF J. GRZYBOWSKI'S PAPER (1896)
„FORAMINIFERA OF THE RED CLAYS FROM WADOWICE”

(Pl. I—VI)

*Rewizja pracy J. Grzybowskiego (1896) „Otwornice czerwonych
iłów z Wadowic”*

(Pl. I—VI)

Stanisław Liszka, Janina Liszkowa: Revision of J. Grzybowski's paper (1896)
“Formainifera of the Red Clays from Wadowice”. Ann. Soc. Geol. Poloniae, 51—
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Abstract: The foraminifers (115 species) described by J. Grzybowski (1896) come from red shales (marls) and from green shales and marls from Wadowice. (Polish Carpathians). Grzybowski defined the age of the microfauna as Oligocene. Revision of the species identified by Grzybowski points to the Campanian age of the red shales (marls) and to Paleocene age of the green shales and marls.

Key words: Foraminifera, Campanian, Paleocene, Carpathians.

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Treść: Otwornice (115 gatunków) opisane przez J. Grzybowskiego (1896) pochodzą z czerwonych łupków (margli) oraz zielonych łupków i margli z Wadowic. J. Grzybowski określił wiek tej mikrofauny jako oligoceński. Rewizja gatunków oznaczonych przez Grzybowskiego wykazała, że czerwone łupki (margle) należą do kampanu, a zielone łupki i margle reprezentują paleocen.

INTRODUCTION

J. Grzybowski described many new species of Foraminifera from the Carpathian flysch. He was the first investigator to point out the value of the use of microfauna for stratigraphic correlation.

In 1896 he published in Polish a paper entitled „Foraminifera of the Red Clays from Wadowice” (Rozprawy Wydziału Matematyczno-przyrodniczego Akademii Umiejętności w Krakowie, vol. XXX, pp. 261—398, Plates VIII—XI). The summary of this paper, without the description of species, appeared early in German as “Foraminiferen der rothen Tone von Wadowice” (Bull. Pol. Acad. Sci., 1895, Kraków, pp. 305—315).

The material described by J. Grzybowski is derived from a pit, inaccessible today, near Wadowice in the Polish western Carpathians. The pit in question penetrated the following beds (J. Grzybowski 1896, p. 264):

- “1—26 m. Thin-bedded sandstones alternating with sandy shales rich in muscovite, containing sphaerosiderites in the lowermost part.
- 26—64 m. Grey claystones with intercalated marls, with lustrous smooth surface, and with partings of green clay with abundant pyrite.
- 64—70 m. Red clays (recte marls) with intercalations of white sugary-grained sandstone.
- 70—80 m. Black oil (“bituminous”) shales.
- 80—84 m. Menilite shales, where the drilling was stopped”.

These beds were assigned to the Subsilesian nappe by M. Książkiewicz (1951).

Unfortunately, the material left by J. Grzybowski is incomplete. Its bulk is in the collections of the Institute of Geological Sciences of the Jagiellonian University in Cracow, whereas a part of the material is housed in the Museum of Natural Sciences in Lwów (the former Dzieduszycki Museum), where it was catalogued by S. J. Pasternak and W. T. Lewicki (1963).

The microfauna in the Cracow collection is poorly preserved, the specimens are very small and in most cases the particular species are represented by single specimens. In this situation examination in immersion oil was adopted without the possibility of sectioning, which considerably hindered the revision.

J. Grzybowski’s specimens, which were stored in glass test-tubes were transferred to microscope slides. The test-tubes, along with their original labels, have been archived. The collection preserved in the Institute of Geological Sciences Jagellonian University, was catalogued by Z. Martini in 1971. Its registration number is 115 P.

Since the pit with J. Grzybowski’s material was filled up and it was

impossible to obtain topotypes from there, Professor M. Książkiewicz showed us an outcrop at Woźniki (near Wadowice) where, in his opinion, the red marls are equivalent to those from Wadowice. The microfaunal assemblages from samples collected at Woźniki were, in fact almost identical to those described by J. Grzybowski.

The outcrop at Woźniki is situated east of the village at a side road leading to an abandoned quarry (see fig. 4 in Książkiewicz, 1966).

Because there is still a divergence in opinions concerning the age of the red "clays" from Wadowice (Upper Cretaceous to Oligocene?), and since several micropalaeontologists refer to J. Grzybowski's paper (1896), a revision of this work seemed to be necessary.

Basing his observations on the available publications (dealing mainly with the Palaeogene) and the comparative materials from Nikoltschitz and Waschberg presented to him for use by A. Rzehak, J. Grzybowski defined the age of the "red clays" as Oligocene. The position of the "red clays" and green marls in the Wadowice pit over the Menilite shales corroborated his hypothesis. However, J. Grzybowski admitted (p. 271) that when comparing the microfaunal assemblages, he did not take into consideration 55 new species described by himself and later micropalaeontological studies showed that a part of them were index species of the Upper Cretaceous.

W. Żelechowski (1923) describing the foraminiferal fauna from a borehole at Lgota near Wadowice, regarded microfauna of the red clays from Wadowice to be of Eocene age.

M. F. Glaessner (1937) maintained that the specimens described by J. Grzybowski should be partly assigned to the Palaeocene and that they were comparable with the Palaeocene microfauna of the Caucasus.

Basing on the foraminiferal assemblage of J. Grzybowski, H. Hiltermann (1943) suggested an Upper Cretaceous or Danian age for the red "clays" from Wadowice.

In 1950 M. Książkiewicz accepted the view of their Upper Cretaceous age and noticed lithological similarity of the red "clays" (correctly speaking marls) from Wadowice (p. 316) to the marls of the Woźniki series. He regarded the red marls from Wadowice, overlying the Menilite shales, to be an overthrust tectonic cap.

Citing the opinions of C.A. Wicher (1943) and H. Hiltermann (1943), R. Noth (1951) also assigned the red marls from Wadowice to the Upper Cretaceous.

F. Huss (1957) compared the microfaunal assemblage from the red "clays" with the marly part of the red beds from Węglówka, defining their age as Lower Senonian (Santonian).

E. W. Mjatliuk (1950) regarded the red "clays" from Wadowice as an equivalent of the Popiele Beds, but in her papers of 1966 and 1970 she changed her view, suggesting a Senonian age.

A. Hillebrandt (1962) believed that the microfauna from Wadowice showed close similarity to that from the Lizard Spring Formation and to the Cretaceous microfauna of the Caucasus reported by M. Glaessner (1937) and H. H. Subbotina (1950, 1953).

Giving descriptions of individual species, W. Grün et al. (1964), W. Grün (1969) determined the age of the red "clays" from Wadowice as Palaeocene.

E. J. Krajewa and B. F. Ziernecki (1969) and Y. Kiesel (1970) regarded the beds in question to be of Upper Eocene age.

S. Geroch (1960) concluded that J. Grzybowski's material is a mixture of Upper Cretaceous and Palaeocene microfauna.

In the Wadowice microfauna it is possible to distinguish the specimens derived from red marls (coloured in red) from the specimens collected from marls and green clays (white specimens). Although Grzybowski treated his material as coeval, he gave hints whether the particular forms were derived from red "clays" or from green clays with marls.

As a result of our revision, it appears that the specimens from the red clays represent Upper Senonian (Campanian) microfauna while the foraminifera from green clays with marls are assigned to the Palaeocene (see table 1) according to their known vertical range. In this revision, for space economy, all synonyms are omitted, save the synonyms used by J. Grzybowski which are put with inverted commas. On the other hand, the authors who described the given species are cited. If a specimen is missing, or its state of preservation made the revision impossible, the corresponding species is cited in the table only. Grzybowski's descriptions of new species if already given in the "Catalogue of Foraminifera" of B. Ellis and A. Messina (1940)¹, are not cited. Translated quotations from Grzybowski's original paper are marked by inverted commas. Generic names are given according to the classification of A. R. Loeblich and H. Tappan (1964). The authors would like to express their thanks to Prof. M. Książkiewicz for valuable information on the geology of the Wadowice region and for critical review of this paper and to Dr S. Geroch for helpfull discussion and consultation.

Table 1

List of Foraminifera in the coll. of J. Grzybowski (1896)

Name used by J. Grzybowski	Name used in this revision	Red "clays"	Green clays with marls
1.	2.	3.	4.
Nubecularia tibia J. et P.	Reophax cf. nodulosa Brady, pars Hyperammia dilatata Grzybowski	+	

¹ In the present text the abbreviation "Cat. E-M" is used.

1	2	3	4
Keramosphaera irregularis	Psammosphaera irregularis Grzyb. + radiolaria sp.		+
Psammosphaera fusca Schultze	Psammosphaera fusca Schultze	+	
Saccammina sphaerica Brady	Nodosaria sp. apertural cham- ber	+	
Hyperammina dilatata Rzk.	Hyperammina dilatata Grzy- bowski	+	
H. vagans Brady	Hyperammina ?nodata Grzy- bowski	+	
H. nodata n. sp.	H. ?nodata Grzybowski	+	
Rhabdammina abyssorum M. Sars	Rhizammina grzybowskii n. sp., pars Hyperammina sub- discretiformis Mjatliuk	+	
R. subdiscreta Rzk.	Hyperammina subdiscretiformis Mjatliuk	+	
R. linearis Brady	Rhabdammina cylindrica Glaessner		+
R. annulata Rzk.	Reopax cf. subnodulosa Grzybowski	+	+
Reopax ovulum n. sp.	Hormosina ovulum (Grzybow- ski)	+	
R. lenticularis n. sp.	Radiolaria sp.		+
R. duplex n. sp. var. α	Reopax duplex Grzybowski	+	
R. duplex n. sp. var. β	Reopax pilulifera Brady		+
R. pilulifera Brady	R. pilulifera Brady	+	+
R. guttifera Brady var. scalaria	R. scalaria Grzybowski	+	
Haplophragmium Wazaczi Rzek.	Ammobaculites wazaczi (Grzy- bowski)	+	
H. turpe n. sp.	Haplophragmoides turpe Grzy- bowski		+
H. (Reussina) quadrilobum n. sp.	?Trochammina bulloidiformis (Grzybowski)	+	
Haplophragmium (Reussina) bulloidiforme n. sp. var. α	Trochammina bulloidiformis (Grzybowski)	+	
H. (Reussina) bulloidiforme var. β	Trochammina globigeriniformis (J. et P.)	+	
Ammodiscus involvens Rss.	Ammodiscus angustus Friedberg	+	
A. angygyrus Rss.	A. angustus Friedberg	+	+
A. polygyrus Rss.	A. angustus Friedberg	+	
A. sp. (fig. 36)	Glomospira gordialis (J. et P.)	+	
A. charoides P. et J.	Gl. charoides (J. et P.)		+
A. gordialis J. et P.	Gl. gordialis (J. et P.)		+
A. Schoneanus Siddal	Plectina sp.		+
A. fallax Rzk.	Trochamminoides sp.	+	
A. aberrans n. sp.	Specimen missing		
Agathammina dubia n. sp.	Rzehakina epigona (Rzehak)	+	

1	2	3	4
Trochammina subglobulosa n. sp.	Haplophragmoides subglobu- losus (Grzybowski)		+
Tr. intermedia Rzk.	Trochamminoides intermedius (Grzybowski)	+	+
Tr. pauciloculata Brady	Cystamina pauciloculata (Brady)	+	
Tr. Carpenteri n. sp.	Specimen indeterminable		
Tr. Carpenteri n. sp. var. angustior n. var.	Specimen indeterminable		
Tr. subcoronata Rzk.	Trochamminoides coronatus (Brady)		+
Tr. acervulata n. sp.	Trochammina acervulata Grzybowski	+	
Cyclammina suborbicularis Rzk.	Haplophragmoides (Cribrostomoides) suborbicularis (Grzybowski)	+	+
C. retrosepta n. sp.	Specimen missing		
C. setosa n. sp.	Specimen missing		
C. globulosa n. sp.	Specimen missing		
Textularia attenuata Rss.	Spiroplectammina anceps (Reuss)	+	
T. subhaeringensis n. sp. var. α	S. subhaeringensis (Grzybowski) ?macro-spheric form	+	
Textularia subhaeringensis var. β	Spiroplectammina subhaeringensis (Grzybowski) ?micro-spheric form	+	
T. flabelliformis Gümb.	Aragonia ouezzanensis (Rey)	+	
Plecanium sublime n. sp.	Plectina coniformis (Grzybowski)		+
Textularia calix n. sp.	Dorothia crassa (Marsson)	+	
Verneulina abbreviata Rzk.	Dorothia crassa (Marsson)	+	
V. Szajnochae n. sp.	Reussella szajnochae (Grzybowski)	+	
Bigenerina nuda n. sp.	Ellipsodimorphina subcompacta (Liebus)	+	
B. fallax Rzk.	Plectina lenis (Grzybowski)	+	
Spiroplecta lenis n. sp.	P. lenis (Grzybowski)		+
S. deflexa n. sp.	P. lenis (Grzybowski)	+	
Gaudryina pupoides d'Orb.	Gaudryina modica Bermudez		+
G. chilostoma Rss.	Specimen indeterminable		
G. Schwageri Rzk.	Specimen indeterminable		
Clavulina subparisiensis n. sp.	Tritaxia subparisiensis (Grzybowski)	+	
Ataxophragmium conulus Rzk.	Specimen indeterminable		
Virgulina digitalis n. sp.	Plectina conversa (Grzybowski)		+
Pleurostomella wadowicensis n. sp.	Pleurostomella wadowicensis Grzybowski	+	
P. Zuberi n. sp.	Ellipsopolymorphina zuberi (Grzybowski)	+	

1	2	3	4
P. sp.	Specimen indeterminable		
Lagena globosa Walk.	Specimen missing		
L. subapiculata n. sp.	Specimen missing		
L. orbignyana Seguenza	Fissurina orbignyana Seguenza		+
L. (Cidaria) cidarina n. sp.	Fragment Nodosaria sp.	+	
L. (Cidaria) coronata n. sp.	Fragment Nodosaria sp.	+	
Glandulina subinflata n. sp.	Glandulina subinflata Grzybowski		+
Nodosaria calomorpha Rss.	Nodosaria cylindracea Reuss	+	+
Nodosaria pungens Rss.	Specimen missing		
N. simplicissima n. sp.	Fragments indeterminable		
N. cornuta Batsch	Nodosaria comatula Cushman	+	
N. alternans n. sp.	Specimen indeterminable		
Dentalina Boueana d'Orb.	Specimen missing		
D. subtilis Neugeb.	Dentalina cf. communis (d'Orb.)	+	
D. indifferens Rss.	D. cf. megalopolitana Reuss	+	
D. laticollis n. sp.	D. laticollis Grzybowski	+	
D. acuticauda Rss.	Ellipsonodosaria div. sp. fragments		+
D. deflexa n. sp.	Ellipsoidella deflexa (Grzybowski)		+
D. vermiculum Rss.	Specimen indeterminable		
D. n. sp. indet.	Specimen indeterminable		
Lingulina dentata n. sp.	Lingulina dentata Grzybowski	+	
Cristellaria cymboides d'Orb.	Pyrolinoides cf. elliptica Marie	+	+
C. lunaria n. sp.	Lagena? lunaria (Grzybowski)	+	
C. concava n. sp.	Lenticulina concava (Grzybowski)	+	
C. Kochi Rss.	L. cf. grata (Reuss)	+	
C. abscisa n. sp.	L. abscisa (Grzybowski)	+	
Robulina kressenbergensis Gumb.	L. macrodisca (Reuss)	+	
R. subangulata Rss. var.	L. subangulata (Reuss)	+	
R. gracilis n. sp.	Specimen missing		
R. cincta Grzyb.	Lenticulina cf. cultrata (Montfort)	+	
R. pectinata n. sp.	L. cf. cultrata (Montfort)	+	
Vaginulina n. sp.	Specimen indeterminable		
Flabellina n. sp. indet.	Neoflabellina juvenile specimen	+	
Polymorphina dubia n. sp.	Specimen indeterminable		
Globigerina triloba Rss.	Globigerina triloculinoides Plummer partim G. linaperta (Finlay)		+
Globigerina bulloides d'Orb.	Fragments Globigerina sp. partim G. varianta Subbotina and G. cf. velascoensis Cushman		+
Sphaeroidina austriaca Rss.	Fragments Globigerina sp.		+

1	2	3	4
Pullenia communis d'Orb.	Specimen indeterminable		
P. compressiuscula var. quadriloba Rss.	Pullenia cf. jarvisi Cushman		+
Truncatulina propinqua Rss.	Cibicides richardsoni Bermudez		+
T. Hantkeni Rzk.	Specimen missing		
T. mirabilis n. sp.	Specimen missing		
Anomalina complanata Rss. var.	Specimen missing		
A. parvula n. sp.	Specimen missing		
A. tenuis n. sp.	Specimen missing		
Pulvinulina Karreri Rzk.	Eponides karreri (Grzybowski)		+
P. Haidingeri d'Orb.	E. cf. candidulus (Schwager)		+
P. megastoma Rzk.	Gyroidina megastoma (Grzybo- wski)	+	
P. subcandidula n. sp.	Eponides subcandidulus (Grzy- bowski)	+	+
Rotalia Römeri Rss.	Cibicides cf. proprius Brotzen		+
R. Dunikowskii n. sp.	Nuttallides dunikowskii (Grzy- bowski)		+
R. Niedźwiedzki n. sp.	Cibicidoides niedźwiedzki (Grzybowski)		+
	* Nodellum velascoense (Cush- man)		+
	* Charltonina florealis (White)	+	
	* Stensioeina beccariiformis (White)	+	

The species marked (*), not described by Grzybowski himself, have been found in the washed material included into the Grzybowski's collection.

On the basis of the above list of species the age of red clays (marls) is Campanian and of the green clays and marls — Palaeocene.

Revision of the species preserved in the collection

Nubecularia tibia Jones et Parker

Grzybowski J. 1896, p. 273, Pl. VIII, Figs. 10—11 (slide no 1); recte: *Reophax* cf. *nodulosa* Brady and *Hyperammina dilatata* Grzyb.

Pl. I, Figs. 5a, b

"*Nub. tibia* Brady. Chall. rap. S. 135. Tab. I. Fig. 1—4"

"Length 0.8 mm. In the red clay very scarce".

In Grzybowski's collection three fragments are preserved, two of which correspond to the author's illustrations. According to the description, these specimens have siliceous tests made up of quartz grains. Due

to this fact they cannot be classified as belonging in the genus *Nubecularia*, despite certain general resemblance of the shape of fragments to Brady's illustrations (1884) of the species *Nubecularia tibia* Jones et Parker (Plate I, figs. 1—4).

Two of these fragments can be assigned to the species *Reophax* cf. *nodulosa* Brady whereas the third specimen found in this slide belongs in the species *Hyperammia dilatata* (Grzybowski) (1896, Plate VIII, fig. 17a, b).

W. Friedberg (1901) and M. Dylązanka (1923) cite after Grzybowski the species *Nubecularia tibia* Jones et Parker from the Upper Cretaceous, yet they provide no illustrations.

Keramosphaera irregularis Grzybowski (Cat. E. M.)

Grzybowski J. 1896, pp. 273, 274, Pl. VIII, Figs. 12—13 (slide no 2, 2b, 3); recte: *Radiolaria* sp. and *Psammosphaera irregularis* (Grzybowski)

In Grzybowski's collection, vials 2, 2b marked "*Keramosphaera irregularis*" contain spherical siliceous forms with fragments of *Radiolaria* skeletons on the exterior.

In vial 3, under the name of *Keramosphaera* sp., specimens of the genus *Psammosphaera* have been found. They are spherical, with slightly rough exterior surface and no trace of aperture. Test wall fairly thick, made up of fine quartz grains. White in colour. The specimens show no division into internal chambers mentioned in Grzybowski's description and illustration, W. Grün et al. (1964, p. 248) rightly uphold his species, changing only the genus to *Psammosphaera irregularis* (Grzybowski).

Psammosphaera fusca Schultze

Grzybowski J., 1896, p. 274, Pl. 8, fig. 14 (slide no. 4) ;
recte: *Psammosphaera fusca* Schultze.

Pl. I. fig. 9

"*Ps. fusca*, Chall. rap. S. 249. Tab. XVIII. Fig. 1—8."

"Test spherical, made up of relatively coarse quartz grains, which gives it a rough and bristle aspect. Aperture indistinct. Diameter 0.4 mm. Very rare in red clays."

The specimens in J. Grzybowski's collection are in accord with his description and illustration. They are included in the synonyms of *Ps. fusca* Schultze by: E. Łuczkowska (1955), T. Neagu (1962, 1970), U. Pflaumann (1964), F. Huss (1966), W. Grün et al. (1966), W. Grün (1969), E. J. Krajewa, B. F. Ziernieckij (1969).

Saccamina sphaerica Brady

Grzybowski J., 1896, p. 274, Pl. VIII, fig. 155 (slide no. 5);
recte: *Nodosaria* sp.

Pl. I. fig. 10a, b

"*Sacc. sphaerica* Brady. Chall. rap. S. 252. Tab. XVIII. Fig. 11—17. *Saccamina sphaerica*. Rzehak. Foram. von Nikoltschitz. Verh. d. g. R. A. 1887. S. 87."

A specimen found in J. Grzybowski's collection and determined as *S. sphaerica* is the apertural chamber of a specimen of the genus *Nodosaria* sp. At high magnification, radiate conical aperture is visible.

T. Neagu (1962) and F. Huss (1966) were therefore wrong to include this form in the synonyms of the species *Saccamina sphaerica* Brady.

Hyperammina dilatata Rzehak (Cat. E. M.)

Grzybowski J., 1896, p. 274, Pl. VIII, fig. 17a, b (slide no. 6);
recte: *Hyperammina* (*Pelosina*?) *dilatata* Grzybowski.

Pl. I. fig. 8

The description and illustration in accord with the specimens in the collection. Since Rzehak gave no description and illustration of this form, according to the rules of the "International Code of Zoological Nomenclature", J. Grzybowski is credited with the authorship of this species as he was the first to give its description and illustration. This species was described from the Polish Carpathians by F. Huss (1966, p. 12) and H. Jurkiewicz (1967), yet their specimens do not correspond to the holotype.

Hyperammina vagans Brady

Grzybowski J., 1896, p. 275, Pl. VIII, fig. 18, (slide no. 7);
recte: *Hyperammina*? *nodata* Grzybowski.

Pl. I. fig. 7a, b

"*H. vagans* Brady. Chall. rap. S. 260, T. XXIV. Fig. 1—9."

In J. Grzybowski's collection there are a few tubular fragments made up of fine sand grains. These are not attached forms, so they cannot be placed in the species *Tolypammina vagans* (Brady) Thalmann 1932—3, but sooner in the species *Hyperammina*? *nodata* Grzybowski.

After Grzybowski this species is cited under the name of *H. vagans* by W. Friedberg (1902) and M. Dylańska (1923) who give very brief descriptions without illustrations.

Hyperammina nodata n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 275, VIII, fig. 16 (slide no. 8);
recte: *Hyperammina? nodata* Grzybowski.

Pl. I. fig. 6

"Quite similar to the preceding form, but with distinct segmentation at regular intervals. Rare in red clay."

In the collection there are two fragments of tubular forms with constrictions and rough surface, made up of fine quartz grains. Diameter of fragments 0.2 mm. The author well illustrates one of them (fig. 16), but he does not bring out into relief its rough surface. V. Pokorny (1949) identified the species *H. nodata* with *H. vagans*, stating that in his material from Nikolčice he found transitional forms between the two species and no traces of attachment. The species *H. nodata* Grzybowski was also reported by W. Friedberg (1901), M. Dylažanka (1923), T. Homola, E. Hanzliková (1955) Mariana Iva et al. (1971), O. Samuel (1977). Because of the small amount of fragments preserved in the collection and their small size, the generic determination is not certain.

Rhabdammina abyssorum M. Sars

Grzybowski J., 1896, p. 275, Pl. VIII, fig. 1—4 (slide no. 9);
recte: *Rhizammina grzybowskii* n. sp. pars *Hyperammina subdiscreta* (Grzybowski).

"*Rhabd. abyssorum*. Brady. Chall. rap. S. 266. Tab. XXI."

"Found only as fragments of tests. Tube made up of fine sand grains with rough or bristle surface, straight or bent, without constrictions. Diameter 0.2—0.6 mm. Length of fragments 0.8—1.2 mm, rarely up to 2 mm. Fig. 3 corresponds to *Rh. abyssorum* var. *irregularis* Carp. described by Brady. In Rzehak's material from Nikoltshitz partly as *Rh. emaciata*. Common in red clay."

In the collection there are few tubular, non-flattened forms which, considering the test structure, can be assigned to two species: one represented by forms with a not very rough surface, for which a new specific name is suggested (described below); the other represented by a few fragments of tubular forms averaging 1.00 mm in length and 0.25—0.30 mm in thickness, with very rough surface, walls made up of coarse, angular quartz grains cemented with a small amount of ferrous-siliceous material. These fragments are identical with those found in a phial marked *Rhabdammina subdiscreta* Rzehak (slide no. 10). The latter species of Grzybowski E. Mjatiuk (1970) includes in the synonyms of the newly determined species *Hyperammina subdiscretiformis*. The present authors are of the opinion that according to the rules of the "International Code of Zoological Nomenclature", the name *Hyperammina subdiscreta* (Grzybowski) should be preserved.

Several authors (W. Friedberg 1902, M. Dylańska 1923, R. Noth 1951, A. Hillebrandt 1962, H. Jurkiewicz 1967) assign J. Grzybowski's species (1896) to the synonyms of *Rh. abyssorum* M. Sars, and W. Grün et al. (1964) place it wrongly in *Psammosiphonella rzehaki* Andreae. T. Neagu (1962) and W. Grün et al. (1964) include *Rh. abyssorum* var. *irregularis* (non Carpenter) Grzybowski (Pl. VIII, fig. 3) in the synonyms of *Rhisammia indivisa* Brady.

Rhisammia grzybowskii n. sp.

1896 *Rhabdammina abyssorum* M. Sars, Grzybowski J., p. 275, Pl. VIII, fig. 1; *Rh. abyssorum* var. *irregularis* Carp., fig. 3.

Holotypus: specimen presented in pl. I. fig. 1 a, b.

Stratum typicum: red marls (Campanian)

Locus typicus: Wadowice (J. Grzybowski's collection, 1896, slide no. 9a).

Material: 7 fragments (holotype and paratypes) from Wadowice, 20 fragments from Woźniki.

Dimensions: length of fragments 1.35—1.45 mm; diameter 0.33—0.45 mm; wall thickness 0.12—0.15 mm

Tests tubular, not flattened, without constrictions, sometimes branched. Walls fairly thick, made up of very fine material with sparse larger grains of quartz, glauconite or pyrite. The test dissolves (completely or partly) in hydrochloric acid. Observations in polarized light reveal the very fine-grained structure of walls composed of a base of carbonates with embedded quartz, glauconite or pyrite grains. Internal channel refilled with calcite crystals. Test surface not very rough, mat, with protruding sparse grains of the mentioned minerals. Test light-grey to white in colour.

Among the preserved specimens, forms shown by J. Grzybowski in figs. 1 and 3 have been found. Specimens branching dichotomously, like those in fig. 3, are also common in the material from Woźniki. Neither J. Grzybowski's material nor that from Woźniki contains specimens with a spherical central chamber.

Rhabdammina subdiscreta Rzehak (Cat. E. M.)

Grzybowski J., 1896, p. 275. Pl. VIII, figs. 5—6 (slide no. 10);

recte: *Hyperammia subdiscreta* (Grzybowski).

Pl. I. fig. 2 a, b

"*Rh. subdiscreta*. Rzehak. Foraminiferen von Nikoltschitz. Verh. d. g. R. A. 1887. S. 87."

In the collection there are 3 fragments of tubular forms open at both ends. Walls composed of angular quartz grains of varying size, with

little siliceous cement. Surface very rough. Two of these specimens are well illustrated by the author, with marked constrictions. In transmitted light also narrowings of the channel are visible, which do not form sutures.

This species was introduced after J. Grzybowski (1896) as "subdiscreta" by W. Friedberg (1901) and M. Dylańska (1923). E. W. Mjatiuk (1950) wrongly assigned the species *Rh. abyssorum* M. Sars. presented by J. Grzybowski (1896) on pl. VIII, fig. 4 and *Rh. subdiscreta* Rzehak on pl. VIII, figs. 5—6 to the new species *Hyperammina gvidonensis* n. sp. In her paper from 1970, this author places *H. subdiscreta* Rzehak in the new species *Hyperammina subdiscretiformis* Mjatiuk.

Rhabdammina linearis Brady

Grzybowski J., 1896, pp. 275—276, Pl. VIII, fig. 7; (slide no. 11).

recte: *Rhabdammina cylindrica* Glaessner

Pl. I. fig. 3

"*Rh. linearis* Brady. Chall. rap. S. 269. T. XXI. Fig. 1—4" (lapsus) Pl. XXI figs. 1—6).

"Fragment of a thin, narrow tubule, straight, not widening into a chamber, with rough surface, without constrictions. Diameter 0.2 mm. Rare in marls."

In the collection there is one tubular specimen with the rough surface and walls composed of angular grains of hyaline, translucent quartz. Internal diameter of the channel very small. There are no thickenings or narrowings on the whole length of the fragment, which fact was stressed and illustrated by the author. The specimen is slightly transparent, which was already stressed by W. Friedberg (1902) and mentioned by A. Grün et al. (1964) in his description of the species *Psammosiphonella cylindrica* (Glaessner), in which he includes as a synonym the form described by J. Grzybowski (1896) under the name "*Rh. linearis* Brady". M. J. Glaessner (1937) regards *Rh. linearis* (non Brady) Grzybowski (1896) as a synonym of his species *Rh. cylindrica*, giving a comprehensive description corresponding to Grzybowski's specimen. R. Noth (1951) supposes erroneously that the species of Grzybowski and Glaessner can belong in *Rh. abyssorum*. H. Jurkiewicz (1967) assigned to the species *Rh. linearis* Brady both the fragments with characteristic thickenings, corresponding to Brady's description and illustrations (1884), and the specimens without these thickenings placed in this species by J. Grzybowski (1896) as he thought that these fragments are presumably the segments between the thickenings. Similarly Grzybowski (1897, p. 275) points out that specimens assigned by him to *Rh. linearis* Brady show slight inflations in the centre that form an oval chamber. It is worth noting, however, that in the assemblage from the Carpathians, forms identical with Grzybowski's specimen (1896) i.e. up

to 0.2 mm in diameter, coarse-grained with little cement, hyaline, slightly translucent without thickenings, usually occur in the Palaeogene and are reported under the specific name of *Rh. cylindrica* Brady. N. J. Maślakowa (1955), A. Hillebrandt (1962) and E. J. Krajewa, B. F. Zarneckij (1969) are of the same opinion, including Grzybowski's form in the synonyms. Also E. W. Mjatiuk (1970) regards Grzybowski's specimen as a synonym of *Hyperammia cylindrica* (Glaessner). The assignation of this species to the genus *Hyperammia* seems to be incorrect.

Rhabdammina annulata Rzehak (Cat. E. M.)

Grzybowski J., 1896, p. 276, Pl. VIII, fig. 8, 9 (slide no. 12);
recte: *Reophax* cf. *subnodulosa* Grzybowski.

Pl. I. fig. 4 a, b, c

The collection contains two fragments corresponding to the specimens illustrated by the author. Examination in transmitted light revealed that they both belong in the genus *Reophax*. One of them, 0.9 mm in length is composed of 6 chambers in a straight linear series (fig. 9). The embryonal chamber is spherical, 0.175 mm in diameter, later chambers are pyriform and connected by thin pipes.

The apertural chamber, 0.25 mm in diameter, has a terminal aperture. The other specimen (fig. 8) is smaller, slightly curved, composed of 3 chambers without the embryonal and apertural chambers. Length of this fragment 0.6 mm, thickness 0.2 mm. The surface rough, walls of fine quartz grains with siliceous cement. Light-grey colour of the fragment suggests that the two specimens come from green marls. In his description of the species "*Rhabdammina annulata* Grzybowski", T. Neagu (1962) suggests that the species described and illustrated by J. Grzybowski (1896) should be placed in the genus *Reophax*. The specimen examined bears closest resemblance to the species *Reophax subnodulosa* Grzybowski (1897). In consequence, the inclusion of the specimens described and illustrated by Grzybowski in the synonymy of *Rh. annulata* Grzybowski (T. Homola, E. Hanzliková 1955, H. Jurkiewicz 1967, O. Samuel 1977) or in the species *Psammosiphonella annulata* (Andreae) (W. Grün et al. 1964) does not come into consideration.

Reophax ovulum n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 276, Pl. VIII, figs. 19—21 (neotyp slide no. 13);
recte: *Hormosina ovulum* (Grzybowski).

No specimens of this species are preserved in the collection, only one specimen has been found in the remaining, non-determined material (vial no. 67 with *Lagena cidarina*). The species in question, very common in the Cretaceous and Palaeocene of the Carpathians, was described and cited under the name of *Hormosina ovulum* (Grzybowski) by M. Glaess-

ner (1937), R. Noth (1951), V. Vašíček (1951), S. Geroch (1955, 1959, 1960, 1966), T. Homola, E. Hanzliková (1955), N. J. Masłakowa (1955), J. Morgiel (1959), A. Hillebrandt (1962), W. Grün et al. (1964), U. Pflaumann (1964), E. Hanzliková (1965), H. Jurkiewicz (1967), T. Neagu (1979), J. Sandulescu (1972), O. Samuel (1977). E. W. Mjatiuk (1966, 1970) placed this species in the newly proposed genus *Carpathiella*. J. Szczechura, K. Pożaryska (1967) follow the same way.

Reophax lenticularis n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 276, Pl. VIII, fig. 22 (slide no. 14);
recte: *Radiolaria* sp.

Fairly numerous specimens determined in the collection as *Reophax lenticularis* represent lenticular Radiolaria, fairly abundant in the Tertiary Flysch formations. This fact was already mentioned by S. Geroch, R. Gradziński (1955), S. Geroch (1960), who gave an accurate description and illustrations.

Reophax duplex n. sp., var. alfa (Cat. E. M.)

Grzybowski J., 1896, p. 276, Pl. VIII, figs. 23, 24 (slide no. 15);
recte: *Reophax duplex* Grzybowski.

Pl. I, fig. 12

Two specimens in the collection conform closely with the author's description and partly with his illustration, but only one of them is presented accurately in fig. 23. Its dimensions are: length 1.1 mm, diameter 0.75 mm. The other specimen does not correspond to fig. 24. It is much smaller, chambers spherical of nearly equal size, distinctly separated. Its dimensions are: length 0.6 mm, diameter 0.45 mm. Walls of both specimens are made up of coarse, angular quartz grains, the surface very rough. Apertures invisible. In spite of this, the two specimens can be included in the species *Reophax duplex* Grzybowski. The specimen illustrated by J. Sandulescu (1972, fig. 7) can also be assigned to this species. It does not seem right to identify this species with *R. pilulifer* Brady (F. Huss 1966, A. Jednorowska 1968).

Reophax duplex n. sp. var. beta (Cat. E. M.)

Grzybowski J., 1896, p. 277, Pl. VIII, fig. 25 (slide no. 16);
recte: *Reophax pilulifer* Brady.

Pl. I, fig. 13

In J. Grzybowski's collection the preserved specimen corresponds to the description and figure of the author. It is composed of 2 chambers of unequal size made up of sand grains, walls not so rough as in *R. duplex*.

In view of the different character of the surface and the size of chambers, it should be assigned to *R. pilulifera* Brady. Placing of this variety in the species *R. duplex*, as suggested by Grün et al. (1964), E. W. Mjatiuk (1970) and T. Neagu (1970), is incorrect.

Reophax pilulifera Brady

Grzybowski J., 1896, p. 277, Pl. VIII, figs. 27—28 (slide no. 18);
recte: *Reophax pilulifera* Brady.

Pl. I, fig. 14

"*Rh. pilulifera* Brady l.c. S. 291. Tab. XXX. Fig. 12—17. *Rh. pilulifera* Rzk. Verh. d. g. R. A. 1887. S. 87. 1888. S. 191, 192."

"Test of three spherical chambers, arranged like in *Dentalina*, made up of fine quartz grains, with bristle surface. The chambers enlarge rapidly, the last one sometimes occupies half of the test. Aperture in the form of a circular opening at the top of the lastformed chamber. Length 0.5—1.5 mm. Very scarce in marls and red clay."

In the collection there is only one specimen corresponding to the author's description and figure 27. Length of the whole specimen composed of 3 chambers is 1.25 mm, diameter of the initial chamber 0,35 mm, of the middle one 0.6 mm, that of the apertural chamber 0.7 mm. This species is very frequently described in Polish and foreign micropaleontological publication. The forms described by J. Grzybowski from Wadowice were included in the synonyms of this species by R. Noth (1912, 1951), W. Grün et al. (1964), U. Pflaumann (1964), F. Huss (1966), H. Jurkiewicz (1967). E. Mjatiuk (1970) assigned them wrongly to the new species *R. paraduplex* n. sp.

Reophax guttifera Brady, var. *scalaria* n. var. (Cat. E. M.)

Grzybowski J., 1896, p. 277, pl. VIII, fig. 26 (slide no. 17);
recte: *Reophax scalaria* Grzybowski.

Pl. I, fig. 15

"*Rh. guttifera*. Brady. l.c. S. 295. Tab. XXXI. Fig. 10—15."

One preserved specimen corresponds to the author's description and figure. After Grzybowski this variety is reported by W. Friedberg (1901), M. Dylązanka (1923) and described by H. Jurkiewicz (1967). J. Schubert questions the specific name of this variety (1902, p. 21), maintaining that such shape can be due to deformation of the specimens. A. Grün et al. (1964) include Grzybowski's variety in the synonyms of *R. splendidus* (Grzybowski) (1897, Pl. X, fig. 16), citing it from the paper of Friedberg (1901). It is worth noting that figure 15 in plate 3 of A. Grün et al. (1964) conforms closely with J. Grzybowski's specimen (1896). Since, however, the name "splendidus" was introduced in the later

paper, the earlier name *R. scalaria* Grzybowski is retained. Also E. Hanzliková (1966) and O. Samuel (1977) cite Grzybowski's species under this name.

Haplophragmium Wazaczi Rzhk. (Cat. E. M.)

Grzybowski J., 1896, 277, Pl. VIII, fig. 29 (slide no. 20);
recte: *Ammobaculites wazaczi* (Grzybowski).

Pl. I, fig. 11

The description corresponds to the figure and the preserved specimen. Dimensions: length 1.5 mm, breadth of the apertural chamber 0.6 mm, diameter of the coiled portion 0.8 mm. Walls of very coarse angular light quartz grains, the surface of walls very rough. This species is similar to *A. coprolithiformis* (Schwager) yet the latter species has more distinct sutures between more numerous chambers, and the surface is not so rough. Since Rzehak gave no description or figure, J. Grzybowski is credited with the authorship of this species, which is newly described and illustrated by E. Hanzliková (1972).

Haplophragmium turpe n. sp. (Cat. E. M.)

Grzybowski J., 1896, pp. 277—278, Pl. VIII, fig. 30 (slide no. 19);
recte: *Haplophragmoides turpe* (Grzybowski).

Pl. I, fig. 16

One of the well preserved specimens corresponds to J. Grzybowski's description and figure. Test small, involute, 0.6 mm in diameter. Chambers very indistinct, 6 in number, separated by slightly depressed sutures, slowly increasing in size. Slit-like aperture at the base of the last-formed chamber. Walls of coarse, sharp-edged grains of milky quartz with little cement. The surface of walls rough. Except for J. Grzybowski (1897, 1901) and W. Friedberg (1901), not reported in the literature.

Haplophragmium (Reussina) quadrilobum n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 278, Pl. VIII, fig. 31 (slide no. 21);
recte: ?*Trochammina bulloidiformis* (Grzybowski).

Pl. I, fig. 17

There is one specimen in the collection composed of three chambers of nearly equal size, arranged in one plane. Surface very rough, walls of large, sharp-edged quartz grains. Aperture invisible. The longest dia-

meter of the 3-chamber specimen 0.9 mm. The preserved specimen lacks the fourth chamber shown in fig. 3I. It is worth noting that foraminifera corresponding to J. Grzybowski's description and figure occur in the microfaunal assemblage from the red shales from Woźniki alongside of specimens composed of three or more chambers. F. Huss (1966) describes and figures similar forms from Węglówka (Santonian-Maastrichtian), determining them as *Trochammina bulloidiformis* (Grzybowski). Describing the species *Trochammina quadriloba* (Grzybowski), S. Geroch (1960) includes Grzybowski's *H. quadrilobum* in its synonyms, pointing out that "the chambers are trochospiral, increasing rapidly in size", which observation is unconformable with the preserved specimens and Grzybowski's figure, as well as with specimens from Woźniki.

Haplophragmium (*Reussina*) *bulloidiforme* n. sp. var. alfa (Cat. E. M.)
Grzybowski J., 1896, p. 278, Pl. VIII, fig. 32 (slide no. 22 alfa);
recte: *Trochammina bulloidiformis* (Grzybowski)

Pl. I, fig. 16 a, b

In J. Grzybowski's materials there are four specimens composed of 3, 4 and 5 chambers. Chambers globular, nearly equal in size, 3-chamber specimens have chambers in a single plane, in 4-chamber ones the fourth lies on 3 chambers (fig. 31), whereas in 5-chamber specimens the fifth chamber lies on 4 chambers, which are in one plane (fig. 32). Walls fairly thick made up of large, angular quartz grains with little siliceous cement. The surface of walls very rough. Neither in Grzybowski's specimens nor in the ones from Woźniki are any apertures to be seen.

Considering insignificant differences in the arrangement, F. Huss (1966) rightly includes both *H. quadrilobum* and *H. bulloidifore* var. alpha in the species *Trochammina bulloidiformis* (Grzybowski). Contrary to S. Geroch's description (1960, p. 64) of *T. quadriloba* (Grzybowski), the specimens have never been found to be composed of more than 5 chambers. Because of the small number of specimens in the collection, a polished section was made from a 3-chamber specimen from Woźniki, which revealed the presence of links between the chambers corresponding to the description and figure of F. Huss (1966). *Haplophragmium quadrilobum* and *H. bulloidiforme* of J. Grzybowski were reported under different generic names by W. Friedberg (1901), R. Noth (1912), M. Dylańska (1923), V. Pokorny (1949, 1953), V. Homola, E. Hanzliková (1955), F. Huss (1966), H. Jurkiewicz (1967) both from the Cretaceous and the Palaeogene of the Carpathian Flysch. T. Neagu (1970) leaves the species *Trochammina quadriloba* and *Tr.*

bulloïdiforme as valid, incorrectly including in the latter *Tr. bulloïdiforme* var. *beta*.

Haplophragmium (Reussina) bulloïdiforme var. *beta* n. sp. var.

Grzybowski J., 1896, p. 278, Pl. VIII, fig. 33 (slide no. 22 *beta*) recte: *Trochammina globigeriniformis* (Parker et Jones).

Pl. II, fig. 1.

There is one specimen in the collection belonging to the genus *Trochammina*. It is poorly preserved, particularly the last-formed chamber, but its structure corresponds to J. Grzybowski's description and figure. Test composed of fine material, surface less rough than in the previous species, with more cement. Chambers trochospiral, rapidly increasing in size as in *Trochammina globigeriniformis* (Parker et Jones), which was mentioned by J. Grzybowski.

Ammodiscus involvens Reuss

Grzybowski J., 1896, p. 279, Pl. VIII, fig. 38 (slide no. 23); recte: *Ammodiscus angustus* (Friedberg)

Pl. II, fig. 5.

"*Operculina involvens* Rss. Denkschrift. d.k. Akad. d. Wiss. in Wien, T. I. S. 370. Tab. 46. Fig. 30.

Cornuspira involvens Rss. Sitzungsber. d.k. Akad. in Wien. T. 48. S. 39. Tab. I. Fig. 2.

Cornuspira involvens Hantken. Die Foraminiferen der Clavulina Szaboi Schichten. S. 19. Tab. II. Fig. 2."

"Siliceous test of 8 planispiral coils corresponds in shape and arrangement to the description and figures of Reuss. The coils are partly covered, the last one is the largest one and makes up nearly 1/4 of the diameter of the test. The margin broad, narrowly rounded toward the periphery, the sides concave. Diameter 0.8 mm. Scarce in red clays."

Ammodiscus angygyrus Reuss

Grzybowski J., 1896, p. 280, Pl. VIII, fig. 34 (slide no. 24 ab); recte: *Ammodiscus angustus* (Friedberg)

Pl. II, fig. 4.

"*Cornuspira angygyra* Reuss. D. s. d. A. W. Bd. I. S. 370. Tab. 46. Fig. 19. *C. angygyra* Rss. S. b. d. A. W. Bd. 48. S. 38."

"Also this form does not differ in any respect from the one described by Reuss from the Miocene and Septaria clays; it also has numerous low, flattened coils and the surface only slightly rough. Scarce in marls and red clays."

Ammodiscus polygyrus Rss.

Grzybowski J., 1896, s. 280, tab. VIII, fig. 37 (slide no. 25); recte: *Ammodiscus angustus* (Friedberg)

Pl. II, fig. 3.

"*Cornuspira polygyra* Reuss. S. b. d. A. W. Bd. 48. S. 39. Tab. I. Fig. 2. *C. polygyra* Hantken l.c. S. 19. Tab. Fig. 11."

"Test relatively thin. Numerous low coils, periphery rounded, slightly concave on both sides. Scarce in red clays."

One specimen of *A. involvens*, one of *A. polygyrus* and two of *A. angygyrus* are preserved in the collection. All these specimens are identical. They have the same diameter and an equal number of coils (about 8) increasing evenly in size and overlapping. Periphery rounded. Tests round or elliptic, bilaterally concave. The surface of walls lustrous, smooth. Walls thin, of cryptocrystalline siliceous material. Test diameter 0.75—1.00 mm.

The specimens, and particularly *A. involvens*, do not show any significant differences in thickness of the last two coils, which fact was noted by J. Grzybowski. *A. polygyrus* does not differ from the other forms in smaller thickness of the test. Elliptical shapes of some specimens may be due to lateral deformation, which also causes flattening of the coils, particularly pronounced on the last one, and simultaneous enlargement of the central depression (*A. angygyrus*, slide no. 24a, b). W. Friedberg (1901) was the first to couple these species and assign them to the species *Cornuspira incerta* d'Orb. suggesting that *C. angusta* n. sp. can be its variety (p. 637). W. Grün et al. (1964) also unites the species described by J. Grzybowski and W. Friedberg, placing them in *A. siliceus* (Terquem). The latter Jurassic species has a larger number of coils (15 on the average) and walls made up of coarse-grained material (vide Cat. E. M.). The specific names *A. involvens* and *A. angygyrus* used by J. Grzybowski (1896) refer to calcareous species and therefore, must be discarded and so must the specific name *A. polygyrus* (Reuss). This latter Oligocene species has a considerably larger number of coils (13—15), and this feature has been observed neither in J. Grzybowski's specimens nor in the ones from Woźniki.

In her comprehensive description of *Grzybowskiella angusta* (Friedberg), E. W. Mjatliuk (1970) includes *A. involvens* and *A. angygyrus* of J. Grzybowski in its synonyms, leaving out wrongly *A. polygyrus*. Moreover, the range she gives for this species (Upper Senonian-Palaeocene) is too short. Identical forms reported from the Polish Carpathian under different names, most commonly as *A. incertus* (d'Orb.) and *A. siliceus* (Terquem) have stratigraphic ranges from the Lower Cretaceous to the Palaeogene (S. Geroch 1966).

Since the description and figures of E. W. Mjatliuk (1970) correspond to the preserved specimens from Wadowice, we accept her name as valid.

Ammodiscus sp.

Grzybowski J., 1896, p. 280, Pl. VIII, fig. 36 (slide no. 27); recte: *Glomospira gordialis* (Jones et Parker).

Two specimens are preserved in the collection. One of them, shown in fig. 36, is *Glomospira gordialis* (J. et P.), according to J. Grzybowski's presumption. The other specimen, indeterminable specifically, belongs in the genus *Ammodiscus* sp.

Ammodiscus charoides Parker et Jones

Grzybowski J., 1896, pp. 280—281, Pl. VIII, figs. 39—43 (slide no. 28a, b, c); recte: *Glomospira charoides* (J. et P.)

Pl. II, fig. 6a, b, 8

"*A. charoides*. Brady. Chall. rap. S. 334. Tab. XXXVIII. Fig. 10—16. *Trochammina proteus*. cz. Karrer. Grzyb. Sb. d. A. W. Bd. 52. S. 494. T. I. F. 4."

According to the opinion of R. Noth (1951) and W. Grün et al. (1964), the specimens found in the collection correspond to the species *G. charoides* (J. et P.). Besides, there are two specimens corresponding (Pl. VIII, fig. 41) to the variety *G. charoides* var. *corona* Cushman et Jarvis.

Ammodiscus gordialis Jones et Parker

Grzybowski J., 1896, p. 281, Pl. VIII, Figs. 44, 45 (slide no. 29).
recte: *Glomospira gordialis* (J. et P.).

Pl. II, fig. 7a, b

J. Grzybowski's description and figure conform closely with the preserved specimens.

Ammodiscus Schoneanus Siddal

Grzybowski J., 1896, p. 281, Pl. VIII, fig. 46 (slide no. 30); recte: *Plectina* sp.

Pl. II, fig. 9a, b

"*A. Schoneanus*. Brady. Chall. rap. S. 335. Tab. XXXVIII. Fig. 17—19."

"Test finely arenaceous with siliceous cement, surface slightly rough in the form of a tube coiled in a close spiral. In a fragment 0.8 mm in length, 5 coils, no initial portion. Very rare in green clays."

One specimen preserved in the collection consists of biserial series of chambers arranged spirally along the test axis, distinct in transmitted light. Due to the lack of the early portion and poorly preserved apertural face, this fragment can only be assigned to the genus *Plectina* sp. It should, therefore, be excluded from the synonyms of *Turritelella schoneana* (Siddal), as suggested by V. Pokorny (1953) and F. Huss (1966).

Ammodiscus fallax Rzehak (Cat. E. M.)

Grzybowski J., 1896, p. 281, Pl. VIII, fig. 47 (slide no. 31);
recte: ? *Trochamminoides* sp.

Pl. II, fig. 10

The specimen preserved in the collection corresponds to J. Grzybowski's description and figure. In transmitted light, globular chambers connected by short, thin channels are visible.

Agathammina dubia n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 282, Pl. VIII, fig. 49 (slide no. 34);
recte: *Rzehakina epigona* (Rzehak)

Pl. II, fig. 12

The preserved specimen corresponds to Grzybowski's figure, yet it belongs to the species *Rzehakina epigona* (Rzehak).

Trochammina subglobulosa n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 282, Pl. VIII, fig. 50 (slide no. 35);
recte: *Haplophragmoides subglobulosus* (Grzybowski).

Pl. II, fig. 11

There is one small specimen in the collection which, considering its structure, should be placed in the genus *Haplophragmoides*. The specimen corresponds partly to J. Grzybowski's figure, only the apertural chamber in the figure is too elongate and extending backward, which gives it an evolute aspect. Test subglobular. In the last-formed whorl, 6 chambers increasing gradually in size, separated by slightly depressed sutures. The last-formed chamber the largest, aperture slit-like at the base of the chamber. Walls of fine angular light quartz grains. Surface rough. Diameter 0.25 mm.

Trochammina intermedia Rzehak (Cat. E. M.)

Grzybowski J., 1896, p. 282, Pl. VIII, fig. 53 (slide no. 36);
recte: *Trochamminoides intermedius* (Grzybowski)

Pl. II, figs. 13a, b

"*Tr. intermedia* Rzk. Verh. d. g. R. A. 1887. S. 88. (Foraminiferen von Nikolt-schitz.)"

One specimen generally corresponding to the author's description and figure, only too narrow in side view (fig. 53c). Identical forms were described and illustrated by J. Jednorowska (1968) from the Upper Cretaceous and Palaeocene of the Inoceranian Beds and from the Palaeocene of the Variegated Shales. This species was also reported by O. Samuel (1977) from the Palaeocene and Eocene of the Czechoslovakian Carpathians.

Trochammina pauciloculata Brady

Grzybowski J., 1896, p. 283, Pl. VIII, figs. 51, 52 (slide 36a);
recte: *Cystamina pauciloculata* (Brady)

Pl. II, fig. 14a, b

"*Tr. pauciloculata*. Brady. Chall. rap. S. 344. Tab. XLI. Fig. 1, 2."

"Test resembling in shape *Globigerina triloba*. On one side 3 globular chambers increasing in size. On the other side, between them, fourth chamberlet, small, triangular in section, and on this side median aperture at the margin of the last-formed chamber. Sutures slightly depressed. Test finely arenaceous with siliceous cement, surface almost smooth. Size 0.5 mm. Common in red clays."

A vial with the described species was missing from the collection, but a specimen was found in the remaining, non-determined materials. Basing on Grzybowski's description and accurate figure, it can be identified with confidence with the given species. The species in question was reported and described by several authors (F. Huss 1957, J. Morgiel 1957, S. Geroch 1960, H. Jurkiewicz 1967, V. Pokorný 1953) from the Upper Cretaceous and Palaeogene of the Carpathians. Recently E. W. Mjatluk (1966, 1970) included it in the synonyms of her new genus and species: *Cystamminella pseudopauciloculata*.

Trochammina subcoronata Rzehak (Cat. E. M.)

Grzybowski J., 1896, pp. 283—284, Pl. IX, figs. 3a, b, c. (slide no. 39, 39a);
recte: *Trochamminoides coronatus* (Brady).

Pl. II, fig. 15

"*Tr. subcoronata* Rzk. Verh. d. g. R. A. 1887. S. 88."

Two preserved specimens correspond to J. Grzybowski's description and figure. This species was described and illustrated by several authors under different generic and specific names. After J. Grzybowski (1896,

1901), *T. subcoronata* Rzk. was cited by W. Friedberg (1901) and M. Dylańska (1923). R. Noth (1951) included it in the synonyms of *Trochammina coronata* Brady. V. Pokorný (1949, 1953), E. Hanzliková (1953), V. Homola, E. Hanzliková (1955), J. Morgiel (1959) described it as *Trochamminoides subcoronatus* (Grzybowski). F. Huss (1966) included it in the synonyms of *Haplophragmoides coronatus* (Brady). However, considering its structure, U. Pflaumann (1964), A. Jednorowska (1968), J. Sandulescu (1972) and O. Samuel (1977) place it rightly in the genus and species *Trochamminoides coronatus* (Brady). In the Polish Carpathians this species occurs in all the Upper Cretaceous and Palaeogene formations.

Trochammina acervulata n. sp

Grzybowski J., 1896, p. 284, Pl. IX, fig. 4. (slide no. 40).
recte: *Trochammina acervulata* Grzybowski.

Pl. III, fig. 1a, b, c

Test composed of globular chambers increasing gradually in size as added. Chambers trochospiral, forming a low cone with a flat base formed by the last whorl consisting of 8 chambers. Chambers separated by fairly deep sutures. Aperture indistinct, slit-like, at the base of the last-formed chamber, near the peripheral margin of the test. Wall finely arenaceous, surface slightly rough. J. Grzybowski gives the "size" of 1.5 mm. The preserved specimen, conforming closely with the author's description and figure, is smaller: 0.6 mm in diameter and 0.3 mm in height. Its structure corresponds to the genus *Trochammina*.

J. Grzybowski's specimen has a different structure than the ones reported and described by H. Jurkiewicz (1967) as *Tr. acervulata* or the species included in his synonymy. It is feasible that the form described by W. Friedberg (1901) as *T. acervulata* Grzybowski corresponds to Grzybowski's species, but Friedberg himself stresses certain differences. M. F. Glaessner (1937), T. Neagu (1962) and J. Sandulescu (1977) included Friedberg's and not Grzybowski's species in the synonyms of *Trochamminoides irregularis* White.

Cyclammina suborbicularis Rzehak (Cat. E. M.)

Grzybowski J., 1896, p. 284, Pl. IX, fig. 6. (slide no. 41, 41a);
recte: *Haplophragmoides (Cribrostomoides) suborbicularis* (Grzybowski).

Pl. III, figs. 2a, b, 3a, b

There are two vials in the collection labelled by the author "*C. suborbicularis* Rzehak", containing 5 specimens (slides 41² and 41a). Al-

² In slide 41 — *Recurvoides* indetermined.

though poorly preserved, the specimens generally correspond to J. Grzybowski's description and figures. However, the chambers in the preserved specimens are less numerous (about 6) than given in the description (9—10). J. Grzybowski does not mention that the last whorl is somewhat offset from the plane of coiling, and this feature is marked in his figure (fig. 5). Abundant and well preserved specimens of this species were found in the comparative material from Woźniki. They have distinct apertures at the base of the apertural face, slit-like, low, with a very thin lip. In some specimens delicate gaps in the aperture are visible. Also more or less distinct coiling in different planes can be observed.

E. W. Mjatiuk (1970) described similar specimens as *Cribrostomoides* ex. gr. *suborbicularis* (Grzybowski) from the Palaeocene of Eastern Carpathians. V. Pokorný (1949) attributes *C. suborbicularis*, *C. retrosepta*, *C. globulosa* and *C. setosa* to the same species *Haplophragmoides suborbicularis* (Grzybowski). The same author in his paper of 1953 expresses an opinion that the species *C. retrosepta* and *C. suborbicularis* should be separated, remarking that in his collection there are no specimens corresponding to *H. suborbicularis* (Grzybowski), but only those corresponding to *C. retrosepta* (Grzybowski). Following V. Pokorný (1953), E. Hanzliková (1970) gives a description of *Haplophragmoides retroseptus* (Grzybowski). Since in the Wadowice collection there have been preserved neither any specimens of *C. retrosepta*, corresponding to the description and illustration of Grzybowski, nor *C. setosa* and *C. globulosa*, no univocal attitude towards this problem can be assumed. However, since the specific name *H. suborbicularis* (Grzybowski) is frequently used in a number of studies V. Homola et E. Hanzliková, 1954; J. Morgiel, 1959; S. Geroch, 1960; H. Jurkiewicz, 1967; A. Jednorowska, 1968; E. W. Mjatiuk, 1970, O. Samuel, 1977), we have decided to maintain this name.

Cyclammina retrosepta n. sp.

Grzybowski J., 1896, p. 284, Pl. IX, figs. 7, 8, (slide no. 42);

A vial labelled *C. retrosepta* n. sp. contains one very small specimen belonging to the genus *Recurvoides*, corresponding neither to Grzybowski's description nor illustration.

Textularia attenuata Reuss.

Grzybowski J., 1896, p. 285, Pl. IX, figs. 11—12 (slide no. 43);

recte: *Spiroplectammina* cf. *anceps* (Reuss).

Pl. III, fig. 5

"Test lanceolate, composed of numerous, low, somewhat diagonally descending chambers. Peripheral margin subacute. Sutures distinct, in the early portion

slightly depressed. Surface rough. Figure 12 shows a form not distinctly sub-acute downward, but having the same structure. Rare in red clays."

In the collection there has been preserved only one specimen that can be identified with the illustration (Fig. 12) of this form. Dimensions: length 0.45 mm, width 0.17 mm, thickness 0.1 mm. Early portion planispiral, composed of 5—6 chambers arranged round a small embryonic chamber (proloculus). Portion arranged biserially consists of 7 pairs of alternating chambers.

Textularia subhaeringensis n. sp. var. alfa (Cat. E. M.)

Grzybowski J., 1896, p. 285, Pl. IX, fig. 16 (slide no. 44, 44a);

recte: *Spiroplectammina subhaeringensis* (Grzybowski) (?macrospheric form)

Pl. III, fig. 6a, b

In the collection there have been preserved specimens bearing the name *T. subhaeringensis* n. sp., corresponding to the description and illustration of the alpha form. This species was reported as *Spiroplectammina subhaeringensis* (Grzybowski) by S. Geroch, R. Gradziński (1955) from the Senonian sub-Silesian unit, by A. Jednorowska (1957) and H. Jurkiewicz (1960) from the Inoceranian Beds of the Skole unit, and by F. Huss (1966), who gave a detailed description and illustration of this species from red marly clays of the Coniacian and Santonian sub-Silesian unit. *S. subhaeringensis* (Grzybowski) was also quoted by T. Neagu (1970) from the Campanian Rumanian Carpathians, and by J. Szczechura et K. Pożaryska (1974) on the recommendation of Paleocene from Babica (the Polish Carpathians).

Textularia subhaeringensis n. sp. var. beta (Cat. E. M.)

Grzybowski J., 1896, p. 286, Pl. IX, fig. 13 (slide no. 45);

recte: *Spiroplectammina subhaeringensis* (Grzybowski) (?microspheric form)

Pl. III, fig. 7 a, b

In slide no. 45, labelled *T. subhaeringensis* var., apart from specimens corresponding to *T. subhaeringensis* (Grzybowski) var. alfa ?macrosphaeric form (Pl. III, Fig. 6 a, b) and specimens of ?microsphaeric form (Pl. III, Fig. 7 a, b), there are 3 specimens corresponding to *Spiroplectammina* sp. (W. Grün 1969, pl. 67, fig. 4, 5, without description).

Textularia flabelliformis Gümbel

Grzybowski J., 1896, p. 286, Pl. IX, fig. 14 (slide no. 46a);
recte: *Aragonia ouezzanensis* (Rey).

Pl. III, fig. 4

"*Textularia flabelliformis* Gümbel. Die Foraminiferen des nordalpinen Eocen-gebirge. S. 69. T. II. Fig. 83."

"Test thick, abruptly flattened downward and towards peripheral margin, almost circular; early chambers very fine, resembling short spine. Chambers low, diagonally arcuate downward. Sutures limbate, thinner towards periphery. Aperture terminal. Brady attributes this form to the same species as *Bigen. capreolus*, despite the fact that it reveals much difference in the arrangement of chambers and sutures. It seems correct, in my opinion to regard them as different species, without denying a visible similarity between them. Form common in red clays."

In the collection a vial bearing the name of this species contained no specimen; all the same, the specimen in question was encountered among the indeterminate material from Wadowice. It was easy to identify, due to the existing description and good illustration (preserved in slide 46a) However, Grzybowski included this form with the genus *Textularia*, regardless of the material making up the test. This species was described and quoted under various generic and specific names (C. A. Wicher, 1956; J. Liszkowa, 1959; A. Hillebrandt, 1962; T. Neagu, 1970), and was finally regarded as *Aragonia ouezzanensis* (Rey).

Plecanium sublime n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 287, Pl. IX, fig. 15 (slide no. 48);
recte: *Plectina coniformis* (Grzybowski)

Pl. IV, fig. 2

The collection contains one specimen thus determined, inconsistent with the author's description and illustration. It is spindle-shaped, has an oval cross-section; surface rough. Wall composed of fine, angular quartz grains with a small admixture of siliceous cement. Sutures linear, faintly depressed. In the early portion approx. 5 chambers visible in transmitted light; farther on, a triserial and finally biserial stage, taking up about one third of the test length. Dimensions: test length 0.45 mm, biggest width (above half-length of the test) 0.25 mm. Aperture circular, on a somewhat elongated last chamber. This specimen corresponds to Geroch's description and illustration (1960) of *Plectina?* cf. *coniformis* (Grzybowski). The colour of the specimen bears evidence of its origin from green marls or clays.

Textularia calix n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 287, Pl. IX, fig. 17 (slide no. 47);
recte: *Dorothia crassa* (Marsson).

Pl. III, fig. 8

In the collection there is one specimen which is a juvenile form of the species *Dorothia crassa* (Marsson). Early portion reveals a foreign fragment, acute at the proximal end, which was overdone in Fig. 17c.

Verneulina abbreviata Rzehak (Cat. E. M.)

Grzybowski J., 1896, p. 287, Pl. IX, fig. 18 (slide no. 49);
recte: *Dorothia crassa* (Marsson).

Pl. III, fig. 13 a, b

The collection contains more than ten specimens of this species, consistent with the author's description and illustration. W. Friedberg (1901) reported this species as *Verneulina abbreviata* from the Inoceranian Beds. Later on, this species was quoted in the Polish bibliography under various generic and specific names. They were reported by S. Bukowy et S. Geroch (1957) as synonyms of *Marssonella crassa* (Marsson), and by F. Huss (1966), who gave a great number of synonyms and a detailed description of *Dorothia crassa* (Marsson). Following J. Cushman (1937), A. Jednorowska (1975) accepted the name *D. trochoides* (Marsson). Since *D. crassa* (Karrer) is a synonym of *D. pupa* Reuss (Cushman, 1937), the name *D. crassa* (Marsson) is maintained.

Verneulina szajnochae n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 287, Pl. IX, fig. 19 (slide no. 50);
recte: *Reussella* (*Pyramidina*) *szajnochae* (Grzybowski)

Pl. III, fig. 9 a, b, c, d

Specimens preserved in the collection are usually very short, with protruding sutures ended with spines. These forms correspond to the specimens described by J. Klasz and H. Knipscher (1955) as *Reussella szajnochae* (Grzybowski). Similar forms are found in the Polish Carpathian Flysch, very frequently in the Campanian. In the Maestrichtian the range of their occurrence interfingers with that of *R. szajnochae californica* Cushman (R. Noth, 1951; J. Liszkowa, 1959). Following the taxonomy of A. R. Loeblich and H. Tappan (1964), T. Neagu (1970) transfer the generic name *Reussella szajnochae* to *Pyramidina*.

Bigenerina nuda n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 288, Pl. IX, figs. 22, 23 (slide no. 52);
recte: *Ellipsodimorphina subcompacta* Liebus.

Pl. III, fig. 10a, b, specimen from Woźniki

In the collection, under the name mentioned above there is a fragment of two final chambers with terminal, slit-like aperture with a lip. This preserved part corresponds to the early portion of the specimen, shown in Fig. 22. In red clays from Woźniki there were found a few very well preserved specimens, wholly consistent with Grzybowski's illustration and description. Early chambers arranged biserially; sutures diagonal in the uniserial part (as shown in Fig. 22); the shape of aperture determines that the specimen belongs to *Ellipsodimorphina subcompacta* Liebus, reported from the Early Tertiary of Moravia. It is noteworthy that a specimen found in the collection and determined as *Bigenerina brevis* n. sp. (slide 55) (Pl. III, fig. 11) agrees with Fig. 23 in Plate IX. The latter specimen was not described by Grzybowski. On the basis of its structure, this specimen can be attributed to *Ellipsopolimorphina* and cannot be connected, as suggested by Grzybowski, with the species *Bigenerina nuda* as its juvenile stage. *E. subcompacta* Liebus (1922) is rare in red shales from Woźniki.

Spiroplecta lenis n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 288, Pl. IX, figs. 24, 25 (slide no. 53);
recte: *Plectina lenis* (Grzybowski)

Pl. IV, fig. 3a, b

Bigenerina fallax Rzehak (Cat. E. M.)

Grzybowski J., 1896, p. 288, Pl. IX, figs. 20—21 (slide no. 51);
recte: *Plectina lenis* (Grzybowski)

Pl. IV, fig. 5

"*Bigenerina fallax* Rzehak. Verh. d. g. R. A. 1887. S. 134."

Spiroplecta deflexa n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 288, Pl. IX, figs. 26, 27 (slide no. 54);
recte: *Plectina lenis* (Grzybowski)

Pl. IV, fig. 4

The collection contains specimens belonging to all the three species of Grzybowski, mentioned above. In transmitted light in all the spe-

cimens there can be seen an early, multi-chamber portion of a different length, followed by a biserial stage. No uniserial portion was found in the specimen of *Bigenerina fallax* Rzehak. Aperture terminal or at the base of the last chamber, dependent upon the stage of growth. All the forms quoted above belong to *Plectina lenis* (Grzybowski). As regards *S. deflexa* Grzybowski, this opinion is also shared by F. Huss (1966), who gives a detailed description, illustration and synonyms of this species. *P. lenis* (Grzybowski) is known from the Carpathians (Turonian to the Lowermost Eocene).

Gaudryina pupoides d'Orbigny

Grzybowski J., 1896, p. 289 (without illustration) (slide no. 56);
recte: *Gaudryina modica* Bermudez.

Pl. III, fig. 12

"*Gaudryina pupoides* d'Orb. l.c. S. 197. T. XXI. Fig. 34—36."

"Test conical, rounded downward. Early chambers inconspicuous, followed by more distinct, large, alternating ones. Cross-section circular. Last chamber far overlaps the preceding one, leaving an incision in which aperture is found. Rare in marls."

In the collection there are two specimens under this name, which however, do not correspond to the description; besides, no illustration is given by the author. Test almost as high (0.55 mm) as broad (0.50 mm), short. Early stage triserial, with a triangular cross-section, very short. Biserial stage has an oval cross-section. Chambers in the biserial portion inflated, rapidly increasing in size; between two final — latest chambers sutures linear, depressed. Surface somewhat rough; wall composed of fine quartz grains. Aperture at the base of last chamber, subcircular, incised. These specimens are consistent with *Gaudryina modica* Bermudez (1949) from the Lower Eocene. S. Geroch and R. Gradziński (1954) quote this species from variegated marly shales of the Paleocene sub-Silesian unit from the Żywiec area; however, these authors give only an illustration of the species, without its description.

Clavulina subparisiensis n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 289, Pl. IX, fig. 30 (slide no. 59);
recte: *Tritaxia subparisiensis* (Grzybowski)

Pl. IV, fig. 1a, fig. 1b. (spec. from Woźniki)

One specimen in the collection is consistent with the author's description and illustration. J. Cushman (1937) transfers the name of the

species to *Pseudoclavulina*, while F. Huss (1966), following the taxonomy of A. R. Loeblich and H. Tappan (1964), includes it with *Tritaxia*, giving its detailed description and illustration. *T. subparisiensis* (Grzybowski) is very common in the Upper Cretaceous in Carpathians.

Virgulina digitalis n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 290, Pl. IX, fig. 31 (slide no. 61);

recte: *Plectina conversa* (Grzybowski)

Pl. IV, fig. 6a, b

The collection contains two specimens of which one belongs to *Plectina lenis* (Grzybowski), and the other, not so thin as shown in Fig. 31, with chambers distinctly coiled round the long axis of the test, corresponds both to the description of *V. digitalis* (Grzybowski, 1896, p. 290) and to the description and illustration of *Gaudryina conversa* Grzybowski (J. Grzybowski, 1901, p. 285, Plate VII, Fig. 15 and 16). At present, the latter species is also attributed to the genus *Plectina*. F. Huss (1966) includes *V. digitalis* with the synonyms of *P. lenis*, assuming that also *Gaudryina conversa* Grzybowski (1901) can be included with these forms. Since numerous authors (V. Pokorny, 1953; S. Geroch, 1960; H. Jurkiewicz, 1967; A. Jednorowska, 1968) distinguish *Plectina conversa* (Grzybowski) as a separate species, it is not possible to join these species without comparing the holotypes of *P. lenis* and *P. conversa*. Therefore, in the case of *V. digitalis* the name *P. conversa* (Grzybowski) is maintained.

Pleurostomella wadowicensis n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 290, Pl. X, fig. 1 (slide no. 62);

recte: *Pleurostomella wadowicensis* Grzybowski.

Pl. IV, fig. 7a, b

Three specimens preserved in the collection are consistent with the author's description and illustration. The species has been quoted and described from the Upper Cretaceous Carpathians (J. Liszkowa, 1959, cum synonyms).

Pleurostomella Zuberi n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 291, Pl. IX, fig. 33 (slide no. 63);

recte: *Ellipsopolymorphina zuberi* (Grzybowski)

Pl. IV, fig. 8

The collection contains one specimen consistent with the author's description and illustration, but having smaller dimensions: length

0.45 mm, biggest width (slightly below half-height of the test) 0.20 mm. Arrangement of chambers and aperture determine (according to Loeblich and Tappan, 1966) that this species is included with *Ellipsopolymorphina*. The form in question is very similar in a general outline and structure to *Ellipsoglandulina velascoensis* Cush. (Cushman, 1946, non 1926). In his description of this species Cushman does not say anything about the arrangement of early chambers; however, in his study of 1946 (Plate 56, Fig. 37) chambers are alternating in the same way as it is observed in Grzybowski's species. In the study of T. Neagu (1970) neither illustrations nor remarks concerning *Pleurostomella zuberi* Grzybowski agree with the specimen preserved in Grzybowski's collection.

Lagena orbignyana Seguenza

Grzybowski J., 1896, pp. 291—292, Pl. X, fig. 4 (slide no. 66);
recte: *Fissurina orbignyana* Seguenza

Pl. IV, fig. 13

"*Lagena orbignyana*. Brady. Chall. rap. S. 484. T. LIX. Fig. 18—20, 24—26."

"Test flask-shaped, somewhat flattened, tapered at the proximal end, with aperture on the elongated neck at the distal end. Peripheral keel divides into two parts at the distal end, surrounds aperture producing short lists on flattened walls. The lists run down the neck, slowly become wider and disappear before reaching the lower end of the neck. At the proximal end the peripheral keel divides into three parts, reaching the widened portion of the test. One of the three parts of the keel runs centrally to the lower pole, while the two others diverge and run circularly in small arches under the proximal end of the test. The form in question resembles best the specimen copied by Brady in Fig. 18. Very rare in marls."

In Grzybowski's collection one specimen, consistent with the description and illustration, was correctly determined as *Fissurina orbignyana* Seguenza.

Lagena (Cidaria) cidarina n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 292, Pl. X, fig. 5 (slide no. 67);
recte: a fragment of *Nodosaria* sp.

Pl. IV, fig. 10a, b

One specimen in the collection is consistent with the author's description and illustration; however, it is a broken early chamber of the genus *Nodosaria*, possibly belonging to *Nodosaria cylindracea* Reuss.

Similarly, also the other specimen, classified as *Lagena (Cidaria) coronata* n. sp. (p. 292, Plate X, Fig. 6) (slide no. 68) is a broken early chamber, as well.

Glandulina subinflata n. sp. (Cat. E. M.)

Grzybowski J., 1896, pp. 292—293, Pl. X, fig. 18 (slide no. 82);
recte: *Glandulina subinflata* Grzybowski

Pl. IV, fig. 11

In the collection one specimen is consistent in a general outline with the description and illustration of the author, who only fails to mention the biserial alternating arrangement of early chambers and radiate aperture. With regard to the above mentioned characteristics, given by the author and observed in the specimen, the generic name *Glandulina* is maintained.

Nodosaria calomorpha Reuss

Grzybowski J., 1896, p. 293, Pl. X, fig. 31 (slide no. 69a, b, c);
recte: *Nodosaria cylindracea* Reuss

Pl. IV, fig. 12

"*Nodosaria calomorpha* Reuss. Ds. d. A. W. Bd. 25. S. 129. T. I. Fig. 15—19."

"This species is known from Oligocene only, where it occurs in two-chamber forms. Rare in red clays, very rare in marls."

In the collection there have been preserved three vials with specimens thus determined. The specimen shown in Fig. 31 (slide 68c), from red clays, has the dimensions: Length 0.62 mm, width of apertural chamber 0.25 mm, width of early chamber 0.20 mm. Aperture terminal, radiate. As regards the shape and arrangement of chambers, these specimens can be included with *Nodosaria cylindracea* Reuss. This species, quoted by J. Cushman (1946, p. 76, Plate XXVII, Fig. 33) from the Upper Cretaceous, is most consistent with Grzybowski's specimens from Wadowice.

Nodosaria cornuta Batsch

Grzybowski J., 1896, p. 293, Pl. X, fig. 8 (slide no. 71);
recte: *Nodosaria comatula* Cushman

Pl. IV, fig. 9

"*Nodosaria cornuta* Brady. Chall. rap. S. 509. Tab. LXIV. Fig. 1—5."

"Test pear-shaped, composed of three low and wide chambers, increasing in size. Last chamber almost as high as the two preceding ones taken together, twice as wide as the first one; at the distal end there is a rounded, knoblike elevation with a circular aperture in its centre. Costae characteristically arranged along the test. Two early chambers have uniform costae with finer lists inserted between them on the first chamber, reaching half the first

chamber or somewhat higher. On the third chamber, at the suture, there begin thicker costae which alternate with lower ones and reach the base of the knob-like elevation where they disappear. Dimensions: length 1 mm, biggest width 0.8 mm. Form very rare in red clays."

In the collection there is one very well preserved specimen, consistent with the description and illustration of the author, who used incorrectly the name *N. cornuta* Batsch instead of according to H. Brady (1884, p. 509, Plate 64, Fig. 1—5), *N. comata* Batsch. Since the original species *Nautilus* (*Orthoceras*) *comatus* Batsch does not correspond to *Nodosaria comatus* Batsch in Brady's study (1884), J. Cushman (1923), p. 83, Plate 14, Fig. 5) created a new species, *N. comatula*, and included *N. comata* (non Batsch Brady) with its synonyms. Grzybowski's description and illustration of the form, as well as very numerous specimens only from the Cretaceous of Woźniki (red marls), wholly correspond to the species of Cushman.

Dentalina subtilis Neugeb.

Grzybowski J., 1896, p. 294, Pl. X, fig. 11 (slide no. 73);
recte: *Dentalina* cf. *communis* (d'Orb.).

Pl. IV, fig. 14

"*Dentalina subtilis* Hantken. l.c. S. 33. T. III. F. 13."

"Test composed of 6 chambers. Early chambers as high as wide, followed by elongated ones; all chambers separated by diagonal depressed sutures. Last, biggest chamber has an eccentric radiate aperture on a short bill. Form very rare in red clays."

In the collection one specimen in 0.9 mm long; other dimensions: thickness of last (apertural) chamber 0.15 mm, thickness of early chamber 0.10 mm. Test slightly bent, of an almost equal thickness, composed of 8 chambers separated by diagonal, linear, very slightly, depressed sutures. Initial chamber pointed at the bottom; early chambers (3) not so high as wide; following ones increase in size so that last but one chamber is twice as high as wide. Apertural chamber elongated, in the form of a short inclined bill with radiate aperture at the distal end. Peripheral margin (on the concave side) forms a straight line; on the ventral side inflated chambers form a slightly lobate margin. This form corresponds to *Dentalina communis* (d'Orb.).

Dentalina indifferens Reuss

Grzybowski J., 1896, p. 295, Pl. X, fig. 12 (slide no. 74);
recte: *Dentalina* cf. *megalopolitana* Reuss

Pl. IV, fig. 15a, b

"*Dentalina indifferens* Rss. Sb. d.A.W. Bd. 48. S. 48. T. II. F. 15, 16."

"A fragment without last chamber. Embryonic chamber round, bigger than the next one. Following chambers as high as wide, square in cross-section, with linear sutures, passing slowly into inflated ones with depressed sutures. Very rare in red marls."

Under this name in the collection there are two fragments without apertural chambers; one of them is shown in Fig. 12. Test in the form of a cylinder slightly wider at the top, somewhat bent. Early chamber in one specimen subrounded, in the other with a short spine. Septa linear transparent, horizontal. Early chambers not so high as wide at the beginning, then as high as wide. These fragments should be included with *D. megalopolitana* Reuss from the Upper Cretaceous.

Dentalina laticollis n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 295, Pl. X, figs. 13—14 (slide no. 75);
recte: *Dentalina laticollis* Grzybowski

Pl. IV, fig. 16

One specimen and two fragments have been preserved in the collection. Dimensions of the preserved specimen: length 1.3 mm, width of embryonal chamber 0.3 mm, width of next chamber 0.25 mm, width of apertural chamber 0.3 mm. Test of the complete specimen slightly bent, cylindrical; initial portion subrounded, with a slight narrowing above the embryonic chamber. Seven chambers not as long as wide, separated by thick, undepressed sutures. Aperture terminal, closer to the dorsal side. This species is quoted by H. Huss (1957) from the Upper Cretaceous sub-Silesian unit of the Flysch Carpathians, and by A. Hillebrandt (1962) from the Cretaceous and Paleocene Alps.

Dentalina acuticauda Reuss

Grzybowski J., 1896, p. 295, without illustration (slide no. 77);
recte: *Ellipsonodosaria* div. sp.

Pl. IV, fig. 17

"*Dentalina acuticauda* Rss. Z.d.d.g. Bd. III. S. 62. T. III. F. 8. Gumb. 1. c. S. 46. T.I.F. 40."

"The specimen from Wadowice is more consistent with Gümbel's illustration because of a more marked roundness of upper chambers. Rare in marls."

In Grzybowski's collection there are a few fragments with shining surface, slightly arched, representative of early and mature stages of

specimens without embryonic and apertural chambers. No complete specimens have been preserved. Early portions of test, markedly narrowing, are composed of a few chambers initially not as high as wide. Sutures linear, slightly depressed. In late apertural portions of tests chambers as high as wide or higher. They are separated by depressed sutures and have inflated walls. In some fragments on late chambers there can be seen tiny, dense costae, more distinct in the neighbourhood of the sutures. Aperture damaged, visible on one single chamber, wide, not radiate, similar in shape to that of *Ellipsonodosaria*. These fragments may represent two species, i.e. *E. verneuili* (d'Orb.) and *E. jarvisi* Cushman, known from the Uppermost Cretaceous and Eocene. *Dentalina acuticauda* Reuss is a much smaller form, 0.8—1.2 mm long, having 15—16 chambers, while the preserved fragments which have, e.g., 6 chambers are already 1.5 mm long, their total length being estimated at over 3—4 mm. Besides, the illustration of Reuss's holotype shows chambers not so wide as high, cylindrical in shape even in the apertural portion.

Dentalina deflexa n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 295, Pl. X, fig. 15 (slide no. 78);
recte: *Ellipsoidella deflexa* (Grzybowski)

Pl. IV, fig. 18a, b

In the collection there has been preserved one specimen, whose general outline is consistent with the author's illustration. However, the arrangement of chambers observed in the specimen, as well as the shape of aperture, do not correspond to the description and illustration. With regard to a biserial, alternating arrangement of chambers in early portion of the test, then passing into a uniserial arrangement with oblique sutures and an arcuate, slit-like aperture with a lip, this specimen should be included with *Ellipsoidella*.

Almost identical forms are described by D. J. Belford (1960) under the name *Ellipsoidella binaria* Belford from the Upper Cretaceous of Australia. Grzybowski's specimen differs from them only in having no notch in the lower part of the apertural slit; for that reason the specific recte: *Lingulina dentata* Grzybowski

Lingulina dentata n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 296, Pl. X, fig. 19 (slide no. 81);
recte: *Lingulina dentata* Grzybowski

Pl. V, fig. 2

In the collection there is one specimen without initial chamber, cuneiform, with an oval cross-section. Dimensions: length 0.65 mm, biggest width (of the last chamber) 0.25 mm, thickness 0.2 mm. In transmitted

light there can be seen markedly embracing, chevron-shaped chambers. Sutures very slightly depressed, flat. Aperture terminal, elliptical. Surface smooth, shining. This form does not correspond to *L. tuberosa* Güm-
bel (incorrectly named "tuberculosa" by Grzybowski), since the latter has spherical chambers, deep sutures and much bigger dimensions (length 3.3 mm). Grzybowski's specimen is very similar to *L. sadeki* Said Barakat (fide Cat. E. et M.), described from the Lower Cretaceous of Egypt. The latter species is only less flattened and has a rounded peripheral margin.

Cristellaria cymboides D'Orb.

Grzybowski J., 1896, p. 296, Pl. X, fig. 20 (slide 85);
recte: *Pyrulinoides* cf. *elliptica* Marie.

Pl. V, fig. 3

"*Cristellaria cymboides* d'Orb. Tab. X, Fig. 29 (Tab. III, fig. 30—31)."

"*Cristellaria cymboides* Hantken l.c. S. 49. T. V. F. 3."

"*Cristellaria cymboides* Grzybowski. Mikrofauna piask. karp. S. 13. T. III, F. 1."

"Specimen from Wadowice show certain deviation from d'Orbigny's form and are more similar to the specimen copied by Hantken; they are characterized by a more pronounced narrowing of the initial portion of test. In general, they are smaller than the forms coming from Folusz near Dukla. Rare in red clays, very rare in marls."

The collection contains one specimen with an outline consistent with the author's illustration, yet not identical with *Cristellaria* in the arrangement of chambers. Test fusiform, with an oval cross-section. Dimensions: length 0.75 mm, biggest width (at half-length of the test) 0.25 mm, thickness 0.23 mm. Chambers biserially arranged, alternating, markedly embracing; sutures slightly oblique, not depressed, flat. Aperture terminally rounded radiate. Test surface smooth, lustrous. This type of structure determines that this form is included with *Pyrulinoides*. The preserved specimen is virtually identical with *P. elliptica* Marie (1941), described from the Upper Senonian — Campanian (horizon with *Belemnitella mucronata*) of the Paris Basin.

Cristellaria lunaria n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 297, Pl. X, fig. 21 (slide no. 84);
recte: *Lagena? lunaria* (Grzybowski)

Pl. V, fig. 1 a, fig. 1 b (specimen from Ubionka)

The preserved specimen is more or less consistent with the author's illustration, yet it does not show the division into chambers in transmitted light, but forms one chamber with the aperture at the thicker

end. Oblique sutures, mentioned by the author, are fractures of the thin test wall. Forms identical in size and shape were found in Upper Cretaceous marls from Ubionka near Wadowice.

Cristellaria concava n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 297, Pl. X, fig. 22 (slide no. 86);
recte: *Lenticulina? concava* (Grzybowski)

Pl. V, fig. 4 a, b

The preserved specimen is consistent in a general outline with the illustration and description of Grzybowski. Test damaged on dorsal margin, which is shown in the picture. Dimensions of the preserved form are somewhat smaller than those reported by the author: length 1.25 mm (length given by Grzybowski — 2 mm), width 0.65 mm, thickness 0.45 mm. Dorsal margin and margin of the coiled portion sharp. Apertural face widely rounded, slightly concave in the centre. Test somewhat evolute; coiled portion takes up ca. 1/3 of the test length. In immersion fluid visible are only the last 5—6 chambers, which are triangular, low, arcuate; they pass steeply down and become narrower towards the coiled portion. The number of chambers in the coiled portion indeterminable. Sutures invisible on the surface. Arrangement of sutures and shape of chambers distinct in immersion fluid only; they do not correspond to Grzybowski's illustration. Rare in red shales from Woźniki.

Cristellaria Kochi Rss.

Grzybowski J., 1896, p. 297, Pl. X, fig. 23 (slide no. 87);
recte: *Lenticulina* cf. *grata* (Reuss)

Pl. V, fig. 5 a, b

"*Cristellaria Kochi* Rss. D.s.d.A.W. Bd. XXV. S. 139. T. II. F. 35, Cr. Kochi Hantken 1. c. S. 53. T. V. F. 7."

"Test consistent with Reuss's form; frontal outline of test only somewhat less incised in its lower part. Rare in red clays."

Two specimens in the collection correspond in a general outline to the author's illustration, but have a greater number of chambers. Test elongated, slightly flattened at sides; peripheral margin subacute; apertural face convex. Coiled portion takes up ca. 1/3 of the test length and has a subacute margin. Approximately 14—15 triangular chambers; sutures linear, transparent, markedly arcuate, reaching the coiled portion. The specimens from Grzybowski's collection differ from *C. Kochi* Rss. in having a greater number of chambers, a much bigger coiled portion

and a considerably smaller lateral flattening. They resemble best *Lenticulina grata* (Reuss), but because of a small number of specimens this name is transferred to *L. cf. grata* (Reuss) (A. Reuss, 1863).

Cristellaria abscisa n. sp.

Grzybowski J., 1896, p. 297, Pl. X, fig. 24 (slide no. 88);
recte: *Lenticulina abscisa* (Grzybowski)

Pl. V, fig. 7 a, b

The collection contains two specimens consistent with the author's description and illustration; their dimensions are only somewhat bigger; biggest diameter (height) 1.35 mm, smaller diameter (width) 1.0 mm thickness 0.65 mm. Test oval, peripheral margin subacute. Coiled portion reaches half length of the test. Apertural face triangular with rounded margin, slightly concave in the centre. Nine triangular chambers are visible in the last whorl. Sutures flat, poorly transparent, arcuate, not marked on the surface of test. Aperture terminal, radiate. This form is very similar to *Lenticulina gibba* (d'Orb.) f. *trucata* Rss. (A. Franke, 1928, p. 106, Plate IX, Fig. 24 a, b). The latter form is smaller and has a flat apertural face, while Grzybowski's specimens have apertural face concave in the centre. *L. abscisa* (Grzybowski) is common in the Cretaceous formation of Woźniki.

Robulina kressenbergensis Gümbel

Grzybowski J., 1896, p. 297, Pl. X, fig. 25 (slide no. 89);
recte: *Lenticulina macrodisca* (Reuss)

Pl. V, fig. 6 a, b

"*Robulina kressenb.* Gümb. 1. c. S. 63. T. I. F. 71."

"Test somewhat less convex than in Gümbel's specimens. Central elevation marked, as well, yet not forming a distinct umbilical plug. Rare in red clays."

One specimen in the collection poorly preserved, in a general outline consistent with the author's illustration. Dimensions: bigger diameter 1.35 mm, smaller diameter 1.1 mm, thickness 0.75 mm. Test oval; peripheral margin acute. Coiled portion takes up over half of the test. Apertural face flat, rimmed; aperture elliptical, not radiate. Sutures almost indistinct even in immersion fluid, fairly arcuate; approximately 8 chambers in the last whorl. Umbilical plug visible on the surface of test only because of a brighter colour and inconsiderable elevation. Wall surface smooth. This form is similar in dimensions, shape and structure to *L. macrodisca* (Reuss). The latter species is very rare in variegated shales from Woźniki.

Robulina subangulata Reuss. var.

Grzybowski J., 1896, p. 298, without illustration (slide no. 90);
recte: *Lenticulina subangulata* (Reuss)

Pl. V, Fig. 9 a, b

"*Robulina subangulata* Rss. S. b. d. A. W. Bd. 48. S. 53. T. VI. F. 64."

"Test circular, markedly convex. Peripheral margin acute, subrounded; sutures linear. It differs from Reuss's form in having sutures ending at a poorly elevated umbilical plug which is less distinct at the top and more visible at the bottom. These details are not given in Reuss's description; this author observes only that sutures do not reach the centre. Form rare in red clays."

One specimen in the collection, despite being damaged, corresponds to the species determined by the author. However, it has a polygonal outline. Sutures flat, towards peripheral margin somewhat elevated. *L. subangulata* (Reuss) is very rare in red shales from Woźniki.

Robulina cincta Grzyb. (Cat. E. M.)

Grzybowski J., 1896, p. 298, Pl. X, fig. 30 (slide no. 91);
recte: *Lenticulina* cf. *cultrata* (Montfort)

Pl. V, fig. 8 a, b, c

"*Robulina cincta* Grzybowski l.c. S. 15. T. III, fig. 19."

The collection contains two fairly damaged specimens, consistent with the author's description and illustration (Grzybowski J. 1894). Dimensions of the better preserved specimen: bigger diameter 0.6 mm, smaller diameter 0.55 mm, thickness 0.3 mm. Test oval, biconvex; peripheral margin acute, with a fairly wide keel deeply incised into the apertural face. In the last whorl 7--8 chambers are visible. Sutures flat, markedly, arcuate, translucent. Umbilical plugs marked on both sides; they are fairly big, elevated, hyaline. These forms best resemble *L. cultrata* (Montfort); A. Hillebrandt (1962) includes Grzybowski's specimens with the synonyms of the latter species.

Robulina pectinata n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 298, Pl. X, fig. 27 (slide no. 92);
recte: *Lenticulata* cf. *cultrata* (Montfort)

In the collection there are a few specimens corresponding to the author's description and illustration. The preserved forms, both under the name *Robulina cincta* n. sp. and *R. pectinata* n. sp., belong to the

same species and can be included, as already suggested by Grzybowski in his description of *R. pectinata*, with *Lenticulina cultrata* (Montfort).

Flabellina n. sp. ind.

Grzybowski J., 1896, p. 299, pl. X, fig. 28 (slide no. 83);
recte: *Neoflabellina* sp.

Pl. V, fig. 12

One juvenile specimen in the collection.

Globigerina triloba Rss.

Grzybowski J., 1896, p. 300 (slide no. 94, 97);
recte: *Globigerina triloculinoidea* Plummer, pars *G. linaperta* (Finlay)

Pl. VI, fig. 8 (*G. triloculinoidea* Plummer)

"*Globigerina triloba* Rss. D.s.d.A.W. Bd. I. S. 10. T. II. F. 11, *Gl. triloba* Hantken. 1. c. S. 69. T. VIII. F. 1."

"Minute specimens, corresponding in size to Hantken's forms from beds with *Clavulina Szaboi*. Very common in marls, common in green clays."

Apart from some damaged and indeterminate specimens, the collection vials with the above mentioned specific name contain a few better preserved forms representing the species *Globigerina triloculinoidea* Plummer and *G. linaperta* (Finlay).

Globigerina bulloides d'Orb.

Grzybowski J., 1896, p. 300 (slide no. 95, 96);
recte: *Globigerina* sp. indet., pars. *G. varianta* Subbotina and *G. cf. velascoensis* Cushman.

Pl. VI, fig. 9, 10

"*Globigerina bulloides* d'Orb. 1. c. S. 163. T. IX. F. 4—6. *Globigerina bulloides* Hantken, 1. c. S. 69. T. VIII. F. 1."

"Rare in marls and green clays."

In the collection vials with this specific name contain damaged and indeterminate specimens of *Globigerina* sp. and one specimen of *G. cf. varianta* Subbotina (slide 96). This species, referred to as *Globigerina*, was reported from the Paleocene by N. Subbotina (1953), N. J. Masłakowa (1959), E. K. Shutskaia (1960), O. Samuel and J. Salay (1968) and A. Jednorowska (1976); other authors, e.g. A. Hillebrandt (1962), W. A. Berggren (1965) regarded it as *G. varianta* (Subbotina). E. W. Mjatluk (1970) quotes this form from the Paleocene as *Subbotina varianta* (Subbotina).

Pullenia compressiuscula var. *quadriloba* Rss.

Grzybowski J., 1896, p. 300, Pl. XI, fig. 1 (slide no. 101);
recte: cf. *P. jarvisi* Cushman.

Pl. V, fig. 10

"*Pullenia quadriloba* Rss. Sb. b. A. W. Bd. LV. S. 71. T. III. F. 8."

"Test circular, composed of 4 chambers spirally coiled. Chambers large, inflated; peripheral margin rounded, lobate. Sutures depressed, arcuate, convex towards younger chambers. The latter characteristics are not observed in Reuss's Miocene forms whose sutures are straight, but can be seen in *Pullenia compressiuscula* var. *quadriloba* from "Septarien tone" (Zd. d. g. G. Bd. III, s. 71, Tab. V, F. 31). Aperture slit-like, arcuate, at the base of apertural face. Diameter 0.4 mm. Rare in marls."

In the collection there are three very poorly preserved specimens whose dimensions are smaller (diameter 0.25 mm) than those given by the author. Similarly, Grzybowski's description and illustration are not precise, since each form has 5 poorly inflated chambers. These specimens correspond best to *P. jarvisi* Cushman.

Truncatulina propinqua Reuss

Grzybowski J., 1896, p. 301, Pl. XI, fig. 3 (slide no. 102);
recte: *Cibicides (Cibicidoides) richardsoni* Bermudez

Pl. V, fig. 13 a, b

"*Truncatulina propinqua* Rss. Sb. d. A. W. Bd. 18. S. 24. T. IV. F. 53. Hantken. l.c. S. 71. T. VIII. F. 9."

"Test circular, lenticular; peripheral margin acute. On the ventral side distinct last whorl, composed of 12—13 chambers. Chambers low, triangular, with straight sutures converging in a small umbilical depression. On the dorsal side there can be seen 2.5 whorls with a distinct central chamber. Aperture interiomarginal. This form corresponds better to Hantken's specimens than to Reuss's. Rare in green marls."

One preserved specimen belongs to the genus *Cibicidoides*. Dimensions: diameter 0.45 mm, thickness 0.25 mm. The ventral side more convex than it is indicated by the author; peripheral margin acute. On the dorsal side there can be seen 2.5 whorls; the last whorl has approximately 12 chambers. Sutures arcuate, limbate. One whorl on the ventral side; sutures slightly arcuate, somewhat depressed; umbilicus large, covered with a hyaline knob. This form does not correspond to the species described by A. Reuss (1856) and M. Hantken (1875), but is virtually identical with *Cibicides (Cibicidoides) richardsoni* Bermudez (fide Cat. E. M.).

Pulvinulina Karreri Rzehak (Cat. E. M.)

Grzybowski J., 1896, pp. 302—303, Pl. XI, fig. 8 (slide no. 105);
recte: *Eponides karreri* (Grzybowski).

Pl. VI, fig. 3 a, b, c

"*Pulvinulina Karreri* Rzehak. Verh. d. g. R. A. 1888. S. 228."

In the collection there are two vials containing, under this specific name, some fairly damaged specimens belonging to the genus *Eponides*.

In one of the vials (no. 105) there is one specimen corresponding with the description of J. Grzybowski, however with 7 chambers. In the same vial (no. 105) there is also *Eponides umbonatus* (Reuss) (Pl. V, fig. 14 a, b).

Pulvinulina Haidingeri d'Orb.

Grzybowski J., 1896, p. 303, Pl. XI, fig. 12 (slide no. 107);
recte: *Eponides cf. candidulus* (Schwager).

Pl. VI, fig. 6 a, b

"*Rotalina Haidingeri* d'Orb. l.c. S. 154. T. VII. F. 7—9. *Pulvinulina Haidingeri* Hantk. l.c. S. 77. T. XV. F. 10."

"Test circular; peripheral margin acute, with a rounded outline. Ventral side inconspicuously convex; dorsal one markedly convex, almost conical. Last whorl on the ventral side reveals 6 triangular chambers with sutures slightly depressed, almost straight, with a small umbilicus in the centre. On the dorsal side there can be seen 3 narrow whorls; sutures of chambers oblique, very distinct. Aperture normal. The illustrations of Hantken and d'Orbigny differ somewhat between one another as regards the number of chambers (8 in Hantken's illustration, 6 in d'Orbigny's); besides, Hantken's specimen is also less convex on the ventral side. Forms from Wadowice have the same number of chambers as Miocene ones, but are less convex on the ventral side and their sutures are more distinct, like in Hantken's specimens. Diameter 0.5 mm. Rare in green clays."

The preserved specimen is almost identical with the description and illustration of Grzybowski; however, sutures on the ventral side are not "almost straight" but sinuate, reaching a transparent, flat umbilical plug which is not marked in the illustration. The form is almost identical with *Eponides candidulus* (Schwager). Because of too little material for examination (one specimen) and its fairly poor condition, the specimen is included with *E. cf. candidulus* (Schwager).

Pulvinulina megastoma Rzehak (Cat. E. M.)

Grzybowski J., 1896, p. 303, Pl. XI, fig. 9 a, b, c;
recte: *Gyroidina megastoma* (Grzybowski).

Pl. VI, fig. 4

“*Pulvinulina megastoma* Rzehak. V. d. g. R. A. 1888. S. 228.”

The collection of species determined by Grzybowski does not include a vial with an original specimen. In the remaining material, not determined by Grzybowski, as well as in red shales from Woźniki there are forms corresponding to those described and illustrated by this author. Their test is trochospiral; dorsal side inconsiderably convex, ventral one markedly convex. On the dorsal side there can be observed 2.5—3 whorls; the last whorl has 5 chambers and is separated by a slight depression from earlier whorls. Sutures on the dorsal side diagonal, arcuate, somewhat depressed; they are more depressed on the peripheral margin, giving a slightly notched outline of the test. On the ventral side there are 5 triangular chambers. Sutures almost indistinct, transparent, in some forms very slightly depressed, inconsiderably “s”-shaped. Apertural face fairly large, with a slit-like aperture at the base, extending more or less from its centre to umbilicus (interiomarginal). Aperture with a narrow lip. Umbilicus small, very slightly depressed. Dimensions of the preserved specimens: diameter ca. 0.5 mm, thickness ca. 0.37 mm. This species has been reported and described by many authors, e.g., M. F. Glaessner (1937), F. Bieda (1946), N. N. Subbotina (1950), E. W. Mjatluk (1953), V. Homola and E. Hanzlikova (1955), F. Huss (1957), A. Hillebrandt (1962), H. Jurkiewicz (1967), J. Szczechura and K. Pożaryska (1974), J. Jednorowska (1975) as *Eponides megastoma* (Grzybowski). With regard to the structure of the form, E. Hanzliková (1969, 1979) correctly transfers the genetic name *Pulvinulina* to *Gyroidina*. *G. megastoma* (Grzybowski) is found in the Cretaceous and Paleocene of the Carpathians.

Pulvinulina subcandidula n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 303, Pl. XI, figs. 10—11 (slide no. 103, 104);
recte: *Eponides subcandidulus* (Grzybowski).

Pl. VI, fig. 1 a, b

In the collection there have been preserved specimens thus determined from red clays (slide 103) and marls (green) (slide 104). Besides, the remaining material contains a considerable amount of forms belonging to this species. Although it was not possible to identify the specimens shown in Grzybowski's illustrations, yet all the preserved forms coming from red clays (marls) (slide 103) correspond to the author's description and illustration (Fig. 10). On the other hand, two specimens

from green marls (slide 104), bearing the same specific name *P. subcandidula*, have dimensions considerably smaller (diameter 0.25—0.30 mm) than those given by Grzybowski (diameter 0.6—0.9 mm). Due to their poor condition, these specimens are indeterminate (*Cibicidoides* sp. indet.).

The dimensions of forms from red clays (slide 103) agree with those given by Grzybowski. Their tests are lenticular. Dorsal side less convex, ventral one distinctly convex. Peripheral margin acute, slightly notched. On the dorsal side distinct last whorl with approximately 8 chambers. Internal whorls inconspicuous, forming a central elevation. Sutures in the last whorl linear, very slightly depressed and somewhat oblique, arcuate. On the ventral side triangular chambers, very considerably inflated, separated by straight sutures, more depressed between last chambers. Sutures disappear towards umbilicus. Umbilicus almost flat, occasionally with an inconspicuous depression in the centre. Due to the character of their structure, these forms belong to the genus *Eponides* and have been often reported as *E. subcandidulus* from the Upper Cretaceous by F. Huss (1957), A. Jednorowska (1957), J. Liszkowa (1957), and from the Paleocene by J. Morgiel (1959), A. Hillebrandt (1962) and A. Jednorowska (1975), J. Szczechura, K. Pożaryska (1974).

Rotalia Römeri Reuss

Grzybowski J., 1896, p. 304 (without illustration) (slide no. 108, 109);
recte: *Cibicides (Cibicidoides) proprius* Brotzen.

Pl. VI, fig. 2 a, b

“*Rotalia Roemeri* Rss. Sb. d. A. W. Bd. XVIII. T. IV. F. 12. S. 240, *Rotalia Roemeri* Rss. Grzybowski l.c. S. 24. T. IV. F. 12.”

The collection contains 2 specimens, of which one — damaged — cannot be determined. The other (slide 108) form is included at genus *Cibicides (Cibicidoides)* and resembles best *C. proprius* Brotzen (Cat. Foram. Ellis and Messina), quoted from the Paleocene and Lower Eocene K. Pożaryska (1965), K. Pożaryska, J. Szczechura (1968), J. Szczechura, K. Pożaryska (1974).

Rotalia Dunikowskii n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 304, Pl. XI, fig. 14 (slide no. 110);
recte: *Nuttallides dunikowskii* (Grzybowski).

Pl. VI, fig. 5 a, b, c

In the collection there are 5 specimens corresponding to the illustration and partly description of Grzybowski. However, their dimen-

sions are smaller (diameter 0.25 mm, thickness 0.15 mm) than those given by Grzybowski (diameter 0.6—0.8 mm). Tests of specimens bi-convex; peripheral margin notched, acute, with a thin keel. Ventral side much more inflated than dorsal one. On the dorsal side there are 2.5 whorls, hardly visible in immersion fluid. In the last whorl there are approximately 7 chambers. Sutures limbate, between chambers oblique, arcuate. On the ventral side sutures very slightly oblique, somewhat bent towards umbilicus, slightly depressed. Umbo fairly big, flattened, hyaline. Aperture indistinct, slit-like, extraumbilical interiomarginal. Grzybowski's species was quoted in the Polish literature by F. Huss (1957) as *Eponides dunikowskii* from the Upper Cretaceous of the sub-Silesian unit from the Węglówka area. A. Jednorowska (1968) gives a very scant description and illustration of one specimen from the Upper Cretaceous Inoceranian Beds from Szymbark. Grzybowski's forms, originating from marls (green), apart from smaller dimensions and very slightly depressed sutures on the ventral side, are in conformity with *Eponides bronnimanni* Cushman et Renz (1946) from the Paleocene of Lizard Springs from Trinidad, and with *Asterigerina trumpyi bronnimanni* (Cushman et Renz), reported by A. Hillebrandt (1962) from the Paleocene and Lowermost Eocene of Bawaria. However, due to differences in dimensions quantity of chambers, and sutures depressed on the ventral side, the specific name *Nuttallides dunikowskii* (Grzybowski) is maintained.

Rotalia niedzwieckii n. sp. (Cat. E. M.)

Grzybowski J., 1896, p. 104, Pl. XI, fig. 13 (slide no. 111);
recte: *Cibicidoides niedzwieckii* (Grzybowski).

Pl. VI, fig. 7 a, b

The collection contains two specimens, of which one belongs to *Nuttallides dunikowskii* (Grzybowski), described in the preceding entry. The other, better preserved specimen, correspond to the description and illustration of *Rotalia niedzwieckii* (Grzybowski). Dimensions of this form are also somewhat smaller (diameter 0.3 mm, thickness 0.15 mm) than those given by Grzybowski (diameter 0.5 mm). Test of the specimen lenticular; dorsal side more convex than ventral one. Peripheral margin acute, smooth slightly lobate. $2\frac{1}{2}$ — whorls visible on the dorsal side; 7 chambers in the last whorl. On the dorsal side sutures limbate, fairly arcuate, slightly depressed. On the ventral side sutures less arcuate, slightly depressed. Umbilicus very small, not depressed, flat. Aperture in the position typical of *Cibicidoides*, very slightly distinct. Since a similar form has not been found in the accessible literature, the specific name Grzybowski is maintained. A. Jednorowska (1968) describes

this species under the generic name *Eponides* from the Inoceranian Beds of Szymbark (Upper Cretaceous). Grzybowski's specimens come from green clays (marls).

translated by H. Kisielewska and E. Smolak

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EXPLANATION OF PLATE — OBJASNIENIA PLANSZ

Plate — Plansza I

- Fig. 1ab. *Rhabdammina abyssorum* M. Sars pars. = *Rhizammina grzybowskii* n. sp. 1a — holotyp, 1b — paratyp, approx. $\times 30$, (slide no. 9).
- Fig. 2ab. *Rhabdammina subdiscreta* Grzybowski = *Hyperammina subdiscreta* (Grzybowski), 2a — holotyp, 2b — paratyp, approx. $\times 35$, (slide no. 10).
- Fig. 3. *Rhabdammina linearis* Brady = *Rhabdammina cylindrica* Glaessner approx. $\times 35$, (slide no. 11).
- Fig. 4abc. *Rhabdammina annulata* Grzybowski = *Reophax* cf. *subnodulosa* Grzybowski, 4c — in transmitted light, approx. $\times 35$, (slide no. 12).
- Fig. 5ab. *Nubecularia tibia* Jones et Parker = 5a *Hyperammina dilatata* (Grzybowski), 5b — *Reophax* cf. *nodulosa* Brady, approx. $\times 45$, (slide no. 1).
- Fig. 6. *Hyperammina nodata* Grzybowski = *Hyperammina* ? *nodata* (Grzybowski), holotyp, approx. $\times 40$, (slide no. 8).
- Fig. 7ab. *Hyperammina vagans* Brady = *Hyperammina nodata* Grzybowski, approx. $\times 40$, (slide no. 7).
- Fig. 8. *Hyperammina dilatata* Grzybowski = *H. (Pelosina?) dilatata* Grzybowski — holotyp, approx. $\times 40$, (slide no. 6).
- Fig. 9. *Psammospaera fusca* Schultze, approx. $\times 30$, (slide no. 4).
- Fig. 10ab. *Saccammina sphaerica* Brady = *Nodosaria* sp., apertural chamber, 10a — apertural view, 10b — side view, approx. $\times 35$, (slide no. 5).
- Fig. 11. *Haplophragmium wazaczi* Grzybowski = *Ammobaculites wazaczi* (Grzybowski), holotyp, approx. $\times 30$, (slide no. 20).
- Fig. 12. *Reophax duplex* Grzybowski, var. alfa, holotyp, approx. $\times 30$, (slide no. 15).
- Fig. 13. *Reophax duplex* Grzybowski, var. beta = *Rh. pilulifer* Brady, approx. $\times 30$, (slide no. 16).
- Fig. 14. *Reophax pilulifer* Brady, approx. $\times 20$, (slide no. 18).
- Fig. 15. *Reophax guttifera* Brady, var. *scalaria* Grzybowski = *Reophax scalaris* Grzybowski, holotyp, approx. $\times 40$, (slide no. 17).
- Fig. 16ab. *Haplophragmium (Reussina) bulloidiforme*, var. alfa Grzybowski = *Trochammina bulloidiformis* (Grzybowski), holotyp, 16a spiral view, 16b — peripheral view, approx. $\times 30$, (slide no. 22).
- Fig. 17. *Haplophragmium (Reussina) quadriloba* Grzybowski = ?*Trochammina bulloidiformis* (Grzybowski), approx. $\times 30$, (slide no. 21).
- Fig. 18ab. *Trochammina bulloidiformis* (Grzybowski), plesiotyp, approx. $\times 30$, specimen from Woźniki. 18b — polished section.
- Figs 1—17 from Grzybowski's collection, Wadowice loc., fig. 18 from Woźniki.

Plate — Plansza II

- Fig. 1. *Haplophragmium (Reussina) bulloidiforme*, var. beta Grzybowski = *Trochammina globigeriniformis* (Jones et Parker), approx. $\times 40$, (slide 22 beta).
- Fig. 2abc. *Haplophragmium turpe* Grzybowski = *Haplophragmoides turpe* (Grzybowski). 2ab — holotyp, 2c — paratyp, 2a — approx. $\times 55$, 2bc — approx. $\times 50$, (slide no. 19).
- Fig. 3. *Ammodiscus polygyrus* Reuss = *A. angustus* (Friedberg), approx. $\times 35$, (slide no. 25).

- Fig. 4. *Ammodiscus angygyrus* Reuss = *A. angustus* (Friedberg), approx. $\times 35$, (slide no. 24a).
- Fig. 5. *Ammodiscus involvens* Reuss = *A. angustus* (Friedberg), approx. $\times 35$, (slide no. 23).
- Fig. 6ab. *Ammodiscus charoides* Jones et Parker = *Glomospira charoides* (J. et P.), approx. $\times 60$, 6a — side view, (slide no. 28).
- Fig. 7ab. *Ammodiscus gordialis* Jones et Parker = *Glomospira gordialis* (J. et P.), 7b — side view, approx. $\times 60$, (slide no. 29).
- Fig. 8. *Ammodiscus charoides* Jones et Parker = *Glomospira corona* Cushman et Jarvis, approx. $\times 60$, (slide no. 28).
- Fig. 9ab. *Ammodiscus Schoneanus* Siddal = *Plectina* sp., 9a — side view, 9b — opposite side view, approx. $\times 60$, (slide no. 30).
- Fig. 10. *Ammodiscus fallax* Grzybowski = *Trochamminoides* sp., approx. $\times 60$, (slide no. 31).
- Fig. 11. *Trochammina subglobulosa* Grzybowski = *Haplophragmoides subglobulosus* (Grzybowski), holotyp, approx. $\times 100$, (slide no. 35).
- Fig. 12. *Agathammina dubia* Grzybowski = *Rzehakina epigona* (Rzehak), approx. $\times 40$, (slide no. 34).
- Fig. 13ab. *Trochammina intermedia* Grzybowski = *Trochamminoides intermedius* (Grzybowski), holotyp, opposite side views, approx. $\times 40$, (slide no. 36).
- Fig. 14ab. *Trochammina pauciloculata* Brady = *Cystammina pauciloculata* (Brady), opposite side views, approx. $\times 40$, (specimen from residuum).
- Fig. 15. *Trochammina subcoronata* Grzybowski = *Trochamminoides coronatus* (Brady), approx. $\times 35$, (slide no. 39).
- All specimens from Grzybowski's coll., Wadowice loc.
Figs: 2bc, 3, 4, 5, 11 — SE Micrograph.

Plate — Plansza III

- Fig. 1abc. *Trochammina acervulata* Grzybowski, holotyp, 1a — spiral side, 1b — peripheral view, 1c — opposite view, approx. $\times 50$, (slide no. 40).
- Fig. 2ab. *Cyclammina suborbicularis* Grzybowski = *Haplophragmoides (Cribrostomoides) suborbicularis* (Grzybowski), holotyp, 2a — side view, 2b — apertural view, approx. $\times 40$, (slide no. 41).
- Fig. 3ab. *Cyclammina suborbicularis* Grzybowski = *Haplophragmoides (Cribrostomoides) suborbicularis* (Grzybowski) paratyp, 3a — side view, 3b — apertural view approx. $\times 40$, (slide no. 41a).
- Fig. 4. *Textularia flabelliformis* Gümbel = *Aragonia ouezzanensis* (Rey), approx. $\times 70$, (slide no. 46a).
- Fig. 5. *Textularia attenuata* Reuss = *Spiroplectammina* cf. *anceps* (Reuss), approx. $\times 40$, (slide no. 43).
- Fig. 6ab. *Textularia subhaeringensis* Grzybowski, var. alfa = *Spiroplectammina subhaeringensis* (Grzybowski), holotyp, ?macrosphaeric, 6a — approx. $\times 60$, 6b — approx. $\times 70$, (slide no. 44).
- Fig. 7ab. *Textularia subhaeringensis* Grzybowski, var. beta = *Spiroplectammina subhaeringensis* (Grzybowski), ?microsphaeric, approx. $\times 70$, (slide no. 45).
- Fig. 8. *Textularia calix* Grzybowski = *Dorothia crassa* (Marsson), approx. $\times 60$, (slide no. 47).
- Fig. 9abcd. *Verneulina Szajnochae* Grzybowski = *Reussella (Pyramidina) szajnochae* (Grzybowski), 9a — holotyp, 9bcd — paratyp, approx. $\times 60$, (slide no. 50).
- Fig. 10ab. *Bigenenerina nuda* Grzybowski = *Ellipsodimorphina subcompacta* Liebus, plesiotyp, 10a — side view, 10b — peripheral view, approx. $\times 60$.

- Fig. 11. *Bigenerina brevis* Grzybowski = *Ellipsopolymorphina* sp. indet., approx. × 60, (slide no. 55).
- Fig. 12. *Gaudryina pupoides* d'Orbigny = *Gaudryina modica* Bermudez, approx. × 60, (slide no. 56).
- Fig. 13ab. *Verneuillina abbreviata* Grzybowski = *Dorothia crassa* (Marsson), approx. × 60, (13a — slide no. 49).
Specimens figs: 1—9, 11—13 a from Grzybowski's coll., Wadowice loc., figs. 10ab, 13b — from Woźniki.
Figs: 6b, 7a, 12 — SE Micrograph.

Plate — Plansza IV

- Fig. 1ab. *Clavulina subparisiensis* Grzybowski — *Tritaxia subparisiensis* (Grzybowski), 1a — holotyp, 1b — plesiotyp, approx. × 35, (1a — slide no. 59).
- Fig. 2. *Plecanium sublime* Grzybowski = *Plectina* (*Karrerella*) *coniformis* (Grzybowski), approx. × 55, (slide no. 48).
- Fig. 3ab. *Spiroplecta lenis* Grzybowski = *Plectina lenis* (Grzybowski), 3a — holotyp, 3b — paratyp, approx. × 60 (slide no. 63).
- Fig. 4. *Spiroplecta deflexa* Grzybowski = *Plectina lenis* (Grzybowski), approx. × 70, (slide no. 54).
- Fig. 5. *Bigenerina fallax* Grzybowski = *Plectina lenis* (Grzybowski), approx. × 70, (slide no. 51).
- Fig. 6ab. *Virgulina digitalis* Grzybowski = *Plectina conversa* (Grzybowski), approx. 6a — × 60, 6b — × 50, (slide no. 61).
- Fig. 7ab. *Pleurostomella wadowicensis* Grzybowski, holotyp, 7a — apertural view, 7b — side view, approx. × 20, (slide no. 62).
- Fig. 8. *Pleurostomella Zuberi* Grzybowski = *Ellipsopolymorphina zuberi* (Grzybowski), holotyp, approx. × 55, (slide no. 63).
- Fig. 9. *Nodosaria cornuta* Batsch = *Nodosaria comatula* Cushman, approx. × 30, (slide no. 61).
- Fig. 10ab. *Lagena* (*Cidaria*) *cidarina* Grzybowski and *Lagena* (*Cidarina*) *coronata* Grzybowski = a fragmentsa of *Nodosaria* sp. approx. 10a — × 20, 10b — × 40, (slide no. 67, 68).
- Fig. 11. *Glandulina subinflata* Grzybowski, holotyp, approx. × 40, (slide no. 82).
- Fig. 12. *Nodosaria calomorpha* Reuss = *Nodosaria cylindracea* Reuss, approx. × 50, (slide no. 69).
- Fig. 13. *Lagena orbignyana* Seguenza = *Fissurina orbignyana* (Seguenza), approx. × 40, (slide no. 66).
- Fig. 14. *Dentalina subtilis* Neugeboren = *Dentalina* cf. *communis* (d'Orb.), approx. × 60, (slide no. 73).
- Fig. 15ab. *Dentalina indiferens* Reuss = *Dentalina* cf. *megalopolitana* Reuss, approx. × 30, (slide no. 74).
- Fig. 16. *Dentalina laticollis* Grzybowski, holotyp, approx. × 30, (slide no. 75).
- Fig. 17. *Dentalina acuticauda* Reuss = *Ellipsonodosaria* sp. approx. × 20, fragment, (slide no. 77).
- Fig. 18ab. *Dentalina deflexa* Grzybowski = *Ellipsoidella deflexa* (Grzybowski), holotyp, 18a — apertural view, 18b — side view, approx. × 30, (slide no. 78).
Specimens: figs: 1a, 2—17 from Grzybowski's coll. Wadowice loc., 1b — from Woźniki.
Figs: 3b, 4, 5, 6a — SE Micrograph.

Plate — Plansza V

- Fig. 1ab. *Cristellaria lunaria* Grzybowski = *Lagena* ? *lunaria* (Grzybowski), 1a — holotyp, (slide no. 84), 1b — plesiotyp from Ubionka near Wadowice, approx. $\times 55$.
- Fig. 2. *Lingulina dentata* Grzybowski, holotyp, approx. $\times 40$, (slide no. 81).
- Fig. 3. *Cristellaria cymboides* d'Orbigny = *Pyrulinoidea* cf. *elliptica* Marie, approx. $\times 30$, (slide no. 85).
- Fig. 4ab. *Cristellaria concava* Grzybowski = *Lenticulina concava* (Grzybowski), holotyp, 4a — apertural view, 4b — side view, approx. $\times 20$, (slide no. 86).
- Fig. 5ab. *Cristellaria Kochi* Reuss = *Lenticulina* cf. *grata* (Reuss), 5a — side view, 5b — apertural view, approx. $\times 20$, (slide no. 87).
- Fig. 6ab. *Robulina kressenbergensis* Gümbel = *Lenticulina macrodisca* (Reuss), 6a — side view, 6b — apertural view, approx. $\times 30$, (slide no. 89).
- Fig. 7ab. *Cristellaria abscissa* Grzybowski = *Lenticulina abscissa* (Grzybowski), holotyp, 7a — side view, 7b — apertural view, approx. $\times 20$, (slide no. 88).
- Fig. 8abc. *Robulina cincta* Grzybowski = *Lenticulina* cf. *cultrata* (Montfort), 8a — side view, 8b — apertural view, 8c — in transmitted light, approx. $\times 50$, (slide no. 91).
- Fig. 9ab. *Robulina subangulata* Reuss, var. = *Lenticulina subangulata* (Reuss), 9a — side view, 9b — apertural view, approx. $\times 25$, (slide no. 90).
- Fig. 10. *Pullenia compressiuscula* var. *quadriloba* Reuss = *Pullenia* cf. *jarvisi* Cushman, approx. $\times 55$, (slide no. 101).
- Fig. 11. *Nonionella communis* d'Orb. = *Nonionella* sp. indet. approx. $\times 35$, (slide no. 100).
- Fig. 12. *Flabellina* sp. indet. = *Neoflabellina* sp. juvenile specimen, approx. $\times 40$, (slide no. 83).
- Fig. 13ab. *Truncatulina propinqua* Reuss = *Cibicides (Cibicidoides) richardsoni* Bermudez, 13a — dorsal side, 13b — ventral side, approx. $\times 60$, (slide no. 102).
- Fig. 14ab. *Eponides umbonatus* Reuss, 14a — dorsal side, 14b — ventral side, approx. $\times 90$, (slide no. 105).
- All specimens from Grzybowski's coll Wadowice loc. Except no. 1b from Ubionka near Wadowice.
- Figs: 1ab, 10 — SE — Micrograph.

Plate — Plansza VI

- Fig. 1ab. *Pulvinulina subcandidula* Grzybowski = *Eponides subcandidulus* (Grzybowski), holotyp, 1a — dorsal side, 1b — ventral side, approx. $\times 35$, (slide no. 103).
- Fig. 2ab. *Rotalia Römeri* Reuss = *Cibicides (Cibicidoides) proprius* Brotzen, 2a — dorsal side, 2b — ventral side, approx. $\times 60$, (slide no. 108).
- Fig. 3abc. *Pulvinulina karreri* Grzybowski = *Eponides karreri* (Grzybowski), holotyp, 3a — dorsal side, 3b — ventral side, 3c — peripheral view, approx. $\times 60$, (slide no. 105).
- Fig. 4. *Pulvinulina megastoma* Grzybowski = *Gyroidina megastoma* (Grzybowski), holotyp, peripheral view, approx. $\times 55$, (specimen from residuum).
- Fig. 5abc. *Rotalia Dunikowski* Grzybowski = *Nuttallides dunikowskii* (Grzybowski), holotyp, 5a — dorsal side, 5b — ventral side, 5c — peripheral view, approx. $\times 110$, (slide no. 110).

- Fig. 6ab. *Pulvinulina Haidingeri* d'Orb. = *Eponides* cf. *candidulus* (Schwager),
6a — dorsal side, 6b — ventral side, approx. $\times 110$, (slide no. 107).
- Fig. 7ab. *Rotalia Niedzwiedzki* Grzybowski = *Cibicides (Cibicidoides) niedzwiedzki*
(Grzybowski), holotyp, 7a — dorsal side, 7b — ventral side, approx.
 $\times 80$, (slide no. 111).
- Fig. 8. *Globigerina triloculinoides* Plummer, ventral side, approx. $\times 70$, (slide
no. 97).
- Fig. 9ab. *Globigerina varianta* Subbotina, 9a — spiral view, 9b — ventral view,
approx. $\times 55$, (slide no. 96).
- Fig. 10. *Globigerina* cf. *velascoensis* Cushman, ventral side, approx. $\times 55$, (slide
no. 96).

All specimens from Grzybowski's coll. Wadowice loc.

Figs: 4, 8 SE — Micrograph.











