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Middle Miocene (Badenian) gastropods from Korytnica, Poland; Part II

ABSTRACT: This report is the second part of the monograph of the surprisingly rich assemblage of gastropods occurring in the Middle Miocene (Badenian), so-called *Pleurotoma Clays* in the environs of Korytnica in the Holy Cross Mountains, Central Poland. Presented are new data on the age of the Korytnica Clays, that involved an adjustment in the title of this monograph. Reviewed is also an updated state of recognition of the associated fauna, both invertebrates and vertebrates. The systematic account contains a description of 135 prosobranch species of the ten superfamilies: Melanellacea, Hipponicacea, Calyptraeacea, Strombacea, Cypraeacea, Triviacea, Naticacea, Tonnacea, Muricacea, and Buccinacea, without Nassariidae. Within this assemblage, 11 species are new for the science (including 2 species formerly reported from Korytnica, but determined erroneously), and the other two require to be labelled as a *nomen novum*; of the recognized as many as 90 have not hitherto been known from Korytnica and 83 from the Miocene of Poland. As new species established are: *Leiostraca jaskiewiczi* sp.n., *Melanella* (*Polygyreulima*) *sanctacrucensis* sp.n., *Melanella* (*Polygyreulima*) *korytnicensis* sp.n., *Melanella* (*Polygyreulima*) *montilysensis* sp.n., *Megalomphalus convictor* sp.n., *Nacca unica* sp.n., *Hadriania polonica* sp.n., *Magilus? ficiformis* sp.n., *Coralliophila* (*Coralliophila*) *serraticincta* sp.n., *Pyrene* (*Mitrella*) *korytnicensis* sp.n., and *Cantharus minutulus* sp.n. For two taxa at the species level the new names introduced are: *Purpura* (*Tritonalia*) *kojumdgievae* nom.n., and *Euthria friedbergi* nom.n.

Contents

INTRODUCTION

An unexpectedly long break of time has lasted until the author is able to offer to the readers the second part ot the monograph of the Miocene gastropods from the locality Korytnica in Poland. Throughout these two decades which have elapsed since the appearance of the first part of this monograph (BAŁUK 1975) the gastropod shells have continuously been collected fromover the cropland where the Korytnica Clays are exposed, to enlarge the paleontological material worth of monographic description. Some rare, even large specimens of the gastropods still appear up-to-now on the Korytnica cropland, especially after the spring thawing and late summer ploughing (*see* BAŁUK 1975, p. 10). Such important newest findings, for instance of *Chicoreus aquitanicus* (BASTEROT), will be presented in the *ADDENDA* to the prosobranch gastropods, which are thought to be included in the fourth part of this monograph.

The stratigraphic age of the Korytnica locality has long been regarded, in all papers on the Miocene deposits and/or their fauna of the Fore-Carpathian Depression, as being an equivalent to the *Tortonian Stage*, understood as the *Vienna-type Tortonian*. Since the early seventies, the concept of the Middle Miocene *Badenian Stage* has been entertained to a common use (*see* BAŁUK 1975, p. 10) and this has consequently involved an adjustment in the title of the presented monograph. The more precise age of the Korytnica Clays was established, as based on the calcareous nannoplankton, by MARTINI (1977) who recognized the presence of the nannoplankton zones *NN5* and *NN6*, the studied

interval of which corresponds to the Middle Badenian of the Central Paratethys, and thus to the upper part of the Langhian Stage of the Mediterranean Realm in Italy. Recently, RÖGL & BRANDSTÄTTER (1993) objected MARTINI'S documentation of the Zone *NN6* in the Korytnica sequence and concluded, from the ranges of large foraminifers of the genus *Amphistegina*, upon an early Badenian age of the Korytnica Clays, precisely the Lower Lagenidae Zone within the foraminifer-based subdivision of the Miocene Stage in the Central Paratethys. This latter assignment of the Korytnica Clays to the Lower Badenian was already indicated in the introduction to the first part of the monograph (BAŁUK 1975, p. 10).

In that introduction to the first part of the monograph, the discovery of the Korytnica locality and its fauna was ascribed to ZEUSCHNER, and dated as someabout the twenties of the last century. Meantime, in the back files of the Jagiellonian Library of the Jagiello University in Cracow an old-styled, but published report by JAŚKIEWICZ (1787) has been detected and nowadays reprinted in 450 copies by CZARNIECKI (1978; *see also* BAŁUK & RADWAŃSKI 1979a, pp. 228-230). That very report by JAŚKIEWICZ (1787) gives the first recognized record of the ubiquitous Korytnica fossils which were studied by this author as early as 1782.

The newly presented part of the monograph, similarly as its first part, is based on the materials collected personally by the author. Nevertheless, some rare specimens from other collections have also been taken into account. This primarily concerns the cowries, that is the representatives of the family Cypraeidae, whose specimens were studied from all available collections, both public and private. Thus, the author offers his cordial gratitudes to Mrs E. FIJAŁKOWSKA, M.Sc., of the National Museum in Kielce, Dr. G. JAKUBOWSKI, of the Museum of the Earth in Warsaw, and Dr. S. ŁAPTAŚ, of the Geological Museum of the Polish Academy of Sciences in Cracow. The same gratitudes are extended to all persons who have kindly made an easy access to their private collections, and who often supplied the cowries and other gastropods not only for a loan but also for the author's own. An almost endless list of these persons includes primarily Dr. K. BIŃKA, Mr. J. GUBAŁA, Dr. M. MACHALSKI, Mr. W. MACIOSZCZYK, M.Sc., Mr. W. MIKUCKI, M.Sc., Mr. E. NONIEWICZ, and Mr. A.W. SZCZEPANIK. A remarkable amount of specimens has generously been donated by the late J. CIBOR, a technician of the Paleontology Department of the University of Warsaw, who spent an essential timespan of his short life to collect the Korytnica fossils.

Throughout the last two decades there have also much been advanced diverse studies upon the gastropod-associated fauna of the Korytnica Clays. A new generation of students has remarkable shared its effort in recognition of the Korytnica fossils with that of the former students.

The published results of all these studies include monographs and/or primary descriptions of:

— scleractinian anthozoans, both solitary, *i.e.* ahermatypic (STOLARSKI 1991) and colonial, *i.e.* hermatypic (RONIEWICZ & STOLARSKI 1991), as well as of sea pens (BAŁUK & PISERA 1984);
— tube-dwelling polychaetes (RADWAŃSKA 1994a), and opercular caps (*calottae*) of the genus *Vermiliopsis* SAINT-JOSEPH, 1894, recognized as a new group of microfossils (RADWAŃSKA 1994b);
— brachiopods (BARCZYK & POPIEL-BARCZYK 1977, RADWAŃSKA & RADWAŃSKI 1984), ctenostomate boring bryozoans (BAŁUK & RADWAŃSKI 1979b) and free-living cheilostomate bryozoans (BAŁUK & RADWAŃSKI 1977b, 1984b), as well as decapod crustaceans (FÖRSTER 1979) and cuttlefish (BAŁUK 1977, 1984);
— acrothoracican cirripedes of the genus *Trypetesa*, with the first paleobiological account on the fossil species of that genus (BAŁUK & RADWAŃSKI 1991);
— common acorn barnacles (ŚWIERCZEWSKA-GŁADYSZ 1994);
— some echinoderms, precisely the free-living comatulid crinoids (RADWAŃSKA 1987), asteroids (KACZMARSKA 1987), echinoids (MĄCZYŃSKA 1977, 1987), and holothurian sclerites (WALKIEWICZ 1977b);
— elasmobranch and teleost fish remains, represented by their dental and spine material (SCHULTZ 1977, 1979);
— otoliths of the teleost fishes (ŚMIGIELSKA 1979, RADWAŃSKA 1984), recently revised comprehensively by RADWAŃSKA (1992).

Moreover, a series of papers on some selected, smaller taxonomic groups and/or particular genera or species has been presented both by the Polish authors (BAŁUK & RADWAŃSKI 1977a, 1979a,c, 1984a,b; WALKIEWICZ 1977a; SZCZECHURA 1985, 1986; MAŁECKI 1985; STALMACH 1989) and by the foreign authors who either elaborated solely the Korytnica material (KERN 1979, VÁVRA 1979, RÖGL & BRANDSTÄTTER 1993) or included it into larger monographs (SPIEGLER & RÖGL 1992, JANSSEN & ZORN 1994). In consequence of these works, the unique fauna of the Korytnica Clays has recently been referenced and/or re-illustrated in the literature, primarily in the academic textbooks (*e.g.*, PEEL 1987, GOMEZ-ALBA 1988, BOUCOT 1990).

Regardless the above references, it seems reasonable to state that the knowledge on the Korytnica gastropods and their associated biota has increasingly been advanced since the former report of the author (BAŁUK 1975), and that the whole fauna of the Korytnica Clays, being confined to a small Middle Miocene (Badenian) bay developed on the southern slopes of the Holy Cross Mountains in Central Poland, becomes evidently one of the most diversified and the best recognized organic assemblages of Miocene age allover the world.

SYSTEMATIC ACCOUNT

Superfamily **Melanellacea**
Family **Melanellidae**

Genus *Leiostraca* H.&A. ADAMS, 1853

Leiostraca angulatocrassa (SACCO, 1892)
(Pl. 1, Fig. 7)

1892. *Subularia angulatocrassa* SACC.; F. SACCO, p. 17, Pl. 1, Fig. 35.

MATERIAL: One specimen.
DIMENSIONS: Height about 9 mm, width 2.6 mm.

REMARKS: The only collected specimen from Korytnica seems to be compatible with the holotype of the species, coming from the Pliocene deposits at Bordighera in northern Italy. This holotype was re-illustrated, in the form of a photo, by FERRERO MORTARA & *al.*(1984, Pl. 9, Fig. 5). To note, the both specimens bear a trace of an attack of the predatory gastropod, situated at almost the same point of the shell; this obviously has no bearing on their similarity and taxonomic accordance.

The species *Leiostraca angulatocrassa* (SACCO) has not hitherto been known from the Miocene of Poland.

Leiostraca jaskiewiczi sp.n.
(Pl. 1, Figs 5-6)

1837. *Melania subulata* BASTEROT (= *Helix subulata* BROCCHI); G. PUSCH, p. 95.
partim 1853. *Eulima subulata* RISSO; E. EICHWALD, pp. 263-264, *non* Pl. 10, Fig. 4.
1856. *Eulima subulata* DON.; M. HÖRNES, pp. 547-548, Pl. 49, Fig. 20.
1901. *Eulima* (*Liostraca*) *subulata* DONOV.; O. BOETTGER, p. 92.
1923-28. *Eulima* (*Subularia*) *subulata* DON.; W. FRIEDBERG, pp. 438-439, Pl. 27, Fig. 2.
1930. *Eulima subulata* DON.; K. KOWALEWSKI, p. 153.

HOLOTYPE: The specimen (Z.PAL.U.W., No. BkK-G359) presented in Pl. 1, Fig. 6.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.
DERIVATION OF THE NAME: *jaskiewiczi* – in honor of JAN JAŚKIEWICZ (1749-1807), professor of natural history at the Crown High School (Jagiello University) in Cracow, who first recognized the wealth of diverse fossils at Korytnica, the author of the first Polish announcement of the Korytnica fossils (JAŚKIEWICZ 1787).
DIAGNOSIS: Shell very slender, of width/height ratio ranging 0.19–0.21, smooth, without any traces of spiral ornamentation.
MATERIAL: More than 1.000 specimens.
DIMENSIONS: The largest specimen (Pl. 1, Fig. 6) is 13.8 mm high and 2.6 mm wide.

DESCRIPTION: Shell very slender, almost of a needle-like shape. Protoconch composed of about three, slightly convex whorls indistinctly separated from the rest of the shell. Teleoconch attains to 10 almost flat whorls separated each other by very shallow and usually hardly discernible sutures. Surface smooth and lustrous; in specimens better preserved (*see* Pl. 1, Fig. 5), with traces of the growth expressed by lines corresponding to the outer lip; these traces are distributed

ununiformly, usually in the number 3-5 per whorl. Aperture nearly oval, rounded anteriorly, and sharply tapering posteriorly. Outer lip sharp at the margin, smooth innerly; inner lip thin, distinctly turn-out anteriorly. Umbilicus absent.

REMARKS: The studied specimens cannot be assigned to any of the hitherto recognized species, and thus the present author regards them as representing a new taxon at the species level.

This newly established species, quite common at Korytnica has been well known to all former authors, who referred to it either as *Melania subulata* or as *Eulima subulata*, ascribing various creators to these specific names (*see* synonymy). It is apparent, however, that the Korytnica specimens are discordant both with the present-day *Leiostraca subulata* (DONOVAN), and with the fossil forms from the Pliocene of Italy labelled as *Leiostraca subulata* (DONOVAN) or *Leiostraca subulata* (BROCCHI). The present-day forms, to which according to WENZ (1940, p. 833) the correct name is *Leiostraca glabra* (DA COSTA), bear their shell distinctly less slender, with another value of the last-whorl height *versus* the total height ratio (*comp.* GLIBERT 1952b, Pl. 4, Fig. 9). In the Korytnica specimens the width/height ratio amounts 0.19–0.21, and the height ratio of the last whorl to the total height is 0.43–0.44. In the present-day forms of *Leiostraca glabra* (DA COSTA) these ratios are 0.24–0.25 and 0.47–0.53, and in the specimen of *Leiostraca subulata* (DONOVAN) from the Pliocene of Empordá in Spain (*comp.* MARTINELL 1979) 0.23 and 0.47, respectively. Moreover, the present-day forms are told to be sculptured by very delicate spiral striation. The Korytnica specimens bear their surface ideally smooth, as noted already by FRIEDBERG (1923, p. 439).

The holotype of the species *Leiostraca subulata* (BROCCHI), labelled originally as *Helix subulata* BROCCHI and with which PUSCH (1837) synonymized the Korytnica specimens was re-illustrated in the form of a photo by PINNA & SPEZIA (1978, Pl. 26, Fig. 4); it distinctly differs from any of the specimens occurring at Korytnica, and the above-discussed ratios, calculated from that photo, amount about 0.24 and 0.49, respectively.

As may be inferred from the description presented by BOETTGER (1901, p. 92) the specimens conspecific with these from Korytnica occur also at Kostej in Transylvania; as calculated, their width/height ratio amounts 0.20. On the other hand, the specimens from Szob in Hungary (*see* STRAUSZ 1966, Pl. 1, Fig. 1), and from Opansko Bardo in Bulgaria (*see* KOJUMDGIEVA 1960, Pl. 30, Fig. 11) are much more slender and cannot be regarded as conspecific with these from Korytnica.

Leiostraca gigantea (DODERLEIN, 1862)
(Pl. 1, Figs 9-10 and Pl. 38, Fig. 1)

1901. *Eulima* (*Liostraca*) *gigantea* DODERL.; O. BOETTGER, p. 92.

MATERIAL: Forty specimens.
DIMENSIONS: The largest specimen (Pl. 38, Fig. 1) is 15.5 mm high and 3.5 mm wide.

REMARKS: Besides the above described species *Leiostraca jaskiewiczi* sp.n. there also occur at Korytnica, in the oyster shellbed at Mt. Lysa, similar forms slightly larger and less slender. In all specimens of this type, if completely preserved, the width/height ratio amounts 0.23, and that of the height of the last whorl *versus* the total height does 0.43–0.44. In the whole studied material there are no intermediate forms between these and those of *Leiostraca jaskiewiczi* sp.n. As it is apparent from the paper by BOETTGER (1901, p. 92), identical forms occur at Kostej in Transylvania, where there are no intermediate forms to those labelled by BOETTGER (1901) as *Eulima* (*Liostraca*) *subulata* DONOVAN; unfortunately, such forms have never been illustrated. On the data given by BOETTGER (1901) the width/height ratio is calculated as 0.22.

The species *Leiostraca gigantea* (DODERLEIN) has not hitherto been known from the Miocene of Poland.

Leiostraca cf. *acmeodes* (BOETTGER, 1907)
(Pl. 1, Fig. 3)

1907. *Eulima* (*Liostraca*) *subulata* DONOV., var. *acmeodes* n. var.; O. BOETTGER, pp. 104-105.
1934. *Strombiformis subulata acmeodes* (BOETTGER); A. ZILCH, p. 231, Pl. 11, Fig. 83.

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen (Pl. 1, Fig. 3), preserved without apical part of the shell, is 6.3 mm high and 1.5 mm wide.

REMARKS: The two studied specimens are preserved without their apical parts, and thus their determination is uncertain. In the holotype of this species, described from Kostej in Transylvania, a part of the shell that corresponds to the protoconch (and beginning of the teleoconch?) is distinctly less slender that the rest of the shell. Both BOETTGER (1907) as well as ZILCH (1934) regarded this form as a variety of *Leiostraca subulata* (DONOVAN), but the diferences in the shape and size of the shell justify fully to treat it as a separate species.

The species *Leiostraca acmeodes* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Genus *Melanella* BOWDICH, 1822
Subgenus *Polygyreulima* SACCO, 1892

Melanella (*Polygyreulima*) *jepiana* (BOETTGER, 1907)
(Pl. 1, Figs 1-2)

1907. *Eulima* (*Acicularia*) *jepiana* n.sp.; O. BOETTGER, p. 103.
1934. *Melanella* (*Acicularia*) *jepiana* (BOETTGER); A. ZILCH, pp. 232-233, Pl. 11, Fig. 89.

MATERIAL: Eight specimens.
DIMENSIONS: The largest specimen (Pl. 1, Fig. 2) is 5.6 mm high and 1.6 mm wide.

REMARKS: The studied specimens are fully compatible with the holotype of the species coming from Kostej in Transylvania.

The species *Melanella* (*Polygyreulima*) *jepiana* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Melanella (*Polygyreulima*) *jickelii* (BOETTGER, 1901)
(Pl. 2, Figs 10-11)

1901. *Eulima jickelii* n.sp.; O. BOETTGER, p. 91.
1934. *Melanella jickelii* (BOETTGER); A. ZILCH, p. 232, Pl. 11, Fig. 88.

MATERIAL: Four specimens.
DIMENSIONS: The largest specimen preserved without early whorls (Pl. 2, Fig. 11), is 6.3 mm high and 2.6 mm wide.

REMARKS: This assignment of the Korytnica specimens is regarded by the present author as not quite unequivocal. By their size and shape these specimens are very similar to the lectotype described by BOETTGER (1901) from Kostej in Transylvania, but they do not display so thick wall of

the shell as the lectotype does. A characteristic feature of this species is the presence of high whorls allover the shell.

The species *Melanella* (*Polygyreulima*) *jickelii* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Melanella (*Polygyreulima*) *spina* (GRATELOUP, 1838) (Pl. 38, Fig. 2)

1917. *Eulima* (*Polygyreulima*) *spina* (GRAT.); M. COSSMANN & A. PEYROT, pp. 274-275, Pl. 8, Figs 51-52.

MATERIAL: Seven specimens.
DIMENSIONS: The largest specimen (Pl. 38, Fig. 2) is 3.2 mm high and 0.85 mm wide.

REMARKS: The studied specimens are fully compatible, as concerns their size as well as the number of whorls and the general shape, with those reported by COSSMANN & PEYROT (1917) from the Aquitaine Basin. It seems that no difference in morphology of these materials may be detected.

The species *Melanella* (*Polygyreulima*) *spina* (GRATELOUP) has not hitherto been known from the Miocene of Poland.

Melanella (*Polygyreulima*) *korytnicensis* sp.n. (Pl. 1, Fig. 4)

HOLOTYPE: The specimen (Z.PAL.U.W., No. BkK-G371) presented in Pl. 1, Fig. 4.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.
DERIVATION OF THE NAME: *korytnicensis* – Latinized name of Korytnica.
DIAGNOSIS: Shell slender, of width/height ratio ranging 0.32–036, smooth, with traces of earlier apertures positioned at every whorl.
MATERIAL: Twelve specimens.
DIMENSIONS: The largest specimen (Pl. 1, Fig. 4) is 2.8 mm high and 1.0 mm wide.

DESCRIPTION: Shell small, slender, translucent, with smooth and lustrous surface; the width/height ratio amounting 0.32–0.36. Shell attains about 8 whorls, with the proto/teleoconch boundary indiscernible. Whorls weakly convex, separated by distinct sutures. On the surface visible are traces of former apertures, distributed more or less precisely at every 360°. Aperture oval, slightly sharpened posteriorly, rounded anteriorly. Outer lip sharp at the margin, not thickened outerly, smooth innerly; inner lip slightly turn-out.

REMARKS: The studied specimens are slightly similar to those coming from the Aquitaine Basin, and presented by COSSMANN & PEYROT (1917, pp. 275-276, Pl. 8, Figs 53-56) under the name *Eulima* (*Polygyreulima*) *fontinensis* COSSMANN & PEYROT. The Korytnica specimens are distinctly less slender than those from Aquitaine whose width/height ratio amounts 0.2. It is probable, that conspecific with *Melanella* (*Polygyreulima*) *korytnicensis* sp.n. are specimens from Zborów in the Ukraine described by FRIEDBERG (1923-28) as "*Eulima fontinensis* COSSMANN & PEYROT(?)", with a question mark to indicate uncertainty of this assignation. The specimens from Zborów bear the width/height ratio 0.32; it may be noted that a discrepancy is recognizable between the measurements of the largest specimen given in the text by FRIEDBERG (1923, p. 440) and magnification of the figured specimen given in the explanation to its photo (FRIEDBERG 1928, Pl. 27, Fig. 5), what obviously does not matter for the discussed ratio.

Melanella (*Polygyreulima*) *montilysensis* sp.n.
(Pl. 2, Figs 8-9)

HOLOTYPE: The specimen (Z.PAL. U.W., No. BkK-G373) presented in Pl. 2, Fig. 9.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.
DERIVATION OF THE NAME: *montilysensis* – Latinized name of the locality where all the specimens were found, along the northern slopes of Mt. Lysa (*see* BAŁUK 1975, Text-fig. 5).
DIAGNOSIS: Shell slender, smooth, distinctly thick-walled, with relatively low whorls and small aperture.
MATERIAL: Four specimens.
DIMENSIONS: The largest specimen, composed of 7 whorls without early ones, is 6.1 mm high and 2.6 mm wide.

DESCRIPTION: Protoconch not preserved in the studied specimens; teleoconch attains about 9 whorls, all remarkably thick-walled. Whorls low, almost flat, separated by distinct sutures. Surface smooth and lustrous, with trace of former apertures distributed irregularly, usually one, rarely two on the whorl. Aperture oval, tapering posteriorly and rounded anteriorly; relatively small because of thick-walled shell. Outer lip consequently not very sharp at the margin, smooth interiorly, inner lip strongly turn-out.

REMARKS: Within the numerous Melanellidae in the Korytnica material, these 4 specimens distinguish by the thickest wall of their shells, and by the lowest whorls. Of other representatives of this family, also numerous in Kostej in Transylvania and described by BOETTGER (1901, 1907), a thick-walled species is *Melanella jickelii* (BOETTGER), which has, however, all its whorls distinctly higher. When comparing, on the photos, the last but one whorls viewed from their apertural side the height/width ratio amounts: 0.44 in the lectotype of the BOETTGER'S species (*see* ZILCH 1934, Pl. 11, Fig. 88), and 0.38 or 0.39 in the studied specimens from Korytnica. As the recognized bibliography does not contain any species to which these specimens could be assigned, the present author decided to establish herein a new species.

Melanella (*Polygyreulima*) *sanctacrucensis* sp.n.
(Pl. 1, Fig. 8)

HOLOTYPE: The specimen (Z.PAL. U.W., No. BkK-G370) presented in Pl. 1, Fig. 8.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.
DERIVATION OF THE NAME: *sanctacrucensis* – Latinized name of the Holy Cross region.
DIAGNOSIS: Shell slender, almost straight, with a faint bending at its juvenile part, quite smooth, and the last whorl relatively high.
MATERIAL: Six specimens.
DIMENSIONS: The largest specimen (Pl. 1, Fig. 8) is 8.1 mm high and 2.2 mm wide.

DESCRIPTION: Shell slender, generally straight, but slightly tending to arch in the younger part of teleoconch. Shell attains to 12 whorls, with the proto/teleoconch boundary indiscernible; it is more slender at the first three whorls. Whorls weakly convex, separated by distinct sutures. Surface smooth and lustrous. Aperture oval, tapering and acutely bent posteriorly, but gently rounded anteriorly. Outer lip sharp at the margin, not thickened outerly, smooth innerly; inner lip thin and very slightly turn-out. Last whorl rather high, with the ratio of its height to the total height of the shell 0.46–0.49.

(LINNAEUS) is one of the most variable cowries. Undoubtedly, the same may be said about its Miocene progenitor.

The species *Monetaria brocchii* (DESHAYES) has not hitherto been reported from Korytnica, but evidently this very species was illustrated by FRIEDBERG (1912) who determined it as *Cypraea amygdalum* BROCCHI (sic!), and by KOWALEWSKI (1930) who wrote about *Cypraea lanciae* BRUSINA. Unknown from other Miocene localities in Poland.

Genus *Apiocypraea* SCHILDER, 1927

Apiocypraea subamygdalum (D'ORBIGNY, 1852)
(Pl. 11, Fig. 4)

1856. *Cypraea amygdalum* BROCC.; M. HÖRNES, pp. 67-68, Pl. 8, Figs 6-8.
partim 1880. *Cypraea (Aricia) amygdalum* BROCC.; R. HOERNES & M. AUINGER, p. 60, Pl. 8, Fig. 5; *non* Fig. 4.
1894. *Luponia labrosa* var. *miobadensis* SACC.; F. SACCO, p. 43.
1894. *Luponia labrosa* var. *examygdalum* SACC.; F. SACCO, p. 43.
1924. *Cypraea (Adusta) subamygdalum* D'ORBIGNY; M. COSSMANN & A. PEYROT, pp. 357-359, Pl. 9, Figs 22-23; Pl. 10, Fig. 5.

MATERIAL: Eight specimens.
DIMENSIONS: Two of the largest specimens are both 31.5 mm high, 20.3 mm or 20.0 mm wide, and 15.0 mm or 14.9 mm thick, respectively. The w/h ratio ranges 0.625–0.671, t/w ratio does 0.730–0.757, and t/h ratio does 0.466–0.504.

REMARKS: The studied specimens seem to be fully concordant with those from the Vienna Basin, presented by HÖRNES (1856) as *Cypraea amygdalum* BROCCHI. In illustration of that species the dentition is visible along the whole inner lip, but in the text HÖRNES (1856, p. 68) stated that this dentition vanished posteriorly. In two specimens from Korytnica, the surface of the last but one whorl is densely furrowed spirally, the same as in the specimen from Möllersdorf illustrated by HOERNES & AUINGER (1880, Pl. 8, Fig. 4). The Korytnica specimens are certainly conspecific also with those from the Aquitaine Basin presented by COSSMANN & PEYROT (1924), and to which no differences may be indicated.

SACCO (1894) established, for the above-indicated HÖRNES' specimens, two varieties in the species *Luponia labrosa* (BONELLI), and which subsequent authors (SCHILDER & SCHILDER 1971, p. 68) joined into one, treated as the subspecies *Apiocypraea subamygdalum miobadensis* (SACCO). A correction of names used by HÖRNES (1856) and HOERNES & AUINGER (1880), as given by SACCO (1894), is quite right, as when having the BROCCHI's holotype, SACCO (1894, Pl. 2, Fig. 12) recognized that the latter is of a shape different (without limbus!) than the Viennese specimens. This holotype was re-illustrated in the form of a photo by PINNA & SPEZIA (1978, Pl. 20, Fig. Fig. 1).

The species *Apiocypraea subamygdalum* (D'ORBIGNY) has not hitherto been known from the Miocene of Poland. Admittedly, both PUSCH (1837) and HÖRNES (1856) reported *Cypraea amygdalum* BROCCHI from Korytnica, but did not illustrate them; thus, it is impossible to recognize which species they had (*comp.* the successive species). Two specimens from herein were also presented as *Cypraea amygdalum* by FRIEDBERG (1912, Pl. 8, Figs 6-7); this determination is erroneous (*see* synonymy). One specimen, under the latter name, was also mentioned by KOWALEWSKI (1930).

Melanella (*Balcis*) *subdepressa* (BOETTGER, 1901) (Pl. 2, Figs 5-6)

1901. *Eulima subdepressa* n.sp.; O. BOETTGER, p. 90.
1934. *Melanella subdepressa* (BOETTGER); A. ZILCH, p. 232, Pl. 11, Fig. 86.

MATERIAL: Ten specimens.
DIMENSIONS: The largest complete specimen is 5.5 mm high, 2.1 mm wide, and 1.7 mm thick (or *deep*, according to BOETTGER).

REMARKS: The studied specimens are regarded to be fully compatible with those described by BOETTGER (1901) from Kostej in Transylvania. The Korytnica specimens display, however, their last whorl relatively a little higher than the specimen indicated by ZILCH (1934) as the lectotype of the species. This feature is well discernible when comparing the lectotype with the most fully grown specimen (Pl. 2, Fig. 6), which was found complete, but damaged during making its photo.

The species *Melanella* (*Balcis*) *subdepressa* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Melanella (*Balcis*) cf. *colon* (BOETTGER, 1907) (Pl. 2, Fig. 7)

1907. *Eulima* (*Vitreulima*) *colon* n.sp.; O. BOETTGER, p. 163.
1934. *Melanella* (*Balcis*) *colon* (BOETTGER); A. ZILCH, p. 233, Pl. 11, Fig. 91.

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen (Pl. 2, Fig. 7), preserved without aperture, is about 3.5 mm high and about 1.2 mm wide.

REMARKS: The studied specimens, although not completely preserved, seem to be concordant with the unique specimen from Kostej in Transylvania, upon which the species *Melanella* (*Balcis*) *colon* (BOETTGER) was established. The Korytnica specimens also display a relatively high last whorl that amounts over 1/3 of the height of the shell. The height of the last whorl was regarded as a distinctive feature by the creator of the species, who reported it as "*...1/3 nec 1/4...*" (BOETTGER 1907, p. 163). Nevertheless, it should be kept in mind that the Korytnica specimens are slightly larger what certainly corresponds to their more advanced maturity. The number of whorls cannot be compared, as the description of the holotype does not contain any information in this matter. The illustrated specimen from Korytnica (Pl. 2, Fig. 7) possesses 6 whorls preserved.

The species *Melanella* (*Balcis*) *colon* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Superfamily **Hipponicacea**
Family **Fossaridae**

Genus *Megalomphalus* BRUSINA, 1871

Megalomphalus bicarinatus (BOETTGER, 1907)
(Pl. 5, Fig. 3)

1907. *Narica bicarinata* n.sp.; O. BOETTGER, pp. 175-176.
1934. *Vanikoro bicarinata* (BOETTGER); A. ZILCH, p. 247, Pl. 13, Fig. 61.

MATERIAL: Ten specimens.
DIMENSIONS: The largest completely preserved specimen (Pl. 5, Fig. 3) is 1.6 mm high and 1.9 mm wide.

REMARKS: The studied specimens are fully concordant with the single specimen coming from Kostej in Transylvania, and upon which BOETTGER (1907) established the species. In one detail the Korytnica specimens deviate a little from the holotype. Namely, as concerns the last whorl BOETTGER (1907, p. 175) noted i.a. that "*...basi planus et prope umbilicum bicarinatus,...*". In the Korytnica specimens there appears practically one crest along the umbilicus, and between that crest and the marginal one the whorl is either quite plain or it is furnished with a weakly developed, spiral rib that runs medially. The holotype is slightly smaller than the herein illustrated specimen (Pl. 5, Fig. 3), as it is 1.25 mm high and 1.75 mm wide. It worths noting, that one incomplete specimen from Korytnica is a fragment of the whorl about 3 mm wide, being not the last one (presumable it was last but one). This indicates that the shells of the discussed species could attain dimensions much larger (even up to 6-8 mm in width) than those of the hitherto known complete specimens.

The species *Megalomphalus bicarinatus* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Megalomphalus depressus (BOETTGER, 1907)
(Pl. 5, Fig. 7)

1907. *Narica depressa* n.sp.; O. BOETTGER, p. 175.
1934. *Vanikoro depressa* (BOETTGER); A. ZILCH, p. 247, Pl. 13, Fig 60.

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen (Pl. 5, Fig. 7) is 1.7 mm high and 3.0 mm wide.

REMARKS: The studied specimens are evidently conspecific with those described by BOETTGER (1907) from Kostej in Transylvania, although one feature should be remarked. Namely, the Korytnica specimens bear their whorls furnished with a very delicate, dense spiral furrowing, whereas BOETTGER (1907, p. 175) noted that his specimens bear the whorls almost smooth ("*sublaeves*" in the diagnosis of the species). Possibly, this difference results from a variable state of preservation of particular specimens.

The species *Megalomphalus depressus* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Megalomphalus cf. *transsylvanicus* (BOETTGER, 1901) (Pl. 5, Figs 4-5)

1901. *Narica transsylvanica* n.sp.; O. BOETTGER, pp. 161-162.
1934. *Megalomphalus transsylvanicus* (BOETTGER); A. ZILCH, p. 246, Pl. 13, Fig. 56.

MATERIAL: Fourteen specimens.
DIMENSIONS: The largest specimen is 1.5 mm high and 2.0 mm wide.

REMARKS: The Korytnica specimens are assigned to the indicated species tentatively. Their rather poor state of preservation, and a lack of fully grown specimens, makes a comparison with the lectotype coming from Kostej in Transylvania difficult (*comp.* ZILCH 1934, Pl. 13, Fig. 56). The width of the Korytnica specimens does not exceed 2 mm; one specimen, however, bears a fragment of terminal part of the last whorl which allows to estimate it as being about 3 mm wide, that is of the same value as the lectotype. The Korytnica specimens are devoid of a marginal crest along the umbilicus; their axial ribs are more loosely spaced, and a delicate, spiral furrowing between them is discernible. A slightly similar species is *Escharella douvillei* MORGAN reported from the Miocene deposits near Pontlevoy in the Loire Basin (*comp.* MORGAN 1915, p. 229, Text-fig. 11). The specimens of the latter species, when compared with those of Korytnica are slightly smaller, their spiral ornamentation is more pronounced, and their umbilicus distinctly narrower.

The species *Megalomphalus transsylvanicus* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Megalomphalus convictor sp.n. (Pl. 5, Fig. 6 and Pl. 38, Fig. 3)

HOLOTYPE: The specimen (Z.PAL.U.W., No. BkK-G386) presented in Pl. 38, Fig. 3.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.
DERIVATION OF THE NAME: Latin *convictor* – a room-mate, a co-tenant.
DIAGNOSIS: Shell low-conical, furnished with a crest vanishing at the last whorl; ornamented with very thin and densely spaced spiral ribs; umbilicus broad and deep.
MATERIAL: Two specimens.
DIMENSIONS: The larger specimen (Pl. 38, Fig 3) is 3.1 mm high and 4.0 mm wide.

DESCRIPTION: Shell small, rather thin-walled, with whorls fastly enlarging laterally. Protoconch formed by about 1 ½ smooth and convex whorls, indistinctly separated from the rest of the shell. Teleoconch attains about 3 ¼ whorls that are angularly bent, and furnished with a distinct spiral rib running along the crest. On the last whorl, both the crest as well as the rib gradually weakens to vanish completely. Between the crest and the suture the shell is almost flat, but slightly convex below the crest. Surface of whorls furnished with very thin, and densely spaced spiral ribs; growth lines well developed, to such an extent that between them the spiral ribs often become discontinuous. Growth lines particularly well pronounced at the base of the last whorl, where they remind the sharp axial ribs. Umbilicus quite wide and very deep, extending as far as the protoconch, ornamented in a similar way as the base of the last whorl. Aperture very wide, distinctly placed obliquely, suboval, rounded anteriorly, and with the lips converging at the right angle. Both lips thin, non thickened outerly, and smooth innerly. The larger specimen bears its left lip projecting out of the base of the last whorl (that is, the terminal part of the last whorl does not adhere to the spire).

REMARKS: To the present author's knowledge, there are no species insofar described to which the studied specimens could be assigned. Slightly similar is the species *Micromphalina bouryi* MORGAN described from the Miocene deposits of Pontlevoy in the Loire Basin (*see* MORGAN 1915, pp. 227-228, Text-fig. 9). The Korytnica specimens, however, attain the size twice larger at the same number of whorls. Moreover, they differ by a weaker crest along the whorls, a lack of any crest bordering the umbilicus that is slightly narrower, and by a more pronounced ornamentation at the base of the last whorl and inside the umbilicus.

The holotype of the newly established species *Megalomphalus convictor* sp.n. is a fully grown individual, almost ideally preserved. Its state of preservation has certainly resulted from a peculiar habitat in which it has been fossilized. The present author has found it, when preparing the coral colony *Tarbellastraea reussiana* (MILNE-EDWARDS & HAIME), in the boring of the bivalve *Gastrochaena* which was overgrown by the coral. After the death of the bivalve, its empty boring had been domiciled by the juvenile (or larva) of the studied gastropod, *Megalomphalus convictor* sp.n., which when growing up could not escape from the boring through its small aperture. The bivalve boring has therefore become a preservation trap for the specimen indicated herein as the holotype of the new species.

Genus *Fossarus* PHILIPPI, 1841

Fossarus costatus (BROCCHI, 1814)
(Pl. 4, Figs 6-8)

1856. *Fossarus costatus* BROCC.; M. HÖRNES, pp. 468-469, Pl. 46, Fig. 25.
1914. *Fossarus (Phasianema) costatus* BR.; S. CERULLI-IRELLI, pp. 361-362, Pl. 15, Figs 11-16.
1919. *Fossarus (Phasianema) burdigalensis* (D'ORBIGNY *em.*); M. COSSMANN & A. PEYROT, pp. 643-645, Pl. 17, Figs 69-70.
1923. *Fossarus costatus* BROCC.; W. FRIEDBERG, pp. 410-411, Pl. 25, Fig. 3.
1949. *Phasianema costatum* BROCCHI; M. GLIBERT, p. 198, Pl. 12, Fig. 12.
?1966. *Phasianema costatum burdigalum* ORBIGNY; L. STRAUSZ, pp. 204-205, Pl. 46, Fig. 29.
1970. *Fossarus (Fossarus) costatus* (BROCCHI); E. CAPROTTI, pp. 151-152, Pl. 3, Fig. 2.
1981. *Fossarus (Phasianema) costatus burdigalensis* (ORBIGNY); W. KRACH, p. 65, Pl. 23, Fig. 13.

MATERIAL: Seventy specimens.
DIMENSIONS: The largest specimen (Pl. 4, Fig. 8) is 9.0 mm high and 6.5 mm wide.

REMARKS: The studied specimens are evidently conspecific with these from the Vienna Basin (*see* HÖRNES 1856) and the Aquitaine Basin (*see* COSSMANN & PEYROT 1919), as well as presumable with those from northern Italy. The recently re-illustrated, by a photo (PINNA & SPEZIA 1978, Pl. 43, Fig. 1), the holotype of the species is the largest of all hitherto reported specimens (its height is 15.8 mm), and certainly due to this the nodes on the spiral ribs in the terminal part of the teleoconch are less distinct.

The systematic position of the discussed species is variably treated in the bibliography. A part of the authors include it into the genus *Fossarus* PHILIPPI, the others classify it as of the genus *Phasianema* WOOD. The difference concerns not only the genus but, consequently, also the superfamily, and possibly even the subclass. According to WENZ (1940), the genus *Fossarus* belongs to the superfamily Hipponicacea, whilst *Phasianema* to the Pyramidellacea. The present author follows those who point to *Fossarus*, the shells of whose species are sculptured in a way more comparable to that of discussed species. A similar view was formerly presented by CAPROTTI (1970, pp. 151-152).

The species *Fossarus costatus* (BROCCHI) has not hitherto been known from Korytnica. In the Miocene of Poland it was recorded from Małoszów (KOWALEWSKI 1930, KRACH 1949), Rybnica (KOWALEWSKI 1950), Nawodzice (BAŁUK & RADWAŃSKI 1968), Węglinek (KRACH 1981), and Bogucice (LISZKA 1933, KRACH 1981).

Genus *Couthouyia* A. ADAMS, 1860

Couthouyia brandenburgi (BOETTGER, 1907)
(Pl. 5, Fig. 1)

1907. *Escharella brandenburgi* n.sp.; O. BOETTGER, p. 176.
1934. *Couthouyia brandenburgi* (BOETTGER); A. ZILCH, p. 246, Pl. 13, Fig. 57.

MATERIAL: Fifty specimens.
DIMENSIONS: The largest completely preserved specimen (Pl. 5, Fig. 1) is 3.0 mm high and 1.4 mm wide.

REMARKS: The studied specimens are almost identical with those described by BOETTGER (1907) from Kostej in Transylvania. The illustrated specimen from Korytnica (Pl. 5, Fig. 1) is slightly smaller than the holotype of the species (measuring 4.25 mm in height), but the other specimens were of similar size, as judged from their preserved fragments.

The species *Couthouyia brandenburgi* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Family **Hipponicidae**

Genus *Cheilea* MODEER, 1793

Cheilea inexpectata (BOETTGER, 1907)
(Pl. 3, Fig. 1)

1907. *Mitrularia inexpectata* n.sp.; O. BOETTGER, p. 172.
1934. *Cheilea inexpectata* (BOETTGER); A. ZILCH, p. 247, Pl. 13, Fig. 62.

MATERIAL: One incomplete specimen.

REMARKS: The single specimen from Korytnica although incomplete (Pl. 3, Fig. 1), is so well preserved that its attribution to the species described by BOETTGER (1907) from Kostej in Transylvania is beyond any doubt. It seems to be slightly smaller than the specimens measured by BOETTGER (1907). The situation, structure and shape of the protoconch, ornamentation of the surface, and structure of the inner ledge are concordant with those of the Kostej specimens.

The species *Cheilea inexpectata* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Genus *Hipponix* DEFRANCE, 1819
Subgenus *Sabia* GRAY, 1847

Hipponix (*Sabia*) *sulcatus* (BORSON, 1820)
(Pl. 3, Figs 7-8)

1856. *Capulus sulcatus* BORS.; M. HÖRNES, p. 639, Pl. 50, Fig. 22.
1919. *Hipponyx sulcatus* (BORSON); M. COSSMANN & A. PEYROT, pp. 522-524, Pl. 14, Fig. 64 and Pl. 15, Fig. 15; ?Pl. 15, Figs 12-14.
1949. *Amalthea sulcata* BORSON; M. GLIBERT, p. 201, Pl. 12, Fig. 13.
1954. *Amalthea sulcata* BORS.; I. CSEPREGHY-MEZNERICS, p. 27, Pl. 3, Fig. 3.
1960. *Amalthea sulcata* (BORSON); E. KOJUMDGIEVA, p. 124, Pl. 34, Fig. 4.

?1966. *Hipponix sulcatus* BORSON; L. STRAUSZ, p. 206, Pl. 77, Figs 12-13.
1966. *Capulus ungaricus palatinus* nov. var.; L. STRAUSZ, p. 208, Pl. 77, Figs 16-17.

MATERIAL: A hundred and twenty specimens, in majority juvenile.
DIMENSIONS: The largest specimen is 4.5 mm high; its minimum diameter is 5 mm, maximum – 10 mm.

REMARKS: The studied specimens are undoubtedly conspecific with those of the Vienna Basin (*see* HÖRNES 1856) and the Loire Basin (*see* GLIBERT 1949). Similarly as in the other localities the Korytnica specimens of *Hipponix* (*Sabia*) *sulcatus* (BORSON) are more variable in their shape, and are characterized by a stable pattern of ornamentation. The latter feature was formerly remarked by GLIBERT (1949). However, none of the Korytnica specimens bears so regular ribbing as noted by COSSMANN & PEYROT (1919, Pl. 15, Figs 12-14) in the specimen from Merignac in the Aquitaine Basin; the present author doubts about an assignment of the latter to the discussed species.

STRAUSZ (1954, 1966) reported this species from Várpalota in Hungary, but the included photos (the same in both papers) are not readable. Possibly, it was really a specimen of this species, whose occurrence in that locality is recognizable by the presence of a juvenile specimen reported as "*Capulus ungaricus palatinus* STRAUSZ" and which evidently is a young representative of *Hipponix* (*Sabia*) *sulcatus* (BORSON).

The species *Hipponix* (*Sabia*) *sulcatus* (BORSON) has not hitherto been known from the Miocene of Poland.

Superfamily **Calyptraeacea**
Family **Capulidae**
Genus *Capulus* MONTFORT, 1810
Capulus ungaricus (LINNAEUS, 1766)
(Pl. 3, Fig. 6)

1856. *Capulus Hungaricus* LINN.; M. HÖRNES, pp. 636-637, Pl. 50, Fig. 19.
1896. *Capulus hungaricus* (L) et var.; F. SACCO, pp. 36-37, Pl. 4, Figs 26-28; Pl. 5, Figs 1-6
1914. *Capulus hungaricus* L.; S. CERULLI-IRELLI, pp. 379-380, Pl. 16, Figs 24-33.
1923. *Capulus hungaricus* L.; W. FRIEDBERG, pp. 416-417, Pl. 25, Fig. 7.
1952b. *Capulus ungaricus* LINNÉ; M. GLIBERT, pp. 63-64, Pl. 5, Fig. 1.
1970. *Capulus* (*Capulus*) *hungaricus* (LINNEO); E. CAPROTTI, p. 152, Pl. 3. Fig. 5.

MATERIAL: Nine incomplete specimens (apical parts of the shell) and a few larger fragments of the last whorl.

REMARKS: An attribution of the collected material to the species *Capulus ungaricus* (LINNAEUS) is quite justified, although no complete specimens have been found. The Korytnica specimens characterized by pronounced ornamentation, and in this respect they are the most similar to those reported by HÖRNES (1856) from Steinabrunn in the Vienna Basin. At first insight, they seem to deviate from the specimen coming from Deurne in Belgium (*comp.* GLIBERT 1952b), but the latter has its outer surface almost completely worn.

The species *Capulus ungaricus* (LINNAEUS) has not hitherto been known from Korytnica. Five juvenile specimens of this species were recorded from Trzydnik by KRACH (1950b, Pl. 1, Fig. 26).

Genus *Thyca* H.&A. Adams, 1854
Subgenus *Cyclothyca* Stearns, 1891
Thyca (*Cyclothyca*) *sulcosa* (Brocchi, 1814)
(Pl. 5, Fig. 2)

1856. *Capulus sulcosus* Brocc.; M. Hörnes, pp. 637-638, Pl. 50, Fig. 20.
1896. *Amathinoides sulcosa* (Br.) et var.; F. Sacco, p. 41, Pl. 5, Figs 7-8.
1919. *Capulus* (*Amathinoides*) *sulcosus* (Brocchi); M. Cossmann & A. Peyrot, pp. 513-514, Pl. 14, Figs 55-57.
1949. *Thyca* (*Cyclothyca*) *sulcosa* Brocchi; M. Glibert, pp. 203-204, Pl. 12, Fig. 15.
1969b. *Thyca* (*Cyclothyca*) *sulcosa* Brocchi; I. Csepreghy-Meznerics, p. 22, Pl. 4, Figs 24-25.

MATERIAL: One juvenile, complete specimen and a fragment of a larger specimen.
DIMENSIONS: The juvenile specimen is 2 mm high and 2.1 mm wide; the larger fragment is of a specimen about 4.5 mm wide.

REMARKS: An attribution of the very poor material collected to this species is fully justified, as it is concordant with the younger parts of the shells presented by the referenced authors, particularly by Glibert (1949).

The adult specimens of this species, coming from the Miocene deposits of Borsodbota in Hungary, were presented by Csepreghy-Meznerics (1969b). A photo of one of these specimens is so curiously mounted in the plate (*see* Csepreghy-Meznerics 1969b, Pl. 4, Fig. 25) that this suggests a sinistral coiling of the shell.

The species *Thyca* (*Cyclothyca*) *sulcosa* (Brocchi) has not hitherto been known from the Miocene of Poland.

Family **Calyptraeidae** Broderip, 1835
Genus *Calyptraea* Lamarck, 1799
Subgenus *Calyptraea* Lamarck, 1799
Calyptraea (*Calyptraea*) *chinensis* (Linnaeus, 1766)
(Pl. 3, Figs 3-5)

1853. *Calyptr. laevigata* Lam.; E. Eichwald, p. 143, Pl. 6, Fig. 14.
partim 1856. *Calyptraea Chinensis* Linn.; M. Hörnes, pp. 632-633, Pl. 50, Fig. 18, *non* Fig. 17.
1914. *Calyptraea chinensis* L.; S. Cerulli-Irelli, pp. 385-386, Pl. 18, Figs 1-11.
1923. *Calyptraea chinensis* L.; W. Friedberg, pp. 417-418, Pl. 25, Fig. 8.
1952b. *Calyptraea* (*Calyptraea*) *chinensis* Linné; M. Glibert, p. 65, Pl. 5, Fig. 5.
1960. *Calyptraea* (*Calyptraea*) *chinensis* (Linnaeus); E. Kojumdgieva, p. 123, Pl. 34, Fig. 2.
1966. *Calyptraea chinensis* Linné; L. Strausz, pp. 209-210, Pl. 77, Figs 1-2.
1970. *Calyptraea* (*Calyptraea*) *chinensis* (Linneo); E. Caprotti, p. 153, Pl. 3, Fig. 3.
1979. *Calyptraea* (*s.s.*) *chinensis* (Linné); J. Martinell, pp. 115-117, Pl. 2, Figs 11-12.
1984. *Calyptraea* (*Calyptraea*) *chinensis* (Linné); A.W. Janssen, p. 187, Pl. 8, Fig. 1; Pl. 52, Fig. 7.

MATERIAL: A hundred and thirty specimens, in majority juvenile.
DIMENSIONS: The largest specimen is 12 mm high; its diameter at the base is 25 mm.

REMARKS: Numerous specimens collected are characterized by a very low variability of their overall shape, and of the pattern of their outer surface. None of the Korytnica specimens displays any elements of the radial sculpture. Due to this feature, the present author excludes from the synonymy the specimen from Grund in the Vienna Basin, reported by Hörnes (1856, Pl. 50,

Fig. 17). On the other hand, all the Korytnica specimens (except of very young ones) are furnished with minute scales, more or less densely spaced over the growth lines. The latter feature distinguishes the discussed species from *Calyptraea cestacensis* COSSMANN & PEYROT, occurring in the Aquitaine Basin, and whose general shape, particularly in the lateral view is very similar.

The species *Calyptraea* (*Calyptraea*) *chinensis* (LINNAEUS) was already mentioned from Korytnica by FRIEDBERG (1923, 1938) and by KOWALEWSKI (1930). In the Miocene of Poland this species occurs also at Gliwice Stare (FRIEDBERG 1923, KRACH 1954), Gaszowice (KRACH 1939), Małoszów (KRACH 1947), Rybnica and Słaboszowice (KOWALEWSKI 1930), Wieliczka (FRIEDBERG 1938), and Błonie (FRIEDBERG 1923, URBANIAK 1974).

Subgenus *Bicatillus* SWAINSON, 1840

Calyptraea (*Bicatillus*) *irregularis* (COSSMANN & PEYROT, 1919) (Pl. 3, Fig. 2)

1856. *Calyptraea deformis* LAM.; M. HÖRNES, pp. 634-635, Pl. 50, Fig. 15, ?Fig. 14.
1896. *Bicatillus deformis* (LK.); F. SACCO, p. 35, Pl. 4, Fig. 23.
1919. *Crucibulum* (*Bicatillus*) *deforme* (LAMK); var. *irregularis* DOLLF. et DAUTZ.; M. COSSMANN & A. PEYROT, pp. 501-502, Pl. 14, Figs 25-27.
1949. *Calyptraea* (*Bicatillus*) *deformis irregularis* D. et D.; M. GLIBERT, p. 205, Pl. 12, Fig. 17.
1966. *Calyptraea* (*Bicatillus*) *deformis irregularis* DOLLFUS & DAUTZENBERG (in COSSMANN & PEYROT); L. STRAUSZ, p. 211, Pl. 77, Fig. 7.
1969b. *Calyptraea peformis irregularis* DOLF.-DAUTZ.; I. CSEPREGHY-MEZNERICS, p. 22, Pl. 4, Fig. 26.

MATERIAL: Twenty-five specimens, in majority juvenile.
DIMENSIONS: The largest specimen is 16 mm high; its minimum diameter is 13.5 mm, maximum – 17.5 mm.

REMARKS: The studied specimens are assigned to this taxon with uncertainty, because no precise description of the inner side of the shell has hitherto been given in the bibliography and, moreover, the taxon itself has not been regarded as a separate species. COSSMANN & PEYROT (1919), who should be recognized as the authors of the taxon report on the absence of any trace of the interior plate on the inner side of shell. At the first insight, this statement should also match well to the Korytnica specimens. Under a magnifying glass, however, the presence of the tiny "pocket" is recognizable in the anterior part of the shell. In the adult specimens it is placed 2-3 mm from the apex, and featured by the measurements of about 0.6 mm in width and about 1.0 mm in length. The wall of this pocket is herein thought to be a rudimentary interior plate. Posteriorly from the apex is situated a large muscle scar, shaped as if letter "B" lying horizontally, or an irregular figure "8". Neither this rudimentary plate by its situation, nor the muscle scar by its shape and placement, remind (*comp.* COSSMANN & PEYROT 1919, Pl. 14, Fig. 22 and Text-fig. 67) the respective elements in *Calyptraea* (*Bicatillus*) *deformis* (LAMARCK). In the present author's opinion, the Korytnica specimens cannot be assigned to the latter species as its variety, but they should be treated as the separate species, *Calyptraea* (*Bicatillus*) *irregularis* (COSSMANN & PEYROT).

Of the specimens hitherto presented in the bibliography the most similar to Korytnica individuals are those from Grund in the Vienna Basin (*see* HÖRNES 1856, Pl. 50, Fig. 15) and from Matraverebely in Hungary (*see* STRAUSZ 1966, Pl. 77, Fig. 7). It is suggestable that all these specimens, the Korytnica ones including, should be distinguished as still another, new species. They all differ by their more elevated shape (that is, the higher shell) and by the very prominent notch at the shell margin anteriorly in the adult specimens.

The species *Calyptraea* (*Bicatillus*) *irregularis* (COSSMANN & PEYROT) has not hitherto been known from the Miocene of Poland.

Genus *Crepidula* LAMARCK, 1799
Subgenus *Crepidula* LAMARCK, 1799
Crepidula (*Crepidula*) *gibbosa* DEFRANCE, 1818
(Pl. 4, Figs 4-5)

1856. *Crepidula gibbosa* DEFR.; M. HÖRNES, pp. 628-629, Pl. 50, Fig. 11.
1896. *Crepidula gibbosa* DEFR., et var.; F. SACCO, pp. 32-33, Pl. 4, Figs 14-18.
1919. *Crepidula* (*Crypta*) *gibbosa* DEFRANCE; M. COSSMANN & A. PEYROT, pp. 490-491, Pl. 14, Figs 7-8, ?Figs 9-11.
1948. *Crepidula gibbosa gibbosa* DEFR.; A. PAPP, p. 232, Text-figs 1-3.
1948. *Crepidula gibbosa gibbosissima* SACC.; A. PAPP, p. 232, Text-fig. 6.
1948. *Crepidula gibbosa planovata* SACC.; A. PAPP, p. 234, Text-figs 7-8.
?1948. *Crepidula gibbosa variatesta* PAPP; A. PAPP, p. 232, Text-figs 4-5 and 16.
1949. *Crepidula gibbosa* DEFRANCE; M. GLIBERT, pp. 205-206, Pl. 12, Fig. 18.
1954. *Crepidula gibbosa* DEFR.; I. CSEPREGHY-MEZNERICS, p. 29, Pl. 3, Fig. 22-24.
1966. *Crepidula gibbosa* DEFRANCE; L. STRAUSZ, p. 212, Pl. 76, Figs 20-21.
1970. *Crepidula* (*Crepidula*) *gibbosa* DEFRANCE; E. CAPROTTI, pp. 153-154, Pl. 3, Fig. 7.

MATERIAL: Ten specimens and a few fragments.
DIMENSIONS: The largest, completely preserved specimen (Pl. 4, Fig. 5) is about 16 mm long and 11.5 mm wide; the largest fragment is estimated as of a specimen about 30 mm long.

REMARKS: All specimens assigned to this species were found in the oyster shellbed at Mt. Lysa and, contrary to the species *Crepidula* (*Janacus*) *crepidula* LINNAEUS reported hereafter, none of them is coming from the interior of another gastropod shell. All the collected specimens have their shell distinctly convex, and their interior deck inserted deeply (*see* Pl. 4, Fig. 5). The two young specimens bear traces of original pigmentation patternd by dark, thin stripes radiating from the apex, to the extent similar to that in the present-day species *Crepidula* (*Crepidula*) *fornicata* (LINNAEUS).

The species *Crepidula* (*Crepidula*) *gibbosa* DEFRANCE has not hitherto been known from the Miocene of Poland.

Subgenus *Janacus* MÖRCH, 1852
Crepidula (*Janacus*) *crepidula* (LINNAEUS, 1766)
(Pl. 4, Figs 1-3)

1856. *Crepidula unguiformis* LAM.; M. HÖRNES, pp. 629-630, Pl. 50, Fig. 12.
1870. *Crepidula unguiformis* BAST.; F. ROEMER, p. 380, Pl. 47, Fig. 21.
1879. *Crepidula unguiformis* LAMARCK; F. FONTANNES, p. 207, Pl. 11, Fig. 11.
1896. *Janacus crepidulus* (L). (an *J. unguiformis* (LK.); F. SACCO, pp. 34-35, Pl. 4, Figs 19-22.
1914. *Crepidula crepidula* L.; S. CERULLI-IRELLI, pp. 385-386, Pl. 18, Figs 12-27.
1919. *Crepidula* (*Janachus*) *crepidula* (LINNÉ); mut. *unguis* D'ORBIGNY; M. COSSMANN & A. PEYROT, pp. 493-495, Pl. 14, Figs 14-21.
1928. *Crepidula crepidula* L.; W. FRIEDBERG, pp. 610-611, Pl. 38, Figs 20-21.
1949. *Crepidula* (*Janacus*) *crepidula* LINNÉ; M. GLIBERT, p. 206, Pl. 11, Fig. 23.
1954. *Crepidula* (*Janacus*) *crepidula subcarinata* SACCO; I. CSEPREGHY-MEZNERICS, p. 29, Pl. 3, Figs 16-19.
1956. *Crepidula* (*Janacus*) *crepidula unguis* D'ORBIGNY; I. CSEPREGHY-MEZNERICS, pp. 394-395, Pl. 3, Fig. 42.
1966. *Crepidula* (*Janacus*) *crepidula* LINNÉ; L. STRAUSZ, pp. 213-214, Pl. 76, Figs 26-31.
1970. *Crepidula* (*Janacus*) *unguiformis* (LAMARCK); E. CAPROTTI, p. 154, Pl. 3, Figs 6 and 8.
1984. *Crepidula* (*Janacus*) *crepidula* (LINNÉ); A.W. JANSSEN, pp. 187-188, Pl. 8, Fig. 2; Pl. 53, Figs 1-4.
1984. *Crepidula* (*Janacus*) *unguiformis* LAMARCK; G. RUGGIERI & F. DAVOLI, p. 54, Pl. 1, Fig. 9.
1985. *Crepidula crepidula* (LINNAEUS); W. BAŁUK & A. RADWAŃSKI, pp. 240-243, Text-figs 3-4.

MATERIAL: Two hundred specimens.
DIMENSIONS: The largest specimen (Pl. 4, Fig. 3) is 29 mm long and 16 mm wide.

REMARKS: Most of the specimens of this species were found in the interior of other gastropod shells, and those collected loose are thought to have fallen out of such shells. The size, and overall shape of particular specimens vary very much, having been dependant on the space available in an empty shell of another gastropod. Thereby, any distinction of morphological variants and/or taxonomic varieties proposed i.a. by SACCO (1896) and PAPP (1948) is soundless. In numerous cases, in the Korytnica gastropod shells a few individuals of *Crepidula* (*Janacus*) *crepidula* have been found, always with one much larger and 1-3 small ones associated. No case was, however, found of two larger specimens, in the way similar to that reported by PAPP (1948) in the shell of *Ancilla* from Enzesfeld in the Vienna Basin (*comp.* BAŁUK & RADWAŃSKI 1985, Text-fig. 3*E*).

A rich material of this species, intriguing both from its taxonomical and ecological point of view, is subjected to a separate paper by BAŁUK & RADWAŃSKI (1996).

The species *Crepidula* (*Janacus*) *crepidula* (LINNAEUS) was already mentioned from Korytnica by FRIEDBERG (1928, 1938) and by KOWALEWSKI (1930). In the Miocene of Poland this species was recorded also from Biskupice (ROEMER 1870).

Superfamily **Strombacea**
Family **Aporrhaidae** PHILIPPI, 1853
Genus *Aporrhais* DA COSTA, 1778
Aporrhais pespelecani (LINNAEUS, 1766)
(Pl. 7, Figs 4-11)

1853. *Chenop. pes pelecani* PHIL.; E. EICHWALD, pp. 211-212, Pl. 8, Fig. 19.
1856. *Chenopus pes pelecani* PHIL.; M. HÖRNES, pp. 194-196, Pl. 18, Figs 2-4.
1870. *Chenopus pes-pelecani* PHIL.; F. ROEMER, p. 380, Pl. 47, Fig. 13.
1884. *Chenopus* (*Aporrhais*) *alatus* EICHW.; R. HOERNES & M. AUINGER, pp. 166-167, Pl. 18, Figs 6 and 8.
1884. *Chenopus* (*Aporrhais*) *pes pelecani* PHIL.; R. HOERNES & M. AUINGER, pp. 167-168, Pl. 18, Fig. 7; Pl. 19, Figs 8-9.
1901. *Chenopus* (*Aporrhais*) *alatus* EICHW., et var. *dactylifera* n.; O. BOETTGER, p. 24.
1906. *Chenopus* (*Aporrhais*) *praeteritus* n.sp.; O. BOETTGER, pp. 37-38.
1912. *Chenopus pes pelecani* L. var *alata* EICHW.; W. FRIEDBERG, pp. 139-142, Pl. 8, Fig. 1; Text-fig. 40.
1912. *Chenopus uttingerianus* RISSO; W. FRIEDBERG, p. 143, Pl. 8, Fig. 2.
1924. *Chenopus burdigalensis* D'ORBIGNY; M. COSSMANN & A. PEYROT, pp. 343-344, Pl. 8, Figs 11-13.
1934. *Aporrhais alatus dactylifera* (BOETTGER); A. ZILCH, p. 248, Pl. 14, Fig. 64.
1934. *Aporrhais praeteritus* (BOETTGER); A. ZILCH, p. 248, Pl. 14, Figs 65-66.
1956. *Aporrhais alatus* EICHWALD; I. CSEPREGHY-MEZNERICS, Pl. 4, Figs 1-2.
1960. *Aporrhais pes-pelecani* var. *alata* (EICHWALD); E. KOJUMDGIEVA, pp. 131-132, Pl. 35, Fig. 7; Pl. 36, Fig. 2.
1966. *Aporrhais pespelecani* LINNÉ; L. STRAUSZ, pp. 215-217, Pl. 22, Fig. 17.
1966. *Aporrhais pespelecani alatus* EICHWALD; L. STRAUSZ, p. 218, Pl. 22, Figs 18-23; Pl. 23, Figs 1-4.
1970. *Aporrhais pespelecani alatus* (EICHWALD); W. BAŁUK, p. 118, Pl. 12, Fig. 1.
1971. *Aporrhais pes-pelecani alata* (EICHWALD); M. EREMIJA, p. 73, Pl. 5, Fig. 5.
1979. *Aporrhais* (*Aporrhais*) *pes-pelecani* (LINNÉ); J. MARTINELL, pp. 119-121, Pl. 3, Figs 3-4.

MATERIAL: More than 500 specimens.
DIMENSIONS: The largest specimen is about 35 mm high and 35 mm wide; the smallest complete specimen is 14 mm high and 12 mm wide.

REMARKS: The studied specimens, very common at Korytnica, are characterized by a great individual variability, expressed both by the size of the shell, details of ornamentation and development of appendages on the outer lip. Similar variability is a typical feature of this species, observed in almost all the Miocene localities in Europe. Its interpretation has often been discussed, and much variable treatments of its meaning been offered.

The variability of the shell size in the Korytnica specimens is shown by these illustrated in Pl. 7, Figs 4-6. The size difference amounts even to 150%. The smallest specimens, with their outer

lip already developed, are smaller than the specimen of *Aporrhais pes-pelecani minor* BUCQUOY, DAUTZENBERG & DOLLFUS presented from the Miocene deposits of the Loire Basin by GLIBERT (1949, Pl. 12, Fig. 19). These smaller specimens from Korytnica are concordant with those of *Aporrhais praeteritus* (BOETTGER) from Soos in the Vienna Basin, and whose average height ranges 17.5—24.0 mm, but the smallest one is only 11.5 mm (*comp.* BOETTGER 1906). The latter species was regarded by ZILCH (1934, p. 248) as very close to the present-day *Aporrhais pespelecani* (LINNAEUS).

The variability of ornamentation in the Korytnica specimens is expressed by the variable development of nodes on the spiral rib (on the last whorl, also on the two remaining ribs). These nodes are sometimes much pronounced, and they may extend into a kind of short axial ribs. On the other way, they may become very weak and vanish completely on the second half of the last whorl. The specimens of a weaker ornamentation are often furnished with slightly longer appendages on the lip. Such very specimens have heretofore subjected to various treatments by the referenced authors. FRIEDBERG (1912) regarded such forms from Korytnica as *Aporrhais uttingerianus* (RISSO), the species separate to *Aporrhais pespelecani alatus* (EICHWALD). A quite different trait has earlier been kept by BOETTGER (1901), who such specimens regarded as the variety *dactilifera* of the species *Aporrhais alatus* (EICHWALD). The present author, when collecting the studied material in various parts of the Korytnica Basin recognized that the less ornamented specimens occur in the sediments more clayey than those more silty that yield well ornamented forms exclusively. BOETTGER (1906) noticed that the better ornamented specimens, called by him *Aporrhais praeteritus*, appear always in sandy clays or sands. It is thus reasonable to suggest a dependence of the ornamentation on environmental conditions. Consequently, the character of ornamentation is thought to have no taxonomic significance.

The development of appendages on the outer lip in the Korytnica specimens varies. The two lateral appendages (*a* and *b* as distinguished by STRAUSZ 1966) may by quite long (*see* Pl. 7, Fig. 8), and they then resemble either these in *Aporrhais alatus dactiliferus* (BOETTGER) from Kostej in Transylvania (*comp.* ZILCH 1934, Pl. 14, Fig. 64) or those in *Aporrhais alatus* (EICHWALD) from Vöslau in the Vienna Basin (*comp.* HOERNES & AUINGER 1884, Pl. 18, Fig. 6). Such long appendages are sometimes fused into one "winglet" (an alated processus), as it is known in *Aporrhais burdigalensis* (D'ORBIGNY) from the Aquitaine Basin (*see* COSSMANN & PEYROT 1924, Pl. 8, Figs 11-13). Between these extremes there also appear intermediate forms (*see* Pl. 7, Fig. 7), i.a. such one as that presented by EICHWALD (1853, Pl. 8, Fig. 19). The posterior appendage (*d* as called by STRAUSZ 1966) is less variable. Usually it is short and it either adheres to the spire along its whole length (*see* Pl. 7, Figs 8, 10-11). Such structure of this appendage is thus the same as in the Viennese specimens presented by HÖRNES (1856, Pl. 18, Figs 2-4). Taking into account the shape of this appendage, some authors (*e.g.*, HOERNES & AUINGER 1884) suggested a distinction of the species *Aporrhais alatus* (EICHWALD) and *Aporrhais pespelecani* (LINNAEUS) within the Miocene forms. This opinion seems to be very arbitrary indeed, and not based on solid ground. It was already BOETTGER (1906, pp. 24-25), who regarded such distinction as soundless. It may also be noted, that EICHWALD (1853, p. 211) himself deleted the name *alatus* from the text, and it remained only in explanation to his Atlas.

In the present author's opinion, all the Korytnica specimens should be attributed to the species *Aporrhais pespelecani* (LINNAEUS), and all the minor differences should be treated in terms of its intraspecific variability.

The species *Aporrhais pespelecani* (LINNAEUS) was reported from Korytnica by all former authors. In the Miocene of Poland this species was mentioned from Biskupice (ROEMER 1870), Gliwice Stare (KRACH 1954), Małoszów (KOWALEWSKI 1930, KRACH 1947), Pińczów (PUSCH 1837), Nadole and Szczaworyż (KOWALEWSKI 1930), Rybnica (KOWALEWSKI 1930, 1950; FRIEDBERG 1938), Benczyn (KRACH 1950a), Winnica near Wieliczka (FRIEDBERG 1912), Zgłobice (URBANIAK 1974), Błonie (FRIEDBERG 1912, URBANIAK 1974), and Niskowa (BAŁUK 1970).

Family **Xenophoridae**

Genus *Xenophora* FISCHER VON WALDHEIM, 1807

Xenophora deshayesi (MICHELOTTI, 1847)
(Pl. 6, Figs 1-3)

1856. *Xenophora Deshayesi* MICHT.; M. HÖRNES, pp. 442-443, Pl. 44, Fig. 12.
1896. *Xenophora Deshayesi* (MICHT.) (an *X. burdigalensis* GRAT.); F. SACCO, pp. 20-21, Pl. 2, Fig. 20.
1919. *Xenophora burdigalensis* (GRATELOUP); M. COSSMANN & A. PEYROT, pp. 461-465, Pl. 17, Figs 105-106.
?1919. *Xenophora crispa* (KOENIG); M. COSSMANN & A. PEYROT, pp. 471-472, Pl. 13, Figs 5-6.
?1923-28. *Xenophora Deshayesi* MICHT.; W. FRIEDBERG, pp. 419-420, Pl. 27, Fig. 1.
1949. *Xenophora deshayesi* MICHELOTTI; M. GLIBERT, pp. 207-208, Pl. 12, Fig. 20.
1952b. *Xenophora deshayesi* MICHELOTTI; M. GLIBERT, pp. 67-68, Pl. 5, Fig. 3.
1960. *Xenophora (Xenophora) deshayesi* (MICHELOTTI); E. KOJUMDGIEVA, pp. 124-125, Pl. 34, Fig. 7.
partim 1973. *Xenophora deshayesi* (MICHELOTTI); T. BÁLDI, p. 266, Pl. 33, Fig. 9; *non* Fig. 8.
1984. *Xenophora deshayesi* (MICHELOTTI); A.W. JANSSEN, pp. 189-190, Pl. 54, Fig. 1.

MATERIAL: Seven incomplete specimens and numerous fragments.
DIMENSIONS: The largest specimen, preserved without last whorl (Pl. 6, Fig. 3), is 35 mm high and 46 mm wide. One of the collected fragments, illustrated formerly (*see* BAŁUK & RADWAŃSKI 1977a, Pl. 8, Fig. 5) is estimated as of a specimen about 90 mm wide.

REMARKS: The studied specimens, although none of them is complete, are fully concordant with *Xenophora deshayesi* (MICHELOTTI) presented by HÖRNES (1856), and coming from Gainfahren in the Vienna Basin.

COSSMANN & PEYROT (1919) when presenting a specimen from the Aquitaine Basin, stated its great similarity to *Xenophora deshayesi*, but with a different furrowing at the base, and consequently they called it as *Xenophora burdigalensis* (GRATELOUP). Because such a difference is of very low importance, and it may result from the individual variability, as already remarked by GLIBERT (1949), a distinction of the separate species *Xenophora burdigalensis* does not seem to be justified. Moreover, the latter name has no priority, as stated by COSSMANN & PEYROT (1919, p. 463) who inform that publication by GRATELOUP dated 1840, really appeared seven years later.

From Korytnica has hitherto been known (FRIEDBERG 1923-28, KOWALEWSKI 1930) only one specimen, determined as *Xenophora deshayesi* (MICHELOTTI). This specimen presented by FRIEDBERG (1923-28, Pl. 27, Fig. 1) has distinctly more advanced furrowing at the base, and thereby it becomes much similar to the specimen from Salles in the Aquitaine Basin (*see* COSSMANN & PEYROT 1919, Pl. 13, Figs 5-6) labelled as *Xenophora crispa* (KOENIG). The other specimens of *Xenophora crispa*, e.g. from the Pliocene of Monte Mario in Italy, presented by CERULLI-IRELLI (1914, Pl. 18, Figs 28-35), differ both from the specimen from Salles as well as from Korytnica, by the larger apical angle and their basal furrowing variably pronounced.

The shell fragments collected at Korytnica indicate that the specimens of *Xenophora deshayesi* attained therein 80-90 mm in height and 100-110 mm in width (*see* BAŁUK & RADWAŃSKI 1977a, Pl. 8, Fig. 5). A similar size is also typical of the specimens from Winterswijk in Holland, but their armoring is remarkably less distinct (*comp.* JANSSEN 1984).

The species *Xenophora deshayesi* (MICHELOTTI) is unknown from other Miocene localities in Poland.

Family **Strombidae**

Genus *Rostellaria* LAMARCK, 1799

Rostellaria dentata GRATELOUP, 1840
(Pl. 7, Figs 1-3)

1856. *Rostellaria dentata* GRAT.; M. HÖRNES, pp. 192-193, Pl. 18, Fig. 1.
1884. *Rostellaria dentata* GRAT.; R. HOERNES & M. AUINGER, pp. 165-166, Pl. 20, Figs 3-7.
1924. *Rostellaria dentata* GRATELOUP; M. COSSMANN & A. PEYROT, pp. 331-334, Pl. 9, Figs 1-2.
1938. *Rostellaria dentata* GRAT.; W. FRIEDBERG, pp. 108-110, Text-fig. 33.
1960. *Rostellaria* (*Rostellaria*) *dentata* GRATELOUP; E. KOJUMDGIEVA, p. 131, Pl. 35, Figs 6, 8; Pl. 36, Fig. 1.
1966. *Rostellaria dentata* GRATELOUP; L. STRAUSZ, p. 220, Pl. 23, Figs 5-9.

MATERIAL: Eleven specimens, all incompletely preserved.
DIMENSIONS: The largest specimen, not fully grown, without the final aperture (Pl. 7, Fig. 2), is 90 mm high and 28 mm wide.

REMARKS: The specimens assigned to this species are fully concordant with those from Grund in the Vienna Basin, and from Lapugy in Transylvania, as reported by HOERNES & AUINGER (1884). The only difference in the Korytnica specimens is that the disappearance of axial ribs takes always place at 9*th* or 10*th* whorl. Insofar, no complete specimens with the final aperture have been found at Korytnica, although very large specimens were living there, as it is judged from the collected fragments (*comp.* BAŁUK & RADWAŃSKI 1977a, Pl. 7, Fig. 5). A specimen presented by FRIEDBERG (1938, Text-fig. 33) has got its outer lip and siphonal canal drawn by a retoucher (sic!).

The species *Rostellaria dentata* GRATELOUP was reported from Korytnica only by FRIEDBERG (1938). Unknown from other Miocene localities in Poland.

Genus *Strombus* LINNAEUS, 1758
Subgenus *Strombus* LINNAEUS, 1758

Strombus (*Strombus*) *bonellii* BRONGNIART, 1823
(Pl. 6, Figs 4-10)

1837. *Strombus tuberculiferus* M. DE SERRES; G. PUSCH, pp. 127-128, Pl. 11, Fig. 12.
1853. *Strombus inflexus* m.; E. EICHWALD, p. 210, Pl. 8, Fig. 18.
1856. *Strombus coronatus* DEFR.; M. HÖRNES, pp. 187-189, Pl. 17, Fig. 1.
1856. *Strombus Bonellii* BRONG.; M. HÖRNES, pp. 189-190, Pl. 17, Figs 2-6.
1879. *Strombus tuberculiferus* DE SERRES; F. FONTANNES, pp. 152-153, Pl. 9, Fig. 2.
1884. *Strombus coronatus* DEFR.; R. HOERNES & M. AUINGER, pp. 163-164, Pl. 18, Figs 1-5; Pl. 19, Fig. 1.
1884. *Strombus Bonellii* BRONG.; R. HOERNES & M. AUINGER, p. 164, Pl. 19, Figs 2-5.
1912. *Strombus Bonelli* BRONGN.; W. FRIEDBERG, pp. 136-138, Pl. 7, Fig. 10; Text-fig. 38.
1924. *Strombus* (*Canarium*) *Bonellii* BRONGNIART; M. COSSMANN & A. PEYROT, pp. 326-329, Pl. 8, Figs 1-3.
1960. *Strombus* (*Canarium*) *bonellii* BRONGNIART; E. KOJUMDGIEVA, p. 130, Pl. 35, Figs 3-4.
1966. *Strombus bonellii* BRONGNIART; L. STRAUSZ, pp. 221-222, Pl. 25, Fig. 1; Pl. 66, Fig. 6.
1971. *Strombus bonellii* BRONGNIART; M. EREMIJA, p. 72, Pl. 5, Fig. 6.
1973. *Strombus coronatus* DEFRANCE; T. BÁLDI, p. 270, Pl. 34, Figs 7-8.
1979. *Strombus coronatus* DEFRANCE; J. MARTINELL, pp. 123-124, Pl. 3, Figs 5-6.

MATERIAL: Thirty-three, mostly incomplete specimens, and numerous fragments of the shell.
DIMENSIONS: The largest specimen (Pl. 6, Fig. 9) is 54 mm high and 34 mm wide; the specimen preserved without aperture (Pl. 6, Fig. 10) is 75 mm high.

REMARKS: Within the specimens from the Vienna Basin, both HÖRNES (1856) and HOERNES & AUINGER (1884) distinguished the two, closely related species, *Strombus bonellii* BRONGNIART and *Strombus coronatus* DEFRANCE, although they also noted the presence of intermediate forms. The features regarded by them as distinctive (variable slenderness of the shell, various distinctness of the spines) do not seem to be of taxonomic significance.

Within the Korytnica specimens there also are these more closely related to *Strombus bonellii*, and those more similar to the Viennese *Strombus coronatus*, without any distinct boundary inbetween. The present author inclines to the opinion that all the Korytnica specimens belong to one species, *Strombus bonellii*, and their small morphological differences are of intraspecific variability and/or sexual dimorphism. It should, however, be remarked that all collected specimens are not fully grown, and their state of preservation is rather poor. Besides such specimens (*see* Pl. 6, Figs 4-10), in the Korytnica Clays there also appear fragments of very large specimens (over 100 mm high) furnished with spines even over 20 mm long (*see* BAŁUK & RADWAŃSKI 1977a, Pl. 7, Fig. 6).

The two herein discussed species have long been treated variously by the referenced authors. For instance, of the two very similar specimens, the Viennese one was classified as *Strombus coronatus* DEFRANCE by HÖRNES (1856, Pl. 17, Fig. 1), and the Aquitanian one to *Strombus* (*Canarium*) *bonellii* BRONGNIART by COSSMANN & PEYROT (1924, Pl. 8, Figs 1-2). According to the data given by these authors, the width/height ratio is 0.61 in the first, and 0.62 in the second case. Of the Korytnica specimens, the closest to those two discussed forms is certainly that one illustrated in the present paper in Pl. 6, Fig. 6.

It is finally to note, that neither any of the Korytnica nor of the Vienna and other Paratethyan specimens, those from the Upper Oligocene of Eger in Hungary including (*see* BÁLDI 1973, Pl. 34, Figs 7-8), and presented as *Strombus coronatus*, resemble, by their overall shape and spatial situation of the suture *versus* the rows of spines, the specimen of *Strombus coronatus* DEFRANCE illustrated by STCHEPINSKY (1938, Pl. 7, Fig. 8) from the Sahelien deposits of Tunisia. The same is to be said about *Strombus coronatus* from the Pliocene of northern Italy, and the three varieties, *percoronata*, *compressonana*, and *perspinosonana*, distinguished by SACCO (1893) within this species (*comp.* FERRERO MORTARA & *al.* 1984, Pl. 21, Figs 2, 6-7).

The species *Strombus* (*Strombus*) *bonellii* BRONGNIART was reported from Korytnica by PUSCH (1837), KONTKIEWICZ (1882), FRIEDBERG (1912, 1938), and KOWALEWSKI (1930). In the Miocene of Poland it is also known from Niechobrz (GOŁĄB 1932, FRIEDBERG 1938).

Superfamily **Cypraeacea** GRAY, 1824
Family **Cypraeidae** GRAY, 1824

The ancient cowries, the rarities of many collections, are still poorly recognized, both as concerns their taxonomy, and their relation to the present-day species. This is caused, partly at least, by low morphologic potential of their similarly shaped, quite smooth shells, the primary color pattern of which has usually been completely lost. The distinctive features are in small differences of the overall shape, which may easily be estimated in a very arbitrary way. An important opportunity, however, realizes due to a possibility of characterizing their shells be three measurements (thus, not by two as is done in the majority of gastropods), to describe their height (h), width (w), and thickness (t). Apparently, more instructive than the absolute values are their ratios (w/h, t/w, and t/h) which have been calculated for all the completely

preserved specimens from Korytnica, and plotted into the diagrams (Text-figs 1-2). These ratios combined with such features as the shape of the aperture, the development of the teeth on both lips and, sometimes, traces of

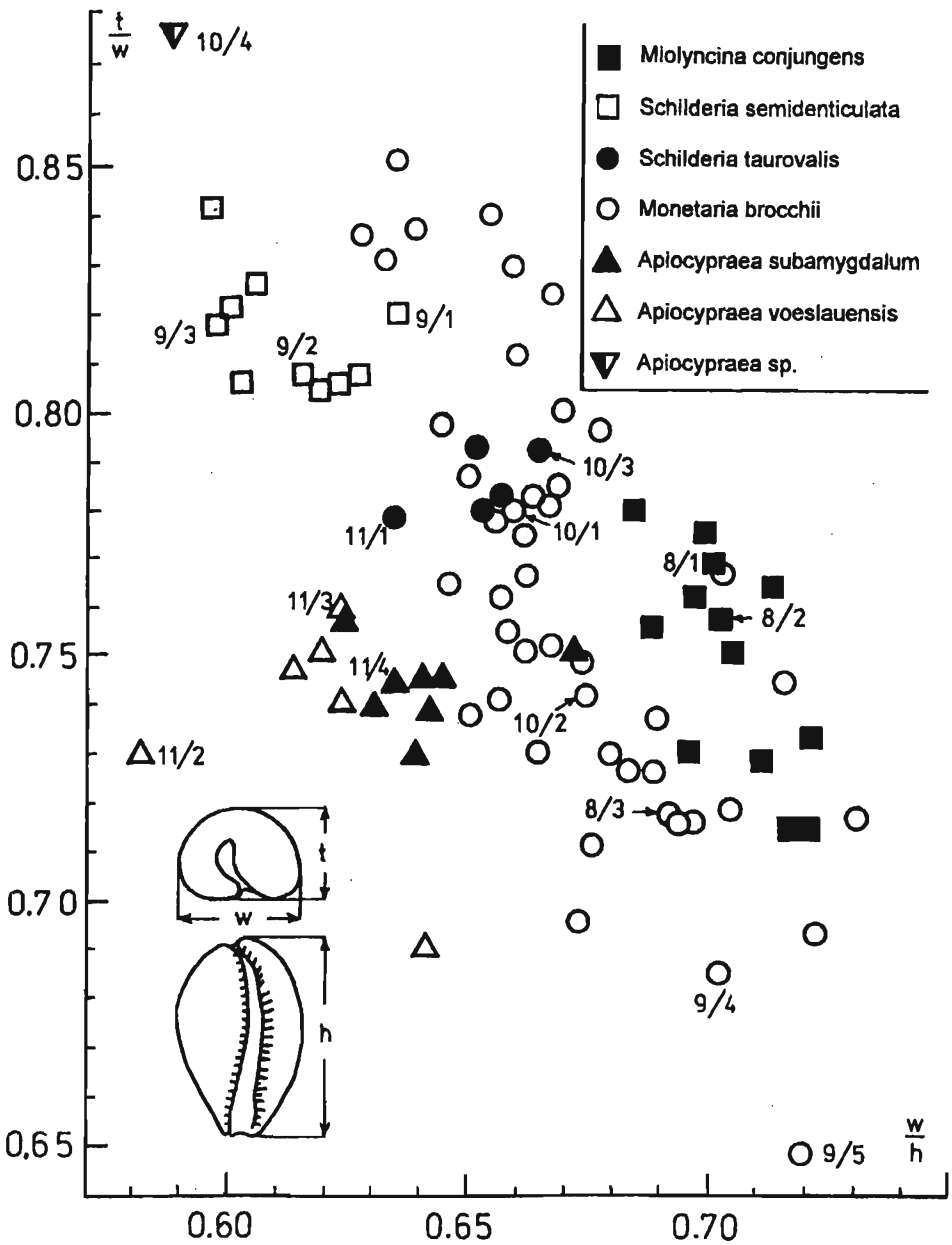

Fig. 1. The t/w *versus* w/h ratio of shells of the studied cowries collected from the Korytnica Clays; the illustrated specimens (*see* Pls 8-11) are referred to by the number of the plate slashed by the number of its figure

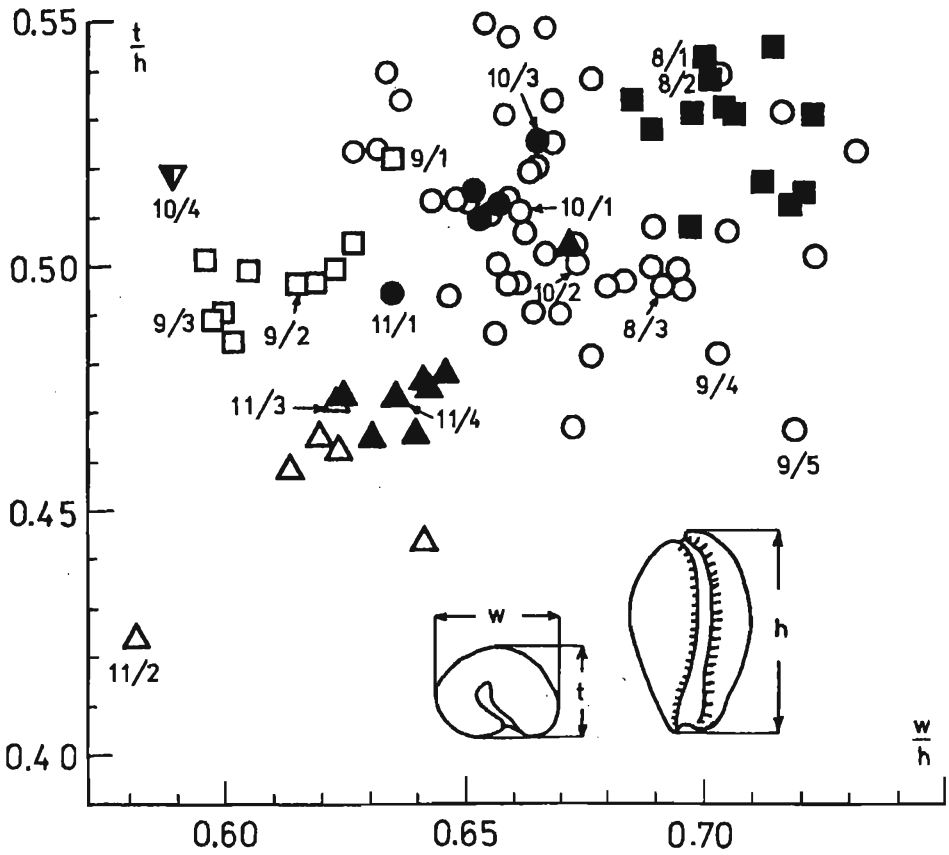

Fig. 2. The t/h *versus* w/h ratio of shells of the studied cowries collected from the Korytnica Clays; the illustrated specimens (*see* Pls 8-11) are referred to by the number of the plate slashed by the number of its figure

primary coloration, allow to distinguish six groups and one, remote specimen. The distinguished groups of specimens appear to be compatible with the ancient species known in the referenced bibliography. Their assignment to the present-day taxa of higher ranks, the genera particularly, may however be a subject of discussion. The higher taxa are hereafter used the same as given by SCHILDER & SCHILDER (1971).

Genus *Miolyncina* SCHILDER, 1932

Miolyncina conjungens (SACCO, 1894)
(Pl. 8, Figs 1-2)

?1856. *Cypraea fabagina* LAM.; M. HÖRNES, pp. 65-66, Pl. 7, Fig. 6.
1984. *Lyncina minor* var. *conjungens* SACC.; F. SACCO, p. 10, Pl. 1, Fig. 14.

MATERIAL: Thirteen complete specimens and a few fragments.
DIMENSIONS: The largest specimen (coll. J. GUBAŁA) is 37.4 mm high, 26.3 mm wide, and 20.4 mm thick; from author's own collection 36.0 mm, 25.4 mm, and 19.1 mm, respectively; one of the fragments is of a specimen 40 mm high. The width/height ratio ranges 0.684–0.721, thickness/width ratio does 0.716–0.780, and thick/height ratio does 0.509–0.545.

REMARKS: The studied specimens are almost fully concordant with those coming from the Miocene deposits of Colli Torinesi in Italy, described by SACCO (1894) as *Lyncina minor* var. *conjungens* SACCO. The holotype of this taxon has been re-illustrated, as a photo by FERRERO MORTARA & *al.* (1984, Pl. 23, Fig. 3). Agreeable is both an overall shape of the shell as well as all the measurements. The only difference is that a part of the Korytnica specimens bear the denticles on the inner lip less distinctly developed.

It is suggested that possibly conspecific with the Korytnica specimens is also that one coming from Mikulov (=Nikolsburg) in Moravia, Czech Republic, and presented by HÖRNES (1856) as *Cypraea fabagina* LAMARCK. The Mikulov specimen (*see* HÖRNES 1856, Pl. 7, Fig. 6) is slightly larger (46 mm high), but keeps very similar ratios of particular measurements. Moreover, the Korytnica specimens display the right side – as given in its photo (Pl. 8, Fig. 2 – taken from the abapertural side), of their shells always convex, whilst the Mikulov specimen bears therein a slight concavity anteriorly.

The species *Miolyncina conjungens* (SACCO) has not hitherto been known from the Miocene of Poland.

Genus *Zonarina* SACCO, 1894

Zonarina cf. *exglobosa* SACCO, 1894
(Pl. 11, Figs 5-6)

1856. *Cypraea globosa* DUJ.; M. HÖRNES, pp. 64-65, Pl. 7, Fig. 5.
1977a. *Cypraea* sp.; W. BAŁUK & A. RADWAŃSKI, p. 109, Pl. 7, Fig. 7.

MATERIAL: Five fragments of shells.
DIMENSIONS: Supposedly, the fragments belong to specimens attaining 55-65 mm in height.

REMARKS: The studied specimens, although much fragmentary, are thought to be concordant with those presented from the Vienna Basin by HÖRNES (1856) as *Cypraea globosa* DUJARDIN. According to SACCO (1894, p. 15), it was an erroneous determination, and he therefore proposed a new name for the Viennese specimens, viz. *Zonarina exglobosa* SACCO. It may be noted, that the name used by DUJARDIN, as a primary homonym, must be rejected (SCHILDER & SCHILDER 1971, p. 43).

The species *Zonarina exglobosa* SACCO has not hitherto been known from the Miocene of Poland. One of the fragments, included to this taxon, has formerly been illustrated (BAŁUK & RADWAŃSKI 1977a, Pl. 7, Fig. 7) as a large fragment of *Cypraea* sp.

Genus *Schilderia* TOMLIN, 1930

Schilderia semidenticulata (SACCO, 1894)
(Pl. 9, Figs 1-3)

1856. *Cypraea sanguinolenta* GMELIN; M. HÖRNES, p. 70, Pl. 8, Figs 9-12.
1894. *Cypraea sanguinolenta* var. *semidenticulata* SACC.; F. SACCO, p. 30.

1912. *Cypraea sanquinolenta* GMEL.; W. FRIEDBERG, pp. 148-149, Pl. 8, Fig. 8.
1928. *Cypraea columbaria* LAM.; W. FRIEDBERG, pp. 593-594.

MATERIAL: Eleven specimens.
DIMENSIONS: The smallest specimen (Pl. 9, Fig. 2) is 16.1 mm high, 9.9 mm wide, and 8.0 mm thick; the largest is 24.5 mm, 14.6 mm, and 12.3 mm, respectively. The w/h ratio ranges 0.596–0.634, t/w ratio does 0.788–0.842, and t/h ratio does 0.485–0.522.

REMARKS: The studied specimens are certainly concordant with those coming from the Vienna Basin, as presented by HÖRNES (1856). Although the illustrated specimens (*see* HÖRNES 1856, Pl. 8, Figs 9-12) seem to be more slender, the measurements given by HÖRNES are almost identical with those of the largest Korytnica specimen. In all studied specimens, similarly as in the Vienna forms, several (3-5) stronger columellar teeth appear anteriorly, whereas they are much weaker in, or absent from, the remaining part of the lip. It was this very feature upon which SACCO (1894) distinguished the variety *semidenticulata* SACCO, recognized subsequently by SCHILDER & SCHILDER (1971) as a separate species.

In the Miocene deposits of France, both in the Aquitaine Basin (*see* COSSMANN & PEYROT 1924, Pl 10, Figs 8-9) and in the Loire Basin (*see* GLIBERT 1952a, Pl. 4, Fig. 2) there occurs a similar species *Schilderia columbaria* (LAMARCK). It differs by the pattern of the columellar teeth (small and evenly sized allover the lip), the larger size of the shell (commonly, over 35 mm in height), and another profile in the lateral view (deeper depression posteriorly). An assignation of the Korytnica specimens to *Schilderia columbaria* (LAMARCK), as formerly given by FRIEDBERG (1928, 1938), is thus unjustified.

Within the studied material, six specimens bear traces of their primary coloration, accentuated by irregular yellowish spots distributed mostly in the central part of the shell. Similar spots, slightly smaller, occur also on the Viennese specimens.

The species *Schilderia semidenticulata* (SACCO) was reported from Korytnica by FRIEDBERG (1912) and KOWALEWSKI (1930); as appears from the latter author (KOWALEWSKI 1930, p. 135) he took into account the specimen described formerly by FRIEDBERG.

Schilderia taurovalis (SACCO, 1894)
(Pl. 10, Fig. 3 and Pl. 11, Fig. 1)

1894. *Zonaria globosa* var. *taurovalis* SACC.; F. SACCO, pp. 15-16, Pl. 2, Fig. 28.

MATERIAL: Five specimens.
DIMENSIONS: The largest specimen (Pl. 10, Fig. 3) is 39 mm high, 26 mm wide, and 20.5 mm thick. The w/h ratio ranges 0.634–0.664, t/w ratio does 0.779–0.793, and t/h ratio does 0.494–0.526.

REMARKS: The studied specimens seem to be conspecific with those from the Miocene deposits of Colli Torinesi in Italy, described by SACCO (1894) as *Zonaria globosa* var. *taurovalis* SACCO. This taxon has subsequently been recognized by SCHILDER & SCHILDER (1971) as a separate species, whose holotype has been re-illustrated in the form of a photo by FERRERO MORTARA & *al.* (1984, Pl. 24, Fig. 1). The Korytnica specimens are slightly less elevated, and the largest one is a few millimeters lower than the holotype.

The species *Schilderia taurovalis* (SACCO) has not hitherto been known from the Miocene of Poland.

Genus *Monetaria* TROSCHEL, 1863

Monetaria brocchii (DESHAYES, 1844)
(Pl. 8, Fig. 3; Pl. 9, Figs 4-5; Pl. 10, Figs 1-2)

1856. *Cypraea pyrum* GMELIN; M. HÖRNES, pp. 66-67, Pl. 8, Figs 2, 4-5; ?Fig. 3.
1856. *Cypraea Brocchii* DESH.; M. HÖRNES, pp. 68-70, Pl. 7, Fig. 3.
1877. *Cypraea Lanciae* BRUSINA; S. BRUSINA, p. 369.
1894. *Zonaria fabagina* var. *Brocchii* (DESH.); F. SACCO, p. 19, Pl. 2, Fig. 5.
1894. *Zonaria fabagina* var. *expansa* (BON.); F. SACCO, pp. 19-20, Pl. 2, Fig. 6.
1894. *Zonaria fabagina* var. *tauromagna* SACC.; F. SACCO, p. 22, Pl. 2, Fig. 14.
1912. *Cypraea amygdalum* BROCC.; W. FRIEDBERG, pp. 147-148, Pl. 8, Figs 6-7.
1924. *Cypraea (Bernayia) Brocchii* GRATELOUP; M. COSSMANN & A. PEYROT, pp. 363-364, Pl. 10, Figs 15-17.
1924. *Cypraea (Bernayia) Brocchii* GRAT. var. *expansa* BONELLI; M. COSSMANN & A. PEYROT, p. 365, Pl. 10, Figs 21-22.

MATERIAL: Forty-six specimens.
DIMENSIONS: The smallest specimen (Pl. 10, Fig. 2) is 18.2 mm high, 12.3 mm wide, and 9.8 mm thick; the largest (Pl. 9, Fig. 5) is 35.4 mm, 25.4 mm, and 16.5 mm respectively. The w/h ratio ranges 0.627—0.730, t/w ratio does 0.650—0.852, and t/h ratio does 0.466—0.550.

REMARKS: The specific attribution of the studied specimens makes much trouble what was formerly also met by the earlier students of these ancient cowries, coming not only from Korytnica. The present author was able to collect a relatively rich material, totalling 46 complete specimens, what allows to throw a new light on its taxonomic position.

Within the studied material there are specimens much differing one from the others (*see* Pl. 9, Figs 4-5 and Pl. 10, Figs 1-2), which all should be treated as extremes passing into variable intermediates. Any subdivision of that material into separate taxa becomes soundless. The observed differences are to be ascribed primarily to be ontogenic variability of the shell size displayed by the specimens of various growth stages, although all of them adorned with the final aperture.

It is doubtless that a part of the studied specimens from Korytnica are conspecific with those presented by HÖRNES (1856) from the Vienna Basin as *Cypraea pyrum* GMELIN, and subsequently called by BRUSINA (1877) *Cypraea lanciae* BRUSINA (*recte: Cypraea lanciai* BRUSINA). The more grown specimens from Korytnica seem to be concordant with those presented by HÖRNES (1856) from the Vienna Basin as *Cypraea brocchii* DESHAYES. In other words, it is an opinion of the present author that any separation of the species *Cypraea brocchii* DESHAYES, 1844, from *Cypraea lanciai* BRUSINA, 1877, is not justified. To note, it is important to indicate that in the occurrence sites of *Cypraea brocchii* in the Vienna Basin reported by HÖRNES (1856, p. 688), i.e. Grund, Steinabrunn, and Gainfahren, and by HOERNES & AUINGER (1880, p. 60), i.e. Szob, Forchtenau, and Lapugy in Transylvania, the species *Cypraea lanciai* is also present. In all these localities, the same as at Korytnica, these two species co-occur, but only one of them is taxonomically valid. Its name should obviously be that one which has priority, and was introduced by DESHAYES. To note, that very name was used by DESHAYES for the specimens from the Miocene of Italy, and formerly labelled as "*Cypraea annulus* L. var.". The specimen so labelled by BROCCHI was re-illustrated by PINNA & SPEZIA (1978, Pl. 20, Fig. 3), and its identity with the Korytnica specimens is quite apparent.

Within the Korytnica specimens, as many as 15 (in majority younger ones) bear a trace of primary coloration, namely a yellow spot situated in the posterior part of the shell, abaperturally. There is, however, no specimen bearing a complicated pattern comparable to that displayed by the specimen illustrated by HÖRNES (1856, Pl. 8, Fig. 3). This fact, as well as slightly different shape of the latter specimen, involves a hesitation of its conspecifity with the discussed species.

The most grown specimen within the Korytnica material (Pl. 9, Fig. 5) is morphologically so close to the present-day species *Monetaria moneta* (LINNAEUS), that their congenerity seems to be obvious. Most probably, the Miocene species *Monetaria brocchii* (DESHAYES) is a phyletic ancestor of this present-day species. In the opinion of ABBOTT & DANCE (1990, p. 87), *Monetaria moneta*

REMARKS: To the present author's knowledge, in the recognized bibliography there is no species to which the studied specimens could be assigned; thus, a new species is herein established. Slightly similar is the *Melanella eichwaldi* (HÖRNES) described from Baden in the Vienna Basin (HÖRNES 1856, p. 546, Pl. 49, Fig. 19), and whose adequate illustration was presented by JANSSEN (1969, Pl. 2, Fig. 3). This species which in JANSSEN's (1969, p. 157) treatment is regarded as *Melanella* (*Balcis*) *alba* (COSTA, 1778) f. *eichwaldi* (HÖRNES), is however featured by the shells slightly larger, with whorls completely flat, and the last whorl distinctly lower (the ratio of the height of last whorl *versus* the total height of the shell amounts about 0.32–0.37). To note, HÖRNES (1856) reports the occurrence of *Melanella eichwaldi* from Korytnica, but he references to EICHWALD (1853) who had, under the name of *Eulima subulata* RISSO, certainly another species, *Leiostraca jaskiewiczi* sp.n. (*see above*).

Subgenus *Balcis* LEACH *in* GRAY, 1847

Melanella (*Balcis*) *polita* (LINNAEUS, 1758)
(Pl. 2, Figs 1-4)

1856. *Eulima polita* LINN.; M. HÖRNES, pp. 544-545, Pl. 49, Fig. 22.
1892. *Eulima polita* var. *subbrevis*; F. SACCO, p. 4, Pl. 1, Fig. 4.
1914. *Eulima polita* L. et var.; S. CERULLI-IRELLI, pp. 418-419, Pl. 21, Figs 42-47.
partim 1917. *Eulima* (*Vitreolina*) *subbrevis* D'ORBIGNY; M. COSSMANN & A. PEYROT, pp. 271-272, Pl. 8, Figs 44-45; *non* Figs 46-47.
1928. *Eulima subbrevis* D'ORB.; W. FRIEDBERG, p. 441, Pl. 27, Fig. 6.
1968. *Melanella* (*Balcis*) *polita subbrevis* (D'ORBIGNY); E. ROBBA, pp. 523-524, Pl. 40, Fig. 9.
1969. *Melanella* (*Balcis*) *alba* (COSTA); A.W. JANSSEN, p. 157, Pl. 2, Fig. 1 and Fig. 4; *non* Figs 2-3; *excl. syn.*
1970. *Melanella* (*Balcis*) *polita* (LINNEO); E. CAPROTTI, p. 150, Pl. 2, Fig. 6.
1979. *Melanella* (*Balcis*) *polita* (LINNÉ); J. MARTINELL, pp. 112-113, Pl. 2, Figs 5-6.

MATERIAL: Sixteen specimens.
DIMENSIONS: The largest specimen, preserved without early whorls (Pl. 2, Fig. 1), is 10 mm high and 3.2 mm wide.

REMARKS: The studied specimens are thought to be conspecific with those coming from Baden in the Vienna Basin, presented by HÖRNES (1856), although none of the Korytnica individuals grows up to the comparable size (16 mm in height). The Korytnica specimens are also concordant with those from the Miocene deposits of Dingden in Holland, and presented by JANSSEN (1969) under the name *Melanella* (*Balcis*) *alba* (DA COSTA). It seems, however, that JANSSEN (1969) treats this species too widely, to combine the three species distinguished by HÖRNES (1856), that is *Eulima polita*, *E. lactea*, and *E. eichwaldi*. In any case, no specimens with a straight shell and corresponding to those which HÖRNES (1856) described as *Eulima eichwaldi* (HÖRNES) have been found at Korytnica. In the present author's opinion, both the material from Dingden as well as that from Korytnica is to scanty to revise the taxonomy of all these species.

Within the specimens from the Aquitaine Basin, described by COSSMANN & PEYROT (1917) as *Eulima* (*Vitreolina*) *subbrevis* D'ORBIGNY, conspecific with the Korytnica specimens is only that one from Manciet (*see* COSSMANN & PEYROT 1917, Pl. 8, Figs 44-45). The second one, from Sallespisse, differs both from the latter as well as from the Italian forms presented by SACCO (1892) and re-illustrated in the form of a photo by FERRERO MORTARA & *al.* (1984, Pl. 9, Fig. 1) who regard F. SACCO to be the author of the name *subbrevis* (*see* FERRERO MORTARA & *al.* 1984, p. 66).

The species *Melanella* (*Balcis*) *polita* (LINNAEUS) has not hitherto been known from the Miocene of Poland. FRIEDBERG (1928) recorded one incomplete specimen of *Eulima subbrevis* from Żukowce, presently in the Ukraine.

Apiocypraea voeslauensis (Sacco, 1894)
(Pl. 11, Figs 2-3)

partim 1880. *Cypraea* (*Aricia*) *amygdalum* Brocc.; R. Hoernes & M. Auinger, p. 60, Pl. 8, Fig. 4; *non* Fig. 5.
1894. *Luponia subphysis* var. *vöslauensis* Sacc.; F. Sacco, p. 42.
1952b. *Eocypraea miobadensis* Sacco; M. Glibert, p. 82, Pl. 6, Fig. 11.

MATERIAL: Six specimens.
DIMENSIONS: Two largest specimens, one (Pl. 11, Fig. 3) is 39.5 mm high, 24.6 mm wide and 18.7 mm thick; the second (Pl. 11, Fig. 2) is 36.3 mm, 21.1 mm, and 15.4 mm, respectively. The w/h ratio ranges 0.581 – 0.641, t/w ratio does 0.691 – 0.760, and t/h ratio does 0.424 – 0.473.

REMARKS: It is doubtless that the studied specimens are concordant with that one coming from Vöslau in the Vienna Basin, and described by Hoernes & Auinger (1880) as *Cypraea amygdalum* Brocchi. The latter determination is, however, erroneous because that specimen is not compatible either with the holotype of the species, coming from the Miocene of Italy (*comp.* Pinna & Spezia 1978, Pl. 20, Fig. 1) or with the specimens presented under that name by Hörnes (1856, Pl. 8, Figs 6-8), from the Vienna Basin. As compared to the holotype of *Cypraea amygdalum* Brocchi, the Vöslau specimen differs by a distinct limbus, and from the specimens presented by Hörnes by more numerous and more densely spaced labial teeth. It was Sacco (1894), who correctly regarded the Viennese specimens as separate from *Cypraea amygdalum* Brocchi. The Korytnica specimens seem to demonstrate that in the species *Apiocypraea voeslauensis* (Sacco) the width of limbus depends on ontogeny, with the wider limbus in more grown (older) specimens.

Glibert (1952b, Pl. 6, Fig 11) presented, from Edegem in the Miocene of Belgium, a unique specimen which seems to be identical with the smallest specimen from Korytnica (to note, Glibert gave a photo of the apertural side only). It is, however, unknown, why he labelled it as *Eocypraea miobadensis* (Sacco), whereas the name *Eocypraea voeslauensis* (Sacco) he used only to specimens similar with those presented by Hörnes (1856, Pl. 8, Figs 6-8).

The species *Apiocypraea voeslauensis* (Sacco) has not hitherto been known from the Miocene of Poland. Krach (1981, pp. 65-66, Pl. 17, Figs 1-4), when presenting the species *Cypraea* (*Zonaria*) *amygdalum* Brocchi from Łychów, compared it to the disscussed specimen from Vöslau; it is however obvious that his determination is erroneous, and the Łychów specimens belong to another species.

Apiocypraea sp.
(Pl. 10, Fig. 4)

MATERIAL: One specimen.
DIMENSIONS: The collected specimen is 24.5 mm high, 15.5 mm wide, and 13.0 mm thick.

REMARKS: Any more precise determination of that single specimen is not quite easy. It seems that, of the specimens hitherto presented in the bibliography, it is slightly similar to that from the Miocene of Colli Torinesi in Italy, described by Sacco (1894, p. 41, Pl. 3, Fig. 16) as *Luponia subphysis* var. *algoensoides* Sacco, and subsequently assigned by Schilder & Schilder (1971, p. 68) to the genus *Apiocypraea* Schilder. The Korytnica specimen differs from it by the more delicate crest along which variously colored parts of the shell have developed on the abapertural side (*see* Pl. 10, Fig. 4). The presented specimen belongs to a relatively young individual, featured by the last whorl slightly covering the former ones at the apex.

Superfamily **Triviacea** TROSCHEL, 1863
Family **Triviidae** TROSCHEL, 1863
Genus *Erato* RISSO 1826
Subgenus *Erato* RISSO, 1826
Erato (*Erato*) *elongata* SEGUENZA, 1880
(Pl. 12, Figs 4-6)

1856. *Erato laevis* DON.; M. HÖRNES, pp. 79-80, Pl. 8, Fig. 16.
1894. *Erato laevis* var. *elongata* SEGU.; F. SACCO, p. 60, Pl. 3, Fig. 65.
1930. *Erato* aff. *laevis* DON.; K. KOWALEWSKI, p. 136.
1960. *Erato* (*Erato*) *laevis* (DONOVAN); E. KOJUMDGIEVA, pp. 125-126, Pl. 34, Fig. 10.
1969b. *Erato laevis* (DON.); I CSEPREGHY-MEZNERICS, p. 23, Pl. 6, Figs 10 and 12.
1973. *Erato laevis* (DONOVAN); M. BOHN-HAVAS, p. 1052, Pl. 4, Fig. 17.

MATERIAL: Forty-eight specimens.
DIMENSIONS: The largest specimen (Pl. 12, Fig. 5) is 10.4 mm high and 6.2 mm wide.

REMARKS: The presented specimens have hitherto been known commonly as *Erato laevis* (DONOVAN). The former students of the Miocene fauna have, however, often presented under this name quite different forms. Thus, the present author regards the Korytnica specimens to be conspecific only with those indicated in the synonymy. All the herein assigned Korytnica specimens are distinctly elongated, have their outer surface always smooth, devoid of any traces of warts (even in the best grown individuals), and the number of labial teeth ranges from 14 to 19.

According to SCHILDER & SCHILDER (1971, p. 14), the name *Erato laevis* (DONOVAN) is a younger synonym of *Erato voluta* (MONTAGU); and the variety *Erato laevis* var. *elongata* SEGUENZA is regarded as being of the rank of a separate species.

The species *Erato* (*Erato*) *elongata* SEGUENZA was reported from Korytnica by KOWALEWSKI (1930). In the Miocene of Poland known, moreover, from Benczyn (KRACH 1950a).

Erato (*Erato*) *pernana* SACCO, 1894
(Pl. 12, Figs 2-3)

1894. *Erato laevis* var. *pernana* SACC.; F. SACCO, p. 60, Pl. 3, Fig. 64.

MATERIAL: Four specimens.
DIMENSIONS: The largest specimen (Pl. 12, Fig. 2) is 5.3 mm high and 3.8 mm wide.

REMARKS: Three of herein assigned specimens (that one figured in Pl. 12, Fig. 2 including) seem to be fully concordant with that one coming from Colli Astesi in Italy, presented by SACCO (1894), and which should be regarded as the holotype of the species. The latter specimen was re-illustrated, in the form of a photo, by FERRERO MORTARA & *al.* (1984, Pl. 28, Fig. 4). The three Korytnica specimens, by their size, general shape, the character of the surface, and by the pattern of labial teeth, are practically identical. The fourth specimen (presented in Pl. 12, Fig. 3), however, has a slightly different outer lip, and consequently the overall outline of the shell more triangular; the latter feature is concordant with SACCO's diagnosis: "*testa ... saepe subtriangularis*" (SACCO 1894, p. 60).

SACCO (1894) regarded his specimens as a variety of *Erato laevis* (DONOVAN). According to SCHILDER & SCHILDER (1971, p. 13), they represent a separate species, and this view is herein accepted by the present author.

The species *Erato* (*Erato*) *pernana* SACCO has not hitherto been known from the Miocene of Poland.

Subgenus *Eratopsis* HOERNES & AUINGER, 1880

Erato (*Eratopsis*) *barrandei* HOERNES & AUINGER, 1880
(Pl. 12, Fig. 1 and Pl. 13, Figs 4-6)

1880. *Eratopsis Barrandei* nov. form.; R. HOERNES & M. AUINGER, p. 64, Pl. 8, Figs 8-10.
1901. *Erato* (*Eratopsis*) *hoernesi* n. sp.; O. BOETTGER, pp. 10-11.
partim 1924. *Erato* (*Eratopsis?*) *subcypraeola* (D'ORBIGNY); M. COSSMANN & A. PEYROT, pp. 392-394, Pl. 11, Figs 44-47; *non* Figs 48-51.
1934. *Erato* (*Erato*) *transiens* BOETTGER; A. ZILCH, pp. 249-250, Pl. 14, Fig. 70.

MATERIAL: Two hundred and twenty specimens.
DIMENSIONS: The largest specimen (Pl. 13, Fig. 4) is 5.6 mm high and 3.7 mm wide.

REMARKS: The studied specimens are undoubtedly conspecific with those presented by HOERNES & AUINGER (1880, Pl. 8, Fig. 10), from Niederleis in Austria, as the variety *B* of the species *Eratopsis barrandei* HOERNES & AUINGER. The variability of the Korytnica specimens is expressed by the prominence of ornamentation, which is absent from the shells of young individuals. Moreover, variable is the number of labial teeth which commonly amounts 10 or 11, but ranges from 8 to 14. It is striking that within the numerous specimens from Korytnica none is concordant with the typical forms or with the variety *A* of this species. It is thus guessed that either at Niederleis, from where HOERNES & AUINGER (1880) had collected only 18 specimens, the range of variability is much wider, or the variety *B* should be treated as a separate species. A similar situation, as at Korytnica, seems to exist at Kostej and Lapugy in Transylvania, from where BOETTGER (1901) described specimens quite compatible with those from Korytnica, and named *Erato* (*Eratopsis*) *hoernesi* BOETTGER [according to ZILCH (1934, p. 249) the latter name is a younger synonym of *Erato transiens* BOETTGER, 1884]. The specimens from Kostej and Lapugy were already known to HOERNES & AUINGER (1880) who determined them (*see* HOERNES & AUINGER 1880, p. 63; BOETTGER 1901, p. 11) as *Erato laevis* DONOVAN; thus they did not recognize therein their (!) newly established genus *Eratopsis*, what so flabbergasted BOETTGER in 1901. Of the two above-suggested possibilities, the present author inclines to the first one, that is the greater variability ranges in *Erato* (*Eratopsis*) *barrandei* (HOERNES & AUINGER), whereas BOETTGER (1901) took into account the second one.

The discussed species was variously treated by other students. The present author does not include herein the specimens from the Miocene of northern Italy presented by SACCO (1894, Pl. 3, Figs 70-73), and from the Ukraine, presented by FRIEDBERG (1912, Pl. 8, Fig. 5). In both these cases the specimens are much larger and featured by quite different pattern of labial teeth. The specimens reported by those two former students the present author attributes to the species *Erato* (*Eratopsis*) *subcypraeola* (D'ORBIGNY), described hereafter.

The species *Erato* (*Eratopsis*) *barrandei* (HOERNES & AUINGER) has not hitherto been known from the Miocene of Poland.

Erato (*Eratopsis*) *subcypraeola* (D'ORBIGNY, 1852)
(Pl. 13, Figs 1-3)

1894. *Erato laevis* var. *subcypraeola* (D'ORB.); F. SACCO, p. 58, Pl. 3, Fig. 62.
1894. *Eratopsis Barrandei* (H. A.) et var.; F. SACCO, pp. 62-63, Pl. 3, Figs 70-73.

1901. *Erato* (*Eratopsis*) *kimakowiczi* Bttg.; O. Boettger, pp. 11-12.
1912. *Erato* (*Eratopsis*) *Barrandei* R. Hoern. i Auing. var. *tauroastulcata* Sacco; W. Friedberg, pp. 146-147, Pl. 8, Fig. 5.
partim 1924 *Erato* (*Eratopsis?*) *subcypraeola* (d'Orbigny); M. Cossmann & A. Peyrot, pp. 392-394, Pl. 11, Figs 48-51; *non* Figs 44-47.
1934. *Erato* (*Erato*) *subcypraeola* (d'Orbigny); A. Zilch, p. 249, Pl. 14, Fig. 69.
1956. *Erato laevis* Donovan; I. Cserhigby-Meznerics, Pl. 3, Figs 7-8.
1969a. *Erato* (*Eratopsis*) *barrandei planulosa* Bon.; I. Cserhigby-Meznerics, p. 78, Pl. 12, Figs 12 and 15.

MATERIAL: Fifteen specimens.
DIMENSIONS: The largest specimen (Pl. 13, Fig. 2) is 8.4 mm high and 5.4 mm wide.

REMARKS: It is highly probable that the herein assigned specimens from Korytnica belong to the species *Erato* (*Eratopsis*) *subcypraeola* (d'Orbigny). A doubt appears because the specimens from Dax (Saint-Paul) in the Aquitaine Basin, the type locality of the species, presented by Cossmann & Peyrot (1924) are slightly smaller, not reaching more than 6 mm in height. It seems, on the other hand, doubtless that the Korytnica specimens are conspecific with those coming from the Miocene of northern Italy, which Sacco (1894) referred either to *Erato laevis* var. *subcypraeola* (d'Orbigny), or to four different varieties of *Eratopsis barrandei* Hoernes & Auinger. The Korytnica specimens are also conspecific with those coming from Kostej and Lapugy in Transylvania, and described by Boettger (1901) as *Erato kimakowiczi* Boettger, but subsequently included by Zilch (1934) to *Erato subcypraeola* (d'Orbigny). With all these Italian and Transylvanian specimens the studied forms of Korytnica share the comparable size and the pattern of the labial teeth.

One of the Korytnica specimens (*see* Pl. 13, Fig. 3) bears its apical part aberrantly developed: the spire is completely covered by the last whorl due to which the shell acquires a *Cypraea*-like shape. A similar specimen from Szob in Hungary was presented by Strausz (1966, Pl. 75, Fig. 25) and included into the discussed species, but the present author does not regard it to be conspecific with the Korytnica specimens. That one from Szob has another pattern of columellar teeth and it is much smaller.

The species *Erato* (*Eratopsis*) *subcypraeola* (d'Orbigny) has not hitherto been known from the Miocene of Poland.

Genus *Trivia* Broderip, 1837
Subgenus *Trivia* Broderip, 1837
Trivia (*Trivia*) *antiquosphaera* Sacco, 1894
(Pl. 14, Fig. 4)

1856. *Cypraea europaea* Mont.; M. Hörnes, pp. 73-74, Pl. 8, Fig. 15.
1894. *Trivia europaea* var. *antiquosphaera* Sacc.; F. Sacco, p. 47, Pl. 3, Fig. 28.
1906. *Trivia europaea* (Mtg.); O. Boettger, p. 4.
1952a. *Trivia antiquosphaera* Sacco; M. Glibert, pp. 265-267, Pl. 3, Fig. 6.
1966. *Trivia europaea* Montagu; L. Strausz, p. 237, Pl. 76, Figs 4-5.

MATERIAL: One specimen.
DIMENSIONS: The collected specimen is 4.5 mm high, 3.6 mm wide, and 3.1 mm thick.

REMARKS: The only, exceptionally small specimen seems to be concordant both with these presented by Hörnes (1856) from the Vienna Basin, and with those reported by Sacco (1894) from Colli Torinesi in Italy. This species, as already noted by Hörnes (1856, p. 73), characterizes by a great variability of size. The exclusively very small specimens occur also in Kostej and Lapugy in Transylvania, and Boettger (1906), when describing them, underlined that his largest specimen was only 6 mm high.

The discussed species has hitherto been reported commonly under the name *Trivia europaea* (Montagu, 1808), but Schilder & Schilder (1971, p. 16) indicated that this is a younger synonym

of *Cypraea monacha* DA COSTA, 1778, and the Italian specimens should be labelled as *Trivia antiquosphaera* SACCO.

The species *Trivia* (*Trivia*) *antiquosphaera* SACCO has not hitherto been known from the Miocene of Poland.

Trivia (*Trivia*) cf. *sphaericulata* (LAMARCK, 1810)
(Pl. 14, Fig. 5)

partim 1894. *Trivia sphaericulata* (LK.) et var.; F. SACCO, pp. 47-49, Pl. 3, Figs 29-33; *non* Figs 34-36.
1970. *Trivia* (*Trivia*) *sphaericulata* (LAMARCK); E. CAPROTTI, p. 158, Pl. 4, Fig. 1, ?Fig. 2.

MATERIAL: One large fragment.
DIMENSIONS: The height of the specimen to which this fragment belonged, is estimated as about 7.5 mm.

REMARKS: The presented specimen is quite distinct from all herein described representatives of the genus *Trivia* BRODERIP from the Korytnica Clays. It differs by its much thinner ribs, and much thinner wall of the shell. Presumably, it belongs to the species *Trivia* (*Trivia*) *sphaericulata* (LAMARCK), which is a rarity in the Miocene deposits of the Paratethys basins; BOETTGER (1906, p. 4) underlined that in his times the species was then recognized only from Lapugy in Transylvania.

The species *Trivia* (*Trivia*) *sphaericulata* (LAMARCK) has not hitherto been known from Korytnica. In the Miocene of Poland noted from Benczyn (KRACH 1950a).

Subgenus *Sulcotrivia* SCHILDER, 1933

Trivia (*Sulcotrivia*) *dimidiatoaffinis* SACCO, 1894
(Pl. 14, Figs 1-3)

1856. *Cypraea affinis* DUJ.; M. HÖRNES, p. 72, Pl. 8, Fig. 14.
1894. *Trivia affinis* DUJ. et var.; F. SACCO, pp. 50-51, Pl. 3, Figs 37-40.
1912. *Trivia affinis* DUJ.; W. FRIEDBERG, pp. 149-150, Pl. 8, Fig. 9.
1924. *Trivia affinis* DUJARDIN; M. COSSMANN & A. PEYROT, pp. 385-386, Pl. 10, Figs 10 and 43-45.
1952a. *Trivia dimidiatoaffinis excoccinella* SACCO; M. GLIBERT, pp. 267-269, Pl. 3, Fig. 7.
1952a. *Trivia dimidiatoaffinis* s.s. SACCO; M. GLIBERT, pp. 270-271, Pl. 3, Fig. 9.
1960. *Trivia affinis* (DUJARDIN); E. KOJUMDGIEVA, p. 126, Pl. 34, Fig. 9.
1966. *Trivia affinis dimidiatoaffinis* SACCO; L. STRAUSZ, pp. 236-237, Pl. 76, Figs 1-3.
1969b. *Trivia affinis* (DUJ.); I. CSEPREGHY-MEZNERICS, p. 23, Pl. 6, Figs 23 and 25.

MATERIAL: Four specimens.
DIMENSIONS: The largest specimen (Pl. 14, Fig. 1) is 9.4 mm high, 7.5 mm wide, and 6.2 mm thick; the smallest is 7.0 mm, 5.3 mm, and 4.4 mm, respectively.

REMARKS: The largest of the herein assigned specimens differs from the others by its height/width and height/thickness ratios slightly smaller. Except of this, all the studied specimens display the same type of furrow, thickness of ribs and the number of labial teeth (it is 16 in the specimen presented in Pl. 14, Figs 1 and 3, *versus* 18 in that from Fig. 2). In the present author's opinion the largest specimen falls within the range of intraspecific variability, and should not been taxonomically separated. However, if the respective ratios data presented by GLIBERT (1952a) are taken into account, it would appear that one specimen (Pl. 14, Fig. 1) belongs to *Trivia dimidiatoaffinis excoccinella* SACCO, and the others to *Trivia dimidiatoaffinis dimidiatoaffinis* SACCO. A very scanty material from Korytnica does not allow to discuss the value of these infraspecific categories.

The discussed species has hitherto been referred commonly to as *Trivia affinis* (DUJARDIN), but SCHILDER & SCHILDER (1971) indicated that this name being younger primary homonym must be rejected.

The species *Trivia* (*Sulcotrivia*) *dimidiatoaffinis* SACCO has not hitherto been known from the Miocene of Poland.

Family **Ovulidae** FLEMING, 1828

Genus *Cypropterina* DI GREGORIO, 1880

Subgenus *Cypraeotrivia* VREDENBURG, 1920

Cypropterina (*Cypraeotrivia*) *duclosiana* (BASTEROT, 1825)

(Pl. 38, Fig. 4)

1856. *Cypraea Duclosiana* BAST.; M. HÖRNES, p. 71, Pl. 8, Fig. 13.
1880. *Cypraea* (*Pustularia*) *Duclosiana* BAST.; R. HOERNES & M. AUINGER, pp. 61-62, Pl. 7, Figs 7-8.
1894. *Jenneria duclosiana* (BAST.), et var.; F. SACCO, pp. 56-57, Pl. 3, Figs 54-61.
1924. *Pustularia Duclosiana* (BASTEROT); M. COSSMANN & A. PEYROT, pp. 390-392, Pl. 11, Figs 4-8.
1954. *Pustularia duclosiana sulcicauda* BON.; I. CSEPREGHY-MEZNERICS, p. 32, Pl. 3, Figs 21 and 26.
1960. *Pustularia duclosiana* (BASTEROT); E. KOJUMDGIEVA, p. 127, Pl. 34, Fig. 11.
1960. *Pustularia duclosiana* var. *sulcicauda* (BONELLI); E. KOJUMDGIEVA, p. 127, Pl. 34, Fig. 12.
1966. *Cypraea* (*Cypropterina*) *duclosiana sulcicauda* BONELLI; L. STRAUSZ, p. 240, Pl. 75, Figs 22-24.

MATERIAL: One specimen.
DIMENSIONS: The collected specimen is 20.5 mm high, 12.7 mm wide, and 10.5 mm thick.

REMARKS: Accepting an opinion expressed by COSSMANN & PEYROT (1924, p. 391) that the great variability of shape and ornamentation in this species is ontogenetically dependent, the present author considers a distinction of any varieties to be unjustified. The Korytnica specimen is relatively slender, with initial pustulas on the abapertural side anteriorly. It bears trace of primary coloration, on the apertural side, in the form of light, small spots on the reddish background. This specimen is very similar to those presented by HÖRNES (1856) from Niederkreuzstätten in Austria, and by STRAUSZ (1966) from Samsonhaza in Hungary, although it is slightly larger and more slender. Of the forms presented by SACCO (1894) from the Miocene of northern Italy, it is the closest (*see* SACCO 1894, Pl. 3, Fig. 54) to those labelled as var. *taurolaevis* SACCO.

The species *Cypropterina* (*Cypraeotrivia*) *duclosiana* (BASTEROT) has not hitherto been known from the Miocene of Poland.

Genus *Simnia* RISSO, 1826

Simnia sp.

(Pl. 14, Fig. 6)

MATERIAL: Two fragmented specimens.
DIMENSIONS: The larger fragment is estimated as of a specimen about 20 mm high.

REMARKS: The studied fragmentary specimens escape from precise recognition. They certainly belong to the genus *Simnia* RISSO, 1826, so understood as given by WENZ (1941, p. 1012) and SCHILDER & SCHILDER (1971, p. 75); any specific attribution cannot however be offered. The presented specimen (Pl. 14, Fig. 6), being the larger of the collected fragments but belonging to the smaller individual, bears a very distinct crest on the abapertural side, underlined by its darker

coloration (dark brown stripe in the light brown background). Such a crest cannot be recognized on any Miocene specimens illustrated in the referenced papers (*comp.* HÖRNES 1856, Pl. 8, Fig. 17; SACCO 1894, Pl. 3, Figs 74-75 and 81; COSSMANN & PEYROT 1924, Pl. 11, Figs 28-30; GLIBERT 1952a, Pl. 3, Fig. 4; CSEPREGHY-MEZNERICS 1969b, Pl. 2, Fig 14). The very inferior material does not allow the present author to draw more precise conclusions. To note, the two discussed specimens were collected from the oyster shellbed at Mt. Lysa.

The genus *Simnia* RISSO has not hitherto been known from the Miocene of Poland.

Superfamily **Naticacea**
Family **Naticidae** FORBES, 1838
Genus *Natica* SCOPOLI, 1777

Natica tigrina RÖDING, 1798
(Pl. 15, Figs 10-14)

1831. *Natica glaucina* LIN.; DU BOIS DE MONTPÉREUX, p. 44, Pl. 3, Figs 42-43.
1837. *Natica epiglottina* LAM.; G. PUSCH, pp. 99-100, Pl. 9, Fig. 12.
1837. *Natica glaucinoides* SOW.; G. PUSCH, pp. 100-101, Pl. 9, Fig. 12.
1853. *Natica eximia* m.; E. EICHWALD, pp. 254-255, Pl. 10, Fig. 42.
1856. *Natica millepunctata* LAM.; M. HÖRNES, pp. 518-522, Pl. 47, Figs 1-2.
1858. *Natica neglecta* MAYER; C. MAYER, p. 388, Pl. 11, Fig. 2.
1864. *Natica Burdigalensis* MAYER; C. MAYER, pp. 166-167, Pl. 8, Fig. 6.
1906. *Natica hoernesi* FISCH. TOURN.; O. BOETTGER, p. 89.
1906. *Natica epiglottina* LMK.; O. BOETTGER, p. 89.
1919. *Natica tigrina* DEFR. *in* GRAT.; M. COSSMANN & A. PEYROT, pp. 394-397, Pl. 11, Figs 1, 9-10.
1919. *Natica burdigalensis* MAYER; M. COSSMANN & A. PEYROT, pp. 397-398, Pl. 11, Figs 2-3.
1919. *Natica neglecta* MAYER-EYMAR; M. COSSMANN & A. PEYROT, pp. 403-405, Pl. 11, Figs 11-14.
1923. *Natica millepunctata* LAM. var.; W. FRIEDBERG, pp. 426-429, Pl. 26, Figs 2-3; Text-fig. 76.
1952a. *Natica* (*Natica*) *tigrina* DEFRANCE; M. GLIBERT, pp. 255-259, Pl. 2, Fig. 3.
1952a. *Natica* (*Natica*) *neglecta* MAYER; M. GLIBERT, pp. 259-260, Pl. 2, Fig. 4.
1960. *Natica* (*Nacca*) *millepunctata* var. *tigrina* (DEFRANCE); E. KOJUMDGIEVA, pp. 118-119, Pl. 33, Fig. 4.
1960. *Natica* (*Nacca*) *millepunctata* var. *hoernesi* (FISCHER und TOURNOUËR); E. KOJUMDGIEVA, p. 119, Pl. 33, Fig. 5.
1960. *Natica* (*N.*) *tigrina hörnesi* FISCH. & TOURN.; T. BÁLDI, p. 64, Pl. 2, Figs 2*a*, 2*c*.
1960. *Natica* (*N.*) *epiglottina* LAM.; T. BÁLDI, pp. 64-65, Pl. 2, Figs 1, 2*b*.
1966. *Natica millepunctata* LAMARCK; L. STRAUSZ, pp. 225-227, Pl. 48, Figs 5-12.
1969. *Natica tigrina hoernesi* FISCHER & TOURNOUËR; A.W. JANSSEN, p. 172, Pl. 6, Figs 26-30; Pl. 7, Figs 13-16.
1969. *Natica neglecta* MAYER; A.W. JANSSEN, pp. 173-174, Pl. 5, Figs 18-24.
1970. *Natica* (*Natica*) *tigrina* DEFRANCE; E. CAPROTTI, p. 164, Pl. 5, Fig. 3.
1975. *Natica* (*s.s.*) *tigrina* DEFRANCE; J. CATALIOTTI-VÁLDINA, pp. 64-65, Pl. 2, Figs 4*a-c*.
1979. *Natica millepunctata* LAMARCK; J. MARTINELL, pp. 132-135, Pl. 4, Figs 1-3.
1980. *Naticarius tigrinus* (DEFRANCE); G. PAVIA, pp. 251-255, Pl. 6, Figs 1-11.
1981. *Natica* (*Nacca*) *millepunctata* LAMARCK; W. KRACH, p. 64, Pl. 17, Fig. 5.

MATERIAL: More than 3000 specimens.
DIMENSIONS: The largest specimen is 37 mm high and 33.5 mm wide.

REMARKS: The discussed species is one of the most common in the Korytnica Clays. Its shell characterizes by a great variability in elevation of the spire, due to which the width/height ratio ranges distinctly from 0.85 to 1.05. Between the extremes there occur intermediates of various ratio values, which was documented already by FRIEDBERG (1923, Text-fig. 76). The present author is of the opinion that any attempts to separate more slender forms from those more stumpy ones would be quite artificial. Of the former students of these gastropods from Korytnica it was only PUSCH (1837) who distinguished two species (*see* synonymy).

A full concordance of the Korytnica specimens with those from the Vienna Basin and coming i.a. from Grund, first recorded by HÖRNES (1856, p. 521), is herein confirmed by the present author's study.

COSSMANN & PEYROT (1919) for the specimens from the Aquitaine Basin, GLIBERT (1952a) for those from the Loire Basin, and JANSSEN (1969, 1984) for those from the vicinity of Dingden, and of Winterswijk in Holland, distinguished the more slender forms as *Natica neglecta* MAYER, 1858, and the more stumpy ones as *Natica tigrina* DEFRANCE, 1825. Within the Korytnica material one may find both specimens quite consistent either with the former or the latter ones, as well as such ones, especially juveniles, which cannot be classified precisely. Apart from the shells, there occur herein opercula, which are preserved either inside the shells, or isolated. The loose opercula are comparable with these which JANSSEN (1969) assigned to *Natica tigrina*, and with those assigned to *Natica neglecta*. In the light of the data presented by JANSSEN himself (1969, p. 171), morphologic features of the naticid opercula, particularly the number of furrows and ribs, are of very limited taxonomic significance. According to PAVIA (1980, pp. 254-255), opercula of *Natica tigrina* are very variable in their morphology, the elements of which may dependent i.a. on the facies, precisely on the bottom conditions.

The two closely related species of *Natica* were also presented by BOETTGER (1901, 1906) from Kostej in Transylvania, and by BÁLDI (1960) from Szokolya in Hungary. These two authors used to distinguish *Natica tigrina hoernesi* FISCHER & TOURNOUËR and *Natica epiglottina* LAMARCK, as based primarily on the morphology of the opercula. What concerns the two discussed species, BOETTGER (1906, p. 89) wrote: "*ich weiss nicht, wo die eine anfängt und die andere aufhört*" [I do not know where the one begins, and the other finishes], and this sentence was cited also by BÁLDI (1960, p. 64).

The specimens of the discussed species from Korytnica have long been called, following HÖRNES (1856), as *Natica millepunctata* LAMARCK. According to ABBOTT & DANCE (1990, p. 109), this name is a younger synonym of *Natica stercusmuscarum* GMELIN. In this present-day species the coloration of the shells is, however, quite different (*see also* RIEDL 1963, p. 370). The colored spots, observable in the Korytnica specimens are almost identical with those presented in illustrations by HÖRNES (1856), althought slightly larger and less densely spaced. Such very pattern occurs in the present-day specimens of *Natica tigrina* (RÖDING) illustrated by ABBOTT & DANCE (1990, p. 109). To note, the majority of authors regard DEFRANCE to be the creator of the name *tigrina*; it seems, however, highly probably that DEFRANCE used in 1825 the name introduced earlier by RÖDING.

The species *Natica tigrina* (RÖDING) was, under various names, reported from Korytnica by all the former authors. In the Miocene of Poland it is a common species. Under the name of *Natica millepunctata* it was reported from Biskupice (ROEMER 1870), Gliwice Stare (KRACH 1954), Małoszów (KOWALEWSKI 1930, KRACH 1947), Zagrody, Wilczyce and Słaboszowice (KOWALEWSKI 1930), Nawodzice (BAŁUK & RADWAŃSKI 1968), Łychów (KRACH 1981), Monastyrz (JAKUBOWSKI 1977), Bogucice (LISZKA 1933), Zgłobice (FRIEDBERG 1938, URBANIAK 1974), as well as Błonie and Szczepanowice (URBANIAK 1974).

Genus *Nacca* RISSO, 1826

Nacca unica sp.n.
(Pl. 15, Fig. 9)

HOLOTYPE: The specimen (Z.PAL.U.W., No. BkK-G465) presented in Pl. 15, Fig. 9.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.
DERIVATION OF THE NAME: *unica* – from Latin *unicus* – the only (one), the sole.
DIAGNOSIS: Shell bulged, thick-walled, of a very low spire; umbilicus completely open, very narrow and very deep.
MATERIAL: One specimen.
DIMENSIONS: Height 42 mm, width 39.5 mm.

DESCRIPTION: Shell relatively large and thick-walled; protoconch not preserved, teleoconch composed of five highly convex whorls; in the rear part of whorls, not very distant to the suture, there appears a wide and very shallow, furrow-shaped depression. Spire very low; the last whorl is about 40 mm high that makes 0.94 of total height of the shell. Outer surface smooth, with discernible growth lines that within the furrow-like depression are slightly arched towards the aperture, and are quite straight on the rest of the whorl, as far as the margin of the umbilicus. Aperture very spacious, almost oval, slightly tapering posteriorly; outer lip not swollen at the margin, smooth inside; inner lip adheres to the outer surface of the shell along a short section running from the umbilicus to the suture. Umbilicus fully opened, very narrow (final diameter about 3 mm), and very deep (attaining more than 16 mm); in its interior developed is a relatively very wide, but very low funiculus.

REMARKS: In the recognized bibliography there is no description of the species to which the studied specimen could be assigned. Thus, the present author decided to establish a new species, *Nacca unica* sp.n., although he is anxious about creating new taxa based on a single specimen. In this case, however, the only specimen is fully grown, well preserved, without any feature suggesting its abnormality.

The studied specimen, by the structure of its umbilicus, reminds a little another unique specimen from Szob in Hungary presented by STRAUSZ (1966, Text-fig. 109) under the name *Natica* (*Lunatia?*) *szobiensis* STRAUSZ; the Korytnica specimen is much larger and its inner lip is developed quite differently. By its size and shape *Nacca unica* sp.n. is slightly similar also to *Polinices catena* (DA COSTA); its spire is still less projecting (*comp.* ABBOTT & DANCE 1990, p. 105). An assignment of the newly established species to the genus *Nacca* RISSO is uncertain, because unknown is its operculum.

Genus *Polinices* MONTFORT, 1810

Polinices protractus (EICHWALD, 1853)
(Pl. 15, Figs 2-3)

1837. *Natica hemiclausa* SOW.; G. PUSCH, p. 101, Pl. 9, Fig. 16.
1853. *Natic. protracta* m.; E. EICHWALD, pp. 255-256, Pl. 10, Fig. 43.
partim 1856. *Natica helicina* BROCC.; M. HÖRNES, pp. 525-527, Pl. 47, Fig. 6; *non* Fig. 7.
1919. *Natica* (*Lunatia*) *helicina* (BROCCHI); M. COSSMANN & A. PEYROT, pp. 432-434, Pl. 11, Figs 39-40 only, *ceterae*?
1923. *Natica* (*Lunatia*) *catena* DA COSTA var. *hellcina* BROCC.; W. FRIEDBERG, pp. 429-432, Pl. 26, Figs 4-5.
1923. *Natica catena* DA COSTA var. *prohelicina* SACCO; W. FRIEDBERG, pp. 432-433, Text-fig. 77.
1960. *Polinices* (*Euspira*) *catena* var. *protracta* (EICHWALD); E. KOJUMDGIEVA, p. 121, Pl. 33, Figs 12-13.
1968. *Polinices* (*Lunatia*) *varians protractus* (EICHWALD); E. ROBBA, p. 529, Pl. 41, Figs 1*a*-1*b*.
1969. *Polinices* (*Euspira*) *helicinus protractus* (EICHWALD); A.W. JANSSEN, p. 165, Pl. 6, Figs 3-6 only, *ceterae*?

MATERIAL: Three hundred and fifty specimens.
DIMENSIONS: The largest specimen (Pl. 15, Fig. 3) is 27 mm high and 22.2 mm wide.

REMARKS: The taxonomic assignation of these numerous specimens bears serious problems. HÖRNES (1856) and FRIEDBERG (1923) classified identical specimens from Korytnica as the species *Natica helicina* BROCCHI, including into its synonymy also *Natica protracta* EICHWALD. Unknown is the locality of the specimen illustrated by EICHWALD (1852, Pl. 10, Fig. 43), that is the holotype of *Polinices protractus* (EICHWALD), but probably it was coming from Korytnica. The width/height ratio of shells of the studied specimens ranges from 0.75 to 0.87 (for illustrated specimens it is 0.79 and 0.82). As calculated from the measurements given by EICHWALD (1853, p. 255) this ratio was about 0.88 in his specimens. The holotype of the species *Polinices helicinus* (BROCCHI) was re-illustrated in the form of a photo both by JANSSEN (1969, Pl. 4, Fig. 17) and by PINNA & SPEZIA (1978, Pl. 42, Fig. 3). This is a large specimen, according to JANSSEN (1969) 33.2 mm

high, and according to PINNA & SPEZIA (1978) attaining 33.7 mm. Its aperture is strongly damaged, and thus its width cannot be measured precisely. None of the Korytnica specimens is so large and so stumpy as the holotype of *Polinices helicinus* (BROCCHI).

From the Vienna Basin, HÖRNES (1856) presented two specimens, distinctly differing in their slenderness: that one from Vöslau has the width/height ratio equal 1.00 (as calculated from measurements given by HÖRNES), and the second one, from Grund, is much more slender. The Korytnica specimens are to be regarded as conspecific only with the latter specimen (*see* HÖRNES 1856, Pl. 47, Fig. 6), and, moreover, with the specimen from Gainfahren presented by GLIBERT (1952a, Pl. 2. Fig. 2). Supposedly, in the Vienna Basin there occur two species which may be classified as *Polinices helicinus* (BROCCHI) and *Polinices protractus* (EICHWALD). The same conclusion was formerly presented by GLIBERT (1952a), who apart from the above-mentioned specimen from Gainfahren had in his disposal also a less slender one, from Baden.

The two discussed taxa, treated as subspecies of *Polinices helicinus* (BROCCHI), were also noted in the Miocene of Dingden in Holland (JANSSEN 1969). It cannot be, however, recognized which of the therein collected specimens are conspecific with these from Korytnica, because JANSSEN (1969, p. 164) distinguished these two taxa upon the features not fully concordant with the EICHWALD's diagnosis: "*...spira elongato-protracta, ...*".

The discussed species occurs also in the Neogene of northern Italy, from where ROBBA (1968) presented, from Tortonien of S.Agata, a specimen fully concordant with these from Korytnica, and determined it as *Polinices* (*Lunatia*) *protractus* (EICHWALD). The width/height ratio in this specimen, as calculated from the given measurements, is 0.83.

Many of the Korytnica specimens bear the trace of their primary coloration, expressed as a dark, not very wide stripe that runs near the suture in the posterior part of the whorls. This stripe is similar to that appearing in *Neverita josephinia* RISSO. Such a coloration pattern is thus quite different from that preserved in *Polinices helicinus* (BROCCHI) coming from Montegibbio in northern Italy, and reported by GLIBERT (1952a, Pl. 1, Fig. 4c).

The present author described formerly (BAŁUK 1970, Pl. 13, Fig. 17), from Niskowa, and under the name *Polinices* (*Euspira*) *catena helicina* (BROCCHI), a specimen having its width/height ratio equal 0.96, and which herein is not regarded to be conspecific with the studied Korytnica specimens.

The species *Polinices protractus* (EICHWALD) was reported from Korytnica, under various names, by PUSCH (1837), EICHWALD (1853), HÖRNES (1856), KONTKIEWICZ (1882), FRIEDBERG (1923), and KOWALEWSKI (1930).

Polinices pseudoredemptus (FRIEDBERG, 1923) (Pl. 15, Fig. 6)

1923. *Natica* (*Poliniceps*) *pseudoredempta* FRIEDB.; W. FRIEDBERG, pp. 434-435, Pl. 26, Fig. 12; Text-fig. 78.
1960. *Polinices* (*Polinices*) *pseudoredempta* (FRIEDBERG); E. KOJUMDGIEVA, p. 120, Pl. 33, Figs 8-9.
partim 1966. *Natica* (*Polynices*) *redempta* MICHELOTTI; L. STRAUSZ, p. 231, Pl. 47, Figs 19-28, ?Figs 31-32.
1966. *Polynices pseudoredempta* (FRIEDBERG); J. KÓKAY, p. 55, Pl. 7, Fig. 9.

MATERIAL: Eighty-five specimens.
DIMENSIONS: The largest specimen is 22 mm high and 17.5 mm wide.

REMARKS: The studied specimens are fully concordant with that one coming also from Korytnica, and presented by FRIEDBERG (1923, Pl. 26, Fig. 12); they differ, however, from that one coming from Małoszów (*see* FRIEDBERG 1923, Text-fig. 78) by their shape being more slender, and their callus less developed.

When creating this species, FRIEDBERG (1923) remarked on its similarity to *Polinices miocolligens* (SACCO), coming from the Miocene of northern Italy. The re-illustrated holotype and

syntype of the latter species (*see* JANSSEN 1969, Pl. 4, Fig. 1; FERRERO MORTARA & *al.* 1984, Pl. 4, Fig. 4) show the specimens of similar height, but much more stumpy. The width/height ratio of the Korytnica specimens, amounts 0.7—0.8; for the holotype of the SACCO's species it equals 0.95. It is thus thought that *Polinices pseudoredemptus* (FRIEDBERG) and *Polinices miocolligens* (SACCO) are more or less similar, but evidently distinct species.

On the other hand, it seems obvious that the studied specimens are conspecific with these which STRAUSZ (1966) presented under the name *Natica* (*Polynices*) *redempta* MICHELOTTI from Herend in Hungary. STRAUSZ (1966, p. 231) remarked that these specimens are common in brackish deposits. It is thus to note that all the Korytnica specimens were collected in a remote spot on the north-western slope of Mt. Grodzisko (*see* BAŁUK & RADWAŃSKI 1977a, Fig. 2, locality No. 1). Within the mollusk assemblage from this locality, ascribed to brackish pools and mangrove swamps, there appear species unknown from the other parts of the Korytnica Basin, i.a. *Hadriania credneri* (HOERNES & AUINGER) and *Pirenella tabulata* (HÖRNES).

The species *Polinices pseudoredemptus* (FRIEDBERG) was reported from Korytnica only by the author of the species (FRIEDBERG 1923). In the Miocene of Poland it is known also from Małoszów (FRIEDBERG 1923, 1938; KOWALEWSKI 1930; KRACH 1947).

Polinices redemptus (MICHELOTTI, 1847)
(Pl. 15, Figs 7-8)

1837. *Natica cepacea* LAM.; G. PUSCH, p. 102, Pl. 9, Fig. 13.
1856. *Natica redempta* MICHT.; M. HÖRNES, pp. 522-523, Pl. 47, Fig. 3.
1870. *Natica redempta* MICHELOTTI; F. ROEMER, p. 380, Pl. 47, Fig. 8.
1919. *Natica* (*Polinices*) *proredempta* SACCO; M. COSSMANN & A. PEYROT, pp. 425-427, Pl. 12, Figs 23-26.
1923. *Natica* (*Poliniceps*) *redempta* MICHT. var.; W. FRIEDBERG, pp. 433-434, Pl. 26, Figs 6-7.
1923. *Natica* (*Poliniceps*) *Staszici* FRIEDB.; W. FRIEDBERG, pp. 435-436, Pl. 26, Fig. 8, ?Fig. 9.
1952*a*. *Polynices* (*Polynices*) *redempta* MICHELOTTI; M. GLIBERT, pp. 252-254, Pl. 2, Fig. 5.
1959. *Natica redempta* MICHT.; M. ERÉMIJA, Pl. 2, Figs 8-8*a*.
1960. *Polinices* (*Polinices*) *redempta* var. *dertoconvexa* SACCO; E. KOJUMDGIEVA, p. 120, Pl. 33, Fig. 6.
partim 1966. *Natica* (*Polynices*) *redempta* MICHELOTTI; L. STRAUSZ, p. 231, Pl. 47, Figs 29-30, ?Figs 31-32; *non* Figs 19-28.
1966. *Natica* (*Polynices*) *redempta staszici* FRIEDBERG; L. STRAUSZ, p. 232, Pl. 47, Figs 33-35; Pl. 48, Figs 1-4.
1984. *Polinices* (*Polinices*) *redemptus* (MICHELOTTI); G. RUGGIERI & F. DAVOLI, p. 55, Pl. 1, Fig. 19.
1990. *Polinices* (*Polinices*) *redemptus* (MICHELOTTI); F. DAVOLI, pp. 58-60, Pl. 5, Fig. 10.

MATERIAL: Two hundred and twenty specimens.
DIMENSIONS: The largest specimen is 42 mm high and 39 mm wide.

REMARKS: The studied specimens characterize by their relatively great variability, as expressed by the details of the general shape of the shell. Some of them are of the more conical outline, the others are shaped step-like, and a full range of intermediate forms is recognizable. The present author does not accept the treatement of FRIEDBERG (1923), who distinguished at Korytnica *Natica redempta* MICHELOTTI var. and *Natica staszici* FRIEDBERG. A separateness of these species was doubted by KOWALEWSKI (1930, p. 161), who regarded them as very closely related. Almost all specimens studied bear a uniformly developed callus that fully fills the umbilicus. In only four specimens this callus is uncomplete; these specimens remind that one from Sogliano in the northern Appenines presented by DAVOLI (1990, Pl. 5, Fig. 10).

The Korytnica specimens are evidently conspecific with these coming from the Vienna Basin, although none of them attains so great size as that one from Grund, presented by HÖRNES (1856, Pl. 47, Fig. 3), and being 66 mm high. HÖRNES (1856, p. 523) noted also that in the specimens from Võslau preserved were the traces of primary coloration, featured as "*weisse, engstehende mittelgrosse Flecken auf dunklem Grunde*" [white, densely spaced, medium-sized spots against the dark background]. A few specimens from Korytnica yield almost similar traces, but featured reversely, by the dark spots on the light background, identical with those on the specimen from

Vöslau presented by GLIBERT (1952a, Pl. 2, Fig. 5*h*); these spots are much smaller than those on the specimen from Montegibbio in northern Italy (*comp.* GLIBERT 1952a, Pl. 2, Fig 5*f*).

The less-grown specimens from Korytnica are seemingly similar to these of *Polinices miocolligens* (SACCO), described from the Miocene of northern Italy, especially if they are compared with a specimen referred to as the holotype of this species (*see* JANSSEN 1969, Pl. 4, Fig. 1). Similarity is much lesser when comparison is made to the specimen regarded as the syntype of the species (*see* FERRERO MORTARA & *al.* 1984, Pl. 4, Fig. 4). In both these cases, the Italian specimens bear their inner lip running distinctly less obliquely.

In regard to the discussed species, PUSCH (1837, p. 102) noted that at Korytnica there occur primarily young specimens ("*meist junge Exemplare*"), but KOWALEWSKI (1930, p. 160) reported that he collected exclusively large specimens, fully grown, that is adult ones. This discrepancy is thought to have resulted from taking into account diverse types by these authors. As a matter of fact, the juvenile specimens of this species are absent from the studied Korytnica material. The present author possesses in his colection only two specimens less than 15 mm high.

The species *Polinices redemptus* (MICHELOTTI) was reported from Korytnica by PUSCH (1837), HÖRNES (1856), KONTKIEWICZ (1882), FRIEDBERG (1923, 1938), and KOWALEWSKI (1930). In the Miocene of Poland known also from Biskupiec (ROEMER 1870), as well as from Zgłobice, Błonie, and Szczepanowice (FRIEDBERG 1923, URBANIAK 1974).

Genus *Neverita* RISSO, 1826

Neverita josephinia RISSO, 1826
(Pl. 15, Figs 4-5)

1837. *Natica sigaretina* DEFR.; G. PUSCH, pp. 101-102, Pl. 9, Fig. 15.
1856. *Natica Josephinia* RISSO; M. HÖRNES, pp. 523-525, Pl. 47, Figs 4-5.
1919. *Natica (Neverita) olla* M. DE SER.; M. COSSMANN & A. PEYROT, pp. 419-421, Pl. 12, Figs 5-7.
1923. *Natica (Neverita) Josephina* RISSO; W. FRIEDBERG, pp. 424-426, Pl. 26, Fig. 1.
1952a. *Polynices (Neverita) olla* DE SERRES; M. GLIBERT, pp. 249-251, Pl. 1, Fig. 8.
1960. *Polinices (Neverita) olla* (SERRES); E. KOJUMDGIEVA, pp. 121-122, Pl. 33, Fig. 14.
1966. *Natica (Neverita) josephinia olla* SERRES; L. STRAUSZ, pp. 232-233, Pl. 49, Figs 9-12.
1971. *Polinices olla* (SERRES); E. EREMIJA, p. 72, Pl. 7, Figs 1-3.
1974. *Natica josephina* RISSO; J. URBANIAK, p. 39, Pl. 14, Fig. 5.
1979. *Neverita josephina* RISSO; J. MARTINELL, pp. 125-127, Pl. 3, Figs 7-8.
1984. *Neverita josephinia olla* (DES SERRES); A.W. JANSSEN, pp. 198-199, Pl. 56, Fig. 3.

MATERIAL: Two hundred and forty specimens.
DIMENSIONS: The largest specimen (Pl. 15, Fig. 5) is 21 mm high and 25 mm wide.

REMARKS: The studied specimens are conspecific with these coming from Vienna Basin as well as with those from the Aquitaine Basin and the Loire Basin. COSSMANN & PEYROT (1919), and GLIBERT (1952a) as well, assigned their specimens to *Neverita olla* (DE SERRES), the species regarded by them as a separate to *Neverita josephinia* RISSO. As a matter of fact, differences between these two species are very indistinct, and may be treated as a result of variability of one species. ABBOTT & DANCE (1990) regard the name *Neverita olla* (DE SERRES) as synonymous with *Neverita josephinia* RISSO, and the present author shares herein this opiniom.

The species *Neverita josephinia* RISSO was reported from Korytnica by PUSCH (1837), MURCHISON (1845), HÖRNES (1856), KONTKIEWICZ (1882), FRIEDBERG (1923, 1938), and KOWALEWSKI (1930). In the Miocene of Poland it is also known from Małoszów (FRIEDBERG 1923, 1938; KOWALEWSKI 1930; KRACH 1947), Benczyn (KRACH 1950a), as well as Zgłobice and Błonie (FRIEDBERG 1923, 1938; URBANIAK 1974).

Genus *Sinum* Bolten *in* Röding, 1798

Sinum striatum (De Serres, 1829)
(Pl. 15, Fig. 1)

1831. *Sigaretus haliotoideus* Lin.; F. Du Bois De Montpéreux, pp. 43-44, Pl. 3, Figs 47-48.
1837. *Sigaretus striatus* M. De Serres; G. Pusch, pp. 93-94, Pl. 9, Fig. 6.
1853. *Sigaretus affinis* m.; E. Eichwald, pp. 257-258, Pl. 11, Fig. 1.
1856. *Sigaretus haliotoideus* Linn.; M. Hörnes, pp. 513-515, Pl. 46, Fig. 27.
1904. *Cryptostoma striatum* (De Serr.) var.; F. Sacco, p. 104, Pl. 23, Figs 8-10.
1919. *Sigaretus striatus* M. De Serres; M. Cossmann & A. Peyrot, pp. 440-442, Pl. 12, Figs 43-44, 51.
1923. *Sigaretus striatus* De Serres; W. Friedberg, pp. 423-424, Pl. 25, Fig. 10.
1952a. *Sigaretus* (*Sigaretus*) *striatus* M. De Serres; M. Glibert, pp. 261-262, Pl. 3, Fig. 1*a*; ?Fig 1*c*.
1959. *Sigaretus striatus* De Serres; M. Eremija, Pl. 2, Figs 12-12*a*.
1960. *Sinum* (*Sinum*) *striatum* (Serres); E. Kojumdgieva, p. 122, Pl. 33, Fig. 15.
1970. *Sinum* (*Sinum*) *striatum* (De Serres); E. Caprotti, pp. 163-164, Pl. 5, Fig. 6.
1979. *Sinum* (*s.s.*) *striatum* (De Serres); J. Martinell, pp. 130-131, Pl. 3, Figs 11-12.

MATERIAL: Twelve specimens, of which only one is complete.
DIMENSIONS: The complete specimen is 13 mm high and 21 mm wide.

REMARKS: The studied specimens are certainly conspecific with these coming from the Vienna Basin as well as with those from Aquitaine Basin and the Loire Basin. A statement of Cossmann & Peyrot (1919, p. 442) that the Viennese and other Paratethyan specimens belong to another species, *Sinum affine* (Eichwald), is wrong, as recognized already by Glibert (1952a). A specimen from Grund, presented by Hörnes (1856) is fully grown and very large, what is a typical feature of many species in this locality. Another problem is in relation of the fossil species *Sinum striatum* (De Serres) to the present-day one, *Sinum haliotoideum* (Linnaeus). The majority of authors accept distinctness of this ancient species, but it was already Hörnes (1856, p. 514) who spoke that such a separateness is unreasonable.

The species *Sinum striatum* (De Serres) has not hitherto been known from Korytnica. In the Miocene of Poland it was reported from Gaszowice (Krach 1939), Rybnica (Kowalewski 1930), and Szczepanowice (Urbaniak 1974).

Superfamily **Tonnacea**
Family **Tonnidae**

Genus *Malea* Valenciennes, 1833

Malea denticulata (Deshayes, 1836)
(Pl. 16, Fig. 11)

1856. *Dolium denticulatum* Desh.; M. Hörnes, pp. 164-165, Pl. 15, Fig. 1.
1884. *Dolium* (*Cadium*) *denticulatum* Desh.; R. Hoernes & M. Auinger, p. 149, Pl. 16, Figs 1-4.
1904. *Malea orbiculata* (Br.) var.; F. Sacco, p. 101, Pl. 22, Figs 6-9.
partim 1970. *Malea* (*Malea*) *orbiculata* (Brocchi); E. Caprotti, p. 178, Pl. 7, Fig. 7; *non* Fig. 10.
1979. *Malea orbiculata* (Brocchi); J. Martinell, pp. 148-150, Pl. 5, Figs 9-10.

MATERIAL: Two specimens, preserved only as the final outer lip of the aperture.
DIMENSIONS: Estimated height of the illustrated specimen is about 80 mm.

REMARKS: The scanty material possessed is so characteristic that its specific assignation may be offered. Moreover, it seems that the Korytnica specimens are conspecific with these coming from Grund in the Vienna Basin (*see* Hörnes 1856, Hoernes & Auinger 1884).

These Viennese specimens were assigned by subsequent authors (CSEPREGHY-MEZNERICS 1954, SIEBER 1958, STRAUSZ 1966) to another species and genus, *Dolium orbiculatum* (BROCCHI) [recte *Tonna orbiculata*]. Such a treatment seems to be unjustified since the holotype of this species, re-illustrated in the form of a photo by PINNA & SPEZIA (1978) is a juvenile (about 27 mm high) and incomplete (outer lip not preserved), and thus it should not be a type of the species at all. A designation of the Viennese specimens to the genus *Dolium* LAMARCK, 1801 (= *Cadium* LINK, 1807; = *Tonna* BRÜNNICH, 1772) is incorrect, because their aperture (both lips) is quite different from that in the type species, *Tonna galea* (LINNAEUS); contrary, it is very comparable to that in *Malea ringens* (SWAINSON), the type species of the genus.

The species *Malea denticulata* (DESHAYES) has not hitherto been known from the Miocene of Poland.

Family **Cassididae**

Genus *Cassidaria* LAMARCK, 1812

Cassidaria cingulifera HOERNES & AUINGER, 1884
(Pl. 16, Figs 9-10)

1884. *Cassidaria* (*Galeodea*) *cingulifera* nov. form.; R. HOERNES & M. AUINGER, pp. 161-162, Pl. 17, Figs 16-20.
1954. *Cassidaria cingulifera* HOERNES & AUINGER; I. CSEPREGHY-MEZNERICS, p. 33, Pl. 4, Fig. 7.
1960. *Cassidaria* (*Cassidaria*) *cingulifera* HOERNES et AUINGER; E. KOJUMDGIEVA, p. 135, Pl. 37, Fig. 5.

MATERIAL: One incomplete specimen (Pl. 16, Fig. 10); 12 fragments of the apical part of the shell with the protoconch preserved; numerous fragments.
DIMENSIONS: Estimated dimensions of the illustrated specimen are: height *c.* 50 mm, width *c.* 40 mm; some fragments are of the much larger specimens.

REMARKS: The collected specimens are fully compatible with those described by HOERNES & AUINGER (1884), and coming from Grund in the Vienna Basin, and Kostej in Transylvania. The recognized species is featured by a relatively very thin-walled shell, and thus no complete specimen has hitherto been found in any country. The Korytnica specimen allows to supplement the diagnostic features of the species (*cf.* HOERNES & AUINGER 1884, p. 161) with such one that after formation of the varix, usually being the terminal part of the shell, the shell could grow further on.

The species *Cassidaria cingulifera* HOERNES & AUINGER was recorded from Korytnica by KOWALEWSKI (1930) only. In the Miocene of Poland it is known from Gliwice Stare (KRACH 1954), Małoszów and Szczaworyż (KOWALEWSKI 1930).

Genus *Morum* BOLTEN *in* RÖDING, 1798
Subgenus *Oniscidia* SWAINSON, 1840

Morum (*Oniscidia*) *cythara* (BROCCHI, 1814)
(Pl. 16, Figs 7-8)

1837. *Oniscia Cythara* Sow. var. *polonica* m.; G. PUSCH, p. 126, Pl. 11, Fig. 19.
1856. *Oniscia cithara* Sow.; M. HÖRNES, pp. 171-172, Pl. 14, Fig. 2.
1884. *Oniscia cithara* BROCC.; R. HOERNES & M. AUINGER, pp. 154-155, Pl.17, Figs 1-6.
1890. *Oniscia* (*Oniscidia*) *cythara* (BROCCHI); F. SACCO, pp. 76-77, Pl. 2, Fig. 34.
1912. *Oniscia cythara* BROCC.; W. FRIEDBERG, pp. 116-117, Pl. 6, Fig. 5.

1924. *Oniscia (Oniscidia) harpaeformis* GRATELOUP; M. COSSMANN & A. PEYROT, pp. 428-430, Pl. 12, Figs 18-20.
1954. *Lambidium cytharum* (BROCCHI); I. CSEPREGHY-MEZNERICS, p. 33, Pl. 4, Fig. 2.
1960. *Morum cytharum* (BROCCHI); E. KOJUMDGIEVA, pp. 135-136, Pl. 37, Fig. 4.
1966. *Morum (Oniscidia) cithara* BROCCHI; L. STRAUSZ, pp. 242-243, Pl. 64, Figs 8-9.

MATERIAL: Twenty-two specimens.
DIMENSIONS: The largest specimen is 43 mm high and 27 mm wide; the smallest specimen, with the final varix (Pl. 16, Fig. 7), is 29 mm high and 18 mm wide.

REMARKS: The studied specimens are evidently conspecific with these coming from the Vienna Basin and adjacent Paratethyan basins. PUSCH (1837) distinguished the Korytnica specimens as a new variety, what does seem to be unjustified. The re-illustrated (PINNA & SPEZIA 1978, Pl. 8, Fig. 3) holotype of this species has a little more pronounced final varix, what is not of a taxonomic significance. The specimens from the Miocene of Aquitaine classified as *Morum harpaeformis* (GRATELOUP) should be included into this species, particularly as COSSMANN & PEYROT (1924) put the Viennese specimens of HÖRNES (1856) into their synonymy list.

The species *Morum (Oniscidia) cythara* (BROCCHI) was reported from Korytnica by PUSCH (1837), EICHWALD (1853), HÖRNES (1856), FRIEDBERG (1912, 1938), and KOWALEWSKI (1930). Unknown from other Miocene localities in Poland.

Genus *Cypraecassis* STUTCHBURY, 1837

Cypraecassis cypraeiformis (BORSON, 1820)
(Pl. 16, Figs 5-6)

1856. *Cassis crumena* LAM.; M. HÖRNES, pp. 180-181, Pl. 16, Figs 1-3.
1884. *Cassis (Cassidea) cypraeiformis* BORS.; R. HOERNES & M. AUINGER, pp. 159-160, Pl. 17, Figs 7-10.
1912. *Cassis cypraeiformis* BORS.; W. FRIEDBERG, pp. 115-116, Pl. 6, Fig. 4.
1924. *Cypraecassis subcrumena* D'ORB.; M. COSSMANN & A. PEYROT, pp. 425-427, Pl. 12, Figs 4-5.
1956. *Cypraecassis cypraeiformis* (BORSON); I. CSEPREGHY-MEZNERICS, p. 396, Pl. 4, Figs 17-18.
1959. *Cassis cypraeiformis* BORS.; M. EREMIJA, Pl. 2, Figs 11-11*a*.
1966. *Cypraecassis crumena cypraeiformis* BORSON; L. STRAUSZ, p. 246, Pl. 64, Figs 10-11.

MATERIAL: Seven specimens.
DIMENSIONS: The largest specimen is 57 mm high and 38 mm wide; the smallest, with fully grown final varix (Pl. 16, Fig. 5) is 26 mm high and 18 mm wide. One of the collected fragments, illustrated formerly (BAŁUK & RADWAŃSKI 1977a, Pl. 7, Fig. 4), is estimated as of specimen about 80 mm high.

REMARKS: The studied specimens are evidently conspecific with those coming from the Vienna Basin and from Transylvania. Within the Korytnica material there appear specimens completely devoid of axial ribs on the last whorl, similarly as in the specimens from Lapugy, presented by HOERNES & AUINGER (1884, Pl. 17, Figs 9-10). The specimens from the Miocene of Aquitaine, designated by COSSMANN & PEYROT (1924) as *Cypraecassis subcrumena* D'ORBIGNY, do not differ from the studied ones, and thus they should not be classified as a separate species, what was earlier postulated already by HÖRNES (1856).

In the Korytnica Basin the specimens of *Cypraecassis cypraeiformis* (BORSON) were growing up to a remarkably great size. Fragments of four specimens allow to estimate the total height of their shell as 70-80 mm (*comp.* BAŁUK & RADWAŃSKI 1977a, Pl. 7, Fig. 4).

The species *Cypraecassis cypraeiformis* (BORSON) was reported from Korytnica by HÖRNES (1856), FRIEDBERG (1912, 1938), and KOWALEWSKI (1930). Unknown from other Miocene localities in Poland.

Genus *Semicassis* MÖRCH, 1852
Subgenus *Semicassis* MÖRCH, 1852
Semicassis (Semicassis) miolaevigata SACCO, 1890
(Pl. 16, Figs 1-4)

1837. *Cassis Saburon* ADANS. var.; G. PUSCH, pp. 124-125, Pl. 11, Fig. 3.
1856. *Cassis saburon* LAM.; M. HÖRNES, pp. 177-178, Pl. 15, Figs 2-7.
1911-12. *Cassis saburon* LAM.; W. FRIEDBERG, pp. 112-115, Pl. 6, Fig. 3; Text-fig. 31.
1924. *Semicassis miolaevigata* (SACCO); M. COSSMANN & A. PEYROT, pp. 414-416, Pl. 12, Figs 14-15.
1956. *Semicassis miolaevigata* SACCO; I. CSEPREGHY-MEZNERICS, p. 396, Pl. 4, Figs 9-10.
1960. *Phalium (Semicassis) miolaevigata* (SACCO); E. KOJUMDGIEVA, p. 134, Pl. 37, Figs 2-3.
1966. *Phalium (Semicassis) saburon miolaevigatum* SACCO; L. STRAUSZ, p. 244, Pl. 64, Fig. 4; Pl. 72, Figs 15-17; Pl. 73, Figs 1-5.
1969b. *Phalium (Semicassis) miolaevigatum* SACCO; I. CSEPREGHY-MEZNERICS, p. 24, Pl. 7, Figs 1; 3.
1971. *Phalium miolaevigata* (SACCO); M. EREMIJA, p. 73, Pl. 5, Fig. 1.

MATERIAL: A hundred and twenty specimens.
DIMENSIONS: Two of the largest specimens are 67 mm or 51 mm high and 53 mm or 38 mm wide; two of the smallest, with fully grown final varix, are 25 mm high and 19 mm wide each.

REMARKS: The studied specimens are very variable as concerns their size and width/height ratio (ranging 0.69 to 0.81, commonly 0.73 or 0.77), the pattern of spiral furrowing near the suture, and distinctness of teeth and ripples on both lips. Although so variable, all should be treated as members of one species, and conspecific with the Viennese forms (*see* HÖRNES 1856, Pl. 15, Figs 2-7) that are similarly differentiated, and even more widely ranging in their size.

One of the collected specimens (Pl. 16, Fig. 2) bears its spire and ornamentation of juvenile whorls very similar to that in the specimen from the Miocene of Aquitaine, and presented by COSSMANN & PEYROT (1924, Pl. 11, Figs 42-43) under the name *Semicassis dumasi* COSSMANN & PEYROT. The Korytnica specimen has about one whorl more, and the spiral furrows completely disappear on that latter whorl, except of its base.

The species *Semicassis (Semicassis) miolaevigata* SACCO was reported from Korytnica by all former authors. In the Miocene of Poland it is also known from Gliwice Stare (KRACH 1954), Gaszowice (KRACH 1939), Małoszów (KRACH 1947), Rybnica (KOWALEWSKI 1930), Nawodzice (BAŁUK & RADWAŃSKI 1968), Benczyn (KRACH 1950a), and Zgłobice (URBANIAK 1974).

Family **Ficidae**
Genus *Ficus* RÖDING, 1798
Subgenus *Ficus* RÖDING, 1798
Ficus (Ficus) cingulata (BRONN *in* HÖRNES, 1856)
(Pl. 17, Figs 1-3)

1856. *Pyrula reticulata* LAM.; M. HÖRNES, pp. 268-270, Pl. 28, Figs 1-3 (= *Pyrula cingulata* BRONN; M. HÖRNES, p. 676).
1890. *Pyrula (Ficula) cingulata* BRONN; R. HOERNES & M. AUINGER, p. 245, Pl. 35, Fig. 3.
1912. *Pyrula cingulata* BRONN; W. FRIEDBERG, pp. 120-121, Text-fig. 35.
1924. *Pirula cingulata* BRONN; M. COSSMANN & A. PEYROT, p. 403, Pl. 10, Fig. 47.
1960. *Ficus (Fulguroficus) cingulatus* (BRONN in HÖRNES); E. KOJUMDGIEVA, p. 133, Pl. 36, Figs 4-5; Pl. 37, Fig. 1.
1969b. *Pirula cingulata* BRONN; I. CSEPREGHY-MEZNERICS, p. 25, Pl. 8, Figs 5, 10.

MATERIAL: Thirty-four specimens.
DIMENSIONS: The largest specimen (Pl. 17, Fig. 3) is 58 mm high and 38 mm wide.

REMARKS: The studied specimens are fully concordant with those coming from the Vienna Basin. This also concerns their size, as from Grund are known specimens 100-120 mm high, but the fragments collected at Korytnica are of the same height. The largest collected specimens bear their inner lip developed identically as do the specimens from Grund, presented by HOERNES & AUINGER (1890).

PUSCH (1837, p. 146), as well as EICHWALD (1853, p. 188), reported from Korytnica *Pyrula reticulata* LAMARCK, without any illustration; thus, it cannot be recognized which species they really had.

The species *Ficus* (*Ficus*) *cingulata* (BRONN) was reported from Korytnica by HÖRNES (1856), KONTKIEWICZ (1882), FRIEDBERG (1912), and KOWALEWSKI (1930). In the Miocene of Poland known also from Małoszów (KOWALEWSKI 1930).

Ficus (*Ficus*) *condita* (BRONGNIART, 1823)
(Pl. 17, Figs 7-9)

1856. *Pyrula condita* BRONG.; M. HÖRNES, pp. 270-271, Pl. 28, Figs 4-6.
1912. *Pyrula condita* BRONG.; W. FRIEDBERG, pp. 118-119, Pl. 6, Fig. 6.
1924. *Pirula condita* BRONGN.; M. COSSMANN & A. PEYROT, pp. 399-401, Pl. 10, Fig. 46; Pl. 11, Fig. 16.
1924. *Pirula condita* var. *inflexicauda* nov. var.; M. COSSMANN & A. PEYROT, p. 402, Pl. 11, Figs 26-27.
1960. *Ficus* (*Fulguroficus*) *conditus* (BRONGNIART); E. KOJUMDGIEVA, pp. 132-133, Pl. 36, Fig. 3.
1973. *Ficus condita* (BRONGNIART); T. BÁLDI, pp. 284-285, Pl. 36, Figs 1-2.
1984. *Ficus* (*Ficus*) *conditus* (BRONGNIART); A.W. JANSSEN, pp. 211-212, Pl. 59, Fig. 1.

MATERIAL: Thirty specimens.
DIMENSIONS: The largest specimen (Pl. 17, Fig. 9) is 52 mm high and 35 mm wide.

REMARKS: The studied specimens are concordant with those coming from the Vienna Basin, and presented by HÖRNES (1856). It is to note, however, that the siphonal canal in the Korytnica specimens is not always so strongly arched as in the specimen from Enzesfeld, shown by HÖRNES (1856, Pl. 28, Fig. 5); it is even quite straight in some collected specimens. An arching of the siphonal canal, as well as a variable number of secondary spiral striae (numbering up to 7) seem to feature the individual variability. It is thus reasonable to state that COSSMANN & PEYROT (1924, p. 402) were not right in suggesting the Viennese specimens to differ from typical *Ficus condita*, and to belong to a separate variety *Ficus condita* var. *inflexicauda* (COSSMANN & PEYROT). Consequently, the latter taxon does not seem to be acceptable.

The species *Ficus* (*Ficus*) *condita* (BRONGNIART) was reported from Korytnica by HÖRNES (1856), KONTKIEWICZ (1882), FRIEDBERG (1912, 1938), and KOWALEWSKI (1930). In the Miocene of Poland known also from Mendrów and Pińczów (PUSCH 1837), as well as from Chańcza (KOWALEWSKI 1930).

Ficus (*Ficus*) *geometra* (BORSON, 1825)
(Pl. 17, Figs 4-6)

1856. *Pyrula geometra* BORSON.; M. HÖRNES, pp. 272-273, Pl. 28, Figs 7-8.
1890. *Pyrula* (*Ficula*) *geometra* BORSON; R. HOERNES & M. AUINGER, pp. 245-246, Pl. 35, Figs 1-2.
1912. *Pyrula geometra* BORS.; W. FRIEDBERG, pp. 119-120, Pl. 6, Fig. 7.
1956. *Pirula geometra* BORSON; I. CSEPREGHY-MEZNERICS, pp. 397-398, Pl. 4, Figs 19-20.
1966. *Pirula geometra* BORSON; L. STRAUSZ, pp. 255-256, Pl. 57, Figs 1-3.
1970. *Ficus* (*Ficus*) *geometra* (BORSON); E. CAPROTTI, p. 180, Pl. 7, Fig. 6.
1976. *Ficus* (*F.*) *geometra* (BORSON); G. PAVIA, pp. 154-155, Pl. 1, Fig. 13; Text-fig. 2B (=holotype of the species).
1979. *Ficus* (*Ficus*) *geometra* (BORSON); J. MARTINELL, pp. 150-152, Pl. 5, Figs 11-12.

MATERIAL: Ten specimens.
DIMENSIONS: The largest specimen (Pl. 17, Fig. 6) is 45 mm high and 29 mm wide.

REMARKS: The studied specimens are fully concordant with those coming from the Vienna Basin. They do not display any substancial differences from the holotype coming from the Neogene of Italy. It should be remarkable, however, that this holotype, re-illustrated by PAVIA (1976), is a juvenile, much smaller than the smallest of the herein presented specimens from Korytnica (Pl. 17, Fig. 5). The variability of the Korytnica specimens is expressed by the prominence of the spire, ranging to an extent demonstrated by the specimens shown in Pl. 17, Figs 4 and 6.

The species *Ficus* (*Ficus*) *geometra* (BORSON) was reported from Korytnica by KONTKIEWICZ (1882), FRIEDBERG (1912, 1938), and KOWALEWSKI (1930). In the Miocene of Poland it is known also from the vicinity of Miechów (KRACH 1947), and from Benczyn (KRACH 1950a).

Family **Cymatiidae** DALL, 1904

Genus *Argobuccinum* BRUGUIÈRE, 1792

Subgenus *Ranella* LAMARCK, 1816

Argobuccinum (*Ranella*) *giganteum* (LAMARCK, 1822)

(Pl. 18, Figs 9-11)

1856. *Ranella reticularis* DESH.; M. HÖRNES, pp. 211-212, Pl. 21, Figs 1-2.
1879. *Ranella gigantea* LAMARCK; F. FONTANNES, pp. 37-39, Pl. 4, Fig. 3.
1884. *Ranella* (*Apollon*) *gigantea* LAMK.; R. HOERNES & M. AUINGER, pp. 188-189, Pl. 23, Figs 1-5.
1904. *Ranella gigantea* LK., et. var.; F. SACCO, p. 39, Pl. 10, Figs 26-29.
1966. *Argobuccinum* (*Ranella*) *giganteum* LAMARCK; J. CATALIOTTI-VALDINA, p. 65, Pl. 3, Fig. 1.
1969b. *Bursa* (*Ranella*) *gigantea* LAM.; I. CSEPREGHY-MEZNERICS, p. 80, Pl. 3, Figs 13, 16-17.
1970. *Argobuccinum* (*Ranella*) *giganteum* (LAMARCK); E. CAPROTTI, pp. 166-167, Pl. 6, Fig. 5.

MATERIAL: Three incomplete specimens, and one final outer lip of the aperture.
DIMENSIONS: The smallest, better preserved specimen (Pl. 18, Fig. 9) is 33 mm high and 22 mm wide.

REMARKS: The studied specimens, although very inferior indeed, are evidently conspecific both with these from the Vienna Basin, as well as with those from other localities, reported in the referenced bibliography (*see* synonymy). At Korytnica this species is one of the greatest rarities.

The species *Argobuccinum* (*Ranella*) *giganteum* (LAMARCK) has not hitherto been known from the Miocene of Poland.

Genus *Charonia* GISTEL, 1848

Subgenus *Charonia* GISTEL, 1848

Charonia (*Charonia*) *nodifera* (LAMARCK, 1822)

(Pl. 19, Figs 1-3)

1856. *Triton nodiferum* LAM.; M. HÖRNES, pp. 201-202, Pl. 19, Figs 1-2.
1884. *Triton nodiferum* LAMK.; R. HOERNES & M. AUINGER, p. 173, Pl. 21, Fig. 1.
1912. *Triton nodiferum* LAM.; W. FRIEDBERG, pp. 127-129, Pl. 7, Fig. 3; Text-fig. 37.
?1924. *Eutritonium* (*s. str.*) *ventricosum* (GRATELOUP); M. COSSMANN & A. PEYROT, pp. 555-557, Pl. 15, Figs 24-25.
?1924. *Eutritonium salbriacense* nov. mut.; M. COSSMANN & A. PEYROT, p. 558, Pl. 16, Figs 3-4.

MATERIAL: Forty-five specimens, of which 13 has the aperture preserved; numerous fragments of large specimens.
DIMENSIONS: The largest, completely preserved specimen (Pl. 19, Fig. 3) is 133 mm high and 74 mm wide; of the fragments, four belonged to specimens still one growth cycle (*i.e.*, one varix) larger, of their height estimated (*see* BAŁUK & RADWAŃSKI 1977a, Pl. 7, Fig. 1) as about 180 mm; two other fragments were of specimens even two growth cycles larger and estimated as 240-250 mm high.

REMARKS: The studied specimens are evidently conspecific with those coming from the Vienna Basin, and presented by HÖRNES (1856), who included into the synonymy also specimens from the Pliocene of northern Italy, known under the name *Murex gyrinoides* BROCCHI. The holotype of the latter species was re-illustrated in the form of a photo by PINNA & SPEZIA (1978, Pl. 36, Fig. 1); this photo shows that the ornamentation is in some details different from (nodes in the main row are very small and densely spaced), and distinctly less pronounced than, that in the specimens from Korytnica. It seem therefore reasonable to state that the species *Charonia nodifera* (LAMARCK) and *Charonia gyrinoides* (BROCCHI) are related, but not identical.

COSSMANN & PEYROT (1924) presented from the Aquitaine Basin two species, namely *Eutritonium ventricosum* (GRATELOUP) and *Eutritonium salbriacense* COSSMANN & PEYROT. The specimens, referred to these species, are slightly more slender and they differ a little in details of their ornamentation. It is herein doubted whether such differences justify a separateness of these two species.

The species *Charonia* (*Charonia*) *nodifera* (LAMARCK) was recorded from Korytnica by PUSCH (1837), FRIEDBERG (1912, 1938), and KOWALEWSKI (1930). A fragmentary specimen, estimated as about 170 mm high, was also reported therein from the marly sands overlying the clays (RADWAŃSKI 1969, p. 106).

Subgenus *Sassia* BELLARDI, 1872

Charonia (*Sassia*) *apenninica* (SASSI, 1827)
(Pl. 18, Fig. 8)

1856. *Triton Apenninicum* SASSI; M. HÖRNES, pp. 202-203, Pl. 19, Figs 3-4.
1884. *Triton* (*Sassia*) *Apenninicum* SASSI; R. HOERNES & M. AUINGER, pp. 178-179, Pl. 21, Figs 2-7.
1904. *Triton* (*Sassia*) *apenninicum* SASS.; F. SACCO, p. 37, Pl. 10, Figs 18-19.
1924. *Eutritonium* (*Sassia*) *apenninicum* (SASSI) mut. *taurocostatum* SACCO; M. COSSMANN & A. PEYROT, pp. 569-570, Pl. 17, Fig. 25.
1928. *Tritonium apenninicum* SASSI; W. FRIEDBERG, pp. 591-592, Pl. 38, Fig. 5.
1956. *Charonia* (*Sassia*) *apenninica* SASSI; I. CSEPREGHY-MEZNERICS, p. 397, Pl. 4, Figs 13-14.
1960. *Cymatium* (*Sassia*) *apenninicum* SASSI; E. KOJUMDGIEVA, p. 137, Pl. 37, Figs 9-10.
1969b. *Charonia* (*Sassia*) *apenninica* SASSI; I. CSEPREGHY-MEZNERICS, p. 24, Pl. 7, Figs 12, 18.
1970. *Charonia* (*Sassia*) *apenninica* (SASSI); E. CAPROTTI, p. 170, Pl. 6, Fig. 6.

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen (Pl. 18, Fig. 8) is 29 mm high and 17 mm wide.

REMARKS: The two collected specimens are fully concordant with those regarded by BELLARDI (1873) and HOERNES & AUINGER (1884) as typical of this species. They both bear nine axial ribs between neighboring varices, similarly as do the specimens from Steinabrunn and Möllersdorf, presented by HOERNES & AUINGER (1884, Pl. 21, Figs 6 and 7). These Viennese specimens are slightly larger what, contrary to the opinion of the latter authors, is not of taxonomic importance, as in the genus *Charonia* the shell grows in a cyclic manner, increasing of about two thirds of the whorl in each cycle. The larger of the collected specimens, as well as that one presented by FRIEDBERG (1928), bear their shell shorter of one cycle, whereas the smaller one is two cycles shorter than the specimens from the Vienna Basin.

Insofar, one specimen of the species *Charonia* (*Sassia*) *apenninica* (SASSI) was reported from Korytnica by FRIEDBERG (1928) and KOWALEWSKI (1930).

Charonia (*Sassia*) *tarbelliana* (GRATELOUP, 1847)
(Pl. 20, Figs 1-2)

1856. *Triton Tarbellianum* GRAT.; M. HÖRNES, pp. 203-205, Pl. 20, Figs 7-11.
1884. *Triton* (*Simpulum*) *Tarbellianum* GRAT.; R. HOERNES & M. AUINGER, pp. 173-175, Pl. 21, Figs 8-11.
1912. *Triton tarbellianum* GRAT.; W. FRIEDBERG, pp. 129-130, Pl. 7, Figs 4-5.
1924. *Eutritonium* (*Sassia*) *Tarbellianum* (GRATELOUP); M. COSSMANN & A. PEYROT, pp. 567-569, Pl. 15, Figs 40-41; Pl. 16, Figs 26-27.
1956. *Charonia* (*Sassia*) *tarbelliana* (GRAT.); I. CSEPREGHY-MEZNERICS, p. 397, Pl. 4, Figs 11-12.
1960. *Cymatium* (*Sassia*) *tarbellianum* (GRATELOUP); E. KOJUMDGIEVA, p. 138, Pl. 38, Fig. 1.
1966. *Charonia* (*Sassia*) *tarbelliana* GRATELOUP; L. STRAUSZ, pp. 249-250, Pl. 30, Figs 7-8.

MATERIAL: Twelve specimens.
DIMENSIONS: The largest specimen (Pl. 20, Fig. 1) is about 43 mm high and 23 mm wide.

REMARKS: When presenting the specimens of *Charonia* (*Sassia*) *tarbelliana* from the Vienna Basin, HOERNES & AUINGER (1884) recognized their great variability, expressed by a diversity of their general shape and of ornamentation distinctness of the last whorl. As compared to these, all the Korytnica specimens are less slender, and their last whorl is featured either by the disappearing axial ribs (numbering 7 or 8 between the last two varices) or by the absence of such ribs. The specimens adorned with ribs are comparable also with those from the Aquitaine Basin, presented by COSSMANN & PEYROT (1924).

A specimen from the Miocene of Winterswijk in Holland, presented by JANSSEN (1984, p. 208, Pl. 58, Fig. 6) under the name of *Charonia* (*Sassia*) *tarbelliana* (GRATELOUP, 1840) is quite distinct from any of the Korytnica specimens, and it evidently belongs to another species, presumably to *Charonia* (*Sassia*) *apenninica* (SASSI, 1827).

The species *Charonia* (*Sassia*) *tarbelliana* (GRATELOUP) was reported from Korytnica by KOWALEWSKI (1930) only. In the Miocene of Poland it is known from Słaboszowice (KOWALEWSKI 1930) and Trzydnik (KRACH 1950b).

Genus *Cymatium* RÖDING, 1798
Subgenus *Lampusia* SCHUMACHER, 1817

Cymatium (*Lampusia*) *affine* (DESHAYES, 1832)
(Pl. 20, Figs 5-11)

1837. *Tritonium leucostoma* m. var. *polonica*; G. PUSCH, p. 139, Pl. 11, Fig. 25.
1856. *Triton corrugatum* LAM.; M. HÖRNES, pp. 205-206, Pl. 20, Figs 1-4 (= *Triton affine* DESH.; M. HÖRNES, p. 670).
1856. *Triton heptagonum* BROCC.; M. HÖRNES, pp. 206-208, Pl. 20, Figs 5-6.
1884. *Triton* (*Simpulum*) *affine* DESH.; R. HOERNES & M. AUINGER, pp. 175-176, Pl. 21, Figs 12-15.
1884. *Triton* (*Simpulum*) *heptagonum* BROCC. Var.; R. HOERNES & M. AUINGER, pp. 176-177.
1912. *Triton affine* DESH.; W. FRIEDBERG, pp. 130-131, Pl. 7, Fig. 6.
1912. *Triton heptagonum* BROCC.; W. FRIEDBERG, pp. 132-133, Pl. 7, Fig. 7.
1924. *Eutritonium* (*Lampusia*) *subcorrugatum* (D'ORB.); M. COSSMANN & A. PEYROT, pp. 560-562, Pl. 16, Figs 23-24.
1924. *Eutritonium* (*Lampusia*) *aquitanicum* nov. mut.; M. COSSMANN & A PEYROT, pp. 562-564, Pl. 16, Figs 7-9.
1924. *Eutritonium* (*Lampusia*) *doliaroides* nov. sp.; M. COSSMANN & A. PEYROT, pp. 564-566, Pl. 15, Figs 48-49.
1960. *Cymatium* (*Lampusia*) *affine* var. *friedbergi* (COSSMANN & A. PEYROT); E. KOJUMDGIEVA, p. 136, Pl. 37, Figs 6-8.
1960. *Cymatium* (*Ranularia*) *heptagonum* var. *vindobonica* (COSSMANN & PEYROT); E. KOJUMDGIEVA, p. 138, Pl. 38, Fig. 2.
1966. *Cymatium* (*Lampusia*) *affine* DESHAYES; L. STRAUSZ, pp. 247-248, Pl. 29, Figs 8-11; Pl. 30, Figs 1-5.
1966. *Cymatium* (*Ranularia*) *heptagonum vindobonicum* COSSMANN & PEYROT; L. STRAUSZ, p. 248, Pl. 29, Fig. 7.
1969b. *Cymatium* (*Lapusia*) *affine friedbergi* COSSMANN et PEYROT; I. CSEPREGHY-MEZNERICS, p. 24, Pl. 7, Figs 16, 20.
1969b. *Cymatium* (*Ranularia*) *heptagona vindobonica* COSSM. et PEYROT; I. CSEPREGHY-MEZNERICS, p. 24, Pl. 7, Figs 11, 13.
1984. *Cymatium* (*Monoplex*) *doliaroides* (COSSMANN & PEYROT); A.W. JANSSEN, p. 209, Pl. 58, Figs 10a-c.

MATERIAL: Two hundred and seventy specimens.

DIMENSIONS: Three largest specimens of those illustrated (Pl. 20) are measured as follows: the first (Pl. 20, Fig. 11) devoid of a part of siphonal canal, is 60 mm high and 33 mm wide; the second (Pl. 20, Fig. 10) is 53 mm high and 31 mm wide; the third (Pl. 20, Fig. 9) is also 53 mm high, but only 27 mm wide.

REMARKS: The problem of relation between the species *Cymatium affine* (DESHAYES) and *Cymatium heptagonum* (BROCCHI) has widely been discussed by almost all authors dealing with gastropods of the Paratethyan basins. They all regarded these species as very relative, but separate. HÖRNES (1856) and HOERNES & AUINGER (1884) recognized, moreover, that the specimens from the Vienna Basin and Transylvania, assigned by them to *Cymatium heptagonum* (BROCCHI) are not fully concordant with those from northern Italy, and should be classified as a variety of the latter (*see* HÖRNES 1856, p. 207). As the features distinctive between *Cymatium heptagonum* (BROCCHI) and *Cymatium affine* (DESHAYES) indicated are: smaller size, less slender shape, more convex whorls, less densely spaced and earlier disappearing axial ribs, lower number of varices, longer and more straight siphonal canal, and forked teeth on the inner side of the outer lip.

The studied, quite numerous specimens from Korytnica share the above features to such a variable extent that the no reasonable division may be demonstrated. Some of the Korytnica specimens (*see* Pl. 20, Figs 7-8) are fully concordant with that of *Cymatium heptagonum* (BROCCHI) from Baden (*see* HÖRNES 1856, Pl. 20, Fig. 6), the others (*see* Pl. 20. Fig. 11) to that of *Cymatium affine* (DESHAYES) from Grund (*see* HÖRNES 1856, Pl. 20, Fig. 1). The majority of the studied specimens, however, cannot be so unequivocally compared. In all the Korytnica specimens, both these resembling more the species "*affine*", and those resembling more "*heptagonum*", the profile of the first whorl of the teleoconch and its ornamentation are identical (*comp.* Pl. 20, Figs 6 and 8). The successive whorls, however, display a variable development of the axial ribs, and variable place of the appearence of the first varix. Among 150 specimens in which the boundary between the protoconch and the first whorl of the teleoconch is visible, the first varix appears not earlier than of a distance of 1 and 1/2 whorl, and the most lately it develops of the distance of 4 and 1/2 whorl; the most commonly it takes place about the third whorl of teleoconch. Such variable emplacement of the first varix has a reasonable bearing upon the shape of the whole shell, as well as upon the profile of the whorls and the total number of varices, the successive forms of which do also appear earlier or later. The Korytnica specimens, in which the first varix appears relatively late, seem to be fully concordant both with these from the Aquitaine Basin, regarded by COSSMANN & PEYROT (1924) as a separate species *Eutritonium* (*Lampusia*) *doliaroides* COSSMANN & PEYROT, as well as with those described by JANSSEN (1984) from the Miocene of Winterswijk in Holland under the name of *Cymatium* (*Monoplex*) *doliaroides* (COSSMANN & PEYROT). In the present author's opinion the acceptance of the latter species is quite unjustified.

FRIEDBERG (1912), when studying the Korytnica material, paid a special attention to the shape of teeth on the outer lip; he stated, however, that not all of their forms classified by him as *Cymatium heptagonum* (BROCCHI) bear the teeth forked. Usually, forked are teeth in smaller specimens, although the present author has observed them in a shell even 42 mm high.

The presented review allows to state that a distinction of two species within the studied material is not justified. All the studied specimens are included by the present author to the species *Cymatium* (*Lampusia*) *affine* (DESHAYES). A great variability of this species has caused that even very small differences in the shell morphology have often been regarded as suffiecient to introduce quite unnecessary names. To exemplify, this is a case of COSSMANN & PEYROT (1924, p. 262) who suggested to call all specimens from the Paratethyan basins as *Cymatium friedbergi*; this suggestion was already objected by STRAUSZ (1966, p. 248).

The specimens from Korytnica are, however, slightly different from those coming from the Pliocene of Emporda in Spain, assigned to this species by MARTINELL (1977, pp. 140-143, Pl. 5, Figs 1-2); their basic difference is in another shape of the aperture, particularly of its inner lip.

The species *Cymatium* (*Lampusia*) *affine* (DESHAYES) was reported from Korytnica by PUSCH (1837), MURCHISON (1845), HÖRNES (1856), KONTKIEWICZ (1882), FRIEDBERG (1912, 1928, 1938), and

KOWALEWSKI, (1930). The specimens referred to as *Cymatium heptagonum* (BROCCHI) were therein noted by HÖRNES (1856), FRIEDBERG (1912, 1938), and KOWALEWSKI (1930). In the Miocene of Poland this species is also known from Benczyn (KRACH 1950a) and Zgłobice (URBANIAK 1974).

Cymatium (*Lampusia*) *grundense* (HOERNES & AUINGER, 1884)
(Pl. 20, Figs 3-4)

1884. *Triton* (*Simpulum*) *Grundense* nov. form.; R. HOERNES & M. AUINGER, p. 177, Pl. 21, Fig. 16.

MATERIAL: Five specimens.
DIMENSIONS: The largest specimen (Pl. 20, Fig. 4) is 23.5 mm high and 15 mm wide; another, with broken siphonal canal, is 18 mm wide.

REMARKS: The studied specimens are consistent with that one described by HOERNES & AUINGER (1884), who had the only specimen coming from Grund in the Vienna Basin, but so distinct from common forms of *Cymatium* (*Lampusia*) *affine* (DESHAYES) that worths to be distnguished as a separate species. The specimens from Korytnica display an angular profile of a whorl and two pronounced, spiral ribs running along the crest formed by the angularity of the whorl, to the same extent as does the discussed specimen from Grund. These two ribs appear just at the beginning of the teleoconch, and therefore the first whorl differs distinctly in its ornamentation from that one in *Cymatium* (*Lampusia*) *affine* (DESHAYES). It is thus reasonable to accept the opinion of HOERNES & AUINGER (1884) that these are very relative, but separate species.

The species *Cymatium* (*Lampusia*) *grundense* (HOERNES & AUINGER) has not hitherto been known from the Miocene of Poland.

Family **Bursidae**
Genus *Bursa* RÖDING, 1798
Subgenus *Bursa* RÖDING, 1798
Bursa (*Bursa*) *papillosa* (PUSCH, 1837)
(Pl. 18, Figs 1-3)

1837. *Ranella papillosa* m.; G. PUSCH, p. 139, Pl. 12, Fig. 7.
1884. *Ranella* (*Lampas*) *papillosa* PUSCH; R. HOERNES & M. AUINGER, p. 188, Pl. 23, Figs 6-9.
1912. *Ranella papillosa* PUSCH; W. FRIEDBERG, pp. 126-127, Pl. 7, Fig. 2.
?1924. *Apollon inaequicrenatus* nov. sp.; M. COSSMANN & A. PEYROT, pp. 601-602, Pl. 16, Figs 40-41.
1960. *Bursa* (*Lampasopsis*) *papillosa* (PUSCH); E. KOJUMDGIEVA, pp. 141-142, Pl. 38, Fig. 10.

MATERIAL: One juvenile specimen preserved with protoconch (Pl. 18, Fig. 3), and eleven adult specimens.
DIMENSIONS: The largest specimen is 41.5 mm high and 28.5 mm wide.

REMARKS: The studied specimens are fully concordant with those originally described by PUSCH (1837), also from Korytnica. HOERNES & AUINGER (1884) stated a rather great variability of this species, expressed by the details of ornamentation, and exemplified by four specimens from Lapugy in Transylvania. All the possessed specimens from Korytnica, as well as these illustrated from there by PUSCH (1837) and FRIEDBERG (1912), bear stable ornamentation which corresponds well to that of a specimen from Lapugy, presented by HOERNES & AUINGER (1884, Pl. 23, Fig. 6). All the Korytnica specimens do not display the variability stated by the latter authors. If the opinion of

HOERNES & AUINGER (1884) is however accepted, to the discussed species should also be included the specimen from the Aquitaine Basin, presented by COSSMANN & PEYROT (1924, Pl. 16, Figs 40-41) under the name of *Apollon inaequicrenatus* COSSMANN & PEYROT.

An assignment of the studied juvenile specimen is not quite certain, as a comparison with the well-preserved, corresponding part of an adult specimen was not possible. By its pronounced ornamentation before the first varix, it seems to differ distinctly from a juvenile part of the specimen herein attributed to the species *Bursa* (*Bufonariella*) *nodosa* (BORSON).

The species *Bursa* (*Bursa*) *papillosa* (PUSCH) was reported from Korytnica by PUSCH (1837), FRIEDBERG (1912), and KOWALEWSKI (1930).

Subgenus *Bufonariella* THIELE, 1929

Bursa (*Bufonariella*) *nodosa* (BORSON, 1825)
(Pl. 18, Figs 4-5)

1856. *Ranella scrobiculata* KIENER; M. HÖRNES, pp. 212-213, Pl. 21, Figs 3-5.
1873. *Ranella nodosa* (BORS.); L. BELLARDI, pp. 233-235, Pl. 15, Fig. 5.
1904. *Ranella* (*Apollon*) *nodosa* (BORS.) var. *subanodosa* SACC.; F. SACCO, p. 39, Pl. 11, Fig. 1.
1904. *Ranella* (*Apollon*) *nodosa* (BORS.) var. *mioquinqueseriata* SACC.; F. SACCO, p. 39, Pl. 11, Fig. 2.
1970. *Bursa* (*Bufonariella*) *scrobiculator* (LINNEO) *nodosa* (BORSON); E. CAPROTTI, p. 172, Pl. 6, Fig. 3.
1976. *Bursa* (*Bufonariella*) *nodosa* (BORSON); G. PAVIA, p. 153, Pl. 2, Figs 2, 5.

MATERIAL: Five specimens.
DIMENSIONS: The largest specimen (Pl. 18, Fig. 4) is 44 mm high and 24 mm; another one is 40 mm high but 25 mm wide.

REMARKS: The studied specimens seem to be consistent with those originally described by BORSON (1825), and re-illustrated in the form of a photo by PAVIA (1976), particularly with that indicated as the lectotype of the species (*see* PAVIA 1976, Pl. 2, Fig. 2).

Under discussion remains, however, the conspecifity of the Korytnica specimens with those from the Vienna Basin. HÖRNES (1856) presented under the name *Ranella scrobiculata* KIENER, 1835, three specimens from Grund, and in the synonymy of the species he put also specimens of BORSON. If the variability in development of nodes, being the major element of ornamentation, is taken into account, the opinion of HÖRNES may be regarded as correct, and thus the conspecifity of the Korytnica and Grund specimens accepted. A quite reverse opinion was however expressed by HOERNES & AUINGER (1884, p. 186) who assigned to *Bursa nodosa* (BORSON) only the fragmentarily preserved specimens from Forchtenau, and a similarly poor, another specimen from Grund; the above-discussed 3 specimens presented by HÖRNES (1856) they included into their species *Bursa austriaca* (HOERNES & AUINGER), established upon the specimens coming from Soos.

The species *Bursa* (*Bufonariella*) *nodosa* (BORSON) has not hitherto been known from the Miocene of Poland.

Genus *Gyrineum* LINK, 1807
Subgenus *Aspa* H.&A. ADAMS, 1853

Gyrineum (*Aspa*) *marginatum* (MARTINI, 1777)
(Pl. 18, Figs 6-7)

1856. *Ranella marginata* BRONG.; M. HÖRNES, pp. 214-215, Pl. 21, Figs 7-11.
1879. *Ranella marginata* MARTINI; F. FONTANNES, pp. 39-40, Pl. 4, Fig. 4.

1884. *Ranella* (*Aspa*) *marginata* MARTINI; R. HOERNES & M. AUINGER, p. 190, Pl. 24, Figs 1-2.
1904. *Ranella* (*Aspa*) *marginata* (MART.); F. SACCO, p. 39, Pl. 11, Figs 13-14.
1904. *Ranella* (*Aspa*) *marginata* (MART.) var. *fossilis* SACC.; F. SACCO, p. 39, Pl. 11, Fig. 15.
1912. *Ranella marginata* MART.; W. FRIEDBERG, pp. 125-126, Pl. 7, Fig. 1.
1924. *Apollon* (*Aspa*) *depressus* (GRATELOUP); M. COSSMANN & A. PEYROT, pp. 606-607, Pl. 16, Figs 1-2; Pl. 17, Figs 8-9.
1924. *Apollon* (*Aspa*) *subgranulatus* (D'ORBIGNY); M. COSSMANN & A. PEYROT, pp. 603-604, Pl. 15, Fig. 54; Pl. 17, Fig. 7.
1954. *Bursa* (*Aspa*) *depressa* (GRATELOUP); I. CSEPREGHY-MEZNERICS, pp. 34-35, Pl. 4, Figs 4, 8.
1960. *Aspa* (*Aspa*) *marginata* (MARTIN); E. KOJUMDGIEVA p. 142, Pl. 38, Figs 8-9.
1966. *Bursa* (*Aspa*) *marginata depressa* GRATELOUP; L. STRAUSZ, pp. 251-252, Pl. 29, Figs 5-6; Pl. 63, Figs 14-18.
1971. *Aspa marginata* (MARTIN); M. EREMIJA, p. 74, Pl. 5, Fig. 3.
1979. *Gyrineum* (*Aspa*) *marginatum* (MARTIN); J. MARTINELL, pp. 144-146, Pl. 5, Figs 3-4.

MATERIAL: A hundred and ten specimens.
DIMENSIONS: The largest specimen is 48 mm high and 34 mm wide; another one, the most slender (Pl. 18, Fig 6) is 44 mm and 28 mm, respectively.

REMARKS: The variability of that species, commonly occurring in the Miocene of Europe, is displayed by the general shape of the shell and, particularly, by a lack or presence of nodes and their diversity on the last whorl of fully grown specimens. Among the studied Korytnica specimens, the majority are devoid of such nodes, but some possess them in the number 1 to 4, and situated between the last two varices. Taking into account this variability, the present author understands the discussed species the same as given over a century ago by HÖRNES (1856). A distinction of separate species, based upon minor morphologic differences, and proposed by COSSMANN & PEYROT (1924), is soundless, as already claimed by FRIEDBERG (1928, p. 592).

The species *Gyrineum* (*Aspa*) *marginatum* (MARTINI) was reported from Korytnica by all former authors. In the Miocene of Poland it is also known from Benczyn (KRACH 1950a).

Superfamily **Muricacea**
Family **Muricidae** FLEMING, 1828
Genus *Murex* LINNAEUS, 1758
Subgenus *Bolinus* PUSCH, 1837
Murex (*Bolinus*) *partschi* HÖRNES, 1856
(Pl. 24, Figs 5-7)

1856. *Murex Partschi* HÖRNES; M. HÖRNES, pp. 258-259, Pl. 25, Fig. 5.
1924. *Murex* (*Haustellum*) *Partschi* HÖRNES, var. *submuticus* GRATELOUP; M. COSSMANN & A. PEYROT, pp. 438-439, Pl. 17, Fig. 35.
1956. *Murex* (*Haustellum*) *partschi* M. HÖRNES; I. CSEPREGHY-MEZNERICS, Pl. 5, Figs 7-10.
1960. *Murex* (*Haustellum*) *partschi* HOERNES; E. KOJUMDGIEVA, p. 144, Pl. 39, Fig. 3.
1966. *Murex* (*Haustellum*) *partschi* HÖRNES; L. STRAUSZ, p. 260, Pl. 54, Figs 9-10.
1978. *Murex* (*Bolinus*) *partschi* M. HOERNES; F. STOJASPAL, p. 332, Pl. 4, Fig. 2.

MATERIAL: Six specimens.
DIMENSIONS: A unique, completely preserved specimen (Pl. 24, Fig. 5) is 32 mm high and 16.5 mm wide; the largest specimen is 29 mm wide.

REMARKS: The studied specimens are fully concordant both with that one presented by HÖRNES (1856) from Baden in the Vienna Basin, as well as with that one shown by COSSMANN & PEYROT (1924) from Saubrigues in the Aquitaine Basin and classified as "var. *submuticus* GRATELOUP". They differ, however, evidently from another specimen from Saubrigues, designated by the latter authors as "*Murex* (*Haustellum?*) *partschi* HÖRNES var. *verefusoides* COSSMANN & PEYROT; an sp. dist." (*see* COSSMANN & PEYROT 1924, p. 439, Pl. 18, Fig. 3).

The variability of the Korytnica specimens is expressed by a diverse development of the crest on the whorls that influences a diverse shape of the varices, which may be arched (*comp.* Pl. 24, Fig. 7) or angularly bent and adorned with a small spine (*comp.* Pl. 24, Fig. 6). The varices appear since the end of the *5th* whorl of the teleoconch, and their number amounts 3 or 4 and never more on the whorl where they are distributed irregularly (at uneven distances).

The discussed species is commonly assigned to the subgenus *Haustellum* BRUGUIÈRE. Reverse opinion was presented by STOJASPAL (1978) who included it to the subgenus *Bolinus* PUSCH. The latter statement seems to be reasonable, because the representatives of *Haustellum* do not display, according to PUSCH (1837, p. 134), a triangular outline in their apical view and this is the case of the studied Korytnica specimens. The present author does therefore follow the view of STOJASPAL (1978).

The species *Murex* (*Bolinus*) *partschi* HÖRNES has not hitherto been known from the Miocene of Poland.

Murex (*Bolinus*) *subtorularius* HOERNES & AUINGER, 1885
(Pl. 23, Fig. 10)

1856. *Murex brandaris* LIN. var.; M. HÖRNES, pp. 257-258, Pl. 26, Figs 3-4.
1885. *Murex* (*Rhynocantha*) *subtorularius* nov. form.; R. HOERNES & M. AUINGER, pp. 200-202.
1960. *Murex* (*Bolinus*) *subtorularius* HOERNES et AUINGER; E. KOJUMDGIEVA, p. 143, Pl. 38, Figs 11-12.
1956. *Murex* (*Bolinus*) *subtorularius* HOERNES et AUINGER; I. CSEPREGHY-MEZNERICS, p. 398, Pl. 4, Figs 21-22.
1966. *Murex* (*Bolinus*) *subtorularius* HOERNES & AUINGER; L. STRAUSZ, pp. 258-259, Pl. 54, Figs 11-13.
1966. *Murex* (*Bolinus*) *subtorularius* HOERNES et AUINGER; J. KÓKAY, p. 56, Pl. 7, Figs 18-19.

MATERIAL: One specimen, preserved without the terminal part of the siphonal canal.
DIMENSIONS: Height about 55 mm, width 34 mm.

REMARKS: The only possessed specimen is evidently conspecific with these coming from the Vienna Basin, and those from the Miocene of Hungary and Bulgaria. The Korytnica specimen distinguishes from all the hitherto presented in the bibliography by the most weakly developed crest in the posterior ("upper") part of the whorls.

The species *Murex* (*Bolinus*) *subtorularius* HOERNES & AUINGER has not hitherto been known from the Miocene of Poland.

Subgenus *Tubicauda* JOUSSEAUME, 1880

Murex (*Tubicauda*) *friedbergi* COSSMANN & PEYROT, 1924
(Pl. 22, Figs 6-8)

1831. *Murex brandaris* LIN.; F. DU BOIS DE MONTPÉREUX, p. 30, Pl. 1, Fig. 49.
1837. *Murex triacanthus* L.; G. PUSCH, pp. 135-136, Pl. 11, Fig. 20.
1856. *Murex Delbosianus* GRAT.; M. HÖRNES, pp. 675-676, Pl. 51, Fig. 7.
1885. *Murex Delbosianus* GRAT.; R. HOERNES & M. AUINGER, p. 199, Pl. 24, Figs 9-11.
1912. *Murex Delbosianus* GRAT.; W. FRIEDBERG, pp. 163-164, Pl. 9, Figs 11-12.
1928. *Murex Friedbergi* COSSM. i PEYR.; W. FRIEDBERG, pp. 586-587.
1960. *Murex* (*Tubicauda*) *friedbergi* COSSMANN et PEYROT; E. KOJUMDGIEVA, pp. 143-144, Pl. 39, Fig. 2.

MATERIAL: More than 5,000 specimens.
DIMENSIONS: The illustrated specimens are: 49 mm high and 30 mm wide (Pl. 22, Fig. 7), or 48 mm high and 30 mm wide (Pl. 22, Fig. 8).

REMARKS: The specimens of this species have long been determined after HÖRNES (1856) as *Murex delbosianus* GRATELOUP. They were COSSMANN & PEYROT (1924) who recognized that the

specimens coming from Korytnica and presented by FRIEDBERG (1912) differ distinctly from those described by GRATELOUP and should be treated as a separate species, named by them as *Murex friedbergi* COSSMANN & PEYROT.

Both HÖRNES (1856) and HOERNES & AUINGER (1885) remarked that the discussed species is surprisingly common at Korytnica, whereas in all localities in the Vienna Basin it is a rarity.

The variability of the Korytnica specimens is not very great, and it is expressed only by the prominence of nodes occurring between the prickly varices. Usually there occur two nodes, the earlier one of which is distinctly stronger; quite often, however, the weaker node is absent. In one specimen it is observable that, after a repaired damage of the shell at its 7*th* whorl, the last five prickly varices are distributed at every 90° instead of 120° typically in the species.

FRIEDBERG (1912), when describing his specimens from Korytnica, noted one of them as high as 60 mm. Such very large specimens have never been met by the present author who had over 5,000 specimens in his hands. It is therefore thought that quite reasonable is a suggestion that FRIEDBERG has really had a shell of another species, namely of *Murex* (*Tubicauda*) *spinicosta* BRONN (*see* description hereafter).

The species *Murex* (*Tubicauda*) *friedbergi* COSSMANN & PEYROT was reported from Korytnica by all former authors. In the Miocene of Poland it is known from Benczyn (KRACH 1950a), as well as from Pińczów, Raków, Staszów, and Szydłów (PUSCH 1837).

Murex (Tubicauda) spinicosta BRONN, 1831
(Pl. 22, Figs 1-2)

1856. *Murex spinicosta* BRONN; M. HÖRNES, pp. 259-260, Pl. 26, Figs 6-8.
1904. *Murex* (*Tubicauda*) *spinicosta* BR.; F. SACCO, p. 18, Pl. 4, Figs 21-22.
1924. *Murex* (*Tubicauda*) *spinicosta* BRONN; M. COSSMANN & A. PEYROT, pp. 435-436, Pl. 12, Figs 26-27.
1956. *Murex* (*Tubicauda*) *spinicosta* BRONN; I. CSEPREGHY-MEZNERICS, p. 399, Pl. 5, Figs 1-6.
1960. *Murex* (*Tubicauda*) *spinicosta* BRONN; E. KOJUMDGIEVA, p. 143, Pl. 38, Fig. 13; Pl. 39, Fig. 1.
1966. *Murex* (*Tubicauda*) *spinicosta* BRONN; L. STRAUSZ, p. 259, Pl. 55, Figs 1-4.
1974. *Murex* (*Tubicauda*) *spinicosta* BRONN; E. CAPROTTI, p. 26, Pl. 2, Fig. 1.
1982. *Murex* (*Tubicauda*) *spinicosta* BRONN; J. MARTINELL, pp. 377-378, Pl. 1, Figs 11-12.
1984. *Murex* (*Tubicauda*) *spinicosta* BRONN; A.W. JANSSEN, p. 216, Pl. 59, Fig. 9.

MATERIAL: Nine specimens, all preserved incompletely.
DIMENSIONS: The largest specimen, preserved without the terminal part of the siphonal canal, is about 60 mm high and 34 mm wide.

REMARKS: The studied specimens are fully concordant both with these presented by HÖRNES (1856) from Baden in the Vienna Basin, as well as with those coming from northern Italy and Aquitaine.

At Korytnica the species *Murex* (*Tubicauda*) *spinicosta* BRONN belongs to the greatest rarities. To the truth, none of the former authors has evidently recorded its presence in this locality. It is, however, possible that FRIEDBERG (1912) had one specimen at his disposal, but included it (*see* description of the preceding species) into the population of *Murex* (*Tubicauda*) *friedbergi* COSSMANN & PEYROT. Moreover, in the list of species presented by MURCHISON (1845) and KONTKIEWICZ (1882) the species *Murex spinicosta* is reported, but this determination certainly concerns, as KOWALEWSKI (1930, p. 124) discussed, the species *Murex friedbergi*.

In the Miocene of Poland the species *Murex* (*Tubicauda*) *spinicosta* (BRONN) is known from Korytnica only.

Genus *Hexaplex* PERRY, 1811
Subgenus *Phyllonotus* SWAINSON, 1833
Hexaplex (Phyllonotus) pomiformis (EICHWALD, 1853)
(Pl. 21, Figs 1-6)

1837. *Murex pomum* L.; G. PUSCH, pp. 136-137, Pl. 11, Fig. 24.
1853. *Mur. pomiformis* m.; E. EICHWALD, p. 191.
1856. *Murex Sedgwicki* MICHT.; M. HÖRNES, pp. 220-222, Pl. 23, Figs 1-5.
1885. *Murex (Phyllonotus) Hoernesi* D'ANC.; R. HOERNES & M. AUINGER, pp. 211-212.
1912. *Murex austriacus* TOURN.; W. FRIEDBERG, pp. 169-170, Pl. 10, Fig. 10.
1960. *Murex (Muricanthus) pomiformis* EICHWALD; E. KOJUMDGIEVA, p. 146, Pl. 40, Fig. 1.
1966. *Murex (Muricanthus) turonensis pontileviensis* TOURNOUËR; L. STRAUSZ, pp. 264-265, Pl. 32, Figs 1 and 4; Pl. 33, Fig. 2; Pl. 56, Figs 9-11, and Pl. 79, Fig. 1.
1982. *Trunculariopsis hörnesi* (D'ANCONA); J. MARTINELL, pp. 375-376, Pl. 1, Figs 1-2.
1994. *Hexaplex (Muricanthus) turonensis pontileviensis* (TOURNOUËR); P.I. NIKOLOV, pp. 48-49, Pl. 1, Figs 3-4.

MATERIAL: Fifty-seven specimens.
DIMENSIONS: The largest specimen (Pl. 21, Fig. 6; Collection Museum of the Earth, Warsaw) is 100 mm high and 72 mm wide.

REMARKS: The studied specimens display a variable development of thorns situated in the posterior part of varices, or even their complete absence. A similar variability has also been recognized in other localities of the European Neogene, what certainly has caused much confusion in the taxonomic recognition of the shells.

A specimen conspecific with the studied ones has first been presented from Korytnica by PUSCH (1837) who attributed it to the present-day species *Murex pomum* LINNAEUS. This assignment was correctly (*see* ABBOTT & DANCE 1990, p. 134) objected soonafter by EICHWALD (1853), who proposed for PUSCH's specimen a new name, *Murex pomiformis* EICHWALD.

The Korytnica specimens are undoubtedly concordant with those occurring in the Vienna Basin (*comp. also* FRIEDBERG 1912, p. 169), and presented by HÖRNES (1856) under the name *Murex sedgwicki* MICHELOTTI. Almost the same opinion was expressed by HÖRNES himself (HÖRNES 1856, p. 222) who stated an identity of his specimens with that of PUSCH. The Viennese specimens were subsequently discussed by BELLARDI (1873, p. 87) who indicated that they differ from *Murex sedgwicki* MICHELOTTI, 1841, from northern Italy by the presence of thorns on the varices, and by the size. It is therefore evident, that the correct name for the studied specimens from Korytnica, as well as for those from the Vienna Basin and other localities in the Paratethyan basins, is that one introduced by EICHWALD (1853). This very name was already used by KOJUMDGIEVA (1960) for specimens from the Miocene of Bulgaria, but interpreted incorrectly as referred to her specimens compatible with these from Korytnica, but differing from those of the Vienna Basin. All other names, used by various authors for the discussed Viennese specimens, i.a. *Murex hörnesi* D'ANCONA, 1871, and *Murex austriacus* TOURNOUËR, 1875, cannot be herein recognized as acceptable.

The species *Hexaplex (Phyllonotus) pomiformis* (EICHWALD) was reported from Korytnica by PUSCH (1837), EICHWALD (1853), HÖRNES (1856), KONTKIEWICZ (1882), FRIEDBERG (1912, 1938), and KOWALEWSKI (1930).

Subgenus *Muricanthus* SWAINSON, 1840

Hexaplex (*Muricanthus*) *sandbergeri* (HÖRNES, 1856)
(Pl. 24, Figs 3-4)

1856. *Murex Sandbergeri* HÖRN.; M. HÖRNES, pp. 674-675, Pl. 51, Fig. 5.

MATERIAL: Five specimens.
DIMENSIONS: The largest specimen (Pl. 24, Fig. 3) is 40 mm high and 23 mm wide.

REMARKS: The studied specimens are undoubtedly conspecific with those coming from the Vienna Basin and presented by HÖRNES (1856). To note, the largest of the Korytnica specimens is about half a whorl shorter than that one from Gainfahren, but the latter is interpreted as an extremely grown (HOERNES & AUINGER 1885, p. 222). It is also to remark that HÖRNES (1856) mentioned a possible identity of his specimens with those described by GRATELOUP under the name *Purpura torulosa*. This suggestion is to be rejected, because the specimen of *Ocenebra torulosa* (GRATELOUP), presented subsequently from the Aquitaine Basin by COSSMANN & PEYROT (1924, pp. 450-451, Pl. 13, Figs 20-21) do not resemble either these from Korytnica or those from the Vienna Basin. Contrary to the opinion of HOERNES & AUINGER (1885), the discussed species cannot be regarded as relative to *Murex craticulatus* LINNAEUS, which is quite different and belongs to another genus. Within five studied Korytnica specimens the number of varices is variable, and on the two last whorls it amounts 6/8, 6/9, 7/10, 8/9, and 9/9, respectively. These varices are only exceptionally furnished with short spines, and any ribs are lacking between particular varices.

The species *Hexaplex* (*Muricanthus*) *sandbergeri* (HÖRNES) has not hitherto been known from the Miocene of Poland.

Genus *Pterynotus* SWAINSON, 1833
Subgenus *Pterynotus* SWAINSON, 1833

Pterynotus (*Pterynotus*) *perlongus* (BELLARDI, 1873)
(Pl. 24, Fig. 8)

1873. *Murex perlongus* BELL.; L. BELLARDI, p. 75, Pl. 5, Fig. 8.
1885. *Murex* (*Chicoreus*) *perlongus* BELL.; R. HOERNES & M. AUINGER, p. 207, Pl. 24, Fig. 13.

MATERIAL: One specimen.
DIMENSIONS: Height 52 mm, width 26 mm.

REMARKS: A taxonomic recognition of this single specimen involves serious troubles. At the first insight, it resembles both that one presented by HÖRNES (1856, Pl. 25, Fig. 12) from Steinabrunn in the Vienna Basin, as well as that one shown by FRIEDBERG (1912, Pl. 10, Fig. 1) from Podhorce in the Ukraine, the both of which were described under the name of *Murex tortuosus* SOWERBY. The studied Korytnica specimen differs from them by the pattern of surface of its whorls between varices, where since the earliest whorls there appears one pronounced node, particularly well visible in the apical view. The specimens illustrated by HÖRNES, and by FRIEDBERG, are furnished at this place with 2, 3, or 4 thin ribs (*comp.* HÖRNES 1856, Pl. 25, Fig. 12c). It therefore seems reasonable to attribute the studied specimen to another species, namely *Pterynotus perlongus* (BELLARDI), described from the Miocene of Colli Torinesi in northern Italy, although it is slightly smaller ("shorter" of about one whorl) and has a thorny process in the posterior part of varices, that is missing in the Italian specimens. The latter feature differs the studied specimen also from those coming from Lapugy in Transylvania (*comp.* HOERNES & AUINGER 1885). This species was reported from the Vienna Basin by STOJASPAL (1978) who did not offer, however, any more precise information.

The species *Pterynotus* (*Pterynotus*) *perlongus* (BELLARDI) has not hitherto been known from the Miocene of Poland.

Subgenus *Purpurellus* JOUSSEAUME, 1880

Pterynotus (*Purpurellus*) *cyclopterus* (MILLET, 1866)
(Pl. 22, Figs 9-11)

1873. *Murex Gastaldii* BELL.; L. BELLARDI, p. 57, Pl. 4, Fig. 9.
1875. *Murex* (*Pteronotus*) *cyclopterus* MILLET; R. TOURNOUËR, pp. 147-149, Pl. 5, Fig. 2.
1924. *Murex* (*Pteropurpura*) *Gastaldii* BELLARDI; M. COSSMANN & A. PEYROT, pp. 443-444, Pl. 18, Figs 6-7.
1924. *Murex* (*Pteropurpura*) *cyclopterus* MILLET; M. COSSMANN & A. PEYROT, pp. 444-445, Pl. 17, Fig. 36.
1952a. *Murex* (*Triremis*) *cyclopterus* MILLET; M. GLIBERT, pp. 292-293, Pl. 6, Fig. 4.

MATERIAL: Six specimens.
DIMENSIONS: The largest specimen, preserved with its aperture damaged is 40 mm high; another one (Pl. 22, Fig. 10) is 38 mm high and 22 mm wide.

REMARKS: The studied specimens are rather poorly preserved, and thus their taxonomic recognition bears some troubles, especially because such poor preservation is also the feature both of the holotype of the species *Murex gastaldii* BELLARDI coming from northern Italy, and of another specimen of that species, presented by COSSMANN & PEYROT (1924) from the Aquitaine Basin. An identity of these specimens with those from Korytnica is evident, in spite of the size difference displayed by the holotype which is two growth cycles "longer", and the Aquitanian specimen being longer one cycle. In one of the studied specimens from Korytnica (Pl. 22, Fig. 10), preserved is however a pronounced, alate process in the posterior part of the varix, and in another one (Pl. 22, Fig. 11) a process on the right margin of the siphonal canal is distinct. The presence of these processes causes that the Korytnica specimens become concordant with the species *Murex cyclopterus* MILLET. To note, traces of these processes are detectable in the holotype of *Murex gastaldii* BELLARDI (that alate process at the fourth varix, counting from the end of the shell). The presented facts clearly indicate that *Murex gastaldii* BELLARDI, 1873, does not differ from *Murex cyclopterus* MILLET, 1866, so distinctly to treat them as separate species. A similar opinion was already taken into account by COSSMANN & PEYROT (1924, p. 444). Slight differences in the size of the alate process are to be regarded as a result of intraspecific and/or ontogenic variability. From nomenclatorial point of view, the specific name used by MILLET has evidently a priority upon that one used by BELLARDI.

The species *Pterynotus* (*Purpurellus*) *cyclopterus* (MILLET) has not hitherto been known from the Miocene of Poland.

Genus *Homalocantha* MÖRCH, 1852

Homalocantha heptagonata (BRONN, 1831)
(Pl. 22, Figs 3-5)

1856. *Murex heptagonatus* BRONN; M. HÖRNES, pp. 255-256, Pl. 26, Fig. 2.
1885. *Murex* (*Muricidea*) *heptagonatus* BRONN; R. HOERNES & M. AUINGER, p. 205, Pl. 24, Figs 5-8.
1904. *Murex* (*?*) *heptagonatus* BRN.; F. SACCO, pp. 19-20, Pl. 5, Figs 16-18.
partim 1924. *Murex* (*Favartia*) *heptagonatus* BRONN, var. *Pauli* TOURN.; M. COSSMANN & A. PEYROT, pp. 464-466, Pl. 13, Figs 40-41; *non* Pl. 12, Figs 44-45.
1960. *Muricopsis heptagonatus* BRONN; E. KOJUMDGIEVA, pp. 147, Pl. 40, Fig. 5.
1966. *Murex* (*Paziella*) *heptagonatus* BRONN; L. STRAUSZ, p. 263, Pl. 55, Fig. 11; Pl. 56, Fig. 2.
1994. *Hexaplex* (*Paziella*) *heptagonatus* (BRONN); P.I. NIKOLOV, pp. 49-50, Pl. 1, Figs 5-6.

MATERIAL: Six specimens.
DIMENSIONS: The largest specimen (Pl. 22, Fig. 5) is 48 mm high and 29 mm wide.

REMARKS: The studied specimens display a great specific variability, as already noted by former authors, and expressed by the diverse height of the spire and by diverse number of varices in the whorl. In particular specimens from Korytnica a number of varices on the last and last but one whorls amounts 8/8 (*see* Pl. 22, Fig. 5), 8/8, 8/7, 7/7, 6/7 and 6/6 (*see* Pl. 22, Fig. 4), respectively.

A generic and/or subgeneric assignment of the species has long been under discussion and much variably treated by successive authors (*see* synonymy). The present author is of an opinion that it should be included into the genus *Homalocantha* MÖRCH. Both by the size of the shell, its general shape, as well as by their ornamentation pattern the studied specimens resemble the type species of the genus, *Homalocantha scorpio* (LINNAEUS), from which they differ by a lack of spatulate tips on the spines. Of the present-day species, especially *Homalocantha melanamathos* (GMELIN) is very similar (*comp.* ABBOTT & DANCE 1990, p. 138).

The species *Homalocantha heptagonata* (BRONN) has not hitherto been known from the Miocene of Poland.

Genus *Typhis* MONTFORT, 1810
Subgenus *Typhinellus* JOUSSEAUME, 1880
Typhis (*Typhinellus*) *tetrapterus* (BRONN, 1838)
(Pl. 30, Figs 6-7)

1856. *Murex* (*Typhis*) *tetrapterus* BRONN; M. HÖRNES, pp. 263-264, Pl. 26, Fig. 10.
1885. *Typhis tetrapterus* BRONN; R. HOERNES & M. AUINGER, p. 228, Pl. 29, Figs 13-16.
1904. *Typhis* (*Typhinellus*) *tetrapterus* BRONN, ct. var. *protetraptera* SACC.; F. SACCO, p. 17, Pl. 4, Figs 19-20.
1911. *Typhis* (*Typhinellus*) *tetrapterus* BRN.; S. CERULLI-IRELLI, pp. 307-308, Pl. 23, Fig 75.
1952a. *Typhis* (*Typhinellus*) *tetrapterus* BRONN; M. GLIBERT, pp. 294-295, Pl. 6, Fig. 6.
1956. *Typhis* (*Typhinellus*) *tetrapterus* BRONN; I. CSEPREGHY-MEZNERICS, p. 401, Pl. 5, Figs 17-20.
1966. *Typhis* (*Typhinellus*) *tetrapterus* BRONN; L. STRAUSZ, p. 267, Pl. 31, Figs 7-8.

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen (Pl. 30, Fig. 7) is 22.5 mm high and 13 mm wide.

REMARKS: The illustration of a specimen from Vöslau, presented by HÖRNES (1856, Pl. 26, Fig. 10) involved serious doubts about the conspecifity of the Viennese specimens with those coming from northern Italy (*see* BELLARDI 1873, p. 41). HOERNES & AUINGER (1885) recognized that specimen from Vöslau as an aberrant one, and they presented as typical four specimens, i.a. from Steinabrunn. Although it has long seemed to be clarified, the problem has again been undertaken in this century by GLIBERT (1952a).

In the Korytnica Clays this species is one of the greatest rarities. Of the two hitherto collected specimens, the smaller one (*see* Pl. 30, Fig. 6) is fully concordant both with that from Steinabrunn (*see* HOERNES & AUINGER 1885, Pl. 29, Fig. 16), as well as with that one coming from Pontlevoy in the Loire Basin (*see* GLIBERT 1952a, Pl. 6, Fig. 6). On the other hand, the larger specimen (*see* Pl. 30, Fig. 7) is very similar to, and identical in size with, that above-discussed one from Vöslau. All the specimens of *Typhis* (*Typhinellus*) *tetrapterus* (BRONN) hitherto reported from the Paratethyan basins (*see also* STRAUSZ 1966) are reasonably variable, especially as concerns the slenderness of the shell and the prominence of varices.

The species *Typhis* (*Typhinellus*) *tetrapterus* (BRONN) has not hitherto been known from the Miocene of Poland.

Genus *Muricopsis* Bucquoy, Dautzenberg & Dollfus, 1882

Muricopsis cristata (Brocchi, 1814)
(Pl. 23, Figs 8-9)

1856. *Murex cristatus* Brocc.; M. Hörnes, pp. 243-244, Pl. 25, Fig. 6.
1885. *Murex (Phyllonotus) cristatus* Brocc.; R. Hoernes & M. Auinger, p. 210, Pl. 26, Figs 1-3.
1904. *Murex (Muricopsis) cristatus* Br.; F. Sacco, p. 21, Pl. 6, Figs 4-5.
1911. *Murex cristatus* Br.; S. Cerulli-Irelli, pp. 310-311, Pl. 25, Figs 5-6.
1912. *Muricopsis cristatus* Brocc.; W. Friedberg, pp. 173-174, Pl. 11, Figs 6-7.
1960. *Muricopsis cristatus* (Brocchi); E. Kojumdgieva, p. 147, Pl. 40, Figs 3-4.
1966. *Muricopsis cristata* Brocc.; J. Kókay, Pl. 7, Fig. 20.
1973. *Muricopsis (Muricopsis) cristata* (Brocchi); E. Caprotti, p. 161, Pl. 1, Fig. 9.
1981. *Muricopsis cristatus* Brocchi; W. Krach, p. 67, Pl. 19, Fig. 1.

MATERIAL: Seven specimens.
DIMENSIONS: The largest specimen (Pl. 23, Fig. 9) is 28 mm high and 12.5 mm wide.

REMARKS: An attribution of the studied specimens to *Muricopsis cristata* (Brocchi) seems to be doubtless, although they slightly differ from the majority of specimens hitherto presented in the bibliography, the holotype including (*comp.* Pinna & Spezia 1978, Pl. 31, Fig. 1). The differences concern the weakness of the spines, or even their absence, at the crossing of varices with spiral ribs. The indicated species is however known to display a remarkable variability of these features. The specimens from Korytnica resemble very much that one from Enzesfeld in the Vienna Basin, and presented by Hörnes (1856, Pl. 25, Fig. 6).

One of the studied specimens (Pl. 23, Fig. 8) is only 8.6 mm high and 4.2 mm wide, with 4 ½ whorls of the teleoconch, and the protoconch distinctly smaller than in the other specimens. Its ornamentation is more delicate; it bears 11 varices on each of the last two whorls, and one secondary rib between the main spiral ribs. Presumably, it is a dwarfish specimen, the phenomenon of which was recognized in this species by Hoernes & Auinger (1885, p. 210). It is not however beyond any doubt that it may represent a separate species.

The species *Muricopsis cristata* (Brocchi) has not hitherto been recorded from Korytnica. In the Miocene of Poland it is known from Łychów (Krach 1981) and Benczyn (Krach 1950a).

Genus *Aspella* Mörch, 1877
Subgenus *Aspella* Mörch, 1877

Aspella (*Aspella*) *anceps* (Lamarck, 1822)
(Pl. 25, Figs 1-4)

1856. *Ranella anceps* Lam.; M. Hörnes, pp. 213-214, Pl. 21, Fig. 6.
1885. *Ranella (Apollon) anceps* Lamk.; R. Hoernes & M. Auinger, p. 190, Pl. 24, Fig. 3.
1901. *Ranella (Argobuccinum) emmae* n. sp.; O. Boettger, p. 26.
1912. *Aspella anceps* Lam.; W. Friedberg, pp. 182-183, Pl. 11, Fig. 16.
1924. *Eupleura subanceps* (d'Orb.); M. Cossmann & A. Peyrot, pp. 524-525, Pl. 12, Figs 24-25.
1934. *Argobuccinum emmae* (Boettger); A. Zilch, p. 250, Pl. 14, Figs 73-74.
1969a. *Argobuccinum emmae* (Boettger); I. Cseprehgy-Mezneries, pp. 79-80, Pl. 3. Figs 2, 4 and 7.
1984. *Aspella anceps* (Lamarck); M. Novelli & E. Gambarino, pp. 385-388, Pl. 1, Figs 1-7.

MATERIAL: Ten specimens.
DIMENSIONS: The largest specimen (Pl. 25, Fig. 3) is 11.8 mm high and 5.7 mm wide.

REMARKS: Two specimens from Steinabrunn in the Vienna Basin presented by HÖRNES (1856, Pl. 21, Fig. 6) and by HOERNES & AUINGER (1885, Pl. 24, Fig. 4), and re-illustrated in the form of photos by NOVELLI & GAMBARINO (1984, Pl. 1, Figs 1-2), allow to conclude a rather great variability of the shell shape in *Aspella anceps* (LAMARCK). This is also demonstrated by a relatively poor material from Korytnica.

NOVELLI & GAMBARINO (1984) included, correctly, to this species also the specimens from Kostej in Transylvania, described by BOETTGER (1901) as *Ranella* (*Argobuccinum*) *emmae* BOETTGER, what is apparently an acceptation of the opinion expressed by BOETTGER himself in his subsequent paper (BOETTGER 1906). Incorrect is, however, their opinion about a separation of the specimens illustrated by FRIEDBERG (1912) although that statement may be understood as the illustration given by FRIEDBERG (1912, Pl. 11, Fig. 16) is really very inferior.

The species *Aspella* (*Aspella*) *anceps* (LAMARCK) has not hitherto been known from the Miocene of Poland. The specimens described by FRIEDBERG (1912, 1938) were coming from Zborów, presently in the Ukraine.

Aspella (*Aspella*) *typhioides* (MAYER, 1869)
(Pl. 25, Fig. 5)

1869. *Murex typhioides* MAYER; C. MAYER, pp. 83-84, Pl. 3, Fig. 6.
1924. *Muricopsis typhioides* (MAYER); M. COSSMANN & A. PEYROT, pp. 481-482, Pl. 14, Figs 14-15.
1952a. *Aspella* (*Aspella*) *typhioides* MAYER; M. GLIBERT, pp. 296-297, Pl. 6, Fig. 8.

MATERIAL: One specimen.
DIMENSIONS: The collected specimen is 9 mm high and 5 mm wide.

REMARKS: Although the singly collected specimen is poorly preserved (its surface is slightly worn), its taxononic assignment is rather doubtless. It is featured by the whorls furnished with varices, numbering 7, and distributed in such a manner that they form distinct rows along the shell. The varices, at the place of their crossing with one of the spiral ribs, bear traces of short, pipe-like spines. It is thought that the Korytnica specimen is compatible (taking into regard its preservation and its being not fully grown) both with that one from Saucats in Aquitaine, presented by COSSMANN & PEYROT (1924), as well as with that one from Pontlevoy in the Loire Basin, presented by GLIBERT (1952a).

The species *Aspella* (*Aspella*) *typhioides* (MAYER) has not hitherto been known from the Miocene of Poland.

Subgenus *Favartia* JOUSSEAUME, 1880

Aspella (*Favartia*) *absona* (DE CRISTOFORI & JAN, 1832)
(Pl. 26, Figs 2-6)

1856. *Murex absonus* JAN; M. HÖRNES, pp. 222-223, Pl. 23, Fig. 6.
1904. *Murex* (*Favartia*) *absonus* JAN; F. SACCO, p. 20, Pl. 5, Figs 19-20.
1912. *Murex absonus* JAN var.; W. FRIEDBERG, pp. 171-172, Pl. 11, Fig. 3.
1973. *Aspella* (*Favartia*) *absona* (DE CRISTOFORI & JAN); E. CAPROTTI & M. VESCOVI, p. 161, Pl. 1, Fig. 4.

MATERIAL: Fifteen specimens.
DIMENSIONS: The largest, completely preserved specimen (Pl. 26, Fig. 5) is 12.5 mm high and 8 mm wide.

REMARKS: It seems doubtless that the studied specimens are conspecific with these coming from the Vienna Basin, presented by HÖRNES (1856), as well as with those from northern Italy. As compared with the re-illustrated holotype of the species (*see* PINNA & SPEZIA 1978, Pl. 29, Fig. 2), the Korytnica specimens are slightly smaller. Moreover, it is to note that the Korytnica specimens bear 4-6 varices on tha last whorl, whereas the Italian ones, according to BELLARDI (1873, p. 68), do 5-7, and the Viennese 6-8, according to HÖRNES (1856, p. 223).

The specimens from Manciel in the Aquitaine Basin, described by COSSMANN & PEYROT (1924, pp. 470-471, Pl. 13, Figs 10-11) under the name "*Murex* (*Favartia*) *absonus* JAN, mut. *interfunatus* COSSMANN & PEYROT" are quite different. They belong to a distinct species, and including the Viennese specimens to their synonymy, as done by COSSMANN & PEYROT (1924), is evidently a misconception.

The species *Aspella* (*Favartia*) *absona* (DE CRISTOFORI & JAN) has not hitherto been recorded from Korytnica. In the Miocene of Poland it is known from Benczyn (KRACH 1950a).

Aspella (*Favartia*) *czjzeki* (HÖRNES, 1848)
(Pl. 26, Fig. 1)

1856. *Murex porulosus* MICHT.; M. HÖRNES, pp. 224-225, Pl. 23, Fig. 8.
1885. *Murex* (*Muricidea*) *Czjzeki* M. HOERN.; R. HOERNES & M. AUINGER, pp. 205-206.
1906. *Murex* (*Muricidea*) *collega* n. sp.; O. BOETTGER, p. 42.
1934. *Muricidea collega* (BOETTGER); A. ZILCH, p. 251, Pl. 15, Fig. 78.
1969a. *Muricidea collega* (BOETTGER); I. CSEPREGHY-MEZNERICS, p. 82, Pl. 3, Figs 14-15.

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen is 10.5 mm high and about 6 mm wide; the smaller (Pl. 26, Fig. 1) is 7.2 mm and 4.0 mm, respectively.

REMARKS: An assignment of the two collected specimens needs a discussion upon a relation of the two close species, viz. *Murex* (*Muricidea*) *czjzeki* HÖRNES and *Murex* (*Muricidea*) *collega* BOETTGER. When establishing the latter species, BOETTGER (1906) based it on two specimens coming from Kostej in Transylvania, supplemented by three specimens from the same locality, and regarded earlier by HOERNES & AUINGER (1885) as belonging to *Murex czjzeki* HÖRNES. According to BOETTGER (1906), this newly established species differs by its smaller size (7.5 mm high, instead of up to 18.0 mm in HÖRNES' specimen), seven instead 5 varices on the last whorl (HÖRNES notes the number of 4-6), and by the presence of 1 or 2 spiral furrows on the spiral ribs (not discussed by HÖRNES). The two specimens from Korytnica bear such very furrows, whereas the greater one has 5, and the smaller 6 varices on the last whorl. It seems therefore doubtless that the specimens described as *Murex* (*Muricidea*) *collega* BOETTGER are really not fully grown individuals of the species *Murex* (*Muricidea*) *czjzeki* HÖRNES. Their last whorl corresponds to the earlier whorls of HÖRNES' specimens, what results in the different number of varices.

Another opinion in the matter of relation between the two discussed species was presented by CSEPREGHY-MEZNERICS (1969a) who assigned specimens about 12 mm high, composed of 6-7 whorls, and with 6 varices on the last whorl, to the species *Muricidea collega* (BOETTGER), including the HÖRNES' species to the synonymy.

The species *Aspella* (*Favartia*) *czjzeki* (HÖRNES) has not hitherto been known from the Miocene of Poland.

Aspella (*Favartia*) *incisa* (BRODERIP, 1832)
(Pl. 26, Figs 7-9 and Pl. 38, Fig. 5)

1856. *Murex incisus* BRODERIP; M. HÖRNES, pp. 223-224, Pl. 23, Fig. 7.
1924. *Murex* (*Favartia*) *excisus* GRAT.; M. COSSMANN & A. PEYROT, pp. 467-468, Pl. 12, Figs 41-42; Pl. 13, Fig. 4.
1952a. *Aspella* (*Favartia*) *incisa excisa* GRATELOUP; M. GLIBERT, pp. 298-299, Pl. 6, Fig. 10.

MATERIAL: Two hundred and sixty specimens.
DIMENSIONS: The largest specimen is 16 mm high and 10 mm wide.

REMARKS: The studied specimens are concordant both with these coming from Steinabrunn in the Vienna Basin, presented by HÖRNES (1856), as well as with those from Pontlevoy in the Loire Basin, described by GLIBERT (1952a). Uncertain is, however, their accordance with those from Saucats in the Aquitaine Basin; possibly, the slightly narrower varices in shells presented by COSSMANN & PEYROT (1924) are displayed by not fully grown specimens. The number of varices on the last whorl in the Korytnica specimens amounts 5-7 (usually 6, and exceptionally even 4).

According to HÖRNES (1856) as well as to GLIBERT (1952a), the Miocene specimens are compatible with those of the present-day species *Aspella* (*Favartia*) *incisa* (BRODERIP). A treatment by GLIBERT (1952a) of the fossil specimens as a subspecies of the present-day species, featured by their slightly smaller size is not justified.

At Korytnica this is one of very few species confined exclusively to the oyster shellbed exposed at Mt. Lysa.

The species *Aspella* (*Favartia*) *incisa* (BRODERIP) has not hitherto been known from the Miocene of Poland.

Genus *Morula* SCHUMACHER, 1817

Morula sp.
(Pl. 29, Figs 7-8 and Pl. 30, Figs 3-4)

MATERIAL: Four specimen, all poorly preserved.
DIMENSIONS: The largest specimen is about 25 mm high and 15.5 mm wide.

REMARKS: Although all the studied specimens are either incomplete, or poorly preserved, the present author demonstrates them as a great rarity amongst the Miocene muricids. Everyone of them is in another growth stage, what is expressed by a variable height of the shell, viz. 9 mm, 14 mm, 20.5 mm, and 25 mm, respectively. They all represent one species, which does not seem to be known in the referenced bibliography. All studied specimens are characterized by a pronounced ornamentation typified by axial varices and spiral ribs. Between the varices there are no axial ribs, and the number of varices on the last and last but one whorls amounts 8/10, 8/8, 6/8, and 6/8, respectively. Of the numerous spiral ribs, the strongest one is that running along the crest on the last whorl; it is associated with one running above, and three beneath, all having been distinctly stronger than the others.

The smallest of the herein presented Korytnica specimens (Pl. 29, Fig. 7) resembles that one from the Aquitaine Basin, presented by COSSMANN & PEYROT (1924, pp. 471-472, Pl. 15, Figs 36-37) under the name *Murex* (*Poirieria*) *elatospira* COSSMANN & PEYROT, and being 12 mm high. The larger specimens from Korytnica are very similar to those of the present-day species *Morula funiculus* (WOOD) from the South/Western Pacific (*see* ABBOTT & DANCE 1990, p. 148). This very similarity involves the present author to attribute the Korytnica specimens to the genus *Morula*; their inferior state of preservation makes a species identification impossible.

Genus *Thais* RÖDING, 1798
Subgenus *Stramonita* SCHUMACHER, 1817

Thais (*Stramonita*) *echinulata* (PUSCH, 1837)
(Pl. 27, Figs 5-6)

1837. *Ricinula echinulata* m.; G. PUSCH, p. 140, Pl. 11, Fig. 27.
1853. *Purp. echinulata* PUSCH; E. EICHWALD, p. 172.
1856. *Purpura haemastoma* LAM.; M. HÖRNES, pp. 167-168, Pl. 13, Fig. 18.
1882. *Purpura* (*Stramonita*) *haemastomoides* nov. form.; R. HOERNES & M. AUINGER, pp. 151-152.
1928. *Purpura haemastomoides* R. HOERN. i AUINGER; W. FRIEDBERG, p. 593, Pl. 38, Fig. 6.
1960. *Thais* (*Stramonita*) *haemastomoides* (HOERNES und AUINGER); E. KOJUMDGIEVA, p. 153, Pl. 41, Fig. 1.
1966. *Thais* (*Stramonita*) *haemastomoides* HOERNES & AUINGER; L. STRAUSZ, p. 282, Pl. 35, Figs 13-15; Pl. 44, Fig. 1.
?1981. *Thais haemastomoides* R. HOERNES et AUINGER; W. KRACH, pp. 68-69, Pl. 17, Fig. 9; Pl. 18, Figs 1-4 and 6.

MATERIAL: Eight specimens.
DIMENSIONS: The largest specimen (Pl. 27, Fig. 6) is 42 mm high and 25.5 mm wide; another one (Pl. 27, Fig. 5) is 34 mm and 21 mm, respectively.

REMARKS: The studied specimens are undoubtedly conspecific with that one coming also from Korytnica, and presented by PUSCH (1837) as *Ricinula echinulata* PUSCH. The PUSCH's specimen, as judged from its illustration (PUSCH 1837, Pl. 11, Fig. 27) is slightly more slender, what seems to be an error of the desinger, because the illustration is discordant with the measurements given by PUSCH in the text. That specimen was not fully grown, and had its outer lip partly crushed; the pattern of teeth in the inner side of that lip remained therefore unknown. All these disopportunities have certainly caused that HÖRNES (1856, pp. 168-169) erroneously regarded *Ricinula echinulata* PUSCH as concordant with specimens classified by him as *Purpura elata* BLAINVILLE, not as *Purpura haemastoma* LINNAEUS. Subsequently, HOERNES & AUINGER (1882) when revising determinations by HÖRNES (1856), recognized that the specimen from Kienberg at Mikulov, in Moravia, presented by HÖRNES (1856, Pl. 13, Fig. 19) as *Purpura elata* BLAINVILLE, belongs to the species *Purpura* (*Stramonita*) *haemastoma* LINNAEUS, whereas those from Gainfahren, presented by HÖRNES (1856, Pl. 13, Fig. 18) as *Purpura haemastoma* LINNAEUS, should be separated as a new species, *Purpura* (*Stramonita*) *haemastomoides* HOERNES & AUINGER. All the specimens from Korytnica kept in the present author's collection bear 4 slaty teeth on the inner side of the outer lip. They correspond thus accurately to these specimens from the Vienna Basin upon which established was the species *Thais* (*Stramonita*) *haemastomoides* HOERNES & AUINGER, 1882. The latter name is regarded by the present author as a junior synonym of *Thais* (*Stramonita*) *echinulata* (PUSCH, 1837) which thus evidently has the priority.

The species *Thais* (*Stramonita*) *echinulata* (PUSCH) was reported from Korytnica by PUSCH (1837), EICHWALD (1853), FRIEDBERG (1928), and KOWALEWSKI (1930). In the Miocene of Poland it is known from Łychów and Węglinek (KRACH 1981).

Thais (*Stramonita*) *exilis* (PARTSCH *in* HÖRNES, 1856)
(Pl. 27, Figs 1-4)

1856. *Purpura exilis* PARTSCH; M. HÖRNES, pp. 169-170, Pl. 13, Figs 20-23.
1870. *Purpura exilis* PARTSCH; F. ROEMER, p. 380, Pl. 47, Fig. 7.
1882. *Purpura subumbilicata* BELL.; L. BELLARDI, p. 175, Pl. 11, Fig. 2.
1912. *Purpura exilis* PARTSCH; W. FRIEDBERG, pp. 134-135, Pl. 7, Fig. 9.
1954. *Thais* (*Stramonita*) *exilis* PARTSCH; I. CSEPREGHY-MEZNERICS; p. 37, Pl. 4, Figs 12-13.
1960. *Thais* (*Stramonita*) *exilis* (PARTSCH); E. KOJUMDGIEVA, p. 153, Pl. 41, Fig. 2.
1966. *Thais* (*Stramonita*) *exilis* PARTSCH (in HÖRNES); L. STRAUSZ, p. 283, Pl. 64, Figs 2 and 5.
partim 1981. *Thasis exilis* (PARTSCH in HOERNES); W. KRACH, p. 69, Pl. 17, Figs 8 and 10-11; Pl. 18, Fig. 5, and Pl. 22, Fig. 13; *non* Pl. 18, Figs 7-8.

MATERIAL: Ten specimens.
DIMENSIONS: The largest specimen (Pl. 27, Fig. 1) is 33 mm high and 24 mm wide; another one (Pl. 27, Fig. 4) is 23 mm and 14.5 mm, respectively.

REMARKS: The studied specimens may be regarded as conspecific with these described by HÖRNES (1856) from the Vienna Basin. Within the studied material, however, the two more or less distinct groups are easily distinguishable. The first is represented by 4 specimens of which two are illustrated (Pl. 27, Figs 1-2), and the second one by 6 specimens of which the other two are figured (Pl. 27, Figs 3-4).

The specimens of the first group are larger, more squabby, with the last but one whorl slightly convex, and ornamented in the last whorl by two more or less distinct rows of spiny nodes, and by numerous, densely spaced furrows.

The specimens of the second group are smaller, more slender, with the last but one whorl slightly concave, and the last one furnished with a quite distinct crest upon which the whorl becomes slightly concave; the nodes on the last whorl are very weakly developed, and the spiral furrows are less numerous and less densely spaced. It is thus probable that these two groups represent two separate taxa. A rather poor and badly preserved material on one side, and the fact of a similar differentiation in specimens described by HÖRNES (1856) on the other, hinders the present author from a formal subdivision. The only hitherto presented specimen of *Thais* (*Stramonita*) *exilis* (PARTSCH) from Korytnica (FRIEDBERG 1912, Pl. 7, Fig. 9) belongs evidently to the second of the above-distinguished groups.

The species *Thais* (*Stramonita*) *exilis* (PARTSCH *in* HÖRNES) was reported from Korytnica by HÖRNES (1856), FRIEDBERG (1912), and KOWALEWSKI (1930). In the Miocene of Poland it is also known from Biskupiec (ROEMER 1870), Rybnica (KOWALEWSKI 1930) and the vicinity of Łychów (KRACH 1981).

Genus *Hadriania* BUCQUOY, DAUZENBERG & DOLLFUS, 1882

Hadriania coelata (DUJARDIN, 1837)
(Pl. 28, Figs 4-7; Pl. 29, Fig. 6)

1856. *Murex sublavatus* BAST.; M. HÖRNES, pp. 236-237, Pl. 24, Figs 14-16.
partim 1885. *Murex* (*Occenebra*) *sublavatus* BAST.; R. HOERNES & M. AUINGER, pp. 216-217, Pl. 26, Figs 4-5; *non* Fig. 6.
partim 1885. *Murex* (*Occenebra*) *caelatus* GRAT.; R. HOERNES & M. AUINGER, pp. 217-218, Pl. 26, Figs 7-8, 10; *non* Figs 9, 11-12.
1912. *Ocenebra sublavata* BAST.; W. FRIEDBERG, pp. 177-178, Pl. 11, Figs 8-10.
1924. *Hadriania mioincrassata* SACCO; M. COSSMANN & A. PEYROT, pp. 520-521, Pl. 14, Figs 9, 41-44.
1928. *Ocenebra orientalis* FRIEDB.; W. FRIEDBERG, pp. 587-588.
1952a. *Tritonalia* (*Hadriania*) *coelata* f. typique DUJARDIN; M. GLIBERT, pp. 304-305, Pl. 7, Figs 3*a*,*b*.
1960. *Tritonalia* (*Ocenebrina*) *orientalis* (FRIEDBERG); E. KOJUMDGIEVA, p. 150, Pl. 40, Fig. 10.
1966. *Ocenebrina sublavata dertonensis* MAYER (in BELLARDI); L. STRAUSZ, pp. 273-274, Pl. 33, Figs 5-8.
1966. *Ocenebrina sublavata striata* EICHWALD; L. STRAUSZ, p. 273, Pl. 33, Figs 9-10.
1971. *Tritonalia sublavata* BAST.; I. CSEPREGHY-MEZNERICS, p. 27, Pl. 9, Figs 23-24.
1971. *Tritonalia sublavata dertonensis* MAY.; I. CSEPREGHY-MEZNERICS, p. 27, Pl. 9, Figs 27-28.
1984. *Hadriania coelata* (DUJARDIN); A.W. JANSSEN, pp. 223-224, Pl. 61, Figs 3-8.
1994. *Ocinebrina caelata badensis* (HOERNES, AUINGER); P. I. NIKOLOV, pp. 51-52, Pl. 1, Figs 9-11; Pl. 2, Figs 3-6.

MATERIAL: Eighty specimens.
DIMENSIONS: The largest specimen is 28.5 mm high and 14 mm wide.

REMARKS: A taxonomic assignation of the studied specimens bears serious troubles. It is doubtless that they are conspecific with these coming from the Vienna Basin, precisely from Gainfahren, as presented by HÖRNES (1856), and from Grund, as given by HOERNES & AUINGER (1885). Following these authors, FRIEDBERG (1912) labelled the specimens from Korytnica as *Ocenebra sublavata* (BASTEROT). Subsequently, COSSMANN & PEYROT (1924) indicated that the

specimens of *Ocenebra sublavata* (BASTEROT) from the Miocene of Aquitaine differ distinctly from those of the Vienna Basin (*see* COSSMANN & PEYROT 1924, Pl. 13, Figs 44-45). The former determination of the Viennese (and Korytnica) specimens thus appeared to be incorrect. COSSMANN & PEYROT (1924) described from the Miocene of Aquitaine the new species *Ocenebra occitanica* COSSMANN & PEYROT, suggesting its identity with that of the Vienna Basin. The specimens of *Ocenebra occitanica* are, however, really distinct from those of the Vienna Basin, not only by their size, as remarked by FRIEDBERG (1928). Taking into account the differences, FRIEDBERG (1928) established a new species, *Ocenebra orientalis* FRIEDBERG, for all the specimens from Korytnica and some of the Viennese forms (*see* synonymy *in* FRIEDBERG 1912, p. 177). This taxonomic discussion is not exhausted, however, because the Korytnica specimens appear *almost identical* with those from the Loire Basin, and presented by GLIBERT (1952a) as "*Tritonalia* (*Hadriania*) *coelata* (DUJARDIN) f. typique". Moreover, GLIBERT (1952a) regards the latter specimens to be conspecific with those coming from the Miocene of Aquitaine and labelled by COSSMANN & PEYROT (1924) as *Hadriania mioincrassata* SACCO, thus with quite different species. The latter comparison is fully acceptable by the present author. Nevertheless, statement about *almost identical* forms under discussion arises from the fact that the specimen illustrated by GLIBERT (1952a, Pl. 7, Fig. 3*b*) has its siphonal canal closed, what happens only once within the Korytnica specimens. This feature was formerly commented by COSSMANN & PEYROT (1924, p. 521) who recognized the presence of the closed siphonal canal in some rare specimens, all of which always been fully grown.

The specific variability of the Korytnica specimens is primarily expressed by their slenderness. Some specimens are remarkably slender (*see* Pl. 29, Fig. 6) and furnished with three spiral ribs on the last but one and earlier whorls, contrary to the others displaying only two ribs exposed and the third one being unexposed. Such specimens resemble well the specimen from Lapugy in Transylvania, presented by HOERNES & AUINGER (1885, Pl. 26, Fig. 15) under the name *Murex* (*Occenebra*) *dertonensis* MAYER. This small difference does not seem to be substantial for creating a separate species. A great variability in the shell slenderness is also observable amongst the specimens presented by JANSSEN (1984) from the Miocene of Winterswijk in Holland.

The species *Hadriania coelata* (DUJARDIN) was reported from Korytnica, under various names, by PUSCH (1837), HÖRNES (1856), KONTKIEWICZ (1882), FRIEDBERG (1912, 1928, 1938), and KOWALEWSKI (1930). In the Miocene of Poland this species is also known from Benczyn (KRACH 1950a).

Hadriania excoelata (COSSMANN & PEYROT, 1924) (Pl. 28, Figs 1-3 and Pl. 29, Fig. 1)

partim 1885. *Murex* (*Occenebra*) *caelata* GRAT.; R. HOERNES & M. AUINGER, pp. 217-218, Pl. 26, Figs 9, 11-12; *non* Figs 7-8, 10.
1924. *Ocenebra* (*Ocenebrina*) *excoelata* nov. nom.; M. COSSMANN & A. PEYROT, pp. 508-510, Pl. 14, Fig. 29; Pl. 16, Figs 5-6.
1924. *Ocenebra excoelata*, var. *merignacensis* nov. var.; M. COSSMANN & A. PEYROT, p. 510, Pl. 14, Figs 38-39.
1928. *Ocenebra crassilabiata* HILB.; W. FRIEDBERG, p. 588, Text-fig. 83.
1952a. *Tritonalia* (*Hadriania*) *coelata*, f. *excoelata* COSSMANN et PEYROT; M. GLIBERT, p. 305, Pl. 7, Fig. 3c.

MATERIAL: Forty-five specimens.
DIMENSIONS: The largest specimen (Pl. 28, Fig. 3) is 21.2 mm high and 10.8 mm wide; another one (Pl. 29, Fig. 1) is 18.8 mm and 11.6 mm, respectively.

REMARKS: The determination of these specimens, similarly as those of the preceding species, bears some difficulties. It seems reasonable to regard them as conspecific with such Viennese specimens which HOERNES & AUINGER (1885, Pl. 26, Figs 9 and 11-12) labelled as *Murex* (*Occenebra*) *caelata* GRATELOUP. Moreover, the Korytnica specimens are concordant with those coming from the Loire Basin, and presented by GLIBERT (1952a) as "*Tritonalia* (*Hadriania*) *coelata* (DUJARDIN) f. *excoelata* COSSMANN & PEYROT". In the present author's opinion, the latter taxon differs from typical representatives of the species so much that it should be treated as a separate species. In this very way it was treated by its creators (COSSMANN & PEYROT 1924, p. 508).

FRIEDBERG (1928, Text-fig. 83) described from Korytnica one specimen (19 mm high, 12 mm wide) which seems to be fully compatible with the studied forms. However, FRIEDBERG considered it, erroneously in the present author's opinion, as a juvenile of another species, viz. *Ocenebra crassilabiata* (HILBER), the adults of which are twice larger (*see* HOERNES & AUINGER 1885, Pl. 26, Figs 18-20).

In the Miocene of Poland the species *Hadriania excoelata* (COSSMANN & PEYROT) is known from Korytnica only.

Hadriania credneri (HOERNES & AUINGER, 1885)
(Pl. 28, Fig. 8)

1885. *Murex (Occenebra) Credneri* nov. form.; R. HOERNES & M. AUINGER, pp. 218-219, Pl. 26, Figs 16-17.
partim 1966. *Ocinebrina sublavata credneri* HOERNES & AUINGER; L. STRAUSZ, p. 274, Pl. 33, Fig. 12; *non* Figs 13-14.

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen is 29 mm high and 15 mm wide.

REMARKS: The studied specimens seem to be concordant with those coming from Lapugy in Transylvania, and described by HOERNES & AUINGER (1885), particularly with a specimen in their Pl. 26, Fig. 16. The Korytnica specimens are identical by their size, overall shape, and ornamentation pattern, but they differ in having their siphonal canal not closed; the latter feature may, however, result from a damage of that part of the shell.

The species *Hadriania credneri* (HOERNES & AUINGER) is certainly a close relative to *Hadriania coelata* (DUJARDIN), but it ought to be treated as separate, what was already stressed by its creators (HOERNES & AUINGER 1885, p. 219).

Within the specimens from the Miocene deposits of Hungary, described by STRAUSZ (1966) as *Ocinebrina sublavata credneri* HOERNES & AUINGER, conspecific with these from Lapugy and Korytnica is probably only that one from Várpalota (STRAUSZ 1966, Pl. 33, Fig. 12), whilst those from Szob (STRAUSZ 1966, Pl. 33, Figs 13-14) differ evidently, primarily by their size twice smaller.

The species *Hadriania credneri* (HOERNES & AUINGER) has not hitherto been known from the Miocene of Poland.

Hadriania polonica sp.n.
(Pl. 29, Figs 2-5)

partim 1912. *Fusus* aff. *virgineus* GRAT.; W. FRIEDBERG, pp. 160-162, Pl. 9. Fig. 10; *non* Fig. 9.

HOLOTYPE: The specimen (Z.PAL.U.W., No. BkK-G583) presented in Pl. 29, Fig. 4.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains.
DERIVATION OF THE NAME: *polonica* — after the country of finding.
DIAGNOSIS: Shell fusiform, of ledge-shaped whorls furnished with a crest; aperture with a very long, straight, and open siphonal canal.
MATERIAL: Eighty specimens.
DIMENSIONS: The holotype is 17.5 mm high and 7 mm wide; the largest specimen, preserved with its siphonal canal broken is 10.5 mm wide.

DESCRIPTION: Shell medium-sized, elongated, fusiform; protoconch composed of about 2½ smooth and lustrous whorls, and not distinctly separated from the rest of the shell. Teleoconch

attains 5-6 whorls, the two primary of which are convex, and the others are furnished with a more or less pronounced crest, above which they become either almost flat or even slightly concave. Ornamentation consists of axial and spiral ribs. The axial ribs are usually thin and slightly advanced, but in some specimens much thicker by the end of the last whorl. The number of the axial ribs ranges from 10 to 18 (commonly 12-15) on the last whorl. The spiral ribs vary in thickness; usually two (rarely three) are stronger, and one of them always runs along the crest. Aperture is oval, and prolongates anteriorly into a very long, straight siphonal canal, always open. Inner lip is smooth; outer lip is innerly furnished with elongated teeth, sometimes forked, numbering 6-9, and it is destitute of any varix outerly.

REMARKS: The studied specimens are evidently conspecific with that one, coming also from Korytnica, and labelled tentatively by FRIEDBERG (1912, p. 162, Pl. 9, Fig. 10) as "*Fusus* an *virgineus* GRAT. juv.?". This labelling (Latin *an* =possibly), adorned with a question mark, indicates that the discussed specimen involved much troubles to such advanced investigator as FRIEDBERG was. Both that specimen, as well as all studied forms, differ distinctly from the juvenile specimens of *Euthriofusus virgineus* (GRATELOUP) presented by FRIEDBERG (1912, Pl. 9, Fig. 9) and by the present author herein (Pl. 35, Figs 1-2). Amongst the studied specimens there is a lot of juvenile forms with protoconch preserved (*see* Pl. 29, Figs 2-3). As concerns the development of the protoconch and primary whorls of the teleoconch these specimens display a great similarity (*comp. also* Pl. 28, Figs 1 and 4) to the juveniles of *Hadriania coelata* (DUJARDIN) and *Hadriania excoelata* (COSSMANN & PEYROT). This evidences that the discussed specimens are to be referred to the genus *Hadriania*, and not to *Euthriofusus*. In the recognized bibliography the present author did not find any species with so long siphonal canal and, therefore, the studied specimens are classified as a separate species, a new one, *Hadriania polonica* sp.n.

Genus *Purpura* MARTYN, 1784
Subgenus *Tritonalia* FLEMING, 1828
Purpura (*Tritonalia*) *erinacea* (LINNAEUS, 1766)
(Pl. 23, Figs 1-7)

1856. *Murex erinaceus* LIN.; M. HÖRNES, pp. 250-251, Pl. 25, Figs 14-16.
1885. *Murex* (*Pteronotus*) *Sowerbyi* MICHTI.; R. HOERNES & M. AUINGER, pp. 203-204, Pl. 29, Fig. 8.
1885. *Murex* (*Pteronotus*) *erinaceus* LINN.; R. HOERNES & M. AUINGER, p. 204.
1904. *Murex Sowerbyi* MICHT.; F. SACCO, p. 19, Pl. 4, Figs 33-34.
1906. *Murex* (*Chicoreus*) *murex-ferreus* n.sp.; O. BOETTGER, p. 45.
1912. *Ocenebra erinacea* L.; W. FRIEDBERG, pp. 175-176, Pl. 10, Fig. 3.
1924. *Murex* (*Inermicosta*) *Dufrenoyi* GRATELOUP; M. COSSMANN & A. PEYROT, pp. 450-451, Pl. 13, Figs 29-30.
1934. *Murex* (*Chicoreus*) *murex-ferreus* BOETTGER; A. ZILCH, p. 251, Pl. 15, Fig. 75.
1966. *Tritonalia erinaceus* (L.); J. KÓKAY, p. 57, Pl. 8, Fig. 5.

MATERIAL: Fifty-five specimens.
DIMENSIONS: The largest specimen is 50 mm high and 28 mm wide.

REMARKS: The studied specimens, the number of which is relatively great, characterize by their remarkable variability, expressed by a more or less slender shape, various prominence of spiral ribs, various thickness of varices, various prominence of spines and varices, and some differences in the shape of the aperture. In the present author's opinion, the studied specimens are conspecific with all specimens coming from the Vienna Basin, and presented by HÖRNES (1856). Thus, the present author rejects the view of BELLARDI (1873, p. 61), and repeated subsequently by HOERNES & AUINGER (1885), that a part of the Viennese specimens belong to another species, namely to *Murex sowerbyi* MICHELOTTI.

Within the studied specimens, twelve are lesser than 15 mm in height, some of them have their protoconch preserved, the same as ornamentation of their primary whorls (*see* Pl. 23, Fig. 4).

These specimens indicate seemingly that those from Kostej, described by BOETTGER (1906) under the name of *Murex* (*Chicoreus*) *murex-ferreus* BOETTGER, are really juvenile forms of *Purpura* (*Tritonalia*) *erinacea* (LINNAEUS).

The specimen presented by COSSMANN & PEYROT (1924) from the Aquitaine Basin as *Murex* (*Internicosta*) *dufrenoyi* GRATELOUP is so similar to those from Korytnica that any distinctness cannot be specified; it is thus herein regarded as conspecific with the latter ones.

One of the collected specimens (*see* Pl. 23, Fig. 1) differs from all the others by having 4, and not 3 varices on the whorls, and by its aperture distinctly smaller (*comp.* Pl. 23, Fig. 6). In its apical view this specimen resembles that one of *Ocenebrina quadrula* (TOURNOUËR) from Parlebosqu in the Aquitaine Basin, reported by COSSMANN & PEYROT (1924, Pl. 18, Figs 20-21). The Korytnica specimen bears, however, its siphonal canal longer and closed. Having only one such a specimen in his disposal, the present author hesitates an introduction of a separate taxon, and classifies it as an aberrant form of the species *Purpura* (*Tritonalia*) *erinacea* (LINNAEUS).

The species *Purpura* (*Tritonalia*) *erinacea* (LINNAEUS) was recorded from Korytnica by KONTKIEWICZ (1882), FRIEDBERG (1912, 1938), and KOWALEWSKI (1930). In the Miocene of Poland it is also known from Benczyn (KRACH 1950a).

Purpura (*Tritonalia*) *granulifera* (GRATELOUP, 1840)
(Pl. 24, Figs 1-2)

1856. *Murex granuliferus* GRAT.; M. HÖRNES, p. 254, Pl. 25, Fig. 19.
1873. *Murex granuliferus* GRAT., var. A.; L. BELLARDI, p. 79, Pl. 6, Fig. 4.
1924. *Murex* (*Inermicosta*) *granulifer* GRATELOUP *em.*; M. COSSMANN & A. PEYROT, pp. 449-450, Pl. 18, Fig. 10.
1960. *Murex* (*Chicoreus*) *granuliferus* GRATELOUP; E. KOJUMDGIEVA, pp. 145-146, Pl. 39, Fig. 7.

MATERIAL: Four specimens.
DIMENSIONS: The largest specimen (Pl. 24, Fig. 1) is 42 mm high and 22.5 mm wide.

REMARKS: The studied specimens are undoubtedly conspecific with those coming from the Vienna Basin, presented by HÖRNES (1856), and from Bulgaria, presented by KOJUMDGIEVA (1960). It is note, that COSSMANN & PEYROT (1924), contrary to HÖRNES (1856), did not identify the Viennese specimens with those from the Aquitaine Basin; the illustrated specimen (*see* COSSMANN & PEYROT 1924, Pl. 18, Fig 10) is really slightly more slender, and bears its varices less projecting, but these two features may variously be interpreted, either as a specific variability or as a result of preservational damage.

The discussed species is rather commonly (HOERNES & AUINGER 1885, KOJUMDGIEVA 1960, STRAUSZ 1966, STOJASPAL 1978) assigned to the genus (or subgenus) *Chicoreus* MONTFORT, 1810. The present author does not share this opinion, but accept the statement of COSSMANN & PEYROT (1924) who include this species to the subgenus *Inermicosta* JOUSSEAUME, 1880, regarded by WENZ (1941, p. 1126) as a younger synonym of *Tritonalia* FLEMING, 1828.

The species *Purpura* (*Tritonalia*) *granulifera* (GRATELOUP) has not hitherto been known from the Miocene of Poland.

Purpura (*Tritonalia*) *vindobonensis* (HÖRNES, 1856)
(Pl. 30, Fig. 5)

1856. *Murex Vindobonensis* HÖRNES; M. HÖRNES, p. 252, Pl. 25, Fig. 17, ?Fig. 20.
1924. *Murex* (*Favartia*) *Vindobonensis* HÖRNES, var. *ligeriensis* TOURNOUËR; M. COSSMANN & A. PEYROT, pp. 466-467, Pl. 18, Fig. 17.
1952a. *Tritonalia* (*Inermicosta*) *vindobonensis ligeriana* TOURNOUËR; M. GLIBERT, pp. 306-307, Pl. 7, Fig. 5.

MATERIAL: Four specimens.
DIMENSIONS: The only complete specimen (Pl. 30, Fig. 5) is 21 mm high and 12 mm wide; the largest specimen is about 28 mm high.

REMARKS: The studied specimens, althogh incomplete, bear their outer lip with spines on the varix preserved. This allows to state their compatibility with the specimen coming from Grund in the Vienna Basin, and presented by HÖRNES (1856, Pl. 25, Fig. 17). Specimens from other localities in the Vienna Basin, e.g. Gainfahren (*see* HÖRNES 1856, Pl. 25, Fig. 20), the same as these from Lapugy in Transylvania (*see* HOERNES & AUINGER 1885, Pl. 25, Fig. 2) bear their spines fused into a continuous plate that runs along the varix. It is to note that HOERNES & AUINGER (1885, p. 213) inclined to postulate their taxonomic separatenes from specimens featured solely by spines, but the presence of intermediate forms hindered them from a definite decision. At Korytnica, such specimens adorned with a continuous plate have not hitherto been found.

The Korytnica specimens are to be regarded as conspecific also with those coming from the Aquitaine Basin (COSSMANN & PEYROT 1924, Pl. 18, Fig. 17) and the Loire Basin (GLIBERT 1952a, Pl. 7, Fig. 5). As concerns the slenderness of the spire, the Korytnica specimens are intermediate between the Viennese and all the French forms.

The species *Purpura* (*Tritonalia*) *vindobonensis* (HÖRNES) has not hitherto been known from the Miocene of Poland.

Purpura (*Tritonalia*) *kojumdgievae* nom.n.
(Pl. 30, Fig. 8)

1856. *Murex Lassaignei* BAST.; M. HÖRNES, pp. 232-233, Pl. 24, Fig. 8.
1960. *Tritonalia* (*Tritonalia*) *lassaignei* BASTEROT; E. KOJUMDGIEVA, p. 149, Pl. 40, Fig. 8.

HOLOTYPE: The specimen from Vöslau in the Vienna Basin, figured by HÖRNES (1856, Pl. 24, Fig. 8).
DERIVATION OF THE NAME: *kojumdgievae* — in memory of EMILIA KOJUMDGIEVA (1929-1989), an outstanding student of the Miocene fossils of Bulgaria.
MATERIAL: Four specimens.
DIMENSIONS: The largest specimen is 31 mm high and 20.5 mm wide.

REMARKS: The herein classified specimens are concordant both with the specimen from Vöslau in the Vienna Basin, which is chosen by the present author as the holotype of the new species, as well as with the specimen from Tarnene in Bulgaria, presented by KOJUMDGIEVA (1960, Pl. 40, Fig 8). All these specimens are quite distinct from those presented by COSSMANN & PEYROT (1924, pp. 490-492, Pl. 13, Figs 23-24 and Pl. 14, Figs 18-19) under the name of *Ocenebra lassaignei* (BASTEROT) from the Aquitaine Basin. When describing the latter species, COSSMANN & PEYROT stated that "the true" (*veritable* in French) *Ocenebra lassaignei* (BASTEROT) is distinct both from the specimens from the Rhône Basin, as well as from those from northern Italy and the Vienna Basin. Moreover, they regard the Viennese forms to be quite different from those of Rhône Basin, that should be labelled as *Ocenebra ariesensis* FONTANNES, and different also from the specimens from northern Italy which they named *Ocenebra saccoi* COSSMANN & PEYROT. Accepting this distinction and understanding that the Viennese specimens remain unnamed, the present author regards the specimens from the Vienna Basin, Bulgaria, and Korytnica, and possibly some others from the Paratethyan basins (*see* HOERNES & AUINGER 1885, p. 213) to represent a separate species.

The discussed species *Purpura* (*Tritonalia*) *kojumdgievae* nom.n. has not hitherto been reported from the Miocene of Poland.

Purpura sp.
(Pl. 30, Figs 1-2)

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen (Pl. 30, Fig. 2) is 19 mm high and 11.5 mm wide; the smaller is 18 mm and 10 mm, respectively.

REMARKS: The determination of these two specimens bears serious troubles. In the available bibliography no similar species may be indicated. Regarding these specimens as adult forms, it is to note that they bear the three broad and thick varices, and the three, also thick, intercalary axial ribs on the last whorl. The earlier whorls bear the varices and axial ribs undistinguishable, with their number values 8, 10, and 10 in both specimens.

An inferior material, combined with an uncertainty about the adulthood of the specimens, one of which (Pl. 30, Fig. 2) is displaying malformation of the surface at the last whorl, are the causes that the present author classifies the collected forms to the genus level only.

Genus *Vitularia* SWAINSON, 1840
Vitularia linguabovis (BASTEROT, 1825)
(Pl. 30, Fig. 9)

1856. *Murex lingua-bovis* BAST.; M. HÖRNES, pp. 230-231, Pl. 24, Figs 1-3.
1885. *Murex (Vitularia) lingua-bovis* BAST.; R. HOERNES & M. AUINGER, pp. 213-214, Pl. 25, Figs 4-7.
1904. *Vitularia linguabovis* (BAST.); F. SACCO, p. 74, Pl. 17, Figs 17-19.
1924. *Vitularia lingua-bovis* (BASTEROT); M. COSSMANN & A. PEYROT, pp. 516-518, Pl. 14, Figs 33-34.
1924. *Vitularia salbriacensis* nov. sp.; M. COSSMANN & A. PEYROT, pp. 518-519, Pl. 14, Figs 30-31.
1957. *Vitularia linguabovis* (BASTEROT); G. ZEYSZEWSKI, p. 174, Pl. 15, Figs 151, 158, 160.
1960. *Tritonalia (Vitularia) lingua-bovis* var. *vindobonula* COSSMANN & PEYROT; E. KOJUMDGIEVA, pp. 150-151, Pl. 40, Fig. 11.

MATERIAL: Four specimens.
DIMENSIONS: The largest specimen (Pl. 30, Fig. 9) is 51 mm high and 31 mm wide.

REMARKS: As noted already by HÖRNES (1856, p. 230), and by HOERNES & AUINGER (1885, p. 214), this species characterizes by a great variability of the shell, as expressed by its slenderness, development (prominence and situation) of the crest along the whorls, sharpness of nodes on the crest, presence or absence of sharp varices, width of the aperture, and length of the siphonal canal. Concerning the first of these features, it is to note that the width/height ratio of the shell amounts 0.57–0.65 (exceptionally even 0.72) in the Viennese specimens, 0.60 in the specimen from Bulgaria (*see* KOJUMDGIEVA 1960, Pl. 40, Fig. 11), and 0.57–0.61 in the studied forms from Korytnica. Consequently, an opinion of COSSMANN & PEYROT (1924) about separateness of the Viennese from the Aquitaine forms does not seem to be justified. In the specimen from Leognan, illustrated by COSSMANN & PEYROT (1924, Pl. 14, Figs 33-34), the discussed ratio amounts 0.59, whereas in that from Saubrigues, which should be regarded as the holotype of the species *Vitularia salbriacensis* COSSMANN & PEYROT, it is 0.58.

The species *Vitularia linguabovis* (BASTEROT) was reported from Korytnica by KOWALEWSKI (1930) only. Unknown from other Miocene localities in Poland.

Family **Magilidae**

Genus *Magilus* MONTFORT, 1810

Magilus? ficiformis sp.n.
(Pl. 38, Fig. 6)

HOLOTYPE: The specimen (Z.PAL.U.W., No BkK-G716) presented in Pl. 38, Fig 6.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.
DERIVATION OF THE NAME: ficiformis — from Latin *ficus* — a fig (or, the name of the gastropod genus *Ficus*), and *forma* — a shape.
DIAGNOSIS: Shell of the *Ficus*-like shape, with a very low spire, furnished with a crest, and ornamented by closely spaced spiral ribs and very dense, sharp growth-lamellae; umbilicus very broad and very deep, ornamented likely as the outer surface.
MATERIAL: Two specimens, both incompletely preserved.
DIMENSIONS: The larger specimen (Pl. 38, Fig. 6) is 11.5 mm high and 7.8 mm wide.

DESCRIPTION: Shell resembling in its shape the shells of the genus *Ficus*. Protoconch composed of about 1 ½ smooth whorls, distinctly separated from the rest of the shell. Teleoconch (its preserved part) has about 3 ½ whorls, the last of which makes up 0.9 of the total height of the shell. In the posterior (upper) part of whorls there appears a quite distinct crest, along which a well pronounced spiral rib is running. Another rib continues above the crest in the first whorl of the teleoconch; afterwards, successive ribs appear both above, and between, it and the crest. On the last part of the teleoconch the number of spiral ribs above the crest equals to five. At the beginning of the last whorl, below the crest there run 13 similar ribs that attain the number of 18 at the end of the whorl. All the ribs are spaced rather densely, and the interrib areas are very narrow. The whole surface is featured by densely spaced, sharp growth lines, due to which the shell is heavily rough at touch. Aperture is not preserved; the shell wall that may correspond to the inner lip adheres to the outer surface of the shell only in its posterior part, just below the crest, while outside that part it turns out, to form a wide and very deep umbilicus. Its surface bears the same ornamentation pattern as that of the rest of the shell.

REMARKS: In the recognized bibliography there is neither similar nor comparable gastropod shell presented. The present author is therefore of an opinion that the collected specimens represent a new species, the generic attribution of which remains, however, open to discussion. It is likely that even a new genus may be taken into account, but a lack of the aperture hinders its creation. An attribution of the newly established species to the genus *Magilus* is based on the presence of a particularly wide umbilicus. It is thought that it may correspond to that part of the shell in the present-day species *Magilus antiquus* MONTFORT at which the coiled part becomes uncoiled. The general shape of the collected shells may also be well compared to that of the genus *Rhizochilus* STEENSTRUP of the same family, but also in this case a lack of the aperture does not allow for definite conclusions.

Genus *Coralliophila* H.&A. ADAMS, 1853
Subgenus *Coralliophila* H.&A. ADAMS, 1853

Coralliophila (*Coralliophila*) *gracilispira* BOETTGER, 1906
(Pl. 27, Figs 7-9)

partim 1890. *Murex* (*Occenebra*) *alternatus* BELL.; R. HOERNES & M. AUINGER, p. 224, Pl. 27, Fig. 8; *non* Figs 6-7.
1906. *Coralliophila gracilispira* n.sp.; O. BOETTGER, p. 35.
1934. *Coralliophila gracilispira* BOETTGER; A. ZILCH, p. 252, Pl. 15, Fig. 82.

MATERIAL: Five specimens.
DIMENSIONS: The largest specimen (Pl. 27, Fig. 7) is 8.5 mm high and 4.5 mm wide.

REMARKS: The studied specimens are fully concordant with those coming from Kostej and Lapugy in Transylvania. BOETTGER (1906) correctly excluded a specimen presented by HOERNES & AUINGER (1890, Pl. 27, Fig. 8) from those assigned to *Murex* (*Occenebra*) *alternatus* BELLARDI. This specimen, classified by HOERNES & AUINGER (1890, p. 224) as extremely slender belongs really to the discussed species; it is evidently distinct from the specimens coming from Colli Torinesi and Stazzano in northern Italy, described by BELLARDI (1873, Pl. 8, Fig. 8).

The species *Coralliophila* (*Coralliophila*) *gracilispira* BOETTGER has not hitherto been known from the Miocene of Poland.

Coralliophila (*Coralliophila*) *serraticincta* sp.n.
(Pl. 27, Fig. 10)

HOLOTYPE: The specimen (Z.PAL.U.W., No. BkK-G602) presented in Pl. 27, Fig. 10.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.
DERIVATION OF THE NAME: *serraticincta* — from Latin *serratus* — serrate, and *cinctus* — belting (*herein*, by a spiral rib), in reference to the shape of spiral ribs.
DIAGNOSIS: Shell of a bi-conical shape, whorls furnished with a crest, and ornamented by spiral and axial ribs, as well as by very sharp growth-lines giving the spiral ribs a finely serrated outline.
MATERIAL: Two specimens.
DIMENSIONS: The larger specimen (Pl. 27, Fig. 10) is 5.5 mm high and 3.5 mm wide, the smaller one is 5.1 mm and 3.4 mm, respectively.

DESCRIPTION: Shell small, shaped like a double cone. Protoconch composed of about 3 whorls, smooth and convex. Teleoconch attains about 3½ whorls; its boundary with the protoconch is distinct, and marked by the appearance of ornamentation. At first, there appear 2 spiral ribs, the upper (posterior) of which runs along a distinct crest on the whorl; afterwards, successive ribs are born gradually. At the end of the last whorl there run three spiral ribs above the crest, and beneath the latter such ribs are numbering 9 or 10 on particular specimens. All these ribs are well developed, strongly turned out, slightly wider than the interrib grooves. Moreover, there also occur well pronounced axial ribs, the first of which appears about 1/4 of the whorl from the protoconch; their number is there 11 on the whorl, and afterwards it drops down to 9. The growth lines are very sharp, due to which the spiral ribs acquire a serrated outline, especially well visible in the apical view. Aperture is spacious, oval, passing anteriorly into a short, wide and opened siphonal canal. Outer lip is sharp at the margin, smooth innerly; inner lip is thin and smooth.

REMARKS: In the recognized bibliography there is no species to which the studied specimens could be assigned. Some similarities are displayed to the species *Murex canaliculatus* BELLARDI described from the Lower Pliocene of Vezza d'Alba in Italy (*see* BELLARDI 1873, p. 123, Pl. 8, Fig. 11; FERRERO MORTARA & *al.* 1981, p. 40, Pl. 3, Fig. 8). The holotype of this species, however, is three times larger, bears the siphonal canal shorter and a different number of spiral ribs both on the first and the last whorl. The newly established species is herein assigned by the present author to the genus *Coralliophila*, as suggested by a distinct similarity of the protoconch (*comp.* Pl. 27, Figs 9-10) and of ornamentation to those of the preceding species, *Coralliophila gracilispira* BOETTGER.

Subgenus *Orania* PALLARY, 1900

Coralliophila (*Orania*) *cheilotoma* (HOERNES & AUINGER, 1890) (Pl. 37, Figs 5-6)

1856. *Murex intercisus* MICHT.; M. HÖRNES, p. 241, Pl. 25, Fig. 2.
1856. *Murex flexicauda* BRONN; M. HÖRNES, pp. 241-242, Pl. 25, Fig. 8.
1890. *Pollia cheilotoma* PARTSCH; R. HOERNES & M. AUINGER, pp. 234-235, Pl. 30, Figs 1-2.
1890. *Pollia Barrandei* M. HOERN.; R. HOERNES & M. AUINGER, p. 235, Pl. 30, Fig. 3.
1912. *Pollia cheilotoma* PARTSCH; W. FRIEDBERG, pp. 185-186, Pl. 11, Figs 20-21.
1960. *Cantharus* (*Pollia*) *cheilotoma* (PARTSCH in HOERNES und AUINGER); E. KOJUMDGIEVA, pp. 173-174, Pl. 43, Fig. 18.
1966. *Cantharus* (*Pollia*) *cheilotomus* PARTSCH (in HÖRNES); L. STRAUSZ, pp. 308-309, Pl. 35, Figs 2-3.
1971. *Cantharus* (*Pollia*) *cheilotomus* PARTSCH; I. CSEPRSGHY-MEZNERICS, p. 28, Pl. 11, Figs 14-16.
1984. *Cantharus* (*Pollia*) *cheilotomus* (HOERNES); A.W. JANSSEN, pp. 231-232, Pl. 62, Figs 7-8.

MATERIAL: Eighteen specimens.
DIMENSIONS: The largest specimen (Pl. 37, Fig. 6) is 15 mm high and 7.8 mm wide.

REMARKS: From the Miocene of the Vienna Basin the two, very similar species were described, namely *Pollia cheilotoma* (PARTSCH) and *Pollia barrandei* (HÖRNES). HOERNES & AUINGER (1885, p. 235) recognized the presence of the forms intermediate between the types of these species, and suggested these two taxa to be united, although they did not follow this assumption in their procedure (*see below*). Within the studied specimens from Korytnica one can indicate both specimens consistent with the first (Pl. 37, Fig. 5) and with the second of these species (Pl. 37, Fig. 6). The observed differences are so indistinct that they do not justify a separateness of the two species. Consequently, the Korytnica specimens should be regarded as conspecific with these from the Vienna Basin, and they all should be named with one species name. The problem is however apparent which name is to be used. The two discussed names have first been used by HÖRNES (1848) in his list of fossils, where the name *barrandei* was given earlier (HÖRNES 1848, p. 18), and *cheilotoma* later (HÖRNES 1848, p. 21). In his fundamental monograph HÖRNES (1856) deleted these two names and used, erroneously, two others, the both species having been documented by improper illustrations (*fide* HOERNES & AUINGER 1890, pp. 234 and 235). When revising that monograph, HOERNES & AUINGER (1890) returned to the former names and presented correct illustrations of specimens to the both species, of which the firstly presented is *Pollia cheilotoma* PARTSCH. In the present author's opinion the revised monograph by HOERNES & AUINGER (1890) offers the first presentation of the discussed species concordantly with the formal requirements, and thus the name *cheilotoma* should be regarded as having priority, and it should be ascribed to HOERNES & AUINGER. Another problem, still open to discussion, is a generic and familiar attribution of this species. For HOERNES & AUINGER (1890, p. 234) it was evident that both *Pollia cheilotoma* and *Pollia barrandei* were closely related to *Pollia exacuta* BELLARDI, and all these three species were included into the *First section* of the genus *Pollia*. The subsequent authors (SACCO 1904, PEYROT 1927, SIEBER 1958, STRAUSZ 1966) transfered the species *Pollia exacuta* BELLARDI to the genus *Orania* PALLARY. According to the systematics introduced by WENZ (1941, pp. 1130 and 1131), *Orania* PALLARY is treated as a subgenus of the genus *Coralliophila* H.&A. ADAMS that belongs to the family Magilidae. The present author accepts this standpoint and, moreover, is of the opinion that the studied species is congeneric with the type species of the genus, *Coralliophila* (*Orania*) *spadae* (LIBASSI), therefore, contrary to a common view in the bibliography, it does not belong to the subgenus *Pollia* SOWERBY of the genus *Cantharus* in the family Buccinidae.

The species *Coralliophila* (*Orania*) *cheilotoma* HOERNES & AUINGER has not hitherto been recorded from Korytnica. In the Miocene of Poland it is known from Biskupice (ROEMER 1870).

Coralliophila (*Orania*) cf. *exacuta* (BELLARDI, 1873) (Pl. 37, Fig. 7)

1873. *Pollia exacuta* BELL.; L. BELLARDI, p. 170, Pl. 12, Fig. 6.
1890. *Pollia exacuta* BELL.; R. HOERNES & M. AUINGER, p. 236, Pl. 30, Fig. 4.
1904. *Nemofusus exacutus* (BELL.) et var.; F. SACCO, p. 59, Pl. 14, Figs 73-76.
1966. *Orania* cfr. *exacuta* BELLARDI; L. STRAUSZ, pp. 309-310, Pl. 35, Figs 8-9.

MATERIAL: One specimen.
DIMENSIONS: Height 9 mm.

REMARKS: The only specimen seems to be compatible both with these coming from the vicinity of Pōls in Austria (HOERNES & AUINGER (1890) and with those from northern Italy (BELLARDI 1873). It is, however, slightly damaged and presumable not fully grown; its specific determination cannot therefore be indicated with certainty. As compared with the above described specimens of *Coralliophila* (*Orania*) *cheilotoma* (HOERNES & AUINGER) it displays a more pronounced ornamentation, with axial ribs furnished with distinct spiny nodes, and spiral ribs containing 4 much stronger ones.

The species *Coralliophila* (*Orania*) *exacuta* (BELLARDI) has not hitherto been known from the Miocene of Poland.

Subgenus *Pseudomurex* MONTEROSATO, 1872

Coralliophila (*Pseudomurex*) *bracteata* (BROCCHI, 1814) (Pl. 25, Figs 6-7)

1873. *Murex bracteatus* BROCCHI, varieta *A*; L. BELLARDI, p. 119.
1971. *Coralliophila* (*Pseudomurex*) *bracteata* (BROCCHI); A. D'ALESSANDRO, p. 382, Pl. 2, Figs 3-3a.
1978. *Murex bracteatus* BROCCHI; G. PINNA & L. SPEZIA, p. 145, Pl. 30, Fig. 1 (= holotype of the species).

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen (Pl. 25, Fig. 7) is about 10 mm high and 6 mm wide.

REMARKS: The specific assignment of these two specimens is not quite certain since they are evidently not fully grown. Regardless their size, the studied specimens seem to be concordant with the holotype of the species *Murex bracteatus* BROCCHI, re-illustrated in the form of a photo by PINNA & SPEZIA (1978). As compared to the specimens described, but unfortunately not illustrated, by BELLARDI (1873), the Korytnica specimens seemingly correspond to his variety *A*, featured by the more pronounced axial ribs.

To note, with the discussed species HÖRNES (1856, p. 332) identified erronously another gastropod, *Pseudotoma bonellii* BELLARDI, which occurs also at Korytnica.

The species *Coralliophila* (*Pseudomurex*) *bracteata* (BROCCHI) has not hitherto been known from the Miocene of Poland.

Superfamily **Buccinacea**
Family **Pyrenidae**

Genus *Pyrene* RÖDING, 1798
Subgenus *Alia* H.&A. ADAMS, 1854

Pyrene (*Alia*) *polonica* (PUSCH, 1837)
(Pl. 31, Figs 8-10)

1837. *Nassa columbelloides* BASTEROT, var. *polonica* m.; G. PUSCH, p. 123, Pl. 11, Fig. 9.
1856. *Columbella curta* BELL.; M. HÖRNES, p. 118, Pl. 11, Figs 2-6.
1869. *Columbella helvetica* MAYER; C. MAYER, p. 282, Pl. 10, Fig. 2.
1869. *Columbella turonica* MAYER; C. MAYER, p. 285, Pl. 10, Fig. 5.
1880. *Columbella curta* DUJARDIN; R. HOERNES & M. AUINGER, p. 93, Pl. 7, Figs 15-20.
1911. *Columbella curta* DUJ.; W. FRIEDBERG, pp. 33-35, Pl. 2, Fig. 1, Text-fig. 8 (*total*).
1927. *Columbella* (*Alia*) *turonensis* MAYER (emend.); A. PEYROT, pp. 8-10, Pl. 1, Figs 34-35.
1927. *Columbella* (*Alia*) *turonensis* MAYER mut *aquitanica* nov. mut.; A. PEYROT, p. 10, Pl. 1, Figs 58-59.
1927. *Columbella* (*Alia*) *turonensis* MAYER *depressior* nov. mut.; A. PEYROT, pp. 10-11, Pl. 1, Figs 60-61.
1928. *Columbella turonensis* MAY.; W. FRIEDBERG, p. 585.
1960. *Columbella curta* (DUJARDIN); E. KOJUMDGIEVA, p. 182, Pl. 45, Fig. 2.
1966. *Columbella* (*Alia*) *helvetica* MAYER ("*curta* AUCT."); L. STRAUSZ, p. 288, Pl. 42, Figs 31-32; Pl. 43, Figs 1-2.
1971. *Columbella* (*Alia*) *helvetica* MAY.; I. CHEPRIGHY-MEZNERICS, p. 28, Pl. 10, Figs 13-14.

MATERIAL: Two hundred and sixty specimens.
DIMENSIONS: The largest specimen (Pl. 31, Fig. 10) is 25 mm high and 9.5 wide; another one is 24.5 mm and 10.5 mm, respectively.

REMARKS: The studied specimens are undoubtedly conspecific with those described by HÖRNES (1856) from the Vienna Basin. Nevertheless, they display a great variability of their size and overall shape, as well as of the shape of the last whorl. It was already FRIEDBERG (1911) who, having only 12 specimens at his disposal, recognized that variability very accurately (*see* FRIEDBERG 1911, Text-fig. 8). A similar variability is also displayed by specimens from the Vienna Basin (*comp.* HÖRNES 1856, Pl. 11, Figs 2-6).

The proper name at the species level of the discussed specimens has not hitherto been clarified. Formerly, HÖRNES (1856) and HOERNES & AUINGER (1880), followed by many subsequent authors, used the name *Columbella curta* and ascribed its authorship either to DUJARDIN, or to BELLARDI. It appeared soonafter that it was an incorrect treatment since the name *Columbella curta* (DUJARDIN, 1835) refers to quite a different species. Then, the name *Columbella turonica* MAYER, 1869 (or *Columbella turoniensis* MAYER, 1869) was introduced to a common use. Unfortunately, the name *Columbella turonica* MAYER refers only to a part of the Viennese specimens of HÖRNES and the same concerns the Korytnica material recognized by STRAUSZ (1966, p. 288). The remaining part of these populations correspond to what was called *Columbella helvetica* MAYER. However, in the present author's opinion any subdivision of the Korytnica material into two groups is far from reality. The proper name for the species should be taken from that one which PUSCH (1837) used for the specimens from Korytnica, calling them "*Nassa columbelloides* BASTEROT var. *polonica* PUSCH" what was obviously known to HÖRNES (1856, p. 118). The indicated variety name, in the present author's opinion, should be regarded as the valid at the species level for the discussed specimens.

The species *Pyrene* (*Alia*) *polonica* (PUSCH) was reported from Korytnica by all former authors. In the Miocene of Poland it is also known from Rybnica (KOWALEWSKI 1930, FRIEDBERG 1938) and Błonie (FRIEDBERG 1911, URBANIAK 1974).

Subgenus *Mitrella* Risso, 1826

Pyrene (*Mitrella*) *bittneri* (Hoernes & Auinger, 1880)
(Pl. 32, Figs 5-6)

1880. *Columbella* (*Mitrella*) *Bittneri* nov. form.; R. Hoernes & M. Auinger, p. 98, Pl. 12, Fig. 4.
1956. *Pyrene* (*Mitrella*) *bittneri* Hoernes et Auinger; I. Cseprechy-Mezneric, p. 403, Pl. 7, Figs 14-15.
1960. *Mitrella* (*Mitrella*) *bittneri* Hoernes & Auinger; E. Kojumdgieva, p. 183, Pl. 45, Figs 4-5.
1966. *Columbella* (*Mitrella*) *bittneri* Hoernes & Auinger; L. Strausz, p. 290, Pl. 42, Figs 25-28.

MATERIAL: More than four hundred specimens.
DIMENSIONS: The largest specimen (Pl. 32, Fig. 6) is 8.5 mm high and 3.5 mm wide.

REMARKS: The studied specimens are slightly more slender than those described by Hoernes & Auinger (1880) from Steinabrunn in the Vienna Basin, but their conspecifity should not be doubted. The above Viennese specimens are featured by such measurements as: height 7.5–9.0 mm, width 4.0–4.5 mm. The measurements of specimens from the Miocene of Bulgaria, given by Kojumdgieva (1960), bear an evident error, since the width "6-8 mm" *versus* 7-9 mm of height is unbelieveable in this gastropod genus.

The species *Pyrene* (*Mitrella*) *bittneri* (Hoernes & Auinger) has not hitherto been known from the Miocene of Poland.

Pyrene (*Mitrella*) *kostejana* (Boettger, 1906)
(Pl. 32, Figs 3-4)

1906. *Columbella* (*Mitrella*) *kostejana* n.sp.; O. Boettger, p. 16.
1934. *Pyrene* (*Mitrella*) *kostejana* (Boettger); A. Zilch, p. 253, Pl. 16, Fig. 87.

MATERIAL: Eighteen specimens.
DIMENSIONS: The largest specimen is 8.0 mm high and 3.0 mm wide; another one (Pl. 32, Fig. 4) is 7.0 mm and 2.6 mm, respectively.

REMARKS: The studied specimens, both in regard to their size and overall shape, are fully compatible with those coming from Kostej in Transylvania, and described by Boettger (1906).

The species *Pyrene* (*Mitrella*) *kostejana* (Boettger) has not hitherto been known from the Miocene of Poland.

Pyrene (*Mitrella*) *semicaudata* (Bellardi, 1849)
(Pl. 31, Figs 1-3)

1856. *Columbella semicaudata* Bon.; M. Hörnes, pp. 117-118, Pl. 11, Fig. 10.
1911. *Columbella* (*Mitrella*) *semicaudata* Bon.; W. Friedberg, pp. 36-37, Pl. 2, Fig. 3.
1966. *Columbella* (*Mitrella*) *semicaudata* Bonelli (in Bellardi); L. Strausz, pp. 290-291, Pl. 42, Figs 23-24.

MATERIAL: Twenty-three specimens.
DIMENSIONS: The largest specimen (Pl. 31, Fig. 1) is 17 mm high and 6.5 mm wide.

REMARKS: The specific assignment of the studied specimens bears some doubts. The illustrations presented both by Hörnes (1856), and by Friedberg (1911), show specimens slightly larger, featured by their whorls more flat. The Korytnica specimens, however, as concerns their

overall shape and pattern of the initial part of the spire, are very similar to the specimen regarded as the syntype of the species illustrated in the form of a photo by FERRERO MORTARA & *al.* (1981, Pl. 56, Fig. 11); this syntype is slightly larger than the biggest of the Korytnica specimens.

The species *Pyrene* (*Mitrella*) *semicaudata* (BELLARDI) was recorded from Korytnica by KOWALEWSKI (1930) only.

Pyrene (*Mitrella*) *korytnicensis* sp.n.
(Pl. 31, Figs 11-12 and Pl. 32, Fig. 7)

1928. *Columbella* (*Mitrella*) an *turgidula* BROCC.; W. FRIEDBERG, p. 586, Pl. 38, Fig. 2.

HOLOTYPE: The specimen (Z.PAL.U.W., No. BkK-G619) presented in Pl. 31, Fig. 12.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.
DERIVATION OF THE NAME: *korytnicensis* — Latinized name of Korytnica.
DIAGNOSIS: Shell thin-walled and slender in its juvenile part, then thick and more stocky; whorls convex (except of the distal portion of the last whorl being flat or slightly concave), smooth or traced by spiral lines.
MATERIAL: Four adult specimens, and two juveniles with their protoconch preserved.
DIMENSIONS: The largest specimen (Pl. 32, Fig. 7) is 16 mm high and 8.5 mm wide; the holotype of the species is 13 mm and 6.8 mm, respectively.

DESCRIPTION: Protoconch (preserved solely in the juvenile specimens) composed of about 1 ⅓ whorls, with indistinct boundary with the teleoconch, marked only by a change of coloration (from white to creamy). The initial three whorls of the teleoconch, gradually less and less convex, form a slender spire which presumably was discarded during the further growth of the shell. In result, adult specimens display a distinct healing after its dropping out. The adults have 4 whorls; the total number of whorls in the teleoconch amounts therefore the figure of 7. The whorls are slightly convex, separated by deep sutures and having smooth surface. The last whorl, originally slightly convex, becomes flat, or even slightly concave in the largest specimen. At the base of all adult specimens there run densely spaced spiral furrows. Aperture is parallelly-sided, and the siphonal canal is very short. Outer lip is sharp, slightly swollen outerly, and furnished with 10 slightly elongated teeth innerly (the smallest of the adult specimens bears only 8 teeth). Inner lip has 3 or 4 very delicate folds.

REMARKS: The studied specimens are very similar to these described by FRIEDBERG (1928) from Zborów in the Ukraine, under the name "*Columbella* (*Mitrella*) an *turgida* BROCC.". This determination, hesitated by FRIEDBERG himself, is evidently erroneous, as it may be ascertained when comparing the specimens from Zborów, and from Korytnica, with the re-illustrated (PINNA & SPEZIA 1978, Pl. 67, Fig. 1) paratype of the species *Voluta turgida* BROCCHI. To the present author's knowledge there are no other closely comparable species, and thus a new species is herein established. A similarity displayed, at the first insight, to the species *Columbella mayeri* HÖRNES, presented by HÖRNES (1856, pp. 666-667, Pl. 51, Fig. 1) from Forchtenau in the Vienna Basin is fallacious, because that species is known (*fide* HOERNES & AUINGER 1880, p. 93) from a single specimen which is distinctly larger (24 mm high) and bears a much narrower aperture.

Subgenus *Atilia* H.&A. Adams, 1853

Pyrene (*Atilia*) *fallax* (Hoernes & Auinger, 1880)
(Pl. 31, Figs 5-7)

1856. *Columbella subulata* Bell.; M. Hörnes, pp. 121-122, Pl. 11, Figs 11, 13.
1880. *Columbella* (*Mitrella*) *fallax* nov. form.; R. Hoernes & M. Auinger, pp. 96-97.
1911. *Columbella* (*Atilia*) *fallax* R. Hoernes i Auinger; W. Friedberg, pp. 38-40, Pl. 2, Fig. 5.
1911. *Columbella* (*Anachis*) *subnassoides* Friedb.; W. Friedberg, pp. 40-41, Pl. 2, Fig. 6.
1954. *Pyrene* (*Mitrella*) *fallax* Hoernes & Auinger; I. Cserhegyi-Meznerics, p. 39, Pl. 5, Figs 4, 6.
1963. *Mitrella* (*Macrurella*) *fallax* Hoernes — Auinger; S. Venzo & G. Pelosio, p. 92, Pl. 35, Figs 17-19.
1966. *Columbella* (*Atilia*) *fallax* Hoernes & Auinger; L. Strausz, p. 292, Pl. 42, Figs 18-21.
1970. *Pyrene* (*Atilia*) *fallax* (R. Hörnes & Auinger); W. Baluk, p. 118, Pl. 12, Fig. 4.
1971. *Pyrene* (*Mitrella*) *fallax* Hoernes et Auinger; I. Cserhegyi-Meznerics, p. 28, Pl. 10, Figs 20-21.

MATERIAL: Eighty specimens.
DIMENSIONS: The largest specimen is 18 mm high and 6.5 mm wide; another one (Pl. 31, Fig. 5) is 16 mm and 5.5 mm, respectively.

REMARKS: Hoernes & Auinger (1880, p. 96) regarded correctly that the Viennese specimens described by Hörnes (1856) as *Columbella subulata* Bellardi, 1849, are not concordant with the type of the species *Columbella subulata* (Brocchi, 1814), and should be distinguished as a separate species. A conspecifity of the studied specimens from Korytnica with those from the Vienna Basin is evident. Juvenile specimens from Korytnica bear a slightly pronounced crest at their base (*see* Pl. 31, Fig. 7), and this gradually vanishes on the whorls of adult specimens. This crest is never so distinct as in the species *Columbella carinata* Hilber.

To the synonymy of the discussed species, in the present author's opinion, should be included specimens described by Friedberg (1911) as making up the separate species *Columbella* (*Anachis*) *subnassoides* Friedberg.

The species *Pyrene* (*Atilia*) *fallax* (Hoernes & Auinger) was recorded from Korytnica by Hörnes (1856), Kontkiewicz (1882), and Kowalewski (1930). In the Miocene of Poland it is also known from Niskowa (Friedberg 1911, Skoczylasówna 1930, Baluk 1970) and Łychów (Krach 1981).

Subgenus *Macrurella* Sacco, 1890

Pyrene (*Macrurella*) *nassoides* (Grateloup, 1840)
(Pl. 31, Fig. 4)

1856. *Columbella nassoides* Bell.; M. Hörnes, pp. 122-123, Pl. 11, Fig. 9.
1927. *Atilia* (*Macrurella*) *nassoides* (Grateloup); A. Peyrot, pp. 27-29, Pl. 1, Figs 57, 89-91.
1960. *Mitrella* (*Macrurella*) *nassoides* Grateloup; E. Kojumdgieva, p. 185, Pl. 45, Fig. 10.
1966. *Columbella* (*Macrurella*) *nassoides* Grateloup; L. Strausz, pp. 294-295, Pl. 42, Fig. 6, ?Fig. 7.

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen is 25 mm high and 9 mm wide.

REMARKS: The studied specimens are seemingly conspecific both with these coming from the Vienna Basin, presented by Hörnes (1856), as well as with those from the Aquitaine Basin, presented by Peyrot (1927). Hoernes & Auinger (1880, p. 96) erroneously regarded that the Viennese specimens belong to the species *Columbella subulata* (Brocchi), the holotype of which re-illustrated in the form of a photo by Pinna & Spezia (1978, Pl. 51, Fig. 2) represents quite a distinct form. From the Miocene of Hungary Strausz (1966) presented as *Columbella* (*Macrurella*) *nassoides* Grateloup two distinctly different specimens. Concordant with the Korytnica

specimens is that one coming from Letkes (*comp.* STRAUSZ 1966, Pl. 42, Fig. 6), while the second, coming from Balaton (*comp.* STRAUSZ 1966, Pl. 42, Fig. 7) has the last whorl distinctly shorter. It is seriously doubted that the latter specimen, as well as that one from the Miocene of Winterswijk in Holland, presented by JANSSEN (1984, p. 229, Pl. 61, Fig. 11) as *Mitrella* (*Macrurella*) *nassoides* (GRATELOUP), could be conspecific with the studied forms from Korytnica.

The species *Pyrene* (*Macrurella*) *nassoides* (GRATELOUP) has not hitherto been known from the Miocene of Poland.

Subgenus *Scabrella* SACCO, 1890

Pyrene (*Scabrella*) sp.
(Pl. 32, Figs 1-2)

MATERIAL: Two specimens.
DIMENSIONS: The larger specimen, preserved without its early whorls (Pl. 32, Fig. 2) is about 9 mm high and 4.5 mm wide.

REMARKS: The studied specimens, regardless their conspecifity, may be determined to the subgenus rank only. They bear seemingly identical ornamentation, but they differ in their general shape. The juvenile specimen (Pl. 32, Fig. 1) is very slender, what is not a decisive feature, because in the family Pyreneidae there are numerous species whose juvenile part of the teleoconch is much slender than the adult one. To the present author's knowledge in the recognized bibliography there are no species to which the studied forms could be assigned. The most comparable seems to be *Scabrella hoernesi* (MAYER), known i.a. from the Aquitaine Basin (*see* PEYROT 1927, Pl. 1, Fig. 77).

In the Miocene of Poland none species of the subgenus *Pyrene* (*Scabrella*) SACCO has hitherto been noted.

Genus *Anachis* H.&A. ADAMS, 1853

Anachis subcorrugata (BOETTGER, 1906)
(Pl. 33, Fig. 6)

partim 1880. *Columbella* (*Anachis*) *Gümbeli* nov. form. Varietät *A.*; R. HOERNES & M. AUINGER, pp. 102-103, Pl. 11, Fig. 10; *non* Figs 9 and 11.
1906. *Columbella* (*Anachis*) *subcorrugata* n.sp.; O. BOETTGER, pp. 18-19.
1934. *Pyrene* (*Anachis*) *subcorrugata* (BOETTGER); A. ZILCH, p. 254, Pl. 16, Fig. 91.

MATERIAL: Three specimens.
DIMENSIONS: The largest specimen (Pl. 33, Fig. 6) is 7 mm high and 3.5 mm wide.

REMARKS: The studied specimens, as concerns their size, general shape, and the number of ribs (12 on the last but one, and 14 on the last whorl), seem to be compatible with those described by BOETTGER (1906) from Kostej and Lapugy in Transylvania. BOETTGER, when establishing this species, has a much richer material at his disposal and recognized a lack of any forms intermediate to the species *Anachis guembeli* (HOERNES & AUINGER).

VENZO & PELOSIO (1963, p. 93, Pl. 35, Figs 22-22c) described, under the name of "*Anachis* (*Costoanachis*) *subcorrugata*", regarded by them as a new species [sic!], the specimens from the Miocene of Vigoleno in Italy, that evidently differ from the Korytnica material by their axial ribs spaced more densely, and by the presence of spiral furrows running on the interrib areas. The

specific name introduced by VENZO & PELOSIO (1963) being a subsequent homonyn is obviously to be rejected.

The species *Anachis subcorrugata* (BOETTGER) has not hitherto been known from the Miocene of Poland.

Anachis terebralis (GRATELOUP, 1834)
(Pl. 33, Figs 1-5)

1856. *Columbella corrugata* BON.; M. HÖRNES, p. 120, Pl. 11, Fig. 8.
1880. *Columbella* (*Anachis*) *Gümbeli* nov. form.; R. HOERNES & M. AUINGER, pp. 102-103, Pl. 11, Figs 8-11.
1927. *Anachis terebralis* (GRATELOUP); A. PEYROT, pp. 16-18, Pl. 1, Figs 65, 79.
1927. *Anachis terebralis* (GRATELOUP) var. *aturensis* nov. var.; A. PEYROT, p. 18, Pl. 1, Figs 72, 80.
1952a. *Pyrene* (*Anachis*) *terebralis* GRATELOUP; M. GLIBERT, p. 317, Pl. 8, Fig. 14.
1960. *Anachis tererbalis* GRATELOUP; E. KOJUMDGIEVA, p. 186, Pl. 45, Fig. 13.
1966. *Columbella* (*Anachis*) *terebralis* GRATELOUP; L. STRAUSZ, pp. 295-296, Pl. 34, Figs 11-12.

MATERIAL: A hundred and sixty specimens.
DIMENSIONS: The largest specimen (Pl. 33, Fig. 4) is 6.5 mm high and 3 mm wide.

REMARKS: The studied specimens are undoubtedly conspecific with those coming both from the Vienna Basin as well as from the Aquitaine Basin. Their variability concerns primarily the number of the axial ribs, ranging 15 to 25, and once even 30 (*see* Pl. 33, Fig. 3) on the last but one whorl. Such a range has not hitherto been reported in the recognized bibliography. Neither HÖRNES (1856) nor HOERNES & AUINGER (1880) gave any information on the number of ribs; BOETTGER (1901) reports 13-15 ribs on the last whorl in the species *Anachis guembeli* (HOERNES & AUINGER), while PEYROT (1927) does 16 in *Anachis terebralis* (GRATELOUP) and 20 in the variety *aturensis* distinguished by himself. The Korytnica specimens that bear more numerous ribs resemble slightly those described as *Anachis embryonalis* (BOETTGER) from Kostej and Lapugy in Transylvania (*comp.* BOETTGER 1906, p. 19; ZILCH 1934, Pl. 16, Fig. 22), although they are slightly larger but less slender.

It is to note that all studied specimens come from one locality in the Korytnica Basin, namely from the oyster shellbed at Mt. Lysa. An association of gastropods of the genus *Anachis* with oysters is typical also of some present-day habitats (*comp.* BOUCOT 1990, Text-fig. 127).

Within the studied specimens there is one (*see* Pl. 33, Fig. 5) destitute of ribs on its last two whorls. It corresponds fully to that coming from Niederleis in the Vienna Basin, and presented by HOERNES & AUINGER (1880, Pl. 11, Fig. 9) as the variety *A* of the discussed species.

The species *Anachis terebralis* (GRATELOUP) has not hitherto been known from the Miocene of Poland.

Family **Buccinidae** LATREILLE, 1825
Genus *Parvisipho* COSSMANN, 1889
Subgenus *Andonia* G.HARIS & BURROWERS, 1891
Parvisipho (*Andonia*) *transsylvanicus* (HOERNES & AUINGER, 1890)
(Pl. 33, Fig. 7)

1890. *Fusus* (*Genea*) *Transsylvanicus* nov. form.; R. HOERNES & M. AUINGER, p. 261, Pl. 32, Figs 9, 11.
1984. *Andonia transsylvanica* HOERNES & AUINGER; A.W. JANSSEN, pp. 315-316, Pl. 73, Figs 10-11.

MATERIAL: Sixteen specimens.

DIMENSIONS: The largest specimen is 8.0 mm high and 1.8 mm wide.

REMARKS: The studied specimens are fully concordant with these coming from Kostej in Transylvania, and described by HOERNES & AUINGER (1890). The illustrated specimens from that locality (*see* HOERNES & AUINGER 1890, Pl. 32, Figs 9 and 11) point to a much variable ornamentation of the species, expressed by a diverse density of both axial and spiral ribs. The Korytnica specimens share such a variability, although these adorned with the spiral ribs very densely spaced are predominant.

The species *Parvisipho* (*Andonia*) *transsylvanicus* (HOERNES & AUINGER) is related to *Parvisipho* (*Andonia*) *bonellii* (BELLARDI & MICHELOTTI). Both HOERNES & AUINGER (1890) and PAVIA (1975) listed a set of features distinguishing these two species. Nevertheless, two of four specimens presented by PAVIA (1975, Pl. 6, Figs 11 and 14) point to a possibility that these labelled as *Parvisipho* (*Andonia*) *transsylvanicus* are only not fully grown specimens of *Parvisipho* (*Andonia*) *bonellii*.

As concerns a higher taxonomic assignment of these two discussed species, there also exists another standpoint, expressed by MORONI & RUGGIERI (1981) who, after a study of the protoconch, concluded that they should be included into the family Turridae, and distinguished as a separate genus *Pseudoandonia*.

The species *Parvisipho* (*Andonia*) *transsylvanicus* (HOERNES & AUINGER) has not hitherto been known from the Miocene of Poland.

Genus *Phos* MONTFORT, 1810
Subgenus *Phos* MONTFORT, 1810
Phos (*Phos*) *hoernesi* SEMPER, 1861
(Pl. 33, Fig. 8)

1856. *Buccinum polygonum* BROCC.; M. HÖRNES, pp. 160-161, Pl. 13, Figs 14-15.
1911. *Phos Hoernesi* SEMP.; W. FRIEDBERG, pp. 105-106, Pl. 5, Figs 22-23.
1927. *Phos polygonum* (BROCCHI); A. PEYROT, pp. 178-180, Pl. 4, Figs 31-34.
1927. *Phos polygonum* (BROCCHI) var. *acarinata* nov. var.; A. PEYROT, p. 180, Pl. 4, Figs 35-36.
1956. *Phos hoernesi* SEMPER; I. CHEPRUGHY-MEZNERICS, p. 404, Pl. 6, Figs 8-11.
1958. *Phos* (*Phos*) *connectens connectens* BELLARDI; E. BEER-BEITRICKY, pp. 44-45, Pl. 1, Fig. 2.
1958. *Phos* (*Phos*) *connectens hoernesi* SEMPER; E. BEER-BEITRICKY, p. 45, Pl. 1, Fig. 3.
1960. *Phos* (*Phos*) *connectens* var. *hoernesi* (SEMPER); E. KOJUMDGIEVA, p. 170, Pl. 43, Fig. 10.
1966. *Phos polygonus hoernesi* SEMPER; L. STRAUSZ, p. 303, Pl. 35, Figs 6-7; Pl. 79, Figs 3, 5, 7-8.
1971. *Phos hoernesi* SEMPER; I. CHEPRUGHY-MEZNERICS, p. 28, Pl. 11, Figs 1-2.
1971. *Phos hoernesi* SEMPER; M. EREMIJA, p. 76, Pl. 7, Fig. 9.
1974. *Phos* (*Phos*) *hoernesi* SEMPER; E. CAPROTTI, p. 27, Pl. 2, Fig. 5.

MATERIAL: Forty-six specimens.
DIMENSIONS: The largest specimen (Pl. 33, Fig. 8) is 29 mm high and 12.5 mm wide.

REMARKS: The studied specimens are undoubtedly conspecific with those coming from the Vienna Basin that were included by HÖRNES (1856) to the species *Phos polygonus* (BROCCHI) known from the Pliocene of Italy. A conformability of the Viennese and Italian specimens was objected by SEMPER (*fide* HOERNES & AUINGER 1882, pp. 120-121) who distinguished the former ones as a separate species, *Phos hoernesi* SEMPER, featured by another pattern of its spiral ornamentation. When comparing the Korytnica specimens with the holotype of the species *Phos polygonus* presented in the form of a photo by PINNA & SPEZIA (1978, Pl. 10, Fig. 2), it is evident that SEMPER was right in his conclusion.

Moreover, from the Miocene of Italy another species was described by BELLARDI (1882), namely *Phos connectens* BELLARDI. To the Viennese and thus to the Korytnica forms it is more close

than *Phos polygonus*, although it differs from these two by its last whorl much larger, as correctly remarked already by BELLARDI (1882, p. 8).

In this century, the species *Phos hoernesi* SEMPER has variously been treated. BEER-BISTRICKY (1958) classified it as a subspecies of *Phos connectens*, and occurring in the Vienna Basin jointly with the nominative subspecies. KOJUMDGIEVA (1960) also suggested its connection with *Phos connectens*, but regarded it as a variety; on the other hand, STRAUSZ (1966) classified it as a subspecies of *Phos polygonus*. Within the Korytnica material, the forms corresponding to the two subspecies distinguished by BEER-BISTRICKY (1958) can easily be demonstrated. In the present author's opinion, the discussed differences are only of individual variability in their nature. All adult specimens from Korytnica characterize by the axial ribs on the last whorl (rarely, on last two whorls) becoming thinner but more numerous (even up to 25-35 on a whorl). Their thickness equals then to that of the spiral ribs due to which the ornamentation of the last whorl becomes cancellated. By this feature the Korytnica specimens resemble *Phos connectens* BELLARDI whose last whorl is however distinctly shorter.

The species *Phos* (*Phos*) *hoernesi* SEMPER was reported from Korytnica by HÖRNES (1856), FRIEDBERG (1911), and KOWALEWSKI (1930). Unknown from other Miocene localities in Poland.

Genus *Cantharus* RÖDING, 1798

Cantharus exsculptus (DUJARDIN, 1837)
(Pl. 37, Figs 1-2)

1856. *Murex plicatus* BROCC.; M. HÖRNES, pp. 245-246, Pl. 25, Figs 9-10.
1873. *Pollia exsculpta* (DUJ.); L. BELLARDI, p. 185, Pl. 12, Fig. 28.
1912. *Pollia exsculpta* DUJ.; W. FRIEDBERG, pp. 183-184, Pl. 11, Figs 17-18.
1927. *Tritonidea exsculpta* (DUJARDIN); A. PEYROT, pp. 185-187, Pl. 4, Figs 37-39.
1960. *Cantharus* (*Pollia*) *exsculptus* (DUJARDIN); E. KOJUMDGIEVA, p. 172, Pl. 43, Fig. 13.
1960. *Cantharus* (*Pollia*) *exsculptus* var. *canaliculatus* n. var.; E. KOJUMDGIEVA, p. 172, Pl. 43, Fig. 14.
1966. *Cantharus* (*Pollia*) *exsculptus* DUJARDIN; L. STRAUSZ, pp. 307-308, Pl. 34, Fig. 23; Pl. 35, Fig. 1.
1966. *Cantharus* (*Pollia*) *exsculptus* (DUJ.); J. KÓKAY, pp. 58-59, Pl. 8, Fig. 10.
1981. *Cantharus* (*Pollia*) *exsculptus* (DUJARDIN); W. KRACH, p. 68, Pl. 18, Figs 9-12.

MATERIAL: Sixty-two specimens.
DIMENSIONS: The largest specimen is 20 mm high and 11 mm wide.

REMARKS: The studied specimens are fully concordant with those presented by referenced authors from various European countries. KOJUMDGIEVA (1960, p. 160) described from the Miocene of Bulgaria, apart from the typical specimens, also those differing by their slightly deeper spiral furrow situated between two spiral ribs in the upper (posterior) part of the whorls. Such a furrow is present in all specimens of this species, and its slightly more pronounced development cannot therefore be a distinguishing feature of a separate taxon. A similarly deep furrow is observable also in specimens from Łychów in the Lublin Upland (*see* KRACH 1981, Pl. 18, Fig. 9).

The species *Cantharus exsculptus* (DUJARDIN) from Korytnica was reported under the name *Murex plicatus* BROCCHI by MURCHISON (1845) and HÖRNES (1856); moreover, by FRIEDBERG (1912) and KOWALEWSKI (1930). In the Miocene of Poland it is also known from Rzegocina (FRIEDBERG 1912), as well as from Łychów and Węglinek (KRACH 1981).

Cantharus subpusillus (HOERNES & AUINGER, 1890)
(Pl. 37, Fig. 4)

1890. *Pollia subpusilla* nov. form.; R. HOERNES & M. AUINGER, p. 242, Pl. 28, Figs 12-13.
1912. *Pollia subpusilla* R.H. i AUING.; W. FRIEDBERG, pp. 186-187, Pl. 11, Fig. 1.

1971. *Cantharus (Pollia) subpusillus* HOERNES et AUINGER; I. CSEPREGHY-MEZNERICS, p. 28, Pl. 11, Fig. 13.
1971. *Cantharus (Pollia) aquitanensis* PEYR.; I. CSEPREGHY-MEZNERICS, p. 28, Pl. 11, Figs 17-18.

MATERIAL: One specimen.
DIMENSIONS: Height 8.5 mm, width 5.5 mm.

REMARKS: The only collected specimen seems to be concordant both with these coming from the Vienna Basin and those from the western Ukraine, although some small differences may be recognized. As compared to the specimens presented by HOERNES & AUINGER (1890) from Forchtenau and Niederleis, the possessed shell is slightly less slender and it has a still less pronounced crest on the last whorl. As compared to the specimen from Zborów in the western Ukraine, presented by FRIEDBERG (1912), it bears one axial rib on the whorls less (that is 9, instead of 10) than do the typical specimens.

The species *Cantharus subpusillus* (HOERNES & AUINGER) has not hitherto been known from the Miocene of Poland. The specimens described by FRIEDBERG (1912) were coming from Zborów, presently in the Ukraine.

Cantharus minutulus sp.n.
(Pl. 37, Fig. 3)

HOLOTYPE: The specimen (Z.PAL.U.W., No. BkK-G665) presented in Pl. 37, Fig. 3.
TYPE HORIZON: Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.
DERIVATION OF THE NAME: *minutulus* — after a small size of the shell.
DIAGNOSIS: Shell small, fusiform, relatively slender, of whorls faintly convex, ornamented by spiral ribs of variable thickness (numbering 15 in the last whorl), and by axial ribs (numbering 11-14 in the last whorl).
MATERIAL: Four specimens.
DIMENSIONS: The largest specimen is 6.0 mm high and 3.1 mm wide.

DESCRIPTION: Shell small, fusiform, enough slender. Protoconch (not preserved in the holotype) consists of about 2½ smooth, slightly convex and lustrous whorls. Its boundary with the teleoconch is distinctly pronounced. Teleoconch attains about 4, slightly convex and heavily ornamented whorls. On the first three whorls, just from the boundary with the protoconch there run 3 spiral ribs, the uppermost of which bifurcates since the third whorl develops. On the third, or fourth, whorl there appears a very thin, filiform secondary rib under one of the three primary ribs. At the base of the last whorl there additionally run 8 spiral ribs. Moreover, the whorls are furnished with axial ribs that number 9 or 10 on the initial, and 13 on the last whorl. Aperture is oval, with the outer lip bearing numerous, lath-shaped teeth innerly; the inner lip is generally smooth, but with a delicate tooth in its posterior part. Siphonal canal is quite long, slightly arched.

REMARKS: In the recognized bibliography no specimen may be indicated to display similar size, ratios of measurements, and ornamentation. Similar ratios and comparable ornamentation appear in specimens from Transylvania, described under the name of "*Cantharus (Pollia) lapugyensis*" by HOERNES & AUINGER (1890), but they are almost twice higher when having 4 whorls of the teleoconch. Supposedly conspecific with the studied forms is a specimen from Várpalota in Hungary, and presented by STRAUSZ (1966, p. 308, Pl. 34, Figs 21-22) under the name "*Cantharus (Pollia) exsculptus* DUJARDIN, var.".

Genus *Euthria* GRAY, 1850

Euthria adunca (BRONN, 1831)
(Pl. 34, Fig. 7)

1873. *Euthria adunca* (BRONN); L. BELLARDI, pp. 198-199, Pl. 13, Figs 20-23.
1879. *Euthria adunca* BRONN; F. FONTANNES, pp. 23-24, Pl. 3, Fig. 2.

MATERIAL: One specimen, preserved without its early whorls.
DIMENSIONS: Height about 38 mm, width 16 mm.

REMARKS: The only collected specimen seems to be concordant with those described by BELLARDI (1873), although an inferior state of preservation does not allow to make more precise comparisons. The specimens from the Miocene of northern Italy are slighty larger, and their spiral ornamentation is more pronounced.

The species *Euthria adunca* (BRONN) has not hitherto been known from the Miocene of Poland.

Euthria intermedia (MICHELOTTI, 1839)
(Pl. 34, Figs 8-12)

1856. *Fusus intermedius* MICHT.; M. HÖRNES, pp. 281-282, Pl. 31, Figs 4-5.
1928. *Euthria intermedia* (MICHELOTTI); A. PEYROT, pp. 214-216, Pl. 5, Figs 47-49.
1956. *Euthria intermedia* (MICHT.); I. CSEPREGHY-MEZNERICS, p. 404, Pl. 7, Figs 8-11.
1960. *Euthria (Euthria) intermedia* (MICHELOTTI); E. KOJUMDGIEVA, p. 171, Pl. 43, Fig. 11.
1966. *Euthria intermedia* MICHELOTTI; L. STRAUSZ, pp. 304-305, Pl. 34, Figs 8-9.
1971. *Euthria intermedia* (MICHT.); I. CSEPREGHY-MEZNERICS, p. 28, Pl. 11, Figs 9-10.
1971. *Euthria subnodosa* (HÖRNES et AUINGER; I. CSEPREGHY-MEZNERICS, p. 28, Pl. 11, Figs 7-8.

MATERIAL: Fifteen specimens.
DIMENSIONS: The largest specimen (Pl. 34, Fig. 9) is 49 mm high and 24 mm wide.

REMARKS: The studied specimens are undoubtedly conspecific with those coming from the Vienna Basin, and described by HÖRNES (1856) who reported on a great variability of this species, expressed by the apical angle, convexity of whorls, and distictness of ornamentation of the particular specimens. One of the herein presented specimens (Pl. 34, Fig. 8) bears a row of weak, rounded nodes due to which it becomes similar to *Euthria subnodosa* HOERNES & AUINGER. In the present author's opinion, this difference is too small to justify a creation of the separate species. Another standpoint on a relation between these two species was presented by CSEPREGHY-MEZNERICS (1971) who assigned a specimen coming from Borsodbota in Hungary to *Euthria subnodosa* HOERNES & AUINGER, although no nodes are distinguishable on the included illustration (*see* CSEPREGHY-MEZNERICS 1971, Pl. 11, Figs 7-8).

The species *Euthria intermedia* (MICHELOTTI) was recorded from Korytnica by HÖRNES (1856) only. A report on this species, by KOWALEWSKI (1930, p. 116), certainly refers to *Euthria friedbergi* nom.n. (*see below*).

Euthria puschi (ANDRZEJOWSKI, 1830)
(Pl. 34, Figs 1-5)

1837. *Fasciolaria polonica* m.; G. PUSCH, pp. 145-146, Pl. 12, Fig. 3.
1856. *Fusus Puschi* ANDR.; M. HÖRNES, pp. 282-283, Pl. 31, Fig. 6.
1904. *Euthria Puschi* (ANDR.); F. SACCO, p. 35, Pl. 10, Figs 1-2.

1912. *Euthria Puschi* ANDRZ.; W. FRIEDBERG, pp. 153-154, Pl. 8, Fig. 12.
1912. *Euthria Zejszneri* FRIEDB.; W. FRIEDBERG, p. 154, Pl. 8, Fig. 13.
1928. *Euthria Puschi* ANDRZ., var. *Zejszneri* FRIEDB.; W. FRIEDBERG, pp. 584-585.
1956. *Euthria puschi* ANDRZ.; I. CSEPREGHY-MEZNERICS, Pl. 7, Figs 6-7.
1960. *Euthria* (*Euthria*) *puschi* (ANDRZEJOWSKI); E. KOJUMDGIEVA, p. 170, Pl. 43, Fig. 8.
1966. *Euthria puschi* ANDRZEJOWSKI; L. STRAUSZ, p. 304, Pl. 34, Figs 6-7, 10.
1971. *Euthria puschi* (ANDRZEJOWSKY); M. EREMIJA, p. 76, Pl. 6, Fig. 10.
1971. *Euthria puschi* ANDRZ.; I. CSEPREGHY-MEZNERICS, p. 28, Pl. 11, Figs 3-4.

MATERIAL: A hundred and sixty specimens.
DIMENSIONS: The largest specimen (Pl. 34, Fig. 3) is 49 mm high and 23 mm wide.

REMARKS: The studied specimens are identical with those presented by FRIEDBERG (1912) who, apart from 9 typical ones, described also one slightly shorter, and distinguished it as *Euthria zejszneri* FRIEDBERG. Subsequently, FRIEDBERG (1928) considered it as a variety of *Euthria puschi* (ANDRZEJOWSKI). In the present author's opinion, this specimen does not differ substancially from typical forms and its shortness is very relative; its taxonomical separateness should therefore be rejected.

The species *Euthria puschi* (ANDRZEJOWSKI) was recorded from Korytnica by all former authors. In the Miocene of Poland it is also known from Benczyn (KRACH 1950a).

Euthria friedbergi nom.n.
(Pl. 34, Fig. 6)

1912. *Euthria intermedia* MICHT., var. *minor* FRIEDB.; W. FRIEDBERG, pp. 154-156, Pl. 9, Fig. 1; ?Fig. 2. (*excl. syn.*).

HOLOTYPE: The species from Dryszczów, the Ukraine, figured by FRIEDBERG (1912, Pl. 9, Fig. 1).
DERIVATION OF THE NAME: *friedbergi* — in memory of Professor WILHELM FRIEDBERG (1873-1941), the prominent student of the Miocene fossils of Poland and the Ukraine.
MATERIAL: Two specimens.
DIMENSIONS: The larger specimen (Pl. 34, Fig. 6) is 31 mm high and 14 mm wide.

REMARKS: The two collected specimens, as concerns their size, general shape, convexity of whorls, ornamentation, and the presence of tooth in the posterior part of the inner lip, are fully concordant with those coming from Dryszczów in the Ukraine and described by FRIEDBERG (1912) as *Euthria intermedia* (MICHELOTTI) var. *minor* FRIEDBERG, to denote their smaller size. FRIEDBERG gave an account of their resemblance also to *Euthria cornea* (LINNAEUS), from which they differ by a smaller size and the presence of the tooth. In the present author's opinion, both those specimens from Dryszczów as well as the studied forms from Korytnica differ distinctly from the two above-discussed species. Moreover, they do not resemble any other in the recognized bibliography, and should thus be treated as representatives of a separate species. The name used by FRIEDBERG (1912) as a variety name *minor* cannot be, however, ascribed to this species, because it is preoccupied by that of the species *Euthria minor* established by BELLARDI (1873, p. 199, Pl. 13, Fig. 24). Consequently, the present author suggests to introduce a new name, *Euthria friedbergi* nom.n.

Family **Fasciolariidae**

Genus *Fusinus* RAFINESQUE, 1815

Fusinus hoessii (PARTSCH *in* HAUER, 1837)
(Pl. 35, Fig. 9)

1856. *Fusus longirostris* BROCCHI; M. HÖRNES, pp. 293-294, Pl. 32, Figs 5-7.
1890. *Fusus Hörnesii* PARTSCH; R. HOERNES & M. AUINGER, p. 253.

non 1912. *Fusus Hörnesi* PARTSCH; W. FRIEDBERG, pp. 158-159, Pl. 9, Fig. 6.
non 1956. *Fusus hörnesi* PARTSCH; I. CSEPREGHY-MEZNERICS, p. 410, Pl. 8, Figs 15-16.

MATERIAL: One specimen, preserved with its siphonal canal partly broken.
DIMENSIONS: The estimated hight should be about 80-85 mm, width 25 mm.

REMARKS: This single specimen, although incomplete, corresponds well to that one coming from Grund in the Vienna Basin (*comp.* HÖRNES 1856, Pl. 32, Fig. 5), and regarded by HOERNES & AUINGER (1890) as the type of the species. The latter authors reported correctly that the name *Fusus longirostris* BROCCHI used by HÖRNES (1856) was inappropriate, because it referred to quite a distinct species (*comp. also* PINNA & SPEZIA 1978, Pl. 37, Figs 4-4*a*); they thus recommended to return to the name used by PARTSCH.

Some researchers of the Korytnica gastropods, precisely FRIEDBERG (1912) and KOWALEWSKI (1930), ascribed the name *Fusus hoessii* PARTSCH to a quite different, although similarly shaped species — *Euthriofusus virgineus* (GRATELOUP), from which *Fusinus hoessii* (PARTSCH) differs by its spiral ornamentation, much longer siphonal canal, as well as by the features of the outer lip, sharp at the margin and smooth innerly.

The species *Fusinus hoessii* (PARTSCH *in* HAUER) has not hitherto been known from the Miocene of Poland.

Fusinus hontensis (CSEPREGHY-MEZNERICS, 1956)
(Pl. 35, Fig. 6)

1956. *Lathyrus* (*Dolicolathyrus*) *hontensis* n.sp.; I. CSEPREGHY-MEZNERICS, p. 448, Pl. 8, Figs 7-8.
1966. *Fusus* (*Aptyxis*) *sismondai hontensis* CSEPREGHY-MEZNERICS; L. STRAUSZ, p. 346, Pl. 27, Figs 3-4.

MATERIAL: One specimen, preserved incompletely.
DIMENSIONS: As compared to the holotype of the species illustrated by CSEPREGHY-MEZNERICS (1956) and STRAUSZ (1966), the Korytnica specimen was about two whorls larger; its height is estimated as about 75-80 mm, and width as about 25-28 mm.

REMARKS: This single specimen, although incomplete, is so well preserved that its specific assignment remains beyond any doubt. Really, it is the third, but the largest specimen ever presented in the recognized bibliography. When establishing this species CSEPREGHY-MEZNERICS (1956) attributed it to the subgenus *Dolicholathyrus* BELLARDI, 1884, what was corrected by STRAUSZ (1966, p. 346). The latter author, however, regarded the taxon *Fusinus hontensis* (CSEPREGHY-MEZNERICS) as a subspecies of *Fusinus sismondai* (MICHELOTTI). To the latter species should, however, be assigned the specimens much smaller (about 20-30 mm high) and much stumpy (*comp.* HÖRNES 1856, pp. 292-293, Pl. 32, Fig. 4; SACCO 1904, p. 26, Pl. 7, Figs 18-21).

The species *Fusinus hontensis* (CSEPREGHY-MEZNERICS) has not hitherto been known from the Miocene of Poland.

Fusinus prevosti (PARTSCH *in* HÖRNES, 1856)
(Pl. 35, Fig. 7)

1856. *Fusus Prevosti* PARTSCH; M. HÖRNES, pp. 285-286, Pl. 31, Fig. 9.
1890. *Fusus Prevosti* PARTSCH; R. HOERNES & M. AUINGER, pp. 253-254, Pl. 31, Figs 1-2.
1956. *Fusus prevosti* PARTSCH; I. CSEPREGHY-MEZNERICS, p. 410, Pl. 8, Fig. 17.
1966. *Fusus prevosti* PARTSCH (in HÖRNES); L. STRAUSZ, pp. 342-343, Pl. 26, Fig. 14.

MATERIAL: One specimen, preserved incompletely.
DIMENSIONS: As compared to the specimen illustrated by HÖRNES (1856), the Korytnica specimen was about one whorl shorter; its height is estimated as about 90 mm, and width as about 30 mm.

REMARKS: This single and incomplete, but unique specimen seems to be concordant with those listed in the synonymy. It is malformed, with its axis arched. In all localities in the Vienna Basin, Transylvania, and Hungary, this species is one of the greatest rarities; in some sections, e.g. at Szob in Hungary, only incomplete specimens have heretofore been found.

The species *Fusinus prevosti* (PARTSCH *in* HÖRNES) has not hitherto been known from the Miocene of Poland.

Fusinus vindobonensis (HOERNES & AUINGER, 1890)
(Pl. 35, Fig. 8)

1856. *Fusus semirugosus* BELL. et MICHT.; M. HÖRNES, pp. 294-295, Pl. 32, Figs 8-10.
1890. *Fusus Vindobonensis* nob.; R. HOERNES & M. AUINGER, p. 252, Pl. 31, Fig. 10.
1966. *Fusus vindobonensis* HOERNES & AUINGER; L. STRAUSZ, pp. 341-342, Pl. 26, Figs 11-12.

MATERIAL: One specimen, preserved incompletely.
DIMENSIONS: As compared to the specimen illustrated by HÖRNES (1856), the Korytnica specimen was about one whorl larger; its height is estimated as about 80 mm.

REMARKS: This single specimen, although incompletely preserved is in its shape and ornamentation fully concordant with those coming from various localities in the Vienna Basin (*comp.* HOERNES & AUINGER 1890).

The species *Fusinus vindobonensis* (HOERNES & AUINGER) has not hitherto been known from the Miocene of Poland.

Genus *Euthriofusus* COSSMANN, 1901

Euthriofusus virgineus (GRATELOUP, 1833)
(Pl. 35, Figs 1-5)

1856. *Fusus virgineus* GRAT.; M. HÖRNES, pp. 286-287, Pl. 31, Figs 10-12.
1890. *Fusus virgineus* GRAT.; R. HOERNES & M. AUINGER, pp. 254-255, Pl. 36, Figs 1-7.
1912. *Fusus Hörnesii* PARTSCH; W. FRIEDBERG, pp. 158-159, Pl. 9, Fig. 6.
1912. *Fusus* an *virgineus* GRAT.; W. FRIEDBERG, pp. 160-161, Pl. 9, Fig. 9.
1956. *Fusus hörnesi* PARTSCH; I. CSEPREGHY-MEZNERICS, p. 410, Pl. 8, Figs 15-16.
1960. *Fusus* (*Euthriofusus*) *virgineus* GRATELOUP; E. KOJUMDGIEVA, p. 191, Pl. 46, Fig. 6.
1966. *Fusus hoernesii* PARTSCH; L. STRAUSZ, pp. 343-344, Pl. 26, Figs 17-18.
?1984. *Kelletia* (*Boreokelletia*) *hoernesi* (BEYRICH); A.W. JANSSEN, pp. 233-234, Pl. 9, Fig. 15; Pl. 63, Fig. 1.

MATERIAL: A hundred and thirty specimens.
DIMENSIONS: The largest specimen (Pl. 35, Fig. 5) is about 80 mm high and 29 mm wide; another one (Pl. 35, Fig. 3) is 70 mm and 24 mm, respectively.

REMARKS: The studied specimens belong to the species relatively common not only in the Korytnica Clays but also in several localities in the Vienna Basin, i.a. Enzesfeld, Gainfahren, and Grund (*see* HÖRNES 1856). They were HOERNES & AUINGER (1890, p. 254) who indicated that the shells of this species are much variable, as expressed by a vanishing of spiny nodes on the axial ribs, or even of the ribs themselves on the last whorl or the last but one whorl. The majority of the

Korytnica specimens are fully concordant with those coming from Enzesfeld and Forchtenau, as presented by HOERNES & AUINGER (1890, Pl. 36, Figs 6-7).

Until the monographic description by FRIEDBERG (1911-1928), the discussed Korytnica specimens were classified as *Fusus virgineus* GRATELOUP, and under such very name listed by HÖRNES (1856, pp. 696-697). It thus remains quite unclear why FRIEDBERG (1912, p. 158) identified them with another species from the Vienna Basin, namely *Fusus hoessii* PARTSCH (=*Fusus longirostris*, as given by HÖRNES 1856). The shells of *Euthriofusus virgineus* (GRATELOUP) and of *Fusinus hoessii* (PARTSCH) differ distinctly by their ornamentation, length of the siphonal canal, and development of the outer lip. An error of FRIEDBERG has been clarified to the present author when finding a specimen conspecific with the true *Fusinus hoessii* (comp. Pl. 35, Fig. 9). FRIEDBERG (1912, p. 161) was, however, aware of the occurrence of the species *Euthriofusus virgineus* (GRATELOUP) in the Korytnica Clays. To that species he included three juvenile specimens, merely 18 mm high, which were well determinable. To the same species FRIEDBERG (1912, pp. 162, Pl. 9, Fig. 10) included also a small specimen, which is herein put by the present author in a quite different family (*comp.* Pl. 29, Figs 2-5). The discussed error of FRIEDBERG had certainly caused that both CSEPREGHY-MEZNERICS (1956) and STRAUSZ (1966) determined the Hungarian specimens from Szob as *Fusus hoessii* PARTSCH, whereas these are evidently conspecific with the discussed Korytnica specimens of *Euthriofusus virgineus* (GRATELOUP).

The species *Euthriofusus virgineus* (GRATELOUP) has been established from the Aquitaine Basin, but its type has not been indicated. Subsequently, PEYROT (1928, p. 264) chose as the plesiotype of the species a slender specimen having the very pronounced ornamentation; moreover, he remarked that both HÖRNES (1856) as well as HOERNES & AUINGER (1890) and all Italian researchers had erroneously interpreted that species. The latter statement is not accepted herein by the present author who regards all the specimens coming from the Vienna Basin and from Korytnica, although some of them much variable morphologically, as conspecific with those from Aquitaine. It is also to note that PEYROT (1928, pp. 265-266, Pl. 6, Figs 17-20) presented, under the name of "*Euthriofusus hoernesi* (BENOIST)" the specimens characterized by a complete disappearance of the axial ribs on the last two or three whorls. It is highly probable that such specimens are also conspecific with *Euthriofusus virgineus* (GRATELOUP).

Finally, it is to note that a very similar specimen was presented by JANSSEN (1984, pp. 233-234, Pl. 63, Fig. 1), from the Miocene of Winterswijk in Holland, under the name of "*Kelletia* (*Boreokelletia*) *hosiusi* (BEYRICH)". This specimen does not differ from the studied ones, and its size is well comparable with that of the largest specimens known from the Paratethyan basins (*comp.* STRAUSZ 1966, p. 343).

The species *Euthriofusus virgineus* (GRATELOUP) was reported from Korytnica by all former authors.

Genus *Latirus* MONTFORT, 1810

Latirus valenciennesi (GRATELOUP, 1840)
(Pl. 36, Figs 1-2)

1856. *Fusus Valenciennesi* GRAT.; M. HÖRNES, pp. 287-288, Pl. 31, Figs 13-15.
1904. *Dolicholathyrus? Valenciennesi* (GRAT.); F. SACCO, p. 26, Pl. 7, Figs 29-30.
partim 1912. *Fusus Valenciennesi* GRAT.; W. FRIEDBERG, pp. 159-160, Pl. 9, Fig. 8; *non* Fig. 7.
1928. *Streptochetus? dispar* nom. mut.; A. PEYROT, pp. 267-269, Pl. 6, Figs 38-39.
1960. *Latirus* (*Dolicholatirus*) *dispar* PEYROT; E. KOJUMDGIEVA, p. 188, Pl. 46, Fig. 1.
1966. *Fusus* (*Streptochetus*) *valenciennesi* GRATELOUP; L. STRAUSZ, pp. 347-348, Pl. 27, Figs 5-10.
1981. *Fusus* (*Streptochetus*) *valenciennesi* GRATELOUP; W. KRACH, p. 74, Pl. 18, Figs 1-2.

MATERIAL: Thirty specimens.

DIMENSIONS: The largest specimen is 67 mm high and 27 mm wide.

REMARKS: The studied specimens are evidently conspecific with these coming from the Vienna Basin, as well as with those of the Aquitaine Basin wherefrom this species was established. PEYROT (1928), when introducing a new species name, *Streptochetus dispar* PEYROT, argued his procedure by the fact that the original of GRATELOUP had been lost. As correctly stated by STRAUSZ (1966, p. 347), such an argumentation cannot be regarded as justifiable.

The specimens from Santa Agata in northern Italy, presented by SACCO (1904), seem to display a less distinct ornamentation what does not exclude their conspecifity with the Korytnica forms.

The specimens illustrated by FRIEDBERG (1912) do not come from Korytnica. In the present author's opinion, only one of them, namely that one from Zborów in the Ukraine (*see* FRIEDBERG 1912, Pl. 9, Fig. 8) belongs to the discussed species.

The species *Latirus valenciennesi* (GRATELOUP) was reported from Korytnica by all former authors, except PUSCH (1837). In the Miocene of Poland it is also known from Węglinek (KRACH 1981) and Szczepanowice (URBANIAK 1974).

Genus *Fasciolaria* LAMARCK, 1799

Fasciolaria fimbriata (BROCCHI, 1814)
(Pl. 36, Fig. 6)

1856. *Fasciolaria fimbriata* BROCC.; M. HÖRNES, p. 299, Pl. 33, Figs 5-7.
1904. *Pleuroploca? fimbriata* (BR.); F. SACCO, p. 28, Pl. 8, Figs 18-19.
1911. *Fasciolaria (Pleuroploca) fimbriata* BR.; S. CERULLI-IRELLI, p. 290, Pl. 22, Fig. 6.
1960. *Fasciolaria fimbriata* var. *hoernesi* SEGUENZA; E. KOJUMDGIEVA, pp. 187-188, Pl. 45, Figs 15, 17.
1966. *Fasciolaria (Pleuroploca) fimbriata* BROCCHI var.; L. STRAUSZ, pp. 353-354, Pl. 29, Fig. 2.

MATERIAL: One specimen.
DIMENSIONS: Height 48 mm, width 24 mm.

REMARKS: The only collected specimen is undoubtedly conspecific with these occurring in the Vienna Basin. Nevertheless, there still exists a problem of the identity of all specimens coming from the Paratethyan basins with those reported from northern Italy. The holotype indicated by BROCCHI, and re-illustrated in the form of a photo by PINNA & SPEZIA (1978, Pl. 36, Fig. 4), really differs so much from the studied Korytnica specimen that it could easily be classified as a separate species. This problem has comprehensively been studied by HOERNES & AUINGER (1890, pp. 263-264), who had a very rich material at their disposal (98 specimens from the Vienna Basin and Transylvania, 49 from Italy), and concluded that neither an overall shape nor the pronounceness of ornamentation, and the number of folds on the columella are decisive for the separateness of the species. The present author, when having solely one specimen (with 4 folds on the columella), is not able to offer any new comment in this matter, and thus is herein to follow HOERNES & AUINGER (1890) and regard all the discussed differences as a case of an intraspecific variability.

The species *Fasciolaria fimbriata* (BROCCHI) has not hitherto been known from the Miocene of Poland.

Fasciolaria tarbelliana GRATELOUP, 1840
(Pl. 36, Figs 3-5)

1856. *Fasciolaria Tarbelliana* GRAT.; M. HÖRNES, pp. 298-299, Pl. 33, Figs 1-4.
1890. *Fasciolaria Tarbelliana* GRAT.; R. HOERNES & M. AUINGER, pp. 262-263, Pl. 30, Figs 5-7.

1904. *Pleuroploca tarbelliana* (GRAT.), et var.; F. SACCO, p. 28, Pl. 8, Figs 14-16.
1928. *Fasciolaria* (*Pleuroploca*) *tarbelliana* GRATELOUP. mut. *proecedens* nov. mut.; A. PEYROT, p. 275, Pl. 7, Figs 14-15.
1966. *Fasciolaria* (*Pleuroploca*) *tarbelliana* GRATELOUP; L. STRAUSZ, p. 353, Pl. 28, Figs 14-15; Pl. 29, Fig. 1.
1994. *Fasciolaria* (*Pleuroploca*) *tarbelliana nodosa* HOERNES, AUINGER; P.I. NIKOLOV, pp. 53-54, Pl. 3, Figs 1-2; Pl. 4, Figs 1-6.

MATERIAL: Ten specimens, of which one is juvenile with its protoconch preserved.
DIMENSIONS: The largest specimen, completely preserved (Pl. 36, Fig. 3), is 60 mm high and 27 mm wide.

REMARKS: The studied specimens as compared with these coming from other Miocene localities in Europe, are slightly more slender. By this feature, they close to those distinguished by PEYROT (1928) as "mutatio *proecedens*" from Saucats in Aquitaine. On the other way, due to the more pronounced ornamentation, they become similar to those presented by HÖRNES (1856) from the Vienna Basin. Both the slight differences in the shape, and even the more distinct differences in the pronounceness of ornamentation should by regarded as a result of the intraspecific variability.

Nevertheless, both the studied forms from Korytnica, as well as those presented by HÖRNES (1856) and by STRAUSZ (1966), seem to be quite dissimilar to those from the Pliocene of the Guadalquivir Basin in Spain, and presented by GONZALES DELGADO (1989, p. 295, Pl. 6, Figs 1-2) under the same name.

The species *Fasciolaria tarbelliana* GRATELOUP has not hitherto been known from the Miocene of Poland.

Family **Galeodidae**

Genus *Galeodes* RÖDING, 1789

Galeodes cornutus (AGASSIZ, 1843)
(Pl. 36, Figs 7-8)

1856. *Pyrula cornuta* AG.; M. HÖRNES, pp. 274-275, Pls 29-30.
1890. *Pyrula* (*Melongena*) *cornuta* AG.; R. HOERNES & M. AUINGER, pp. 247-248, Pl. 28, Figs 14-16.
1957. *Galeodes cornutus* (AGASSIZ), et var. *semispinosa* DOLLFUS; G. ZBYSZEWSKI, p. 168, Pl. 14, Figs 146-147, 149.
1960. *Galeodes* (*Galeodes*) *cornutus* (AGASSIZ); E. KOJUMDGIEVA, p. 192, Pl. 47, Fig. 1.
1966. *Melongena cornuta* AGASSIZ; L. STRAUSZ, pp. 298-299, Pl. 59, Figs 3-4; Pls 60-62; Pl. 63, Figs 1-13.

MATERIAL: One incomplete juvenile specimen (Pl. 36, Fig. 7), and four fragments of adult specimens.
DIMENSIONS: One of the collected fragments, illustrated formerly (BAŁUK & RADWAŃSKI 1977a, Pl. 8, Fig. 3) is estimated as of the specimen about 160 mm high.

REMARKS: The collected fragments belong undoubtedly to the indicated species that was the largest gastropod in the Miocene of Europe. The incomplete juvenile specimen is fully concordant with the juveniles from Várpalota in Hungary, a locality where this species is surprisingly common (*see* STRAUSZ 1954, 1966).

The species *Galeodes cornutus* (AGASSIZ) is one of the greatest rarities at Korytnica. It was first reported therefrom by BAŁUK & RADWAŃSKI (1977a, p. 109) who had only fragmented shells at their disposal. Up to now, Korytnica remains the only occurrence site of this species in the Miocene of Poland.

A SEQUEL ANNOUNCEMENT

The last member of the superfamily Buccinacea, viz. the family **Nassariidae** will be presented at the beginning of Part III of this monograph. This very family is known, within the gastropod assemblages of the Korytnica Clays, from an extremely wide range of species, numbering over 20, and some of which are represented by thousands of specimens.

The announced 3*rd* part of the monograph that is about to be submitted for publication, contains also a systematic account of the following families: **Olividae, Mitridae, Vasidae, Volutidae, Cancellariidae, Marginellidae, Terebridae,** and **Conidae.**

The family **Turridae** (=**Pleurotomidae**), due to the ubiquity of which the Korytnica Clays owe their another, less commonly used, name of the "*Pleurotoma* Clays" (*see* BAŁUK 1975, p. 9; BAŁUK & RADWAŃSKI 1977a, p. 96), will be presented in the successive part of the monograph. Into that last, the 4*th* part of the monograph will also be included the above-mentioned *ADDENDA* to the whole subclass of the Prosobranchia. Beyond the intended scope of the monograph remains the subclass Opisthobranchia, the sacoglossans (*see* BAŁUK & JAKUBOWSKI 1968, BAŁUK & RADWAŃSKI 1977a, PEEL 1987) and pteropods including. The representatives of the latter, the order Pteropoda, that appear within the Korytnica Clays quite seldom, have satisfactorily been recognized by former authors (KOWALEWSKI 1930, FRIEDBERG 1938, KRACH 1981) and recently revised by JANSSEN & ZORN (1994).

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PLATES 1–38

PLATE 1

Family **Melanellidae**

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Figs **1–2** — *Melanella* (*Polygyreulima*) *jepiana* (BOETTGER), × 6.8; Specimens No. U.W., BkK–G365-366 164

Fig. **3** — *Leiostraca* cf. *acmeodes* (BOETTGER), × 6.8; Specimen No. U.W., BkK–G363 164

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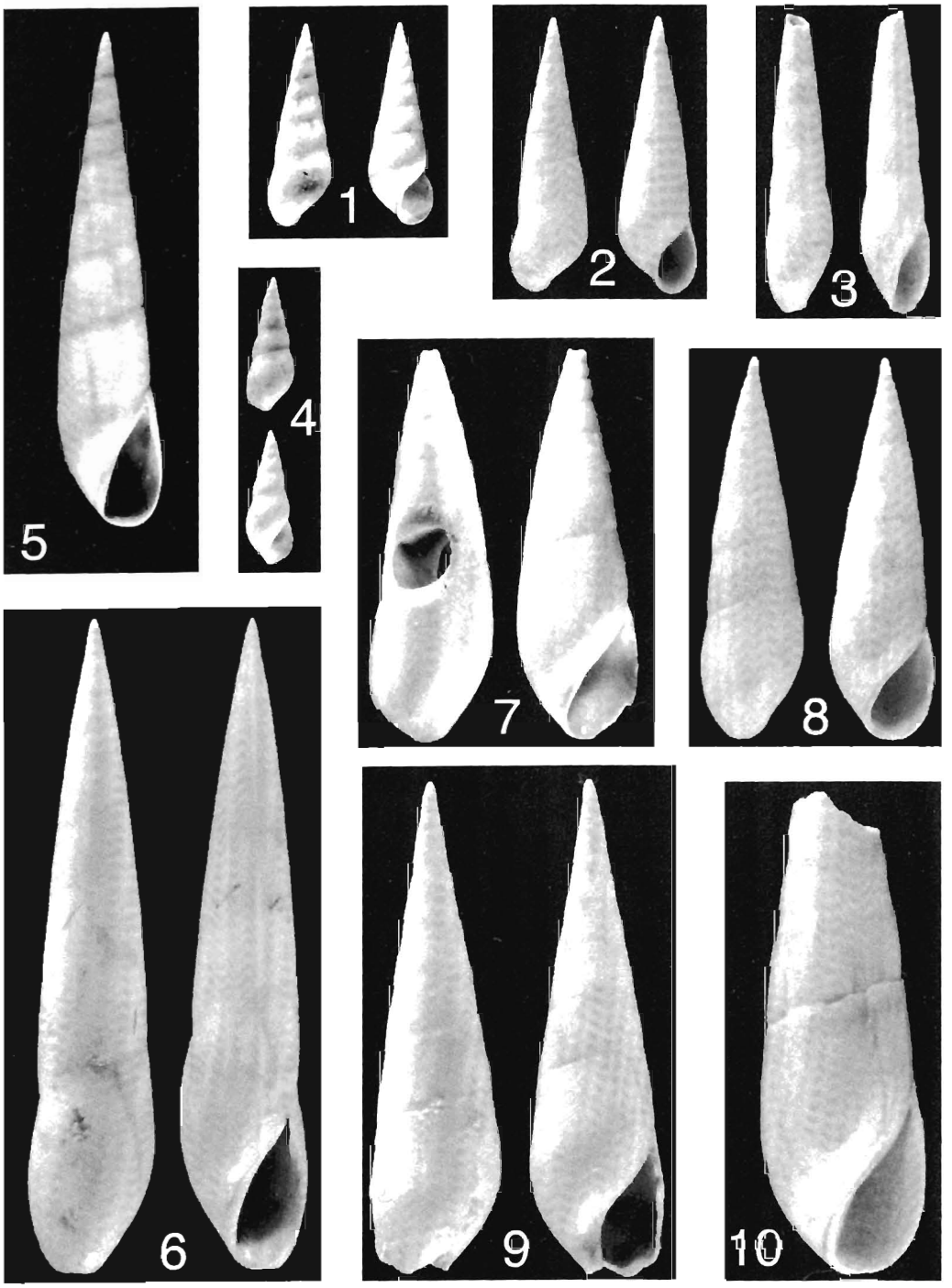
All photos taken by B. DROZD, M.Sc.



Family **Melanellidae**

PLATE 2

Family **Melanellidae**

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Figs **1–4** — *Melanella* (*Balcis*) *polita* (LINNAEUS), × 6.8; Specimens No. U.W., BkK–G374-377 167

Figs **5–6** — *Melanella* (*Balcis*) *subdepressa* (BOETTGER), × 6.8; Specimens No. U.W., BkK–G378-379 168

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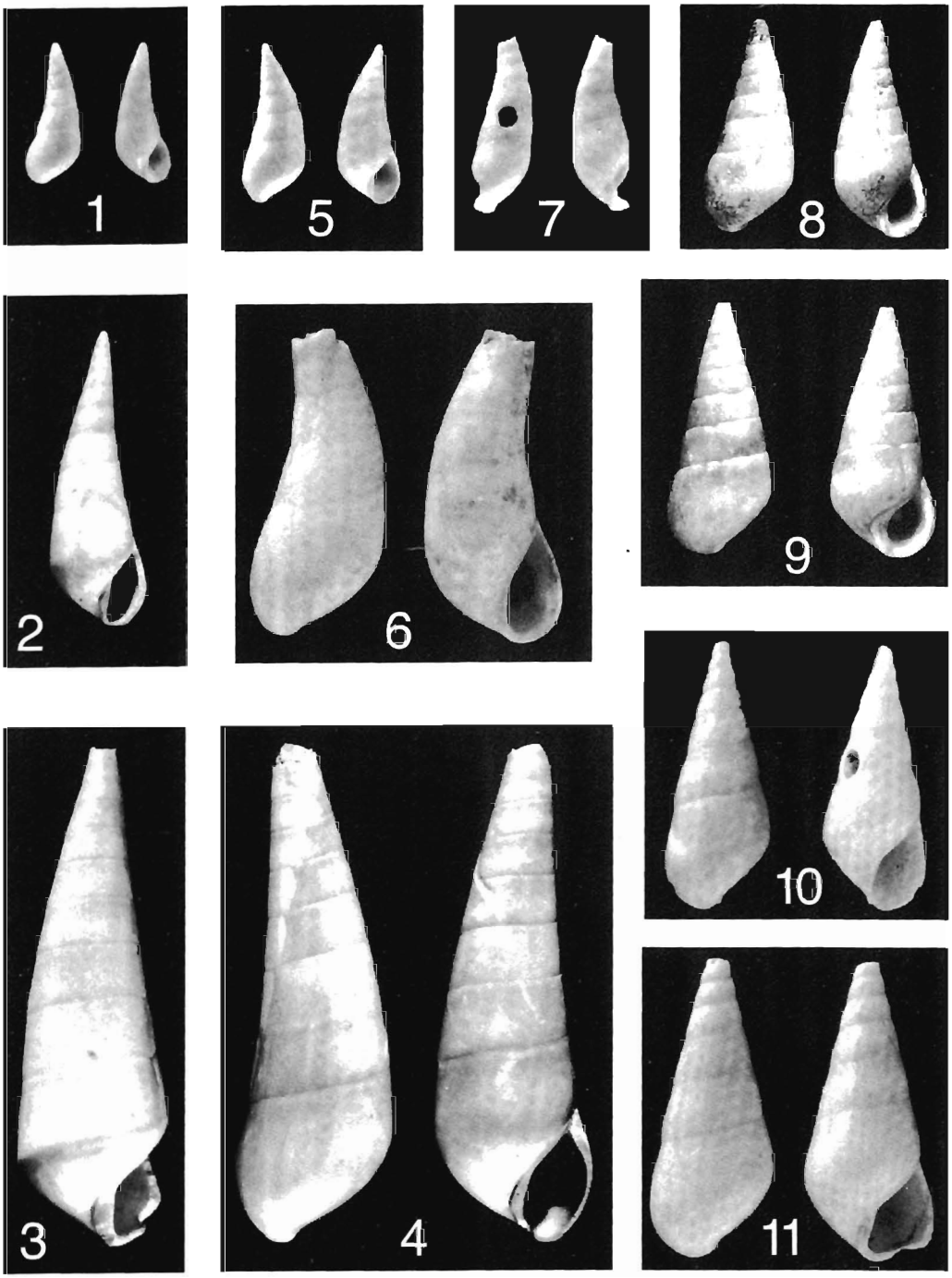
All photos taken by B. DROZD, M.Sc.



Family **Melanellidae**

PLATE 3

Families **Hipponicidae, Calyptraeidae,** and **Capulidae**

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Fig. **1** — *Cheilea inexpectata* (BOETTGER), × 6.8; Specimen No. U.W., BkK–G390 172

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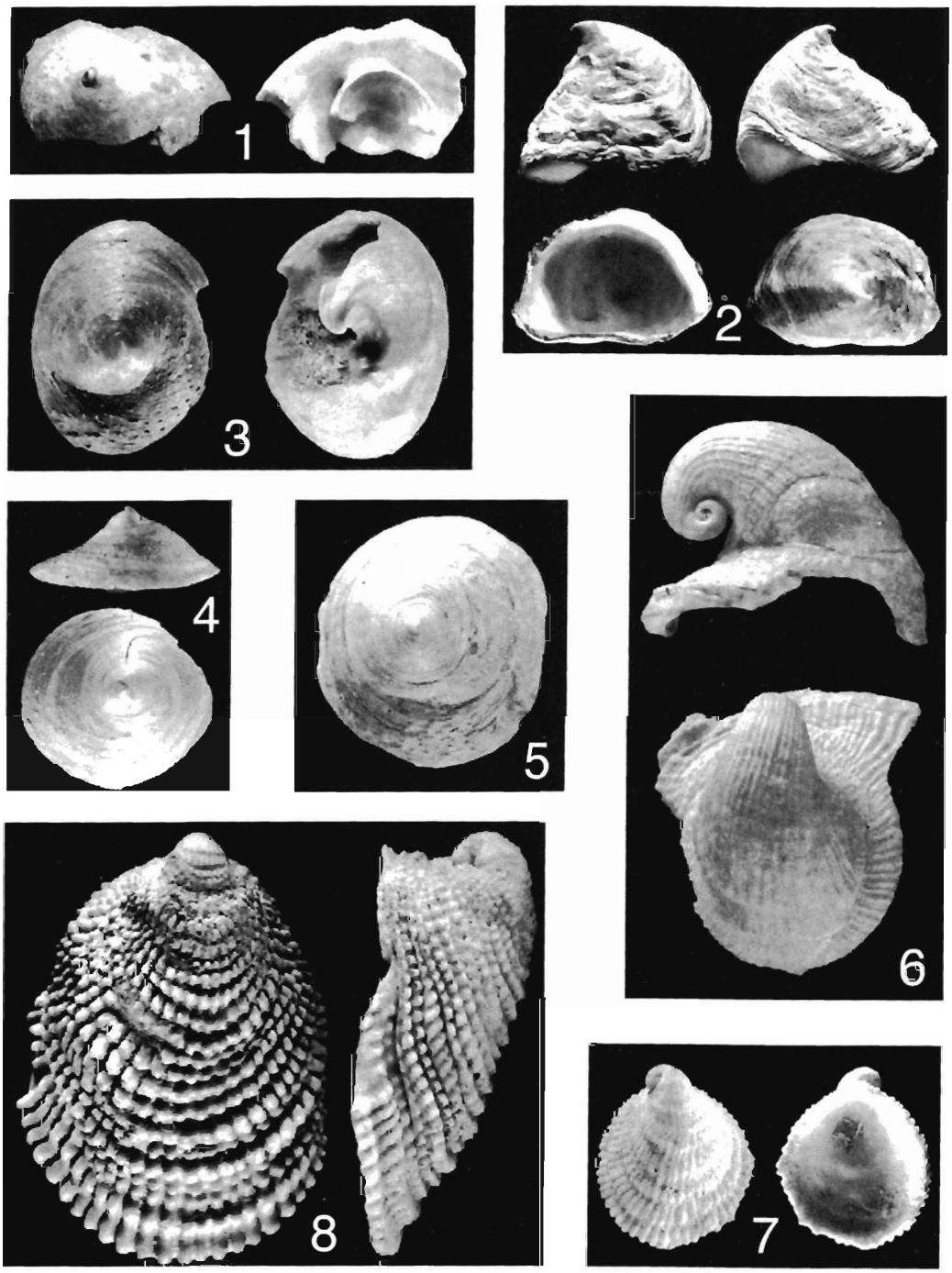
All photos taken by B. DROZD, M.Sc.



Families **Hipponicidae**, **Calyptraeidae**, and **Capulidae**

PLATE 4

Families **Fossaridae** and **Calyptraeidae**

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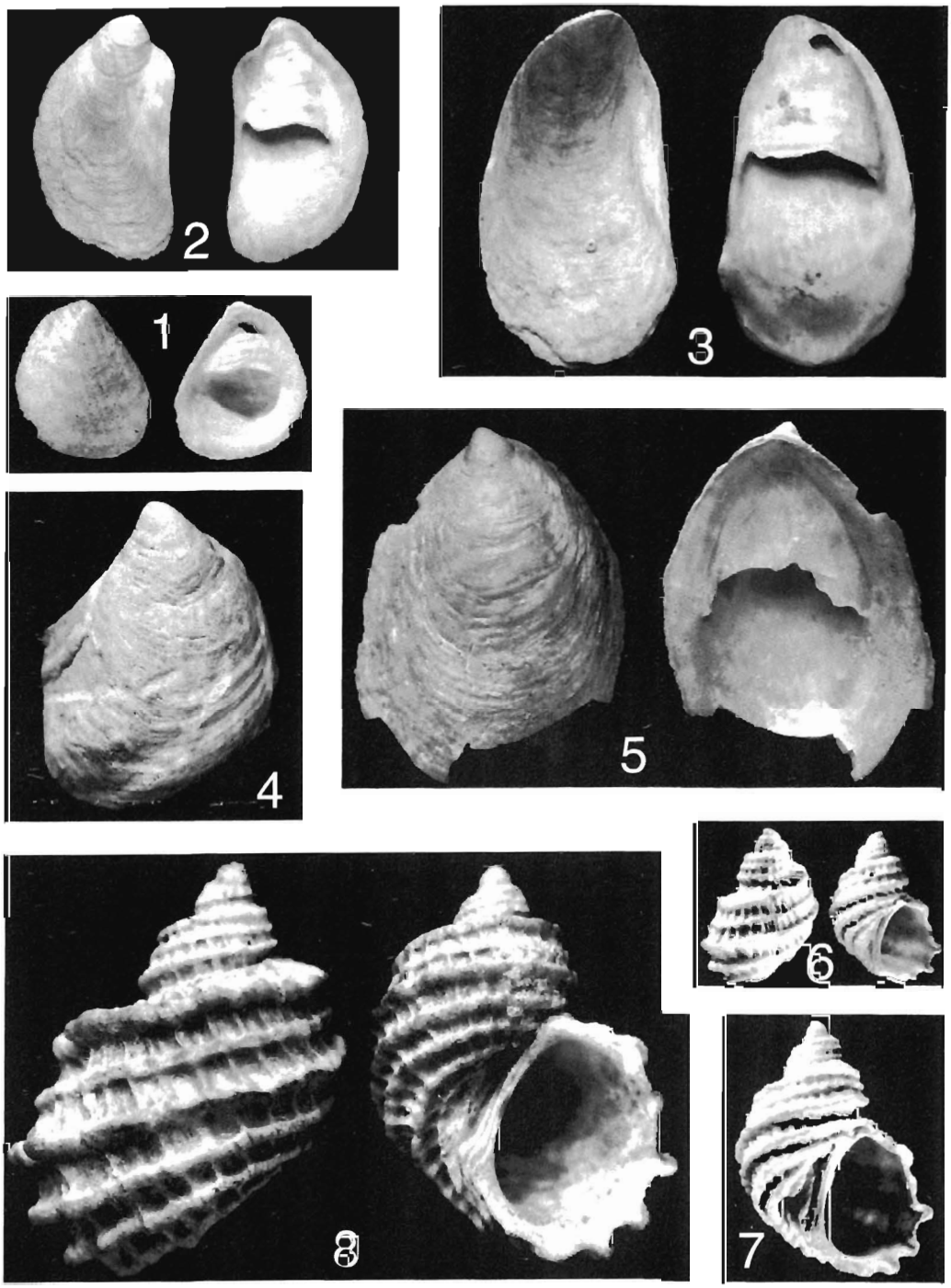

Families **Fossaridae** and **Calyptraeidae**

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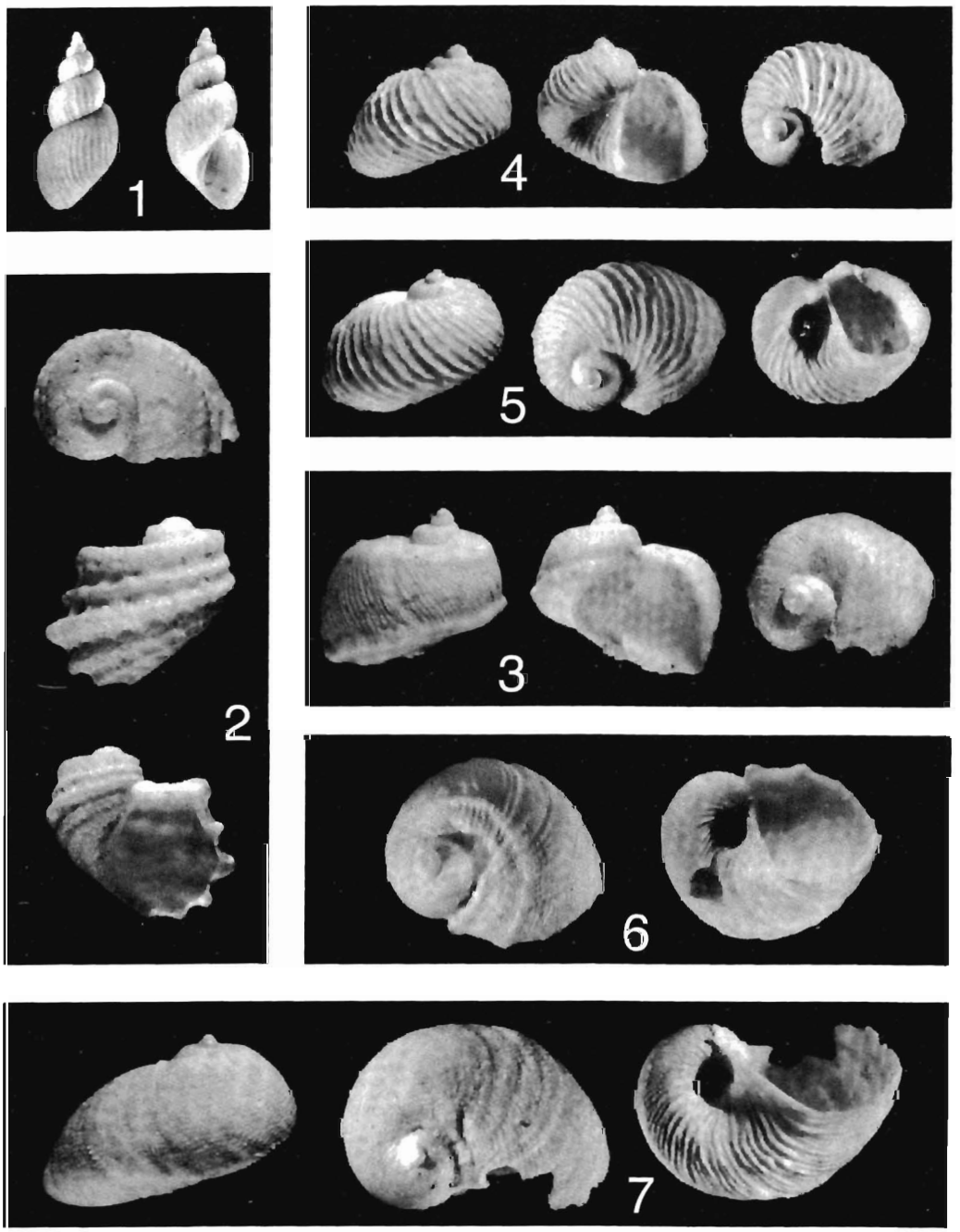

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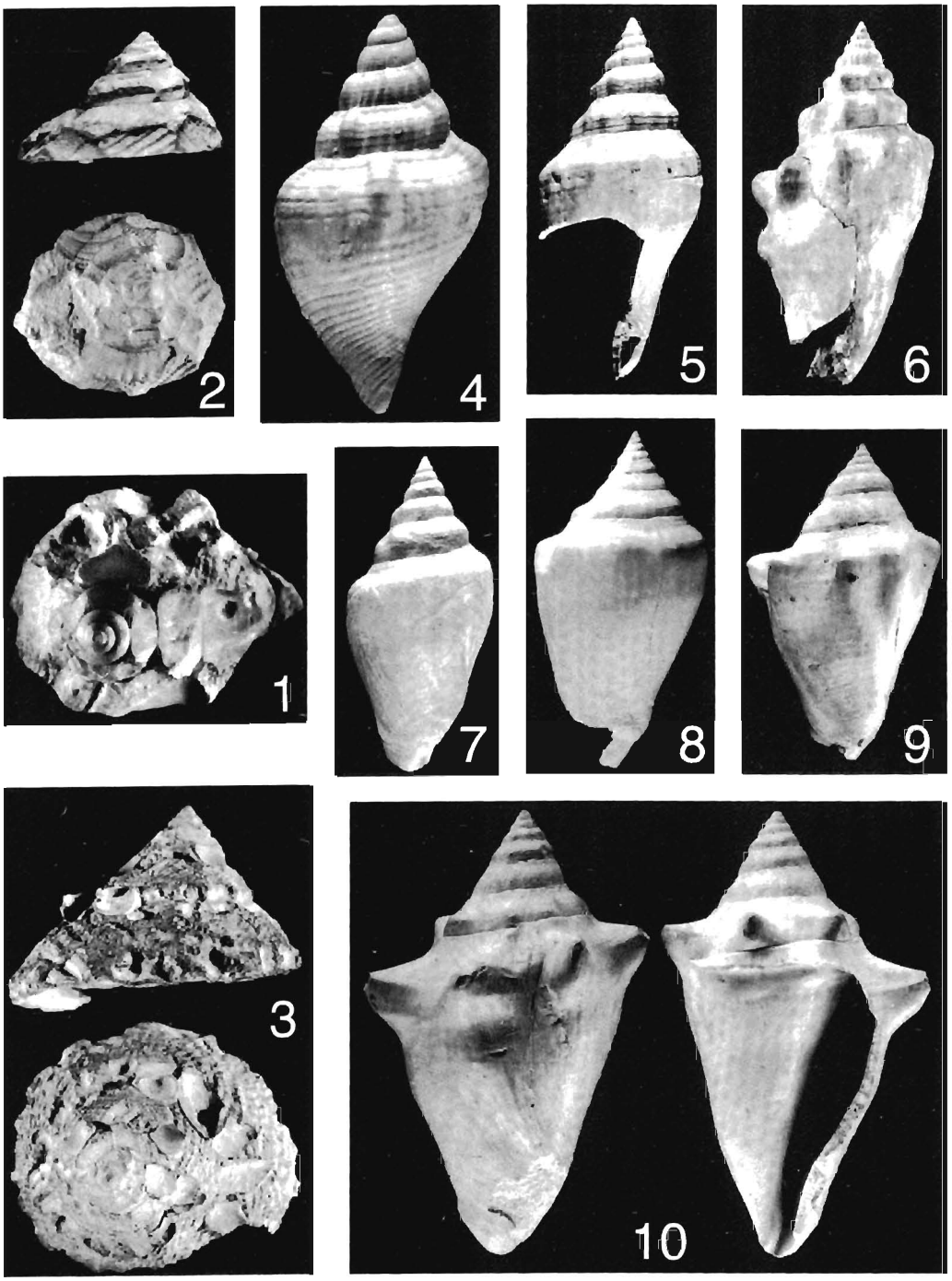

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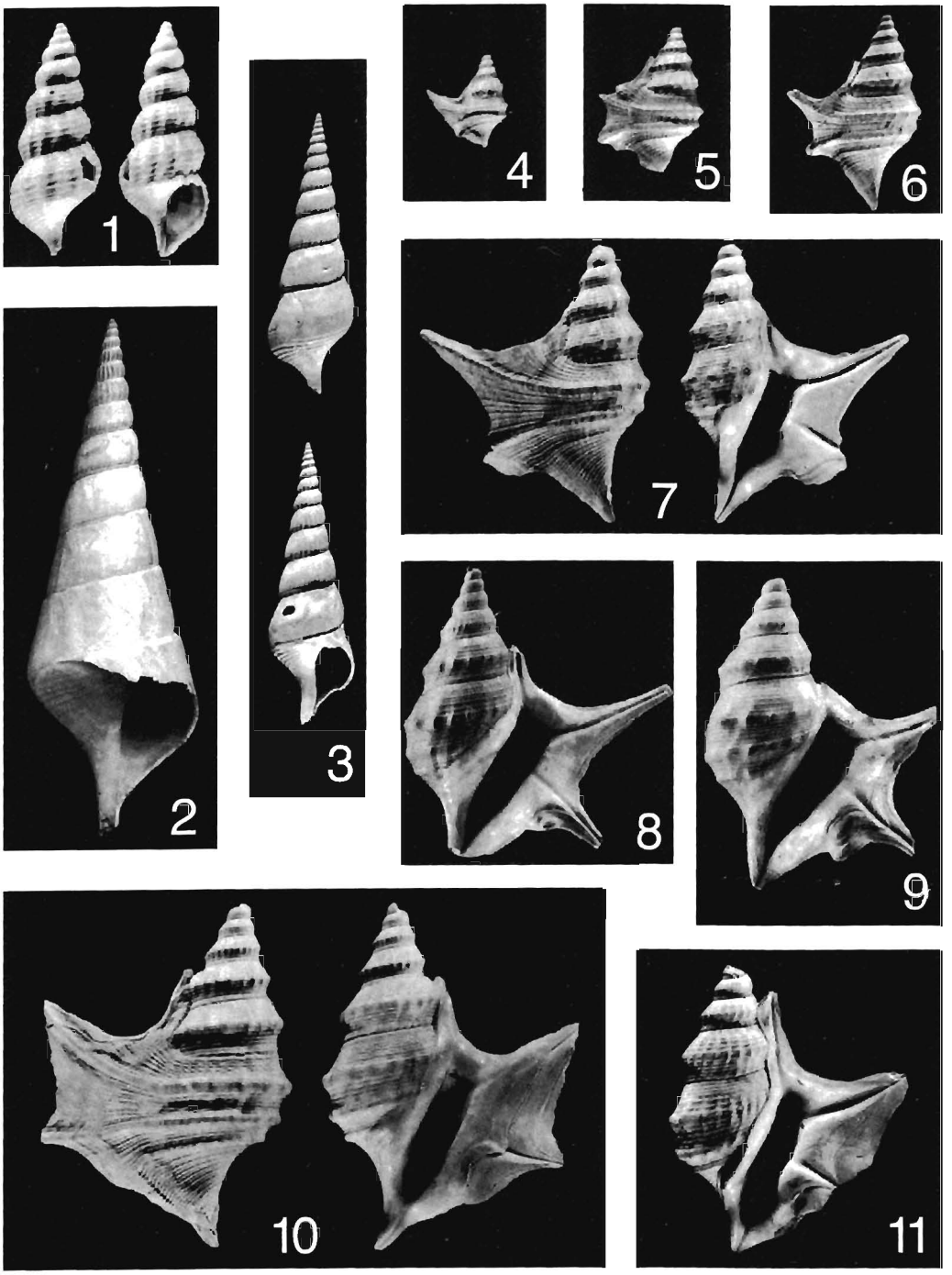

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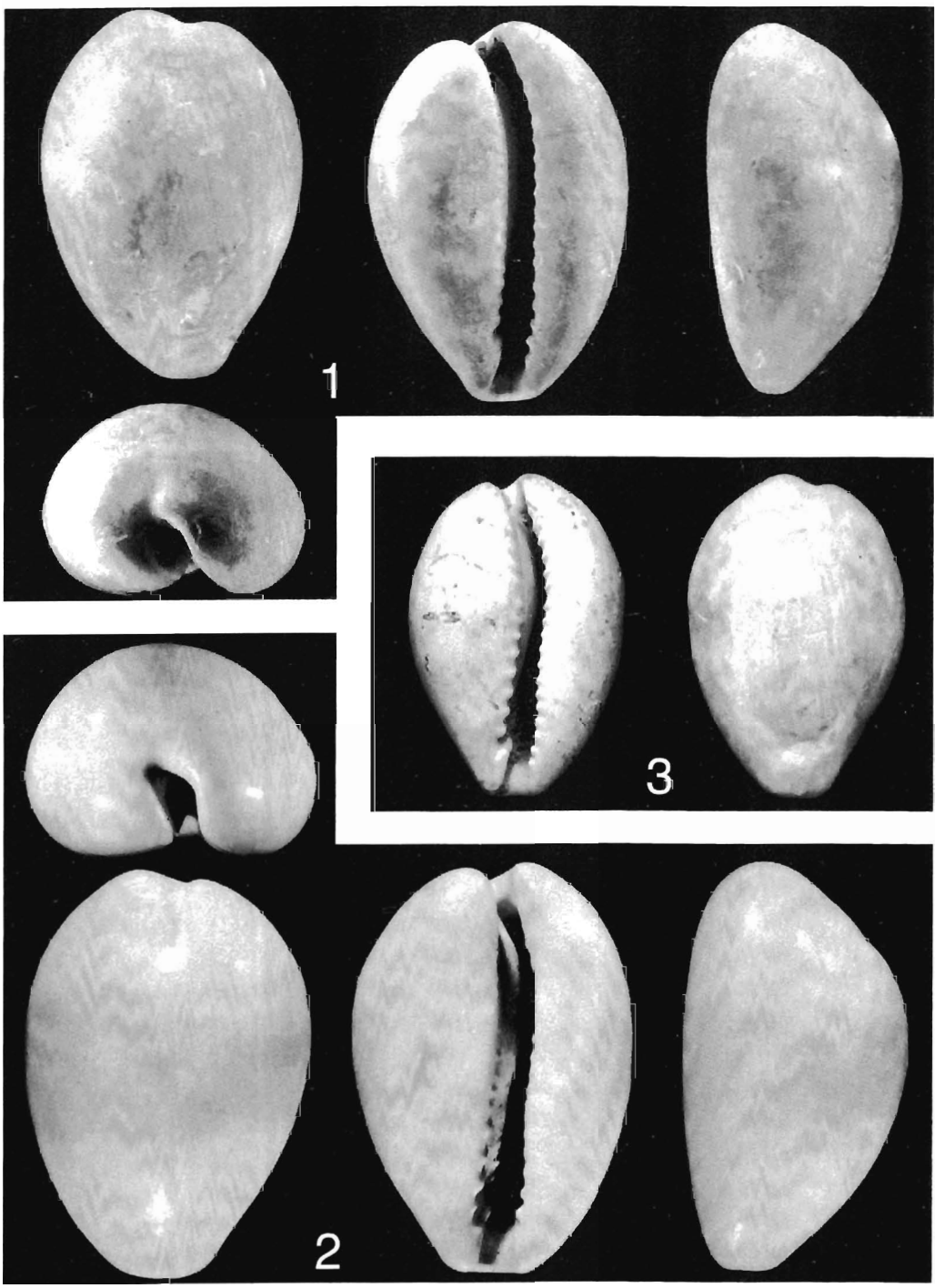

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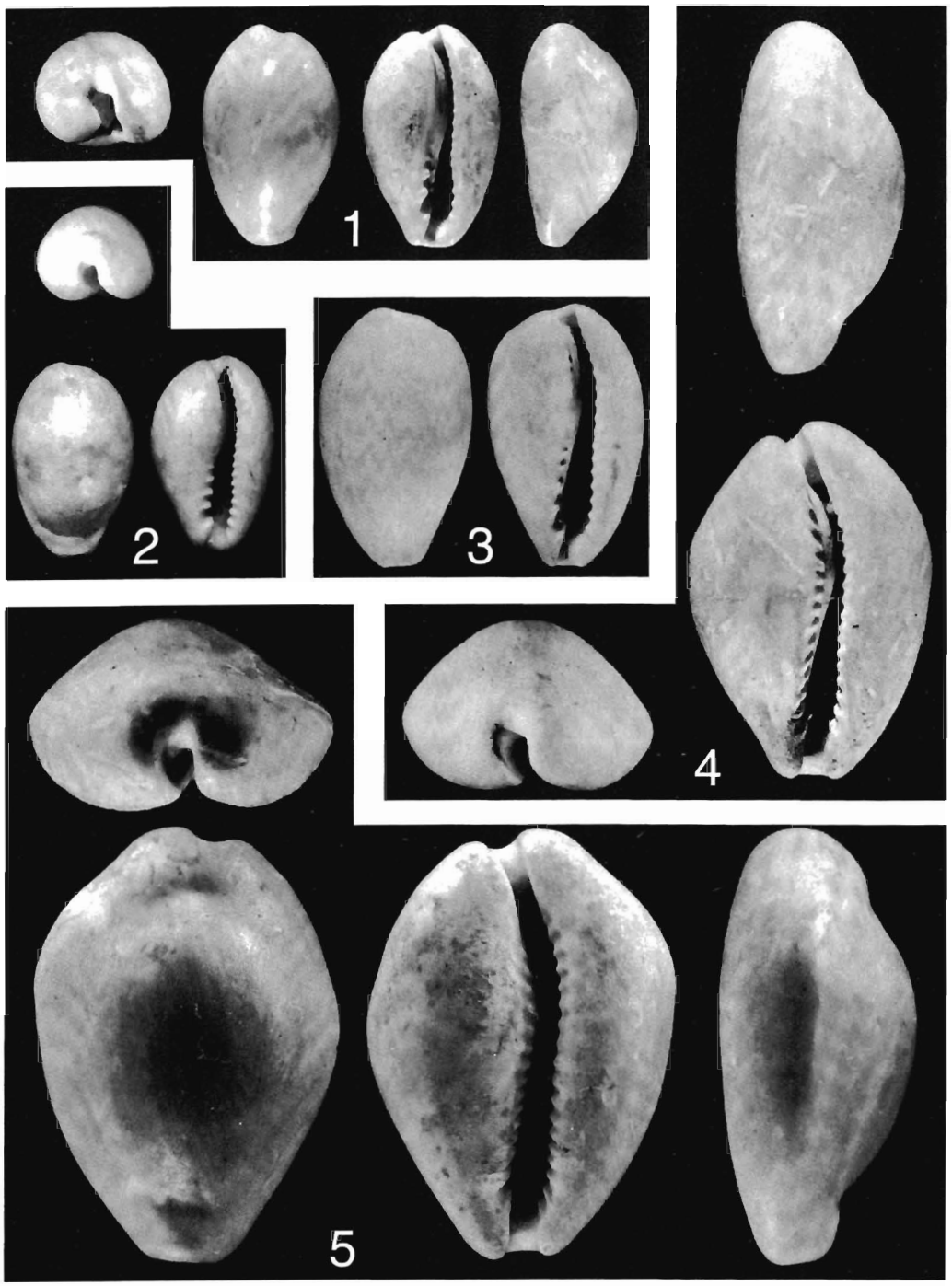

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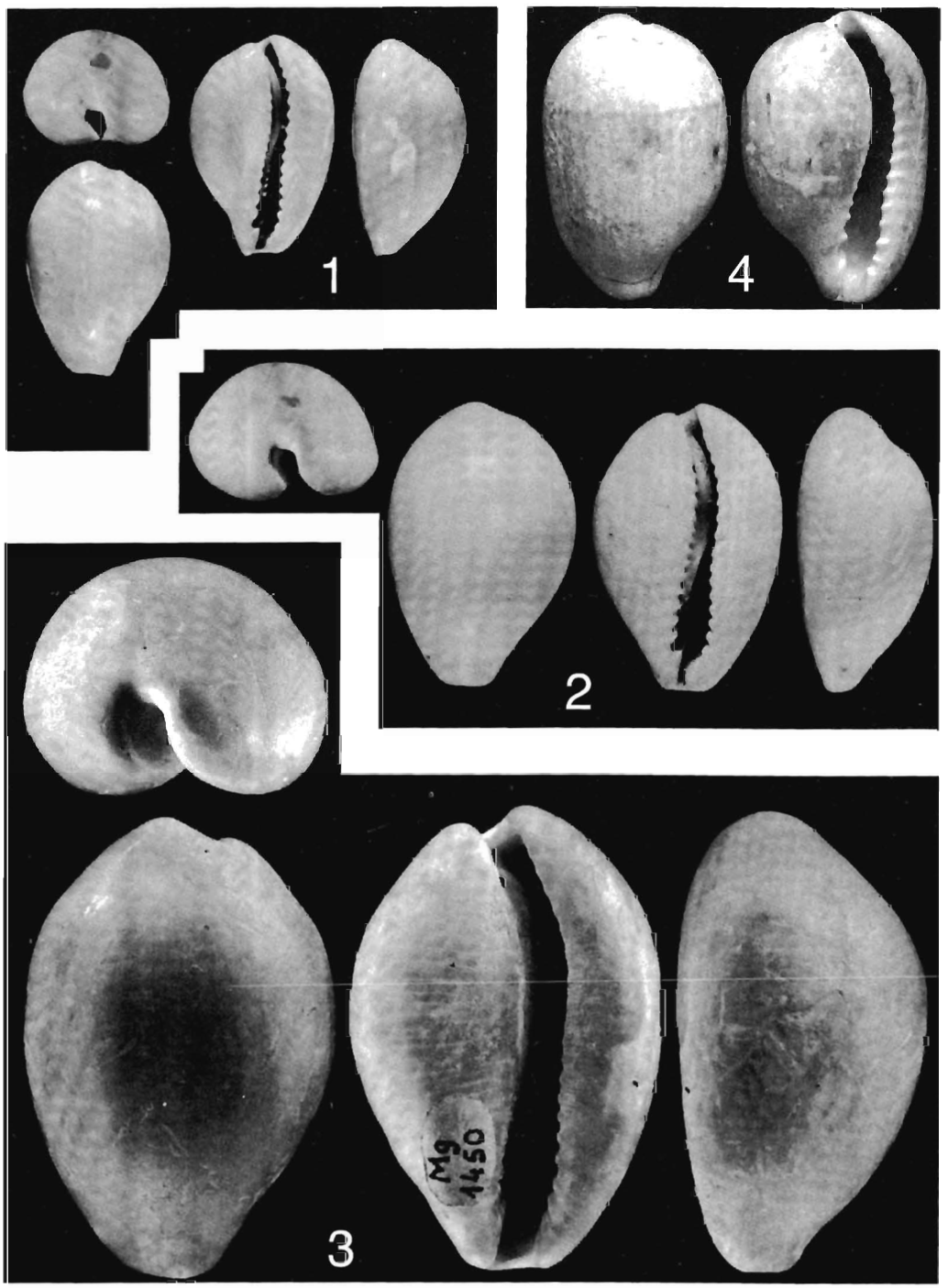

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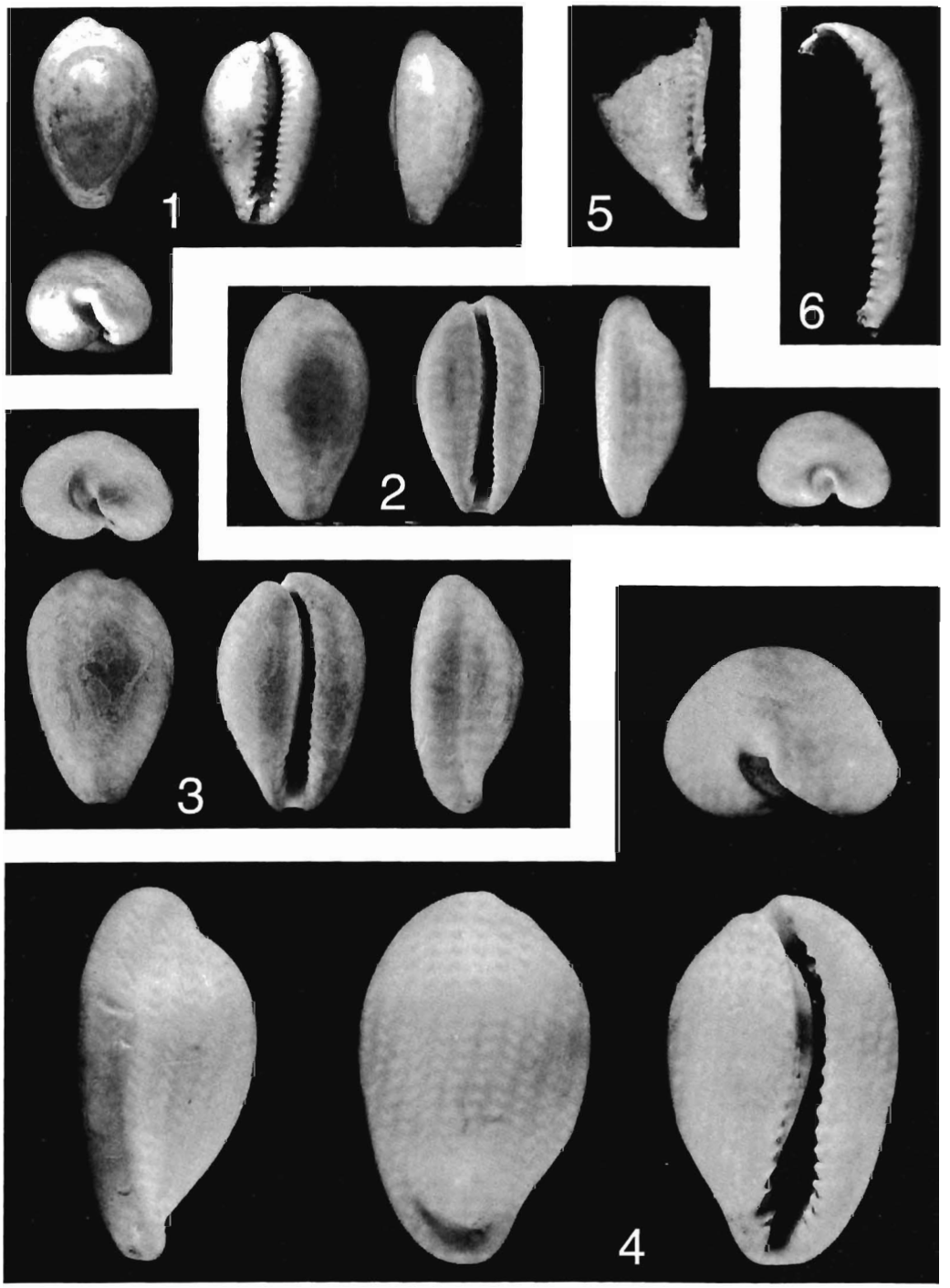

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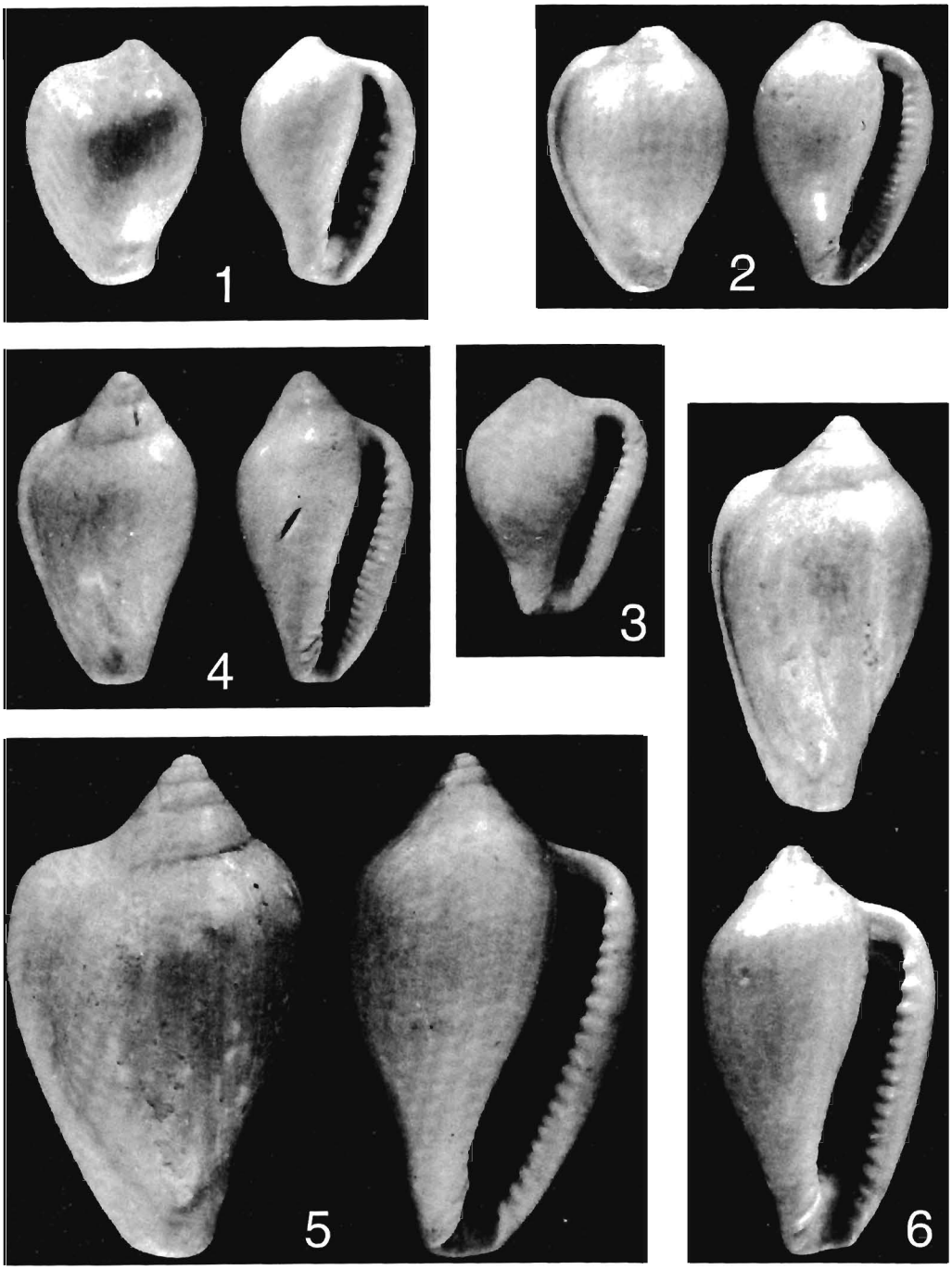

Family **Triviidae**

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Family **Triviidae**

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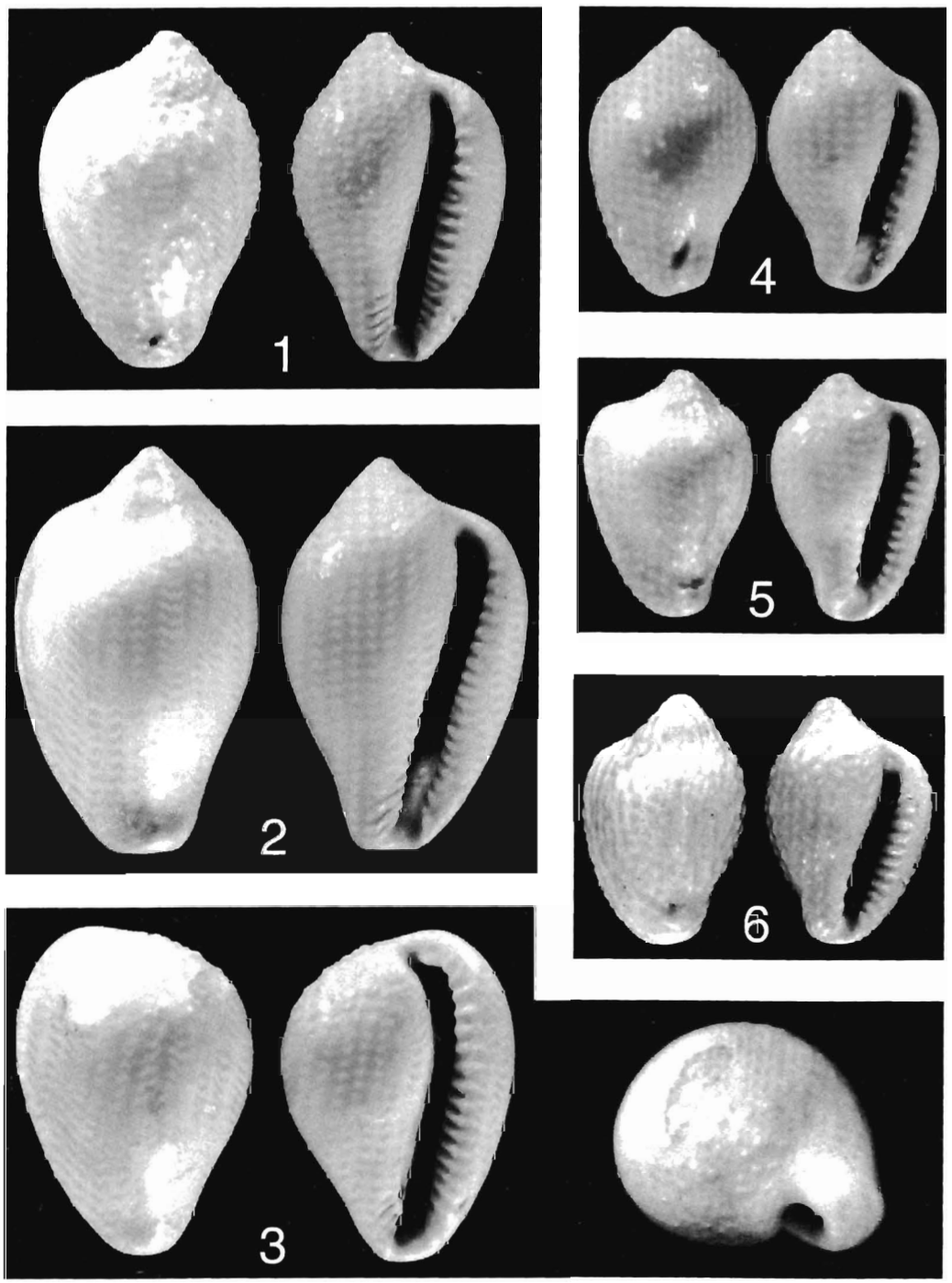

Family **Triviidae**

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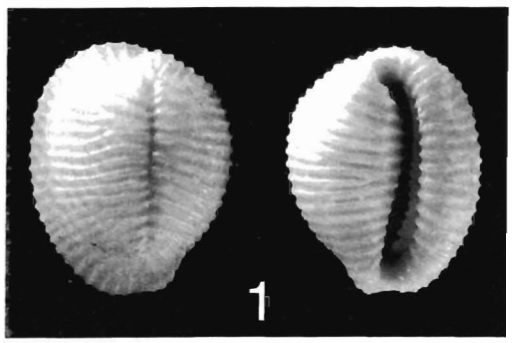

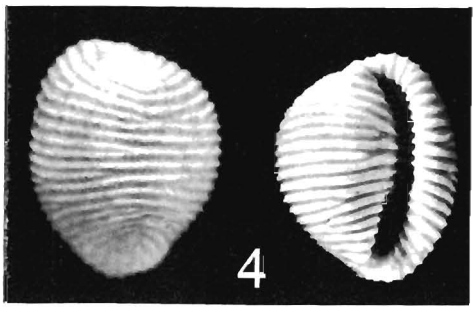

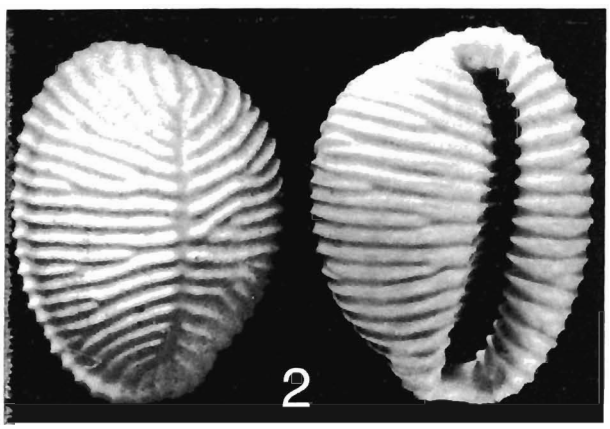

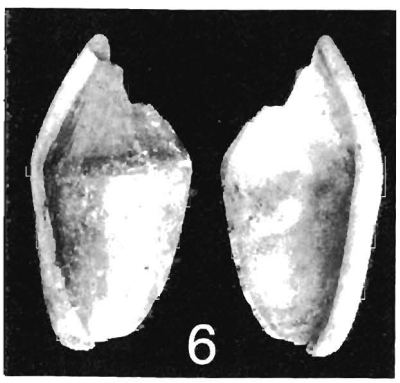

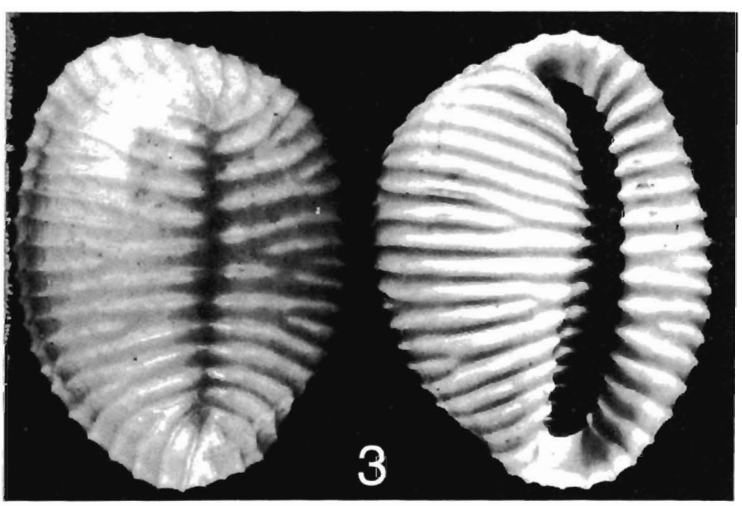

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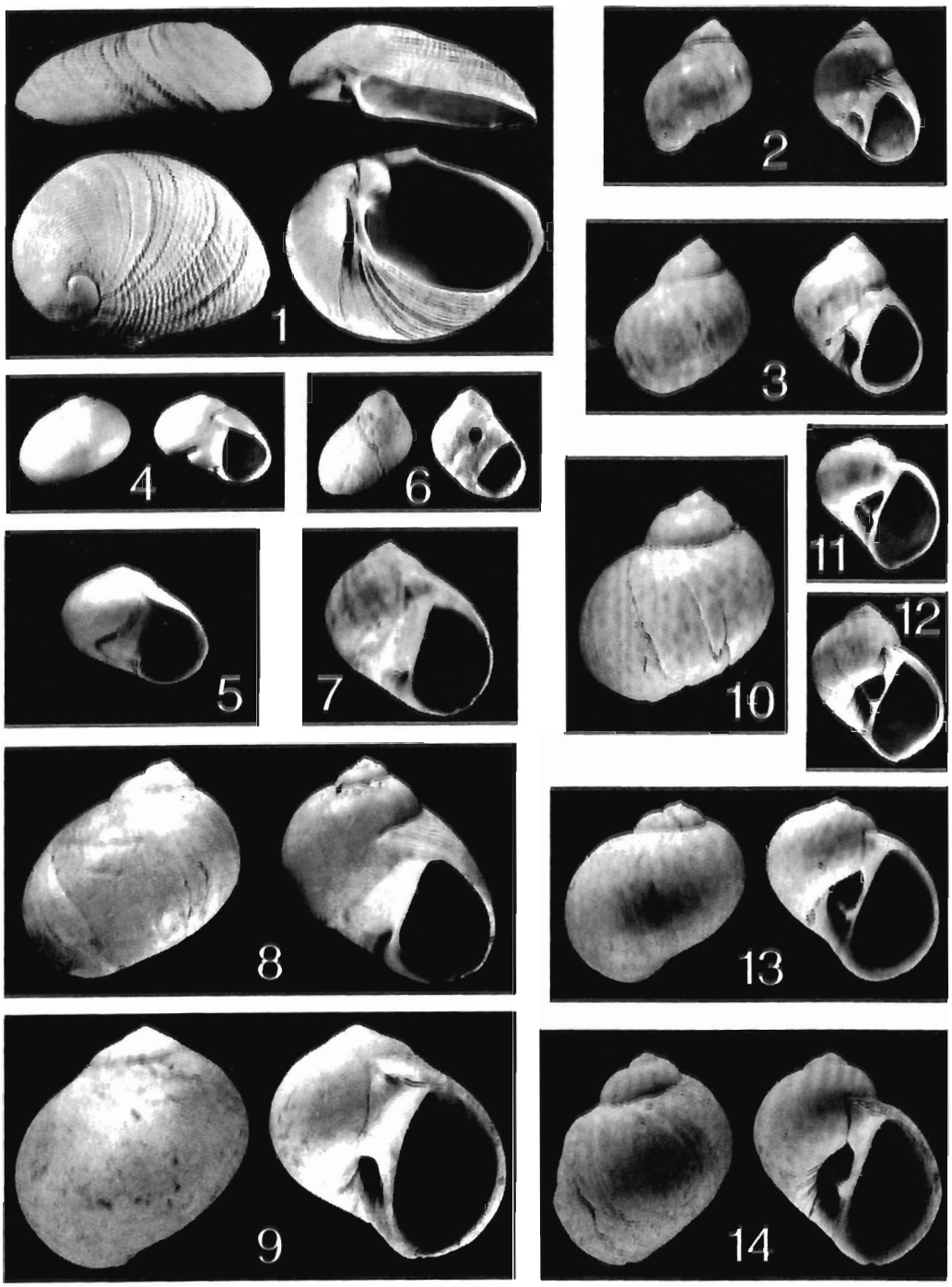

Family **Naticidae**

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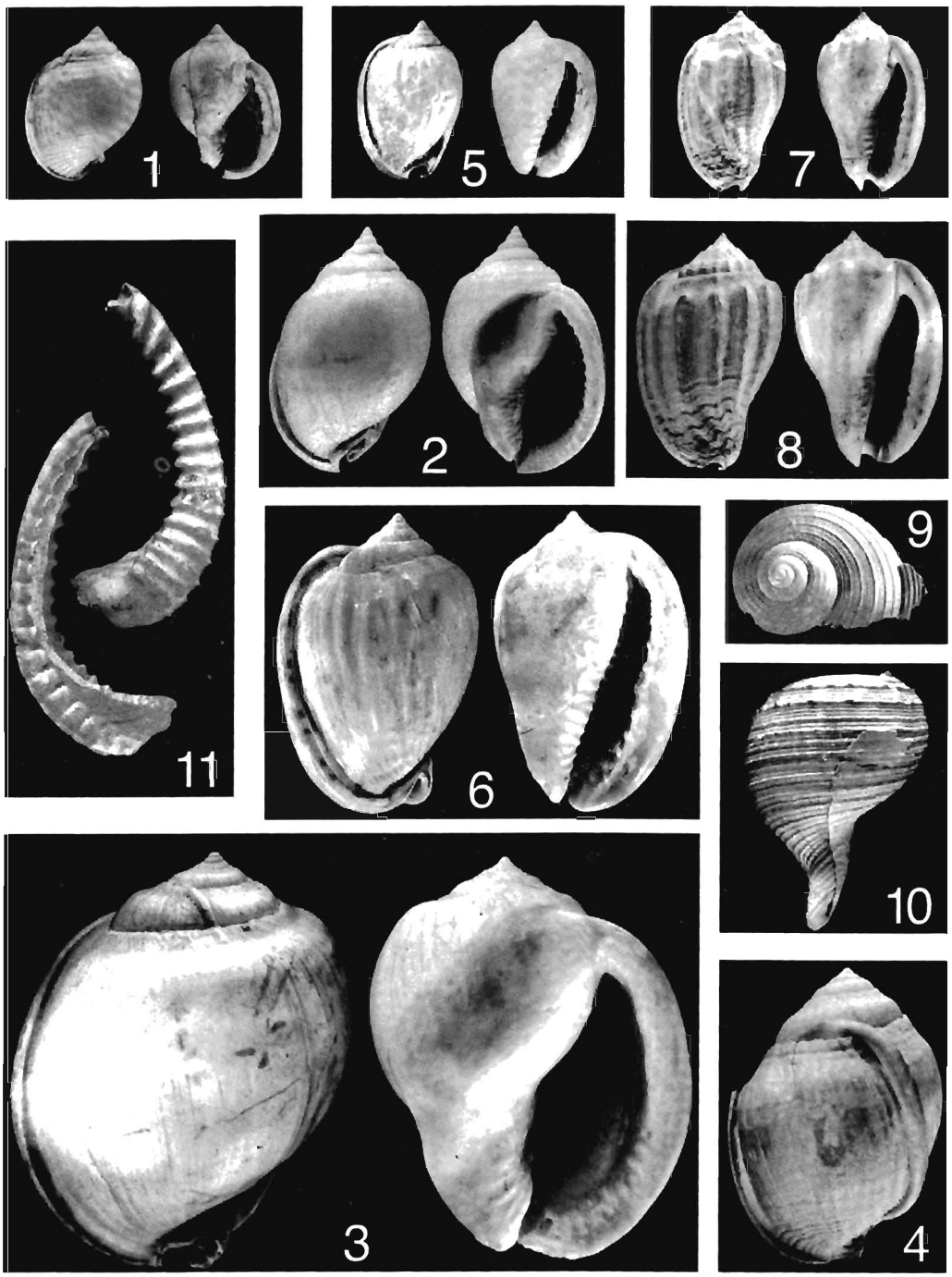

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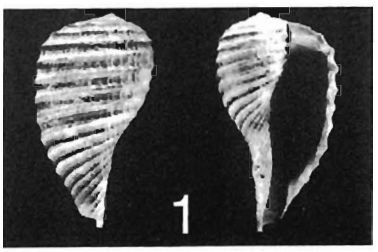

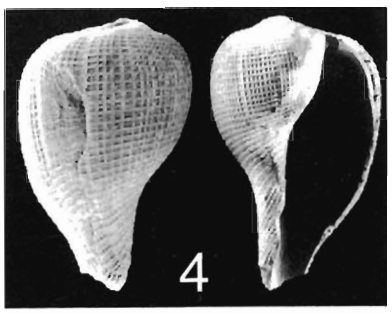

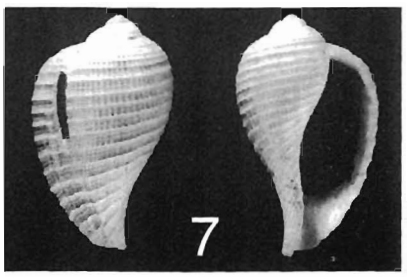

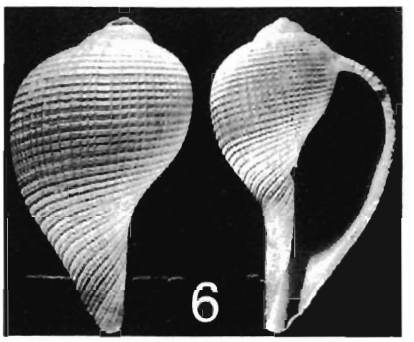

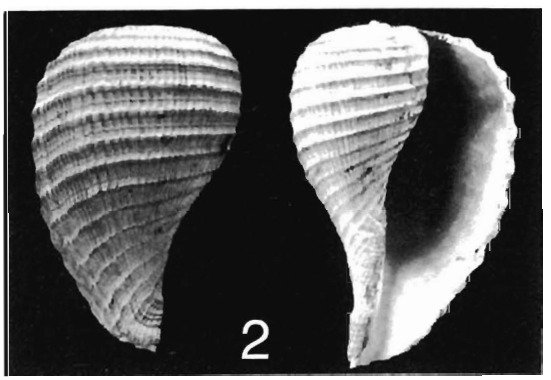

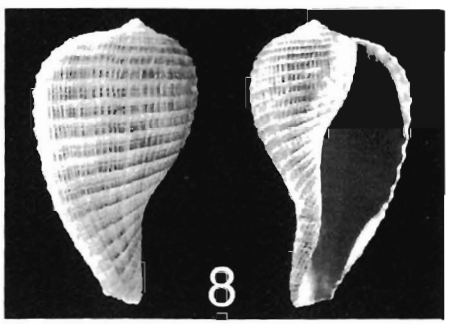

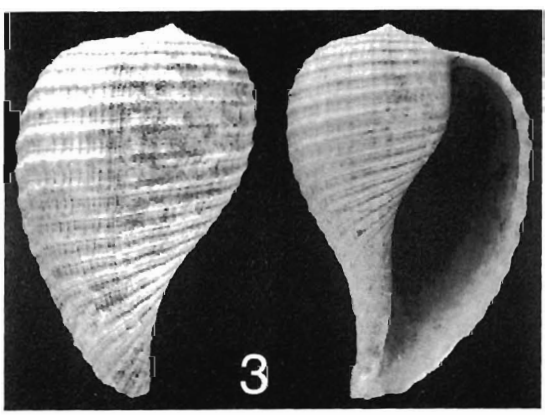

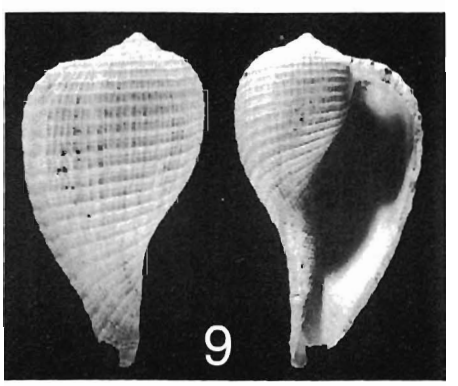

Family **Ficidae**

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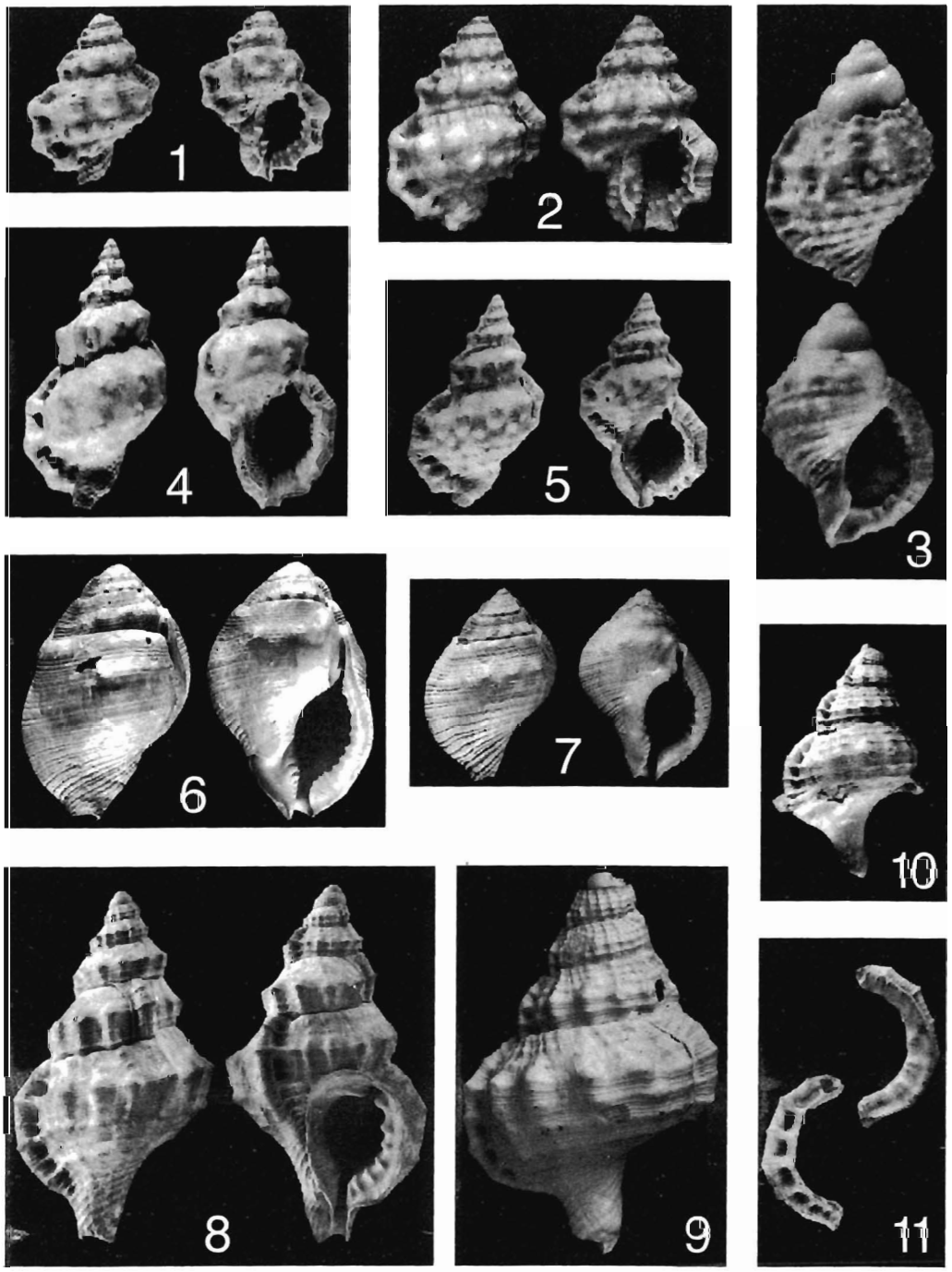

Families **Cymatiidae** and **Bursidae**

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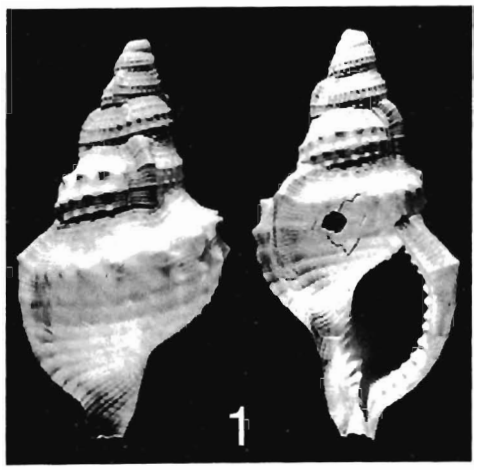

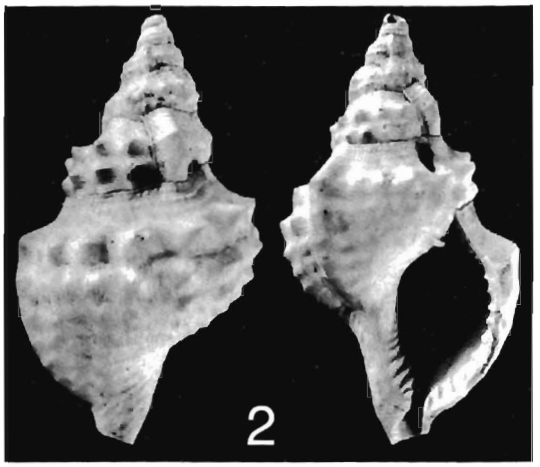

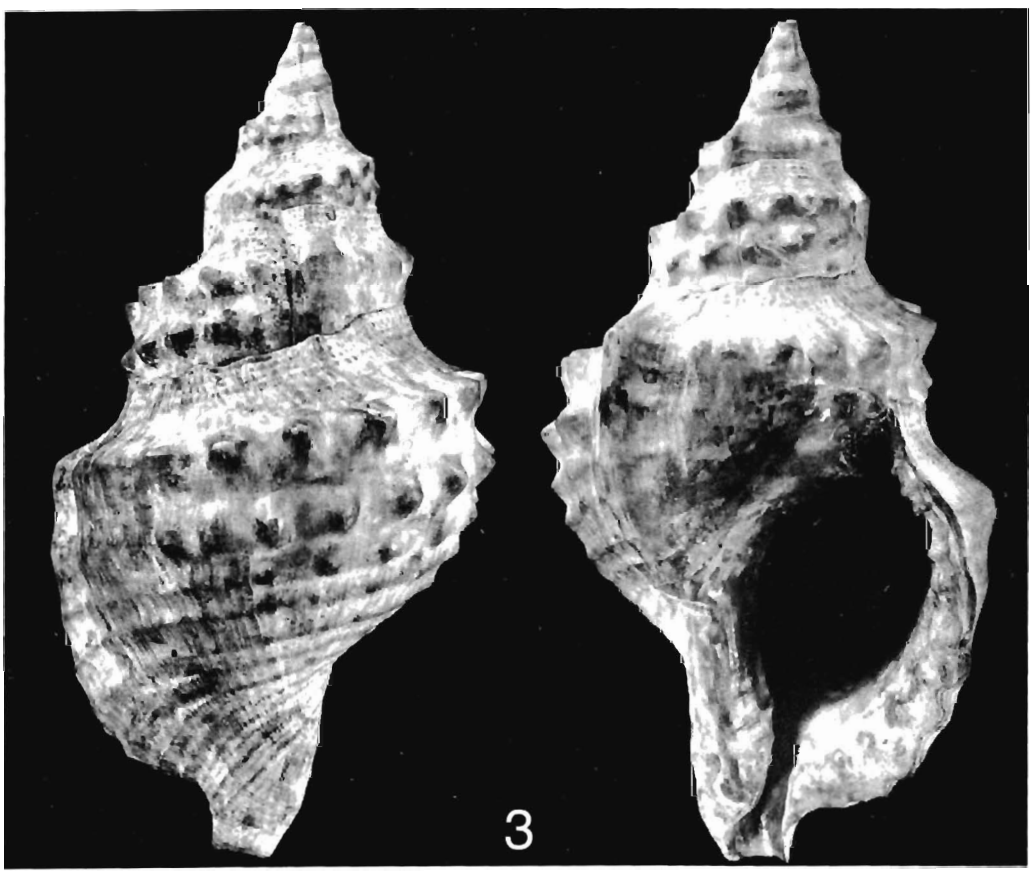

Family **Cymatiidae**

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Family **Cymatiidae**

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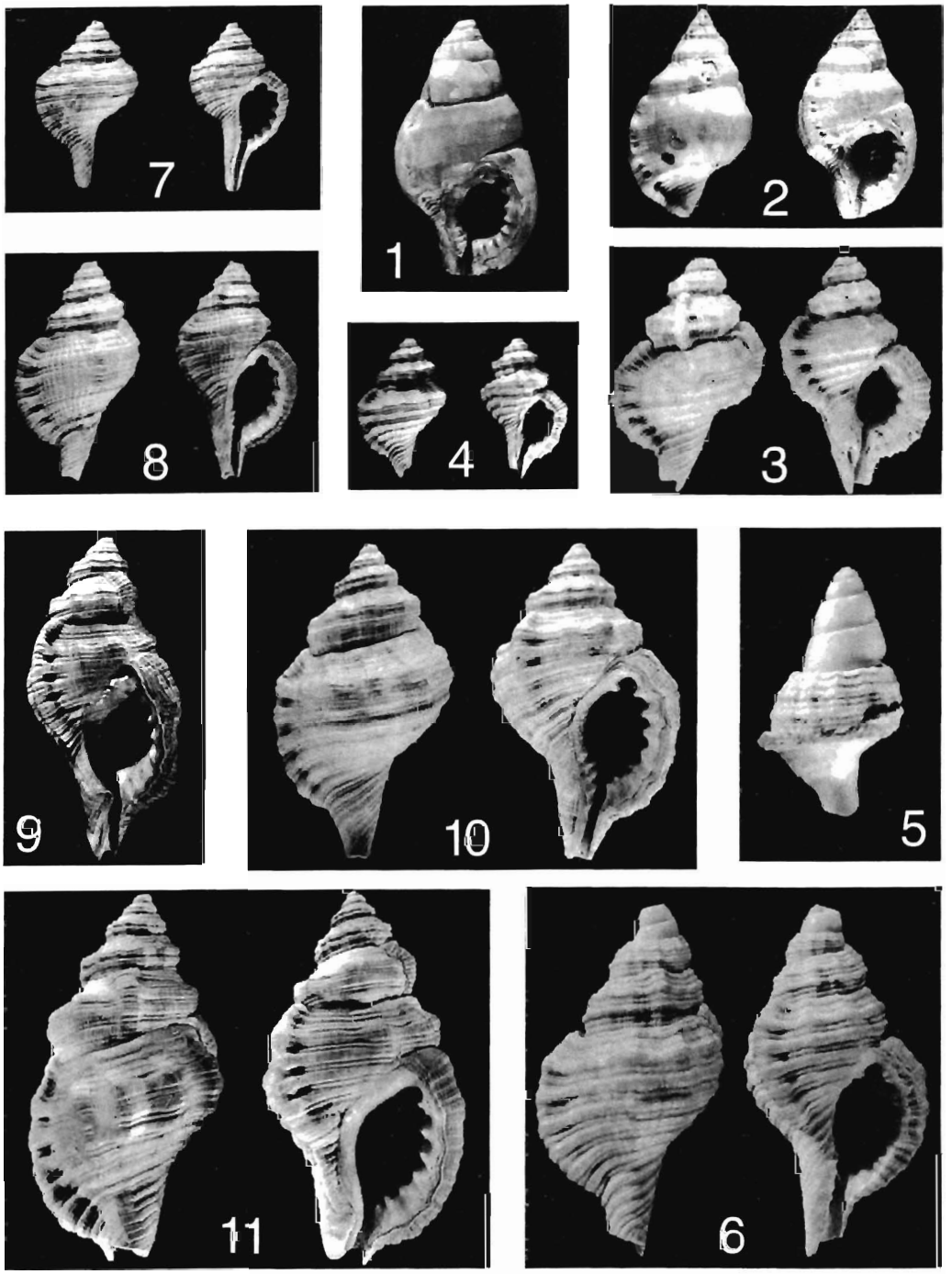

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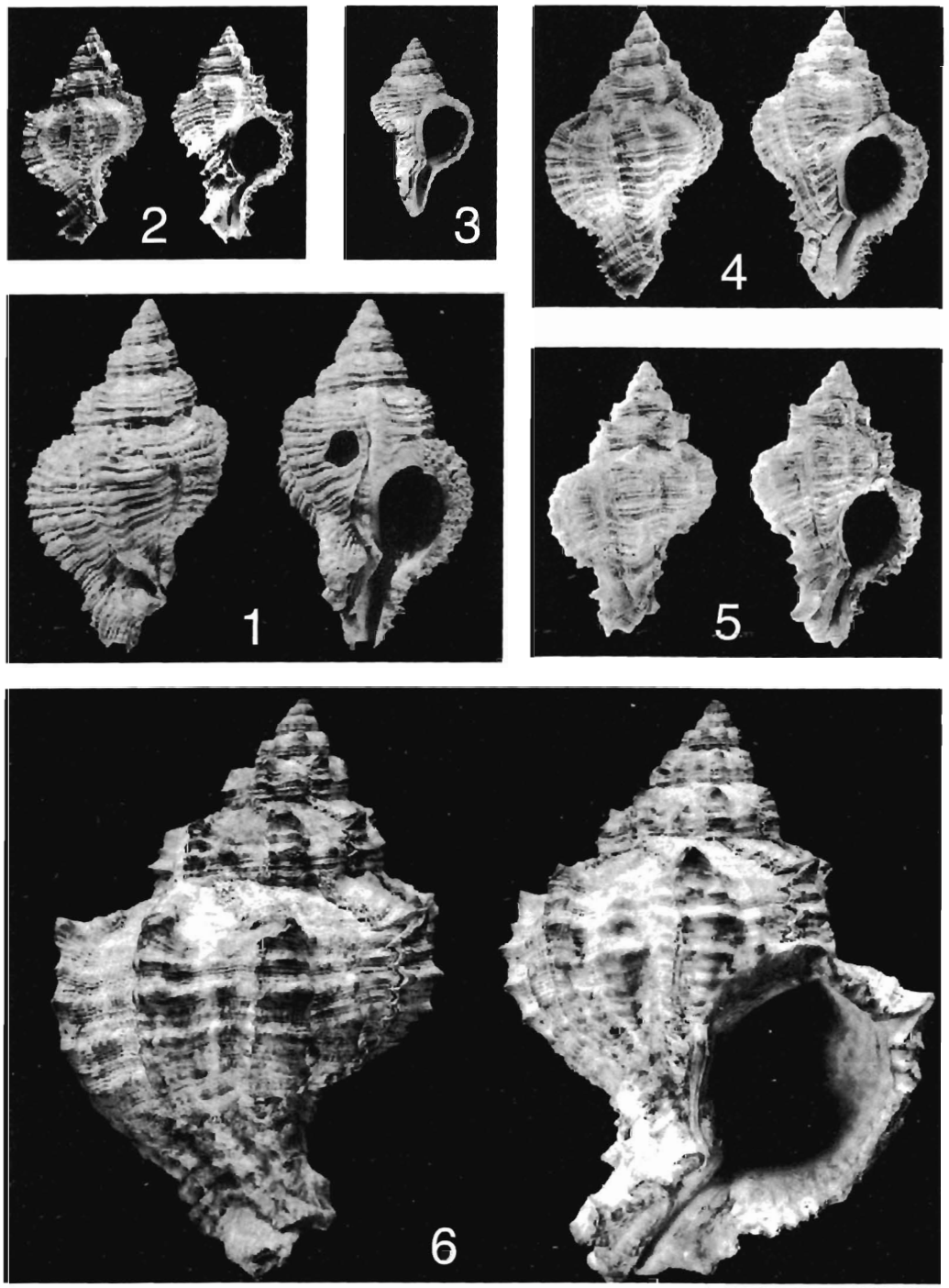

Family **Muricidae**

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Family **Muricidae**

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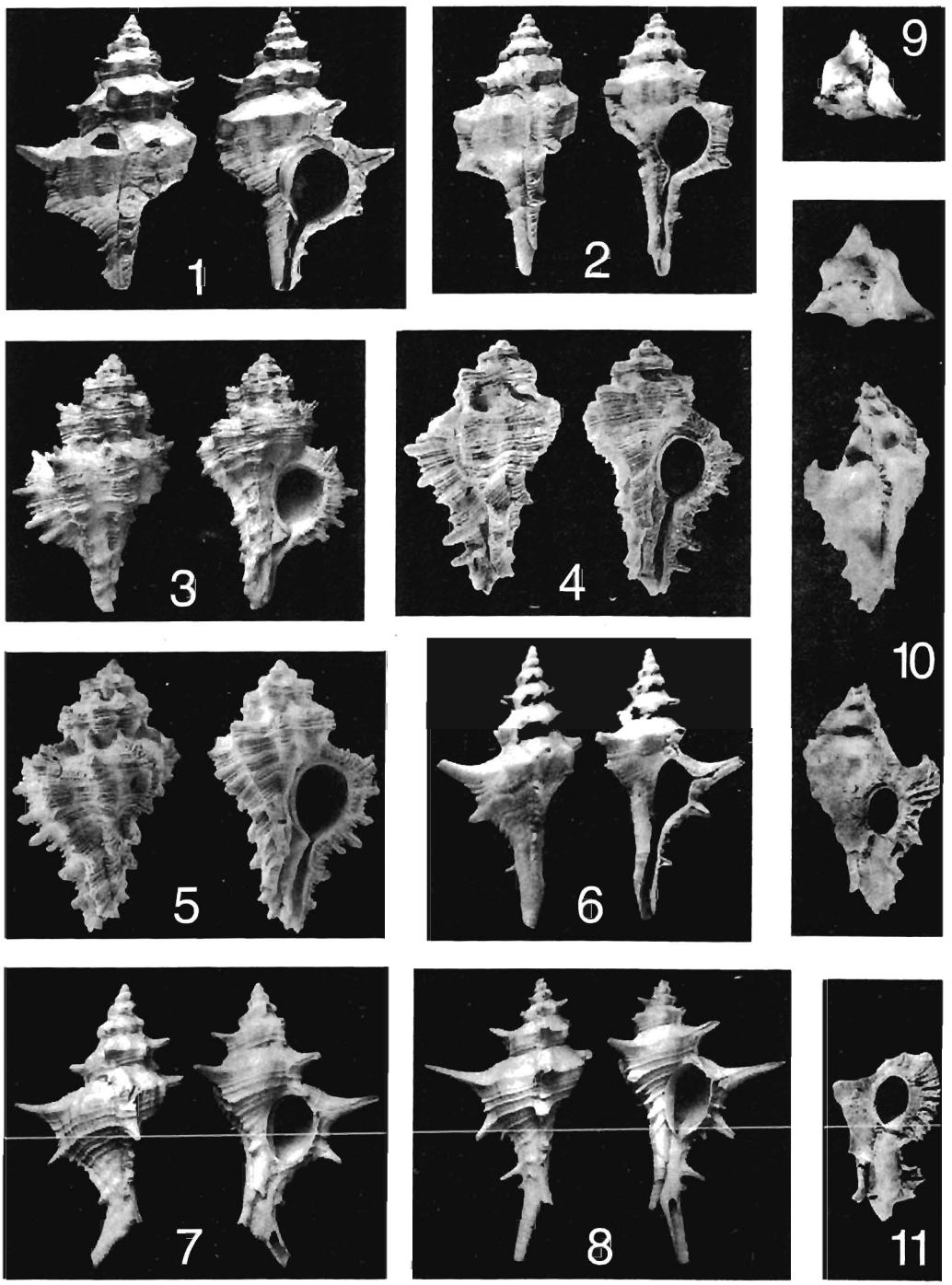

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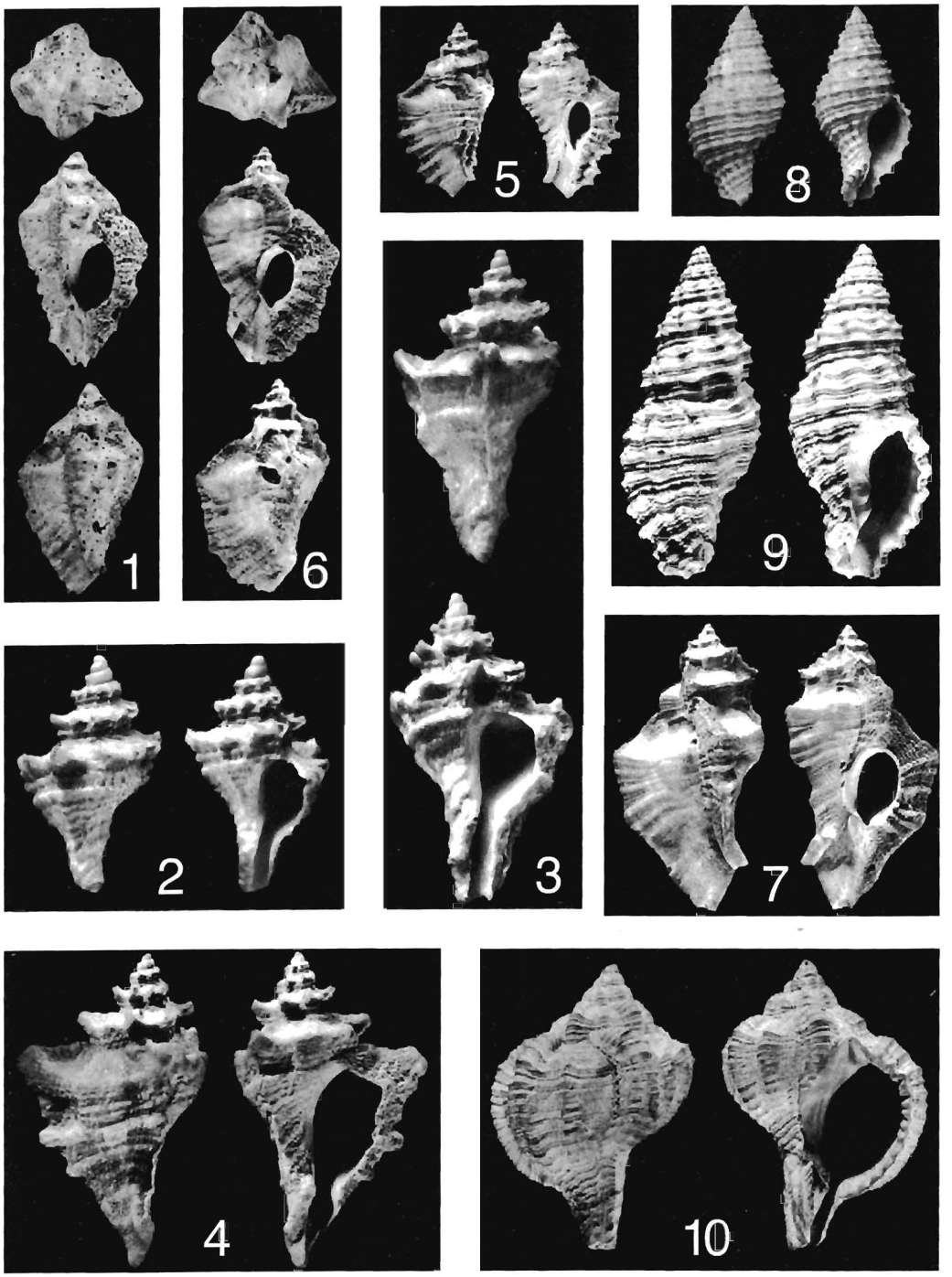

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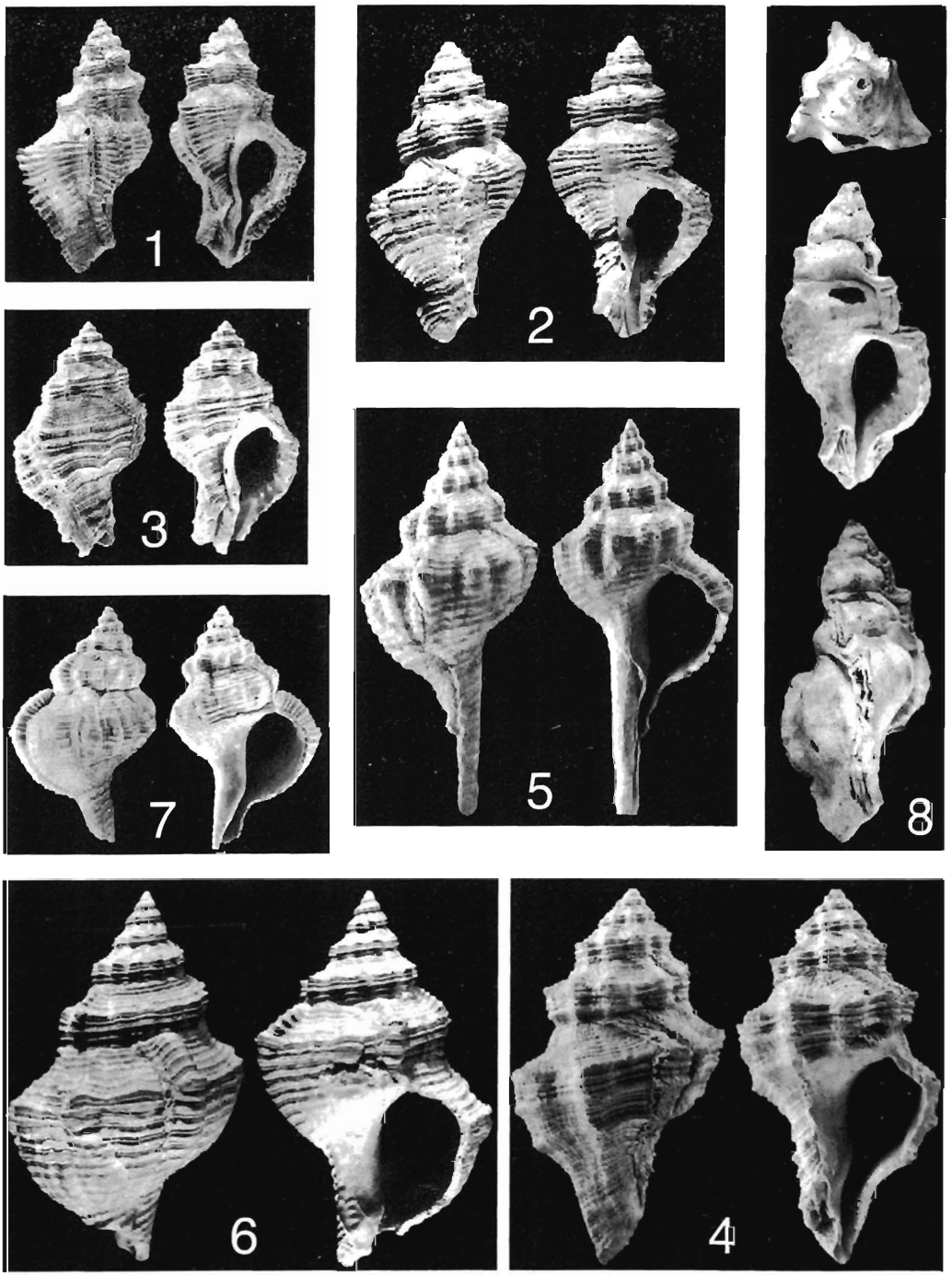

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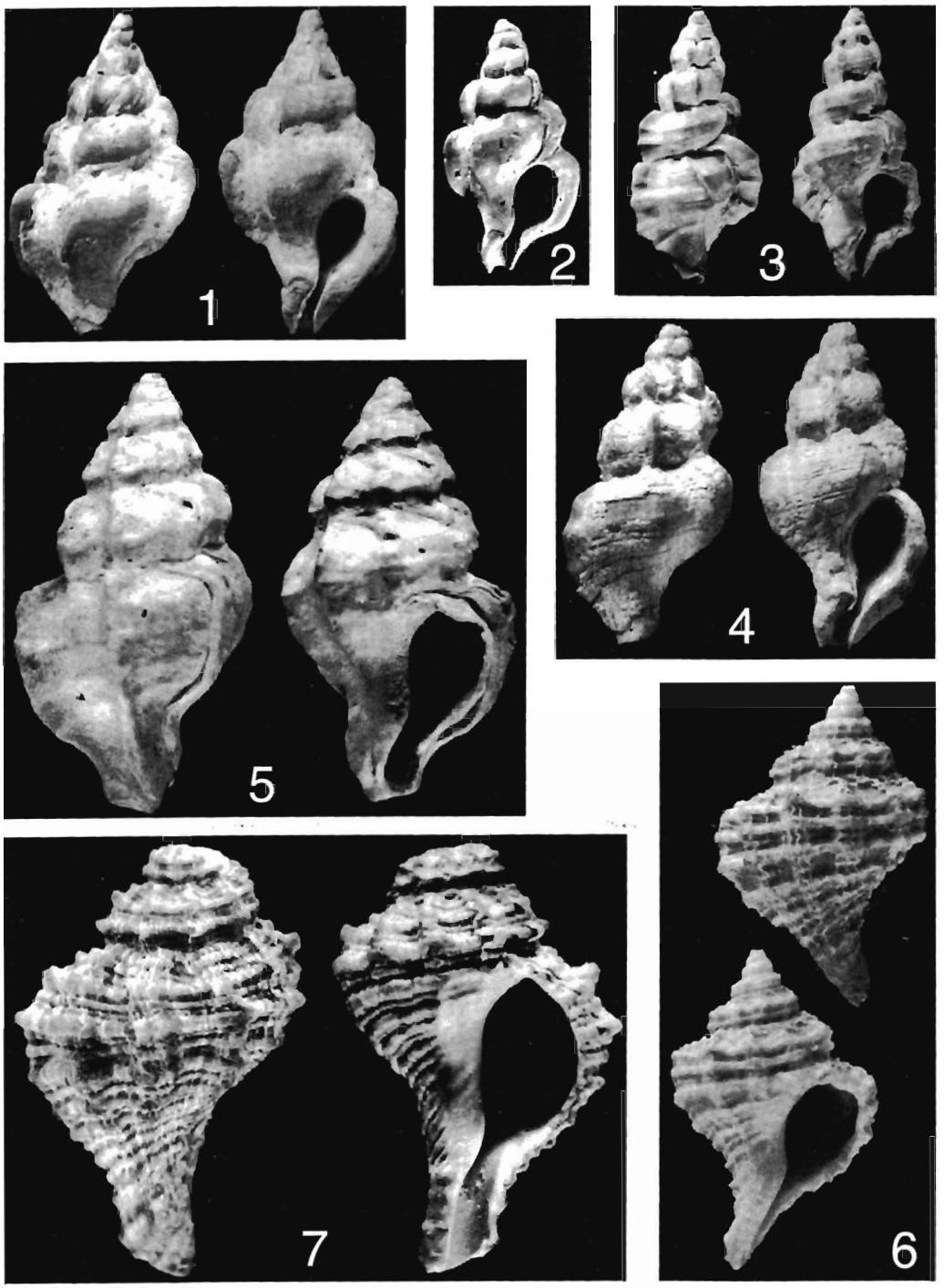

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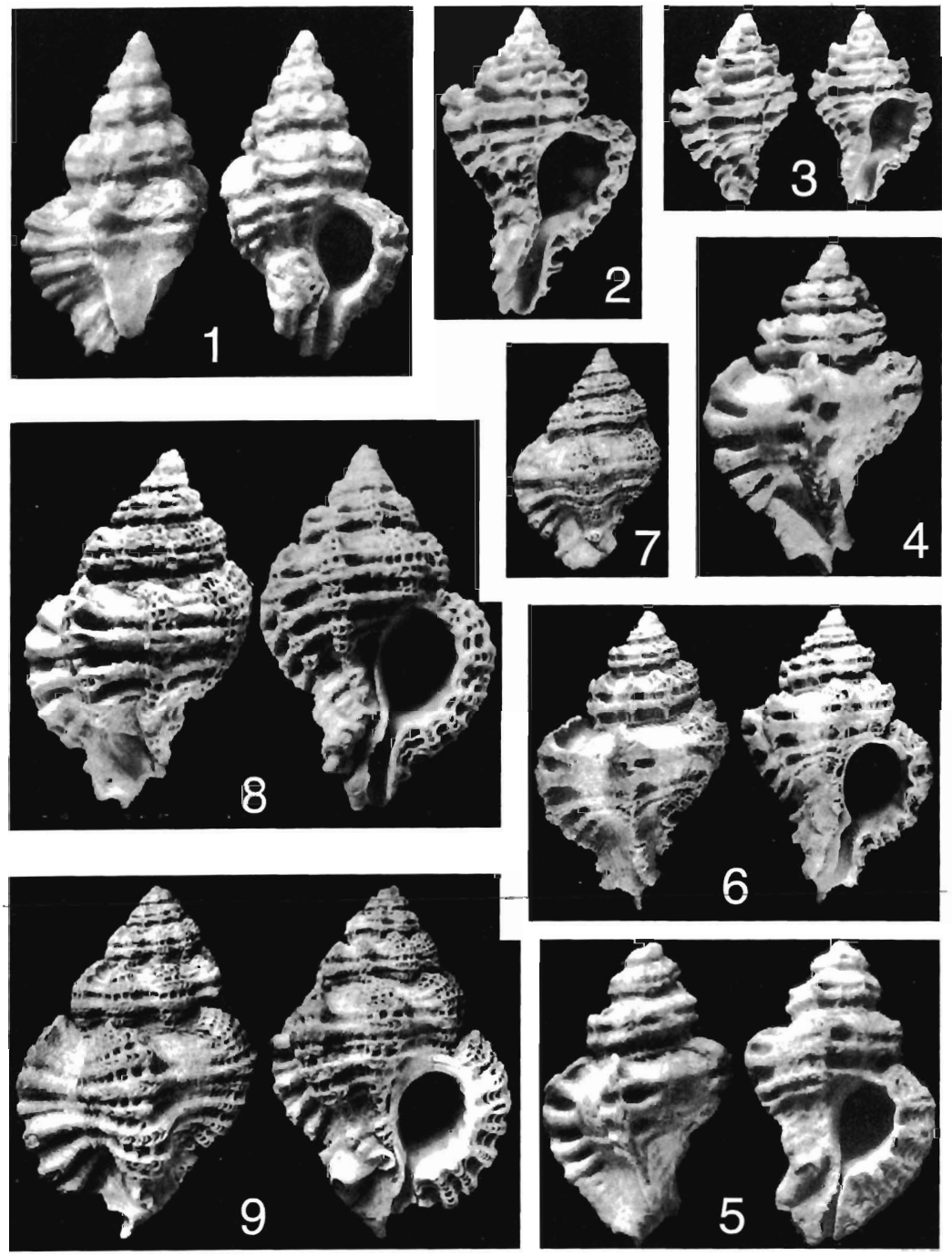

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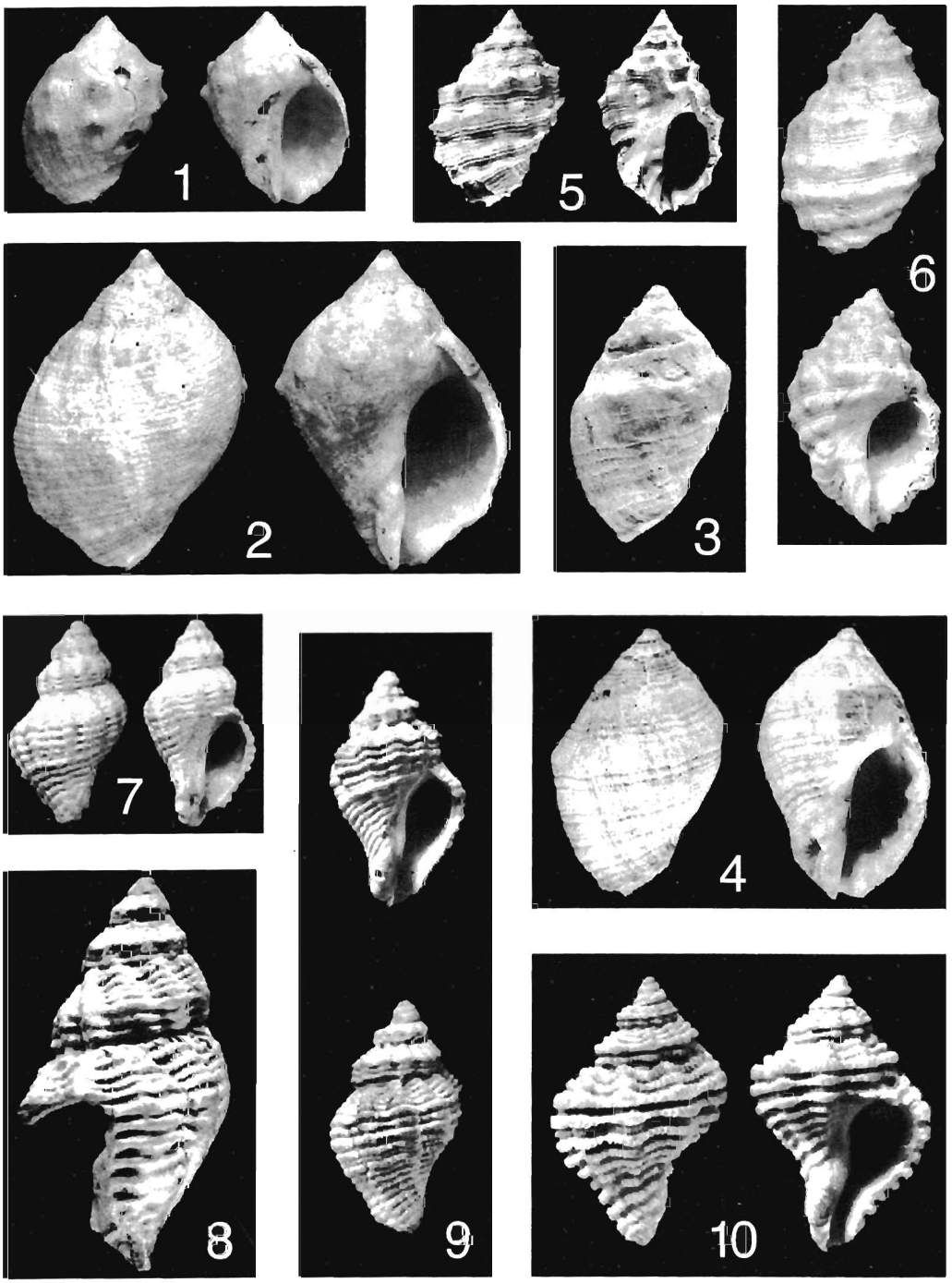

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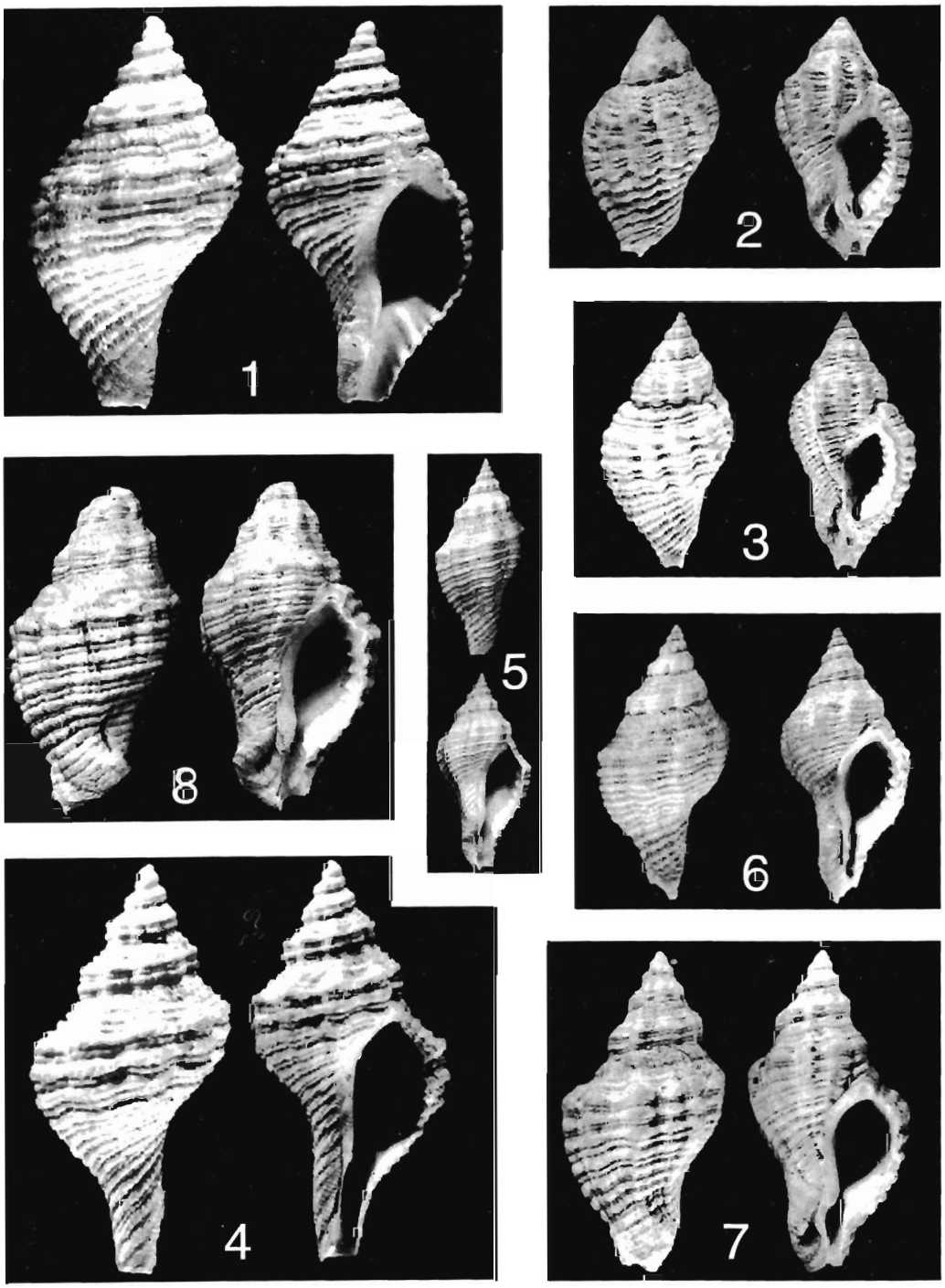

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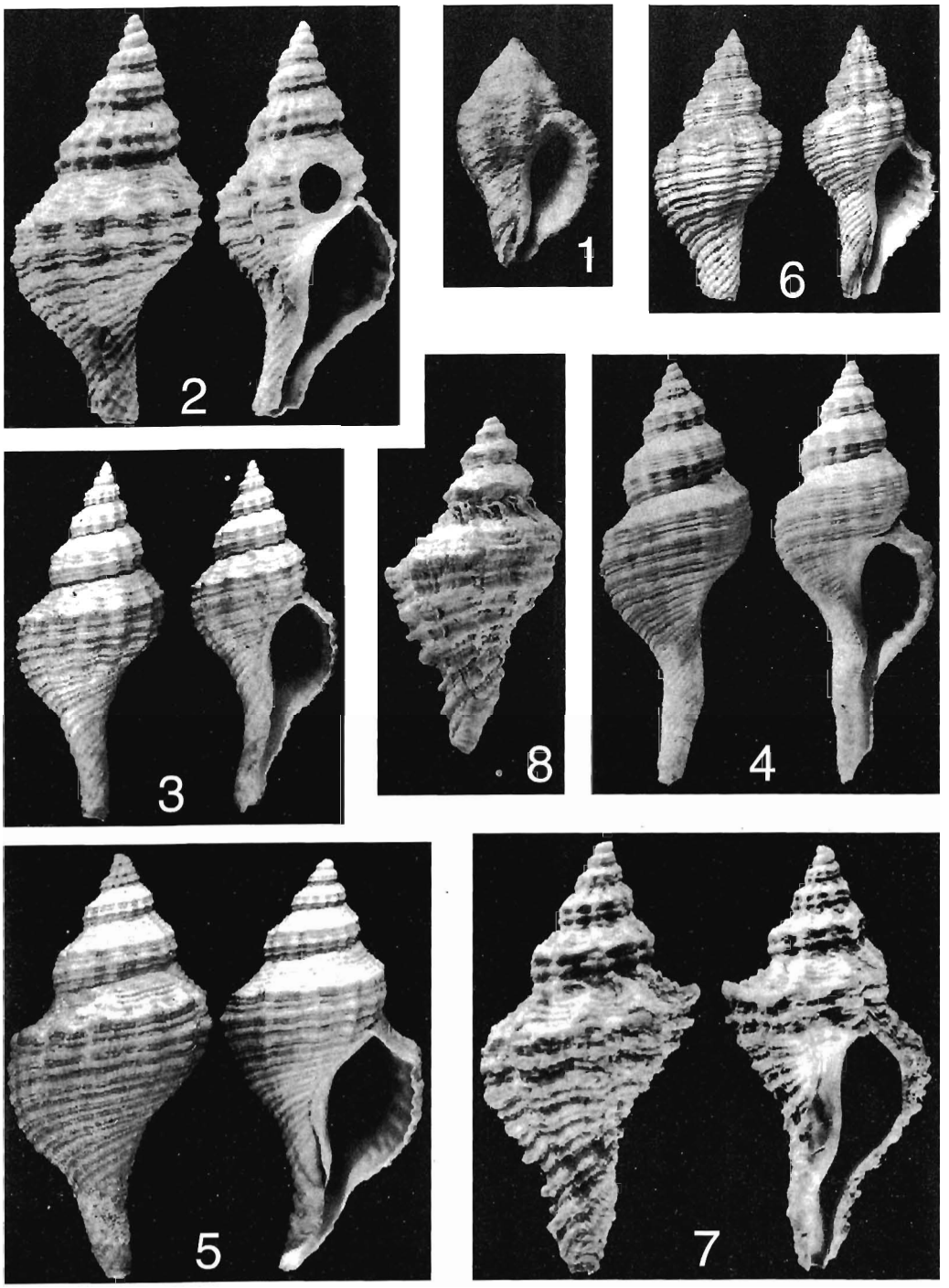

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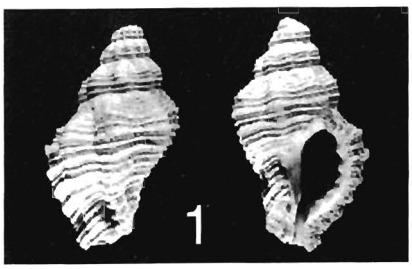

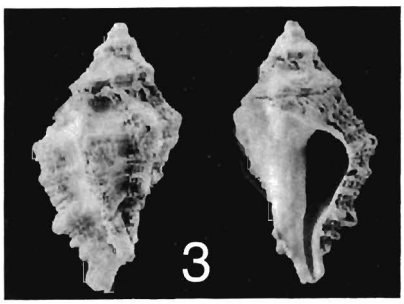

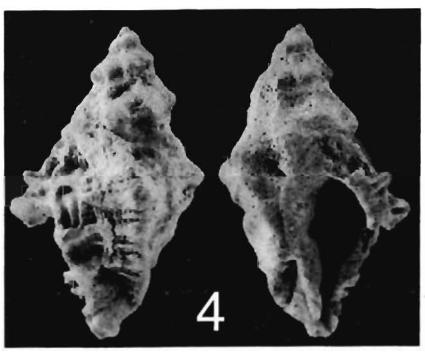

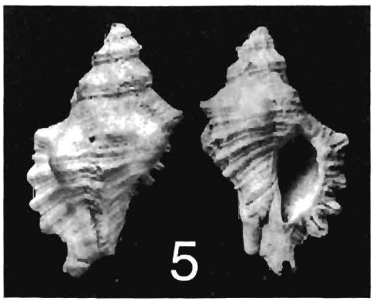

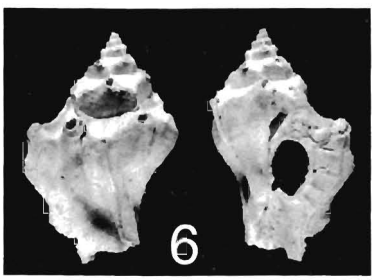

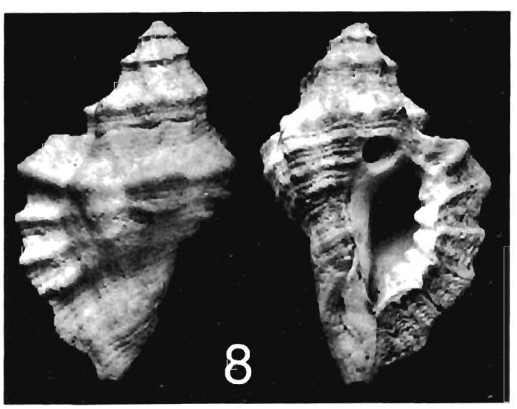

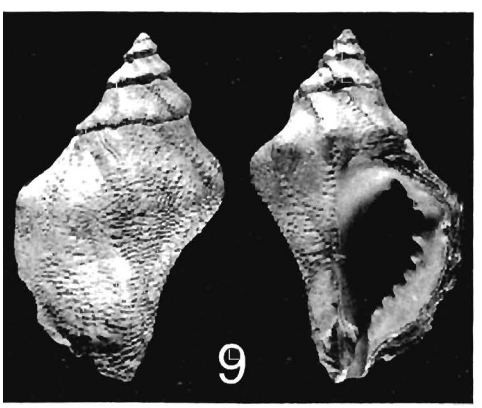

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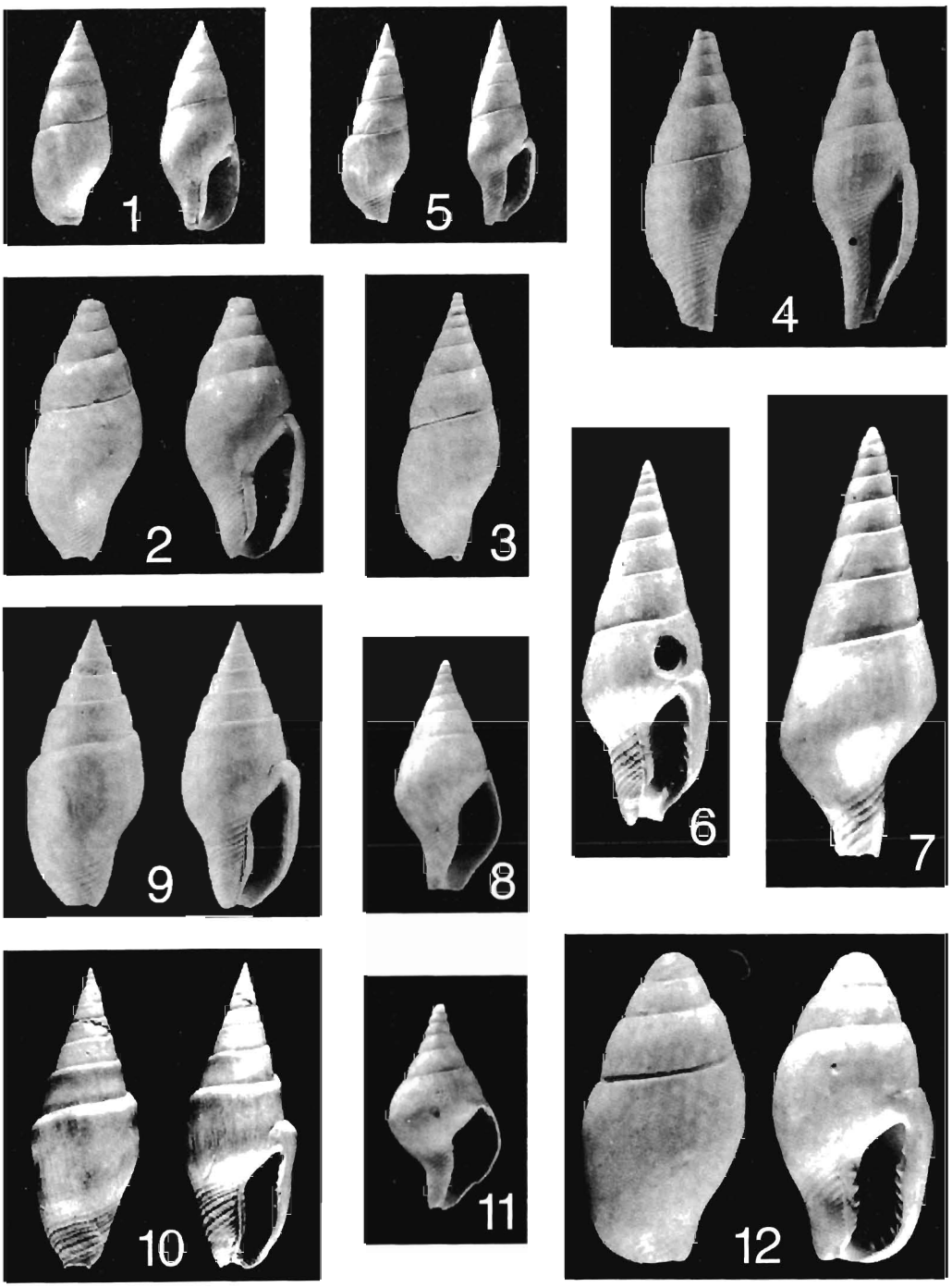

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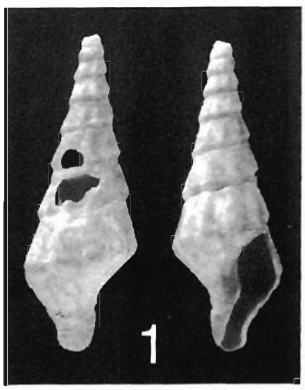

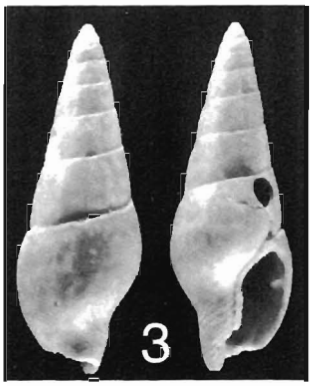

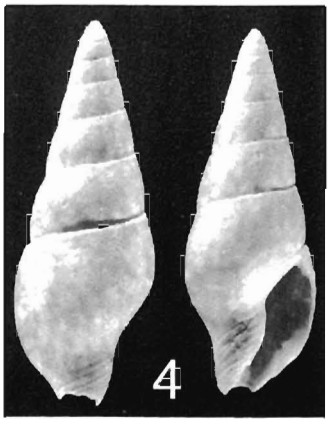

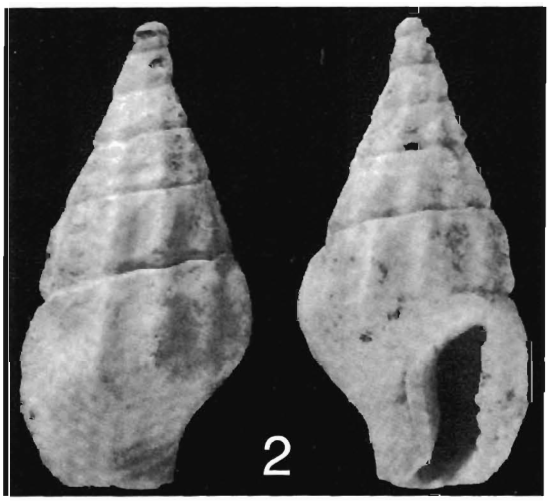

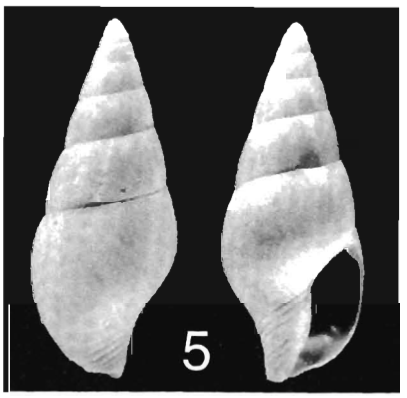

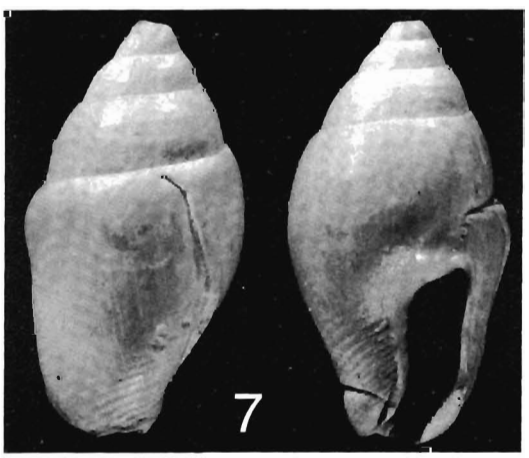

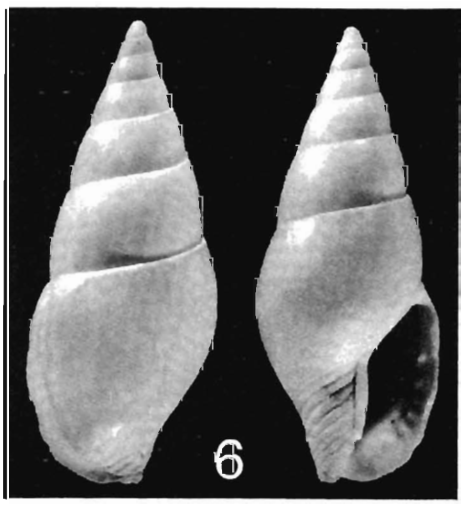

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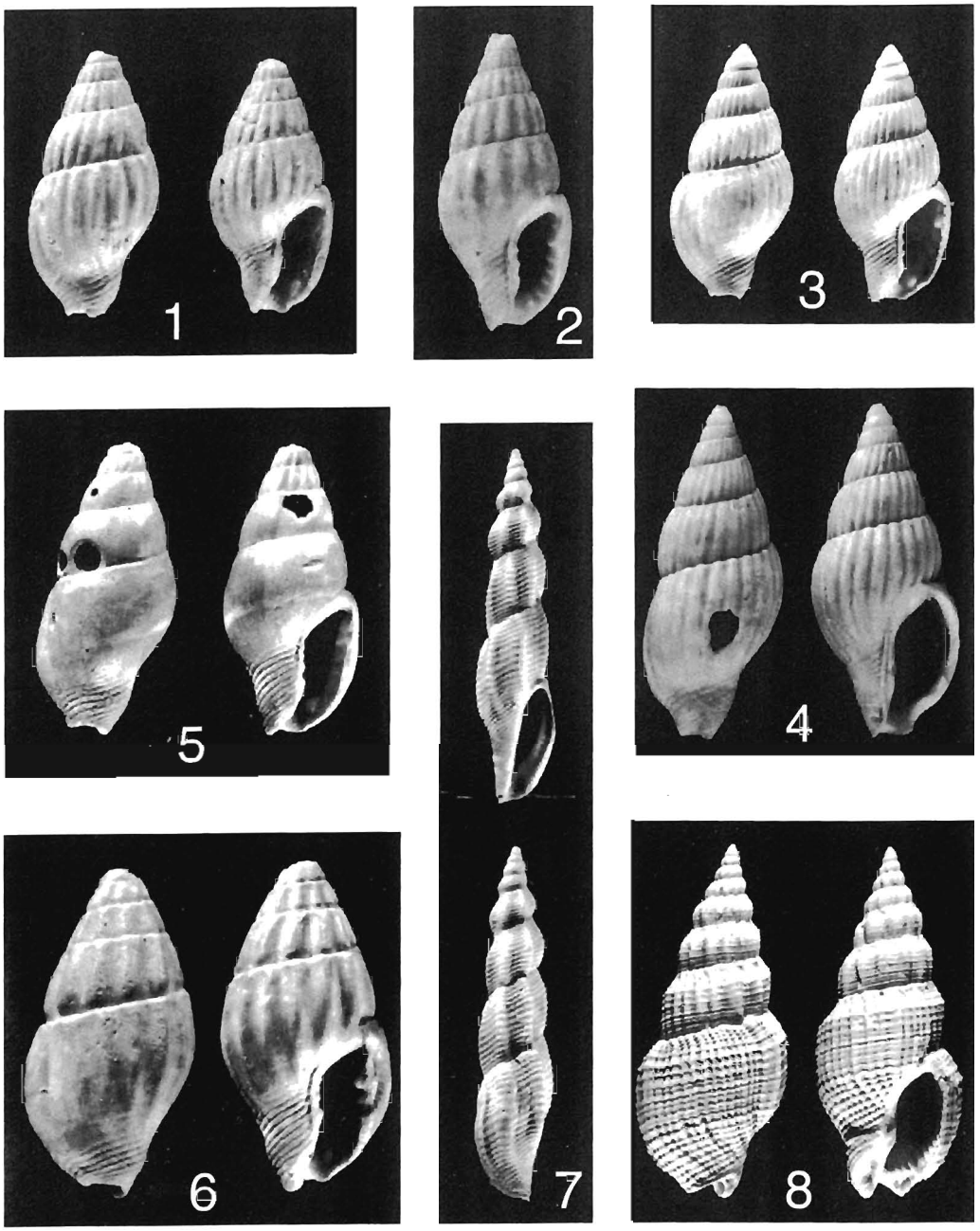

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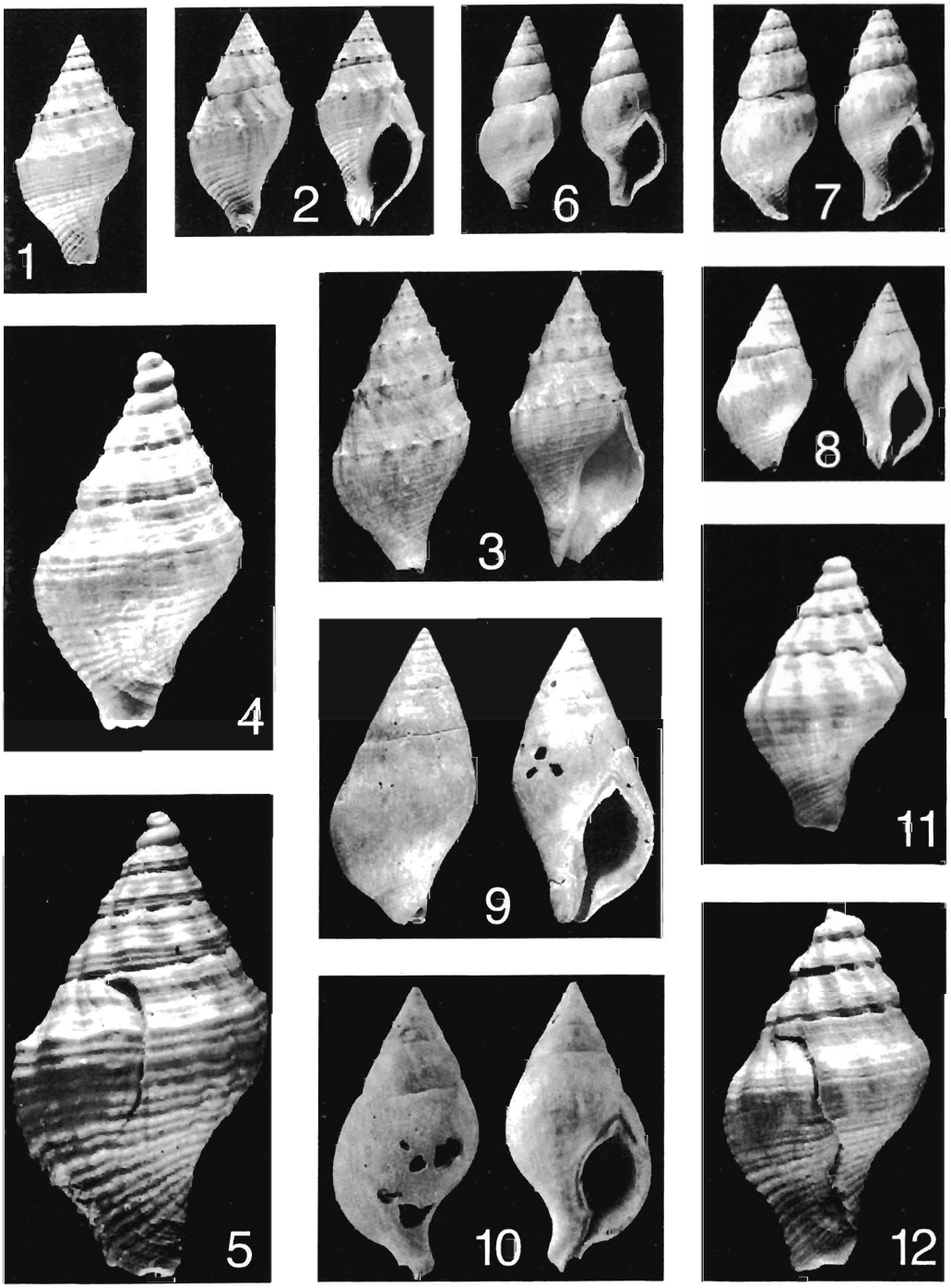

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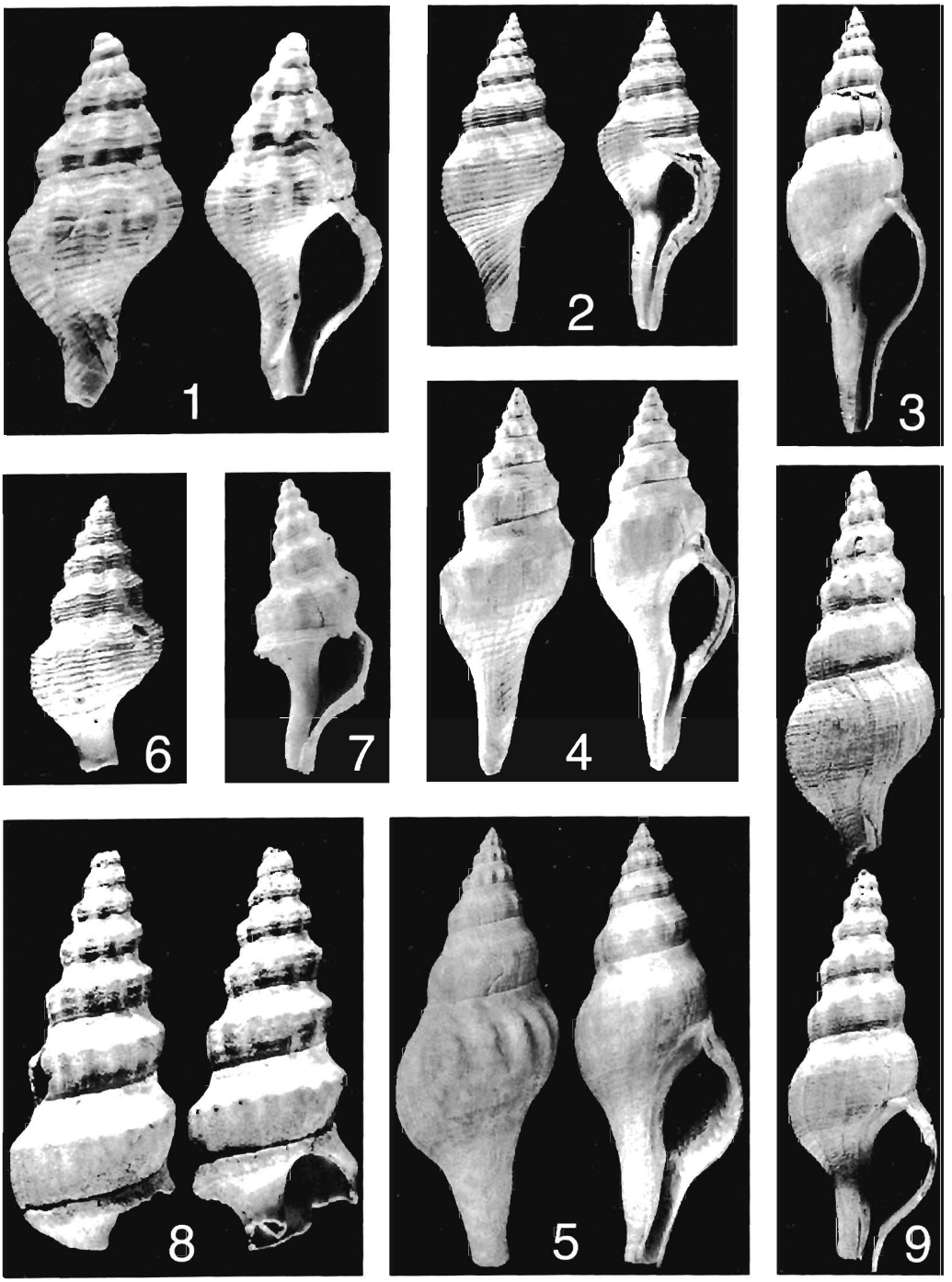

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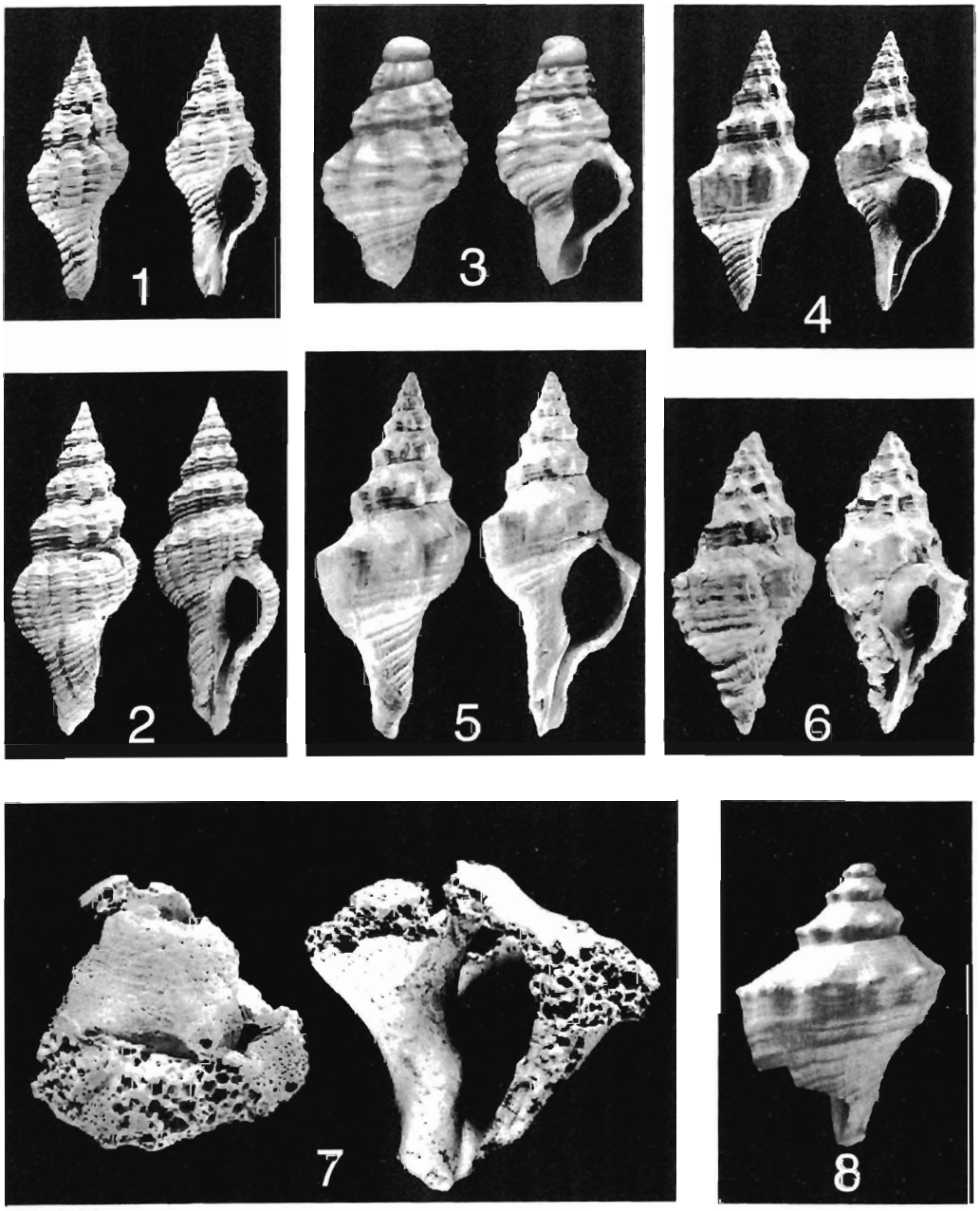

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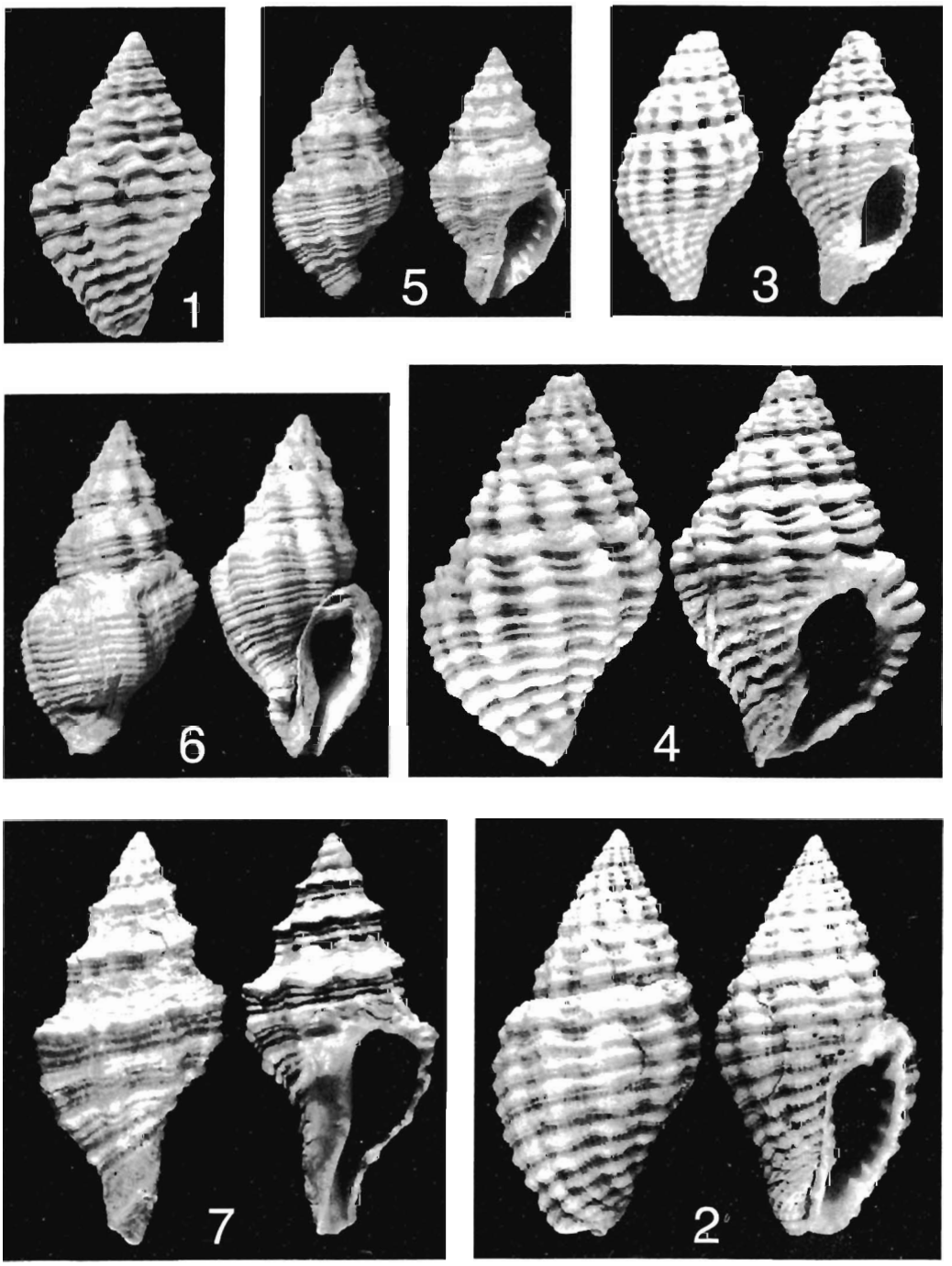

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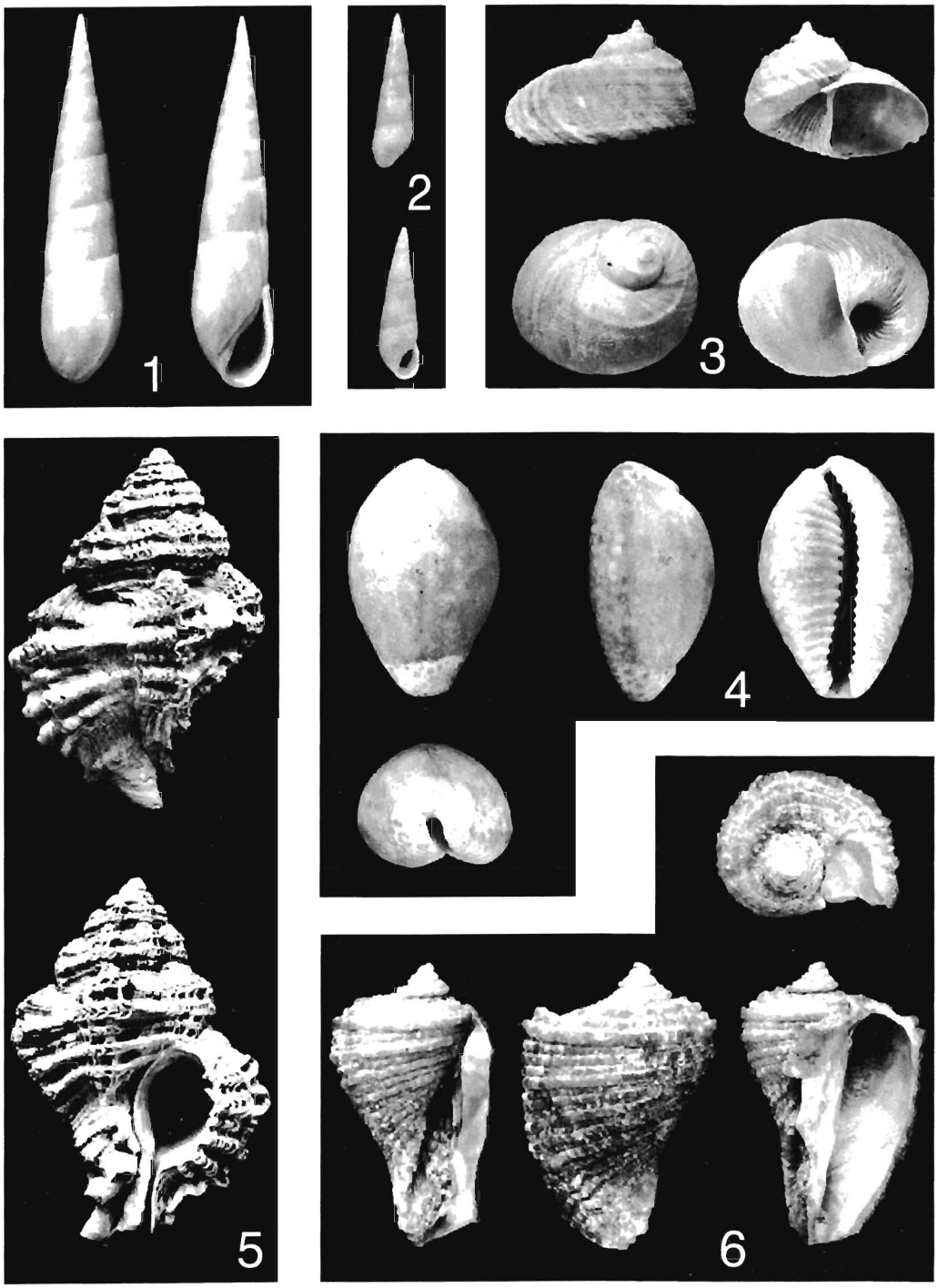
Fig. **6** — *Magilus*? *ficiformis* sp.n., × 6.8; **holotype**; Specimen No. U.W., BkK–G716 230

All photos taken by B. DROZD, M.Sc.



Miscellaneous families