Middle Miocene (Badenian) gastropods from Korytnica, Poland; Part IV – Turridae

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ABSTRACT:


This report is the fourth part of the monograph of the surprisingly rich assemblage of gastropods occurring in the so-called *Pleurotoma Clays* of Middle Miocene (Badenian) age, exposed in the environs of Korytnica in the Holy Cross Mountains, Central Poland. It contains characteristics of 101 prosobranch species of one family, the Turridae. Within this assemblage, five species are new for the science (including one, formerly reported from Korytnica, but determined erroneously); of the recognized species as many as 72 have not hitherto been reported from Korytnica, and 66 from the Miocene of Poland. As the new species established are: *Clavatula kowalewskii* sp.nov., *Perrona (Perrona) czarnockii* sp.nov., *Turricula (Surcula) korytnicensis* sp.nov., *Cythara (Mangelia) cibori* sp.nov., and *Bela sanctacrucensis* sp.nov.

Key words: Prosobranch gastropods, Turridae, Middle Miocene, Korytnica.

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INTRODUCTION

The present paper is the fourth part of a monographic description (see BALUK 1975, 1995, 1997) of the Middle Miocene (Badenian) prosobranch gastropods from Korytnica, occurring within the so-called Pleurotoma Clays, the fossiliferous content of which has involved their fame in the European literature since over two centuries.

At Middle Miocene time, the Paratethys sea has transgressed onto the southern slopes of the Holy Cross Mountains, Central Poland, to form a series of rocky bays along dismembered shorezone, the fragments of which are still well recognizable in the present-day morphology. One of these bays has formed, in its terminal part, what is called the Korytnica Basin in which, the Pleurotoma Clays with a ubiquity of diverse fossils were the main litho- and biofacies filling up the Basin. The basic data on the setting of the Basin were given by RADWANSKI (1969) and BALUK & RADWANSKI (1977), its age was precisely dated by MARTINI (1977) and ROGL & BRANDSTÄTTER (1993), whereas a review of the associated fossils was given by the present author (BALUK 1975, 1995, 1997) in introductions to the former parts of the present monograph.

Subjected to this paper the representatives of the family Turridae (formerly, more often referred to as Pleurotomidae) are the most spectacular elements not only of the gastropod assemblage, but of all Korytnica fossils. These very gastropods, primarily and the most largely the representatives of the genus Clavatula are these that strike the view of any collector searching over the cropland at Korytnica, and which gave the birth of the name of Pleurotoma Clays.

The former students, since ZEUSCHNER (1830) have been able to distinguish 30 species amongst the Korytnica turrids. Of these, only one, that is Surcula turrids. Of these, only one, that is been able to distinguish 30 species amongst the fossils. These very gastropods, primarily and the most largely the representatives of the genus Clavatula are these that strike the view of any collector searching over the cropland at Korytnica, and which gave the birth of the name of Pleurotoma Clays.

The present author has long been aware of a great similarity of the gastropod assemblage of Korytnica to that of Kostej in Transylvania, as described by BOETTGER (1896, 1901, 1906, 1907) and subsequently illustrated by ZILCH (1934, 1935). This has been especially well demonstrated by the herein presented family Turridae, of whose species established by BOETTGER as new, as many as 42 are recognized at Korytnica (regardless 4 others, taken herein as younger synonyms). Impressively, of some species established by BOETTGER upon unique, single specimens from Kostej, the four species, viz. Mitrolumna paraptyscha (BOETTGER, 1906), Clathurella casilorica BOETTGER, 1906, C. postuma BOETTGER, 1906, and C. carolinae (BOETTGER, 1901), have first been found repeatedly, since almost a century, in another locality where are represented by 1, 4, 30, and 1 specimens, respectively.

During the present investigation, due to courtesy of the former Director of the Geological Survey of Poland, Professor Dr. S. SPECZIK, and of H. Grodzicka, M.Sc., the Keeper of its Museum, the author had an opportunity to acquaint with a part of the materials collected at Korytnica in the thirties by K. KOWALEWSKI and by J. CZARNOCKI. Some specimens of this collection are included into the present paper (the photograph were taken due to courtesy of Dr. G. Pienkowski, the former Director of the Museum). All these persons are cordially acknowledged, the same as Dr. A. ŁAPAS, of the Museum of the Polish Academy of Sciences in Cracow, for making an access to FRIEDBERG’s collection, as well as Mr. J. GUBALA for lending some rare specimens of his famous collection.

Formerly, it was thought (BALUK 1995, p. 250) that the present fourth part of the monograph would also contain a chapter of the ADDENDA to describe some new materials collected either personally or by private finders. The number of such materials has, however, been increased so distinctly that they could not be contained in this paper. Consequently, announced herein is the fifth part of the present monograph of the prosobranch gastropod from Korytnica, entitled as ADDENDA et CORRIGENDA. It is intended to include therein some taxa new for Korytnica, some rare species recovered by numerous specimens, some specimens remarkably better preserved or of much larger size, as well as the species which need a further comment and/or supplementary information (or, correction).

The present research program has financially been supported by the University of Warsaw (Grants BW 1410/1, BW 1454/1, and BW 1484/1) what is herein acknowledged.
SYSTEMATIC ACCOUNT

Family Turridae SWAINSON, 1840

Genus Clavatula LAMARCK, 1801

Clavatula camillae (HOERNES & AUINGER, 1891) (Pl. 1, Figs 1-3)


1912. Clavatula Camillae R. HOERN. & AUING.; W. FRIEDBERG, pp. 193-194, Pl. 12, Fig. 4.


?1960. Clavatula (Clavatula) camillae (HOERNES und AUINGER); E. KORUMDZEV, p. 198, Pl. 47, Fig. 10.

1966. Clavatula camillae HOERNES & AUINGER; L. STRAUSZ, p. 405, Pl. 15, Fig. 15.

?1968. Clavatula (Clavatula) camillae (HOERNES et AUINGER); L. HINCULOV, pp. 147-148, Pl. 37, Fig. 3.

1973. Clavatula camillae (HOERNES et AUINGER); I. BOHNHAVAS, p. 1065, Pl. 6, Fig. 8.

1982. Clavatula (Clavatula) camillae (R. HOERNES et M. AUINGER); J. ŠVAGROVSKY, p. 414, Pl. 8, Fig. 4.

?1994. Clavatula (Clavatula) camillae (HOERNES, AUINGER); P. I. NIKOLON, p. 56, Pl. 6, Figs 1-2.

?1998. Clavatula (Clavatula) camillae (HOERNES R. & AUINGER); V. MIKUŽ, pp. 70-71, Pl. 2, Fig. 3.

MATERIAL: Two hundred and fifty specimens.

DIMENSIONS: The largest specimen (see Pl. 1, Fig. 2) is 52 mm high and 21.5 mm wide.

REMARKS: The studied specimens are evidently conspecific with those coming from Lapugy in Transylvania, and distinguished by HOERNES & AUINGER (1891) as a separate species Clavatula camillae (HOERNES & AUINGER). If this separateness, as recognized by HOERNES & AUINGER (1891) is fully justified, their opinion that their species is transitional (Übergang) between groups of species Clavatula interrupta and Clavatula asperulata is obviously false.

The variability of the numerous specimens from Korytnica is very low, having been expressed only by a variable number (usually 3, rarely 2 or 4) of spiral riblets on the margin of the last whorl. At Korytnica the specimens of Clavatula camillae (HOERNES & AUINGER) are not only frequently met, but they also are typically quite showy and large (see dimensions); the conspecific forms reported in the literature never exceed 44 mm in height and 18 mm in width.

A specimen from Dolenja Brezovica in Slavonia, illustrated by MIKUŽ (1998), differs from these of Korytnica, as well as those of Lapugy, by its distinctly less slender shape; it cannot be thus ascribed unequivocally to the discussed species.

The species Clavatula camillae (HOERNES & AUINGER, 1891) was recorded from Korytnica by SIEMIRADZKI (1909), FRIEDBERG (1912, 1938) and KOWALEWSKI (1930).

Clavatula eleonorae (HOERNES & AUINGER, 1891) (Pl. 3, Figs 6-9)

part 1856. Pleurotoma asperulata LAM.; M. HÖRNES, pp. 341-342, Pl. 37, Fig. 5; non Figs 1-4.


1912. Clavatula Eleonorae R. HOERNES i AUINGER; W. FRIEDBERG, p. 198, Pl. 12, Fig. 6.

1998. Clavatula (Clavatula) eleonorae (HOERNES R. & AUINGER); V. MIKUŽ, p. 71, Pl. 1, Fig. 3.

MATERIAL: Five specimens, of which one is kept in the collection of the Museum of the Earth, Warsaw, and another one in the collection of the Museum of the Geological Survey of Poland.

DIMENSIONS: The largest specimen (see Pl. 3, Fig. 9) is 57 mm high and 24 mm wide.

REMARKS: The two specimens of the author’s own collection (see Pl. 3, Figs 3 and 4) differ one from the other by their slenderness. A specimen from Korytnica illustrated by FRIEDBERG (1912) is transitional between these two extremes. All these recognitions evidence a rather great diversity in the overall shape of the species. Similar diversity, although much less advanced, is also visible in the specimens illustrated by HOERNES & AUINGER (1891). The conspecificity of Korytnica and Vienna Basin specimens does not yield any doubts, as already remarked by FRIEDBERG (1912).

Furthermore, the four other specimens and the fifth one from the collection of the Museum of Geological Survey of Poland, all presumably juvenile (see Pl. 3, Figs 1-5), are suggestive of the premature shells of Clavatula eleonorae. In this species, the ornamentation of juvenile whorls in adult specimens has not however been known as yet. All specimens presented in the literature, as well as these studied from Korytnica, bear the surface of their primary whorls preserved very inferiorly. The specimens studied are thus classified as “Clavatula sp., an Clavatula eleonorae (HOERNES & AUINGER, 1891)”, with an under-
standing that they cannot be accommodated into any other Clavatula species.

The species Clavatula eleonorae (HOERNES & AUINGER, 1891) was reported from Korytnica by SIEMIRADZKI (1909), FRIEDBERG (1912) and KOWALEWSKI (1930).

Clavatula evae (HOERNES & AUINGER, 1891) (Pl. 5, Figs 1-8)

1912. Clavatula c.f. Evae R. HOERN. i AUING.; W. FRIEDBERG, p. 195, Pl. 12, Fig. 10.
1971. Clavatula asperulata cfr. evae HOERNES & AUINGER; I. CSEPREGHY-MEZNERICS, p. 32, Pl. 15, Fig. 19.

MATERIAL: Forty-five specimens.

DIMENSIONS: The largest specimen (see Pl. 5, Fig. 8) is 80 mm high and 26 mm wide.

REMARKS: The studied specimens are fully concordant with that one which FRIEDBERG (1912, Pl. 12, Fig. 10) regarded as “Clavatula c.f. Evae R. HOERN. i AUING.,” as well as with another one (see FRIEDBERG 1912, Text-fig. 48) classified as “Clavatula Evae R. HOERN. i AUING. var.,” both coming from Korytnica.

A specific assignation of the studied specimens makes a difficulty, as they do differ, although slightly, from those described by HOERNES & AUINGER (1891) from Grund in the Vienna Basin. The Korytnica specimens are more slender, and they bear the more concave whorls and the more conspicuous spiral sculpture. In the present author’s opinion, such a diversity should be accepted as possible within the species Clavatula evae (HOERNES & AUINGER), to which the Korytnica specimens are therefore assigned.

A peculiar morphologic feature of shells of the studied species is their sculpturing by specific biogenic structures distinguished by RADWAŃSKI & BA¸UK (1997) as transitional between Clavatula granulatocincta and Clavatula angelae (HOERNES & AUINGER), the latter of which has, however, more distinct prickly nodes in the posterior of 3-4 last whorls. The studied specimens from Korytnica do not resemble that one from Gainfahren, because their whorls are more concave, and their proximal part of the teleoconch is much more slender. According to HOERNES & AUINGER (1891, p. 353), the shells of the studied species are featured by their

Clavatula granulatocincta (MÜNSTER, 1843) (Pl. 6, Figs 1-3)

1837. Pleurotoma cataphracta Bast. var. β; G.G. PUSCH, p. 144, Pl. 12, Fig. 15.
1843. Pleurotoma granulato-cincta MÜNSTER; G. MÜNSTER in A. GOLDFUSS, p. 20, Pl. 171, Fig. 5.
1856. Pleurotoma granulato-cincta MÜNSTER; M. HÖRNES, p. 344, Pl. 37, Figs 14-17.
1891. Pleurotoma (Clavatula) granulato-cincta MÜNSTER; R. HOERNES & M. AUINGER, p. 353, Pl. 43, Figs 11 and 14; ?Pl. 46, Fig. 16. partim 1891. Pleurotoma (Clavatula) Angelae nov.form.; R. HOERNES & M. AUINGER, pp. 353-354, Pl. 46, Fig. 19; non Figs 17-18.
1931. Clavatula granulato-cincta (MÜNSTER); A. PEYROT, pp. 90-91, Pl. 8, Figs 76-77.
1966. Clavatula granulatocincta MÜNSTER (in GOLDFUSS); L. STRAUSZ, pp. 407-408, Pl. 16, Fig. 11.
1998. Clavatula (Clavatula) granulatocincta (MÜNSTER); O. SCHULZ, p. 74, Pl. 30, Fig. 3.
1998. Clavatula (Clavatula) granulatocincta (MÜNSTER); V. MIKULAC, pp. 76-77, Pl. 5, Fig. 1.

MATERIAL: Ten specimens, of which one is in the private collection of Mr. J. GUBAŁA.

DIMENSIONS: The largest specimen (see Pl. 6, Fig. 2; the same as presented by BAŁUK & RADWANSKI 1991, Pl. 1, Fig 2a) is 54 mm high and 23 mm wide.

REMARKS: The studied specimens are close to that one from Pötzleinsdorf in the Vienna Basin, as presented by HOERNES & AUINGER (1891), although they are slightly more pronouncedly sculptured. They are also concordant with a specimen from Möllersdorf, regarded by HOERNES & AUINGER (1891) as transitional between Clavatula granulatocincta and Clavatula angelae (HOERNES & AUINGER), the latter of which has, however, more distinct prickly nodes in the posterior of 3-4 last whorls. The studied specimens from Korytnica do not resemble that one from Gainfahren, because their whorls are more concave, and their proximal part of the teleoconch is much more slender. According to HOERNES & AUINGER (1891, p. 353), the shells of the studied species are featured by their
outer lip being smooth marginally, but spirally striated more innerly, as stated already by FRIEDBERG (1912, p. 200), also for the specimens from Korytnica. Of the specimens at the present author’s collection only one bears very indistinct striae. The largest specimen from Korytnica, above-mentioned as used for other studies by BALUK & RADWANSKI (1991, Pl. 1, Fig. 2) has been cut into halves, but nowhere its inner surface yielded a spiral striation. It therefore seems that the presence or absence of such striation may be included into the features much variable within the species.

The species Clavatula granulatocincta (MÜNSTER, 1843) was reported from Korytnica by PUSCH (1837), HORNES (1856) who mentioned that he personally collected it herein, as well as by EICHWALD (1853), SIEMIRADZKI (1909), FRIEDBERG (1912), and KOWALEWSKI (1930).

Clavatula juliae (HOERNES & AUINGER, 1891) (Pl. 7, Figs 1-5)

1891. Pleurotoma (Clavatula) juliae nov. form.; R. HOERNES & M. AUINGER, p. 350, Pl. 45, Figs 4-6.
non 1928. Clavatula laevigata EICHW. var., aff. Cl. Juliae; W. FRIEDBERG, pp. 569-570, Text-fig. 81 right.

MATERIAL: Five specimens, of which one is in the private collection of Mr. J. GUBAŁA.

DIMENSIONS: The largest specimen (see Pl. 7, Fig. 5) is 64 mm high and 25 mm wide; another one (see Pl. 7, Fig. 4) is 42 mm and 20 mm, respectively.

REMARKS: The present author is of the opinion that a separateness of the species Clavatula juliae (HOERNES & AUINGER) is disputable, or even problematic. Nevertheless, this very assignment is herein used for the specimens from Korytnica, above-mentioned as used for other studies by BALUK & RADWANSKI (1991, Pl. 1, Fig. 2) has been cut into halves, but nowhere its inner surface yielded a spiral striation. It therefore seems that the presence or absence of such striation may be included into the features much variable within the species.

As concerns the presence of Clavatula juliae (HOERNES & AUINGER) at Korytnica, it was FRIEDBERG (1928, pp. 569-570), who reported it when having one specimen (see FRIEDBERG 1928, Text-fig. 81 right) quite distinctly different from those of Lapugy. This specimen was devoid of the two uniformly strong files of prickly nodes at the margin of the last whorl, as well as of a spiral row of bead-like nodes at the base of the last whorl (that is at the place where that base transforms into the siphonal canal). FRIEDBERG (1928) classified that specimen as “Clavatula laevigata EICHW. var., aff. Cl. Juliae”, but this assignment cannot be herein justified.

The species Clavatula juliae (HOERNES & AUINGER, 1891) has not hitherto been known in the Miocene of Poland. A report by KOWALEWSKI (1930, p. 92) concerns his reference to the above-discussed specimen of FRIEDBERG (1928).

Clavatula laevigata EICHWALD, 1853) (Pl. 7, Figs 7-10)

1853. Pleur. laevigata m.; E. EICHWALD, pp. 183-184, Pl. 8, Fig. 3.
partim 1938. Clavatula laevigata EICHW.; W. FRIEDBERG, p. 142.
1960. Clavatula sublaevigata n.sp.; T. BALDI, p. 80, Pl. 3, Fig. 1.

MATERIAL: 760 specimens.

DIMENSIONS: The largest specimen (see Pl. 7, Fig. 9) is 60 mm high and 22 mm wide.

REMARKS: The species Clavatula laevigata (EICHWALD) was first reported from Korytnica by FRIEDBERG (1912). This commonly occurring species has earlier been not distinguished from Clavatula asperulata (LAMARCK) [recte: Clavatula polonica (PUSCH)]. Having 80 specimens at his disposal, FRIEDBERG (1912) accepted their conspecificity both with specimens from Podolya described by EICHWALD (1853) as “Pleur. laevigata m.”, as well as with specimens coming from Baden in the Vienna Basin and described by HOERNES & AUINGER (1891) as “Pleurotoma (Clavatula) Susannae nov. form.”. It is evident that the specimens illustrated by FRIEDBERG (1912, Text-figs 45 and 46; Pl. 12, Figs 3a-b and 3c) are identical with the latter ones.

The present author, having at his disposal (over two thousands) much more specimens concordant with those described by FRIEDBERG, is of the opinion that the two taxa were present in the collection. A part is represented by these of smaller and more slender shells with more concave whorls and as if of a more smoother surface. When a necessity of division of the shell collection appeared, it became evident that a group of smaller and slender specimens (numbering 760) never had the above-indicated biogenic structures distinguished as Clavatulicola evaephilus by RADWAŃSKI & BALUK (1997). Another group (of 1400 specimens) was typified by such structures, recognizable in the majority of these shells. As suggested earlier by RADWAŃSKI & BALUK
Báldi (1960) described from the Szokolya Clays in Hungary a separate species, *Clavatula sublaevigata* Báldi, based upon one specimen which seems to be identical with those from the herein presented specimens of Korytnica. This Hungarian specimen is, unfortunately, not fully grown (its dimensions: height 38.4 mm, width about 31 mm wide; another, completely preserved specimen over the cropland of Korytnica, about 73 mm high and 33 mm wide; another, preserved specimen). The present author understands the same as subsequently did Hornes (1856). Sustenius (1837) was the first, who presented an adequate illustration of the species, although he supposedly understood it in a slightly wider sense, the same as subsequently did Hornes (1856). Hornes (1856), who ascribed the specimens from Korytnica to the species *Clavatula asperulata* LAM., was aware of their distinction to the type, and thus he classified them as "*Var. polonica*." Hornes (1856), who personally collected specimens over the cropland of Korytnica, and had Pusch’s monograph at his disposal, determined both these and the Vienna Basin specimens as "*Pleurotoma asperulata Lam.*." This very name has long been in a common use, excepted by Eichwald (1853), and in an earlier report by Friedberg (1912), who later (Friedberg 1936, 1938) accepted the name introduced by Pusch (1837). The latter statement has certainly been inspired by Peyrot (1931), who indicated that the name *Clavatula asperulata* (Lamarck) concerns a species whose shells are smaller, more slender, and profusely striated spirally. In consequence, Friedberg (1938) supplemented his earlier description (Friedberg 1912, p. 188) with a note that the last whorls of *Clavatula polonica* (Pusch) from Korytnica are devoid of spiral striaion. Friedberg’s (1936, 1938)
conclusion referred both to specimens from Korytnica, and to those from the Vienna Basin, having been traditionally treated as *Clavatula asperulata* (Lamarck). Unfortunately, the subsequent authors were not familiar with Friedberg’s opinion or, as Strausz (1966), regarded *Clavatula asperulata* differently, in a way similar to that of Hornes (1856).

Friedberg’s recognition does not concern the specimens presented by Hinculov (1968, p. 148, Pl. 37, Figs 4-5) as *Clavatula (Clavatula) asperulata* (Lamarck) from the Miocene of Romania. These are quite distinct from those of Korytnica, and even Hinculov herself did not identify them with those of the Vienna Basin, and of the Aquitaine Basin.

The shells of *Clavatula polonica* (Pusch) are much variable, primarily in their slenderness and prominence of ornamentation, the extremes of which are herein illustrated (see Pl. 1, Figs 4-8 and Pl. 2, Figs 1-8). To note, the variability range of ornamentation (and usually also its prominence) is identical in the initial 8-10 whorls of the teleoconch (see Pl. 2, Figs 1 and 2), and it is quite distinct from that of other comparable species. The ornamentation variability of *Clavatula polonica* (Pusch) comprises also the number of spiral rows of nodes distributed along the margin of the last whorl, that ranges from 2 (see Pl. 1, Fig. 4; Pl. 2, Fig. 5) through 4 (see Pl. 2, Fig. 8), but 3 being the most common (see Pl. 1, Figs 7 and 8; Pl. 2, Figs 3 and 6). This variability range was certainly a reason why Friedberg (1912) had troubles with a specific assignment of some specimens from Korytnica. In the present author’s opinion, as many as 12 specimens determined by Friedberg (1912) jako “Clavatula Olgae R. Horn. i Auinger var.” and one specimen as “Clavatula aff. calcarata Grat.” should evidently be included into *Clavatula polonica* (Pusch). The first ones (see Friedberg 1912, Pl. 12, Figs 11-12) are evidently the juveniles of the discussed species (cf. Pl. 2, Figs 2 and 4), and the last one (see Friedberg 1912, Pl. 12, Fig. 5) is a specimen bearing the strongly pronounced nodes of the upper row (cf. Pl. 2, Fig. 7).

The majority of the studied shells (92%) are sculptured by the above-indicated biogenic paradigm *Clavatulicola evaphilus* Radwanisk i Baluk, 1997, attributed to the activity of an unknown commensal of the gastropod.

The species *Clavatula polonica* (Pusch, 1837) was, under various names (see synonymy), reported from Korytnica by Zeuschner (1830), Pusch (1837), Murchison (1845), Eichwald (1853), Kontkiewicz (1882), Siemiradzki (1909), Friedberg (1912, 1936, 1938), and Kowalewski (1930). Moreover, it was also recorded by Hornes (1856) who noticed its significantly common occurrence at Korytnica.

*Clavatula pretiosa* (Bellardi, 1847) (Pl. 7, Fig. 6)

1877. *Pleurotoma pretiosa* Bell.; L. Bellardi, pp. 185-186, Pl. 6, Fig. 9.

1981. *Clavatula pretiosa* (Bellardi); E. Ferrero Mortara & al., p. 78, Pl. 15, Fig. 2.

**MATERIAL:** One specimen.

**DIMENSIONS:** Height about 53 mm, width about 19 mm.

**REMARKS:** Although the only specimen is partly damaged at the apex and aperture, its attribution to the species *Clavatula pretiosa* (Bellardi) described from the Miocene of northern Italy seems to be evident. Its juvenile whorls, just above the lower (anterior) suture, are adorned with a characteristic row of densely spaced, bead-like nodes. Such very row is well discernible in a picture given by Bellardi (1877), as well as in a specimen indicated as the syntype of the species in the photograph (see Ferrero Mortara & al. 1981, Pl. 10, Fig. 2).

The species *Clavatula pretiosa* (Bellardi) was recorded from Enzesfeld in the Vienna Basin by Hornes (1856). Subsequently, Bellardi (1877) himself was of the opinion that the Viennese specimens differ from the Italian ones by their ornamentation of juvenile whorls, and thus should be classified as a separate species. Hornes & Auinger (1891, pp. 361-362) accepted Bellardi’s statement and called the Enzesfeld specimens as “*Pleurotoma emmae* nobis”; the illustrated specimens were lacking of the row of bead-like nodes. If so, such a difference does seem to exist, although the majority of Enzesfeld specimens had the juvenile whorls damaged. Hornes & Auinger (1891) indicated still another feature of *Clavatula emmae*, distinctive from *Clavatula pretiosa*, namely the presence of a distinct spiral striation on the whorl surface (see Hornes & Auinger 1891, Pl. 48, Figs 1-3). Such a striation is, however, present in the studied specimen from Korytnica.

The species *Clavatula pretiosa* (Bellardi, 1847) has not hitherto been known from the Miocene of Poland; the herein presented specimen has earlier been illustrated by Baluk & Radwaniski (1996, Pl. 7, Fig.4).

*Clavatula reginae* (Hornes & Auinger, 1891) (Pl. 4, Figs 1-5)

The species \textit{Clavatula sophiae} (Hoernes & Auinger, 1891) was reported from Korytnica by Hörnes (1856) and Siemiradzki (1909). In the Miocene of Poland it is also known as \textit{affinis} from Niskowa (Baluk 1970).

\textit{Clavatula styriaca} (Hilber, 1879)

(Pl. 6, Fig. 4)

1879. \textit{Pleurotoma (Clavatula) styriaca} \textit{Auinger.} in coll.; V. Hilber, p. 19, Pl. 3, Figs 6-7.

1891. \textit{Pleurotoma (Clavatula) styriaca} \textit{Auinger.}; R. Hoernes & M. Auinger, pp. 348-349, Pl. 44, Fig. 9; Pl. 47, Figs 4-10.

non 1912. \textit{Clavatula styriaca} \textit{Auinger.}, var.; W. Friedberg, Text-fig. 49.

non 1930. \textit{Clavatula styriaca} \textit{Auinger.}, var.; K. Kowalewski, p. 93.

non 1970. \textit{Clavatula styriaca} (Auinger); W. Baluk, p. 119, Pl. 13, Fig. 6.

\textit{partim} 1998. \textit{Clavatula (Clavatula) styriaca} (Hilber); V. Mikuž, p. 73, Pl. 3, Fig. 4, \textit{non} Fig. 3.

1998. \textit{Clavatula (Clavatula) cf. styriaca} (Hilber); V. Mikuž, pp. 73-74, Pl. 4, Fig. 1.

\textbf{MATERIAL:} One specimen.

\textbf{DIMENSIONS:} Height 49 mm, width about 19 mm.

\textbf{REMARKS:} The studied specimen, featured by the slightly less concave whorls is regarded as concordant with \textit{Clavatula styriaca (Auinger in Hilber)} reported from Styria (Steiermark) and the Vienna Basin (Hoernes & Auinger 1891, Pl. 47, Figs 4-10). The studied specimen from Korytnica is very close to that one coming from Soos near Baden, and which was presented by Hoernes & Auinger (1891, Pl. 47, Fig. 8) and commented as concordant with the holotype coming from Pöls.

Friedberg (1912, p. 199, Text-fig. 49) described from Korytnica quite a different specimen, classified as "\textit{Clavatula styriaca} Auinger. var.", although he hesitated to present a definite opinion. On one side, he regarded this specimen as identical (really, it is distinctly more slender) with one from Soos near Baden presented by Hoernes & Auinger (1891, Pl. 44, Fig. 10), but on the other side, he suggested its belonging to a separate species. In the present author’s collection there are sixty specimens compatible with such one as presented by Friedberg (1912).

The species \textit{Clavatula styriaca (Auinger in Hilber, 1879)} has not hitherto been correctly repeated from Korytnica; the specimens referred to by Siemiradzki (1909), Friedberg (1912) and by Kowalewski (1930), are herein excluded from that species and treated as \textit{Clavatula kowalewskii} sp.nov.
Clavatula suturalis (ANDRZEJOWSKI, 1833)  
(Pl. 8, Figs 1-8)

1833. Pleurotoma suturalis; A. ANDRZEJOWSKI, pp. 441-442, Pl. 13, Fig. 5.

partim 1856. Pleurotoma asperulata LAMK.; M. HORNES, pp. 341-342, Pl. 37, Fig. 2; non Figs 1 and 3-5.


1891. Pleurotoma (Clavatula) Clarae nov.form.; R. HOERNES & M. AUINGER, p. 342, Pl. 45, Fig. 9.


partim 1912. Clavatula laevigata EICHW.; W. FRIEDBERG, pp. 191-193, Pl. 12, Fig. 3; Text-figs 45 and 46.

1928. Clavatula laevigata EICHW. var.; W. FRIEDBERG, pp. 569-570, Text-fig. 81.

1960. Clavatula (Clavatula) laevigata (EICHWALD); E. KOJUMDGIEVA, pp. 197-198, Pl. 47, Figs 7-8.

1960. Clavatula laevigata var. amaldae (HOERNES und AUINGER); E. KOJUMDGIEVA, p. 198, Pl. 47, Fig. 9.

1966. Clavatula asperulata suturalis ANDRZEJOWSKI; L. STRAUß, p. 407, Pl. 15, Fig. 22; Pl. 16, Figs 1-2.


?1994. Clavatula (Clavatula) rosaliæ (HOERNES, AUINGER); PI. NIKOLOV, p. 57, Pl. 6, Figs 16-17.

1998. Clavatula (Clavatula) asperulata (LAMARCK); O. SCHULTZ, p. 74, Pl. 30, Fig. 1.

1998. Clavatula (Clavatula) laevigata (EICHWALD); V. MIKUŽ, p. 72, Pl. 3, Figs 1-2.

?partim 1998. Clavatula (Clavatula) styriaca (HILBER); V. MIKUŽ, p. 73, Pl. 3, Fig. 3, non Fig. 4.

MATERIAL: Two specimens.

DIMENSIONS: The both specimens are 30 mm high and 12.5 mm wide.

REMARKS: The studied specimens are evidently conspecific with those coming from Baden in the Vienna Basin, which were described by HOERNES & AUINGER (1891) as Clavatula susannae (HOERNES & AUINGER). The authors of this species, did not inform about the size of the specimens; these illustrated (HOERNES & AUINGER 1891, Pl. 45, Figs 7-8) are slightly smaller than those from Korytnica. Nevertheless, the name Clavatula susannae is herein recognized as a younger synonymy of Clavatula

Clavatula suturalis introduced earlier by ANDRZEJOWSKI (1833) for specimens from Podolya. It is to note, that the specimen illustrated by ANDRZEJOWSKI (1833, Pl. 13, Fig. 5) bears the biogenic paradigm Clavatulicola evaeophillus ascribed to the activity of gastropod commensal (RADWAŃSKI & BALUK 1997), which are also present in the majority of Korytnica specimens.

The species Clavatula suturalis (ANDRZEJOWSKI, 1833) from Korytnica was recorded under the name of Clavatula susannae by SIEMIRADZKI (1909), and subsequently as Clavatula laevigata by FRIEDBERG (1912, 1928, 1938) and KOWALEWSKI (1930).

Clavatula veronicae (HOERNES & AUINGER, 1891)  
(Pl. 4, Figs 9-10)


1966. Clavatula granulatocincta angelae HOERNES & AUINGER; L. STRAUß, p 408, Pl. 16, Fig. 12.

1966. Clavatula veronicae (HOERN. et AUING.); J. KÖKAY, p. 64, Pl. 9, Fig. 17.

1994. Clavatula Clavatula) granulatocincta angelae (HOERNES, AUINGER); PI. NIKOLOV, pp. 58-59, Pl. 7, Figs 1-3; Pl. 6, Figs 3-4.

MATERIAL: Two specimens.

DIMENSIONS: The both specimens are 30 mm high and 12.5 mm wide.

REMARKS: The studied specimens are evidently conspecific with those coming from Lapugy in Transylvania, upon which HOERNES & AUINGER (1891) established the species Clavatula veronicae (HOERNES & AUINGER). Their size, slenderness and ornamentation are almost identical with those of the larger specimens from Lapugy (see HOERNES & AUINGER 1891, Pl. 46, Figs 13 and 14).

Under discussion is, however, a problem their separateness from a few other, similarly shaped species. CSEPREGHY-MEZNERICS (1953), followed by STRAUß (1966), determined the specimens, coming from Szob, and concordant with those from Korytnica, as Clavatula granulatocincta angelae (HOERNES & AUINGER). The same assignment for specimens from Opanec and Bivolare in Bulgaria was given by NIKOLOV (1994), who regarded one of his specimens as a transitional form to Clavatula granulatocincta granulatocincta (MÜNSTER). The latter statement is not acceptable, since Clavatula granulatocincta (MÜNSTER) from Korytnica is well distinctive from
Clavatula veronicae, not only by its relatively shorter siphonal canal, but also by ornamentation and the shape of several (5-6) juvenile whorls. If a separateness of Clavatula veronicae is not accepted, then it should be indicated as the closest to Clavatula schreibersi (HÖRNES) rather than to Clavatula granulatocincta (MÜNSTER) and/or Clavatula angela (HOERNES & AUINGER), what was recognized already by HOERNES & AUINGER (1891, p. 351).

The species Clavatula veronicae (HOERNES & AUINGER, 1891) has not hitherto been known from the Miocene of Poland.

Clavatula kowalewskii sp.nov.

(Pl. 6, Figs 5-10)

1912. Clavatula styriaca AUING. var.; W. FRIEDBERG, p. 199, Text-fig. 49.


HOLOTYPE: The specimen (Z.PAL.U.W., No BkK-G928) presented in Pl. 6, Fig. 9.

TYPE HORIZON: Middle Miocene (Badenian).

TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.


DIAGNOSIS: Shell of adult whorls of the teleoconch smooth, with one row of prickly nodes just below the suture.

MATERIAL: Sixty specimens.

DIMENSIONS: The holotype is 50 mm high and 18.5 mm wide; the largest specimen (see Pl. 6, Fig. 10) is 60 mm and 21 mm, respectively.

DESCRIPTION: The shell is fusiform, slender, relatively large. The protoconch not preserved in the studied specimens. The teleoconch attains about 13, slightly concave whorls, separated by deep sutures. Ornamentation of 5-6 initial whorls consists of densely spaced sickle-shaped riblets; on 2-3 successive whorls the median parts of riblets fade gradually out, and nearby sutures there remain bead-like nodes arrayed into two spiral rows. Farther on, these rows disappear, but the upper (posterior) one is the first to vanish. The 3 or 4 final whorls are furnished, below the upper suture, with weak and/or very inconspicuous prickly nodes distributed very sparsely and irregularly. On the last whorl, at its base, there run two indistinct margins. The well preserved specimens display a delicate spiral striation on the surface of whorls, particularly of the earlier ones. The siphonal canal is relatively long and almost straight. The aperture is longitudinally oval. The outer lip sharply outlined, with a deep pleurotomal notch, and smooth innerly; the inner lip thin.

REMARKS: FRIEDBERG (1912, Text-fig. 49) reported from Korytnica one specimen, classified as “Clavatula styriaca AUING. var.”; he paid an attention to its deviation from the indicated species. In the present author’s opinion, this specimen is identical with the studied ones, and they all differ from the other species of the genus Clavatula distinctly, and sufficiently to separate them as a new species Clavatula kowalewskii sp.nov.

In his subsequent report, FRIEDBERG (1938, p. 143) when commenting Clavatula styriaca, reminded from Korytnica still another specimen, which was identical with that from Grund in the Vienna Basin, and classified by HOERNES & AUINGER (1891, Pl. 44, Fig. 9) as a form transitional between Clavatula asperulata LAMARCK and Clavatula styriaca AUINGER. It only may be guessed that either this was concordant with the studied specimens, or it was a specimen of Clavatula polonica PUSCH of extremely inconspicuous ornamentation, similar to one presented herein (see Pl. 1, Fig. 4).

KOWALEWSKI (1930), who followed FRIEDBERG (1912) in reporting “Clavatula styriaca AUING. var.” from Korytnica, supplemented his list with 3 specimens named as Clavatula antoniae (HOERNES & AUINGER). These could possibly be almost identical with the herein established Clavatula kowalewskii sp.nov., but slightly less slender and featured with less concave whorls. Such specimens are also kept in the present author’s collection, but their relation to Clavatula antoniae (HOERNES & AUINGER) is evidently excluded.

All the studied specimens, classified earlier (RADWANSKI & BALUK 1997) as Clavatula styriaca (AUINGER in HILBER), bear the above-indicated biogenic paradigm of shells, the trace fossil Clavatulicola evaeophilus RADWANSKI & BALUK, 1997, ascribed to the life activity of unknown commensals to live gastropods.

Genus Perrona SCHUMACHER, 1817

Subgenus Perrona SCHUMACHER, 1817

Perrona (Perrona) descendens (HILBER, 1879)

(Pl. 9, Figs 1-7)
partim 1856. *Pleurotoma jouanneti* DESM.; M. HÖRNES, pp. 346-347, Pl. 38, Figs 4-6; non Figs 1-3.

1879. *Pleurotoma (Clavatula) descendens* HILB.; R. HOERNES & M. AUINGER, p. 19, Pl. 3, Fig. 5.


1912. *Clavatula Jouanneti* DESM.; W. FREIDBERG, pp. 201-202, Pl. 13, Fig. 1; *synonym excl.*

1912. *Clavatula (Perrona) Jouanneti* DES MOLINS; A. PEYRO, pp. 109-112, Pl. 8, Fig. 34; non Pl. 8, Figs 43, 61-62, 66, 71, and 99.

1960. *Clavatula (Perrona) emmae* HOERNES und AUINGER; E. KOJUMDZIEVA, p. 199, Pl. 48, Fig. 2.

1960. *Clavatula (Perrona) emmae var. sabinae* (HOERNES und AUINGER); E. KOJUMDZIEVA, pp. 199-200, Pl. 48, Figs 3-4.


1966. *Clavatula (Perrona) descendens* (HILB.); J. KOKAY, Pl. 9, Fig. 19.


1973. *Clavatula (Perrona) jouanneti descendens* (HILB.); M. BOHN-HAVAS, pp. 1062 and 1118, Pl. 6, Fig. 10.

1994. *Perrona (Perrona) vindobonensis* (PARTSCH in HORNES); P. NIKOLOV, p. 59, Pl. 6, Figs 9-10.


1998. *Perrona (Perrona) jouannetti descendens* (HILB.); O. SCHULTZ, p. 74, Pl. 30, Fig. 4.

1998. *Clavatula (Perrona) jouanneti* (DES MOLINS); V. MIKUZ, pp. 78-79, Pl. 5, Fig. 8.

1998. *Clavatula (Perrona) sabinae* (HOERNES R. & AUINGER); V. MIKUZ, p. 81, Pl. 6, Fig. 3.

MATERIAL: Forty-eight specimens.

DIMENSIONS: Of the two largest specimens the first is 34 mm high and 12.5 mm wide; the second is 32.5 mm and 13 mm, respectively.

REMARKS: The studied specimens are much variable, particularly in the prominence of nodes on the spiral swell running at the upper (posterior) part of the 2 or 3 last whorls. As extremes, these nodes are either very prominent and densely spaced (up to 15 on the last whorl), or merely discernible and dispersed. Variable is also the height and concavity of whorls. The majority of specimens are concordant with those reported by HOERNES & AUINGER (1891, Pl. 48, Figs 7-8) as “*Pleurotoma (Clavatula) descendens* HILB.” from Grund in the Vienna Basin. At Korytnica, however, numerous are also specimens resembling those from Lapugy in Transylvania, and which HOERNES & AUINGER (1891, Pl. 48, Figs 10-11) described as “*Pleurotoma (Clavatula) Sabinae nov.form.*.” In the present author’s opinion such differences do not justify to create separate species.

The species *Perrona (Perrona) descendens* (HILB., 1879) was recorded from Korytnica by HORNES (1856), SIEMIRADZKI (1909), FREIDBERG (1912, 1938), and KOWALEWSKI (1930).

**Perrona (Perrona) czarnockii** sp. nov. (Pl. 4, Figs 6-8)

HOLOTYPE: The specimen in the collection of the Museum of the Geological Survey of Poland, Warsaw (Catalogue No. 28.II. 179), presented in Pl. 4, Fig. 7.

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: *czarnockii* – in memory of Jan **CZARNOCKI** (1889-1951), a prominent student of the Miocene of Poland.

DIAGNOSIS: The course of the pleurotomal notch (“anal fasciole”) of fully-growth whorls shaped like a swell with numerous spiral striae beneath; a row of prickly nodes below the suture.

MATERIAL: Three specimens.

DIMENSIONS: The holotype is 37 mm high and 16 mm wide; the largest specimen, lacking juvenile whors (see Pl. 4, Fig. 8), is 64 mm and 24 mm, respectively.

DESCRIPTION: The protoconch and juvenile whors of the teleoconch are not preserved in the studied specimens. The earliest of the recognized whors are adorned with a distinct ridge at the middle between the lower and upper suture. Above that ridge there runs a furrow-like depression, and just when reaching the upper suture there appears a row of densely spaced, fine nodes. The whorl surface is sculptured by very dense riblets, obliquely running below the margin. Such ornamentation continues as far as the last whorl, but the margin then changes gradually into a rodlike swell (where the growthlines mark the pleurotomal notch),
and nodes situated below the upper suture change into indistinct prickles and become more scarcely distributed (11 on the last whorl of the holotype). Below the margin in the last whorls, there run numerous thin spiral striae (numbering about 30 on the last whorl), one of which is distinctly conspicuous. The aperture is not preserved, and it may only be imagined as a Clavatula-like, with a long siphonal canal.

REMARKS. No forms of such sculpture have hitherto been known in the literature. The newly established species Perrona (Perrona) czarnockii sp.nov. is the closest to that of the specimen from Saucats (Pelona) in Aquitaine, presented by Peyrot (1931, p. 109, Pl. 6, Fig. 33) under the name of “Clavatula (Perrona) carinifera Grat., var. insolita Peyr.” which differs, however, by its complete lack of prickly nodes below the upper suture.

The Korytnica specimens vary in their apical angle, but a low number of specimens does not allow to ascertain a taxonomical significance of this feature.

Genus Turricula Schumacher, 1817
Subgenus Surcula H. & A. Adams, 1853

Turricula (Surcula) consobrina (Bellardi, 1877)
(Pl. 14, Fig. 3)

1856. Pleurotoma recticosta Bell.; M. Hornes, pp. 363 and 683, Pl. 52, Fig. 11.
1877. Surcula consobrina Bell.; L. Bellardi, p. 73, Pl. 2, Fig. 25.
1960. Surcula (Surcula) consobrina var. badensis Meznerics; E. Kojumdgieva, pp. 203-204, Pl. 48, Fig. 14.

MATERIAL: One specimen.

DIMENSIONS: Height 22.5 mm, width 6.8 mm.

REMARKS: The studied specimen is not fully grown. Nevertheless, its conspicuity with those presented by Hornes (1856) from Vöslau in the Vienna Basin, and by Hoernes & Auinger (1891) from Lapugy in Transylvania is evident. It reminds especially the more slender forms, e.g. that one from Lapugy presented by Hoernes & Auinger (1891, Pl. 38, Fig. 26). The Korytnica specimen is also concordant, although more slender, with the syntype of Bellardi from Stazzano (North Italy), presented in the photograph by Ferrero Mortara & al. (1981, Pl. 10, Fig. 2).

A specimen from Zg³obilce in the Carpathians, described by Friedberg (1928, pp. 568-569, Pl. 37, Fig. 7) as “Surcula consobrina Bell. (?)” has a different whorl profile and shape of axial ribs; it thus cannot be identified with this species. The same concerns a specimen from Devceser in Hungary, reported by Strausz (1966, pp. 416-417, Pl. 11, Fig. 5).

The species Turricula (Surcula) consobrina (Bellardi, 1877) has not hitherto been known from the Miocene of Poland.

Turricula (Surcula) dimidiata (Brocchi, 1814)
(Pl. 10, Figs 1-4)

1891. Pleurotoma (Surcula) dimidiata Brocchi; R. Hoernes & M. Auinger, pp. 304-305, Pl. 38, Figs 11-22.
1912. Surcula dimidiata Brocchi var.; W. Friedberg, pp. 207-208, Pl. 13, Fig. 8.
1931. Surcula dimidiata Brocchi; A. Peyrot, pp. 120-122, Pl. 6, Figs 1, 3, and 11.
1953. Clavatula (Surcula) dimidiata Brocchi; I. Csepregy-Meznerics, p. 12, Pl. 4, Figs 13-14.
1970. Clavatula neugeboreni M. Hoernes; I. Csepregy-Meznerics, Pl. 3, Fig. 16.
1975. Turricula (Surcula) dimidiata (Brocchi); E. Robba & F. Ostinelli, p. 318, Pl. 48, Fig. 6.
1976. Turricula dimidiata (Brocchi); E. Caprotti, p. 12, Pl. 17, Fig. 12.
1982. Turricula (Surcula) dimidiata (Brocchi); J. Martinell, pp. 96-98, Pl. 1, Figs 3-4.
1983. Pleurotoma dimidiata (Brocchi); J. Martinell & J. de Porta, p. 101, Pl. 1, Fig. 4.
1984. Turricula dimidiata (Brocchi); M. Bernasconi & E. Robba, pp. 300-301, Pl. 6, Fig. 3.
1994. Turricula (Surcula) dimidiata (Brocchi); P.I. Nikolov, pp. 60-61, Pl. 6, Figs 18-20.
1998. Turricula (Surcula) dimidiata (Brocchi); O. Schulz, p. 74, Pl. 30, Fig. 7.
1998. Turris (Turris) neugeboreni (Hörnes); O. Schulz, p. 76, Pl. 31, Fig. 3.

MATERIAL: Eighty specimens.

DIMENSIONS: The largest specimen, preserved completely, is 29.5 mm high and 10.0 mm wide; one incomplete is 11.4 mm wide.
REMARKS: The studied specimens are pronounced by their low diversity of slenderness and prominence of marginal nodes. In other classical localities, e.g. Soos and Portzterich in the Vienna Basin, and Lapugy in Transylvania, it is much higher, as already stated by Hoernes & AUINGER (1891, p. 304). Of these, the Korytnica specimens are fully concordant only with these the least slender ones (see Hoernes & Auinger 1891, Pl. 38, Figs 14-15 and 19-20). Bellardi (1877) included such specimens into his “var. C”. At Korytnica, there is a lack of more slender specimens, having been regarded as typical. Hoernes & Auinger (1891) showed many forms of transitional shape and regarded that variety as unjustified.

To note, none of the Korytnica specimens bears its outer lip completely preserved (that is, with the pleurotomal notch). Its location at the whorl margins is recognizable in the course of growthlines, particularly of growth stoppages. These very margins are, however, about 1 mm wide, and thus a separateness of the discussed species and Pleurotoma neugeboreni Höernes, noted i.a. from Baden and Lapugy, escapes from a distinction which was claimed so that Turricula (Surcula) dimidiata (Brocchi) had a notch slightly above, and Pleurotoma neugeboreni Höernes just at the margin. Höernes (1856, p. 352) noted also a difference of the slenderness which, as recognized by Hoernes & Auinger (1891), varies distinctly in the Brocchi’s species, and thus a separateness of these two species remains rather speculative. A definitive decision is premature, as the protoconch of Vienna Basin specimens has never been studied. Of the Korytnica specimens, as many as ten have their protoconch preserved. It is about 0.6 mm in diameter, having been composed of about two and half smooth whorls, and bearing its apex small and as if flattened. The protoconchs of the Korytnica specimens differ slightly from that of the specimen from Rio Torsere, Pliocene of northern Italy (cf. Bernasconi & Robba 1984, Pl. 6, Figs 3a and 3b) by their diameter, number of whorls and the shape of the tip. It is not excluded that Turricula (Surcula) dimidiata (Brocchi) and Turricula neugeboreni (Hörnes) are really separate, and either they both, or only the second one really occur at Korytnica.

The species Turricula (Surcula) dimidiata (Brocchi, 1814) was reported from Korytnica by Siemiradzki (1909), Friedberg (1912) and by Kowalewski (1930). In the Miocene of Poland this species is also known from Benczyn (Krach 1950a).

Turricula (Surcula) intermedia (BRONN, 1837) (Pl. 10, Figs 9-10)
1856. Pleurotoma intermedia BRONN; M. HÖRNES, p. 359, Pl. 39, Fig. 9.
1891. Pleurotoma (Surcula) Ottiliae nov.form.; R. Hoernes & M. Auinger, p. 302, Pl. 38, Figs 1-3.
1912. Surcula intermedia BRONN; W. Friedberg; pp. 208-209, Pl. 13, Fig. 9.
1960. (Surcula) intermedia (BRONN); E. Kojumdjeva, pp. 204-205, Pl. 48, Figs 15-16.
1966. Surcula intermedia BRONN; L. Strausz, pp. 415-416, Pl. 17, Fig. 13.
1984. Surcula intermedia (BRONN); G. Ruggieri & F. Davoli, pp. 67-68, Pl. 5, Fig. 23.
1997. Surcula intermedia (BRONN); C. Chirle; pp. 99-100, Pl. 28, Fig. 9; Figs 7-8.

MATERIAL: Sixteen specimens.

DIMENSIONS: The largest specimen is 39 mm high and 10.3 mm wide.

REMARKS: The studied specimens are fully concordant with those described by Hoernes & Auinger (1891), from Baden in the Vienna Basin and from Lapugy in Transylvania as “Pleurotoma (Surcula) Ottiliae nov.form”. It seems reasonable, however, that they do not differ substantially from the specimens of Steinebrunn, which not only Höernes (1856), but also Hoernes & Auinger (1891) themselves have distinguished as a separate species, namely Pleurotoma intermedia BRONN. A variable shell slenderness is herein regarded as of intraspecific variability.

The species Turricula (Surcula) intermedia (BRONN, 1837) was reported from Korytnica by Siemiradzki (1909), Friedberg (1912) and Kowalewski (1930).

Turricula (Surcula) reevei (Bellardi, 1847) (Pl. 10, Figs 5-7)
1891. Pleurotoma (Surcula) Reevei BELL.; R. Hoernes & M. Auinger, p. 303, Pl. 38, Figs 5-7.
1904. Surcula Reevei (BELL.); F. Sacco, p. 43, Pl. 11, Fig. 52.
1950. Clavatula (Surcula) reevei BELLARDI; I. Csepregyh-Meznerics, p. 59, Pl. 2, Fig. 16.
1955. Surcula reevei BELLARDI var. butitica var. nov.; G. Moisescu, pp. 169-171, Pl. 13, Fig. 24.
1960. Surcula (Surcula) reevei (Bellardi); E. Kojumdjeva, p. 204, Pl. 48, Fig. 17.
1966. Surcula reevei BELLARDE; L. Strausz, p. 417, Pl. 17, Fig. 14.
1968. *Surcula (Surcula) reevei* (Bellardi); L. Hinculov, p. 148, Pl. 37, Fig. 8.

1982. *Surcula reevei* (Bellardi); I. Švagrovský, p. 417, Pl. 9, Fig. 4.

1994. *Turricula (Surcula) reevei butiturica* (Moisescu); P.I. NikoloV; pp. 61-62, Pl. 6, Figs 5-6.

**MATERIAL:** Twenty specimens.

**DIMENSIONS:** The largest specimen, lacking the youngest whorls, is 36 mm high and 12.4 mm wide; another specimen, represented by the last whorl only, is 13.0 wide.

**REMARKS:** The studied specimens are fully concordant with those presented by Hornes (1856) from Gainfahren in the Vienna Basin. They should also be regarded as conspecific with those from Bujtur in Transylvania, reported by Hoernes & Auinger (1891), whose illustrations display specimens of slightly lower whorls and more densely spaced axial ribs. In the present author’s opinion such differences are not so significant to distinguish a separate subspecies *Turricula (Surcula) reevei butiturica* (Moisescu). The specimen from Bujtur presented by Moisescu (1955) as the holotype of “*Surcula reevei Bellardi var. butiturica var. nov.*” is quite compatible, though slightly larger, with those coming from Korytnica. It is herein important to indicate that Ferrero Mortara & al. (1981, p. 63, Pl. 9, Fig. 4) illustrated as the syntype of Bellardi’s species a specimen quite dissimilar to that presented by Sacco (1904, p. 43, Pl. 11, Fig. 52), although they referenced to this very specimen(!).

The species *Turricula (Surcula) reevei* (Bellardi, 1847) was reported from Korytnica by Hornes (1856) and Siemiradzki (1909).

*Turricula (Surcula) korytnicensis* sp.nov.

(Pl. 10, Fig. 8)

*partim* 1891, *Pleurotoma* (Surcula) Lamarcki Bell.; R. Hoernes & M. Auinger, p. 307, Pl. 38, Fig. 9; *non* Fig. 10.


**HOLOTYPE:** The specimen (Z.PAL.U.W., No Buk-G-947), presented in Pl. 10, 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:** korytnicensis – Latinized name of Korytnica.

**DIAGNOSIS:** Whorls strongly convex, with a slightly concave, smooth part above the margin; stria adhered to the suture very inconspicuous.

**MATERIAL:** One specimen.

**DIMENSIONS:** Height 37.0 mm, width 13.8 mm.

**DESCRIPTION:** Shell fusiform, weakly slender. The protoconch not preserved; the teleoconch consists of 7 whorls. The whorls are rather strongly convex, but their part above the mid-whorl margin is concave. This part above the mid-whorl margin is smooth, having only one spiral stria just at the suture, and discernible growthlines. The latter indicate the location of the pleurotomal notch, which is rather wide, with its end situated at the middle between the margin and the suture. Below the margin, as far as the lower suture, there run conspicuous, wide, rounded axial ribs (numbering 14 on the last, and 13 on the last but one whorl). Both these ribs and their interspaces are covered with spiral riblets, the three of which (one at the margin, and two directly below) are more distinct. The siphonal canal is long and almost straight, covered by spiral riblets outerly. The aperture is siphonostomous; the inner lip is very thin, the outer one not preserved.

**REMARKS:** The studied specimen is remarkably well compatible with that coming from Lapugy in Transylvania, and presented by Hoernes & Auinger (1891, Pl. 38, Fig. 9) as “*Pleurotoma (Surcula) Lamarcki Bell.*”. Another specimen from Korytnica, reported by Kowalewski (1930) as identical with the same specimen from Lapugy, has been lost. These two specimens from Korytnica plus one from Lapugy are distinctly different from *Turricula (Surcula) Lamarcki* (Bellardi) presented by Hornes (1856), Friedberg (1912), Cesareghy-Mezerics (1953), Kojumdieva (1960), Strausz (1966), and Schultz (1998). The syntype of the species established by Bellardi, and photographed by Ferrero Mortara & al. (1981, Pl. 9, Fig. 8) is also different. Strausz (1966) regarded the discussed illustration presented by Hoernes & Auinger (1891) as erroneous (“mala” in Latin); this is, however, not wrong, but it displays a specimen belonging not to *Turricula (Surcula) Lamarcki* (Bellardi), but to a separate species for whom the name *Turricula (Surcula) korytnicensis* sp.nov. is here-in proposed.

*Genus Clavus* Montfort, 1810

*Subgenus Drillia* Gray, 1838

*Clavus (Drillia) obtusangulus* (Brocchi, 1814)

(Pl. 14, Figs 1-2)


1954. *Clavus (Brachytoma) obtusangula* Brocchi; M. Glibert, p. 25, Pl. 4, Fig. 4.

1960. *Drillia (Drillia) obtusangula* (Brocchi); E. Kojumdgieva, p. 200, Pl. 48, Fig. 5.


1973. *Clavus (Drillia) obtusangulus* (Brocchi); E. Caprotti & M. Vescovi, p. 178, Pl. 2, Fig. 20.

1976. *Clavus obtusangulus* (Brocchi); E. Caprotti, p. 12, Pl. 16, Fig. 20.

1997. *Clavus obtusangulus* (Brocchi); C. Chirli, pp. 41-42, Pl. 11, Figs 8-10.

**MATERIAL:** Twelve specimens.

**DIMENSIONS:** The largest specimen (see Pl. 14, Fig. 1) is 12.5 mm high and 4.5 mm wide.

**REMARKS:** The studied specimens are fully concordant with those presented by Hörnes (1856), Kóntkiewicz (1882), Siemiradzki (1909), Friedberg (1912, 1928), and Kowalewski (1930).

To this species the present author includes, with a hesitation, one specimen (see Pl. 11, Fig. 1) differing by its much smaller size (12.4 mm high, and 5.2 mm); this is thought to be dwarfish. A similar specimen was presented by Hörnes 1856, Pl. 40, Fig. 1), and the others do that from Steinebrunn (see Hörnes 1856, Pl. 40, Fig. 2).

The species *Clavus (Drillia) obtusangulus* (Brocchi, 1814) has not hitherto been known from the Miocene of Poland.

*Clavus (Drillia) strombillus* (Dujardin, 1837)

(Pl. 11, Figs 1-4)

1854. *Pleurotomoides strombillus* Dujardin; M. Glibert, p. 56, Pl. 6, Fig. 6; Pl. 7, Figs 1a, b and c, d.


1957. *Pleurotomoides strombillus* Dujardin; G. Zbyszewski, p.182, Pl. 18, Fig. 193.

1966. *Pleurotomoides herbaceus* strombillus Dujardin; L. Strausz, pp. 436-437, Pl. 19, Fig. 13.

1998. *Pleurotomoides (Pleurotomoides) strombillus* (Dujardin); O. Schultz, p. 76, Pl. 31, Fig. 8.

**MATERIAL:** Forty-five specimens.

**DIMENSIONS:** The largest specimen is 30.5 mm high and 12.5 mm wide; another one is 28 mm and 13 mm, respectively.

**REMARKS:** The studied specimens are fully concordant with those coming from the Vienna Basin and presented by Hörnes (1856). Their variability concerns the slenderness, as it is well demonstrated by the specimens from Korytnica some of which resemble the specimen illustrated from Vöslau (see Hörnes 1856, Pl. 40, Fig. 1), and the others do that from Steinebrunn (see Hörnes 1856, Pl. 40, Fig. 2).

The species *Clavus (Drillia) strombillus* (Dujardin, 1837) was reported from Korytnica by Pusch (1837) under the name of “*Pleurotoma costellata Bast.*” [as recognized by Friedberg (1912)], as well as by Hörnes (1856), Kontkiewicz (1882), Siemiradzki (1909), Friedberg (1912, 1928), and Kowalewski (1930).

**Genus Gemmula** Weinkauff, 1876

**Gemmula annae** (Hoernes & Auinger, 1891)

(Pl. 12, Figs 5-9)

1856. *Pleurotoma turricula* Brocc.; M. Hörnes, pp. 350-351, Pl. 38, Fig. 11.


1912. **Pleurotoma Annae** R. Höern, i Auinger; W. Friedberg, pp. 204-205, Pl. 13, Figs 4-5.

1928. **Pleurotoma Annae** R.H. i A. var. Mathildae R.H. & A.; W. Friedberg, p. 567, Pl. 37, Fig. 4.


1960. **Pleurotoma** (Hemipleurotoma) **annae** Hornez und Auinger; E. Kojumdjeeva, p. 195, Pl. 46, Fig. 15.

1966. **Pleurotoma annae** Hoernes & Auinger; L. Strausz, p. 421, Pl. 18, Figs 3-5.


1998. **Gemmula** (Hemipleurotoma?) **annae** (Hoernes & Auinger); O. Schultz, p. 76, Pl. 31, Fig. 4.

MATERIAL: Twenty-three specimens.

DIMENSIONS: The largest specimen is 33 mm high and 10.5 mm wide.

REMARKS: The studied specimens are assigned to the species **Gemmula annae** (Hoernes & Auinger) established for those from the Vienna Basin, although their majority are comparable to the variety (Var. A) from Baden, better than to the typical ones. The discussed species is very common in the Vienna Basin (Hoernes & Auinger 1891, p. 297) and typically it is featured by variable ornamentation. Moreover, Hoernes & Auinger (1891) distinguished another species, **Gemmula mathildae**, regarded by them as conjoined (verbunden in German) by transitional forms. Of the Korytnica specimens, none has ornamentation such as of **Gemmula mathildae**, that is none bears the main sculptural element, the pleurotomal carina, situated in the lower (anterior) half of the whorl. Friedberg (1928), who had one specimen from Korytnica, described it under the name of "**Pleurotoma Annae** R.H. i A. var. **Mathildae** R.H. i A.", and recorded this element at the middle, not in the lower part of the whorl. In the preserved complete only in three specimens; it consists of 4-4.25 whorls, and the riblet-covered part is not longer that a half whorl.

The species **Gemmula annae** (Hoernes & Auinger, 1891) was reported from Korytnica by Pusch (1837) under the name of "**Pleurotoma contigua** (Brockchi)", as well as by Höernes (1856), Kondrackiewicz (1882), Friedberg (1928), and Kowalewski (1930). In the Miocene of Poland it is also known from Beniczyn (Krach 1950a).

**Gemmula coronata** (Münst Monthly of Goldfuss, 1843) (Pl. 12, Figs 1-4)

1843. **Pleurotoma coronata** Münst; G. Münst in A. Goldfuss, p. 21, Pl. 171, Fig. 8.

1856. **Pleurotoma coronata** Münst; M. Hornez, pp. 355-356 and 683, Pl. 52, Fig. 9.


1928. **Pleurotoma coronata** Münst; W. Friedberg, pp. 567-568, Pl. 37, Figs 5-6.

1953. **Clavatula** (Surcula) **coronata** (Münst); I. Csepreghy-Meznerics, p. 10, Pl. 2, Figs 9-12.

1954. **Turris** (Gemmula) **coronata** Münst; M. Glibert, pp. 7-8, Pl. 2, Fig. 4.

1960. **Pleurotoma** (Pleurotoma) **coronata** Münst in Goldfuss; E. Kojumdjeeva, pp. 193-194, Pl. 46, Fig. 10.

1974. **Pleurotoma coronata** Münst; J. Urbaniak, p. 38, Pl. 12, Fig. 1.

1984. **Gemmula** (Gemmula) **denticula borealis** (Glibert); A.W. Janssen, p. 278, Pl. 11, Fig. 3; Pl. 68, Fig. 4.

**non** 1984. **Gemmula** (Gemmula) **coronata** (Von Münst); A.W. Janssen, p. 277, Pl. 11, Fig. 2; Pl. 68, Fig. 5.

MATERIAL: Over three hundred specimens.

DIMENSIONS: The largest specimen (see Pl. 12, Fig. 4) is 19.8 mm high and 6.8 mm wide.
REMARKS: The studied specimens are almost ideally concordant with those coming from Lapugy in Transylvania, and presented by Hoernes & Auinger (1891) under the name of “Pleurotoma coronata Münnst. var. Lapugensis”. They also are concordant with a specimen coming (probably!) from Vöslau in the Vienna Basin, and presented by Hornes (1856) whose illustration (Hornes 1856, Pl. 52, Fig. 9) does however not display the most important ornamentation feature, viz. the margin of the whorls. All specimens from Korytnica come from that part of the basin whose gastropod assemblage is the most similar to that of Baden in the Vienna Basin (see Baluk 1997, p. 49). In all the Korytnica specimens there run two spiral striae on the margin [or, as termed by Höernes & Auinger (1891, p. 295) a furrow runs along the mid-margin], that is in the terminology of M. Hornes' this should be a “carina bifasciata”. It has long been known that in many localities of the Vienna Basin, particularly of the Baden Clays (“badener Tegel” in German) there occur several similar species which, as already stressed by Höernes & Auinger (1891, p. 294), may easily be confused. For instance, such are Pleurotoma badensis R. Hornes, Pleurotoma rotata Brocchi, Pleurotoma trifasciata M. Hornes, and Pleurotoma coronata Münnst in Goldfuss. In this context, an evident misinterpretation is that claimed by Strausz (1966, p. 419) that Pleurotoma trifasciata M. Hornes is identical with these described as Pleurotoma coronata Münster in Goldfuss, those from Korytnica (Friedberg 1928) including. The diagnosis of the species Pleurotoma trifasciata M. Hornes is satisfactory clear (evident in the figure as well) and there is no reason to widen it at any extent. It may only be assumed that Strausz' misinterpretation was involved by an arbitrary determination by Csepreghy-Meznerics (1953, Pl. 2, Figs 1-4) of the specimens from Szob in Hungary. Strausz (1966) did not take into account the shell size, and reported for the M. Hornes' species height of 30-40 mm, whereas the shells of Gemmula coronata (Münster in Goldfuss) rarely attain over 20 mm. The species holotype, from Baden, is 16 mm high (vide Hornes 1856, p. 355); a specimen (supposedly from Vöslau), presented by Hornes (1856), is 22 mm high, and of over 300 specimens from Korytnica none exceeds 20 mm. Strausz' (1966) opinion is obviously accepted that the whole discussed group should thoroughly be revised, an SEM analysis of the protoconch including.

Within the specimens illustrated by Janssen (1984) from the Miocene of Winterswijk-Miste in the Netherlands, concordant with these from Korytnica is undoubtedly “Gemmula (Gemmula) denticula borealis (Glibert)”, whereas Janssen’s “Gemmula (Gemmula) coronata (von Münnst)” cannot be included to the studied species.

Of the specimens classified by Montanaro (1939, Pl. 4, Figs 21-27) as “Pleurotoma coronata Münster” from the Miocene of Montegibbio none is concordant with the Viennese specimens. All these Italian specimens, in their posterior (upper) part of the whorls, bear a conspicuous, bead-like spiral which, on the contrary, is absent from all specimens of Baden, Lapugy, and of Korytnica as well.

Hornes (1856, p. 353), with a reference to Bellardi (1847), reports from Korytnica an occurrence of Pleurotoma monilis Brocchi (= Pleurotoma badensis R. Hornes). Since that time nobody of successive collectors has found this species, what has already been commented by Kowalewski (1930, p. 97). It may only be assumed, that Hornes had really a similarly ornamented species, just the discussed herein Gemmula coronata (Münster in Goldfuss).

The species Gemmula coronata (Münster in Goldfuss, 1843) was reported from Korytnica by Friedberg (1928) and Kowalewski (1930). In the Miocene of Poland it was also mentioned from Zglobice by Urbaniaik (1974).

Genus Crassispira Swainson, 1840
Crassispira obeliscus (Desmoulins, 1842)
(Pl. 13, Figs 6-10)

1856. Pleurotoma obeliscus Des Moul.; M. Hornes, pp. 371-372, Pl. 39, Fig. 19.
1912. Drillia Allionii Bell.; W. Friedberg, pp. 214-215, Pl. 13, Fig. 16.
1937. Drillia Allionii Bell.; E. Montanaro, p. 117, Pl. 6, Figs 50-51.
1960. Drillia (Stenodrillia) allionii Bellarde; E. Kojumdjigiev, p. 201, Pl. 48, Fig. 6.
1966. Drillia allionii Bellarde; L. Strausz, pp. 422-423, Pl. 11, Figs 6-10.
1982. Surcula consobrina badensis (Csepreghy-Meznerics); J. Švagrovský, p. 416, Pl. 9, Fig. 3.
1998. Clavus (Drillia) allionii Bellarde; O. Schultz, p. 74, Pl. 30, Figs 11-12.

MATERIAL. Twenty specimens.

DIMENSIONS: The largest specimen (see Pl. 13, Fig. 9) is 34 mm high and 10 mm wide.
REMARKS: The taxonomic assessment of the studied specimens yields some difficulties. Undoubtedly, they are concordant with the specimens from Saubrigues in Aquitaine, presented by Peyrot (1931) under the name of “Drillia (Crassispira) obeliscus (Des Moulins)”. To this very species Hornes (1856) assigned specimens from many localities of the Vienna Basin. Such an assignment was objected by Hoernes & Auinger (1891) who both followed Bellardi (1877), to classify the discussed specimens as “Pleurotoma (Drillia) Allionii Bell.”, a species of very variable morphology; they regarded the illustration of Hornes (1856, Pl. 39, Fig. 19) as wrong (“malà” in Latin). Almost all subsequent reports on gastropods of which the first has not been studied by Bernasconi & Robba (1984) who, upon morphological studies of the protoconchs, concluded that the five closely related species from the Miocene and Pliocene of Italy, one of which was Pleurotoma allionii Bellardi, represent really one species, whose priority name should be “Pleurotoma bellardi DesMoulins”. If their conclusion on such a “pock” species is correctly, an use of the name introduced by DesMoulins is inadequate, since it should preferably be ascribed to specimens from the type locality (Saubrigues in Aquitaine); neither topotype material, nor DesMoulins’ paper were analysed by Bernasconi & Robba (1984) who abstained from discussion because they had “no shell material at hand”. A relation of these two species established by DesMoulins remains therefore still unclear and requires a further study. It may only be assumed, when based on description and photos reported by Peyrot (1931), that these two species do not differ sufficiently to be treated as separate. If so, it is herein advocate consequently, that the priority name is Pleurotoma obeliscus used by DesMoulins on an earlier page of the same paper (vide Peyrot 1931). Finally, it is to indicate that several specimens from Koryntica bear their protoconch preserved; both its size and sculpture are well compatible with these presented by Bernasconi & Robba (1984, Pl. 7, Figs 3a, 4 and 5) in Stenodrillia belardi (DesMoulins).

The species Crassispira obeliscus (DesMoulins, 1842) has not hitherto been known from Koryntica. In the Miocene of Poland it was mentioned under the name of “Drillia allioni” from Benczyn (Krach 1950a), and Grudna Dolna by Uhlig (fide Friedberg 1912), as well as from the vicinity of Miechów (Krach 1947).

Crassispira pustulata (Brocchi, 1814) (Pl. 13, Figs 1-5)

1837. Pleurotoma pustulata Bronn u. Brocchi, var.; G.G. Pusch, pp. 143-144, Pl. 12, Fig. 9.
1856. Pleurotoma pustulata Brocchi; M. Hornes, pp. 369-370, Pl. 39, Fig. 21.
1891. Pleurotoma (Drillia) pustulata Brocchi var.; R. Hoernes & M. Auinger, pp. 319-320, Pl. 40, Figs 1-12.
1912. Drillia pustulata Brocchi; W. Friedberg, pp. 215-217, Pl. 13, Fig. 17.
1954. Drillia pustulata Brocchi; I. Csepreghy-Meznerics, p. 50, Pl. 6, Figs 22-23 and 28-29.
1958. Clavus (Crassispira) pustulatus (Brocchi); J. Šágrovský, pp. 23-24, Pl. 7, Figs 6-13.
1959. Clavatula augustae R. Hoern. et Auinger; M. Eremita, p. 187, Pl. 1, Fig. 8.
1960. Drillia pustulata (Brocchi); E. Kojumdgieva, p. 202, Pl. 48, Fig. 10.
1966. Drillia pustulata Brocchi; L. Strausz, pp. 424-425, Pl. 19, Fig. 9.
1968. Drillia (Drillia) rotundicosta crassicostata (Sacco); L. Hinculov, pp. 148-149, Pl. 37, Fig. 9.
1970. Clavus (Crassispira) pustulatus (Brocchi); W. Baluk, p. 119, Pl. 13, Fig. 10.
1973. Clavus pustulatus (Brocchi); M. Bohn-Havas, p. 1065, Pl. 6, Fig. 6.
1982. Drillia augustae (R. Hornes et M. Auinger); J. Šágrovský, pp. 409-410, Pl. 10, Fig. 1.
1984. Crassispira (Crassispira) pustulata (Brocchi); G. Ruggieri & F. Davoli, p. 69, Pl. 5, Figs 5-9.
1990. Crassispira (Crassispira) pustulata (Brocchi); F. Davoli, pp. 91-92, Pl. 8, Figs 22-23; Pl. 9, Figs 2-7.
1998. Clavus (Drillia) pustulatus (Brocchi); O. Schultz, p. 74, Pl. 30, Fig. 10.
1998. Drillia pustulata (Brocchi); V. Mikuž, pp. 67-68, Pl. 1, Fig. 1.

MATERIAL: Thirty-two specimens.

DIMENSIONS: The four largest specimens are 25.5, 23.5, 22.0, or 21.5 mm high, and 8.2, 8.0, 8.6, or 7.7 mm wide, respectively.

REMARKS: The studied specimens are evidently concordant with all those commonly known (see synonymy) from Miocene sequences of the Paratethys and classified as Crassispira pustulata (Brocchi). The shells of this
species are very variable, especially in their size and ornamentation details, as demonstrated e.g. by Hoernes & Auinger (1891) and Strausz (1966).

Under discussion, however, remains the problem of identity of the specimens from the Vienna Basin and from the northern Italy, studied already by Hoernes & Auinger (1891) who regarded the Viennese specimens as of an unnamed variety (varietas). The Italian specimens are really slightly different from those of the Vienna Basin and, thereby, also from these of Korytnica. Those from northern Italy differ in their ornamentation of the last whorl, and this concerns also the holotype of the species, photographed by Penerima & Spezia (1978, Pl. 41, Fig. 3). Recently, of the Italian authors it has been Davoli (1990) who recognized his specimens as concordant with those herein studied from Korytnica.

The present author includes into the discussed species the specimens which Moisescu (1955), from Bujtur in Transylvania, and Eremita (1959), from Klaśnic in Croatia, described as Drilíia augustae, or as Clavatulía augustae (Hoernes & Auinger), respectively. Both the size and ornamentation (shape and the number of axial ribs) suggest their erroneous assignment.

The species Crassispíra postulata (Broccchi, 1814) was recorded from Korytnica by Pusch (1837), Eichwald (1853), Hornes (1856), Siemiradski (1909), Friedberg (1912), and Kowalewski (1930). In the Miocene of Poland, it is also known from Benczyn (Krach 1950a), Niskowa (Friedberg 1912, 1938; Skoczylasówna 1930; Baluk 1970), and Grudna Dolna (Uhlig, fide Friedberg 1912). A report by Urbaniaik (1974, Pl. 12, Fig. 9) from Zgóbice cannot be confirmed as the state of preservation of the illustrated specimen is too inferior.

**Genus Miracíathurella Woodring, 1928**

*Miracíathurella granaria* (Dujardin, 1837) (Pl. 11, Figs 5-8)

1856. Pleurotoma granaria Duj.; M. Hornes, pp. 382-389, Pl. 40, Fig. 10.

1877. Driltia Matheroni Bell.; L. Bellardi, p. 117, Pl. 4, Fig. 5.


1931. Drillia (Crassispíra) granaria Duiardin; A. Peyrot, pp. 162-163, Pl. 9, Fig. 33; Pl. 10, Figs 45-47.


1954. Clavus (Crassispíra) granaria Duiardin; M. Glibert, p. 31, Pl. 5, Figs 1a, b.

1960. Drilíia (Stenodrillia) granaria (Duiardin); E. Koiumdjujeva, pp. 201-202, Pl. 48, Figs 8-9.

1966. Drillia granaria szobensis Csepreghy-Meznerics; L. Strausz, p. 425, Pl. 19, Fig. 10.

1966. Drillia (Stenodrillia) granaria Duj.; J. Kókay, Pl. 9, Fig. 13.

1981. Drillia matheroni Bellardi; E. Ferreró Mortara & al., p. 71, Pl. 11, Fig. 11.

1984. Miracíathurella matheroni (Bellardi); M.P. Bernasconi & E. Robba, pp. 317-319, Pl. 8, Figs 4-5.


**MATERIAL:** A hundred and eighty specimens.

**DIMENSIONS:** The largest specimen (see Pl. 11, Fig. 7) is 11 mm high and 4.3 mm wide.

**REMARKS:** The studied specimens are concordant with those described and commented by Hoernes & Auinger (1891, p. 322), who stated that in some localities of the Vienna Basin *Pleurotoma granaria* Duiardin is common (e.g. at Forchtenau, Niederleis) and typically very variable. This variability concerns generally their ornamentation, and particularly the shape of axial ribs, which range from narrow, but numerous on the whorl to those rather scarce and broad. Hoernes & Auinger did not indicate definite numbers of these ribs, but the illustrated forms (Hoernes & Auinger 1891, Pl. 41, Figs 14-20) are evidently identical with these from Korytnica, in which the number of axial ribs on the last but one whorl ranges between 9 and 14. From localities of other countries, this number is reported usually as 12 (Friedberg 1912, Pl. 13, Fig. 19; Peyrot 1931), and maximally as 16 (Friedberg 1912, Pl. 13, Fig. 18); a specimen with extremely numerous axial ribs (not counted) was also presented by Glibert (1954) from Ferriere-Larçon in the Loire Basin. Consequently, in the present author’s opinion unjustifiable is a treatment by Csepreghy-Meznerics (1953) who established, upon one unique specimen from Szob in Hungary, a separate subspecies *Drillia granaria* szobensis Csepreghy-Meznerics diagnosed solely on broad and not numerous ribs, numbering 8 according to Strausz (1966).

The studied specimens from Korytnica are also concordant with those coming from the Neogene of North Italy, and presented by Bellardi (1877), Bernasconi & Robba (1984), and Chirli (1997) under the name “Drillia matheroni Bellardi 1877”. They are of identical size and ornamentation of the protoconch, and they always bear two spiral cords at the front of the first teleoconch whorl. To note, Bernasconi & Robba (1984, p. 319) considered *Pleurotoma granaria* Duiardin, 1837, and *Drillia matheroni* Bellardi, 1877, to be closely
related species, but they did not know the protoconch of the former.

The species *Miraculathurela granaria* (DuiJARDIN, 1837) has not hitherto been known from the Miocene of Poland. The specimens described by FRIEDBERG (1912) were coming from localities Dryszczów and Zborów, at present in the Ukraine.

**Genus Haedropleura** BUCQUOY, DAUTZENBERG & DOLLFUS, 1882

*Haedropleura adami* (FRIEDBERG, 1912)

(Pl. 15, Figs 1-3)

1912. *Raphitoma Adami* FRIED.; W. FRIEDBERG, p. 239, Pl. 14, Fig. 22.

1938. *Bela septangularis* MONT.; W. FRIEDBERG, p. 147. non 1960. *Raphitoma adami* FRIEDBERG; G. RADO, p. 104, Pl. 2, Fig. 2.

**MATERIAL:** Fifteen specimens.

**DIMENSIONS:** The largest specimen is 6.7 mm high and 2.7 mm wide.

**REMARKS:** The studied specimens are concordant with those coming from the locality Zborów (at present, in the state of the Ukraine), for which FRIEDBERG (1912) established the species *Raphitoma adami*. The present author convinced this when comparing the specimens with Korytnica from topotypes kept at the Museum of the Polish Academy of Sciences in Cracow (Collection: ZGN PAN A-I-50). Subsequently, FRIEDBERG (1938) recognized that his species is identical with *Bela septangularis* (MONTAGU). As concerns this very assignment, the present author claims serious doubts as the Korytnica specimens (and these from Zborów) differ more or less distinctly from those presented in the literature, e.g. by SACCO (1904, p. 47, Pl. 12, Figs 51-52), PEYROT (1931, pp. 176-177, Pl. 9, Figs 65-67), GLIBERT (1954, pp. 52-53, Figs 12a and 12b), and by STRAUSZ (1966, p. 434, Pl. 20, Figs 3-4). The Korytnica specimens are less slender, with usually 8 (rarely 9) axial ribs on the last, and 9 (rarely 8 or 10) on the last but one whorl; all these ribs usually do not locate one above the other. On the last whorl, associated with a varix at the outer lip, there may also appear one or two accessory varices. Consequently, the present author accepts herein an earlier FRIEDBERG’s designation.

Supposedly, an allied species is *Haedropleura sccalima* (PHILIPPI, 1844) to which assigned were the specimens presented from the Neogene of North Italy, for instance by BERNASCONI & ROBBA (1984, pp. 279-281, Pl. 3, Fig. 2) and CHIRLI (1997, pp. 36-37, Pl. 9, Figs 10-12). When compared to the Korytnica specimens, those from Italy bear slightly more densely spaced axial ribs (10 per whorl). The Italian specimens vary in the structure of their protoconch: according to BERNASCONI & ROBBA (1984), the protoconch consists of 3.25 whorls, but CHIRLI (1997) report only 1.5. Of the photographed specimens from Korytnica only one (Pl. 15, Fig. 1) bears its protoconch completely preserved; it is identical with that of a Lower Pliocene specimen from Río Torsero (see BERNASCONI & ROBBA (1984, Pl. 3, Fig. 2).

The species *Haedropleura adami* (FRIEDBERG, 1912) has not hitherto been known from the Miocene of Poland.

*Haedropleura avenacea* BOETTGER, 1906

(Pl. 14, Figs 4-6)

1906. *Haedropleura avenacea* n.sp.; O. BOETTGER, p. 60.

1934. *Haedropleura avenacea* BOETTGER; A. ZILCH, p. 262, Pl. 18, Fig. 35.

**MATERIAL:** One hundred and ten specimens.

**DIMENSIONS:** The largest specimen (see Pl. 14, Fig. 5) is 8.5 mm high and 3.6 mm wide.

**REMARKS:** The studied specimens, quite common at Korytnica, seem to be conspecific with those described by BOETTGER (1906) from Kostej, Lapugy, and Bujtur in Transylvania. Commented should only be the size of specimens from Korytnica, where numerous are such ones as noted by BOETTGER (that is, up to 5-6 mm high and 2-2.5 mm wide), but these much larger ones (up to 8.5 mm high) are also present; and they are generally more slender than the lectotype presented by ZILCH (1934). Such larger specimens resemble those from Stazzano in northern Italy, presented by SACCO (1904, p. 47, Pl. 12, Figs 53-54) under the name of “Bela (*Haedropleura*) septangularis var. parvulata SACCO.”

The species *Haedropleura avenacea* BOETTGER, 1906, has not hitherto been known from the Miocene of Poland.

*Haedropleura cristallina* BOETTGER, 1906

(Pl. 15, Figs 4-6)


1934. *Haedropleura cristallina* BOETTGER; A. ZILCH, p. 262, Pl. 18, Fig. 34.

1969. *Haedropleura cristallina* BOETTGER; M. ATANACKOVIČ, p. 213, Pl. 12, Fig. 7.
MATERIAL: Fourteen specimens.

DIMENSIONS: The largest specimen (see Pl. 15, Fig. 6) is 6.5 mm high and 3.0 mm wide.

REMARKS: The taxonomic assessment of the studied specimens yields some difficulties. They seem to be conspecific with those described by BOETTGER (1906) from Kostej in Transylvania, as they also bear 7-8 axial ribs and usually two (exceptionally even 3) varices on the last whorl, and are lustrous. Their whorls, however, are more convex and not smooth, but delicately grooved spirally. These features make the specimens from Korytnica similar to another species from Kostej, namely Haedropleura corae BOETTGER, the axial ribs of which are, however, more densely spaced (numbering 11-12 plus a wide varix), according to BOETTGER (1906).

An assignment of the Miocene specimens from Bosna, presented by ATANACKOVIĆ (1969) is not quite evident as their state of preservation is very inferior.

The species Haedropleura cristallina BOETTGER, 1906, has not hitherto been known from the Miocene of Poland.

Haedropleura etelkae (BOETTGER, 1901)
(Pl. 14, Figs 7-8)

1901. Drillia (Haedropleura) pseudosigmoidea n.sp.; O. BOETTGER, p. 46.
1934. Haedropleura pseudosigmoidea (BOETTGER); A. ZILCH, p. 262, Pl. 18, Fig. 33.

MATERIAL: Thirty specimens.

DIMENSIONS: The largest specimen (see Pl. 14, Fig. 8) is 7.8 mm high and 3.4 mm wide.

REMARKS: The studied specimens are concordant with those described by BOETTGER (1901) from Kostej in Transylvania. They also bear rather weakly developed axial ribs, numbering 7-9 on the last whorl, although a figure of 8-9 was noted by BOETTGER (1906). In the present author’s opinion, the Korytnica specimens are identical with those presented by CHIRLI (1997) under the name Cerodrilla exigua DELLA BELLA & TABANELLI, 1990 from the Pliocene of Toscana; they are thereby treated herein as conspecific with BOETTGER’s species.

The species Haedropleura pseudosigmoidea (BOETTGER, 1901) has not hitherto been known from the Miocene of Poland.

Haedropleura etelkae (BOETTGER, 1901)
(Pl. 14, Figs 9)

MATERIAL: One specimen.

DIMENSIONS: Height about 7.2 mm, width about 3.4 mm.

REMARKS: The studied specimen is evidently different from all the studied forms and even its generic assignment remains unclear. Its aperture is damaged, and thus one cannot ascertain whether it is fully grown. It reminds, to some extent, the above-discussed Haedropleura etelkae (BOETTGER), but its axial ribs are more sparse (8 on the last whorl). On the other hand, it is similar to a form of much larger size (height 20 mm), Daphnella (Raphitoma) mutabilis MAYER presented by PEYROT (1931, pp. 250-251, Pl. 9, Figs 71-73) from the Miocene of Aquitaine. Not excluded is also a possibility of its separateness at the species level, that is of the representing a species new to science.

Genus Asthenotoma HARRIS & BURROWS, 1891

Asthenotoma festiva (HÖRNES, 1856)
(Pl. 16, Figs 1-6)
1856. *Pleurotoma festiva* DODERLEIN; M. HÖRNES, pp. 337-338, Pl. 36, Fig. 15.


1912. *Asthenotoma pannus* BAST.; W. FRIEDBERG, pp. 220-221, Pl. 14, Fig. 1.


1954. *Asthenotoma festiva* HÖRNES; M. GLIBERT, pp. 36-37, Pl. 5, Fig. 9.

1958. *Asthenotoma* (*Asthenotoma*) *pannus* (BASTEROT); J. ŠWAGROVSKÝ, pp. 8-9, Pl. 1, Fig. 1.


1990. *Asthenotoma tuberculata* (PUSCH); R. GATTO, Fig. 4.

1997. *Asthenotoma tuberculata* (PUSCH); R. GATTO, pp. 39-40, Pl. 1, Figs 1-8; Pl. 7, Fig. 1.

MATERIAL: Seventy specimens.

DIMENSIONS: The largest specimen is 21.5 mm high and 6.7 mm wide.

REMARKS: The studied specimens are evidently conspecific with those coming from several localities in the Vienna Basin, and described by HÖRNES (1856) under the name of *Pleurotoma festiva* DODERLEIN. This conspecifity was already stressed by FRIEDBERG (1912), who followed BELLARDI (1877) and HOERNES & AUINGER (1891), however, with an use of the name, *Asthenotoma pannus* BASTEROT, the first one treated as synonymous. Recently, GATTO (1997) indicated that the Viennese specimens are not conspecific with those from Salles in Aquitaine, and concisely discussed this nomenclatorial misunderstanding to advocate M. HÖRNES as the creator of the species (as already given earlier by GLIBERT 1954).

The species *Asthenotoma festiva* (HÖRNES, 1856) was reported from Korytnica, under the name of *Asthenotoma pannus* by FRIEDBERG (1912, 1938). In the Miocene of Poland it is also known from Ma∏oszów (KRACH 1947), Rybnica (KOWALEWSKI 1930, 1950), and Nawodzice (BA¸UK & RADWA¡SKI 1968).

*Asthenotoma tuberculata* (PUSCH, 1837) (Pl. 16, Figs 7-10)

1837. *Pleurotoma tuberculata* m.; G.G. PUSCH, p. 143, Pl. 12, Fig. 2.

1856. *Pleurotoma Heckeli* HÖRN.; M. HÖRNES, p. 371, Pl. 39, Fig. 20.


1990. *Asthenotoma tuberculata* (PUSCH); R. GATTO, Fig. 4.

1997. *Asthenotoma tuberculata* (PUSCH); R. GATTO, pp. 39-40, Pl. 1, Figs 1-8; Pl. 7, Fig. 1.

MATERIAL: Fifteen specimens.

DIMENSIONS: The largest specimen is 28.5 mm high and 9.7 mm wide.

REMARKS: An accordance of specimens from Korytnica, first described by PUSCH (1837) as *Pleurotoma tuberculata* PUSCH, with those from various localities of the Vienna Basin and Transylvania, classified by HÖRNES (1856) as *Pleurotoma heckeli* HÖRNES is undoubted (cf. also GATTO 1990, Fig. 4; 1997, Pl. 1, Figs 1-6). A high similarity of these two taxa was claimed already by HÖRNES (1856) and HOERNES & AUINGER (1891), who were not able to state definitely their identity (possibly, because a poor illustration by PUSCH). This species established by PUSCH has often been identified (BELLARDI 1877, SACCO 1904, MONTANARO 1937) with *Pleurotoma meneghini* MAYER occurring in the Miocene of Montegibbio in Italy, and which has recently been documented by GATTO (1990 to be distinctly separate. Nevertheless, in the Miocene of northern Italy the PUSCH’s species is also present, as evidenced subsequently by GATTO (1997, Pl. 1, Figs 7-8) who illustrated two specimens of *Asthenotoma tuberculata* (PUSCH) coming from the Miocene of Stazzano.

The present author has formerly (BA¸UK 1975, p. 13) regarded the name *tuberculata* PUSCH as being a nomen oblitum; GATTO (1990, p. 223) indicated that it is not so, and PUSCH’s name fulfils the ICZN rules.

The species *Asthenotoma tuberculata* (PUSCH, 1837) was established just upon the specimens from Korytnica, where its occurrence was also noted by SIEMIRADZKI (1909), FRIEDBERG (1912, 1938) and by KOWALEWSKI (1930).

Genus *Microdrillia* CASEY, 1903

*Microdrillia crispata* (De Cristofori & Jan, 1832) (Pl. 17, Figs 5-7)

1856. *Pleurotoma crispata* JAN; M. HÖRNES, pp. 367-368, Pl. 39, Fig. 13.

1931. Drilliia (Crassipina) crispata JAN; A. PEYROT, pp. 163-165, Pl. 7, Figs 32-34.
1937. Drilliia (Crassipina) crispata (JAN) in BELL.; E. MONTANARO, pp. 127-128, Pl. 7, Figs 33-34.
1938. Drilliia crispata JAN; W. FRIEDBERG, p. 146, Text-fig. 47.
1960. Drilliia? crispata JAN; E. KOJUMDGIEVA, p. 202, Pl. 48, Fig. 11.
1968. Microdrillia crispata (JAN); E. ROBBA, pp. 595-597, Pl. 45, Fig. 8.
1973. Microdrillia (Microdrillia) crispata (DE CRISTOFORI & JAN); E. CAPROTTI & M. VESCOVI, p. 179, Pl. 3, Fig. 15.
1976. Microdrillia crispata (DE CRISTOFORI & JAN); E. CAPROTTI, p. 12, Pl. 17, Fig. 15.
1984. Microdrillia crispata (DE CRISTOFORI and JAN); M. BERNASCONI & E. ROBBA, pp. 268-270, Pl. 1, Figs 5-6.
1997. Microdrillia crispata (DE CRISTOFORI & JAN); C. CHIRLI, pp. 28-29, Pl. 7, Figs 11-12; Pl. 8, Figs 1-2.

MATERIAL: A hundred and thirty-seven specimens.

DIMENSIONS: The largest specimen is 12 mm high and 4.4 mm wide.

REMARKS: The studied specimens are evidently concordant both with these coming from the realm of the Paratethys basins (HOERNES & AUINGER 1891, GATTO 1992), as well with those from Neogene of northern Italy (BELTARDI 1877, MONTANARO 1937) and Aquitaine (PEYROT 1931). Within specimens from Korytnica the protoconch has fully been preserved in 40 shells, having been well comparable, although slightly slender, with that protoconch which is very close to these coming from the realm of the Paratethys basins (HOERNES & AUINGER 1891, GATTO 1992), as well with those from Neogene of northern Italy (BELTARDI 1877, MONTANARO 1937) and Aquitaine (PEYROT 1931). Within specimens from Korytnica the peripheral carina on the teleoconch in all specimens from Korytnica is ideally smooth, devoid any knobs. In this feature the Korytnica specimens are concordant with that one from the Pliocene of Fornaci, but they differ from another one, coming from the Miocene of S. Agata Fossili, both from northern Italy (see BERNASCONI & ROBBA 1984, Pl. 1, Figs 5b and 6b).

The species Microdrillia crispata (DE CRISTOFORI & JAN, 1832) was reported from Korytnica by FRIEDBERG (1938) only. In the Miocene of Poland it is also known from Benczyn (KRACH 1950a).

Genus Bathytoma HARRIS & BURROWS, 1891
Bathytoma cataphracta (BROCCHI, 1814) (Pl. 17, Figs 2-4)
1856. Pleurotoma cataphracta BROCCH.; M. HORNES, pp. 333-335, Pl. 36, Figs 5-9.
1912. Bathytoma cataphracta BROCCH.; W. FRIEDBERG, pp. 224-225, Pl. 14, Fig. 5.
1931. Bathytoma cataphracta BROCCH., var. dertogranosa SACCO; A. PEYROT, pp. 182-184, Pl. 8, Figs 45-47.
1937. Bathytoma cataphracta (Br.) et var.; E. MONTANARO, pp. 132-134, Pl. 7, Figs 51-60.
1953. Monilopsis (Bathytoma) cataphracta orientalis (SACCO); E. KOJUMDGIEVA, pp. 196-197, Pl. 47, Figs 4-5.
1956. Bathytoma cataphracta (BROCCH); L. BANKE RASMUSSEN, p. 91, Pl. 9, Fig. 3.
1960. Bathytoma (Bathytoma) cataphracta var. dertogranosa SACCO; E. KOJUMDGIEVA, p. 196, Pl. 47, Figs 4-5.
1960. Bathytoma (Bathytoma) cataphracta var. orientalis MEZNERICS; E. KOJUMDGIEVA, p. 197, Pl. 47, Fig. 6.
1973. Epalxis (Bathytoma) cataphracta (BROCCH); E. CAPROTTI & M. VESCOVI, p. 180, Pl. 3, Fig. 19.
1976. Epalxis cataphracta (BROCCH); E. CAPROTTI, p. 12, Pl. 17, Fig. 19.
1984. Epalxis (Bathytoma) cataphracta (BROCCH); G. RUGGIERI & F. DAVOLI, pp. 69-70, Pl. 4, Fig. 24.
1984. Bathytoma cataphracta (BROCCH); M. BERNASCONI & E. ROBBA, pp. 297-299, Pl. 6, Figs 1-2.
1990. Bathytoma cataphracta (BROCCH); F. DAVOLI, pp. 96-97, Pl. 8, Fig. 25.
1997. Bathytoma cataphracta (BROCCH); C. CHIRLI, pp. 33-34, Pl. 9, Figs 7-9.
1998. Epalxis (Bathytoma) cataphracta dertogranosa (SACCO); O. SCHULTZ, p. 76, Pl. 31, Fig. 7.

MATERIAL: Four specimens, of which two are in the private collection of Mr. J. GUBA¸A, and one in the collection of the Museum of the Geological Survey of Poland, Warsaw.

DIMENSIONS: The largest specimen (see Pl. 17, Fig. 4) is 47.5 mm high and 17 mm wide.

REMARKS: The juvenile specimen from Korytnica bears a well preserved protoconch which is very close to these presented by BERNASCONI & ROBBA (1984). It is identically ornamented, though longer of a half whorl at least (thus, having 3.5 whorls), with its distal section adorned with ten sharp, fold-like ribs and attaining almost a half whorl. These variables indicate that the extent of the protoconch in this species is not so stable as suggested by BERNASCONI & ROBBA. The present author thus does not follow them in a definite exclusion of specimens presented by RASMUSSEN (1956) from the range of the discussed species.

The species Bathytoma cataphracta (BROCCH, 1814) was recorded from Korytnica by PUSCH (1837), HORNES (1856), SIEMIRADZKI (1909) and FRIEDBERG (1938). In the Miocene of Poland it is also known from Benczyn (KRACH 1950a).
Bathytoma lapugyensis (MAYER in BELLARDI, 1877) (Pl. 17, Fig. 1)


1891. Pleurotoma (Rouaultia) Lapugyensis MAY.; R. HORNES & M. AUINGER, pp. 376-377, Pl. 50, Figs 1-4.

1891. Pleurotoma (Rouaultia) Martyae nobis; R. HORNES & M. AUINGER, pp. 377-378, Pl. 50, Figs 6-10.


1969. Rouaultia lapugyensis badensis CSEPREGHY-MEZNERICS; I. CSEPREGHY-MEZNERICS, p. 99, Pl. 6, Fig. 13.

1971. Cochlespira lapugyensis (MAY.); M. EREMLA, pp. 45-46, Pl. 14, Fig. 1.

MATERIAL: One specimen.

DIMENSIONS: Height about 23 mm, width 10.5 mm.

REMARKS: The studied specimen, although of a rather inferior preservation state, is fully concordant with that one from Vösål in the Vienna Basin, and described by HORNES & AUINGER (1891, Pl. 50, Fig. 7) under the name of "Pleurotoma (Rouaultia) marthae HORNES & AUINGER". To note, HORNES & AUINGER (1891) were of the opinion to distinguish in the Vienna Basin and Transylvania still more two other species, viz. Pleurotoma (Rouaultia) magdanae MAYER and Pleurotoma (Rouaultia) lapugyensis HORNES & AUINGER, the both yielding the transitional forms ("Übergangsformen"). These three species are very similar indeed, and their slight differences concern the prominence of the row of nodes, the concavity of whorls (precisely, their part above that row of nodes), and the slenderness of the shell. In the present author's estimation, a specific separation of all these forms is very doubtful, and these should rather be treated as intraspecific variants, not uncommon in the genus Bathytoma. A single specimen from Korytnica does not allow, however, for a definite judgement. Of another opinion was CSEPREGHY-MEZNERICS (1969), who introduced a new name of the subspecies rank, "Rouaultia lapugyensis badensis ", for one of the unnamed varieties (var. B) of HORNES & AUINGER (1891).

The discussed forms have often been assigned to the genus Rouaultia BELLARDI, 1877, regarded by WENZ (1943) as synonymous with Cochlespira CONRAD, 1865. In the present author's opinion, not justified is an accommodation of the discussed species into the genus other than Bathytoma. An assignment of this species to the genus Rouaultia was already doubted by CSEPREGHY-MEZNERICS (1969) who put a question mark in her systematic account.

The species Bathytoma lapugyensis (MAYER in BELLARDI, 1877) has not hitherto been known from the Miocene of Poland.

Genus Genota H.&A. ADAMS, 1853
Subgenus Genota H.&A. ADAMS, 1853
Genota (Genota) elisae (HOERNES & AUINGER, 1891) (Pl. 18, Figs 7-9)

partim 1856. Pleurotoma ramosa Base; M. HORNES, pp. 335-336, Pl. 36, Figs 12-14; ?Fig. 10, non Fig. 11.


partim 1931. Genota ramosa (BASTEROT) et var. evanescens PEYROT; A. PEYROT, pp. 53-56, Pl. 1, Figs 31 and 33; non Pl. 1, Figs 29-30, 32, and 34.

1954. Genota ramosa f. elisae HORNES et AUINGER; M. Gliber, p. 21, Pl. 4, Fig. 4a, ?Fig. 4b.


1960. Genota ramosa var. elisae (HORNES und AUINGER); E. KOJUMĐIJEVA, p. 196, Pl. 47, Fig. 3.


1998. Genota ramosa elisae (HOERNES R. & AUINGER); V. MIKUŽ, pp. 68-69, Pl. 1, Fig. 2.

MATERIAL: Forty specimens.

DIMENSIONS: The largest, complete specimen is 43 mm high and 12 mm wide; another one, broken in its initial part, is 13 mm wide.

REMARKS: HORNES & AUINGER (1891) established the species Genota (Genota) elisae for specimens some of which were these treated by HORNES (1856) as varieties of Genota ramosa (BASTEROT). Earlier, BELLARDI (1877) opted for their assignment to the species Genota mayeri (BELLARDI) but, as recognized by HORNES & AUINGER (1891) this was quite separate. Recently, as apparent from the photograph presented by FERRERO MORTARA & al. (1981), the syntype of Genota mayeri clearly confirms a statement expressed by HOERNES & AUINGER (1891).

The specimen from Borský Mikuláš in Slovakia presented by ŠWAGROVSKÝ (1982, pp. 410-411, Pl. 10, Fig. 2) under the name "Genota ramosa elisae (R. HOERNES et
M. Auinger) has quite different relation of the height of the spire and of the last whorl; it thereby cannot be conspecific with any of the Korytnica specimens.

The studied specimens from Korytnica do not achieve such larger sizes (73 mm high and 20 mm wide) as do specimens from Grund in the Vienna Basin. To note, the present author has already paid an attention earlier (Baluk 1995), that the specimens from Grund are commonly typified by their more or less “enormously” large size.

The species Genota (Genota) elisae (Hornes & Auinger, 1891) was reported from Korytnica by Hornes & Auinger (1891), Friedberg (1912, 1938), and Kowalewski (1930).

Genota (Genota) ramosa (Basterot, 1825) (Pl. 18, Figs 2-3)

Partim 1856. Pleurotoma ramosa BAST; M. Hornes, pp. 335-336, Pl. 36, Fig. 11; non Figs 10 and 12-14.

1912. Genota ramosa BAST; W. Friedberg, pp. 211-212, Pl. 13, Fig. 12.

Partim 1931. Genota ramosa (Basterot) et var. austry-gallica May.; A. Peyrot, pp. 53-56, Pl. 1, Figs 29-30, 34; non Pl. 1, Figs 31-33.

1954. Genota ramosa (Basterot); I. Csereghy-Meznerics, pp. 55-54, Pl. 7, Figs 2, 4 and 10.

1958. Genota ramosa ramosa (Basterot); J. Švagrovský, pp. 9-10, Pl. 1, Figs 2-3.

1970. Genota ramosa (Basterot); W. Baluk, p. 119, Pl. 13, Fig. 9.

Material: Seven specimens.

Dimensions: The largest specimen (see Pl. 18, Fig. 2) is 35 mm high and 12 mm wide.

Remarks: The specific assignment of the studied specimens bears some difficulties. Their overall shape reminds both these from the Vienna Basin, regarded by Hornes (1856) and Hornes & Auinger (1891) as typical of Genota ramosa (Basterot), as well as those from the Miocene of Aquitaine classified by Peyrot (1931, Pl. 1, Fig. 34) as “Genotia ramosa, var. austry-gallica May.”. The specimens from Korytnica, however, differ by their ornamentation, the main element of which are prominent nodes at the whorl margin, whereas the extended downwards (anteriorly) axial ribs are weakly developed. The nodes are numbering 13 or 14 on the last but one whorl, while in other localities they are reported (e.g. Friedberg 1912) as being 14-16. To the truth, none of the presented in literature specimens of Genota ramosa is fully compatible with the herein-presented ones from Korytnica; possibly all these differences may be regarded as of intraspecific variability. Morphologically, the studied specimens from Korytnica resemble the best that one from Sámsonháza in Hungary, presented by Csereghy-Meznerics (1954, Pl. 7, Figs 2, 4 and 10) and by Strausz (1966, Pl. 22, Fig. 6) as well.

The species Genota (Genota) ramosa (Basterot, 1825) was reported from Korytnica by Hornes (1856), Kontkiewicz (1882), Hoernes & Auinger (1891), Siemiradzki (1909), Friedberg (1912), and Kowalewski (1930). In the Miocene of Poland it is also known from Niskowa (Friedberg 1912, 1938; Skoczylasówna 1930; Baluk 1970).

Genota (Genota) valeriae (Hornes & Auinger, 1891)

(Pl. 18, Figs 4-6)

1891. Pleurotoma (Genota) Valeriae nov.form.; R. Hornes & M. Auinger, pp. 311-312, Pl. 34, Fig. 15.

1912. Genota Valeriae R. Hornes & Auinger; W. Friedberg, pp. 213-214, Pl. 13, Fig. 15.

Partim 1931. Genotia ramosa (Basterot) [var. tortonica Peyrot]; A. Peyrot, pp. 53-56, Pl. 1, Fig. 32; non Pl. 1, Figs 29-31, 33-34.


1960. Genota ramosa (Basterot); E. Kojumdzieva, pp. 195-196, Pl. 46, Figs 16-17.

Material: Fifty-two specimens.

Dimensions: The largest, completely preserved specimen (see Pl. 18, Fig. 6) is 41.5 mm high and 11 mm wide; another one, with a partly damaged siphonal canal is 12.5 mm wide (its height estimated as 45-46 mm).

Remarks: The studied specimens from Korytnica are undoubtedly conspecific with those coming from Lapugy in Transylvania, described by Hoernes & Auinger (1891). The specimens from these two localities do not practically one differ from the other. Interestingly, both at Korytnica and Lapugy, the species Genota valeriae (Hoernes & Auinger) is quite common, whereas in other localities of the Vienna Basin, Transylvania, and Hungary it is regarded even as a unique one (Csereghy-Meznerics 1953).

The species Genota (Genota) valeriae (Hoernes & Auinger, 1891) was reported from Korytnica by Siemiradzki (1909) and Friedberg (1912).
**Subgenus Pseudotoma Bellardi, 1875**

*Genota (Pseudotoma) praecedens* (Bellardi, 1877)

(Pl. 9, Fig. 8)

_1856. Pleurotoma intorta_ Brocchi; M. Hornes, pp. 331-332, Pl. 36, Fig. 2, non Fig. 1.

_1877. Pseudotoma praecedens_ Bell.; L. Bellardi, p. 216, Pl. 7, Fig. 11.

_1891. Pleurotoma (Pseudotoma) praecedens_ Bell., var.; R. Hoernes & M. Auinger, p. 369, Pl. 34, Fig. 4, Pl. 49, Fig. 5.


_1938. Genota praecedens_ Bell.; W. Friedberg, p. 154, Text-fig. 50.

_1973. Genota (Pseudotoma) intorta_ (Brocchi); E. Caprotti & M. Vescovii, p. 181, Pl. 3, Fig. 18.

_1974. Genota (Acamptogenotia) intorta_ (Brocchi); G. Pavia, pp. 151-152, Pl. 9, Figs 18-19.

_1981. Pseudotoma praecedens_ Bellardi; M. Ferrero Mortara _al._, p. 82, Pl. 16, Fig. 4; (=syntype of the species).

**MATERIAL:** One specimen (in the the collection of the Museum of the Geological Survey of Poland, Warsaw).

**DIMENSIONS:** Height 63 mm, width 27 mm.

**REMARKS:** The only specimen (collected by K. Kowalewski) is undoubtedly concordant with that coming from Baden in the Vienna Basin, presented by Hoernes & Auinger (1891). All specimens from the Vienna Basin were earlier (Höernes 1856) classified as _Pleurotoma intorta_ Brocchi; but it was already Bellardi (1877) who recognized their difference to those from the Neogene of northern Italy. Hoernes & Auinger (1891) accepted this recognition and stated that the discussed specimen from Baden should be determined as _Pseudotoma praecedens_ Bellardi. This has recently been confirmed by Ferrero Mortara _al._ (1981) who photographed the syntype of this species: it is evidently concordant with the specimen from Korytnica. In the present author’s opinion, conspecific is also a specimen from Orthez (Paren) in the Aquitaine Basin, presented by Peyrot (1931) under the name of “Genota (Pseudotoma) intorta Brocchi”. Noteworthy is the size of the Korytnica specimen which is the largest of all hitherto presented _Genota (Pseudotoma) praecedens_ (Bellardi) in the literature.

The species _Genota (Pseudotoma) praecedens_ (Bellardi, 1877) has not hitherto been known in the Miocene of Poland. One incomplete specimen presented by Friedberg (1938) was coming from Dryszczów, at present in the Ukraine.

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**Genota (Pseudotoma) bonellii** (Bellardi, 1839)

(Pl. 18, Fig. 1)

_1856. Pleurotoma bracteata_ Brocchi; M. Hornes, pp. 332-333, Pl. 36, Fig. 3.


_1901. Pseudotoma bonellii_ Bell. var. subspinosa Böttger.; O. Boettger, p. 48.


_1934. Genota (Pseudotoma) bonellii subspinosa_ (Boettger); A. Zilch, p. 275, Pl. 22, Fig. 5.

_1953. Genota (Pseudotoma) bonellii subspinosa_ (Boettger); I. Csepreghy-Meznerics, p. 19, Pl. 3, Figs 15-16.


_1968. Genota (Pseudotoma) bonellii_ (Bellardi); E. Robba, pp. 609-610, Pl. 46, Fig. 6.

_1969. Genota (Pseudotoma) bonellii_ (Bellardi); I. Csepreghy-Meznerics, p. 98, Pl. 6, Figs 21-22.

_1969. Genota (Pseudotoma) bonellii botensis_ n.ssp.; I. Csepreghy-Meznerics, p. 98, Pl. 6, Fig. 23.

_1974. Genota (Pseudotoma) bonellii_ (Bellardi); E. Caprotti, p. 34, Pl. 4, Figs 2 and 7.

_1981. Pseudotoma bonellii_ (Bellardi); M. Ferrero Mortara _al._, p. 82, Pl. 16, Fig. 8 (=syntype of the species).

_1994. Genota (Pseudotoma) bonellii_ (Bellardi); P.I. Nikolov, pp. 67-68, Pl. 8, Figs 1-2.


_1997. Genota bonellii_ (Bellardi); C. Chielli, pp. 100-101, Pl. 28, Figs 10-12.

_1998. Genota (Pseudotoma) bonellii_ (Bellardi); O. Schultz, p. 76, Pl. 31, Fig. 9.

**MATERIAL:** One specimen.

**DIMENSIONS:** Height about 22 mm, width 12.5 mm

**REMARKS:** The only specimen from Korytnica is well comparable to that from Baden in the Vienna Basin, presented by Hornes (1856). Conspecific are also those from Kostej in Transylvania (Boettger 1901, Zilch 1934) and Szob in Hungary (Csepreghy-Meznerics 1953), although Boettger (1901) regarded them as a variety _subspinosa_. Because the species _Genota bonellii_ (Bellardi) is characterized by a great variability of shape and ornamentation, any distinction of varieties/subspecies (compare Bellardi 1877, Hoernes & Auinger 1891) is not justified. The species _Genota (Pseudotoma) bonellii_ (Bellardi, 1839) has not hitherto been known in the Miocene of Poland.
Genus *Mitrolumna* BUCQUOY, DAUTZENBERG & DOLLFUS, 1882

*Mitrolumna aptycha* (BOETTGER, 1906)

(Pl. 19, Fig. 3)


1934. *Mitromorpha aptycha* (BOETTGER); A. ZILCH, p. 263, Pl. 18, Fig. 38.

**MATERIAL:** Two specimens.

**DIMENSIONS:** The larger specimen (preserved without outer lip) is 6 mm high and 2.7 mm wide.

**REMARKS:** An accordance of the two studied specimens with the holotype of the species established by BOETTGER (1906) from Kostej in Transylvania is evident, although they are less completely grown (about of one whorl), and their aperture has the outer lip damaged. BOETTGER (1906) noted that the inner lip has two very inconspicuous folds (“columella media parte pliculis 2 per obsoletis”), and assigned his two specimens to the subgenus *Mitromorpha* A. ADAMS, 1865, regarded as identical with *Mitrolumna* BUCQUOY, DAUTZENBERG & DOLLFUS, 1882. According to WENZ (1943), these two taxa are separate at the genus level (of the family Turridae, obviously), and this very statement is herein accepted by the present author.

The specimens from the Pliocene of Toscania, presented by CHIRLI (1997, p. 27, Pl. 7, Figs 8-10) under the name *Mitrolumna olivoidea* (CONTRAINE, 1835), are of morphology slightly similar to these studied from Korytnica. They are more squabby and they bear more prominent folds on their inner lip; they are thus taxonomically quite different.

The species *Mitrolumna aptycha* (BOETTGER, 1906) has not hitherto been known from the Miocene of Poland.

*Mitrolumna paraptycha* (BOETTGER, 1906)

(Pl. 19, Fig. 2)


1934. *Mitromorpha paraptycha* (BOETTGER); A. ZILCH, p. 263, Pl. 18, Fig. 39.

**MATERIAL:** One specimen.

**DIMENSIONS:** Height 9.5 mm, width 3.3 mm.

**REMARKS:** The only specimen from Korytnica is fully concordant with a unique one from Kostej in Transylvania, being thus the holotype of the species established by BOETTGER (1906). The present author shares opinion of BOETTGER that this species although similar to the preceding one, *Mitrolumna aptycha* (BOETTGER, 1906), makes up a separate taxon.

The species *Mitrolumna paraptycha* (BOETTGER, 1906) has not hitherto been known from the Miocene of Poland.

Genus *Agathotoma* COSSMANN, 1899

*Agathotoma perfragilis* (BOETTGER, 1901)

(Pl. 19, Fig. 1)


1934. *Cythara* (*Agathotoma*) *perfragilis* (BOETTGER); A. ZILCH, p. 263, Pl. 18, Fig. 42.

**MATERIAL:** Three specimens.

**DIMENSIONS:** The largest specimen (see Pl. 19, Fig. 1) is 5.4 mm high and 1.8 mm wide.

**REMARKS:** An accordance of the studied specimens with those described by BOETTGER (1901) from Kostej in Transylvania is undoubted, as evidenced by their shape, ornamentation and the pleurotomal notch being identical. The largest specimen from Korytnica is slightly more completely grown than the holotype; it is larger of almost one whorl which increases in width a little more than all preceding ones.

The species *Agathotoma perfragilis* (BOETTGER, 1901) has not hitherto been known from the Miocene of Poland.

Genus *Cythara* SCHUMACHER, 1817

*Cythara* (*Mangelia*) *bittneri* (BOETTGER, 1901)

(Pl. 20, Figs 5-6)


1906. *Mangilia bittneri* BTGR.; O. BOETTGER, p. 78.

1934. *Cythara* (*Mangelia*) *bittneri* (BOETTGER); A. ZILCH, p. 264, Pl. 18, Fig. 46.

**MATERIAL:** Eight specimens.

**DIMENSIONS:** The largest specimen is 7.5 mm high and 2.8 mm wide.

**REMARKS:** The state of preservation of the studied specimens is surprisingly worse than an average of the Korytnica material. Nevertheless, their concordance with those described by BOETTGER (1901) from Kostej and
Lapugy in Transylvania is undoubted, although they are slightly less slender.

The species *Cythara (Mangelia) bittneri* (Boettger, 1901) has not hitherto been known from the Miocene of Poland.

*Cythara (Mangelia) burdigalica* (Peyrot, 1931)

(Pl. 22, Fig. 5)


MATERIAL: Two specimens.

DIMENSIONS: The larger specimen (see Pl. 22, Fig. 5) is 4.6 mm high and 1.9 mm wide.

REMARKS: The studied specimens seem to be concordant with those described by Peyrot (1931) from Saucats in Aquitaine. The Korytnica specimens are slightly less completely grown, what certainly controlled a smaller number of axial ribs on their last whorl (10 instead of 12).

The species *Cythara (Mangelia) clathrata* (De Serres, 1829) has not hitherto been known from the Miocene of Poland. The specimens described by Friedberg (1912, 1938) were coming from Zborów, at present in the Ukraine.

*Cythara (Mangelia) clathrata* (De Serres, 1829)

(Pl. 20, Figs 1-2)

1829. *Pleurotoma clathrata* Ser.; M. Hornes, p. 379, Pl. 40, Fig. 20.
1856. *Mangilia clathrata* n.sp.; M. Hornes, p. 379, Pl. 40, Fig. 20.
1877. *Mangilia paucilirata* n.sp.; O. Boettger, p. 70.
1901. *Mangilia paucilirata* n.sp.; O. Boettger, p. 70.
1904. *Mangilia (Clathromangilia) clathrata* (Serr.); F. Sacco, p. 55, Pl. 14, Fig. 31.
1912. *Mangilia clathrata* Serr.; W. Friedberg, pp. 228-229, Pl. 14. Fig. 10.
1934. *Cythara (Mangelia) paucilirata* (Boettger); A. Zilch, p. 265, Pl. 19, Fig. 50.
1954. *Clathromangilia clathrata* M. de Serres; M. Glibert, p. 55, Pl. 6, Fig. 16.

MATERIAL: One hundred and sixty specimens.

DIMENSIONS: The largest specimen completely preserved is 6.5 mm high and 2.9 mm wide; another one (last whorl only) is 3.1 mm wide.

REMARKS: The studied specimens are evidently conspecific with those commonly occurring in the Miocene sequences of Europe, and presented i.a. by Hornes (1856) from the Vienna Basin, and by Peyrot (1931) from Aquitaine. In all the referenced specimens (see synonymy) the spiral ornamentation, from a place of its appearance through the last but one whorl including, is developed as two thin striae. In the present author’s opinion conspecific are also the specimens described, under the name of *Mangilia paucilirata*, by Boettger (1901) from Kostej in Transylvania, regardless their having of only 9 axial ribs on the last whorl, instead of 9-11 present in the Korytnica specimens.

The species *Cythara (Mangelia) clathrata* (De Serres, 1829) has not hitherto been known from the Miocene of Poland. The specimens described by Friedberg (1912, 1938) were coming from Zborów, at present in the Ukraine.

*Cythara (Mangelia) contracta* (Bellardi, 1877)

(Pl. 20, Figs 3-4)

1912. *Mangilia contracta* Bellardi; C. Chirli, p. 66, Pl. 19, Fig. 7; ?Figs 4-6.

MATERIAL: Twelve specimens.

DIMENSIONS: The largest specimen (see Pl. 20, Fig. 4) is 6.0 mm high and 2.5 mm wide.

REMARKS: The studied specimens seem to be concordant with those described by Peyrot (1931) from Saucats in Aquitaine. The Korytnica specimens are slightly less completely grown, what certainly controlled a smaller number of axial ribs on their last whorl (10 instead of 12).

The species *Cythara (Mangelia) contracta* (Bellardi, 1877) has not hitherto been known from the Miocene of northern Italy, presented by Sacco (1904) and Ferrero Mortara & al (1981). Of the specimens from the Pliocene of Toscania, and presented by Chirli (1997) concordant is rather only one (Chirli 1997, Pl. 19, Fig. 7), the others being distinctly less slender. The shells of this species are similar to *Cythara (Mangelia) clathrata* (De Serres), differing in having a greater number of spiral striae. A stable difference is kept by the number of 3-4 striae on the last but one whorl, and of 8-9 on the last whorl, whereas in *Cythara (Mangelia) clathrata* this number is 2, and 5-6, respectively. Another similar species is *Cythara (Mangelia) clathrataformis* (Degrange-Touzin) described by Peyrot (1931, pp. 203-204, Pl. 8, Figs 105-106) from Salies-Béarn in Aquitaine, but which has 5 spiral striae on the median whorls.

The species *Cythara (Mangelia) contracta* (Bellardi, 1877) has not hitherto been known from the Miocene of Poland.
Cythara (Mangelia) fraterna (BOETTGER, 1901)  
(Pl. 22, Fig. 11)

1901. Rhaphitoma fraterna n.sp.; O. BOETTGER, p. 76.
1906. Rhaphitoma fraterna BTTR.; O. BOETTGER, p. 84.
1934. Cythara (Mangelia) fraterna (BOETTGER); A. ZILCH, p. 267, Pl. 19, Fig. 63

MATERIAL: One specimen.

DIMENSIONS: Height 8.0 mm, width 3.0.

REMARKS: The studied specimen is fully concordant with those described by BOETTGER (1901, 1906) from Kostej in Transylvania. The shells of this species are easily recognizable from those of other similar species by the relatively large protoconch, the whorls of which are ornamented by a very dense, oblique netting.

The species Cythara (Mangelia) fraterna (BOETTGER, 1901) has not hitherto been known from the Miocene of Poland.

Cythara (Mangelia) fuchsi (BOETTGER, 1901)  
(Pl. 20, Figs 7-8)

1906. Mangilia fuchsi BTTR.; O. BOETTGER, p. 78.
1934. Cythara (Mangelia) fuchsi (BOETTGER); A. ZILCH, p. 264, Pl. 19, Fig. 45.

MATERIAL: Seven specimen.

DIMENSIONS: The largest specimen (see Pl. 20, Fig. 8) is 9.5 mm high and 3.8 mm wide.

REMARKS: The studied specimens are evidently conspecific with those described by BOETTGER (1901) from Kostej and Lapugy in Transylvania. An identical specimen was also presented by FRIEDBERG (1938) from the locality Holdy in the Ukraine, but erroneously regarded as a form related (affinis) to Mangilia sassii (BELLARDI). This misidentification by FRIEDBERG appeared clear when the syntype of the latter had been photographed by FERRERO MORTARA & al. (1981, Pl. 16, Fig. 6).

The species Cythara (Mangelia) fuchsi (BOETTGER, 1901) has not hitherto been known from the Miocene of Poland.

Cythara (Mangelia) paulae (BOETTGER, 1901)  
(Pl. 20, Fig. 10)

1906. Mangilia paulae BTTR.; O. BOETTGER, pp. 78-79.
1934. Cythara (Mangelia) paulae (BOETTGER); A. ZILCH, p. 264, Pl. 19, Fig. 48.

MATERIAL: Seven specimens.

DIMENSIONS: The largest specimen, completely preserved (see Pl. 20, Fig. 10), is 5.0 mm high and 1.9 mm wide; another one (last whorl only) is 2.0 mm wide.

REMARKS: The studied specimens seem to be concordant (the size including) with those described by BOETTGER (1901, 1906) from Kostej in Transylvania.

The species Cythara (Mangelia) paulae (BOETTGER, 1901) has not hitherto been known from the Miocene of Poland.

Cythara (Mangelia) perforata (BRUSINA, 1877)  
(Pl. 20, Fig. 9)

1856. Pleurotoma caerulans PHIL.; M. HORNES, pp. 377-378, Pl. 40, Fig. 19.
1877. Rhaphitoma (Mangilia) perforata BRUSINA; S. BRUSINA, pp. 377-378.
1901. Mangilia detmersiana n.sp.; O. BOETTGER, p. 69.
1906. Mangilia detmersiana BTTR.; O. BOETTGER, p. 79.
1912. Mangilia Monterosati BELL.; W. FRIEDBERG, pp. 227-228, Pl. 14, Fig. 9.
1931. Mangelia perforata BRUSINA; A. PEYROT, Pl. 7, Figs 47-49.
1934. Cythara (Mangelia) detmersiana (BOETTGER); A. ZILCH, pp. 264-265, Pl. 19, Fig. 49.
1938. Manglia perforata BRUS.; W. FRIEDBERG, p. 149.

MATERIAL: Three specimens.

DIMENSIONS: The largest specimen (see Pl. 20, Fig. 9) is 6.8 mm high and 2.8 mm wide.

REMARKS: The studied specimens seem to be concordant with those presented by HORNES (1856), under an incorrect name of “Pleurotoma caerulans PHIL.”, from Steinebrunn in the Vienna Basin. They are evidently different from Manglia monterosati, described from northern Italy by BELLARDI (1877), the species morphologically similar or even, as suggested by FRIEDBERG (1938), identical. Unfortunately, none of these forms has ever been presented in the photograph, and the indicated BELLARDI’s species has not been catalogued by FERRERO MORTARA & al. (1981).

In the present author’s opinion the Korytnica specimens are conspecific with those described by BOETTGER.
under the name of *Mangilia detmersiana* Boettger, coming from Kostej in Transylvania; consequently, this species is herein included into the synonymy of the studied one. To note, the Kostej specimens are characterized by having one whorl less than these from Korytnica.

The species *Cythara* (*Mangelia*) *perforata* (Brusina, 1877) has not hitherto been known from the Miocene of Poland. Friedberg (1912, 1938) reported it from Zborów, at present in the Ukraine.

### Cythara (*Mangelia*) rugulosa (Philippi, 1844)

(Pl. 22, Figs 6-10)

1856. Plearotoma Vanquelini Gayr.; M. Hornes, p. 378, Pl. 40, Fig. 18.

1901. Mangilia rugulosa (Phil.); O. Boettger, pp. 69-70.

1901. Mangilia subaurea n.sp.; O. Boettger, pp. 72-73.


1906. Mangilia subcostata n.sp.; O. Boettger, pp. 77-78.

1906. Mangilia rugulosa (Phil.); O. Boettger, p. 79.

1912. Mangilia rugulosa Phil.; W. Friedberg, pp. 225-226, Pl. 14, Fig. 7; Fig. 6.

1934. Cythara (*Mangelia*) subcostata (Boettger); A. Zilch, p. 263, Pl. 18, Fig. 43.

1934. Cythara (*Mangelia*) subaurea (Boettger); A. Zilch, pp. 265-266, Pl. 19, Fig. 55.


1958. Mangilia (*Mangelia*) rugulosa (Philippi); J. Švagrovský, p. 28, Pl. 8, Fig. 7.

1966. Mangilia albida rugulosa Philippi; L. Strausz, p. 439, Pl. 20, Fig. 17.

1975. Cythara (Cytharella) rugulosa (Philippi); G. Pavla, p. 113, Pl. 8, Figs 8-9.

partim 1981. Mangilia rugulosa Philippi; W. Krach, pp. 74-75, Pl. 22, Fig. 7; non Fig. 8.

1982. Bela subcostata (Boettger); J. Švagrovský, p. 420, Pl. 11, Fig. 4.

**MATERIAL:** Three hunred and seventy specimens.

**DIMENSIONS:** The largest specimen (see Pl. 22, Fig. 10) is 5.8 mm high and 2.3 mm wide.

**REMARKS:** The studied specimens are pronouncedly variable, especially in terms of the shell slenderness, the number and prominence of axial ribs on the last whorl (7 to 13), a distinction of the margin at the upper (posterior) part of whors and, finally, the height of the aperture. Any attempt to distinguish separate groups in such material remained unsuccessful, as the extremes are easily to indicate, but a lot of intermediate forms are also found, what was evident both to Hornes (1856) and to Friedberg (1938). A treatment offered by Boettger (1901, 1906) upon a material from Kostej in Transylvania is not satisfactory, at least in the present author’s opinion. Several species distinguished by Boettger (1901, 1906) are very similar one to the other, and these may also be identified at Korytnica, the same as their transitional forms. The forms of strongly convex whors (see Pl. 22, Fig. 9) resemble those classified as *Cythara* (*Mangelia*) *banatica* (Boettger) by Zilch (1934, p. 264, Pl. 18, Fig. 44).

To note, the studied species is enormously common in many localities of the Paratethys Miocene, e.g. at Kostej in Transylvania, Steinbrunn in the Vienna Basin, and Korytnica as well.

The species *Cythara* (*Mangelia*) *rugulosa* (Philippi, 1844) has not hitherto been known from the Miocene of Korytnica. Krach (1981) reports it from Lychów, and Kowalewski (1933) from Wieliczka. The specimens reported from Niskowa by the present author (Baluk 1970) do not belong to this species. Those described by Friedberg (1912, 1938) were coming from several localities in Podolya, at present in the Ukraine.

### Cythara (*Mangelia*) subcylindrata (Boettger, 1901)

(Pl. 22, Figs 1-4)

1901. Raphitoma subcylindrata n.sp.; O. Boettger, pp. 75-76.

1906. Raphitoma subcylindrata BTGGR.; O. Boettger, p. 83.

1928. Raphitoma plicatella JAN; W. FRIEDBERG, pp. 572-573, Pl. 37, Figs 14-16.

1931. Daphnella (Raphitoma) helvetica nov.sp.; A. Peyrot, p. 253, Pl. 9, Figs 2-4.


1934. Cythara (*Mangelia*) subcylindrata (Boettger); A. Zilch, p. 267, Pl. 19, Fig. 31.

1938. Daphnella sp. an plicatella JAN; W. FRIEDBERG, p. 152.

1938. Daphnella an n.sp.; W. FRIEDBERG, p. 153, Text-fig. 49.


**MATERIAL:** Over 400 specimens.

**DIMENSIONS:** The largest specimen is 6.0 mm high and 2.0 mm wide.

**REMARKS:** The studied specimens may be regarded as

TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, TYPE HORIZON: Middle Miocene (Badenian).

G1039) presented in Pl. 22, Fig.13.

HOLOTYPE: The specimen (Z.P AL. U.W ., No.BkK-(BOETTGER, 1901) was reported from Korytnica, under FRIEDBERG (1938) and by KOWALEWSKI(1930).

The variability of specimens coming from Korytnica is also expressed by the prominence of their ornamentation and slenderness. The present author assumes that the studied taxon includes the specimens classified by PEYROT (1931) as “Daphnella (Raphitoma) helvetica nov.sp.” and “Daphnella (Raphitoma) girandica nov.sp.”, and coming from various localities of Aquitaine; they differ in the number of axial ribs, which is 11, or 8-9, respectively, what may be regarded as morphological variables of Cythara (Mangelia) subcylindrata (BOETTGER).

The species Cythara (Mangelia) subcylindrata (BOETTGER, 1901) was reported from Korytnica, under the name of “Raphitoma plicatella JAN”, both by FRIEDBERG (1928, 1938) and by KOWALEWSKI (1930).

**Cythara (Mangelia) cibori** sp.nov.

(PI. 22, Figs 12-13)

HOLOTYPE: The specimen (Z.PAL. U.W., No.BkK-G1039) presented in Pl. 22, Fig.13.

TYPE HORIZON: Middle Miocene (Badenian).

TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mts.

DERIVATION OF THE NAME: cibori – in memory of Jacek CIBOR (1957-1988), a technician at the Paleontology Department of the University of Warsaw, an eminent collector of the Korytnica fossils.

DIAGNOSIS: Shell of very pronounced spiral ornamentation, the spiral ribs of which are covered densely by minute tubercles.

MATERIAL: Twenty-seven specimens.

DIMENSIONS: The largest specimen is 6.4 mm high and 2.5 mm wide.

DESCRIPTION: The shell is small, fusiform. The protoconch composed of about 2.5 whorls, the first of which is smooth, and the others are delicately ornamented by numerous (about 20 per whorl) very thin axial ribs, and by two thin spiral ribs. The teleoconch attains almost 5.5 whorls; its boundary with the protoconch is distinctly outlined by diverse ornamentation. On the first teleoconch whorl, the axial ribs become distinctly thicker, and thereby their number drops to 10 or 11, or 8-10 on the last whorl of fully-grown specimens. Spiral ribs are very conspicuous, numbering four initially, six on the last but one and 15-17 on the last whorl, to cover also the siphonal canal. On the two distal whorls there appear intercalatory ribs. All spiral ribs of the teleoconch are coated with very tiny, densely spaced tubercles arrayed into a row. The aperture is elongated, smooth innerly, with thin lips, the outer of which has a shallow but broad pleurotomal notch; the siphonal canal is straight, rather long.

REMARKS: To present author’s recognition, no species is known of the so-conspicuous ornamentation, that spiral one particularly. A little similar is the afore-discussed species Cythara (Mangelia) subcylindrata (BOETTGER) whose shells differ, however, by their more pronounced slenderness and another ornamentation. Between the latter species, Cythara (Mangelia) subcylindrata (BOETTGER), and Cythara (Mangelia) cibori sp.nov. there is a lack of any intermediate forms. The ornamentation of the adult whorls resembles that of the species Cythara (Mangelia) moroni VENZO & PELOSIO, 1964, which is featured by the protoconch quite distinct. Upon that latter feature a separate genus Sorgenfreispira MORONI, 1979, was established by MORONI (1979), who indicated Cythara (Mangelia) moroni VENZO & PELOSIO, 1964, as the type species.

**Genus Bela Gray, 1847**

**Bela halavatsi** (BOETTGER, 1901)

(Pl. 24, Figs 1-3)

1901. Raphitoma (Ginnania) halavatsi n.sp.; O. BOETTGER, p. 80.
1906. Raphitoma (Ginnania) halavatsi BTGGR.; O. BOETTGER, p. 87.
1934. Cythara (Mangelia) halavatsi (BOETTGER); A. ZILCH, p. 268, Pl. 20, Fig. 69.

MATERIAL: Thirty specimens.

DIMENSIONS: The largest specimen (see Pl. 24, Fig. 1) is 5.2 mm high and 2.5 mm wide.

REMARKS: The studied specimens are supposedly conspecific with those described by BOETTGER (1901) from Kostej and Lapugy in Transylvania. To note, in a part of
specimens from Korytnica, following a varix on the outer lip, the shell was growing further on of about half whorl, to form another varix, and occasionally even the third one. Such specimens become slightly wider than those yielding the single varix. Unclear remains a statement by Boettger that this species is similar to Haedropleura pseudosigmoidea.

The species Bela halavatsi Boettger, 1901, has not hitherto been known from the Miocene of Poland.

Bela jeffreysi (Bellardi, 1877)  
(Pl. 23, Figs 1-3)

1877. Raphitoma Jeffreysi Bell.; L. Bellardi, p. 303, Pl. 9, Fig. 13.  
1912. Raphitoma holubicensis Friedr.; W. Friedberg, pp. 236-237, Pl. 14, Fig. 19.

1937. Daphnella (Raphitoma) Jeffreysi Bell.; E. Montanaro, p. 186, Pl. 8, Figs 59-60.


1997. Raphitoma jeffreysi Bellardi; C. Chirli, p. 82, Pl. 23, Fig. 8.

MATERIAL: A hundred and eighty specimens.

DIMENSIONS: The largest specimen (see Pl. 23, Fig. 3) is 8.5 mm high and 3.2 mm wide.

REMARKS: The studied specimens seem to be conspecific with those coming from the Miocene of Vigoleno in northern Italy, and presented by Venzo & Pelosi (1963). The specimens from Korytnica are slightly larger, featured by 9-11 axial ribs on the last whorl instead of the stable figure of 11 reported by Venzo & Pelosi (1963) who regarded this species to be identical with Cythara (Mangelia) eichwaldi (Friedberg). The latter opinion is not justified, although these two species are certainly similar. The specimens from Korytnica are evidently conspecific also with those upon which Friedberg (1912, 1938) established the species Raphitoma holubicensis Friedberg, and which all were coming from various localities of Podolya in the Ukraine.

An accordance of the Korytnica specimens with that one presented by Chirli (1997) from the Pliocene of Toscania at Poggibonsi is uncertain. It has more pronounced spiral ornamentation, and it is comparable rather to specimens of Raphitoma subvellicata (Boettger) coming both from Korytnica and from Kostej.

The species Bela jeffreysi (Bellardi, 1877) has not hitherto been known from the Miocene of Poland.

Bela submarginata (Bonelli in Bellardi, 1847)  
(Pl. 23, Fig. 7)

1847. Raphitoma submarginata Bon.; L. Bellardi, p. 95, Pl. 4, Fig. 21.

1856. Pleurotoma submarginata Bon.; M. Hörnes, p. 375, Pl. 40, Fig. 9.

1877. Raphitoma submarginata Bon.; L. Bellardi, pp. 309-310, Pl. 9, Fig. 21.

1912. Raphitoma submarginata Bon. var.; W. Friedberg, pp. 233-234, Pl. 14, Fig. 16.


1970. Mangelia submarginata (Bonelli); W. Baluk, p. 119, Pl. 13, Fig. 1.

1982. Bela submarginata eichwaldi (Friedberg); J. Šagrovský, pp. 417-418, Pl. 10, Figs 3-4.

1997. Bela submarginata (Bonelli MS, Bellardi); C. Chirli, p. 55, Pl. 15, Figs 5-8.

MATERIAL: Five specimens.

DIMENSIONS: The largest specimen (see Pl. 23, Fig. 7) is about 8.0 mm high and 3.5 mm wide.

REMARKS: The taxonomic assessment of the studied specimens bears some troubles. Although slightly smaller, they seem to be concordant with those described by Hörnes (1856) from Steinebrunn in the Vienna Basin, and by Friedberg (1912) from Holubica in Podolya, the Ukraine. As concerns Friedberg (1912), he doubted of an identity of his specimens, as well as Viennese ones, with those coming from northern Italy. It seems that he was right in his assumption when one compares them with the syntype of the species Raphitoma submarginata Bellardi, coming from the Pliocene of Colli Astesi, and photographed by Ferrero Mortara & al. (1981, Pl. 18, Fig. 12); this syntype is evidently more slender, and featured by a longer siphonal canal. Some other specimens from the Miocene of northern Italy, e.g. those from Vigoleno, and presented by Venzo & Pelosi (1963), may be regarded as conspecific with these from Korytnica.

Hörnes (1856) assumed that the Viennese specimens are concordant with those described by Eichwald (1853, p. 186, Pl. 8, Fig. 6), under the name of “Pleur. costata m.”. On the other hand, Friedberg (1912, p. 235) assigned Eichwald’s specimen to quite another species, to which he proposed the name Raphitoma eichwaldi Friedberg. It is apparent that the so-named specimens from Holubica and Tarnoruda (Friedberg 1938, p. 152) differ distinctly from these herein studied and coming from Korytnica.

The species Bela submarginata (Bonelli in Bellardi, 1847) has not hitherto been known from Korytnica. In the Miocene of Poland it was noted from...
Łychów (Czarnocki 1968) and Niskowa (Baluk 1970). Friedberg (1912, 1938) reported it from Holubicza, and other localities, all of which at present are in the territory of the Ukraine.

**Bela subturgida** (Boettger, 1906)  
(Pl. 23, Figs 4-6)

1934. *Cythara* (*Mangelia*) subturgida (Boettger); A. Zilch, p. 266, Pl. 19, Fig. 56.  
1966. *Mangelia turgida subturgida* Boettger; L. Strausz, pp. 439-440, Pl. 20, Fig. 16.

**MATERIAL:** Thirty-seven specimens.

**DIMENSIONS:** The largest specimen (see Pl. 23, Fig. 6) is 7.5 mm high and 3.5 mm wide; another one (Pl. 23, Fig. 5) is 6.0 mm and 2.7 mm, respectively.

**REMARKS:** The studied specimens are regarded as conspecific with those presented by Boettger (1901) from Kostej in Transylvania. The Korytnica specimens are generally a little smaller, and only the largest one is comparable to those from Kostej.

The species *Bela subturgida* (Boettger, 1906) has not hitherto been known from the Miocene of Poland.

**Bela tumida** (Boettger, 1906)  
(Pl. 24, Figs 4-6)

1934. *Cythara* (*Mangelia*) tumida (Boettger); A. Zilch, p. 268, Pl. 20, Fig. 70.

**MATERIAL:** Ten specimens.

**DIMENSIONS:** The largest specimen (see Pl. 24, Fig. 6) is 5.2 mm high and 2.2 mm wide.

**REMARKS:** The studied specimens seem to be concordant with those described by Boettger (1906) from Kostej and Bujtur in Transylvania. The largest of the Korytnica specimens is however about one millimeter higher.

The species *Bela tumida* (Boettger, 1906) has not hitherto been known from the Miocene of Poland.

**Bela vulpecula** (Brocchi, 1814)  
(Pl. 24, Figs 10-11)

1901. *Rhaphitoma vulpecula* (Brocchi); O. Boettger, p. 75.  
1906. *Rhaphitoma vulpecula* (Brocchi); O. Boettger, p. 82.  
1954. *Mangelia* (s.s.) *vulpecula* Brocchi; M. Gilberg, pp. 49-50, Pl. 6, Fig. 9.  

**MATERIAL:** Twenty specimens.

**DIMENSIONS:** The largest specimen (see Pl. 24, Fig. 10) is 8.5 mm high and 3.5 mm wide.

**REMARKS:** The studied specimens are very similar to the holotype of Brocchi’s species, photographed by Pinna & Spezia (1978, Pl. 40, Fig. 4). They slightly differ only by their size, being half smaller than the holotype (17.3 mm high), as well as the specimens presented by Chirli (1997); this is thought to result from their being not fully grown, and having their teleoconch shorter of about one whorl. To note, within the more numerous specimens from Kostej in Transylvania, the largest were those attaining the height of 12 mm and breadth of 4.5 mm.

Within the studied specimens from Korytnica the axial ornamentation is variable, particularly as concerns the number of axial ribs (12-14 on the last by one, and 8-10 on the last whorl) which tend to fade out at the aperture; the spiral ornamentation remains almost identical.

Doubted is an assignment of specimens from Podhorcze in the Ukraine presented by Friedberg (1928, pp. 573-574, Pl. 37, Fig. 17), which are featured by a higher spire and appearance of a margin on the whorls, what was already observed by Friedberg (1938, p. 152) himself. Unclear is also an assignment of the specimens coming from the Miocene of Szob and Devecser in Hungary, and presented by Strausz (1966, pp. 437-438, Pl. 20, Figs 18-21). A difference was earlier recognized by Csepreghy-Meznerics (1953, pp. 16-17, Pl. 3, Figs 8-9), who established a separate subspecies, *Cythara* (*Mangelia*) *vulpecula polonica* Csepreghy-Meznerics, for the discussed specimens from Podhorcze and Szob.

The species *Bela vulpecula* (Brocchi, 1814) has not hitherto been known from Korytnica. In the Miocene of Poland it was reported from Benczyń (Krach 1950a).

**Bela sanctacrucensis** sp.nov.  
(Pl. 24, Figs 7-9)

**HOLOTYPE:** The specimen (Z.PAL. U.W., No.BkK-G1069) presented in Pl. 24, Fig. 9.

**TYPE HORIZON:** Middle Miocene (Badenian).
TYPE LOCALITY: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mts.


DIAGNOSIS: Like Bela tumida Boettger, but with a distinct margin along the whorls; spiral ornamentation of very densely spaced, minute striae covered with very delicate tubercles.

MATERIAL: Four specimens.

DIMENSIONS: The largest specimen (see Pl. 24, Fig. 7) is 6.2 mm high and 2.7 mm wide.

DESCRIPTION: The shell is small, fusiform. The protoconch composed over 3 whorls, of which the first 1.5 are smooth and successive ones ornamented by numerous, very thin axial ribs and by five thin, equally-sized spiral ribs. The teleoconch attains 3.3-3.6 whorls; its boundary with the protoconch is sharply outlined by diverse ornamentation. The teleoconch is featured by a delicate and originally very indistinct margin, above which the whorl becomes slightly concave. On the first teleoconch whorl there run 12 axial ribs, slightly oblique, relative broad and rounded at their crest. The number of axial ribs gradually decreases on successive whorls, being 9-11 on the last whorl. Moreover, the whole teleoconch is sculptured by very thin, densely spaced spiral striae, the number of which attains about 50 on the last whorl; they cover also the siphonal canal. Although all spiral striae are very thin, both primaries and intercalatories are distinguishable, and all are coated with very delicate tubercles. The aperture is elongated, smooth innerly, with not very thin lips, the outer one of which has a shallow but broad pleurotomal notch, whose deepest arch is situated just at the middle between the suture and the margin; the siphonal canal is rather long, almost straight.

REMARKS: To the present author’s recognition, also this species, typified by the conspicuous ornamentation, particularly spiral, has not been reported in the literature. Slightly similar is the afore-discussed Bela tumida Boettger, 1906, whose first whorl of the protoconch has a different shape, and all whorls of the protoconch are smooth; moreover, the whorls of the teleoconch lack of a margin, and are ornamented by delicate spiral grooves between which the striae are smooth and a little wider than the striae in Bela sanctacrucensis sp.nov.

Genus Glyphostoma Gabb, 1873
Glyphostoma amphiodon (Boettger, 1901) (Pl. 25, Figs 4-5)

1901. Clathurella (Glyphostoma) amphiodon n.sp.; O. Boettger, pp. 49-50.
1906. Clathurella (Glyphostoma) amphiodon BITGR.; O. Boettger, pp. 65-66.
1934. Glyphostoma amphiodon (BOETTGER); A. Zilch, p. 269, Pl. 20, Fig. 72.

MATERIAL: Twenty-eight specimens.

DIMENSIONS: The largest specimen (see Pl. 25, Fig. 5) is 6.8 mm high and 3.0 mm wide.

REMARKS: The studied specimens are undoubtedly conspecific with those presented by Boettger (1901) from Kostej in Transylvania, although they are slightly larger (those of Kostej being maximum 6.0 mm high and 2.75 wide).

The species Glyphostoma amphiodon (Boettger, 1901) has not hitherto been known from the Miocene of Poland.

Glyphostoma sp. (Pl. 25, Fig. 6)

MATERIAL: One specimen.

DIMENSIONS: Height of the shell lacking apical whorls is 11.6 mm, width 5.2 mm.

REMARKS: Besides the specimens of the preceding species, Glyphostoma amphiodon (Boettger), still another one of the genus Glyphostoma has been found (see Pl. 25, Fig. 6). It is much larger, of the estimated height about 12.5 mm, and featured with slightly denser spiral ribs and more numerous teeth of the outer lip innerly. This fragmented specimen does not allow to recognize whether it may belong to the preceding species as its large representative. If so, noteworthy should be its teleoconch of about two whorls longer than anyone of the reported specimens of Glyphostoma amphiodon (Boettger).

Genus Clathurella Carpenter, 1857
Clathurella annamariae Boettger, 1901 (Pl. 25, Fig. 1)

1901. Clathurella (Clathromangilia) annamariae n.sp.; O. Boettger, pp. 50-51.
1906. Clathurella (Clathromangilia) annamariae BTTGR.; O. BOETTGER, p. 66.
1934. Clathromangelia annamariae (BOETTGER); A. ZILCH, p. 269, Pl. 20, Fig. 74.

MATERIAL: Two specimens.

DIMENSIONS: The larger specimen (see Pl. 25, Fig. 1) is 4.8 mm high and 2.3 mm wide.

REMARKS: The studied specimens correspond exactly to those described by BOETTGER (1901) from Kostej and Lapugy in Transylvania. The specimens from these localities were divided by BOETTGER (1901) into two groups: of typical forms (6-6.25 mm high), and of dwarfish ones (of about 4 mm high). The specimens from Korytnica should be treated as typical, but of about half a whorl shorter than those from Transylvania.

The species Clathurella annamariae BOETTGER, 1901, has not hitherto been known from the Miocene of Poland.

Clathurella casilorica BOETTGER, 1906
(Pl. 25, Fig. 8)

1906. Clathurella casilorica n.sp.; O. BOETTGER, p. 68.
1934. Clathurella casilorica BOETTGER; A. ZILCH, p. 272, Pl. 21, Fig. 90.

MATERIAL: Four specimens.

DIMENSIONS: The largest specimen (see Pl. 25, Fig. 8) is 8.2 mm high and 4.1 mm wide.

REMARKS: The studied specimens are fully concordant, both as concerns the shape, size, and ornamentation, with the specimens described by BOETTGER (1901, 1906) and illustrated by ZILCH (1934) from Kostej in Transylvania.

The species Clathurella casilorica BOETTGER, 1906, has not hitherto been known from the Miocene of Poland.

Clathurella densestriata BOETTGER, 1906
(Pl. 26, Figs 9-10)

1906. Clathurella densestriata n.sp.; O. BOETTGER, p. 69.
1934. Clathurella densestriata BOETTGER; A. ZILCH, p. 272, Pl. 21, Fig. 91.

MATERIAL: Fifteen specimens.

DIMENSIONS: The largest, but incomplete specimen (see Pl. 26, Fig. 9) may be estimated as 12 mm high and 4.5 mm wide.

REMARKS: Although no complete specimens have been found, the studied fragments, the protoconch including, as well as the shape, ornamentation and size of the teleoconch are concordant with those of the species described by BOETTGER (1906) and illustrated by ZILCH (1934) from Kostej in Transylvania.

The species Clathurella densestriata BOETTGER, 1906, has not hitherto been known from the Miocene of Poland.

Clathurella henrichi BOETTGER, 1901
(Pl. 26, Figs 1-2)

1901. Clathurella henrichi n.sp.; O. BOETTGER, pp. 52-53.
1906. Clathurella henrichi BTTGR.; O. BOETTGER, p. 66.
1934. Clathurella henrichi BOETTGER; A. ZILCH, p. 271, Pl. 21, Fig. 85.

MATERIAL: Ten specimens.

DIMENSIONS: The largest completely preserved specimen (see Pl. 26, Fig. 1) is 3.7 mm high and 1.5 mm wide; another one (see Pl. 26, Fig. 2) is 1.8 mm wide.

REMARKS: The studied specimens are fully concordant, both as concerns the shape, size, and ornamentation, with the specimens described by BOETTGER (1901, 1906) and illustrated by ZILCH (1934) from Kostej in Transylvania.

The species Clathurella henrichi BOETTGER, 1901, has not hitherto been known from the Miocene of Poland.

Clathurella januszkiewiczii (FRIEDBERG, 1912)
(Pl. 26, Figs 5-7)

1912. Mangilia Januszkiewiczii FRIEDR.; W. FRIEDBERG, pp. 229-230, Pl. 12, Fig. 12.

MATERIAL: Thirty-seven specimens (in majority juvenile).

DIMENSIONS: The largest specimen (see Pl. 26, Fig. 5) is 8.0 mm high and 4.1 mm wide.

REMARKS: The studied specimens are undoubtedly concordant with those described by FRIEDBERG (1912) from Zborów in the Ukraine, and no difference may be indicated between materials collected in these two locali-
ties. Friedberg (1912) assumed a similarity of his species to Clathurella fuchsi (Bellardi), whose photographed holotype (Ferrero Mortara & al. 1981, Pl. 16, Fig. 15) represents, however, quite a distinct species.

The species Clathurella januszkiewiczi (Friedberg, 1912) has not hitherto been known from Korytnica. In the Miocene of Poland it was mentioned as “Mangilia cf. Januszkiewiczii Friedb.” by Krach (1950α) from Benczyn.

Clathurella postuma Boettger, 1906
(Pl. 25, Figs 2-3)

1906. Clathurella postuma n.sp.; O. Boettger, p. 68.
1934. Clathurella postuma Boettger; A. Zilch, p. 272, Pl. 21, Fig. 89.

MATERIAL: Thirty specimens.

DIMENSIONS: The largest specimen is 7.8 mm high and 3.1 mm wide.

REMARKS: The studied specimens are evidently concordant with the holotype described by Boettger (1906) from Kostej in Transylvania. This holotype, being heretofore the only specimen of the species, is slightly larger, but less slender (8.5 mm high, 3.9 mm wide). Both the holotype and specimens from Korytnica bear their whorls featured with a detectable margin, what does not allow to classify their profile (cf. Boettger 1906, p. 68) as “nullo modo angulatis”. In this holotype, four thin striae are present between the suture and the margin; some of the Korytnica specimens have five such striae.

The species Clathurella postuma Boettger, 1906, has not hitherto been known from the Miocene of Poland.

Clathurella undatolinata (Boettger, 1901)
(Pl. 25, Fig. 7)

1901. Drilla (Crassispira) undatolinata n.sp.; O. Boettger, pp. 41-42.
1906. Clathurella undatolinata (Boettger); O. Boettger, pp. 66-67.
1934. Clathurella undatolinata (Boettger); A. Zilch, pp. 271-272, Pl. 21, Fig. 86.

MATERIAL: One specimen.

DIMENSIONS: The specimen, having its siphonal canal broken off, is 8 mm high (total height should be estimated as about 11 mm) and 3.5 mm wide.

REMARKS: The only specimen from Korytnica seems to be concordant with the holotype of the species, established by Boettger (1901), and coming from Kostej in Transylvania. An inferior state of preservation of this specimen, having its siphonal canal broken, does not allow for its definitive assignment. The author of this species, in his subsequent paper (Boettger 1906) classified the earlier
established species as conspecific with *Pleurotoma subtilis* Partsch, reported by Hörnès (1856, pp. 381-382, Pl. 40, Fig. 4). The present author has no possibility the latter assignment, and therefore suggests to accept the former one, of Boettger (1901). The two discussed species differ by a longer size and much more densely spaced axial ribs in the species introduced by Partsch.

The species *Clathurella carolinae* (Boettger, 1901) has not hitherto been known from the Miocene of Poland.

*Clathurella* sp.  
(Pl. 26, Fig. 8)

**MATERIAL:** Eight specimens.

**DIMENSIONS:** The largest specimen is 7.2 mm high and 3.2 mm wide.

**REMARKS:** The studied specimens are either fragmented, or not fully grown to possess the final aperture. The best preserved one (see Pl. 26, Fig. 8), due to its shape, structure of the protoconch, and ornamentation, does evidently belong to the genus *Clathurella*. Details of its ornamentation are, however, different from those of any known species of this genus, and should be distinctive at the species level. The present author therefore suggests its separateness, although a lack of the complete specimen does not allow to create a new taxon.

**Genus Teretia Norman, 1888**

*Teretia anceps* (Eichwald, 1853)  
(Pl. 27, Figs 1-3)

1853. *Pleurotoma* m.; E. Eichwald, pp. 186-187, Pl. 8, Fig. 7.  
1856. *Pleurotoma anceps* Eichw.; M. Hörnès, pp. 368-369, Pl. 40, Fig. 11.  
1877. *Homotoma turritelloides* Bell.; L. Bellardi, p. 281, Pl. 8, Fig. 29.  
1912. *Teres anceps* Eichw.; W. Friedberg, pp. 232-233, Pl. 14, Fig. 15.  
1966. *Teretia anceps* Eichwald; L. Strausz, pp. 435-436, Pl. 18, Fig. 16.  
1972. *Teretia anceps* (Eichwald); F. Nordsieck, p. 115, Pl. 29, Fig. 190.  
1972. *Teretia anceps fusiaceps* n.sp.; F. Nordsieck, p. 115, Pl. 29, Fig. 191.  
1977. *Teretia anceps* (Eichwald); G. Jakubowski, pp. 113-114, Pl. 16, Figs 5-6.  
1982. *Teretia anceps* (Eichwald); J. Švagrovský, p. 422, Pl. 11, Fig. 5.  
1984. *Teretia anceps* (von Eichwald); A.W. Janssen, pp. 326-328, Pl. 75, Fig. 2; Pl. 80, Fig. 2.  
1984. *Teretia fusiaceps* Nordsieck; A.W. Janssen, p. 328, Pl. 75, Fig. 3; Pl. 80, Fig. 3.

**MATERIAL:** Ninety-eight specimens.

**DIMENSIONS:** The largest specimen is 6.0 mm high and 2.2 mm wide.

**REMARKS:** The studied specimens are fully concordant with those presented by Eichwald (1853) from Žukowce in Podolya, and by Hörnès (1856) from Baden in the Vienna Basin. Although in the original illustration of the holotype, the median spiral stria is not more conspicuous than the others, but in its description Eichwald (1853) indicates that feature firmly. Within the specimens from Korytnica there occur two specimens with all striae equally developed (see Pl. 27, Fig. 3), what certainly should be ascribed to the intraspecific variability. Consequently, the present author does not share a treatment to distinguish the subspecies, or species *Teretia fusiaceps* Nordsieck. A conspecificity of the studied specimens with those coming from northern Italy is not evident, as the latter ones are almost of a twice longer size.

Athanacković (1969, p. 213, Pl. 12, Fig. 6) presented, under the name of “*Teres anceps* (Eichwald)” the specimens from the Miocene of Bosna which differ in size and ornamentation from these of Korytnica so distinctly, that they evidently are not conspecific, and their determination is actually erroneous.

The species *Teretia anceps* (Eichwald, 1853) was reported from Korytnica only by Friedberg (1938). In the Miocene of Poland it is also known from Rybnica (Kowalewski 1950), Trzydnik (Krach 1950b), Monastyrz (Jakubowski 1977), Gliwice Stare (Krach 1954), Wieliczka (Kowalewski 1933), and Brzeźnica (Krach 1960).

**Genus Daphnella Hinds, 1844**

Subgenus *Favriella* Hornung, 1923  
*Daphnella* (*Favriella*) alterego (Boettger, 1906)  
(Pl. 27, Fig. 4)

1906. *Surcula alterego* n.sp.; O. Boettger, pp. 54-55.  
1934. *Clavatula (Surcula) alterego*; A. Zilch, p. 261, Pl. 17, Fig. 28.
MATERIAL: Three specimens.

DIMENSIONS: The largest specimen (see Pl. 27, Fig. 4) is 5.5 mm high and 2.2 mm wide.

REMARKS: The studied specimens are supposedly concordant with those described by Boettger (1906) from Kostej in Transylvania, although of about one whorl lesser. Boettger hesitated whether his specimens, numbering five, should be separated, or accommodated into the species Daphnella (Favriella) tenerrima as its variety. In the present author's opinion the differences are so substantial that a unifying of these two species into one is not motivated.

The species Daphnella (Favriella) alterego (Boettger, 1906) has not hitherto been known from the Miocene of Poland.

Daphnella (Favriella) dorae (Boettger, 1906) (Pl. 27, Figs 5-7)

1901. Drilli a rotundicosta n.sp.; O. Boettger, p. 44.
1906. Drillia dorae Boettg. n.nom.; O. Boettger, p. 56.
1934. Drillia dorae Boettg.; A. Zilch, p. 260, Pl. 17, Fig. 25.

MATERIAL: Ninety specimens.

DIMENSIONS: The largest, completely preserved specimen (see Pl. 27, Fig. 5) is 7.0 mm high and 2.7 mm wide; another one, represented only by its last whorl is 3.3 mm wide.

REMARKS. The studied specimens are undoubtedly conspecific with those described detaily by Boettger (1901, 1906) from Kostej in Transylvania. The Korytnica specimens are about one whorl lesser than the holotype. All of them are rather very variable as concerns their shape: more common are slender forms (see Pl. 27, Fig. 5), but as many as 20 specimens are more stumpy, almost conical (see Pl. 27, Fig. 6). The number of axial ribs on the last whorl attains 7 or 8 (in one stumpy specimens even 9), whereas Boettger (1901) noted it as 6 or 7.

Boettger (1906) accommodated his species, althought not without hesitation, to the genus Drillia Gray. According to the present author, it should be assigned rather to the genus Daphnella Hinds, 1844, and subgenus Favriella Hornung, 1923, similarly as two other species distinguished by Boettger as “Surcula tenerrima” and the above-disussed “Surcula alterego”. A close relationship of those three species was evident already for Boettger (1906, p. 55). They all display the features compatible with those of the type species of the genus Daphnella (Favriella) weberi described from the Pliocene of northern Italy (Wenz 1943, p. 1455). The specimens from Korytnica bear a multispiral protoconch of an almost identical shape and ornamentation as those of Favriella sinuosa (Sorgenfrei) presented from the Pliocene of Zinola in northern Italy by Bernasconi (1989, Pl. 1, Figs 4-5).

The species Daphnella (Favriella) dorae (Boettger, 1906) has not hitherto been known from the Miocene of Poland.

Daphnella (Favriella) tenerrima (Boettger, 1901) (Pl. 27, Figs 8-9)

1901. Surcula tenerrima n.sp.; O. Boettger, pp. 42-43.
1934. Clavatula (Surcula) tenerrima (Boettger); A. Zilch, p. 261, Pl. 17, Fig. 27.

MATERIAL: Two specimens.

DIMENSIONS: The smaller, but almost complete specimen (see Pl. 27, Fig. 8), is 6.5 mm high and about 3 mm wide; the larger, but with its siphonal canal broken, is about 5.5 mm wide, and of the height estimated as about 10 mm.

REMARKS. The two specimens, of which smaller one is slightly more slender, are fully concordant with those described detaily by Boettger (1901), whose specimens from Kostej in Transylvania bear 9-12 axial ribs on their last whorl. The smaller of the Korytnica specimens bears 9 such ribs on the last whorl, and 8 ribs on the first whorl of the teleoconch; the larger specimen bears 12 and 11 ribs, respectively. In both specimens the ribs are of similar width and distribution. To note, Boettger (1901) reported from Kostej (locality Valea semini) a similar variability displayed by 4 larger and 4 smaller specimens.

The species Daphnella (Favriella) tenerrima (Boettger, 1901) has not hitherto been known from the Miocene of Poland.

Genus Raphitoma Bellardi, 1848
Raphitoma hispida Bellardi, 1877 (Pl. 21, Figs 4-5)

1877. Raphitoma hispida Bell.; I. Bellardi, p. 299, Pl. 9, Fig. 5.
1968. Raphitoma (Raphitoma) hispida Bellardi; E. Robba, pp. 605-606, Pl. 46, Fig. 3.
1971. Cythara (Mangelia) hispida Bellardi; I. Csepregy-Meznerics, p. 33, Pl. 16, Figs 34 and 36.
1981. Raphitoma hispida Bellardi in Seguenza; E. Ferrero Mortara & al., p. 92, Pl. 18, Fig. 9.

partim 1981. Mangelia hispidula (Jan in Bellardi); W. Krak, p. 74, Pl. 22, Fig. 6; non Fig. 5.


MATERIAL: Forty-five specimens.

DIMENSIONS: The largest specimen is 8.6 mm high and 4.1 mm wide.

REMARKS: The studied specimens seem to be concordant with those described by Bellardi (1877) from Stazzano in the Miocene of northern Italy. A doubt arises as concerns the size of the Korytnica specimens smaller than that of the Bellardi’s holotype (height 12 mm, width 5 mm); the other Italian specimens, however, are of the same size as these from Korytnica. The largest specimen reported by Montanaro (1937) from Montegibbio was 7.2 mm high, and 3.3 mm wide, whereas a unique one presented by Robba (1968) from Santa Agata-Fossili was only 7.0 mm in its height and 3.5 mm in width. An accordance of the Korytnica specimens with one presented by Chirli (1997), and coming from the Pliocene of Toscana at Empoli, is uncertain. That specimen is distinctly more slender, being 11.2 mm high and 4.3 mm wide. To note, the specimens from Korytnica are featured by the presence of 9-11 axial ribs on the last whorl. The species Raphitoma hispida Bellardi, 1877, has not hitherto been known from the Miocene of Poland.

Raphitoma plicatella Jan in Bellardi, 1847
(Pl. 21, Figs 1-3)

1847. Raphitoma plicatella Jan; L. Bellardi, p. 92, Pl. 4, Fig. 18.

partim 1856. Pleurotoma plicatella Jan; M. Hornes, pp. 374-375, Pl. 40, Fig. 6; non Fig. 5.

1877. Raphitoma plicatella Jan; L. Bellardi, p. 307, Pl. 9, Fig. 19.

1901. Raphitoma plicatella (Jan); O. Boettger, pp. 73-74.

1912. Raphitoma Zejszneri Friedbg; W. Friedberg, pp. 234-235, Pl. 14, Fig. 17.


1969. Raphitoma hispida (Jan); M. Atanackovic, p. 212, Pl. 12, Fig. 12.

1981. Cythara (Mangelia) hispida Bellarde; I. Csepreghy-Meznerics, p. 33, Pl. 16, Figs 34 and 36.

1971. Raphitoma plicatella Jan in Bellardi; C. Chirli, pp. 85-86, Pl. 24, Fig. 8.

MATERIAL: Six hundred and seventy specimens.

DIMENSIONS: The largest specimen is 13.7 mm high and 4.5 mm wide.

REMARKS: A specific assignment of these specimens, quite common at Korytnica bears some troubles, as they are very variable in their slenderness (compare Pl. 21, Fig. 1 and Fig. 2), and the number of axial ribs, ranging 9 to 13 on the last but one, and 8 to 12 on the last whorl. Friedberg (1912), when having one specimen at his disposal, established a separate species Raphitoma zejszneri Friedberg, but later when keeping four other specimens, he classified them (Friedberg 1928) as Raphitoma hispida Jan, regardless their similar slenderness and an identical number (12) of ribs. Friedberg believed that his specimens of Raphitoma hispida are concordant with those described by Hornes (1856, pp. 374-375, Pl. 40, Figs 5-6) under the name of “Pleurotoma plicatella Jan”, although the dimensions reported by Hornes for the Viennese specimens were different - at the height of 10 mm, they were of 7 mm in breadth. [Supposedly, Friedberg deduced from an illustration of Hornes that these dimensions are false]. However, Friedberg was familiar with the fact that the Viennese specimens (or, their part at least) and these of Korytnica differ from Raphitoma hispida Jan by their lesser number of axial ribs; his treatment remains unclear.

In the present author’s opinion, the studied specimens from Korytnica may either be regarded as conspecific with Raphitoma plicatella Jan, or with Raphitoma zejszneri Friedberg. The first possibility is vague by the fact that Bellardi (1847, 1877) has twice figured specimens of “Raphitoma plicatella Jan” of a much larger size. A specimen first illustrated (Bellardi 1847, Pl. 4, Fig. 18) and thus being the holotype of the species (see Pinna 1971, p. 437), is about 23.5 mm high and about 9.0 mm wide, featured by a distinct margin on all whorls. A specimen illustrated secondly (Bellardi 1877, Pl. 9, Fig. 19) is still larger, and almost lacking a margin on the distal whorls. Boettger (1901) when studying gastropods from Kostiej in Transylvania, classified as Raphitoma plicatella Jan specimens 12.5 mm high and 5 mm wide, having 10-14 axial ribs on the last whorl, whereas larger forms (up to 15 mm in height) and with 19 axial ribs he assigned to Raphitoma hispida Jan.
The present author follows HÖRNES (1856) and BOETTGER (1901, 1906) to classify the Korytnica specimens as Raphitoma plicatella JAN in BELLARDI. It is unfortunate that this taxon has been omitted in the photo catalogue (PINNA 1971) of holotypes established by JAN, as well as in that one (FERRERO MORTARA & al. 1981) of the species introduced by BELLARDI and by SACCO. The original description by BELLARDI (1847, p. 92), repeated by CHIRLI (1997, p. 85) is very unclear, also as concerns the holotype; the only precise information is that on the number of axial ribs as about 13 (“13 circiter”). The name Raphitoma zejszneri FRIEDBERG, 1912, should thus be regarded as a younger synonym of Raphitoma plicatella JAN in BELLARDI.

The specimens from Łychów, described by KRACH (1981, p. 74, Pl. 22, Figs 5-6) under the name of “Mangelia hispidula (JAN in BELLARDI)”, are twice smaller than those from Korytnica, and they supposedly belong neither to this species nor to Raphitoma plicatella (JAN in BELLARDI, 1847). Their part may be close to Raphitoma hispida BELLARDI, 1877, as assumed by KRACH himself.

Noteworthy is also that FRIEDBERG (1928) attributed the name “Raphitoma plicatella JAN” to quite a different species [see remarks hereafter, to Cythara (Mangelia) subcylindrata (BOETTGER)].

The specimens Raphitoma plicatella JAN in BELLARDI, 1847 from Korytnica was reported under the names of “Raphitoma hispidula” or “Raphitoma zejszneri” by FRIEDBERG (1912, 1928, 1938) and by KOWALEWSKI (1930). Under the latter name, it may be recognized from Gliwice Stare in the report by KRACH (1954), the same as under the name of “Daphnella Zejszneri FRIEDB.” reported by KRACH (1950a) from Bencznyc.

Raphitoma pohacyanthal (BOETTGER, 1906)
(Pl. 21, Figs 9)

1906. Rhapitoma pohacyanthal n.sp.; O. BOETTGER, pp. 82-83.
1934. Cythara (Mangelia) pohacyanthal (BOETTGER); A. ZILCH, p. 266, Pl. 19, Fig. 60.

MATERIAL: Five specimens.

DIMENSIONS: The largest specimen (see Pl. 21, Fig. 9) is 11.9 mm high and 4.6 mm wide.

REMARKS: The studied specimens are regarded as conspecific with those described by BOETTGER (1906) from Kostej in Transylvania, although their number of axial ribs on the last whorl is slightly lesser (9-10 instead of 11-13).
MATERIAL: Two specimens.  
DIMENSIONS: The larger specimen (see Pl. 23, Fig. 8) is 7.8 mm high and 3.0 mm wide.  
REMARKS: The studied specimens are undoubtedly conspecific with those described by Boettger (1901, 1906) from Kostej in Transylvania. In comparison with the holotype of the species, presented by Zilch (1934), the larger of the Korytnica specimens is shorter of about one whorl, and its spiral striae between the suture and the margin are slightly less developed.  
The species Raphitoma subvellicata (Boettger, 1901) has not hitherto been known from the Miocene of Poland.

Genus Philbertia Montersato, 1884  
Philbertia adelgundae (Boettger, 1906)  
(Pl. 28, Figs 9-10)  
1906. Peratotoma (Cordiera) adelgundae n.sp.; O. Boettger, p. 74.  
1934. Philbertia adelgundae (Boettger); A. Zilch, p. 271, Pl. 20, Fig. 82.  
MATERIAL: Twenty specimens.  
DIMENSIONS: The largest specimen (see Pl. 28, Fig. 10) is 5.6 mm high and 2.6 mm wide; another one is 4.6 mm and 2.3 mm, respectively.  
REMARKS: The studied specimens seem to be conspecific with those described by Boettger (1906) from Kostej in Transylvania. A hesitation arises, however, from fact that none of the Korytnica specimens bear 16 axial ribs on the last whorl as diagnosed by Boettger, but either 15 or even 14 in the case of the largest specimen (Pl. 28, Fig. 10).  
The species Philbertia adelgundae (Boettger, 1906) has not hitherto been known from the Miocene of Poland.

Philbertia microhystrix (Boettger, 1901)  
(Pl. 28, Figs 2-3)  
1901. Peratotoma (Cordiera) microhystrix n.sp.; O. Boettger, pp. 54-55.  
1906. Peratotoma (Cordiera) microhystrix Biagr.; O. Boettger, p. 70.  
1934. Philbertia microhystrix (Boettger); A. Zilch, p. 270, Pl. 20, Fig. 78.  
MATERIAL: One specimen.  
DIMENSIONS: Height 3.7 mm, width 2.0 mm.  
REMARKS: The only specimen from Korytnica is not fully grown, being about two whorls lesser than those described by Boettger (1901) from Kostej in Transylvania; nevertheless, its conspecificity with the latter ones is undoubted.  
The species Philbertia microhystrix (Boettger, 1901) has not hitherto been known from the Miocene of Poland.

Philbertia praehispida (Boettger, 1906)  
(Pl. 28, Fig. 4)  
1901. Peratotoma (Cordiera) praehispida n.sp.; O. Boettger, pp. 71.  
1934. Philbertia praehispida (Boettger); A. Zilch, p. 270, Pl. 20, Fig. 80.  
MATERIAL: One incomplete specimen.  
DIMENSIONS: Roughly estimated width should be not lesser than 2.5 mm.
REMARKS: This damaged specimen, although incomplete, is undoubtedly concordant with those described by Boettger (1906) from Kostej in Transylvania.

In the present author’s opinion, quite uncertain is an assignment to this species of a specimen from the Miocene of Winterswijk-Miste in the Netherlands presented by Janssen (1984, pp. 322-323, Pl. 74, Fig. 5) under the name of “Philbertia praehispida (Boettger)”. The species Philbertia praehispida (Boettger, 1906) has not hitherto been known from the Miocene of Poland.

Philbertia raynevali (Bellardi, 1877)
(Pl. 28, Figs 5-6)

1877. Homotoma Raynevali Bell.; L. Bellardi, p. 274, Pl. 8, Fig. 24.
1981. Homotoma raynevali Bellardi; E. Ferrero Mortara & al., p. 88, Pl. 18, Fig. 3.
1997. Raphitoma raynevali (Bellardi); C. Chirli, p. 87, Pl. 25, Figs 1-4.

MATERIAL: Ninety specimens.

DIMENSIONS: The largest specimen (see Pl. 28, Fig. 6) is 6.7 mm high and 2.5 mm wide.

REMARKS: The studied specimens seem to be conspecific with those described by Bellardi (1877) from the Pliocene of Colli Astesi in northern Italy. Although Ferrero Mortara & al. (1981) selected as the syntype of the species a specimen slightly less slender and with a shorter siphonal canal, but the original illustration by Bellardi (1877) presents a specimen to which these from Korytnica are fully concordant. The less slender specimens, having their siphonal canal of comparable length, have recently been presented by Chirli (1997) from the Pliocene of Toscana. Such differences should be regarded as of the species variability.

The species Philbertia raynevali (Bellardi, 1877) has not hitherto been known from the Miocene of Poland.

Philbertia subpurpurea (Boettger, 1901)
(Pl. 28, Figs 11-13)

1901. Peratotoma (Philbertia) subpurpurea n.sp.; O. Boettger, p. 57.
1906. Peratotoma (Philbertia) subpurpurea Boett.; O. Boettger, p. 73.
1934. Philbertia subpurpurea (Boettger); A. Zilch, p. 269, Pl. 20, Fig. 75.

MATERIAL: Seventy specimens.

DIMENSIONS: The largest specimen is 8.4 mm high and 3.7 mm wide.

REMARKS. The studied specimens are fully concordant with those described by Boettger (1901, 1906) from Kostej in Transylvania, and some of them are even slightly larger; according to Boettger (1906, p. 73), the largest of his specimens attained only to 7 mm in its height. The species Philbertia subpurpurea (Boettger, 1901) has not hitherto been known from the Miocene of Poland.

Philbertia ulricae (Boettger, 1906)
(Pl. 28, Figs 7-8)

1906. Peratotoma (Cordiera) ulricae n.sp.; O. Boettger, p. 70.
1934. Philbertia ulricae (Boettger); A. Zilch, p. 270, Pl. 20, Fig. 79.

MATERIAL: Twenty-five specimens.

DIMENSIONS: The two largest specimens are both 5.7 mm high, and 2.8 or 2.6 mm wide.

REMARKS: The studied specimens seem to be conspecific with those described by Boettger (1906) from Kostej in Transylvania, although their axial ribs are more densely spaced (10-12 on the last whorl), instead of 10-11 as given by Boettger, and their size is slightly larger. Krach (1981, p. 75, Pl. 22, Figs 3-4) described from Łychów under the name of “Philbertia ulricae (Boettger)” still larger specimens (7.5 mm high) and serrated along the outer lip innerly. The specimens from Korytnica as well as those from Kostej are featured by the smooth lips at their inner side. Consequently, a conspecificity of specimens coming from these three localities cannot be ascertained.

The specimens from Várpalota in Hungary, presented by Strausz (1966, p. 444, Pl. 21, Figs 13-18) under the same name, are supposedly also not conspecific with these from Korytnica; all bear a conspicuous margin on the whorls, lesser number of axial ribs, and a different ornamentation on the siphonal canal.

The species Philbertia ulricae (Boettger, 1906) has not hitherto been known from the Miocene of Poland.

Genus Peratotoma Harris & Burrows, 1891
Peratotoma augustae Boettger, 1901
(Pl. 19, Figs 4-6)
The species *Peratotoma echinus* Boettger, 1901 has not hitherto been known from the Miocene of Poland.

*Peratotoma herminae* Boettger, 1901

(Pl. 29, Figs 1-3)

1901. *Peratotoma herminae* n.sp.; O. Boettger, pp. 56-57.
1906. *Peratotoma herminae* BTTRG.; O. Boettger, p. 73.
1934. *Peratotoma herminae* Boettger; A. Zilch, p. 273, Pl. 21, Fig. 94.

MATERIAL: Ten incomplete specimens.

DIMENSIONS: The largest specimen (see Pl. 29, Fig. 2) is 5.2 mm high and about 2.5 mm wide.

REMARKS: The studied specimens, all fragmentary, exhibit complementarily the features fully concordant with those of numerous (146) specimens described by Boettger (1901) from Kostej in Transylvania. To note, in his subsequent paper Boettger (1906) supplemented the description when finding at Kostej a still larger specimen (6.75 mm high), that possessed its outer lip serrated innerly. The latter feature is typical of all specimens from Korytnica (see Pl. 29, Fig. 3).

The species *Peratotoma herminae* Boettger, 1901, has not hitherto been known from the Miocene of Poland.

*Peratotoma hildae* Boettger, 1901

(Pl. 29, Fig. 4)

1906. *Peratotoma hildae* BTTRG.; O. Boettger, p. 75.
1934. *Peratotoma hildae* Boettger; A. Zilch, p. 275, Pl. 21, Fig. 4.

MATERIAL: Two specimens.

DIMENSIONS: The larger specimen, lacking its initial whorls, is 4.5 mm (total estimated as about 5.5 mm) high and 2.4 mm wide.

REMARKS: Although incomplete, the studied two specimens seem to be fully concordant with those described by Boettger (1901, 1906) from Kostej in Transylvania.

The species *Peratotoma hildae* Boettger, 1901, has not hitherto been known from the Miocene of Poland.

*Peratotoma leufroyi* (Michaud, 1828)

(Pl. 29, Fig. 12)
1856. *Pleurotoma Leufroyi* MICH.; M. HÖRNES, pp. 373-374, Pl. 40, Fig. 16.


1912. *Mangilia Leufroyi* MICHD.; W. FRIEDBERG, pp. 226-227, Pl. 14, Fig. 8.

1938. *Mangilia Leufroyi* MICHD.; W. FRIEDBERG, pp. 226-227, Pl. 14, Fig. 8.

The species *Peratotoma philberti* (MICHAUD, 1828) has not hitherto been known from the Miocene of Poland.

1901. *Peratotoma subaequalis* BOETTGER, 1901

(Pl. 19, Figs 7-9)


1934. *Peratotoma subaequalis* BOETTGER; A. ZILCH, p. 273, Pl. 21, Fig. 95.


The species *Peratotoma subaequalis* BOETTGER, 1901, has not hitherto been known from the Miocene of Poland.

1901. *Peratotoma unica* BOETTGER, 1901

(Pl. 29, Figs 9-10)


1906. *Peratotoma unica* BTTGR.; O. BOETTGER, p. 76.

1934. *Peratotoma unica* BOETTGER; A. ZILCH, p. 274, Pl. 21, Fig. 2.


The species *Peratotoma unica* BOETTGER, 1901, has not hitherto been known from the Miocene of Poland.

1901. *Peratotoma philberti* MICH.; M. HÖRNES, pp. 372-373, Pl. 40, Fig. 17.

?1904. *Peratotoma Philberti* var. *pliocostulatissima* SACCO.; F. SACCO, p. 53, Pl. 13, Fig. 51.


The species *Peratotoma philberti* (MICHAUD, 1828) has not hitherto been known from Korytnica.

MATERIAL: Two specimens.

DIMENSIONS: The larger specimen (see Pl. 29, Fig. 12) is 10.5 mm high and 4.9 mm wide.

REMARKS: The studied specimens are undoubtedly conspecific with those coming from Steinbrunn in the Vienna Basin, and presented by HÖRNES (1856). They do not differ, either in size and shape, or in ornamentation. The specimens reported from Korytnica by FRIEDBERG (1938, pp. 150-151) under the name of "*Mangilia Leufroyi* MICHD." do not belong to this species, but they do evidently to *Peratotoma unica* BOETTGER, 1901.

The species *Peratotoma leufroyi* (MICHAUD, 1828) has not hitherto been known from Korytnica. In the Miocene of Poland it was reported from Łychów (CZARNOCKI 1968). FRIEDBERG (1912) described it from Holubica, at present in the Ukraine.

1856. *Pleurotoma Philberti* MICH.; M. HÖRNES, pp. 372-373, Pl. 40, Fig. 17.

?1904. *Peratotoma Philberti* var. *pliocostulatissima* SACCO.; F. SACCO, p. 53, Pl. 13, Fig. 51.


The species *Peratotoma philberti* (MICHAUD, 1828) has not hitherto been known from the Miocene of Poland.


1906. *Peratotoma philberti* BTTGR.; O. BOETTGER, p. 76.

1934. *Peratotoma philberti* BOETTGER; A. ZILCH, p. 274, Pl. 21, Fig. 2.


The species *Peratotoma philberti* (MICHAUD, 1828) has not hitherto been known from Korytnica.

MATERIAL: One specimen.

DIMENSIONS: Height 9.3 mm, width 3.1 mm.

REMARKS: An assignment of the only specimen from Korytnica may bear some doubts, because it differ from the description of HÖRNES (1856) by a lack of serration along the outer lip. The latter may be caused by a premature nature of the studied specimen. The specimens from the Pliocene of Toscania, presented by CHIRLI (1997), are more slender and have their axial ribs more densely spaced. They thus differ distinctly from only specimen collected at Korytnica.
The species *Peratotoma unica* Boettger, 1901, was presented from Korytnica by Fiedenberg (1938) under the false name of “*Mangilia Leufroyi Michd.*” [see remarks to that species, above].

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PLATE 1

Family Turridae

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1-3 – *Clavatula camillae* (HOERNES & AUINGER), × 1; 1 - U.W., BkK-G867; 2 - U.W., BkK-G868; 3 - U.W., BkK-G869

4-8 – *Clavatula polonica* (PUSCH), × 1; 4 - U.W., BkK-G894; 5 - U.W., BkK-G895; 6 - U.W., BkK-G896; 7 - U.W., BkK-G897; 8 - U.W., BkK-G898

Photo 1 taken by B. MALINOWSKA
Photos 2-3 and 7-8 taken by B. DROZD, M.Sc.
Photos 4-6 taken by S. KOLANOWSKI
PLATE 2

Family Turridae

1-8 – Clavatula polonica (PUSCH); 1-2 × 4, 4 × 2, 3 and 5-8 × 1; 1 - U.W., BkK-G899; 2 - U.W., BkK-G900; 3 - U.W., BkK-G901; 4 - U.W., BkK-G902; 5 - U.W., BkK-G903; 6 - U.W., BkK-G904; 7 - U.W., BkK-G905; 8 - U.W., BkK-906

Photos 1-4 and 6 taken by S. KOLANOWSKI
Photos 5 and 7-8 taken by B. DROZD, M.Sc.
PLATE 3

Family Turridae

1-4 – Clavatula sp., an Clavatula eleonorae (Hoernes & Auinger); 1 × 8, 2-4 × 4;
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Photos 1 and 4 taken by S. Kolanowski
Photos 2, 3, and 8 taken by B. Malinowska
Photos 6-7 and 10-11 taken by B. Drozd, M.Sc.
Photos 5 and 9 taken by A. Nowicka
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Photos 1-3 and 9-10 taken by B. Malinowska
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Photos 7-8 taken by A. Nowicka
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Photos 1-3 and 8 taken by S. KOLANOWSKI
Photos 4-7 taken by B. DROZD, M.Sc.
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Photos 1-4 and 9 taken by B. Drozd, M.Sc.
Photos 5-8 and 10 taken by S. Kołanowski
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Photos 1-2 taken by B. Malinowska
Photos 3-4 and 8-10 taken by B. Drozd, M.Sc.
Photos 5-7 taken by S. Kolanowski
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Photos 3-5 and 7-8 taken by B. DROZD, M.Sc.
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Photos 1-7 taken by S. KOLANOWSKI

Photo 8 taken by A. NOWICKA

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Family Turridae

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Photos 3-4 and 6-7 taken by B. Drozd, M.Sc.
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Photos 1, 3-4 and 8 taken by B. Drozd, M.Sc.
Photos 2, 5-7 taken by B. Malinowska
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Photos 3-4, 7 and 8-9 taken by B. Malinowska
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Photos 1-3, 6, 8, and 10 taken by B. MALINOWSKA
Photos 4-5, 7, and 9 taken by B. DROZD, M.Sc.
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Photos 1-2 and 4-9 taken by B. Malinowska
Photo 3 taken by B. Drozd, M.Sc.
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Family Turridae

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<td><em>Haedropleura cristallina</em> BOETTGER, × 8; 4 - U.W., BkK-G980; 5 - U.W., BkK-G981; 6 - U.W., BkK-G982</td>
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<td>7-9</td>
<td><em>Haedropleura pseudosigmoidea</em> (BOETTGER), × 8; 7 - U.W., BkK-G985; 8 - U.W., BkK-G986; 9 - U.W., BkK-G987</td>
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All photos taken by B. MALINOWSKA
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Family Turridae

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Photos 1, 5-6 and 9-10 taken by B. DROZDO, M.Sc.
Photos 2-4 and 7-8 taken by B. MALINOWSKA
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Family **Turridae**

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<td>1</td>
<td><em>Bathyoma lapugyensis</em> (Mayer in Bellardi), × 2; U.W., BkK-G1006</td>
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<td>2</td>
<td><em>Bathyoma cataphracta</em> (Brocchi), × 4; U.W., BkK-G1005</td>
</tr>
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<td>3</td>
<td><em>Bathyoma cataphracta</em> (Brocchi), × 2; Private collection of Mr. J. Guba</td>
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<td>4</td>
<td><em>Bathyoma cataphracta</em> (Brocchi), × 2; Collection of the Museum of the Geological Survey of Poland, Warsaw (Catalogue No. 28.II. 249; coll. K. Kowalewski)</td>
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**Photo 1** taken by B. Drozd, M.Sc.
**Photos 2-3 and 5-7** taken by B. Malinowska
**Photo 4** taken by A. Nowicka
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All photos taken by B. Drozd, M.Sc.
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All photos taken by B. MALINOWSKA
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<td>9</td>
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<td>10</td>
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All photos taken by B. Malinowska.
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All photos taken by B. Malinowska
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All photos taken by B. Malinowska
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All photos taken by B. Malinowska
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Family Turridae

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All photos taken by B. Malinowska
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All photos taken by B. MALINOWSKA
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8 – Clathurella sp., × 8; U.W., BkK-G1088

9-10 – Clathurella densestriata BOETTGER, × 8; 9 - U.W., BkK-G1075;
   10 - U.W., BkK-G1076

11 – Clathurela cf. carolinae (BOETTGER), × 8; U.W., BkK-G1087

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PLATE 27

Family Turridae

1-3 – *Teretia anceps* (EICHWALD) , × 8; 1 - U.W., BkK-G1089; 2 - U.W., BkK-G1090;
3 - U.W., BkK-G1091

4 – *Daphnella (Favriella) alterego* (BOETTGER), × 8; U.W., BkK-G1095

5-7 – *Daphnella (Favriella) dorae* (BOETTGER) , × 8; 5 - U.W., BkK-G1092;
6 - U.W., BkK-G1093; 7 - U.W., BkK-G1094

8-9 – *Daphnella (Favriella) tenerrima* (BOETTGER) , × 8; 8 - U.W., BkK-G1096;
9 - U.W., BkK-G1097

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PLATE 28

Family Turridae

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<td>Philbertia microhystrix (Boettger), × 8; 2 - U.W., BkK-G1100; 3 - U.W., BkK-G1101</td>
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<td>Philbertia praehispida (Boettger), × 8; U.W., BkK-G1103</td>
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<td>Philbertia subpurpurea (Boettger), × 8; 11 - U.W., BkK-G1106; 12 - U.W., BkK-G1107; 13 - U.W., BkK-G1108</td>
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PLATE 29

Family Turridae

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1-3 – *Peratotoma herminae* Boettger, × 8; 1 - U.W., BkK-G1118;
   2 - U.W., BkK-G1119; 3 - U.W., BkK-G1120 ......................... 73

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