

Some molluscs from the Badenian (Middle Miocene) west of Pleven (Central Northern Bulgaria). II. Gastropoda: order Neogastropoda

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*П. И. Николов — Некоторые моллюски из бадена (средний миоцен) западнее города Плевена (Центральная Северная Болгария). II. Gastropoda: отряд Neogastropoda. В статье впервые описываются 31 таксонов видовой группы бадена Болгарии. Они принадлежат 17 родам и 7 семействам отряда Neogastropoda. Найдены в обнажениях рифовой фации между с. с. Тырне и Биволаре, находящейся вдоль правого берега р. Вит в западном направлении от города Плевена. Они входят в составе Опанецкой свиты. Здесь обнажаются только позднеморавские (фораминиферовая зона *Orbulina suturalis*) и величские (фораминиферовая зона *Uvigerina*) отложения баденского регионального яруса. Гастроподовая фауна, несмотря на свое разнообразие и хорошую фациальную привязанность, не является критерием, сообразно которому можно было бы разделить баденский региональный ярус на подъярусы.*

Abstract. Thirty one taxa of the species group undescribed upto now in Bulgaria are discussed in this paper. They belong to 17 genera and 7 families of Neogastropoda order. The species were found in outcrops of the reef facies exposed between the villages of Târne and Bivolare along the right bank of the Vit River to the West of the town of Pleven. They belong to the Opanec Formation. Only Late Moravian (*Orbulina suturalis* Foraminiferal zone) and Wielickian (*Uvigerina* Foraminiferal zone) sediments of the Badenian regional substage are exposed here. The gastropod fauna is diverse and facially well tied but it is not a criterium by the subdivision of the Badenian Regional Stage into substages.

Introduction

This paper presents an identification and description of some new for the Badenian in Bulgaria taxa assigned to the species group of Gastropoda class. They originate from natural outcrops situated near the villages of Târne, Jasen, Opanec and Bivolare, along the right bank of the Vit River, to the west of the town of Pleven. This is the second paper of a series discussing the abundant mollusc fauna related to reefs of the Badenian Sea.

Some of the fossils described here were kindly submitted to me by Mr Ivan Kadiev, a nature lover from Pleven. They are part of his collection, gathered in the period 1970-1985. The study was financed from the National Fund "Scientific Research" in accordance with contract ES (Earth Sciences) 235/1992.

I express my sincere thanks to everybody who assisted him with advice and consultations and also for the precise translation of the diagnoses of a number of taxa. I express also my regards and cordial thanks to Mr Ivan Kadiev.

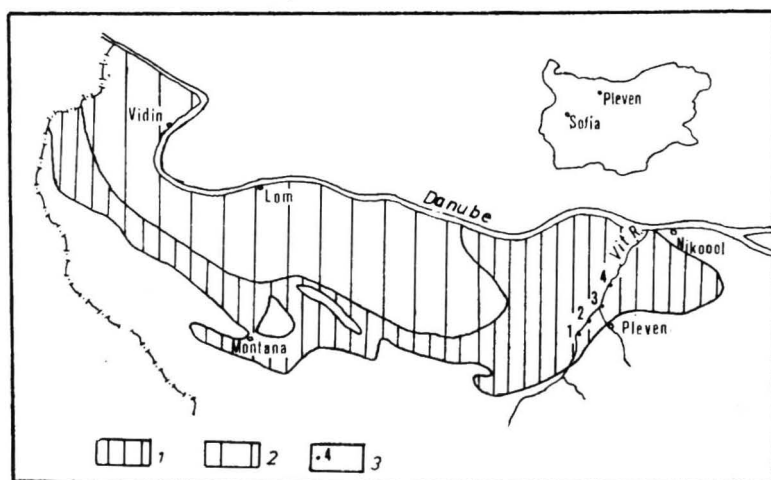


Fig. 1. Situation of the Badenian outcrops from the southern shelf zone in Plevna district (after K o j u m d g i e v a, D i k o v a, 1989)
1 — southern shelf area; 2 — other areas of the Badenian Basin; 3 — outcrops: 1 — Târnene, 2 — Jasen, 3 — Opanec, 4 — Bivolare

General remarks on the Badenian Stage near the town of Plevna and its molluscan fauna

The geologic disposition of the Badenian sediments and the current state of knowledge on them, and their molluscan fauna, are discussed in more details by N i k o l o v (1993).

The studied region (Fig. 1) is situated in the southern coastal structural-paleogeographic region of the Badenian Sea (a relatively shallow littoral) in Northwestern Bulgaria (Желев, Гочев, 1938; Трашлиев et al., 1964; К о ю м д ж и е в а, Попов, 1968; К о ю м д ж и е в а, Р о р о в, 1989). The outcrops represent segments of reef structures strongly influenced by the post-Badenian — pre-Sarmatian denudation. The rocks of the Opanec Formation (К о ю м д ж и е в а, Попов, 1988) are represented by clays, calcareous clays and limestones (Fig. 2). Their age determination and subdivision into substages are based upon the foraminifera fauna (Дикова in Трашлиев et al., 1964; Дикова in К о ю м д ж и е в а, Дикова, 1989; К о ю м д ж и е в а et al., 1989). In the outcrops near the villages of Târnene and Jasen only sediments belonging to the Moravian Substage of the Badenian Regional Stage (*Orbulina suturalis* Foraminiferal Zone) are exposed while near the villages of Opanec and Bivolare sediments with Wielickian age also occur (*Uvigerina* Foraminiferal Zone).

All investigators point out the extreme abundance of macrofossils, mainly molluscs, in these outcrops. Most thorough and comprehensive are the works of K o j u m d g i e v a on their taxa composition and ecology (К о ю м д ж и е в а, 1960; К о ю м д ж и е в а, 1974; 1976; К о ю м д ж и е в а, 1986; 1988 — thesis, unpublished; К о ю м д ж и е в а, Дикова, 1989; К о ю м д ж и е в а et al., 1989). This author refers to the molluscs of the Moravian clays in the base of the Opanec Formation to the community with *Turritella spirata* and *Limopsis anomala*. The molluscs of the bioclastic limestones, building lenses in the upper parts of the Moravian clays refer to the community with *Chione basteroti*. The Wielickian carbonate clays from the upper parts of the outcrops between the villages of Opanec and Bivolare contain fauna which refers to the subcommunity with *Turritella badensis*.

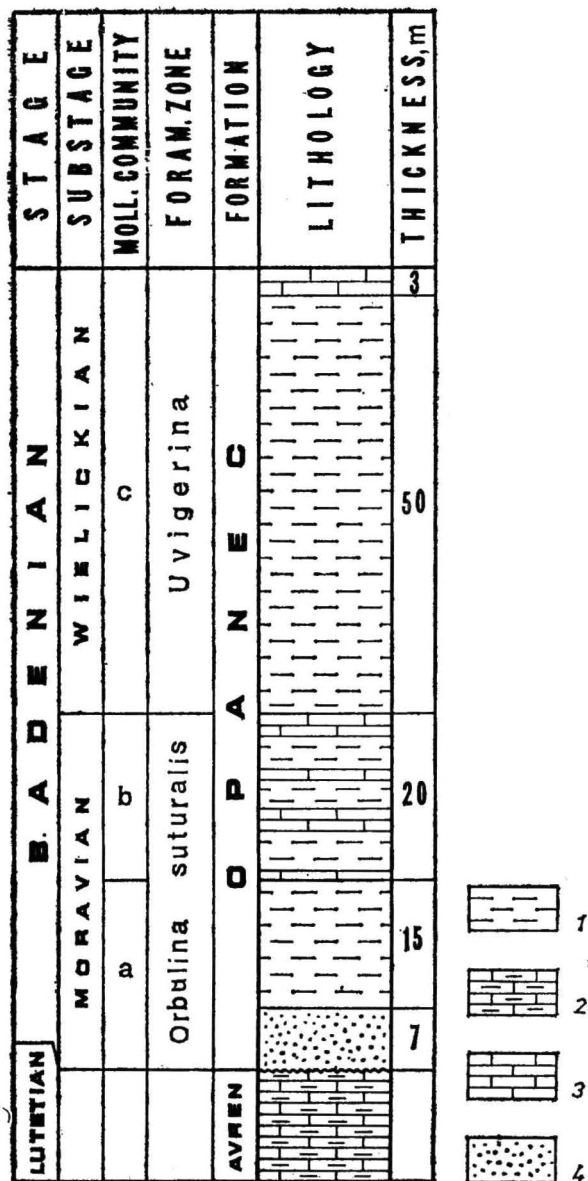


Fig. 2. Cross-section of the Neogene sediments at the village of Opanec (after N i k o l o v, 1993); a — community with *Turritella spirata* and *Limopsis anomala*; b — community with *Chione basteroti*; c — subcommunity with *Turritella badensis*; 1 — clays; 2 — marls; 3 — limestones; 4 — sandstones

The gastropod fauna is diverse and well facially tied but the gastropod species could not be used for subdivision of the Badenian Regional Stage. The availability of a large number of stenohalin forms is an indication of normal salinity of the basin in this region (K o j u m d g i e v a, 1976; 1986).

Taxonomy

I do not dispose of the original publications where the type-specimens are described. For that reason the Bulgarian gastropods are compared with specimen figures in later publications and these figures are used as basis for taxonomic identifications.

Under the heading "Dimensions" I use the designations H — height; D — width of the shell. The dimensions are in mm.

The specimen submitted by Ivan Kadiev are marked with the "*" sign. Since it is not possible to establish their exact position in the section under the heading "Location" only the town or village and the composition of rocks in which the described specimen originate are given.

The material discussed in this paper is stored in the paleontologic collection of the Geological Institute of the Bulgarian Academy of Science (Coll. GI-Nb).

Class **GASTROPODA**

Subclass **PROSOBRANCHIA**

Order **NEOGASTROPODA**

Superfamily **MURICACEA**

Family **MURICIDAE** Fleming, 1828

Subfamily **MURICINAE** H. Adams, A. Adams, 1853

Genus ***Hexaplex*** Perry, 1811

Subgenus ***Hexaplex (Muricanthus)*** Swainson, 1880

Hexaplex (Muricanthus) bourgeoisi (Tournouër, 1875)

Plate I, figs. 1, 2

1952. *Murex (Hexaplex) bourgeoisi* Tournouër — Glibert, p. 289, pl. 5, fig. 5.

Nomenclature. No data for type-specimen available.

Material. One specimen, well preserved. Coll. GI-Nb 138*.

Dimensions. H — 29.0; D — 16.0.

Description. The shell is medium large, thick-walled, consisting of 7 prominent stepped whorls. Protokonh consisting of an convexed whorl. The sculpture of the teleokonh is dominated by varices (5 on each whorl) with a wrinkled costae near the front varice. The spiral sculpture is represented by numerous of small ribs of different size, irregularly distributed. They bear dense needle-like tubercles to thorns, especially on the varices. Just above the middle of the whorl there is a blunt rounded carina. The last whorl occupies about 75% of the total height. The aperture is ellipso-oval like. Distinct gutter. The outer lip is varicously thickened with a wrinkled edge and 10 small teeth inside. The inner lip is thick, smooth, adjoined, with distinct gutter. The siphonal canal is rather covered.

Location. Opanec Formation, Moravian Substage, organogenic limestones in the upper part of the section at the village of Târnene.

Hexaplex (Muricanthus) turonensis pontileviensis (Tournouër, 1875)

Plate I, figs. 3, 4

1950 b. *Murex (Muricantha) hörnesi* d'Ancona — Cs.-Meznerics, p. 47, pl. 2, fig. 18.
1952. *Murex (Muricantha) turonensis pontileviensis* Tournouër — Glibert, p. 285, pl. 4, figs. 8, 9.

1954. *Murex (Muricantha) hoernes* d'Anc. — Strausz, pp. 25, 74, pl. 5, fig. 123.
 1966. *Murex (Muricanthus) turonensis pontileviensis* Tournouër — Strausz, p. 264, pl. 32, figs. 1, 4; pl. 33, fig. 2; pl. 56, figs. 6-11; pl. 79, fig. 1.

Nomenclature. No data for type-specimen available. Therefore the taxa is conditionally identified according to the figured by Gilbert (1952, pl. 4, figs. 8, 9).

Material. Two specimen, well preserved. Coll. GI-Nb 139*, 140.

Dimensions.	N°N°	139*	140
	H	29.4	29.4
	D	15.7	16.3

Description. The shell is medium large, with moderate wall thickness, consists of 9 convex stepped whorls. The protoconch consists of 2 smooth moderately convex whorls. The structure of the teleoconch is dominated by low asymmetric varices (6 per whorl) with an axial wrinkled rib near to the front varice inbetween them. The numerous spiral ribs covering the whole shell are differently high, 1-3 lower ones coming inbetween 2 higher. They have tubercle-like nodes which strengthen towards the bottom to needle like ones and on the varices — to upwards curved thorns. The last whorl occupies about 70% of the total height and is ornamented as the previous ones. The axial wrinkled ribs disappear on the base. The aperture is oval-like. The edge of the outer lip is wrinkled, with 8 small teeth from the inside. The inner lip is thick, adjoined, smooth. The siphonal canal is wide, rather covered.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Opanec.

Subgenus *Hexaplex (Paziella)* Jousseume, 1880

Hexaplex (Paziella) heptagonatus (Bronn, 1831)

Plate I, figs. 5, 6

1856. *Murex heptagonatus* Bronn — Höernes, p. 255, pl. 26, fig. 2.
 1885. *Murex (Muricidea) heptagonatus* Bronn — Höernes, Auinger, p. 205, pl. 24, figs. 5—8.
 1904. *Murex (?) heptagonatus* Brn. — Sacco, 30, p. 19, pl. 5, fig. 16.
 1966. *Murex (Paziella) heptagonatus* Bronn (an var. nov.) — Strausz, p. 263, pl. 55, fig. 11; pl. 56, figs. 1-3.

Nomenclature. No data for type-specimen available. Therefore the species is conditionally identified based upon the figured by Strausz (1966, pl. 55, fig. 11; pl. 56, fig. 1) specimen of Szob.

Material. A specimen with a broken siphon and a young specimen with entirely missing siphonal part. Coll. GI-Nb 141*, 142.

Dimensions.	N°N°	141*	142 (jun.)
	H	31.0 (incomplete)	
	D	15.8 (without thorns)	9.3

Description. The shell is medium large, thick-walled, consists of 5 1/2 whorls with a low stepped spiralis. The convex, smooth protoconch consists of 1 1/2 whorls. The sculpture of the teleoconch is dominated by high varices (7 per whorl). The spiral sculpture is represented by numerous low and flat ribs with a different width, which cover the entire shell. Often different in number fibrous-like furrows and costellae occur. A little above the middle of the whorl a rectangular rounded carina occurs. Above it the spiral ribs are more dense, lower and levelled and the varices change their direction to the front revealing a triangular profile on the subhorizontal shelf. The last whorl occupies about 85% of the total height. The ornamentation is the same as of the previous ones. The aperture has rounded-oval form. The edge of the outer lip is wrinkled, being smooth from the inside. The inner lip is smooth, widened, adjoined. The siphonal canal is wide, partly covered. On the base 3 high thorned spiral ribs wound in a higher spiral are observed.

Remarks. The studied specimen are closer to the specimen of Szob described by Strausz (1966, p. 263). I share the hesitancy of Strausz on the rank of the taxon. This problem could probably be solved by availability of more specimen which I do not dispose of yet.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Tárnene.

Genus *Aspella* Mörch, 1877

Subgenus *Aspella* (*Aspella*)

Aspella (*Aspella*) *scalarioides* (Blainville, 1826)

Plate I, figs. 7, 8

1958. *Aspella* (*Aspella*) *scalaroides* (Blainv.) — Sieber, p. 145.

v. 1960. *Aspella* (*Aspella*) *scalarioides* (Blainville) — К о ю м д ж и е в а, p. 148, pl. 40, fig. 7 (cum syn.).

1968. *Aspella scalaroides* (Blainville) — Зелинская et al., p. 187 (non pl. 44, figs. 17, 18).

Nomenclature. No data for type-specimen available. Therefore the taxon is conditionally identified based upon comparison with the figured by Gilbert (1952, pl. 6, fig. 7).

Material. One specimen, relatively well preserved. Coll. GI-Nb 143*.

Dimensions. H — 19.2 (incomplete); D — 10.7.

Description. The shell is moderately thick-walled, consists of 8 well convex stepped whorls, divided by a deep suture. The shell is subhorizonatal. The protoconch consists of 2 slightly tubby-like convex whorls. The teleconch is dominated by axial sculpture — 6 strong lamellar varices with an equal height to the sixth-seventh whorl. On the last whorl only 3 typical varices are observed. Inbetween, on the place of the varices of the front whorls a low, fluctuating wrinkled ribs occurs. The elements of the axial sculpture are inclined to the back, with a slant front slope. In the upper half of the whorl height they turn to the front and cross the upper suture aslant. The spiral sculpture is represented by 3-4 low, wide and rounded ribs. On their crossing with the axial sculpture blunt tubercles, becoming lower in the intercostal space. On the whole surface of the shell fibrous-like spiral ribs are equally developed on the axial elements and between them. The last whorl occupies about 62% of the total height. It is more convex and has 6 spiral ribs. The aperture has an ellipse-oval form, the gutter is vague. The outer lip is variceously thickened, with 8 teeth from the inside. The inner lip is thickened, smooth and adjoined. The siphon is short, with a wide canal, rather closed, inclined to the left. The columella is strongly curved at the very beginning of the canal.

Remarks. The studied specimen is close to the figured by Gilbert (1952, pl. 6, fig. 7) specimen of Pontlevoy. It differs from the latter in the morphology of its last whorl — availability of narrow wrinkled ribs without visible traces of cease of the shell growth; development of 6 instead of 4 spiral ribs; 8 teeth from the inside of the outer lip instead of 5-6. These features bring the specimen closer to the described by Bellardi (1872, p. 72) one. It is possible these differences to concern the individual development of the specimen only and to be included into the inner species mutability which undoubtedly varies widely. No other specimen were available to observe tendencies of stability of these morphologic characteristics. The specimen from the village of Jasen, figured by К о ю м д ж и е в а (1960, pl. 40, fig. 7) is possibly a young representative of the species.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Tárnene.

Subfamily DRUPINAE

Genus *Ocinebrina* J o u s s e a u m e, 1880

Ocinebrina sublavata dertonensis (M a y e r i n B e l l a r d i, 1872)

Plate II, figs. 1, 2

1872. *Murex dertonensis* M a y. — B e l l a r d i, 1, p. 107, pl. 7, fig. 12.

1885. *Murex (Ocinebra) Dertonensis* M a y e r — H o e r n e s, A u i n g e r, p. 218, pl. 26, fig. 15.

1951. *Ocenebra sublavata* B a s t. — F r i e d b e r g, p. 174 (partim), pl. 11, fig. 8 (cet. excl.).

1958. *Ocinebrina dertonensis* (M a y.) — S i e b e r, p. 146.)

1966. *Ocinebrina sublavata dertonensis* M a y e r — S t r a u s z, p. 273, pl. 33, figs. 5-8.

1972. *Tritonalia sublavata dertonensis* M a y. — C s.-M e z n e r i c s, pl. 9, figs. 27, 28.

Nomenclature. A holotype is the only specimen figured by Mayer in B e l l a r d i (1872, pl. 7, fig. 12). It originates from Santa Agata. Upper Miocene. Museo di Zurigo.

Material. One specimen, well preserved. Coll. GI-Nb 144*.

Dimensions. H — 29.2; D — 14.7.

Description. The shell is large, thick-walled, built up of 6 1/2 convexed whorls. The protoconch consists of 1 1/2 smooth whorls. A lower slightly convexed part and an upper — slightly concave one are observed in the whorl sculpture of the teleoconch. Inbetween a blunt rounded carina is observed (about 130°), approximately at the middle of the whorl. On the convexed part low, rounded axial ribs (11 at the forelast whorl) are developed. Above the carina they are reduced and disappear under the upper suture. The spiral sculpture is represented by 7-9 lamellar ribs. Three of them, passing on the convexed part are slightly higher. The upper one represents a carina. On its crossing with the axial ribs blunt tubercles are formed. A second rank rib occurs inbetween the higher ones. The spiral sculpture on the concave part are intermediate of the ones on the convexed part. The last whorl occupies about 76% of the total height and is ornamented as the previous ones. The aperture is ellipse-oval. Vague gutter. The outer lip is nearly straight, thick and ribbed from the inside. The inner one is thick, smooth, adjoined in its upper part. The siphon is elongated, slightly curved to the left, with a relatively wide opened canal.

Remarks. The studied specimen corresponds well to the figured by H o e r n e s, A u i n g e r (1885, pl. 26, fig. 15) specimen of Lapugy. It differs from the holotype in its slightly less convexed carina, situated higher. Probably these differences refer only to the normal proclivity of the taxon towards inner species mutability. This is confirmed also through the figured by S t r a u s z (1966, pl. 33, figs. 5-8) specimens of Pécsvárad and Várpalota.

Locality. Opanec Formation, Moravian Substage, organogenic limestones at the village of Tárne.

Ocinebrina caelata badensis (H o e r n e s, A u i n g e r, 1885)

Plate I, figs. 9, 10, 11; Plate II, figs. 3, 4, 5, 6

1856. *Murex sublavatus* B a s t. — H o e r n e s, p. 236 (partim), pl. 24, fig. 15 (cet. excl.).

1885. *Murex (Ocinebra) caelatus* G r a t. var. *Badensis* — H o e r n e s, A u i n g e r, p. 217, pl. 26, figs. 13, 14.

1951. *Ocenebra sublavata* B a s t. — F r i e d b e r g, p. 174 (partim), pl. 11, fig. 9 (cet. excl.).

1954. *Ocenebra orientalis* F r i e d b. — F r i e d b e r g, p. 599.

v. 1960. *Tritonalia (Ocinebrina) orientalis* (F r i e d b e r g) — К о ю м д ж и н е в а, p. 150, pl. 40, fig. 10.

Nomenclature. Lectotype, here designated, is the syntype, figured by H o e r n e s, A u i n g e r (1885, pl. 26, fig. 13). According to data from the original publication it is 21.0 mm high and 10.0 mm wide. Originates from the Soos location. Miocene.

Material. Five specimen, relatively well preserved. Coll. GI-Nb 145*, 146-149.

Dimensions	N°N°	145*	146	147	148	149
H		15.0		16.9	18.6	
D		7.0	6.2	8.3	9.0	9.6

Description. Medium sized shell, thick-walled, spindle-shaped, consisting of 6 1/2 convexed whorls. Protokonh of 1 1/2 smooth whorls. The whorls of the teleokonh have 9 not very high axial wrinkled ribs each and 7-8 differently thick, low, rounded, dense spiral ribs. In the lower third of the whorl 2 stronger ribs which form a carina zone occur. Along the axial ribs they are convexed to tubercule-like nodes which become smaller to the front. The area above the ribs is slightly concave. The last whorl comprises about 80% of the total height. On it fibrous-like secondary spiral ribs are formed. The aperture is ellipse-formed. The outer lip is curved to a small arc with a wrinkled edge and has 7-8 teeth from the inside. The inner lip is thick, smooth, adjoined. The siphon is elongated, very slightly curved to the left, with a wide, often closed canal.

Remarks. My taxonomic identifications are influenced mainly by the comprehension of Hoernes, Auinger (1885) on the volume and contents of the species *O. sublavata* Bast., *O. caelata* Grat. and *O. dertonensis* Mayer. Many later investigators made only partial revisions. This led to distortion of the definitions and solving of the borders of these similar species.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Tárnene.

Family **MAGILIDAE**

Genus ***Coralliophila*** H. Adams, A. Adams, 1853

***Coralliophila* sp.**

Plate II, figs. 7, 8

Material. One specimen, well preserved. Coll. GI-Nb 150*.

Dimensions. H — 11.3; D — 6.9.

Description. The shell is small, moderately thick-walled, consisting of 6 1/2 convexed whorls. Protokonh of 2 1/2 smooth whorls. The axial sculpture of the teleokonh consists of 12-13 (on the last whorl 10) moderately high, narrow, slightly inclined ribs. The spiral sculpture is represented by 5-7 lamellar ribs, equally strong on the axial ribs and inbetween them. At places the shells increase to small thorns. On the fore-last and last whorls between these ribs a fibrous-like rib is situated. The last whorl occupies 2/3 of the total height and is considerably larger and convexed. It is decorated as the previous ones. The aperture is oval-formed with a vague gutter. The outer lip is adjoined, with a wrinkled edge, smooth from the inside. The outer lip is smooth, adjoined, distinctively limited. The siphonal canal is wide, rather closed, slightly inclined to the left.

Remarks. The studied specimen reveals the morphological features of genus *Coralliophila* H. Adams, A. Adams, 1853. In my opinion it could be assigned to the subgenus *Hirtomurex* Coen, 1922 because of its strong spiral sculpture without regards that according to Копобков (1955, p. 309) the representatives of this subgenus are known in the Pliocene to recent.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Tárnene.

Superfamily **BUCCINACEA**

Family **BUCCINIDAE** Latreille, 1825

Genus *Euthria* Gray, 1850

Subgenus *Euthria* (*Euthria*)

Euthria (*Euthria*) *adunca* (Bronn, 1831)

Plate II, figs. 9, 10

1872. *Euthria adunca* (Bronn) var. B — Bellardi, 1, p. 198, pl. 13, fig. 22.

1882. *Euthria adunca* Bronn — Fontannes, p. 23, pl. 3, fig. 2.

1890. *Fusus* (*Euthria*) *aduncus* Bronn — Hoernes, Auinger, p. 259, pl. 31, figs. 5-8.

1958. *Euthria* (*Euthria*) *adunca* (Bronn) — Sieber, p. 150.

Nomenclature. No data on type-specimen available. Therefore the taxon is conditionally identified according to the figured by Hoernes, Auinger (1890, pl. 31, figs. 5-8).

Material. Three specimens, well preserved. Coll. GI-Nb 151-153*.

Dimensions.	N°	151*	152*	153* (jun.)
H		51.0	47.1	28.0
D		20.2	18.2	12.3

Description. The shell is large, thick-walled. Only the last smooth convex whorl has remained from the protoconch. The teleoconch consists of 7 convex whorls, divided by a shallow distinct suture. Immediately below the upper suture a shallow concave is formed. The sculpture is represented by numerous, dense, fibrous-like spiral ribs, 3-4 stronger ones distinguished among them. In direction to the base they are reduced and near the last whorl disappear completely. 9-11 axial wrinkled ribs are observed. They also decrease and disappear in direction to the last whorl. They do not reach to the suture in their upper part but disappear in the shallow concave. The sculpture of the young specimen is preserved. The last whorl comprises about 75% of the total height. In their lower part and on the base stronger spiral ribs with 2 finer ones in between are developed. The aperture is ellipse-oval, with distinct gutter. The outer lip is thick, with a thin edge, with teeth from the inside. The inner lip is moderately thick, adjoined, also with some small teeth. The siphon is long, inclined.

Location. Opanec Formation, Moravian Substage, calcareous clays under the organogenic limestones at the villages of Jasen and Opanec.

Superfamily FASCIOLARIACEA

Family FASCIOLARIIDAE

Genus *Fasciolaria* Lamarck, 1801

Subgenus *Fasciolaria* (*Pleuroploca*) Fischer, 1884

Fasciolaria (*Pleuroploca*) *tarbelliana nodosa* Hoernes, Auinger, 1890

Plate III, figs. 1, 2

1884. *Fasciolaria tarbelliana* Gart. var. A — Bellardi, 4, p. 9.

1890. *Fasciolaria Tarbelliana* var. *nodosa* — Hoernes, Auinger, p. 262, pl. 30, fig. 7.

1904. *Pleuroploca tarbelliana* (Gart.) var. *tauroventrosa* Sacco — Sacco, 30, p. 28, pl. 8, fig. 15.

Nomenclature. A holotype is the only specimen figured by Hoernes, Auinger (1890), pl. 30, fig. 7). Originates from Lapugy, Transylvania, Romania. Miocene, Badenian. The place of storage is not specified.

Material. One specimen, relatively well preserved. Coll. GI-Nb 155.

Dimensions. H — 114.6; D — 44.5.

Description. The shell is large, thick-walled, consists of 11 convex whorls. Protoconch of 1 1/2 smooth whorls. Apical angle 37°. The sculpture is represented by

convex and concave parts, divided by a carina, strengthened by a low carina rib. On the convex part strong, rounded axial wrinkled ribs (10 at the forelast whorl) are observed. They disappear in the concave above the carina. Near the fore-last whorl the axial wrinkled ribs shrink into tubercles. The shell is covered with numerous spiral ribs. Three of them are stronger, pass on the convex part, and the middle one represents a carina. Inbetween a lower rib occurs. The last curve comprises about 71% of the total height. One of the rounded tubercles increase to thorns and the spiral sculpture is smoothed and nearly disappears. On the base wide strong spiral ribs with a secondary one inbetween occur. The outer lip is broken, ribbed from the inside. The inner lip is thin, adjoined, distinctly limited, with 3 columellar folds. The siphon is long, slightly inclined, with a wide canal.

Remarks. Three specimens are shown on pl. IV, figs. 1-6 (Coll. GI-Nb 156 — from the village of Jasen, 157* — from the village of Opanec, 191 — from the village of Opanec). They are conditionally identified as transitional forms between *F. (P.) tarbelliana* Gr. et al. and *F. (P.) tarbelliana nodosa* H. - A. according to the figured by Hoernes, Auinger (1890, pl. 30, fig. 6) specimen of Lapugy.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Tárnene.

***Fasciolaria (Pleuroploca) pyrrulaeformis* Hoernes, Auinger, 1890**

Plate V, figs. 1, 2

1890. *Fasciolaria pyrrulaeformis* nov. form. — Hoernes, Auinger, p. 265, pl. 32, figs. 5, 6.

Nomenclature. Lectotype, here designated is the specimen of the type-series figured by Hoernes, Auinger (1890, pl. 32, fig. 5). According to data from the original publication it has dimensions: H — 111 mm; D — 55 mm. Originates from the deposit Lapugy, Transylvania, Romania, Miocene, Badenian. The place of storage is not specified.

Material. One specimen, in bad condition. Coll. GI-Nb 158*.

Dimensions. D — 48.0.

Description. The shell is large, thick-walled. The protoconch is not preserved. 6 whorls are observed. Approximately at the middle of the whorl two higher spiral ribs which form a carina zone are observed. They bear dense rounded tubercles (14 on the fore-last whorl). The tubercles on the upper rib are larger than those on the lower. Above the carina zone the shell is concave and has 5-6 relatively weak flat-rounded spiral ribs. The axial sculpture is represented by moderately high "ribs", convex by the situated one above the other tubercles, with narrow intercostal spaces. The last whorl is ornamented as the previous ones. Three strong spiral ribs are observed on the base. They are wound in a higher spiral. The outer lip is broken, ribbed from the inside. The inner one is wide, narrow, adjoined, with 3 columellar folds.

Location. Opanec Formation, Wielickian Substage, the upper parts of the calcareous clays at the village of Bivolare.

***Fasciolaria moravica* Hoernes, Auinger, 1890**

Plate III, figs. 5, 6, 7

1890. *Fasciolaria moravica* nov. form. — Hoernes, Auinger, p. 266, pl. 31, fig. 9.

1958. *Fasciolaria (Pleuroploca) moravica* R. Horn. et al. — Sieber, p. 152.

1969. *Fasciolaria moravica* Hoernes et Auinger — Cs. — Meznerics, p. 90, pl. 5, figs. 24, 26.

1972. *Fasciolaria moravica* Hoernes et Auinger — Cs. — Meznerics, pl. 13, figs. 17, 18.

Nomenclature. A holotype is the only specimen, figured by Hoernes, Auinger (1890, pl. 31, fig. 9). According to data from the original publication it

has dimensions H — 14.0 mm, D — 6.0 mm. Originates from the Niederleis. Miocene. The place of storage is not specified.

Material. One specimen, well preserved. Coll. GI-Nb 159*.

Dimensions. H — 17.1; D — 6.9.

Description. The shell is not large, moderately thick-walled, consisting of 11 convexed whorls. The protoconch consists of 3 smooth whorls. The whorls of the teleoconch are ornamented with 7 moderately elevated, convexed and rounded, slightly inclined wrinkled ribs each. The intercostal space comprise about 1/2 of the width of the ribs. The whorls have 4 radial ribs each, elevated and flatly-rounded on the axial ribs and nearly disappearing in the intercostal space. Under magnification numerous fibrous-like riblets covering the whole shell without the ridge of the main radial ribs are visible. The last whorl occupies about 57% of the total height. It is ornamented as the others. The axial wrinkled ribs disappear on the base. The aperture is variceously thickened but with a narrow edge with 7 elongated faultlets from the inside, distinct gutter in the upper part. The inner lip is thin, adjoined, distinctly limited, with 3 faultlets in its lower end and a parietal fault on the upper. The siphon is short, with a wide canal, slightly curved.

Location. Opanec Formation, Wielickian Substage, calcareous clays at the village of Opanec.

Family **MELONGENIDAE** Schumacher, 1817

Genus **Melongena** Schumacher, 1817

Melongena cornuta pseudobasilica Strausz, 1943

Plate V, figs. 3, 4

1950. b. *Galeodes (Volema) cornuta hungarica* n. var. — Cs. — Meznerics, p. 51, pl. 3, fig. 3.

1966. *Melongena cornuta pseudobasilica* Strausz — Strausz, p. 299, pl. 57, figs. 10-12; pl. 58, figs. 1-5; pl. 59, figs. 1, 2.

1973. *Galeodes (Volema) cornuta* (Agassiz) — Bohn-Havas, p. 1054, pl. 5, fig. 9.

Nomenclature. I do not dispose of the original publication, where *M. cornuta pseudobasilica* Strausz, 1943 is introduced. In his work of 1966 (p. 299) the author of the taxon does not explicitly indicate that he reconfigures the holotype. For that reason I conditionally identify my specimen through comparison with the figured (Strausz, 1966, pl. 57, figs. 10-12) specimens of Pécsvárad.

Material. One specimen, relatively well preserved. Coll. GI-Nb 154*.

Dimensions. H — 46.5; D — 29.1.

Description. The shell is medium large, thick-walled. The protoconch is not preserved. The teleoconch consists of 6 strongly enveloping whorls with numerous small radial riblets which appear on the third whorl and become bigger to the front. A little above the lower suture at the first whorls high tubercles are developed. They form an obtuse carina, strengthened by two slightly stronger radial riblets. To the front the carina comes down into the suture where the tubercles grow to strong thorns. The last whorl comprises about 80% of the total height. In its lower quarter another line of high thorns, wound into a higher spiral, occurs. Distinct gutter. The outer lip is not preserved. The inner lip is relatively thick, widened, adjoined. The siphon is wide, slightly curved on the base.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Opanec.

Superfamily **CONACEA**

Family **TURRIDAE** H. Adams, A. Adams, 1853

Subfamily **CLAVATULINAE** H. Adams, A. Adams, 1853

Genus ***Clavatula*** Lamarck, 1801

Subgenus ***Clavatula* (*Clavatula*)**

Clavatula* (*Clavatula*) *camillae (Hoernes, Auinger, 1891)

Plate VI, figs. 1, 2

1891. *Pleurotoma* (*Clavatula*) *Camillae* nov. form. — Hoernes, Auinger, p. 340, pl. 43, figs. 12, 13.
1951. *Clavatula camillae* R. Hoern. i Auinger. — Friedberg, p. 190, pl. 12, fig. 4.
1954. *Clavatula camillae* Hoernes et Auinger — Cs.—Meznerics, p. 51, pl. 7, figs. 6, 7.
1960. *Clavatula* (*Clavatula*) *camillae* (Hoernes und Auinger) — Коюмджнева, p. 198, pl. 47, fig. 10.
1966. *Clavatula camillae* Hoernes & Auinger — Strausz, p. 405, pl. 15, fig. 15.
1968. *Clavatula* (*Clavatula*) *camillae* (Hoernes et Auinger) — Hinculov, p. 147, pl. 37, fig. 3.
1973. *Clavatula camillae* (Hoernes & Auinger) — Bohn-Havas, p. 1065, pl. 6, fig. 8.

Nomenclature. Lectotype, here designated, is the specimen of the type-series, figured by Hoernes, Auinger (1891, pl. 43, fig. 12). According to data from the original publication it has dimensions H — 39 mm; D — 15 mm. Originates from the Lapugy location, Transylvania, Romania. Miocene, Badenian. The place of storage is not specified.

Material. One specimen, relatively well preserved. Coll. GI-Nb 160*.

Dimensions. H — 24.6; D — 8.8.

Description. The shell is medium sized, moderately thick-walled, consisting of 9 1/2 whorls. Protokonh of 9 1/2 smooth whorls. The whorls of the teleokonh have inflations immediately below the upper and above the lower sutures and the space between them represents a wide concave band. On the first 3-4 whorls on the upper inflation dense low tubercles are established. The lower inflation is delineated by 2 radial ribs with moderately high tubercles, the space between them is smooth but traces from the lines of growth are observed. Starting from the fifth whorl of the teleokonh the upper inflation rises, 4-5 radial ribs and a carina delineated by a high radial rib and thorns (10 on the fore-last whorl) appear on it. In the concave 4-5 radial ribs with tubercles at the crossings with the lines of growth occur. The last whorl comprises about 45% of the total height. It is ornamented as the previous ones. On it a general strengthening of the sculpture is observed. The aperture has an oval form. The outer lip is missing. The inner lip is thin, adjoined.

Remarks. The specimen which I dispose of differs from these of the type-series in its smaller dimensions and in the availability of radial ribs with tubercles on the fore-last and last whorls. It is the closest to the figured by Hinculov (1968, pl. 37, fig. 3).

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Târnene.

Clavatula* (*Clavatula*) *asperulata granulata Sacco, 1890

Plate III, figs. 3, 4

1877. *Clavatula asperulata* (Lamck.) var. A — Bellardi, 2, p. 181.
1904. *Clavatula asperulata* var. *granulata* — Sacco, 30, p. 48, pl. 12, fig. 72.

Nomenclature. No data on type-specimen available. Therefore this subspecies is conditionally identified according to the figured by Sacco (1904, pl. 12, fig. 72) specimen.

Material. One specimen, well preserved. Coll. GI-Nb 161*.

Dimensions. H — 17.9; D — 7.9.

Description. The shell is small, moderately thick-walled. The protoconch is not preserved. The teleoconch consists of 9 whorls. Tubercles occur on the first 2-3 whorls, both on the upper and lower inflations and between them. Starting from the fourth whorl fine spiral whorls appear on the lower inflation. In direction to the base they become stronger and cover the whole shell. The upper inflation becomes more strong and distinct from the fifth whorl. The tubercles on it grow to thorns (11 on the fore-last whorl). The tubercles on the concave part inbetween disappear up to the seventh whorl. The last whorl occupies about 45% of the total height. The aperture has an elliptic-rhomboidal form. The outer lip is not preserved. The inner one is thin, smooth, distinctly limited, adjoined.

Location. Opanec Formation, Wielickian Substage, calcareous clays at the border with the organogenic limestones in the upper part of the section at the village of Bivolare.

***Ccavatula (Clavatula) rosaliae* (Hoernes, Auinger, 1891)**

Plate VI, figs. 16, 17

1891. *Pleurotoma (Clavatula) Rosaliae nobis* — Hoernes, Auinger, p. 347, pl. 47, figs. 2, 3.

Nomenclature. Lectotype, here designated, is the syntype, figured by Hoernes, Auinger (1891, pl. 47, fig. 2). According to data from the original publication it has dimensions H — 46.0 mm (incomplete) and D — 18.0 mm. Originates from the Potzleinsdorf, Austria. Miocene.

Material. One specimen with broken outer lip and siphon. Coll. GI-Nb 162*.

Dimensions. H — 30.0 (incomplete); D — 11.4.

Description. The shell is medium sized, moderately thick-walled, consists of 11 whorls. Immediately below the upper and above the lower suture inflations occur, the upper one being more distinct. On the first whorls in the interinflation space screscent-curved axial riblets which disappear to the sixth whorl occur. Starting from the fifth whorl 5-6 fine radial furrows are imposed on them. In direction to the base they become smoother but do not disappear. From the sixth whorl on the upper inflation small thorns (9 on the fore-last whorl) appear. Immediately above the suture on the lower inflation at the fore-last whorl tubercles occur. To the front they grow to thin thorns. The fore-last whorl comprises about 50% of the total height. It is ornamented as the previous ones. The aperture is oval-elliptic. The outer lip is broken. The inner lip is smooth, thin, adjoined.

Remarks: Our specimen differs from the specimens of the type-series in its not so well enveloping whorls.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Tárne.

***Clavatula (Clavatula) cf. oliviae* (Hoernes, Auinger, 1891)**

Plate VI, figs. 7, 8

Cf. 1891. *Pleurotoma (Clavatula) Oliviae* nov. form. — Hoernes, Auinger, p. 360, pl. 47* figs. 13-16.

Nomenclature. Lectotype, here designated, is the specimen of the type-series, figured by Hoernes, Auinger (1891, pl. 47, fig. 14). According to data from the original publication it has dimensions H — 50 mm; D — 16 mm. Originates from the Lapugy location, Transylvania, Romania, Miocene, Badenian.

Material. One specimen of a young species with a broken outer lip. Coll. GI-Nb 163.

Dimensions. H — 10; D — 4.3.

Description. The shell is small, byconical, consisting of 8 whorls. The protoconch consists of 2 1/2 smooth, slightly convex whorls. The first 2-2 1/2 whorls of the teleoconch have small axial riblets, inclined and arc-shaped to the back. They are slightly lower at the lower suture than at the upper one. Starting from the third whorl they disappear quickly and shelf thickenings occur at their place. At the forelast and especially at the last whorl the upper thickening is more distinctively limited, stronger and bears rare, obtuse tubercles. The space between the varices is concave, slightly asymmetric at the last two whorls. Fibrous-like furrows, nearly invisible by magnification, more distinct in the lower third occur on it. The last whorl occupies about 50% of the total height. On the base dense, flat riblets occur. On the studied specimen they are strongly obliterated.

Remarks: My specimen corresponds relatively well to the figured by Hoernes, Auinger (1891, pl. 47, fig. 16) young specimen. Probably *C. (C.) oliviae* (H.-A u.), *C. (C.) ursulae* (H.-A u.) and *Perrona semimarginata* (L a m c k.) have similar morphological features at the early stages of development. Hoernes, Auinger (1891, p. 360) pointed out the availability of small tubercles on the upper thickening by *C. oliviae* as a difference with *P. semimarginata* where they occur on the lower thickening. According to Strausz (1966, p. 402), *C. oliviae* differs from *C. ursulae* in its smaller and more vague furrows on the last whorls and also in the slightly longer and curved siphon.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Opanec.

***Clavatula (Clavatula) granulocincta angelae* (Hoernes, Auinger, 1891)**

Plate VII, figs. 1, 2, 3

1856. *Pleurotoma granulocincta* Münster — Hö r n e s, p. 344 (partim), pl. 37, fig. 14 (cet. excl.).

1891. *Pleurotoma (Clavatula) Angelae* nov. form. — Hoernes, Auinger, p. 353, pl. 46, figs. 17, 18.

1953. *Clavatula granulocincta angelae* Hö r n e s & Auinger — Cs.-Meznerics, p. 10, pl. 1, figs. 27, 28.

1958. *Clavatula (Clavatula) granulato-cincta angelae* (R. Hö r n. et A u.) — Sieber, p. 157.

1966. *Clavatula granulocincta angelae* Hoernes, Auinger — Strausz, p. 408, pl. 16, fig. 12.

Nomenclature. Lectotype, here designated, is the syntype, figured by Hoernes, Auinger (1891, pl. 46, fig. 18). According to data from the original publication it has dimensions H — 40 mm; D — 18.5 mm. Originates from the Lapugy location, Transylvania. Miocene, Badenian.

Material. Two specimens, well preserved. Coll. GI-Nb 164*, 165*.

Dimensions.	NoNo	164*	165*
	H	28.6	35.9
	D	9.8	14.8

Description. The shell is medium large, moderately thick-walled. The protoconch is not preserved. The teleoconch consists of 9 whorls, divided by a shallow wave-like suture. On the first 2-3 whorls immediately below the upper and above the lower sutures low spiral crests occur. They are delineated by slightly inclined and elongated dense tubercles. Starting from the last whorl in the concave space between them low spiral ribs with tubercles appear. From the fifth whorl the tubercles on the upper crest grow quickly to thorns (10-11 on each whorl), curved slightly up. The last whorl comprises about 45% of the total height. On it the lower spiral crest has high sharpened tubercles (but not thorns). Between the many fine tubercled spiral ribs on the base two pairs of higher ribs with slightly stronger ribs stand out. The aperture

has an ellipse form. The outer lip has a deep sinus. The inner lip is relatively thin, adjoined. The siphon is short with a wide canal. The fasciole is thin.

Remarks: A specimen from the village of Opanec (Coll. GI-Nb 166*) is shown on pl. VI, figs. 3, 4. It is conditionally identified as transitional form to the nominant subspecies and corresponds relatively well to the figured by Höernes, Auinger (1891, pl. 46, fig. 19) specimen of Möllersdorf.

Location. Opanec Formation, Wielickian Substage, calcareous clays at the village of Opanec and to the north of the village of Bivolare.

Genus **Perrona** Schumacher, 1817

Subgenus **Perrona (Perrona)**

Perrona (Perrona) vindobonensis (Partsch in Höernes, 1856)

Plate VI, figs. 9, 10

1856. *Pleurotoma Jouanneti* Des Moul. — Höernes, p. 346 (partim), pl. 38, figs. 5, 6 (cet. excl.).

1891. *Pleurotoma (Clavatulula) vindobonensis* Partsch — Höernes, Auinger, p. 358, pl. 48, figs. 17, 18.

1951. *Clavatulula vindobonensis* Partsch — Friedberg, p. 199, text fig. 50.

1954. *Clavatulula jouanneti vindobonensis* Pa. — Strausz, pp. 34, 72, pl. 5, fig. 105.

1954. *Clavatulula (Perrona) vindobonensis* Partsch — Cs. — Meznerics, p. 52, pl. 7, fig. 1.

1958. *Perrona (Perrona) vindobonensis* (Partsch) — Sieber, p. 157.

1966. *Clavatulula Jouanneti vindobonensis* Partsch — Strausz, p. 400, pl. 14, figs. 5-9 (non figs. 10-14).

1972. *Clavatulula (Perrona) vindobonensis* Partsch — Cs. — Meznerics, pl. 16, fig. 1.

1985. *Perrona (Perrona) vindobonensis* Partsch — Atanacković, p. 167, pl. 38, figs. 3, 4.

Nomenclature. No data on type-specimen available. For that reason I conditionally identify the species through comparison with the figured by Atanacković (1986, pl. 38, figs. 3, 4).

Material. A well preserved specimen. Coll. GI-Nb 167*.

Dimensions. D — 5.6.

Description. The shell is small, thick-walled. Only 4 whorls divided by distinct shallow suture are preserved. Immediately below the upper suture a high, rounded, smooth crest is developed. Above the lower suture a second, significantly lower crest occurs. It is relatively well outlined on the fore-last whorl. The concave space between them is covered with 5-6 fine radial furrows. The three morphological elements are nearly equal in height and occupy 1/3 of the height of the whorl. The lines of growth are distinct with relatively deep symmetrical sinus, coinciding with the concave part of the sculpture. The last whorl is ornamented as the previous ones. The base is covered with dense, thin, flatly-rounded spiral riblets. The aperture has an ellipsoid form. The outer lip is broken. The inner lip is thin, smooth, adjoined, distinctly limited. The siphon is short with a narrow canal.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Tárnene.

Perrona (Perrona) vindobonensis nodosa (Csepregy-Meznerics, 1954)

Plate VI, figs. 14, 15

1954. *Clavatulula (Perrona) vindobonensis nodosa* n. subsp. — Cs. — Meznerics, p. 52, pl. 7, figs. 8, 9, 11, 12.

1966. *Clavatulula (Perrona) vindobonensis nodosa* Mezn. — Kókay, pl. 9, fig. 18.

Nomenclature. A holotype is the only specimen figured by Cs. — Meznerics (1954, pl. 7, figs. 8, 9, 11, 12), coll. Országos Természettudományi Múzeum —

M 52/1435. Originates from Mátraverebely, Hungary, the layers "Szent László" (5a) — sand facies; "Tortonian".

M a t e r i a l. One specimen, in bad condition. Coll. GI-Nb 168*.

D i m e n s i o n s. H — 23.4; D — 5.2.

D e s c r i p t i o n. The shell is small, relatively thick-walled. Nine whorls are visible. At the places where the structure is preserved a fine shade (5-6 furrows) on the concave part below the upper thickening is visible under magnification. The lower thickening is not well outlined. At the last whorl on the upper thickening obtuse tubercles occur. The aperture has an ellipse form. The siphon is short. The outer lip is broken. The inner lip is thin, adjoined.

L o c a t i o n. Opanec Formation, Moravian Substage, organogenic limestones at the village of Tárneň.

***Perrona (Perrona) semimarginata servata* (S a c c o, 1890)**

Plate VI, figs. 11, 12, 13; Plate VII, figs. 7, 8

1856. *Pleurotoma semimarginata* L a m. — H ö r n e s, p. 347, pl. 38, fig. 6, (an fig. 7?).

1877. *Clavatula semimarginata* var C — B e l l a r d i, 2, p. 201.

1891. *Pleurotoma (Clavatula) semimarginata* L a m c k. — H o e r n e s, A u i n g e r, p. 359, pl. 47, fig. 17.

1904. *Clavatula (Perrona) semimarginata* var. *servata* S a c c o. — S a c c o, p. 49, pl. 13, figs. 11, 12.

N o m e n c l a t u r e. No data on type-specimen available. Therefore the taxon is conditionally identified according to the figured by S a c c o (1904, pl. 13, figs. 11, 12).

M a t e r i a l. Three specimens at different stage of development each. Coll. GI-Nb 169, 170*, 171*.

D i m e n s i o n s.	NoNo	169 (jun.)	170*	171*
	H	20.8	73.7	86.0 (incompl.)
	D	6.5	21.2	30.3

D e s c r i p t i o n. The shell is large, thick-walled, consists of 14 1/2 whorls. Protokonh of 1 1/2 convex whorls. Apical angle — 30°. The first two whorls of the teleokonh have small inclined rib-like tubercles, most convex at the lower suture. At the third whorl they merge in their base and at the fourth whorl form a carina immediately above the suture. In direction to the base it gradually reduces and near the ninth whorl a vague outlined lower inflation is formed at its place. From the fourth-fifth whorl of the teleokonh the forming of an upper inflation starts. Its direction to the base it becomes bigger. The space between the inflations is concave, its deeper most part being situated below the upper inflation. The relatively deep and asymmetric sinus of the lines of growth occurs at the deeper most part. The last whorl occupies about 50% of the total height and has the same sculpture. On the curved base and on the siphon numerous radial ribs are situated. The aperture is with rhomboidal-ellipse form. The outer lip is not preserved. The inner lip is thin, smooth, adjoined, distinctly limited. The siphon is long, with a narrow canal.

L o c a t i o n. Opanec Formation, Moravian Substage, the upper parts of the calcareous clays at the villages of Jasen and Opanec.

Genus *Turricula* S c h u m a c h e r, 1817

Subgenus ***Turricula (Surcula)* H. A d a m s, A. A d a m s, 1853**

***Turricula (Surcula) dimidiata* (B r o c c h i, 1814)**

Plate VI, figs. 18, 19, 20

1843. *Murex dimidiatus*: nob. — B r o c c h i, p. 226, pl. 8, fig. 18.

1856. *Pleurotoma dimidiata* B r o c c. — H ö r n e s, p. 360, pl. 39, figs. 2, 3.

1891. *Pleurotoma (Surcula) dimidiata* Brocc. — Hoernes, A u i n g e r, p. 304, pl. 38, figs. 11-22.
 1904. *Surcula dimidiata* (Br.) — S a c c o, 30, p. 43, pl. 11, figs. 53, 54.
 1951. *Surcula dimidiata* Brocc. var. — F r i e d b e r g, p. 204, pl. 13, fig. 8.
 1953. *Clavatula (Surcula) dimidiata* Brocchi — Cs.—M e z n e r i c s, p. 12, pl. 4, figs. 13, 14.
 1958. *Turricula (Surcula) dimidiata* (Brocchi) — S i e b e r, p. 157.
 1966. *Surcula (Surcula) dimidiata* Brocchi — S t r a u s z, p. 413, pl. 17, fig. 6-9.
 1968. *Surcula dimidiata* (Brocchi) — З е л н и с к а я et al., p. 223, pl. 50, fig. 32.

Nomenclature. No data on type-specimen available. Therefore the taxon is conditionally identified according to the figured by Hoernes, A u i n g e r (1891, pl. 38, figs. 11-22).

Material. Shell fragments of four specimens. Coll. GI-Nb 172-175.

Dimensions. D — 6.8-8.6.

Description. According to the material, which I dispose of, the embrional and the first whorls of the teleokoh are missing. The whorl is slightly concave in its upper part and a little below its middle it is convexed. On the fore-last whorl the inflexion bears 12-13 low rounded tubercules. They are situated immediately above the suture at the older whorls and diverge from it to the front. At the fore-last and last not very dense fine furrows are observed. They are nearly obliterated in the upper part of the whorl. At the older whorls of our specimen such furrows are not observed. The traces of the lines of growth form a sinus which coincides with the tubercules on the convexed part. The last whorl has a fast, but smooth transition into a curved to the inside base.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Opanec.

***Turricula (Surcula) reevei buiturica* (M o i s e s c u, 1955)**

Plate VI, figs. 5, 6

1955. *Surcula reevei* Bellardi var. *buiturica* var. nov. — M o i s e s c u, p. 169, pl. 13, fig. 24.

Nomenclature. A holotype is the only preserved specimen, figured by M o i s e s c u (1955, pl. 13, fig. 24). Originates from the southern slope of the hill Carpinis, Buituri region, Transylvania, Romania. Sandy facies. "Tortonian". The place of storage is not specified.

Material. Two specimens, relatively well preserved. Coll. GI-Nb 176*, 177*.

Dimensions.	NoNo	176*	177*
	H	42.0	34.0
	D	13.0	10.9

Description. The shell is large, thick-walled. The protokoh is missing. 10 whorls divided by a shallow suture are visible. The sculpture is dominated by the axial ribs (13 on the fore-last whorl). They are rounded, not very high, slightly asymmetric. They occur on the slant part of the whorl. A little above their middle they end with tubercules. The tubercules are slightly elevated and form a carina. Above it the shell sharply concaves and rises towards the upper suture. Immediately below it small, obtuse tubercules are observed. At the first 4-5 whorls the axial ribs come to the upper suture and the concave part is not outlined. The lines of growth are strong, distinctly asymmetric and form a sinus on the carina. On the axial ribs 3-4 slightly deeper furrows of first rank occur. They come to the foot of the carina and are not observed in upper direction. The last whorl occupies about 64% of the total height. It is ornamented as the previous ones. The axial ribs disappear on the base. The aperture has an oval-ellipse form. The outer lip is not well preserved. The inner lip is thin, adjoined, distinctly limited. The siphon is not very long, with a wide canal, slightly curved in its lower part. Not well formed fasciole.

Remarks. The studied specimens differ from the holotype in their bigger elongation.

Location. Opanec Formation, Wielickian Substage, organogenic limestones in the upper part of the section at the village of Bivolare.

Subfamily **TURRINAE**

Genus ***Drillia*** Gray, 1838

Drillia helenae (Hoernes, Auinger, 1891)

Plate VII, figs. 4, 5, 6

1891. *Pleurotoma (Drillia) Helenae* nov. form. — Hoernes, Auinger, p. 320, pl. 39, figs. 24-29.

1951. *Drillia* s. f. *helenae* R. Hoernes i Auinger — Friedberg, p. 213, text fig. 52.

1968. *Drillia helenae* (R. Hoernes et Auinger) — Зелинская et al., p. 222.

Nomenclature. Lectotype, here designated, is the specimen of the type-series, figured by Hoernes, Auinger (1891, pl. 39, fig. 28). According to data from the original publication it has dimensions H — 31 mm; D — 11 mm. Originates from the Lapugy Location, Transylvania, Romania. Miocene, Badenian.

Material. One specimen, preserved. Coll. GI-Nb 178*.

Dimensions. H — 30.6; D — 10.4.

Description. The shell is large, thick-walled, tower-like. The protoconch consists of 2 1/2 smooth convex whorls. The teleoconch consists of 10 slightly enveloping whorls. Immediately below the upper suture a small radial inflation occurs. Below it follows a wide, shallow concave part. On the remaining (about 60%) part of the whorl slightly inclined, rounded axial ribs (10 on the fore-last whorl) occur. The whorls are covered with numerous low radial riblets, 3-5 stronger ones outlined on the ribs. The last whorl occupies about 55% of the total height. It is ornamented as the previous ones. The axial ribs disappear on the base and the radial ones are stronger. The aperture is rounded and rhomb-like, becoming slightly narrower in its lower part. The outer lip is thick, adjoined in its upper part. Distinct fasciole.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Târnene.

Subfamily **CYTHARINAE**

Genus ***Cythara*** Schumacher, 1817

Subgenus ***Cythara (Atoma)*** Bellardi, 1875

Cythara (Atoma) hypotetica (Bellardi, 1847)

Plate VIII, figs. 13, 14

1877. *Atoma hypotetica* Bell. — Bellardi, 2, p. 324, pl. 9, fig. 39.

1968. *Cythara (Atoma) hypotetica* (Bell.) — Robba, p. 604, pl. 46, fig. 2.

Nomenclature. No data on type-specimen available. Therefore the taxon is conditionally identified through comparison with the figured by Robba (1968, pl. 46, fig. 2).

Material. One specimen, preserved. Coll. GI-Nb 179*.

Dimensions. H — 14.5; D — 5.2.

Description. The shell is elongated, moderately thick-walled, built of 8 1/2 whorls. The protoconch consists of 2 1/2 smooth convex whorls. The whorls of the teleoconch are ornamented with 10 relatively narrow, slightly inclined axial

ribs each. In the upper third of the whorl an obtuse carina is formed. Above it the ribs become narrower and come to the upper suture spear-shaped. Very fine radial riblets, which disappear above the carina are also observed. The last whorl occupies about 52% of the total height. It is ornamented as the rest. The axial ribs are S-shaped and disappear on the base. The radial ribs become stronger in direction to the base. The aperture is ellipse formed. The outer lip is variceously thickened, its edge is not preserved. The inner lip is thin, adjoined. The siphon is short with a wide canal.

L o c a t i o n. Opanec Formation, Moravian Substage, silty clays at the village of Jasen.

Genus *Raphitoma* Bellardi, 1848

Subgenus *Raphitoma* (*Raphitoma*)

Raphitoma (*Raphitoma*) *spinifera* (Bellardi, 1847)

Plate VIII, figs. 15, 16

1877. *Raphitoma spinifera* Bell. — Bellardi, 2, p. 298, pl. 9, fig. 2.

1968. *Raphitoma* (*Raphitoma*) *spinifera* (Bellardi) — Robba, p. 606, pl. 46, fig. 4.

1972. *Cythara* (*Mangelia*) *spinifera* Bellardi — Cs.—Meznerics, pl. 16, figs. 25, 26.

Nomenclature. No data on type-specimen available. Therefore the taxon is conditionally identified according to the figured by Robba (1968, pl. 46, fig. 4).

Material. One specimen, in bad condition. Coll. GI-Nb 180.

Dimensions. H — 5.9 (incompl.); D — 2.4 (incompl.).

Description. The shell is small, byconical. Six convex whorls are visible. The protoconch consists of 2 1/2 smooth, convex, slightly flattened whorls. The sculpture of the whorls of the teleoconch consists of low, narrow, slightly curved and inclined to the back axial ribs, triangular in profile (10 on the fore-last whorl). Approximately at the middle of the whorl they rise and form a carina, strengthened by a nearly invisible radial riblet. At their crossing a sharp tubercle is formed. The axial ribs disappear above the carina and do not come to the upper suture. The lower part of the shell is broken.

L o c a t i o n. Opanec Formation, Moravian Substage, silty clays at the village of Târnene.

Philbertia praehispida (Boettger, 1906)

Plate VIII, figs. 17, 18

1985. *Philbertia praehispida* (Boettger) — Atanacković, p. 174, pl. 39, figs. 1, 2.

Nomenclature. No data on type-specimen available.

Material. One specimen, preserved. Coll. GI-Nb 181.

Dimensions. H — 4.2; D — 2.3.

Description. The shell is very small, spindle-like, built of 7 1/2 convex whorls. The protoconch consists of 3 1/2 whorls, the lower two of them have net-like ornamentation. The whorls of the teleoconch are ornamented with not very high, rounded, slightly inclined axial ribs, triangular in profile (15 on the fore-last whorl) with about two times wider intercostal spaces. 2-3 low, rounded axial ribs, slightly smaller in the intercostal spaces are imposed on them. A little above the middle of the whorl an obtuse carina with tubercles on the crossing of the carina radial rib with the axial ribs is formed. Above the carina the shell is concave. The axial ribs are curved to the front, become smaller and disappear on the concave part. Immediately under the upper suture a tubercled strong spiral rib is observed. From these tubercles spear-formed thinning ribs go to the back. The are curved to the back and disappear on the concave

part with a draw back from the continuances of the axial ribs on the convexed zone. The last whorl occupies about 60% of the total height. The axial ribs disappear on the base and the radial ones are 9. The aperture has an ellipse-oval form. The outer lip is broken. The inner lip is thin, smooth, adjoined. The siphon is short, with a wide canal.

Location. Opanec Formation, Moravian Substage, clays to the north of the village of Tárnene.

Genus *Pleurotomoides* Br o n n, 1831

Subgenus *Pleurotomoides* (*Pleurotomoides*)

Pleurotomoides (*Pleurotomoides*) *mioweberi* (N o r d s i e c k, 1972)

Plate VIII, figs. 9, 10

1984. *Pleurotomella* (*Pleurotomella*) *mioweberi* (N o r d s i e c k) — J a n s s e n, p. 325, pl. 74, fig. 10; pl. 82, fig. 5.

Nomenclature. No data on type-specimen available.

Material. One specimen. Coll. GI-Nb 182*.

Dimensions. H — 8.0; D — 3.3.

Description. The shell is small, spindle-like. Consists of 8 convexed whorls divided by a shallow wave-formed suture. The first whorl of the protoconch is missing. The rest 3 have fine net-like ornamentation. A little below the middle of the latter a carina appears. It disappears with the appearance of the sculpture of the teleoconch. This sculpture is dominated by the axial ribs-folds (8 on the fore-last whorl). They are well outlined, rounded, but not wide. The intercostal spaces are about 1 1/2 wider. The ribs do not come to the upper suture but disappear on the shallow concave part under it. On this convexed part of the shell 5 radial riblets of first rank are developed, with one fibrous-like rib inbetween. From the first rank ribs 3 which become stronger on the axial and become smaller in the intercostal spaces are distinguished. On the concave part the radial riblets are 4-6, equally strong or smaller than these of second rank on the convexed part. They thin out towards the upper suture. The last whorl occupies about 56% of the total height. It is ornamented as the previous ones. Its transition into the base is fast, but not sharp. The aperture is oval. The outer lip is broken. The inner lip is thin, adjoined, distinctly limited. The siphon is short with a wide canal, curved to the inside.

Remarks. According to K o r o b k o v (1955, p. 398) the genus nomination *Pleurotomella* V a r r i l l, 1873 is a younger synonym of *Pleurotomoides* Br o n n, 1831. J a n s s e n (1984, p. 406) defines them and assigns them to the representatives of genus *Pleurotomoides* Br o n n, subfamily Mangeliinae of family Turridae H. A d a m s, A. A d a m s, and the representatives of genus *Pleurotomella* V a r r i l l — to the subfamily Daphnellinae of the same family.

Location. Opanec Formation, Wielickian Substage, calcareous clays at the village of Opanec.

Subgenus *Pleurotomoides* (*Acmaturris*) W o o d r i n g, 1928

Pleurotomoides (*Acmaturris*) *subtilis* (P a r t s c h i n H ö r n e s, 1856)

Plate V, figs. 5, 6, 7; Plate VIII, figs. 6, 7, 8

1856. *Pleurotoma subtilis* P a r t s c h — H ö r n e s, p. 381, pl. 40, fig. 4.

1877. *Clathurella subtilis* (P a r t s c h) — B e l l a r d i, 2, p. 249, pl. 8, fig. 2.

1958. *Pleurotomoides* (*Pleurotomoides*) *subtilis* (P a r t s c h) — S i e b e r, p. 160.

Nomenclature. No data on type specimen available. Therefore the taxon is conditionally identified through comparison with the figured by H ö r n e s (1856, pl. 40, fig. 4) specimen.

PLATE I

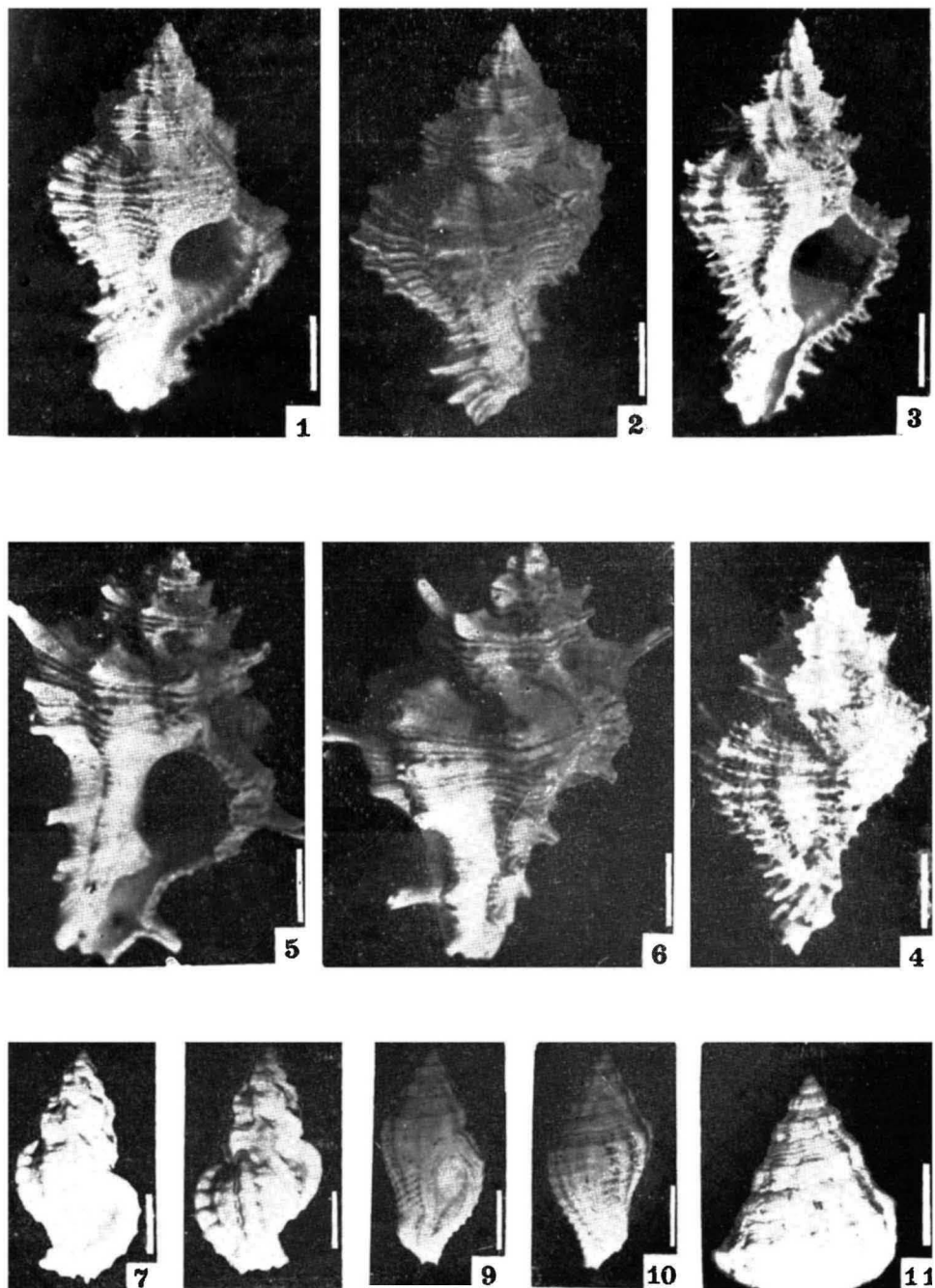
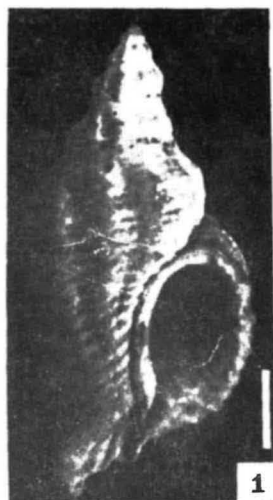


PLATE II





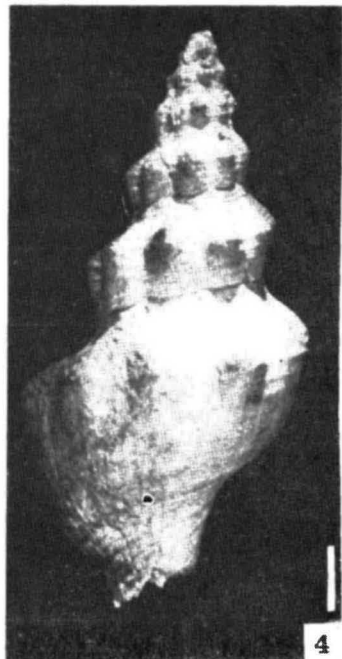
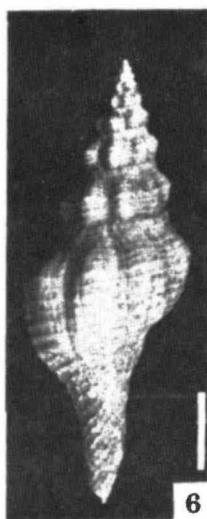
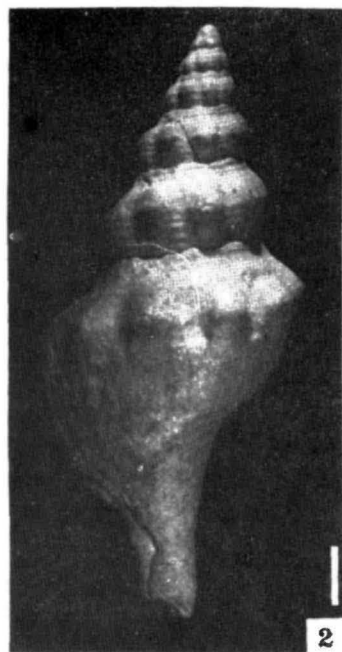
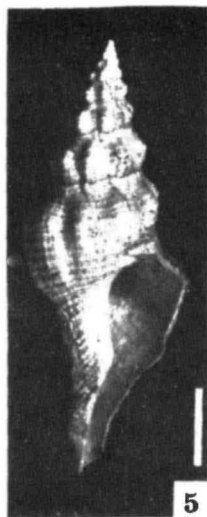
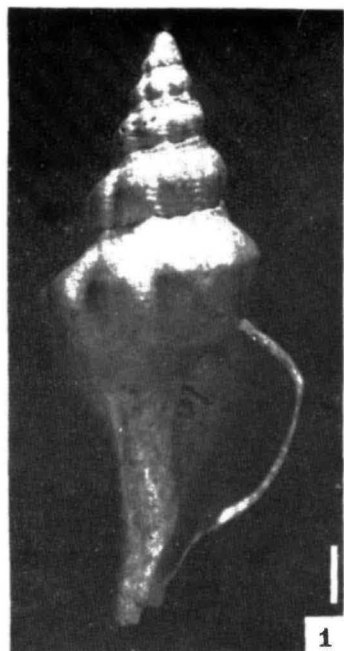
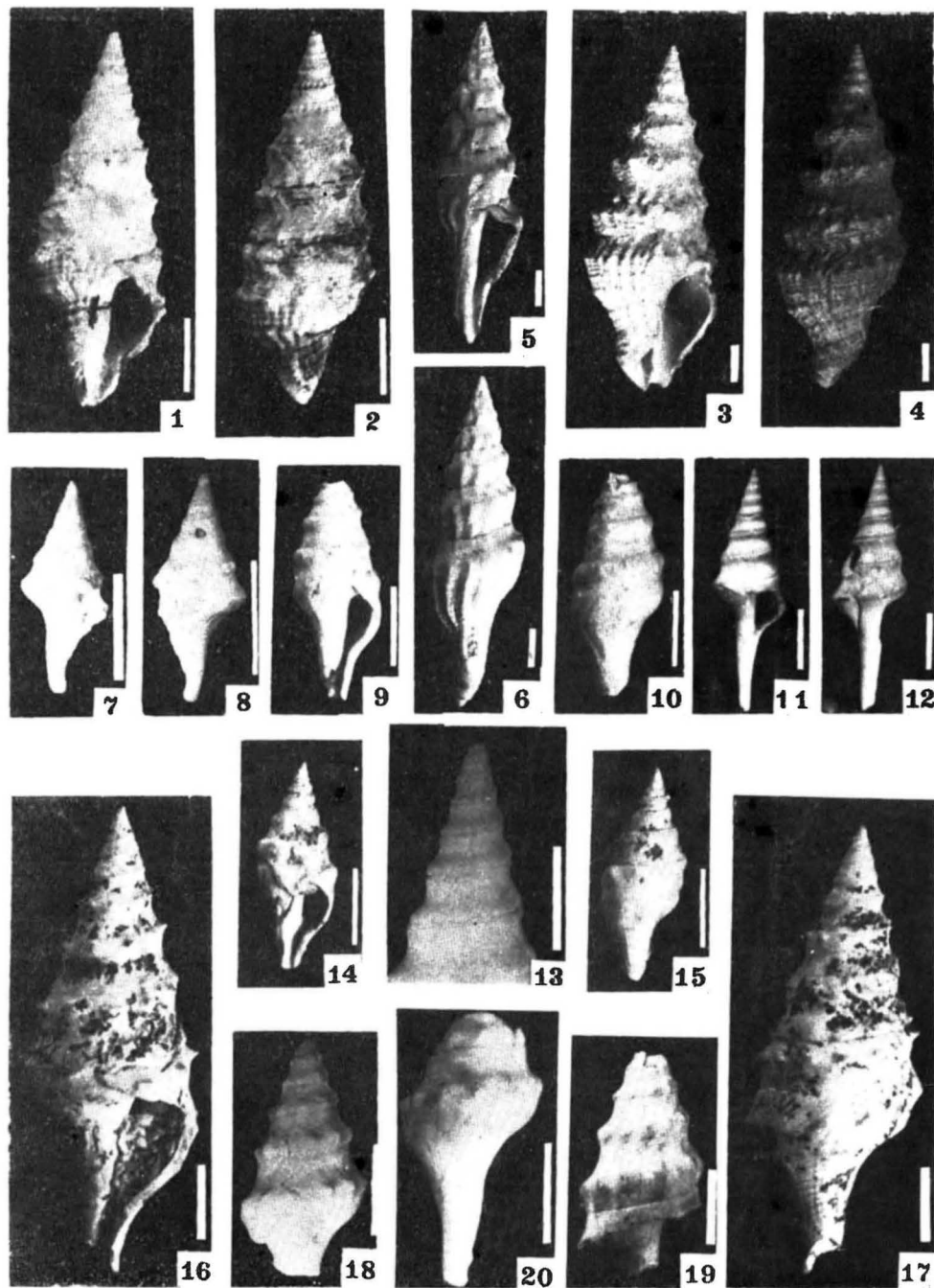


PLATE V





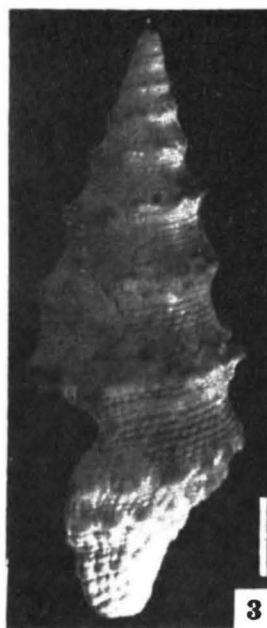
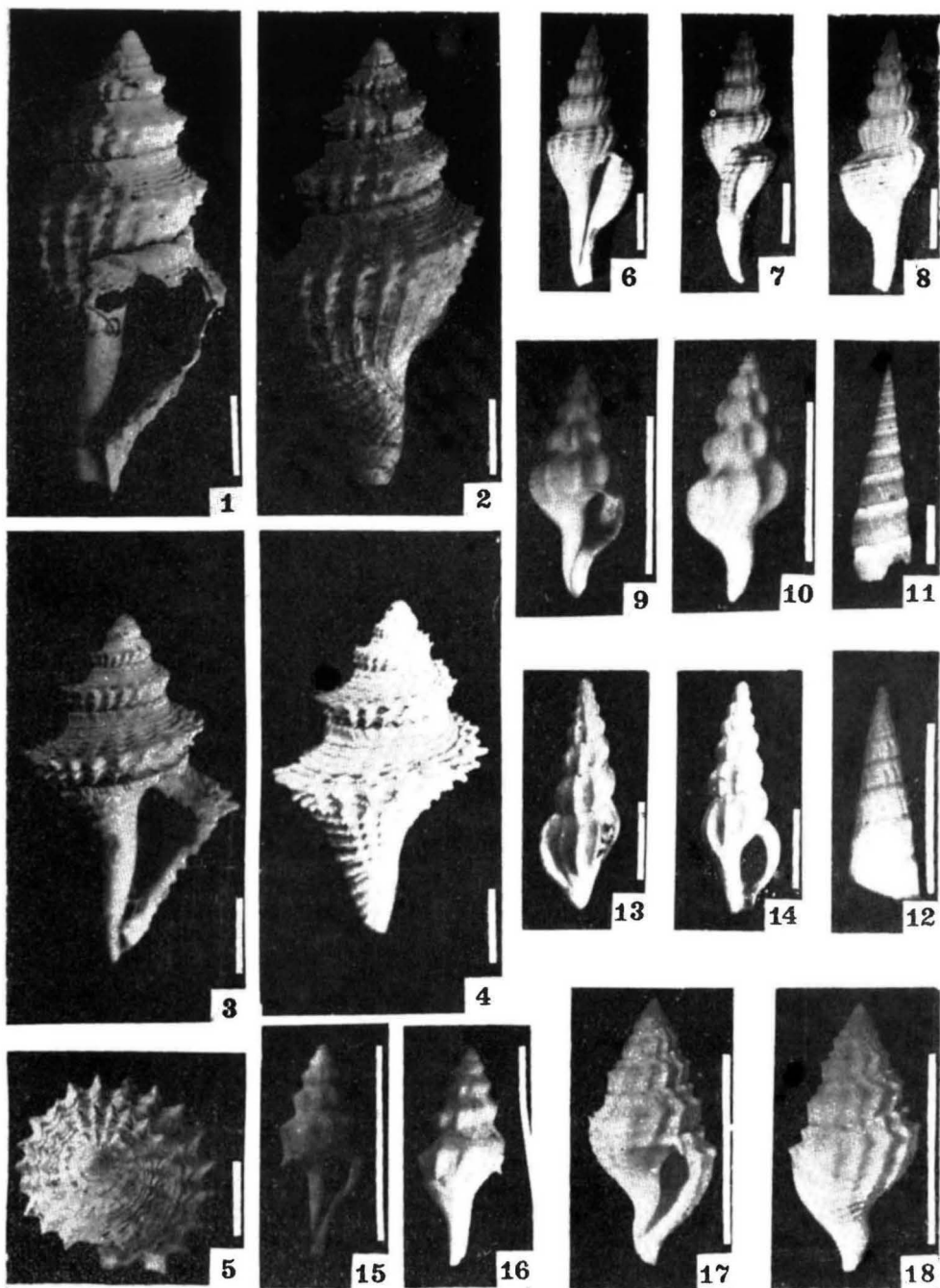


PLATE VIII



Explanations to the plates

PLATE I

Figs. 1, 2. *Hexaplex (Muricanthus) bourgeoisi* (Tournouër). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 138*. The linear scale is 5 mm.

Figs. 3, 4. *Hexaplex (Muricanthus) turonensis pontileviensis* (Tournouër). Opanec Formation, Moravian Substage; organogenic limestones, Opanec village. Coll. GI-Nb 139*. The linear scale is 5 mm.

Figs. 5, 6. *Hexaplex (Paziella) heptagonatus* (Bronn). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 141*. The linear scale is 5 mm.

Figs. 7, 8. *Aspella (Aspella) scalarioides* (Blainville). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 143*. The linear scale is 5 mm.

Figs. 9, 10, 11. *Ocinebrina caelata badensis* (Hoernes, Auinger). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 148. The linear scale is 5 mm.

PLATE II

Figs. 1, 2. *Ocinebrina sublavata dertonensis* (Mayer). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 144*. The linear scale is 5 mm.

Figs. 3, 4, 5, 6. *Ocinebrina caelata badensis* (Hoernes, Auinger). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 145* (figs. 3, 4), 147 (figs. 5, 6). The linear scale is 5 mm.

Figs. 7, 8. *Coralliophila* sp. Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 150*. The linear scale is 5 mm.

Figs. 9, 10. *Euthria (Euthria) adunca* (Bronn). Opanec Formation, Moravian Substage; organogenic limestones, Opanec village. Coll. GI-Nb 152*. The linear scale is 5 mm.

PLATE III

Figs. 1, 2. *Fasciolaria (Pleuroploca) tarbelliana nodosa* Hoernes, Auinger. Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 155. The linear scale is 10 mm.

Figs. 3, 4. *Clavatula (Clavatula) asperulata granulata* Sacco. Opanec Formation, Wielickian Substage; calcareous clays, Bivolare village. Coll. GI-Nb 161*. The linear scale is 5 mm.

Figs. 5, 6, 7. *Fasciolaria moravica* Hoernes, Auinger. Opanec Formation, Wielickian Substage; calcareous clays, Opanec village. Coll. GI-Nb 159*. The linear scale is 5 mm.

PLATE IV

Figs. 1-6. *Fasciolaria (Pleuroploca) tarbelliana nodosa* Hoernes, Auinger transition to the nominant subspecies. Opanec Formation, Moravian Substage; organogenic limestones, Jasen village — Coll. GI-Nb 156* (figs. 1, 2); Opanec village — Coll. GI-Nb 157* (Figs. 3, 4), 191* jun. (figs. 5, 6). The linear scale is 10 mm.

PLATE V

Figs. 1, 2. *Fasciolaria (Pleuroploca) pyrulaeformis* Hoernes, Auinger. Opanec Formation, Wielickian Substage; calcareous clays, Bivolare village. Coll. GI-Nb 158*. The linear scale is 10 mm.
Figs. 3, 4. *Melongena cornuta pseudobasilica* Strausz. Opanec Formation, Moravian Substage; organogenic limestones, Opanec village. Coll. GI-Nb 154*. The linear scale is 10 mm.
Figs. 5, 6, 7. *Pleurotomoides (Acmaturris) subtilis* (Partsch). Opanec Formation, Moravian Substage; clays, Jasen village. Coll. GI-Nb 183*. The linear scale is 5 mm.

PLATE VI

Figs. 1, 2. *Clavatula (Clavatula) camilae* (Hoernes, Auinger) Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 160*. The linear scale is 5 mm.
Figs. 3, 4. *Clavatula (Clavatula) granulocincta angelae* Hoernes, Auinger transition to the nominate subspecies. Opanec Formation, Wielickian Substage; calcareous clays, Opanec village. Coll. GI-Nb 166*. The linear scale is 5 mm.
Figs. 5, 6. *Turricula (Surcula) reevei buiturica* (Moisesescu). Opanec Formation, Wielickian Substage; organogenic limestones, Bivolare village. Coll. GI-Nb 176*. The linear scale is 5 mm.
Figs. 7, 8. *Clavatula (Clavatula) cf. oliviae* (Hoernes, Auinger). Opanec Formation, Moravian Substage; organogenic limestones, Opanec village. Coll. GI-Nb 163 (jun). The linear scale is 5 mm.
Figs. 9, 10. *Perrona (Perrona) vindobonensis* (Partsch). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 167*. The linear scale is 5 mm.
Figs. 11, 12, 13. *Perrona (Perrona) semimarginata servata* (Sacco). Opanec Formation, Moravian Substage; calcareous clays, Opanec village. Coll. GI-Nb 169 jun. The linear scale is 5 mm.
Figs. 14, 15. *Perrona (Perrona) vindobonensis nodosa* (Csepregy-Meznerics). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 168*. The linear scale is 5 mm.
Figs. 16, 17. *Clavatula (Clavatula) rosaliae* (Hoernes, Auinger). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 162*. The linear scale is 5 mm.
Figs. 18, 19, 20. *Turricula (Surcula) dimidiata* (Brocchi). Opanec Formation, Moravian Substage; organogenic limestones, Opanec village. Coll. GI-Nb 172-174 (fragments). The linear scale is 5 mm.

PLATE VII

Figs. 1, 2, 3. *Clavatula (Clavatula) granulocincta angelae* (Hoernes, Auinger). Opanec Formation, Wielickian Substage; calcareous clays, to the north of Bivolare village. Coll. GI-Nb 165*. The linear scale is 5 mm.
Figs. 4, 5, 6. *Drillia helenae* (Hoernes, Auinger). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 178*. The linear scale is 5 mm.
Figs. 7, 8. *Perrona (Perrona) semimarginata servata* (Sacco). Opanec Formation, Moravian Substage; calcareous clays, Opanec village. Coll. GI-Nb 170*. The linear scale is 10 mm.

PLATE VIII

Figs. 1, 2. *Genota (Pseudotoma) bonellii* (Bellardi). Opanec Formation, Moravian Substage; silty clays, Jasen village. Coll. GI-Nb 188*. The linear scale is 5 mm.
Figs. 3, 4, 5. *Genota (Pseudotoma) bonellii botensis* Csepregy-Meznerics. Opanec Formation, Moravian Substage; silty clays, Jasen village. Fig. 5 — from above. Coll. GI-Nb 189*. The linear scale is 5 mm.
Figs. 6, 7, 8. *Pleurotomoides (Acmaturris) subtilis* (Partsch). Opanec Formation, Wielickian Substage; calcareous clays, to the north of Bivolare village. Coll. GI-Nb 184*. The linear scale is 5 mm.
Figs. 9, 10. *Pleurotomoides (Pleurotomoides) mioweberi* (Nordsieck). Opanec Formation, Wielickian Substage; calcareous clays, Opanec village. Coll. GI-Nb 182*. The linear scale is 5 mm.
Figs. 11, 12. *Terebra (Terebra) cacellensis transylvanica* Hoernes, Auinger. Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 190. The linear scale is 5 mm.
Figs. 13, 14. *Cythara (Atoma) hypotetica* (Bellardi). Opanec Formation, Moravian Substage; silty clays, Jasen village. Coll. GI-Nb 179*. The linear scale is 5 mm.
Figs. 15, 16. *Raphitoma (Raphitoma) spinifera* (Bellardi). Opanec Formation, Moravian Substage; silty clays, to the north of Tárnene village. Coll. GI-Nb 180. The linear scale is 5 mm.
Figs. 17, 18. *Philbertia praehispida* (Boettger). Opanec Formation, Moravian Substage; silty clays, to the north of Tárnene village. Coll. GI-Nb 181. The linear scale is 3 mm.

PLATE V

Figs. 1, 2. *Fasciolaria (Pleuroploca) pyrulaeformis* Hoernes, Auinger. Opanec Formation, Wielickian Substage; calcareous clays, Bivolare village. Coll. GI-Nb 158*. The linear scale is 10 mm.
Figs. 3, 4. *Melongena cornuta pseudobasilica* Strausz. Opanec Formation, Moravian Substage; organogenic limestones, Opanec village. Coll. GI-Nb 154*. The linear scale is 10 mm.
Figs. 5, 6, 7. *Pleurotomoides (Acmaturris) subtilis* (Purtsch). Opanec Formation, Moravian Substage; clays, Jasen village. Coll. GI-Nb 183*. The linear scale is 5 mm.

PLATE VI

Figs. 1, 2. *Clavatula (Clavatula) camilae* (Hoernes, Auinger) Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 160*. The linear scale is 5 mm.
Figs. 3, 4. *Clavatula (Clavatula) granulocincta angelae* Hoernes, Auinger transition to the nominate subspecies. Opanec Formation, Wielickian Substage; calcareous clays, Opanec village. Coll. GI-Nb 166*. The linear scale is 5 mm.
Figs. 5, 6. *Turricula (Surcula) reevei buiturica* (Moisesescu). Opanec Formation, Wielickian Substage; organogenic limestones, Bivolare village. Coll. GI-Nb 176*. The linear scale is 5 mm.
Figs. 7, 8. *Clavatula (Clavatula) cf. oliviae* (Hoernes, Auinger). Opanec Formation, Moravian Substage; organogenic limestones, Opanec village. Coll. GI-Nb 163 (jun). The linear scale is 5 mm.
Figs. 9, 10. *Perrona (Perrona) vindobonensis* (Purtsch). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 167*. The linear scale is 5 mm.
Figs. 11, 12, 13. *Perrona (Perrona) semimarginata servata* (Sacco). Opanec Formation, Moravian Substage; calcareous clays, Opanec village. Coll. GI-Nb 169 jun. The linear scale is 5 mm.
Figs. 14, 15. *Perrona (Perrona) vindobonensis nodosa* (Csepregy-Meznerics). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 168*. The linear scale is 5 mm.
Figs. 16, 17. *Clavatula (Clavatula) rosaliae* (Hoernes, Auinger). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 162*. The linear scale is 5 mm.
Figs. 18, 19, 20. *Turricula (Surcula) dimidiata* (Brocchi). Opanec Formation, Moravian Substage; organogenic limestones, Opanec village. Coll. GI-Nb 172-174 (fragments). The linear scale is 5 mm.

PLATE VII

Figs. 1, 2, 3. *Clavatula (Clavatula) granulocincta angelae* (Hoernes, Auinger). Opanec Formation, Wielickian Substage; calcareous clays, to the north of Bivolare village. Coll. GI-Nb 165*. The linear scale is 5 mm.
Figs. 4, 5, 6. *Drillia helenae* (Hoernes, Auinger). Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 178*. The linear scale is 5 mm.
Figs. 7, 8. *Perrona (Perrona) semimarginata servata* (Sacco). Opanec Formation, Moravian Substage; calcareous clays, Opanec village. Coll. GI-Nb 170*. The linear scale is 10 mm.

PLATE VIII

Figs. 1, 2. *Genota (Pseudotoma) bonellii* (Bellardi). Opanec Formation, Moravian Substage; silty clays, Jasen village. Coll. GI-Nb 188*. The linear scale is 5 mm.
Figs. 3, 4, 5. *Genota (Pseudotoma) bonellii botensis* Csepregy-Meznerics. Opanec Formation, Moravian Substage; silty clays, Jasen village. Fig. 5 — from above. Coll. GI-Nb 189*. The linear scale is 5 mm.
Figs. 6, 7, 8. *Pleurotomoides (Acmaturris) subtilis* (Purtsch). Opanec Formation, Wielickian Substage; calcareous clays, to the north of Bivolare village. Coll. GI-Nb 184*. The linear scale is 5 mm.
Figs. 9, 10. *Pleurotomoides (Pleurotomoides) mioweberi* (Nordsieck). Opanec Formation, Wielickian Substage; calcareous clays, Opanec village. Coll. GI-Nb 182*. The linear scale is 5 mm.
Figs. 11, 12. *Terebra (Terebra) cacellensis transylvanica* Hoernes, Auinger. Opanec Formation, Moravian Substage; organogenic limestones, Tárnene village. Coll. GI-Nb 190. The linear scale is 5 mm.
Figs. 13, 14. *Cythara (Atoma) hypotetica* (Bellardi). Opanec Formation, Moravian Substage; silty clays, Jasen village. Coll. GI-Nb 179*. The linear scale is 5 mm.
Figs. 15, 16. *Raphitoma (Raphitoma) spinifera* (Bellardi). Opanec Formation, Moravian Substage; silty clays, to the north of Tárnene village. Coll. GI-Nb 180. The linear scale is 5 mm.
Figs. 17, 18. *Philbertia praehispida* (Boettger). Opanec Formation, Moravian Substage; silty clays, to the north of Tárnene village. Coll. GI-Nb 181. The linear scale is 3 mm.

Material. Five specimens, well preserved. Coll. GI-Nb 183-187*.

Dimensions.	NoNo	183*	184*	185*	186*	187*
H		25.5	22.4	13.0		17.2
D		8.1	7.9	4.6	4.4	5.3

Description. The shell is medium large, moderately thick-walled, consisting of 10 convex whorls, divided with a shallow wave-formed suture. Protokonh of 2 1/2 smooth, slightly flattened whorls. Apical angle 34-35°. The whorls of the teleokonh have a tower-like position. They are ornamented with inclined, not very high, rounded axial ribs (15 on the fore-last whorl) situated on the lower convex and slant part of the whorl. It occupies nearly 2/3 from the height of the whorl. Above it the whorl is slightly concave and more slant to the upper suture. On the convex part 5-6 radial ribs of first rank are imposed. On the ribs slightly higher, as if elongated, tubercles occur. Between them a fibrous-like rib of second rank occurs. On the concave part there are 4-5 riblets of equal strength with the secondary or stronger than them. The last whorl occupies about 64% of the total height. The axial ribs disappear on the base. The aperture is ellipse-like. The outer lip has a thin edge, is smooth and adjoined. The siphon is moderately long, slightly curved to the inside, with a wide canal.

Location. Opanec Formation. Moravian Substage, clays at the village of Jasen (NoNo 183-186*); Wielickian Substage, calcareous clays to the north of the village of Bivolare (No 187*).

Subfamily **CRYPTOCONINAE**

Genus **Genota** H. Adams, A. Adams, 1853

Subgenus **Genota (Pseudotoma)** Bellardi, 1875

Genota (Pseudotoma) bonellii (Bellardi, 1839)

Plate VIII, figs. 1, 2

1856. *Pleurtoma bracteata* Brocc. — Hörnes, p. 332, pl. 36, fig. 3.

1877. *Pseudotoma Bonellii* Bell. — Bellardi, 2, p. 218, pl. 7, fig. 13.

1890. *Pleurotoma (Pseudotoma) bonellii* Bell. — Hörnes, Auinger, p. 370, pl. 34, figs. 5, 6, 7, 9, 10.

1896. *Pseudotoma bonellii* Bell. — Cossmann, 2, p. 146, pl. 7, figs. 11, 12.

1958. *Genota (Pseudotoma) bonellii* (Bell.) — Sieber, p. 160.

1968. *Genota (Pseudotoma) bonellii* (Bellardi) — Robba, p. 609, pl. 46, fig. 6.

1969. *Genota (Pseudotoma) bonellii* (Bellardi) — Cs. — Meznerics, p. 98, pl. 6, figs. 21, 22.

1972. *Genota (Pseudotoma) bonellii* (Bellardi) — Cs. — Meznerics, pl. 17, figs. 1, 2.

Nomenclature. No data on type-specimen available. Therefore the taxon is conditionally identified through comparison with the figured by Robba (1968, pl. 46, fig. 6) specimen of location 10, ESE of S. Agata.

Material. One specimen, relatively well preserved. Coll. GI-Nb 188*.

Dimensions. H — 28.9; D — 13.9.

Description. The shell is not big, moderately, thick-walled. Consists of 7 convex whorls, 2 1/2 of them belonging to the protokonh. The whorls of the teleokonh consist of an convex part, slant towards the lower suture (about 2/5 of the height of the whorl), and a slightly concave upper part. Between them a sharp carina is formed (about 80°). On the convex part small, inclined, triangular in profile, dense axial ribs (20 on the fore-last whorl) are observed. Imposed on them are 3 moderately high radial ribs which become stronger to sharp tubercles on the axial ribs and become smaller in the intercostal space. Between them 1-2 fibrous-like riblets occur. Above the carina the axial ribs are curved slightly to the front and disappear quickly. On the concave part 4-5 relatively strong to rounded-lamellar, slightly leaning to the periphery radial ribs are observed. Immediately under the upper suture an inflation occurs,

strengthened by 2 low radial riblets. At the first whorls sharp tubercles are observed. They gradually disappear in direction to the base and the inflation becomes wider and lower. The last whorl occupies about 75% of the total height. On the base 9-10 radial ribs of first rank are developed with one rib of second and two ribs of third rank in between. The axial ribs become thinner and disappear. The outer lip is not preserved. The inner lip is relatively thick, adjoined. The siphon is short, with a wide canal, slightly curved to the inside.

Location. Opanec Formation, Moravian Substage, silty clays at the village of Jasen.

***Genota (Pseudotoma) bonellii botensis* Csépreghy-Meznerics, 1969**

Plate VIII, figs. 3, 4, 5

1969. *Genota (Pseudotoma) bonellii botensis* n. ssp. — Cs.-Meznerics, p. 98, pl. 6, fig. 23.

1972. *Genota (Pseudotoma) bonellii botensis* Csépr.-Mezn. — Cs.—Meznerics, pl. 17, fig. 3 (non fig. 4).

Nomenclature. A holotype is the only specimen, figured in the original publication (Cs.-Meznerics, 1969, pl. 6, fig. 23). Originates from the Barsodbota, Hungary. Sandy facies. Early "Tortonian". The place of storage is not specified.

Material. One specimen with a broken outer lip. Coll. GI-Nb 189*.

Dimensions. H — 23.0; D — 13.6.

Description. The shell is medium large, thick-walled, byconical. It is built of 7 whorls, three of them convex on the protoconch. It has a very strong and sharp carina (about 30°). It is delineated by lamellar triangular thorns (20 on the forelast whorl). The space immediately above the carina is subhorizontal and has 2 higher spiral ribs with tubercles with significantly lower and slightly upwards curved triangular thorns. A slant zone with three moderately high ribs with tubercles follows. Between all radial ribs above the carina there is a thin fibrous-like riblet. Immediately below the upper suture a subvertical zone delineated by column-like lamellas is observed (about 27% of the height of the whorl). It ends with a wave-formed edge that rises high. The shelf is subhorizontal. Below the carina it is also slant. Two spiral ribs with triangular thorns slightly inclined downwards and fibrous-like radial riblets are observed. The outer lip is thin, smooth, adjoined. The aperture has a rounded-triangular form. The siphon is not very long, with a wide canal.

Location. Opanec Formation, Moravian Substage, clayey deposits at the village of Jasen.

Family **TEREBRIDAE** H. Adams, A. Adams, 1853

Genus ***Terebra*** Bruguiere, 1789

Subgenus ***Terebra (Terebra)***

***Terebra (Terebra) cacellensis transylvanica* Hoernes, Auinger, 1880**

Plate VIII, figs. 11, 12

1880. *Terebra Transylvanica* nov. form. — Hoernes, Auinger, p. 110, pl. 12, fig. 14.

1954. *Terebra transylvanica* H. et Au. — Strausz, pp. 36, 61, pl. 2, fig. 41.

1966. *Terebra (Terebra) cacellensis transylvanica* Hoernes & Auinger — Strausz, p. 392, pl. 5, figs. 6, 7.

1972. *Terebra cacellensis transylvanica* Hoernes et Auinger — Cs.—Meznerics, pl. 18, fig. 10.

Nomenclature. A holotype is the only specimen, figured by Hoernes, Auinger (1880, pl. 12, fig. 14). It originates from Lapud, Transylvania, Romania. Miocene, Badenian.

Material. One specimen with only the upper part of the shell preserves. Coll. GI-Nb 190.

Description. The shell is conical, thick-walled. Only the upper 15 1/2 whorls are preserved. The protoconch consists of 3 1/2 smooth convex whorls. At the upper 3 whorls of the teleoconch 13 inclined and slightly curved axial riblets are observed. Their side line is not step-formed. Starting from the fourth whorl below the upper suture the development of a weak radial furrow, outlined only in the intercostal spaces, begins. The axial ribs become slightly S-shaped. No tubercles are formed above the furrow. Starting from the sixth whorl the elements of the sculpture become gradually smoother. The shelf band transits into a weak flat inflation and the numerous transversal riblets become lower and spread wave-like.

Location. Opanec Formation, Moravian Substage, organogenic limestones at the village of Tárnene.

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