New Devonian gastropod genera important for paleogeographic reconstructions

Nové rody devonských gastropodů důležité pro paleogeografické rekonstrukce (Czech summary)

(11 text-figs)

This publication is dedicated to the memory of Vladimír Havlíček (1922–1999)

ROBERT B. BLODGETT[1] – JIŘÍ FRÝDA[2]

[1]*Department of Zoology, Oregon State University, Corvallis, Oregon, USA, blodgetr@bcc.orst.edu*
[2]*Czech Geological Survey, Klárov 3, 118 21 Praha 1, Czech Republic, fryda@cgu.cz*

Twelve new Devonian gastropod genera are established in this paper which we deem important in better delineating Devonian biogeographic units. New genera include: *Semilukispira*, *Teutonophon*, *Goldfussoceras*, *Manitobiella*, *Ibergia*, *Humboldtiella*, *Paragnesia*, *Winterbergiella*, *Spiniplatyceras*, *Roemeriella*, *Devononerita*, and *Dahmeria*. In addition, one new Silurian genus, *Ornatosinuitina*, is established.

Key words: Paleozoic, Gastropoda, Devonian, new taxa

Introduction

On-going study by the two authors of Devonian gastropod biogeography has brought to our attention the need to establish many generic entities in order to better qualify the taxonomic content of former biogeographic units (realms, regions, and provinces). Previous works on Devonian gastropod biogeography (Forney *et al.*, 1981; Blodgett *et al.*, 1988, 1990) have depended considerably upon usage of open nomenclatorial terminology (i. e. n. genus pleurotomarid 1, or spinose platyceratid plexus, etc.) and it is deemed necessary at this time to establish genera which are critical in better understanding Devonian biogeography. Despite intensive study of Devonian gastropods during the 19th Century, the general neglect received by this group during the early half of the 20th Century, has resulted in a vast gap of detailed generic descriptions. Most notably lacking are updated revisions of Upper Devonian faunas, i. e. the famous Iberger Kalk of Germany, where a large percentage of Frasnian gastropod species have been described to date. To date, only two genera are based upon Iberger Kalk species: 1. *Serpulospira* Cossmann, 1916, based on *Serpulospira centrifuga* F. A. Roemer, 1843; and 2. *Coloniacirrus* Bandel, 1993, based on *Ammonites primordialis* Schlotheim, 1820. As noted by Linsley (1979, p. 252), our knowledge of Upper Devonian gastropods is one of "woefull ignorance". In this paper, we establish several new genera based on Iberger Kalk species, most of which were illustrated by drawings of rather poor quality, which do not adequately reflect their shell characters. This reef associated gastropod fauna is the most diverse known in the Frasnian, and share some affinity to the Koltuban Limestone fauna of the Urals (Nalivkin 1947, 1951). We are presently preparing a revision of the complete gastropod fauna of the Iberger Kalk.

In this short paper, we intend to establish genera which we feel have long needed naming. It is with this aim that we hope to better communicate with fellow gastropodologists what these biogeographically-significant Devonian genera represent. In addition, we are also establishing a new Silurian bellerophontid genus, *Ornatosinuitina* gen. nov., from the Upper Silurian of Bolivia, which came to our attention during study of Devonian species of *Sinuitina*.

Systematic part

Subclass Amphigastropoda
Superfamily Bellerophontoidae M'Coy, 1851
Family Sinuitidae Dall *in* Zittel, 1913
Subfamily Bucanellinae Koken, 1925

Genus *Ornatosinuitina* gen. nov.

Text-fig. 1A–B

Type species: *Sinuitina reyesi* Fischer, 1969, from the Upper Silurian of Bolivia.

Etymology: Combination of the word *ornatus* (Latin for "bearing ornament") and the genus name of *Sinuitina*.

Diagnosis: Small helmet-shaped shell similar to *Sinuitina* and *Branzovodiscus*; dorsum bearing V-shaped sinus; whorl surface ornamented with transverse, posteriorly curved threads crossed by spiral threads forming a reticulate pattern; circumbilical whorl area ornamented only by radial threads.

Comparison: The new genus *Ornatosinuitina* resembles species of *Sinuitina* Knight, 1945 and *Branzovodiscus* Frýda, 1999, in its general shell shape. It differs from all of the three previously recognized subgenera of *Sinuitina*, *S.* (*Sinuitina*) Knight, 1945, *S.* (*Vorticina*) Gordon and Yochelson, 1987, and *Sinuitina* (*Globosinuitina*) Frýda, 1998, in bearing a reticulate shell ornament. Gordon and Yochelson (1987) proposed to divide Carboniferous species of *Sinuitina* into two subgenera. According to these authors, the subgenus *Sinuitina (Sinuitina)* includes species with a broadly helmet-shaped whorl pro-

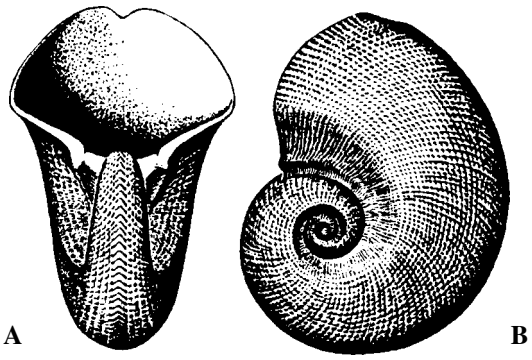

Fig. 1. A–B. *Ornatosinuitina reyesi* (Fischer, 1969), from the Upper Silurian of Bolivia. A – apertural view, B – lateral view, x7. (*ex* Fischer 1969, fig. 1).

file, which have a prominent somewhat flattened median crest bearing a pseudoselenizone and having prominent collabral ornament. Members of their new subgenus *Sinuitina (Vorticina)* were diagnosed as species of *Sinuitina* having a whorl profile with the shape of a pointed arch and having collabral ornament which is prominent on the inner flanks, and reduced on the outer flanks and dorsum (Gordon – Yochelson 1987). The Early Devonian *Sinuitina* (*Globosinuitina*) differs from the latter subgenera in having a rounded dorsum without a median crest and in having a deeper and wider dorsal sinus. In addition, the shell ornament of *Sinuitina* (*Globosinuitina*) consists of distinct, widely spaced ribs extending across the entire whorl surface, however, the ribs are irregular in the middle of dorsum and form a ripple-like pattern. The Silurian age *Ornatosinuitina* gen. nov. bears a reticulate shell ornament and is easily distiguished by this character from all of the three previously recognized subgenera of *Sinuitina*. No other species of *Sinuitina* have such a pattern. The reticulate ornament of the Late Silurian type species of *Ornatosinuitina* somewhat resembles that of the Early Devonian *Branzovodiscus* Frýda, 1999. The type species of the latter genus, *Branzovodiscus bajae* Frýda, 1999, differs from *Ornatosinuitina reyesi* by the shape of the dorsum and a differing style of reticulate ornament. The shell of *Ornatosinuitina reyesi* has a rounded dorsum in contrast to *Branzovodiscus bajae*, which has an angular, helmet-shaped dorsum. The circumbilical area in *Branzovodiscus* is covered by a coinductural layer ornamented with fan-like, posteriorly curved lamellae (Frýda 1999, figs 1b–f). On the other hand, the ornament of the circumbilical area in *Ornatosinuitina* gen. nov. consists of fine radial threads (see Fischer 1969 and herein fig. 1). In addition, the reticulate ornament in the latter genus is formed by the intersection of collabral and spiral threads, in contrast to *Branzovodiscus bajae*, whose shell lacks spiral elements. The reticulate ornament of *Branzovodiscus bajae* is limited only to an area about half of whorl back from the aperture and probably originated as a perinductural secondary shell deposit. The shape of whorl in radial section is rhomboidal in *Ornatosinuitina*, but subtriangular in *Branzovodiscus*.

Composition: Only the type species is known.

Family Bellerophontidae M'Coy, 1851
Subfamily Bellerophontinae M'Coy, 1851

Genus *Semilukispira* gen. nov.

Type species: *Bellerophon petinensis* Nalivkin, 1930.
Etymology: The genus name refers to the Semiluki beds from which the only illustrated specimen (the lectotype) was recovered.

Diagnosis: Bellerophonitid gastropods with large, sharp, oblique ribs which are arched backwards from dorsum.

Comparison: This genus is easily distinguished from all other related bellerophontid genera (i. e. *Bellerophon*, *Aglaoglypta*) by its sharp, oblique backwards inclined ribs. No other bellerophontid genus bears such a distinctive ornament.

Comments: According to Nalivkin (1941, p. 228), the ornament consists of large tubercles which form more or less regular rows, that form a sharp angle with the keel. Commonly, these tubercles unite to form discontinuous low ribs (translation by authors). However, the photographs provided in both of the above papers of Nalivkin show strong, backwards arched ribs which appear to be continuous in the single illustrated specimen (the lectotype). The presence of tubercles referred to by Nalivkin on some parts of the shell (not visible in his photographs) suggest that the genus is allied to *Aglaoglypta*, which is almost wholly restricted to the Frasnian. However, the latter genus has an ornament of tubercles which do not unite to form ribs.

Composition: Only the type species, *Bellerophon petinensis* Nalivkin, 1930, from the Frasnian of the Russian Platform is known.

Genus *Teutonophon* gen. nov.

Type species: *Bellerophon striatus* de Ferussac and Orbigny in Archiac and Verneuil, 1842, p. 353, plate 28, fig. 6.
Etymology: The name is derived from the term Teuton (Latin for Germany) and the Greek word *phone* (sound or voice).

Diagnosis: Bellerophontid with a very large, globular, narrowly phaneromphalous shell; in adult whorls the outer surface of the thick shell ornamented by numerous coarse, undulose collabral ridges, which give the exterior a distinctive "shingled" appearance.

Comparison: This new genus is very similar to the genus *Bellerophon* Montfort, 1808, in its general shell shape. Knight et al. (1960) divided the genus *Bellerophon* into three subgenera *Bellerophon (Bellerophon)* Montfort, 1808, *Bellerophon (Aglaoglypta)* Knight, 1942, and *Bellerophon (Pharkidonotus)* Girty, 1912, according to the type of shell ornamentation. The shell of *Bellerophon*

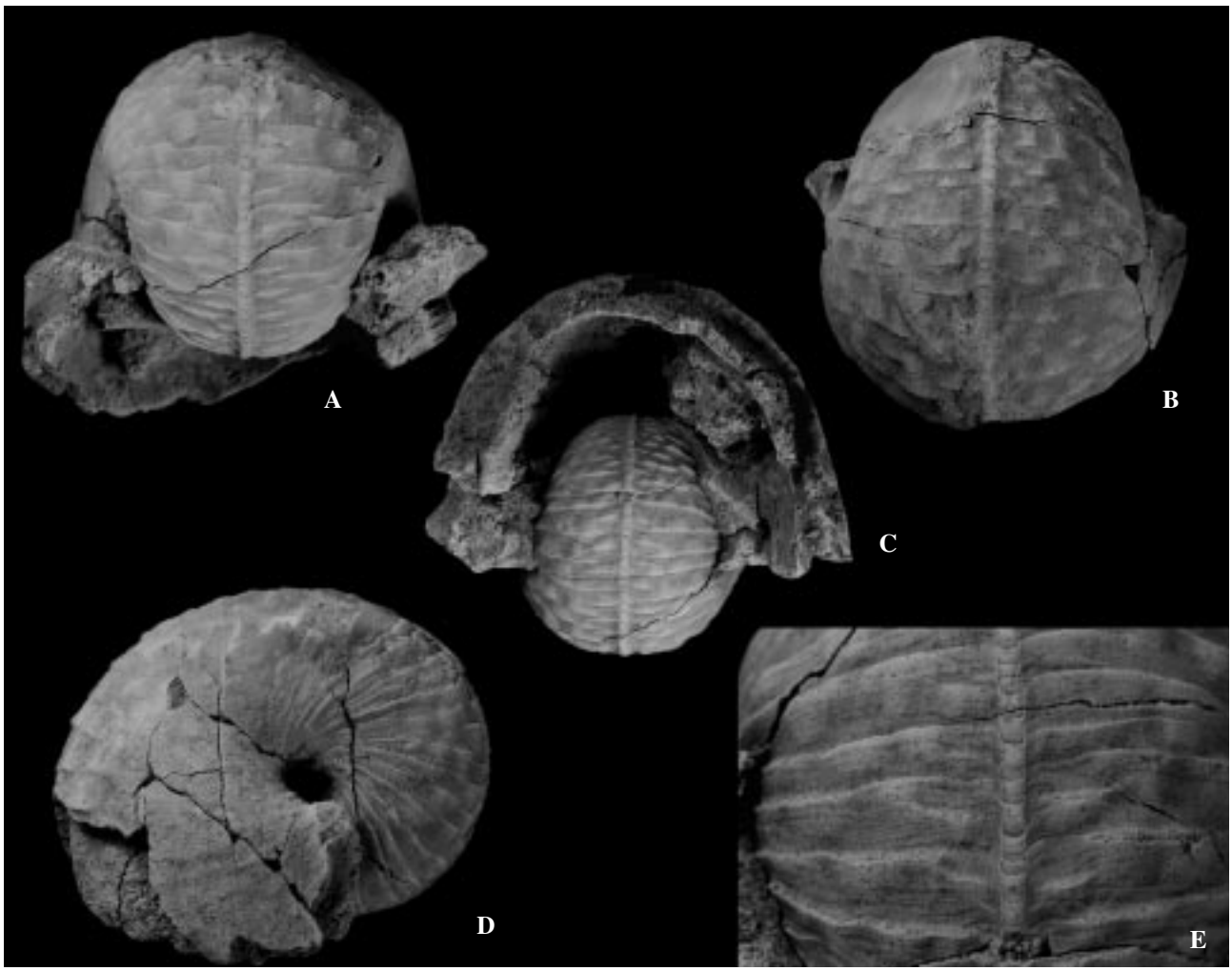

Fig. 2. A–E. *Teutonophon striatus* (de Ferussac and Orbigny *in* Archiac and Verneuil, 1842) from the Bücheler Schichten (Givetian, Middle Devonian; Herrenstrunden, Bergisches Land, Germany). A – dorsal view, x0.9; B – abapertural view, x0.75; C – apertural view showing a thick shell formed by two layers, x0.75; D – lateral view, x0.75; E – detail view of fig. 2C showing a shell ornamentation, x1.5.

(Bellerophon) is ornamented by collabral costae. In contrast to the latter subgenus, the shell ornamentation of *Bellerophon (Aglaoglypta)* consists of quincuncially arranged pustules. The shell of *Bellerophon (Pharkidonotus)* is ornamented by collabrally arranged large, rounded undulations running across the shell dorsum. Other characteristic features of *Pharkidonotus* are a thick parietal inductura, a strongly developed medial ridge, a subquadrate whorl profile, and rounded collabral undulations; all of which distinguish *Pharkidonotus* from *Bellerophon*. Yochelson (1960) suggested that *Pharkidonotus* represents a separate genus from *Bellerophon*. Kues (1987) noted that the separation of *Pharkidonotus* from *Bellerophon* is complicated by the fact that some Permian species possess a combination of morphological characters that are usually restricted to one or the other of these genera. The shell of *Bellerophon striatus* de Ferussac and Orbigny in Archiac and Verneuil, 1842 shares a somewhat similar type of shell ornamentation with that of *Pharkidonotus*, but can be distinguished from the latter by having a rounded, instead of subquadrate whorl profile. The new genus *Teutonophon* also shows close similarity with *Bellerophon*, but can be differentiated by its distinctive "shingled" appearance due to its numerous coarse, undulose ridges. For this reason we establish the new genus *Teutonophon* for the late Middle Devonian (Givetian) species *Bellerophon striatus* (figured by Archiac and Verneuil, 1842).

D i s c u s s i o n : The new monotypic genus *Teutonophon* is known from Givetian age strata in Germany (Archiac – Verneuil, 1842) and China (Frech, 1914a, 1914b). The genus is closest to *Bellerophon* Montfort, 1808, which according to Knight et al. (1960) has a stratigraphic range from Silurian to Lower Triassic. It is slightly further removed from the genus *Pharkidonotus* Girty, 1912, which according to Knight et al. (1960) has a stratigraphic range from Mississippian (Lower Carboniferous)–Permian. *Pharkidonotus* also has an unpublished occurrence in the Weatherall Formation (Givetian) of Melville Island, Canadian Arctic Islands (Blodgett and Frýda, personal observation of Geological Survey of Canada collections from Melville Island).

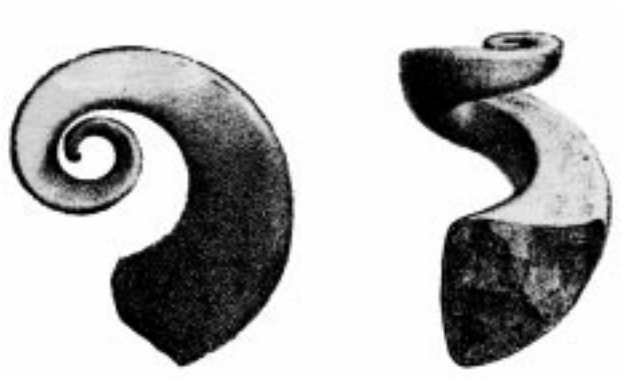

Fig. 3. *Goldfussoceras circinalis* (Goldfuss, 1844) from the Eifel district of Germany (*ex* Goldfuss, pl. 189, figs 6a and 6b).

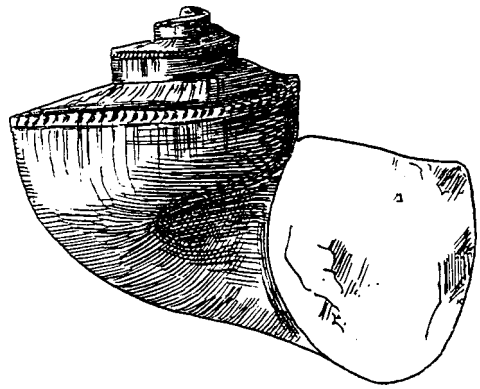

Fig. 4. *Manitobiella goniostoma* (Whiteaves, 1890) from the Winnipegosis Formation (early Givetian) of Manitoba, Canada. (*ex* Whiteaves, 1890, pl. VI, fig. 1).

Teutonophon striatus (de Ferussac and Orbigny in Archiac and Verneuil, 1842) comb. nov.

Text-fig. 2A–E

non 1835 *Bellerophon striatus*, Bronn, plate 1, fig. 11, plate 3, fig.19.
? 1840 *Bellerophon striatus*, de Ferussac and Orbigny, plate 7, figs 6, 7.
non 1841 *Bellerophon striatus*, Phillips, plate 40, fig. 198.
1842 *Bellerophon striatus* de Ferrusac and orbigny in Archiac and Verneuil, p. 353, plate 28, fig. 6.
1876 *Bellerophon striatus*, Roemer, plate 32, fig. 9.
1915 *Bellerophon striatus*, Kirchner, fig. 1–2.

D i s c u s s i o n : *Teutonophon striatus* (de Ferussac et Orbigny in Archiac and Verneuil, 1842) resembles some species of *Pharkidonotus* in its large shell size and very thick shell wall, but its globular whorl profile separates it from *Pharkidonotus* species that have a strongly subquadrate whorl profile. *Pharkidonotus megalius* Kues, 1987, from the Pennyslvanian of New Mexico represents the largest known bellerophontid mollusc.

The species name *Bellerophon striatus* was used for the first time by Bronn (1835), and later this name was applied very widely to forms which would now be recognized as belonging to several different species. Kirchner (1915a) analysed in detail the usage of this species name by previous authors, and concluded that *Bellerophon lineatus* Sandberger, 1853 represents an immature specimen of *Bellerophon striatus* sensu lato. Kirchner (1915b) also noted *Bellerophon nanus* Eichwald, 1860 to be a younger synonym of *Bellerophon striatus.* On the other hand, he suggested that the species figured by Archiac and Verneuil (1842) is not conspecific with *Bellerophon striatus* Bronn, 1835. We have had no possibility to study Bronn's (1835) original material. However, we had opportunity to study the specimen figured by Archiac and Verneuil (1842, plate 28, fig. 6) through the kind gift by Patrick Racheboeuf of a plastic cast. If a future revision of Bronn's (1835) material will show that both species, i. e. *Bellerophon striatus* Bronn, 1835 and *Bellerophon striatus* figured by Archiac and Verneuil (1842) are conspecific, then the first will be the type species of *Teutonophon*. Otherwise it will be necessary to establish a new species name for Archiac and Verneuil's *Bellerophon striatus*.

Subclass E u o m p h a l o m o r p h a
Superfamily E u o m p h a l o i d e a De Koninck, 1881
Family E u o m p h a l i d a e De Koninck, 1881

Genus *Goldfussoceras* gen. nov.

Text-fig. 3

T y p e s p e c i e s : *Euomphalus circinalis* Goldfuss, 1844, p. 77, pl. 189, figs 6a and 6b, from the "E montibus Eifeliae" (Eifel hills of Germany).
E t y m o l o g y : "Goldfuss's horn", in honor of the vast work contributed by Georg August Goldfuss to our knowledge of German fossil gastropods.

D i a g n o s i s : Medium-sized, dextral euomphalid shell with flattened upper whorl face, separated from outer whorl face by strong angulation forming nearly 90°; outer whorl face weakly convex, separated by another strong basal angulation from inner whorl face; early whorls conjunct and form a very low, gradate spire; final whorl rapidly separating and becoming disjunct to form an openly coiled, high spired, "corkscrew"-like shell.
C o m p a r i s o n : The bizarre open-coiled, high spired ("corkscrew"-like) shell form readily separates this new genus from most other euomphalid genera. From other open-coiled euomphalid genera such as *Lytospira* Koken, 1896, *Ecculiomphalus* Portlock, 1843, and *Devonicornu* Frýda, 1998, it is distinguished in being much higher spired and in bearing an additional (basal) angulation. Other open-coiled euomphalid taxa include *Serpulospira* Cossmann, 1916, which differs in being low-spired and in lacking any angulations, and *Straparollus* (*Eleutherospira*) Blodgett and Johnson, 1992, which while being relatively high-spired, likewise differs in lacking any angulations.
D i s c u s s i o n : The higher level taxonomic position of the species was seemingly made unstable by the report

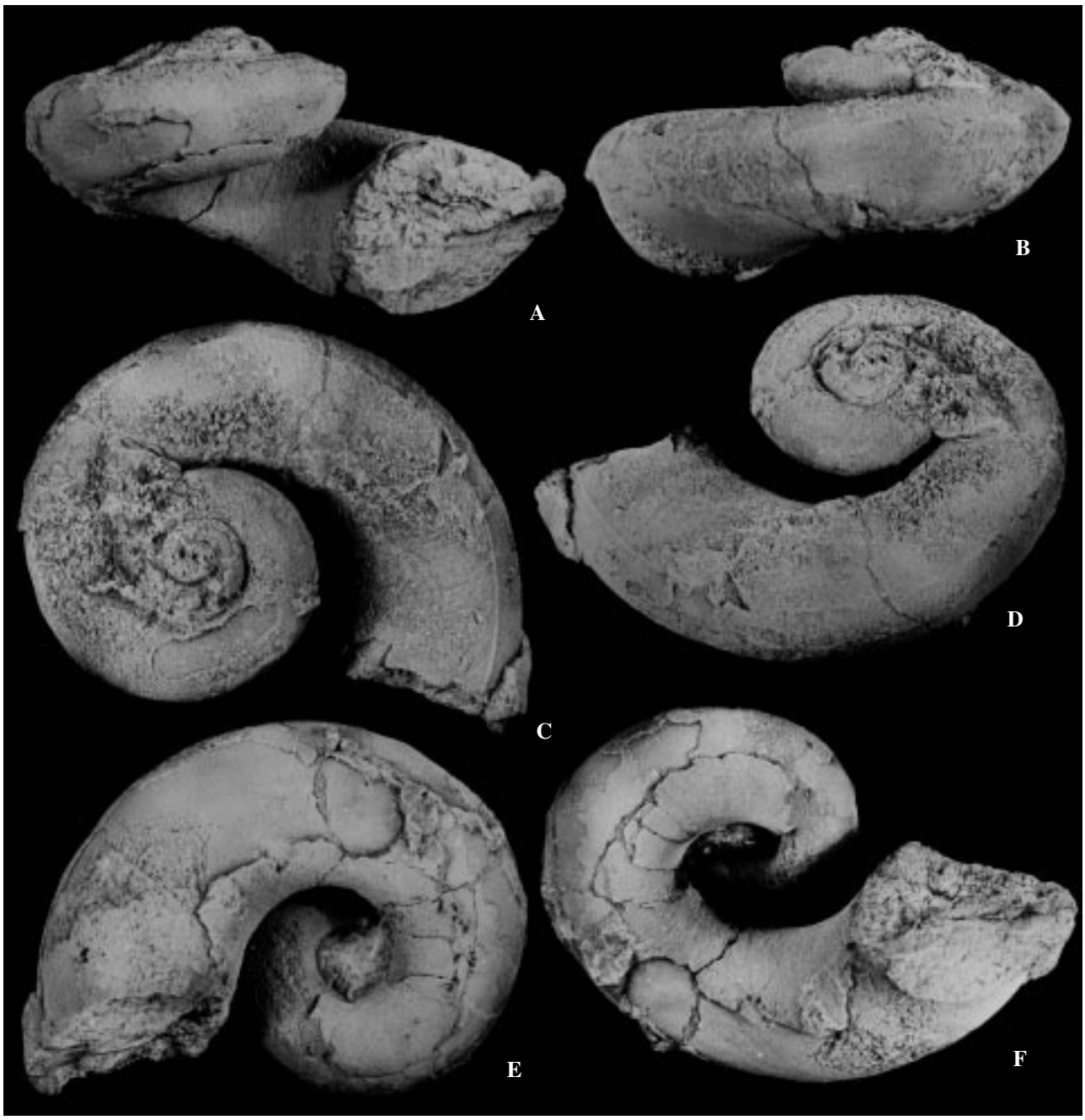

Fig. 5 A–F. *Ibergia centrifuga* (Roemer, 1843) from the Iberger Kalk (Frasnian), near Bad Grund, Harz Mountains, Germany. Specimen from collection of the Museum für Geologie und Paläontologie of the Georg-August-Universität in Göttingen, Germany, A–F – apertural, abapertural, apical, oblique, basal and oblique abapertural views, x1.5.

in Koken (1889, p. 321) of the presence of small selenizone (without "collar") at the upper angulation. However, close examination of Eifel district specimens in the Museum für Naturkunde and der Humboldt-Universität zu Berlin as well as external latex molds of specimens from the Honseler Schichten (early Givetian) of the Sauerland (collection of Dr. Frank Langenstrassen, Göttingen) show no distinct selenizone to be present. It seems best at this time to retain this taxon in the Euomphalidae. As noted, the upper whorl face is typically flattened, but in the distal-most part of the final whorls of several gerontic specimens from the Museum für Naturkunde this feature becomes highly accentuated into a sinusoidal-like shape in cross-section; the inner half of upper whorl face being convex upward, while the outer half of the upper whorl face develops a concave-upward depression.

S p e c i e s a s s i g n e d : Only the type species, *Euomphalus circinalis* Goldfuss, 1844, from the Middle Devonian of Germany is presently recognized. The species is known both the Eifel district and the Sauerland, occurring in the latter region in early Givetian age strata.

Fig. 6 A–E. *Ibergia centrifuga* (Roemer, 1843) from the Iberger Kalk (Frasnian), near Bad Grund, Harz Mountains, Germany. Specimen from Roemer collection at Clausthal-Zellerfeld, A–E – abapertural, apertural, apical, basal and oblique views, x1.5.

Subclass Archaeogastropoda
Superfamily Pleurotomarioidea Swainson, 1840
Family Raphistomatidae Koken, 1896
Subfamily Raphistomatinae Koken, 1896

Genus *Manitobiella* gen. nov.
Text-fig. 4

Type species: *Pleurotomaria goniostoma* Whiteaves, 1890 (p. 99, pl. VI, fig. 1) from the Winnipegosis Formation (early Givetian) of Manitoba, Canada.
Etymology: For the Province of Manitoba, from where the type species is found.
Lectotype: Specimen illustrated by Whiteaves (1890, pl. VI, fig. 1).

Diagnosis: Relatively large shell with gradate spire, whorls numbering up to five; upper whorl surface flat and nearly horizontal, but slightly raised near strongly angular keel which forms boundary between upper and outer whorl faces; selenizone situated at keel forming upper-outer whorl face boundary; base strongly convex, rounded; umbilicus broad, with steep, nearly vertical walls forming its inner surface.

Discussion: In its strongly gradate whorl profile, *Manitobiella* gen. nov., most closely resembles two other raphistomatinid genera: *Scalites* from the Middle Ordovician of North America and *Scalitina* from the Middle Devonian of Germany. It is distinguished from the former genus by its relatively much broader shell and the presence of a distinct umbilical depression; from the latter genus it is likewise distinguished by the presence of a distinct umbilical depression.
Composition: In addition to the type species, from the Givetian of Manitoba, the new genus also has numerous other representatives in the Middle Devonian North American strata belonging to the Old World Realm. These include an early Eifelian occurrences in the Cheeneentuk Limestone of the McGrath A-5 quadrangle, west-central Alaska and a late Eifelian occurrence in the Rogers City Limestone of Michigan, as well as another early Givetian occurrence in the Baird Group of the De Long Mountains A-3 quadrangle (northwestern Brooks Range) of Alaska. This new genus was noted by Blodgett *et al*. (1990, p. 280) under the heading gen. nov. aff. *Scalitina* as an important, biogeographically significant element of Middle Devonian Old World Realm faunas.

Family Gosseletinidae Wenz, 1938
Subfamily Coelozoninae Knight, 1956
Tribe Coelozonides Knight, 1956

Genus *Ibergia* gen. nov.
Text-figs 5A–F, 6A–F

Type species: *Pleurotomaria centrifuga* Roemer, 1843, p. 28, Pl. 7, figs 11a–b.
Etymology: After the Iberger Kalk (Frasnian) of the Harz Mountains.

Diagnosis: Relatively large *Euryzone*-like shell with openly-coiled final whorl; spire relatively in height; whorls number up to five in teleoconch, protoconch unknown; selenizone wide, flush with shell surface, situated relatively high (well above mid-whorl height), bounded by two weak spiral threads; ornament composed only of growth lines, prosocyrt (convex forward) on upper whorl face, weakly opisthocyrt (convex backward) on umbilical whorl face; base widely phaneromphalous.
Comparison: The disjunct, openly coiled final whorl of fully adult shells of this genus distinguish it easily from all other *Euryzone*-like shells of Devonian age, as well as from all other members of tribe Coelozonides Knight, 1956.
Composition: Only the type species, *Pleurotomaria centrifuga* Roemer, 1843, from the Iberger Kalk (Frasnian) at Bad Grund, Harz Mountains, Germany is known.

Genus *Humboldtiella* gen. nov.

Type species: *Pleurotomaria undulata* Roemer, 1843, from the Iberger Kalk (Frasnian) near Bad Grund, Harz Mountains, Germany.
Etymology: In honor of both the well-renowned German naturalist, Alexander von Humboldt, as well as the German foreign scientific exchange fellowship program, the Alexander von Humboldt-Stiftung (Bonn, West Germany). Without the financial support of the latter foundation, the study of German Devonian gastropod faunas by Blodgett would not have been possible.

Fig. 7 A–C. *Humboldtiella undulata* (Roemer, 1843) from the Iberger Kalk (Frasnian), near Bad Grund, Harz Mountains, Germany. Specimen from Roemer collection at Clausthal-Zellerfeld, A–C – abapertural, oblique, and apical views, x1.5.

Diagnosis: Medium sized, extremely low-spired coelozoninid gastropods; upper shell surface nearly flat, sutures deeply impressed, selenizone broad and flat, inclined at 45° from horizontal, situated at juncture between upper and outer whorl surfaces; ornament composed of numerous, fine spiral threads and much weaker collabral growth lines; base widely phaneromphalous.
Comparison: *Humboldtiella* gen. nov. is easily distinguishable from all other genera of the subfamily Coelozoninae in having a nearly flat upper shell surface. It is closest to *Euryzone* Koken (type species *Helicites delphinuloides* Schlotheim, 1820, from the Givetian of Germany) and was even included in the genus when established by Koken in 1896. Nevertheless it is readily distinguished from the latter by its nearly flat, upper shell surface, its ornament of prominent spiral threads (these are almost wholly absent in fully adult whorls of the latter, note the illustration of the holotype of the latter in figs 7A–C), as well in having somewhat differing orientation of the collabral growth lines.
Species assigned: Only the type species, *Pleurotomaria undulata* Roemer, 1843, from the Iberger Kalk (Frasnian) is known.

***Humboldtiella undulata* (Roemer, 1843) comb. nov.**
Text-fig. 7A–C

1843 *Pleurotomaria undulata* Roemer, p. 28, Pl. VII, figs 10a, b; Clarke, 1884, p. 340.
1896 *Euryzone undulata* Koken, p. 508.

D e s c r i p t i o n : Medium sized, shells, with up to four adult whorls, nucleus unknown; spire very low, nearly flat; apical sutures deeply impressed; upper whorl surface very weakly convex, succeeding whorls joining preceeding at, but separated by deep sutural furrow, the angulation separating the outer and upper whorl surfaces of the latter, selenizone broad flat, situated at juncture between outer and upper whorl surfaces, inclined at 45° from horizontal, bordered on either side by coarse, prominent spiral cord, somewhat stronger in strenght than adjoining spiral lirae of ornament, lunulae very faint, U-shaped, more readily visible under binocular microscope are numerous fine spiral threads which are much finer that those of the spiral ornament of the adjacent upper and outer whorl surfaces; outer whorl surface moderately convex, steeply inclined above, periphery located at lower border cord of selenizone; base rounded, broadly phaneromphalous, with deep umbilicus, a weak circumumbilical angulation is present; basal (umbilical) whorl surface moderately convex; ornament consists of fine spiral threads which are numerous and closely spaced on both the upper and outer whorl surfaces, being separated by flat interspaces of nearly equal or slightly greater width; on umbilical whorl surface the spiral threads are considerably weaker and further spaced, being separated by flat interspaces 3–5 times their width; weak collabral growth also present, being poorly preserved on upper whorl surface, but where visible these appear to be moderately prosocyrt (concave-forward) with arching nearly symmetrical with respect to upper whorl surface, growth lines on outer whorl surface initially arched forward for a short distance beneath the selenizone, but soon culminate in a rounded arch and are then declined in a prosocline manner in the middle portion of the whorl surface, but become opistocyrt lower towards the basal angulation, on the umbilical whorl surface the growth lines are prosocline initially becomes prosocyrt as they descend deeper into the umbilical depression; apertural margins no preserved, but based on the form of the growth lines it appears that a shallow sinus was present at the angulation separating the upper and outer whorl surface, depth of slit uncertain.
R e m a r k s : Koken (1889, 1896) considered *Pleurotomaria imbricata* Roemer, 1843, to represent juvenile specimens of *Pleurotomaria undulata* Roemer, 1843. No other investigator of Iberger Kalk gastropods had arrived at such a conclusion, so we leave this question of their synonomy open pending further study.

Fig. 8. *Paragnesia costata* (Goldfuss, 1844) from the Middle Devonian of the Eifel district of Germany. (*ex* Goldfuss, 1844, pl. 188, fig. 7).

Superfamily C i r r o i d e a
Family P o r c e l l i i d a e Broili, 1924

R e m a r k s : The genus *Coloniacirrus* Bandel, 1993, is based on the type species, *Ammonites primordalis* Schlotheim, 1820, from the Iberger Kalk (Frasnian) of the Harz Mountains of Germany. Bandel in the same publication also attributed to this genus the following species: *Coloniacirrus radiatus* (Goldfuss, 1841) from the Middle Devonian of Germany.

Genus *Paragnesia* gen. nov.

T y p e s p e c i e s : *Schizostoma costatum* Goldfuss, 1844, p. 75, pl. 188, fig. 7 from the "Uebergangskalke der Eifel" [Middle Devonian of the Eifel district of Germany].
E t y m o l o g y : In reference to the morphological similarity with the genus *Agnesia*.

D i a g n o s i s : Large moderately high-spired shell with a coeloconoid and turbiniform, sinistral teleoconch; teleoconch wider than high; shell ornamentation consists of fine reticulate pattern and one spiral row of radially elongated ribs (nodules) of *Porcellia puzo*-type situated above the selenizone.
C o m p a r i s o n : *Paragnesia* gen. nov. differs from the genus *Agnesia* de Koninck, 1883 by its lower-spired, coeloconoid teleoconch, by the type of shell ornamentation and selenizone. All other species of *Agnesia* including its type species have a teleoconch with straight or convex shell sides. Also their teleoconch is higher than wide in contrast to *Paragnesia.* The shell of the type species of *Agnesia*, *A. acuta* Phillips, 1836, has a

Fig. 9 A–F. *Winterbergiella binodosa* (Roemer, 1843) from Iberger Kalk (Frasnian), near Bad Grund, Harz Mountains, Germany. A–C – lectotype (here designated), TuPCl/G12 (formerly Original Nr. R101); lateral, oblique apical, and apical views, x3; D–F – paralectotype (here designated), TuPCl/11; apical, basal, and lateral views, x3.

characteristic selenizone (see Knight 1941, Pl. 38, fig. 2b) which resembles that of *Pernericirrus* Frýda, 1997 from the Ludlow (Silurian) of the Prague Basin. The simple selenizone of *Paragnesia*, as well as its shell ornamentation of *Porcellia puzo*-type situated above selenizone resembles that of the genus *Porcellia* Léveillé, 1835.

Included species: Only the type species, *Paragnesia costata* (Goldfuss, 1844), from the Middle Devonian of Germany is hitherto known.

***Paragnesia costata* (Goldfuss, 1844) comb. nov.**
Text-fig. 8

1844 *Schizostoma costatum,* Goldfuss, plate 188, fig. 7.
1993 *Agnesia costata*, Bandel, plate 1, figs 1, 3.

Remarks: We agree with Bandel (1993) that the Middle Devonian species *Paragnesia costata* (Goldfuss, 1844) forms a transitional morphological type between *Porcellia* and *Agnesia.* However, the low spired, sinistrally coiled teleoconch of *Paragnesia costata* with axial nodes of the *Porcellia puzo*-type forming its shell ornamentation differs from all hitherto known species of *Agnesia*. The strongly concave shell sides of its teleoconch (see Bandel 1993, pl. 1, fig. 1) are not known in other species of the genus *Agnesia*. For this reason, we place this species into the new genus *Paragnesia* which we consider to be a highly specialized form. *Paragnesia* resembles by its general shell shape an undescribed new genus of Agnesiinae from the Early Devonian of Yukon Territory, Canada (Frýda – Blodgett – Lenz, in prep.).
Stratigraphic position: Middle Devonian.

Family Uncertain

Genus *Winterbergiella* gen. nov.

Type species: *Pleurotomaria binodosa* Roemer, 1843, p. 28, Pl. 8, fig. 2.
Etymology: After Winterberg Hill, near Bad Grund, Germany, where Clarke (1884, p. 341) stated that the only two specimens known to him of the type species were derived.

Diagnosis: Medium-sized, low-spired, dextral shell with extremely deep sutures; whorls number up to five in teleoconch, protoconch unknown; whorl strongly rounded between sutures and on final whorl; narrow selenizone situated at mid-whorl height; ornament consists of numerous fine spiral threads which are intersected by slightly weaker, closely spaced collabral threads resulting in distinctive cancellate sculpture, in addition, both upper and lower whorl surfaces are crossed by prominent, widely spaced transverse ribs.
Discussion: The taxonomic position of this distinctive new genus is still uncertain to us at this time, due to lack of complete characterization of critical shell features. We see some similarities with the family Porcelliidae (similar shell ornament), but in contrast to the latter, this genus is distinctly dextrally coiled and slightly higher spired.
Species assigned: In addition to the type species, the following species are also assigned:

1. New genus, new species aff. "*Pleurotomaria*" *binodosa* Roemer of Blodgett, 1992, p. 149–150, pl. 9, fig. 3 from the Eifelian of east-central Alaska.

2. *Pleurotomaria binodosa* Roemer of Sandberger and Sandberger, p. 186–187, Pl. 22, figs 13, 13a, 13b from the Givetian "Stringocephalenkalk" at Villmar, Germany. This species is similar to the type species, but judging from their illustration it appears to be distinct.

3. The species *Turbo semicostatus* Goldfuss, 1844, p. 90, pl. 192, figs 5a–b, from the Middle Devonian of the Eifel district, Germany may also possibly belong to this genus, but further investigation is necessary for confirmation.

***Winterbergiella binodosa* Roemer, 1853**
Text-fig. 9 A–F

1843 *Pleurotomaria binodosa* Roemer, p. 28, Pl. 8, fig. 2.
non 1850–1856 *Pleurotomaria binodosa* Sandberger & Sandberger, p. 186, pl. 22, fig. 13, 13a, 13b.
1884 *Pleurotomaria binodosa* Clarke, p. 341.

Description: Small to medium sized [largest of two specimens (lectotype) with diameter of about 21 mm], low-spired shell, whorl profile rounded, nearly evenly arched, whorl number up to five, nucleus not preserved; sutures deeply incised; selenizone situtated at periphery (mid-whorl height) and bordered by two strong, flange-like cords; internal details of selenizone uncertain due to poor preservation, however the lectotype appears to show the faint trace of an internal cord or pair of cords; ornament symmetrically developed on both upper and lower whorl surfaces consisting of intersecting collabral and spiral threads (spiral threads slightly greater in strength than collabral) forming a reticulate pattern; collabral threads are weakly and evenly prosocline in orientation; superimposed on the crests of both the upper and lower whorl surfaces are a series of prominent, widely spaced elongate ribs which are slightly tangentially disposed away from the shell apex.
Remarks: Two specimens were found in the Roemer collections of the Technische Universität (Clausthal/Zellerfeld), both attached to a single board identified as belonging to this species; both are illustrated here. Clarke (1884, p. 341) also reported that at the time of his study of the Iberger Kalk fauna, that only two specimens of this taxon was available for study. The lectotype specimen (TuPCl/G12) shows well the nature of the upper shell surface and only a small portion of the basal shell surface is present. The paratype specimen (TuPCl/G11) is remarkable since it displays not only the upper but also a good portion of the lower shell surface.

Superfamily Microdomatoidea Wenz, 1938
Family Microdomatidae Wenz, 1938
Subfamily Decorospirinae subfam. nov.

Diagnosis: Microdomatid gastropods with subequally developed ornament of closely spaced, collabral threads which are prosocline on upper and outer whorl surface, and opisthocyrt on basal whorl surface, intersecting with numerous closely spaced spiral threads to yield distinctive reticulate ornament, weakly nodose at juncture of spiral and collabral elements.
Discussion: This new subfamily incorporates a diverse plexus of Devonian microdomatid species which are currently in the process of revision by us. The sub-

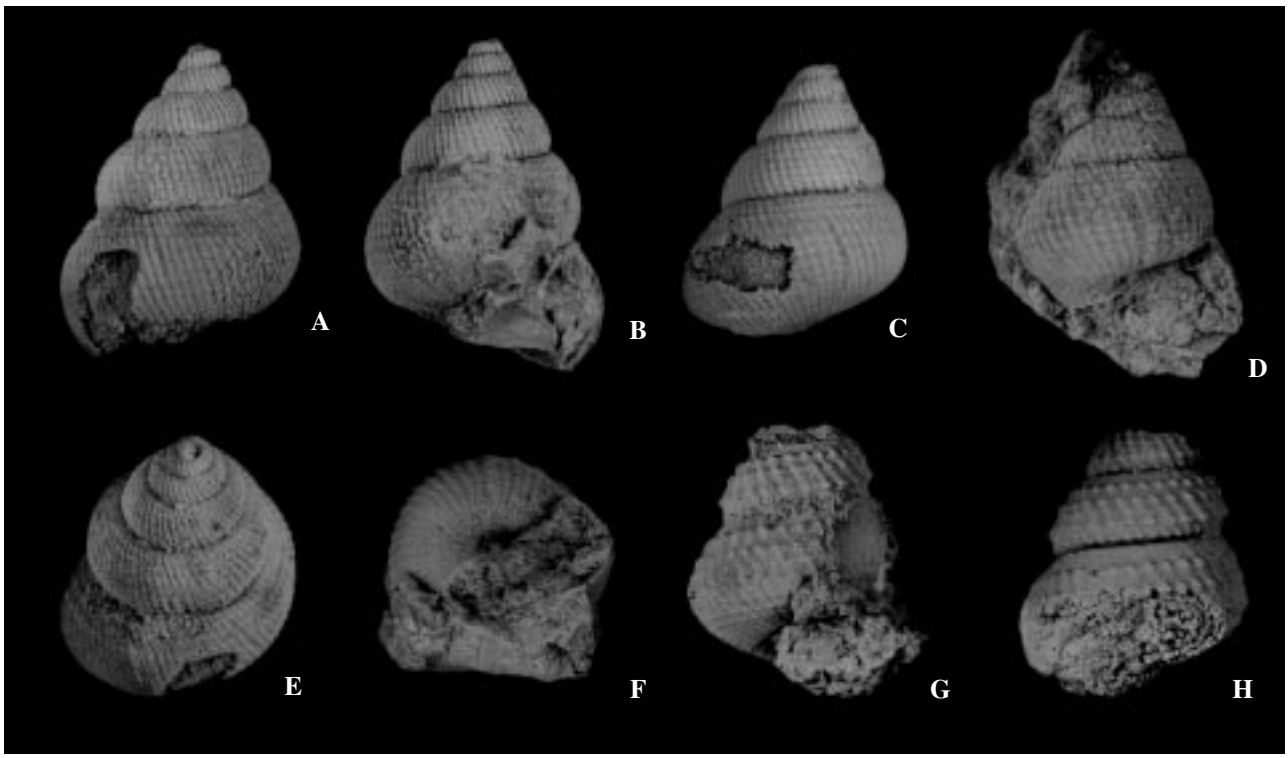

Fig. 10. A–F. *Roemeriella cyclostomoides* (Roemer, 1850) from Iberger Kalk (Frasnian), near Bad Grund, Harz Mountains, Germany. A, B, and E – lectotype, TuPCl/G7 (formerly Original Nr! 194), abapertural, apertural, and oblique apical views, x3; C – paralectotype A, TuPCl/G8, abapertural view, x3; D, F – paralectotype B, TuPCl/G9, apertural and basal views, x3. G–H – *Roemeriella octocincta* (Roemer, 1843) from Iberger Kalk (Frasnian), near Bad Grund, Harz Mountains, Germany; apertural and abapertural views, x3.

family ranges from Emsian (late Early Devonian) to Frasnian (early Late Devonian). The oldest member of this subfamily is *Decorospira pragensis* (type species of the monotypic genus *Dongiovannia* Horný, 1992; which we regard as junior subjective synonym of *Decorospira* Blodgett and Johnson, 1992) from the late Emsian age Třebotov Limestone of Daleje-Třebotov Formation. Another undescribed Emsian age species of *Decorospira* is known to us (Frýda and Blodgett, in preparation) from the rich fauna on the south flank of Limestone Mountain, Medfra B-4 quadrangle, west-central Alaska. Eifelian age representatives includes *Dutrochus alaskensis* Blodgett, 1993, from the Cheeneetnuk Limestone, McGrath A-5 quadrangle, west-central Alaska, and three species of *Decorospira*: *D. tasselli* Blodgett and Johnson, 1992 (the type species of *Decorospira*) and *D. gilberti* Blodgett and Johnson, 1992, both from the Cheeneetnuk Limestone of Alaska, and *D. rigbyi* Blodgett and Johnson, 1992, from the Denay Limestone of Nevada. The youngest representatives known to us are the species ascribed herein to the new genus *Roemeriella*, *R. cyclostomoides* (Roemer, 1850) and *R. octocinctus* (Roemer, 1843) both from the Frasnian age Iberger Kalk of the western Harz Mountains, Germany. The Devonian genus *Episfaxis* Knight, 1937, based on *Cosmina complacens* Perner, 1903, from the Lower Devonian of the Czech Republic, was placed in the family Microdomatidae by Knight et al. (1960). Horný (1991) regarded the genus *Episfaxis* be a junior synonym of the genus *Mitchellia* DeKoninck, 1877. Several other Devonian genera, commonly attributed to the family Microdomatidae, are considered by us to not belong in the new subfamily Decorospirinae. These include the genus *Copidocatomus* Linsley, 1968, from the Anderdon Limestone (Eifelian) of Ontario, Canada. It lacks a reticulate ornament of intersecting spiral and collabral threads, and has a prominent well developed angulation unlike other members of the new subfamily. We questionably retain this genus within the family Microdomatidae. The genus *Pagodea* Perner, 1903, from the Lower Devonian of Czech Republic, is rejected from the new subfamily because it lack numerous closely spaced spiral threads. The genus *Petrochus* Horný, 1992, from the Lower Devonian of the Czech, which resembles *Pagodea* somewhat, is likewise rejected on the basis of total lack of spiral threads.

In the subfamily Microdomatinae Wenz (ex Microdominae Wenz, 1938) we recognize the type genus *Microdoma* Meek and Worthen, 1867 and *Glyptospira*, Chronic, 1952, The genera *Pagodea* and *Petrochus* are more problematic, and closely approach one another in general shell form. If retained within the Microdomatidae, it could be argued that they may belong in their own separate subfamily.

C o m p o s i t i o n : *Decorospira* Blodgett and Johnson, 1992 (=*Dongiovannia* Horný, 1992; *Decorospira* having slight temporal priority), *Dutrochus* Blodgett, 1993, and *Roemeriella* gen. nov.

Genus *Roemeriella* gen. nov.

Type species: *Turbo cyclostomoides* F.A. Roemer, 1850, from the Iberger Kalk (Frasnian), Harz Mountains, Germany.
Etymology: In honor of F. A. Roemer, who made great contributions to our knowledge of the Devonian faunas of the Harz Mountains of Germany.

Diagnosis: Turbiniform microdomatids with rounded whorls and ornament of regularly spaced, prosocline collabral cords and numerous spiral threads, which at their juncture are weakly pustulose.
Comparison: Among microdomatid genera, *Roemeriella* gen. nov., clearly is separable from all extant, named genera within the subfamily Decorospirinae subfam. nov. *Roemeriella* gen. nov. differs from *Dutrochus* Blodgett, 1993, from the Cheeneetnuk Limestone (Eifelian) of west-central Alaska in being lower spired and in having spiral threads which are of equal strength, not stronger along the shell periphery as in the latter genus. The new genus differs from *Decorospira* Blodgett and Johnson, 1992, from the Middle Devonian (Eifelian) of Alaska and Nevada, in possesing fewer elements of spiral ornament and in having an evenly rounded whorl, not strongly angular as is typical for *Decorospira*.
Composition: Two species are known: *Roemeriella cyclostomoides* (Roemer, 1850) and *Roemeriella octocinctus* (Roemer, 1843), both from the Frasnian age Iberger Kalk of the Harz Mountains, Germany.

***Roemeriella cyclostomoides* (F. A. Roemer, 1850)**
Text-fig. 10 A–F

1850 *Turbo cyclostomoides* F. A. Roemer, p. 37, pl. 5, fig. 23.
1884 *Turbo* (*Cyclonema*) *cyclostomoides* Clarke, p. 351.

Description: Moderately high-spired turbiniform shell with up to five whorls in teleoconch; protoconch not preserved; sutures well incised; whorl profile weakly convex on spiral whorls, strongly rounded on final whorl; base minutely phaneromphalous to anomphalous; ornament composed of numerous closely and regularly spaced, steeply inclined prosocline cords which are intersectedy by numerous spiral threads (numbering up to 16) to give weakly pustulose swellings at their intersection.
Occurrence: This species is known only from the Iberger Kalk (Frasnian) of the Harz Mountains, Germany.

Subclass Neritimorpha
Superfamily Platyceratoidea Hall, 1879
Family Platyceratidae Hall, 1879

***Spiniplatyceras* gen. nov.**
Text-fig. 11A–C

Type species: *Platyceras dumosum* Conrad, 1840, from the Onondaga Limestone (Eifelian) of New York.
Etymology: Combination of the Latin term *spini* (spiny) and the genus name *Platyceras*.

Diagnosis: Platyceratid gastropods with scattered, numerous to few hollow spines scattered over entire shell surface and initial whorls in contact during early growth stages.
Comparison: The only other named spine-bearing platyceratid taxon is *Platyceras* (*Euthyrachis*) Tyler, 1965, based upon *Platyceras indianense* Miller and Gurley, 1897, recognized from the Givetian of Indiana and Michigan. The latter taxon we prefer to regard as a distinct genus, probably more closely related to *Orthonychia* Hall. A slightly older species, *Platyceras blatchleyi* Kindle, 1901, from the Jeffersonville Limestone (Eifelian) of Indiana and the Columbus Limestone of Ohio is also assignable to the genus *Euthyrachis*. *Spiniplatyceras* gen. nov. differs from *Euthyrachis* Tyler in its possession of hollow spines which are located all over the entire shell surface, and not just limited to a single row. Other major differences include the lack in the former genus of a prominent carina between the apex and anterior margin and the absence of an uncoiled, hooklike apex. Other spine-bearing platyceratids are known from the Carboniferous (i. e., *Platyceras spinigerum* Worthen, 1883, and *Platyceras tribulosum* White, 1880), but none of these forms belong to our new genus. Rather, they all appear to have disjunct early whorls and are most likely related, or assignable to *Orthonychia*.
Stratigraphic range: Pragian (middle Early Devonian) to Givetian (late Middle Devonian).
Species assigned: In addition to the type species, the following species are also assigned.

1. *Platyceras parvispinum* Howell, 1945, from the Hamilton Group (Middle Devonian) of New York or Pennsylvania (exact locality not known).
2. *Platyceras echinatum* Hall, 1861, (Givetian) from the Hamilton Group (Moscow and Ludlowville) and Tully Limestone of New York.
3. *Platyceras fornaticum* Hall, 1861, from the Onondaga Limestone (Eifelian) of New York.
4. *Platyceras multispinosum* Meek, 1871, from the Columbus Limestone (Eifelian) of Ohio.
5. *Platyceras dumosum* var. *rarispinum* Hall, 1861, from the Onondaga Limestone (Eifelian) of New York and Ontario and the Jeffersonville Limestone (Eifelian) of the Falls of the Ohio.
6. *Platyceras dumosum* var. *pileum* Kindle, 1901, from the Jeffersonville Formation (Eifelian) at the Falls of the Ohio.
7. *Platyceras milleri* Nettelroth, 1889, from the Jeffersonville Formation (Eifelian) at the Falls of the Ohio, Kentucky.
8. *Platyceras rictum* var. *spinosa* Kindle, 1901, from "Sellersburg beds" at Charlestown, Indiana.
9. *Platyceras bartlettense* Yochelson and Kopf, 1956, from the Arkona Shale (Givetian) of Ontario.
10. *Platyceras arkonse* Shimer and Grabau, 1902, from Arkona Shale (Givetian) of Ontario [maybe a synonym of *P. bartlettense*, see Yochelson and Kopf (1956, p. 1171)].

Fig. 11. A – *Spiniplatyceras prisca* var. *spinosa* (Goldfuss, 1844) from the *Calceola* Schichten (Eifelian) of the Rheinland of Germany. (*ex* Goldfuss, 1844, pl. 168, fig. 1d). B–C – *Spiniplatyceras dumosum* (Conrad, 1840) from the Onondaga Limestone (Eifelian) of New York. (*ex* Hall 1879, pl. 5, figs 11, 15)

11. *Platyceras paxiller* Clarke, 1908, from the upper beds of the Grande Grčve Limestone (late Pragian or early Emsian), Gaspé, Canada.

12. *Pileopsis prisca* var. *spinosa* Goldfuss, 1844, from the *Calceola* Schichten (Eifelian) of the Rheinland of Germany.

13. *Platyceras dumosiforme* Koken, 1889, from the Rhenish Lower Devonian (no description or illustration provided in that paper).

14. *Platyceras erinaceum* Koken, 1889, from the lowest Coblenz-Schichten of the Rheinisches Schiefergebirge (no description provided, but illustrated on Tafel XI of that paper).

Species to be investigated: The two following species from the Oriskany Sandstone and its equivalents (of Pragian age) in eastern North America bear prominent nodes. However, as these species are known to us only as internal molds, it is uncertain as to whether either bore spines similar in type to those known in *Spiniplatyceras* gen. nov. It would be most germane for future researchers to find external molds of either of these species in order to better establish their external morphological characteristics.

1. *Platyceras nodosum* Conrad, 1841, from the Oriskany Sandstone of New York, as well as its equivalents throughout the Appalachian Basin.

2. *Platyceras subnodosum* Hall, 1859, from the Oriskany Sandstone of New York.

In addition, representatives of this new genus are plentiful in Pragian and Emsian age strata of Nevada (Blodgett et al., 1988), where they are present as silicified forms representing at least 3 species. This new genus was referred to earlier by Blodgett et al. (1988, 1990) under the heading of the plexus of spinose members of *Platyceras* (*Platyceras*) or spinose platycerid plexus, and was referred to as a typical element of the Eastern Americas Realm gastropod faunas from Pragian to Givetian time. An exception to this generalization is the occurrence of a single species, *Pileopsis prisca* var. *spinosa* Goldfuss, 1844, from the Eifelian of Germany. In addition, Koken (1889) mentions two spine-bearing platyceratid species from the Rhenish Lower Devonian: *Platyceras dumosiforme* Koken, 1889, and *Platyceras erinaceum* Koken, 1889. The first species appears only as a name (Koken 1889, p. 467) without description or illustration, while the latter appears also as a name without description (Koken 1889, p. 467), but is illustrated (*ibid*, Tafel XI, fig. 2, 2a) and cited as being from the "lowest Coblenz-Schichten of Ergeshausen bei Katzenellnbogen" (*ibid*, fig. caption on p. 482)

Superfamily Neritoidea Rafinesque, 1815
Family Neritopsidae Gray, 1847
Subfamily Neritopsinae Gray, 1847

***Devononerita* gen. nov.**

Type species: *Buccinum breve* J. de C. Sowerby, 1827, p. 128, plate (table in book) 566, fig. 3., from the Givetian of England.
Etymology: Combination of the words Devonian and the genus name *Nerita*.

Diagnosis: Low-spired turbiniform shells with an ornament of strong, prosocline collabral ridges which bear elongate, crescentric spirally aligned rows of tubercles, the latter opening adaperturally; inner lip markedly thickened; base phaneromphalous to cryptomphalous.
Comparison: *Devononerita* gen. nov. is most similar to the genus *Trachydomia* Meek and Worthen, 1866, from the Pennsylvanian and Permian, but differs from the latter in having less numerous tubercles, which also are more distinctly aligned to form collabral rows (3–4 tubercles per row), as compared to the seemingly more irregular arrangment in *Trachydomia*.

In addition, the outer lip in *Devononerita* is also much thicker and the tubercles also tend to be less rounded (more elongate), and in some cases, even spatulate in

form (see illustrations for *D. brevispira* Whiteaves, 1892, pl. XLII, figs 6–7). Nevertheless, the general similarity of external form suggests that the Middle Devonian age *Devononerita* was probably the ancestor of *Trachydomia*. The only other externally similar Paleozoic neritopsinid genus is *Trachyspira* Gemmellaro from the Permian, which differs from *Devononerita* gen. nov. in being higher spired and possessing tubercles (or pustules) of differing two differing catagories.

Stratigraphic range: Middle Devonian (Eifelian-Givetian).

Species assigned: Besides the type species, the genus also includes *Turbo schwelmensis* Kayser, 1889, from the Givetian of Germany. As noted by Whidborne (1892, p. 272) the latter species is very similar and may be conspecific with the English type species of our new genus. The only other named species belonging to the new genus is *Eunema brevispira* Whiteaves, 1892, from the Winnipegosis Formation (early Givetian) of Manitoba. Undescribed and unillustrated specimens of the genus are also found in Eifelian age strata of the Cheeneetnuk Limestone of west-central Alaska (Blodgett, personal observation) and the Rogers City Limestone of Michigan (Blodgett, personal observation) and from late Givetian strata of Paffrath area, Germany (Frýda, personal observation). Thus, this distinctive new genus appears to be a typical Middle Devonian faunal element in the Old World Realm (denoted as gen. nov. neritopsinid in Blodgett et al., 1990, p. 280).

Dahmeria gen. nov.

Type species: *Pleurotomaria findespinosa* Dahmer, 1917.

Etymology: In honor of Georg Dahmer, German paleontologist who made great contributions to our knowledge of Lower Devonian gastropod faunas from Germany.

Diagnosis: Medium-sized, high-spired, cyrtoconoid neritopsinid shells consisting of about 5–6 whorls; outer whorl face weakly convex and steeply inclined, bordered above by narrow ramp-like shoulder which is separated by a deeply incised suture from the preceding whorl; numerous well-developed outwardly projecting, narrow stick-like spines occur in a single row on the upper part of the outer whorl face, just below the ramp-like shoulder; base anomphalus, with well developed angulation separating outer whorl face from basal whorl face.

Comparison: The distinctive cyrtoconoid shell shape and development of spines clearly distinguish the new genus from all other previously established genera within the subfamily Neritopsinae. In general shell shape, it most closely resembles the genus *Turbonitella* DeKoninck, 1881, but differs again in being much higher spired and in its possession of spines.

Comments: It is indeed puzzling why Dahmer placed his *Pleurotomaria findespinosa* in the genus *Pleurotomaria*. Examination of excellent collections of this taxon in several German museums shows that this species definitively lacks a selenizone or sinus. In view of this fact, as well as its generalized neritopsid shell shape, it seems most reasonable to place it in the subfamily Neritopsinae. The conclusion is also supported by the apertural characters of the shell of this taxon, again similar to that other neritopsids, displayed in latex casts of specimens from the collections of the Museum für Geologie und Paläontologie of the Georg-August-Universität in Göttingen, Germany. Knight *et al*. (1960) gave the lower stratigraphic range of the suborder Neritopsina, the superfamily Neritoidea, as well as that of the family Neritopsidae as Middle Devonian. The recognition of this taxon in the Neritopsidae indicates that the lower stratigraphic range of all of the above high-order taxa should be recognized at least as low as the Emsian (upper Lower Devonian).

Composition: Only the type species, *Pleurotomaria findespinosa* Dahmer, 1917, from the Upper Lower Devonian (Lower Emsian) Germany is known. The species is recognized in the *Nessigi*-Schichten and Giengelsberger Schichten of the Kahlebergsandstein in the Harz Mountains and the Remscheider Schichten of the Rheinisches Schiefergebirge (Dahmer 1917, 1921, 1943, and 1946).

Acknowledgments. This publication is based on work sponsored by the U. S. – Czechoslovak Science and Technology Joint Fund in cooperation with the Czech Geological Survey and U. S. Geological Survey under Project Number 95057. Blodgett wishes to thank the Alexander von Humboldt Stiftung (Bonn, Germany) for providing financial support which allowed him a six month stay in Germany to study European Devonian gastropods. We also wish to acknowledge Arthur J. Boucot (Corvallis, Oregon) for improving the use of English language herein and for his helpful, critical review of this paper.

Submitted October 1, 1999

References

Archiac, E. J. A. D. – Verneuil, E. P. D. (1842): On the fossils of the older deposits in the Rheinish Province. – Geol. Soc. London, Trans., 6, 303–410.

Bandel, K. (1993): Evolutionary history of sinistral archaeogastropods with and without slit (Cirroidea, Vetigastropoda). – Freiberger Forschungshefte, C450, 41–81.

Blodgett, R. B. (1992): Taxonomy and paleobiogeographic affinities of an early Middle Devonian (Eifelian) gastropod faunule from the Livengood quadrangle, east-central Alaska. – Palaeontographica Abteilung A, 221, 125-168.

– (1993): *Dutrochus*, a new microdomatid (Gastropoda) genus from the Middle Devonian (Eifelian) of west-central Alaska. – Journal of Paleontology, 67, 194–197.

Blodgett, R. B. – Johnson, J. G. (1992): Early Middle Devonian (Eifelian) gastropods of central Nevada. – Palaeontographica Abt. A, 222, 85–139.

Blodgett, R. B. – Rohr, D. M. – Boucot A. J. (1988): Lower Devonian gastropod biogeography of the Western Hemisphere, p. 281–294 (also 291a, b added as addemdum later due to printer's error). *In:*

McMillan, N. J., – Embry, A. F., – Glass, D. J. (eds.), Devonian of the World. Canadian Society of Petroleum Geologists Memoir 14, volume 3.
– (1990): Early and Middle Devonwian gastropod biogeography, 277–284. *In: McKerrow, W.S., – Scotese C. R.* (eds.), Palaeozoic Palaeogeography and Biogeography. Geological Society (London) Memoir 12.
Chronic, H. (1952): Molluscan fauna from the Permian Kaibab Formation, Walnut Canyon, Arizona. – Geological Society of America Bulletin, 63, 95–166.
Clarke, J. M. (1884): Die Fauna des Iberger Kalkes. – Neues Jahrbuch für Mineralogie, Geologie und Palaeontologie, III Beilage–Band: 316–411.
– (1908): Early Devonic history of New York and eastern North America. – New York State Museum Memoir 9.
Conrad, T. A. (1840): Third annual report of the Paleontological Department of the Survey. – New York State Geological Survey, Annual Report 4, 199–207.
– (1841): Fifth annual report of the Paleontological Department of the Survey. – New York State Geological Survey, Annual Report.
Cossmann, M. (1916): Essais de paléoconchologie comparée, volume 10, Paris.
Dahmer, G. (1917): Studien über die Fauna des Oberharzer Kahlebergsandsteins. I. – Jahrbuch der Königlichen Preussischen Geologischen Landesanstalt für 1916, Bd. 37, Teil 1, Heft 3, 457–466.
– (1921): Studien über die Fauna des Oberharzer Kahlebergsandsteins. II. – Jahbuch der Preussischen Geologischen Landesanstalt für 1919, Bd. 40, Teil II, Heft 2, 221–297.
– (1943): Die Fauna im Tuff-Lager des Oberharzer Kahleberg-Sandsteins (Unter-Devon). – Senckenbergiana, 26(1/3), 1–12.
– (1946): Revidiertes Verzeichnis der Versteinerungen des Oberharzer Kahleberg-Sandsteins (Unter-Devon). – Senckenbergiana, 27:167–187.
Fischer, J. C. (1969): Deux Bellerophonacés nouveaux de Bolivie. – Bulletin de la Société Géologique de France, series 7, XI, 605-608.
Forney, G. – Boucot, A. J. – Rohr, D. M. (1981): Silurian and Lower Devonian zoogeography of selected molluscan genera, p. 119–164. *In: Gray, J. – Boucot, A. J. – Berry W. B. N.* (eds.), Communities of the Past. Hutchinson Ross Publishing Company, Stroudsberg, Pennsylvania.
Frech, F. (1914a): Über einige mitteldevonische *Bellerophon*-Arten. – Centralblatt für Mineralogie, Geologie und Paläontologie, Jahrgang 1914, no. 6, 161–169.
– 3(1914b): Beiträge zur Geologie Chinas. 1. Ein neues Vorkommen des Stringocephalenkalkes in Hunan (Südchina). – Centralblatt für Mineralogie, Geologie und Paläontologie, Jahrgang 1914, no. 7, 193–202.
Frýda, J. (1997): Oldest representatives of the superfamily Cirroidea (Vetigastropoda) with notes on their early phylogeny. – Journal of Paleontology, 71, 5, 839–847.
– (1998): Some new and better recognized Devonian gastropods from the Prague Basin (Bohemia): part II. – Bull. Czech geol. Survey, 73, 4, 355–361.
– (1999): Three new gastropod genera from the Early Devonian of Bohemia. – Bull. Czech geol. Survey, 74, 1, 31–38, Praha.
Frýda, J. – Blodgett, R. B. – Lenz, A. C. (1999): Early evolution of Cirroidea (Gastropoda) still mysterious. – 65th Annual Meeting, American Malacological Society, Pittsburgh, 30–31.
Girty, G. H. (1912): On some new genera and species of Pennsylvanian fossils from the Wewoka Formation of Oklahoma. – Annals of the New York Academy of Sciences, 21, 119–156.
Goldfuss, A. (1841–1844): Petrefacta Germaniae, Dritter Theil, Düsseldorf.
Gordon, M. – Yochelson, E. L. (1987): Late Mississippian Gastropods of the Chainman Shale, west-central Utah. – U. S. Geological Survey Professional Paper 1368, 112 pp.
Gray, J. E. (1847): On the classification of British mollusca, by Dr. W. E. Leach. – The Annals and magazine of natural history, including zoology, botany, and geology, 1st series, 20:267–273.
Hall, J. (1859): Palaeontology, Volume 3, Containing descriptions and figures of the organic remains of the Lower Helderberg Group and the Oriskany Sandstone, Part 1, Text; Part 2, Plates. – Geological Survey of New York, Albany.
– (1861): Descriptions of new species of fossils from the Upper Helderberg, Hamilton and Chemung groups; with observations upon previously described species. Fourteenth Annual Report of the Regents of the University of the State of New York on the condition of the State Cabinent of Natural History, and the Historical and Antiquarian Collection annexed thereto, 99–109, Albany.
Horný, R. (1991): *Episfaxis*, *Sinistracirsa* and *Ptychospirina*: three invalid generic names of the Palaeozoic Archaeogastropoda (Mollusca). – Časopis Národního Muzea, 157, 51pp.
– (1992): New Lower Devonian Gastropoda and Tergomya (Mollusca) of Bohemia. Časopis Národniho Muzea 159, 88–110.
Howell, B. F. (1945): A new snail from the Devonian Hamilton Group. – Notulae naturae of the Academy of Natural Sciences of Philadelphia, no. 152, 2 pp.
Kayser, E. (1889): Ueber einige neue oder wenig gekannte Vesteinerungen des rheinischen Devonian. – Zeitschrift der Deutschen geologischen Gesellschaft, XLI, 288–296.
Kindle, E. M. (1901): The Devonian fossils and stratigraphy of Indiana. – Twenty-Fifth Annual Report, Indiana Department of Geology and Natural Resources, 529–758.
Kirchner, H. S. (1915a): Mitteldevonische Gastropoden von Soetenich in der Eifel. – Verhandlungen des Naturhistorischen Vereins der preussischen Rheinlande und Westfalens, II, 189–261.
– (1915b): Über *Bellerophon striatus* Bronn. – Centralblatt für Mineralogie, Geologie und Paläontologie, 11, 348–351.
Knight, J. B. (1937): Genotype designations and new names for invalid homonyms among Paleozoic gastropod genera. – Journal of Paleontology, 10, 709–714.
– (1942): Four new genera of Paleozoic Gastropoda. – Journal of Paleontology, 16, 487–488.
– (1945): Some new genera of the Bellerophontacea. – Journal of Paleontology, 19, 333–340.
– (1956): New families of Gastropoda. – Journal of the Washington Academy of Sciences, 46, 41–42.
Knight, J. B. – Cox, L. R. – Keen, A. M. – Batten, R. L. – Yochelson, E. L. – Robertson, R. (1960): Systematic descriptions, p. I169-I324. *In: Moore R. C.* (ed.), Treatise on Invertebrate Paleontology, Part I, Mollusca 1. Geological Society of America and University of Kansas Press, Lawrence.
Koken, E. (1889): Ueber die Entwicklung der Gastropoden vom Cambrium bis zur Trias. – Neues Jahrbuch für Mineralogie, Geologie und Palaeontologie, Beilageband 6, 305–484.
– (1896): Die Leitfossilien. Chr. Herm. Trachnitz, Leipzig, 848 pp.
Koninck, L. G. de. (1877): Recherches sur les fossiles paléozoiques de la Nouvelle-Galles du Sud (Australie). – Mémoires de la Société royale des Sciences de Liége, 2e sér., t. 6, 135 p., 4 plates. Bruxelles.
– (1881): Faune du calcaire carbonifčre de la Belgique. – Annales du Musée Royal d'Histoire Naturelle de Belgique, Série Paléontologique, Tome VI, Troisičme Partie, Gastéropodes, 170 p.
Kues, B. S. (1987): *Pharkidonotus megalius*, a large new gastropod species from the Middle Pennsylvanian of south-central New Mexico. – Journal of Paleontology, 61, 6, 1187–1193.
Linsley, R. M. (1968): Gastropods of the Middle Devonian Anderdon Limestone. – Bulletins of American Paleontology, 54:333–465.
– (1979): Gastropods of the Devonian. *In: House, M. R. – Scrutton, C. T. – Bassett, M. G.* (eds.): The Devonian System. Spec. Pap. in Palaeont., 23:249–254. Palaeont. Assoc., London.
Meek, F. B. (1871): Descriptions of new species of invertebrate fossils from the Carboniferous and Devonian rocks of Ohio. – Proceedings of the Academy of Natural Sciences of Philadelphia (for 1871): 57–93.

Meek, F. B. – Worthen, A. H. (1866): Descriptions of invertebrates. Geological Survey of Illinois, Volume 2, Palaeontology.

– (1867): Contributions to the palaeontology of Illinois and other Western States. – Proceedings of the Academy of Natural Sciences of Philadelphia, 1866, 251–275.

Miller, S. A. – Gurley, W. F. E. (1897): New species of crinoids, cephalopods, and other Paleozoic fossils. – Bulletin of the Illinois State Museum of Natural History, 12:69 pp.

Nalivkin, D. V. (1930): Semilukskie i voronezhskie sloi. Izvestiya glavnogo geologo- razvedochnogo upravleniya, 49(1), 53–93.

– (1941): Gastropody glavnogo devonskogo polya, 227–254. *In: Batalina, M. A.* et al. (eds.), Fauna glavnogo devonskogo polya, Izdatelstvo Akademii Nauk SSSR, Moskva, Leningrad.

– (1947): Klass Gastropoda, 148–155. *In:* Nalivkin, D. V. (editor), Atlas rukovodyashchikh form iskopaemykh faun SSSR, Tom III, Devonskaya Sistema. Moskva, Leningrad, Gosgeolizdat, 245 pp.

– (1951): Fauna verkhnego i srednego devona vostochnogo sklona bashkirskogo urala. Moskva, Gosgeolizdat, 66 pp.

Nettelroth, H. (1889): Kentucky fossil shells; a monograph of the fossil shells of the Silurian and Devonian rocks of Kentucky. – Kentucky Geological Survey, 245 pp.

Perner, J. (1903, 1907, 1911): Gastéropodes. *In* J. Barrande, Systęme silurien du centre de la Bohême. IV, 1–390. Prague.

Portlock, J. E. (1843): Report on the Geology of the County of Londonderry and of parts of Tyrone and Fermanagh. Dublin.

Roemer, F. A. (1843): Die Versteinerungen des Harzgebirges. 40 pp., Hahn'schen Hofbuchhandlung, Hannover.

– (1850): Beiträge zur geologischen Kenntnis des nordwestlichen Harzgebirges. – Palaeontographica, 3:1–67.

Sandberger, G. – Sandberger, F. (1850–1853): Die Versteinerungen des Rheinischen Schichtensystems in Nassau. 1–237. Wiesbaden.

Schlotheim, E. F. (1820): Die Petrefactenkunde auf ihrem jetzigen Standpunkte durch die Beschreibung seiner Sammlung versteinerter und fossiler Überreste des Thier- und Pflanzenreichs der Vorwelt erlautert. 1–436. Gotha.

Shimer, H. W., – Grabau, (1902): Hamilton group of Thedford, Ontario. – Bulletin of the Geological Society of America, 13:149–186.

Sowerby, J. de C. (1826–1829): The Mineral Conchology of Great Britain, Volume 6, printed by Richard Taylor, London.

Tyler, J. H. (1965): Gastropods from the Middle Devonian Four Mile Dam Limestone (Hamilton) of Michigan. – Journal of Paleontology, 39:341–349.

Wenz, W. (1939–1943): Gastropoda, Handbuch der Palaeozoologie, 1–6, 1–1639. O. H. Schindewolf.

Whidborne, G. F. (1889–1892): A monograph of the Devonian fauna of the South of England, Volume 1, The fauna of the limestones of Lummaton, Wolborough, Chircombe Bridge, and Chudleigh. – Palaeontographical Society, London.

White, C. A. (1880): Contributions to invertebrate paleontology, No. 8; Fossils from the Carboniferous rocks of the interior States. U. S. Geological and Geographical Survey Terr. Ann. Rept. 12 (Hayden), pt. 1, 155–171, pls. 39–42 [Advance printing; report issued 1883].

Whiteaves, J. F. (1890): Descriptions of some new or previously unrecorded species of fossils from the Devonian rocks of Manitoba. Transactions of the Royal Society of Canada, Volume VIII, Section IV, 93–110.

– (1892): The fossils of the Devonian rocks of the islands, shores or immediate vicinity of Lakes Manitoba and Winnipegosis. Contributions to Canandian Palaeontology, Volume 1, Part IV, Geological Survey of Canada, 255–359.

Worthen, A. H. (1883): Descriptions of fossil invertebrates. – Illinois Geological Survey, Volume 7, 265–326.

Yochelson, E. L. (1960): Bellerophontacea and Patellacea, Permian Gastropoda of the southwestern United States with notes on Pennsylvanian Bellerophontacea. Bulletin of the American Museum of Natural History, 119:207–294.

Yochelson, E. L., and Kopf, R. W. (1956): A new Devonian spinose platyceratid gastropod. – Journal of Paleontology, 30:1170–1172.

Nové rody devonských gastropodů důležité pro paleogeografické rekonstrukce

V této práci je popsano dvanáct nových gastropodových rodů, které jsou považovány za důležité pro lepší vymezení devonských biogeografických jednotek. Nové rody: *Semilukispira*, *Teutonophon*, *Goldfussoceras*, *Manitobiella*, *Ibergia*, *Humboldtiella*, *Paragnesia*, *Winterbergiella*, *Spiniplatyceras*, *Roemeriella*, *Devononerita*, and *Dahmeria*. Kromě těchto je popsán rovněž nový silurský rod *Ornatosinuitina.*