

SZq 3581

A. A. SCHILEYKO



TREATISE

ON

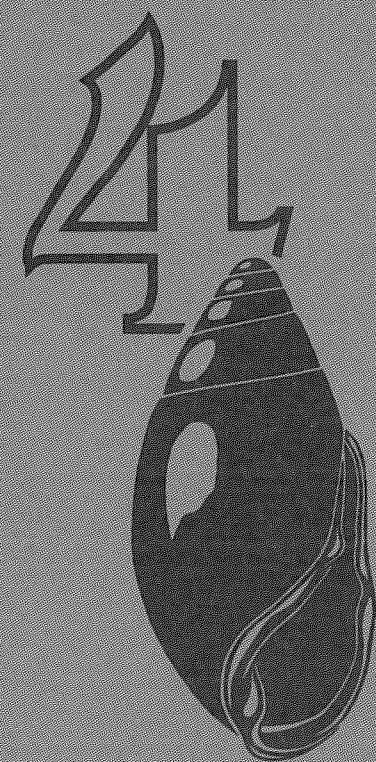
RECENT TERRESTRIAL  
PULMONATE MOLLUSCS

RUTHENICA

SUPPLEMENT 2

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Pt.4  
1999

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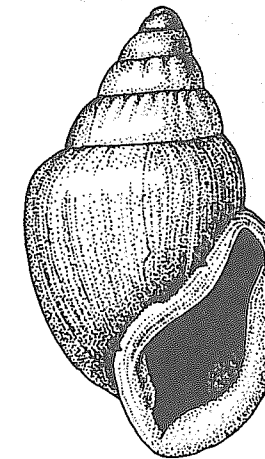


A. A. Schileyko

TREATISE ON RECENT TERRESTRIAL  
PULMONATE MOLLUSCS

Part 4

Draparnaudiidae, Caryodidae, Macrocyclidae,  
Acavidae, Clavatoridae, Dorcasiidae,  
Sculptariidae, Corillidae, Plectopylidae,  
Megalobulimidae, Strophocheilidae,  
Cerionidae, Achatinidae, Subulinidae,  
Glessulidae, Micractaeonidae, Ferrussaciidae



Ruthenica, Supplement 2  
Moscow ♦ December, 1999

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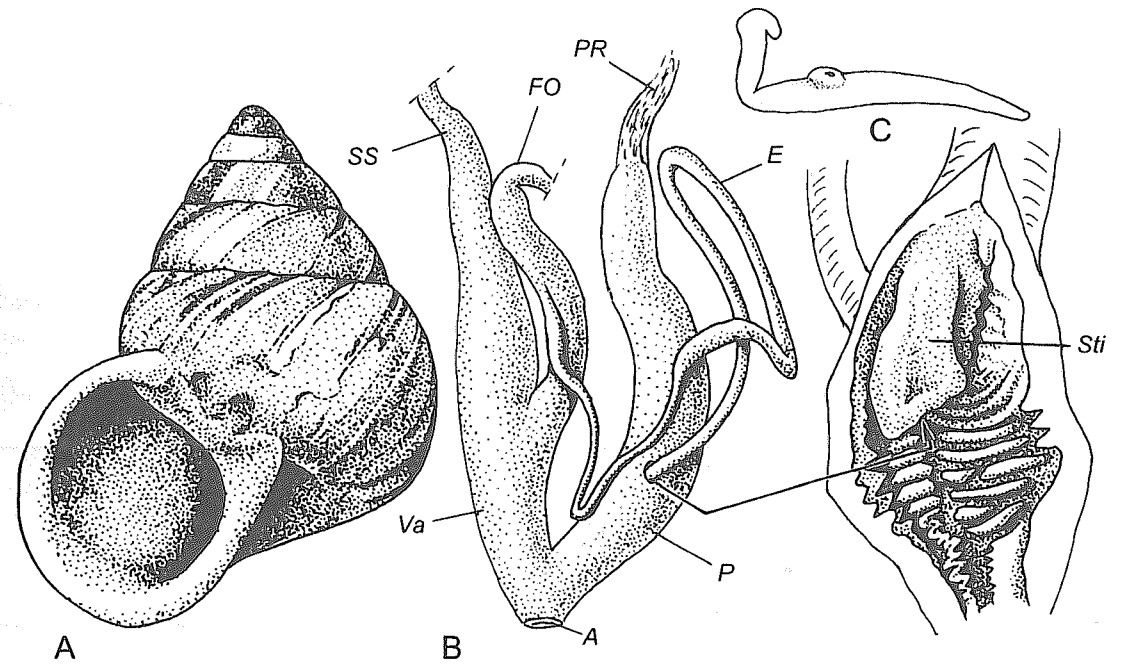


Fig. 567. *Draparnaudia michaudi* Montrouzier, 1859. Oubatche, NW coast of New Caledonia, September 16, 1965. A — shell. B — distal parts of reproductive tract and interior of penis. Vienna. C — ! *Draparnaudia singularis* (Reeve, 1854). Spermatophore. After Tillier & Mordan, 1995.

Correction to part 3:

On p. 368, right column, the name *Cylindrellidae* was three times mentioned. This spelling is a typographic error, must be *Cylindrellidae*.

short to very short rounded flagellum. Penial retractor inserted apically to flagellum. Reservoir of spermatheca without apical ligament.

DISTRIBUTION. New Caledonia and New Hebrides (thought to result from introductions).

Addition to Partuloidea:

DRAPARNAUDIIDAE Solem, 1962

Solem, 1962: 219 (Enidae subfam.). Tillier & Mordan, 1995: 47 (as *Draparnaudidae*).

Shell sinistral, medium-sized, turbanate to globose-conic. Aperture margins more or less reflexed. Parietal wall without tooth. Columellar margin dilate, simple.

Sole with median groove. Jaw crescent shaped with very weak vertical striae.

Kidney long, orthurethrous, ureters open.

Prostate of many large elongated acini, comparatively long, vas deferens arising at some distance from albumen gland; spermoviduct of moderate length. Penis with

*Draparnaudia* Montrouzier, 1859  
 Fig. 567

Montrouzier, 1859: 288. Tillier & Mordan, 1995: 56.

TYPE SPECIES — *Draparnaudia michaudi* Montrouzier, 1859; monotypy.

Shell rather thin to solid, mat, of 5-7 convex whorls; last whorl sometimes carinated. Color dark-brown to corneous, often with variously developed whitish streaks. Embryonic whorls smooth, later with irregular radial lines. Aperture rounded, strongly oblique, peristome insertions more or less drawn together. Umbilicus round, narrowly open. Height 4.4-13.7, diam. 3.8-10.0 mm (10.2 × 8.1 mm).

Talon hidden in albumen gland. Vas deferens rather short, passing into epiphallus apically. Epiphallus long, cylindrical, somewhat wider than vas deferens. Penis (rather) short, bulky, internally with complex relief of irregular, strong, sometimes corrugated longitudinal folds which in basal section more or less distinctly broken into series of short, elongated tubercles. Pore of epiphallus opens on or under fleshy pad (stimulator) of various shape. Flagellum short to rather long, stout, with terminal retractor. Free oviduct and vagina of about equal length. Basal part of spermathecal stalk more or less swollen, reservoir not large.

In *D. singularis* (Reeve, 1854), Tillier & Mordan (1995) have found a spermatophore situated in base of spermathecal stalk and extended into vagina: it is cylindrical, soft, with smooth surface, tapering towards both ends which are blunt and rounded; more or less at its centre there is a short, rounded outgrowth.

DISTRIBUTION. As in family. 6 spp.

#### ACAVOIDEA Pilsbry, 1894

Pilsbry, 1894 (1893-1895): xxxii (Helicidae subf.).

Shell dextral, medium to rather large, helicoid to nearly flat or bulimuloid, with more or less enlarged embryonic whorls. Aperture and columella without teeth or lamellae; rarely with columellar tubercle or short parietal lamella.

Jaw aulacognathous, thin, smooth or weakly vertically striated, sometimes with median projection.

Kidney short, of mesurethral type, primary ureter mostly completed, secondary ureter as a ciliary groove.

Reproductive tract simple, without appendages; only rarely with short flagellum, penial caecum or vaginal appendix. Penis internally often with complex relief, sometimes with verge or stimulator(s). Penis sheath absent. Spermathecal stalk without diverticle, more or less enlarged basally, adherent to spermoviduct and often bound to it by thick, well developed membrane.

DISTRIBUTION. S Africa, Madagascar, Seychelles, Ceylon, Australia, Tasmania, New Guinea, S America.

#### CARYODIDAE Thiele, 1926

Thiele, 1926: 145.

— Anoglyptidae Iredale, 1937: 14 (nom. nud.); Allen, 1950: 375.

— Pedinogyridae Iredale, 1937: 15.

— Hedleyellidae Iredale, 1937: 17.

Shell flattened to bulimuloid or auriculate, medium to large, variously sculptured, aperture toothless.

Vas deferens tightly or loosely adherent to penis. Flagellum mostly absent (in 1 genus present). Epiphallus present or wanting. Penis of various length, internally with deep, regular grooves, sometimes with verge. Vagina often with digitate appendix. Spermathecal stalk rather long, often bound to spermoviduct, its basal part not or slightly enlarged.

DISTRIBUTION. Australia, Tasmania, New Guinea.

#### *Anoglypta* Martens, 1860

Fig. 568

Martens in Albers, 1860: 312 (*Helix* Gruppe).

TYPE SPECIES — *Helix launcestonensis* Reeve, 1853; OD.

Shell trochoid, quite solid, lusterless, of 5-5.5 moderately convex whorls; last whorl rather deeply and abruptly deflecting behind aperture, with angled periphery. Color corneous, with two whitish bands: one (narrow) on keel, the other (wide) — on shell base. Embryonic whorls finely spirally lirate, sculpture of subsequent whorls complex: most prominent elements — spiral cords; largest of them occupying periphery (keel). These cords, especially on lower spire, interrupted into separate tubercles. Among cords there are fine spiral threadlets. Besides, radial irregular incised lines visible. Basal surface with combination of fine spiral and radial striation. Aperture rounded, strongly oblique, with simple margins; basal and columellar margins somewhat expanded. Umbilicus cylindrical, moderately broad. Height 19-20 diam. 30-32 mm (19.8 × 32.0 mm).

Vas deferens firmly bound to vagina and penis. Flagellum very short. Penis moderately long, internally with strong longitudinal ridges, without verge. Penial retractor

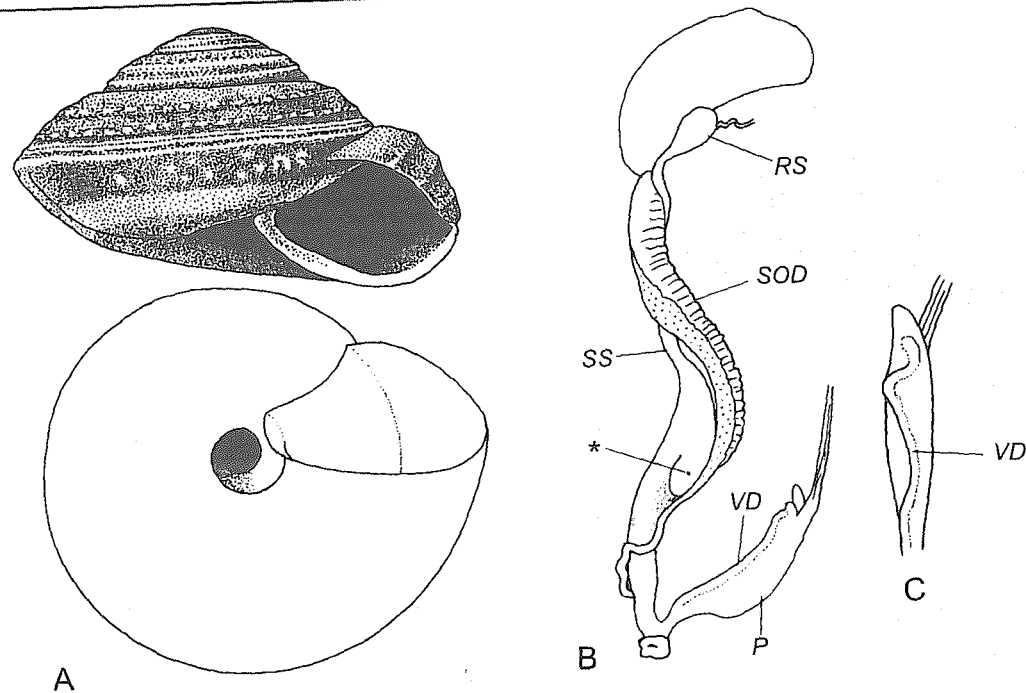


Fig. 568. *Anoglypta launcestonensis* (Reeve, 1853). A — shell: Tasmania. SPb. B — reproductive tract. C — lateral view of penis. After Pilsbry, 1894 (1893-1895). Asterisk — blind sac of spermathecal stalk.

arising on diaphragm, attached subapically. Spermathecal stalk long, slender, closely bound to spermoviduct; basal part enlarged, with muscular walls, bears short blind sac, directed downwards. Ovate reservoir on basal section of albumen gland.

DISTRIBUTION. NE Tasmania. 1 sp.

#### *Pedinogyra* Martens in Albers, 1860 Fig. 569

Martens in Albers, 1860: 162 (*Helix* subg.).

TYPE SPECIES — *Helix cunninghami* Gray, 1834; OD.

Shell much flattened, solid, opaque, somewhat glossy, of 5-6 slightly convex whorls; last whorl deeply deflexed in front, with maximal width below mid-line. Color corneous, with several brown bands. Embryonic whorls smooth, later whorls irregularly and weakly radially striated; there are also spiral incised lines, very weak on upper side, better expressed on shell base, and best visible on slopes of umbilicus. Aperture strongly oblique, places of its insertion ap-

proached and connected by thick white callus. Margins somewhat thickened and shortly reflexed. Umbilicus very broad. Height 18-24, diam. 45-65 mm (20.2 × 50.0 mm).

Jaw smooth, without median projection, faintly striated vertically and longitudinally. Kidney ovate, primary oviduct complete, with slit-like opening, lies on surface of kidney. Secondary ureter open.

Talon, an enlarged distal part of hermaphroditic duct. Vas deferens thin, bound to vagina and penis, entering epiphallus terminally. Epiphallus thin-walled, of loose alveolar structure. Penis subcylindrical, rather long. Internally penis with minute conic verge. Penial retractor inserted at penis/epiphallus junction. Vagina with long appendix located opposite to base of spermathecal stalk. Free oviduct and vagina rather long. Internally vagina with thin longitudinal folds, some of them run into spermathecal stalk, some — to free oviduct, some — to vaginal appendix. Spermathecal stalk slender, reservoir spherical, fastened to floor of lung cavity opposite to pericardium.

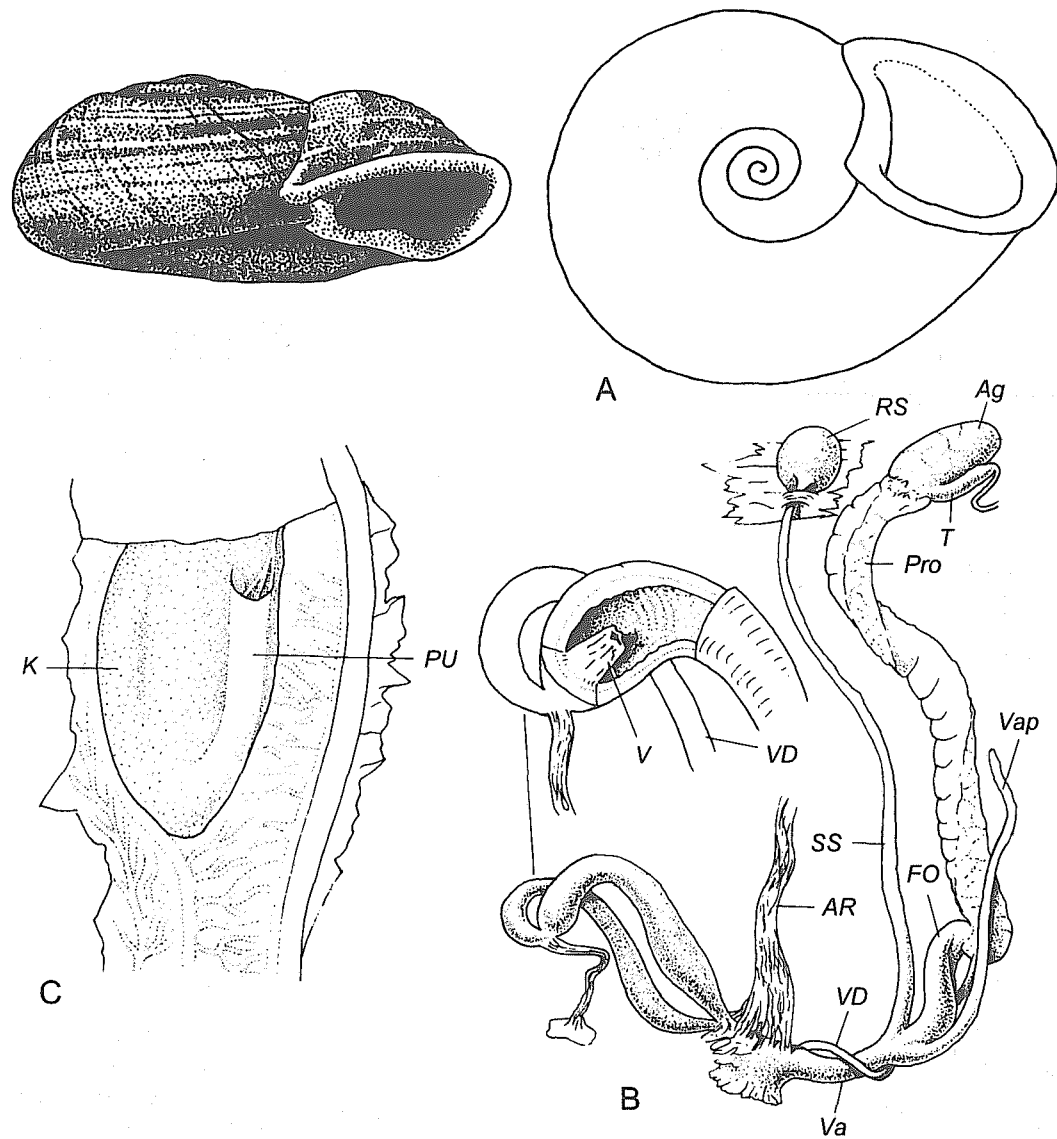


Fig. 569. *Pedinogyra cunninghami* (Gray, 1834).  
A — shell: Queensland. SPb. B, C — "Australien, Nangengo bei Kingoroi, Queensland".  
Vienna No. 86619. B — reproductive tract and interior of penis. C — excretory apparatus.

DISTRIBUTION. E Australia (Queensland, New South Wales), New Guinea. 5 spp.

*Caryodes* Albers, 1850  
Fig. 570

Albers, 1850: 141 (*Bulimus* subg.).

TYPE SPECIES — *Bulimus dufresnii* Leach, 1815; monotypy.

Shell elongated-ovate, thin but firm, of 5 slightly convex whorls; last whorl nearly straight. Color yellowish to brownish, with dark peripheral band margined above and below by light zones. Embryonic whorls smooth, later whorls with weak radial irregular wrinkles that become coarser below suture, especially on body whorl. Aperture ovate, with simple, somewhat thickened margins; columellar margin slightly dilate.

Umbilicus closed. Height 30-50, diam. 18-28 mm (39.5 × 25.3 mm).

Jaw arcuate, smooth, without median projection.

Talon minute, exposed. Vas deferens not bound to penis, entering at sharp angle. Flagellum relatively long, with rounded tip. Penis consists of globular proximal and cylindrical distal portions, former internally with quite distinct, regular, narrow, longitudinal slits. Penial retractor attached to globular portion of penis by several bundles. Free oviduct short, vagina noticeably longer. Atrial retractor very strong. Spermathecal shaft long, with stout diverticle tightly bound to spermoviduct.

DISTRIBUTION. Tasmania excluding Bass Strait islands. 1 sp.

*Pygmipanda* Iredale, 1933  
Fig. 571

Iredale, 1933: 39.

TYPE SPECIES — *Bulimus atomatus* Gray, 1834; OD.

Shell ovate, rather solid, slightly translucent, of about 5 rather convex whorls. Last whorl straight. Ground color ivory, with fulvous-reddish radial streaks. Embryonic whorls covered with very vague malleation. Subsequent whorls with weak radial striae and thin but distinct spiral engraved lines; these spirals more or less wavy on body whorl. Aperture rounded, moderately oblique, with thin, simple or a little reflexed margins. Umbilicus closed. Height 50-60, diam. 25-30 mm (56.2 × 28.2 mm).

Jaw arcuate, nearly smooth, with or without slight median projection.

Talon exposed, short. Vas deferens short, entering subcylindrical epiphallus apically. Epiphallus internally with fleshy longitudinal cord adnate along one side and passing into penis, and there expanding into peculiar verge. Penis stout, elongated, of irregular shape, internally with several weak longitudinal fleshy folds. Penial retractor arising from columellar retractor, attached to penis terminally. Free oviduct swollen. Spermathecal stalk of moderate length, reservoir ovate. Long vaginal appendix situated opposite to base of spermatheca.

DISTRIBUTION. NE Australia. 2 spp.

*Hedleyella* Iredale, 1914  
Fig. 572

Iredale, 1914: 174 (nom. nov. pro *Panda* Martens in Albers, 1860).

— *Panda* Martens in Albers, 1860: 149 [nom. praecoc., non Van Heyden, 1826 (Acarina); *Helix* subg.; t.-sp. *Helix falconeri* Gray, 1834; OD].

TYPE SPECIES — *Helix falconeri* Gray, 1834; OD.

Shell subglobose, rather thin, of about 4.5 convex, slightly shouldered whorls. Body whorl very large, rounded, not descending in front or slightly and gradually deflected. Apex rounded. Color brownish-yellow to chestnut, with several narrow darker bands. Embryonic whorls granulated; subsequent with fine radial and spiral striation and malleate-vermiculate sculpture. Aperture large, widely ovate, with simple margins; columellar margin reflexed. Umbilicus narrow, closed partially or completely. Height 30-85, diam. 28-80 mm (75.2 × 72.0 mm).

Vas deferens short, entering epiphallus apically. Epiphallus subfusiform, thick-walled, internally with longitudinal folds. Penis consists of globular proximal and elongated distal parts. Inner surface of distal part furnished with spirally directed, sharp, deep grooves on one side and corresponding ridges on opposite side; thus, in intact penis a peculiar valve arises, isolating cavity of atrium from cavity of globular section. Inner surface of latter covered with numerous, rounded tubercles. Penial retractor attached to penis/epiphallus junction by several arms. Free oviduct rather short, supplied with its own retractor. Vagina noticeable enlarged, coated by numerous fibres. Spermathecal stalk tapering, slightly expanded towards its base. Reservoir reaching albumen gland.

DISTRIBUTION. Queensland, New South Wales. 2 spp.

*Brazieresta* Iredale, 1933  
Fig. 573

Iredale, 1933: 39.

TYPE SPECIES — *Bulimus larreyi* Brazier, 1871; OD.

Shell elongated-ovate, thin, fragile, very translucent, dull, of 3.5 flattened whorls.

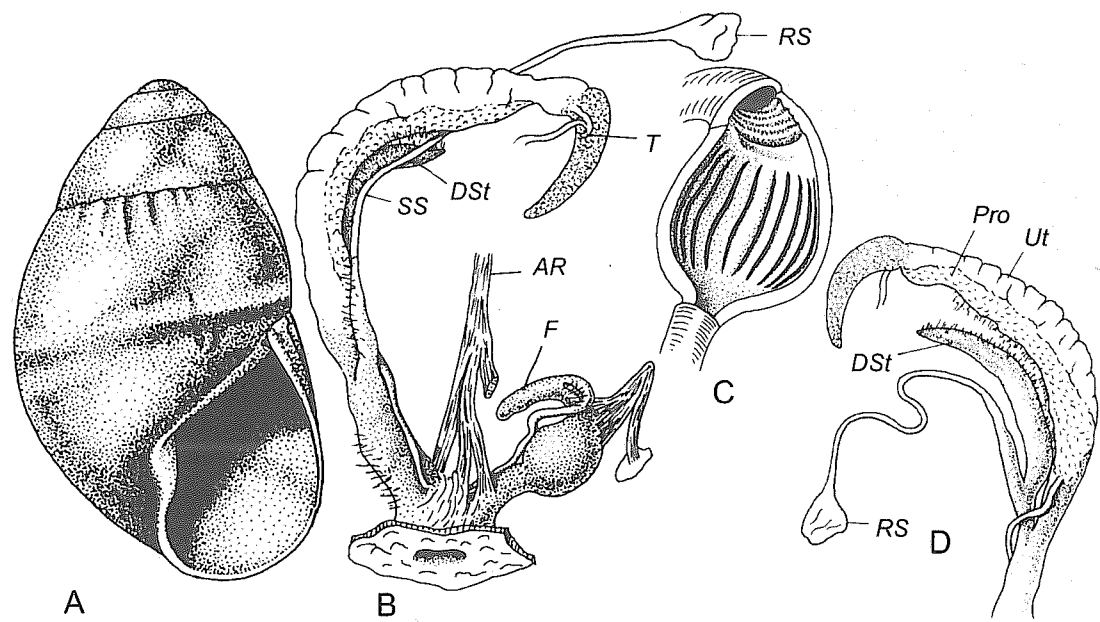


Fig. 570. *Caryodes dufresnii* (Leach, 1815).  
A — shell. B — reproductive tract. C — interior of penis. D — spermoviduct and spermatheca showed from opposite side. Tasmania. Vienna No. 29.343.

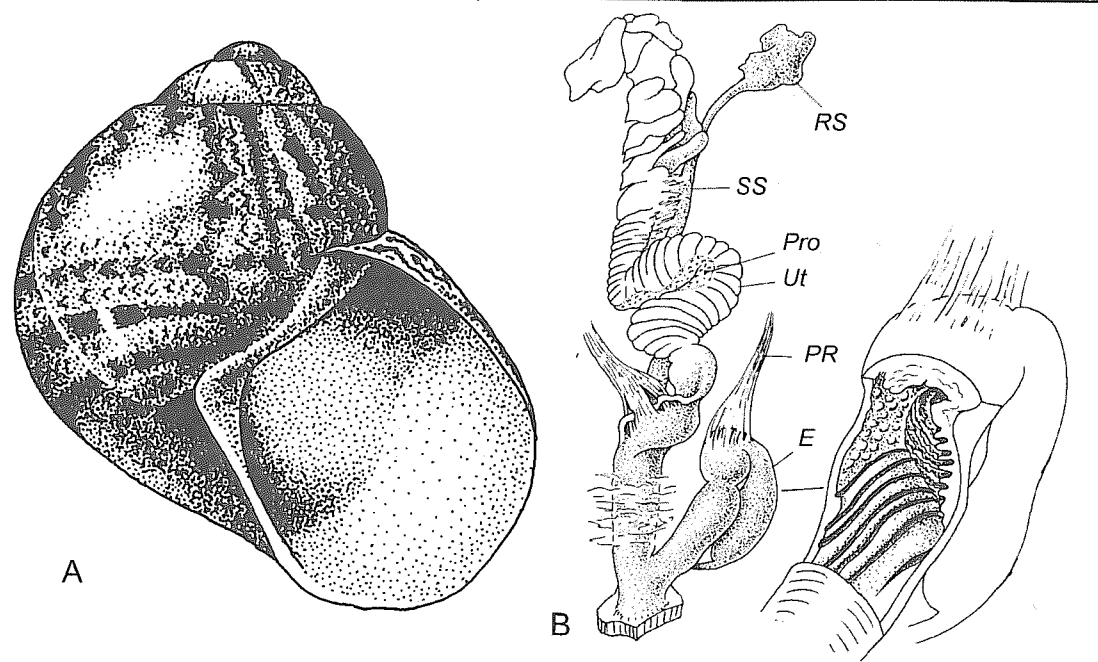


Fig. 572. *Hedleyella falconeri* (Gray, 1834).  
A — shell: Australia. SPb. B — reproductive tract and interior of penis. New South Wales. 1839. Paris.

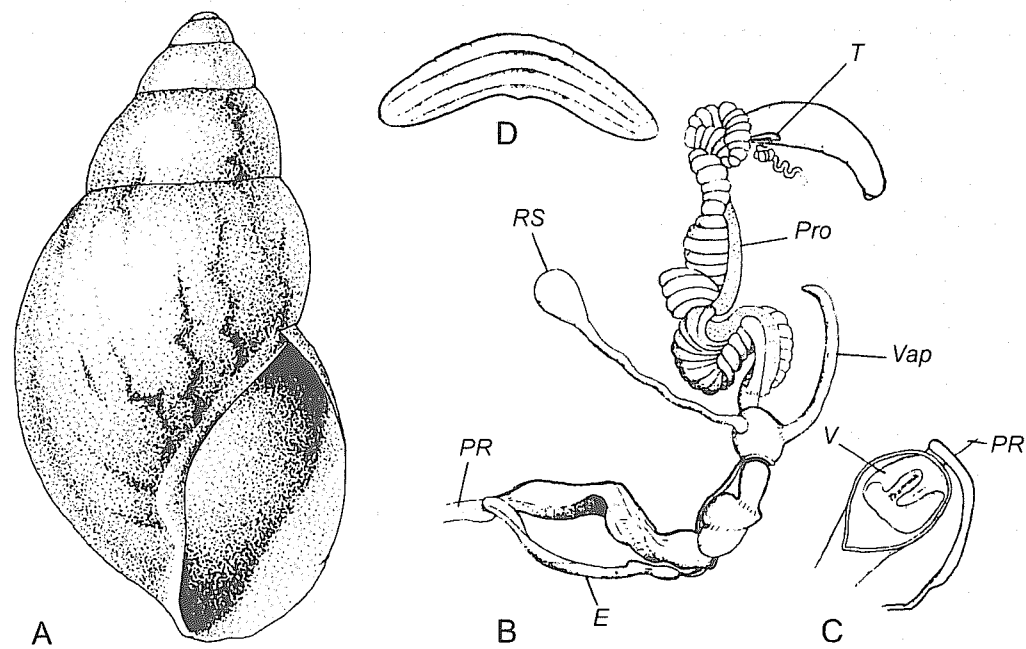


Fig. 571. *Pygmipanda atomata* (Gray, 1834).  
A — shell: Eastern coast of Australia. StB. B — reproductive tract. C — interior of penis. D — jaw. After Pilsbry, 1894 (1893-1895).

Last whorl straight, evenly rounded. Color dull yellow (ochraceous), with spiral bands broken into rows of reddish-brown spots. Embryonic sculpture of coarse reticulation because of crossing spiral, somewhat wavy lines and anastomosing radial wrinklelets. Later whorls covered with extremely fine, scarcely visible even at magnification, microscopical granulation; but superficially surface looking smooth. Aperture large, subvertical, with thin margins. Umbilicus absent. Height up to 23, diam. up to 17 mm (20.1 × 15.6 mm).

DISTRIBUTION. New South Wales. 1 sp.

*Pandofella* Iredale, 1933  
Fig. 574

Iredale, 1933: 39.

TYPE SPECIES — *Panda whitei* Hedley, 1912; OD.

Shell somewhat succinoid, ear-shaped, thin, fragile, of about 3 slightly convex whorls. Last whorl straight. Spire very short. Color white or yellowish, with 3-5 dark narrow bands broken into series of elongated spots. Regular sculpture absent. Aperture

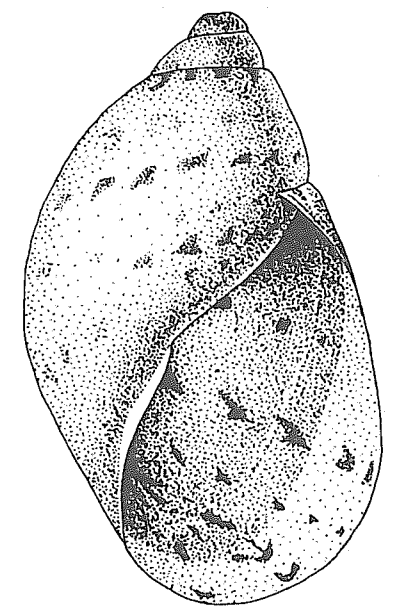


Fig. 573. *Brazieresta larreyi* (Brazier, 1871).  
New South Wales. Vienna.

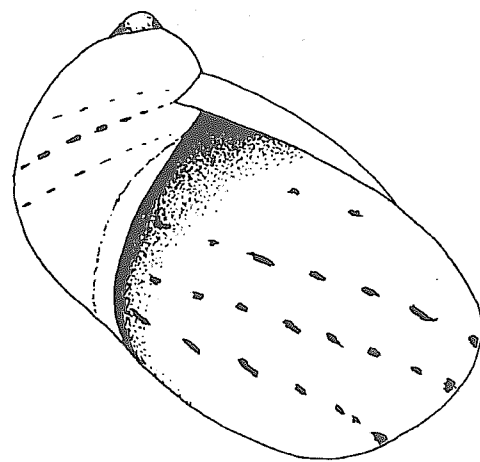


Fig. 574. *Pandofella whitei* (Hedley, 1912).  
After Bishop, 1981.

4.5-5 convex whorls. Last whorl deeply descending in front. Color yellowish, olive-greenish or brownish-yellow. Embryonic whorls smooth, later whorls with fine, dense radial striae and more or less distinct spiral grooves. Aperture ovate, quite oblique, pearly within, with thin, narrowly expanded throughout, reflexed below margins. Umbilicus very broad, quite perspective. Height 15-20, diam. 40-60 mm (Leiden: 19.0 × 41.2; Geneva: 15.2 × 26.7 mm).

Talon hidden. Vas deferens bound to vagina, inserts on upper section of penis subapically. Upper section rather small, subglobular; lower cylindrical. Penial retractor attached to lower section of penis at short distance from upper one. Free oviduct very short, vagina comparatively long. Spermathecal stalk subcylindrical, reservoir moderately long, poorly defined, not reaching albumen gland.

DISTRIBUTION. Chile (Maule to Chiloé). 1 sp. with few forms.

ample, patulous, with simple margins. Columellar margin evenly concave. Umbilicus absent. Height 20-22, diam. 19-22 mm.

DISTRIBUTION. Queensland. 1 sp.

#### MACROCYCLIDAE Thiele, 1926

Thiele, 1926: 145.

Shell flattened, rather large (diameter up to 60 mm). Periostacrum often persistent. Animal with labial lobes.

Jaw rather thin, smooth, vertically striated or with weak ribs.

Flagellum absent, vas deferens inserted on upper subglobular end of penis.

DISTRIBUTION. Chile.

#### *Macrocyclus* Beck, 1837

Fig. 575

Beck, 1837: 24 (*Helix* subg.).

TYPE SPECIES — *Helix laxata* Férussac, 1822 (= *Helix peruviana* Lamarck, 1822); SD Albers, 1950.

Shell flattened, rather thin, shining, of

#### ACAVIDAE Pilsbry, 1894

Pilsbry, 1894 (1893-1895): xxxii (*Helicidae* subf.).

Shell medium to large, helicoid, bulimuloid or flattened, without strong sculpture. Embryonic shell relatively very large. Aperture toothless or columellar tubercle present.

Jaw thin, aulacognathous.

Kidney sigmurethral, with completed or partially open ureters.

Vas deferens mostly adhering to penis. Flagellum absent or very short. Epiphallus absent or short. Penis short, bulky, internally with longitudinal folds and often with stimulator(s). Sometimes there is penial appendix. Penial retractor attached terminally. Vagina without appendix. Spermathecal shaft long to short, swollen basally and/or in mid-section, bound to spermooviduct by numerous fibres.

DISTRIBUTION. Ceylon, Madagascar, Seychelles.

#### *Acavus* Montfort, 1810

Fig. 576

Montfort, 1810: 234.

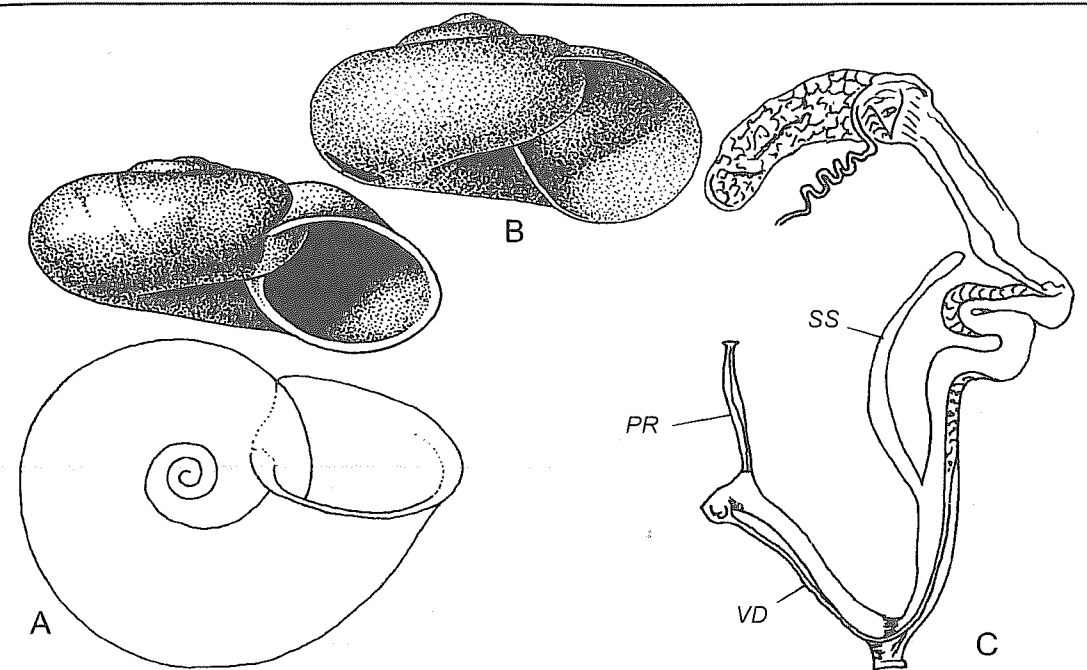


Fig. 575. *Macrocyclus peruviana* (Lamarck, 1822).  
A — shell: Chiloé Prov., Chiloé Island, Puntra, Chile. Leiden. B — holotype (immature shell). Geneva No. 1091/29. C — reproductive tract. After Ihering, 1912.

TYPE SPECIES — *Helix haemastoma* Linnaeus, 1758; OD.

Shell globose-depressed or globose-trochoid, quite solid, glossy, of 4-5 moderately convex whorls. Last whorl gradually but deeply descending in front. Embryonic whorls greatly enlarged. Color bright, usually brownish to rich chestnut, often with milky-white broad band; aperture margins yellowish to pink. Embryonic whorls smooth, later sculptured with weak, irregular radial wrinklets. Aperture generally subquadrangular, very oblique, with expanded and more or less thickened margins. Umbilicus absent. Height 25-38, diam. 38-58 mm (38.0 × 43.3 mm).

Jaw rather strong, smooth, without median projection.

Talon relatively long. Vas deferens tightly adherent to distal section of female division and penis, entering subapically or well below. Penis bulky, of irregular shape, internally with very strong longitudinal pilasters. Orifice of vas deferens located at mid-section of penis and surrounded by circular or subcircular thickening. Penial retractor attached terminally. Free oviduct rather long, stout, with fleshy walls. Atrial

retractor well developed. Spermatheca entering female duct very low, thus vagina very short. Spermathecal shaft swollen at mid-section; upper part of spermatheca above swelling sometimes rudimentary.

DISTRIBUTION. Ceylon. About 10 spp. & forms.

#### *Oligospira* Ancey, 1887

Fig. 577

Ancey, 1887: 22.

— *Acavella* Jousseaume, 1894: 288 (t.-sp. *Helix skinneri* Reeve, 1854; designated here).

TYPE SPECIES — *Helix valtoni* Reeve, 1842; SD Pilsbry, 1894.

Shell strongly flattened, solid, glossy or dull, of 3.25-3.5 slightly convex whorls. Last whorl strongly but gradually descending in front, evenly rounded at periphery. Color yellow or greenish-gray, with variously developed darker bands; aperture inside and/or its margins black, dark-brown or violet. Embryonic whorls distinctly, microscopically reticulate, subsequent whorls with same type of sculpture; basal surface

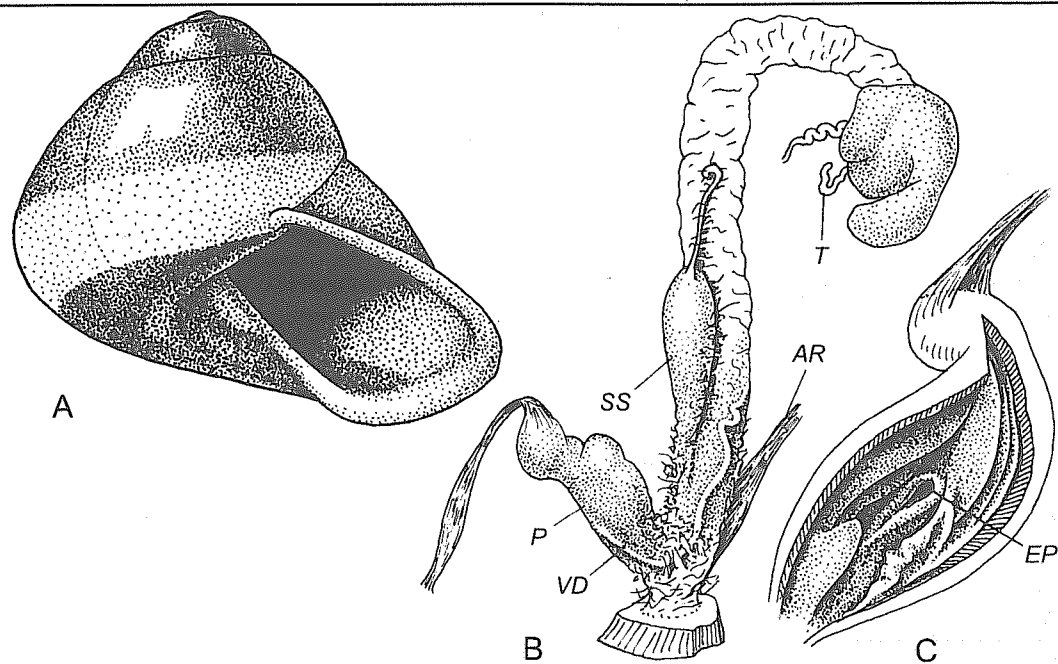


Fig. 576. A — *Acavus haemastomus* (Linnaeus, 1758). Shell: Ceylon. Moscow No. Lc-19590. B, C — ! *Acavus phoenix* (L. Pfeiffer, 1854). B — reproductive tract. C — interior of penis. Kottawa, Ceylon, December 9, 1973. Vienna.

smooth. Aperture ovate, strongly oblique, with thickened and reflexed margins; sometimes peristome strongly thickened and surrounded by sort of cuff. Umbilicus absent. Height 17-30, diam. 31-59 mm (*valtoni*: 28.2 × 53.2; *skinneri*: 22.2 × 36.1 mm).

Talon exposed, small. Vas deferens not adherent, entering penis laterally. Penis slender, subcylindrical. Penial retractor attached to vas deferens/penis junction. Free oviduct and vagina short, swollen. Spermathecal stalk very short.

DISTRIBUTION. Ceylon. 2 spp.

*Stylodon* Beck, 1837  
Fig. 578

Beck, 1837: 46.

— *Pachya* Albers, 1850: 107 (in part; *Helix* subg.; t-sp. *Helix unidentata* Chemnitz, 1795; designated here).

TYPE SPECIES — *Helix unidentata* Chemnitz, 1795; SD Martens in Albers, 1860.

Shell (sub)globose, solid, of about 5 convex whorls; last whorl slightly and

gradually deflected, rounded or slightly angled. Color uniformly chestnut. Embryonic whorls enlarged, with spiral striae, subsequent with delicate granulation. Aperture somewhat rounded, oblique, margins slightly reflexed and thickened; columellar margin bears more or less developed oblique tubercle or lamella. Umbilicus closed. Height 25-32, diam. 30-40 mm (29.2 × 35.3 mm).

Jaw thin, scarcely vertically and longitudinally striated, with very weak median projection.

Talon not visible externally. Vas deferens tightly adherent to free oviduct, vagina and penis, entering penis subapically. Penis internally with longitudinal folds subdivided into rows of tubercles in upper portion; in the same portion there is large slit-like opening of vas deferens surrounded by circular thickening. Penial retractor very strong, attached terminally. Spermathecal duct enters very low, thus vagina practically absent; basal part of duct somewhat swollen. Reservoir voluminous, not attending albumen gland.

DISTRIBUTION. Seychelles. 2 spp.

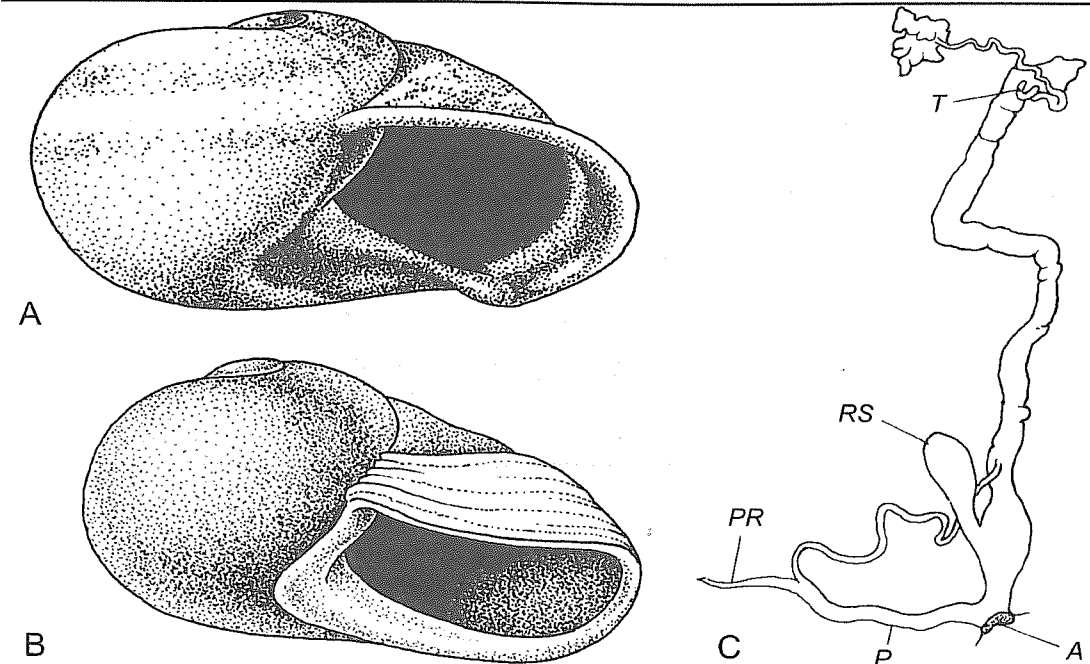


Fig. 577. A — *Oligospira valtoni* (Reeve, 1842). Shell: Ceylon. Phil. No. 1378. B, C — ! *Oligospira skinneri* (Reeve, 1854). B — shell: Ceylon. Bern No. 1696.506 (Cum. No. 1.1854). C — reproductive tract. After Semper, 1870.

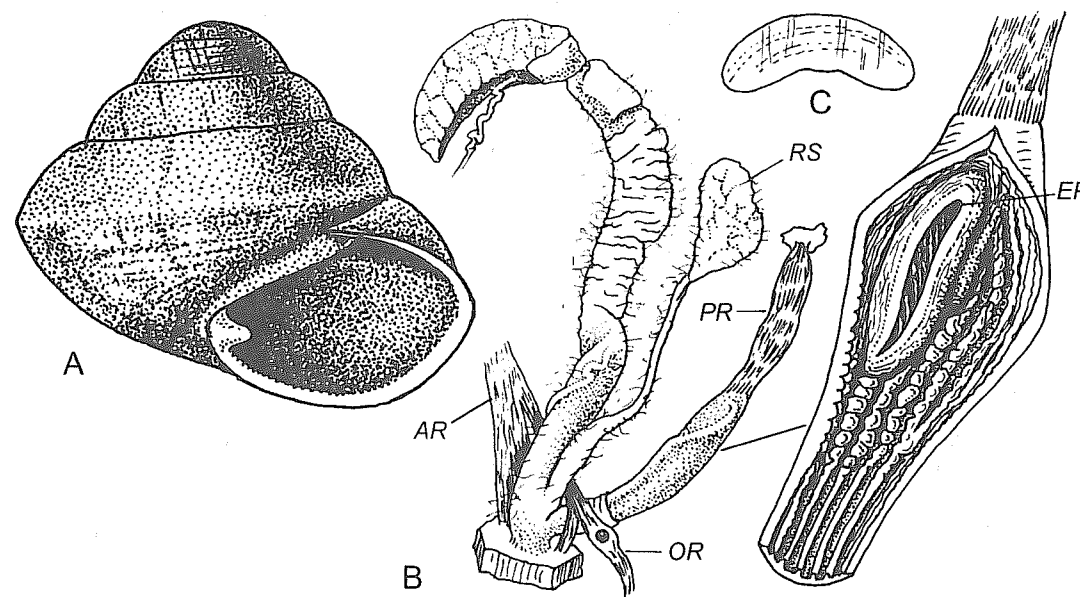


Fig. 578. *Stylodon unidentatus* (Chemnitz, 1795). Silhouette Island, Seychelles, August 23, 1984. A — shell. B — reproductive tract and interior of penis. C — jaw. Moscow No. Lc-12915.



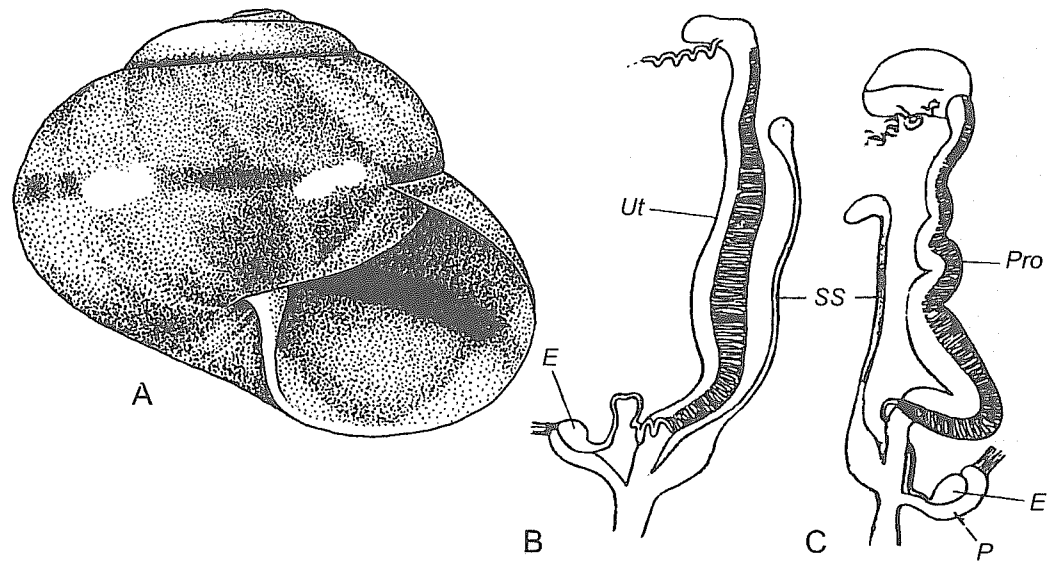


Fig. 579. *Ampelita (Eurystyla) cerina* (Morelet, 1877).  
A — shell: Madagascar. Phil. No. 32916. B, C — reproductive tract of two specimens. After Fischer-Piette & Garreau de Loubresse, 1965.

*Ampelita* Beck, 1837

Beck, 1837: 30 (*Helix* subg.). Emberton, 1990: 106.

TYPE SPECIES — *Helix lanx* Férussac, 1821; SD Martens in Albers, 1860.

Shell depressed to high-spined, thin to solid, of about 5 flattened to moderately convex whorls. Last evenly rounded to sharply carinate. Color various, often with 1-2 dark bands. Embryonic whorls generally smooth, later with fine to coarse radial sculpture, sometimes surface granulated and hirsute. Aperture ovate, often rostrate, with somewhat thickened and slightly expanded margins. Umbilicus broadly open to closed.

Epiphallus absent or bulbous, thin-walled, and adherent to side of penis. Penial lateral appendix present or absent. Penial retractor attached apically. Atrial protruding appendix may be present. Spermathecal shaft swollen at its base and/or in mid-section.

DISTRIBUTION. Madagascar.

*Ampelita (Eurystyla) Ancy, 1887*  
Fig. 579

Ancy, 1887: 39.

— *Poecilostylus* Pilsbry, 1890: 56 [nom. nov. pro *Eurystyla* Ancy, 1887, non *Eurystylus* Stål, 1870 (Insecta)].

Emberton, 1990: 107.

TYPE SPECIES — *Helix cerina* Morelet, 1877; SD Pilsbry, 1890.

Shell globose to high-spined, body whorl rounded. Embryonic whorls generally smooth. Umbilicus closed. Height 16-29, diam. 21-23 mm (16.0 × 21.0 mm).

Talon hidden. Vas deferens short, free. Epiphallus swollen, thin-walled, adherent to side of penis. Penis short, not swollen. Penial retractor attached to penis at its junction with epiphallus. Penial lateral appendix and atrial protruding appendix absent. Spermathecal duct swollen at its base or in mid-section.

DISTRIBUTION. Madagascar. 3 spp.

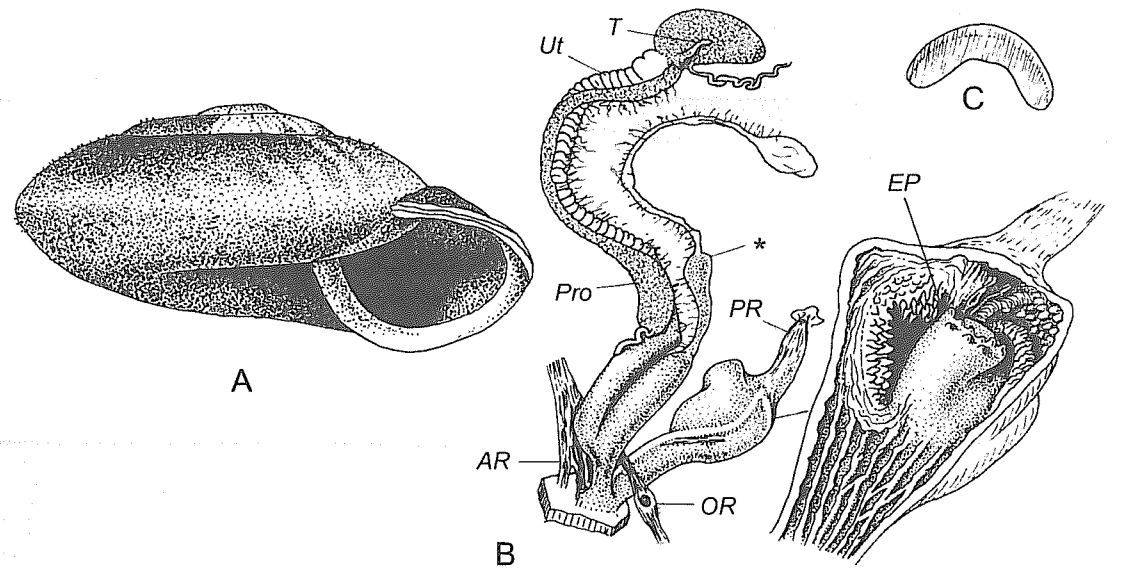


Fig. 580. ! *Ampelita (Ampelita) granulosa* (Férussac, 1851).  
A — shell. B — reproductive tract and interior of penis. C — jaw. Montagne des Français near Anciranana (Diego-Suarez), January 1, 1984. Moscow No. Lc-12917 (dry shells), Lc-20067 (alcohol specimens). Asterisk — place where mass of spermatozoa has been found.

*Ampelita (Ampelita) s. str.*  
Fig. 580

Shell depressed, body whorl rounded to keeled. Embryonic whorls generally smooth. Umbilicus broadly to moderately open. Height 11-32, diam. 25-65 mm (19.3 × 39.1 mm).

Jaw thin, vaguely vertically striated, with or without very weak median projection.

Talon exposed, thin, finger-shaped. Vas deferens tightly adherent to penis laterally. Epiphallus absent. Penis irregularly clavate, its lower part internally with numerous, thin, longitudinal folds, that anastomosing locally. Upper portion of penis enlarged, densely lined with numerous pointed papillae and containing fleshy stimulator furnished with tubercles. Pore of vas deferens situated above base of stimulator. No penial lateral appendix or atrial protruding appendix. Spermathecal duct swollen at its base and/or in mid-section; I found dense mass of spermatozoa in mid-section enlargement.

DISTRIBUTION. Madagascar. 40 spp.

? *Ampelita (Xystera) Emberton, 1990*  
Fig. 581

Emberton, 1990: 107.

TYPE SPECIES — *Helix xystera* L. Pfeiffer, 1841; OD.

Shell depressed, body whorl sharply keeled. Embryonic whorls generally smooth. Remaining whorls with fine radial wrinkles and often with delicate spiral striation. Umbilicus moderately to narrowly open. Height 14-25, diam. 29-64 mm (16.5 × 40.0 mm).

Talon hidden. Vas deferens adherent to penis. Epiphallus wanting. Penis short, bulky. No penial lateral appendix. Atrial protruding appendix present. Spermathecal duct swollen at its base or in mid-section.

REMARK. I would suggest that the so-called "atrial protruding appendix" is just a protruded penial stimulator in the specimen dissected by Pilsbry (1894 (1893-1895), pl. 51a, figs. 1, 2, 3, 6) (compare with description and figure of *Ampelita* s. str.: fig. 580). If so, the subgeneric name *Xystera* is a synonym of *Ampelita* s. str.

DISTRIBUTION. Madagascar. 8 spp.

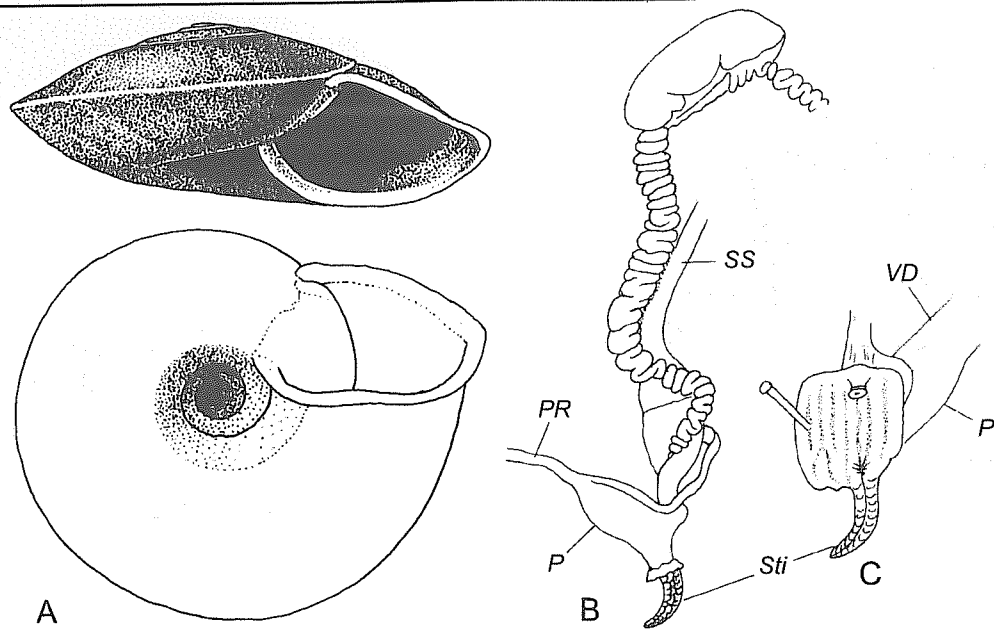


Fig. 581. *Ampelita (Xystera) xystera* (L. Pfeiffer, 1841).  
A — shell: Madagascar. Phil. No. 45611. B — reproductive tract. C — interior of atrium.  
After Pilsbry, 1894 (1893-1895).

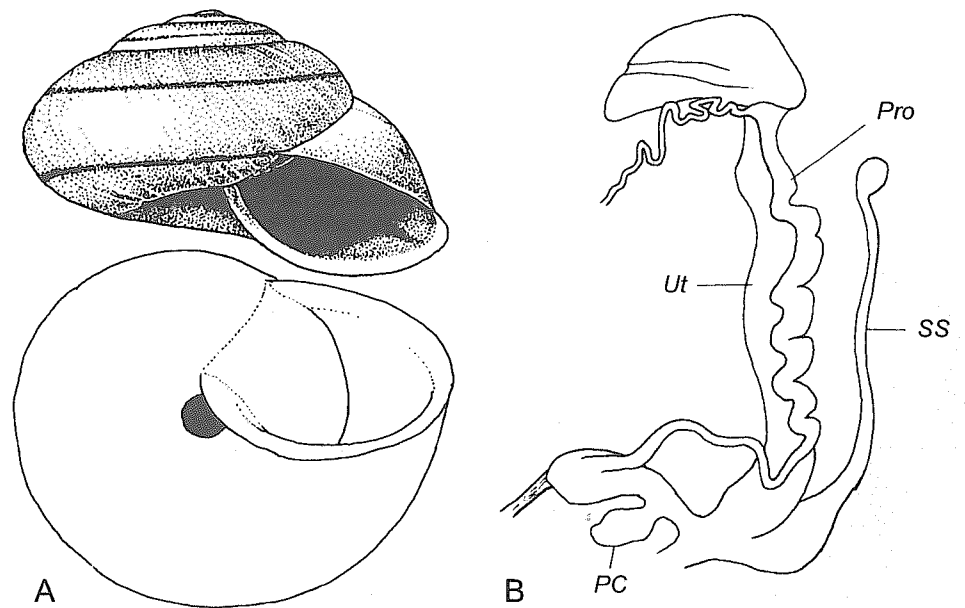


Fig. 582. *Ampelita (Vescona) robillardi* (Angas, 1876).  
A — shell: "Ex Morelet coll." [Madagascar]. Phil. No. 63592. B — reproductive tract. After  
Fischer-Piette & Garreau de Loubresse, 1965.

*Ampelita (Vescona) Emberton, 1990*  
Fig. 582

Emberton, 1990: 107.

TYPE SPECIES — *Helix robillardi* Angas, 1876; OD.

Shell (sub)globose, body whorl rounded. Embryonic whorls generally smooth. Umbilicus narrowly open. Height 17-22, diam. 28-34 mm (20.5 x 31.4 mm).

Epiphallus absent. Penis with sac-like lateral appendix at its base. Atrial protruding appendix absent. Spermathecal duct swollen at its base or in mid-section.

DISTRIBUTION. Madagascar. 10 spp.

*Helicophanta* Férussac, 1821  
Fig. 583

Férussac A., 1821: 29. Emberton, 1990: 110.

TYPE SPECIES — *Helix cornu-giganteum* Chemnitz, 1795 (= *Helix vesicalis* Lamarck, 1822); SD Gray, 1847.

Shell subglobose, moderately thin to thick and ponderous, of 3-4 flattened whorls; last inflated, capacious, evenly

rounded at periphery, not deflected. Color yellowish to brownish, usually with a few variously developed brown or chestnut bands. Embryonic whorls smooth, postnuclear with fine, irregular, radial striae and usually with delicate granulation. Aperture broadly ovate, strongly oblique, with simple margins. Umbilicus absent. Height 30-65, diam. 34-85 mm (58.2 x 71.5 mm).

Kidney occupying nearly transversal position, partly embedded in visceral mass. Primary ureter completed, secondary open, as a ciliary groove.

Talon hidden. Vas deferens rather long, bound to penis by thin fibers. Epiphallus short, tubular or bulbous, thick-walled, not adherent to side of penis, entering penis through simple pore. Internally distal portion of penis with distinct longitudinal folds; proximal portion with a number of corrugated pads and folded stimulator. Penial retractor attached slightly to extremely apically, sometimes by a few arms. Free oviduct not long, vagina much swollen, moderately long. Spermathecal shaft short, swollen at its base or in mid-section.

DISTRIBUTION. Madagascar. 14 spp. & forms.

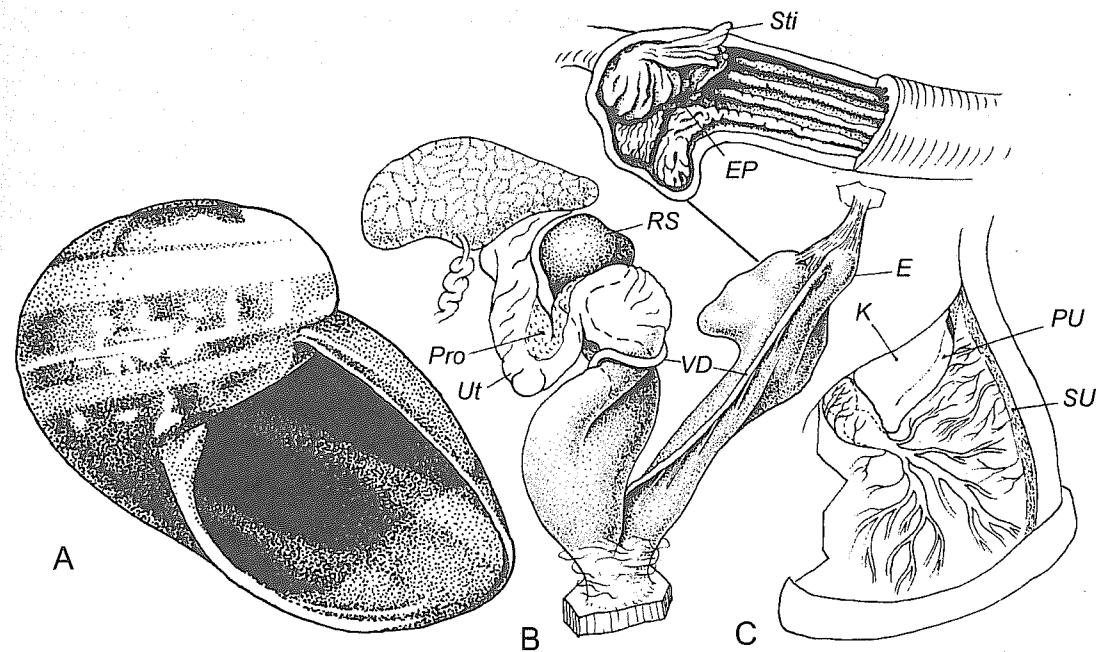


Fig. 583. ! *Helicophanta magnifica* Férussac, 1821.  
A — shell: Madagascar. ? Syntype ("ex author"). Paris. B — reproductive tract and interior of penis. C — pallial complex. Madagascar. Moscow.

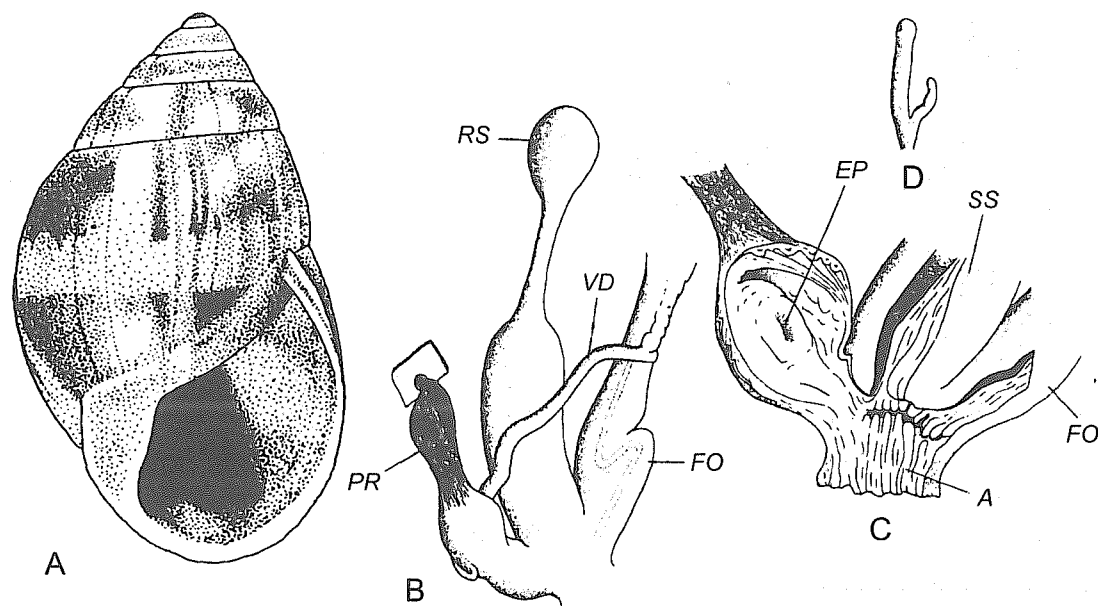


Fig. 584. *Leucotaenius favanni* (Lamarck, 1822).  
A — shell: Madagascar. Phil. No. 22961. B — reproductive tract. C — interior of distal genitalia. D — talon enlarged. After Mead, 1986.

*Leucotaenius* Martens, 1860  
Fig. 584

Martens in Albers, 1860: 229 (*Buliminus* subg.).

— *Pseudoclavator* Germain, 1913: 476 [t.-sp. "*Buliminus favannei* (sic!) Bruguière in Lamarck, 1819"; OD].

Mead, 1986: 137. Emberton, 1990: 110.

TYPE SPECIES — *Bulimus favanni* (= *favannii*) Lamarck, 1822; OD.

Shell bulimoid, elongated-ovate, rather thin but solid, of 5-7 slightly convex whorls; last whorl only slightly deflected. Color yellowish to brown, usually with lighter broad peripheral band and radial streaks of various width. Embryonic whorls with fine regular radial riblets, later whorls slightly, irregularly, radially wrinkled. Aperture large, semiovate, with somewhat thickened margins; columellar margin broadly expanded. Umbilicus closed to chinked. Height 25-55, diam. 17-32 mm (47.2 × 28.3 mm).

Talon slender, consisting of two branches, one shorter than other. Vas deferens short, stout, not adherent, circum-

vents penis basally, narrows abruptly to less than half of its diameter, goes short way apically as it incorporates into wall of penis, and enters about midway of penis. Epiphallus absent. Penis short, bulky, internally with short but broad, rugose verge. Smooth, muscular elevation surrounds slit-like opening on summit of verge. Opposite wall of penis with coarse, rounded rugae oriented diagonally toward atrium in fan-shaped pattern. Strong penial retractor attached apically. Free oviduct internally with narrow, strongly sigmoid canal. As spermatheca enters nearly to atrium, vagina practically absent. Spermathecal shaft swollen at its base or in mid-section.

DISTRIBUTION. Madagascar. 7 spp.

CLAVATORIDAE Thiele, 1926

Thiele, 1926: 144.

Shell bulimuloid, slender, high, large, without strong sculpture. Embryonic whorls not greatly enlarged. Aperture toothless.

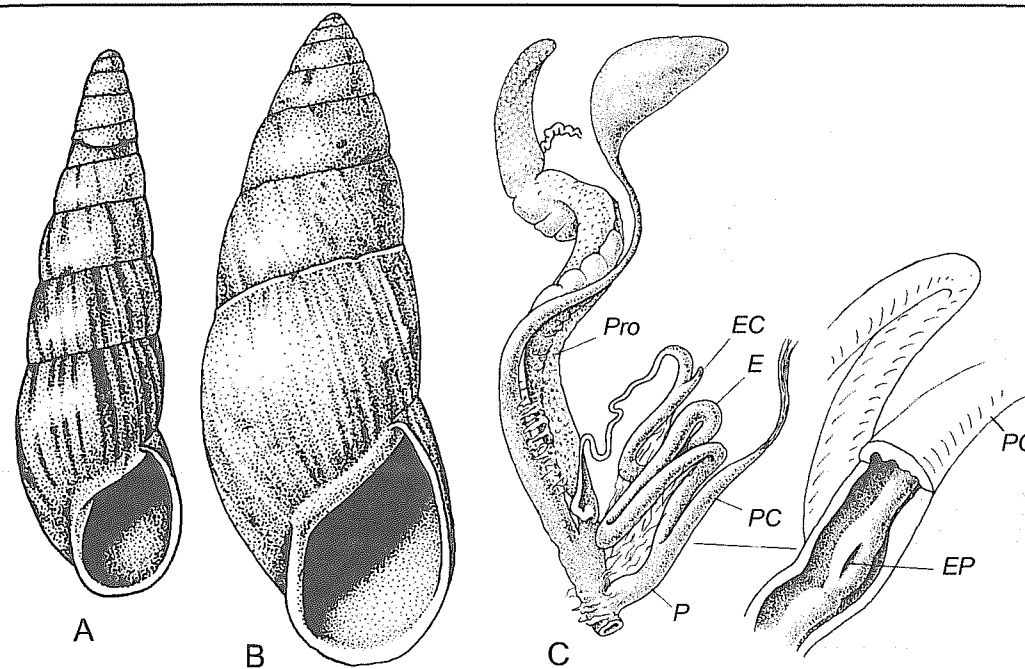


Fig. 585. A — ! *Clavator obtusatus* (Gmelin, 1758). Shell: Madagascar. Phil. No. 83515. B — *Clavator clavator* (Petit, 1844). Shell: Madagascar. Paris. C — ! *Clavator eximius* (Shuttleworth, 1852). Reproductive tract and interior of penis. South of Ambosites, Madagascar, December 23, 1971. Paris.

*Clavator* Martens, 1860  
Fig. 585

Martens in Albers, 1860: 312. Emberton, 1990: 108.

TYPE SPECIES — *Bulimus clavator* Petit, 1844; tautonymy.

Shell slender, elongated, moderately thin to solid, of 6-8 flattened to moderately convex whorls. Last whorl not descending in front. Color generally yellowish to brown or greenish, often with radial diffuse streaks. Embryonic whorls with more or less pronounced spiral striae, subsequent with

weak irregular radial wrinkles often crossed by broadly spaced, spiral, incised lines. Aperture ovate, subvertical, margins shortly reflexed and somewhat thickened, columellar dilated. Umbilicus closed to chinked. Height 45-145, diam. 18-40 mm (*obtusatus*: 75.2 × 20.2; *clavator*: 61.0 × 23.2 mm).

Jaw of many narrow, tightly fused plaits.

Talon not visible externally. Vas deferens not adherent to penis, entering epiphallus strongly terminally. At insertion of vas deferens often there is short epiphallic caecum ("flagellum"). Epiphallus very long, convoluted, its loops connected by thin membrane. Inner surface of epiphallus covered with high, branching ridges. Epiphallus/penis junction with rather long, tapering process (penial caecum), to tip of which penial retractor attaches. Penis short, with a few strong longitudinal pilasters; slit-like pore of epiphallus opens on main pilaster. Free oviduct very short, vagina a little longer. Spermathecal shaft thin, tapering, only slightly swollen basally; reservoir large, bulky, reaching albumen gland. I found a compact mass of spermatozoa inside reservoir.

DISTRIBUTION. Madagascar. 12 spp.

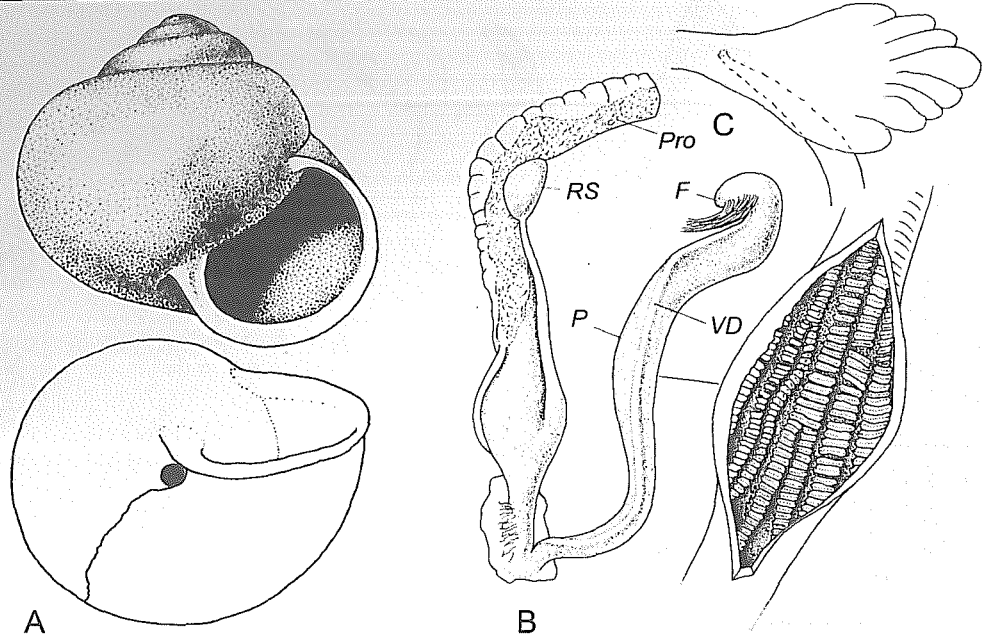


Fig. 586. A — *Trigonephrus globulus* (Müller, 1774). S Africa. Vienna No. 3880. B — ! *Trigonephrus rosaceus* (Müller, 1774). Reproductive tract and interior of penis. Anenous, Namaqualand [S Africa], June 1924. Paris. C — ! *Trigonephrus gypsinus* (Melvill et Ponsonby, 1891). Talon enlarged. After Brinders & Sirgel, 1992/3.

## DORCASIIDAE Connolly, 1915

Connolly, 1915: 121, 134.

Shell helicoid to strongly depressed, medium-sized, weakly sculptured. Embryonic whorls moderately enlarged. Aperture rounded, generally toothless (in *Tulbaghinia* with 2 teeth).

Vas deferens tightly adherent to penis. Flagellum vestigial or absent. Epiphallus wanting. Penis (moderately) long, internally with pilasters broken into series of elongated tubercles or bearing numerous papillae; short stimulator may be present. Penial retractor attached to penis (sub)apically. Vagina lacking appendix. Spermathecal stalk moderately long, adhering but not bound to spermooviduct.

DISTRIBUTION. S Africa.

### *Trigonephrus* Pilsbry, 1905 Fig. 586

Pilsbry, 1905: 286. Brinders & Sirgel, 1992/3: 1.

— *Galaxias* Beck, 1837: 42 [part.; *Helix* subg.;

nom. praeocc., non Cuvier, 1817 (Pisces); t.-sp. not designated].

TYPE SPECIES — *Helix globulus* Müller, 1774; OD.

Shell globular, moderately thin to solid, of 4.5-5 convex whorls; last slightly descending in front. Color yellowish, bluish-gray, rosy-white or brown. Embryonic whorls smooth, postembryonic whorls finely irregularly striatulated, often with weak malleation. Aperture slightly to moderately oblique, with shortly reflexed and thickened margins. Umbilicus narrow, partly covered. Height 15.8-41.5, diam. 19.0-42.0 mm (31.8 × 30.2 mm).

Kidney large, subtriangular or rhombic, ureters open.

Talon exposed, shortly clavate, of many chambers. Vas deferens tightly adherent to vagina and penis, entering subapically. Flagellum very short. Epiphallus absent. Penis long, more or less cylindrical, internally with longitudinal anastomosing pilasters broken into rows of quite distinct, high, elongated tubercles. Penial retractor inserted subapically. Free oviduct enlarged, greatly swollen, vagina short. Spermathecal

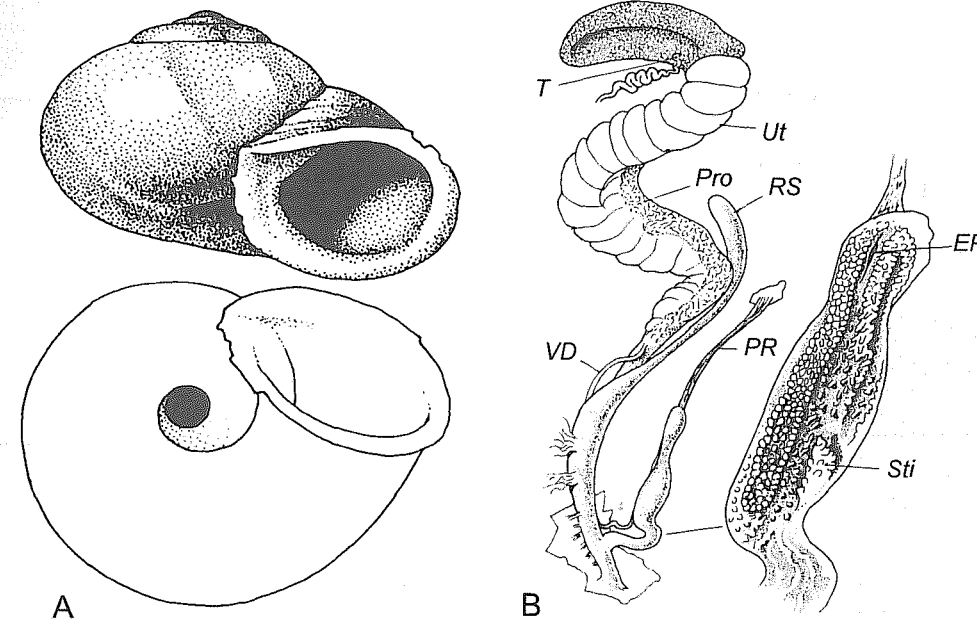


Fig. 587. *Dorcasia alexandri* (Gray, 1838). A — shell: Damaraland [upland in SW Africa]. Vienna No. 56302b. B — reproductive tract and interior of penis: Farm Vaalglass, Khomas Bochland, Namibia. Paris.

shaft more or less swollen basally, reservoir well defined, not reaching albumen gland.

DISTRIBUTION. S Africa. 13 spp. & forms.

### *Dorcasia* Gray, 1838 Fig. 587

Gray J., 1838: 268.

TYPE SPECIES — *Dorcasia alexandri* Gray, 1838; OD.

Shell depressed to depressed-globose, glossy, more or less solid, of 4.5-5.5 rather convex whorls; last whorl more or less strongly descending in front. Color uniformly corneous-brown to whitish. Embryonic whorls smooth, remaining radially striated or finely costate. Aperture not interrupted on parietal wall, strongly oblique to subhorizontal, with broadly reflexed and expanded margins. Umbilicus narrow, sometimes partially covered. Height 11-20, diam. 21-45 mm (17.0 × 29.2 mm).

Jaw smooth, with weak median projection.

Talon exposed, minute. Vas deferens ad-

herent to penis, entering subapically through slit-like pore. Epiphallus absent. Penis cylindrical to clavate, consists of tubular distal and enlarged proximal sections. Proximal internally with a few broad pilasters covered with numerous, high papillae; besides, small tuberculate stimulator situated in lower part of this section. Inner surface of distal section bears low, irregular, slightly corrugated, longitudinal folds. Penial retractor attached terminally. Free oviduct longer than vagina. Spermathecal shaft only slightly swollen basally; reservoir has no distinct boundary, not reaching albumen gland.

DISTRIBUTION. South Africa. 13 spp. & forms.

### *Tulbaghinia* Melvill et Ponsonby, 1898 Fig. 588

Melvill & Ponsonby, 1898: 28 (*Dorcasia* subg.).

— *Tulbaghinia* Gude, 1921: 155 (nom. err. pro *Tulbaghinia* Melvill et Ponsonby, 1898).

TYPE SPECIES — *Dorcasia (Tulbaghinia)*

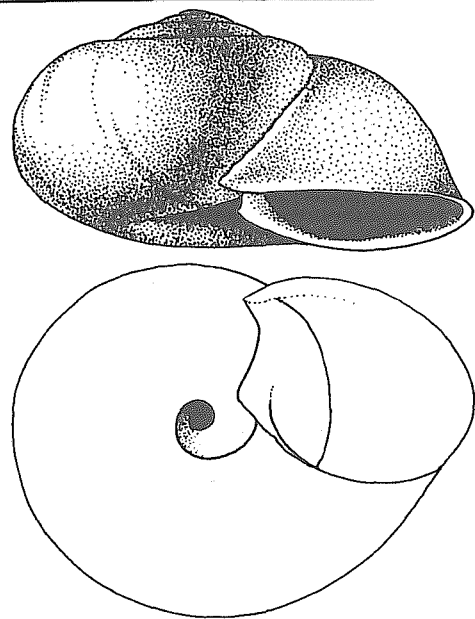


Fig. 588. *Tulbaghinia isomerioides* (Melvill et Ponsonby, 1898). "Cape Prov., Bain's Kloof nabij Paarl". Leiden.

*isomerioides* Melvill et Ponsonby, 1898; monotypy.

Shell depressed-globose, rather solid but somewhat translucent, of about 5 moderately convex whorls. Last whorl strongly descending in front, rounded at periphery. Color fulvous or red-brown above, light below, slightly mottled with dark and paler shades; aperture margins white. Embryonic whorls nearly smooth, postnuclear at first with thin, regular radial wrinklets, later sculpture becoming obsolete, and body whorl practically smooth. Aperture subcircular, very strongly oblique, with shortly reflexed margins. Parietal callus strong, protruding. 3 glossy, variously developed tubercles on inner margin of peristome on left part of base, just below columella. Umbilicus deep, narrow. Height 16-19, diam. 28-35 mm (18.0 × 33.4 mm).

DISTRIBUTION. South Africa (Cape Province). 1 sp.

#### SCULPTARIIDAE Degner, 1923

Degner, 1923: 157 (Endodontidae subf.).

Shell flattened, small, often heavily

sculptured, embryonic whorls somewhat enlarged. Aperture with short parietal lamella.

Vas deferens not adhering to penis. Flagellum short, blunt. Epiphallus very short. Penis of moderate length, with small subapical caecum. Internally caecum with conspicuous relief consisting of minute, long papillae on one side and corresponding depressions on opposite side. Penial caecum lined with similar papillae. Penial stimulator absent. Vagina lacking appendix. Spermathecal stalk long, only slightly enlarged basally, not bound to spermooviduct.

DISTRIBUTION. SW Africa.

#### *Sculptaria* L. Pfeiffer, 1855 Fig. 589

Pfeiffer L., 1855: 135 (*Helix* subg.).

TYPE SPECIES — *Helicodonta sculpturata* Gray, 1838; monotypy.

Shell discoidal, lenticular, nearly discoidal, rather solid, of 4-6 convex whorls. Last whorl descending in front, becoming free at aperture, carinated at periphery. Color pale-fawn or creamy, sometimes with faint rufous markings. Embryonic whorls smooth. Subsequent whorls nearly smooth or having complex tubercular sculpture due to crossing radial and spiral incised lines or grooves. Aperture continuous, adnate, subcircular, strongly oblique, with expanded and reflexed margins. There is a parietal entering lamella and 2 or 3 palatal plicae. Umbilicus broad, quite perspective. Height 1.8-4.3, diam. 5-10 mm (2.8 × 6.7 mm).

Jaw thin, smooth.

Talon hidden. Vas deferens free, entering very short, semitransparent epiphallus apically through simple pore. Penis thin-walled, subcylindrical, not long, with very short flagellum and small caecum at upper end. Internally penis with quite conspicuous relief: one side occupied by thin, long papillae; on opposite side turning to vas deferens, there are numerous, deep fosses corresponding to papillae. In intact penis this structure forms a sort of valve that may isolate upper chamber of penis from cavity of atrium. Penial retractor inserts on flagellum apically. Free oviduct extremely short, vagina long, cylindrical. Spermathecal stalk slender, subcylindrical, elongated reservoir bound to spermooviduct at short distance from albumen gland.

DISTRIBUTION. SW Africa. About 10 spp.

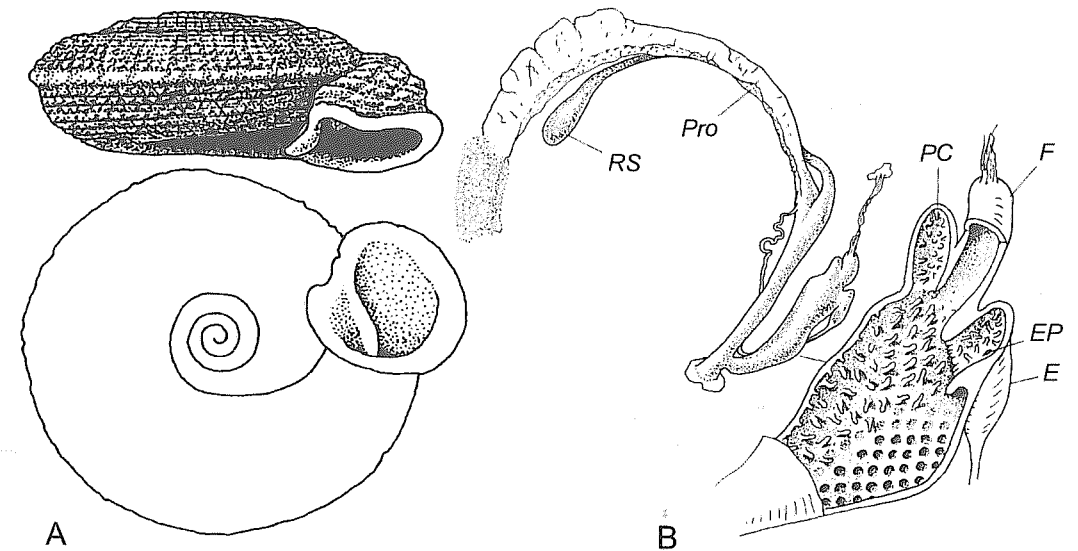


Fig. 589. A — *Sculptaria sculpturata* (Gray, 1838). Shell: "Swakopmund, nabij lagune, ZW Afrika". Leiden. B — ! *Sculptaria sculpturata* f. *collaris* (L. Pfeiffer, 1867). Reproductive tract and interior of penis: Soubkera, Angola. London.

#### PLECTOPYLOIDEA Moellendorff, 1898

Moellendorff, 1898: 147 (pro fam.).

Shell dextral or sinistral, small, depressed to flat, embryonic whorls only slightly enlarged. Aperture and last whorl with conspicuous complex system of teeth.

Jaw aulacognathous, thin, slightly striated, with or without weak median projection.

Kidney mesurethral, primary ureter completed, secondary ureter open, as ciliary groove.

Vas deferens not adhering to penis. Flagellum vestigial or absent. Epiphallus well developed or absent. Penis internally with verge or specialized honey-comb-like relief consisting of tubercles; each tubercle has depression in which calcareous spine is situated. Spermathecal stalk long, not or slightly enlarged basally.

DISTRIBUTION. Ceylon, Hindustan Peninsula, SE Asia.

REMARK. Data on the anatomy of Plectopyloidea are insufficient. I dissected specimens of only 5 species (of 2 genera) of this taxon: *Corilla erronea* (Albers, 1853), *C. colletti* Sykes, 1897, *C. beddomeae* Hanley,

1875, *Endothyrella pinacis* (Benson, 1859) and *E. affinis* (Gude, 1897). Differences in the structure of reproductive tract between *Corilla* and *Plectopylis* are so evident (see below) that assigning these two genera to different families is quite justified.

#### CORILLIDAE Pilsbry, 1905

Pilsbry, 1905: 289.

Shell flat, with ovate contour. Internal sculpture of a number lamella(e) and/or plicae directed along whorls.

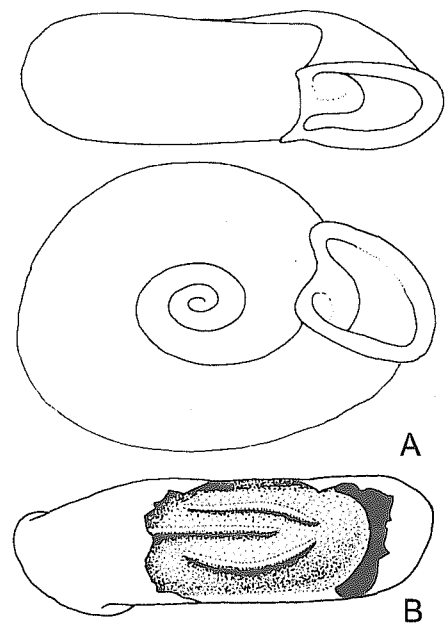
Jaw nearly smooth, with only delicate transversal striae.

Epiphallus long, cylindrical. Penis internally with large, grooved verge, inner surface of penis covered with numerous, simple, rounded tubercles.

DISTRIBUTION. Ceylon and S India.

#### *Corilla* H. Adams et A. Adams, 1855 Fig. 590

Adams H. & Adams A., 1855 (1853-1858): 208 (nom. nov. pro *Atopa* Albers, 1850).



— *Atopa* Albers, 1850: 90 [nom. praeocc., non Fabricius, 1799 (Coleoptera); part.; t.-sp. *Helix rivolii* Deshayes, 1830; designated here].

TYPE SPECIES — *Helix erronea* Albers, 1853; SD Pilsbry, 1893 (1893-1895).

Shell dextral or sinistral, discoidal, solid, dorsoventrally compressed, of 5-5.5 convex whorls. Last whorl deflected in front. Color brown to yellow. Embryonic whorls smooth, later whorls radially striated above. Aperture ovate, strongly oblique, with broadly reflexed and more or less thickened margins. Parietal wall toothless or with a strong, entering lamella; interior of body whorl smooth or obstructed by a series of lamellae running nearly parallel to direction of whorl coiling; transversal barriers wanting. Height 5.5-9.0, diam. 15-30 mm (*erronea*: 6.5 × 21.0; *colletti*: 5.8 × 21.2 mm).

Jaw scarcely transversally striated, with or without a weak median projection.

Talon hidden or exposed, minute. Vas deferens narrow, long, entering long, cylindrical epiphallus apically or subapically and laterally. Penis clavate, not long, internally

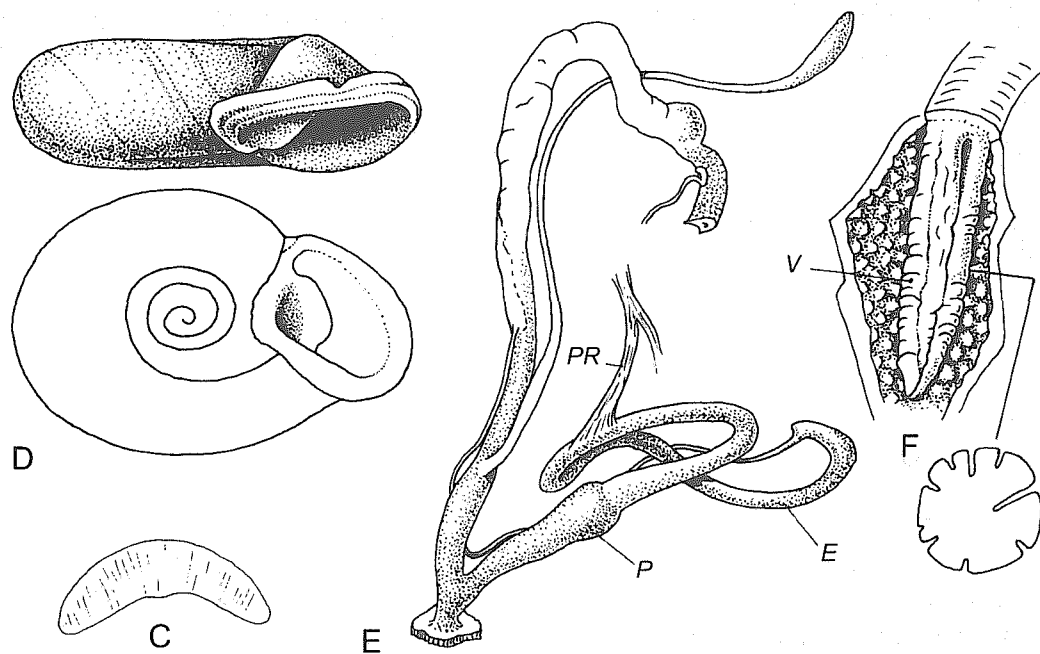


Fig. 590. A, B, C — *Corilla erronea* (Albers, 1853). A — shell: Kandy, Ceylon. Leiden. B — parietal folds. C — jaw: 1 km NNW of Nuwara-Eliya, Piduru ridge, Central Prov., Ceylon, January 20, 1997. Moscow. D, E, F — ! *Corilla colletti* Sykes, 1897. D — shell. E — reproductive tract. F — interior of penis. Balangoda, Ceylon. Moscow No. Lc-24417 (shell) (Vienna No. 41.430).

with relief of conic or short corrugated tubercles and well-developed rod-like verge which has 1 permanent principal longitudinal groove and a number of accidental, shallower grooves. Penial retractor originating on columellar muscle and inserted onto epiphallus somewhat lower from its middle. Free oviduct and vagina moderately long, subequal. Spermathecal stalk long, cylindrical, reservoir elongated, reaching albumen gland.

DISTRIBUTION. S India, Ceylon. About 12 spp. & forms.

REMARK. Data by Semper (1870, Taf. XII, Fig. 18) on the anatomy of *C. erronea* and by Pilsbry (1905: 288, Pl. XIII, fig. 1) on *C. humberti* (Brot, 1864) differ markedly from those given above: these species, according to Semper and Pilsbry, have a long diverticle of spermathecal stalk, and a penial retractor originating on the spermoviduct. I dissected one specimen of *C. erronea* from the type locality (Nuwara-Eliya) and found that its anatomy does not differ substantially from that of *C. colletti*. Besides, I investigated the anatomy of *C. beddomeae* (Hanley, 1875) (Vienna) and established that it is nearly identical to mentioned species; above all, the drawing by Godwin-Austen (1907, pl. CXIV, fig. 3f) of the reproductive tract of *C. gudei* Sykes, 1897 generally agrees with my data.

#### PLECTOPYLIDAE Moellendorff, 1898

Moellendorff, 1898: 147.

Shell with slightly protruded spire (flat in one genus) its contour subcircular. Elements of armature inside whorls directed across whorls.

Jaw of thin, scarcely overlapping, slightly converging plates.

Talon exposed, small. Vas deferens long, free. Epiphallus rather short, at first slightly swollen, then thin, thread-like. Penis without verge, of 2 parts separated by narrowing: proximal (upper) internally with regular pattern of tubercles; each has central depression, in which minute calcareous hook situated. Distal (lower) part with weak irregular folds.

DISTRIBUTION. SE Asia (NE India, Burma, N Vietnam, S and Central China, Ryukyu Archipelago).

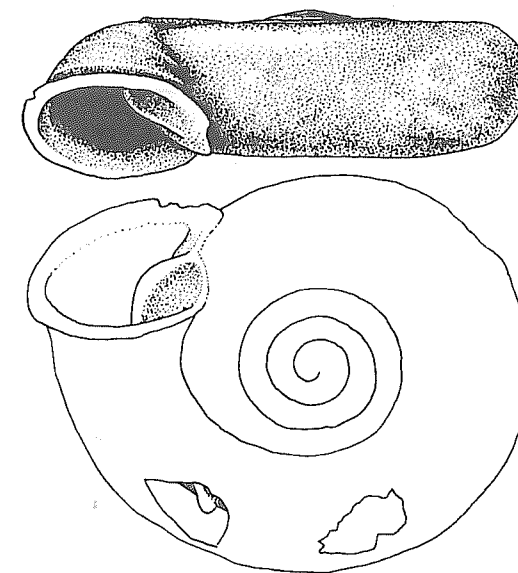


Fig. 591. *Plectopylis bensoni* (Gude, 1914). Andaman Islands. Phil. No. 33477.

#### *Plectopylis* Benson, 1860 Fig. 591

Benson, 1860: 243 (*Helix* sect.).

TYPE SPECIES — *Helix achatina* L. Pfeiffer, 1845 (nom. praeocc., non Potiez et Michaud, 1838 = *Plectopylis bensoni* Gude, 1914); SD Pilsbry 1894 (1893-1895).

Shell sinistral, strongly flattened, moderately thin, of 5 convex whorls. Last whorl abruptly and strongly descending. Color brown. Embryonic whorls smooth, later without regular sculpture. Aperture subcircular, strongly oblique, its insertions connected by well developed callus. Parietal wall with vertical lamella, 3 horizontal lamellae above it and 1 lamella below. Umbilicus very broad. Height 3-10, diam. 9-31 mm (6.0 × 19.2 mm).

DISTRIBUTION. Burma. 20 spp. & forms.

#### *Endoplon* Gude, 1899 Fig. 592

Gude, 1899: 148 (*Plectopylis* sect.).

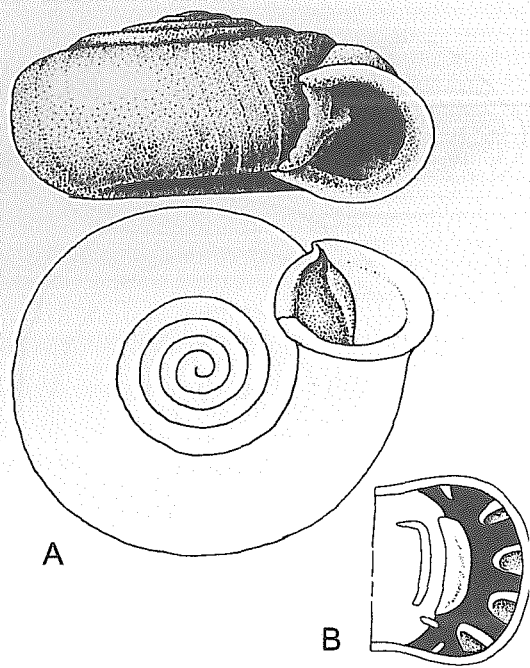


Fig. 592. A — ! *Endoplon hirsuta* (Moellendorff, 1901). Shell: "Tonkin" (N Vietnam). Phil. No. 109240. B — *Endoplon brachyplecta* (Benson, 1863). Armature in last whorl. After Gude, 1914.

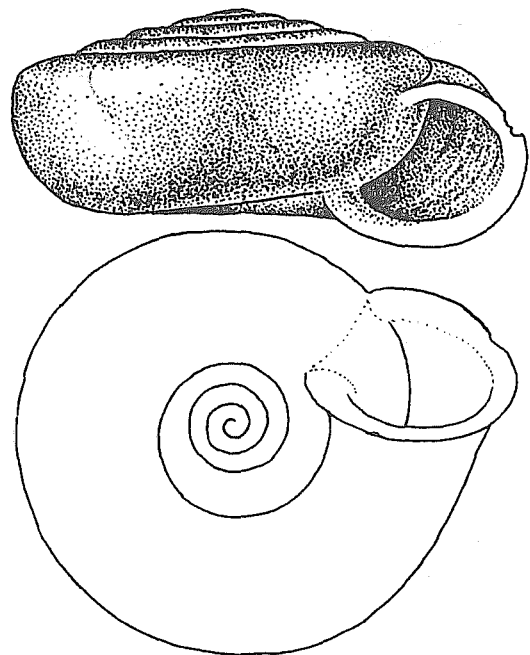


Fig. 593. A — *Sinicola fimbriosa* (Martens, 1875). Hainan, China. Phil. No. 62954.

TYPE SPECIES — *Helix (Plectopylis) brachyplecta* Benson, 1863; OD.

Shell flattened, rather solid, of 5-6.5 quite convex whorls. Last whorl moderately descending near aperture. Color corneous. Embryonic whorls smooth, postnuclear with dense radial rib-striation and spaced, weak spiral lines. Aperture subcircular, moderately oblique, with well developed parietal callus and reflexed, sometimes thickened margins. Parietal lamella rather short. Transversal columellar/parietal lamellae comparatively weak, sometimes some of them curved; besides, small additional, spirally directed lamella may be present. Palatal and basal plicae short, either horizontal, or oblique or subvertical. Umbilicus very wide. Height 8-10, diam. 16-27 mm (8.5 × 16.6 mm).

DISTRIBUTION. Burma, N Vietnam. About 10 spp.

*Sinicola* Gude, 1899  
Fig. 593

Gude, 1899: 148 (*Plectopylis* sect.).

TYPE SPECIES — *Plectopylis fimbriosa* Martens, 1875; OD.

Shell dextral, low-conic, moderately solid, of 6-7 rather convex whorls. Last whorl slightly, gradually deflected. Color uniformly corneous. Embryonic whorls finely radially striated, subsequent whorls with distinct radial and spiral striation above and obsolete sculpture on basal surface. Aperture ovate, well oblique, with shortly reflexed and expanded margins. Internally last whorl with 5-6 spirally directed palatal plicae; opposite to them, on columellar wall, there is strong transversal lamella and 2 short spiral lamellae in front of it. Umbilicus broadly open, perspective. Height 3-12, diam. 6-22 mm (6.1 × 12.0 mm).

DISTRIBUTION. China, Tibet, Vietnam. 18 spp.

*Endothyrella* Zilch, 1960  
Fig. 594

Zilch, 1960: 594 (nom. nov. pro *Endothyra* Gude, 1899).

— *Endothyra* Gude, 1899: 148 [nom. praeocc., non Phillips, 1845; t.-sp. *Helix (Plectopylis) plectostoma* Benson, 1836; OD].

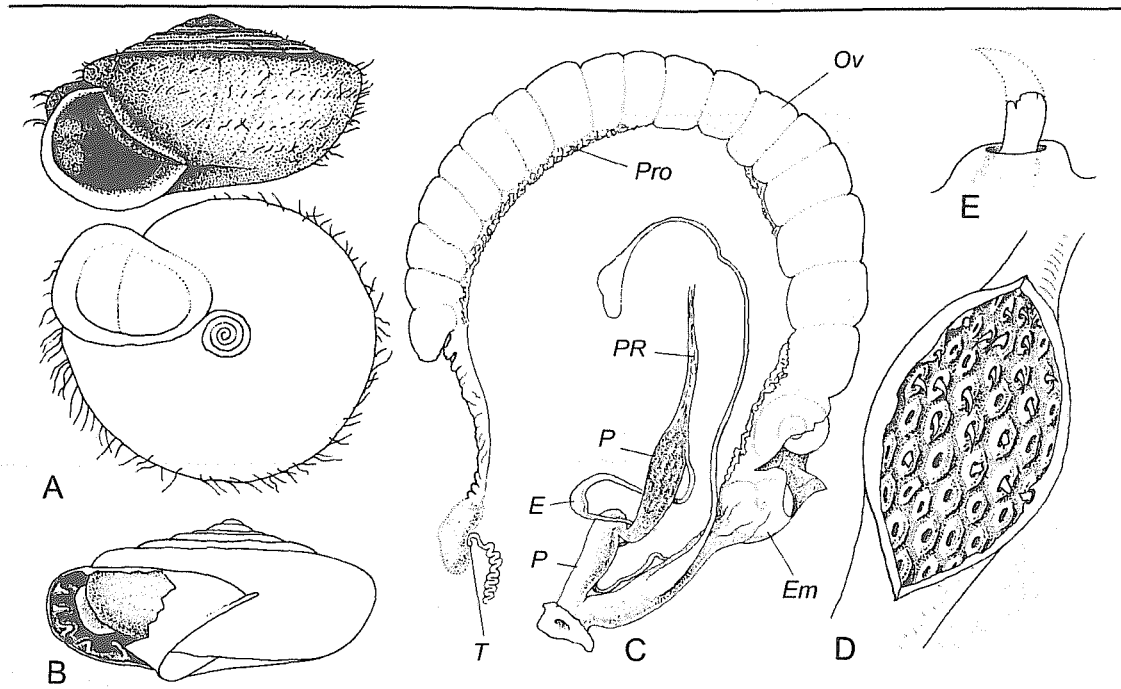


Fig. 594. A — *Endothyrella plectostoma exserta* (Gude, 1901). Shell: Assam. Phil. No. 84375. B — ! *Endothyrella affinis* (Gude, 1897). Armature in last whorl: SW slope of Swayambhunat hill, Katmandu valley, Nepal. Moscow. C, D, E — ! *Endothyrella pinacis* (Benson, 1859). Damsang Peak, Burma. C — reproductive tract. D — interior of penis. E — element of inner sculpture of penis, strongly enlarged (tip of hook broken out). Paris.

TYPE SPECIES — *Helix (Plectopylis) plectostoma* Benson, 1836; OD.

Shell sinistral, moderately solid, of 5-7.5 quite convex whorls. Last whorl more or less angular above mid-line, slightly or not descending. Color pale amber to ochraceous, uniform or with radial bars of brown. Embryonic whorls finely ribbed, later with complex sculpture consisting of radial thin, sharp, leaflet-like membranous riblets, distinct spiral threads and long hairs; on body whorl 3-4 rows of hairs. Aperture broadly lunate to ear-shaped, moderately oblique, with parietal callus and somewhat reflexed margins. Spiral parietal lamella wanting, transversal moderately developed; each set of palatal plicae often interrupted into 2 parallel rows of short longitudinal or oblique folds. Umbilicus moderately wide. Height 2-7, diam. 5-20 mm (*exserta*: 6.0 × 10.2; *affinis*: 5.9 × 12.0 mm).

Talon exposed, minute, with globular head. Prostate looking like thin whitish band running on adcolumnar side of thin-

walled uterus. Uterus with numerous eggs arranged in one row; 2-3 lowest eggs contain shelled embryos having about 2 whorls. Vas deferens thin, not adherent, entering swollen upper portion of epiphallus apically. Epiphallus enters upper section of penis laterally, its diameter diminished toward penis. Penis distinctly divided into lower and upper sections separated by narrowing; lower internally with irregular longitudinal folds, upper has conspicuous relief of honey-comb-like tubercles, each of them with deep depression on summit and calcareous hook in depression. Some hooks may be absent or broken, hooks more often lost or damaged in lower part of this section. Externally mentioned tubercles visible as minute, light, elongated spots. Penial retractor attached to upper section of penis apically. Free oviduct and vagina of about equal length. Spermathecal stalk thin, noticeably enlarged basally; reservoir small, not reaching albumen gland.

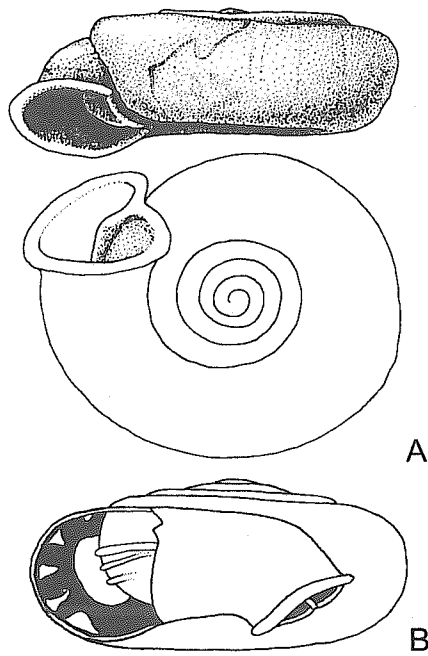


Fig. 595. *Chersaecia leiophis* (Benson, 1860).  
A — shell: Pegu [Burma]. Phil. No. 109237.  
B — armature in last whorl. After Gude, 1914.

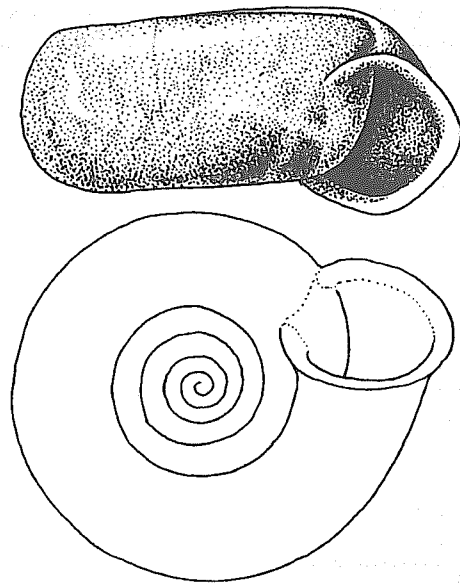


Fig. 596. *Amphicoelina biconcava* (Heude, 1882).  
China. Phil. No. 33066.

DISTRIBUTION. India (Sikkim, Assam),  
Nepal, Burma. About 10 spp.

*Chersaecia* Gude, 1899  
Fig. 595

Gude, 1899: 148 (*Plectopylis* sect.).

TYPE SPECIES — *Helix (Plectopylus) leiophis*  
Benson, 1860; OD.

Shell dextral or sinistral, nearly flat,  
moderately thin, of 5-6.5 convex whorls.  
Last whorl strongly descending. Color pale  
corneous to brown. Embryonic and 2-2.5  
subsequent whorls covered with delicate,  
densely crowded tubercles, later with variously  
developed microscopic spiral  
threadlets and fine radial striae. Aperture  
rounded, strongly oblique, with well developed  
parietal callus, adnate or almost free.  
Parietal lamella(e) present or wanting; col-  
lumellar wall inside with strong transversal  
lamella; palatal and basal walls with 4-6  
horizontal or oblique plicae that sometimes  
desintegrated into many smaller, short  
folds. Umbilicus very wide. Height 4.0-8.5,  
diam. 8-27 mm (5.3 x 9.0 mm).

DISTRIBUTION. From Assam through  
Upper Burma and Laos to Tenasserim.  
About 20 spp.

*Amphicoelina* Haas, 1933  
Fig. 596

Haas, 1933: 231.

TYPE SPECIES — *Helix biconcava* Heude,  
1882; OD.

Shell sinistral, rather thin, dull, of 6-7  
convex whorls. Last whorl gradually de-  
flected in last quarter. Spire flat or some-  
what sunken. Color corneous. Embryonic  
whorls smooth or with very fine radial  
wrinklets, subsequent weakly radially stri-  
ated, usually with very short, delicate hairs  
when fresh; each hair sits on a minute tu-  
bercle. Aperture roundly-triangular, quite  
oblique, with shortly reflexed margins and  
fine parietal callus. Within last whorl there  
is thin parietal lamella. Umbilicus wide and  
deep. Height 4-5, diam. 8-12 mm (4.5 x  
10.2 mm).

DISTRIBUTION. China. 4 spp.

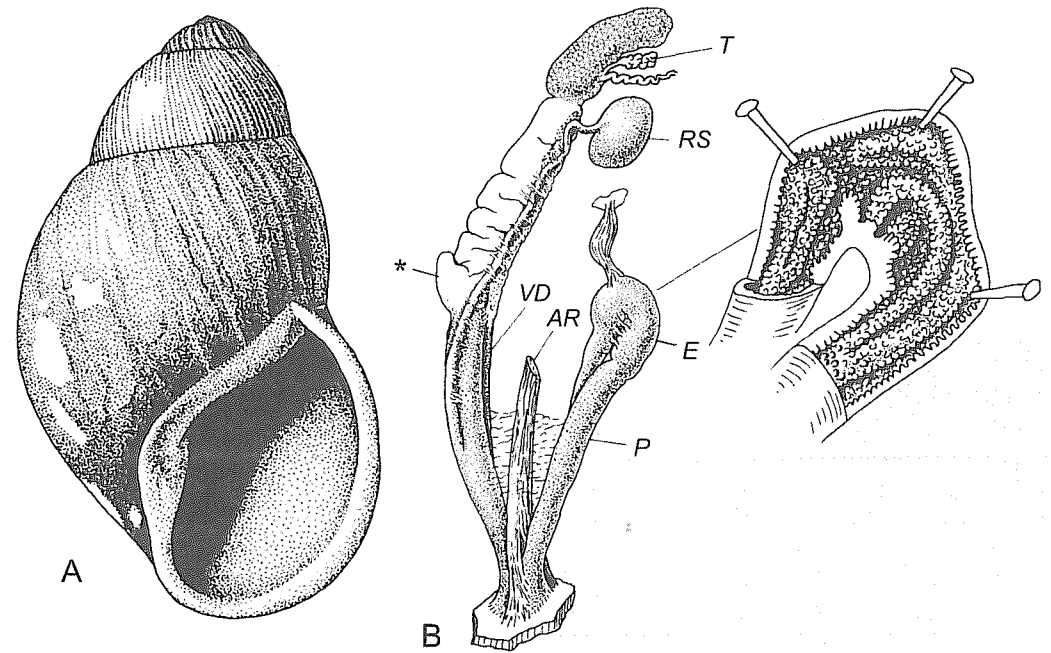


Fig. 597. *Megalobulimus popelairianus* (Nyst, 1845).  
A — shell: Peru. Phil. No. 183838. B — reproductive tract and interior of upper portion  
of epiphallus. Cusuimi, ca 150 km SE of Puyo, Dept. Pastaza, Ecuador, July 18-23, 1971.  
Chicago No. 174889. Asterisk — enlargement of free oviduct.

STROPHOCHEILOIDEA  
Pilsbry, 1902

Pilsbry, 1902 (1902-1903): iv (pro fam.). Leme,  
1973: 295.

Shell dextral, medium to very large,  
mostly ovoid, sometimes fusiform, rarely  
flattened, with enlarged embryonic whorls.  
Aperture and columella simple, without  
teeth or lamellae.

Jaw solid, smooth or ribbed.

Sole smooth, without constant grooves.

Kidney of mesurethral type.

Vas deferens mostly adherent through-  
out. Flagellum not long or wanting. Penis  
internally with numerous minute papillae  
or tubercles. Spermathecal stalk usually  
bound to spermoviduct by numerous fibers.

DISTRIBUTION. S America.

MEGALOBULIMIDAE Leme, 1973

Leme, 1973: 333.

Shell medium-sized to large (height 50-

160 mm). Periostracum persistent or de-  
ciduous.

Animals with pair of labial lobes.

Jaw solid, strong, with thickened, raised  
ribs.

Kidney long to short, rounded to cordi-  
form, both ureters open; excretory pore, a  
simple lateral opening near middle of kid-  
ney. Roof of lung with longitudinal pulmo-  
nary septum dividing lung into respiratory  
and excretory zones.

Intestine with pre-rectal valve.

Flagellum variously developed, but never  
long, or absent.

DISTRIBUTION. S America.

*Megalobulimus* K. Miller, 1878  
Fig. 597

Miller K., 1878: 172 (*Bulimus* subg.).

— *Bulimus* Scopoli, 1786 (1786-1788): 67 (non  
Scopoli, 1777).

— *Borus* Albers, 1850: 141 (nom. praeocc., non  
Agassiz, 1846; t.-sp. *Bulimus oblongus* K.  
Müller, 1774; SD Martens in Albers, 1860).



— *Megabulimus* Haas, 1935: 110 (nom. err. pro *Megalobulimus* K. Miller, 1878).

— *Phaiopharus* Morretes, 1952: 111 (*Megalobulimus* subg.; t.-sp. *Helix granulosa* Rang, 1831; OD).

— *Psilolicus* Morretes, 1952: 112 (t.-sp. *Helix oblonga* Müller, 1774; OD).

Leme, 1973: 333.

TYPE SPECIES — *Borus garcia-moreni* K. Miller, 1878 (= *Bulimus popelairiana* Nyst, 1845); monotypy.

Shell ovate, solid, shining, of 4.5-5 moderately convex whorls. Color corneous, reddish-brown or rich-chestnut, often with narrow darker streaks. Embryonic whorls smooth, later at first finely ribbed, then spiral lines often added, and body whorl more or less malleated. Aperture ovate, with shortly reflexed and thickened margins. Columellar margin expanded, usually with oblique fold. Umbilicus closed or narrowly slit-like. Height 50-160, diam. 35-95 mm (132.2 × 77.3 mm).

Talon large, irregularly clavate, with numerous tubercles on its surface. Vas deferens adherent throughout its length, expanding toward epiphallus; entering (sub)terminally through long slit. Flagellum wanting or minute. Epiphallus short, sharply bent, both distal and proximal sections connected by short muscular bands. Boundary between epiphallus and penis marked by circular constriction. Penis subcylindrical, internally with longitudinal folds covered with numerous minute papillae; similar pattern inside epiphallus, but folds less regular there. Penial retractor attached to upper part of epiphallus at short distance from vas deference entrance. Atrial retractor very strong, saddle-shaped at its lower end. Free oviduct short to rather long, stout, thick-walled, of approximately same length as vagina, ovoid enlargement of oviduct located just below spermiduct, opposite to prostate. Vagina narrower than oviduct, bound, along with atrium, into skin by heavy fibers. Spermathecal stalk slender, subcylindrical, long, bound by numerous bands to spermiduct; reservoir voluminous, ovoid to subglobose.

DISTRIBUTION. S America. About 10 spp.

REMARKS. 1. Bequaert (148: 54, footnote) states: "The question of *Borus* Agassiz, 1846, versus *Borus* Albers, 1850, was submitted to the International Commission on Zoological Nomenclature, which decided

that they are homonyms (Opinion 125, 1936, Smithsonian Miscellaneous Collection, 73(8): 3-4).

2. The name *Corus* "Jousseau, 1877" has not been published in the sense of ICZN [art. 9(10)] since it was mentioned in the meeting of Zool. Soc. France, report of which has been anonymously published in Bull. Soc. zool. France, 1877, vol. 2: 311. Therefore this name is unavailable.

## STROPHOCHEILIDAE Pilsbry, 1902

Pilsbry, 1902 (1902-1903): iv. Leme, 1973: 325.

Shell comparatively small to medium-sized (height 19-70 mm). Periostracum often persistent.

Animals without labial lobes.

Jaw solid, smooth, vertically striate or with slightly thickened riblets.

Kidney elongated or nearly triangular, primary and secondary ureters open; excretory pore situated on tip of short papilla at upper end of kidney. Roof of lung without a pulmonary septum.

Intestine without pre-rectal valve.

Flagellum absent, vas deferens inserted directly on enlarged upper section of penis or on boundary between upper and lower sections of penis.

DISTRIBUTION. S America.

### *Anthinus* Albers, 1850

Fig. 598

Albers, 1850: 148 (*Bulimus* subg.). Leme, 1973: 332.

TYPE SPECIES — *Helix (Cochlogena) multicolor* Rang, 1831; SD Martens in Albers, 1860.

Shell elongated-conic, ovate-conic or subfusiform, moderately solid, of about 5 more or less convex whorls. Last whorl not descending. Coloration of whitish to brown background and white irregular spots and streaks. Embryonic whorls smooth, later whorls with weak spiral lines and fine irregular radial striae, giving appearance of fine granulation. Aperture ovate, slightly oblique, broadly and evenly curved below, with reflexed, not thickened margins. Umbilicus closed or slit-like. Height 40-55, diam. 16-23 mm (41.0 × 19.2 mm).

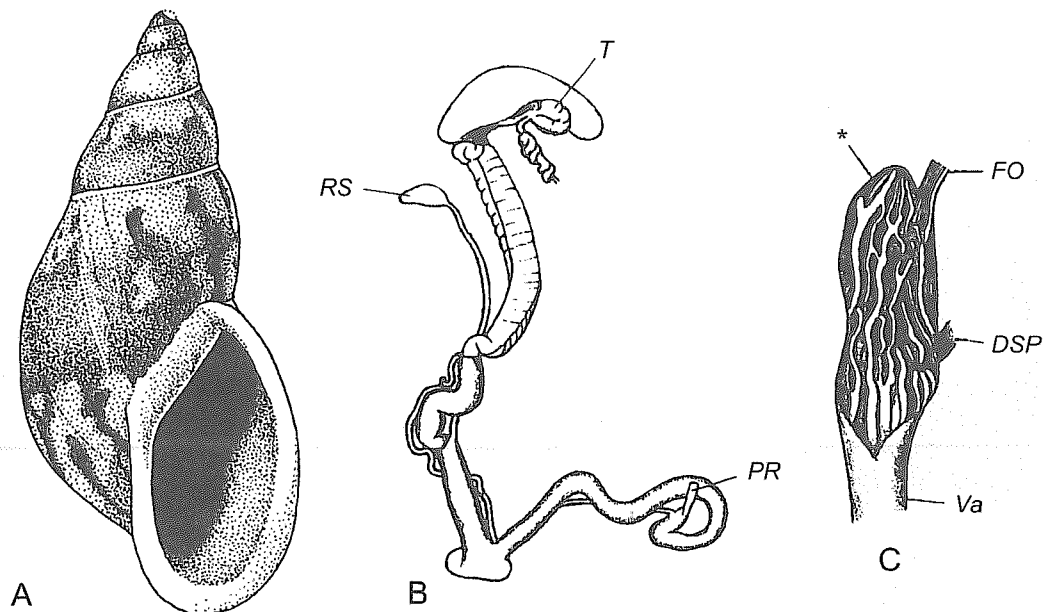


Fig. 598. *Anthinus multicolor* (Rang, 1831).

A — shell: Rio de Janeiro, Brazil. Phil. No. 32910. B — reproductive tract. After Pilsbry, 1902 (1901-1902). C — interior of vagina and free oviduct. Asterisk — blind process of free oviduct.]

Talon large, sac-like, globular. Spermiduct without accessory gland. Flagellum very short, with subapical attachment of penial retractor. Epiphallus short, parallel to penis and perfectly detachable from its external wall. Penis without basal papilla. Free oviduct rather long, with very short blind process, internally with irregular, anastomosing, longitudinal folds. Vagina of about same length. Spermathecal stalk narrow, reservoir elongated.

DISTRIBUTION. S Brazil. 5 spp.

### *Gonyostomus* Beck, 1837

Fig. 599

Beck, 1837: 53 (*Bulimus* subg.).

— *Gonyostoma* Swainson, 1840: 335 [t.-sp. *Gonyostoma erubescens* Swainson, 1840 (= *Helix gonyostoma* Férussac, 1821); monotypy].

— *Gonyostomus* Herrmannsen, 1847: 467 (nom. err. pro *Gonyostomus* Beck, 1837).

— *Gonyotomus* Paetel, 1875: 88 (nom. err. pro *Gonyostomus* Beck, 1837).

Leme, 1973: 331.

TYPE SPECIES — *Helix (Cochlogena) gonyostoma* Férussac, 1821; tautonymy.

Shell high, fusiform, rather thin, of about 6 moderately convex whorls. Last whorl straight. Color uniformly yellowish-corneous to light-brown. Embryonic whorls initially (0.5-0.75 whorl) nearly smooth to vaguely granulate; then distinctly sculptured by radial wrinkles and spiral threads; same sculpture on subsequent whorls down to aperture, but on body whorl radial elements become more regular and turn into a sort of silky striation. Aperture more or less spindle-shaped, its lower portion attenuated, angled. Aperture margins somewhat reflexed; columellar overlaps narrow umbilicus. Height 41-62, diam. 12-22 mm (55.5 × 19.5 mm).

Talon partly embedded in albumen gland. Vas deferens tightly adherent to vagina, atrium and penial tube, enters subapically. Penis rather long, consisting of 2 chambers: shorter upper ("pseudepiphallus" of Leme, 1974) and longer lower. At boundary between these chambers there is a short verge with narrow lumen. Internally upper chamber covered with numerous, crowded, high tubercles, lower chamber closely, longitudinally plicated. Penial retractor at-

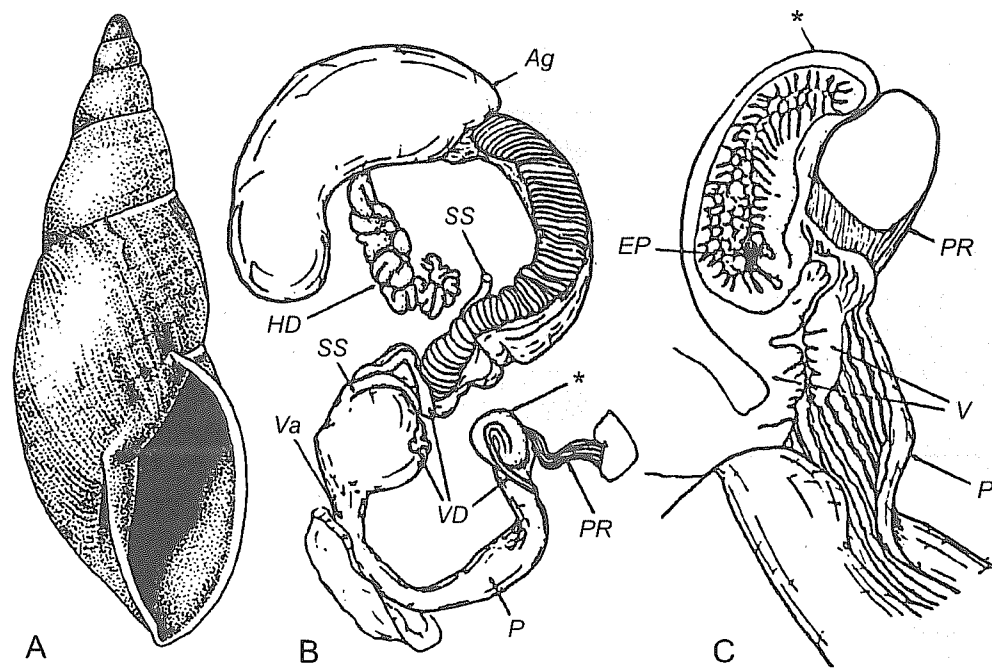


Fig. 599. *Gonyostomus goniostoma* (Férussac, 1821).  
A — shell: S America. Moscow No. L-1263. B — reproductive tract. C — interior of penis.  
After Leme, 1974. Asterisk — upper chamber of penis (pseudepiphalus).

tached to boundary between chambers of penis. Free oviduct narrow, vagina swollen in upper part. Spermathecal stalk subcylindrical, rather long.

DISTRIBUTION. S Brazil. 3 spp.

***Strophocheilus* Spix, 1827**  
Fig. 600

Spix, 1827: Tab. XI.

— *Otis*, Férussac, 1821: 461 [nom. praeocc., non Linnaeus, 1758 (Aves); t.-sp. "*Otis rosaceus*, Humphrey, Mus. calonn."; in syn. of *Partula pudica* Müller, 1774; monotypy].

— *Strophochilus* Agassiz, 1846: 355 (nom. emend. pro *Strophocheilus* Spix, 1827).

— *Coniculus* Albers, 1850: 147 (*Bulimus* subg.; t.-sp. *Helix pudicus* Müller, 1774; designated here).

— *Strophocheilus* Ihering, 1929: 18 (nom. err. pro *Strophocheilus*).

TYPE SPECIES — *Strophocheilus almeida* Spix, 1827 (= *Helix pudicus* Müller, 1774); SD Nevill, 1878.

Shell elongated-ovate to nearly fusiform, slightly flattened dorsoventrally, solid, shin-

ing, of about 5 slightly convex whorls. Color uniformly corneous to greenish-olive. Embryonic whorls with radial riblets, not granulated; subsequent whorls radially wrinkled or malleated; spiral elements absent. Aperture ovate, moderately oblique, margins expanded; columellar margin with more or less developed, low, rounded lamella. Umbilicus, a narrow crack. Height 40-70, diam. 22-34 mm (60.0 x 31.2 mm).

Talon large, exposed. Vas deferens short, stout, bound to vagina and penis, entering penis apically. Penis consisting of short upper ("pseudepiphalus" of Leme, 1973) and swollen, globose lower sections. Internally lower sections with basal verge. Penial retractor attached to penis below insertion of vas deferens. Free oviduct and vagina expanded, of about equal length. Spermathecal stalk subcylindrical, reservoir reaching albumen gland.

DISTRIBUTION. Brazil. 6 spp.

***Mirinaba* Morretes, 1952**  
Fig. 601

Morretes, 1952: 111 (*Strophocheilus* subg.).

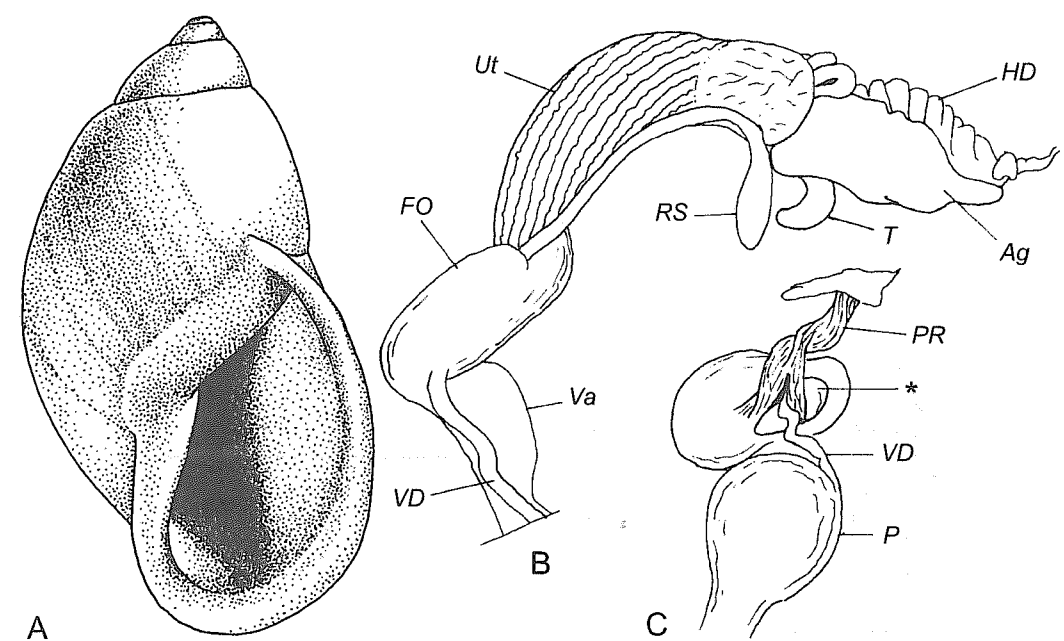


Fig. 600. A — *Strophocheilus pudicus* (Müller, 1774).  
Shell: Brazil. Phil. No. 66403. B, C — ! *Strophocheilus debilis* Bequaert, 1948. B — united and female division. C — penis. After Leme, 1973. Asterisk — upper chamber of penis (pseudepiphalus).

— *Metara* Morretes, 1952: 111 (*Strophocheilus* subg.; t.-sp. *Partula unidentata* Sowerby, 1825; OD).

Leme, 1973: 329.

TYPE SPECIES — *Strophocheilus erythrosoma* Pilsbry, 1895; OD.

Shell pointed-ovate, solid, dull, of about 5 slightly convex whorls. Apex flattened, planorboid. Color partly roseate, partly white under yellow or brownish periostracum; aperture margins pink to dark-brown. Embryonic whorls smooth, subsequent with inconspicuous radial lines, fine, shallow malleation, and crowded, wavy spiral striation. Aperture comparatively small, somewhat oblique, margins thickened and reflexed, sometimes with palatal nodules. Umbilicus absent or minutely open. Height 40-70, diam. 25-40 mm (52.8 x 29.3 mm).

Talon well developed. Vas deferens entering penial tube subapically. Epiphallus varying in shape or absent. Penis internally with strongly developed sphincter forming short verge. Inner surface of penis below and above verge with thin longitudinal folds. Penial retractor inserts apically. Free

oviduct without proximal enlargement, about same length as vagina. Spermathecal shaft slender, more or less expanded basally.

DISTRIBUTION. Brazil. 9 spp.

***Speironepion* Bequaert, 1948**  
Fig. 602

Bequaert, 1948: 26 (*Strophocheilus* subg.). Leme, 1973: 330.

TYPE SPECIES — *Bulinus milleri* Sowerby, 1838; OD.

Shell elongated-ovate, rather solid, shining, of 4.5-5 slightly convex whorls. Last whorl slightly descending in front. Apex flat, with somewhat sunken tip. Color chestnut or olive-brown; parietal callus bluish, aperture white or purplish inside, with pinkish or whitish margins. Both embryonic and postembryonic whorls with conspicuous sculpture of finely beaded spiral threads (wavy on lower spire) crossed by fine radial wrinkles. Aperture ovate, slightly oblique, with reflexed, expanded and thickened margins. Columellar margin with weak oblique fold. Umbilicus very narrow or absent.

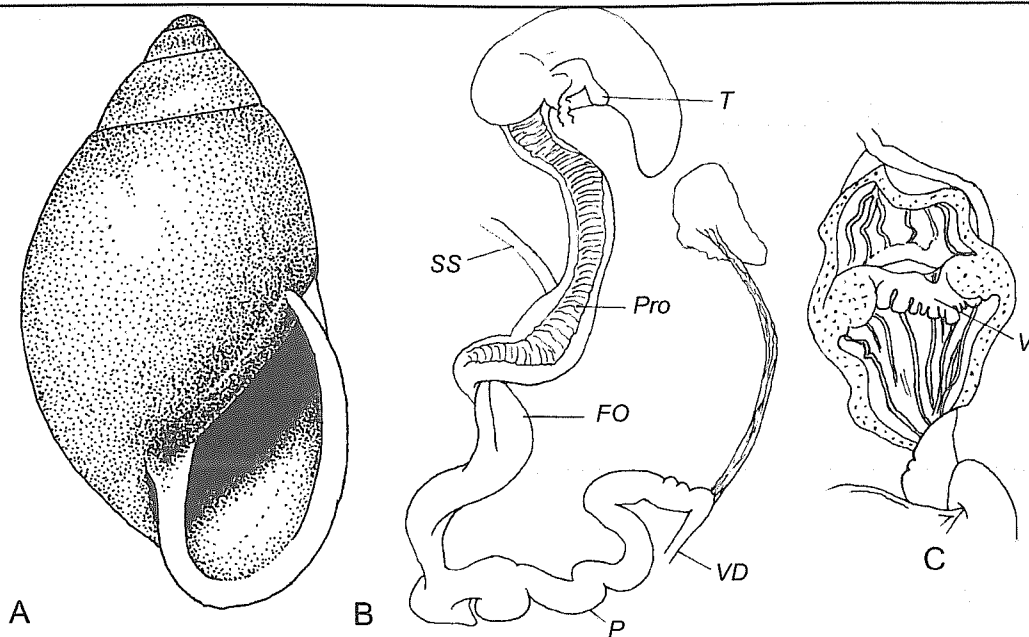


Fig. 601. *Mirinaba erythrosoma* (Pilsbry, 1895).  
A — shell: Jureira Rain Forest, Dept. South São Paulo, Brazil. Private collection of A.G. Kuznetsov. B, C — ! *Mirinaba planidens* (Michelin, 1831). B — reproductive tract. C — interior of penis. After Leme, 1973.

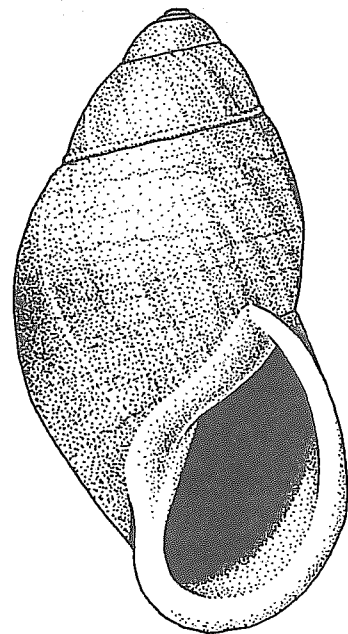


Fig. 602. *Speironepion milleri* (Sowerby, 1838).  
Brazil. Phil. No. 3584.

Height 53-60, diam. 30-32 mm (60.0 × 30.2 mm).

DISTRIBUTION. Brazil. 4 spp.

*Chiliborus* Pilsbry, 1926  
Fig. 603

Pilsbry, 1926a: 6 (*Borus* subg.). Leme, 1973: 331.

TYPE SPECIES — *Bulinus chilensis* Sowerby, 1833; OD.

Shell subglobose-ovate to elongated-ovate, moderately thin, of about 4 slightly convex whorls. Last whorl scarcely descending in front. Apex blunt. Color whitish to pale-yellow, sometimes with indistinct darker radial streaks. Embryonic whorls with spiral cordlets, subsequent with irregular tuberculate sculpture resulted from crossing of rather thin to coarse radial wrinkles and widely spaced spiral engraved lines. Aperture ample, ovate, moderately oblique, with shortly reflexed and more or less thickened margins. Columellar margin without lamella. Umbilicus, a short and very narrow crack. Height 19-67, diam. 11-42 mm (31.3 × 19.5 mm).

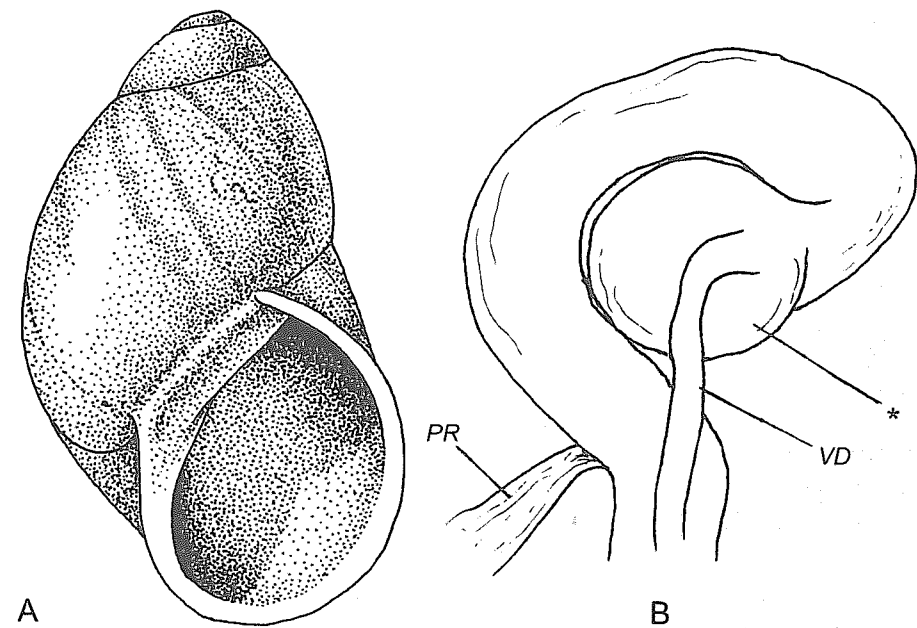


Fig. 603. A — *Chiliborus chilensis* (Sowerby, 1833).  
Shell: Chile. Moscow No. Lc-19620. B — *Chiliborus* sp. Penis. After Leme, 1973. Asterisk — upper chamber of penis.

Vas deferens enters basal part of globular section penis. Penis consisting of globular upper and subcylindrical lower sections. Penial retractor attached to lower section of penis well below globular part.

DISTRIBUTION. Chile. 5 spp.

*Austroborus* Parodiz, 1949  
Fig. 604

Parodiz, 1949: 189 (*Strophocheilus* subg.; nom. nov. pro *Microborus* Pilsbry, 1926).

— *Microborus* Pilsbry, 1926b: 6 [nom. praecoc., non Blanford, 1897 (Coleoptera, Scolytidae); *Strophocheilus* (*Borus*), sect.; t.-sp. *Bulinus lutescens* King et Broderip, 1832; OD].

Leme, 1973: 330.

TYPE SPECIES — *Bulinus lutescens* King et Broderip, 1832; OD.

Shell elongated-ovate to broadly ovate, relatively thin, of about 4 slightly convex whorls. Color uniformly straw, pale-yellow or whitish. Embryonic whorls with fine, close-set radial riblets cut by many spiral engraved lines into minute granules. Postembryonic whorls with fine distinct

granulation and weak radial wrinklets; granules sit mainly on wrinklets. Aperture ovate, subvertical, margins a little or not reflexed; columellar margin expanded. Umbilicus absent. Height 23-36, diam. 14-22 mm (28.3 × 17.3 mm).

Vas deferens enters between sections of penis. Upper section of penis elongated-conic, lower part long, subcylindrical. Penial retractor inserting by enlarged base to both sections of penis.

DISTRIBUTION. Uruguay, N Argentina. 3 spp.

CERIONOIDEA Pilsbry, 1901

Pilsbry, 1901 (1901-1902): 174 (pro fam.).

Shell dextral, medium-sized, (sub)cylindrical to bullet-shaped or clavate, rarely subglobose. Aperture simple, sometimes with parietal tooth; columella smooth or with weak lamella(e).

Jaw picnognathous: smooth, solid, with or without small median projection.

Sole of cephalopodium smooth.

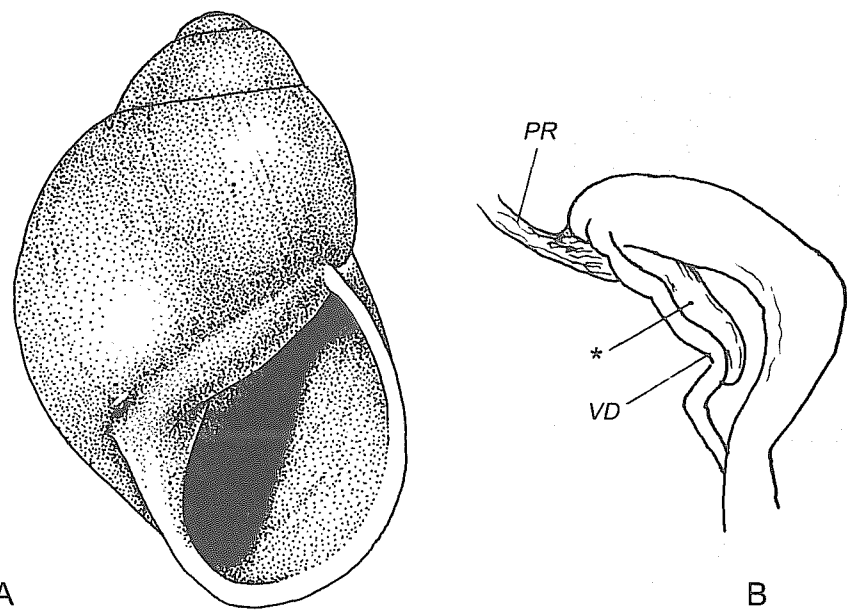


Fig. 604. *Austroborus lutescens* (King et Broderip, 1832).  
A — shell: Uruguay. Senck. No. 88559. B — penis. After Leme, 1973. Asterisk — upper chamber of penis.

Kidney mesurethral, both ureters open, as ciliary grooves.

Male division of reproductive tract without appendages except flagellum; well-developed atrial stimulator present. Penis without accessory gland. Spermathecal stalk with long diverticle.

DISTRIBUTION. West Indies and Florida, Guiana.

#### CERIONIDAE Pilsbry, 1901

Pilsbry, 1901 (1901-1902): 174.

Shell solid, opaque, cretaceous, of 8-13 moderately convex, tightly coiled whorls. Last whorl straight. Color uniformly white to variegate. Embryonic whorls smooth, postnuclear nearly smooth to strongly ribbed. Aperture ovate to rounded, with widely reflexed, thickened and expanded margins. Columella sometimes with short lamella. Umbilicus narrowly open.

Vas deferens extremely long, strongly convoluted, entering penis through simple pore. Penis with long apical process, to

which penial retractor attached terminally. Atrial retractor strongly developed. Free oviduct much longer than vagina. Spermathecal stalk with long diverticle. Atrium very wide, capacious, contains short, irregularly tongue-shaped fleshy stimulator.

DISTRIBUTION. As in superfamily.

#### *Cerion* Röding, 1798

Röding, 1798: 90.

— *Pupa* Lamarck, 1801: 88 (non Draparnaud, 1801; t.-sp. *Turbo uva* Linnaeus, 1758; monotypy).

— *Cerium* Link, 1807: 131 (nom. err. pro *Cerion* Röding, 1798).

— *Puppa* Montfort, 1810: 298 (nom. err. pro *Pupa* Lamarck, 1801).

— *Puparia* Rafinesque, 1814: 28 (nom. nov. pro *Pupa* Lamarck, 1801).

— *Cochlodonta* Férussac, 1821: 58 (*Helix* subg.; nom. nov. pro *Pupa* Lamarck, 1801).

— *Canistrum* Fabricius, 1823: 90 [t.-sp. *Canistrum uva* - in the list (non Mörch, 1852)].

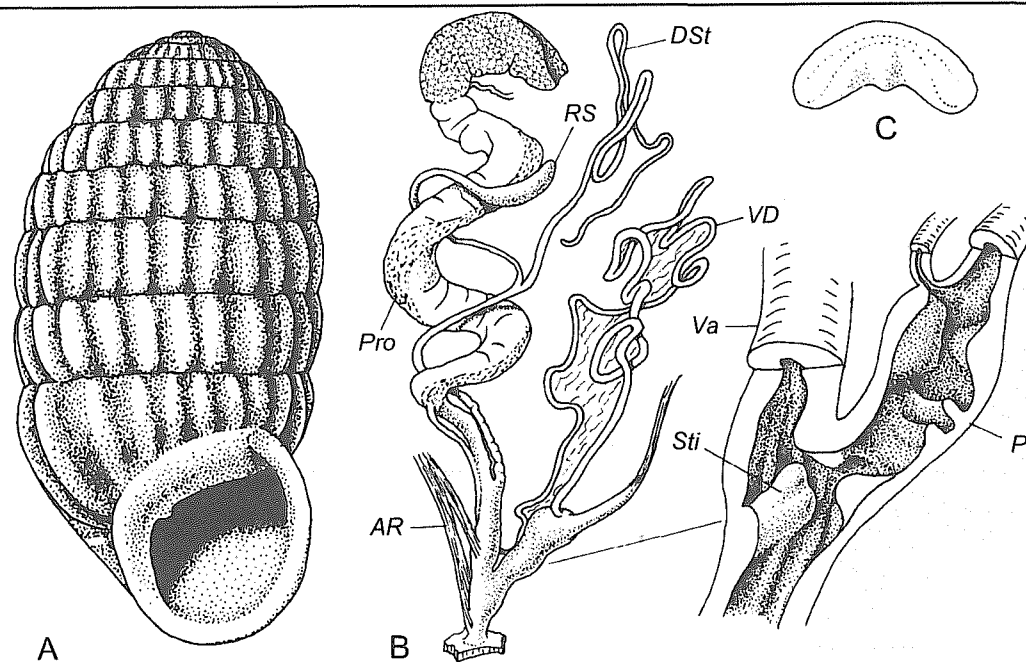


Fig. 605. *Cerion (Cerion) uva* (Linnaeus, 1758).  
Villemstadt, Curaçao, May 7, 1981. A — shell. B — reproductive tract and interior of atrium and penis. C — jaw. Moscow No. Lc-19544.

— *Cochlodon* Sowerby, 1825: 40 [part.; t.-sp. "*Cochlodon uva* Linnaeus, 1758"; SD Pilsbry, 1918 (1916-1918)].

— *Pulpa* Poey, 1858 (1851-1858): 30 (nom. err. pro *Pupa* Lamarck, 1801; t.-sp. *Pulpa sculpta* Poey, 1858; monotypy).

TYPE SPECIES — *Cerion vulgare* Röding, 1798 (= *Turbo uva* Linnaeus, 1758); SD Dall, 1894.

Characters of family.

DISTRIBUTION. As in superfamily.

#### *Cerion (Cerion s. str.)*

Fig. 605

Shell elongated-ovate to subcylindrical or clavate, quite solid, of convex whorls. Color dirty-white or pale-yellowish. Parietal lamella situated in parieto-columellar angle. Internal sets of armament sometimes persists in adult shells, but often absorbed and absent. Height 16-26, diam. 8-11 mm (21.4 × 9.6 mm).

Talon exposed, short, clavate. Vas deferens entering penis laterally by simple pore, forms several loops connected by thin,

transparent membrane. Before entering penis vas deferens not or scarcely swollen. Penial process approximately as long as penis. Penis internally with few high, irregular, fleshy folds; its lumen separated from lumen of atrium by a sphincter. At boundary between atrium and vagina, opposite to penis orifice, there is stimulator as mere fleshy valve. Spermathecal diverticle branched off from stalk a little above its middle.

DISTRIBUTION. Curaçao Island: 1 sp. with many forms.

#### *Cerion (Strophlops)* Dall, 1894

Fig. 606

Dall, 1894: 121 (nom. nov. pro *Strophia* Albers, 1850).

— *Strophia* Albers, 1850: 202 (nom. praeocc., non Meigen, 1832; *Pupa* subg.; t.-sp. *Pupa mumia* Bruguière, 1792; SD Martens in Albers, 1860).

— *Maynardia* Dall, 1894: 122 (t.-sp. *Strophlops neglecta* Maynard, 1894; OD).

— *Cyclocerion* Bartsch, 1952: 1 [*Cerion* subg.; t.-sp. *Cerion (Cyclocerion) baconi* Bartsch, 1952; OD].

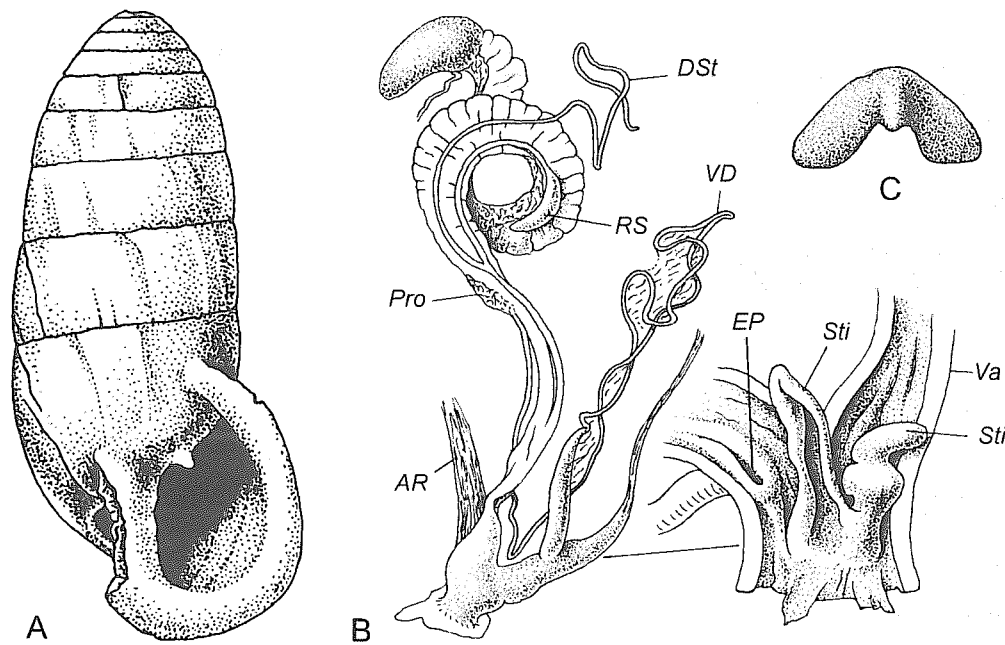


Fig. 606. *Cerion (Strophlops) regium* (Benson, 1841).  
A — shell: Castle Id., Bahamas. Chicago No. 42209. B, C — Beach of Sol Palmeras Hotel, Varadero, Matanzas Prov., Cuba, June 10, 1998. B — reproductive tract and interior of its distal section. C — jaw. Moscow No. Lc-23690.

Clench, 1957: 121.

TYPE SPECIES — *Helix (Cochlodonta) decumana* Férussac, 1821 (nom. nud.; = *Pupa regium* Benson, 1841); OD.

Shell cylindrical to ovate and (rarely) subglobose, mostly solid, cretaceous, of 7-9 slightly convex to nearly flat whorls. Parietal tooth situated at or near middle of parietal wall, may be either short or moderately long, sometimes penetrating half-whorl inward. It sometimes reinforced by callous deposit or smaller tooth near its lower (outer) end on side towards columella, but otherwise continuous and simple. Columellar lamella deeply penetrating. Cavity of whorls rather ample, not obstructed within by teeth in mature shells. Height 10-47, diam. 5-20 mm (45.2 × 18.8 mm).

Anatomically differs from *Cerion* s. str. mainly by two characters: 1. Distal portion of vas deferens more or less swollen before entering penis. 2. Presence of well-developed, bilobed, fleshy atrial stimulator. One (larger) lobe forms spoon-like lamella with

margins bent inward; another (smaller) lobe solid, smooth or longitudinally grooved.

DISTRIBUTION. Florida Keys, Bahama Islands, Cuba, Cayman Islands, Haiti, Puerto Rico, Virgin Islands, St. Croix Island, Guiana. Nobody knows how many species of this subgenus exist in reality because of wide variety and existing hybrids. For example, Gould & Woodruff (1986) stated that more than 90 nominal species have been recognized from New Providence Island whereas these authors confirmed the presence of only 2 semispecies.

*Cerion (Diacerion) Dall, 1894)*

Fig. 607

Dall, 1894: 122.

— *Paracerion* Pilsbry et Vanatta, 1895: 206 [*Cerion* subg.; t.-sp. *Cerion (Paracerion) tridentatum* Pilsbry et Vanatta, 1895; SD Clench, 1957].

— *Tridentistrophia* Maynard, 1896: 9 (t.-sp. *Strophia striatella* Férussac, 1829; OD).

TYPE SPECIES — *Strophia dalli* Maynard, 1889; OD.

Shell ribbed. Parietal lamella rather short, its inner end contiguous to or continuous with small denticle or long, spirally entering lamella. Infraparietal tooth or parallel lamella developed between parietal lamella and columella. Some or all of these lamellae sometimes absent. Low columellar lamella developed. Height 14-36, diam. 7-14 mm (26.0 × 11.0 mm).

DISTRIBUTION. Great Inagua Island and S Cuba. 2 or 3 Recent spp. with several forms.

ACHATINOIDEA Swainson, 1840

Swainson, 1840: 161, 334 (as Achatinae, Helicidae subfam.).

Shell generally dextral, medium to very large, ovoid, pillar-shaped or fusiform. Aperture simple, columellar margin often truncated.

Jaw picnognathous, smooth or with rounded ribs.

Sole of cephalopodium smooth.

Kidney of mesourethral type, ureters open or primary ureter closed.

Reproductive tract simple. Penis sheath present. Spermathecal stalk lacking diverticle, mostly not bound to spermoviduct, although usually tightly adherent to it.

DISTRIBUTION. Africa and adjacent islands. One species introduced in many tropical and subtropical countries.

ACHATINIDAE Swainson, 1840

Swainson, 1840: 161, 334 (as Achatinae, Helicidae subfam.).

— Ampullidae Winckworth, 1945: 146 (nom. nud.; as syn. of Achatinidae).

Shell mostly dextral, medium to very large, elongated, paucispiral, thin to very solid. Umbilicus mostly closed, rarely dot-like.

Jaw solid, without median projection, sometimes with smoothed, broad ribs.

Reproductive apparatus without appendages. Penis sheath well developed, open or closed at its upper end.

DISTRIBUTION as in subfamily.

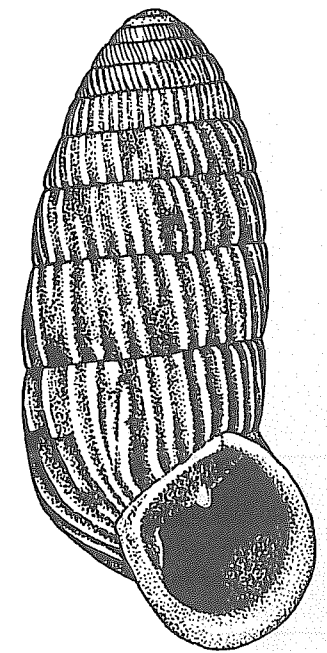


Fig. 607. *Cerion (Diacerion) dalli* (Maynard, 1889).  
Ridge 2 mi. E of Matthew Town, Great Inagua Island, Bahamas. Moscow No. Lc-23334 (Phil.).

LIMICOLARIINAE Schileyko, subfam. nov.

Shell dextral, rarely sinistral, mostly medium-sized. Columellar margin not truncated.

Vas deferens penetrate penis sheath. Sheath closed at upper end. Penial retractor originates on diaphragm, short to long, not covered by penis sheath. Penis internally with verge.

DISTRIBUTION. Tropical Africa.

*Limicolaria* Schumacher, 1817

Fig. 608

Schumacher, 1817: 61.

— *Limicolaria* Schumacher, 1817: 200 (nom. err. pro *Limicolaria* Schumacher, 1817).

— *Limicolarius* Beck, 1837: 60 (*Bulinus* subg.; nom. err. pro *Limicolaria* Schumacher, 1817).

— *Perideriopsis* Putzeys, 1898: VI (t.-sp. *Perideriopsis umbilicata* Putzeys, 1898; OD).

Crowley & Pain, 1970: 11.

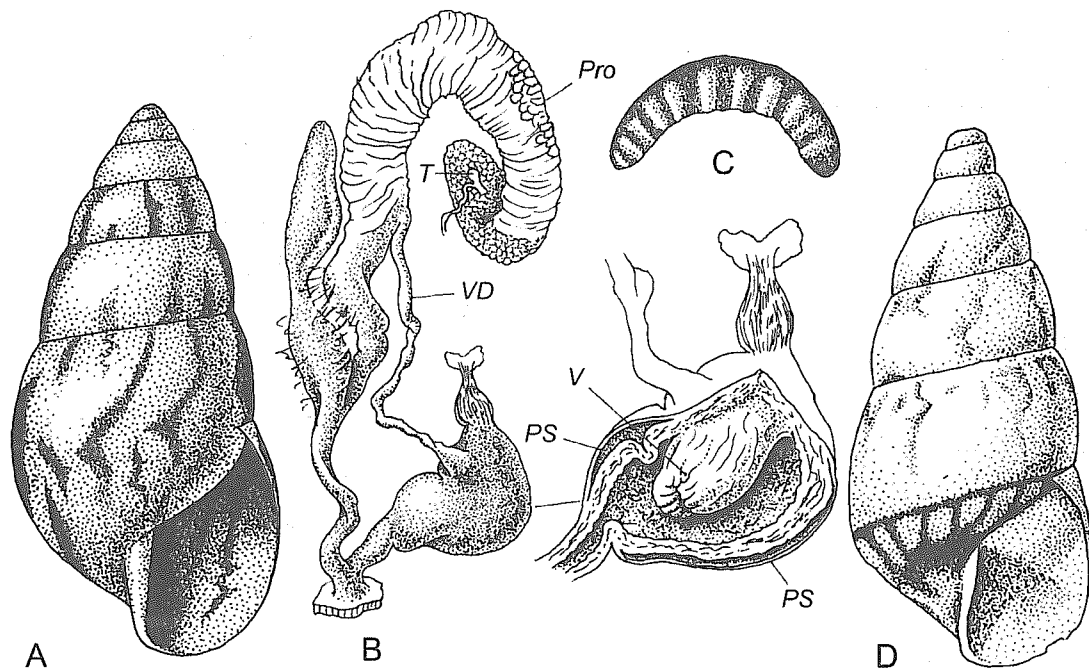


Fig. 608. A, B, C — *Limicolaria flammea* (Müller, 1774). Konakri, Guinea. August 1988. A — shell. B — reproductive tract and interior of penis. C — jaw. Moscow No. Lc-20462. D — ! *Limicolaria umbilicata nsendweensis* (Dupuis et Putzeys, 1901). Shell: Nsendwe, Congo. Phil.

TYPE SPECIES — *Helix flammea* Müller, 1774; monotypy.

Shell ovate to ovate-conic or turrete, moderately thin to solid, of 6-8 moderately or slightly convex whorls. Apex pointed. Color uniformly pale to (more often) having bright brown radial streaks or flammules; sometimes dark below periphery. Embryonic whorls smooth, sculpture of subsequent whorls from shiny rippled surface to series of close cut oblong granules becoming most marked on upper portions of whorls. Aperture ovoid, with simple, sometimes a little thickened margins. Columella vertical, more or less expanded. Umbilicus closed or minutely open. Height 30-120, diam. 16-55 mm (*flammea*: 40.6 × 19.7 mm; *umbilicata nsendweensis*: 36.0 × 17.2 mm).

Jaw with more or less developed, broad, flattened ribs.

Talon exposed, small, consisting of globular head and short cylindrical stalk; hermaphroditic duct entering upper part of stalk. Vas deferens rather stout, not long, inserting onto upper part of penis. Penis bulky, swollen, thick-walled, with sheath

attaching at both ends. Internally penis without special sculpture, contains large verge with slit-like terminal orifice. Free oviduct more or less enlarged, vagina of same length as oviduct, thin. Spermathecal stalk greatly enlarged basally, reservoir elongated, not reaching middle part of spermoviduct.

DISTRIBUTION. Tropical Africa. About 90 spp. & forms.

*Limicolariopsis* Ailly, 1910  
Fig. 609

Ailly, 1910: 24.

— *Rebmanniella* Preston, 1911: 471 [*Limicolaria* subg.; t.-sp. *Limicolaria (Rebmanniella) inepta* Preston, 1911; OD].

Crowley & Pain, 1961.

TYPE SPECIES — *Limicolariopsis sjoestedti* Ailly, 1910; monotypy.

Shell elongated-ovate, rather thin, dull, with rounded apex, of 6-6.5 convex whorls; last scarcely descending in front. Colora-

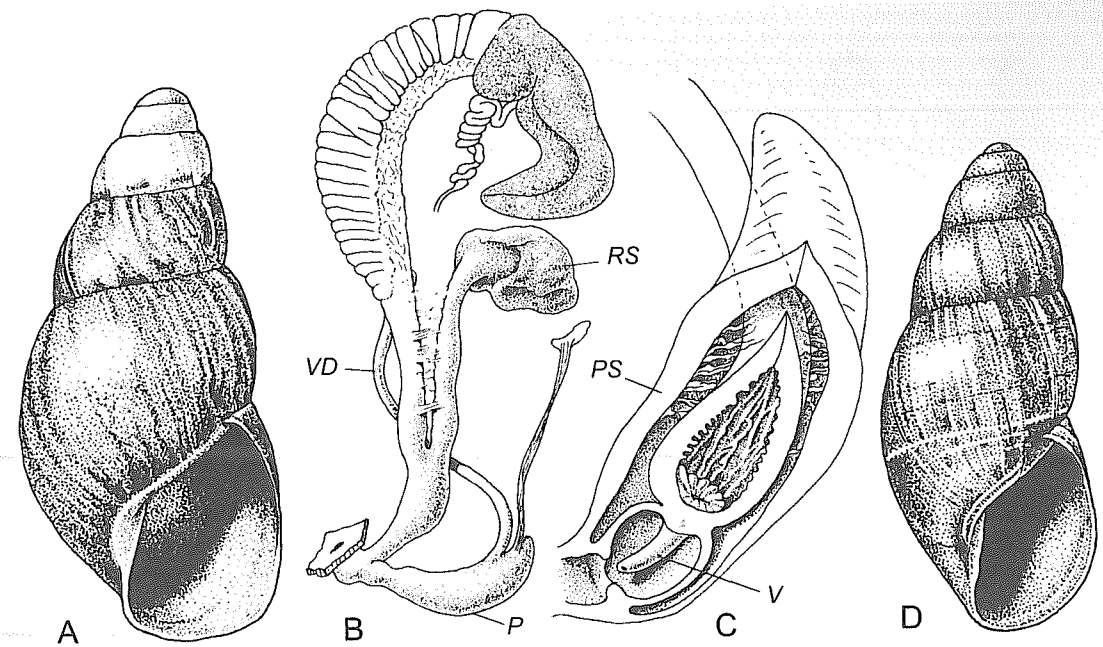


Fig. 609. A, B, C — *Limicolariopsis sjoestedti* Ailly, 1910. Cameroon. Syntype. A — shell. B — reproductive tract. C — interior of male division. Meru [Kenya], Paris. D — ! *Limicolariopsis ruwensoriensis* Pilsbry, 1919. Shell: Lanuri, Ruwenzori Mt. [Uganda]. Phil. No. 118568.

tion of ochraceous background and variously developed darker radial streaks; sometimes nearly uniformly chestnut. Embryonic whorls smooth, rest surface granulated because of crossing radial and spiral grooves; spiral sculpture much weaker below periphery. Aperture nearly vertical, subquadrangular, with smoothed angles at baso-columellar and baso-palatal regions. Parietal callus well expressed. Margins simple. Umbilicus closed. Height 42-59, diam. 20.0-26.5 mm (*sjoestedti*: 51.3 × 24.2; *ruwensoriensis*: 53.2 × 22.2 mm).

Talon hidden. Vas deferens comparatively stout, entering penis sheath at some distance from apex which forms a short, conic process. After penetrating sheath vas deferens enlarged as ampulla; bottom of this enlargement with narrow orifice surrounded by crown of radial folds. Distally from ampulla there is a small chamber containing rod-like verge. Numerous thin bands connect internal surface of penis sheath with distal part of vas deferens. Penial retractor attached to penis sheath at short distance from apex. Free oviduct rather long, vagina somewhat shorter.

Spermathecal duct of moderate length, connected with oviduct by numerous bands; reservoir voluminous, adhering to midway of spermoviduct.

DISTRIBUTION. Tropical Africa. 16 spp.

*Columna* Perry, 1811  
Fig. 610

Perry, 1811: pl. 51.

TYPE SPECIES — *Buccinum columna* Müller, 1774; tautonymy.

Shell sinistral, slender, oblong-tapering or pillar-shaped, rather thin, of 6.5-8.5 flattened or moderately convex whorls. Color yellow or dirty yellowish-white, marked with red-brown obliquely-radial streaks, which may be weak, splitted and interrupted or obsolete on upper part of each whorl; apical part dull and red-brown, sometimes yellowish with oblique zigzag radial brown stripes or corneous-fulvous with dark chestnut bent and angulated streaks. Embryonic whorls large, flattened, practically smooth. Postapical whorls

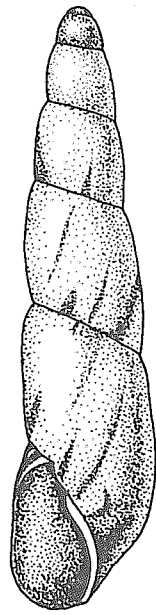


Fig. 610. *Columna columna* (Müller, 1774). "Prinz. I." Vienna No. 1482.

densely granose-decussate and spirally striated. Aperture relatively small, oblique, with thin, simple margins; columellar margin concave. Columella slender, at first nearly straight, then strongly spiral, with projecting callous flange in last whorl. Umbilicus closed. Height 37-96, diam. 14.5-19.0 mm (60.5 × 15.8 mm).

DISTRIBUTION. Islands in the Gulf of Guinea. 3 spp.

#### CALLISTOPLEPINAE Mead, 1994

Mead, 1994: 3.

Shell dextral, mostly medium-sized. Columellar margin truncated.

Vas deferens not penetrate penis sheath but leaves apically with penial retractor through sheath aperture. Penial retractor originates from right columellar retractor, extremely short, entirely or almost entirely covered by penis sheath. Penis internally with large, conspicuous verge.

DISTRIBUTION. Equatorial W Africa.

#### *Callistoplepa* Ancey, 1888 Fig. 611

Ancey in Vignon, 1888: 69.

— *Ganomidos* Ailly, 1896: 66 (t.-sp. *Achatina barriana* Sowerby, 1890; SD Mead, 1994).

— *Callistoplepa* Ancey, 1898: 92 (nom. emend. pro *Callistoplepa* Ancey, 1888).

— *Ganomidos* O. Boettger, 1905: 170 (nom. err. pro *Ganomidos* Ailly, 1896).

— *Ganomides* Verdcourt, 1966: 111 (nom. err. pro *Ganomidos* Ailly, 1896).

Mead, 1994: 4, 5.

TYPE SPECIES — "*Achatina shuttleworthiana*" L. Pfeiffer, 1856 (= *Achatina shuttleworthi* L. Pfeiffer, 1856); OD.

Shell inflated, obesely-fusiform, very thin, shining, semitransparent, of 5-6 flattened whorls. Last whorl rounded or with smoothed, rounded peripheral angle. Color generally yellow, with reddish pattern of radial and zigzag streaks and peripheral band. Embryonic whorls glabrous, later with radial thin but coarse, slender, tightly and evenly placed prosocline costate wrinkles; widely spaced spiral lines usually present; below peripheral angle radial sculpture becomes obsolete but spiral striation retained. Aperture large, pointed-ovate, with simple, thin margins. Columellar margin truncated. Umbilicus absent. Height 27-65, diam. 13-30 mm (28.5 × 15.7 mm).

Posterior foot with dorsolateral serrate ridges. No colored band on neck.

Vas deferens short, thick, passing through upper opening of penis sheath to enter verge, and opening on verge laterally. Verge large, fleshy, conic. Penis globular, completely coated by sheath. Penial retractor passes, together with vas deferens, through upper orifice of sheath and attaches to penis apically. Free oviduct moderately long, vagina extremely short. Spermathecal shaft stout, not long, reservoir poorly demarcated from shaft.

DISTRIBUTION. Equatorial Guinea to Nigeria. 2 spp.

#### *Leptocala* Ancey, 1888 Fig. 612

Ancey in Vignon, 1888: 70.

— *Petitia* Jousseaume, 1884: 171 (nom. praeocc.,

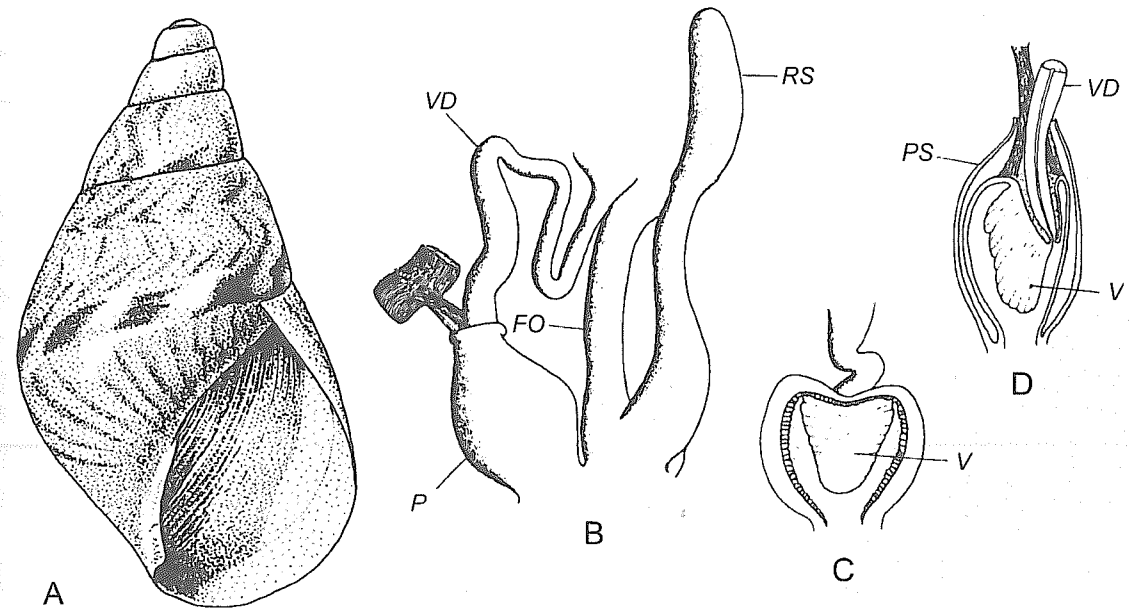


Fig. 611. *Callistoplepa shuttleworthi* (L. Pfeiffer, 1856). A — shell: Gabon. Paris. B — distal part of reproductive tract. C — interior of penis (penis sheath not shown). D — penis cut sagittally. After Mead, 1994.

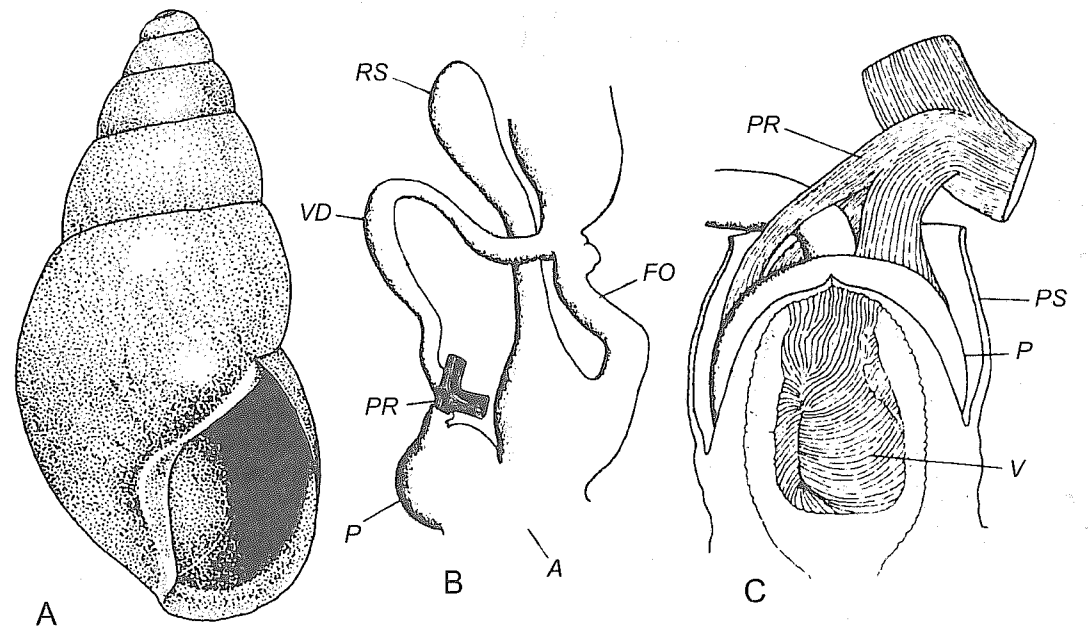


Fig. 612. *Leptocala mollicella* (Morelet, 1860). A — shell: Buena, Cameroon. Paris. B — distal part of reproductive tract. C — interior of penis sheath and penis. After Mead, 1994.

non Chitty, 1857; t.-sp. *Petitia petitia* Jous-seaume, 1884; tautonymy).

— *Leptocola* Kobelt, 1910: 66 (*Achatina* subg.; nom. err. pro *Leptocala*).

Mead, 1994: 12.

TYPE SPECIES — *Achatina mollicella* Morelet, 1860; SD Ancey, 1898.

Shell elongated-ovate, thin but sturdy, translucent, glossy, of 6-6.5 moderately convex whorls. Color uniformly pale-fulvous and zebra-striped with darker streaks. Sculpture of body whorl with extremely finely engraved microscopic rhomboids or vertical vermiculate granules. Aperture semioval, pearly within, usually more than 52% of shell height; last whorl shorter, usually more than 73% of shell height. Columella somewhat twisted, nearly straight, obliquely truncated. Height 18-32, diam. 12-18 mm (30.7 × 16.7 mm).

Dark gray band on neck between ommatophores and mantle.

Vas deferens moderately short, thick, passes through upper opening of penis sheath to enter verge and opens on verge subapically. Verge large, blunt, its surface covered with numerous, thin, crowded grooves. Penis very short, globular, completely covered with sheath. Penial retractor passes, together with vas deferens, through upper orifice of sheath and attaches to penis apically by a few branches. Free oviduct moderately long, vagina as such not expressed. Spermathecal stalk greatly enlarged basally, rather short, reservoir indistinctly demarcated from stalk.

DISTRIBUTION. Cameroon to western Zaïre. 2 spp.

#### ACHATININAE Swainson, 1840

Mead, 1994: 3.

Shell as in family.

Vas deferens penetrates penis sheath. Even within a single population, penial retractor may variously originate from muscle bands, body wall, diaphragm or fascia; it is usually long to very long and entirely or almost entirely free of penis sheath. Penis internally with an ill-defined pilaster, no pilaster or a verge.

DISTRIBUTION. Africa.

#### *Bequaertina* Mead, 1994

Fig. 613

Mead, 1994: 18.

TYPE SPECIES — *Achatina graueri* Thiele, 1911; OD.

Shell pointed-ovate, thin, fragile, of about 6 slightly convex whorls. Color brownish-yellow, with brown radial streaks. Embryonic whorls covered with beautiful granulation for crossing spiral and radial striae. On later whorls spiral lines wider spaced; radial lines dense, irregular. Aperture ample, ovate, with thin, simple margins. Columellar margin truncated. Umbilicus closed. Height 40-80, diam. 22-46 mm (55.2 × 30.3 mm).

Vas deferens short, enormously enlarged, entering penis laterally through sheath by simple pore; verge wanting. Penis very short, somewhat swollen, internally with numerous, very small papillae covered upper part of the organ. Penial retractor attached to blind end of penis. Free oviduct noticeably longer than vagina. Spermathecal stalk very short, reservoir voluminous, elongated.

DISTRIBUTION. Area of the Rift Valley — Lake Region and the Lualaba branch of the Zaïre River in central, E and SE Africa. At least 5 spp.

#### *Achatina* Lamarck, 1799

Lamarck, 1799: 75.

TYPE SPECIES — *Bulla achatina* Linnaeus, 1758; monotypy.

Embryonic whorls form somewhat pointed, narrow apex.

DISTRIBUTION. Africa (1 sp. introduced to many tropical and subtropical countries).

#### *Achatina* (*Achatina* s. str.)

Fig. 614

— *Ampulla* Röding, 1798: 110 [part.; t.-sp. *Ampulla priamus* Röding, 1798; SD Pilsbry, 1908 (1907a-1908a)].

— *Achathina* Latreille, 1804: 113 (nom. err. pro *Achatina* Lamarck, 1799).

— *Achatium* Link, 1807: 137 [part.; t.-sp. *Achatium elegans* Link, 1807 (= *Achatina achatina elegans*); SD Pilsbry, 1919a].

— *Agathina* Férussac, 1801 (1807): 49 (*Helix*

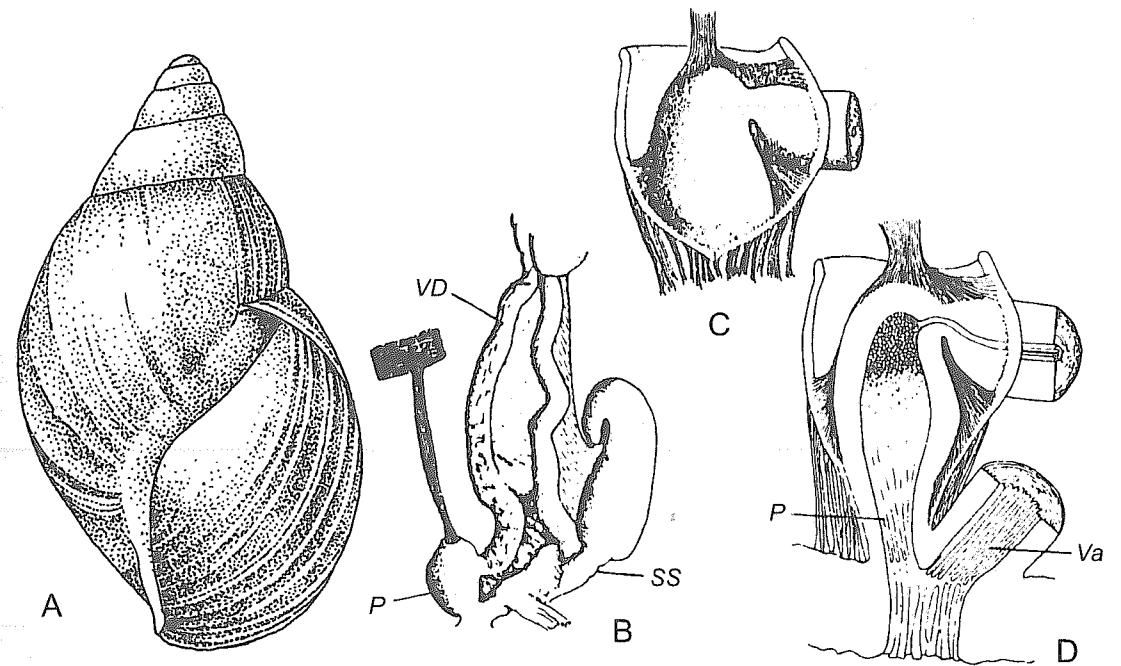


Fig. 613. *Bequaertina graueri* (Thiele, 1911).

A — shell: Idjéwi Id., Lake Kivu [Zaire]. Chicago No. 122603. B — basal part of reproductive tract. C — penis sheath cut and spread. D — interior of penis and basal portion of vagina. After Mead, 1994.

subg.; probably nom. emend. pro *Achatina* Lamarck, 1799; t.-sp. *Bulla achatina* Linnaeus, 1758; SD Bequaert, 1950).

— *Achatinus* Montfort, 1810: 418 (nom. err. pro *Achatina* Lamarck, 1799).

— *Achatinum* M. Gray, 1850: 116 (as syn. of *Achatina* Lamarck, 1799).

— *Chersina* Férussac, 1821: 49 (t.-sp. *Bulimus zebra* Bruguière, 1792; SD Kennard, 1942).

— *Cochlitoma* Férussac, 1821: 48 [*Helix* subg.; t.-sp. *Bulimus zebra* Bruguière, 1792; SD Pilsbry, 1904 (1904-1905)].

— *Oncaea* Gistel, 1847 (1850): 550 [nom. praecoc., non Philippi, 1843; nom. nov. pro *Achatina*; nom. nud.; t.-sp. *Achatina perdix* Lamarck, 1822 (= *Bulla achatina* Linnaeus, 1758); SD Pilsbry, 1919a].

— *Geodes* Gistel, 1848: viii (nom. nud.; nom. nov. pro *Achatina*; t.-sp. *Bulla achatina* Linnaeus, 1758; SD Pilsbry, 1919a).

— *Euachatina* Shuttleworth, 1856: 33 [t.-sp. *Achatina perdix* Lamarck, 1822 (= *Bulla achatina* Linnaeus, 1758); SD Bequaert, 1950].

— *Urceus* Mörch, 1857: 194 [*Achatina* subg.; t.-sp.

*Achatina variegata* Lamarck, 1801 (= *Bulla achatina* Linnaeus, 1758); SD Bequaert, 1950].

— *Parachatina* Bourguignat, 1889: 73 [t.-sp. *Achatina dohrniana* L. Pfeiffer, 1870; SD Pilsbry, 1904 (1904d-1905)].

— *Serpaea* Bourguignat, 1889: 74, 85 [t.-sp. *Achatina hortensiae* Morelet, 1866; SD Pilsbry, 1904 (1904-1905)].

Bequaert, 1950: 9.

TYPE SPECIES — *Bulla achatina* Linnaeus, 1758; monotypy.

Shell inflated, ovate-conic, moderately thin, of 6-7 slightly convex whorls. Spire conic, apex pointed. Coloration of corneous or yellowish background and irregular pattern of reddish or brown radial streaks; parietal wall of aperture and columella often pink. Embryonic whorls smooth, later with coarse radial wrinkles and distinct, widely spaced, incised spiral lines. Aperture ovate, with simple, thin margins. Columellar margin nearly straight or a little concave, truncated below. Height 50-200, diam. 24-98 mm (184.6 × 97.4 mm).

Talon hidden. Vas deferens short, stout.



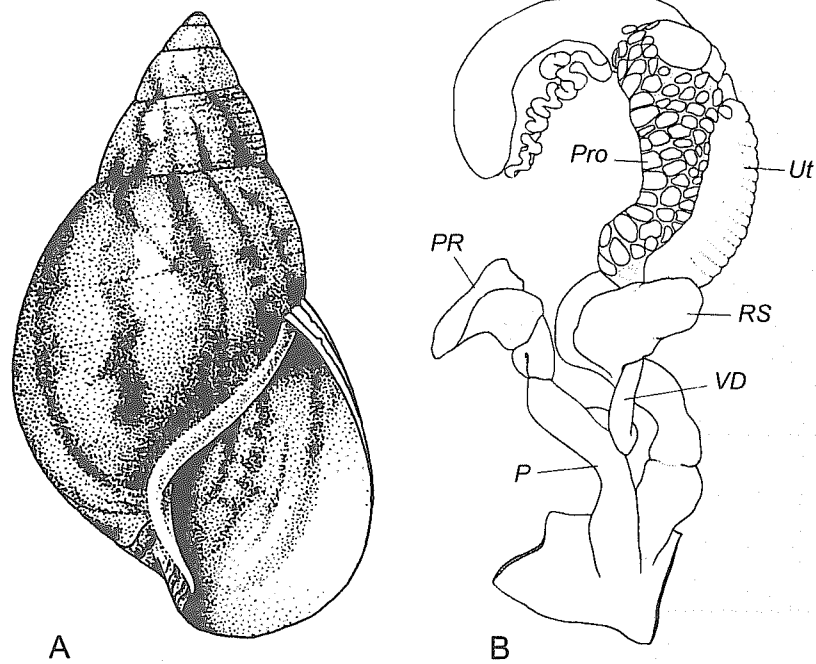


Fig. 614. A — *Achatina (Achatina) achatina* (Linnaeus, 1758). Shell: Forest Tabuna, Santa River valley, env. of Kindia, Guinea. Moscow No. Lc-15560. B — ! *Achatina (Achatina) dammarensis* L. Pfeiffer, 1870. Reproductive tract. After Van Bruggen, 1970.

Penis sheath covers most of penis. Penial retractor attached to vas deferens/penis junctions. Free oviduct and vagina more or less enlarged, latter somewhat longer, sometimes with circular narrowing. Atrium very shallow. Spermathecal stalk very short, so that reservoir nearly sessile.

DISTRIBUTION. Tropical and S Africa. About 10 spp. & subsp.

*Achatina (Pintoa) Bourguignat, 1889*  
Fig. 615

Bourguignat, 1889: 80.

TYPE SPECIES — *Achatina pfeifferi* Dunker, 1854; SD Pilsbry, 1904 (1904-1905).

Shell elongated, comparatively slender, rather solid, glossy, of 7-8 scarcely convex whorls. Apex obtuse and rather large. Color yellowish or pale-corneous, usually with variously developed radial or oblique reddish flammulations. Embryonic whorls finely granulated, later with rather regular radial striation better expressed on early postnuclear whorls. Aperture relatively

small, ovate, with thin, simple margins. Columellar margin concave, truncated. Height 35-58, diam. 10-18 mm (42.3 × 15.0 mm).

DISTRIBUTION. W and S Africa. 5-6 spp.

? *Achatina (Tripachatina)*  
Bourguignat, 1889)  
Fig. 616

Bourguignat, 1889: 73.

TYPE SPECIES — *Achatina vignoniana* Morelet, 1874; monotypy.

Shell elongated-ovate, rather thin, of about 8 slightly convex whorls. Color pattern of radial diffuse streaks on paler ground. Embryonic whorls densely granulate, later irregularly radially striated and locally finely granulate. Aperture comparatively narrow, pointed-ovate, with thin margins; columellar margin nearly straight, subvertical, scarcely truncated. Umbilicus, a minute perforation limited by strong an-

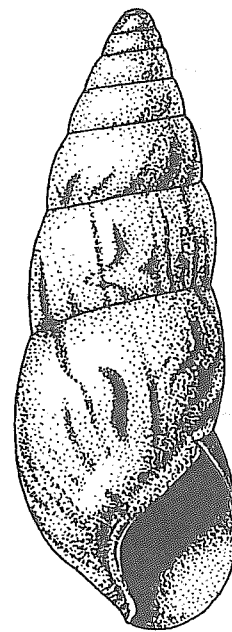


Fig. 615. *Achatina (Pintoa) pfeifferi* Dunker, 1854. Loanda, W Africa. Phil. No. 85124.

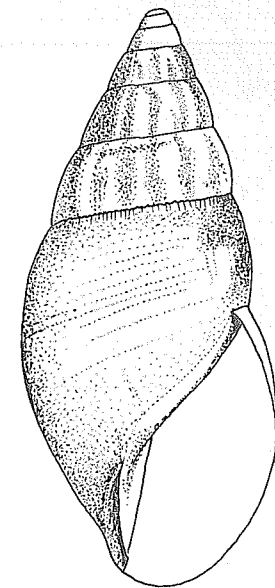


Fig. 616. *Achatina (Tripachatina) vignoniana* Morelet, 1874. After Bequaert, 1950.

gle forming obtuse crest. Height up to 105, diam. (estimated) up to 40 mm.

DISTRIBUTION. W Africa (Gaboon). 1 sp.

REMARK. I am not sure if *Tripachatina* warrants even a subgeneric status. As Bequaert (1950: 48-49) stated, "The few known specimens of ... *A. vignoniana* ... the largest of which measures 105 mm. in length, appear to be all immature and it is a question whether the umbilicus might not be completely closed in the fully adult shell."

*Achatina (Lissachatina)*  
Bequaert, 1950)  
Fig. 617

Bequaert, 1950: 49.

TYPE SPECIES — *Achatina fulica* Bowdich, 1822; OD.

Shell broadly ovate to obesely fusiform, solid to rather thin, of 6-8 moderately convex whorls. Apex either conic or more or less drawn out into narrow nipple. Colora-

tion generally consists of yellowish or whitish background and brown (sometimes with lilacish or violet tint) radial streaks; some of streaks often sinuous or broken into spots. Embryonic whorls smooth or with faint radial wrinkles, subsequent granulate or decussate; on last whorl sculpture sometimes obsolete. Aperture ovate, with simple, scarcely thickened margins; columellar margin subvertical, distinctly truncated. Umbilicus closed. Height 60-210, diam. 28-100 mm (107.2 × 52.2 mm).

Jaw pseudodontognathous, with wide vertical folds and very fine, crowded, longitudinal threadlets.

Talon exposed, clavate. Prostate composed of 2 sections: upper (just below albumen gland) consists of sinuous tubules; distal section composed of elongated acini. Vas deferens rather stout, piercing thick-walled penis sheath at its upper part; outside of sheath male duct forms a loop, to which penial retractor attached, then this duct continues as penis. Internally penis with crowded longitudinal folds. Penial retractor, a branch of common columellar

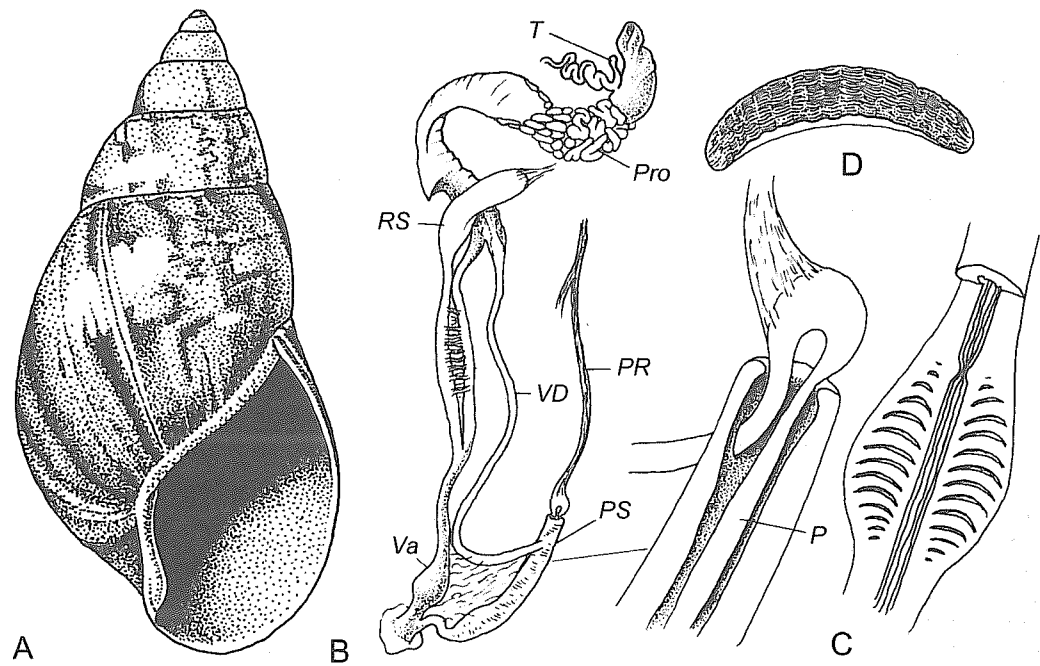


Fig. 617. *Achatina (Lissachatina) fulica* Bowdich, 1822. A — shell: Victoria, Mahé Island, Seychelles. Moscow No. Lc-24219. B, C, D — Sultan's Park, Male, Maldive Islands, March 6, 1980 (subadult specimen). B — reproductive tract and interior of penis sheath. C — interior of vagina. D — jaw. Moscow No. Lc-20068.

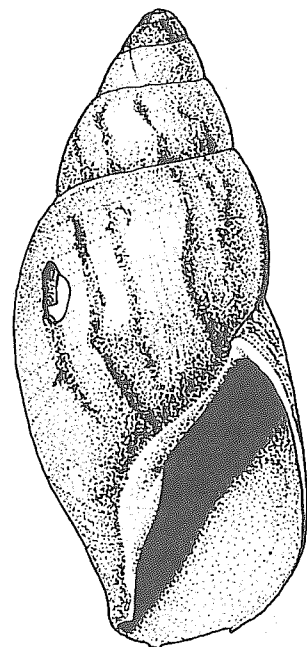


Fig. 618. *Achatina (Euaethiopina) loveridgei* (Clench et Archer, 1930). Bagilo, Uluguru Mts., Tanzania. Holotype. Cambridge No. 58934.

trunk. Internally penis with narrow lumen and fine but sharp longitudinal folds. Penis sheath, vas deferens and vagina connected by thin, transparent membrane. Free oviduct and vagina of about same length; wall of lower, swollen section of vagina contains series of distinct, slit-like, narrow, circular cavities. Lumen of vagina obstructed by thin, lamellar longitudinal folds. Spermathecal stalk bound to free oviduct by numerous bands. Reservoir elongated-ovate, with apical ligament, tightly appressed to spermooviduct.

DISTRIBUTION. Tropical Africa. 20-25 spp.; 1 sp. (*A. fulica*) introduced in many tropical countries (Mead, 1961).

*Achatina (Euaethiopina)*  
Bequaert, 1950)  
Fig. 618

Bequaert, 1950: 136 (nom. nov. pro *Euaethiops* Clench et Archer, 1930).

— *Euaethiops* Clench et Archer, 1930: 295 (nom. praecoc., non Hampson, 1926; t-sp.

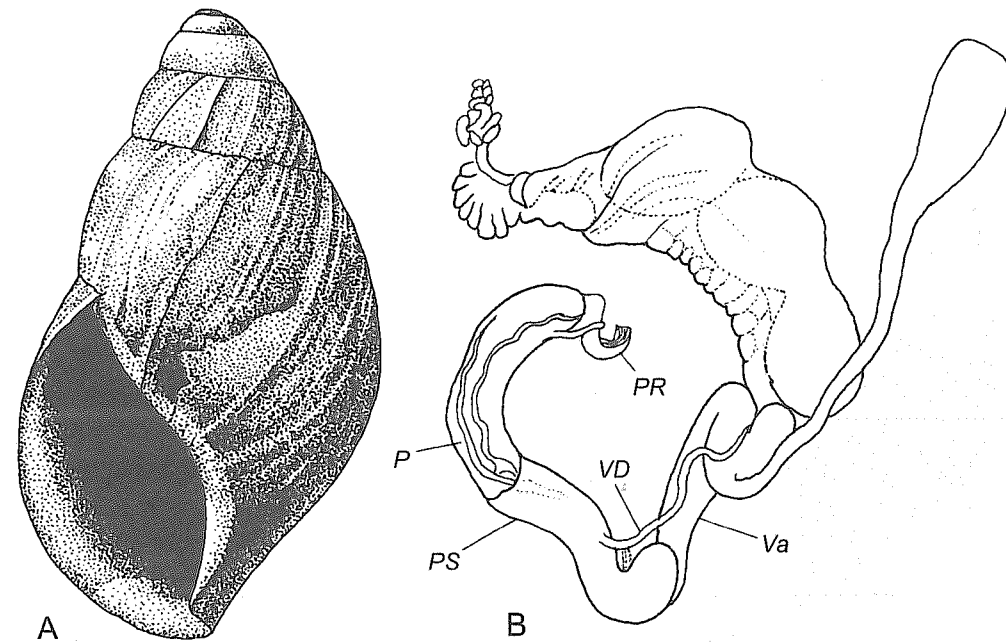


Fig. 619. *Archachatina (Archachatina) bicarinata* (Bruguière, 1792). A — shell: W Africa. Phil. No. 8360. B — reproductive tract. After Deshayes in Férussac, 1819.

*Euaethiops loveridgei* Clench et Archer, 1930; OD).

TYPE SPECIES — *Euaethiops loveridgei* Clench et Archer, 1930; OD.

Shell elongated-ovoid, rather solid, of about 6.5 moderately convex whorls. Apex narrowly but bluntly conic. Color yellowish-ochraceous, with radial reddish-brown streaks. Embryonic whorls finely malleated, later whorls coarsely radially wrinkled and bear widely spaced, rather shallow, spiral grooves. Aperture elongated, subvertical, with slightly thickened, non-reflexed margins. Columella only weakly truncated. Umbilicus absent. Height 70.0, diam. 29.8 mm.

DISTRIBUTION. E Africa (Tanzania). 1 sp.

*Archachatina* Albers, 1850

Albers, 1850: 189 (*Achatina* subg.; part.).

TYPE SPECIES — *Achatina sinistrorsa* L. Pfeiffer, 1848 (= *Bulimus bicarinatus* Bruguière, 1792); SD Herrmannsen, 1852 (1846-1852).

Embryonic whorls form obtuse, rounded apex.

DISTRIBUTION. W Africa (from Sierra Leone to Congo valley).

*Archachatina (Archachatina s. str.)*  
Fig. 619

Shell usually sinistral, broadly ovate, moderately thin, of 6.5-7 convex whorls. Last whorl sometimes weakly and bluntly angulated at periphery and below suture. Apex somewhat bulbous, blunt. Color generally yellowish to brown, with variously developed darker radial markings. Embryonic whorls with fine and rather regular granulation. On postapical whorls coarse radial wrinkles cut at irregular intervals by fine incised lines which become fainter or disappear on last whorl. Aperture ovate, with thin or slightly thickened margins. Columellar margin callouse, somewhat truncated. Height 110-150, diam. 64-80 mm (112.2 × 66.4 mm).

Vas deferens slender, entering penis sheath near its middle. Penis sheath covers

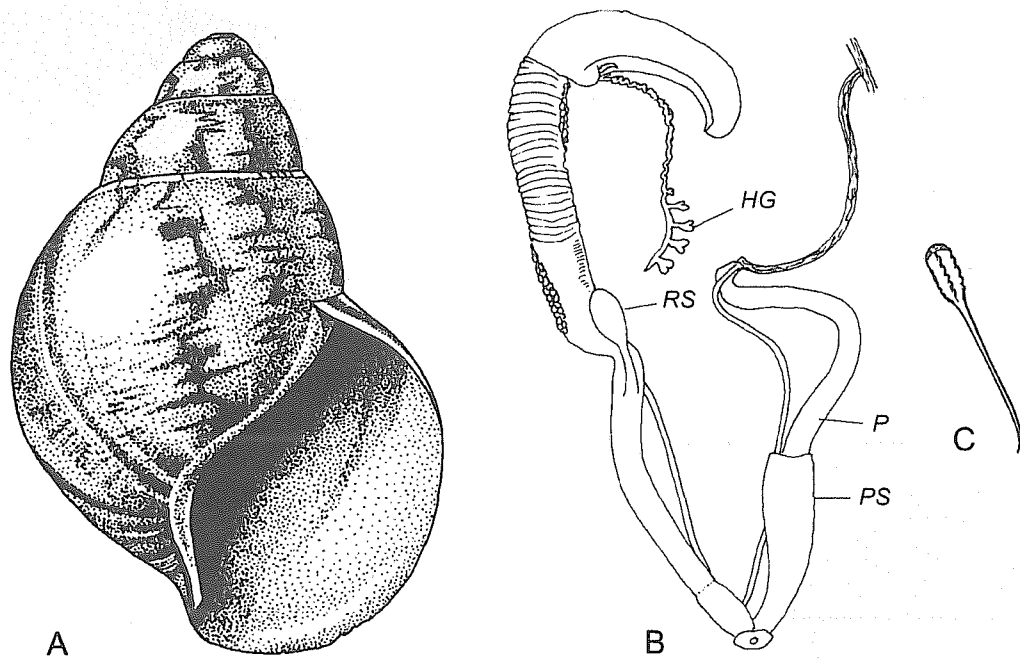


Fig. 620. *Archachatina (Calachatina) marginata* (Swainson, 1821).  
A — shell: Metet, Cameroon, W Africa. Chicago No. 125821. B — reproductive tract. After L. Ortiz de Zarate & R. Ortiz de Zarate, 1959. C — spermatophore. After Plummer, 1975.

about half of penis. Penial retractor inserts nearly apically. Free oviduct of about same length as vagina. Spermathecal stalk rather long, reservoir voluminous.

DISTRIBUTION. Islands in the Gulf of Guinea (Prince's Island, São Thomé, and neighboring Islet of Rolas). 1 sp. with few forms.

*Archachatina (Calachatina)*  
Pilsbry, 1919  
Fig. 620

Pilsbry, 1919a: 99 (footnote).

— *Megachatina* Bequaert et Clench, 1936: 76 (t.-sp. *Achatina marginata* Swainson, 1821; OD).

— *Magachatina* Bequaert et Clench, 1936: 78 (nom. err. pro *Megachatina* Bequaert et Clench, 1936).

Bequaert, 1950: 140.

TYPE SPECIES — *Achatina marginata* Swainson, 1821; OD.

Shell ovate, rather thin to solid, of 5.5-7 moderately convex whorls. Apex very ob-

tuse. Color ivory or yellow, with chestnut pattern of broad streaks or serrated stripes; early whorls often pinkish; aperture inside blue-white. Embryonic whorls nearly smooth. Early postnuclear whorls covered with regular dots arranged in spiral rows; body whorl nearly smooth. Aperture large, broadly ovate, margins usually more or less expanded, often thickened within. Columellar margin expanded, concave, strongly truncated below. Height 80-180, diam. 40-95 mm (133.0 x 80.4 mm). Winter (1997: 41) indicates size of the largest specimen from SW Cameroon as 213 x 124 mm; this is "probably the largest, and most voluminous, shell of a recent land snail ever recorded".

Talon minute, exposed. Vas deferens long, piercing upper section of penis sheath and entering penis apically. Penis long. Penis sheath covers half of penis. Penial retractor branched off from columellar muscle, attached to vas deferens/penis junction. Free oviduct very short, vagina, on the contrary, long; its lower part slightly swollen and separated by circular narrowing. Spermathecal stalk very short, ovate reservoir bound to lower part of spermooviduct. Sper-

matophore consists of tail thread and expanded head bearing on its surface longitudinal, corrugated ridges.

DISTRIBUTION. W Africa. About 15 spp. & forms.

*Archachatina (Megachatinaopsis)*  
Bequaert et Clench, 1936  
Fig. 621

Bequaert & Clench, 1936: 76.

— *Megachatinaopsis* Bequaert et Clench, 1936: 87 (nom. err. pro *Megachatinaopsis* Bequaert et Clench, 1936).

Bequaert, 1950: 180.

TYPE SPECIES — *Achatina knorri* Jonas, 1839; OD.

Shell broadly ovate to elongated-ovate, rather thin and fragile, of 5-7 rather convex whorls. Apex broadly rounded. Coloration of whitish, pinkish or yellow background and radial, irregular brown flames, often widened downwards and becoming confluent at base, where they become darker. Embryonic whorls finely granulose, postapical whorls either granulose, coarsely decussate or nearly smooth. Aperture elongated-ovate, with thin, sharp, simple margins. Columellar margin a little concave, distinctly truncated. Height 50-120, diam. 31-53 mm (72.2 x 39.2 mm).

DISTRIBUTION. W Africa. 8-10 spp.

*Archachatina (Tholachatina)*  
Bequaert, 1950  
Fig. 622

Bequaert, 1950: 200.

TYPE SPECIES — *Achatina zebra* var. *granulata* Krauss, 1848; OD.

Shell pointed-ovate to elongated or narrowly clavate, rather thin, of 5.5-9 rather convex whorls. Apex broad, dome-shaped or bulbous. Coloration of yellowish or whitish background and brown radial, straight and/or zigzag streaks. Embryonic whorls densely granulose; same sculpture usually persists on postnuclear surface, though occasionally worn off. Aperture ample, ovate, with simple margins. Columellar margin more or less concave, truncated. Umbilicus absent. Height 34-135, diam. 16-75 mm (120.2 x 69.8 mm).

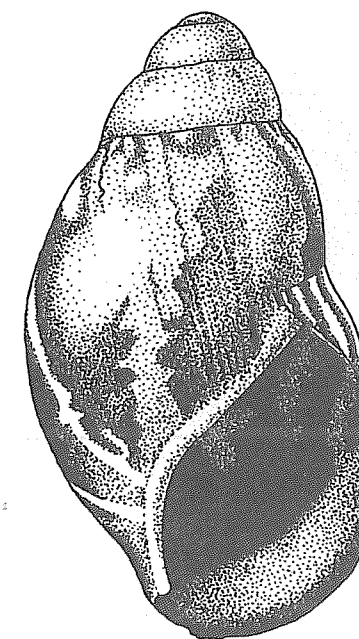


Fig. 621. *Archachatina (Megachatinaopsis) knorri* (Jonas, 1839).  
Liberia. Phil. No. 299386.

Talon exposed, clavate, with globular head. Vas deferens short, stout, narrowed distally, penetrating penis sheath. Penis rather thin, entirely or partially coated by thick sheath. Penial retractor, a branch of columellar muscle, attached to penis apically. Free oviduct markedly longer than vagina. Spermathecal stalk of moderate length, reservoir variously developed.

DISTRIBUTION. S and E Africa. About 25 spp. & forms.

*Metachatina* Pilsbry, 1904  
Fig. 623

Pilsbry, 1904 (1903-1904): 307.

TYPE SPECIES — *Bulimus kraussi* L. Pfeiffer, 1846; OD.

Shell elongated-ovate, moderately solid, of 8-9 a little convex whorls. Color white, uniform or with pale radial flames and markings; aperture margins blackish or dark-brown. First 0.5 embryonic whorl smooth, rest surface delicately, regularly granulose throughout. Aperture ovate, with simple margins; columellar subvertical,

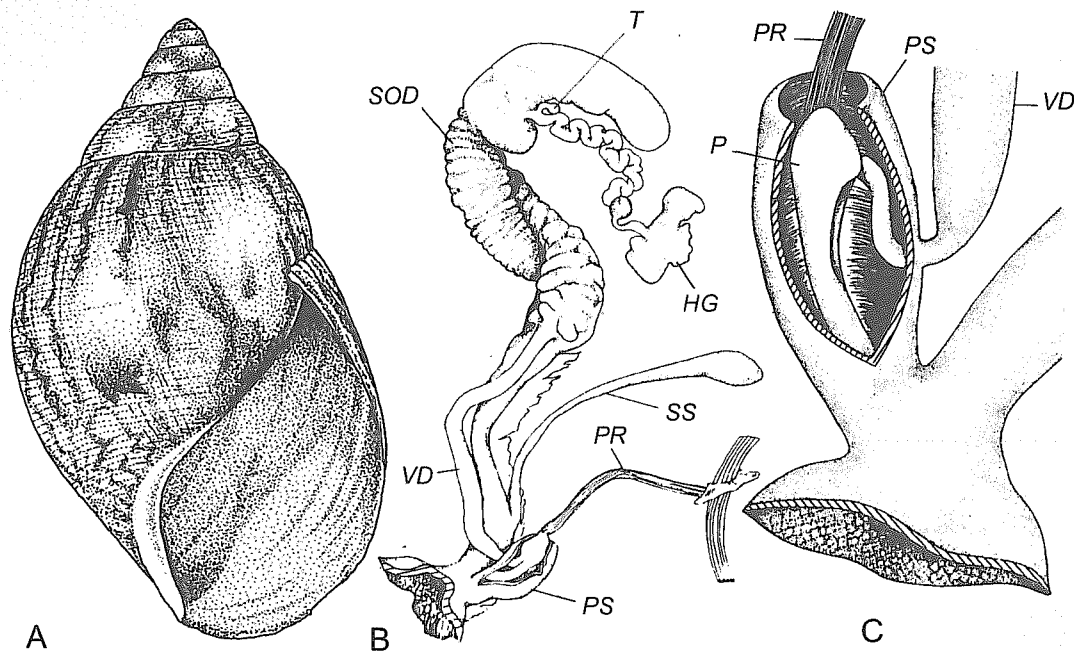


Fig. 622. A — *Archachatina (Tholachatina) granulata* (Krauss, 1848). Shell: "Natal, S-Afrika". Senck. No. 157255. B, C — ! *Archachatina (Tholachatina) marinae* Sirgel, 1989. B — reproductive tract. C — interior of penis sheath. After Sirgel, 1989.

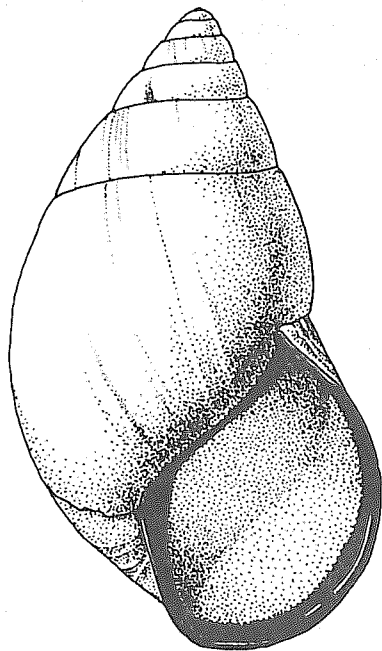


Fig. 623. *Metachatina kraussi* (L. Pfeiffer, 1846). Natal Bay near Durban [S Africa]. Phil. No. 264457.

straight or slightly concave, scarcely truncated. Umbilicus absent or slit-like. Height 100-145, diam. 60-75 mm (120.3 × 66.4 mm).

DISTRIBUTION. S and SE Africa. 2 spp.

*Burtoa* Bourguignat, 1889  
Fig. 624

Bourguignat, 1889: 88.

— *Burtopsis* Bourguignat, 1889: 98 (t.-sp. *Burtopsis jouberti* Bourguignat, 1889; designated here).

— *Livinhacia* Crosse, 1889: 107, 108 (t.-sp. *Bulimus niloticus* L. Pfeiffer, 1861; OD).

TYPE SPECIES — *Bulimus niloticus* var. *schweinfurthi* L. Pfeiffer, 1861; OD.

Shell ovate to oblong-ovate, rather thin to solid, of 6.5-8 rather convex whorls. Color whitish to brown, mostly uniform, sometimes with occasional dark brown radial streaks; aperture margins more or less roseate. Embryonic whorls smooth, later radially plicatulate, cut by spiral lines, generally smoother below periphery. Aperture

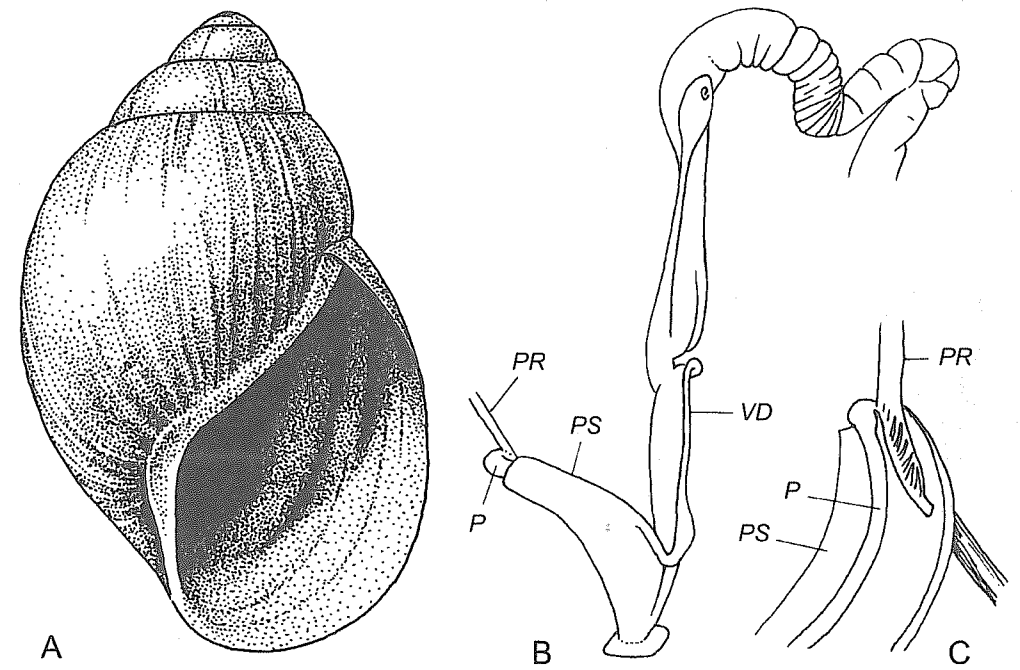


Fig. 624. A — *Burtoa nilotica nilotica* (L. Pfeiffer, 1861). Shell: Yakuluku [near border between Zaire and Sudan]. Phil. No. 119553. B, C — *Burtoa nilotica obliqua* (Martens, 1895). B — reproductive tract. C — interior of penis sheath. After Pilsbry, 1919b.

ample, rounded, with simple margins; columellar margin more or less expanded. Umbilicus slit-like. Height 48-120, diam. 23-55 mm (94.2 × 58.4 mm).

Vas deferens slender, penetrates lower part of penis sheath; its upper part protruded from upper aperture of sheath and, after forming of sharp curvature, passes to thin, cylindrical penis. Penial retractor attached to distal portion of vas deferens by several short arms. Free oviduct very short, vagina much longer. Spermathecal stalk a little enlarged basally, reservoir ovate, not reaching middle portion of spermooviduct.

DISTRIBUTION. Tropical E Africa to Zimbabwe. 7 spp. with several subspp. & forms.

*Leptocalina* Bequaert et Clench, 1934  
Fig. 625

Bequaert & Clench, 1934: 117 (*Leptocala* sect.).

TYPE SPECIES — *Achatina specularis* Morelet, 1866; SD Bequaert, 1950.

Shell elongated-ovate to ovate-conic,

thin, much translucent to semitransparent, shining, of 7-8 flattened whorls. Apex obtuse. Color yellowish, usually with irregular whitish spots; base often obscurely marked with reddish streaks. Embryonic whorls smooth, subsequent with very fine, irregular radial striae and more or less wrinkled or finely crenulate below suture. Aperture subvertical, with thin and straight margins. Columellar margin lightly arcuate, distinctly obliquely truncated. No umbilicus. Height up to 40, diam. up to 17 mm (27.3 × 14.0 mm).

DISTRIBUTION. W Africa. 8 spp. & subspp.

*Leptocallista* Pilsbry, 1904  
Fig. 626

Pilsbry, 1904 (1904-1905): 75 [*Achatina (Leptocala)*; sect.]

TYPE SPECIES — *Stenogyra grandidierana* Bourguignat, 1889.

Shell oblong, thin to moderately solid, more or less translucent, glossy, of 7-9

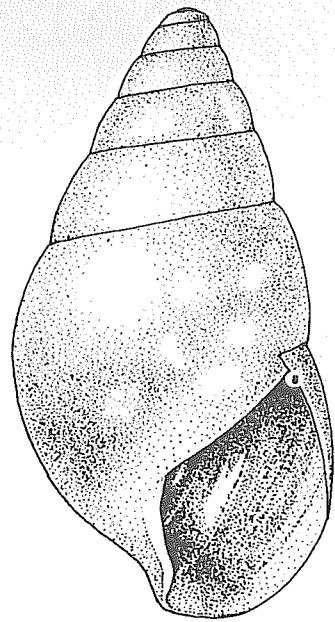


Fig. 625. *Leptocalina specularis* (Morelet, 1866). Manghay (Kassai) [Zaire]. Vienna No. 12079.

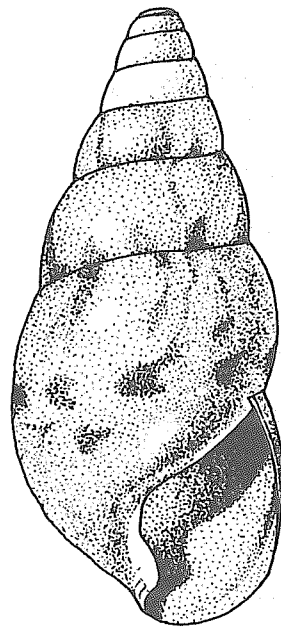


Fig. 626. *Leptocallista grandidierana* (Bourguignat, 1889). Mt. N'Gourou (Ousaghara) [Tanzania]. Syntype. Paris.

slightly convex whorls. Apex blunt. Coloration consists of ivory or buff-corneous background and light-corneous spots on periphery and radial streaks above them. Embryonic whorls smooth, polished, post-nuclear sculpture of very weak radial wrinklets (surface looks glabrous). Aperture relatively small, irregularly ovate, oblique, with simple margins. Columellar margin short, curved, concave, at base contorted and abruptly, strongly truncated. Height 26-36, diam. 12.0-15.5 mm (29.8 × 12.6 mm).

DISTRIBUTION. E and NE Africa. 2 spp.

*Lignus* Gray, 1834  
Fig. 627

Gray J., 1834: 66.

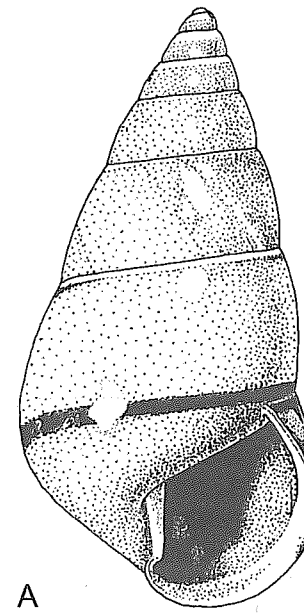
— *Pseudotrochus* Mörch, 1852: 21 [nom. praeocc., non Herrmannsen, 1847 (Bulimulidae); t.-sp. *Helix alabaster* Rang, 1831; monotypy].

— *Perideris* Shuttleworth, 1856: 76 [nom. praeocc., non Brandt, 1835 (Holothuria); t.-sp. *Lignus tenuis* Gray, 1834; designated here].

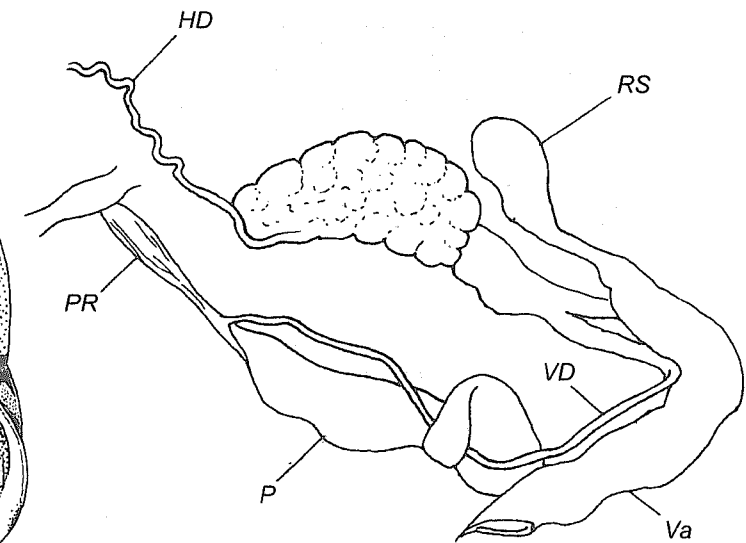
TYPE SPECIES — *Lignus tenuis* Gray, 1834; monotypy.

Shell high conic to elongated-ovate, rather thin, shining, of 6-7 slightly convex whorls. Last whorl with smoothed peripheral angle. Color white or yellowish, usually with narrow brown band running slightly above peripheral angle. Embryonic whorls glabrous, later whorls look smooth, with distinct spiral incised lines. Aperture pointedly ovate, well oblique, with a little expanded or slightly thickened margins. Columellar margin nearly vertical, somewhat callous, truncated. Umbilicus absent. Height 30-80, diam. 14-38 mm (38.0 × 18.2 mm).

Talon hidden or absent. Spermoviduct unusually short. Vas deferens long, slender, penetrates upper part of penis sheath and enters penis apically under sharp angle. Penis large, bulky. Penial retractor originates on columellar muscle and attached to junction of vas deferens and penis. Free oviduct narrow, approximately equal in length to enlarged vagina. Spermathecal stalk greatly swollen basally, reservoir reaching albumen gland.



A



B

Fig. 627. ! *Lignus alabaster* (Rang, 1831). A — shell: "W-Afrika, Prinzen-Insel". Senck. No. 157260. B — reproductive tract. After Semper, 1870.

DISTRIBUTION. Prince's Islands, Gulf of Guinea. About 30 spp. & forms.

*Pseudachatina* Albers, 1850  
Fig. 628

Albers, 1850: 192 (*Achatina* subg.).

TYPE SPECIES — *Achatina downesii* Sowerby, 1840; monotypy.

Shell obesely conic-fusiform, very solid, of 7-9 flattened whorls. Last whorl with rounded, smoothed, variously developed peripheral angle. Coloration consists of pale (ivory, whitish, yellowish) background and reddish radial spots and streaks; base below peripheral angle often brown or blackish; positive sculpture elements lighter. Embryonic whorls spirally striated, later with coarse, uneven radial ribs or vermiculation. Aperture irregularly ovate, with thickened, somewhat reflexed margins. Columellar margin truncated, sometimes with low lamella or callousity. Umbilicus closed. Height 45-105, diam. 28-48 mm (70.2 × 33.2 mm).

Talon small, globular. Vas deferens long, slender, piercing penis sheath and entering penis at short distance from apex, leaving short subglobular flagellum. Penis long, its lower half coated by sheath. Penial retractor, a branch of columellar muscle, attached to flagellum apically. Free oviduct very thin, vagina considerably wider. Spermathecal stalk enlarged basally, then narrowed, reservoir ovate, not reaching middle part of spermoviduct.

DISTRIBUTION. Tropical W Africa. About 15 spp., subspp. & forms.

*Atopocochlis* Crosse et Fischer, 1888  
Fig. 629

Crosse & Fischer, 1888: 11 (*Perideris* subg.).

— *Eutaxis* Ancey in Vignon, 1888: 67 (footnote) (t.-sp. *Buccinum exaratus* Müller, 1774; monotypy).

TYPE SPECIES — *Buccinum exaratum* Müller, 1774; OD.

Shell high-conic, thin but rather firm, translucent, of 6-7 nearly flat whorls. Last

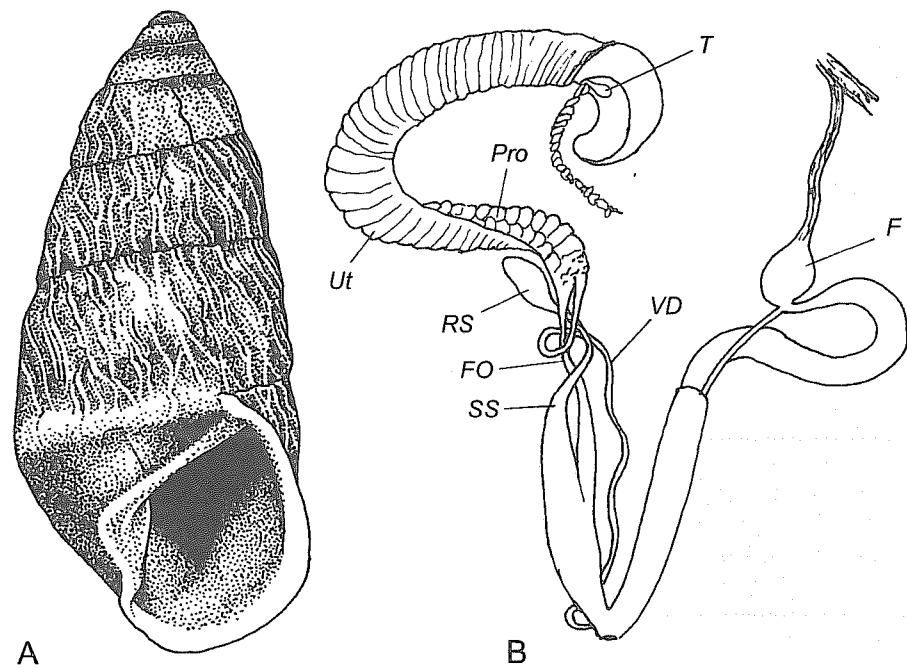


Fig. 628. *Pseudachatina downesii* (Sowerby, 1840).  
A — shell: "Z. Kameroen, 7 mijl landinwaarts vanuit Kribi". Leiden. B — reproductive tract. After L. Ortiz de Zarate & R. Ortiz de Zarate, 1959.

whorl angled at periphery. Color white, aperture margins pale-ivory. Embryonic whorls smooth, subsequent whorls with irregular, thin but coarse and sharp wrinkles; distinct spiral lines also present. Aperture irregularly rounded, moderately oblique, with shortly reflexed margins. Umbilicus absent. Height 55-60, diam. 30-33 mm (57.0 × 31.2 mm).

Talon exposed, short, ovoid. Vas deferens initially stout, piercing middle section of penis sheath; diameter of vas deferens narrowing within sheath. Vas deferens enters penis subapically through simple pore; flagellum extremely short, with apical attachment of penial retractor. Penis sheath thick, muscled, covering approximately half of penis length. Penis internally with many longitudinal corrugated folds. Free oviduct of moderate length, vagina consists of 2 portions: rather slender proximal and strongly expanded, swollen distal, having very thick muscular walls. Spermathecal shaft not long, tapering; reservoir bulky, connected with lower portion of spermoviduct by numerous fibers.

DISTRIBUTION. São Thomé Island. 1 sp.

#### SUBULINOIDEA Fischer et Crosse, 1877

Fischer & Crosse, 1877 (1870-1902): 592 [as Subulinine (sic!).]

Shell generally dextral, small to medium-sized (very rarely large), slender, turreted or pillar-shaped (in one genus nearly discoid), embryonic whorls not enlarged. Aperture and columella simple or with folds or lamella(e); columellar margin often truncated. Umbilicus narrowly open or wanting.

Jaw thin, aulacognathous.

Kidney sigmurethral, ureters completed.

Reproductive tract simple or may include flagellum, epiphallus and caecum. Penis bulky or long, consisting of 2 or 3 sections, internally sometimes with verge. In some taxa inner surface of penis equipped with numerous papillae. Penis sheath mostly wanting, rarely present. Penial retractor attached apically or (if epiphallus present) to penis/epiphallus junction. Spermathecal stalk lacking diverticle, sometimes reduced in size, mostly not bound

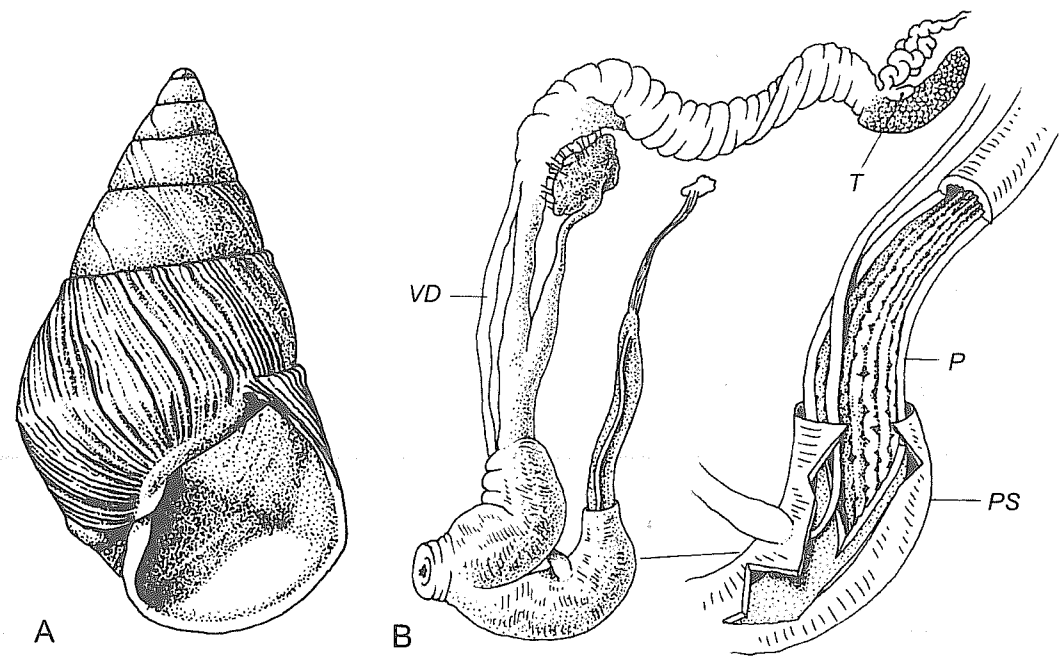


Fig. 629. *Atopocochlis exaratus* (Müller, 1774).  
A — shell: São Thomé Island, W Africa. Chicago No. 166116. B — reproductive tract and interior of penis. Gulf of Guinea, São Thomé, July 1992. Moscow No. Lc-24229.

to spermoviduct, although usually tightly adherent to it.

DISTRIBUTION. Circumglobally.

#### SUBULINIDAE Fischer et Crosse, 1877

— Stenogyridae Fischer & Crosse, 1877 (1870-1902): 581.

Direction 27, Opinions & Declarations rendered by the ICZN, vol. 10, pt. 20, 1955: 484.

Shell generally slender, turreted, mostly thin, rarely solid, of many whorls. Color usually uniformly whitish to chestnut, sometimes with radial stripes. Embryonic whorls smooth or finely radially ribbed, surface of later whorls nearly glabrous to weakly radially wrinkled. Aperture ovate, margins usually simple, rarely thickened; columella truncated or continuous.

Epiphallus variously developed or wanting. Penis simple or consisting of 3 sections, mostly without caecum, verge or stimulator(s) sometimes present.

DISTRIBUTION. Tropical and subtropical

zones of the world; maximal diversity in Africa, SE Asia, Central and S America.

REMARK. Conchologically Subulinidae as a whole is a rather compact group. Anatomically this taxon is poorly studied, but, judging by available fragmentary data, the structure of reproductive tract is rather diverse: several groups exist whose anatomy is quite characteristic (compare diagnoses of the subfamilies). At the same time the suggested system should be considered just as preliminary, and systematic position of many unstudied anatomically genera is questionable.

#### OPEATINAE Thiele, 1931

Thiele, 1931: 552.

Shell not decollated, dextral. Last whorl lacking internal sculpture, columella simple.

Flagellum and penial caecum absent. Very short epiphallus sometimes present. Penis enlarged, internally with large completed verge and sinuous and folded longitudinal pilasters. Penis sheath short, em-

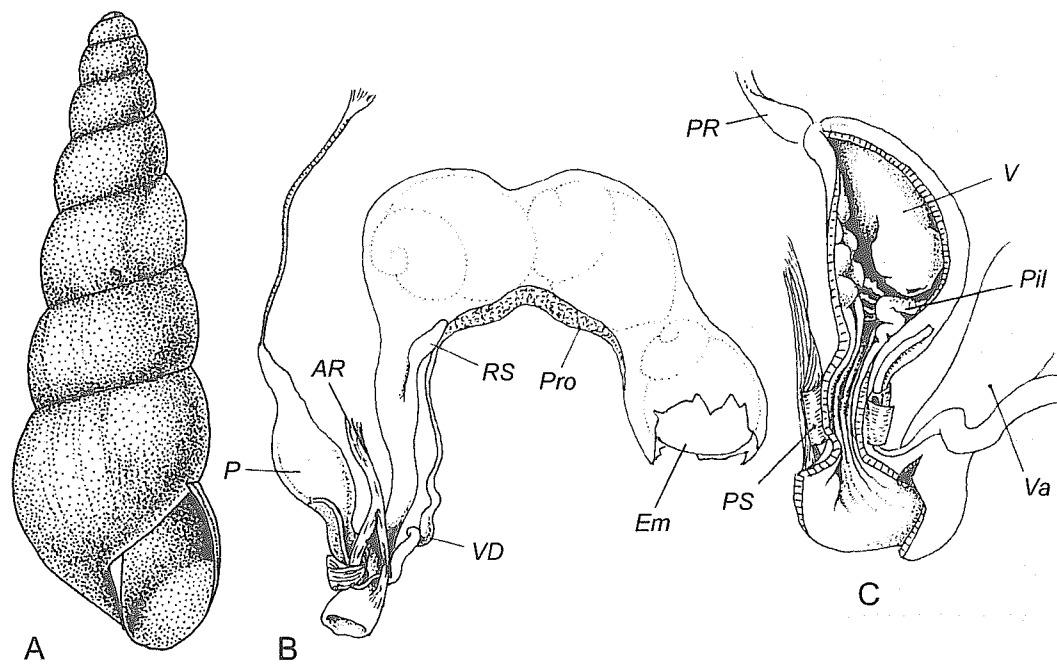


Fig. 630. *Eremopeas interioris* (Tate, 1894).  
A — shell: 4 km W of King Cascade, S side Prince Regent River, ca. 30 km SE of St. George Bassin [Northern Territory, Australia]. Moscow No. Lc-24202 (Phil.). B — reproductive tract. C — interior of penis and atrium. After Solem, 1988.

braces distalmost section of penis. Penial retractor attaches apically. Spermatheca more or less reduced, minute, stalk short to very short.

DISTRIBUTION. Tropical and subtropical regions of Old and New World, Australia.

*Eremopeas* Pilsbry, 1906  
Fig. 630

Pilsbry, 1906 (1906-1907): 115 (*Pseudopeas* subg.). Solem, 1988: 525.

TYPE SPECIES — *Stenogyra interioris* Tate, 1894; OD.

Shell slender, turreted, thin, translucent, a little glossy, of 7-9 quite convex whorls. Apex narrowly rounded. Color yellowish to light corneous. Embryonic whorls with rather coarse, low, weakly nodose spiral lines. Subsequent whorls densely and evenly finely striated. Aperture ovate, with simple and thin margins; columellar margin dilate. Columella straight, not truncated. Umbilicus, a tiny crack.

Height 7.3-10.5, diam. 2.4-3.3 mm ( $9.3 \times 3.0$  mm).

Vas deferens initially very slender, expanded and kinked distally, narrowing and then passing inside well developed atrial retractor and then up through narrow penis sheath, entering wall of penis and continuing to apex. Penis swollen apically, internally with large verge having terminal pore; verge flanked by low pilaster. Distal part of penis with longitudinal folds that extend into atrium. Free oviduct much shorter than vagina. Spermatheca very small.

DISTRIBUTION. Australia. 2 spp.

*Opeas* Albers, 1850  
Fig. 631

Albers, 1850: 175 (*Bulimus* subg.).

TYPE SPECIES — *Helix goodalli* Miller, 1822 (non Férussac, 1821; = *Bulimus pumilus* L. Pfeiffer, 1840); SD Martens in Albers, 1860.

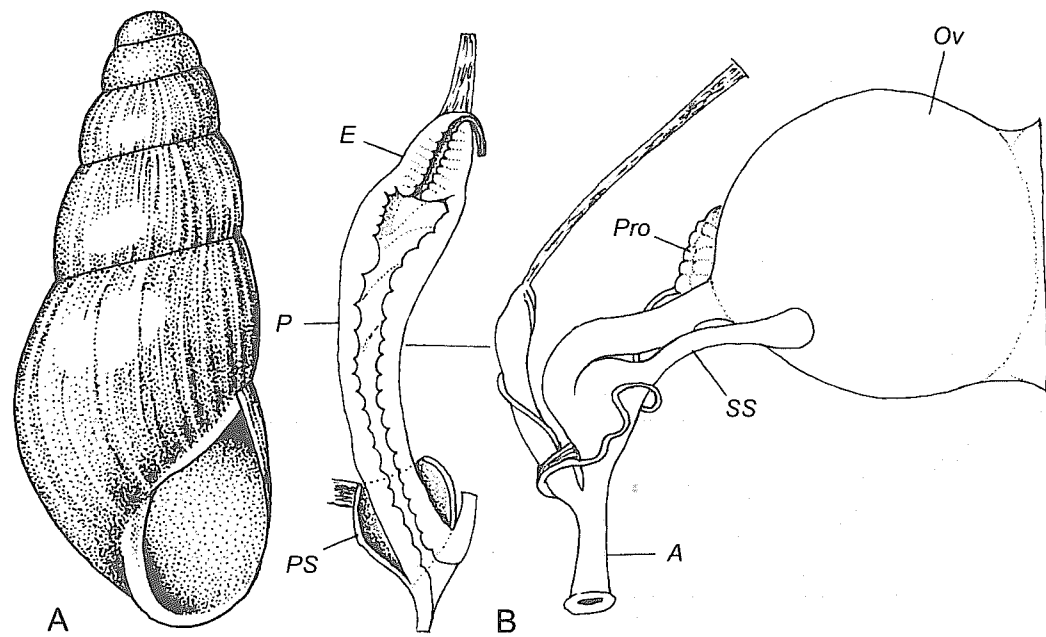


Fig. 631. A — *Opeas pumilum* (L. Pfeiffer, 1840). Shell: Puerto-Rico. SPb. B — ! *Opeas pyrgula* Schmacker et Boettger, 1891. Reproductive tract and interior of penis. After Baker in Pilsbry, 1946b.

Shell turreted, thin, glossy, of 5-6 convex to flattened whorls. Apex large, rounded, obtuse. Color uniformly yellowish to corneous. Embryonic whorls smooth, later irregularly radially wrinkled; coarser wrinkles alternating with finer. Aperture ovate, somewhat pointed above; margins thin, simple, palatal margin usually arched forward. Columellar margin reflexed, straight or concave, not sinuous or truncated. Umbilicus dot-like. Height 3-21, diam. 1.4-8.5 mm ( $5.0 \times 1.8$  mm).

Vas deferens long, evenly slender, tightly adherent to penis. Penis moderately long, elongated-fusiform, internally with very short verge and diagonal folds. Penial retractor attached to penis apically. Free oviduct noticeably longer than vagina. Atrium long. Spermathecal stalk swollen basally, not long, reservoir small, weakly demarcated.

DISTRIBUTION. Tropical and subtropical regions of Old and New World. About 90 spp. & subspp.

? OBELISCINAE Thiele, 1931

Thiele, 1931: 554.

Shell not decollated, dextral, generally slender, turreted to subfusiform; in one genus nearly flat. Last whorl lacking internal sculpture, columella simple.

Penis without flagellum, caecum or epiphallus, internally with a few longitudinal folds; verge wanting.

DISTRIBUTION. S America, Caribbean region and some Pacific islands (Caroline, Cocos); 1 genus in SE Asia.

Remark. Originally this taxon has been introduced with diagnosis as follows: "Shell more or less high turreted; columella not or scarcely truncated, although it may be distinctly truncated in the embryonic shell. Lateral and marginal plates of the radula tricuspid. Mainly American." Evidently these characters are not sufficient for establishing of a subfamily; anatomically this taxon remains nearly unstudied. I provisionally retain this subfamily for some American, one Asian and three Pacific gen-

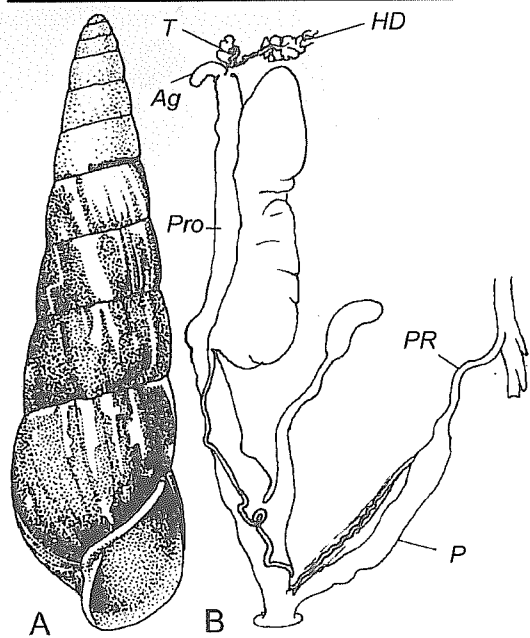


Fig. 632. *Neobeliscus calcarius* (Born, 1780). A — shell: Bahia, Brazil. Leiden. B — reproductive tract. After Pilsbry, 1907 (1906-1907).

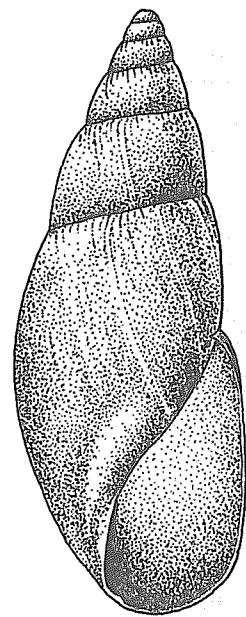


Fig. 633. *Synapterpes hanleyi* (L. Pfeiffer, 1846). Brazil. Phil. No. 189394.

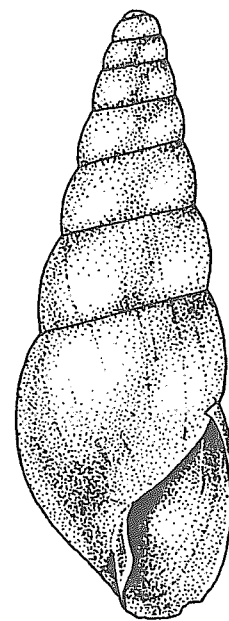


Fig. 634. *Chryserpes amabilis* (Pilsbry, 1906). "Marmato N. G." [Colombia]. Holotype. Phil. No. 59347.

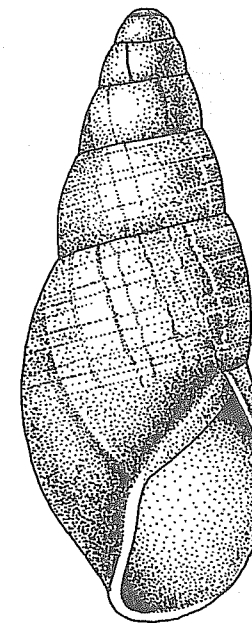


Fig. 635. *Promoussonius incertus* (Mousson, 1873). "Coll. E.D. Schmelz". Leiden.

era until anatomy of their representatives is known.

*Neobeliscus* Pilsbry, 1896  
Fig. 632

Pilsbry, 1896: 46.

TYPE SPECIES — *Helix calcarius* Born, 1780; OD.

Shell turrated, slowly tapering, quite solid, of 10-11 moderately convex whorls; last whorl rounded at periphery. Apex convexly-conic, somewhat obtuse. Color deep chestnut, usually with darker irregular radial strikes; upper part of shell usually calcareous, white. Embryonic whorls smooth, later densely and very finely radially striated; besides, somewhat wavy, incised spiral lines present. Aperture approximately ear-shaped, with simple margins, columella straight to slightly concave, not truncated. Umbilicus absent. Height 106-120, diam. 28-32 mm (119.2 x 29.2 mm).

Albumen gland very small, shorter than talon and far smaller than reservoir of sper-

matheca. Talon large, consisting of swollen distal portion on narrow, devious duct of similar length. Vas deferens entering terminally at sharp angle. No flagellum or epiphallus. Penis club-shaped, internally with strong longitudinal folds. Penial retractor arising from columellar muscle and attaching apically to penis. Free oviduct as long as spermathecal shaft. Vagina rather short. Spermathecal duct short, reservoir bean-shaped.

DISTRIBUTION. SE Brazil. 1 sp.

*Synapterpes* Pilsbry, 1896  
Fig. 633

Pilsbry, 1896: 46.

— *Oxycheilus* Albers, 1850: 174 [non *Oxycheilus* Fitzinger, 1833; *Bulimus* subg.; t.-sp. *Bulimus hanleyi* (sic!) L. Pfeiffer, 1846; designated here].

TYPE SPECIES — *Bulimus hanleyi* L. Pfeiffer, 1846; OD.

Shell oblong-subfusiform or ovate-turrated, thin, glossy, of 7-8 moderately con-

vex whorls. Apex obtuse, narrowly rounded. Color dull-yellowish with green tint, or whitish. Embryonic whorls smooth, postapical whorls with fine irregular radial striation. Aperture slightly oblique, oblong-ovate, with thin, sharp margins. Columella slender, straightened above, broadly concave below, not truncated. Umbilicus minute or absent. Height 21-51, diam. 7.5-20.5 mm (46.0 x 16.9 mm).

DISTRIBUTION. Brazil, Colombia. 3 spp.

*Chryserpes* Pilsbry, 1906  
Fig. 634

Pilsbry, 1906 (1906-1907): 228, 231 (*Synapterpes* subg.).

TYPE SPECIES — *Synapterpes* (*Chryserpes*) *amabilis* Pilsbry, 1906; OD.

Shell high-conic, thin, translucent, glossy, of 7-11 convex whorls. Apex obtuse. Color greenish or golden. Embryonic whorls smooth, remaining whorls superficially glabrous, but exceptionally delicate spiral striae locally visible under magnifi-

cation. Aperture acutely ovate, with thin margins; columella truncated, with spiral thickening below. Umbilicus, a tiny perforation. Height 25-38, diam. 8-11 mm (25.0 x 8.6 mm).

DISTRIBUTION. Colombia, Ecuador. 4 spp. & subspp.

*Promoussonius* Pilsbry, 1906  
Fig. 635

Pilsbry, 1906 (1906-1907): 230 (*Synapterpes* subg.).

TYPE SPECIES — *Spiraxis incerta* Mousson, 1873; OD.

Shell elongated-subturrated, rather thin, silky, of 6.5-7 moderately convex whorls. Apex large and very obtuse. Color yellowish-brown or greenish-brownish-olive, with numerous darker radial streaks and variously developed brown narrow spiral bands. Embryonic whorls elegantly rib-striated, following whorls reticulated with close, rather rough radial wrinkles and spiral widely spaced lines interrupting them.



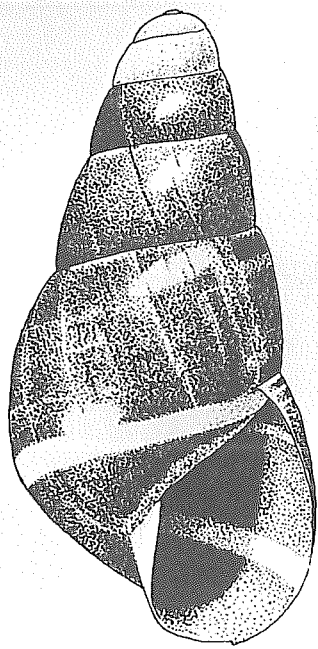


Fig. 636. *Zoniferella albopalmeta* (Dunker, 1882). Ecuador. London No. 1885.4.11.224-5.

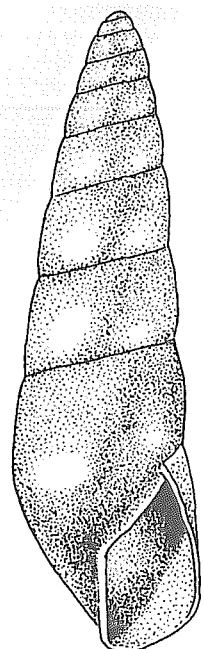


Fig. 637. *Protobeliscus cuneus* (L. Pfeiffer, 1852). Mindo, Ecuador. Phil. No. 170715.

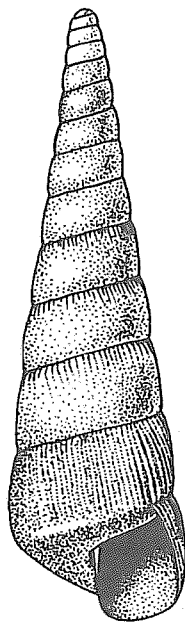


Fig. 638. *Obeliscus obeliscus* (Moricand, 1833). Brazil. Leiden.

Aperture only slightly oblique, narrowly ovate, angular above; margins simple, columella long, somewhat twisted, a little thickened below, obliquely subtruncated. Umbilicus absent. Height 34-40, diam. 14.5-16.0 mm (39.0 x 15.2 mm).

DISTRIBUTION. Colombia (Bogota). 1 sp.

*Zoniferella* Pilsbry, 1906  
Fig. 636

Pilsbry, 1906 (1906-1907): 233 (*Synapterpes* subg.).

TYPE SPECIES — *Bulimus albo-balteatus* Dunker, 1882; OD.

Shell oblong-ovate or ovate-acuminate, thin, translucent, brilliant, of 6-7 slightly convex whorls. Apex obtuse, rounded. Color greenish-black, with distinctly defined white (sub)peripheral band; band largely concealed on upper whorls; summit whitish. Embryonic whorls smooth, later whorls with very delicate radial wrinkles and extremely fine spiral striation. Aperture ovate, with simple, thin margins; co-

lumella more or less reflexed, continuous with basal margin. Umbilicus, a minute rim. Height 13.0-20.2, diam. 7-13 mm (16.0 x 7.5 mm).

Oviparous animals.

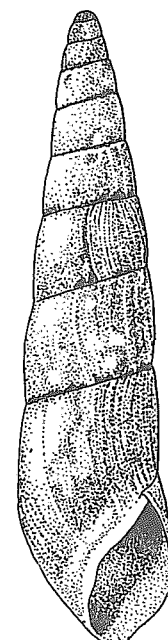
DISTRIBUTION. Colombia, Ecuador. 2 spp.

*Protobeliscus* Pilsbry, 1906  
Fig. 637

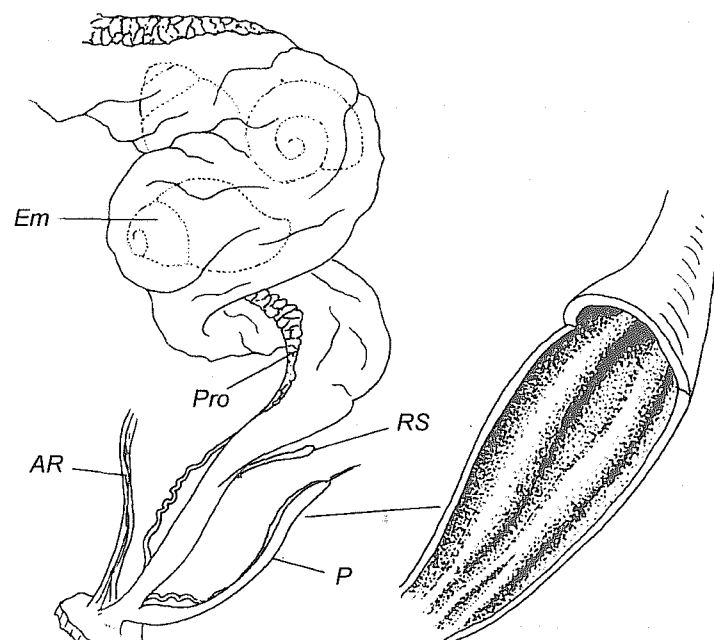
Pilsbry, 1906 (1906-1907): 243, 251 (*Obeliscus* subg.).

TYPE SPECIES — *Bulimus cuneus* L. Pfeiffer, 1852; OD.

Shell turreted, slender, thin, shining, of 7-11.5 moderately convex to flattened whorls. Apex narrowly rounded to slightly obtuse. Color monotonously yellow. Embryonic whorls smooth, following nearly so; body whorls sometimes with widely spaced elements of spiral sculpture. Aperture subquadrangular, slightly oblique, with nearly straight margins; columellar margin somewhat reflexed, vertical, not cal-



A



B

Fig. 639. *Stenogyra terebraster* (Lamarck, 1822).

A — shell: Puerto Rico. Syntype. Paris. B — reproductive tract and interior of penis. Cordillera Central, Puerto Rico, September 6, 1939. Phil. No. A 1849-D.

loused. Umbilicus absent. Height 8.0-71.8, diam. 2.0-16.8 mm (49.0 x 14.3 mm).

DISTRIBUTION. Andes of S America. 7 spp. & forms.

*Obeliscus* Beck, 1837  
Fig. 638

Beck, 1837: 61.

TYPE SPECIES — *Helix (Cochlicella) obeliscus* Moricand, 1833; tautonymy.

Shell turreted, tapering, solid, opaque, of 9-18 slightly convex whorls. Last whorl sometimes a little angled. Apex obtuse, narrowly rounded. Color yellowish or ochraceous. Embryonic whorls smooth, subsequent more or less radially striated, usually with widely spaced spiral engraved lines. Aperture rounded to subquadrate, with thin margins; columella concave to vertical, continuous or indistinctly truncated. Umbilicus absent or nearly so. Height 17-104, diam. 4.0-25.5 mm (64.8 x 18.1 mm).

DISTRIBUTION. Tropical S America and Greater Antilles. About 10 spp. & forms.

*Stenogyra* Shuttleworth, 1854  
Fig. 639

Shuttleworth, 1854: 45.

TYPE SPECIES — *Bulimus terebraster* Lamarck, 1822; SD Pilsbry, 1906.

Shell mostly cylindrical-turreted, slender, thin, more or less glossy, of 9.5-10.5 flattened whorls. Apex narrowly rounded. Color dull yellowish to corneous-brown. Embryonic whorls glabrous, following with irregular curved radial striae. Aperture rather oblique, obliquely pyriform, acute above, with thin margins; columella caloused below (truncated in juvenile shells). Umbilicus absent. Height 7.5-50.0, diam. 2.0-14.0 mm (26.3 x 6.1 mm).

Vas deferens thin, adherent to penis in its upper section, entering penis near apex. Penis internally with 2 rounded pilasters. Penial retractor weak, inserting to penis terminally. Free oviduct short, vagina rather long. Atrial retractor well developed. Spermatheca vestigial.

DISTRIBUTION. E Cuba, Haiti, Puerto Rico. About 15 spp. & subspp.

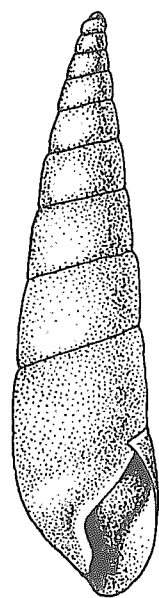


Fig. 640. *Dolicholestes dunkeri* (L. Pfeiffer, 1851). Santo Domingo [Haiti]. Phil. No. 59325.

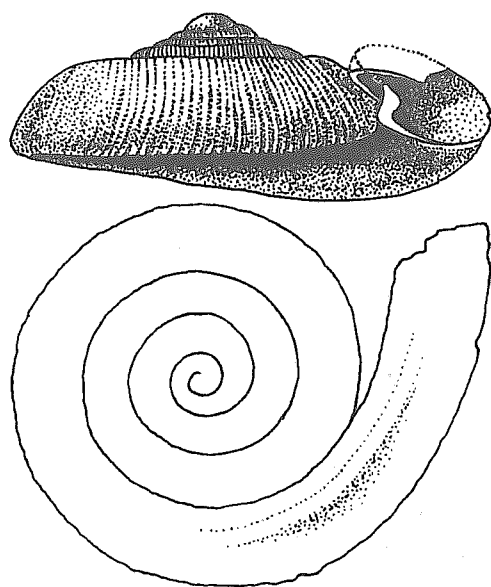


Fig. 641. *Cupulella vallei* Aguayo et Jaume, 1948. Loma Paloma, La Palma, Consolacion del Norte, Pinar del Rio [Cuba]. Paratype. Phil. No. 183875.

*Dolicholestes* Pilsbry, 1906

Fig. 640

Pilsbry, 1906 (1906-1907): 266; 1908 (1907-1908): 346 (*Obeliscus* subg.).

TYPE SPECIES — *Achatina dunkeri* L. Pfeiffer, 1851; OD.

Shell subulate, narrowly turreted, rather thin, glossy, of 9-10 nearly flat whorls. Apex narrow, obtusely rounded. Color light yellow to chestnut. Both embryonic and adult whorls without regular sculpture. Aperture small, with simple margins; columella sinuous, spirally twisted, concave, truncated. Umbilicus absent. Height 28-38, diam. 7.5-9.0 mm (37.9 × 9.0 mm).

DISTRIBUTION. Haiti. 3-4 spp.

? *Cupulella* Aguayo et Jaume, 1948  
Fig. 641

Aguayo & Jaume, 1948: 1.

TYPE SPECIES — *Cupulella vallei* Aguayo et Jaume, 1948; OD.

Shell flattened, discoidal, cupuliform,

with more or less protruded spire, thin, fragile, of 4.5-6 rather convex whorls; last somewhat contracted at periphery, angled basally. Color uniformly corneous. Embryonic whorls microscopically punctate to nearly smooth; later finely, regularly, radially ribbed to rib-striated. Aperture adnate to free, with fragile, thin margins; columellar margin with small entering lamella. Umbilicus very broad, shallow. Height 1.9-2.8, diam. 6.5-8.5 mm (2.0 × 6.5 mm).

DISTRIBUTION. Cuba. 2 spp.

*Lyobasis* Pilsbry, 1903

Fig. 642

Pilsbry, 1903 (1902-1903): 175 (*Obeliscus* subg.).

TYPE SPECIES — *Stenogyra gonostoma* L. Pfeiffer, 1863; OD.

Shell fusiform or pillar-shaped, thin, glossy, of 9-13 rather convex whorls; last adnate or becoming free. Summit large, obtuse. Color yellowish. Embryonic whorls smooth, later finely ribbed or rib-striated.



Fig. 642. *Lyobasis gonostomus* (L. Pfeiffer, 1863). Lagunillas [Cuba]. Phil. No. 330945.

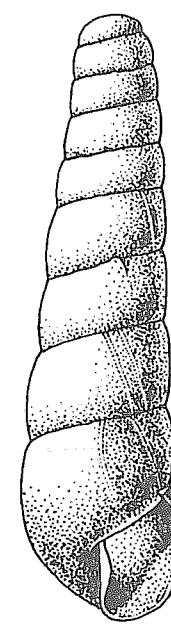


Fig. 643. *Rectobelus rectus* (Baker, 1927). La Fria, Venezuela. Paratype. Phil. No. 140935.

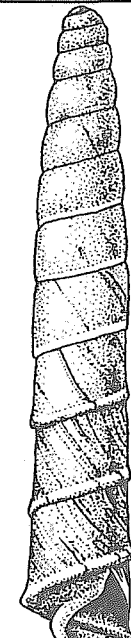


Fig. 644. *Rhodea californica* (L. Pfeiffer, 1846). Colombia. Vienna.

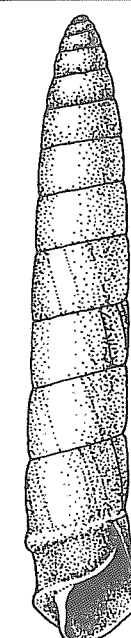


Fig. 645. *Plicaxis mirabilis* (Sykes, 1902). Kelantan, Malay Peninsula. Leiden.

Aperture pyriform or narrowly ovate, very oblique, with slightly thickened margins; columellar margin simple; columella straight in earlier whorls, becoming more or less sinuous in last one or two whorls. Umbilicus absent, but slit-like umbilical depression present above aperture. Height 10-17, diam. 2.0-3.5 mm (11.5 × 2.4 mm).

DISTRIBUTION. W Cuba. 7 spp.

*Rectobelus* Baker, 1927

Fig. 643

Baker, 1927: 6 (*Obeliscus* sect.).

TYPE SPECIES — *Obeliscus (Rectobelus) rectus* Baker, 1927; OD.

Shell column-shaped, probably glass-like when fresh, shining, of 11 flattened whorls. Apex blunt, obtuse, broadly rounded. Embryonic whorls practically smooth; subsequent whorls only slightly sculptured with scarcely arcuate, faint and widely separated radial striae, more impressed below suture. Aperture more or less ovate, margins simple, sharp. Columella

with low but distinct spiral thickening making columella slightly subtruncated. Umbilicus absent. Height 8.5-22.0, diam. 2.2-3.0 mm (8.7 × 2.2 mm).

DISTRIBUTION. Venezuela, Argentina, ? Brazil. 3 spp.

*Rhodea* H. Adams et A. Adams, 1855

Fig. 644

Adams H. & Adams A., 1855 (1853-1858): 135 (*Columna* subg.).

TYPE SPECIES — *Achatina californica* L. Pfeiffer, 1846; monotypy.

Shell dextral or sinistral, pillar-shaped or tapering, somewhat similar to Asian *Plicaxis*, thin to moderately solid, of 10-14 whorls; earlier more or less convex, later nearly flat or concave. Last whorl with strong thread-like keel traced above suture on a few preceding whorls. Apex obtuse. Embryonic whorls smooth, postnuclear smoothish to roughly radially striated. Aperture oblique, subtriangular, channelled at basal

and palatal angles. Internal axis ascending in open spiral, at aperture forming strong columellar lamella above, and continuing to base; columella concave below lamella, calloused, and sometimes truncated at base. Umbilicus closed. Height 15-56, diam. 3-10 mm (22.8 × 3.4 mm).

Ovoviviparous snails.

DISTRIBUTION. Andean region of Colombia and Ecuador. 8 spp.

*Plicaxis* Sykes, 1903  
Fig. 645

Sykes, 1903: 1 (nom. nov. pro *Rhodina* Morgan, 1885).

— *Rhodina* Morgan, 1885: 68 (nom. praeocc., non Guenée, 1854; t.-sp. *Rhodina perakensis* Morgan, 1885; monotypy).

TYPE SPECIES — *Rhodina* (?) *mirabilis* Sykes, 1902; OD.

Shell cylindrical, somewhat similar to South American *Rhodea*, rather thin, of 10-13 whorls; earlier slightly convex, later flattened. Last whorl angled or keeled. Apex narrowly obtuse. Color corneous to brown. Embryonic whorls smooth, following radially striated. Aperture irregularly pyriform, columella more or less twisted, excavated below, prominent at its junction with parietal wall. Umbilicus absent. Height 24-25, diam. 3.5-4.5 mm (25.1 × 4.2 mm).

DISTRIBUTION. Perak, Malay Peninsula. 2 spp.

*Ochroderma* Ancey, 1885  
Fig. 646

Ancey, 1885: 93 (pro subg.).

TYPE SPECIES — *Tornatella gigas* Martens, 1880; OD.

Shell ovate-turritid, solid, of 5.5-7 slightly convex whorls. Apex convexly conic, somewhat rounded. Color olivaceous to greenish-yellow. Embryonic whorls smooth, following with suboblique wrinkles and exceptionally fine and dense spiral striation. Aperture narrowly ovate, margins simple; parietal wall with deeply entering parietal lamella. Columella concave, twisted and truncated below. Umbilicus absent. Height 35-44, diam. 15-18 mm (35.0 × 15.3 mm).

Jaw densely vertically striated, striae

subregular, and more like fine plaits near lower edge.

DISTRIBUTION. Caroline Islands. 1 sp.

*Ochrodermatina* Thiele, 1931  
Fig. 647

Thiele, 1931: 552 (*Ochroderma* sect.).

TYPE SPECIES — *Stenogyra carolina* Martens, 1880; monotypy.

Shell turritid, rather slender, moderately solid, glossy, of about 6 flattened whorls. Apex obtuse. Body whorl slightly obtusely angulate. Color yellow. Embryonic whorls smooth, postnuclear slightly irregularly radially wrinkled; two last whorls with very fine spiral striation. Aperture elongated-ovate, margins sharp and straight; palatal margin arched forward. Parietal lamella absent, columella continuous with basal margin or a little obliquely truncated. Height 22-25, diam. 4.5-5.8 mm (25.0 × 5.8 mm).

DISTRIBUTION. Caroline Islands. 1 sp.

*Ochrodermella* Pilsbry, 1907  
Fig. 648

Pilsbry, 1907 (1906-1907): 327 (*Ochroderma* sect.).

TYPE SPECIES — *Leptinaria* (*Neosubulina*) *martensi* Dall, 1900; OD.

Shell dextral or sinistral, elongated-ovate, thin, lustrous, of 5.5-6.5 slightly convex whorls. Apex acute to narrowly rounded. Color yellowish-green, olivaceous-buff, or chestnut. Embryonic whorls smooth, following whorls radially striatulate; in addition, sometimes there is also fine, obscure, spiral striation. Aperture semioval, with simple margins. Parietal lamella strong, columellar slightly weaker. No umbilicus. Height 8-10, diam. 3.6-4.0 mm (9.5 × 3.9 mm).

DISTRIBUTION. Nicaragua, Cocos Island. 3 nominal spp.

COELIAXINAE Pilsbry, 1906

Pilsbry, 1907 (1906-1907): 330.

— Pyrginae Germain, 1916: 300, 301.

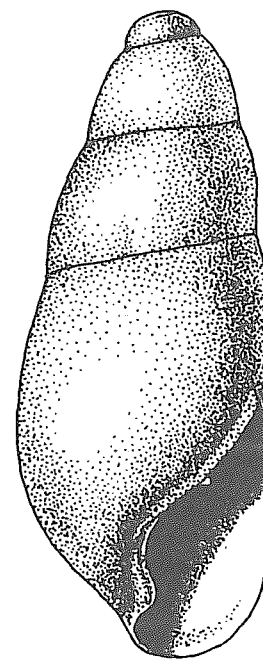


Fig. 646. *Ochroderma gigas* (Martens, 1880). Truk Island, Carolines. Leiden.

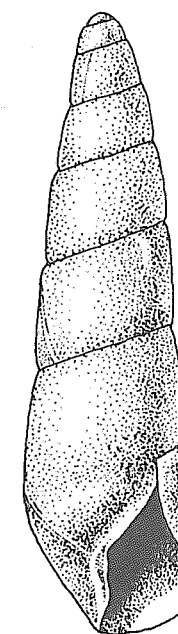


Fig. 647. *Ochrodermatina carolina* (Martens, 1880). Dublon Islet, Truk, Caroline Islands. Phil. No. 170818.

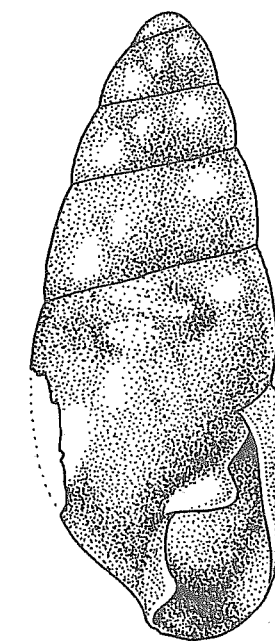


Fig. 648. *Ochrodermella martensi* (Dall, 1900). Cocos Island. Phil. No. 77880.

— Cryptelasminae Germain, 1916: 299. Jaime & Fuentes, 1943: 42 ("Familia Subulinidae?").

Shell slender, not decollated (only rarely decollated), dextral or sinistral. Cavity of whorls obstructed by lamellae on columella, parietal and sometimes basal wall.

Flagellum short or wanting. Epiphallus short. Caecum absent. Penis internally with numerous, slender papillae; verge minute or absent. Penis sheath absent. Penial retractor attached to epiphallus terminally. Spermatheca normally developed.

DISTRIBUTION. S Africa, São Thomé Island, and Caribbean region.

*Coeliaxis* H. Adams et Angas, 1865  
Fig. 649

Adams H. & Angas, 1865: 54 (*Subulina* subg.).

— *Bathyaxis* Ancey, 1887: 39 (t.-sp. *Subulina layardi* H. Adams et Angas, 1865; OD).

— *Sphalerostoma* Girard, 1892: 247 (t.-sp. *Subulina layardi* H. Adams et Angas, 1865; OD).

TYPE SPECIES — *Subulina* (*Coeliaxis*) *layardi* H. Adams et Angas, 1865 (= *Bulinus blandi* L. Pfeiffer, 1852); monotypy.

Shell long, turritid, moderately thin, sometimes decollated; entire shell of 19-21 narrow, tightly coiled whorls; last rounded at periphery. Upper half of spire with slightly concave outline, apex globose and a little enlarged. Color corneous. Embryonic whorls smooth, subsequent densely radially rib-striated. Aperture small, ovate, with simple margins, columellar margin rolled back. Columella encircled by a cord-like lamella below middle in each whorl, terminating in small columellar tubercle which sometimes visible at standard position of shell. Juvenils with strong, spiral, parietal and basal plicae and oblique columellar barrier in antepenultimate whorl. Umbilicus narrow, cylindrical. Height up to 31, diam. up to 7.8 mm (29.7 × 7.6 mm).

Jaw finely, densely vertically striated. Vas deferens distinctly convoluted in distal portion, entering short epiphallus apically. Epiphallus thick-walled, with very narrow lumen. Penis long, oblong-clavate, internally with longitudinal, thin, anosto-

Jaw finely, densely vertically striated.

Vas deferens distinctly convoluted in distal portion, entering short epiphallus apically. Epiphallus thick-walled, with very narrow lumen. Penis long, oblong-clavate, internally with longitudinal, thin, anosto-

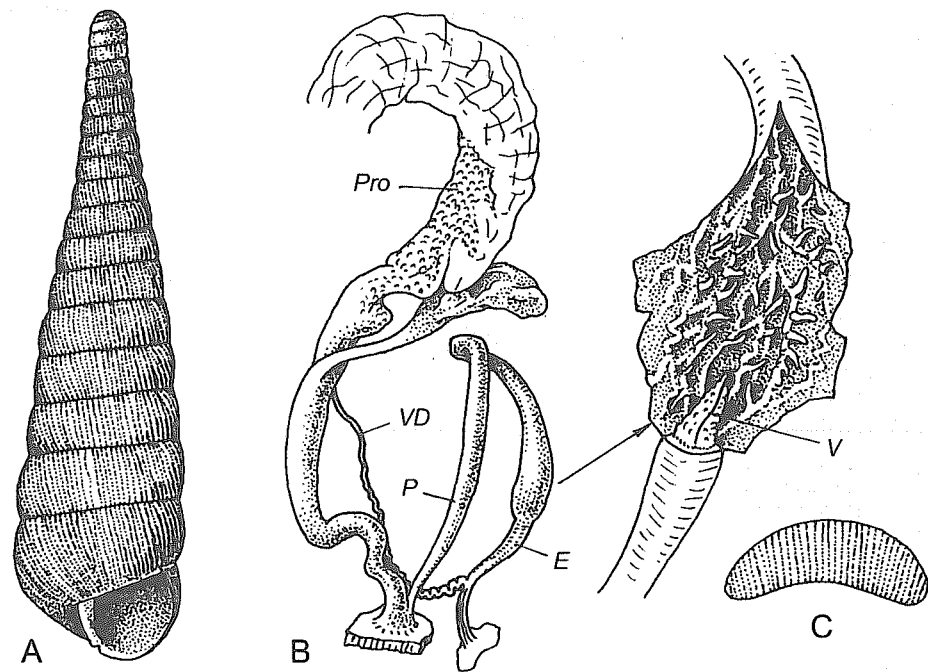


Fig. 649. *Coeliaxis blandi* (L. Pfeiffer, 1952). Port Alfred, S Africa.  
A — shell. B — reproductive tract and interior of penis. C — jaw. Vienna No. 42.267.

mosing folds; at expanded upper part of penis folds furnished with numerous, elongated, tapering papillae; penial verge minute, conic, grooved, pointed, its surface covered with tiny folds and tubercles. Penial retractor attaching to vas deferens/epiphallus junction. Free oviduct short, vagina long, internally with thin longitudinal folds. Spermathecal stalk rather short, reservoir thin-walled, voluminous, not reaching midway of spermoviduct.

DISTRIBUTION. S Africa. 1 sp.

*Thomea* Girard, 1893  
Fig. 650

Girard, 1893: 106.

TYPE SPECIES — *Thomea newtoni* Girard, 1893; monotypy.

Shell dextral, turruculate, rather thin, shining, of 12-14 slightly convex, narrow whorls. Apex pointed. Color greyish to olive-corneous. Embryonic whorl nearly smooth, subsequent regularly rib-striated. Aperture ovate, subvertical, with simple margins; columellar margin vertical, re-

flexed, continuous with basal margin, with lamella not visible externally; parietal wall bears deeply entering lamella visible externally. Umbilicus cylindrical, comparatively broad, a little covered up by reflection of columellar margin. Height 10-15, diam. 3.3-4.0 mm (10.1 × 3.4 mm).

DISTRIBUTION. Island of São Thomé (Gulf of Guinea). 1 sp.

*Pyrgina* Greeff, 1882  
Fig. 651

Greeff, 1882: 518.

TYPE SPECIES — *Pyrgina umbilicata* Greeff, 1882; monotypy.

Shell turruculate, thin, of about 13 very narrow whorls. Body whorl a little swollen, slightly carinated at base around umbilicus. Upper whorls form conus, remaining part of shell cylindrical. Apex conic. Color corneous-brown. Embryonic whorls smooth, later whorls lightly radially striated. Aperture ovate, a little angular at base, with thin, sharp margins. Parietal lamella visible externally, columella lightly reflexed, with

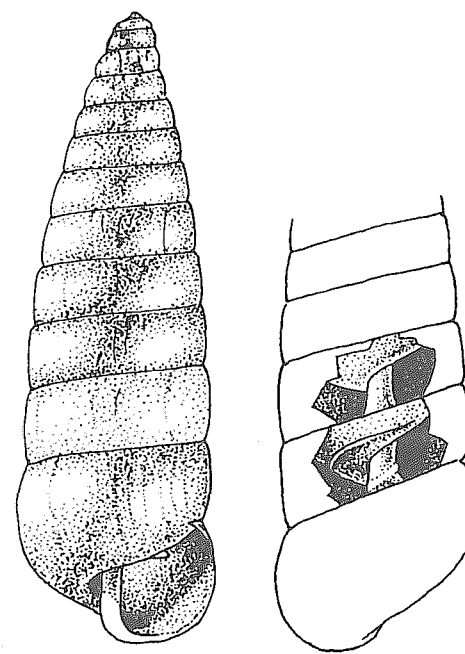


Fig. 650. *Thomea newtoni* Girard, 1893. São Thomé Island. Moscow No. Lc-24215 (Paris).

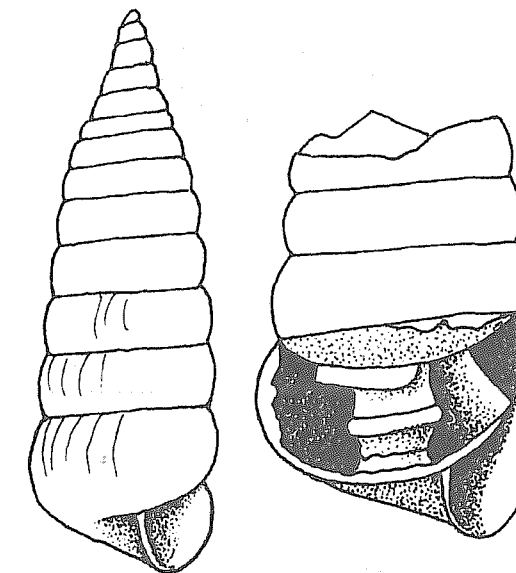


Fig. 651. *Pyrgina umbilicata* Greeff, 1882. After Girard, 1893 from Pilsbry, 1906.

internal lamella. These two lamellae resorbed above penultimate whorl, but vestiges of them present throughout entire length of columella. Umbilicus round, cylindrical, comparatively broad. Height 7.5, diam. 2.5 mm.

DISTRIBUTION. Island of São Thomé (Gulf of Guinea). 1 sp.

*Neosubulina* E. Smith, 1898  
Fig. 652

Smith, 1898b: 115.

TYPE SPECIES — *Neosubulina harteri* E. Smith, 1898; monotypy.

Shell slender, turruculate to subcylindrical, thin, translucent, of 8-10 rather convex whorls. Apex narrowly rounded or shortly pointed. Color yellowish to dull yellowish-corneous. Embryonic whorls smooth, subsequent whorls closely and rather coarsely radially wrinkled. Aperture small, narrowly ovate, with thin margins; columella more or less truncated. Parietal wall with low, deeply entering lamella. Height 7.8-13.0, diam. 2.1-3.0 mm (9.7 × 2.1 mm).

Kidney in transversal position, i.e. with

long axis at almost right angle to that of lung.

Talon exposed, tiny, located at lower border of albumen gland. Vas deferens short, not adherent to penis, entering epiphallus subapically. Epiphallus and penis much reduced. Epiphallus with very narrow lumen, its inner surface covered with tiny tubercles. Penis internally with minute verge, inner walls of penis with a few, transversely crenulate, prominent, longitudinal plicae. Penis sheath tapering gradually towards apex. Free oviduct and vagina not long, of about equal length. Spermathecal shaft very short, slender for about half of its length and basally expanded into large, thick-walled body. Reservoir globular, thin-walled, not reaching middle part of spermoviduct.

DISTRIBUTION. Curaçao and Bonaire Islands. 2-3 spp.

*Ischnocion* Pilsbry, 1907  
Fig. 653

Pilsbry, 1907 (1906-1907): 287, 324 (*Leptinaria* subg.).

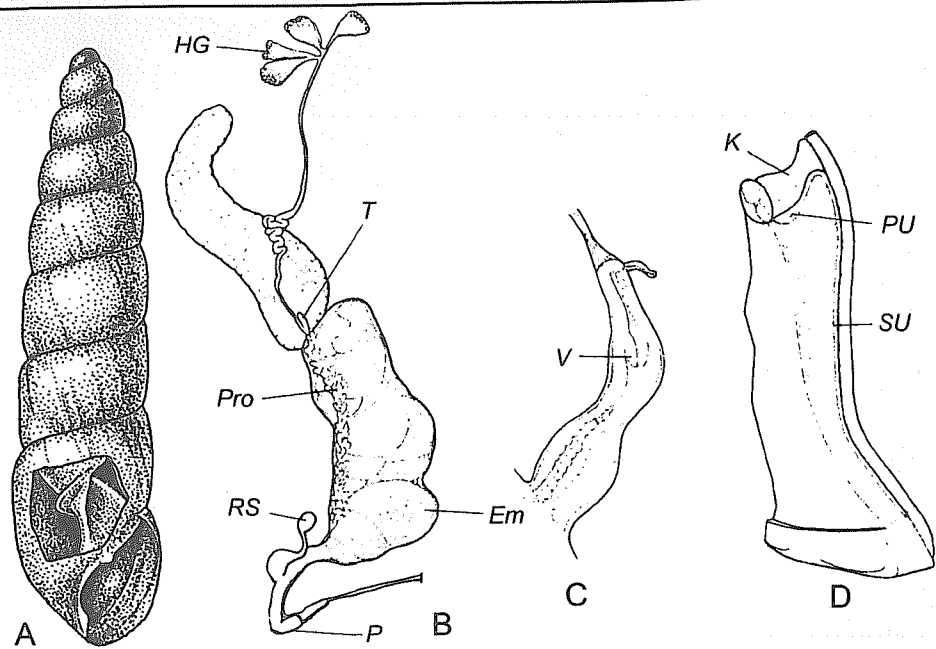


Fig. 652. A — *Neosubulina harteri* (E. Smith, 1898). Porta Spaño, Bonaire Island. Phil. No. 133601. B, C, D — ! *Neosubulina scopulorum* H. Baker, 1924. B — reproductive tract. C — interior of penis. D — roof of lung. After H. Baker, 1927.

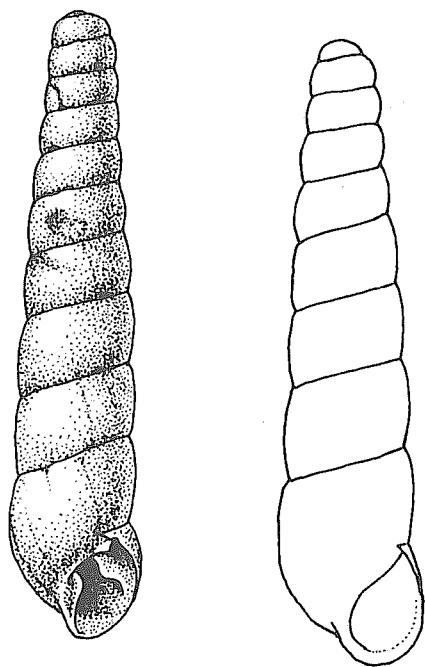


Fig. 653. *Ischnocion triptyx* (Pilsbry, 1907). New Grenada [Colombia]. Holotype. Phil. No. 24113a. Fig. 654. *Nannobeliscus silvaevagus* (Weyrauch, 1964). After Weyrauch, 1964.

TYPE SPECIES — *Leptinaria triptyx* Pilsbry, 1907; OD.

Shell slender, nearly cylindrical, comparatively solid, of 11 moderately convex whorls. Apex obtuse, widely rounded. Color pale-yellow. Embryonic whorls smooth, postnuclear sculpture of weak irregular radial wrinkles. Aperture small, ovate, with thin, simple margins. Parietal wall with rather low entering lamella. Columella concave below, twisted into large entering lamella above. Palatal wall with lamellar plica of about 0.5 whorl length, not reaching aperture edge. Umbilicus absent. Height 10.2, diam. 2.2 mm.

DISTRIBUTION. Colombia. 1 sp.

*Nannobeliscus* Weyrauch, 1967  
Fig. 654

Weyrauch, 1967: 458 (nom. nov. pro *Microbeliscus* Weyrauch, 1964).

— *Microbeliscus* Weyrauch, 1964: 40 [nom. praeocc., non Sandberger, 1875; *Obeliscus* subg.; t.-sp. *Obeliscus (Microbeliscus) silvaevagus* Weyrauch, 1964; OD].

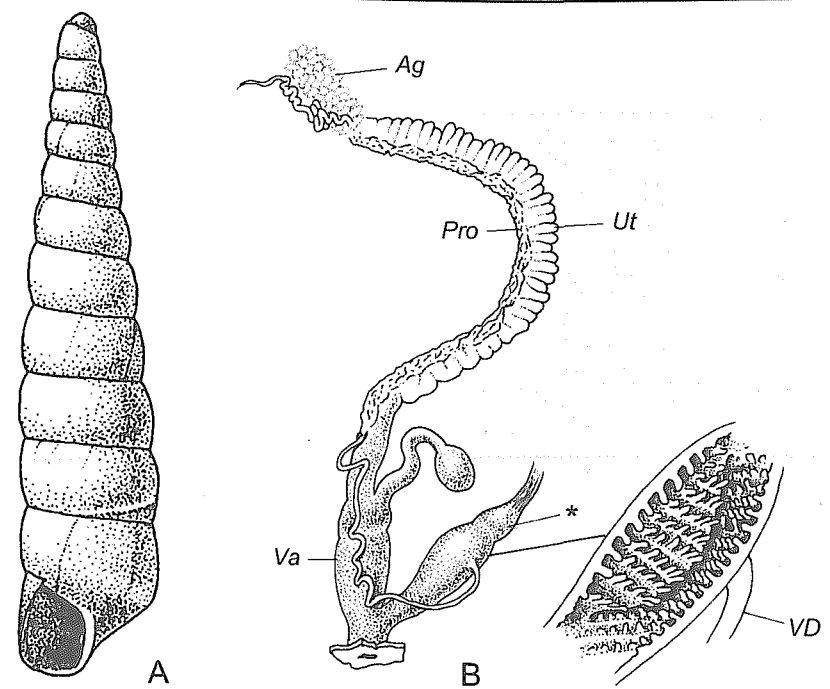


Fig. 655. *Pseudobalea dominicensis* (L. Pfeiffer, 1851). S of Cataña, San Juan Dist., Puerto Rico. A — shell. B — reproductive tract and interior of penis. Phil. No. 256158 (as *hasta* L. Pfeiffer, 1856). Asterisk — upper chamber of penis.

TYPE SPECIES — *Obeliscus (Microbeliscus) silvaevagus* Weyrauch, 1964; OD.

Shell slender, pillar-shaped, a little tapering, rather solid, shining, of 9.5 whorls: upper convex, lower flattened. Color uniformly corneous-yellowish. Embryonic whorls smooth, later whorls with smoothed, very low, broad radial plicae. Aperture small, somewhat trapezoid, with simple, slightly thickened margins. Parietal wall with filiform lamella. Columellar margin straight, vertical, columella with low spiral lamella. Umbilicus closed. Height 8.3, diam. 1.9 mm.

DISTRIBUTION. Central Peru. 1 sp.

*Pseudobalea* Shuttleworth, 1854  
Fig. 655

Shuttleworth, 1854: 138 (*Stenogyra* subg.).

TYPE SPECIES — *Balea dominicensis* L. Pfeiffer, 1851 (= *Bulimus hasta* L. Pfeiffer, 1856); monotypy.

Shell sinistral, turrated, thin, of 11-16 rather convex whorls; last slightly angled at periphery. Apex narrowly rounded.

Color corneous to greenish-olive. Embryonic whorls smooth, postnuclear weakly sculptured with faint irregular radial wrinkles. Aperture small, ovate or subquadrate, with simple or somewhat reflexed margins; columella concave or weakly plicate at base. Umbilicus absent. Height 11.5-19.0, diam. 2.5-3.0 mm (13.7 × 2.7 mm).

Vas deferens entering penis at almost right angle. Penis consisting of two chambers: upper one short, slightly swollen, lower (penis proper) bulky, internally with numerous, comparatively large and distinct papillae, arranged in oblique and transversal series, and longitudinal lamellate lobe which covers opening of vas deferens. Free oviduct short, vagina enlarged, thick-walled. Spermatheca distinctly divided into rather short shaft and globose reservoir.

DISTRIBUTION. Haiti, Puerto Rico, E Cuba. 3 spp. & subspp.

*Cryptelasmus* Pilsbry, 1906

Pilsbry, 1906 (1906-1907): 331.

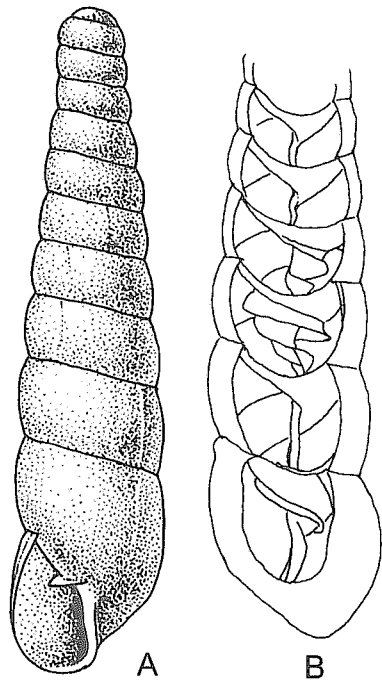


Fig. 656. *Cryptelasmus (Cryptelasmus) canteroiana cienfuegosensis* Pilsbry, 1907.  
A — shell: Lagunilla near Cienfuegos, Cuba. Moscow No. Lc-24216 (Phil. No. 113170).  
B — inner structure of shell. After Pilsbry, 1907 (1906-1907).

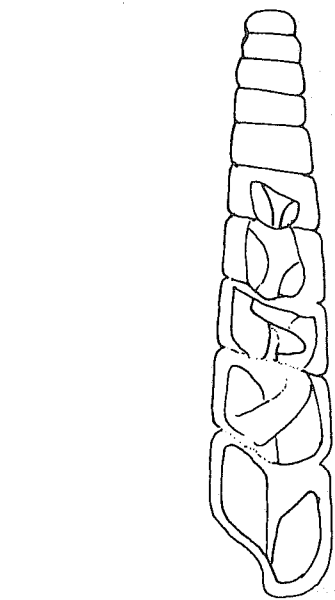


Fig. 657. *Cryptelasmus (Eucryptelasmus) verai* Jaume et Fuentes, 1943.  
After Jaume & Fuentes, 1943.

TYPE SPECIES — *Balea* (?) *canteroiana* L. Pfeiffer, 1857; OD.

Shell sinistral, turreted, very slender, thin, of 8-15 more or less convex whorls. Apex very obtuse and somewhat bulging. Color pale-yellow. Embryonic whorls smooth, following finely and densely radially striated. Aperture relatively small, ovate, moderately oblique, with simple margins; columella straightened, vertical. Parietal wall with entering lamella. Cavity of 1 or 2 intermediate whorls obstructed by parietal and columellar lamellae; central axis elsewhere thin and straight. Umbilicus absent.

DISTRIBUTION. Central Cuba.

*Cryptelasmus (Cryptelasmus* s. str.)  
Fig. 656

Parietal lamella visible in aperture. Height 11.5-16.8, diam. 2.5-3.0 mm (11.5 × 2.5 mm).

DISTRIBUTION. Central Cuba (Santa Clara Prov.). 5 spp. & subspp.

*Cryptelasmus (Eucryptelasmus*  
Jaume et Fuentes, 1943)  
Fig. 657

Jaume & Fuentes, 1943: 42.

TYPE SPECIES — *Cryptelasmus (Eucryptelasmus) verai* Jaume et Fuentes, 1943; OD.

Parietal lamella not visible in aperture. Height 8.5-16.0, diam. 3.0-3.5 mm.

DISTRIBUTION. Cuba (Matanzas prov.). 1 sp.

SUBULININAE  
Fischer et Crosse, 1877

Shell not decollated, dextral. Last whorl lacking internal sculpture or (rarely) with parietal lamella. Columella simple, often truncated.

Flagellum short or absent. Epiphallus short or wanting. Caecum absent or tightly adherent to epiphallus. Penis initially con-

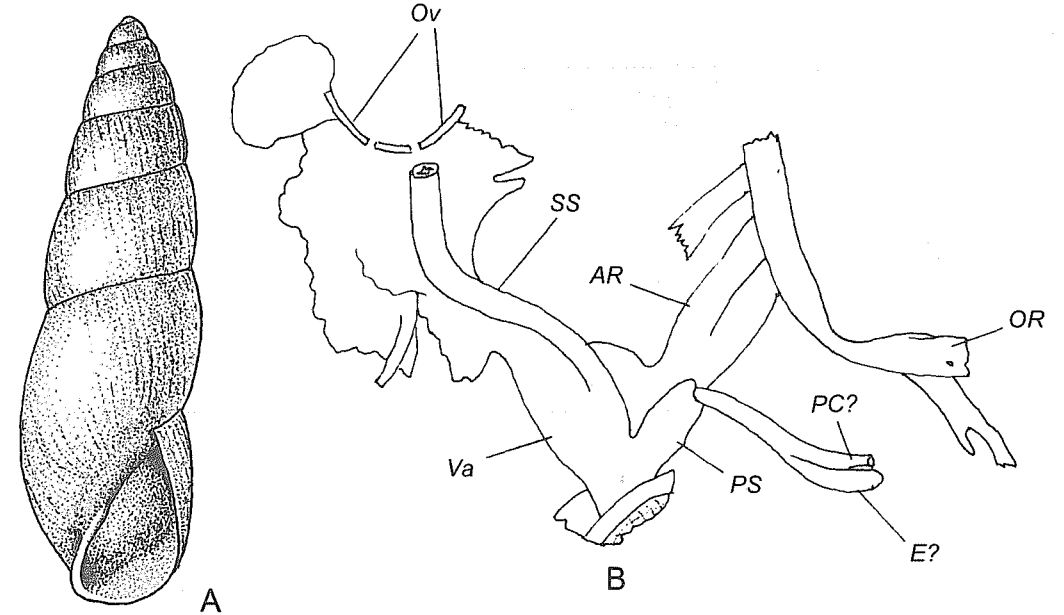


Fig. 658. *Prosopeas roepstorfi* (Mörch, 1876).  
A — shell: Nicobar Is. Phil. No. 78444. B — reproductive tract (recovered from dried remains and rehydrated). After Naggs, 1994.

sists of 3 sections: short distal, narrow tubular middle and more or less enlarged proximal, internally penis with a few folds or pilasters; however, because of protherandria, copulatory apparatus often more or less reduced, in this case inner surface of penis with somewhat diagonal folds. [Pilsbry, 1906 (1906-1907: 123) pointed out that some Subulinidae "... begin to reproduce before the shell has attained its full size, usually when it is about two-thirds grown."]. Verge absent or very small. Penis sheath sometimes present. Penial retractor inserted apically. Spermatheca often more or less reduced.

DISTRIBUTION. As in family.

*Prosopeas* Mörch, 1876  
Fig. 658

Mörch, 1876: 358 (*Bulimus* subg.). Naggs, 1994: 184.

TYPE SPECIES — *Bulimus (Prosopeas) roepstorfi* Mörch, 1876; SD Pilsbry, 1906 (1906-1907).

Shell turreted, elongated, thin, glossy, of 7-8 moderately convex whorls. Apex rather small, narrowly rounded. Color generally pale-straw to light corneous. Embryonic whorls smooth, subsequent densely sculptured with fine oblique radial striae arched forward above and retracted to suture. Aperture ovate, margins more or less reflexed; columella straight to somewhat concave, continuous with basal margin below, slightly or not folded above. Axis slender, straight or nearly so. Umbilicus, a tiny rim, or absent. Height 10-50, diam. 3.5-11.5 mm (16.2 × 4.5 mm).

"The penis rested on the right side of the right ocular retractor and, although the penial retractor muscle was detached from the penis and not found, this suggests that the right ocular retractor *might* pass behind, not between, the penis and the female duct. The penis was broken distal (proximal, in my sense — A. Sch.) to what *might* be an epiphallus, severing what *could* be a penial caecum; a penis sheath was firmly attached to the retractor muscle from the

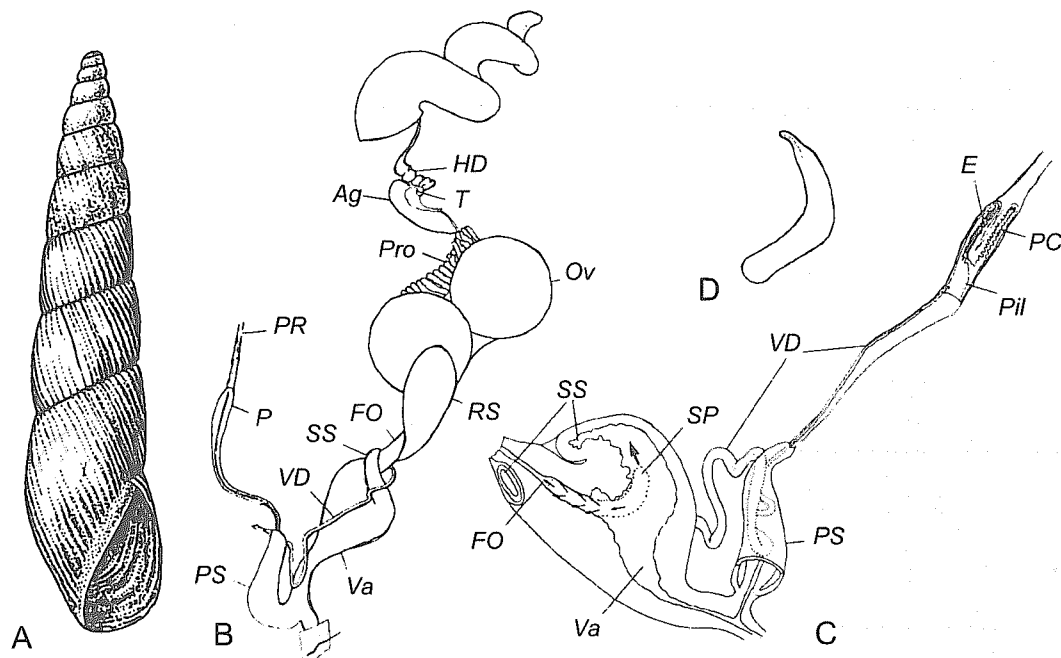


Fig. 659. A — *Paropeas acutissimus* (Mousson, 1857). Shell: Java. Chicago No. 36090. B, C, D — ! *Paropeas achatinaceum* (L. Pfeiffer, 1846). B — reproductive tract. C — interior of vagina and penis. D — spermatophore. After Naggs, 1994. Large arrow shows subsequent route of spermatophore; small arrows indicate exit route of spermatozoa.

genital atrum... The vagina leads directly to the oviduct whilst the bursa duct is straight and originates from a simple branching in the wall of the vagina." (Naggs, 1994: 185).

DISTRIBUTION. SE Asia north to China, Philippines. About 30 spp. & subspp.

REMARK. Unfortunately the given description of anatomical characters is fragmentary and based on data by Naggs (1994) who obtained them from dry remains of a specimen which was between 100 and 150 years old, after soaking in dilute detergent solution.

*Paropeas* Pilsbry, 1906  
Fig. 659

Pilsbry, 1906 (1906-1907): 14 (*Prosopaeas* sect.). Naggs, 1994.

TYPE SPECIES — *Bulimus acutissimus* Mousson, 1857; OD.

Shell differs from *Prosopaeas* mainly by presence of radial ribbing and microscopic spiral lines on embryonic whorls, al-

though sometimes this sculpture may be very indistinct; later whorls usually with very delicate spiral striae. Height 23-40, diam. 6-8 mm (33.2 × 7.1 mm).

Jaw delicate, narrow, irregularly ribbed.

Talon exposed. Vas deferens thin, bound to penis and entering epiphallus subapically. Epiphallus short, with very narrow lumen. Penis long, consists of 2 sections. Basal (distal) section muscular, its inner surface bears series of longitudinal ridges; this section enclosed in penis sheath. Proximal part longer and narrower, internally with strong pilaster. This part ends in short penial caecum; inner surface of caecum strongly corrugate. Penial retractor in juveniles often originates from diaphragm but in adults it branched off from columellar muscle; attached to summit of epiphallus and caecum. Vagina swollen, strongly muscular. Spermathecal stalk not long, adheres to and runs around free oviduct; reservoir lies on lower section of spermooviduct. Naggs (1994) found a spermatophore which was lodged not in spermatheca, but across and below muscular process ("ligula") which extends down be-

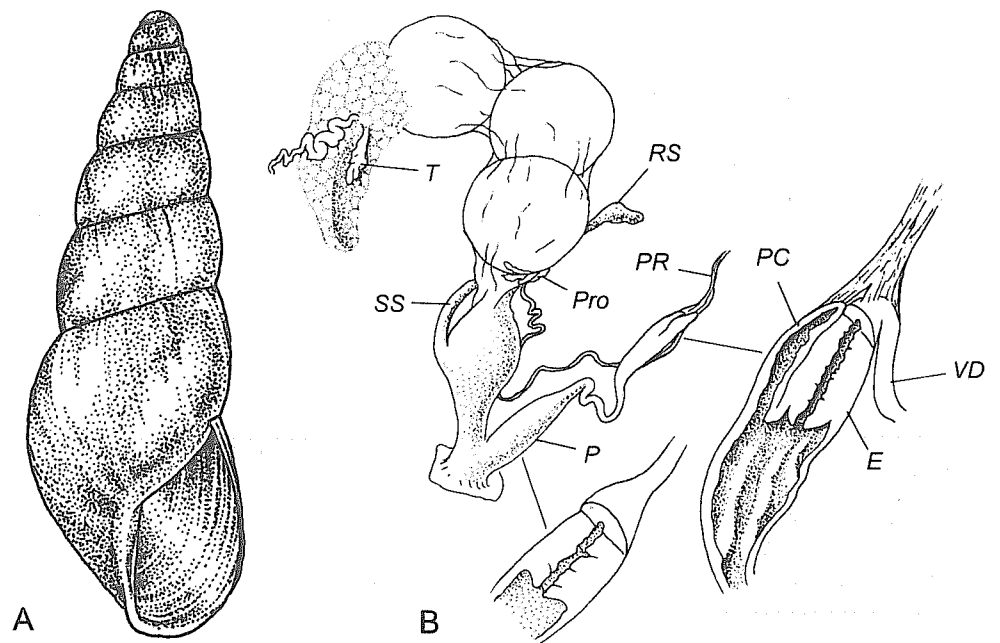


Fig. 660. *Allopeas gracile* (Hutton, 1834). A — shell: "Los Banos, Laguna, P.I." [Philippines]. Phil. No. 149677. B — reproductive tract and interior of basal and proximal divisions of penis. Huananu Island, Tonga, July 15, 1980. Moscow No. Lc-24236.

tween spermathecal stalk and free oviduct. Spermatophore short, fusiform, consists of solid head and porous tail.

DISTRIBUTION. Indonesia. 6-8 spp.

*Allopeas* Baker, 1935  
Fig. 660

Baker, 1935: 84 (*Lamellaxis* subg.).

TYPE SPECIES — *Bulimus gracilis* Hutton, 1834; OD.

Shell slender, nearly aciculate, thin, translucent, glossy, of 7-9 rather convex whorls. Apex narrowly rounded, somewhat obtuse. Color yellowish to olivaceous. Embryonic whorls smooth, later finely, radially, irregularly striatulate. Aperture elongated-ovate, with thin simple margins; columella nearly vertical, not or scarcely truncated, with very weak subvertical lamella. Umbilicus dot-like. Height up to 11, diam. up to 4 mm (9.2 × 3.1 mm).

Talon large, exposed, irregularly clavate, of several chambers. Vas deferens thin, convoluted, entering epiphallus apically.

Epiphallus opens through very short verge. Penis of 3 sections: basal (distal) contains sphincter-like, extremely short verge; then a more or less long narrow section follows; proximal part internally with smoothed longitudinal folds. Blind lateral penial caecum tightly bound to epiphallus. Penial retractor attached by 2 arms to apex of epiphallus and caecum. Uterus contains 2-5 large eggs. Free oviduct and vagina enlarged, with thick muscular walls. Spermathecal shaft branched off from this swelling, reservoir small.

DISTRIBUTION. Tropical regions of Old and New World. At least 20 spp.

*Dysopeas* Baker, 1927  
Fig. 661

Baker, 1927: 10 (*Pseudopeas* subg.).

TYPE SPECIES — *Pseudopeas* (*Dysopeas*) *translucidum* Baker, 1927; OD.

Shell slender, subulate to subulate-ovate, thin, glossy, of 5.5-8 rather convex whorls. Apex narrowly rounded. Color

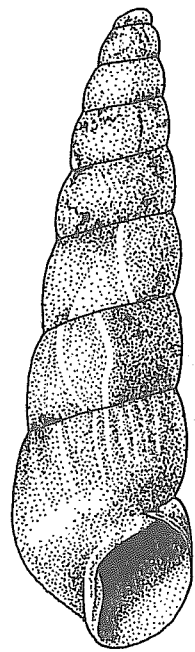


Fig. 661. *Dysopeas translucidum* (Baker, 1927).  
La Fria, Venezuela. Syntype. Phil. No. 140943.

greenish. Embryonic whorls with spiral striae extended over later whorls; besides, postembryonic whorls bear delicate irregular radial striation. Aperture ovate, with simple, sharp margins; columellar margin slightly oblique. Umbilicus rimate. Height 6.0-10.5, diam. 1.5-2.6 mm (10.0 × 2.6 mm).

DISTRIBUTION. Ecuador, Venezuela. 2-3 spp.

*Subulina* Beck, 1837  
Fig. 662

Beck, 1837: 76.

TYPE SPECIES — *Bulimus octonus* Bruguière, 1792; SD Gray, 1847b.

Shell slender, turreted or subulate, thin, translucent to nearly transparent, of 9-13 convex whorls. Apex obtuse, rounded. Color pale yellowish to corneous or brownish. Embryonic whorls smooth, post-nuclear with weak irregular radial wrinkles. Aperture relatively small, broadly ovate, slightly oblique, with simple margins. Co-

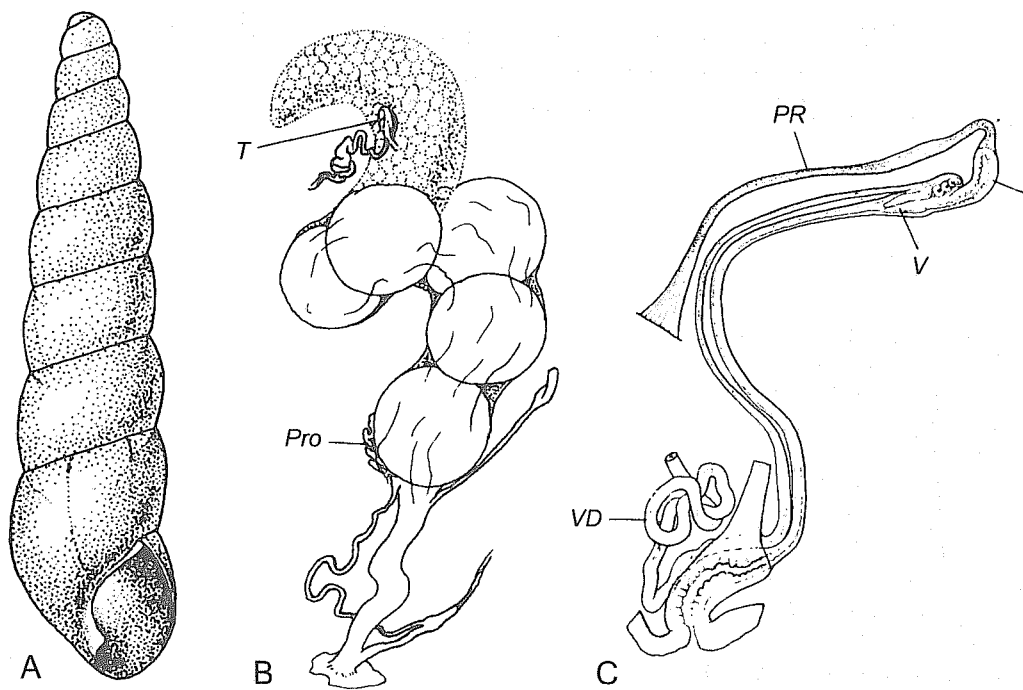


Fig. 662. *Subulina octona* (Bruguière, 1792).  
A — shell: Plaia Mosquito W of Habana, Cuba. Moscow No. Lc-20472. B — reproductive tract. Huananu Island, Tonga, July 15, 1980. Moscow No. Lc-24233. C — penis. After Baker, 1927.

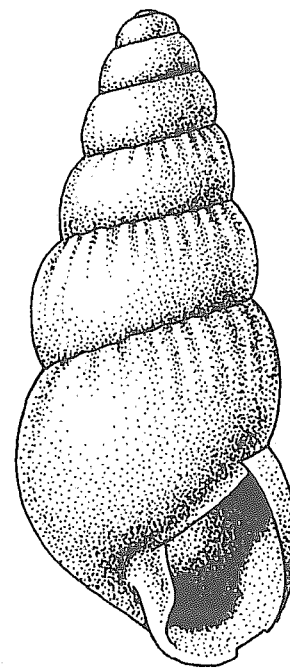


Fig. 663. *Lamellaxis mexicana* (L. Pfeiffer, 1866).  
Tampico [Mexico]. Phil. No. 93785.

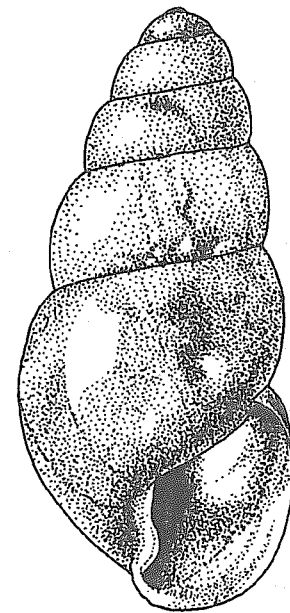


Fig. 664. *Leptopeas bequaerti* (Pilsbry, 1926).  
Carvoeiro, Brazil. Holotype. Phil. No. 135055a.

lumella concave, truncated. Height up to 24, diam. up to 4.5 mm (13.2 × 3.9 mm).

Talon exposed, (sub)clavate. Vas deferens moderately convoluted, entering penis at short distance from its apex. Penis usually somewhat reduced. Uterus contains relatively large eggs and embryos. Free oviduct very short, vagina rather long. Spermatheca inclines to reduction: stalk very narrow, reservoir minute, transparent.

Since phenomenon of proterandria takes place in Subulininae (or, at least, in Subulininae) the data by Baker (in Pilsbry, 1946b: 173) should be cited: "The actual penis consists of three regions: a flagellar appendix, a long, slender region, and a swollen base inside of the heavy sheath. The apical appendix is about 1/6 the length of the entire organ, it has thick, internally plicate walls and a quite large cavity, which opens into the lumen of the penis on one side of the penial papilla. The vas deferens enters the penial wall a little above the base of the flagellum and opens into the cavity of the penis through a rather elongated papilla. The slender region of the penis is about 2/3 of its length and has a

relatively large, simple lumen with quite thin walls. The basal portion forms the remaining 1/6 and is 4 or 5 times the diameter of the slender region; it develops a large lumen and thick, muscular walls, which are completely folded internally. The penial retractor is over half as long as the entire copulatory organ, arises from the diaphragm near the base of the uterus, and inserts on the apex of the flagellum. This complicated apparatus appears to be a remarkably efficient structure instead of a vestigial one, as suggested by Wiegmann [1893] (pp. 214-5); nevertheless, I am inclined to agree with him that this species is probably protandrous".

DISTRIBUTION. Tropical Africa, Comoro Islands, Central and tropical S America; type species introduced to most (sub)tropical regions. About 50 spp.

*Lamellaxis* Strebel et Pfeffer, 1882  
Fig. 663

Strebel & Pfeffer in Strebel, 1882: 109.



TYPE SPECIES — *Spiraxis mexicana* L. Pfeiffer, 1866; SD Baker, 1945.

Shell turrited to oblong-ovate, moderately fragile, translucent, of 6-10 convex whorls. Apex blunt. Color whitish to light corneous. Embryonic whorls smooth, later whorls with radial wrinkles which are more strong below suture. Aperture ovate, with thin margins; columella somewhat expanded, distinctly truncated. Parietal lamella absent. Height 4-15, diam. 1.0-4.5 mm (9.0 × 3.5 mm).

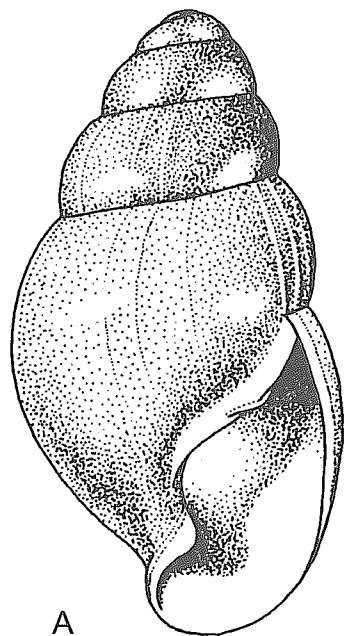
DISTRIBUTION. West Indies, tropical regions of S and Central America, Mexico. At least 15 spp.

*Leptopeas* Baker, 1927  
Fig. 664

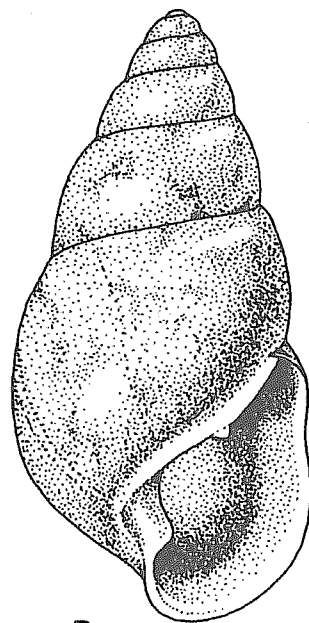
Baker, 1927: 17 (*Leptinaria* subg.).

TYPE SPECIES — *Leptinaria bequaerti* Pilsbry, 1926; OD.

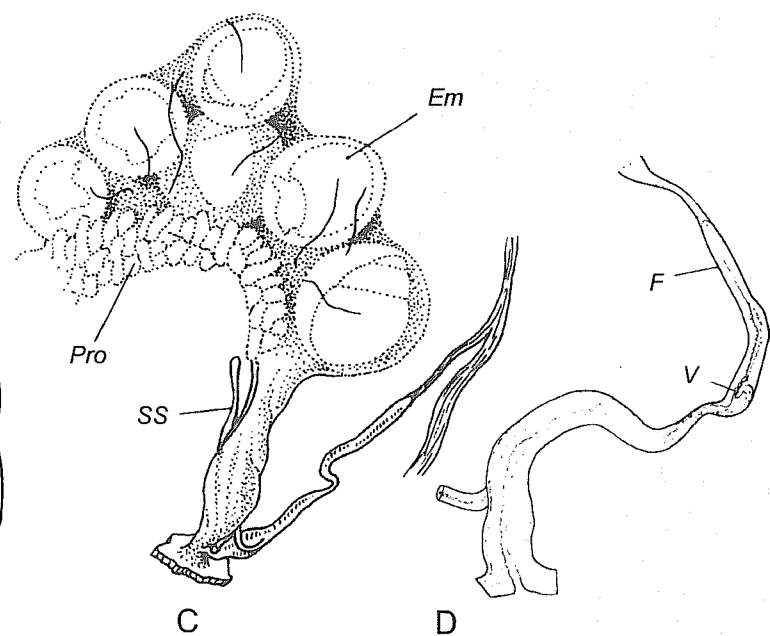
Shell elongated-ovate, thin, transparent, shining, glass-like, of 5.5-7 convex whorls. Apex rounded. Colorless. Embryonic whorls with weak radial wrinkles, postapical sculpture of very fine irregular radial



A



B



C

D

Fig. 665. *Leptinaria unilamellata* (Orbigny, 1835).

A — juvenile shell: New Granada [Colombia]. SPb. B — adult shell: Trinidad Id. Leiden. C — reproductive tract. Albina, dist. Marssmijne, Surinam, March 1, 1930. Leiden. D — interior of penis. After Baker, 1927.

striation. Aperture ovate, margins simple, thin; columella somewhat sinuous, truncated. Umbilicus absent. Height 6-14, diam. 2.5 × 5.3 mm (6.0 × 2.5 mm).

DISTRIBUTION. Tropical regions of S America. At least 4 spp.

*Leptinaria* Beck, 1837  
Fig. 665

Beck, 1837: 79 (*Achatina* subg.).

— *Nothus* Albers, 1850: 168 [nom. praeocc., non Olivier, 1811 (Coleoptera)]; *Bulimus* subg.; t.-sp. *Bulimus anomalus* L. Pfeiffer, 1846; monotypy].

TYPE SPECIES — *Helix unilamellata* Orbigny, 1835; SD Herrmannsen, 1846.

Shell pointed-ovate, thin, shining, translucent, polished, of 4.5-7 moderately convex whorls. Apex narrowly rounded. Colorless or yellowish. Both embryonic and postembryonic whorls smooth, only lower whorls with vague irregular radial wrinkles. Aperture more or less ovate, margins thin or slightly thickened; parietal wall often with variously developed lamella present at any stage. Columellar margin reflexed, twisted below, and notched or truncated. Umbilicus absent. Height 3-18, diam. 1.4-7.5 mm (SPb: 2.1 × 1.0; Leiden: 11.0 × 5.1 mm).

Jaw exceptionally thin, scarcely vertically striated (practically smooth).

Prostate of many large acini. Vas deferens bound to penis, entering at sharp angle; long, slender flagellum present above junction. Penis small, slender, internally nearly smooth. Vas deferens opens to penis through tiny verge. Penial retractor arising from columellar muscle, attaching to flagellum apically. Vagina enlarged, internally with spirally directed folds. Uterus contains few large eggs, lower of which with well developed embryos. Spermatheca reduced, its stalk slender apically and gradually swollen towards base; reservoir minute.

DISTRIBUTION. Caribbean region, Central America, tropical parts of S America. About 50 spp., subspp. & forms.

*Abaconia* Clench, 1938  
Fig. 666

Clench, 1938: 321 (*Leptinaria* subg.).

TYPE SPECIES — *Leptinaria (Abaconia) naufraga* Clench, 1938; OD.

Shell pointed-ovate, relatively solid, of 8.5-9 slightly convex whorls. Color pale brown to yellowish brown. Embryonic whorls delicately radially ribbed, early postnuclear whorls with fine radial riblets, last 3-4 whorls with fine spiral threadlets. Aperture irregularly ovate, basal margin nearly horizontal, forming rounded angle with subvertical palatal margin. Peristome sharp, simple. Columellar margin with large, flattened, entering lamella. Umbilicus minute. Height 4.0-4.6, diam. 2.1-2.3 mm (4.0 × 2.3 mm).

DISTRIBUTION. Great Abaco Island, Bahamas. 1 sp.

*Pelatrinia* Pilsbry, 1907  
Fig. 667

Pilsbry, 1907 (1906-1907): 324 (*Leptinaria* subg.).

TYPE SPECIES — *Leptinaria helenae* Pilsbry, 1907; OD.

Shell conic-turrered, slightly contracted near apex, thin, glossy, a little translucent, of 8.5 quite convex whorls. Apex slightly acuminate. Color uniformly light brown. First half of embryonic whorls nearly smooth, next 2 whorls very finely, densely radially striated. Striae (riblets) then become somewhat arcuate, coarser, and thread-like, but on last three whorls threads substituted by low, less regular wrinkles. Aperture slightly oblique, ovate, with simple margins; columella calloused, sinuous, strongly concave and obliquely truncated. Parietal lamella absent. Height 18.0, diam. 7.7 mm.

DISTRIBUTION. Venezuela (Caracas). 1 sp.

*Luntia* E. Smith, 1898  
Fig. 668

Smith, 1898a: 28.

TYPE SPECIES — *Luntia insignis* E. Smith, 1898; monotypy.

Shell elongated, slender, thin, of 7 convex whorls. Apex mammillate. Color white. Embryonic whorls smooth, subsequent with delicate arcuate radial riblets, somewhat projecting above suture. Aperture

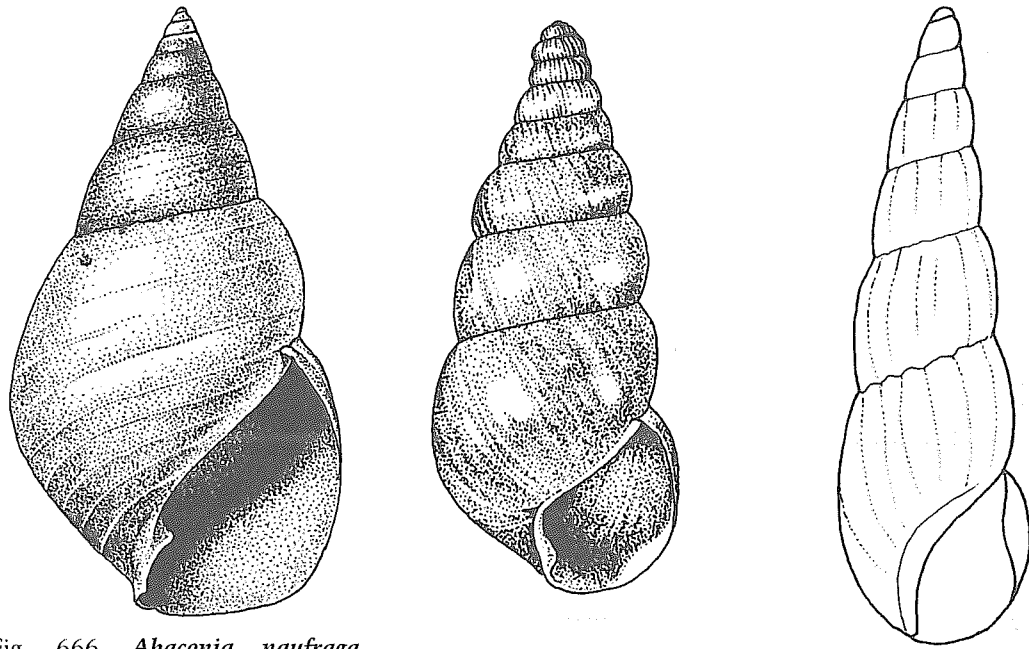


Fig. 666. *Abaconia naufraga*  
(Clench, 1938).

Sand Bank, Crossing Bay,  
Great Abaco Island, Bahamas.  
Holotype. Cambridge No.  
116705.

Fig. 667. *Pelatrinia helenae*

(Pilsbry, 1907).  
Caracas [Venezuela]. Holo-  
type. Phil. No. 24114.

Fig. 668. *Luntia insignis* E.

Smith, 1898. After Smith,  
1898a.

small, inversely ear-shaped; palatal margin arched forward and deeply sinuated above, slightly thickened below sinus. Columella calloused, arcuately twisted and obliquely truncated. Umbilicus closed. Height 5.50, diam. 1.33 mm.

DISTRIBUTION. Trinidad Id. 1 sp.

*Beckianum* Baker, 1961

Fig. 669

Baker, 1961: 84 (as gen. or subg. of *Leptinaria*).

— *Synopeas* Jousseaume, 1889b: 239 [nom. praeocc., non Foerster, 1856; t.-sp. *Bulimus caracasensis* Reeve, 1849 (= *Bulimus beckianus* L. Pfeiffer, 1846); OD].

TYPE SPECIES — *Bulimus beckianus* L. Pfeiffer, 1846; OD.

Shell subcylindrical, with conic upper part, thin, fragile, nearly glass-like, semi-transparent, shining, of 7.5-8.5 quite convex whorls. Color light-yellowish or greyish. First 0.5 whorl smooth, rest surface with distantly spaced radial riblets. Aperture rounded, moderately oblique, with

thin, simple margins; columellar margin almost vertical, somewhat reflexed and expanded, not truncated. Umbilicus circular, minutely open. Height 6-9, diam. 2.3-3.0 mm (6.8 × 2.5 mm).

Talon partly exposed, tiny. Vas deferens at first running along free oviduct and vagina, then distinctly convoluted and loosely bound to penis; entering penis at some distance from its apex, remaining rather long, slender flagellum. Penis subcylindrical, internally with fine corrugated longitudinal plicae. Penial retractor attached to summit of flagellum. Uterus containing 2-5 eggs with shelled embryos having 1-1.5 whorls. Free oviduct greatly swollen, vagina markedly enlarged. Spermathecal stalk short, cylindrical, slender, reservoir thin-walled, subtransparent.

DISTRIBUTION. Venezuela. 1 or 2 spp.

*Pseudopeas* Putzeys, 1899

Fig. 670

Putzeys, 1899: lviii (*Opeas* subg.).

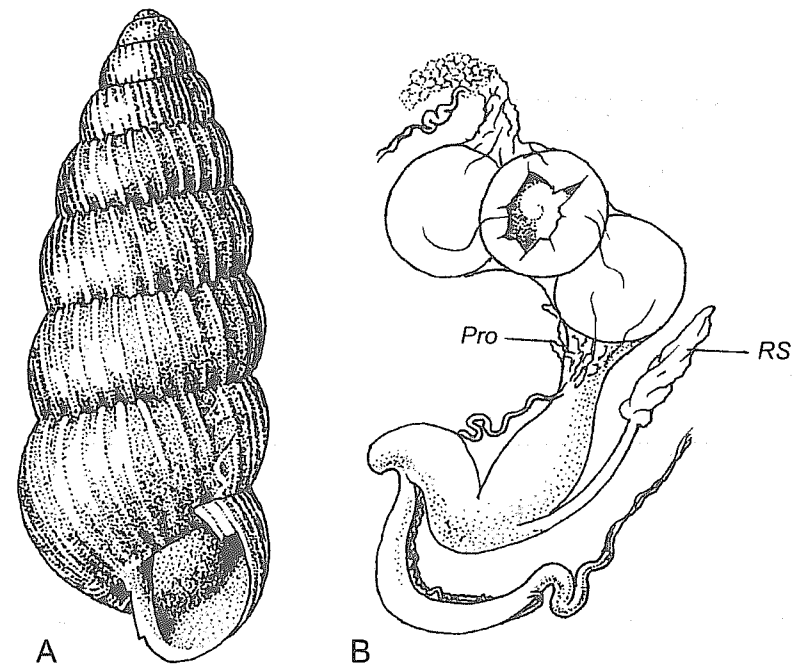


Fig. 669. *Beckianum beckianum* (L. Pfeiffer, 1846).

A — shell: Cariacuita, Venezuela. Moscow No. Lc-24223 (Phil. No. 105214). B — reproductive tract. French Guyana. Moscow.

— *Beccaria* Bourguignat, 1883: 119 [nom. praeocc., non Trinchese, 1870 (Nudibranchia); t.-sp. *Subulina isseli* Jickeli, 1874; OD].

TYPE SPECIES — *Pseudopeas pulchellum* Putzeys, 1899; SD Pilsbry, 1906.

Shell elongated-ovate, thin, translucent, glossy, of 5-7 moderately convex whorls. Apex widely rounded. Color yellowish to light corneous. Embryonic whorls very finely spirally striated, postnuclear radially ribbed or rib-striated. Aperture acuminate-ovate, with thin margins; palatal margin more or less arched forward. Columella reflexed, not truncated, continuing with basal margin. Umbilicus closed or dot-like. Height 2.7-9.0, diam. 1.5-3.0 mm (5.5 × 2.2 mm).

DISTRIBUTION. NE, W and S Africa, Comoro Islands. Over 20 spp. & forms.

*Curvella* Chaper, 1885

Fig. 671

Chaper, 1885: 48, 49.

— *Hapalus* Albers, 1850: 140 [nom. praeocc.,

non Billberg, 1820 (Coleoptera); t.-sp. *Bulimus grateloupi* L. Pfeiffer, 1846; monotypy].

Gaillard, 1954: 56.

TYPE SPECIES — *Curvella sulcata* Chaper, 1885; SD Pilsbry, 1906 (1906-1907).

Shell oblong-conic, thin, semitransparent, shining, of 5-7 whorls. Apex obtuse, rounded. Color light-corneous to whitish. Embryonic whorls smooth, postnuclear whorls with delicate, strongly arcuate radial wrinkles. Aperture ovate, its margins sharp, palatal margin arching forward in the middle, restricted at suture and base; columella slightly sinuous or straight, curving into basal margin. Umbilicus dot-like or closed. Height 4.5-20.0, diam. 1.4-8.0 mm (10.5 × 4.0 mm).

DISTRIBUTION. Tropical and S Africa, Hindustan Peninsula, SE Asia including S China. About 50 spp. & subspp.

*Hypolysia* Melvill et Ponsonby, 1901

Fig. 672

Melvill & Ponsonby, 1901: 318.

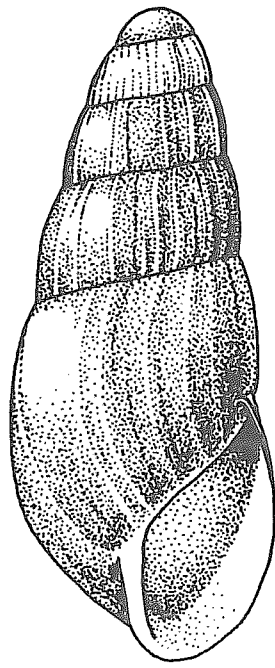


Fig. 670. *Pseudopeas pulchellum* Putzeys, 1899. Upper Congo. SPb.

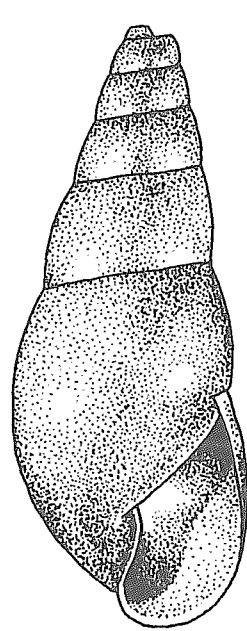


Fig. 671. ! *Curvella redfieldi* Pilsbry, 1906. Liberia. Holotype. Phil. No. 58202a.

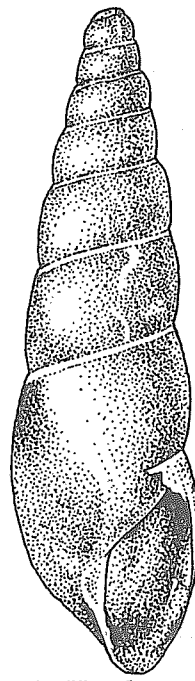


Fig. 672. *Hypolysia florentiae* Melvill et Ponsonby, 1901. Ntimbankulu, Mid-Illovo, S Africa. Phil. No. 47316.

TYPE SPECIES — *Hypolysia florentiae* Melvill et Ponsonby, 1901; monotypy.

Shell slender, fusiform or elongated-turritiform, tapering, very thin, fragile, shining, of 5.5-10 flattened to moderately convex whorls. Apex obtuse. Suture filiform. Color yellowish to crystalline white. Embryonic whorls smooth, postnuclear with delicate sinuous radial striae or fine riblets. Aperture acuminate ovate to subquadrangular; palatal margin projecting as rounded lobe far forward, retracted to suture. Columellar margin straight, scarcely truncated, reflexed and expanded above. Umbilicus, a minute perforation. Height 5.7-11.5, diam. 1.8-3.1 mm (10.0 × 2.8 mm).

DISTRIBUTION. E (Tanzania) and S (Natal, Transvaal) Africa. 4-5 spp.

*Euonyma* Melvill et Ponsonby, 1896  
Fig. 673

Melvill & Ponsonby, 1896: 316.

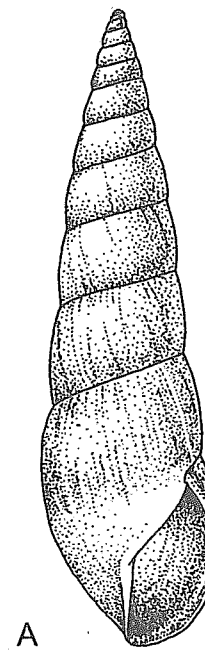
TYPE SPECIES — *Subulina laeocochlis* Melvill et Ponsonby, 1896; monotypy.

Shell dextral or sinistral, slender, thin to relatively solid, of 9-14 moderately convex whorls. Apex narrowly rounded to acuminate. Color whitish, corneous, or pale greenish-cream to olive-brown. Embryonic whorls smooth, later glabrous to finely striated. Aperture ovate, slightly oblique, margins a little thickened, not reflexed or expanded; columella concave or straight, not truncated, continuous with basal margin; palatal margin simple. Umbilicus absent or tiny. Height 15.0-52.5, diam. 4.5-14.0 mm (48.0 × 12.0 mm).

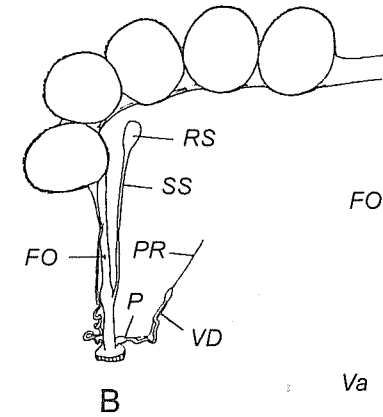
Vas deferens long, thin, entering epiphallus at short distance from summit. Flagellum short, more or less swollen, with apical insertion of penial retractor. Epiphallus of various length, sometimes wanting. Penis short to very short. Uterus may contain several eggs. Free oviduct long, vagina markedly shorter. Spermathecal stalk not long, thin, sometimes slightly swollen basally; reservoir small, not reaching albumen gland.

DISTRIBUTION. E and S Africa. About 20 spp., subspp. & forms.

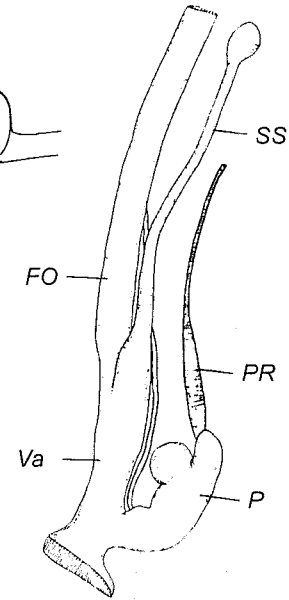
REMARK. According to Verdcourt



A



B



C

Fig. 673. A — ! *Euonyma lanceolata* (L. Pfeiffer, 1854). Shell: Maritzburg, Natal, S Africa. Chicago No. 86125. B — ! *Euonyma magilensis* (Craven, 1880). Reproductive tract. After Verdcourt, 1968. C — ! *Euonyma curtissima* Verdcourt, 1968. Reproductive tract. After Verdcourt, 1968.

(1968), two species of the genus (*magilensis* and *curtissima*) noticeably differ by the presence/absence of epiphallus and presence/absence of swollen caecum on penis (fig. 673, B and C). Perhaps, they belong to different (sub)genera, but, since anatomy of the type species is unknown, I refrain from definite decision.

*Micropeas* Connolly, 1923  
Fig. 674

Connolly, 1923: 655 (*Opeas* sect.).

TYPE SPECIES — *Opeas (Micropeas) peringueyi* Connolly, 1923; OD.

Shell aciculate, slender, thin, glossy, translucent, of about 7 moderately convex whorls. Apex obtuse, rounded. Colorless. Embryonic whorls with very delicate, crowded, microscopic spiral striae, subsequent whorls with very faint, close, curved, radial striae. Aperture subpyriform, with simple margins; palatal margins curved a little forward. Columella slightly

concave, not truncated. Umbilicus absent. Height 4.3-7.5, diam. 1.4-2.0 mm.

DISTRIBUTION. S and Equatorial Africa, northward to Cameroon and Kenya. 3-5 spp. & subspp.

*Neoglessula* Pilsbry, 1909  
Fig. 675

Pilsbry, 1909: 108 (*Glessula* sect.).

TYPE SPECIES — *Achatina paritura* Gould, 1851; OD.

Shell ovate-turritid, thin, somewhat translucent, of 6-7 rather convex whorls. Apex evenly and broadly rounded. Color light-yellow. Embryonic whorls smooth; rest surface with delicate regular silky radial rib-striation. Aperture irregularly ovate, with simple, sharp margins; columella concave, distinctly truncated. Umbilicus absent. Height 15-30, diam. 6.0-8.5 mm (18.1 × 7.1 mm).

DISTRIBUTION. W Africa (Gulf of Guinea). 4 spp.

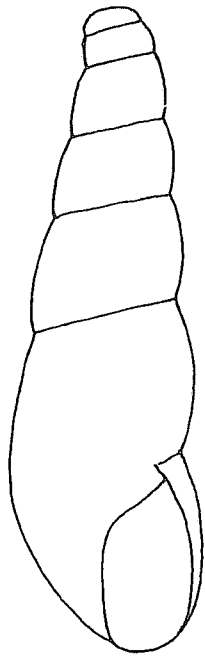


Fig. 674. *Micropeas peringueyi* (Connolly, 1923). After Connolly, 1923.

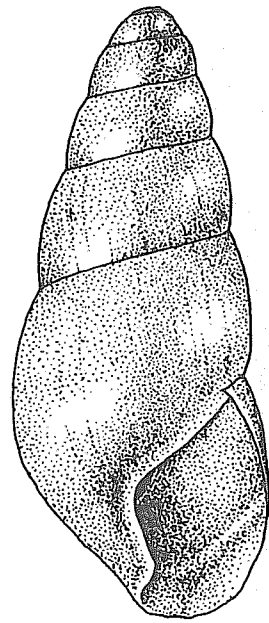


Fig. 675. *Neoglessula paritura* (Gould, 1851). Cape Palmas [Liberia]. Phil. No. 23411.

***Striosubulina* Thiele, 1933**  
Fig. 676

Thiele, 1933: 301 (*Homorus* sect.).

TYPE SPECIES — *Helix striatella* Rang, 1831; monotypy.

Shell high conic, turrated, thin, translucent, silky glossy, of 11-12 slightly convex whorls, last whorl straight. Color uniformly light corneous to straw-yellow. Embryonic whorls smooth, later whorls finely and rather regularly radially wrinkled. Aperture pointed-ovate, slightly oblique, with simple and sharp margins; columella truncated. Parietal callus usually well developed. Umbilicus closed. Height up to 33, diam. up to 7.5 mm (25.6 × 6.8 mm).

Talon large, clavate or fusiform, consisting of few chambers. Prostate composed of elongated, loosely arranged acini. Vas deference thin, long, somewhat convoluted, entering penis at short distance from its apex. Penis noticeably reduced, internally with a few weak, spirally directed folds. Free oviduct and vagina long, former slightly shorter. Spermatheca rather short,

only slightly divided into stalk and reservoir, with apical ligament.

DISTRIBUTION. W Africa and adjacent islands; 1 sp. introduced in some tropical countries. At least 5 spp.

***Pseudoglessula* O. Boettger, 1892**  
Fig. 677

Boettger, 1892: 202 (*Stenogyra* sect.). Verdcourt, 1967: 43.

TYPE SPECIES — *Achatina calabarica* L. Pfeiffer, 1865 (= *Achatina clavata* Gray, 1837); OD.

Shell acuminate-ovate to turriform, rather fragile, translucent, shining, of 8-10 convex whorls. Apex obtuse, narrowly rounded. Color corneous to chestnut, usually with darker radial streaks. Embryonic whorls finely radially ribbed or reticulated, postnuclear slightly radially wrinkled or finely ribbed. Last whorl with a thread-like or subobsolete peripheral keel, smoother below it. Aperture ovate, slightly oblique, margins sharp, simple to perceptibly expanded. Columella concave, distinctly truncated.

Umbilicus usually absent. Height 8-40, diam. 3-13 mm (25.5 × 10.1 mm).

Jaw highly flexible, narrow in centre, expanded at both ends, irregularly ridged with wavy, narrow crests.

Talon globular, on long, narrow stalk. Prostate of digitate acini. Vas deferens long, thin, loosely bound to upper half of penis, entering penis after slight reflection. Penis moderately long, subcylindrical, with terminal caecum. Penial retractor originating from diaphragm, inserting onto apex of penial caecum. Free oviduct short, slightly swollen apically near junction with spermathecal stalk; vagina much longer. Spermathecal stalk short, enlarged, reservoir not large, located at lower portion of spermoviduct.

DISTRIBUTION. Tropical Africa. About 50 nominal spp. & subspp.

***Zooteucus* Westerlund, 1887**  
Fig. 678

Westerlund, 1887: 3, 75 (*Buliminus* sect.).

— *Chilogymnus* Jousseume, 1894: 289 (*Pupa* subg.; t.-sp. *Pupa insularis* Ehrenberg, 1831; SD Pilsbry, 1906).

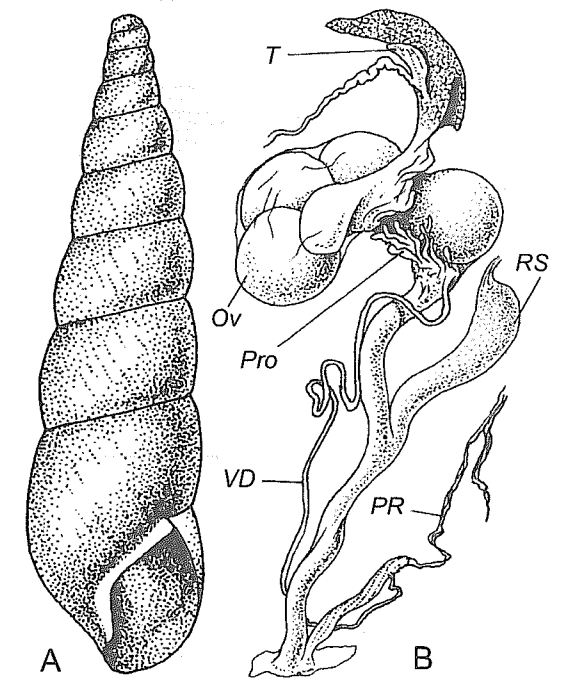


Fig. 676. *Striosubulina striatella* (Rang, 1831). A — shell: Royal Botanic Gardens, Kew, UK (introduced and bred there). Moscow No. Lc-19635 (gift of Dr. B. Verdcourt). B — reproductive tract. Alwis Terrace, Colpetty, Colombo-3, Sri Lanka, January 6-7, 1997. Moscow No. Lc-23267.

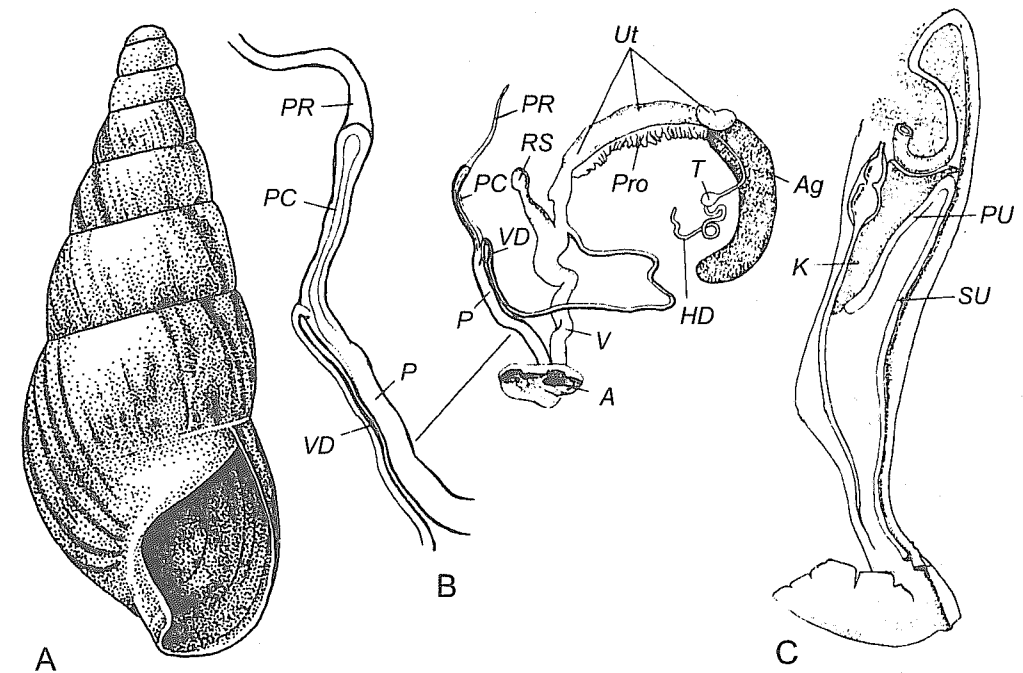


Fig. 677. A — ! *Pseudoglessula camerunensis* (Preston, 1909). Bitze, Cameroon. Syntype. Phil. No. 99340. B, C — ! *Pseudoglessula libera* Solem et Van Bruggen, 1976. B — reproductive tract and interior of penis. C — pallial complex. After Solem & Van Bruggen, 1976.

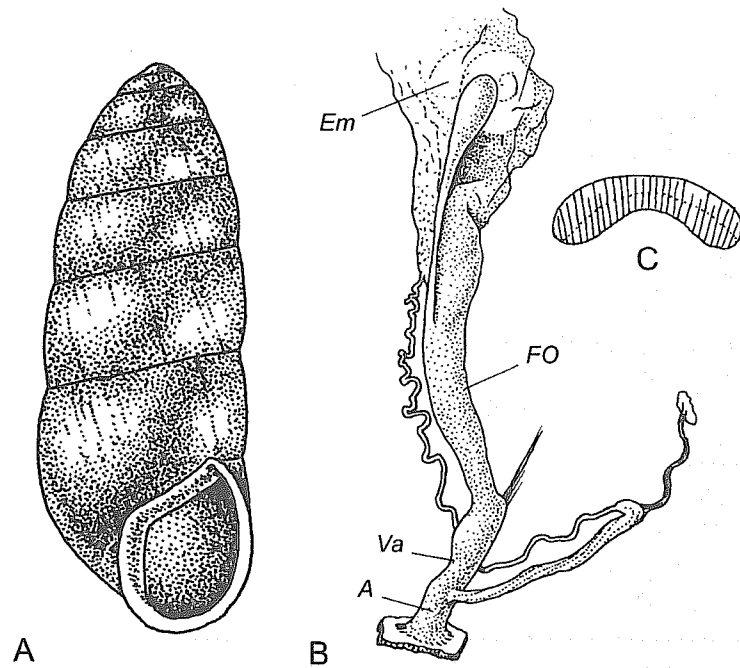


Fig. 678. *Zootecus insularis* (Ehrenberg, 1831). Kharat Island, Dahlak Archipelago, Red Sea, February 6, 1980. A — shell. B — reproductive tract. C — jaw. Moscow No. Lc-19549.

TYPE SPECIES — *Pupa insularis* Ehrenberg, 1831; SD Pilsbry, 1906.

Shell bullet-shaped to pillar-shaped, thin but solid, silky glossy, of 7-10 narrow, compact, slightly convex whorls. Apex conic, somewhat pointed. Color whitish to light-brown. Embryonic whorls with fine radial wrinkles, subsequent with similar wrinkles which in places crossed by narrow glabrous spiral zones; sometimes surface nearly smooth. Aperture comparatively small, rounded, with slightly thickened, blunt, straight margins. Parietal callus well developed. Columella subvertical, straight or a little concave, somewhat reflexed, continuous. Umbilicus, a minute perforation. Height 8-20, diam. 3.3-5.5 mm (11.8 x 4.1 mm).

Jaw thin, distinctly vertically striated.

Vas deferens long, strongly convoluted, not bound, entering penis terminally. Penis slender, thin, bent at proximal end, internally with fine, somewhat spirally ascending from atrium folds. Penial retractor arising on diaphragm, attaching to bend at upper end of penis. Free oviduct very short, vagina enormously long and stout. Sper-

mathecal shaft rather short, very slender, reservoir clavate.

DISTRIBUTION. Cabo Verde Islands and Sahara, eastward to Arabia, Sokotra Island, India and Burma. 2 spp. with numerous forms.

**PETRIOLINAE Schileyko, subfam. nov.**

Shell not decollated, generally dextral. Last whorl lacking internal sculpture.

Flagellum absent. Epiphallus well developed. Penial caecum sometimes present. Penis internally with large verge or fleshy stimulator. Penis sheath wanting. Penial retractor attached to penis or epiphallus. Spermatheca normally developed, not reduced.

DISTRIBUTION. Africa, St. Helena Island.

REMARK. This subfamily differs from all others mainly by structure of penis: no other subfamily has such conspicuous organization of copulatory apparatus.

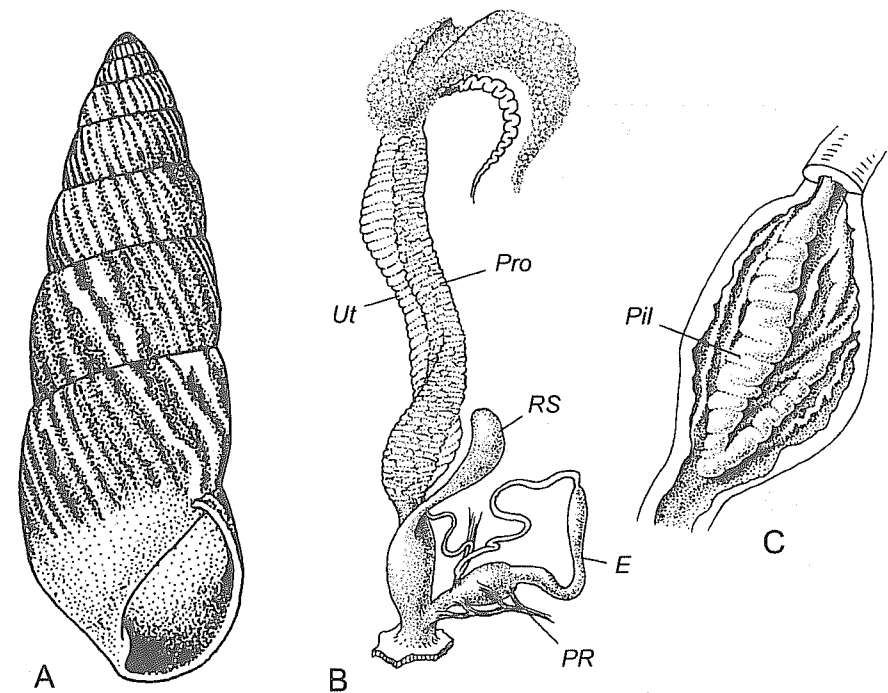


Fig. 679. ! *Petriola clava* (L. Pfeiffer, 1864). A — shell. B — reproductive tract. C — interior of penis. São Thomé Id. Chicago No. 160759.

***Petriola* Dall, 1905  
Fig. 679**

Dall, 1905: 143 (nom. nov. pro *Trichodina* Ancey, 1888).

— *Trichodina* Ancey in Vignon, 1888: 71 [nom. praeocc., non Ehrenberg (Infusoria); t.-sp. *Achatina marmorea* Reeve, 1850; OD].

TYPE SPECIES — *Achatina marmorea* Reeve, 1850; OD.

Shell turreted, rather thin to solid, glossy, more or less translucent, of 7-9 flattened whorls. Apex narrowly rounded. Color yellowish to light corneous, mostly with lighter, irregular, radial streaks. Embryonic whorls with very fine regular riblets, later have similar sculpture which usually becomes weaker toward body whorl. Basal surface often nearly smooth. Aperture ovate, with simple margins; columella distinctly truncated. Umbilicus absent. Height 17-45, diam. 6-13 mm (27.0 x 9.2 mm).

Talon hidden. Vas deferens entering epiphallus terminally. Epiphallus more or less cylindrical, markedly longer than pe-

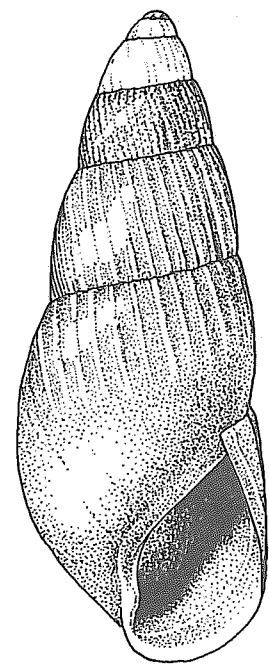


Fig. 680. *Bocageia lotophaga* (Morelet, 1848). "Ile du Prince". Paris.

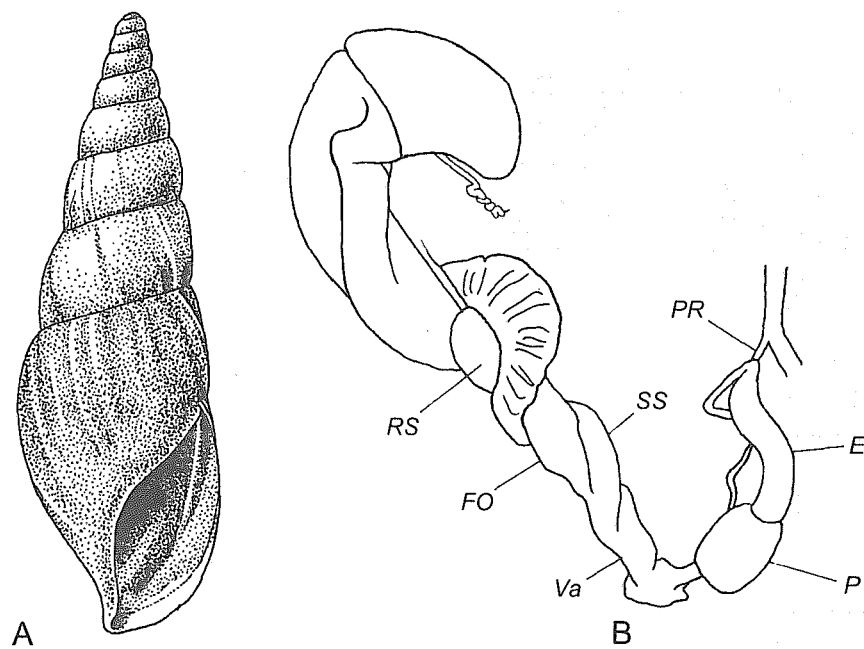


Fig. 681. A — *Homorus cyanostomus* (L. Pfeiffer, 1842). Shell: "Abyssinia". Phil. No. 24818. B — ! *Homorus clarus* (Pilsbry, 1919). Reproductive tract. After Pilsbry, 1919b.

nis. Penis short, clavate, internally with strong stimulator consisting of large, fleshy V-shaped pilaster; besides, there are few smaller pilasters or folds. Penial retractor inserting onto penis by several arms. Free oviduct very short, vagina noticeable longer, somewhat swollen. Spermathecal stalk short, reservoir poorly demarcated.

DISTRIBUTION. Islands of W Africa; Comores; Andaman Islands. 10-15 spp.

*Bocageia* Girard, 1893  
Fig. 680

Girard, 1893: 100.

TYPE SPECIES — *Bulimus lotophagus* Morelet, 1848; OD.

Shell elongated-ovate, rather solid, translucent, somewhat glossy, of 6-7 slightly convex whorls. Color brown to olive, upper whorls usually lighter. Embryonic whorls smooth, later whorls with fine, regular striation or delicate riblets; body whorl polished below periphery. Aperture ovate, only slightly oblique, margins thin

or scarcely thickened, not reflexed or expanded. Columellar margin vertical, straight, subobsoletely truncated. Umbilicus absent. Height 20-25, diam. 8-9 mm (21.6 × 8.2 mm).

DISTRIBUTION. Prince's Island (Gulf of Guinea). 1 sp.

*Homorus* Albers, 1850  
Fig. 681

Albers, 1850: 196 (*Achatina* subg.).

TYPE SPECIES — *Achatina cyanostoma* L. Pfeiffer, 1842; monotypy.

Shell turrated-conic or subulate, thin to solid, of 8-10 convex whorls. Apex obtusely rounded. Color whitish to buff or brown, often brown-streaked. Embryonic whorls smooth, subsequent whorls smoothish, sometimes locally with exceptionally fine spiral striation. Aperture rather narrow, ovate or nearly semilunar, pointed at both ends, subvertical, with simple and sharp margins. Columella concave, truncated.

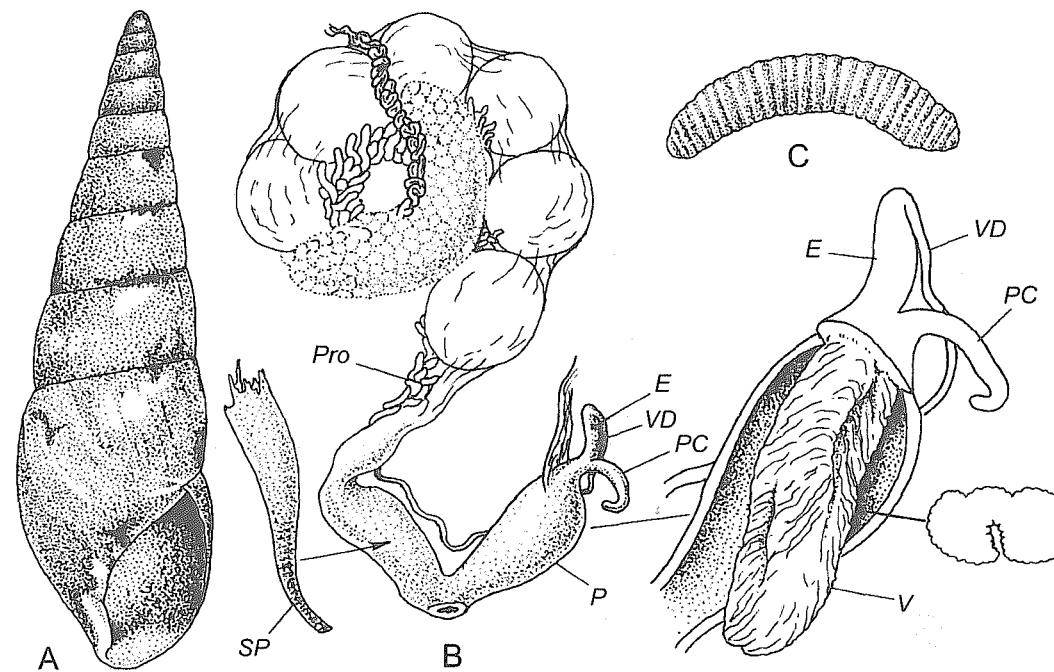


Fig. 682. *Itiopiana meneliki* (Preston, 1910). A — shell: "Harar, Abyssinie". Syntype. Paris. B, C — Fntoto (suburb of Addis-Abbeba, Ethiopia), March 9, 1991. B — reproductive tract and interior of penis. C — jaw. Moscow No. Lc-24238. Arrow indicates location of spermatophore.

Umbilicus absent. Height 6-55, diam. 1.5-15 mm (40.0 × 13.1 mm).

Vas deferens attached to epiphallus under sharp angle. Epiphallus not long, cylindrical. Penis consisting of very short tubular distal and greatly swollen, subglobular proximal sections. Penial retractor originating from columellar muscle, inserting onto junction of vas deferens with epiphallus. Free oviduct a little longer than vagina. Spermathecal stalk somewhat enlarged, reservoir lies on middle part of spermo-viduct.

DISTRIBUTION. Central, S and NE Africa, Comores. About 20 spp.

*Itiopiana* Preston, 1910  
Fig. 682

Preston, 1910: 169 (*Subulina* sect.).

TYPE SPECIES — *Subulina (Itiopiana) meneliki* Preston, 1910; SD Zilch, 1959.

Shell rather slender, turrated, thin, translucent, of 9-12 moderately convex whorls. Apex small, narrowly rounded.

Color uniformly greyish or corneous-brown. Embryonic whorls smooth, sculpture of subsequent whorls weak, consists of radial, crowded, fine wrinkles and widely spaced spiral lines. Aperture subvertical, with simple, sharp margins. Columella distinctly truncated. Umbilicus closed. Height 18-30, diam. 8.5-10.5 mm (21.9 × 9.4 mm).

Jaw with numerous, narrow, smoothed, vertical plaits.

Talon hidden. Prostate consists of many loosely arranged, elongated acini. Vas deferens entering very short, slender epiphallus terminally. Short vermiform caecum located at base of epiphallus. Penis swollen, internally with very large verge furnished with deep, narrow longitudinal groove running along its surface; no internal canal. Penial retractor attached to upper part of penis just below entrance of epiphallus. Uterus contains several large eggs. Spermatheca absent. Posterior fragment of spermatophore found in lower section of vagina.

DISTRIBUTION. Central and NE Africa. 3 spp.

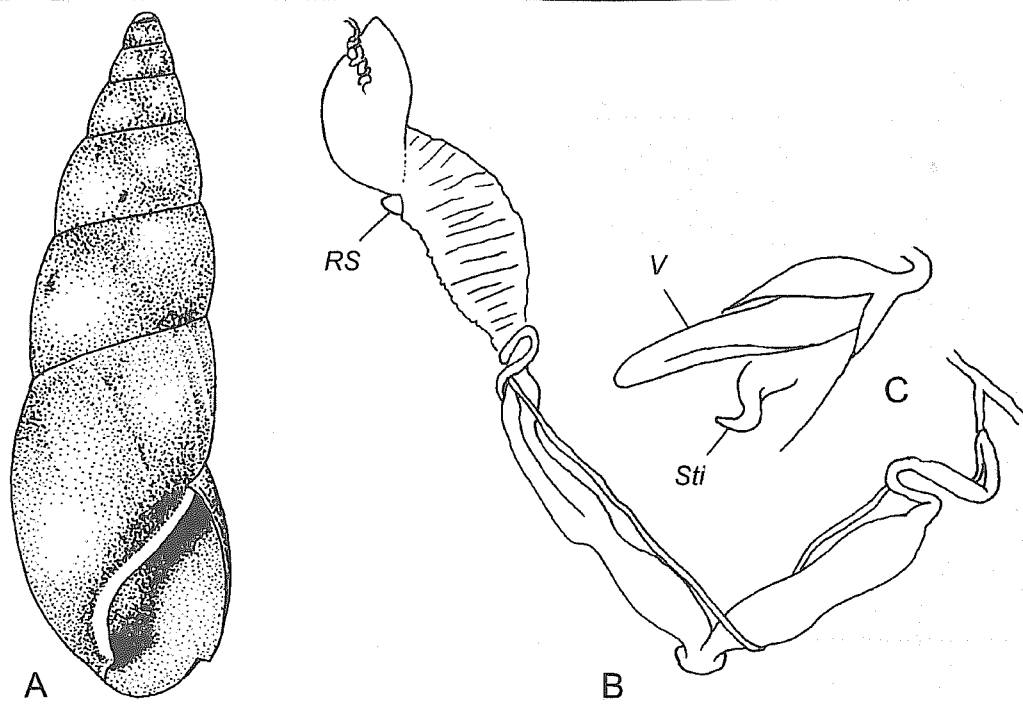


Fig. 683. A — *Nothapalus paucispira paucispira* (Martens, 1892). Shell: "Bords de la Riviere Yala, Brit. E-Africa". Paris. B, C — *Nothapalus paucispira xanthophaeus* (Pilsbry, 1919). B — reproductive tract. C — interior of penis. After Pilsbry, 1919b.

*Nothapalus* Martens, 1897  
Fig. 683

Martens, 1897: 124 (*Subulina* subg.).

— *Kenia* Preston, 1911: 473 (t.-sp. *Kenia suturalis* Preston, 1911; OD).

TYPE SPECIES — *Subulina paucispira* Martens, 1892; monotypy.

Shell elongated, almost turritid, thin, translucent, very glossy, of 7-8 moderately convex whorls. Apex narrowly rounded. First whorl globose, 2nd hardly wider than 1st; from 3rd whorl shell regularly increasing in diameter; last whorl rounded, gradually tapering. Color pale yellowish or yellowish-olive. Embryonic whorls smooth, later whorls finely radially striated; striae somewhat stronger and somewhat curving backward just below suture. Aperture rather oblique, acutely ovate, its margins thin, simple, moderately arcuate; columellar margin strongly arcuate, obliquely truncated; basal margin narrowly rounded. No umbilicus. Height 15-25, diam. 5.0-7.5 mm (22.5 × 7.0 mm).

Talon superficially not visible. Vas deferens entering epiphallus terminally at

sharp angle. Epiphallus slender, moderately long. Penis markedly enlarged, subfusiform, internally with non-completed verge (with longitudinal groove on its surface) and tongue-like, tapering stimulator. Penial retractor originates on columellar muscle and attaches to vas deferens/epiphallus junction. Free oviduct a little longer than somewhat swollen vagina. Spermathecal stalk slender, comparatively long, reservoir reaches lower edge of albumen gland.

DISTRIBUTION. Ruwenzori Mt. and nearby territories (Zaire, Uganda). More than 20 spp. & forms.

*Dictyoglessula* Pilsbry, 1919  
Fig. 684

Pilsbry, 1919b: 7, 149 (*Pseudoglessula* subg.).

TYPE SPECIES — *Stenogyra retifera* Martens, 1876; OD.

Shell ovate-conic, thin, translucent, of about 8 moderately convex whorls. Apex narrowly rounded. Ground color yellowish; pattern consists of olive-brown sigzags and radial streaks. Embryonic whorls with re-

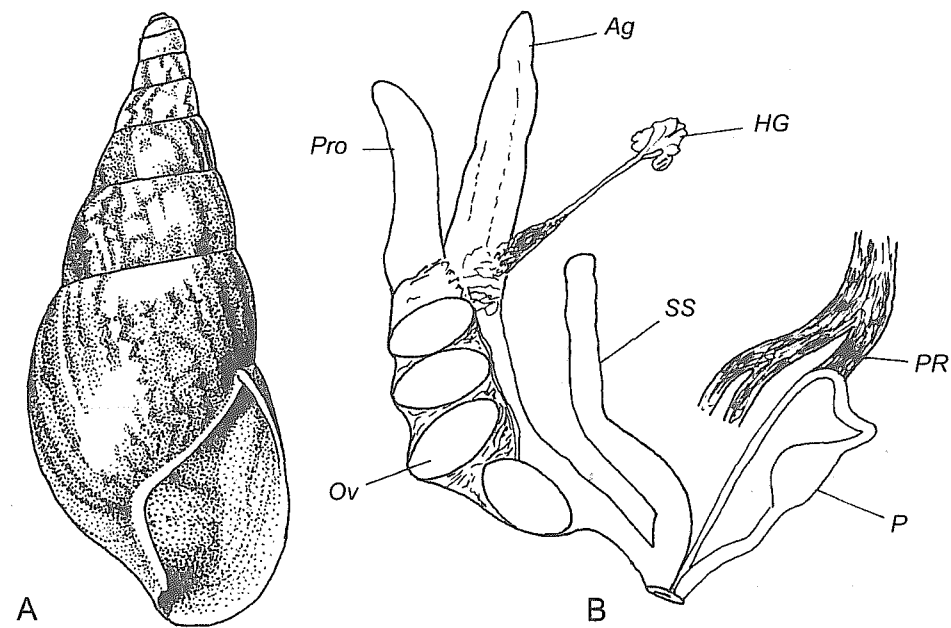


Fig. 684. *Dictyoglessula retifera* (Martens, 1876). A — shell: Bibundi, Cameroon. Senck. No. 145966. B — reproductive tract. After L. Ortiz de Zarate & R. Ortiz de Zarate, 1959.

ticulated sculpture; postapical sculpture of fine, more or less regular radial wrinkles crossed by few widely spaced spiral grooves. Aperture ovate, relatively large, margins simple; columella concave, truncated. Umbilicus absent. Height 30-42, diam. 13-16 mm (33.4 × 13.8 mm).

Talon hidden. Prostate forms a large process at its upper section. Vas deferens enters short epiphallus apically, diameter of both ducts approximately equal. Penis consists of slender, tubular distal portion and greatly swollen proximal. Penial retractor, which is a branch of columellar muscle, attached to boundary of vas deferens and epiphallus. Vagina as such practically absent, since spermatheca entering very low. Spermathecal reservoir not differentiated from shaft.

DISTRIBUTION. Cameroon. 3 spp.

*Liobocageia* Pilsbry, 1919  
Fig. 685

Pilsbry, 1919b: 135 (*Bocagea* subg.).

TYPE SPECIES — *Glessula runssorina* Martens, 1895; OD.

Shell elongated-ovate, rather thin, glossy, of about 6 moderately convex whorls. Apex narrowly pointed. Color olivaceous to dark-brown, sometimes with darker, diffuse radial streaks; aperture inside usually milky bluish. Embryonic whorls smooth, upper postnuclear whorls often with exceptionally fine spiral lines; radial sculpture nearly absent. Aperture ovate, margins simple, columella slightly to distinctly truncated. Umbilicus absent. Height 14-35, diam. 5-13 mm (30.9 × 12.2 mm).

Talon exposed, small, globular. Vas deferens entering epiphallus at sharp angle. Epiphallus rather short and stout, internally with four strong pilasters consisting of series of tubercles. Penis clavate, containing large, closed (not grooved), chaotically wrinkled verge; inner surface of penis covered with numerous small longitudinal irregular folds. Penial retractor arising from columellar muscle and attaching to vas deferens/epiphallus junction. Uterus contains a few large eggs. Oviduct a little longer than vagina. Spermatheca cylindrical, not

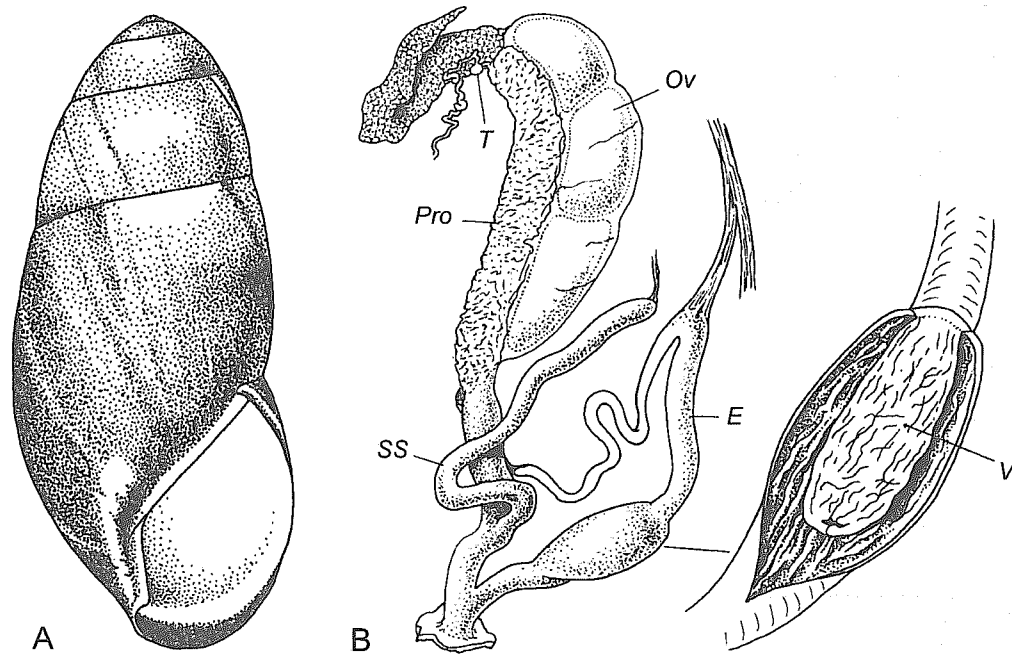


Fig. 685. A — ! *Liobocageia carpenteri* (Connolly, 1923). Shell: Mt. Elgon, Uganda. Leiden. B — ! *Liobocageia jeanneli* (Germain, 1934). Reproductive tract and interior of penis. Mt. Elgon, Uganda. Paris.

divided into shaft and reservoir; thin ligament attached apically to it.

DISTRIBUTION. E Africa (Ruwenzori Mt., Elgon Mt. and adjacent territories). 8-9 spp.

*Oleata* L. Ortiz de Zarate  
et R. Ortiz de Zarate, 1959  
Fig. 686

Ortiz de Zarate L. & Ortiz de Zarate R., 1959:  
71 (*Subulona* sect.).

TYPE SPECIES — *Stenogyra oleata* Martens, 1876; tautonymy.

Shell high-conic, moderately thin, translucent, shining, of 7.5-9 moderately convex whorls. Color uniformly light-corneous. Embryonic whorls smooth, later whorls with very vague irregular wrinkles and (locally) exceptionally fine spiral striae. Aperture semioval, with simple, sharp margins. Height 19.8-31.0, diam. 6.6-10.4 mm (21.7 x 7.5 mm).

Vas deferens entering epiphallus at some angle. Flagellum moderately long, cy-

lindrical. Epiphallus short, penis longer as much as twice. Penial retractor arising from columellar muscle and inserting to flagellum apically. Vas deferens rather long, vagina of about same length. Spermatheca short, with distinct globular reservoir. Uterus contains a few large eggs.

DISTRIBUTION. Fernando Poo Island. 2 spp.

*Nothapalinus* Connolly, 1923  
Fig. 687

Connolly, 1923: 654 (*Opeas* sect.).

TYPE SPECIES — *Subulina kemp* Preston, 1912; OD.

Shell pillar-shaped, thin, shining, glass-like, of about 5 slightly convex whorls. Apex obtuse, broadly rounded. Practically colorless. Embryonic whorls smooth, later whorls also nearly smooth, just with vague radial wrinkles. Aperture slightly oblique, with simple margins; columella truncated. Umbilicus absent. Height 6-8, diam. 2.2-2.5 mm (6.0 x 2.2 mm).

DISTRIBUTION. Kenya, Uganda. 4-5 spp.

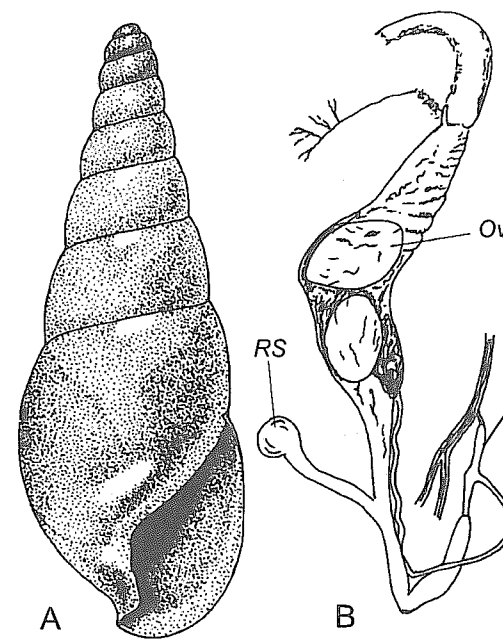


Fig. 686. *Oleata oleata* (Martens, 1876). A — shell: Fernando Poo Island. Leiden. B — reproductive tract. After L. Ortiz de Zarate & R. Ortiz de Zarate, 1959.

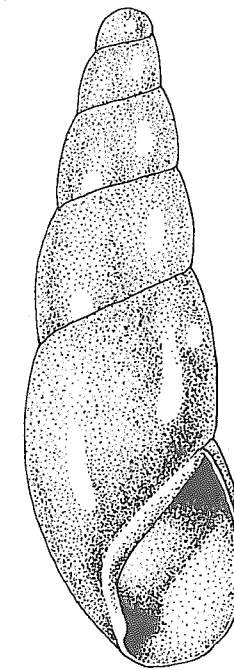


Fig. 687. *Nothapalinus kemp* (Preston, 1912). Uganda. Syntype. Paris.

*Ischnoglessula* Pilsbry, 1919  
Fig. 688

Pilsbry, 1919b: 149, 155 (*Pseudoglessula* subg.).

TYPE SPECIES — *Pseudoglessula subfuscidula* Pilsbry, 1919; OD.

Shell slender, thin, shining, of 7-9 moderately convex whorls. Last whorl slightly angled. Apex narrowly rounded. Color deep-chestnut. Embryonic whorls with radial spaced riblets. Postnuclear whorls gently radially ribbed or wrinkled; this sculpture becomes obsolete below peripheral angle. Microsculpture, when present, consists of most minute granules in spiral series. Aperture ovate, with simple margins. Columella nearly straight, vertical, strongly truncated. Umbilicus absent. Height 8-15, diam. 2.5-5.0 mm (12.7 x 4.0 mm).

DISTRIBUTION. Tropical and W Africa. At least 7 spp.

*Oreohomorus* Pilsbry, 1919  
Fig. 689

Pilsbry, 1919b: 123 (*Homorus* subg.).

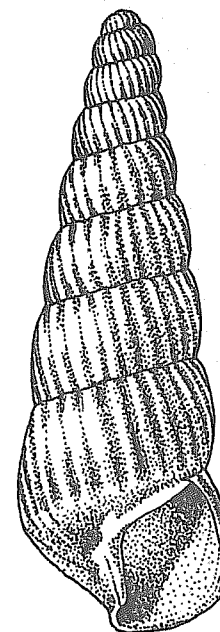


Fig. 688. *Ischnoglessula subfuscidula* (Pilsbry, 1919). "Penge, Belgian Congo" [Zaire]. Paratype. Phil. No. 118742.



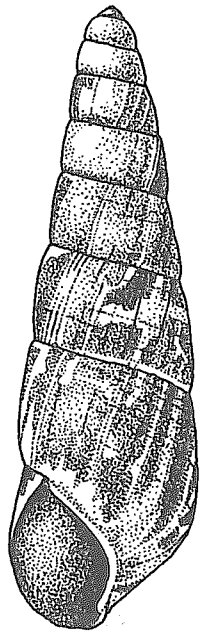


Fig. 689. *Oreohomorus bequaerti* (Pilsbry, 1919).  
Butugu Valley, Ruwenzori  
[Uganda]. Phil. No.  
118763.

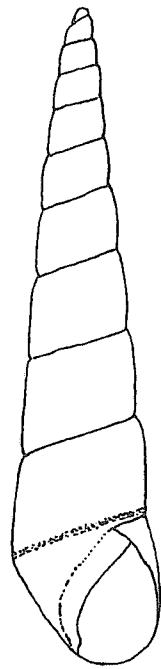


Fig. 690. *Subulona badia*  
(Martens, 1889).  
After Martens, 1889.

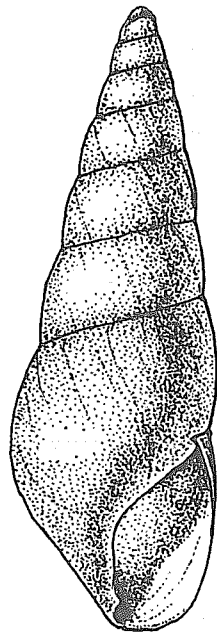


Fig. 691. *Subuliniscus ruwenzoriensis* (Pollonera, 1907).  
Ruwenzori [Uganda]. Phil.  
No. 118748.

TYPE SPECIES — *Homorus bequaerti* Pilsbry, 1919; OD.

Shell dextral or sinistral (in type species), elongated turreted, somewhat glossy, moderately thin, of 8-9.5 slightly to strongly convex whorls. Apex a little pointed. Color chestnut-brown, often fading to yellowish in upper whorls, sometimes with irregular darker streaks. Embryonic whorls with distinct granulation by intersection of radial wrinkles and deeply engraved spiral lines. Following whorls with more or less delicate reticulate sculpture. Aperture simple, columella abruptly truncated. Umbilicus closed. Height 28-44, diam. 9.9-13.5 mm.

DISTRIBUTION. Drainage basin of Congo. About 20 spp. & forms.

*Subulona* Martens, 1889  
Fig. 690

Martens, 1889: 9 (*Stenogyra* subg.).

— *Pileata* Ortiz de Zarate L. & Ortiz de Zarate R., 1959: 90 (*Subulina* sect.; t.-sp. *Stenogyra pileata* Martens, 1876; monotypy).

TYPE SPECIES — *Stenogyra badia* Martens, 1889; SD Pilsbry, 1905 (1904-1905).

Shell long, slender, turreted, with upper part more or less attenuated, shining, of 10-12 nearly flat to slightly convex whorls. Last whorl often bluntly angled at periphery. Apex obtuse, rounded. Coloration consists of corneous to reddish background and variously developed radial markings. Embryonic whorls smooth, next 2 whorls often with sharp, short wrinkles below suture; subsequent whorls covered with colored periostracum. Aperture comparatively small, ovate, with thin or slightly thickened margins; columella more or less truncated. Umbilicus closed. Height 52.0-63.5, diam. 12.0-13.5 mm.

DISTRIBUTION. Tropical W and Central Africa, eastward to Great African Lakes. About 30 spp. & forms.

*Subuliniscus* Pilsbry, 1919  
Fig. 691

Pilsbry, 1919b: 145.

TYPE SPECIES — *Subulina ruwenzoriensis* Pollonera, 1907; OD.

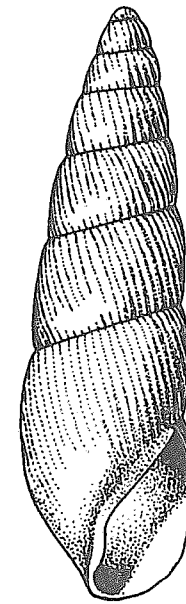


Fig. 692. *Comoropeas apiculum* (Morelet, 1885).  
Great Comoro Island. Phil. No. 24138.

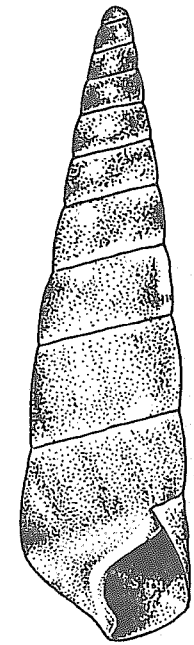


Fig. 693. ! *Ceras zenkeri* Thiele, 1934.  
Faunde, Cameroon. Paratype. Phil. No.  
167827.

Shell elongated-turriform to subuliform, rather thin, translucent, glossy, of 9-10 rather convex to flattened whorls. Apex subacute, 1st whorl not depressed. Color brownish-chestnut or yellowish-greenish. Embryonic whorls with fine incised spiral striae, remaining whorls with delicate reticulated sculpture. Aperture semiovate, with simple, sharp margins. Columella distinctly truncated. Umbilicus absent. Height 18-21, diam. 5.5-7.5 mm (18.4 × 5.8 mm).

DISTRIBUTION. Tropical Africa down to Zimbabwe. About 10 spp.

*Comoropeas* Pilsbry, 1906  
Fig. 692

Pilsbry, 1906 (1906-1907): 123 (*Opeas* sect.).

TYPE SPECIES — *Stenogyra (Opeas) apiculum* Morelet, 1885; OD.

Shell subulately turreted, slender, thin, a little shining or dull, of 8-9 flattened whorls. Apex rather acute to narrowly rounded. Color uniformly brownish-oli-

vaceous or corneous-reddish. Embryonic whorls smooth, early postnuclear whorls rib-striated, later densely striated. Aperture narrowly ovate, with simple, thin margins. Columella scarcely truncated. Umbilicus absent. Height 12-19, diam. 3-5 mm (12.3 × 3.5 mm).

DISTRIBUTION. Comoro Islands. 2 spp.

*Ceras* Dupuis et Putzeys, 1901  
Fig. 693

Dupuis & Putzeys, 1901: xxxviii.

TYPE SPECIES — *Ceras dautzenbergi* Dupuis et Putzeys, 1901; SD Pilsbry, 1905.

Shell slender, thin, translucent, of about 12 slightly convex whorls. Last whorls angled or with thread-like peripheral keel. First nuclear whorl initially slightly ascending, then horizontally involuted over left part of spire. Color dark, chestnut, often with diffuse, indistinct lighter streaks. Both embryonic and later whorls polished, just with irregular, very fine wrinkles and delicate spiral lines. Aperture small, ovate,

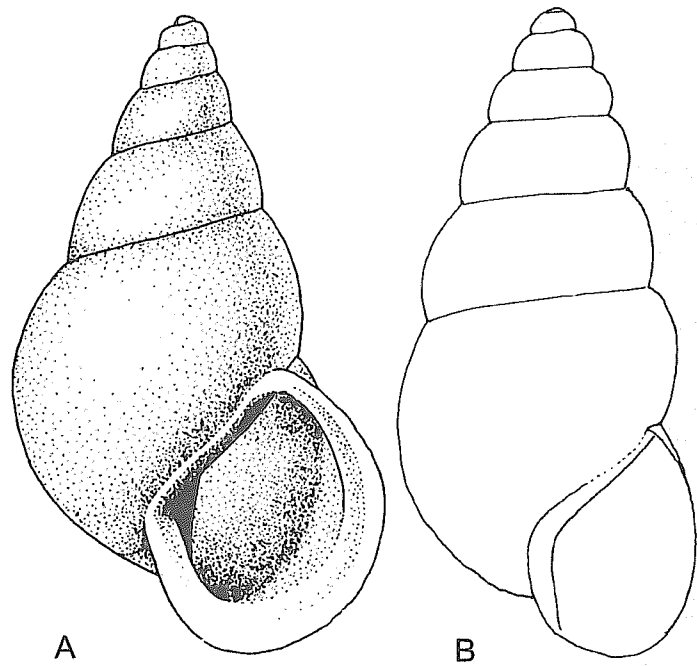


Fig. 694. A — ! *Kempioconcha mokotoensis* (Pilsbry, 1919). Mokoto near Masisi [NW of Kivu Lake, E Zaire]. Phil. No. 118538. B — ! *Kempioconcha hessei* (C. Boettger, 1916). After Zilch, 1959.

somewhat quadrangular, with simple margins; columellar margin only slightly truncated. Umbilicus absent. Height 17-35, diam. 4.5-6.5 mm (17.3 × 4.5 mm).

DISTRIBUTION. Congo drainage basin. 3 or 4 spp.

*Kempioconcha* Preston, 1913  
Fig. 694

Preston, 1913b: 212 (nom. nov. pro *Kempia* Preston, 1913).

— *Kempia* Preston, 1913a: 53 [nom. praeocc., non Mathews, 1912 (Aves); t.-sp. *Kempia kivuensis* Perston, 1913; OD].

— *Pseudocerastus* Germain, 1918: 258 (*Pseudoglessula* subg.; t.-sp. *Glandina boivini* Morelet, 1860; OD).

— *Pseudocerastus* Fischer-Piette, 1947: 85, 95 (nom. err. pro *Pseudocerastus* Germain, 1918).

TYPE SPECIES — *Kempia kivuensis* Preston, 1913; OD.

Shell oblong-conic, rather thin, silky, of 6-7 moderately to quite convex whorls.

Color greyish to corneous, sometimes reddish-brown. Embryonic whorls nearly smooth to finely costulate, postnuclear sculpture of fine, irregular, radial wrinkles. Aperture subovate, columella nearly straight, not or scarcely truncated, curving into basal margin. Aperture margins simple to reflexed; in latter case white lip present at some distance from edge. Umbilicus dot-like or narrowly cylindrical. Height 9-26, diam. 5-12 mm (21.5 × 11.9 mm).

DISTRIBUTION. Tropical and S Africa. At least 30 spp.

*Mabilliella* Ancey, 1886  
Fig. 695

Ancey, 1886: 231. Verdcourt, 1983: 216.

TYPE SPECIES — *Bulimus notabilis* E. Smith, 1881; OD.

Shell ovate, thin, more or less translucent, glossy, of 5-7 slightly convex whorls. Last whorl direct or scarcely descending in front. Color uniformly corneous or olive-greenish. Embryonic whorls smooth or in-

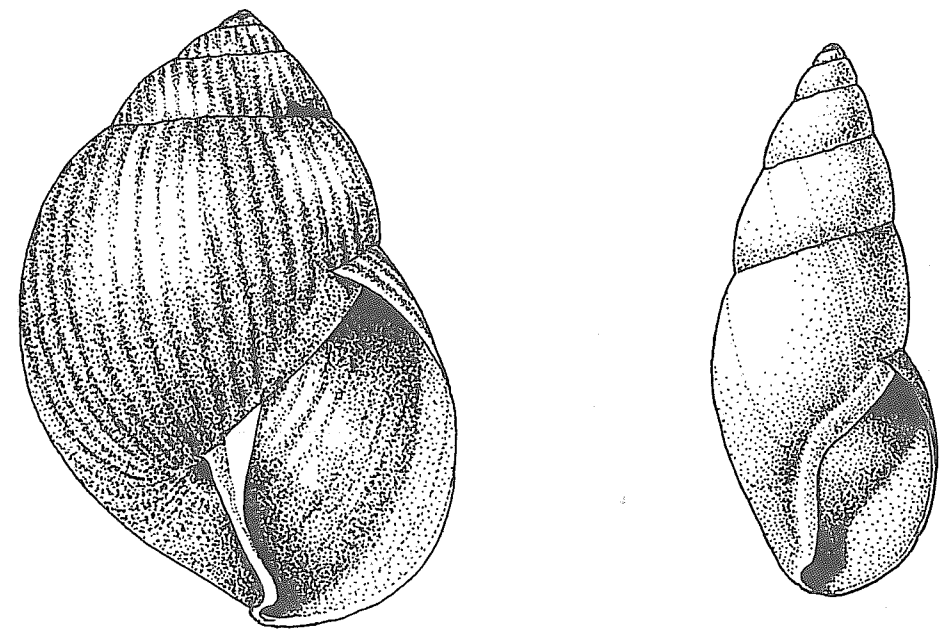


Fig. 695. ! *Mabilliella daubenbergi* (Dautzenberg, 1881). Kibosho, SE Kilimanjaro [Kenya]. Syntype. Paris.

Fig. 696. *Cleostyla exulata* (Reeve, 1850). St. Helena Id. Phil. No. 69979.

distinctly granulate, later radially wrinkled, rib-striated or with smoothed, rounded ribs. Aperture ovate, moderately oblique, with simple margins; columellar margin truncated. Umbilicus narrow, slit-like. Height 16-43, diam. 11-27 mm (16.7 × 11.5 mm).

DISTRIBUTION. E Africa. 2 or 3 spp.

*Cleostyla* Dall, 1896  
Fig. 696

Dall, 1896: 419 (*Chilonopsis* subg.).

TYPE SPECIES — *Achatina exulata* Reeve, 1850; OD.

Shell ovate to oblong or ovate-conic, thin, of 6.5-7 moderately convex whorls. Apex narrowly rounded. Color pale to brownish-corneous, often with radial irregular opaque-white streaks. Embryonic whorls smooth, postnuclear sculpture of more or less fine radial striation. Aperture only slightly oblique, inversely ear-shaped to acutely-ovate, with simple, scarcely expanded margins. Columella oblique, rather

straight, distinctly truncated. Umbilicus absent or very narrow. Height 17-28, diam. 7.7-12.5 mm (20.1 × 8.1 mm).

DISTRIBUTION. St. Helena Island. 3 spp.

*Chilonopsis*  
Fischer von Waldheim, 1848  
Fig. 697

Fischer von Waldheim, 1848: 236.

TYPE SPECIES — *Chilonopsis sulcata* Fischer von Waldheim, 1848 (= *Melania nonpareil* Perry, 1811); monotypy.

Shell ovate to oblong, very thick, heavy and solid, of 6.5-9 convex, usually more or less shouldered whorls. Apex narrowly rounded. Coloration, when present, of whitish, oblique, interlacing marks or sub-sutural spots on dark background; apex sometimes pinkish; aperture margins white to reddish. Embryonic whorls nearly smooth, postembryonic whorls coarsely radially plicate, especially below suture; besides, usually there are widely spaced spiral cords. Aperture ovate, subvertical, margins

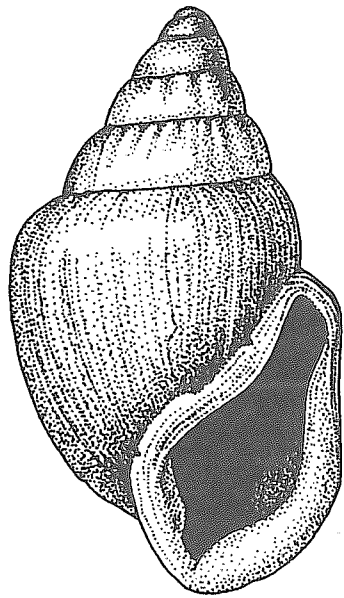


Fig. 697. *Chilonopsis nonpareil* (Perry, 1811).  
St. Helena Id. Leiden.

simple, expanded or thickened. Columella obliquely truncated. Umbilicus absent or slit-like. Height 9-49, diam. 3.5-28.0 mm (49.0 x 26.3 mm).

DISTRIBUTION. St. Helena Island. 1 or 2 Recent (extinct?) spp. (a few subfossil spp. are known, including type species).

**RISHETIINAE Schileyko,  
subfam. nov.**

Shell not decollated, dextral. Last whorl without internal sculpture, columella simple.

Flagellum long, tapering. Long epiphallus and short caecum present. Penis internally with longitudinal smoothed folds; verge wanting. Penis sheath absent. Penial retractor inserts onto penis/epiphallus junction. Spermatheca well developed.

DISTRIBUTION. Comoro Islands, Hindustan Peninsula, Ceylon, and SE Asia including S China.

REMARK. The presence of a long flagel-

lum, conspicuous epiphallic caecum (similar to that of Enidae) in *Rishetia* and attachment of penial retractor to penis/epiphallus junction put this taxon in an isolated taxonomic position. Because of conchological similarity and geographical distribution, I provisionally include also genera *Eutomopeas*, *Tortaxis* and *Bacillum* in this subfamily.

***Rishetia* Godwin-Austen, 1920  
Fig. 698**

Godwin-Austen, 1920: 7 (*Glessula* subg.).

— ? *Dikranga* Godwin-Austen, 1920: 27 (t.-sp. *Opeas nevillei* Godwin-Austen, 1876; monotypy).

— *Ranibania* Schileyko et Kuznetsov, 1996: 158 (t.-sp. *Achatina tenuispira* Benson, 1836; OD).

TYPE SPECIES — *Achatina tenuispira* Benson, 1836; OD.

Shell slender, turreted, thin, translucent, shining, of 11-14 moderately convex whorls. Apex narrowly rounded. Color uniformly corneous. Embryonic whorls with regular, delicate radial riblets, rest surface with irregular rib-striation and extremely fine spiral striae. Aperture generally ovate, slightly oblique, somewhat acuminate above, with simple, thin margins. Columellar margin concave, distinctly truncated. Umbilicus absent. Height 21.0-41.5, diam. 7-9 mm (32.9 x 8.2 mm).

Talon hidden. Vas deferens runs alongside free oviduct and vagina, curves sharply at atrium and enters epiphallus at some angle through simple pore. Flagellum well developed, not pointed, nearly cylindrical. At flagellum/epiphallus junction there is short and somewhat pointed caecum. Inner surface of both penis and epiphallus covered with smoothed, weak, rounded, irregular folds directed more or less longitudinally. Penial retractor rather short, arising from diaphragm and attaching to boundary between epiphallus and penis. Free oviduct somewhat shorter than vagina. Spermathecal shaft basally enlarged, with longitudinal internal folds; voluminous reservoir has pointed tip not reaching albumen gland.

DISTRIBUTION. Nepal and N India. Over 30 spp.

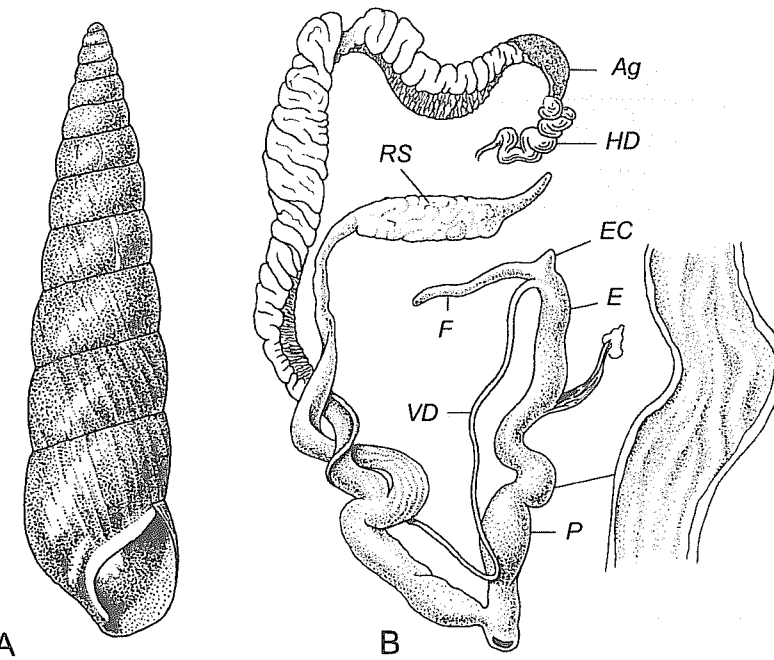


Fig. 698. *Rishetia tenuispira* (Benson, 1836).  
Kathmandu Valley, 3.3 km NW of Kathmandu City and 1.3 km NW of Balaju village, Nepal, April 28, 1995. A — shell. B — reproductive tract and interior of penis. Moscow.

***Eutomopeas* Pilsbry, 1946  
Fig. 699**

Pilsbry, 1946a: 105 (nom. nov. pro *Tomopeas* Pilsbry, 1906).

— *Tomopeas* Pilsbry, 1906 (1906-1907): 123 [nom. praeocc., non Miller, 1900 (Mammalia, Chiroptera); *Opeas* sect.; t.-sp. *Spiraxis layardi* Benson, 1863; OD].

TYPE SPECIES — *Spiraxis layardi* Benson, 1863; OD.

Shell elongated-turreted, thin, translucent to semitransparent, of 7-8 convex whorls. Apex acute. Color whitish to yellowish, monochromatic or with diffuse, radial, darker streaks. Embryonic whorls smooth, later whorls with fine irregular radial striation. Aperture ovate, moderately oblique, with simple margins. Columellar margin concave to subvertical, truncated, more or less twisted. Umbilicus absent. Height 7-13, diam. 3.3-4.5 mm (10.8 x 3.9 mm).

DISTRIBUTION. Comoro Islands, Ceylon, Lombok Island. 5-6 spp.

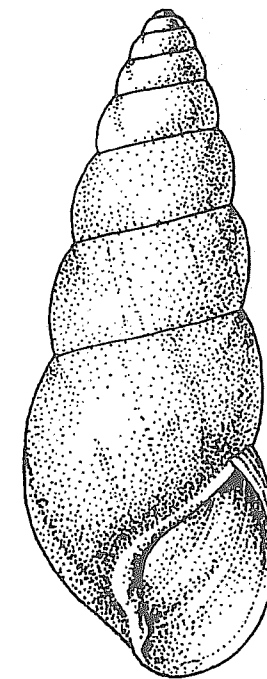


Fig. 699. *Eutomopeas layardi* (Benson, 1863).  
Ceylon. Phil. No. 33066.

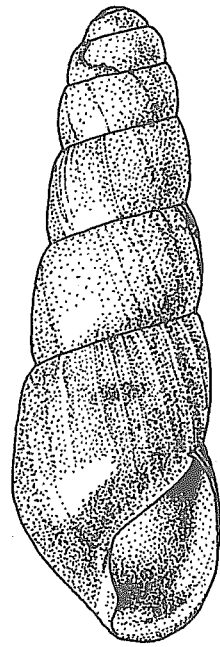


Fig. 700. *Tortaxis erectus* (Benson, 1842).  
Tongchow, near Macao, China. Chicago  
No. 115467.

*Tortaxis* Pilsbry, 1906  
Fig. 700

Pilsbry, 1906 (1906-1907): 5.

TYPE SPECIES — *Achatina erecta* Benson, 1842; OD.

Shell turreted, cylindrical-turreted, or subulate-turreted, glossy, rather thin, of 6-13 (usually 8-10) slightly to moderately convex whorls. Apex large, obtuse. Color light: whitish to pale-corneous. Embryonic whorls smooth, postnuclear rather weakly radially wrinkled. Aperture pointed-ovate, margins simple or somewhat expanded, columella concave, with spiral callous fold below, obliquely or vertically truncated at base. Umbilicus, a narrow rim or absent. Height 25-30, diam. 6-7 mm (16.0 × 5.1 mm).

DISTRIBUTION. Vietnam, Laos, S China. 12-13 spp. & forms.

*Bacillum* Theobald, 1870  
Fig. 701

Theobald in Hanley & Theobald, 1870 (1870-1876): 17 (*Achatina* subg.).

TYPE SPECIES — *Achatina cassiaca* Reeve, 1849; SD Pilsbry, 1906.

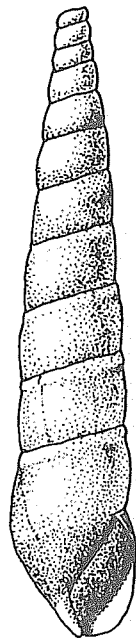


Fig. 701. *Bacillum cassiacum* (Reeve, 1849).  
N Cachar Hills, India. Phil. No. 62988.

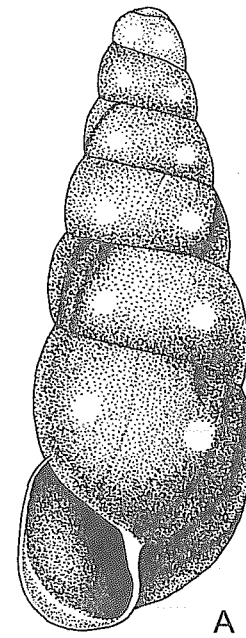
Shell slender, turreted, relatively solid, of 9-14 moderately convex whorls. Apex obtuse, rounded, rather broad. Color uniformly grey to corneous. Embryonic whorls with radial rib-striation beginning somewhere on 1st whorl; postnuclear surface being obliquely, regularly rib-striated. Aperture oblique, elongated-ovate, pointed above. Columellar margin concave, truncated. Palatal margin arched forward. Internal axis slender; strongly sigmoid within each whorl. Umbilicus absent. Height 34-64, diam. 9-12 mm (52.0 × 10.2 mm).

DISTRIBUTION. Hindustan Peninsula, predominantly eastern parts. 6 spp. & subspp.

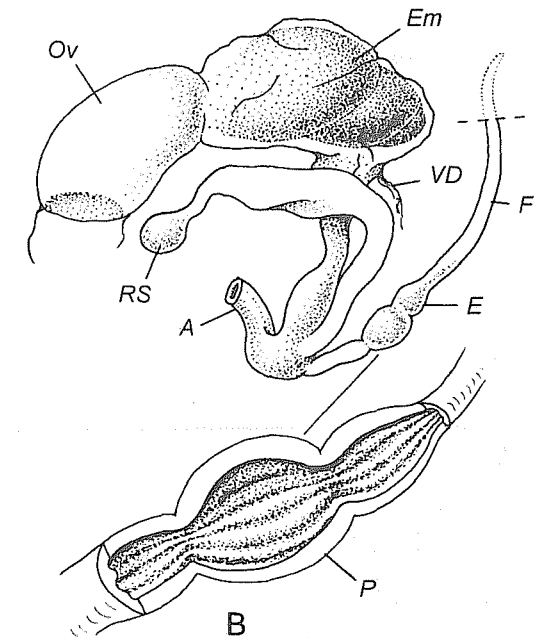
TRISTANIINAE Schileyko,  
subfam. nov.

Shell not decollated, sinistral. Last whorl without internal sculpture. Columella simple.

Flagellum and epiphallus present. Caecum wanting. Penis consisting of short tubular distal section and swollen proximal chamber; internally both portions with



A



B

Fig. 702. *Tristania tristensis* (Gray, 1825).  
"Tristan d'Acunha". A — shell. B — reproductive tract and interior of penis. London.

smoothed longitudinal folds. Penis sheath absent. Penial retractor attached (?) apically. Spermatheca well developed, with enlarged stalk and small reservoir.

DISTRIBUTION. Tristan da Cunha Islands.

REMARK. Tristaniinae are somewhat similar to Rishetiinae in having a long flagellum, well developed spermatheca and simple inner structure of penis. The only included genus differs from Rishetiinae by absence of epiphallic caecum and by attachment of penial retractor not to boundary between epiphallus and penis (? to flagellum). At the same time I am not sure if these two subfamilies are really related: first, anatomy of *Tristania* is studied insufficiently; second, the genus is quite isolated geographically.

*Tristania* O. Boettger, 1878  
Fig. 702

Boettger O., 1878: 19. Odhner, 1960: 168.

TYPE SPECIES — *Balea tristensis* Gray, 1825; SD Pilsbry, 1906.

Shell sinistral, oblong-turreted, thin, a little glossy, of 6.5-8.5 convex whorls. Apex

obtuse, rounded. Color chestnut to pale brown, sometimes with weak, irregular, darker streaks. Embryonic whorls smooth, subsequent whorls with delicate irregular radial wrinkles to rib-striation. Aperture ovate, with simple, thin margins; columellar margin more or less expanded. Umbilicus dot-like. Height 4.5-9.5, diam. 2.0-3.5 mm (7.2 × 2.6 mm).

In a single, much contracted, very old specimen I have dissected, I was unable to find neither penial retractor nor distal part of vas deferens.

Prostate reduced to a few scarcely expressed acini. Epiphallus and flagellum present, but boundary between them scarcely visible. Penis consists of cylindrical distal portion and globular proximal, both internally with indistinct longitudinal folds. Atrium rather long. As spermathecal stalk enters just above base of penis, vagina very short. Spermathecal shaft greatly enlarged in middle portion, small globular reservoir demarcated from shaft by short, narrowed neck. Thin-walled transparent uterus contained one white egg and well developed embryo with pigmented shell of about 2.5 whorls.

DISTRIBUTION. Tristan da Cunha Islands. 6 spp.

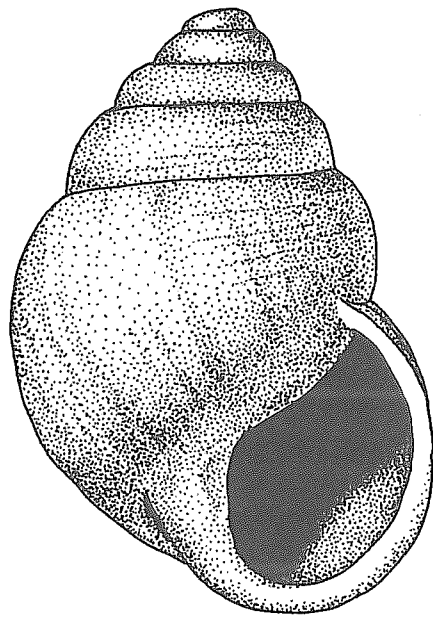


Fig. 703. *Namibiella hottentota* (Gray, 1838). "Usakos S.W. Afr. Protectorat." Phil. No. 47301.

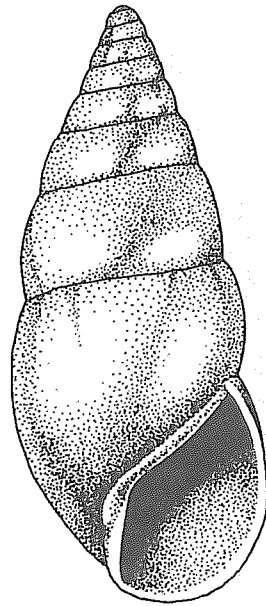


Fig. 704. *Xerocerastus damarensis* (H. Adams, 1870). Etosha Pau, SW Africa. Leiden.

#### RUMININAE Wenz, 1923

Wenz, 1923 (1923-1930): 875 (pro fam.).

Shell decollated or entire, dextral. Last whorl lacking internal sculpture, columella simple.

Male division of reproductive tract lacks flagellum, epiphallus, penis sheath or caecum. Penis internally with strong irregular folds broken into series of short lamellae or bearing numerous, rounded tubercles. Penial retractor attached to penis terminally. Spermatheca well developed.

DISTRIBUTION. S Africa, Mediterranean countries.

#### *Namibiella* Zilch, 1954 Fig. 703

Zilch, 1954: 85 (*Xerocerastus*? subg.).

TYPE SPECIES — *Bulimus hottentota* Gray, 1838; OD.

Shell ovate-conic to subglobose, solid, opaque, mat, of 5-6 quite convex whorls. Apex obtuse, broadly rounded. Color white, summit sometimes yellowish to yel-

lowish-orange. Embryonic whorls with microscopical spiral threadlets, remaining whorls weakly sculptured with indistinct, irregular, radial wrinkles and, sometimes, with spiral engraved lines. Aperture subcircular to broadly ovate, with somewhat thickened margins; columella vertical, well expanded. Umbilicus dot-like. Height 6-13, diam. 4.0-8.5 mm (12.1 × 8.0 mm).

DISTRIBUTION. SW Africa. 5 spp. & subspp.

#### *Xerocerastus* Kobelt et Moellendorff, 1902 Fig. 704

Kobelt & Moellendorff in Kobelt, 1902: 1021 (*Cerastus* subg.).

— *Eburnea* Mousson, 1887: 295 (nom. praeocc., non Fleming, 1828; *Buliminus* subg.; t.-sp. *Buliminus damarensis* H. Adams, 1870; monotypy).

TYPE SPECIES — *Buliminus damarensis* H. Adams, 1870; monotypy.

Shell fusiform-conic to turreted, moderately solid, opaque, shining, of about 10

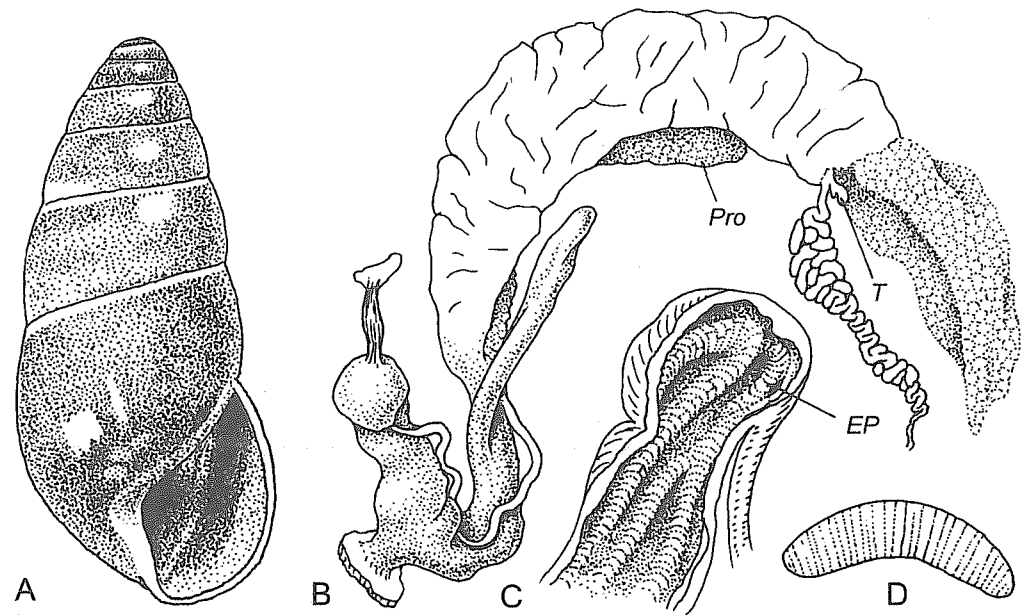


Fig. 705. *Lubricetta rollei* (Haas, 1928).

A — shell: "Randberge der Namib bei Naukluft, Gr. Nama-Land". Holotype. Senck. No. 3378. B, C, D — Windhoek South, SW Africa, February 5, 1969. B — reproductive tract. C — interior of penis. D — jaw. Leiden.

slightly convex whorls. Apex narrowly rounded. Color whitish to yellowish. Embryonic whorls smooth, postembryonic whorls with delicate silky radial striation being denser on early whorls; besides, widely spaced incised spiral lines usually present. Aperture ovate, slightly acuminate above; its margins slightly thickened, not expanded or reflexed. Columella subvertical, continuous with basal margin. Umbilicus closed or nearly so. Height 11-27, diam. 5-11 mm (26.8 × 11.0 mm).

DISTRIBUTION. SW Africa (eastward to Limpopo River valley). About 20 spp., subspp. & forms.

#### *Lubricetta* Haas, 1928 Fig. 705

Haas, 1928: 94 (*Bocageia* subg.).

TYPE SPECIES — *Bocageia (Lubricetta) rollei* Haas, 1928; OD.

Shell bullet-shaped, thin but rather solid, more or less translucent, very shining, of 6-7 flattened whorls. Apex obtuse. Color whitish to corneous, suture often

whitish. Embryonic whorls smooth, post-nuclear whorls with fine, vague radial striae and, sometimes, delicate spiral lines. Aperture ovate, with somewhat thickened margins; columella nearly straight, subvertical, continuous with basal margin. No umbilicus. Height 12-30, diam. 5.0-7.5 mm (15.0 × 5.6 mm).

Talon rather short, not embedded in albumen gland. Vas deferens free, entering penis subapically. Penis bulky, elongated, of irregular shape, internally with longitudinal pilasters bending at upper portion of the organ. Orifice of vas deferens, a simple pore between pilasters. Penial retractor attached subapically. Free oviduct short, vagina markedly longer. Spermatheca short, sleeve-like, without distinct subdivisions into shaft and reservoir.

DISTRIBUTION. SW Africa. 7-8 spp. & subspp.

#### *Krapfiella* Preston, 1911 Fig. 706

Preston, 1911: 472.

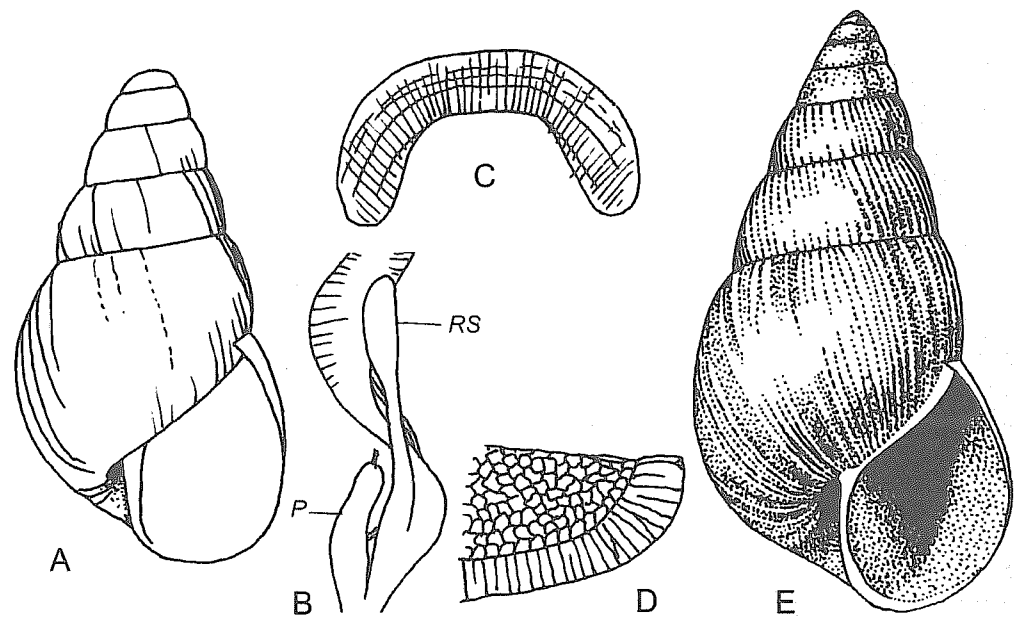


Fig. 706. A, B, C, D — *Krapfiella mirabilis* Preston, 1911. A — shell. B — reproductive tract. C — jaw. D — posterior end of cephalopodium. After Watson, 1921. E — ! *Krapfiella magnifica* Preston, 1913. E Africa. Leiden.

TYPE SPECIES — *Krapfiella mirabilis* Preston, 1911; OD.

Shell ovate-conic, thin, translucent, somewhat shining, of 6-7 convex whorls. Spire conic. Apex broadly rounded. Color brown to chestnut. Embryonic whorls with distinct, spaced spiral threads, later irregularly radially wrinkled. Aperture broadly ovate, margins simple or shortly reflexed. Columella straight to slightly concave, continuous with basal margin. Umbilicus narrowly open, cylindrical. Height 23.5-42.5, diam. 13-25 mm (42.5 × 21.0 mm).

Jaw arcuate, vertically striated, with a few shallow longitudinal lines.

Vas deferens free, entering penis subapically. Penis moderately short, subcylindrical. Penial retractor attached apically. Free oviduct noticeably longer than vagina. Spermathecal stalk comparatively long, reservoir poorly demarcated.

DISTRIBUTION. E Africa. 3 spp.

*Riebeckia* Martens, 1883  
Fig. 707

Martens, 1883: 147 (*Stenogyra* subg.).

TYPE SPECIES — *Achatina sokotrana* Martens, 1881; monotypy.

Shell high, turrated, rather solid, of 10-15 slightly to moderately convex whorls. Apex bluntly rounded. Color uniformly whitish to white, calcareous. Embryonic sculpture of delicate spiral cords, postnuclear whorls with weak irregular radial wrinkles and vague spiral striae. Aperture semioval, subvertical, with simple margins; columellar margin vertical or arcuate, distinctly truncated to nearly continuous. Umbilicus closed or perforated. Height 13-90, diam. 4-28 mm (60.0 × 19.6 mm).

DISTRIBUTION. Sokotra Island. 5-6 spp.

*Balfouria* Crosse, 1884  
Fig. 708

Crosse, 1884: 356 (*Prosopaeas* subg.).

TYPE SPECIES — *Stenogyra* (*Opeas*?) *hirsuta* Godwin-Austen, 1881 (= *Stenogyra arguta* Martens, 1881); monotypy.

Shell subulate-turrated, thin, moderately fragile, of 10-11 rather convex whorls. Apex obtuse. Color white to dull

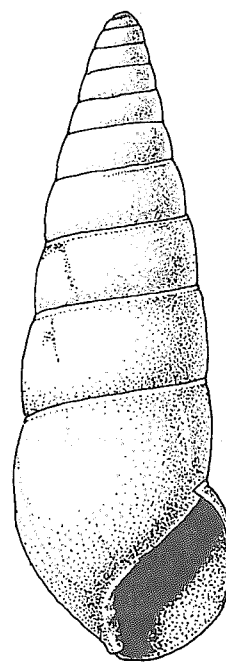


Fig. 707. *Riebeckia sokotrana* (Martens, 1881). East Sokotra. Cardiff.

ochraceous, sometimes with ferruginous incrustations. Embryonic whorls vaguely microscopically granulate, subsequent with closely spaced radial sharp, wavy striae. Besides, very short periostracal hairs usually present. Aperture relatively small, slightly oblique, with simple margins; columella slightly arcuate, continuous. Umbilicus, a minute perforation. Height 11-23, diam. 3-6 mm (11.4 × 3.0 mm).

DISTRIBUTION. Sokotra Island. 1 or 2 spp.

*Rumina* Risso, 1826  
Fig. 709

Risso, 1826: 79.

— *Orbitina* Risso, 1826: 82 (for *Orbitina incomparabilis* Risso, 1826 and *Orbitina truncatella* Risso, 1826; both based on juveniles of *Helix decollata* Linnaeus, 1758).

— *Cylindrina* Schlüter, 1838: 7 (*Bulimus* subg.; t.-sp. *Helix decollata* Linnaeus, 1758; monotypy).

— *Sira* Schmidt, 1855: 42 (t.-sp. *Sira decollata*; monotypy).

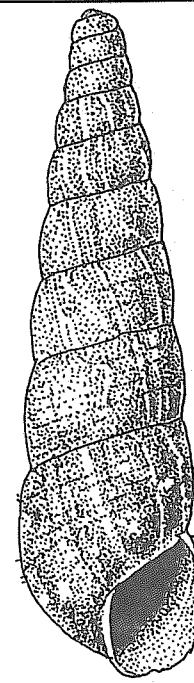


Fig. 708. *Balfouria arguta* (Martens, 1881). Sokotra Island. Holotype of *Stenogyra hirsuta* Godwin-Austen, 1881. London No. 1881.12.14.2.

Bank, Gittenberger, 1993: 525.

TYPE SPECIES — *Helix decollata* Linnaeus, 1758; monotypy.

Shell decollated, pillar-shaped, moderately thin to solid, opaque, somewhat shining, of 5-10 (after decollation) whorls. Apex globular. Color whitish to corneous-brown. Embryonic whorls smooth, glossy, later with irregular radial striae and wrinkles, spaced spiral grooves and, in places, elements of malleate sculpture. Aperture ovate, subvertical, with simple, obtuse margins. Columella subvertical, straight to slightly concave. Umbilicus minutely open to closed or nearly so. Height (of decollated shells) 20-60, diam. 8-17 mm (31.8 × 12.2 mm).

Jaw arcuate, with rather weak vertical striae.

Vas deferens tightly bound to penis, entering subterminally. Penis elongated, internally with spirally ascending folds; orifice of vas deferens slit-like, surrounded by circular thickening; opposite to orifice a glandular pad situated. Free oviduct almost absent, vagina enlarged, rather short. Sper-

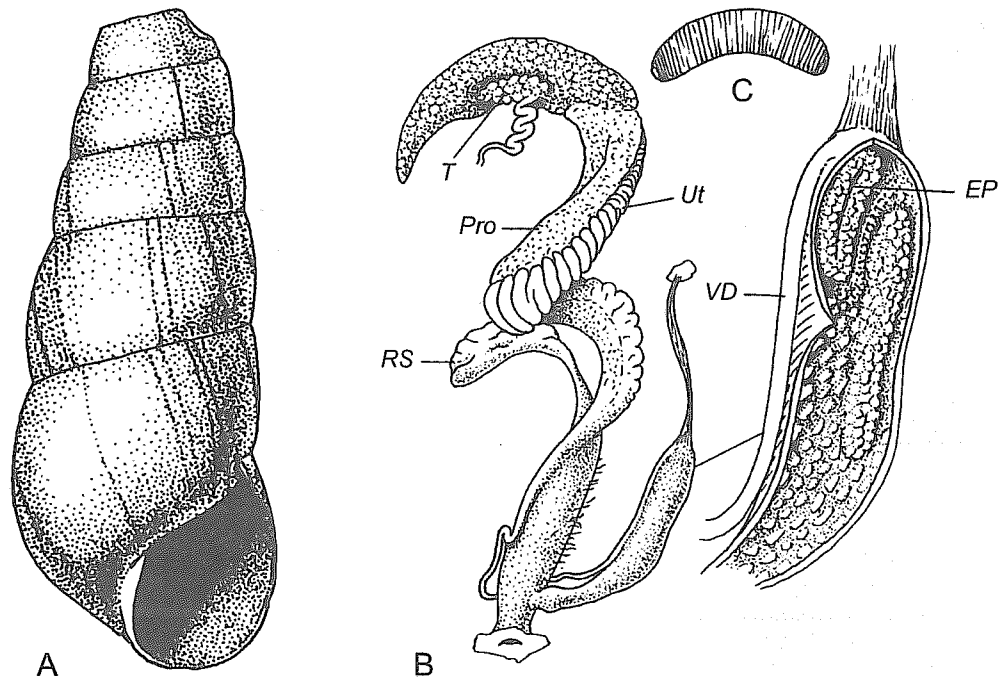


Fig. 709. *Rumina decollata* (Linnaeus, 1758). Subtropical forest in 40 km E of Bejaia (= Buji), Algeria, February 10, 1973. A — shell. B — reproductive tract and interior of penis. C — jaw. Moscow No. Lc-19605 (dry shells); Lc-19627 (alcohol specimens).

matheca consisting of short, slender duct and voluminous, sac-like reservoir.

DISTRIBUTION. Mediterranean region; *R. decollata* introduced in many countries. Probably 2 spp. with numerous forms.

#### PERRIERIINAE Schileyko, subfam. nov.

Shell sinistral, decollated, subcylindrical or pillar-shaped, solid, of 7-7.5 (after decollation) flattened whorls. Sculpture weak. Aperture pyriform to ear-shaped, continuous, peristome thickened; columellar margin truncated. Columella sinuous in each whorl, with very thin spiral lamella.

DISTRIBUTION. New Guinea.

REMARK. The genus *Perrieria* is usually assigned to Megaspiridae [Pilsbry, 1904 (1903-1904); Thiele, 1931; Zilch, 1959], in spite of the fact that Pilsbry later [1906 (1906-1907): 36], after Sykes' examination of the columella structure of *Perrieria*, has changed his opinion and placed this genus "in the vicinity of *Prosopas* or *Tor-*

*taxis*". Indeed, there are no characters which could permit to place it in Megaspiridae. Conchologically this genus is somewhat similar to some Rumininae, that is why I agree with Pilsbry's (1906) conclusion and provisionally place it in Subulinidae. At the same time this genus occupies an isolated enough position (both conchologically and geographically) to establish a taxon of family rank for its reception.

#### *Perrieria* Tapparone-Canefri, 1878 Fig. 710

Tapparone-Canefri, 1878: 169.

TYPE SPECIES — *Perrieria clausiliaeformis* Tapparone-Canefri, 1878; monotypy.

Surface shining. Last whorl direct or slightly ascending in front. Color chestnut to olive-yellow; aperture inside whitish or pale-lilac. Height 36-65, diam. 8-12 mm (40.0 × 10.6 mm).

DISTRIBUTION. Western New Guinea. 2 or 3 spp.

#### GLESSULIDAE Godwin-Austen, 1920

Godwin-Austen, 1920: 6. Schileyko in Schileyko & Kuznetsov, 1996: 159 (Subulinidae subf.).

Shell oblong-conic to ovate, glossy, of 6-8 rather convex whorls. Columella truncated.

Penis with conspicuous flagellum, containing narrow lumen and a number of slit-like glandular cavities branching off from common duct. Internally penis with well-developed stimulator of complex structure, often spirally coiled.

DISTRIBUTION. Hindustan Peninsula and Ceylon.

#### *Glessula* Martens, 1860 Fig. 711

Martens in Albers, 1860: 254 (*Cionella* subg.).

— *Electra* Albers, 1850: 194 [nom. praeocc., non Stephens, 1829; *Achatina* subg.; t.-sp. *Achatina ceylanica* L. Pfeiffer, 1845; monotypy].

— ? *Jadukamia* Godwin-Austen, 1920: 43 [t.-sp. *Glessula (Jadukamia) abnormis* Godwin-Austen, 1920; monotypy].

TYPE SPECIES — *Cionella gemma* Benson, 1850; OD.

Shell elongated-ovate to ovate-conic, thin but rather solid, shining, of 5-8 convex to very convex whorls. Apex narrowly rounded. Color uniformly chestnut to yellowish. Embryonic whorls smooth, later weakly sculptured with delicate radial wrinkles; rarely rib-striated. Aperture broadly ovate, margins simple and sharp or slightly thickened; columella more or less concave, distinctly truncated. Umbilicus absent. Height 3-37, diam. 1.5-17.0 mm (20.2 × 9.2 mm).

Prostate band-like, of numerous narrow, somewhat lamellar, fused acini. Vas deferens free, entering epiphallus terminally. Epiphallus stout, sharply bent in middle, internally with distinct small papillae. Peculiar flagellum ("feather-like gland", after Pilsbry, 1909) located at some distance below entrance of vas deferens. Lumen of flagellum narrow, shifted to one side of the organ; many narrow cavities occupying opposite wall of flagellum and lined with glandular cells, enter main lumen. Penis generally subglobular, internally with 1 or

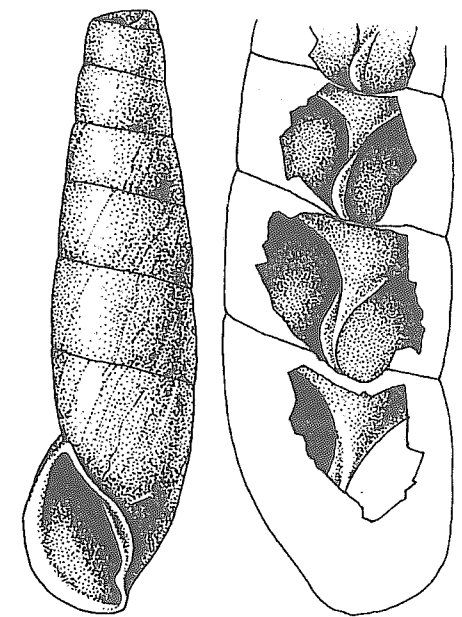


Fig. 710. *Perrieria clausiliaeformis* Tapparone-Canefri, 1878. "Irian Jaya, Cendrawasih Peninsula, Steenkool" [New Guinea]. Moscow No. Lc-19586 (Leiden).

2 strong, short pilasters and spirally coiled stimulator; epiphallus pore located under it. Penis sheath very thin, transparent. Penial retractor attached to middle convex section of epiphallus. Uterus containing several white eggs. Free oviduct and vagina rather short. Spermathecal stalk moderately long, cylindrical or tapering, reservoir elongated, bound to midway of spermoviduct.

DISTRIBUTION. Hindustan Peninsula and Ceylon. About 90 spp.

#### MICRACTAEONIDAE Schileyko, fam. nov.

Shell broadly ovate, tiny, not glass-like. Color corneous. Sculpture peculiar, consisting of series of spirally arranged dots.

Jaw polyplacognathous, of numerous separate but cohering narrow platelets.

Ureter straight, without division into ascending (primary ureter) and descending (secondary ureter) arms.

Epiphallus present, lacking caecum. Penis rather long, forming a loop at its basal

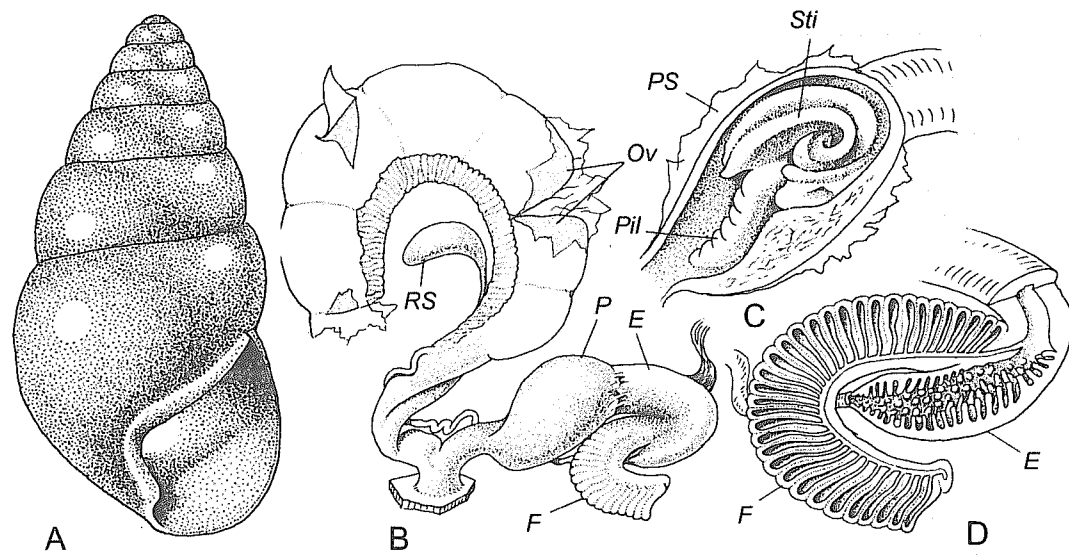


Fig. 711. ! *Glessula serena* (Benson, 1860).  
Nouwara Eliya, Ceylon, July 5, 1983. A — shell. B — reproductive tract. C — interior of penis. D — interior of epiphallus and flagellum. Paris.

section, internally with process (? stimulator or verge).

DISTRIBUTION. Tropical Africa.

REMARK. The family Micractaeonidae is probably distantly related to Ferrussaciidae (as Verdcourt, 1993 and Van Bruggen & Winter, 1995 suggested), but differs in having a minute broadly ovate shell with conspicuous dotted sculpture. Anatomically it drastically differs in having a straight ureter without division into primary and secondary sections.

*Micractaeon* Verdcourt, 1993  
Fig. 712

Verdcourt, 1993: 82. Van Bruggen & de Winter, 1995: 80.

— *Microglessula* [Van Bruggen & Winter, 1995: 80 — "*Microglessula* Adam ined. (files in IRSNB — Inst. Royal des Sciences Naturelles de Belgique, Brussels, no manuscript description found), here published as a synonym, therefore not valid or available according to ICZN."].

TYPE SPECIES — *Micractaeon kakamegaensis* Verdcourt, 1993 (= *Pseudopeas koptawelilense* Germain, 1934); OD.

Shell broadly ovate, thin, translucent, not glossy, of about 6 moderately convex whorls. Apex broadly rounded. Color light-to orange-corneous. Sculpture consists of spiral rows of close punctures, horizontal distance between them either less than or about equal to width of puncture; between rows of punctures slightly raised spiral ridges present. Aperture a little oblique, very narrowly pyriform, with simple margins; columella straight, sinuate and produced in middle, roundly truncated below. Height 1.8-2.1, diam. 1.1-1.2 mm (1.9 × 1.2 mm).

Jaw consisting of about 35 separate platelets.

"Unfortunately little has been made of the genital system. The penial complex has a massive twist near its base; epiphallus probably without caeca but lumen of penis has a short pointed thick-walled apical diverticulum [verge? — A. Sch.]; spermatheca on the female side, rather longer than the duct." (Verdcourt, 1993: 82).

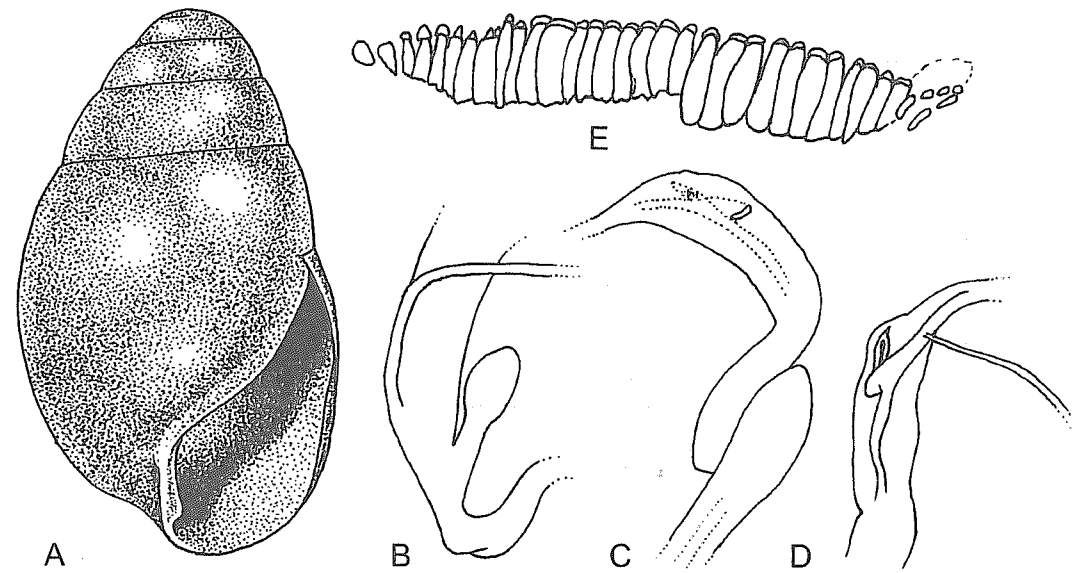


Fig. 712. *Micractaeon koptawelilense* (Germain, 1934).  
A — shell: Kakamega Forest Complex, Western Kenya. Moscow No. Lc-24221 (Cardiff).  
B — basal part of female ducts. C — penial complex showing basal loop. D — top of penial complex. E — jaw. After Verdcourt, 1993.

DISTRIBUTION. Tropical Africa (Ghana, Cameroon, E and SE Zaïre, Kenya, Malawi, E Zambia). 1 sp.

FERRUSSACIIDAE  
Bourguignat, 1883

Bourguignat, 1883: 120.

— Caecilianellinae Fischer et Crosse, 1877 (1870-1902): 585 (based on *Caecilianella* Bourguignat, 1856 which is an objective synonym of *Cecilioides* Férussac, 1814).

Shell generally rather small, elongated-ovate to turrated or nearly cylindrical, thin, glossy, smooth (rarely finely ribbed), mostly glass-like, translucent to transparent. Suture usually more or less margined. Aperture ovate to pear-shaped, simple or with parietal and/or columellar lamellae. Columella below sinuated or truncated, rarely continuous with basal margin.

Jaw aulacognathous, mostly vertically striated.

Epiphallus short or wanting. Penis sim-

ple or furnished with caecum, internally with stimulator of various structure or with a short verge; sometimes with chitinous hooks.

DISTRIBUTION. Mainly Mediterranean; some species penetrate southward to tropical Africa and eastward to Philippines and Hawaiian Islands; two genera in tropical America.

FERRUSSACIINAE  
Bourguignat, 1883

Kidney short, sigmurethral, both ureters completed.

Penis internally without chitinous spines.

DISTRIBUTION. As in family.

*Karolus* Folin, 1870  
Fig. 713

Folin in Folin & Perier, 1870 (1867-1872): 189.

— *Caecilianopsis* Pilsbry, 1907 (1906-1907): 28



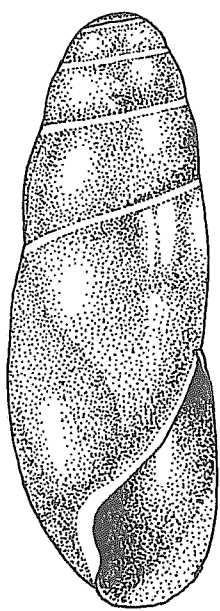


Fig. 713. *Karolus consobrinus primus* Folin, 1870. Little Swan Island [NNE of Honduras, Caribbean]. Phil. No. 150709.

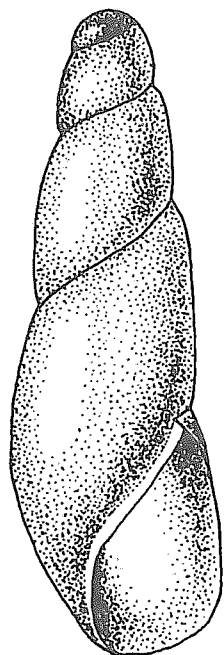


Fig. 714. *Geostilbia gundlachi* (L. Pfeiffer, 1850). St. Martin, West Indies. Chicago No. 36429.

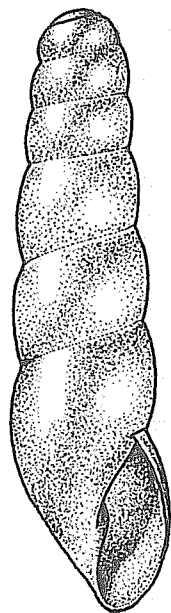


Fig. 715. ! *Coilostele tampicoensis* (Pilsbry, 1907). Tampico, Mexico. Chicago No. 36418.

[*Cecilioides* subg.; t.-sp. *Cecilioides* (*Caecilianopsis*) *jod* Pilsbry, 1907; monotypy].

TYPE SPECIES — *Karolus primus* Folin, 1870; monotypy.

Shell shortly cylindrical-ovoid, thin, glass-like, very shining, colorless, of about 5 slightly convex whorls. Apex very obtuse, broadly rounded. Sculpture practically absent. Aperture pyriform, with thin margins. Palatal margin nearly straight, vertical, not arching; columella varying from abruptly to very indistinctly truncated. Height 1.6-2.5, diam. 0.4-0.6 mm (2.5 × 0.6 mm).

DISTRIBUTION. Jamaica, E Mexico, Trinidad, Guadeloupe, Barbados, Brazil, Caribbean region. 5 spp. & forms.

*Geostilbia* Crosse, 1867  
Fig. 714

Crosse, 1867: 184.

TYPE SPECIES — *Geostilbia caledonica* Crosse, 1867 (? = *Achatina gundlachi* L. Pfeiffer, 1850); monotypy.

Shell pillar-shaped, thin, semitranspar-

ent, very much shining, of about 4 flattened whorls separated by deep suture. Color uniformly ivory. Regular sculpture absent. Aperture pear-shaped, with thin, sharp, simple margins; basal margin more or less straight. Columellar margin thin, subvertical, continuous with basal margin, being separated there only by very slight sinuation, not by abrupt truncation. Height 3-6, diam. 1.0-1.8 mm (3.3 × 1.0 mm).

DISTRIBUTION. E Africa (Runssoro), Comoro Islands, Mauritius, Seychelles, India, Philippines, New Caledonia (introduced), Hawaiian Islands, Caribbean region, St. Helena Island. At least 10 spp.

*Coilostele* Benson, 1864  
Fig. 715

Benson, 1864: 136.

— *Francesia* Paladilhe, 1872: 9 [t.-sp. *Francesia scalaris* Paladilhe, 1872 (= *Coilostele paladilhiana* Nevill, 1879, nom. nov. pro *F. scalaris* Paladilhe, 1872, non *Coilostele scalaris* Benson, 1864); OD].

— *Coilostele* Crosse, 1876: 194 (nom. err. pro *Coilostele* Benson, 1864).

— *Coelostele* Bourguignat, 1880: 6 (nom. err. pro *Coilostele* Benson, 1864).

TYPE SPECIES — *Coilostele scalaris* Benson, 1864; monotypy.

Shell pillar-shaped to subcylindrical, very thin, subtransparent, glossy, of 6-9 flattened whorls. Apex broad, very obtuse, rounded. Colorless to light corneous. Embryonic whorls smooth, rest whorls either smooth, radially striated or finely ribbed. Aperture small, oblong, more or less oblique, margins usually expanded slightly in fully adult shells, straight in profile. Columella sometimes with low tubercle at its junction with parietal wall. Internal partitions absorbed in adult shells, leaving only internal spiral cord along suture. Height 2.5-4.0, diam. 0.33-1.00 mm (3.2 × 0.6 mm).

DISTRIBUTION. S Spain, Syria, Egypt, S Arabia, Hindustan Peninsula; Mexico. About 20 spp.

REMARKS. (1) Pilsbry (1946b: 184) stated, without explanation, that this genus belongs to Carychiidae (Basommatophora). I provisionally retain *Coilostele* in Ferrussaciidae until anatomy of the type species is known.

(2) The only American (Mexican) species — *Coilostele tampicoensis* — is very similar to Spanish *C. letourneuxiana* Bourguignat, 1880. Pilsbry [1908 (1907-1908): 346] stated: "The question of whether this Mexican species is an importation from Spain, or is really indigenous, awaits the actual comparison of specimens."

*Ferrussacia* Risso, 1826

Risso, 1826: 80.

— *Vediantius* Risso, 1826: 81 [t.-sp. *Vediantius eristalius* Risso, 1826 (= juv. of *Ferrussacia gronoviana* Risso, 1826); monotypy].

— *Ferrussacia* Bourguignat, 1856 (1856-1860): 210 (nom. emend. pro *Ferrussacia* Risso, 1826).

— *Euferrussacia* Bourguignat, 1864: 200 (*Ferrussacia* sect.; nom. nud.).

— *Folliculiana* Bourguignat, 1864: 201 (*Euferrussacia* "groupe"; t.-sp. *Ferrussacia folliculus* Bourguignat, 1856; OD).

— ? *Pseudostreptostyla* Nevill in Godwin-Austen, 1881: 665 (*Ferrussacia* subg.; t.-sp. *Ferrussacia abnormis* Nevill, 1881; OD).

— *Folliculina* Westerlund, 1887: 154 (nom. err. pro *Folliculiana* Bourguignat, 1864).

TYPE SPECIES — *Ferrussacia gronoviana* Risso, 1826; SD Pilsbry, 1908 (1907-1908).

Shell oblong to cylindrical-oblong, thin to comparatively solid. Spire conic or convexly conic. Aperture pyriform, parietal wall smooth or with entering lamella; columella with 1 or 2 folds, not distinctly truncated at base.

DISTRIBUTION. Mediterranean countries, Canary Islands, Madeira; Mauritius.

*Ferrussacia* (*Ferrussacia* s. str.)  
Fig. 716

Shell acutely ovate to cylindrical-oblong, comparatively solid, somewhat opaque, shining, of 5-8 flattened whorls. Spire convexly conic or ovoid. Color yellowish to straw. Sculpture nearly absent. Aperture pyriform, with a little thickened margins. Parietal wall smooth, palatal margin more or less arching forward, columella with convex subvertical fold-like lamella. Height 6-15, diam. 2-5 mm (8.3 × 3.2 mm).

Jaw thin, elastic, closely ribbed or folded, with zigzag or serrated edge.

Talon not visible. Prostate long, band-like, of many elongated acini. Vas deferens long, slender, free, entering epiphallus apically. Epiphallus subglobular, thick-walled, with narrow lumen, opens to penis through short verge. Penis short, of irregular form, with thin-walled, semitransparent caecum, which tightly bound to side of penis; besides, penis has additional lateral pouch containing a skittle-shaped muscular stimulator. Lumen of penis proper very narrow. Penial retractor arising on diaphragm, attached to epiphallus terminally, at base of vas deferens. Uterus filled with numerous eggs that contain well-developed shelled embryos. Free oviduct short, vagina thin-walled, markedly swollen, internally with thin longitudinal folds. Spermatheca reduced in size, with short, slightly expanded basally stalk and small reservoir.

DISTRIBUTION. Mediterranean countries, Canary Islands, Madeira; Mauritius.

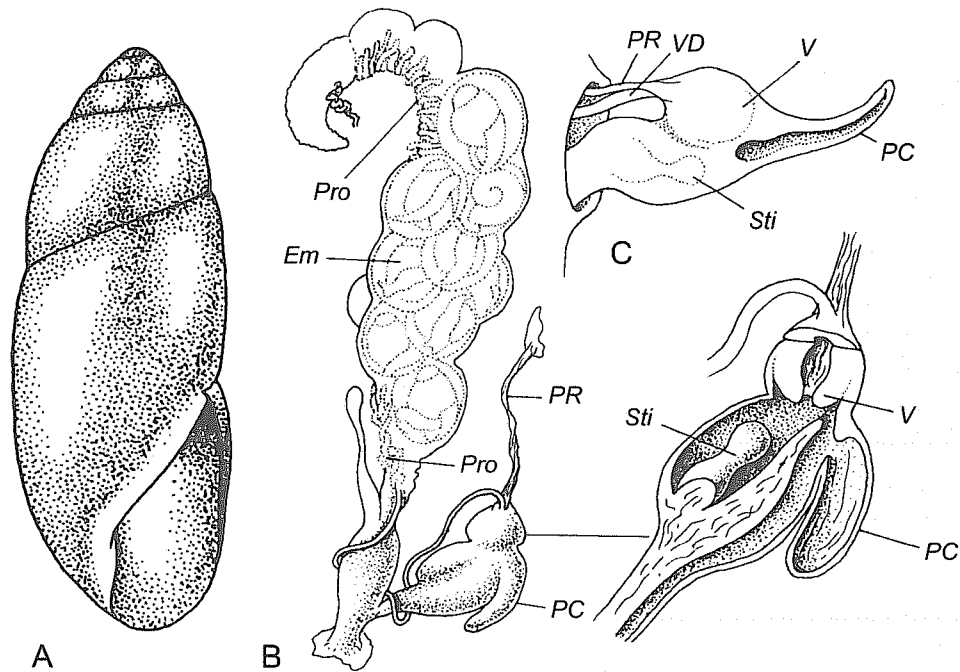


Fig. 716. *Ferrussacia (Ferrussacia) gronoviana* Risso, 1826. Seuta, NW Africa, December 10, 1979. A — shell. B — reproductive tract and interior of penis. C — everted penis. Moscow No. Lc-24237.

About 20 spp. with numerous subsp. & forms.

*Ferrussacia (Pegea) carnea* Risso, 1826)  
Fig. 717

Risso, 1826: 88.

- *Proceruliana* Bourguignat, 1864: 201 (*Euferrussacia* "groupe"; t.-sp. *Glandina procerula* Morelet, 1851; OD).
- *Pseudazeca* L. Pfeiffer, 1877: 299 (*Ferrussacia* sect.; t.-sp. *Glandina procerula* Morelet, 1851; designated here).
- *Phylacus* Westerlund, 1887: 154 [t.-sp. *Ferrussacia splendens* Bourguignat, 1887; SD Pilsbry, 1908 (1907a-1908a)].

TYPE SPECIES — *Pegea carnea* Risso, 1826; monotypy.

Shell fusiform-cylindrical, thin, translucent, shining, of 6-8 flattened whorls. Spire conic. Color whitish to yellow. Sculpture practically absent. Aperture pyriform or elongated-ovate, with simple margins. Parietal wall usually bearing deep-seated, low, entering lamella; columella with 1 or 2 cal-

Fig. 717. *Ferrussacia (Pegea) carnea* Risso, 1826. Tunisia. Phil. No. 218539.

lous lamellae or denticles. Palatal margin straight or a little concave. Height 7-18, diam. 2.5-6.0 mm (12.0 x 4.1 mm).

DISTRIBUTION. N Africa; 1 sp. introduced to Italy. Over 40 spp., subsp. & forms.

*Amphorella* Lowe, 1852

Lowe, 1852: 120 (*Achatina* subg.).

TYPE SPECIES — *Helix tornatellina* Lowe, 1831; SD Lowe, 1854.

Shell ovate, thin to moderately solid, shining, more or less translucent, of 6-7 flattened whorls. Apex obtuse. Colorless to light corneous. Sculpture practically absent. Aperture narrow, pyriform, pointed above; margins thin or thickened. Palatal margin somewhat arching forward. Parietal wall smooth or with supraparietal lamella; columella plicate basally.

DISTRIBUTION. Madeira.

*Amphorella (Amphorella) s. str.*  
Fig. 718

— *Agraulina* Bourguignat, 1858 (1856-1860): 88 (part.; t.-sp. *Helix tornatellina* Lowe, 1831; designated here).

— *Lovea* R. Watson, 1876: 677 (t.-sp. *Helix tornatellina* Lowe, 1831; designated here).

Shell ovate, rather solid, more or less shining, of 5-6 nearly flat whorls. Aperture with very narrow, acuminate upper part; margins strongly thickened within; parietal wall smooth or with supraparietal lamella; columella strongly plicate basally; palatal margin in profile descending obliquely forward. Height 6.5-12.0, diam. 3-5 mm (8.6 x 4.2 mm).

DISTRIBUTION. Madeira. 4 spp. & subsp.

*Amphorella (Hypselia) producta* Lowe, 1854)  
Fig. 719

Lowe, 1854: 202 (*Achatina* subg.).

TYPE SPECIES — *Achatina producta* Lowe, 1852; OD.

Shell fusiform-ovate, thin, shining, translucent, of 6-8 slightly convex whorls. Apex rounded, more or less narrow. Color

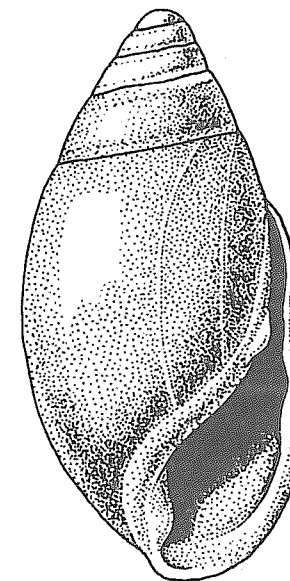


Fig. 718. *Amphorella (Amphorella) tornatellina* (Lowe, 1831). Madeira. SPb.

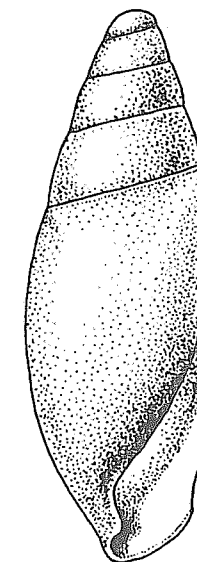


Fig. 719. *Amphorella (Hypselia) producta* (Lowe, 1852). S. Deserta Island [Madeira]. Holotype. Phil. No. 97204.

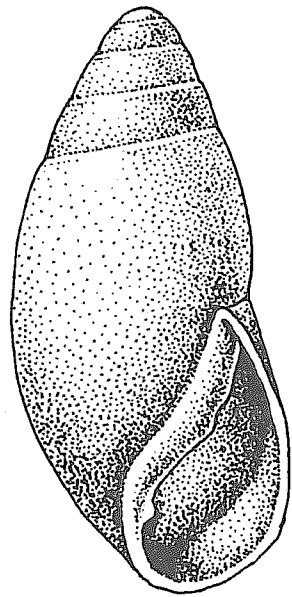


Fig. 720. *Amphorella (Fusillus) oryza* (Lowe, 1852).  
Porto Santo, Madeira. Chicago No. 145954.

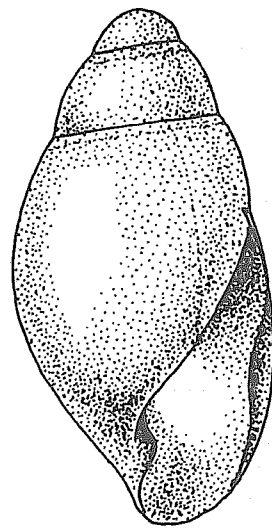


Fig. 721. *Amphorella (Pyrgella) leacociana* (Lowe, 1852) (juvenile shell).  
Madeira. SPb.

absent or light-corneous. Shell surface practically smooth throughout. Aperture narrow, sharply pointed above; parietal wall smooth; palatal margin sometimes with thin internal callus; columellar margin concave, distinctly truncated. Height 4.0-8.5, diam. 1.5-2.5 mm (7.0 × 2.3 mm).

DISTRIBUTION. Madeira. 7 spp. & forms.

*Amphorella (Fusillus) oryza* (Lowe, 1852)  
Fig. 720

Lowe, 1852: 120 (*Achatina* subg.).

— *Alsobia* Bourguignat, 1858 (1856-1860): 88 (t.-sp. *Achatina paroliniana* Webb et Berthelot, 1833; OD).

TYPE SPECIES — *Helix oryza* Lowe, 1852; SD Lowe, 1854.

Shell ovate, thin, subtransparent, glass-like, shining, of 5.5-6 flat whorls. Colorless. Surface of both embryonic and postembryonic whorls smooth, without regular sculpture. Aperture moderately narrow, with somewhat calloused within margins. Parietal callus usually well developed; pa-

rietal wall with variously developed supraparietal and parietal lamellae; latter sometimes wanting. Columellar margin with tooth-like lamella. Height 6-7, diam. 3.0-3.2 mm (6.9 × 3.2 mm).

DISTRIBUTION. Madeira. 2 or 3 spp.

*Amphorella (Pyrgella) leacociana* (Lowe, 1854)  
Fig. 721

Lowe, 1854: 205 (*Achatina* subg.).

TYPE SPECIES — *Achatina leacociana* Lowe, 1852; OD.

Shell oblong-turritid, thin, fragile, shining, of 5-5.5 slightly convex whorls. Apex obtuse, broadly rounded. Color whitish to yellowish. Embryonic whorls smooth, rest whorls with vague radial wrinkles. Aperture comparatively short, elongated-ovate, acuminate above, with thin, simple margins; parietal wall smooth; palatal wall strongly arching forward. Columella truncated, slightly twisted. Height 3.7, diam. 1.6 mm [1.5 × 0.6 mm (juvenile shell)].

DISTRIBUTION. Madeira. 1 sp.

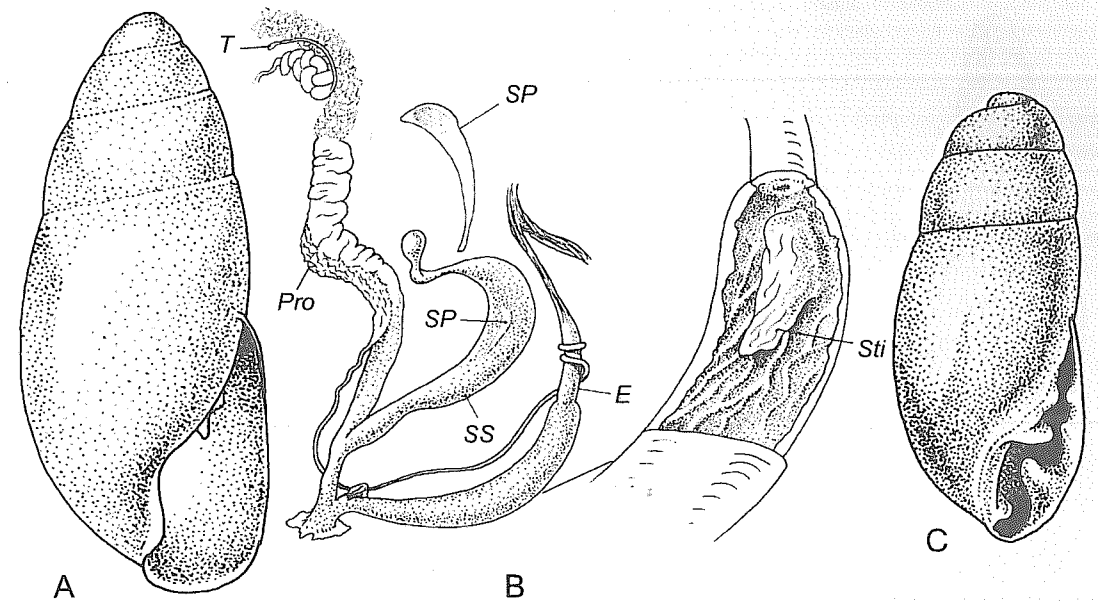


Fig. 722. A, B — *Amphorella (Cylichnidia) ovuliformis* (Lowe, 1831).  
Pico Blanco, Madeira. A — shell. B — reproductive tract, spermatophore and interior of penis. Cardiff No. 1986.20.10. C — ! *Amphorella (Cylichnidia) cylichna* (Lowe, 1852).  
Shell: Caniçal, Madeira. Syntype. Leiden.

*Amphorella (Cylichnidia) ovuliformis* (Lowe, 1831)  
Fig. 722

Lowe, 1852: 119 (*Achatina* subg.).

TYPE SPECIES — *Helix ovuliformis* Lowe, 1831; SD Lowe, 1854.

Shell ovate, somewhat pupiform, thin, glossy, translucent, of 4-5 slightly convex whorls. Apex rounded. Color yellowish. Sculpture practically absent. Aperture pyriform, with simple margins. Palatal margin a little or not arching forward. Parietal wall bears one or two more or less developed lamellae; supraparietal (may be absent) much smaller; columella plicate or horizontally truncated at base. Palatal wall simple or with 1-3 folds. Height 2.7-3.7, diam. 1.10-1.75 mm (*ovuliformis*: 3.4 × 1.3 mm; *cylichna*: 3.0 × 1.1 mm).

Talon exposed, very long, slender, with small apical bulb. Vas deferens forms one or two loops around epiphallus, entering subapically. Epiphallus short, opening into penis chamber through simple pore. Penis long, subcylindrical, internally with network of low, delicate, anastomosing folds and large fleshy stimulator located at upper

portion of penis. Penial retractor arising from columellar muscle and attaching to epiphallus terminally. Free oviduct moderately long, vagina somewhat shorter. Spermathecal shaft greatly swollen in middle, reservoir very small. Small, hockey stick-shaped spermatophore was found inside swollen portion of spermathecal stalk.

DISTRIBUTION. Madeira. 2 spp.

*Sculptiferussacia chudeaui* Germain, 1911  
Fig. 723

Germain, 1911: 327 (*Ferussacia* subg.).

TYPE SPECIES — *Ferussacia (Sculptiferussacia) chudeaui* Germain, 1911; OD.

Shell cylindro-conic to fusiform, rather thin to solid, shining, of 6-8.25 moderately to rather strongly convex whorls. Last whorl a little attenuate basally. Apex obtuse. Color light-corneous. Embryonic whorls smooth, later whorls with lamellar ribs. Aperture pyriform, somewhat pointed above, with thin or slightly thickened margins; parietal callus well developed. Columellar margin truncated. Umbilicus tiny

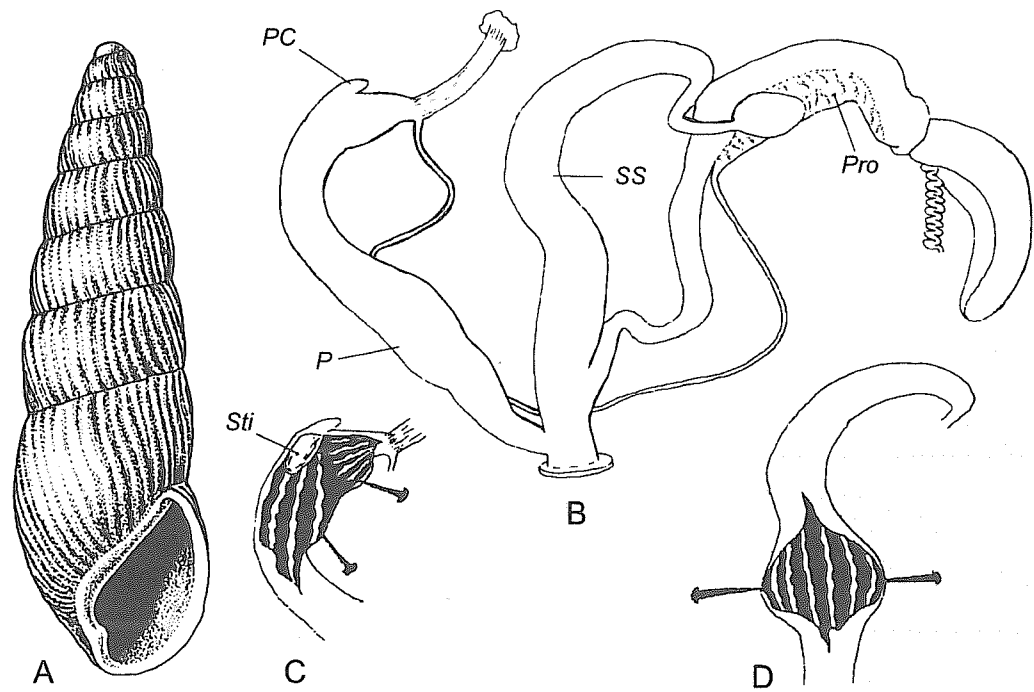


Fig. 723. ? *Sculptiferussacia clausiliaeformis* Alonso, Groh et Ibáñez, 1992.  
A — shell: Fuenteventura Island, Canary Islands. Paratype. Zürich No. 534971. B — reproductive tract and interior of penis. After Alonso et al., 1992.

or closed. Height 4.0-4.5, diam. 1.00-1.75 mm (*chudeaui*) and 11.0-14.5, diam. 2.9-3.5 (*clausiliaeformis*) (11.2 × 3.0 mm).

Jaw of numerous thin, narrow, rounded platelets; some of them forked at convex edge.

Talon hidden. Spermoviduct short. Vas deferens long, thin, entering penis subapically through simple pore. Penis large, expanded, with blind caecum not far from its apex. Internally penis with a few corrugated longitudinal folds; caecum contains small fusiform stimulator. Penial retractor originating on diaphragm and inserting onto penis terminally. Free oviduct long, vagina short. Spermathecal shaft long, voluminous, stout, narrowed in upper end; reservoir ovate.

DISTRIBUTION. Morocco (*chudeaui*), Canary Islands (Fuenteventura Island) (*clausiliaeformis*). 2 spp.

REMARK. The type species of this genus has never been illustrated; I did not find the species in Paris or in Geneva among species described by Germain. The species described by Alonso et al. (1992) as ?*Sculptiferussacia clausiliaeformis* differs from *S.*

*chudeaui* mainly by larger size and much more prominent sculpture.

*Calaxis* Bourguignat, 1887  
Fig. 724

Bourguignat in Letourneux & Bourguignat, 1887: 114.

— *Elasmophora* Westerlund, 1887: 152 (as syn. of *Calaxis*; t.-sp. not designated).

TYPE SPECIES — *Tornatellina hierosolymarum* Roth, 1855; SD Pilsbry, 1908 (1907-1908).

Shell aciculate, oblong-cylindrical or lanceolate, thin, glass-like, shining, transparent when fresh, of 6-9 flattened whorls. Apex narrowly rounded. Colorless. Both embryonic and postembryonic whorls practically smooth. Aperture narrow, lanceolate, pointed above, with simple margins; palatal margin not arching forward. Parietal wall with a strong subhorizontal lamella. There is deep rounded sinus below projecting, lamellar, strongly truncated columella. Palatal wall sometimes with weak

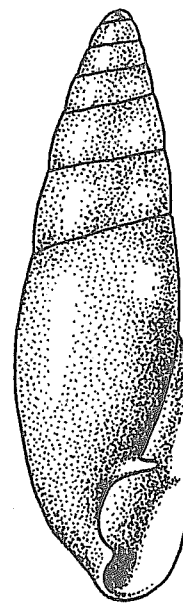


Fig. 724. *Calaxis hierosolymarum* (Roth, 1855).  
Tabila at Tiberias, Israel. Phil. No. 218461.

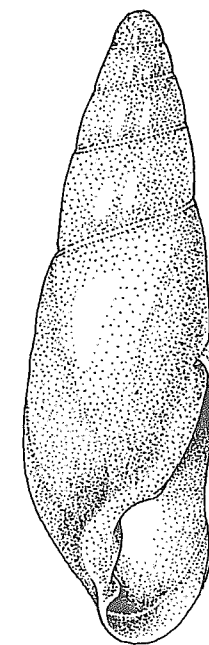


Fig. 725. *Pseudocalaxis terebellum* Pallary, 1912.  
Alexandria, Egypt. Senck. No. 157235.

plica opposite to parietal lamella. Height 4-8, diam. 1.50-2.25 mm (7.1 × 2.0 mm).

DISTRIBUTION. Syria, Palestine, Israel, Cyprus Island, N Egypt. 3 spp. with a few forms.

*Pseudocalaxis* Pallary, 1912  
Fig. 725

Pallary, 1912: 126 (pro sect.; but in the following text as genus).

TYPE SPECIES — *Pseudocalaxis terebellum* Pallary, 1912; OD.

Shell turreted, thin, shining, glass-like, transparent, of 6-7 flattened whorls. Apex somewhat obtuse, narrowly rounded. Embryonic whorls smooth, later also practically glabrous, just with very delicate irregular radial wrinkles. Aperture narrowly pyriform, acuminate above, with thin margins. Palatal margin vertical, straight or somewhat concave, slightly arching forward. Parietal wall smooth or with weak, rather short lamella; columella with two

distinct lamellae. Height 4.5-6.8, diam. 1.7-2.1 mm (5.7 × 1.9 mm).

DISTRIBUTION. N Egypt. 1 or 2 spp.

*Connollya* Odhner, 1932  
Fig. 726

Odhner, 1932: 36.

TYPE SPECIES — *Connollya camerunensis* Odhner, 1932; monotypy.

Shell cylindro-conic, thin, semitransparent, shining, of 5.5 slightly convex whorls. Apex obtuse. Color straw-yellow. Embryonic whorls smooth, subsequent whorls nearly so, just with accidental weak radial curved lines. Aperture narrowly subovate, pointed above, with thin, simple margins; palatal margin arching forward. Columella truncated. Height 7.8-8.4, diam. 2.8-3.4 mm.

Vas deferens entering epiphallus apically. Epiphallus very short, with slit-like cavity. Penis elongated clavate, with short verge.

DISTRIBUTION. Cameroon. 1 sp.

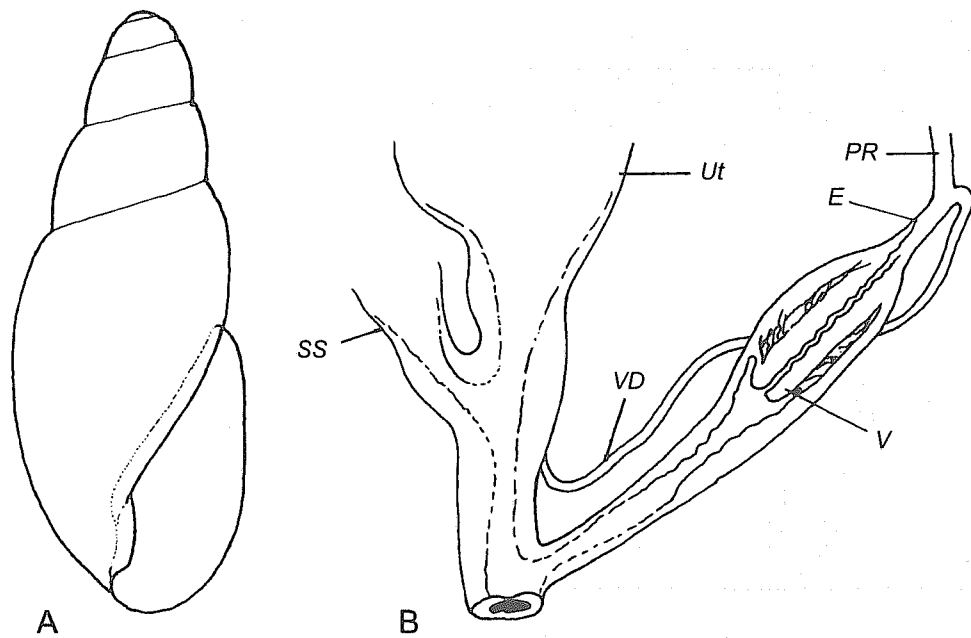


Fig. 726. *Connollya camerunensis* Odhner, 1932.  
A — shell. B — distal part of reproductive tract. After Odhner, 1932.

*Hohenwartiana* Bourguignat, 1864  
Fig. 727

Bourguignat, 1864: 201 (*Euferrussacia* "groupe").

— *Hohenwarthia* Bourguignat in Letourneux et Bourguignat, 1887: 126 (nom. err. pro *Hohenwarthiana* Bourguignat, 1864).

TYPE SPECIES — *Achatina hohenwarti* Rossmassler, 1839; OD.

Shell elongated bullet-shaped or oblong-fusiform, thin, very fragile, glossy, translucent to subtransparent, of 5-7 flattened to slightly convex whorls. Apex narrowly obtuse. Color yellowish or light whitish-corneous. Both embryonic and postembryonic whorls smooth, polished. Aperture narrow, pyriform, with thin margins; palatal margin arching forward. Columella vertical, almost straight, tapering or a little excised below, but not really truncated, not reaching base. Height 3.75-8.00, diam. 1.25-2.50 mm (6.4 × 2.1 mm).

DISTRIBUTION. Mediterranean region. About 20 spp.

*Cecilioides* Férussac, 1814

Férussac, 1814: 48.

— *Acicula* Risso, 1826: 81 (nom. praeocc., non Hartmann, 1821; t.-sp. *Acicula eburnea* Risso, 1826; monotypy).

— ? *Belonis* Hartmann, 1841: 48 (t.-sp. "*Belonis acicula*"; monotypy).

— *Caecilioides* Herrmannsen, 1846: 150 (nom. nov. pro *Acicula* Risso, 1826).

— *Caecilianella* Bourguignat, 1856: 378 [t.-sp. *Buccinum acicula* Müller, 1774; SD Pilsbry, 1909 (1909-1910)].

— *Aciculina* Westerlund, 1887: 175 (t.-sp. *Buccinum acicula* Müller, 1774; designated here).

TYPE SPECIES — *Bulinus acicula* Bruguière, 1792 (= *Buccinum acicula* Müller, 1774); monotypy.

Shell aciculate, turrated or slightly fusiform, glossy, fragile, glass-like, of 5.5-6.5 flattened whorls. Apex widely rounded. Colorless. Sculpture very weak and irregular. Aperture pear-shaped, pointed above, with thin, straight margins. Columellar margin arched, more or less obliquely truncated. Teeth absent, or small parietal tubercle present.

DISTRIBUTION. Jamaica, E Mexico, Trinidad, Guadeloupe, Barbados, Brazil;

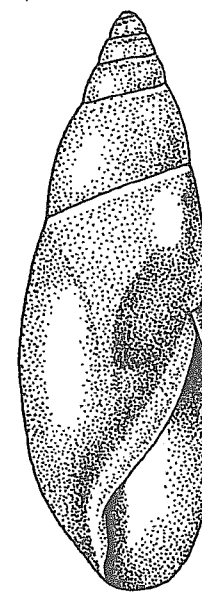


Fig. 727. *Hohenwartiana hohenwarti* (Rossmassler, 1839).  
No data. Moscow No. L-1322.

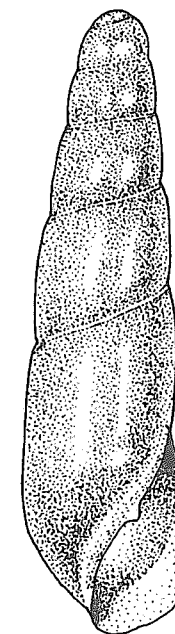


Fig. 728. *Cecilioides (Raphidiella) barbozae* (Maltzan, 1886).  
Faro, Portugal. Paris.

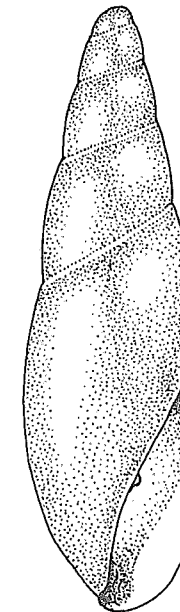


Fig. 729. *Cecilioides (Terebrella) clessini* (Maltzan, 1886).  
Portimao, Algarve, Portugal. Syntype. Senck. No. 157223.

Portugal, Central and S Europe, Africa, Asia Anterior, Arabian Peninsula.

*Cecilioides (Raphidiella)*  
Maltzan, 1886)  
Fig. 728

Maltzan, 1886: 26 (*Caecilianella* subg.).

TYPE SPECIES — *Caecilianella (Raphidiella) barbozae* Maltzan, 1886; monotypy.

Shell pillar-shaped, very thin, shining, of 5-6 nearly flat whorls. Apex obtuse, widely rounded. Sculpture practically absent. Aperture acuminate-ovate, palatal margin arching forward, in young shells with two teeth: parietal and rather weak columellar; in subadults columellar tooth remains deep inside shell; in completely adult shells even parietal lamella scarcely visible. Columella strongly sigmoid, twisted, not truncated at base, passing gradually into basal margin. Height up to 3.3, diam. up to 0.8 mm (3.1 × 0.7 mm).

DISTRIBUTION. Portugal. 1 or 2 spp.

*Cecilioides (Terebrella)* Maltzan, 1886)  
Fig. 729

Maltzan, 1886: 27 (*Caecilianella* subg.).

TYPE SPECIES — *Caecilianella (Terebrella) clessini* Maltzan, 1886; OD.

Shell aciculate, of about 5 a little convex whorls. Regular sculpture absent. Aperture narrow, pointed above; parietal and columellar margins not separated from each other, with 1 or 2 nodules; upper dentiform, lower obliquely elongated (sometimes wanting). Columella truncated. Height 2.6-7.3, diam. 1.0-2.3 mm (4.8 × 1.8 mm).

DISTRIBUTION. Portugal. 2 spp.

*Cecilioides (Cecilioides* s. str.)  
Fig. 730

Shell pillar-shaped to aciculate, of 5-6 slightly convex whorls. Apex rounded. Regular sculpture absent. Aperture comparatively long, acuminate above, without any teeth. Columellar margin subvertical to slightly oblique, more or less distinctly

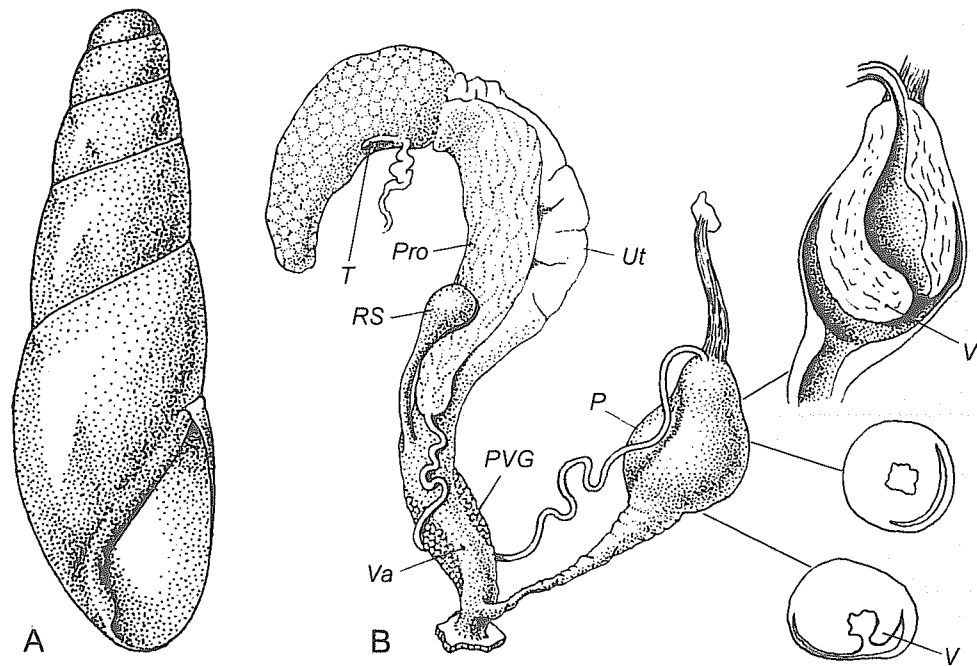


Fig. 730. *Ceciliooides (Ceciliooides) acicula* (Müller, 1774).  
A — shell. B — reproductive tract and interior of penis. Env. of Tsudahar city, Daghestan, E Caucasus, June 27, 1967. Moscow No. Lc-19595.

truncated. Height 4-6, diam. 1.2-1.6 mm (4.5 × 1.4 mm).

Talon small, not embedded in albumen gland. Prostate broad, band-like. Epiphallus as such absent. Vas deferens free, entering penis nearly terminally, at base of penial retractor. Penis clavate, with slender distal and swollen proximal portions; latter contains a voluminous thick-walled verge having a large cavity and excentric pore. Free oviduct very short, vagina rather long, with partially glandular walls (perivaginal gland). Spermathecal shaft moderately short, not expanded basally; reservoir not large, bound to prostate.

DISTRIBUTION. Central and S Europe, Africa, Asia Anterior, Arabian Peninsula. 30-40 sp. and forms.

#### CRYPTAZECINAE Schileyko, subfam. nov.

Kidney long, orthurethral, primary ureter completed, secondary open.

Penis internally with large verge bearing chitinous spines on its surface; similar spines present in distal section of female division.

DISTRIBUTION. Pyrenean Peninsula.

REMARK. As it has been shown by Gómez & Angulo (1987), the kidney of *Cryptazeca* is of orthurethral type; it was the reason, together with conchological characters, why these authors assigned the genus to the family Cochlicopidae. However, orthurethria is probably a primary condition for Stylommatophora and it sometimes retains in some taxa outside orthurethral groups (Schileyko, 1976). In this connection, it should be said that in *Cryptazeca* the primary ureter is completed — a feature not characteristic of kidney of true orthurethral groups. At the same time, the shell of *Cryptazeca* is similar to that of many other Ferrussaciidae, and the presence of perivaginal gland, very short epiphallus and voluminous verge may indicate a relationship between *Cryptazeca* and *Ceciliooides*. I isolate *Cryptazeca* as a subfamily to underline its peculiarity.

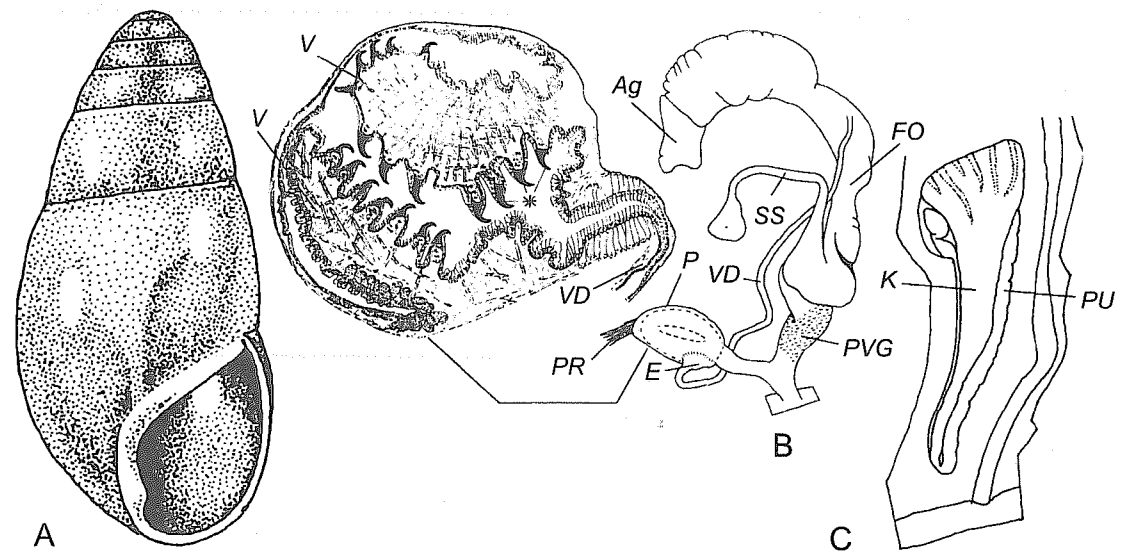


Fig. 731. *Cryptazeca monodonta* (Folin et Berillon, 1878).  
A — shell: "France, dept. Pyrénées-Atlantiques, Cambo, Olhaco-Shara". Leiden. B — reproductive tract and interior of penis. After Gómez, 1991. C — pallial complex. After Gómez & Angulo, 1987.

#### *Cryptazeca* Folin et Berillon, 1878 Fig. 731

Folin & Berillon, 1878: 3 (*Azeca* subg.). Gómez & Angulo, 1987: 57. Gómez, 1991: 95.

TYPE SPECIES — *Azeca monodonta* Folin et Berillon, 1878; OD.

Shell ovate, thin, shining, of about 6 flattened whorls. Apex obtuse, evenly rounded. Color yellowish or shell nearly colorless. Both embryonic and postembryonic whorls smooth, polished. Aperture ovate, with somewhat thickened margins; parietal wall toothless; columella with small tubercle, continuous with basal margin. Height 3-4, diam. 1.4-1.6 mm (3.0 × 1.4 mm).

Talon, a simple curvature of hermaphroditic duct. Spermooviduct unusually short. Vas deferens long, free, entering epiphallus terminally. Epiphallus very short, thick-walled. Penis subglobular, its lumen filled with very large verge of complex and highly peculiar structure [Gómez (1991) designated this organ as sarcobel-

lum]: it is a very fleshy organ with surface bearing numerous, connective-tissued papillae; each papilla has a sharp, curved, conchiolinous spine (hook) on its top. Penial retractor arising from diaphragm, attaching to penis apically. Free oviduct long, vagina shorter, expanded, with glandular walls (perivaginal gland). Inner surface of lower section of free oviduct and adjacent part of vagina equipped with spines similar to those in penis. Spermathecal stalk enlarged basally, reservoir not reaching albumen gland.

DISTRIBUTION. Western and northern parts of Iberian Peninsula. Some species live in caves. 6 spp.

#### Addition to Ferrussaciidae (?)

? *Digoniaxis* Jousseume, 1889  
Fig. 732

Jousseume, 1889a: 348. Neubert, 1998: 105.

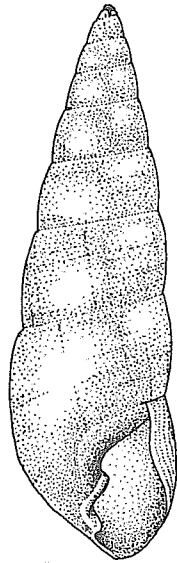


Fig. 732. *Digoniaxis bourguignati* (Jousseume, 1889). Aden. "Syntype" (actually holotype). Paris.

TYPE SPECIES — *Digoniaxis bourguignati* Jousseume, 1889; monotypy.

Shell turrated, thin, fragile, subtranspar-

ent, glossy, of 8-12 slightly convex whorls. Apex heterostrophic, narrowly rounded, a little obtuse. Suture very shallow. Practically colorless. Embryonic whorls smooth, following distinctly spirally striated; on 2-3 last whorls these striae crossed by very fine irregular radial lines. Aperture only slightly oblique, semioval, with thin margins; palatal arching forward. Columella vertical, truncated, with two lamellae; internal axis spirally sinuous. Height 7.5-14.0, diam. 2.4-3.0 mm (7.6 × 2.2 mm).

DISTRIBUTION. Arabia (Yemen) and Ceylon. 2 spp.

REMARK. Jousseume (1889) assigned the genus *Digoniaxis* to the family Ferrussaciidae, an opinion followed by Zilch (1959). However, recently Neubert (1998), after studying the "syntype" of the type species of *Digoniaxis* and an additional lot of 5 specimens came to the conclusion that *Digoniaxis bourguignati* must be placed in the family Pyramidellidae mainly because its protoconch is heterostrophic. Besides, he found that the type specimen is an immature shell and that adult shell has no columellar lamellae in the aperture. In all probability, Neubert's opinion is correct, nevertheless I give the description and illustration of type species of this genus, since the definite solution of this problem requires an anatomical study.

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