

BULLETIN

of the
FLORIDA STATE MUSEUM
Biological Sciences

Volume 33

1988

Number 2

THE HOLLOW-RIBBED LAND SNAILS OF THE GENUS
COELOSTEMMA OF THE SOUTHWESTERN
UNITED STATES AND MEXICO

Fred G. Thompson



UNIVERSITY OF FLORIDA

GAINESVILLE

Numbers of the BULLETIN OF THE FLORIDA STATE MUSEUM, BIOLOGICAL SCIENCES, are published at irregular intervals. Volumes contain about 300 pages and are not necessarily completed in any one calendar year.

S. DAVID WEBB, *Editor*
OLIVER L. AUSTIN, JR., *Editor Emeritus*
RHODA J. BRYANT, *Managing Editor*

Communications concerning purchase or exchange of the publications and all manuscripts should be addressed to: Managing Editor, Bulletin; Florida State Museum; University of Florida; Gainesville FL 32611; U.S.A.

This public document was promulgated at an annual cost of \$1338.75 or \$1.338 per copy. It makes available to libraries, scholars, and all interested persons the results of researches in the natural sciences, emphasizing the circum-Caribbean region.

ISSN: 0071-6154

CODEN: BF 5BA5

Publication date: May 26, 1988

Price: \$1.35

THE HOLLOW-RIBBED LAND SNAILS OF THE GENUS *COELOSTEMMA* OF THE SOUTHWESTERN UNITED STATES AND MEXICO

Fred G. Thompson*

ABSTRACT

This paper discusses the hollow-ribbed species of *Coelostemma* (Gastropoda, Pulmonata, Urocoptidae). *Goniapex*, new subgenus is proposed for *C. pyrgonasta*, new species (type locality: Bishop's Cap Mountain, New Mexico). Referred species are *C. townsendi* (Bartsch, 1906), *C. freytagi* Bartsch, 1950, *C. bryantwalkerii* (Pilsbry, 1917), *C. reiteri* Drake, 1951, and *C. attenuapex*, new species (type locality: 12.7 km SE Ciudad Camargo, Chihuahua). *Coelostemma marrsi* Drake, 1951 is a junior synonym of *C. freytagi* Bartsch, 1950. *Coelostemma* (*C.*) *scaphopleuron*, new species (type locality: 1.5 km WNW Colotlipa, Guerrero) also has hollow ribs, but is more closely related to solid-ribbed species from southern Mexico. *Holospira* (*Allocoryphe*) *minima* Martens, 1897 is superficially similar to *Goniapex* in that it also has hollow ribs.

RESUMEN

Se discuten las especies de *Coelostemma* (Gastropoda, Pulmonata, Urocoptidae) con costillas huecas. Se propone *Goniapex*, subgénero nuevo para *C. pyrgonasta*, especie nueva (localidad tipo: Bishop's Cap Mountain, New Mexico). Las especies asignadas son *C. townsendi* Bartsch, 1906), *C. freytagi* Bartsch, 1950, *C. bryantwalkerii* (Pilsbry, 1917), *C. reiteri* Drake, 1951, y *C. attenuapex*, especie nueva (localidad tipo: 12.7 km SE Ciudad Camargo, Chihuahua). *Coelostemma marrsi* Drake, 1951 es sinónimo de *C. freytagi* Bartsch, 1950. *Coelostemma* (*C.*) *scaphopleuron*, especie nueva (localidad tipo: 1.5 km WNW Colotlipa, Guerrero) también tiene costillas huecas, pero es más afín a especies de costillas sólidas del sur de México. *Holospira* (*Allocoryphe*) *minima* Martens, 1897 se parece superficialmente a *Goniapex* pues también tiene costillas huecas.

Key words: Gastropoda, Pulmonata, Urocoptidae, *Coelostemma*, *Holospira*, *Goniapex*, *Allocoryphe*, Mexico, Guerrero, Chihuahua, New Mexico, Bishop's Cap Mountain, Chihuahua Desert, sculpture.

*The author is Curator in Malacology, Florida State Museum, University of Florida, Gainesville, Florida 32611.

TABLE OF CONTENTS

Introduction	88
Acknowledgements	89
Measurements.....	89
<i>Coelostemma</i>	90
<i>Goniapex</i> new subgenus.....	90
<i>Coelostemma pyrgonasta</i> new species	92
<i>Coelostemma townsendi</i> (Bartsch).....	94
<i>Coelostemma freytagi</i> Bartsch.....	95
<i>Coelostemma reiteri</i> Drake.....	97
<i>Coelostemma attenuapex</i> new species.....	99
<i>Coelostemma bryantwalkerii</i> (Pilsbry).....	100
<i>Coelostemma scaphopleuron</i> new species.....	101
Literature Cited.....	102
Figures.....	104

INTRODUCTION

During recent years a considerable number of new species of land snails have been discovered inhabiting various mountain ranges in New Mexico. One is a snail described below from Bishop's Cap Mountain. It is particularly interesting because it belongs to a genus thought to be endemic to Mexico in areas far to the south of the United States border. Systematic affinities are with several poorly known species from the Chihuahua Desert. In order to properly define the species from New Mexico it is necessary to redescribe its Mexican counterparts. Collectively they comprise a very distinct group within *Coelostemma* (Urocoptidae, Holospirinae) and warrant the recognition of a new subgenus.

Coelostemma consists of snails with cylindrical shells that have an enlarged hollow axis internally. The axis may or may not bear spiral lamellae, nodes, or oblique thread-riblets. The species are obligate inhabitants of limestone. The genus is known from Veracruz, Oaxaca, Guerrero, Mexico, Colima, Nueva Leon, Coahuila, Durango, and Chihuahua, and is herein recorded from New Mexico. *Coelostemma* is divided into five subgenera. *Coelostemma* s. s. is found in the states bordering the southern edge of the Mexican Plateau, Coahuila and Nueva Leon (Pilsbry, 1953; Thompson, 1971). *Styloptyx* and *Crycoryne* are known only from southern Durango. *Apertaxis* is known only from the Sierra Guadalupe, Coahuila. The fifth subgenus is defined in this paper. It occurs in Chihuahua and New Mexico.

The snails treated in this paper have in common hollow axial ribs on the postembryonic whorls of the shell and also a simple, enlarged hollow columella. The structure of the columella places them in *Coelostemma*. The hollow ribs would suggest that they all are closely related within the genus. Hollow axial ribs are an uncommon morphological trait in the Holospirinae. Of the approximately 150 species named in this subfamily, only one has been described as having hollow ribs. The close relationships implied by the rib structure do not exist. Instead, the trait represents a case of morphological convergence. Features of the embryonic whorls demonstrate that hollow-ribbed species belong to three different generic or subgeneric groups.

ACKNOWLEDGEMENTS

I wish to express my gratitude to the following people who have assisted me in this project. For the loan of type specimens in their charge: John B. Burch, Museum of Zoology, University of Michigan (UMMZ); Robert Hershler, National Museum of Natural History (USNM). Kurt Auffenberg and Mary Lou Lyman assisted in the preparation of photographs and illustrations. Artie Metcalf, University of Texas, El Paso (UTEP) brought to my attention specimens of *Coelostemma pyrgonasta*, which led to a review of other species to which it appeared related. Field work in Mexico was conducted under permit 219.1, issued by the Dirección General de La Fauna Silvestre, Mexico. Specimens catalogued at the Florida State Museum are referred to by UF numbers.

MEASUREMENTS

Cylindrical land snails, such as Urocoptidae and Clausiliidae, are highly variable individually in shape due to allometric growth that frequently occurs in the lower whorls (e.g. Figs. 30-33, 42-46). Therefore shell measurements are made differently from those usually employed for other kinds of land snails. These measurements (Figs. 1, 2) are described here because confusion exists in the literature due to inconsistent methods used by various authors. SHELL LENGTH.- The distance parallel to the axis from the base of the peristome to the top of the apex (Fig. 1). SHELL WIDTH.- The widest part of the shell above the last whorl. This measurement does not include the peristome (Fig. 1). APERTURE WIDTH.- The greatest diameter perpendicular to the columella across the face of the aperture. This measurement includes the peristome (Fig. 1). APERTURE HEIGHT.- The greatest vertical distance across the aperture. This measurement includes the peristome and is made parallel to the face of the aperture (Fig. 2). ANGLE OF APERTURE.- The angle formed in lateral profile between the plane of the aperture and the axis of the shell (Fig. 2).

Coelostemma Dall, 1895*Goniapex*, new subgenus

Type species.-- *Coelostemma pyrgonasta*, new species.

Referred species.--

Holospira (Haplocion) townsendi Bartsch, 1906

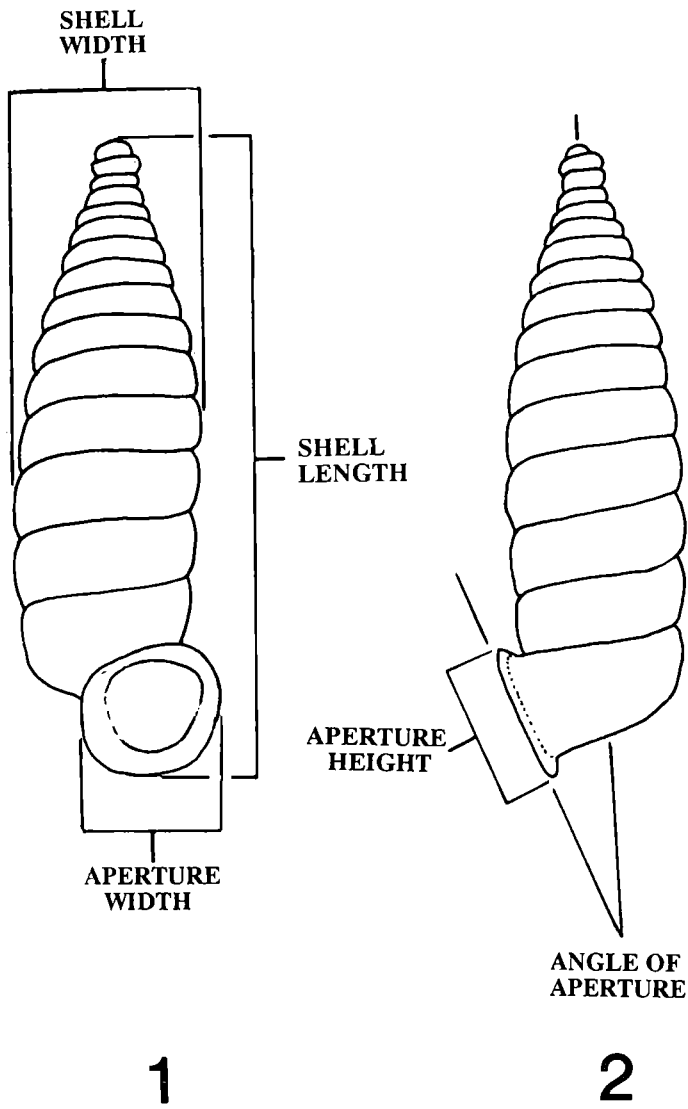
Holospira bryantwalkerii Pilsbry, 1917

Coelostemma freytagi Bartsch, 1950

Coelostemma reiteri Drake, 1951

Coelostemma attenuapex, new species

This subgenus is proposed for a group of species endemic to the Chihuahua Desert of northern Mexico and the southwestern United States. The species inhabits isolated limestone hills and mountain ranges where they occupy xeric habitats among limestone boulders and talus. The subgenus is characterized by the growth form of its embryonic shell, its postembryonic sculpture, its peristome, its columella, and its shell color. The embryonic shell consists of three or four large protruding whorls. The second whorl is conspicuously larger than the following two whorls and is distinctly angular at the periphery (Fig. 3). The embryonic sculpture is superficially smooth. Under high magnification it consists of a dense mesh of close, vertical threads and granules on the first two whorls and weak ribs on the third whorl (Figs. 3, 4). In contrast *Coelostemma s. s.* has low, rounded embryonic whorls bearing poorly defined granules and riblets (Fig. 52, 53). The embryonic whorls of *Crycoryne* and *Styloptyx* are similar to *Coelostemma s. s.* (Thompson 1971: 271, 290). The postembryonic shell of *Goniapex* is sculptured with hollow axial ribs, and incomplete, irregular incremental threads between the ribs (Figs. 3, 7). The peristome is broadly expanded and nearly equally wide around the aperture. It is flat-faced, in contrast to the trumpet-shaped opening that is found in most other Urocoptinae, including other subgenera of *Coelostemma*. The columella is hollow and large, being about 0.20-0.45 times the diameter of the shell. It is smooth and lacks lamellae or protuberances such as characterize the subgenera *Crycoryne* and *Styloptyx* (Thompson 1971). The dull lusterless shell is light brown or tan in color, in contrast to the glossy white shells of *Crycoryne*, *Styloptyx*, and most species of *Coelostemma s. s.* The growth form of the embryonic whorls and the broad, flat-faced peristome are unique features of *Goniapex*.



Figures 1, 2.-- Shell measurements of cylindrical land snails.

Relationships are difficult to determine within the morass of genera and subgenera that comprise the Holospirinae. *Goniapex* is treated as a subgenus of *Coelostemma* because of its enlarged hollow columella. About 15 genera and subgenera of Holospirinae are currently recognized, all of which are based upon shell characteristics. Evolutionary convergence in shell characters has been a common occurrence. The hollow-ribbed species discussed in this paper are an example of one such convergence in which species of three different subgenera show this trait. *Goniapex* is most similar in appearance to *Allocoryphe* Pilsbry 1946, a subgenus of *Holospira*, occurring west of the Sierra Madre Occidental in Sonora and Sinaloa. The type species, *H. (A.) minima* von Martens, has a dull brown shell with hollow axial ribs and has an enlarged hollow columella (Figs. 9-11). However, the aperture differs from that of *Goniapex* by being trumpet-shaped. The growth form of the embryonic whorls differs by regularly increasing in size, by being acutely angular at the shoulder and flattened below, and by the embryonic sculpture which consists of regularly spaced ribs that are overlaid by an open mesh of granular reticulations (Figs. 5, 6). A single species of *Coelostemma* s. s. also has hollow ribs, but other characteristics of the shell indicate relationships within that subgenus, as is discussed below. *Apertaxis* Pilsbry 1953 also may be closely related. The type species, *C. (A.) coahuilensis* (Bartsch 1906), has an extended apex, but the embryonic whorls are rounded and the postembryonic whorls support fine, solid thread-like riblets. The type species remains too poorly known to allow further interpretations of its phylogenetic position (Thompson 1971: 298-299).

Large areas of suitable habitat exist in southeastern and eastern Chihuahua from which no specimens of *Goniapex* have been collected. Further field work undoubtedly will discover additional new species in this group.

Etymology.-- The subgeneric name *Goniapex* is derived from the Classical Greek *gonia*, meaning angle, and *apex*, in allusion to the unique form of the embryonic whorls.

Coelostemma pyrgonasta, new species

Bishop Tubeshell

(Figs. 12-14)

Description.-- Shell elongate-elliptical in shape. Cylindric portion consisting of 4-5 whorls, slightly tapering upward. Apex elongate conical, containing about 10-11 whorls; first two embryonic whorls distinctly enlarged and strongly angular peripherally (Figs. 3, 12, 13); apex weakly concave in outline below embryonic whorls. Last whorl with a short neck extending

peristome about 1 mm forward (Fig. 13). Neck slightly flattened dorsally, rounded laterally and below. Shell medium-sized and moderately stocky; about 15-18 mm long; about 0.28-0.32 times as wide as long. Color light brown with light tan ribs; peristome white; interior of aperture tan. Shell narrowly umbilicate. Columella simple and hollow (Fig. 14); slightly concave within each whorl; widest at base of spire, gradually narrowing below. Columella 0.30-0.36 times width of shell. Whorls 14.8-16.6; weakly arched and nearly flattened peripherally. Suture moderately impressed. Embryonic whorls 2.7-3.2; first 2.5 whorls superficially smooth, followed by oblique, weak axial riblets. Sculpture on postembryonic shell consisting of narrow, protracted, arched, hollow axial ribs that are about half as wide as their interspaces. Ribs narrowest at their upper ends, slightly enlarged at their bases and only slightly crenulating the suture. Penultimate whorl with 30-48 ribs (41 in holotype). Ribs on last whorl continuing around base and into umbilicus; forming an angular crest around baso-lateral margin where the ribs are abruptly reduced in height (Fig. 12). Aperture slightly wider than high; 0.67-0.73 times width of shell; 0.20-0.23 times length of shell; aperture opening ovate in shape. Peristome moderately wide and flat; widest in baso-columellar area, and usually narrowest in parietal-columellar corner. Plane of aperture lying at an angle of about 15-21° to axis of shell.

Measurements in mm of the holotype and four paratypes (UF 34482) selected to show variation are as follows.

	length	width	aper.h.	aper.w.	whorls
Holotype	16.7	5.8	3.6	3.6	15.9
Paratype	14.5	4.5	3.3	3.3	14.9
Paratype	16.6	4.9	3.6	3.6	15.7
Paratype	17.1	5.2	3.4	3.5	16.4
Paratype	17.8	5.0	3.5	3.6	16.0

Type locality.-- NEW MEXICO, Dona Ana County, west-northwest side of Bishop's Cap Mountain (32° 11' 25" N, 106° 36' 06" W); 5200 ft (1600 m) altitude, 200 ft (60 m) below the summit. HOLOTYPE: UF 93143; collected 1 December 1970 by Fred G. Thompson and Artie Metcalf; PARATYPES: UF 34481 (30), UF 34482 (31), UF 34483 (36), UTEP 9957 (18); same locality as the holotype.

Bishop's Cap is a nearly conical mountain that is capped with a dense limestone which forms abrupt cliffs about 65 m high surrounding the summit. Snails were found only in talus at the base of the cliffs, where they were aestivating on the underside of huge limestone boulders.

Distribution.-- *C. pyrgonasta* is confined to the uppermost slopes around the summit of Bishop's Cap Mountain, New Mexico. It is very disjunct in its distribution from other known species of *Coelostemma*.

Remarks.-- This species is readily distinguished by its elliptical-conical shape, very short neck behind the peristome, low number of whorls, large number of ribs, the baso-lateral angle formed by the ribs on the last whorl, and the non-uniform width of the peristome. The slope of the aperture is greater than is usual for *Goniapex*. Most specimens have a slope of $20-21^\circ$ to the axis of the shell. The general appearance of the shell is more like that of a large *Microceramus* than the cylindrical shape that characterizes most other *Coelostemma*.

Etymology.-- The species name *pyrgonaste* is from the classical Greek *pyrgos*, meaning tower, and *nastes*, meaning inhabitant, in allusion to the geographic confinement of this species to the uppermost slope of Bishop's Cap Mountain. In addition, a vernacular name is proposed for this species.

Coelostemma townsendi (Bartsch, 1906)
(Figs. 15-21)

Holospira (Haplocion) townsendi Bartsch, 1906; Proc. U. S. National Museum 31: 145-146; pl. 4, fig. 13.

Haplocion townsendi Bartsch, 1943; J. Washington Acad. Sci. 33: 56.

This species was known previously only from the holotype (USNM 109215). The original illustration consists of a photograph of the frontal view. It is in poor focus and does not depict satisfactorily its characteristics. A new description is given for the species based on the holotype and additional material from near the type locality (UF 34490).

Description.-- Shell compact cylindrical-turret in shape; cylindric part of shell consisting of about seven whorls that are nearly equal in diameter; apex consisting of about 8-10 whorls that gradually diminish in size forming a convex spire; first two embryonic whorls conspicuously enlarged and protruding, forming a slight concavity on spire at this point. Shell medium-sized, about 15-18 mm long; about 0.26-0.31 times as wide as long. Color of shell dull tan with nearly white axial ribs; aperture and peristome white. Shell narrowly umbilicate. Columella hollow, widest near middle of shell (Fig. 18, 21); about 0.27-0.29 times width of shell. Whorls 15.1-18.1, weakly arched with a moderately impressed suture. Embryonic whorls 2.6-3.1; protruding, conspicuously angular peripherally. Postembryonic whorls with posteriorly arched hollow axial ribs that are narrowest apically and widest at their base; ribs not alternating, nor crenulating suture; ribs about half as wide as their interspaces; about 31-41 on penultimate whorl (38 in holotype, *vide* Bartsch 1906). Aperture extended forward slightly on a very short neck (Fig. 19); lying at an angle of $9-18^\circ$ to axis of shell; aperture opening circular, slightly

wider than high. Peristome broadly reflected, nearly uniformly wide around aperture. Aperture 0.68-0.85 times width of shell, 0.18-0.22 times length of shell.

Measurements in mm of the holotype and five specimens selected to show variation are as follows.

	length	width	aper.h.	aper.w.	whorls
Holotype	16.3	4.5	3.6	3.3	15.0
UF 34490	15.1	4.1	3.0	3.1	16.2
UF 34490	16.0	4.8	3.3	3.3	16.7
UF 34490	17.0	4.6	3.6	3.6	17.6
UF 34490	17.8	4.6	3.9	3.9	18.1
UF 34490	18.4	4.7	3.3	3.2	18.2

Type locality.-- CHIHUAHUA, Cerro Chilicote, (28° 47'W, 106° 05'N); **HOLOTYPE:** USNM 10925; collected by C. H. T. Townsend. Cerro Chilicote is a low peak on a low limestone range extending NNW-SSE, and is approximately 20 km north of Chihuahua City and due east of the pueblo of Alamida.

Specimens examined.-- CHIHUAHUA, 5 km NNE Chihuahua (UF 34490, 68 specimens; Museo Nacional de Mexico, 10 specimens; UTEP, 10 specimens). The holotype was also examined.

Distribution.-- Known only from the two localities cited above.

Remarks.-- This snail is distinguished from other species of *Goniapex* by its compact cylindric-turret shape, its more numerous ribs per whorl, and the slight forward projection of the aperture. The series of 68 specimens before me from 5 km NNE Chihuahua (UF 34490) are similar to the holotype in all respects. The locality from which the specimens came is separated from the type locality only by a distance of about 12 km and is on the same limestone ridge.

Bartsch (1906: 145-146) placed *townsendi* in *Haplocion* on the basis of its smooth columella, even though he noted that it is enlarged and hollow in contrast to typical *Haplocion*, which has a solid slender columella. In addition, the configuration of the embryonic whorls differs from that of *Haplocion*. In typical *Haplocion* the embryonic whorls are low and weakly rounded.

Coelostemma freytagi Bartsch, 1950
(Figs. 22-29)

Coelostemma freytagi Bartsch, 1950; J. Washington Acad. Sci. 40: 265; figs. 1.

Coelostemma marrsi Drake, 1951; Revista Sociedad Malacologica 8: 39-40; figs 1-2.

This species was described by Drake as *Coelostemma marrsi* on the basis of advice by Bartsch that it represented a new species. Almost concurrent with Drake's description, but slightly earlier, Bartsch described the species as *C. freytagi*. The holotype of *freytagi* has a complete apex and is in nearly perfect condition (Figs. 22, 23). Apparently this is the only specimen Bartsch received from Freytag. The holotype of *marrsi* has a broken apex and is badly eroded (Fig. 24). Drake had about 20 specimens in the paratypic series. Apparently none had complete apices. A new description is given for the species based upon the study of more extensive material.

Description.-- Shell elongate cylindric-turret in shape. Medium-sized, about 16.4-21.0 mm long; about 0.21-0.25 times as wide as long. Apex attenuate; concave in outline along uppermost whorls. Umbilicus rimate or narrowly perforate. Color light grayish-brown with nearly white ribs; aperture and peristome white. Columella tubular, weakly concave within each whorl, about 0.22-0.28 times diameter of shell at widest whorl; widest at base of apex, narrowing toward base of shell (Fig. 25). Whorls 16.1-20.1, weakly arched with a moderately impressed suture; suture weakly crenulated at base of ribs. Embryonic whorls 2.7-3.3; first two smooth; next embryonic whorl with weak axial riblets that gradually increase in size. Following whorls sculptured with large, hollow, oblique ribs that are higher than wide and are about half the width of their interspaces; ribs more crowded toward apex, more widely spaced below; ribs weakly reversed-sigmoid, narrowest at their apex and enlarged at their base; 17-25 ribs on penultimate whorl (holotype of *freytagi*, 20; holotype of *marrsi*, 25). Aperture projected forward on a moderately long neck that is about 1/4 as long as diameter of last whorl; neck rounded peripherally and below, flattened above and forming a rounded angle dorso-laterally. Aperture opening broadly ovate, about as wide as high. Peristome broadly expanded, flat, equally wide around aperture. Width of aperture about 0.75-0.88 times width of shell; height about 0.16-0.21 times length of shell. Aperture lying at an angle of about 7-14° to axis of shell in lateral profile (Figs. 29).

Measurements in mm for the two holotypes and five other specimens (UF 34485) selected to show variation are as follows.

	length	width	aper.h.	aper.w.	whorls
<i>freytagi</i>	17.7	4.1	3.6	3.3	18.1
<i>marrsi</i>	18.2	4.6	3.4	3.3	14 +
UF 34485	16.7	4.1	3.3	3.3	16.9
UF 34485	17.7	4.1	3.3	3.5	16.8

UF 34485	18.1	4.4	3.2	3.3	17.2
UF 34485	19.7	4.5	3.6	3.7	18.6
UF 34485	21.0	4.5	3.4	3.7	20.1

Type localities.-- *Coelostemma freytagi* Bartsch 1950: CHIHUAHUA, 29 km west of [Ciudad] Jimenez; HOLOTYPE: USNM 601851; collected by George F. Freytag. *Coelostemma marrsi* Drake 1951: CHIHUAHUA, Cueva Diablo, near Salaices; HOLOTYPE: USNM 601645; Collected by Robert J. Drake, 18 August 1947. Both localities are in the Sierra Almoloya.

Specimens examined.-- I examined the holotypes of both *freytagi* and *marrsi*. The following specimens from the Sierra Almoloya were also studied. CHIHUAHUA: 4 km N of Salaices, 1450 m alt. (UF 34485, 41 specimens); 5.7 km WSW, 3 km N Salaices, 1600 m alt. (UF 34486, 22 specimens; Museo Nacional de Mexico, 10 specimens).

Distribution.-- Apparently this species is endemic to the Sierra Almoloya. This is a low limestone range that is about 6 km wide and lies just a few kilometers north of Salaices. The range is also inhabited by two other endemic land snails, *Oreohelix almoloya* Drake 1949 and *Haplocion greggi* (Drake 1951). The latter species was described as *Coelostemma greggi* (Drake 1951: 40-41), but the slender, solid axis, as well as all other aspects of the shell clearly place it in *Haplocion* (Thompson 1971: 269).

Remarks.-- This snail is identified by its relatively slender shape, its moderately attenuate, concave apex, the low number of ribs on the penultimate whorl, and the relatively long neck behind the aperture. Apparently the species is most closely related to *C. reiteri* Drake because of the shape of the apex and its crenulated suture.

Coelostemma reiteri Drake, 1951
(Figs. 30-34)

Coelostemma reiteri Drake, 1951; Revista Sociedad Malacologica 8: 41-42; figs. 5-6.

Description.-- Shell obese, turret in shape with a moderately attenuate apex; Upper portion of spire strongly concave in outline. Cylindric portion of shell barrel-shaped, consisting of about six whorls. Apex consisting of about 13-17 whorls that gradually decrease in size and form an extended concave spire. First two embryonic whorls strongly angular at periphery and noticeably larger than next two whorls. Shell large, about 19-24 mm long; about 0.25-0.33 times as wide as long. Last whorl with a short neck; length of neck about 1/6-1/3 the diameter of last whorl. Neck rounded laterally and

below, weakly compressed above; upper ends of ribs forming a weak angle along dorso-lateral margin of neck. Color light brown with nearly white ribs; aperture and peristome white. Columella hollow; broad and club shaped; about 0.31-0.44 times width of shell; weakly concave within each whorl. Columella widest at base of apex, tapering gradually to last whorl; surface of columella sculptured with numerous minute granules. Whorls, 18.1-23.1; moderately arched with a moderately impressed suture. Embryonic whorls 3.0-3.5. Postembryonic whorls sculptured with numerous protracted, posteriorly arched, hollow ribs that are almost as wide as their interspaces, and are slightly higher than wide; 32-48 ribs on penultimate whorl. Ribs narrow above; widest at their bases which crenulate the suture. Aperture opening nearly circular, tending to be flattened above. Aperture width about 0.65-0.79 times width of shell; aperture height about 0.18-0.23 times length of shell. Peristome broadly expanded, flat, nearly uniformly wide around aperture opening. Plane of aperture lying at an angle of about 11-20° to axis of shell.

Measurements in mm for the holotype (USNM 601627) and six other specimens selected to show variation are as follows.

	length	width	aper.h.	aper.w.	whorls
Holotype	23.7	7.2	4.6	4.9	19 +
UF 34492	19.0	5.7	4.3	4.4	18.2
UF 34492	20.2	5.5	3.9	3.7	19.2
UF 34492	22.1	5.6	4.1	4.1	20.3
UF 34491	21.0	6.3	4.0	4.1	20.6
UF 34491	23.0	5.9	4.3	4.1	22.6
UF 34491	24.0	6.1	4.7	4.8	23.0

Type locality.-- CHIHUAHUA, Distrito Jimenez, Los Remedios (26° 53'N, 104° 21'W). Los Remedios is a small village at the southeast end of the Sierra de Los Remedios.

Specimens examined.-- I have examined the holotype and the following specimens. CHIHUAHUA: Sierra Las Margaritas, 21 km NE Ciudad Jimenez, 1385 m alt. (UF 34491, 38 specimens); limestone ridge 26 km SSE Ciudad Camargo, 1260 m alt. (UF 34484, 145 specimens; UF 34492, 59 specimens; Museo Nacional de Mexico, 25 specimens; UTEP 9959, 10 specimens).

Distribution.-- This species occurs in southeast Chihuahua in a series of low limestone mountain ranges that extend in a linear direction from Los Remedios northwest to about halfway between Ciudad Jimenez and Ciudad Camargo.

Remarks.-- This species is readily distinguished by its large, obese size, its strongly recurved axial ribs, its wide hollow columella, and its nearly round

aperture opening. Drake (1951: 41-42) selected a specimen with a broken apex for the holotype. He stated incorrectly that the holotype is 20.4 mm long and 7 mm wide.

Coelostemma attenuapex, new species
(Figs. 35-39)

Description.-- Moderately large; slender with a very attenuate apex. Shell about 21-23 mm long; about 0.22-0.24 times as wide as long. Cylindric portion consisting of about 6-7 whorls. Apex consisting of about 14-16 whorls. Widest point of shell at about 4-5 whorls above aperture. The lower whorls narrow slightly, and the upper whorls taper gradually into the very attenuate cone. First two embryonic whorls strongly carinate and conspicuously larger than next two whorls. Last whorl with a short neck extending forward for a distance equal to about 1/6-1/3 the diameter of the last whorl. Color of shell light tan with whitish ribs; aperture and peristome white. Shell rimate or very narrowly umbilicate. Columella hollow and ample, about 0.30-0.36 times diameter of shell (Fig. 39); widest at about middle of shell, tapering slightly below. Columella straight-sided within each whorl. Whorls, 21.8-23.6. Embryonic whorls, 3.0-3.4. Remaining whorls on spire and cylindric portion of shell sculptured with large, protracted, posteriorly arched, hollow axial ribs that are about as wide as their interspaces; ribs continuing on neck almost undiminished. Penultimate whorl with 21-29 ribs (29 in holotype). Ribs narrowing above and enlarged at their bases where they crenulate the suture. Aperture opening broadly ovate in shape; slightly wider than high. Width of aperture about 0.70-0.82 times width of shell; height about 0.16-0.20 times length of shell. Peristome very wide and flat; nearly uniform in width around aperture. Plane of aperture lying at an angle of about 10-16° to axis of shell.

Measurements in mm of three specimens selected to show variation are as follows.

	length	width	aper.h.	aper.w.	whorls	emb.wh.
Holotype	22.0	5.0	4.2	4.1	22.2	3.1
Paratype	21.0	5.0	4.1	4.1	21.8	3.3
Paratype	22.3	5.0	-	3.5	23.2	3.4

Type locality.-- CHIHUAHUA, limestone ridge 12.7 km southeast of Ciudad Camargo; 1275 m altitude. This locality is along the road to Ojinaga, and is 2.5 km northeast of old Hwy. 45. The area is covered with a sparse growth of xeric scrub. Snails were found aestivating under blocks of

limestone. HOLOTYPE: UF 93144; collected 25 November 1970 by Fred G. Thompson. PARATYPES: UF 34488 (23), Museo Nacional de Mexico (5); same data as the holotype.

Distribution.-- Known only from the type locality.

Remarks.-- This snail is readily distinguished by its size, its very attenuate apex, its closely spaced ribs, its moderate neck and its relatively wide columella. It is most closely related to an undescribed species from the Sierra de Camargo, from which it differs by having fewer ribs and a longer apex. The material on hand of the latter species (UF 34889) is inadequate for taxonomic description.

Etymology.-- The name *attenuapex* is derived from the Latin *attenuatus* and *apex* and alludes to the most striking feature of the species.

Coelostemma bryantwalker (Pilsbry, 1917)
(Figs. 40, 41)

Holospira bryantwalker Pilsbry, 1917; Nautilus 30: 124-125; pl. 4, fig. 6.

This species is known only from the holotype (UMMZ 140145), which was found in river drift "along the Rio Conchos, not far above its confluence with the Rio Grande," CHIHUAHUA. Measurements in mm for the holotype are: length, 19.5; width, 5.3; aperture height, 4.1; aperture width, 4.2; 14.8 whorls remaining; penultimate whorl with 43 ribs. It has a broken apex. Three important traits of the specimen are: (1) the ribs are hollow, (2) the peristome is flat and nearly uniformly wide around the aperture, and (3) the columella is simple and hollow. These traits indicate the relationship of *C. bryantwalker* with the other hollow-ribbed species placed in *Goniapex*. It is similar in appearance to *C. townsendi*, but it is larger, has more numerous ribs, and has a longer neck on the last whorl. The distribution of the species remains unknown. The Rio Conchos drains a very large area of Chihuahua, and the holotype could have originated hundreds of kilometers from where it was found.

Coelostemma Dall, 1895 s. s.

A new species from southern Mexico is described below. It has hollow ribs, as do the other species discussed above, but its subgeneric relationships appear to be in *Coelostemma* s. s. because of the structure of the embryonic whorls.

Coelostemma scaphopleuron, new species
(Figs. 42-47)

Description.-- Shell elongate-clavate in shape with a long neck on last whorl and a short apex with protruding embryonic whorls; greatest width of shell slightly above middle. Cylindric portion of shell consisting of 8-9 whorls. Apex short, consisting of about 6-8 whorls; concave in outline below protruding embryonic whorls. Medium-sized, about 13-18 mm long; moderately slender, about 0.26-0.31 times as wide as long. Color of shell tan with light colored axial ribs; interior of aperture and peristome white. Umbilicus rimate or narrowly perforate. Columella hollow and tubular, about 0.53-0.59 times diameter of whorl; white with faint, oblique axial thread-riblets. Whorls 13.6-17.3 (15.2 in holotype), flattened peripherally; suture moderately impressed. Embryonic whorls 2.6-3.0 (2.9 in holotype); rounded peripherally with a deep suture (Fig. 48); sculptured with minute granular reticulations (Fig. 49); last half embryonic whorl with faint axial ribs. Subsequent whorls sculptured with hollow axial ribs that are about half or a third as wide as their interspaces and crenulate the suture along their upper ends (Fig. 8); ribs tend to alternate along the suture; ribs weakly sigmoid on middle whorls, arched posteriorly on upper and lower whorls and becoming obsolete on neck of last whorl; 27-38 ribs on penultimate whorl (31 in holotype). Interspaces between ribs smooth or with scattered minute granules. Aperture extending forward on a short neck that is about 0.2-0.3 times the diameter of the last whorl; neck flattened above, rounded peripherally and basally. Aperture slightly wider than high, about 0.65-0.71 times diameter of shell and about 0.17-0.20 times length of shell; lying at an angle of 8-19° to axis of shell. Interior of aperture auriculate in shape with a conspicuous parietal tubercular projection near posterior corner that underlies an elongate indentation externally. Peristome moderately reflected and trumpet-shaped, not flat-faced as in other species discussed above; widest along basal and columellar margin; narrowest around posterior corner.

Measurements in mm of the holotype and four paratypes (UF 34487) selected to show variation are as follows.

	length	width	aper.h.	aper.w.	whorls
Holotype	15.4	4.2	2.8	3.0	15.2
Paratype	13.2	4.0	2.5	2.7	14.3
Paratype	14.3	4.4	2.7	2.9	14.9
Paratype	16.3	4.3	2.8	3.0	15.8
Paratype	17.8	4.1	3.1	2.9	17.2

Type locality.-- GUERRERO, limestone ridge 1.5 km west-northwest of Colotlipa (99° 10'W, 17° 26'N); 800 m alt. The type locality is the area adjacent to the Cueva de Colotlipa and is forested with a dense submesic thicket of trees and shrubs. Snails were found aestivating on exposed limestone. **HOLOTYPE:** UF 93145; collected 3 November 1970 by Fred G. Thompson. **PARATYPES:** UF 34487 (53), Museo Nacional de Mexico (5); same data as holotype.

Distribution.-- Known only from the type locality.

Remarks.-- There are no other hollow-ribbed species of *Coelostemma* s. s. with which this snail can be compared. However, a close relationship with *C. fusca* (Martens, 1897) may exist. *C. fusca* is a small brown snail that lives at higher altitudes near Omilteme, Guerrero. Its shell is sculptured with fine, solid riblets. The embryonic shell-form and sculpture of *C. fusca* (Figs. 50, 51) are very similar to those of *C. scaphopleuron* (Figs. 48, 49), contrasting strongly with the embryonic characteristics of *Coelostemma elizabethae* (Pilsbry 1895), the type species of *Coelostemma* (Fig. 52, 53). A close relationship between *C. fusca* and *C. scaphopleuron* is suggested on this basis.

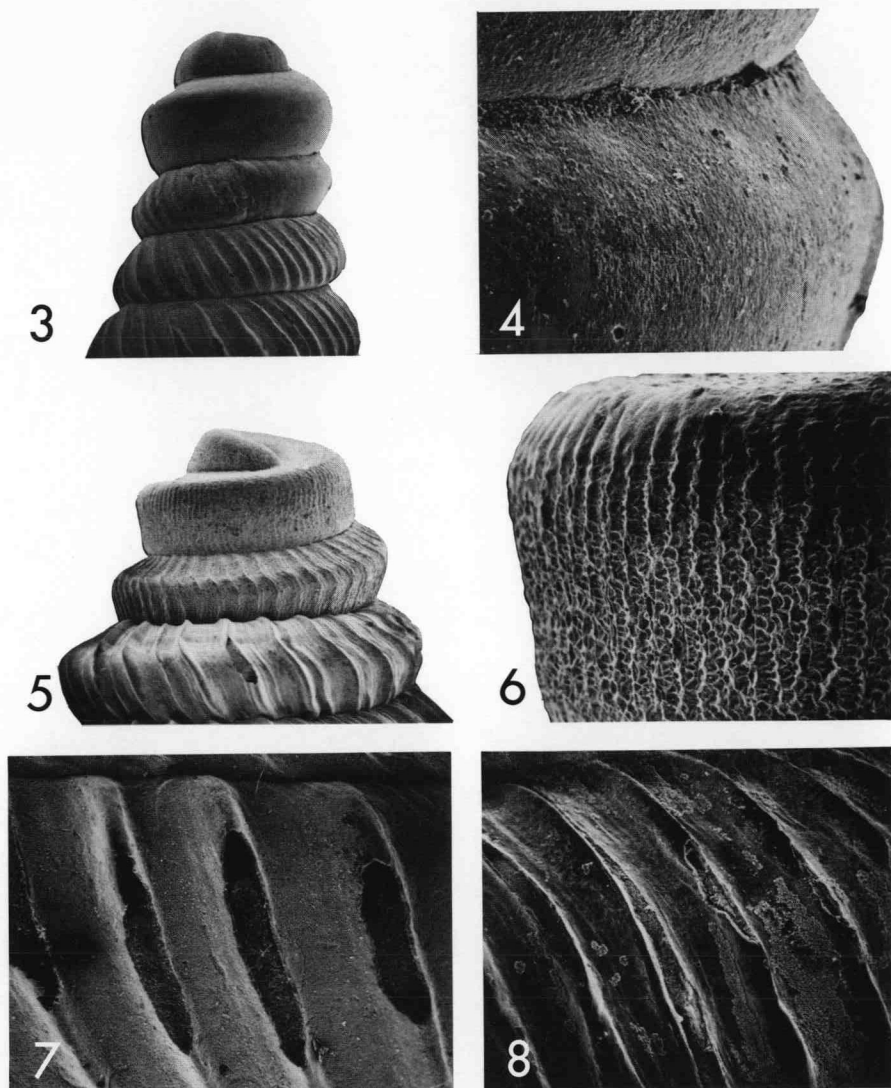
The Rio Balsas basin of Guerrero and Oaxaca is inhabited by a great diversity of *Coelostemma*, all of which currently are placed in *Coelostemma* s. s. (Thompson 1971). Pilsbry (1946: 123) erected the subgenus *Megaxis* for *Holospira fusca* Martens 1897. Thompson (1971) synonymized *Megaxis* with *Coelostemma* s.s. on the basis that its characteristics were not sufficiently distinct to separate the two groups in light of the morphological variation of some recently described species. Much more field work in the Rio Balsas basin is required in order to clarify the group relationships of the numerous species that inhabit the region, and undoubtedly many new species remain to be described. Eventually it may be necessary to recognize more than one subgenus in this area.

Etymology.-- The name *scaphopleuron* is derived from the classical Greek, *skaphe*, hollow, and *pleuron*, rib. The name alludes to the hollow ribs on the shell. It is the only known species of *Coelostemma* s. s. that has hollow ribs.

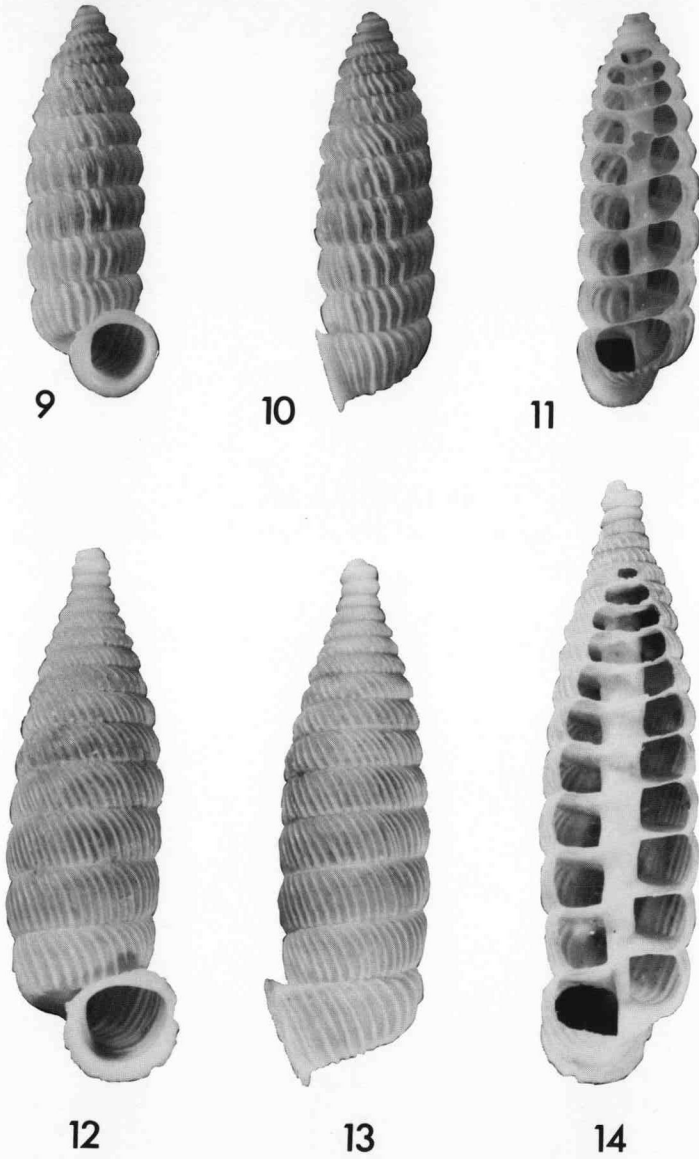
LITERATURE CITED

- Bartsch, P. 1906. The urocoptid mollusks from the mainland of America in the collection of the United States National Museum. Proc. U. S. Natl. Mus. 31:109-160; pls. 3-5.
_____. 1950. A new terrestrial mollusk from Mexico. J. Washington Acad. Sci. 40:265; fig. 1.
Drake, R. J. 1949. A new species of *Oreohelix*, subgenus *Radiocentrum*, from southeastern Chihuahua. Nautilus 62:109-112; pl. 8.
_____. 1951. Three new species of *Coelostemma* from southeastern Chihuahua. Revista Sociedad Malacologica 8:39-42; pl. 6.

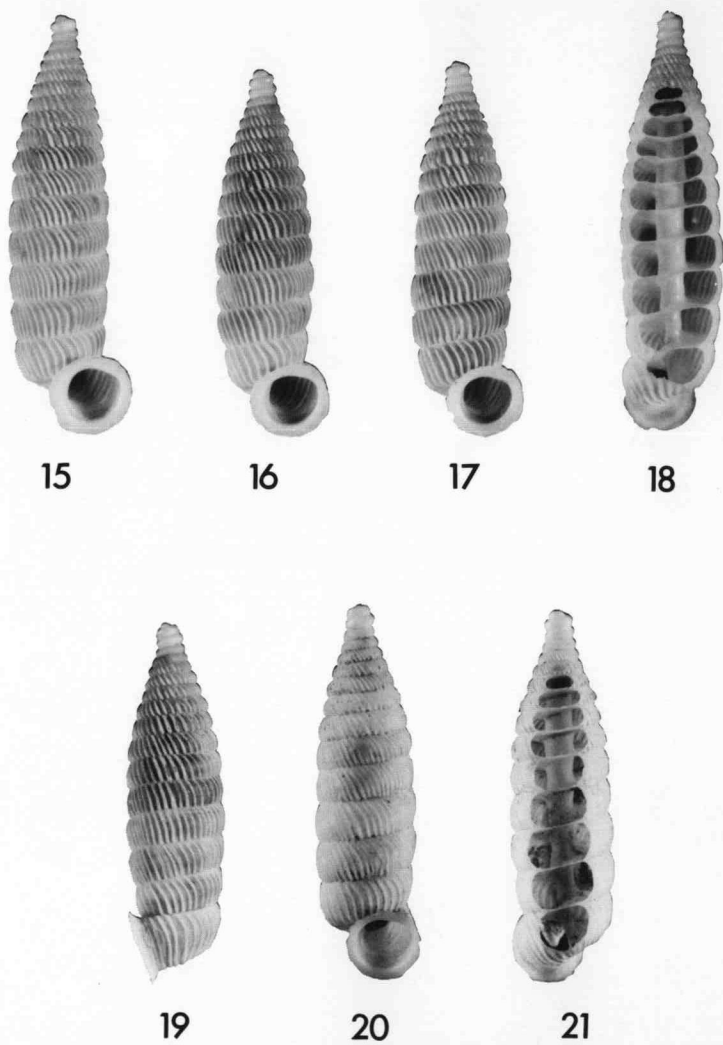
- Martens, Eduard von. 1890-1901. *Biologia Centrali Americana: Land and freshwater Mollusca*. London. 706 p., 44 pls.
- Pilsbry, H. A. 1889. New and little known American molluscs. No. 1. *Proc. Acad. Nat. Sci., Philadelphia* 41:81-88.
- _____. 1917. A new *Holospira* from Chihuahua. *Nautilus* 30:124-125, pl. 4, fig. 6.
- _____. 1946. *Land Mollusca of North America*, vol. 2, pt. 1:1-520. Philadelphia.
- _____. 1953. Inland Mollusca of northern Mexico. II. Urocoptidae, Pupillidae, Strobilopsidae, Valloniidae and Cionellidae. *Proc. Acad. Nat. Sci., Philadelphia* 105:133-167.
- Thompson, F. G. 1971. Some Mexican land snails of the genera *Coelostemma* and *Metastoma*. *Bull. Florida State Mus., Biol. Sci.* 15(5):267-302; figs. 1-12.



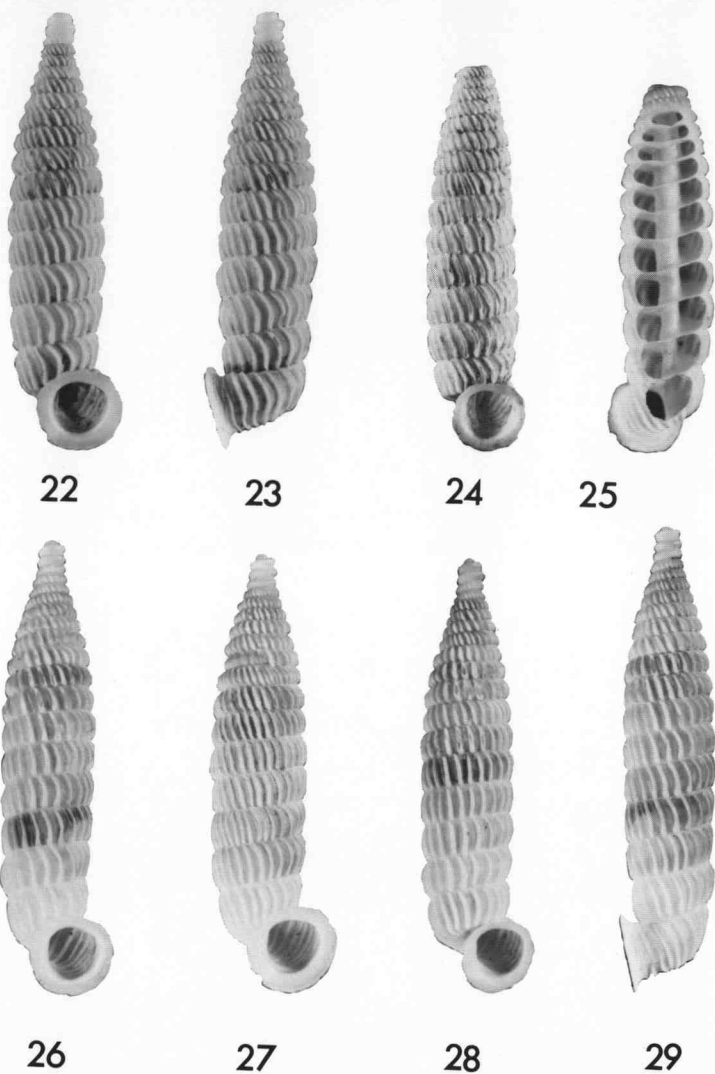
Figures 3-8.-- Sculpture of Holospirinae. Figs. 3, 4, 7.- *Coelostemma* (*Goniapex*) *pyrionasta*, new species, PARATYPE (UF 34483). Figs. 5, 6.- *Holospira* (*Allocoryphe*) *minima* Martens, hill 2 km. S Hermosillo, Sonora (UF 93142).- Fig. 8.- *Coelostemma* (s. s.) *scaphopleuron*, new species, PARATYPE (UF 34487). Fig. 3, X 18.7; Figs. 4, 6, X 125; Fig. 5, X 25; Figs. 7, 8, X 51.



Figures 9-14.-- Figs. 9-11.- *Holospira (Allocoryphe) minima* Martens, hill 1 km S Hermosillo, Sonora (UF 34496). Figs. 12, 13.- *Coelostemma (Goniapex) pyrgonasta*, new species, HOLOTYPE (UF 93143). Fig. 14.- PARATYPE (UF 34482). Figs. 9-14 X 5.



Figures 15-21.-- *Coelostemma townsendi* (Bartsch). Figs. 15-19.- (UF 34490). Figs. 20,21.- HOLOTYPE (USNM 109215). Figs. 15-21 X 3.5.



Figures 22-29.-- *Coelostemma freytagi* Bartsch. Figs. 22, 23.- HOLOTYPE of *Coelostemma freytagi* Bartsch (USNM 601851). Fig. 24.- HOLOTYPE of *Coelostemma marrsi* Drake (USNM 601626). Figs. 25-29.- (UF 34485). Figs. 22-29 X 3.4.



30



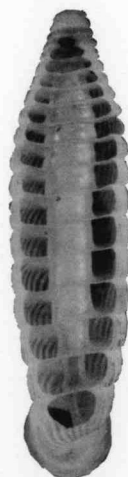
31



32

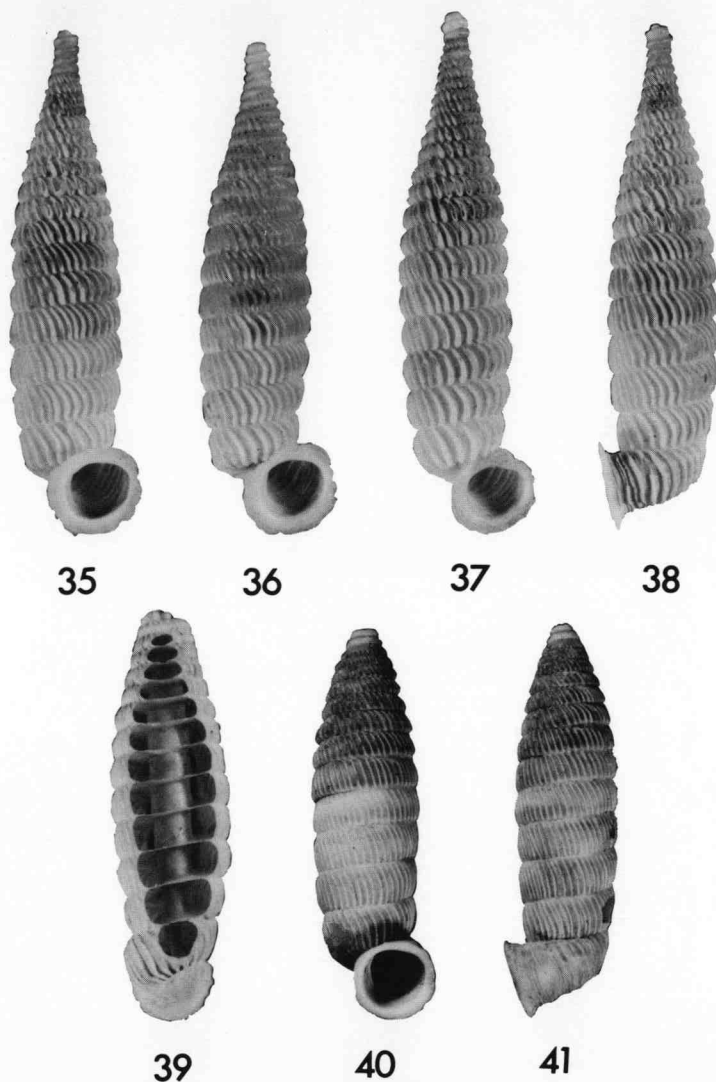


33

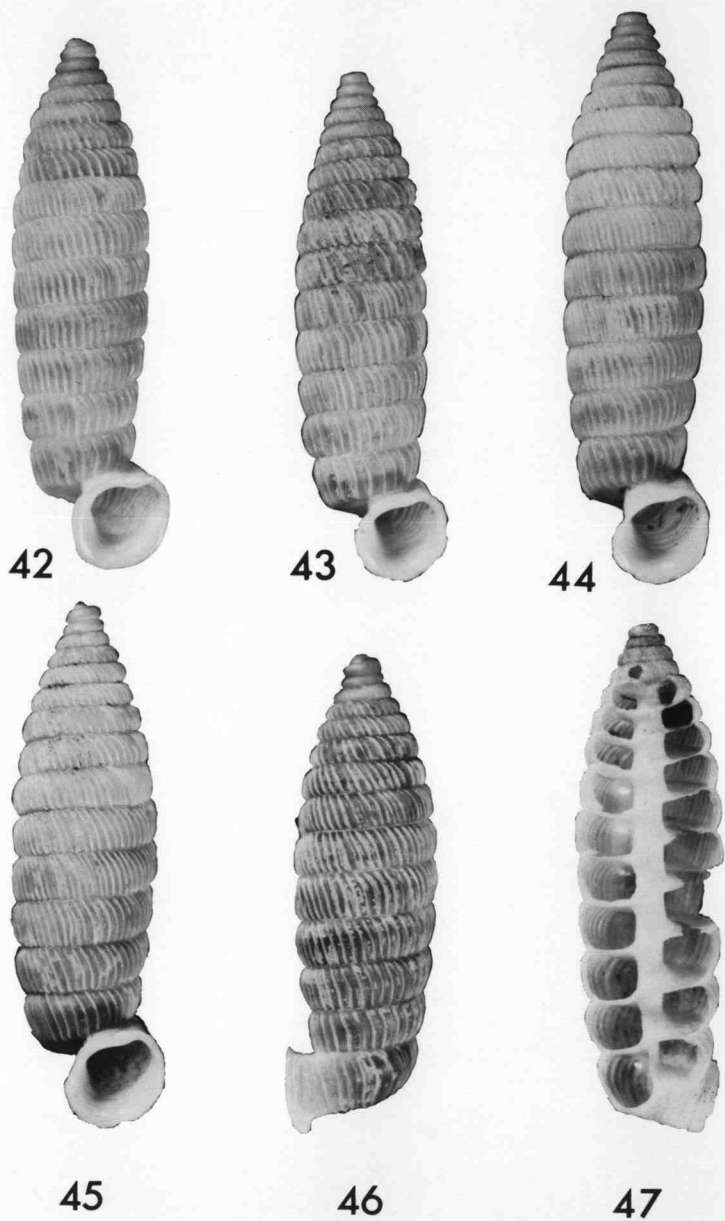


34

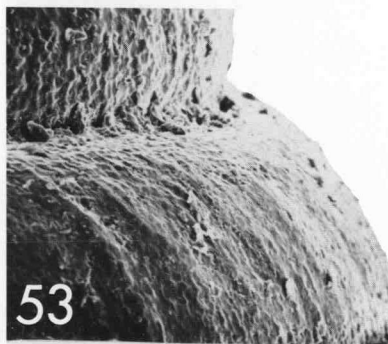
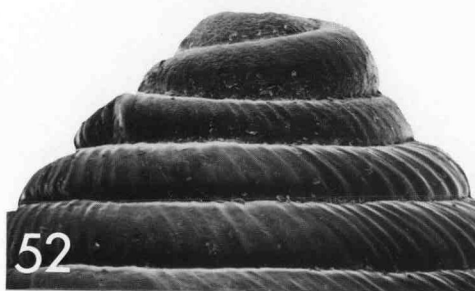
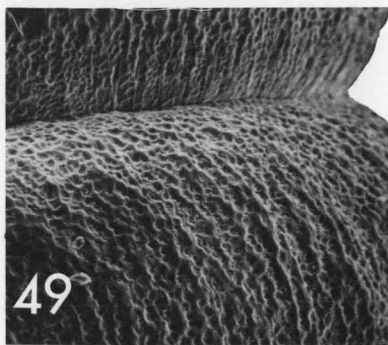
Figures 30-34.-- *Coelostemma reiteri* Drake (UF 34491). Figs. 30-34 X 3.4.



Figures 35-41.-- Figs. 35-39.- *Coelostemma attenuapex*, new species. Figs. 35, 38.- HOLOTYPE (UF 93144). Figs. 36, 37, 39.- PARATYPES (UF 34488). Figs. 40, 41.- *Coelostemma bryantwalkeri* (Pilsbry), HOLOTYPE (UMMZ 140145). Figs. 35-39 X 3.9; Figs. 40, 41 X 3.1.



Figures 42-47.-- *Coelostemma scaphopleuron*, new species. Fig. 42.- HOLOTYPE (UF 93145). Figs. 43-49.- PARATYPES (UF 34487). Figs. 42-47 X 5.3.



Figures 48-53.-- Embryonic shell characteristics of some *Coelostemma*. Figs. 48, 49.- *C. scaphopleuron*, new species, PARATYPE (UF 34487). Figs. 50, 51.- *C. fusca* (Martens), 10 Km ESE Omilteme, Guerrero, 2100 m alt. (UF 93140). Figs. 52, 53.- *C. elizabethae* (Pilsbry), 18 km. E Tuxtla, Guerrero, 2000 m alt. (UF 93141). Figs. 48, 50, 52 X 28; Figs. 49, 51, 53 X 142.

Contributions to the BULLETIN OF THE FLORIDA STATE MUSEUM, BIOLOGICAL SCIENCES SERIES, may be in any field of biology. Manuscripts dealing with natural history or systematic problems involving the southeastern United States or the New World tropics are solicited especially. Manuscripts should be of medium length—circa 35 to 200 pages (10,500-60,000 words). Examination for suitability is made by an Editorial Board.

The BULLETIN is distributed worldwide through institutional subscriptions and exchanges. It is considered the responsibility of the author to distribute his paper to all interested individuals. To aid in this the author(s) receive(s) 50 copies free, and he(they) may purchase additional separates at cost if ordered when page proof is returned. The author is also responsible for any charges incurred for alterations made by him on galley or page proofs. The Museum will send an invoice to the author for this amount upon completion of publication.

PREPARATION OF MANUSCRIPT

Contributors should consult recent numbers of the BULLETIN for preferred style and format. Highly recommended as a guide is the CBE Style Manual, 3rd Edition, 1972 (American Institute of Biological Sciences, Washington, D.C.).

Manuscripts must be submitted in duplicate and satisfy the following minimal requirements. Please submit duplicate copies of manuscripts. They must be double-spaced throughout, including tables, figure captions, and literature citations. Figure legends and tables should be typed on separate sheets. Also, please submit a copy of the complete text and tables on one or more 5¼" flexible diskettes.

All illustrations are referred to as figures. They must comply with the following standards: Photographs should be sharp, with good contrast, and printed on glossy paper. If the background of photographs (especially those of specimens) is not desired, amberlith should be cut out and used to cover the background. Drawings should be made with dense black waterproof ink on quality paper or illustration board. All illustrations should have a cover sheet. All lettering will be medium weight, sans-serif type (e.g. Futura Medium, News Gothic) in cutout, dry transfer, or lettering guide letters. Make allowance so that after reduction no lower case letter will be less than 1 mm high (2 mm is preferred) nor any capital letter greater than 5 mm high. The maximum size for illustrations is 9" x 14" (twice BULLETIN typepage size); illustrations should not be less than typepage width (4½"). With soft lead pencil on the back of each illustration, designate the top and identify each by author's name, manuscript title, and figure number.

All manuscripts not submitted in BULLETIN format will be returned to the author for retyping.

Manuscripts and all editorial matters should be addressed to:

Managing Editor of the BULLETIN
Florida State Museum
University of Florida
Gainesville FL 32611