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THE GENERA EPITONIUM (PART II), DEPRESSISCALA, CYLINDRISCALA, NYSTIELLA AND SOLUTISCALA IN THE WESTERN ATLANTIC

BY
WILLIAM J. CLENCH AND RUTH D. TURNER

This present number concludes our studies in the family Epitoniidae. It completes the genus *Epitonium* and covers several smaller genera usually considered in this family. The various species in the several subgenera of *Epitonium* which are covered in this report, possess weak to very strong spiral sculpture as well as the various types of axial sculpture found in all members of the genus. Again, we must state that the division of species into subgenera based on the presence or absence of spiral sculpture and the possession of a basal ridge is still arbitrary. It is a system of convenience rather than one expressing true relationships. When more data are available regarding the anatomy and ecology of the many species considered, a more natural classification can be attempted.

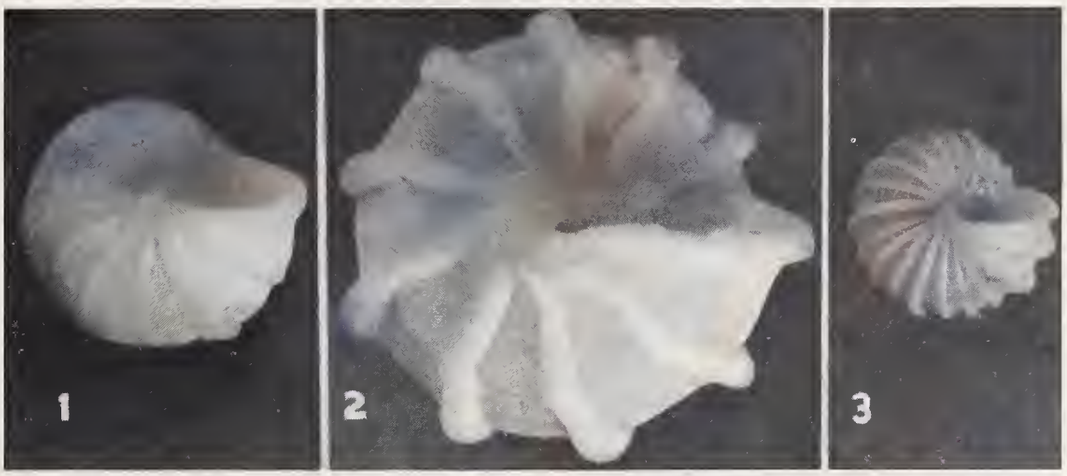

Plate 131. Basal views of *Epitonium*.

Fig. 1 *Epitonium championi* Clench and Turner, Lewis Bay, Hyannis, Massachusetts. Fig. 2. *Epitonium greenlandicum* Perry, Gotts Island, Blue Hill Bay, Maine. Fig. 3. *Epitonium candeanum* d'Orbigny, Lake Worth, Florida all (8x).

ACKNOWLEDGMENTS

We are exceedingly grateful to many friends for the loan and gift of specimens in this family. Curators in many institutions both here and abroad kindly loaned us their entire collections of Atlantic material for our studies. Without their substantial aid this study would have been impossible. We are indebted to the following for their interest and support.

C. G. Aguayo, Museo Poey, Universidad de la Habana, Habana, Cuba; J. Armstrong, American Museum of Natural History; F. Bruun, Universitetets Zoologiske Museum, Köbenhavn, Denmark; A. Carcelles, Museo Argentino de Ciencias Naturales, Buenos Aires; L. Forcart, Naturhistorisches Museum, Basel, Switzerland; B. Hubendick, Naturhisturiska Riksmuseet, Stockholm, Sweden; J. Kjennerud, Zoologiske Museum, Bergen, Norway; N. Knaben, Zoologiske Museum, Oslo, Norway; P. Morris, Peabody Museum, Yale University; H. A. Pilsbry, Academy of Natural Sciences Philadelphia; H. A. Rehder, United States Natural Museum; E. B. Richardson, Charleston Museum, Charleston, South Carolina; T. Soot-Ryen, Tromsö Museum, Tromsö, Norway; H. vander Schalie, Museum of Zoology, University of Michigan.

In addition to institutional loans, many private collectors have sent their entire collections of Western Atlantic Epitoniidae and without their aid many of the facts in this present study would have been unknown to us. Credit in all cases is given in the Records. However, we are particularly indebted to Ester Bates, Leo Burry, M. Jaume, Roy Latham, Tom McGinty, Nevada Schmidt, Jeanne Schwengel, and Jay Weber for extensive series of carefully localized specimens.

To David and Nevada Schmidt we are grateful for much new material especially collected at critical areas along the southwest coast of Florida, as well as live specimens for radula studies.

Genus **Epitonium** *Röding*
Part II

The genus *Epitonium* is continued here from *Johnsonia*, no. 30, p. 287. The subgenera covered in Part I of *Epitonium* were those lacking spiral sculpture.

Subgenus **Asperiscala** *de Boury*

Asperiscala de Boury 1909, Journal de Conchyliologie **57**, p. 257.

Cinctiscala de Boury 1909, Journal de Conchyliologie **57**, p. 257 (subgenotype, *S. antillarum* de Boury [= *E. candeanum* d'Orbigny]).

Decussiscala de Boury 1909, Journal de Conchyliologie **57**, p. 257 (subgenotype, *S. denticulata* Sowerby).

Sodaliscala de Boury 1909, Journal de Conchyliologie **57**, p. 257 (subgenotype, *S. multistriata* Say).

Subgenotype, *Scalaria bellastriata* Carpenter, original designation.

Shells axially costate with either cord or blade-like costae and possessing spiral sculpture ranging from low cords to very fine incised lines. The costae may be rounded or hooked at the whorl shoulder. Basal ridge absent. Nuclear whorls $2\frac{1}{2}$ to 3, white or light brown in color, glass-like and smooth.

Epitonium (Asperiscala) apiculatum *Dall*
Plate 132

Scala apiculata Dall 1889, Bulletin Museum Comparative Zoölogy **18**, p. 310 (*Albatross*, station 2596, about 18 miles southeast of Cape Hatteras, North Carolina); non *Epitonium apiculatum* Dall 1917.

Description. Shell reaching 4.5 mm. (about $\frac{3}{8}$ of an inch) in length, attenuate and subimperforate. Whorls 9, convex and attached by the costae only. Aperture circular to subcircular and with a thickened, expanded lip. The umbilical area partially closed by a parietal thickening. Columella short and arched. Axial sculpture consisting of numer-

ous blade-like costae. There are 11 costae on the body whorl of the holotype. There are two stages in the development of these axial costae. The nuclear whorls (about the first three) are smooth, the first three postnuclear whorls possess costae which are low, cord-like and far more numerous than those on the remaining whorls. Beyond these first three postnuclear whorls the costae are reduced in number and become high and blade-like. Spiral sculpture consisting of numerous, thread-like cords which exist only on the first three postnuclear whorls. On the later whorls they are barely visible or entirely lacking. There is no basal ridge. Nuclear whorls three, white, smooth and glass-like. Color of entire shell a shining white. Operculum unknown.

length	width	whorls	
4.5	2.5 mm.	9	Holotype
4.5	2.5	9	From off Cape Lookout, N.C.
4.5	2.4	9	S.E. of Cape Fear, N.C.

Type. The holotype of *E. apiculatum* Dall is in the United States National Museum, no. 94890, from the *Albatross*, station 2596 (N. Lat. 35°08′; W. Long. 75°10′) in 49 fathoms. This station is about 18 miles southeast of Cape Hatteras, North Carolina.

Remarks. This species differs rather strikingly from all others in this rather compact group. This difference is based upon the two forms taken by the axial costae, the low cord-like costae on the first three postnuclear whorls and the strong blade-like costae on the later whorls. In addition, the spiral sculpture is limited to the first three postnuclear whorls. This species appears to be related rather distantly to *E. candeanum* by the sim-

Fig. 1 Fig. 2

Plate 132. *Epitonium apiculatum* Dall

Fig. 1. From *Albatross*, station 2596, off Cape Hatteras, North Carolina. Holotype (19x). Fig. 2. From *Albatross*, station 2617, 25 miles southeast of Cape Fear, North Carolina (about 20x).

ilar type of spiral sculpture on the early postnuclear whorls. This same sculptural character relates it to *E. multistriatum* Say, in addition to the numerous, low, cord-like costae which both possess. In *E. multistriatum* these cord-like costae persist throughout, while they are limited on *E. apiculatum* to the first three postnuclear whorls.

It is difficult to explain the limited distribution of this species. Certainly, the lack of collecting in the offshore waters to the immediate south of North Carolina may be part of the answer. At the same time this could be an aberrant form of some more widely distributed species. The two types of postnuclear sculpture exhibited by *E. apiculatum* are unique so far as our Western Atlantic species are concerned. Possibly this may be a southern species, larval stages of which are carried north by the Gulf Stream. On settling to the bottom they survive, at least for a short period of time. After the summer months have passed and the temperature gradient is on its downward swing, the colder waters of this northern area may in some way affect the sculpture. The three postnuclear whorls are almost identical to the early whorls of *E. candeanum*, the later whorls somewhat resemble *E. albidum* d'Orbigny. All specimens of *E. apiculatum* that we have examined appear to be only half grown.

Range. Known only from North Carolina.

Records. North Carolina: *Albatross*, station 2596, 18 miles S.E. of Cape Hatteras (N. Lat. 35°08′; W. Long. 75°10′) in 49 fathoms; *Albatross*, station 2616, off Cape Fear (N. Lat. 33°42′; W. Long. 77°31′) in 17 fathoms; *Albatross*, station 2618, about 25 miles southeast of Cape Fear in 14 fathoms (N. Lat. 33°17′; W. Long. 77°35′); *Albatross*, station 2619, about 25 miles southeast of Cape Fear in 15 fathoms (N. Lat. 33°38′; W. Long. 77°36′); 12 miles east of Frying Pan Shoals in 12 fathoms; off Cape Lookout in 8 fathoms (all USNM).

Epitonium (Asperiscala) multistriatum *Say*

Plates 133, 134

Scalaria multistriata Say 1826, Journal Academy of Natural Sciences Philadelphia (1) **5**, p. 208; Say 1830, American Conchology no. 3, pl. 27, lower right figure and the enlarged figure above (east coast of Florida and Charleston, South Carolina).

Scala multilirata 'Say' H. and A. Adams 1853, The Genera of Recent Mollusca **1**, p. 221 [nude name, probably error for *multistriata* Say].

Scalaria leptalea Bush 1885, Transactions Connecticut Academy **6**, pt. 2, p. 465; Bush 1893, Bulletin Museum Comparative Zoölogy **23**, no. 6, p. 240, pl. 1, fig. 17 (off Cape Hatteras, North Carolina).

Epitonium elliotti Mazyck 1913, Catalog of Mollusca of South Carolina. Contributions from the Charleston Museum no. 2, p. 12 (Pawley's Island, South Carolina).

Epitonium virginicum Henderson and Bartsch 1914, Proceedings United States National Museum **47**, no. 2055, p. 414, pl. 13, fig. 1 (Chincoteague Island, Virginia).

Description. Shell reaching about 15 mm. (about $\frac{1}{2}$ inch) in length, attenuate, imperforate, rather light in structure and having axial costae and spiral threads. Whorls 8 to 10, rather strongly convex, having the later whorls unattached. Color a uniform dull-white. Suture rather deeply impressed to profound. Aperture subcircular to ovate and with a narrowly expanded lip. Parietal lip moderately developed and appressed tightly to the parietal area. Columella not defined. Axial sculpture consisting of very numerous, cord-like to low blade-like costae which do not form angles at the whorl shoulder. There

are 16 to 19 costae on the body whorl. Spiral sculpture consisting of exceedingly numerous and fine incised lines or threads which do not pass over the costae. Nuclear whorls 3 to 4, smooth and glass-like, the apical whorls being exceedingly small. There is no basal ridge. Operculum unknown.

length	width	whorls	
14.8	5.5 mm.	$8\frac{1}{2}$*	Holotype, *leptaleum* Bush
14.2	5.2	$9\frac{1}{2}$	Sullivans Island, Charleston, South Carolina
13.7	5.2	9	Charleston, South Carolina
7.0	3.4	8	Holotype, *elliotti* Mazyck
3.0	1.5	5	Holotype, *virginicum* Henderson and Bartsch

* 1 or 2 early whorls lost

Types. Say's type of *E. multistriatum* has been lost. The type locality is Charleston, South Carolina, Stephen Elliott, collector. The holotype of *E. leptaleum* Bush is in the United States National Museum, no. 44845, from the *Albatross*, station 2277 (N. Lat. 35°20′; W. Long. 75°19′) from off Cape Hatteras, North Carolina in 16 fathoms. The holotype of *E. virginicum* Henderson and Bartsch is in the United States National Museum no. 252568, from Chincoteague Island, Virginia. The holotype of *E. elliotti* Mazyck is in the Charleston Museum, no. 43.28.9831 from Pawleys Island, South Carolina.

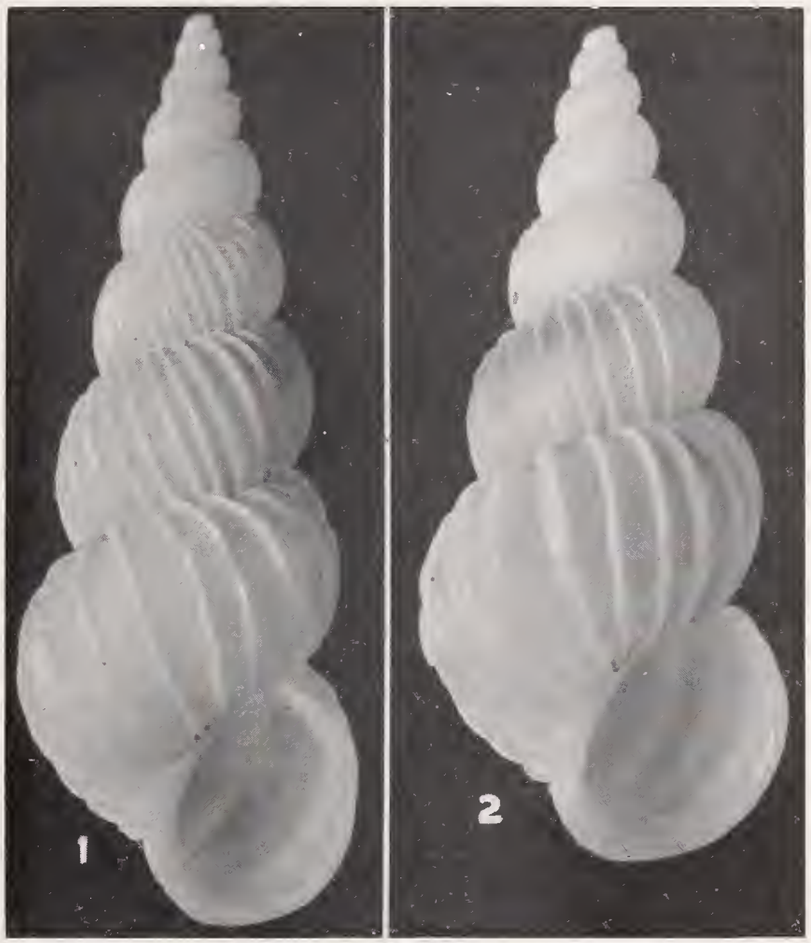

Plate 133. *Epitonium multistriatum* Say

Fig. 1. *Epitonium leptaleum* Bush (= *E. multistriatum* Say) from *Albatross*, station 2277, off Cape Hatteras, North Carolina. Holotype (7x). Fig. 2. Isle of Palms, South Carolina (about 9x).

Remarks. *Epitonium leptaleum* Bush appears to us to be an absolute synonym of *E. multistriatum* Say. It exactly duplicates specimens of *E. multistriatum* we have seen from Sullivans Island, Charleston, South Carolina. Though Say's original description is brief, it is clear and the species is well figured in his American Conchology. *E. virginicum* Henderson and Bartsch is a very young specimen of this species. In older specimens the nuclear whorls are generally lost and unless this is understood there may appear to be a disproportionate number of whorls to the size of the shell. *E. elliotti* Mazyck is also a young specimen and it appears to us to be an absolute synonym of *E. multistriatum* Say.

There is considerable variation in the number and spacing of the costae, a factor which probably has been responsible for the large number of synonyms. The costae are very numerous on the early postembryonic whorls. As the animal increases in size, the costae become more widely spaced and fewer in number on the last or body whorl. Fully adult specimens of 9 to 9½ whorls possess 16 to 18 costae on the body whorl, while a specimen of only 5 to 6 whorls may have as many as 46 costae on the body whorl.

This species is not particularly common to judge by the comparatively few specimens we have seen. It occurs in depths from a little below low water to 120 fathoms and is found mainly on sandy bottoms.

Epitonium multistriatum is readily separated from others in this complex by the very large number of costae which are particularly numerous on the early whorls. It also differs from *E. novangliae* and *E. denticulatum* by lacking the hooks or angles on the costae at the whorl shoulder. From *E. candeanum* it differs by having more numerous and much finer costae, by having finer spiral sculpture, by being somewhat larger in size and having less globose whorls.

Range. From Buzzards Bay, Massachusetts south to Cape Canaveral, Florida and probably along the north coast of the Gulf of Mexico from Florida to Texas.

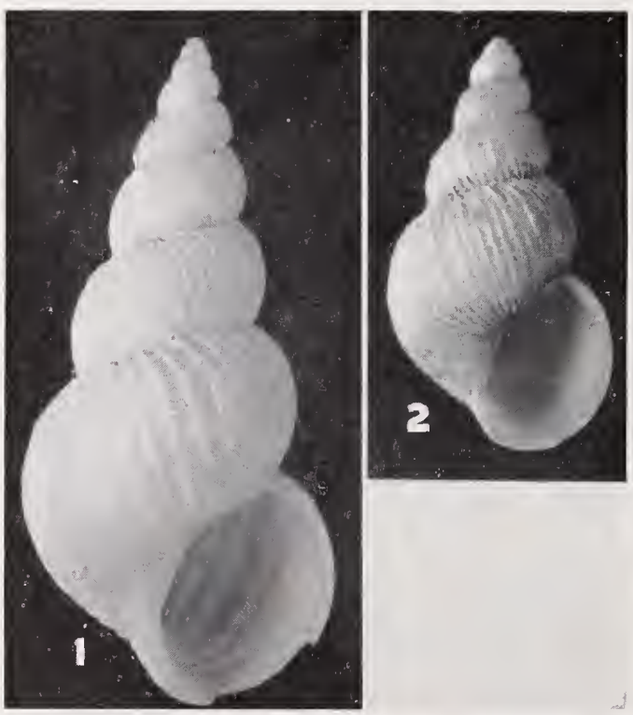

Plate 134. *Epitonium multistriatum* Say

Fig. 1. *Epitonium elliotti* Mazyck (= *E. multistriatum* Say) Pawleys Island, South Carolina. Holotype (10.7x). Fig. 2. *Epitonium virginicum* Henderson and Bartsch (= *E. multistriatum* Say) Chincoteague Island, Virginia. Holotype (15.5x).

Records. Massachusetts: Mattapoisett; Vineyard Sound (both MCZ); *Fish Hawk*, station 863, off Cuttyhunk Light, Vineyard Sound (USNM). Rhode Island: Sakonnet Point (MCZ); Block Island (MCZ; USNM). New Jersey: Atlantic City; Ocean City (both ANSP). Virginia: Chincoteague Island; Smith's Island; Lynnhaven Bay, Chesapeake Bay (all USNM). North Carolina: *Albatross*, station 2278, off Cape Hatteras (N. Lat. 35°20′; W. Long. 75°20′) in 16 fathoms (ANSP; Peabody Museum, Yale Univ.); *Albatross*, station 2277, off Cape Hatteras (N. Lat. 35°20′; W. Long. 75°19′) in 16 fathoms; *Albatross*, station 2595, 22 miles S.E. of Cape Hatteras (N. Lat. 35°08′; W. Long. 75°05′) in 63 fathoms; *Albatross*, station 2592, off Cape Hatteras (N. Lat. 35°02′; W. Long. 75°12′) in 120 fathoms; off Cape Lookout in 8 fathoms (all USNM); Shackleford Island (MCZ); Beaufort; off Cape Fear (N. Lat. 33°35′; W. Long. 77°36′) in 12½ fathoms (both ANSP); 12 miles E. of Frying Pan Shoals (USNM). South Carolina: Pawleys Island; Isle of Palms; Folly Island (all Charleston Museum); Sullivans Island (MCZ). Florida: St. Augustine (USNM); Ponce de Leon Inlet, Daytona (E. Bates); Cape Canaveral (Charleston Museum). Texas: Galveston; Port Aransas (both T. Pulley).

Epitonium multistriatum matthewsae, new subspecies

Plate 135

Description. Shell reaching 13 mm. (about ½ inch) in length, rather light in structure, imperforate and possessing both axial costae and spiral threads. Color a china-white. Whorls 9 to 10, moderately convex and attached well down in the suture. Spire extended

Plate 135
Epitonium multistriatum matthewsae
Clench and Turner, Sanibel Island, Florida. Holotype (8.4x).

and produced at an angle of 23°. Aperture elliptical with the outer lip slightly reflected. Parietal lip rather tightly appressed against the lower costae. Columella not defined. Suture profound. Sculpture consisting of numerous blade-like costae which are low and slightly reflected backward. There are 13 to 18 costae on the body whorl. These axial

costae are far more numerous on the early whorls than they are on the later whorls. There is no indication of any shoulder angles. Spiral sculpture consisting of numerous fine threads which do not pass over the costae. Nuclear whorls about $2\frac{1}{2}$, white, glass-like and smooth. There is no basal ridge. Operculum unknown.

length	width	whorls	
11	4 mm.	10	Holotype
10.5	3.5	9	off Fort Walton, Florida
12	3.9	9.5	Sanibel Island, Florida
13.5	4.5	8*	" " "

* early whorls lost

Types. Holotype, Museum of Comparative Zoölogy, no. 197134, from Sanibel Island, Florida. Paratypes from the same locality in the Museum of Comparative Zoölogy, the United States National Museum, the collections of Jay Weber and N. E. Schmidt.

Remarks. This subspecies can be readily differentiated from the typical form by being smaller in proportion to the number of whorls as well as being more attenuate. The whorls are attached at the base of a deep suture whereas in *E. multistriatum* the whorls are very close together but are actually attached only by the costae, at least on the later whorls. The costae are exceedingly numerous on the early whorls as in the typical form.

This subspecies, along with several others, indicates that there is a slightly different faunistic element along the west coast of Florida. It is here that *Epitonium tollini* Bartsch and *Dinocardium robustum vanhyningi* Clench and Smith also occur, additional forms not known elsewhere in the Western Atlantic.

We take pleasure in naming this subspecies for Charlotta Matthews of Sanibel Island, Florida, whose interest and aid have meant much to a generation of malacologists.

Range. West coast of Florida from off Fort Walton south to Marco, Florida.

Records. FLORIDA: 15 to 35 miles off Fort Walton (L. A. Burry); Egmont Key (USNM); Sanibel Island (MCZ; USNM; Jay Weber; N. E. Schmidt); Marco Island (USNM).

Epitonium (Asperiscala) rushii *Dall*

Plate 136

Scala rushii Dall 1889, Bulletin Museum Comparative Zoölogy **18**, pt. 2, p. 313 (off Cape Hatteras, North Carolina in 49-63 fathoms, *Albatross*, stations 2595 and 2596 .

Description. Shell reaching 9 mm. (about $\frac{3}{8}$ inch) in length, attenuate, imperforate and rather light in structure. Whorls 12, moderately convex and attached. Color a very pale straw-yellow with occasional specimens showing irregular bands or patches of reddish-brown. Spire extended and formed at an angle of about 25°. Suture deep but not profound. Aperture subcircular to subovate with little or no development of a parietal shield. Columella rather short and arched. Axial sculpture consisting of numerous low, blade-like costae which become a little higher at the sutures. There are 25 to 27 costae on the body whorl. Spiral sculpture consisting of numerous threads which do not cross over the costae. There is no basal ridge. Nuclear whorls 3 to 4, glass-like and smooth. Operculum thin, yellow and paucispiral.

length	width	whorls	
9	3.1 mm.	12	off Key West, Florida
8	2.8	12	" " " "
5.5	2.2	10 (broken)	Holotype

Types. Holotype, United States National Museum, no. 83698, from *Albatross*, station 2596, 17 miles off Cape Hatteras, North Carolina (N. Lat. 35°08′; W. Long. 75°10′) in 49 fathoms. Paratypes from the same locality and from *Albatross*, station 2595, 22 miles off Cape Hatteras, North Carolina (N. Lat. 35°08′; W. Long. 75°05′) in 63 fathoms.

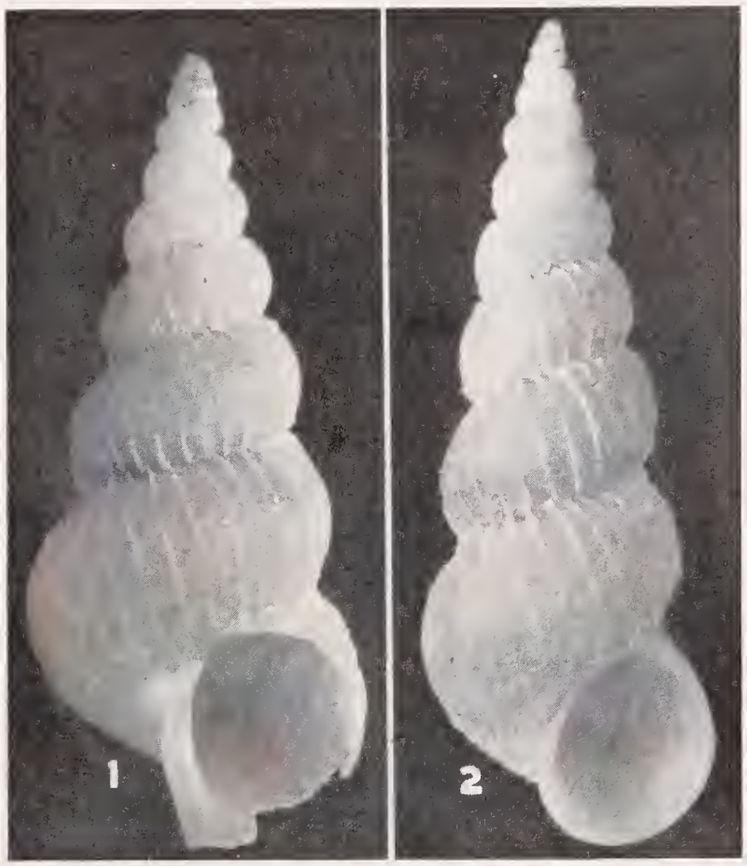

Plate 136. *Epitonium rushii* Dall

Fig. 1. From *Albatross*, station 2596, about 17 miles off Cape Hatteras, North Carolina in 49 fathoms. Holotype (15.5x). Fig. 2. From off Key West, Florida in 63 fathoms (about 10x).

Remarks. This appears to be a rare species. It occurs in fairly deep water ranging from 38 to 100 fathoms. In relationship it appears to be nearest to *E. polaceum* Dall differing by having much stronger spiral threads and a more uniform cone to the spire. It is also related to *E. turritellulum* Mörch, but *E. rushii* is much larger and is proportionately wider and has more convex whorls. Both have a very similar sculpture.

Range. North Carolina south through the Florida Keys.

Records. North Carolina: *Albatross*, station 2595, 22 miles off Cape Hatteras (N. Lat. 35°08′; W. Long. 75°05′) in 63 fathoms; *Albatross*, station 2596, 17 miles off Cape Hatteras (N. Lat. 35°08′; W. Long. 75°10′) in 49 fathoms (both USNM). Florida: off Boynton (Gilbert Voss): *Eolis*, station 160, off Sand Key in 62 fathoms; *Eolis*, station 1, off Key West in 55 fathoms: *Eolis*, station 42, off Key West in 60 fathoms:

Eolis, station 183, off Fowey Light in 80 fathoms; *Eolis*, station 69, off Miami in 38 fathoms (all USNM); off Looe Key, Marathon in 70 to 90 fathoms; off American Shoals, Cudjoe Key in 50 fathoms; off Sombrero Light in 90–100 fathoms (all L. A. Burry).

Epitonium (Asperiscala) turritellulum *Mörch*

Plate 137

Scala turritellula Mörch 1874, Vidensk. Medd. Naturhist. Forening i Kjöbenhavn no. 17, p. 264; Mörch 1875, Malakozoologische Blätter **22**, p. 151; Mörch 1876, Journal Academy Natural Sciences Philadelphia (2) **8**, p. 202 (St. Martin's [Lesser Antilles]).

Scala turritellula var. *riisei* Mörch 1874, Vidensk. Medd. Naturhist. Forening i Kjöbenhavn no. 17, p. 264; Mörch, 1875, Malakozoologische Blätter **22**, p. 151; Mörch 1876, Journal Academy Natural Sciences Philadelphia (2) **8**, p. 202 (St. Thomas [Virgin Islands]; Porto Plata [Hispaniola]).

Scala rushii stylina Dall 1889, Bulletin Museum Comparative Zoölogy **18**, pt. 2, p. 313 (Samana Bay, Santo Domingo [Hispaniola]).

Description. Shell reaching 6.4 mm. (about $\frac{1}{4}$ inch) in length, attenuate, imperforate and fairly strong. Whorls 10, moderately convex and attached. Color a flat china-white. Spire extended and formed at an angle of 17° to 18°. Suture deep but not profound. Aperture circular with a moderately thickened lip. Columella short and arched. Axial sculpture consisting of numerous, low, blade-like costae which become somewhat higher at the suture. A few of these costae become thickened, forming varices. There are 20 costae on the body whorl. Spiral sculpture consisting of numerous and very regular

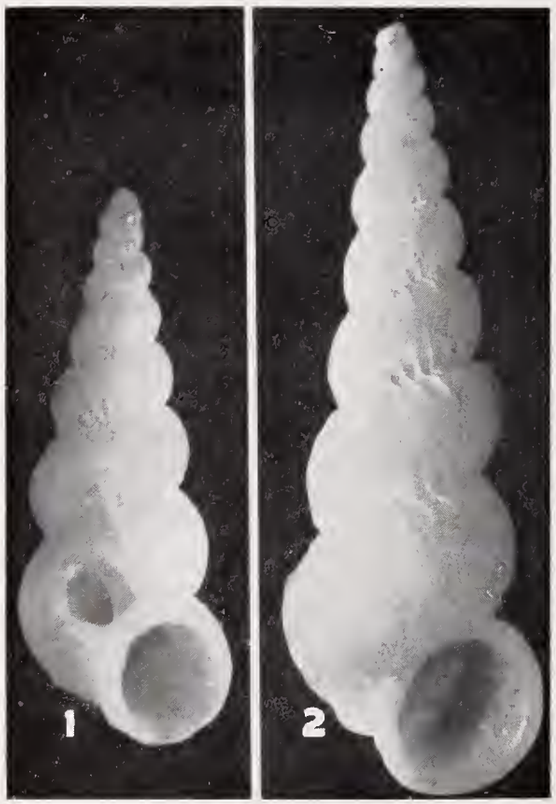

Plate 137. *Epitonium turritellulum* Mörch

Fig. 1. *Epitonium rushii* var. *stylinum* Dall (= *E. turritellulum* Mörch) Bahía de Samaná, Santo Domingo, Hispaniola. Holotype (14x). Fig. 2. *Epitonium turritellulum* var. *riisei* Mörch (= *E. turritellulum* Mörch) St. Thomas, Virgin Islands. Cotype (13.5x).

threads which do not cut over the costae. Nuclear whorls 2 to 3, glass-like and smooth. Operculum unknown.

length	width	whorls	
6.4	2 mm.	11	Cotype of *riisei*
4.7	1.7	9 (broken)	Holotype of *stylinum*

Types. The whereabouts of the type of *E. turritellulum* Mörch is unknown. A cotype of *E. turritellulum riisei* Mörch from St. Thomas, Virgin Islands is in the Universitetets Zoologiske Museum, Köbenhavn, Denmark. The holotype of *E. rushii stylinum* Dall is in the United States National Museum, no. 54828, from Bahía de Samaná, Hispaniola.

Remarks. See remarks under *E. rushii* Dall. *Epitonium turritellulum* Mörch is a very rare species and to date is known from only three rather widely separated localities. Dall's *E. rushii stylinum*, even though a broken specimen, is an unquestionable synonym.

We have no knowledge as to where this present species lives. It probably occurs in fairly deep water as so few specimens have been obtained.

Range. Known only from Jamaica and east to the Virgin Islands.

Records. Hispaniola: Bahía de Samaná, Santo Domingo (USNM). Virgin Islands: St. Thomas (Univ. Zool. Mus. Köbenhavn, Denmark). Jamaica: Robins Bay, St. Mary's (USNM).

Epitonium (Asperiscala) tenuistriatum *d'Orbigny*

Plate 138

Scalaria tenuistriata d'Orbigny 1840, Voyage dans l'Amérique Méridionale **5**, pt. 3, p. 390, pl. 54, fig. 4–6 (Bahía Blanca [Buenos Aires, Argentina]).

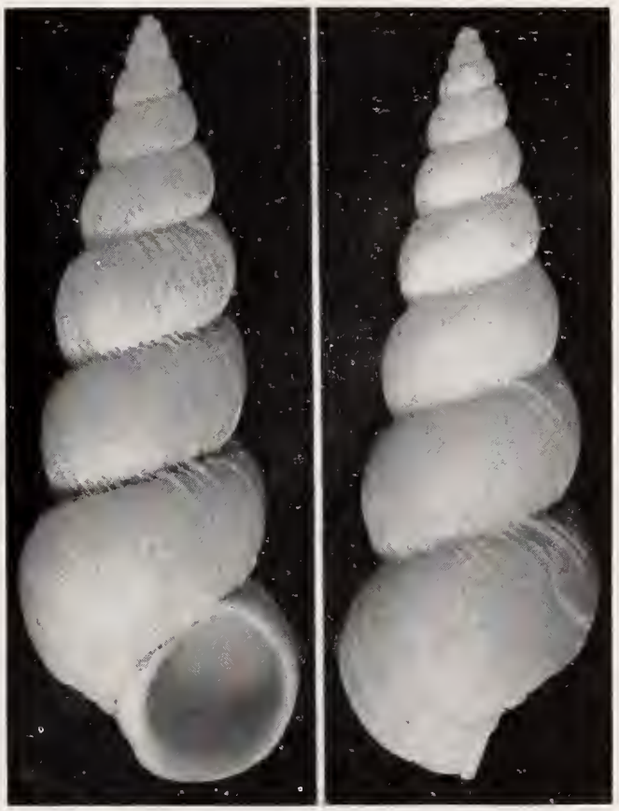

Plate 138. *Epitonium tenuistriatum* d'Orbigny
Puerto San Antonio, Rio Negro, Argentina (2.3x).

Description. Shell reaching 28.5 mm. (about $1\frac{1}{8}$ inches) in length, attenuate, imperforate and fairly solid. Whorls 10 (nuclear whorls missing), strongly convex and attached. Color a flat china-white. Spire produced and formed at an angle of 27°. Suture deep but not profound. Aperture subcircular. A small parietal shield is pressed tightly over the low costae. Columella short and arched. Axial sculpture consisting of numerous low almost cord-like costae which are not angled at the whorl shoulder. There are 34 costae on the body whorl. These costae vary considerably in width. Spiral sculpture consisting of numerous and rather strong threads which do not pass over the costae. Generally the earlier whorls have far more costae than appear on the body whorl. There is no basal ridge. Nuclear whorls and the operculum unknown.

length	width	whorls	
28.5	9.8 mm.	9*	Puerto San Antonio Oeste, Golfo San Matías, Rio Negro, Argentina
17.5	7.0	8*	La Coronilla, Uruguay

* loss of 2 or 3 early whorls

Types. According to Gray 1854, the types of *E. tennistriatum* d'Orbigny are in the British Museum. The type locality is Bahía Blanca (39° South Latitude), Buenos Aires, Argentina.

Remarks. This is a large and characteristic species of the Argentinian coast line. In relationship it appears to be nearest to *E. multistriatum* Say from which it differs by being much larger and by having more numerous and much finer axial costae. The two species appear to be related, based upon the similarity in their sculpture and the fact that they have more numerous costae on their earlier whorls.

Range. Cabo Palonio, Uruguay south to the Golfo San Matías, Rio Negro, Argentina.

Records. URUGUAY: Cabo Palonio (USNM); La Coronilla (A. Carcelles); Maldonado (Univ. of Michigan; ANSP). ARGENTINA: Puerto San Antonio Oeste, Golfo San Matías, Rio Negro (A. Carcelles).

Epitonium (Asperiscala) frielei *Dall*

Plate 139

Scala frielei Dall 1889, Bulletin Museum Comparative Zoölogy **18**, pt. 2, p. 313 (*Albatross*, station 2595, off Cape Hatteras, North Carolina).

Description. Shell reaching 15.5 mm. (about $\frac{5}{8}$ of an inch) in length, conic, umbilicate and very light in structure. Whorls 12, strongly convex and attached. Color a flat white. Spire somewhat extended and produced at an angle of about 40°. Aperture nearly circular. Columella short and arched. Axial sculpture consisting of numerous very low, thin, blade-like costae. There are 52 costae on the body whorl. In addition these costae appear somewhat irregular, particularly as to their spacing. Spiral sculpture consisting of numerous threads which, crossing the costae, form a reticulated surface on the shell. The axial costae are without hooks at the whorl shoulder and are a little stronger than the spiral threads. Umbilicus fairly wide and deep and partially covered by the parietal reflection. There is no basal ridge. Nuclear whorls $3\frac{1}{2}$, very small, smooth, glass-like and faintly brown in color. Operculum unknown.

length	width	whorls	
15.5	9.5 mm.	12	Lake Worth, Florida
4.8	2.6	8	Holotype

Types. The holotype of *E. frielei* is in the United States National Museum, no. 83727, from the *Albatross*, station 2595 (N. Lat. 35°08′; W. Long. 75°05′) about 20 miles off Cape Hatteras, North Carolina in 63 fathoms.

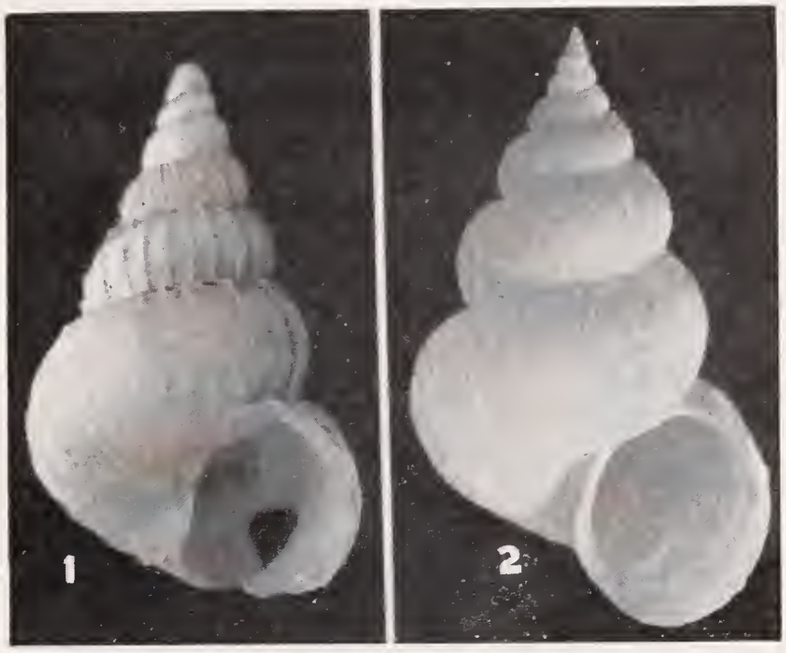

Plate 139. *Epitonium frielei* Dall

Fig. 1. From *Albatross*, station 2595, 22 miles off Cape Fear, North Carolina in 63 fathoms. Holotype (13.3x). Fig. 2. From off Lake Worth, Florida in 75 fathoms (4x).

Remarks. We have seen but six specimens of this very beautiful species. Dall's type is a young and broken specimen, and a single paratype, somewhat smaller, is also broken. However, we are able to figure a large specimen collected by Tom McGinty from off Lake Worth, Florida.

Range. North Carolina south to the Florida Keys.

Records. North Carolina: *Albatross*, station 2595, 20 miles off Cape Hatteras (N. Lat. 35°08′; W. Long. 75°05′) in 63 fathoms (USNM). Florida: off Lake Worth in 75 fathoms (T. McGinty); *Eolis*, station 329, off Sambo Reef in 135 fathoms (USNM).

Epitonium (Asperiscala) candeanum *d'Orbigny*

Plates 140, 141

Scalaria caudeana d'Orbigny 1842 [in] Sagra, Histoire de l'Isle de Cuba, Mollusques **2**, p. 20, pl. 11, fig. 28–30 (Jamaica and St. Thomas .

Scalaria turricula Sowerby [in part] 1844, Thesaurus Conchyliorum **1**, Scalaria, p. 92, pl. 34, fig. 88 (West Indies); not plate 33, fig. 61 [1]; non *Scalaria turricula* Sowerby 1873,[2] Conchologica Iconica **19**, pl. 8, fig. 59a–b (West Indies); non *S. turricula* Cantraine 1842.

[1] Sowerby has figured two different species under this name, one from the West Indies and one from the Philippines. The Philippine species has been named *S. confusa* by E. A. Smith, based upon Sowerby's description and figure. (E. A. Smith 1890, Proc. Zoological Society, London, p. 273.)

[2] This reference applies to the Philippine form described by the elder Sowerby.

Scalaria turrita Nyst 1871, Annales Société Malacologique de Belgique **6**, p. 142 [new name for *turricula* Sowerby 1844, non Contraine 1842]; non *turrita* de Blainville 1827.

Scalaria antillarum de Boury 1909, Journal de Conchyliologie **57**, p. 258 [new name for *turrita* Nyst 1871; non de Blainville 1827].

Description. Shell reaching 10 mm. (about $\frac{1}{2}$ inch) in length, attenuate and imperforate. Whorls 11 to 13, moderately convex and attached. Color a more or less uniform dull-white to a light-brown. Suture deeply impressed. Aperture subcircular with a thickened and somewhat expanded lip. A small parietal shield extends over the umbilical area. Columella short and arched. Axial sculpture consisting of numerous, strong, blade-like and occasionally reflected costae which sometimes develop small angles at the whorl

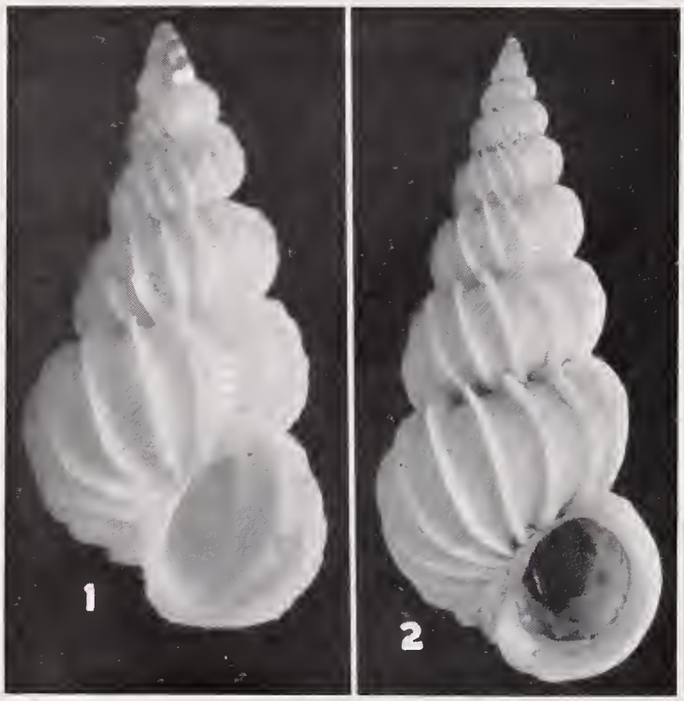

Plate 140. *Epitonium candeanum* d'Orbigny
Fig. 1. Off Fowey Light, Florida (about 19.5x).
Fig. 2. Lake Worth, Boynton, Florida (10.5x).

shoulder. On the body whorl these costae pass below the parietal shield and into the umbilicus and above they extend well into the suture, a factor causing the whorls to become nearly separated. There are 18 to 25 costae on the body whorl. Spiral sculpture consisting of numerous, fine, distinct ridges which are crossed by exceedingly fine axial threads. There is no basal ridge. Nuclear whorls 3 and smooth. Operculum paucispiral, thin and yellowish-brown in color.

length	width	whorls	
7.0	2.3 mm.	13	Boynton, Lake Worth, Florida
9.5	3.0	13	" " " "

Types. The types of this species are probably in the British Museum. The type locality is here restricted to Kingston, Jamaica, a locality from which we have seen specimens.

Remarks. Epitonium candeanum differs from *E. novangliae*, *E. denticulatum*, and *E. pourtalesi* by lacking the angles or hooks on the costae at the whorl shoulder or else having these angles very small and relatively inconspicuous. Also the microscopic sculpture between the costae is generally coarser. From *E. multistriatum* it differs by having fewer and stronger costae and in being smaller.

This species occurs in depths from low water to about 300 fathoms.

Range. Florida, Bermuda, the Bahamas, and south through the Lesser Antilles to the Barbados.

Records. Florida: off Palm Beach in 50 to 70 fathoms; Lake Worth: off Lake Worth in 90 fathoms; Boynton Beach (all T. McGinty); *Eolis*, station 51, off Miami in 24 fathoms; *Eolis*, station 78, off Fowey Light in 30 fathoms; *Eolis*, station 182, off Fowey Light in 75 fathoms; *Eolis*, station 339, off Ragged Key in 100 fathoms; *Eolis*,

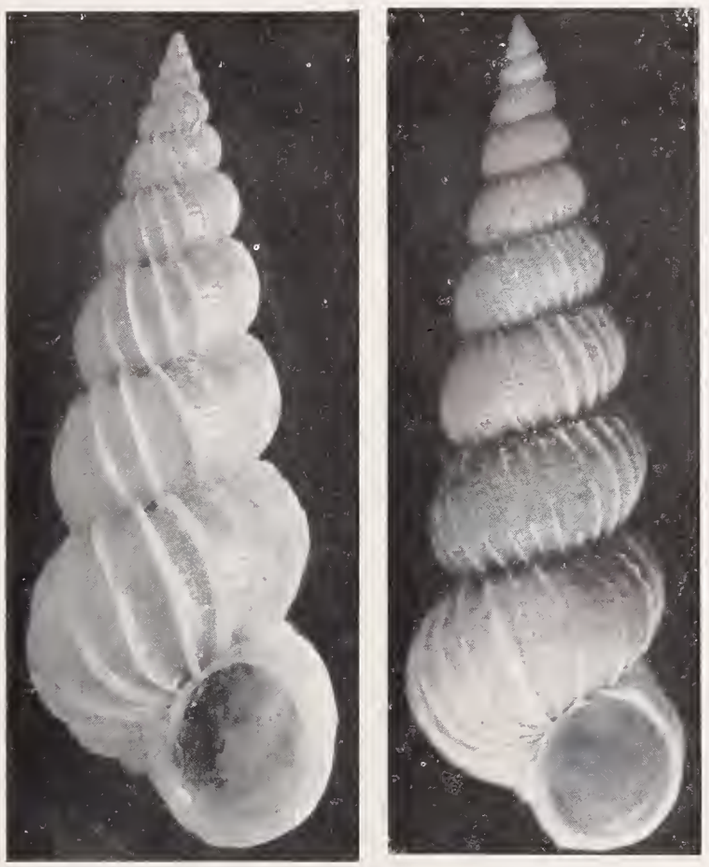

Fig 1. Fig. 2

Plate 141. *Epitonium candeanum* d'Orbigny, Lake Worth, Florida (Fig. 1, about 10x; Fig. 2, 16x).

station 100, off Sand Key in 65 fathoms; off Key West in 7 fathoms; off Tortugas in 90 fathoms (all USNM); Dry Tortugas (ANSP); Cape Sable (N. E. Schmidt). Bermuda: Harrington Sound (MCZ). Bahama Islands: off Mintie Bar, southeast end of South Bight, Andros Island (USNM). Cuba: *Barrera*, station 208, Bahía Honda in 1 to 12 fathoms (USNM). Hispaniola: Bahía de Samaná, Santo Domingo; Les trois Pavillons, Dept. du Nord-Ouest, Haiti; Saltrou, Dept. de l'Ouest, Haiti (all USNM). Lesser Antilles: Anguilla in 300 to 400 fathoms (B. Hubendick); Falmouth, Antigua; English Harbour, Antigua; off Barbados in 94 fathoms; off Pelican Island, Barbados in 33 to 80 fathoms; off Telegraph Station, Barbados in 18 fathoms (all USNM).

Epitonium candeanum subspecies **marcoense** *Dall*

Plate 142

Epitonium marcoënse Dall 1927, Proceedings United States National Museum **70**, Art. 18, p. 60 (off Fernandina; off Marco, Florida and off Georgia [1]).

[1] All of the stations are off Florida. Actually Dall's record for Georgia is south of the station given for Fernandina.

Description. Shell reaching about 8 mm. (about $\frac{1}{3}$ inch) in length, attenuate and imperforate. Whorls 10, convex, barely attached, and with a profound suture. Axial sculpture consisting of numerous, thin, blade-like costae numbering 22 on the body whorl. Spiral sculpture consisting of exceedingly fine spiral threads. Nuclear whorls 3, glass-like, smooth and white. Operculum unknown.

length	width	whorls	
8.0	3 mm.	10	Holotype, off Fernandina, Florida
6.2	2.8	9	off Fowey Light, Florida
8.0	3.0	10	off Palm Beach, Florida

Types. Holotype, United States National Museum, no. 108017, from the *Albatross*, station 2668 (N. Lat. 30°58′; W. Long. 79°38′) in 294 fathoms. Paratypes from the same locality and from the *Albatross*, station 2415 (N. Lat. 30°44′; W. Long. 79°26′) in 440 fathoms, both off Fernandina, Florida.

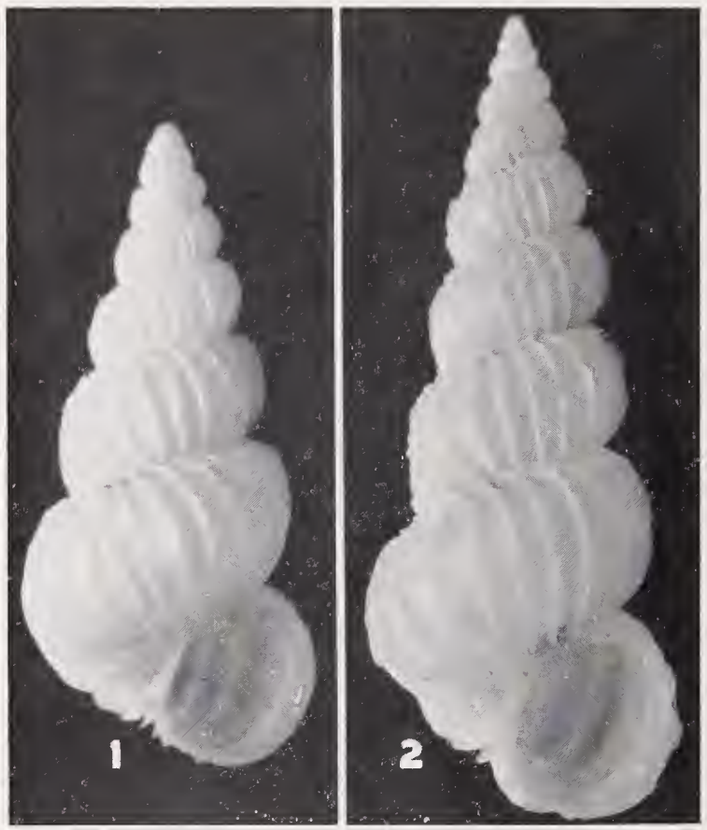

Plate 142. *Epitonium candeanum marcoense* Dall
Fig. 1. From *Albatross*, station 2668, off Fernandina, Florida in 294 fathoms. Holotype (16x). Fig. 2. From off Palm Beach, Florida in 110 fathoms (11.3x).

Remarks. This subspecies is only slightly different from *Epitonium candeanum*. It differs in being smaller, much lighter in structure and in having finer, more numerous costae and having the spiral threads exceedingly fine.

Dall's choice of name was most unfortunate as the specimens that he had from Marco Island on the west coast of Florida were not at all the same as his type specimens from deep water of the northeast coast of Florida. His original specimens from Marco are *Epitonium multistriatum mattheesae* Clench and Turner, a very different form.

Range. Off the northeast coast of Florida south to the northern Florida Keys.

Records. Florida: *Albatross*, station 2668 (N. Lat. 30°58′; W. Long. 79°38′) in 294 fathoms; *Albatross*, station 2415 (N. Lat. 30°44′; W. Long. 79°26′) in 440 fathoms, both off Fernandina (both USNM); off Palm Beach in 110 fathoms (T. McGinty); *Eolis*, station 179, off Fowey Light in 70 fathoms; *Eolis*, station 351, off Fowey Light in 90 fathoms; *Eolis*, station 350, off Triumph Reef, Elliott Key in 70–90 fathoms (all USNM).

Epitonium (Asperiscala) tiburonense, new species

Plate 143

Description. Shell reaching about 6.8 mm. ($\frac{1}{4}$ inch) in length, attenuate and imperforate. Whorls 9, convex and attached. Color a light reddish-brown throughout, occasionally with a darker area just below the suture. Costae white. Suture deeply impressed. Aperture subcircular with a thickened outer lip. Parietal area rather narrow and tightly appressed against the body whorl. Columella short and arched. Axial sculpture consisting of numerous strong and somewhat thickened blade-like costae which do not produce

Plate 143
Epitonium tiburonense Clench and Turner, Aquin, Dept. du Sud, Haiti. Holotype (12.5x).

angles or hooks at the whorl shoulder. The costae merge at the parietal area where they become somewhat flattened to form a thickened pad. There are 12 to 14 costae on the body whorl. Spiral sculpture consisting of very fine axial threads which are uniformly disposed over the whorl. There is no basal ridge. Nuclear whorls 3, smooth, glass-like and whitish in color. Operculum unknown.

length	width	whorls	
6.8	3 mm.	9	Aquin, Haiti (Holotype)
6.2	2.8	8.5	" " (Paratype)

Types. Holotype, United States National Museum, no. 440128, from Aquin, Dept. du Sud, Haiti. Paratypes from the same locality in the United States National Museum and the Museum of Comparative Zoölogy. Additional paratypes in the United States National Museum from Baie Anglaise, Dept. du Sud, Haiti.

Remarks. Fresh specimens of this species can be distinguished readily from all other *Epitonium* in the Western Atlantic by their uniform red-brown color, small, white costae and lack of a basal ridge. In relationship this species appears to be nearest to *E. candeanum* d'Orbigny. It differs from this species by being smaller, proportionately wider, by having much finer spiral threads and fewer costae. The costae on one whorl of *E. tiburonense* usually line up with those on the whorl above, while in *E. candeanum* the costae are more numerous on the early whorls and do not have a tendency to line up from one whorl to the next. From *E. albidum*, another species with which it might be confused, it differs in having well developed spiral sculpture, in being red-brown in color and in being proportionately smaller. It is similar to *E. albidum* in its shape and in having the costae more or less line up with the costae on the whorl above.

It is quite remarkable that this new form seems to have such a limited distribution, the two localities from which specimens are known are actually only one area, the Baie d'Aquin being only a small part of the larger Baie Anglaise.

This species is named for the southwest peninsula of Haiti which is often referred to as the Shark or Tiburón Peninsula.

Range and Records. Known only from Baie Anglaise and Aquin, Dept. du Sud, Haiti.

Epitonium (Asperiscala) novangliae *Couthouy*

Plates 144, 145, 146

Scalaria novangliae Couthouy 1838, Boston Journal of Natural History **2**, p. 96, pl. 3, fig. 5 (from stomach of a cod taken off Cape Ann, Massachusetts).

Scalaria uncinati-costa d'Orbigny 1842 [in] Sagra, Histoire de l'Isle de Cuba, Mollusques **2**, p. 19, pl. 11, fig. 25–27 (Guadeloupe).

Scala aeospila Mörch 1874, Vidensk. Medd. Naturhist. Forening i Kjöbenhavn no. 17, p. 15 (St. Croix); Mörch 1875, Malakozoologische Blätter **22**, p. 151; Mörch 1876, Journal Academy Natural Sciences Philadelphia (2) **8**, p. 202.

Scalaria muscapedia Dall 1889, Bulletin Museum of Comparative Zoölogy **18**, pt. 2, p. 314 (25 miles off Cape Fear, North Carolina).

Epitonium bahamensis 'Dall' Peile 1926, Proceedings Malacological Society London **17**, p. 80 (nude name).[1]

Description. Shell reaching about 14 mm. (about $\frac{1}{2}$ inch) in length, attenuate, umbilicate, rather light in structure and having axial costae and spiral threads. Whorls 8 to 10, strongly convex, with the early whorls attached, while generally the later whorls are attached by the costae only. Color white to banded light-brown, with the interrupted bands of brown being just above and below the periphery of the whorl. Generally the coloration is strongest on the last two whorls. Occasional specimens occur in which the brownish coloration is diffused throughout the shell. Suture rather deeply impressed to profound. Aperture subcircular to ovate with a narrowly expanded lip. Parietal lip moderately developed, thickened and appressed to the body whorl above the umbilical opening.

[1] As this name has appeared in Peile's list we include it here as a synonym. We figure the specimen of Dall, but so far as we can trace, this species was never described by Dall.

Columella not defined. Umbilicus narrow and partially hidden by the parietal lip. Axial sculpture consisting of numerous blade-like to cord-like costae. The cord-like costae are produced by a backward and downward reflection of the outer edge of the costae. There are from 9 to 16 costae on the body whorl. On the whorl shoulder there is generally developed a fine hook or angle on each costa, these angles usually being reflected backwardly. Spiral sculpture consisting of exceedingly numerous and fine thread-like lines which are crossed by somewhat finer axial threads giving a fine reticulated pattern to the

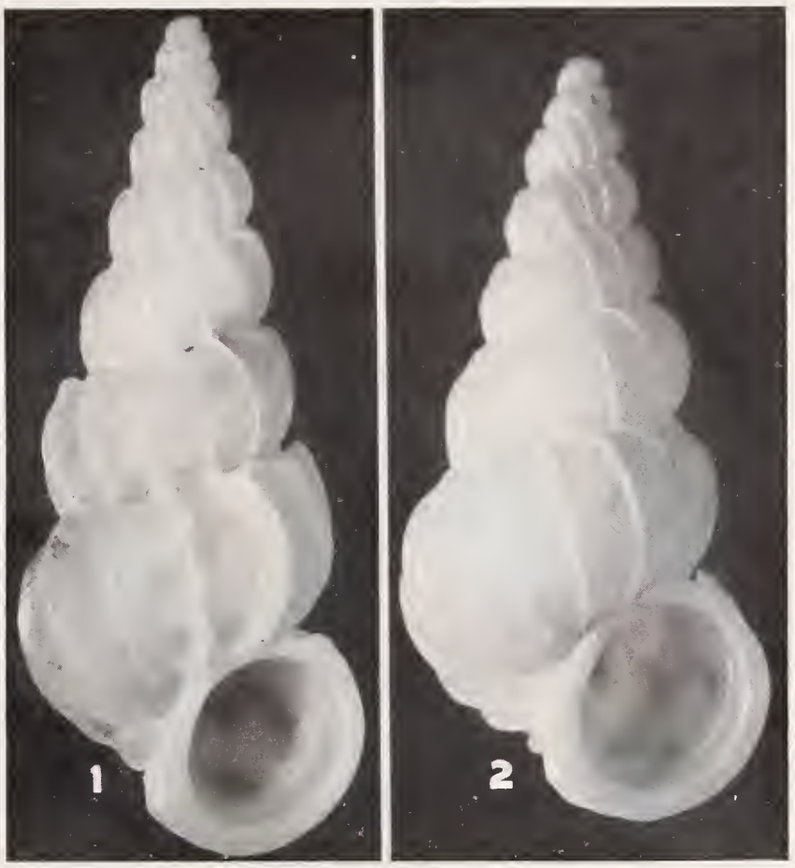

Plate 144. *Epitonium novangliae* Couthouy

Fig. 1. From stomach of a cod, taken off Cape Ann, Massachusetts. Holotype (7x). Fig. 2. *Epitonium muscapedium* Dall (=*E. novangliae* Couthouy), from *Albatross*, station 2619, off Cape Fear, North Carolina. Holotype (7x).

shell between the costae. However, there appears to be a fair amount of variation in the strength of the axial threads: in some specimens they are detected only under rather strong magnification. On young specimens the spiral threads are generally much stronger than the axial threads, while on the body whorl of large specimens the spiral and axial threads are of nearly equal strength. Nuclear whorls white to brownish, opaque, glass-like and smooth. There is no basal ridge. Operculum corneous, paucispiral and dark-brown in color.

length	width	whorls	
13.2	5.4 mm.	9*	Holotype of *novangliae* Couthouy
14.3	6.0	10*	off Cape Lookout, North Carolina
11.8	5.5	9*	Holotype of *muscapedium* Dall

* loss of one and possibly two early whorls.

Types. The holotype of *E. novangliae* Couthouy is in the Museum of Comparative Zoölogy, no. 182888, taken from the stomach of a cod off Cape Ann, Massachusetts. The holotype of *E. muscapedium* Dall is in the United States National Museum, no. 83721 from the *Albatross*, station 2619, from off Cape Fear, North Carolina (N. Lat. 33°38′; W. Long. 77°36′) in 15 fathoms. The type of *E. uncinati-costum* d'Orbigny is probably in the British Museum.

As the type of *E. novangliae* was adventitiously present off Cape Ann, it seems best to select the locality of *E. muscapedium* Dall for the type locality of this species. This latter came from the *Albatross*, station 2619, about 25 miles off Cape Fear, North Carolina. To our knowledge *E. novangliae* has never been collected north of Virginia since the original specimen was obtained.

Plate 145. *Epitonium novangliae* Couthouy
Epitonium denticulatum bahamense 'Dall' Peile
(= *E. novangliae* Couthouy) Bahamas (8.2x).

Remarks. This species is one of the larger members of this complex. The whorls are unattached other than by the costae and are very globose. One of the distinctive characters is the spotted coloration which appears on many of the specimens. However, this color is not strong and may be entirely absent. In relationship it appears nearest to *candeanum*, but differs by its much larger size, by having heavier and more widely spaced costae and unattached whorls. The intercostal sculpture is much finer in this species than in *candeanum* and this latter speeies does not possess a reticulated sculpture.

This species has an extensive distribution ranging from Virginia south through the West Indies to Brasil. It appears, however, to be rare at the extremities of its range. *Epitonium novangliae* occurs in depths from low water to about 250 fathoms.

Range. From Massachusetts (adventitious) and Virginia south to Brasil.

Records. Massachusetts: off Cape Ann, in stomach of a cod (MCZ). Virginia: *Fish Hawk*, station 8338, off Butler's Bluff in 4 fathoms (USNM); *Fish Hawk*, station

8369, off Horseshoe Light, Chesapeake Bay (USNM). North Carolina: *Albatross*, station 2278, off Cape Hatteras (N. Lat. 35°20′; W. Long. 75°20′) in 16 fathoms (Yale University); *Albatross*, station 2596, 17 miles off Cape Hatteras (N. Lat. 35°08′; W. Long. 75°10′) in 49 fathoms; *Albatross*, station 2112, off Cape Hatteras (N. Lat. 35°20′; W. Long. 75°18′) in 15½ fathoms (both USNM); *Albatross*, station 2277, off Cape Hatteras (N. Lat. 35°20′; W. Long. 75°19′) in 16 fathoms (Yale University); Beaufort (MCZ; USNM; Univ. of Michigan); *Albatross*, station 2619, 25 miles off Cape Fear (N. Lat. 33°38′; W. Long. 77°36′) in 15 fathoms; off Cape Lookout in 6 to 9 fathoms; off Fryingpan Shoals in 12 fathoms (all USNM). Florida: St. Augustine (USNM); Cape Canaveral (Charleston Museum); off Palm Beach in 20 to 110 fathoms; Lake Worth in 2–3 fathoms (both T. McGinty); off Fort Lauderdale in 75 fathoms; off Hollywood in 45 fathoms (both L. A. Burry); *Eolis*, station 49, off Miami in 30 fathoms; *Eolis*, station 165, off Fowey Light in 78 fathoms (both USNM); off Looe Key, Marathon in 70–90 fathoms (L. A. Burry); *Eolis*, station 338, off Sand Key in 61–85 fathoms; *Eolis*, station 42, off Key West in 60 fathoms; *Eolis*, station 33, off Tortugas in 16 fathoms (all USNM); off Destin in 14 fathoms (T. McGinty); off Fort Walton in 16 fathoms (L. A. Burry); Little Clearwater Pass (ANSP); off St. Petersburg; Boca Grande; Marco (all USNM); Sanibel (MCZ); Fort Myers Beach (N. E. Schmidt); Texas: Gulf Beach, Padre Island (L. A. Weisenhaus). Bermuda: (Bermuda Government Museum; USNM). Bahama Islands: Clifton Point, New Providence (T. McGinty). Cuba: Veradero, near Cardenas (ANSP); off Habana (M. Jaume); *Barrera*, station 208, off Bahía Honda in 1–12 fathoms (USNM); *Atlantis*, station 3331

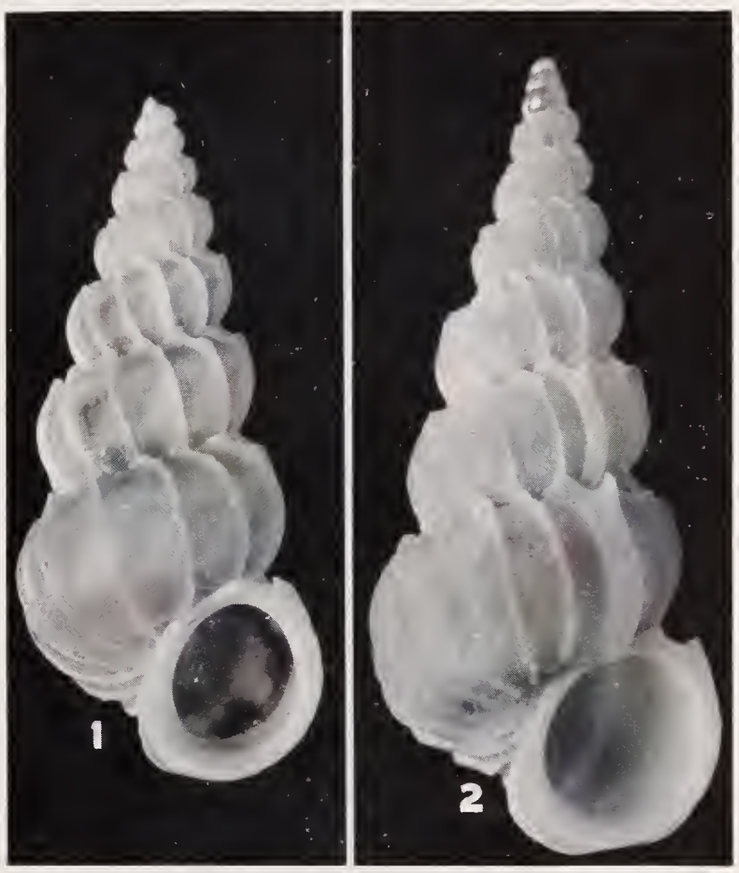

Plate 146. *Epitonium novangliae* Couthouy
Fig. 1. From off Fort Walton, Florida in 16 fathoms (6.7x).
Fig. 2. From off Sand Key, Florida in 85 fathoms (about 14x).

and 3332, Bahía Cochinos in 230 to 260 and 175 to 225 fathoms (MCZ). PUERTO RICO: Culebra Island (USNM). JAMAICA: Kingston Harbour; Montego Bay (both USNM). HISPANIOLA: Anse O'Hamvolt, Haiti (USNM); Baie Anglaise, near Aquin, Dept. du Sud, Haiti (USNM). VIRGIN ISLANDS: St. Thomas (MCZ). LESSER ANTILLES: Anguilla in 100–250 fathoms; St. Martins in 200–300 fathoms (both H. Hubendick); St. Martins (ANSP); *Blake*, off Barbados in 100 fathoms (MCZ); Spey Side, Tobago Island (H. G. Kugler). BRASIL: off Rio de Janeiro in 59 fathoms (USNM).

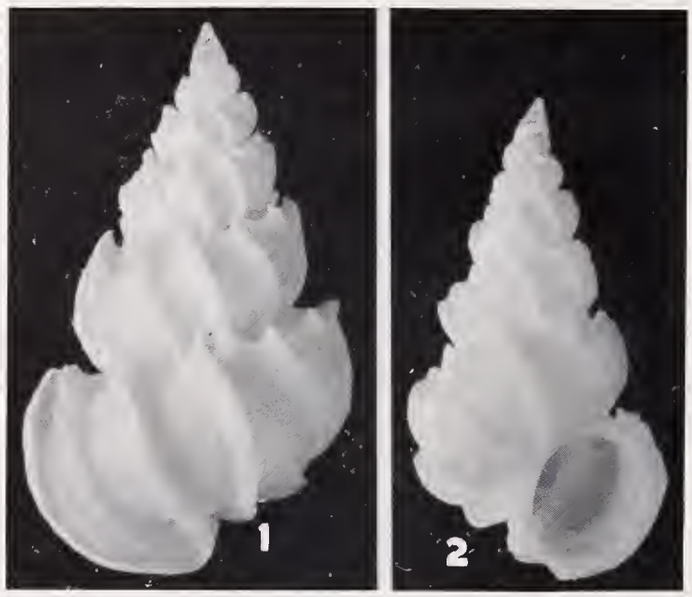

Plate 147. *Epitonium denticulatum* Sowerby
Fig. 1. Boynton, Lake Worth, Florida (10x). Fig. 2. Off Bears Cut, Miami, Florida in 18–20 fathoms, *Eolis*, station 113 (9.2x).

Epitonium (Asperiscala) denticulatum *Sowerby*
Plates 147, 148

Scalaria denticulata Sowerby 1844, Thesaurus Conchyliorum **1**, Scalaria, p. 87, species 19, pl. 32, fig. 25–26 (West Indies).

Scala (*Aciona*) *centiquadra* Mörch 1874, Vidensk. Medd. Naturhist. Forening i Kjöbenhavn no. 17, p. 255 [new name for *Scalaria denticulata* Sowerby,[1] non *Turbo denticulata* Montagu]; Mörch 1875, Malakozoologische Blätter **22**, p. 145; Mörch 1876, Journal Academy Natural Sciences Philadelphia (2) **8**, p. 194, pl. 29, fig. 4 (Anguilla; St. Thomas; St. Croix).

Scala octocostata Mörch 1874, Vidensk. Medd. Naturhist. Forening i Kjöbenhavn no. 17, p. 260 (St. Thomas [Virgin Islands]); Mörch 1875, Malakozoologische Blätter **22**, p. 148; Mörch 1875, Journal Academy Natural Sciences, Philadelphia (2) **8**, p. 198.

Description. Shell reaching 15 mm. (about $\frac{5}{8}$ of an inch) in length, attenuate and umbilicate. Whorls 12 to 13, strongly convex and separated, being attached by the costae only. Color a flat china-white. Spire produced and formed at an angle of about 30°. Suture profound. Aperture subcircular and holostomatous. A small parietal shield is

[1] Mörch proposed the name *centiquadra* for *Scalaria denticulata* Sowerby 1844, non *Turbo denticulata* Montagu 1803. However, Montagu's species was described as a *Turbo* and is now considered to be in the Rissoidae, not in the Epitoniidae. Montagu's species was never figured, and according to Forbes and Hanley 1853, p. 149, the type is lost and the species remains unknown.

generally formed and is appressed against the costae and may extend somewhat over the umbilical area. Columella short and oblique. Axial sculpture consisting of numerous and well developed blade-like costae which are strongly angled at the whorl shoulder. These costae may be bent slightly backward. There are 11 to 12 costae on the body whorl, and these pass below the parietal shield and into the umbilical area. Spiral sculpture consisting of numerous and very fine threads which are crossed by exceedingly fine axial threads giving the shell a reticulated surface. There is no basal ridge. Nuclear whorls 5, glass-like and smooth. Operculum thin, paucispiral, corneous and yellowish-brown in color.

length	width	whorls	
15.0	7 mm.	9 *	St. Thomas, Virgin Islands
9.5	4.6	11	Boynton, Lake Worth, Florida

* early whorls lost.

Plate 148. *Epitonium denticulatum* Sowerby
Epitonium centiquadra Mörch (= *E. denticulatum* Sowerby),
St. Thomas, Virgin Islands. Lectotype ($5\frac{1}{2}$x).

Types. The type specimen of *E. denticulatum* Sowerby is probably in the British Museum. Original specimens of *E. centiquadrum* Mörch are in the Universitetets Zoologiske Museum, Köbenhavn, Denmark and the Academy of Natural Sciences, Philadelphia. As Sowerby gave only the West Indies as a locality we here limit the type locality to St. Thomas, Virgin Islands where many collectors such as Krebs, Swift, and Riise obtained the material upon which Mörch's name is based.

Remarks. This species is exceedingly close to *E. pourtalesii* Verrill and Smith from which it differs by being a little smaller, more attenuate and having the microscopic sculpture faintly reticulate. In *E. pourtalesii* the spiral threads predominate, the axial threads being either exceedingly weak or entirely absent.

Epitonium denticulatum appears to be limited to the West Indian Zone while *E. pourtalesii* extends nearly to the northern limit of the Carolinian Zone.

Epitonium denticulatum occurs from just below low water line to depths up to 75 fathoms. The *Blake*, at station 2, in the Straits of Yucatan, obtained a dead specimen in 805 fathoms but this would appear to be adventitious at this locality.

Range. From Fort Pierce, Florida, the Bahama Islands and south to the Virgin Islands.

Records. Florida: Fort Pierce (USNM); off Palm Beach in 20 fathoms; Lake Worth; Boynton Beach (all T. McGinty); off Hillsboro Light in 30 to 50 fathoms; off Fort Lauderdale in 40 to 75 fathoms (both L. A. Burry); *Eolis*, station 139, off Miami in 30 fathoms (USNM); off The Elbow, Key Largo in 66 fathoms; off Molasses Reef, Key Largo in 75 fathoms; 1½ mi. southeast of Looe Key, off Marathon in 25–39 fathoms (all L. A. Burry). Bahama Islands: Great Abaco (USNM); Northeast Point, Cat Island (MCZ). Cuba: *Blake*, station 2, Yucatan Straits in 805 fathoms; *Barrera*, station 203, Bahía de Cabañas in 3–12 fathoms (both USNM). Virgin Islands: St. Thomas (Univ. Zool. Mus. Denmark; ANSP).

Epitonium (Asperiscala) pourtalesii *Verrill and Smith*

Plate 149

Scalaria pourtalesii Verrill and Smith 1880, American Journal of Science **20**, p. 395; Verrill 1882, Transactions Connecticut Academy **5**, pt. 2, p. 527, pl. 57, fig. 32 (*Fish Hawk*, station 874, from off Barnegat Bay, New Jersey in 85 fathoms).

Description. Shell reaching 22 mm. (about ⅞ inch) in length, rather attenuate and umbilicate. Whorls 9 to 10, very strongly convex and separated, attached by the costae only. Color a flat white. Spire produced at an angle of about 35° to 40°. Suture profound. Aperture subcircular and holostomatous. A small parietal shield is usually formed and is appressed against the costae. Columella short and oblique. Axial sculpture consisting of numerous and well developed blade-like costae which are strongly angled or hooked at the whorl shoulder, and may be bent slightly backward. There are 11 to 14 costae on the body whorl and these pass below the parietal shield and into the umbilical area. Spiral sculpture consisting of numerous fine threads. Axial threads barely visible or lacking. There is no basal ridge. Nuclear whorls 4, glass-like and smooth. Operculum thin, paucispiral, corneous and dark-brown in color.

length	width	whorls	
18	9.5 mm.	7*	Bermuda
15.5	9.1	7*	Holotype
22	12	7*	off Barnegat Bay, New Jersey

*early whorls lost.

Types. The holotype of *E. pourtalesii* Verrill and Smith is in the United States National Museum, no. 44801 from the *Fish Hawk*, station 874 (N. Lat. 40°00′; W. Long. 70°57′) in 85 fathoms. There is a single paratype in the Peabody Museum, Yale University from the *Fish Hawk*, station 873 (N. Lat. 40°02′; W. Long. 70°57′) in 100 fathoms. Both these stations are about 145 miles east of Barnegat Bay, New Jersey.

Remarks. See also remarks under *E. denticulatum*.

This species has been dredged in depths of 43 to 600 fathoms. It seems to be quite rare as only one or two specimens appear in any one dredge haul. This species occurs in much deeper water than *E. deuticulatum*.

Range. In deep water from New Jersey south to the Virgin Islands.

Records. New Jersey: about 120 miles east of Barnegat Bay in 80 fathoms (MCZ): *Fish Hawk*, station 873 about 145 miles east of Barnegat Bay (N. Lat. 40°02′: W. Long. 70°57′) in 100 fathoms; *Fish Hawk*, station 871, about 160 miles east of Barnegat Bay (N. Lat. 40°02′: W. Long. 70°23′) in 115 fathoms (both Yale University): *Fish Hawk*, station 874, about 145 miles east of Barnegat Bay (N. Lat. 40°00′: W. Long. 70°57′) in 85 fathoms: *Fish Hawk*, station 876, about 150 miles east of Barnegat Bay (N. Lat. 39°57′; W. Long. 70°56′) in 120 fathoms: *Albatross*, station 2244, about 160 miles east of Barnegat Bay (N. Lat. 40°05′; W. Long. 70°23′) in 67 fathoms; *Fish Hawk*, station 949, about 170 miles east of Barnegat Bay (N. Lat. 40°03′; W. Long. 70°31′) in 100 fathoms; *Fish Hawk*, station 1038, about 180 miles east of Barnegat Bay, (N. Lat. 39°58′; W. Long. 70°06′) in 146 fathoms (all USNM). North Carolina: *Albatross*, station 2596, about 18 miles off Cape Hatteras (N. Lat. 35°08′; W. Long. 75° 10′) in 49 fathoms; *Albatross*, station 2600, about 45 miles east of Cape Lookout (N. Lat. 34°39′; W. Long. 75°35′) in 87 fathoms: *Albatross*, station 2601, about 50 miles east of Cape Lookout (N. Lat. 34°39′: W. Long. 75°33′) in 107 fathoms (all USNM).

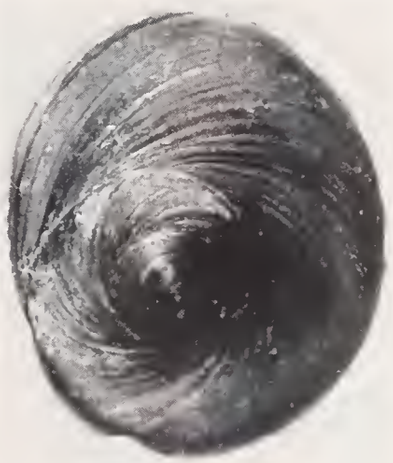

Fig. 2

Fig. 1 Plate 149. *Epitonium pourtalesii* Dall

Fig. 1. *Fish Hawk*, station 874, from about 145 miles east of Barnegat Bay, New Jersey. Holotype (6x). Fig. 2. Operculum of the same specimen (12x).

Florida: *Atlantis*, station 3779, off St. Augustine (N. Lat. 30°21′; W. Long. 79°55′) in 230–250 fathoms (MCZ); off Lake Worth in 90 fathoms (T. McGinty); 18 miles off Delray in 300–325 fathoms (L. A. Burry); *Eolis*, station 309, off Fowey Light in 60 fathoms (USNM); off Cudjoe Key in 50 fathoms; off Sombrero Light in 90 to 100 fathoms (both L. A. Burry); *Eolis*, station 337, off Sand Key in 90 fathoms; *Eolis*, station 43, off Key West in 43 fathoms (both USNM); off Fort Walton (L. A. Burry). Bermuda: (H. Moore). Bahama Islands: 14 miles west of Gun Cay, Bimini Islands in 351 fathoms (USNM). Cuba: *Atlantis*, station 2989, off Sagua la Grande (N. Lat. 23°10′; W. Long. 80°04′) in 360 fathoms (MCZ); *Atlantis*, station 3459, off Sagua la Grande, Las Villas (N. Lat. 23°21′; W. Long. 80°36′) in 500 fathoms (Museo Poey); *Atlantis*, station 3369, off Puerto Tanamo (N. Lat. 20°49′; W. Long. 75°08′) in 600 fathoms (Museo Poey). Virgin Islands: *Caroline*, station 93, 20 miles northwest of St. Thomas (N. Lat. 18°38′; W. Long. 65°09′) in 350 fathoms (USNM). Lesser Antilles: Barbados, off Lazaretto (USNM).

Epitonium (Asperiscala) babylonium *Dall*

Plate 150

Scala babylonia Dall 1889, Bulletin Museum of Comparative Zoölogy **18**, pt. 2, p. 311 (*Albatross*, station 2678, 160 miles due east of Charleston, South Carolina).

Description. Shell reaching 29.5 mm. (1¼ inches) in length, very attenuate, imperforate and rather thin. Whorls 16 to 17, strongly convex and attached. Color a flat china-white. Spire greatly extended and formed at an angle of about 15°. Suture deep but not profound. Aperture subcircular with a flattened parietal shield appressed against the costae and extending completely over the umbilical area. Columella short and straight. Axial sculpture consisting of numerous and well developed blade-like costae which are strongly angled or hooked near the whorl shoulder. There are 24 costae on the body whorl of the holotype. These costae pass below the parietal shield and into the umbilical area. Spiral sculpture consisting of rather numerous fine threads which are crossed by exceedingly fine axial threads. There is no basal ridge. Nuclear whorls 2½, glass-like and smooth. Operculum unknown.

length	width	whorls	
28.5	6.5 mm.	14½ *	Holotype
12.8	4.5	12½ (young)	off Bahía de Cardenas, Cuba

* loss of about two early whorls.

Types. The holotype of *E. babylonium* is in the United States National Museum, no. 83723, *Albatross*, station 2678 (N. Lat. 32°40′; W. Long. 76°40′) in 731 fathoms, about 160 miles due east of Charleston, South Carolina.

Remarks. This species is very close in its general appearance to *E. fractum* and *E. dallianum*. It differs from both by possessing fine spiral threads. From the group or species associated with *novangliae* and *multistriatum*, it differs by being larger and far more attenuate.

The two specimens figured on our plate look rather different, but figure 2 is double the magnification of figure 1 and, in addition, the specimen is in perfect condition, showing the well developed angles on the whorl shoulder. In this species the angles are de-

veloped much lower on the costae than they are on other species that we have examined.

This species is found in rather deep water, the few records obtained having a depth range of 66 to 731 fathoms.

Range. In deep water from off Cape Lookout, North Carolina south to the north coast of Cuba.

Records. North Carolina: *Albatross*, station 2600, about 45 miles due east of Cape Lookout (N. Lat. 34°39′; W. Long. 75°35′) in 87 fathoms (USNM). South Carolina: *Albatross*, station 2678, about 160 miles due east of Charleston (N. Lat. 32°40′; W. Long. 76°40′) in 731 fathoms (USNM). Florida: off Hillsboro Light in 66 to 83 fathoms (L. A. Burry); *Eolis*, station 371, off Fowey Light in 110 fathoms (USNM). Cuba: *Atlantis*, station 3475, off Bahía de Cardenas (N. Lat. 23°18′; W. Long. 80°48′) in 400 fathoms (MCZ).

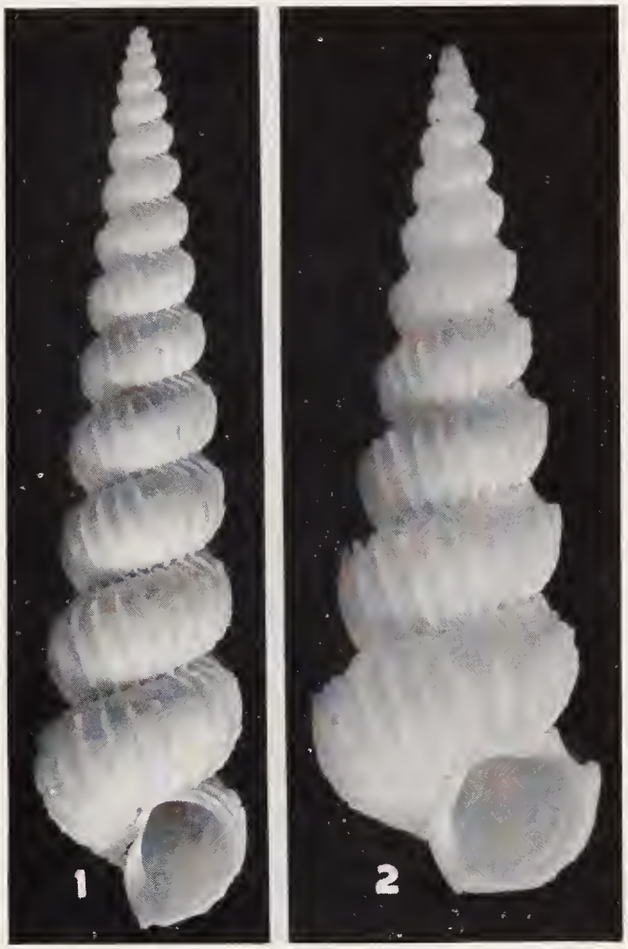

Plate 150. *Epitonium babylonium* Dall

Fig. 1. From 160 miles east of Charleston, South Carolina, *Albatross*, station 2678. Holotype (3.3x). Fig. 2. From off Bahía de Cardenas, Cuba (7x).

Epitonium (Asperiscala) polacium *Dall*

Plate 151

Scala polacia Dall 1889, Bulletin Museum of Comparative Zoölogy **18,** pt. 2, p. 319, pl. 18, fig. 10 (off Cuba [30 miles southwest of Key West, Florida]).

Description. Shell reaching 8 mm. (about $\frac{3}{8}$ of an inch) in length, attenuate, imperforate and rather light in structure. Whorls 12 to 13, moderately convex and attached. Color a flat white. Spire extended and produced at an angle of 15°. Suture well indented. Aperture subcircular. Columella rather short and nearly straight. Axial sculpture consisting of numerous low, thin, blade-like costae. There are 26 to 28 costae on the body whorl, with no indication of hooks or angles at the whorl shoulder. Spiral sculpture consisting of numerous and very fine threads with no indication of axial threads. There is no basal ridge. Nuclear whorls 3 to 4, the first three very small, glass-like, smooth and brownish in color. Operculum unknown.

length	width	whorls	
7	2.5 mm.	12	Holotype
8	2.7	13	off Sambo Reef, Florida

Plate 151. *Epitonium polacium* Dall
Blake, station 5, from off Florida (N. Lat. 24°15′; W. Long. 82°13′). Holotype ($10\frac{1}{2}$x).

Types. The holotype of *E. polacium* is in the United States National Museum, no. 106910, from the *Blake*, station 5 (N. Lat. 24°15′; W. Long. 82°13′) in 229 fathoms, about 30 miles southwest of Key West, Florida.

Remarks. This species is characterized mainly by the peculiar shape of the spire. The first three whorls are very small, the fourth whorl enlarges rapidly and as a consequence the apex appears somewhat dome-shaped.

This species, so far as is known, has a very limited distribution being known only from the reefs off Key West, Florida in 115 to 229 fathoms.

Range. Known only from off Key West, Florida.

Records. FLORIDA: *Eolis*, station 322, off Sand Key in 115 fathoms; *Eolis*, station 316, off Sand Key in 120 fathoms; *Eolis*, station 331, off Sambo Reef in 118 fathoms; *Eolis*, station 330, off Sambo Reef in 120 fathoms: *Eolis*, station 329, off Sambo Reef in 135 fathoms; *Blake*, station 5, 30 miles southwest of Key West (N. Lat. 24°15′: W. Long. 82°13′) in 229 fathoms (all USNM).

Plate 152. *Epitonium sericifilum* Dall
From Honduras. Holotype (13x).

Epitonium (Asperiscala) sericifilum *Dall*
Plate 152

Scala sericifila Dall 1889, Bulletin Museum Comparative Zoölogy **18**, pt. 2, p. 313 (coast of Honduras).

Description. Shell reaching 5.1 mm. (about $\frac{1}{4}$ inch) in length, attenuate, imperforate and rather strong. Whorls 10, attached and angled at the periphery. Color a flat white. Spire extended and formed at an angle of 15°. Suture deep but not profound. Aperture subcircular with no parietal shield indicated. Columella short and arched. Axial sculpture consisting of very numerous and well developed low, oblique, costae which are quite uniform. There are 25 costae on the body whorl of the holotype. Spiral sculpture consisting of very numerous fine threads which do not pass over the costae. There is no basal ridge. Nuclear whorls $2\frac{1}{2}$, smooth and glass-like. Operculum unknown.

length	width	whorls	
5.1	1.8 mm.	10	Holotype

Types. Holotype, United States National Museum, no. 61190, from the coast of Honduras, Simpson collection.

Remarks. This species is known from only a single specimen. The oblique costae and well angled whorl periphery separates it from all other species in this group known to us.

Dall (1889, p. 124) has listed this species as possibly occurring in Texas but the specimen upon which the record from Galveston, Texas was based is badly worn and broken. It may be this species but was probably fortuitous at this locality as it has not been taken since that time.

Range and Records. Honduras (USNM).

Epitonium (Asperiscala) championi, new species
Plate 153

Description. Shell reaching about 14 mm. ($\frac{1}{2}$ inch) in length, attenuate, imperforate, rather solid and strongly sculptured. Whorls 10 to 11, convex and attached. Color a flat white to a light cream. Aperture subcircular, with both the palatal and parietal margins thickened, the palatal or outer lip being greatly thickened in older specimens. Columella short and arched. Spire extended and produced at an angle of 20°. Suture moderately impressed. Axial sculpture consisting of 8 or 9 flattened cord-like, slightly impressed costae which are rather variable as to width. Spiral sculpture consisting of 19 to 20 flattened ridges, those nearest the umbilical area being a little narrower. Basal ridge absent. Operculum thin, paucispiral and brown in color. Nuclear whorls $2\frac{1}{2}$ to 3, smooth and opaque.

Plate 153. *Epitonium championi* Clench and Turner
Lewis Bay, Hyannis, Massachusetts. Holotype (8.3x).

length	width	whorls	
13.7	5.5 mm.	9 *	Shackleford Island, North Carolina
11.5	4.6	8 *	Holotype

* early whorls broken.

Types. Holotype, Museum of Comparative Zoölogy, no. 182900 from Lewis Bay, Hyannis, Cape Cod, Massachusetts, M. E. Champion, collector. Paratypes from the same locality and from Dennisport; Mattapoisett and off Gay Head, Marthas Vineyard, all Massaehusetts. Paratypes from Hyannis deposited in the United States National Museum.

Remarks. This speeies has been confused with *E. greenlandicum* Perry. It is, however, readily distinguished by its much smaller size, flattened axial eostae and, most important, the laek of a basal ridge. The sculpture in *E. championi* appears much like a basket weave in which the upright and outer struts (the axial costae) are woven tightly, causing the horizontal weave (the spiral ridges) to bulge outwardly between the struts.

The species does not appear to be closely related to any other in the subgenus *Asperiscala*. It is perhaps a divergent element of *E. candeanum*, in which both axial and spiral sculpture have had an excess of development. On the other hand, it is somewhat similar to *E. greenlandicum* but the laek of a basal ridge easily separates these two species. We have eonsidered the presence or absence of a basal ridge of subgeneric value but we may have over emphasized its importance.

This species is rare and local in its distribution. It has been found in the intertidal area and in depths up to 22 fathoms.

Range. South eoast of Cape Cod, Massaehusetts south to North Carolina.

Records. Massachusetts: Dennisport; Lewis Bay, Hyannis (both MCZ); Woods Hole (USNM); Mattapoisett; off Gay Head, Marthas Vineyard in 10 fathoms (both J. Miller); West Jetty, Nantueket (D. Taylor). Rhode Island: Block Island (MCZ). New York: Noyaek Bay, South Hampton, Long Island (R. Latham). New Jersey: Atlantic City: Anglesea (both ANSP); MeCrie Shoals, off Cape May (USNM). Virginia: *Albatross*, station 2015, off Chincoteague Bay (N. Lat. 37°31′; W. Long. 74°53′) in 19 fathoms; Smiths Island, Cape Charles (both USNM). North Carolina: *Albatross*, station 2608, about 17 miles southeast of Cape Lookout (N. Lat. 34°32′; W. Long. 76°12′) in 22 fathoms (USNM); Shackleford Island (MCZ); Frying Pan Shoals, Cape Fear (Univ. of Michigan).

Subgenus **Boreoscala** *Kobelt*

Boreoscala Kobelt 1902, Icon. der Schalentragenden europäischen Meeresconchylien **3**, p. 23.

Arctoscala Dall 1909, United States Geological Survey, Professional Papers no. 59, p. 53 (subgenotype, *Scalaria greenlandica* Perry, original designation).

Liriscala de Boury 1909, Journal de Conchyliologie **57**, p. 255 (subgenotype, *Scala groenlandica* Chemnitz, original designation).

Pyramiscala de Boury 1909, Journal de Conchyliologie **57**, p. 255 (subgenotype, *Scalaria billaudeli* Mayer, original designation).

Subgenotype, *Scala groenlandica* Chemnitz (=*Scalaria greenlandica* Perry), original designation.

Shells imperforate and strongly sculptured, having axial costae which are generally thickened and not blade-like. Spiral sculpture rather coarse and consisting of flattened ridges. The whorls are attached and there is a well developed basal ridge.

Epitonium (Boreoscala) greenlandicum *Perry*

Plate 154

Turbo clathrus groenlandicus Chemnitz 1795, Conchylien-Cabinet (1) **11**, p. 155, pl. 195a, fig. 1878–1879 Greenland) [non binomial].

Scalaria greenlandica Perry 1811, Conchology, London, pl. 28, fig. 8 (Greenland).

Scalaria similis J. Sowerby 1813, The Mineral Conchology of Great Britain **1**, p. 49, pl. 16, fig. 1–2 (fossil, Bramerton near Norwich, England); non *S. similis* G. B. Sowerby 1844.

Scalaria subulata Couthouy 1838, Boston Journal of Natural History **2**, p. 93, pl. 3, fig. 4 (Massachusetts Bay in the vicinity of Cape Ann).

Scalaria planicosta Kiener 1839, Iconographie Coquilles Vivantes **10**, Scalaria, p. 18, pl. 7, fig. 21 (locality unknown).

Scalaria grönlandica var. *crebricostata* G. O. Sars 1878, Mollusca, Regionis Arcticae Norvegiae, Christiania, p. 194, pl. 23, fig. 1 (Vadsö, Norway); non *S. crebricostata* Cooper 1870.

Scalaria groenlandica Posselt 1898, Grönlands Brachiopoder og Blöddyr. Meddelelser om Grönland **23**, p. 233.

Description. Shell reaching about 60 mm. ($2\frac{1}{2}$ inches) in length, attenuated, chalky and imperforate. Whorls 11 to 12, moderately convex and joined. Color a uniform grayish tan to chalky white. Suture moderately impressed. Aperture subcircular. Lip usually thickened. Columella short and arched. Axial sculpture consisting of numerous strong blade-like to ridge-like costae varying from 9 to 12 on the body whorl. These costae may be so strongly developed and recurved that they almost cover the intercostal spaces (form *lovenii*). Spiral sculpture consisting of a weak to a well developed basal ridge, though occasionally it may be entirely absent. In addition there are about 9 flattened and regularly spaced spiral cords above the basal ridge, and 3 to 5 flattened and relatively inconspicuous cords below it. Nuclear whorls 2 and smooth. Operculum paucispiral, corneous and generally colored a dark brown.

length	width	whorls	
36	12.8 mm.	11 *	Georges Bank, off Massachusetts
61	21	8 *	Alaska
35	12.5	11 *	Middle Bank, off Massachusetts

* probable loss of 2 or more whorls.

Types. The whereabouts of Perry's types is unknown to us. We here restrict the type locality to Godthaab, southwest Greenland, one of the several localities listed by Posselt. The type specimen of *Scalaria subulata* Couthouy has been lost. The type of *Scalaria planicosta* Kiener is in the Paris Museum. A cotype of *S. grönlandica* var. *crebricostata* G. O. Sars is in the Oslo Museum, Oslo, Norway.

Remarks. This species has long been known under the name of *groculandicus* Chemnits, but as the Conchylien-Cabinet (1) **11** is non-binomial it must date from Perry. Perry evidently attempted to copy the figure in Chemnitz and embellished his drawing with a few characters certainly not found in any specimen of this species that we have seen. All of Perry's figures on plate 28 are overdrawn and he also gave free rein to his imagination when coloring them.

This species occurs along the coast of southwest Greenland to Newfoundland and south to Long Island, New York. It is exceedingly rare in Labrador as Packard mentions but a single fragment obtained in his dredgings along this coast (1867, p. 284) and it is reported by Whiteaves as very rare in the Gaspé area of Quebec.

J. G. Jeffreys (1884, Proc. Zool. Soc. London, p. 137) reports a living specimen of *E. greenlandicum* that was dredged by the *Porcupine* between the Hebrides and Faroe Islands in 345 fathoms.

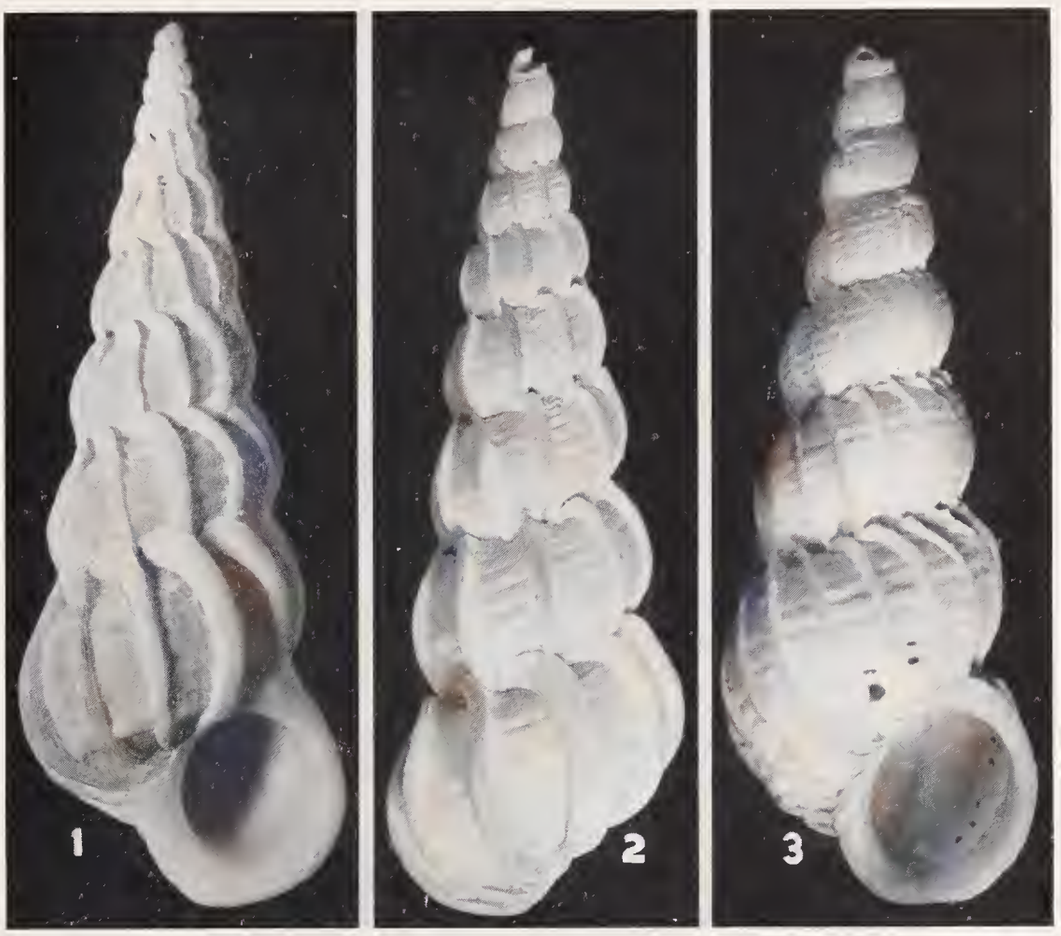

Plate 154. *Epitonium greenlandicum* Perry

Fig. 1. From Middle Bank, off Massachusetts in 35 fathoms (3x). Fig. 2. From Swampscott, Massachusetts (2.8x). Fig. 3. *Epitonium greenlandicum crebricostatum* Sars (=*greenlandicum* Perry), from Vadsö, Norway. Cotype (3.5x).

Range. Probably circumpolar. Eastern Atlantic: From Spitzbergen south to southern Norway, the Faroe Islands and Iceland. Western Atlantic: Godhavn, Greenland south to Montauk Point, Long Island, New York. Northern Pacific: coasts of Alaska and Siberia.

Records. Western Atlantic. Greenland: (Zool. Mus. Oslo). Newfoundland: *Albatross*, station 2446, Eastern Shoals (N. Lat. 46°20′; W. Long. 49°52′) in 40 fathoms. Nova Scotia: *Speedwell*, station 70, Emerald Bank (N. Lat. 42°45′30″; W. Long. 62°43′) in 190 fathoms (USNM); 14 miles south of Cape Sable; Bradelles Bank; Banquereau; Sable Island Bank; Brown's Bank in 40 fathoms (all MCZ); *Speedwell*, station 39, Brown's Bank (N. Lat. 42°44′; W. Long. 66°27′) in 75 fathoms; Digby; Halifax; *Albatross*, station 2520, off Cape Sable (N. Lat. 42°41′; W. Long. 64°55′) in 62 fathoms

(all USNM). New Brunswick: Grand Manan Island in 40–45 fathoms (MCZ). Maine: Eastport (MCZ); Little River Light in 20–40 fathoms; Bar Harbor (both USNM); Mt. Desert; Ironbound Island, Frenchman's Bay (both MCZ); Blue Hill Bay; Penobscott Bay (both USNM); Casco Bay (MCZ; USNM); Old Orchard (MCZ); Cape Porpoise (Charleston Museum). New Hampshire: *Bache*, station 46B, off Portsmouth (N. Lat. 43°03′; W. Long. 70°04′) in 51 fathoms (USNM); 150 miles off Portsmouth in 110 fathoms (MCZ). Massachusetts: Ipswich (MCZ); *Speedwell*, station 199, off Cape Ann (N. Lat. 42°30′; W. Long. 70°20′) in 98 fathoms; Salem (both USNM); Lynn; Duxbury; off Provincetown in 105 fathoms (all MCZ); *Speedwell*, station 344, off Provincetown (N. Lat. 42°19′; W. Long. 69°47′) in 130 fathoms (USNM); 17 miles off Chatham in 22 fathoms; 8 miles east of Nauset Light, Cape Cod (both MCZ); *Speedwell*, station 322, Stellwagen Bank (N. Lat. 42°12′30″; W. Long. 70°01′) in 67 fathoms; *Albatross*, station 2580, Cultivator Shoals (N. Lat. 41°25′; W. Long. 69°01′) in 83 fathoms; *Bache*, station 81B, Georges Bank (N. Lat. 41°25′; W. Long. 66°45′) in 28 fathoms (all USNM); Georges Bank (N. Lat. 41°23′; W. Long. 68°45′) in 50 fathoms (MCZ). Rhode Island: *Fish Hawk*, station 815, 17 miles off Block Island Light in 29 fathoms (USNM). New York: *Fish Hawk*, station 986, off Montauk Point, Long Island (N. Lat. 40°55′; W. Long. 70°48′) in 28 fathoms (USNM); Fort Pond Bay, Montauk, Long Island (R. Latham).

Eastern Atlantic. Norway: Vadsö; Vardö (both Tromsö Museum and Zool. Mus. Oslo); Porsanger Fjord (Tromsö Museum); Hammerfest (Zool. Mus. Oslo); Tromsö in 40 to 70 fathoms (Tromsö Mus.: Oslo Museum; Bergens Mus.; MCZ); Mestervik, Malangen (Tromsö Museum); Röstad in 27 to 43 fathoms (Tromsö Museum); Trondheim (Trondheim Museum); Bergen; Oslo Fjord; Foldafjord, Namdalen; Bodö, Store Hjerö in 24 to 30 fathoms; Skraaven in 10 to 20 fathoms (all Zool. Mus. Oslo).

Epitonium greenlandicum form **lovenii** *A. Adams*

Plate 155, fig. 2

Scalaria lovenii A. Adams 1856, Proc. Zoological Society London, p. 1 (Scandinaviae); G. O. Sars 1878, Mollusca Regionis Arcticae Norvegiae, Christiania, p. 194, pl. 10, fig. 16 (Norway).

Description. Similar to the typical form but having the axial costae recurved backward leaving a recessed area under each costa. Occasional specimens have this character so well developed that the inter-costal areas are completely covered over.

length	width	whorls	
28	10.5 mm.	9*	Browns Bank, off Cape Sable, Nova Scotia
18.5	7	9*	Vardö, Norway

* 2 or more early whorls lost.

Types. The type of *E. greenlandicum lovenii* A. Adams is probably in the British Museum. The type locality is here restricted to Vardö, Norway.

Remarks. This is only an extreme variation occurring in this species. It probably has no geographic or environmental significance as specimens of *lovenii* occur with the typical form and intergrade completely with it.

Range. Probably co-extensive with the typical form.

Records. Western Atlantic. Nova Scotia: about 43 miles off Cape Sable in 110 fathoms; Browns Bank in 40 fathoms (both MCZ); Lahave Bank in 45 fathoms (USNM). Massachusetts: Georges Bank (N. Lat. 41°51′; W. Long. 66°18′) in 45 fathoms (MCZ); *Albatross*, station 2524, Georges Bank (N. Lat. 41°48′; W. Long. 65°47′) in 85 fathoms (USNM).

Eastern Atlantic. Norway: Tromsö (Tromsö Museum; MCZ); Vardö (Tromsö Museum); Balsfi (Oslo Museum).

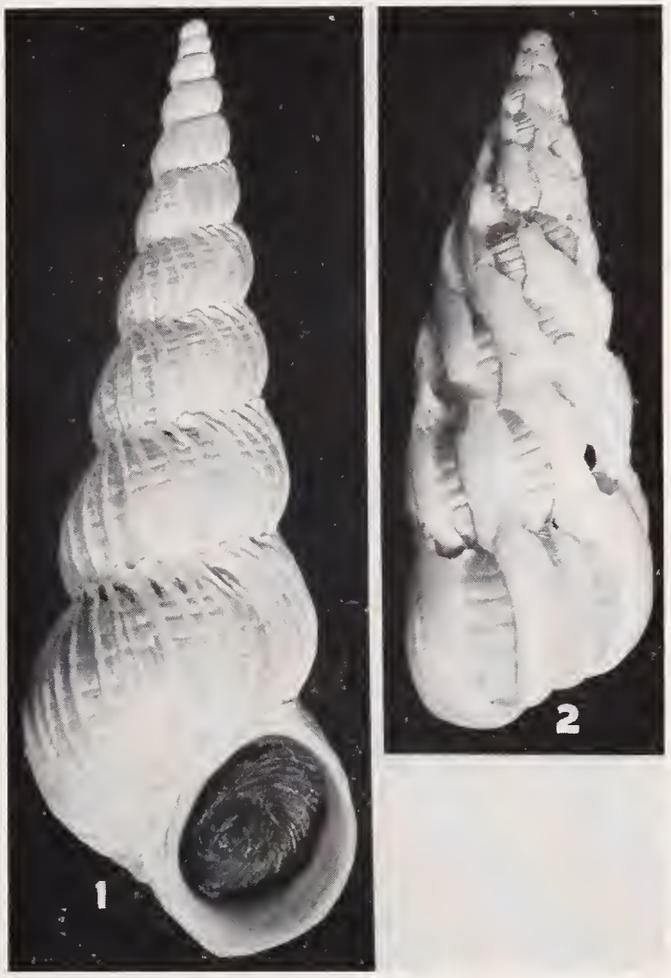

Plate 155

Fig. 1. *Epitonium greenlandicum ornatum* Friele and Grieg (= *E. norvegicum* Clench and Turner) from off Vest Fjorden, Norway. Holotype (2.8x). Fig. 2. *Epitonium greenlandicum lovenii* A. Adams from Browns Bank off Cape Sable, Nova Scotia in 40 fathoms (2.8x).

Epitonium greenlandicum subspecies **norvegicum,** new name
Plates 155, fig. 1

Scalaria groenlandica var. *ornata* Friele and Grieg 1901, Norwegian North Atlantic Expedition 1876–1878, Christiania, Mollusca **3**, p. 79; (S.S. *Vöringen*, station 124, off Vest Fjorden, Norway); non *S. ornata* Baily 1865.

Description. Somewhat similar to *greenlandicum*, differing in being lighter in structure, and more attenuated. In addition, the axial costae are much finer, more numerous and

exceedingly weak on the early whorls. There are 15 to 34 costae on the body whorl. The operculum is paucispiral, corneous and dark brown in color.

length	width	whorls	
44	13 mm.	10	Nordkapp, Norway
38	12.8	11	off Vest Fjorden, Norway

Types. The holotype of *Scalaria groenlandica ornata* Friele and Grieg is in the Zoologisk Museum, Universitetet, Bergen, Norway, no. 21669. We figure the holotype from station 124 (N. Lat. 66°41′; E. Long. 6°59′) off Vest Fjorden, Norway.

Remarks. This is a deep water subspecies which appears to be limited in its distribution to the arctic region off Norway. It is quite possible that when more material is available it will be seen to intergrade with the typical form. We have seen only two specimens of this subspecies.

So far as we can check the record, the description of *ornata* dates from the publication given above by Friele and Grieg, though no indication was given that this was being described as new.

Range. Known only from Norway, in deep water.

Records. Eastern Atlantic. Norway: off Nordkapp (N. Lat. 72°53′; E. Long. 21°51′) in 223 fathoms; off Vest Fjorden (N. Lat. 66°41′; E. Long. 6°59′) in 350 fathoms (both Bergen Museum).

Epitonium (Boreoscala) magellanicum *Philippi*

Plate 156

Scalaria magellanica Philippi 1845, Archiv für Naturgeschichte for 1845, **1**, p. 65 (Straits of Magellan).

Scalaria (*Opalia*) *magellanica* Philippi, Strebel 1905, Zoologischen Jahrbüchern **22**, p. 656, pl. 23, fig. 44a–f.

Scalaria (*Opalia*) *magellanica* var. *latecostata* Strebel 1905, Zoologischen Jahrbüchern **22**, p. 658, pl. 23, fig. 43a–d (Straits of Magellan and Lenox Island [south coast of Tierra del Fuego]).

Cirsotrema douvillei Fenaux 1937, Journal de Conchyliologie **81**, p. 219, pl. 2, fig. 1 (Santa Cruz River, Patagonia [Argentina]).

Description. Shell reaching about 30 mm. (about 1¼ inches) in length, attenuate, chalky and imperforate. Whorls 10 and moderately convex. Color a uniform chalky-white. Suture moderately impressed. Aperture circular. Lip thickened. Parietal or inner lip with a small thickened area caused by the union of the terminal ends of the axial costae. Columella short and arched. Axial sculpture consisting of numerous strong blade-like to ridge-like costae varying from 16 to 18 on the body whorl. These costae are generally slightly recurved backwardly. Spiral sculpture consisting of a well defined basal ridge with numerous but rather indistinct spiral cords between the basal ridge and the suture above. There is only a slight indication of spiral cords below the basal ridge. Nuclear whorls 2 and smooth. Operculum chitinous, paucispiral and dark-brown in color.

length	width	whorls	
29.5	11.5 mm.	10	off Puerto Gallegos, Argentina
25.5	10.5	8 *	off Mar del Plata, Buenos Aires, Argentina

* early whorls lost.

Types. The whereabouts of the type of *E. magellanicum* is unknown to us. The type locality is the Straits of Magellan. It may possibly be in the British Museum as Sherburn mentions that Philippi's collection went to the British Museum and the Museum at Santiago de Chile. Fenaux does not state where his types were deposited.

Plate 156. *Epitonium magellanicum* Philippi
From Mar del Plata, Buenos Aires, Argentina (2.7x).

Remarks. E. douvillei Fenaux appears to be only a very large example of *magellanicum.* According to Fenaux, the broken holotype, if "reconstructed" would have been 95 mm. in length, which would make it one of the largest of the recent species. Excessively large specimens in other species are known, however.

This species is strikingly similar to *E. greenlandicum* Perry. It differs, however, in having more numerous costae, having a more strongly developed basal ridge and in having the spiral cords somewhat smaller and more numerous.

This species is quite rare in collections, probably because it is a fairly deep water species and as it occurs along a rather infrequently visited coast.

Range. Southern Argentina south through the Straits of Magellan and probably north along the southern coast of Chile, also the Falkland Islands.

Records. ARGENTINA: off Mar del Plata, Buenos Aires (S. Lat. 39°28′: W. Long. 57°02′) in 55 fathoms (A. Carcelles); *Hassler* Voyage, off Puerto Gallegos (S. Lat. 51°26′: W. Long. 68°05′) in 55 fathoms (MCZ); Isla de los Estados, off Tierra del Fuego (S. Lat. 54°41′; W. Long. 64°01′) in 30 fathoms (A. Carcelles). FALKLAND ISLANDS: Lively Island, Falkland Islands (A. Carcelles). CHILE: *Hassler* Voyage, Straits of Magellan (MCZ).

Epitonium (Boreoscala) pandion, new name
Plate 157

Acirsa gracilis Verrill 1880, Proceedings United States National Museum **3,** p. 377; Verrill 1882, Transactions Connecticut Academy **5,** p. 528, pl. 57, fig. 31 (*Fish Hawk*, station 894 (N. Lat. 39°53′; W. Long. 70°58′) in 365 fathoms; non *Scalaria gracilis* Sowerby 1844; non *Acirsa* (*Acirsella*) *gracilis* Fenaux 1937.[1]

Description. Shell reaching about 8 mm. (about $\frac{1}{3}$ of an inch) in length, attenuate and imperforate. Whorls probably 8 or 9, moderately convex and attached. Color a light ivory. Spire extended and produced at an angle of 12°. Suture deep but not profound. Aperture ovate, simple and slightly flaring below. Parietal lip consisting of a thin fold over the umbilical area. Columella short and somewhat arched. Axial sculpture consisting of rather numerous low and broad costae which are stronger above the periphery. Generally these costae are stronger on the early whorls, becoming very weak to almost absent on the body whorl of adult specimens. Spiral sculpture consisting of numerous and fine threads which end just below the whorl periphery, the lowest thread occasionally larger and forming a basal ridge. Basal area nearly smooth, sculptured only by exceedingly fine growth lines. Nuclear whorls unknown. Operculum paucispiral, thin and light-brown in color.

length	width	whorls	
7.1	2.5 mm.	7*	off Cape Hatteras, North Carolina
5.0	2.2	6*	Holotype

* early whorls lost.

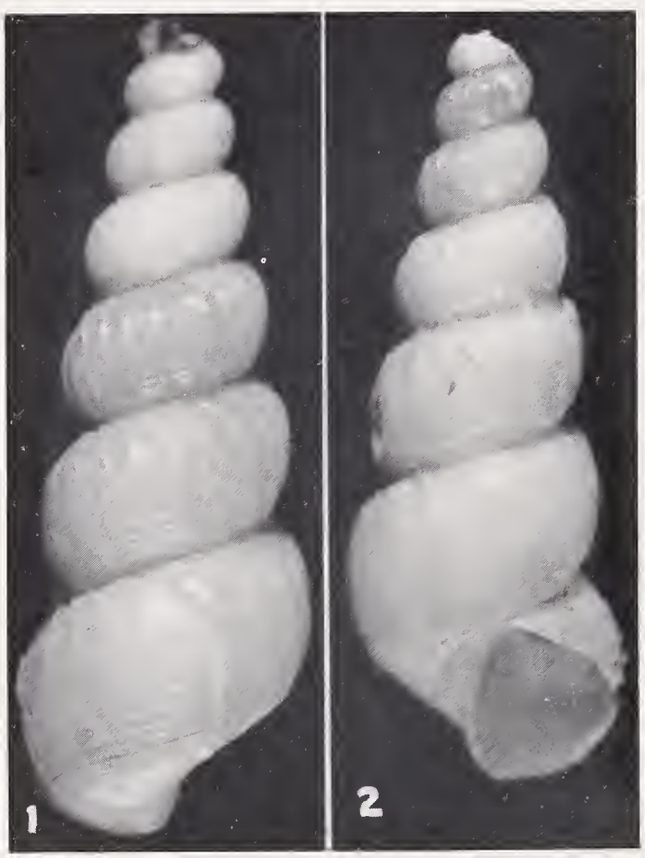

Plate 157. *Epitonium pandion* Clench and Turner
Fig. 1. *Albatross*, station 2115, 60 miles northeast of Cape Hatteras, North Carolina (13x). Fig. 2. *Acirsa gracilis* Verrill (= *E. pandion* Clench and Turner) *Fish Hawk*, station 894, 150 miles east of Barnegat Bay, New Jersey. Holotype (15x).

[1] If this species of Fenaux proves to be valid it will have to have a new name owing to the prior use of *Acirsa gracilis* by Verrill.

Types. The holotype of *E. gracilis* Verrill is in the United States National Museum, no. 44813, *Fish Hawk*, station 894, about 150 miles east of Barnegat Bay, New Jersey (N. Lat. 39°53′; W. Long. 70°58′) in 365 fathoms. Paratypes from the same locality in the Peabody Museum, Yale University.

Remarks. It is with some hesitation that we include this species in the subgenus *Boreoscala*. In our opinion it is certainly not in the genus *Acirsa* as originally assigned by Verrill.

This is a deep water species. It occurs off the continental shelf in depths ranging from 349 to 1004 fathoms. Specimens that we have seen have all lost their nuclear whorls and most if not all were dead when collected.

The name *pandion* is taken from the generic name of the fish hawk or osprey, the bird after which the United States Fish Commission vessel, *Fish Hawk*, was named.

Range. In deep water in the latitude of northern New Jersey south to Cape Hatteras, North Carolina.

Records. Albatross, station 2048, about 250 miles east of Asbury Park (N. Lat. 40°02′; W. Long. 68°50′) in 547 fathoms (USNM): *Albatross*, station 2213, about 175 miles east of Barnegat Bay (N. Lat. 39°58′; W. Long. 70°30′) in 384 fathoms (USNM; Yale); *Fish Hawk*, station 1093, about 210 miles east of Barnegat Bay (N. Lat. 39°56′; W. Long. 69°45′) in 349 fathoms (USNM); *Albatross*, station 2547, about 185 miles east of Barnegat Bay (N. Lat. 39°54′; W. Long. 70°20′) in 390 fathoms (USNM: Yale): *Fish Hawk*, station 894, about 150 miles east of Barnegat Bay (N. Lat. 39°53′; W. Long. 70°58′) in 365 fathoms (USNM: Yale): *Fish Hawk*, station 892, about 145 miles east of Barnegat Bay (N. Lat. 39°46′; W. Long. 71°05′) in 487 fathoms (USNM): *Albatross*, station 2689, about 135 miles east of Barnegat Bay (N. Lat. 39°42′; W. Long. 71°15′) in 525 fathoms (Yale Univ.); *Albatross*, station 2682, about 200 miles east of Atlantic City (N. Lat. 39°38′; W. Long. 70°22′) in 1004 fathoms (USNM); *Fish Hawk*, station 1143, about 115 miles east of Atlantic City (N. Lat. 39°29′; W. Long. 72°01′) in 452 fathoms (USNM; Yale); *Albatross*, station 2237, about 130 miles east of Cape May (N. Lat. 39°12; W. Long. 72°09′) in 520 fathoms (Yale); *Albatross*, station 2721, about 125 miles east of Cape May (N. Lat. 38°56′; W. Long. 72°11′) in 813 fathoms (USNM). Delaware: *Albatross*, station 2233, about 95 miles east of Cape Henlopen (N. Lat. 38°36′; W. Long. 73°06′) in 630 fathoms (USNM; Yale). North Carolina: *Albatross*, station 2115, about 60 miles northeast of Cape Hatteras (N. Lat. 35°49′; W. Long. 74°34′) in 843 fathoms (USNM).

Genus **Depressiscala** *de Boury*

Depressiscala de Boury 1909, Journal de Conchyliologie **57**, p. 258.

Genotype, *Scala aurita* Sowerby, original designation.

Shells attenuate, shining, umbilicate or imperforate, usually colored a diffused brown or purple and having low, white costae. There is no basal ridge. Nuclear whorls smooth, glass-like and lighter in color than the post nuclear whorls.

The two Western Atlantic species in this genus are quite different and are readily separated from each other and from *Epitonium*. They differ mainly from *Epitonium* by their

coloration and by the very low and somewhat recurved costae (*D. nautlae*). The surface between the costae is highly polished, with microscopic sculpture exceedingly fine or absent.

There is no single character that separates *Depressiscala* from *Epitonium* or its several subgenera. In their aggregate, however, the several characters of *Depressiscala*, indicate a series of species quite different from the assemblage of species grouped together in *Epitonium*.

Depressiscala nitidella *Dall*

Plate 158

Scala nitidella Dall 1889, Bulletin Museum of Comparative Zoölogy **18**, p. 314 (15 to 30 miles off the North Carolina coast;[1] Dall 1902, Proceedings United States National Museum **24**, p. 505, pl. 30, fig. 8.

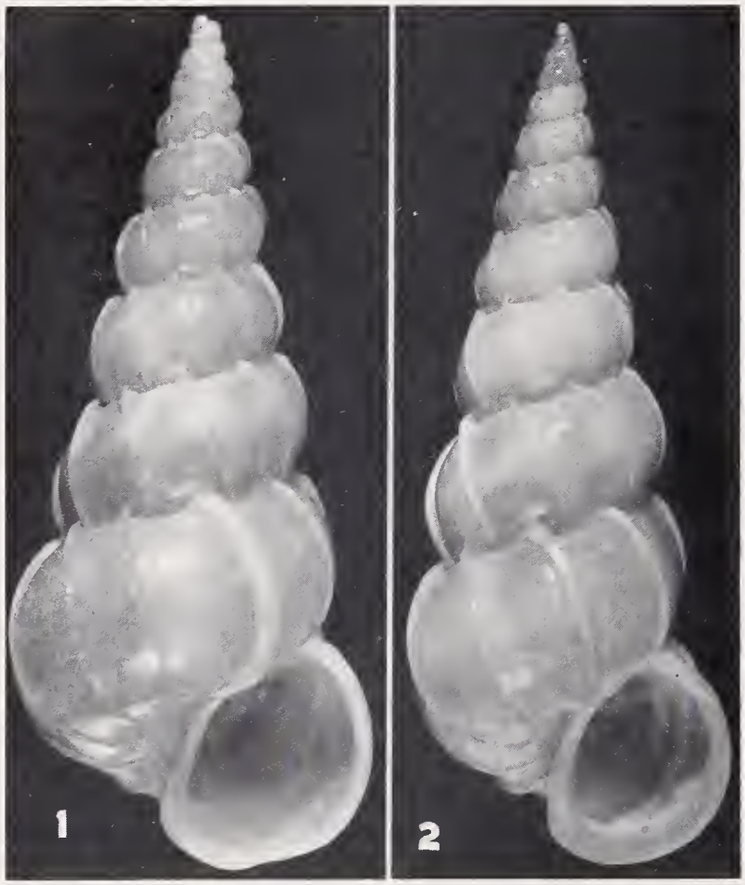

Plate 158. *Depressiscala nitidella* Dall
Fig. 1. *Albatross*, station 2596, from off Cape Hatteras, North Carolina. Holotype (7x). Fig. 2. Boynton, Lake Worth, Florida ($5\frac{1}{2}$x).

Description. Shell reaching 20 mm. (about $\frac{3}{4}$ of an inch) in length, attenuate, umbilicate and shining. Whorls 10 to 13, strongly globose and attached. Color a glossy-white with irregular patches of light-brown which may become rather widely diffused. Spire extended and produced at an angle of about 28°. Suture deep but not profound. Aperture subovate with the parietal area thickened and nearly straight. Columella not defined. Axial sculpture consisting of a few very low blade-like costae which number 9 to 10 on the body whorl. On certain specimens many of the costae may be cord-like. Spiral sculpture consisting of a few, exceedingly fine, slightly incised threads. There is no basal

[1] *Albatross*, station 2596, about 20 miles southeast of Cape Hatteras, North Carolina.

ridge. Umbilical opening partially covered by the parietal wall with the costae entering the umbilicus in a spiral formation. Nuclear whorls 3, glass-like and smooth. Operculum thin, paucispiral and light brown in color.

length	width	whorls	
20	7.6 mm.	10 *	Great Abaco, Bahama Islands
16.5	6.5	13	Lake Worth, Boynton, Florida
13	5.0	11 *	Holotype, off Cape Hatteras, North Carolina

* 1 or 2 early whorls lost.

Types. The holotype of *D. nitidella* Dall is in the United States National Museum, no. 83716, from the *Albatross*, station 2596, about 20 miles east of Cape Hatteras, North Carolina (N. Lat. 35°08′; W. Long. 75°10′) in 49 fathoms.

Remarks. This species, similar to *D. nautlae*, has a discontinuous distribution. Undoubtedly more collecting will fill in many of the gaps in our present records. It has been dredged in depths ranging from 32 to 117 fathoms. A few beach specimens are known which would indicate that it probably lives also in rather shallow water, at least in certain areas.

See also remarks under *D. nautlae*.

Range. From off Cape Hatteras, North Carolina and from off Palm Beach, Florida south to Key West. Then again off northwest Florida, the Bahamas and south through the West Indies to Barbados, Lesser Antilles.

Records. North Carolina: *Albatross*, station 2596, about 20 miles east of Cape Hatteras (N. Lat. 35°08′; W. Long. 75°10′) in 49 fathoms; *Albatross*, station 2595, about 22 miles east of Cape Hatteras (N. Lat. 35°08′; W. Long. 75°05′) in 63 fathoms; *Albatross*, station 2612, about 30 miles southeast of Cape Lookout (N. Lat. 34°11′; W. Long. 76°10′) in 52 fathoms (all USNM). Florida: off Palm Beach in 50 to 70 fathoms; off Lake Worth in 70 to 85 fathoms; Lake Worth, Boynton (all T. McGinty); *Eolis*, stations 157 and 48, off Miami in 22 and 60 fathoms; *Eolis*, stations 152 and 309, off Fowey Light in 40 and 60 fathoms (all USNM); Carysfort Reef, Key Largo in 66 fathoms; northeast of The Elbow, Key Largo in 50 to 83 fathoms; southeast of The Elbow, Key Largo in 58 to 117 fathoms; off Looe Key, Lower Florida Keys in 70 to 90 fathoms; off Cudjoe Key, Lower Keys in 50 fathoms (all L. A. Burry); *Eolis*, station 160, off Sand Key (USNM); off Sombrero Light in 90 to 100 fathoms (L. A. Burry); *Eolis*, station 43, off Key West in 63 fathoms (USNM). Alabama: *Albatross*, station 2387, 55 miles south of Mobile Bay (N. Lat. 29°24′; W. Long. 88°04′) in 32 fathoms (USNM). Bahamas: Great Abaco (USNM). Cuba: *Tomas Barrera*, station 224, off Cape San Antonio (USNM); Arenas de la Chorrera, Habana (M. Jaume). Lesser Antilles: Bathsheba, Barbados (MCZ).

Depressiscala nautlae *Mörch*

Plate 159

Scala nautlae Mörch 1874, Vidensk. Medd. Naturhist. Forening i Kjöbenhavn no. 17, p. 265 (between Veracruz and Nautla, Mexico); Mörch 1875, Malakozoologische Blätter **22**, p. 151; Mörch 1875, Journal Academy Natural Sciences, Philadelphia (2) **8**, p. 202, pl. 29, fig. 12.

Scala scipio Dall 1889, Bulletin Museum of Comparative Zoölogy **18**. p. 310 (Veracruz [Mexico]).

Scalaria teres Bush 1885, Transactions Connecticut Academy **6**, p. 465, pl. 45, fig. 8 (*Albatross*, station 2276, about 12 miles east of Cape Hatteras, North Carolina).

Description. Shell reaching 15 mm. (about $\frac{5}{8}$ of an inch) in length, very attenuate, imperforate, shining and rather solid. Whorls 10 to 12, moderately convex and attached. Color red-brown to purplish-brown with an occasional specimen nearly white. Spire greatly extended and formed at an angle of about 25°. Suture impressed but not very deep. Aperture ovate. Parietal area smooth and tightly appressed against the body whorl. Columella short and arched. Axial sculpture consisting of numerous, rather low and reflected costae which usually have a small angle or hook on the whorl shoulder. There are 12 to 14 costae on the body whorl. There is no trace of spiral sculpture and no basal ridge. Nuclear whorls 4, glass-like, smooth and a very light amber-brown in color. Operculum thin, corneous, paucispiral and yellow-brown in color.

length	width	whorls	
15	4 mm.	10*	Veracruz, Mexico
15	4	11*	Holotype of *scipio* Dall
13.2	3.5	11*	off Fort Lauderdale, Florida
12	3.1	14	off Destin, Florida
4	1.3	8	Holotype of *teres* Bush

* 1 or 2 early whorls lost.

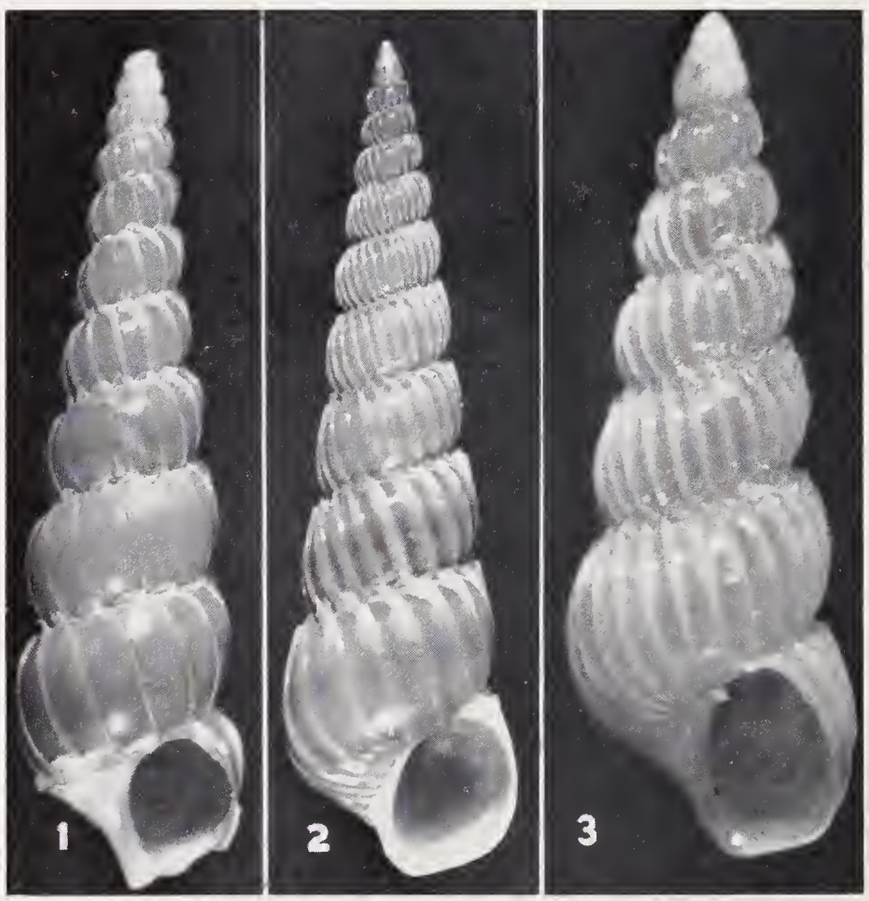

Plate 159. *Depressiscala nautlae* Mörch

Fig. 1. *Scalaria scipio* Dall (=*nautlae* Mörch) from Veracruz, Mexico. Holotype (6.3x). Fig. 2. From off Destin, Florida (8x). Fig. 3. *Scalaria teres* Bush (=*nautlae* Mörch) from *Albatross*, station 2276, off Cape Hatteras, North Carolina. Holotype (24x).

Types. The whereabouts of the holotype of *D. nantlae* Mörch is unknown to us. It was collected by a Mr. Rathsack between Veracruz and Nautla, Mexico in 1842. The holotype of *Depressiscala scipio* Dall is in the United States National Museum, no. 10694, from Veracruz, Mexico. The holotype of *D. teres* Bush is in the United States National Museum, no. 44842, from *Albatross*, station 2276, about 20 miles east of Cape Hatteras, North Carolina (N. Lat. 35°20′; W. Long. 75°19′) in 16 fathoms.

We here restrict the type locality to Veracruz, Mexico.

Remarks. Depressiscala teres Bush is but a very young specimen of *D. nantlae*. The range of this species, so far as we now know, is very discontinuous. The specimens of *D. nantlae* obtained off North Carolina are all very young and it may well be that these were carried north by the Gulf Stream and became established for only a short time. They are the form that was described as *teres* Bush. This species has been dredged in depths between 15 and 66 fathoms. Occasionally beach specimens have been found which would indicate that it probably does occur near low water line.

Depressiscala nantlae differs from *D. nitidella* by being much narrower proportionately, having the whorls far less globose, by being imperforate and having small hooks on the costae at the whorl shoulder.

Range. From off Cape Hatteras, North Carolina and off Florida from Palm Beach south through the Florida Keys. Then again off northwest Florida, the western Bahamas, the northern coast of Cuba and southern Mexico.

Records. North Carolina: *Albatross*, station 2276, about 20 miles east of Cape Hatteras (N. Lat. 35°20′; W. Long. 75°19′) in 16 fathoms: *Albatross*, station 2597, about 15 miles southeast of Cape Hatteras (N. Lat. 34°57′; W. Long. 75°43′) in 15 fathoms; *Albatross*, station 2598, about 25 miles south of Cape Hatteras (N. Lat. 34°51′; W. Long. 75°40′) in 22 fathoms; *Albatross*, station 2611, about 65 miles south southeast of Cape Hatteras (N. Lat. 34°15′; W. Long. 76°11′) in 31 fathoms; 12 miles east of Frying Pan Shoals (all USNM). Florida: off Palm Beach in 20 and 50 fathoms: North Inlet, Lake Worth (all T. McGinty); Boynton (G. Voss); off Fort Lauderdale in 20 fathoms (L. A. Burry); *Eolis*, station 113, off Bear's Cut, Miami in 18 to 20 fathoms (USNM); off Sombrero Light, Lower Keys in 50 to 66 fathoms; off Fort Walton in 16 fathoms (both L. A. Burry); off Destin in 18 to 20 fathoms (T. McGinty). Bahama Islands: off Bimini Islands (Univ. of Michigan). Cuba: Boca del Almandares, Habana (M. Jaume); Arenas de la Chorrera, Habana (MCZ; C. G. Aguayo). Mexico: Veracruz (ANSP; USNM).

Genus **Cylindriscala** *de Boury*

Cylindriscala de Boury 1909, Journal de Conchyliologie **57**, p. 256 (nomen nudum); de Boury 1912, Journal de Conchyliologie **60**, p. 169 (subgenotype, *Scala* (*Cylindriscala*) *aeus* Watson, monotypic).

Genotype, *Scalaria aeus* Watson, monotypic.

Shells with whorls attached, strongly sculptured with axial costae and generally with spiral threads. Basal ridge strongly developed. Nuclear whorls 3 and smooth.

This genus appears to be closely allied to *Opalia* H. and A. Adams. Superficially the sculpture is very similar in certain forms. In *Opalia*, however, most of the species we

have examined possess pitted spiral threads and the axial costae usually extend above the suture creating a series of bosses. In *Cylindriscala* the new whorl follows along the basal ridge so that the sutures possess a thin narrow cord (Plate 161, fig. 1).

Cylindriscala watsoni *de Boury*

Plate 160; 161, figs. 3–4

Scalaria funiculata Watson 1883, Journal Linnean Society **16**, p. 608; Watson 1886, Voyage of H.M.S. *Challenger*, Zoology **15**, p. 141, pl. 9, fig. 4 (off Pernambuco [Recife] Brasil); non *S. funiculata* Carpenter 1857.

Scalaria watsoni de Boury 1911, Revista Chilena de Historia Natural **15**, p. 34 (new name for *S. funiculata* Watson; non Carpenter).

Opalia (*Opalia*) *watsoni* 'de Boury' Clench and Turner 1950, *Johnsonia* **2**, p. 231 (in part).

Plate 160. *Cylindriscala watsoni* de Boury
Eolis, station 316, off Sand Key, Florida in 120 fathoms (15.2x).

Description. Shell reaching about 7 mm. (about $\frac{1}{4}$ of an inch) in length, attenuate, imperforate and strongly sculptured. Whorls 11, moderately convex and attached. Color a grayish-white. Spire produced and formed at an angle of about 18°. Suture rather deeply impressed. Aperture subcircular. Columella short and arched. Axial sculpture consisting of exceedingly heavy and thickened costae which end at the basal ridge. Below the ridge the shell is definitely flattened. Occasionally one of the costae becomes greatly thickened to form a varix. Spiral sculpture consisting of numerous and fine incised threads which are crossed by somewhat finer axial threads. Both these fine thread-like incised lines pass over the costae. Nuclear whorls smooth and glass-like. Operculum unknown.

length	width	whorls	
7.0	2.5 mm.	10*	off Sand Key, Florida
5.5	1.6	10	Holotype, after Watson

* loss of 1 or 2 early whorls

Types. The types of *funiculata* Watson are probably in the British Museum, from the *Challenger*, station 122, off Pernambuco [Recife] Brasil (S. Lat. 9°05′; W. Long. 34°05′) in 350 fathoms.

Remarks. In *Johnsonia* **2,** p. 231 we described under the name of *Opalia watsoni* a species which we now realize is new. It is described in this number as *Opalia abbotti.* The synonymy on p. 231 applies to *watsoni* de Boury while the description and figures apply to *abbotti.* At the time of our first description we lacked material and depended entirely upon Watson's figure and description of *funiculata* (=*watsoni*). Believing that Watson had possibly overlooked the pitted sculpture typical of *Opalia* we placed his species in that genus. We now have a specimen dredged off Sand Key, Florida that agrees entirely with the description and figure given by Watson in the *Challenger* report. We figure this specimen and also the original figures of Watson.

In relationship this species is close to *C. tortilis* Watson, differing by being proportionately wider and not having the axial costae notched by the spiral threads.

Range. Lower Florida Keys and probably through the West Indies, Central and South America to Brasil.

Records. Florida: *Eolis*, station 316, off Sand Key, Key West in 120 fathoms. Brasil: *Challenger*, station 122, off Pernambuco (S. Lat. 9°05′; W. Long. 34°05′) in 350 fathoms (from the Challenger Report).

Cylindriscala acus *Watson*

Plate 161, figs. 5–6

Scalaria acus Watson 1883, Journal Linnean Society **16,** p. 608 (off the Azores in 1000 fathoms); Watson 1886, Report of the Voyage of H.M.S. *Challenger*, Zoology **15,** p. 140, pl. 9, fig. 2.

Scala fulgens de Boury 1909, Journal de Conchyliologie **57,** p. 256 (nomen nudum); de Boury 1912, Journal de Conchyliologie **60,** p. 169.

Description. Shell reaching 5 mm. (about 1/5 of an inch) in length, attenuate, imperforate and sculptured. Whorls 12, moderately convex and attached. Color ivory-white. Suture moderately impressed. Aperture probably subcircular [specimen broken]. Spire extended and produced at an angle of about 21°. Columella short and arched. Axial sculpture consisting of numerous, strongly developed costae which number about 17 on the last whorl of the holotype. Spiral sculpture consisting of exceedingly fine threads. Basal ridge well developed. Nuclear whorls 3, brownish-yellow, smooth and glass-like. Operculum unknown.

length	width	whorls	
5	1.4 mm.	12	Holotype (after Watson)

Types. The holotype of this species is probably in the British Museum. The type locality is about 160 miles west of Fayal Island, Azores (N. Lat. 38°30′; W. Long. 31°14′) in 1000 fathoms.

Remarks. Watson in the Challenger Report mentions that the nuclear whorls of this species have exceedingly fine axial threads. The artist, however, did not indicate them in the enlarged drawing of the apex. We suspect that these axial threads may be only faint growth lines rather than actual sculpture. We have not seen any specimens of this species.

This is a deep water species and it has been collected on both sides of the Atlantic. According to Jeffreys (Proceedings Zoological Society London, 1884, p. 139) it has been obtained in depths ranging from 49 to 1254 fathoms.

Range. Probably throughout the West Indies in deep water and in deep water in the Eastern Atlantic.

Records. Western Atlantic. Puerto Rico: *Challenger*, station 24, off Culebra Island (N. Lat. 18°38′; W. Long. 65°05′) in 390 fathoms (ex Challenger Report).

Eastern Atlantic. Azores: *Challenger*, station 73, 160 miles west of Fayal Island (N. Lat. 38°30′; W. Long. 31°14′) in 1000 fathoms (ex Challenger Report). Portugal: *Porcupine*, station 16 (N. Lat. 39°55′; W. Long. 09°56′) in 994 fathoms; *Porcupine*, station 17 (N. Lat. 39°42′; W. Long. 09°43′) in 740 to 1095 fathoms (both from Jeffreys). Gibraltar: *Porcupine*, station 31 (N. Lat. 35°56′; W. Long. 07°06′) in 477 fathoms; *Porcupine*, station 34 (N. Lat. 35°44′; W. Long. 06°53′) in 414 fathoms (both from Jeffreys).

Cylindriscala tortilis *Watson*

Plate 161, figs. 1–2

Scalaria tortilis Watson 1883, Journal Linnean Society **16**, p. 607; Watson 1886, Voyage of H.M.S. *Challenger*, Zoology **15**, p. 139, pl. 9, fig. 1 (North of Culebra Island [Puerto Rico] West Indies).

Description. Shell reaching 10 mm. (about $\frac{3}{8}$ of an inch) in length, attenuate, rather solid, strongly sculptured and imperforate. Whorls 10 or more, moderately convex and attached. Color white. Spire extended and produced at an angle of about 20°. Suture moderately impressed. Aperture subcircular. Columella short and slightly arched. Axial

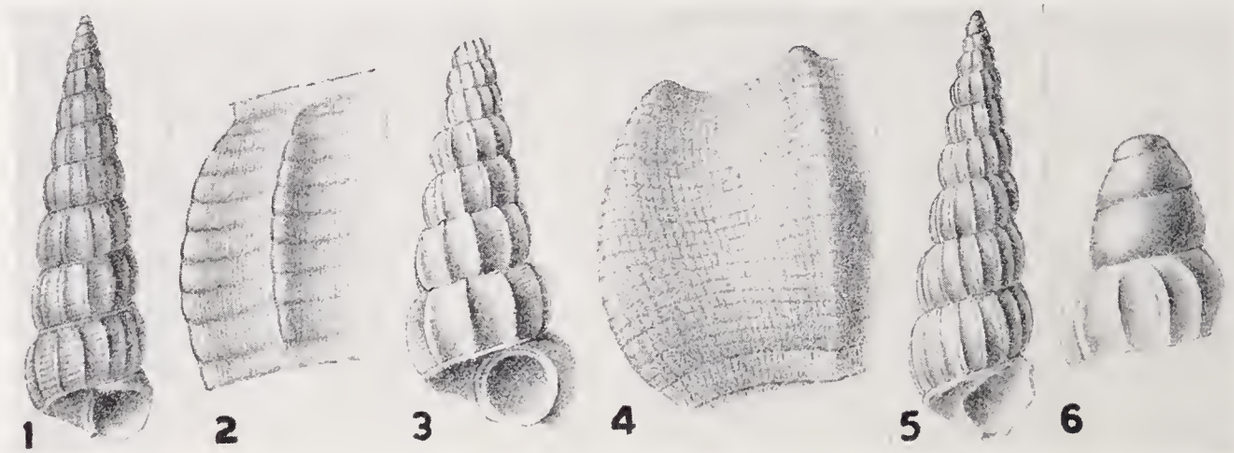

Plate 161

Figs. 1–2. *Cylindriscala tortilis* Watson (5x) and enlarged sculpture (25x). Figs. 3–4. *Cylindriscala funiculata* Watson (=*watsoni* de Boury) (9x) and enlarged sculpture (40x). Figs. 5–6. *Cylindriscala acus* Watson (10x) and enlarged apex (50x). All after Watson, Challenger Report, plate 9.

sculpture consisting of numerous well developed axial costae which do not extend below the basal ridge. There are 14 costae on the body whorl of the holotype. These costae are crossed by several rather fine spiral threads which cut in very slightly where they pass over the costae. Basal ridge present. Nuclear whorls and operculum unknown.

length	width	whorls	
10	3 mm.	10*	Holotype (ex Watson)

* early whorls lost.

Types. The holotype of this species is probably in the British Museum. The type locality is north of Culebra Island, Puerto Rico (N. Lat. 18°38′; W. Long. 65°05′) in 390 fathoms.

Remarks. We have not seen a specimen of this species. Our description and measurements have been taken from Watson and though the figure of *tortilis* on pl. 9, fig. 1 of the Challenger Report shows the embryonic whorls, Watson in his description said that they are broken.

This species is fairly close to *watsoni* de Boury, differing in possessing less robust costae and in having the spiral threads cut very slight notches where they pass over the costae.

Range and Records. Known only from the type locality, off Culebra Island, Puerto Rico.

Cylindriscala andrewsii *Verrill*

Plate 162

Scalaria (*Opalia*) *andrewsii* Verrill 1882, Transactions Connecticut Academy **5**, pt. 2, p. 526, pl. 57, fig. 35 (*Fish Hawk*, station 873, from off Newport, Rhode Island [150 miles east of Barnegat Bay, New Jersey]).

Description. Shell reaching 8 mm. (about $\frac{1}{3}$ of an inch) in length, attenuate, rather solid, strongly sculptured and imperforate. Whorls 13, convex and attached. Color a rather dull flat-white. Spire extended and produced at an angle of 15°. Suture deeply impressed. Aperture subcircular. Columella short and arched. Axial sculpture consisting of numerous well developed, rounded and somewhat nodulose costae which number 13 on the body whorl. Spiral sculpture consisting of several ridges which are much smaller than the axial costae. The lowest peripheral ridge is enlarged to form a basal ridge. There appears to be no microscopic sculpture. Nuclear whorls $3\frac{1}{2}$, smooth, glass-like and colored a very light brown. Operculum unknown.

length	width	whorls	
7.5	2 mm.	13	off Western Dry Rocks, Florida
6.5	2	12	off Ragged Key, Florida
5.5	2	7*	Holotype

* early whorls lost.

Types. The holotype of *C. andrewsii* Verrill is in the United States National Museum no. 44807 from the *Fish Hawk*, station 873, about 150 miles east of Barnegat Bay, New Jersey (N. Lat. 40°02′; W. Long. 70°57′) in 100 fathoms.

Remarks. Cylindriscala andrewsii Verrill differs from other species in this complex by having much stronger spiral ridges, besides having the axial costae slightly nodulose. It is an exceedingly rare species as only 7 specimens have come to our attention. So far as

our records indicate, this species lives on the continental slope in depths ranging between 85 and 500 fathoms.

See also remarks under *Nystiella cania* Dall, a species which it superficially resembles.

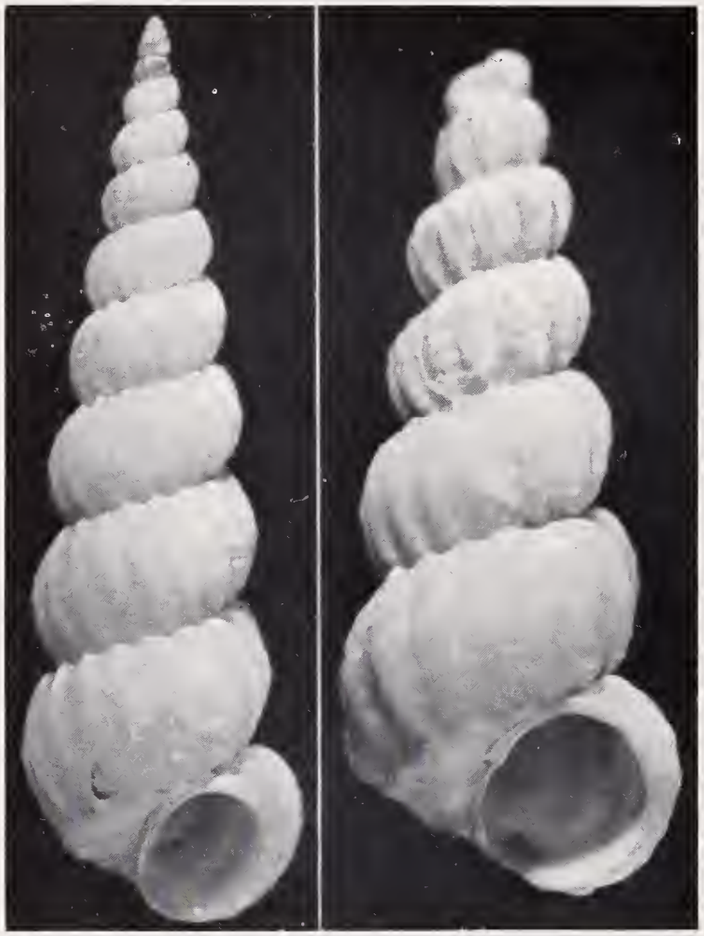

Plate 162. *Cylindriscala andrewsii* Verrill
Fig. 1. *Eolis*, station 317, off Western Dry Rocks, Key West, Florida in 110 fathoms (14x). Fig. 2. *Fish Hawk*, station 873, about 150 miles east of Barnegat Bay, New Jersey in 100 fathoms. Holotype (20x).

Range. In deep water from the latitude of central New Jersey south to Cuba.

Records. New Jersey: *Fish Hawk*, station 873, about 150 miles east of Barnegat Bay (N. Lat. 40°02′; W. Long. 70°57′) in 100 fathoms (USNM); about 125 miles east of Barnegat Bay (N. Lat. 39°55′; W. Long. 71°30′) in 170 fathoms (J. Miller). Florida: *Eolis*, station 317, off Western Dry Rocks in 110 fathoms; *Eolis*, station 339, off Ragged Key in 100 fathoms; *Eolis*, station 338, off Sand Key in 85 fathoms. Cuba: *Atlantis*, station 3459, off Sagua la Grande (N. Lat. 23°21′; W. Long. 80°36′) in 500 fathoms.

Nystiellinae, new subfamily [1]

Shells with the whorls attached or solute, sculptured both axially and spirally. First nuclear whorl smooth, remaining nuclear whorls with strong and regular axial costae. There is usually a rather abrupt change in the sculpture and the shape of the whorls at the beginning of the first postnuclear whorl.

[1] All other species and genera so far considered in these studies of the family belong to the subfamily Epitoniinae.

This subfamily differs from the Epitoniinae by reason of the strong, axial sculpture on the nuclear whorls. In the Epitoniinae, the nuclear whorls are smooth, shining and glass-like. In addition, there is no abrupt change in the whorl shape at the start of the post-nuclear whorls. Radula of the Nystiellinae are very different from those in the Epitoniinae. See Plate 176.

It is quite possible that the smooth and costate whorls represent two different larval periods, the first smooth whorl representing the larval stage developed in the egg, the next three costate whorls developed during the veliger or free swimming period. The same is probably true of the early development of all members of this family only that sculptural differences are not indicated in the larval development in the Epitoniinae. Young stages in both subfamilies, however, are quite different in their characters compared with the sculpture developed on the postnuclear whorls.

Nystiella, new genus

Shells with the whorls attached, usually strongly and axially costate and having the nuclear whorls beyond the first whorl strongly and evenly axially ribbed or costate. Spiral sculpture of the postnuclear whorls usually much finer than the axial sculpture.

The genus is named for P. H. Nyst, a very able and distinguished Belgian malacologist of the middle of the 19th century. His catalogue of the Scalidae[1] has been of great value in our present study.

Genotype, *Epitonium opalinum* Dall.

Nystiella opalina *Dall*

Plates 163; 164

Epitonium opalinum Dall 1927, Proc. United States National Museum **70**, art. 18, p. 61 (off Georgia, *Albatross*, station 2415 in 440 fathoms).

Epitonium lavaratum Dall 1927, Proc. United States National Museum **70**, art. 18, p. 62 (off Georgia, *Albatross*, station 2415 in 440 fathoms).

Opalia (?) *dromio* Dall 1927, Proc. United States National Museum **70**, art. 18, p. 63 (off Fernandina, Florida, *Albatross*, station 2668 in 294 fathoms).

Description. Shell reaching 11–12 mm. (about $\frac{1}{2}$ inch) in length, attenuate, imperforate and strongly sculptured. Whorls 8 to 10, slightly convex and attached. Color a yellowish-brown with the nuclear whorls somewhat darker. Spire produced and formed at an angle of 15°. Suture well defined but not deep. Aperture subcircular to subquadrate. Columella rather short and arched. Axial sculpture consisting of numerous, low costae with 15 costae on the body whorl. In addition, there are numerous and exceedingly fine axial threads between the costae. Spiral sculpture consisting of from 7 to 10, low ridges that do not pass over the crests of the axial costae. What appears to be a thin, dark periostracum remains in the base of the axial threads, but worn away on the crests of the spiral ridges. This gives a rather striking appearance to the spiral sculpture. Base of body whorl sharply angled, somewhat flattened and occasionally sculptured with a few spiral incised lines. The ridge is not seen on the earlier whorls as the aperture is built forward along its superior margin. Nuclear whorls: first $1\frac{1}{2}$ whorls smooth, remaining 2 to $2\frac{1}{2}$ whorls finely but axially costate. These nuclear whorls are less convex than

[1] Annales Société Malacologique de Belgique **6**, pp. 77–147, 1871.

the postnuclear whorls and, in addition, the first postnuclear whorl is proportionally much larger.

length	width	whorls	
10.3	3.0 mm.	14	Holotype of *opalina* Dall
10.9	3.5	8	Lectotype of *lavarata* Dall
5.8	2.2	9	Holotype of *dromio* Dall

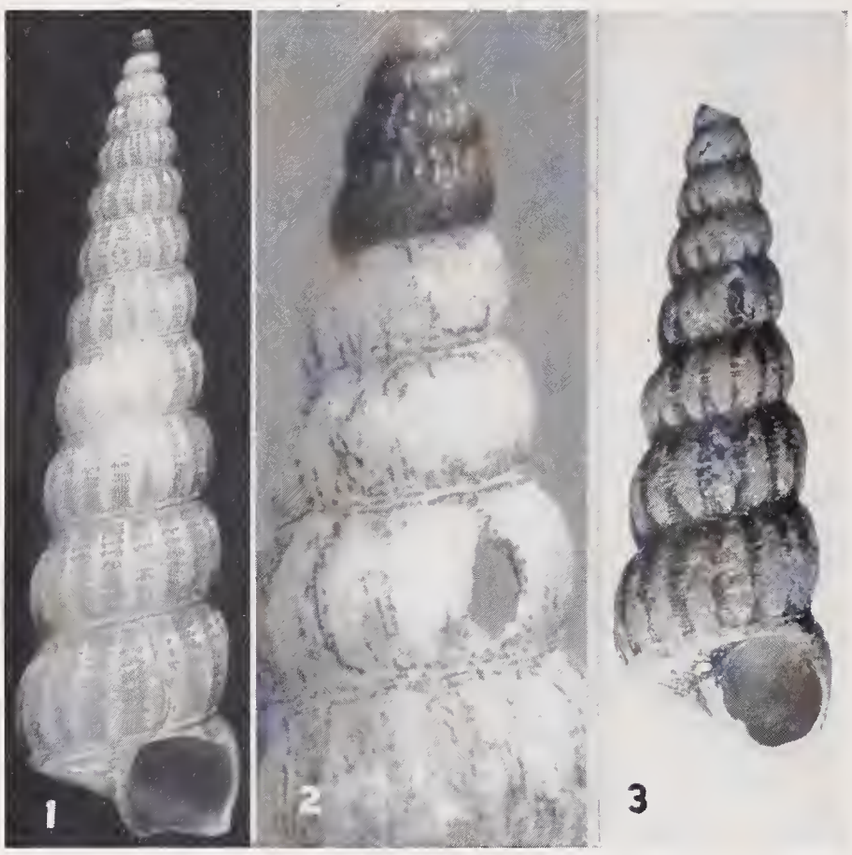

Plate 163. *Nystiella opalina* Dall

Fig. 1. *Albatross*, station 2415, off Fernandina, Florida in 440 fathoms. Holotype (9x). Fig. 2. A paratype from the same locality to show nuclear whorls (37x). Fig. 3. *Epitonium lavaratum* Dall (=*N. opalina* Dall) from the same locality. Holotype (6.3x).

Types. The following holotypes are all in the National Museum. *Epitonium opalinum* Dall, no. 108368; *E. lavaratum* Dall, no. 347845; both from *Albatross*, station 2415 off Georgia [105 miles off Fernandina, Florida]; *Opalia dromio* Dall, no. 108018, from *Albatross*, station 2668, from off Fernandina, Florida.

Remarks. There appears to be little question that the three names indicated in our synonymy above all belong to the same species. Dall was dealing with a variable species. All specimens were collected dead and all were in a somewhat worn condition. Two of the above were collected at the same station, the third at a station only about 18 miles away. See remarks under *N. concava*.

Range. From off northern Florida and south to the Lesser Antilles in deep water.

Records. Florida: *Albatross*, station 2415, 105 miles off Fernandina (N. Lat. 30°44′; W. Long. 79°26′) in 440 fathoms; *Albatross*, station 2668, about 95 miles east of Fernandina (N. Lat. 30°58′; W. Long. 79°38′) in 294 fathoms (both USNM); Lesser Antilles: off St. Kitts in 687 fathoms (USNM).

Nystiella concava *Dall*

Plate 165

Scala (Opalia) concava Dall 1889, Bulletin Museum Comparative Zoölogy **18**, p. 323 (off Sand Key, Key West, Florida in 15 fathoms).

Plate 164. *Nystiella opalina* Dall
Epitonium dromio Dall (= *N. opalina* Dall) off Fernandina, Florida in 294 fathoms. Holotype. Fig. 1 (15.5x). Fig. 2. Showing nuclear whorls (30x).

Description. Shell probably reaching 15 mm. (a little over $\frac{1}{2}$ inch) in length, attenuate, probably imperforate and rather strong in structure. Whorls about 14, attached and very slightly convex. There is a strong peripheral ridge produced with the portion of the whorl below the ridge being flattened. As the new whorl grows forward, it extends itself along the lower margin of this ridge, the peripheral ridge then becoming a sutural cord. Color unknown. Spire extended and produced at an angle of 15°. Aperture subcircular. Columella short and arched. Axial sculpture consisting of rather numerous and very strong axial costae which number 11 on the last whorl of the broken holotype. Spiral sculpture consisting of numerous and very fine threads which cut over the tops of the costae. Nuclear whorls and operculum unknown.

length	width	whorls	
13.8	4 mm.	10 *	Holotype

* both early whorls and aperture broken.

Types. The holotype and only specimen is in the United States National Museum, no. 106916, from the *Blake*, an unnumbered station off Sand Key, Key West, Florida in 15 fathoms.

Remarks. Unfortunately, this species is known from only the single holotype, a badly worn and broken specimen. It appears to be a member of this genus but a final decision cannot be made until fresh specimens possessing nuclear whorls are obtained.

Nystiella concava appears to be related to *N. opalina* by its general shape and by its type of sculpture, both having very well developed axial costae and relatively weak spiral threads. It differs from *opalina* by being much larger and by having much stronger axial costae.

Dall stated that his specimen was originally inhabited by a hermit crab. It is quite probable that the depth of 15 fathoms may not be the true depth at which this species lives.

Range and Records. Known only from the type locality off Key West, Florida.

Plate 165. *Nystiella concava* Dall
From off Sand Key, Key West, Florida in 15 fathoms. Holotype ($6\frac{1}{2}$x).

Nystiella cania *Dall*

Plate 166

Epitonium canium Dall 1927, Proceedings United States National Museum **70**, art. 18, p. 62 (off Georgia, *Albatross*, station 2415 in 440 fathoms).

Description. Shell reaching 9.8 mm. (about $\frac{3}{8}$ of an inch) in length, solid, attenuate, very strongly sculptured and imperforate. Whorls 13, moderately convex and attached. Color a dull yellowish-gray with the nuclear whorls brown. Spire extended and produced at an angle of about 32°. Suture well defined and rather deeply impressed. Aperture subcircular. Columella short and arched. Axial sculpture consisting of many strongly developed axial costae numbering 14 on the body whorl. Several of the costae may be enlarged to form varices. Covering the surface of the shell there are fine thread-like axial

ridges which are particularly pronounced in the intercostal areas. Spiral sculpture consisting of several rather strong ridges which are somewhat nodulose where they cross the costae. Basal ridge well developed and below this the axial costae disappear while 3 or 4 of the spiral ridges are strongly developed. Nuclear whorls 3, amber-brown in color and axially costate. Operculum unknown.

length	width	whorls	
6.5	1.4 mm.	9	Holotype
9.8	3.6	13	off Lantana, Florida

Types. The holotype of *N. cania* Dall is in the United States National Museum, no. 333464 from the *Albatross*, station 2415, about 105 miles off Fernandina, Florida (N. Lat. 30°44′; W. Long. 79°26′) in 440 fathoms.

Plate 166. *Nystiella cania* Dall
Albatross, station 2415, off Fernandina,
Florida in 440 fathoms. Holotype (15x).

Remarks. *Nystiella cania* differs from *N. opalina* and *N. concava* by having mueh stronger spiral ridges and more globose whorls. From *N. azelotes* it differs by having more numerous spiral ridges and from *N. atlantis* by having the area below the strong basal ridge devoid of axial costae while the spiral sculpture is greatly reduced. See also remarks under *N. atlantis.*

This species is elose superfieially to *Cyliudriscala andrewsii* Verrill but differs by having the nuclear whorls eostate and by possessing very fine intereostal axial threads.

This is a rare species and our entire knowledge is based upon 6 specimens, three of whieh are young.

Range. In deep water off the east coast of Florida from Fernandina south to the Keys.

Records. Florida: *Albatross*, station 2415, about 105 miles off Fernandina (N. Lat.

30°44′; W. Long. 79°26′) in 440 fathoms; *Eolis*, station 349, off Fowey Light in 100 to 150 fathoms (both USNM).

Nystiella azelotes *Dall*

Plate 167

Epitonium azelotes Dall 1927, Proceedings United States National Museum **70**, art. 18, p. 61 (off Georgia [off Fernandina, Florida]).

Description. Shell reaching 4 mm. (about $\frac{1}{6}$ of an inch) in length, attenuate and imperforate. Whorls 10 and moderately convex. Color a flat-white. Spire extended and produced at an angle of 20°. Aperture subcircular. Columella short and arched. Suture deeply indented. Axial sculpture consisting of numerous, nodulose costae which number 17 on the body whorl. Spiral sculpture consisting of 4 very strong ridges, the lowest one

Plate 167. *Nystiella azelotes* Dall
Albatross, station 2415, off Fernandina, Florida
in 440 fathoms. Holotype (about 24x).

forming the basal ridge. The areas in-between the costae and the ridges are square and rather deep. Below the basal ridge the shell is somewhat flattened and nearly devoid of sculpture. Nuclear whorls 3 to 4, axially costate and amber-brown in color. Operculum unknown.

length	width	whorls	
4.1	1.7 mm.	10 *	Holotype

* loss of 1 or 2 early whorls.

Types. The holotype of *N. azelotes* Dall is in the United States National Museum, no. 108370, from *Albatross*, station 2415, 105 miles east of Fernandina, Florida (N. Lat. 30°44′; W. Long. 79°26′) in 440 fathoms.

Remarks. This species is readily differentiated from all others in the genus *Nystiella* by its strongly developed and reticulate sculpture. It is perhaps nearest in relationship to *N. cania* Dall which was obtained at the same station. The present species differs from *cania* by having fewer spiral ridges and having the excavations between the costae and the ridges much deeper. In addition, *cania* possesses a few fine spiral threads below the basal ridge.

This species is based upon a single specimen.

Range and Records. Known only from the type locality off Fernandina, Florida.

Nystiella atlantis, new species
Plate 168

Description. Shell reaching 9.7 mm. ($\frac{3}{8}$ of an inch) in length, attenuate, strongly sculptured and imperforate. Whorls 14, moderately convex and attached. Color a dull brownish-white with the costae and the spiral ridges light-brown. Spire extended and produced at an angle of 23°. Columella short and arched. Aperture subcircular and slightly flaring below. Axial sculpture consisting of numerous and well developed costae, numbering 15 on the body whorl of the holotype. Nearly all whorls possess 1 or 2 costae which have become enlarged to form varices. Spiral sculpture consisting of 8 to

Plate 168. *Nystiella atlantis* Clench and Turner
Atlantis, station 3330, Bahía de Cochinos, Cuba. Holotype (9.7x).

12 strongly developed spiral ridges which, on passing over the costae, form small nodules. In addition, there are numerous fine axial threads which are most prominent in the intercostal areas. There is a moderately developed basal ridge with both the axial and spiral sculpture continued below it, but not as strong as in the peripheral area. Nuclear whorls 3, dark amber-brown and axially costate. Operculum nearly circular, paucispiral, corneous and yellowish-brown in color.

length	width	whorls	
9.7	3 mm.	14	Holotype

Types. Holotype, Museum of Comparative Zoölogy, no. 187988 from *Atlantis*, station 3330, Bahía de Cochinos, Cuba (N. Lat. 22°09′; W. Long. 81°10′) in 230–265 fathoms. A paratype from off Lantana, Florida is in the collection of T. McGinty and a paratype from *Eolis*, station 43, from off Key West, Florida, is in the United States National Museum.

Remarks. This species is rather distantly related to *N. cania* Dall, differing by being larger, more attenuate, having stronger axial costae and having the base of the whorl sculptured by both the axial costae and spiral ridges.

This species is named after the ketch *Atlantis*, the research vessel of the Woods Hole Oceanographic Institute.

Range. From off southern Florida to the south coast of Cuba in deep water.

Records. Florida: off Lantana in 83 fathoms (T. McGinty); *Eolis*, station 43, off Key West Florida in 63 fathoms; *Eolis*, station 321, off Western Dry Rocks, Key West in 65 fathoms (both USNM). Cuba: *Atlantis*, station 3330, from Bahía de Cochinos (N. Lat. 22°09′; W. Long. 81°10′) in 230–265 fathoms (MCZ).

Genus **Solutiscala** *de Boury*

Solutiscala de Boury 1909, Bull. Muséum d'Histoire Naturelle, Paris **15**, p. 482.

Shell freely coiled or solute, small and finely sculptured both axially and spirally. First nuclear whorl smooth, remaining nuclear whorls axially costate. All nuclear whorls attached, remaining postnuclear whorls separated.

Genotype, *Scalaria dissoluta* Locard, original designation.

Remarks. E. de Boury also included *S. vermetiformis* Watson and *S. revoluta* Hedley in his genus *Solutiscala*. Unfortunately, Locard makes no mention regarding the nuclear whorls of *S. dissoluta*, the species de Boury chose for his genotype. However, the axial costae on the nuclear whorls of *S. vermetiformis* are well figured by Watson, a species included by de Boury in *Solutiscala*.

Subgenus **Foratiscala** *de Boury*

Foratiscala de Boury 1909, Bull. Muséum d'Histoire Naturelle, Paris **15**, p. 484.

Shell rather small, scarcely 10 mm. in length, thin, sculptured both spirally and axially and having the nuclear whorls axially costate. Generally the whorls are angled and attached. Basal ridge, if present, is formed by the greater development of lowest spiral cord.

Subgenotype, *Scalaria formosissima* Jeffreys, monotypic.

Solutiscala (Foratiscala) formosissima *Jeffreys*

Plate 169

Scalaria formosissima Jeffreys 1884, Proc. Zoological Society London, p. 140, pl. 10, fig. 10 (*Porcupine*, station 16 and 17a, off Portugal).

Scala formosissima Jeffreys, Dall 1889, Bull. Museum Comparative Zoölogy **18**, p. 319, pl. 18, fig. 11; Dall 1889, Bull. United States National Museum **37**, p. 124, pl. 18, fig. 11.

Description. Shell reaching 6½ mm. (about ¼ of an inch) in length, thin, sculptured, attenuate and narrowly umbilicate. Whorls 9 to 12, strongly convex and somewhat angled at the whorl shoulder. Color white and somewhat shining. Spire extended and formed at an angle of about 30°. Suture rather deep. Aperture subcircular, the outer lip thin, the inner lip thin and slightly reflexed, partially closing over the narrow umbilicus. Axial sculpture consisting of rather numerous, low, blade-like costae which are a little higher over the whorl shoulder. There are 18 to 20 costae on the body whorl. Spiral sculpture consisting of numerous, raised threads more or less equally disposed over the surface of the whorl. Nuclear whorls 3, the first smooth, the second and third axially costate. First postnuclear whorl much larger than the last nuclear whorl. Operculum very thin, paucispiral and light yellow-brown in color.

length	width	whorls	
6.5	2.9	9	off Fowey Light, Florida
6.5*	2.8	7	off Mobile Bay, Alabama
6.5*	2.7	7	off Mobile Bay, Alabama

* loss of nuclear whorls.

Plate 169. *Solutiscala formosissima* Jeffreys
Off Fowey Light, Florida. Fig. 1 (12.5x). Fig. 2. Showing nuclear whorls (25x).

Types. Lectotype, here selected, is the specimen upon which Jeffreys based his figure. There are two paratypes in the United States National Museum, no. 182744. The type locality is *Porcupine*, 1870, stations 16 and 17a (N. Lat. 39°55′; W. Long. 09°56′) and (N. Lat. 39°39′; W. Long. 09°39′) off Portugal, about 50 miles northwest of Lisbon.

Remarks. So far as we are able to determine, the specimens of this species from Europe and from the Western Atlantic are identical. This is a very delicate species and as a consequence nearly all of the specimens obtained have been injured in some manner. It ranges in depth from 120 to 944 fathoms. The figure of Dall which appeared in the Bul-

letin of the Museum of Comparative Zoölogy and that of the United States National Museum is apparently overdrawn, at least so far as the aperture is concerned. In specimens which we have seen the aperture is subcircular and is similar to others in this group.

In relationship, *S. formosissima* is nearest to *S. pyrrhias* Watson. In this latter species, the spiral threads are reduced to only 3 or 4 and these are grouped in the peripheral area. In addition, there seem to be fewer axial costae in *pyrrhias*.

Range. Florida Keys and deep water in the Gulf of Mexico south of Alabama. Also in the Eastern Atlantic off Portugal.

Records. Western Atlantic. Florida: *Eolis*, station 304, off Fowey Light in 120 fathoms (USNM). Alabama: *Albatross*, station 2384, about 100 miles due south of Mobile Bay (N. Lat. 28°45′; W. Long. 88°15′) in 940 fathoms; *Albatross*, station 2385, about 90 miles due south of Mobile Bay (N. Lat. 28°51′; W. Long. 88°18′) in 730 fathoms (both USNM).

Eastern Atlantic. Portugal: *Porcupine*, station 16 (N. Lat. 39°55′; W. Long. 09°56′) in 994 fathoms (USNM).

Solutiscala (Foratiscala) pyrrhias *Watson*

Plate 170, figs. 3–4

Scalaria (*Acirsa*) *pyrrhias* Watson 1886, Voyage of H.M.S. *Challenger*, Zoology **15**, p. 145, pl. 9, fig. 7 (off Culebra Island, West Indies).

Description. Shell small, reaching about 5 mm. (about $\frac{1}{4}$ of an inch) in length, turreted, imperforate and very thin. Whorls 8, rather strongly convex and attached. Color white. Spire extended and produced at an angle of about 35°. Suture deep but not profound. Aperture subcircular. Columella short and arched. Axial sculpture consisting of rather widely spaced and thin costae. There are 11 costae on the body whorl of the holotype. Spiral sculpture consisting of 3 to 4 threads which are grouped near the peripheral area of the whorl. Nuclear whorls 4, the first smooth, the next 3 very slightly convex and rather strongly costate. Operculum unknown.

length	width	whorls	
5	2.03 mm.	8	Holotype

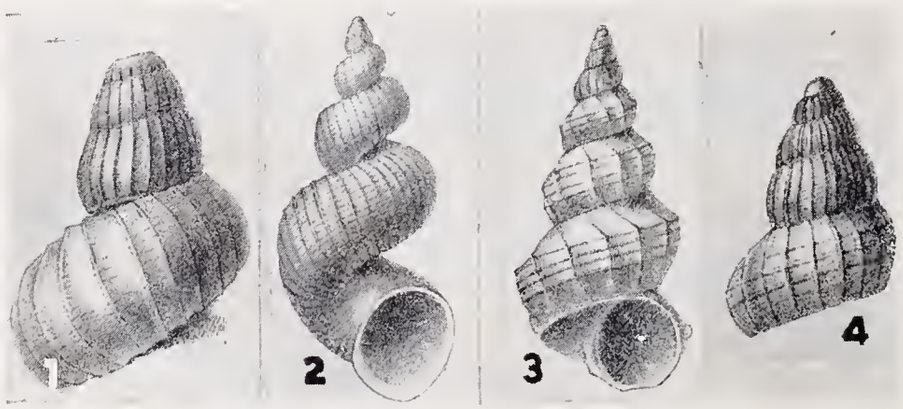

Plate 170

Figs. 1–2. *Solutiscala vermeliformis* Watson, from off Pernambuco [Recife], Brasil. Fig. 1. Showing nuclear and first postnuclear whorls (40x). Fig. 2 (about 8x). Figs. 3–4. *Solutiscala pyrrhias* Watson, from off Culebra Island, Puerto Rico. Fig. 3 (about 8x). Fig. 4. Showing nuclear and first postnuclear whorls (30x). All after Watson.

Types. The holotype of this species is probably in the British Museum. The type locality is *Challenger*, station 24, off Culebra Island, Puerto Rico, West Indies (N. Lat. 18°38′; W. Long. 65°05′) in 390 fathoms.

Remarks. This species appears to be close in its relationship to *formosissima* Jeffreys. However, it is quite distinct and readily differentiated. *Solutiscala pyrrhias* Watson is a broader species possessing fewer axial costae and much stronger spiral threads. In *pyrrhias* the spiral threads are grouped near the periphery of the whorl while in *formosissima* they are equally distributed over the entire whorl.

Range and Records. Known only from the type locality, from off Culebra Island, Puerto Rico, West Indies.

Subgenus **Solutiscala** *de Boury*

Solutiscala de Boury 1909, Bulletin Muséum d'Histoire Naturelle, Paris **15**, p. 482.

Subgenotype, *Scalaria dissoluta* Locard, original designation.

Shells small, thin, with the postnuclear whorls unattached or solute. Nuclear whorls attached, the first whorl usually smooth, the remaining nuclear whorls being axially costate.

Solutiscala (Solutiscala) vermetiformis *Watson*

Plate 170, figs. 1–2

Scalaria vermetiformis Watson 1886, Voyage of H.M.S. *Challenger*, Zoology **15**, p. 142, pl. 9, fig. 6 (off Pernambuco [Brasil]).

Description. Shell reaching 5.5 mm. (about $\frac{1}{4}$ of an inch) in length, thin, whorls unattached and finely sculptured. Whorls $7\frac{1}{2}$, nearly cylindrical and solute, only the nuclear whorls being attached. Color a transparent white and not glossy. Aperture subcircular and holostomatous. Axial sculpture consisting of numerous fine and rather regularly spaced costae. Spiral sculpture consisting of numerous fine, rounded threads which do not pass over the costae, the interspaces about double the width of the threads. Nuclear whorls: first whorl smooth, next three whorls finely and axially costate. First postnuclear whorl proportionally much larger. All nuclear whorls are slightly convex with a moderately indented suture.

length	width	whorls	
5.5	2.5 mm.	$7\frac{1}{2}$	Holotype (from Watson)

Types. The holotype of *S. vermetiformis* Watson is probably in the British Museum. The type locality of this species is *Challenger*, station 122, from off Pernambuco [Recife] Brasil (S. Lat. 09°05′; W. Long. 34°50′) in 350 fathoms.

Remarks. This species is unknown to us. Our description and measurements are based entirely upon Watson's description in the Challenger Report. We have reproduced his figures. This species is probably closely related to *Solutiscala dissoluta* Locard. Watson compared his species to *Scalaria semidisjuncta* Jeffreys, but according to Jeffreys the nuclear whorls of this species are smooth and in our opinion *semidisjuncta* is a true *Epitonium* which is closely allied to *E. babylonium* Dall (see p. 315).

Range and Records. Known only from the type locality.

Additions, Corrections and Notes

We append to this study of the Epitoniidae species not considered in the earlier numbers, new records for other species and data on the radulae. Under the caption of Corrections and Notes we include names of species wrongly assigned to the Western Atlantic or other information regarding names that may aid in the clarification of the nomenclature of this family.

* * * *

Additions

Opalia (Opalia) abbotti, new species
Plate 171

Opalia watsoni 'de Boury' Clench and Turner 1950, *Johnsonia* **2**, p. 232 (in part), pl. 100, figs. 1–2.

This species is figured and described in this volume of *Johnsonia*, pp. 231 and 232, under the name of *Opalia watsoni* de Boury. We redescribe it as certain minor changes are necessary.

Descriptions. Shell reaching 4.5 mm. (about 1/5 of an inch) in length, attenuate, imperforate and sculptured. Whorls 10, moderately convex. Color a flat-white. Suture well impressed and not crenulated or only slightly so. Aperture subcircular. Outer lip thickened. Columella short and arched. Axial sculpture consisting of strong costae which terminate below on the basal ridge, the costae numbering 12 on the body whorl. Microscopic sculpture consisting of numerous and exceedingly fine spiral threads which are minutely pitted. Nuclear whorls $3\frac{1}{2}$ to 4, smooth and glass-like. Operculum unknown.

Plate 171. *Opalia abbotti* Clench and Turner
Atlantis, station 3374, off Puerto Tanamo, Oriente, Cuba in 300 fathoms. Holotype (24.8x).

length	width	whorls	
4.3	1.5 mm.	10	off Puerto Tanama, Cuba
4.5	1.6	10	Fowey Light, Florida
2.7	1.0	8	Bahía de Matanzas, Cuba

Types. Holotype, Museum of Comparative Zoölogy, no. 184511, from *Atlantis*, station 3374, off Puerto Tanamo, Cuba (N. Lat. 20°45′; W. Long. 75°19′) in 300 fathoms.

Remarks. We were in error regarding our determination of *O. watsoni* de Boury. The specimen we figured is different and we are now able to figure both a specimen and the original figures of *S. funiculata* Watson (=*O. watsoni* de Boury). This new species is named for R. T. Abbott, Associate Curator in the United States National Museum.

Range. Southern Florida and the north coast of Cuba in deep water.

Records. Florida: *Eolis*, stations 351, 355 and 340 off Fowey Light in 90, 70 and 209 fathoms; *Eolis*, station 6 off Sand Key, Key West, in 35 fathoms (all USNM). Cuba: *Atlantis*, station 3485, Bahía de Matanzas (N. Lat. 23°13′; W. Long. 81°22′) in 385 fathoms; *Atlantis*, station 3435, off Sagua la Grande (N. Lat. 23°05′; W. Long. 79°25′) in 255 fathoms; *Atlantis*, station 3374, off Puerto Tanamo (N. Lat. 20°45′; W. Long. 75°19′) in 300 fathoms (all MCZ and Museo Poey).

Opalia (Opalia) leeana *Verrill*

Plate 172

Scalaria (*Cirsotrema*) *leeana* Verrill 1882, Transactions of the Connecticut Academy **5**, pt. 2, p. 256 (off Martha's Vineyard, *Fish Hawk*, station 1038 in 146 fathoms [185 miles E. of Barnegat Bay, New Jersey]).

Description. Shell reaching 5 mm. (1/5 of an inch) in length, attenuate, moderately sculptured and imperforate. Whorls 5[1] remaining, moderately convex and attached. Color a dull grayish-white. Spire extended and produced at an angle of 14°. Suture well depressed and indented. Aperture subcircular. Columella short and arched. Sculpture consisting of numerous axial costae which are fairly low and do not extend below a well developed basal ridge. Spiral sculpture consisting of numerous fine and evenly pitted threads. Nuclear whorls 3, smooth and glass-like. Operculum unknown.

length	width	whorls	
5	2 mm.	5*	Holotype

* probable loss of 5 or 6 whorls.

Types. Holotype of *O. leeana* Verrill is in the United States National Museum, no. 44806, from *Fish Hawk*, station 1038, from about 185 miles east of Barnegat Bay, New Jersey (N. Lat. 39°58′; W. Long. 70°06′) in 146 fathoms.

Remarks. We know but little about this species. Only two lots have been obtained, the holotype from off northern New Jersey and three fragmented specimens from off Cape Hatteras, North Carolina. It does not appear to be closely related to any other Western Atlantic species.

Range. From the latitude of northern New Jersey south to Cape Hatteras, North Carolina in fairly deep water.

[1] This specimen, the holotype, is broken and many of the early whorls as well as the last whorl are lost.

Records. New Jersey: *Fish Hawk*, station 1038, about 185 miles east of Barnegat Bay (N. Lat. 39°58′; W. Long. 70°06′) in 146 fathoms. North Carolina: *Albatross*, station 2595, about 22 miles southeast of Cape Hatteras (N. Lat. 35°08′; W. Long. 75°05′) in 63 fathoms.

Plate 172. *Opalia leeana* Verrill
Fish Hawk, station 1038, 185 miles east of Barnegat Bay, New Jersey in 146 fathoms. Holotype (20.4x).

Epitonium (Epitonium) eulita *Dall and Simpson*
Plate 173

Scala eulita Dall and Simpson 1901, Bulletin United States Fish Commission for 1900, **1**, p. 412, pl. 57, fig. 2 (Mayagüez Harbor, Puerto Rico, *Fish Hawk*, station 6062, in 25 to 30 fathoms).

Description. Shell reaching 4 mm. ($\frac{1}{6}$ of an inch) in length, attenuate and imperforate, whorls 9, strongly convex and attached well down in the suture. Color a glossy-white. Spire extended and produced at an angle of 23°. Suture very deep. Aperture subcircular. Columella short and arched above. Sculpture consisting of numerous low, blade-like costae which number 16 on the body whorl (specimen broken). These costae are very slightly hooked at the whorl shoulder. There is no indication of spiral sculpture nor is there a basal ridge. Nuclear whorls 3, glass-like and smooth. Operculum unknown.

length	width	whorls	
4	1.2 mm.	9	Holotype

Types. The holotype of *E. eulita* Dall and Simpson is in the United States National Museum, no. 160493, from *Fish Hawk*, station 6062, Mayagüez Harbor, Puerto Rico, dredged in 25 to 30 fathoms.

Remarks. The figure of *E. eulita* Dall and Simpson is poor. Under the remarks in their original description the authors state: "The specimen is somewhat defective and the figure hardly shows the little angular projections near the suture, which is normal to the varices." So far as we can detect, this species is exceedingly close to or identical with *E. fractum* Dall. It is perhaps best to retain this name until additional material, particularly young specimens, is available for comparative study.

It is unfortunate that Dall published descriptions of this and other species that he based on unique and broken specimens. This has left the burden of proof as to the validity of the species to future students.

Range and Records. Known only from the type locality.

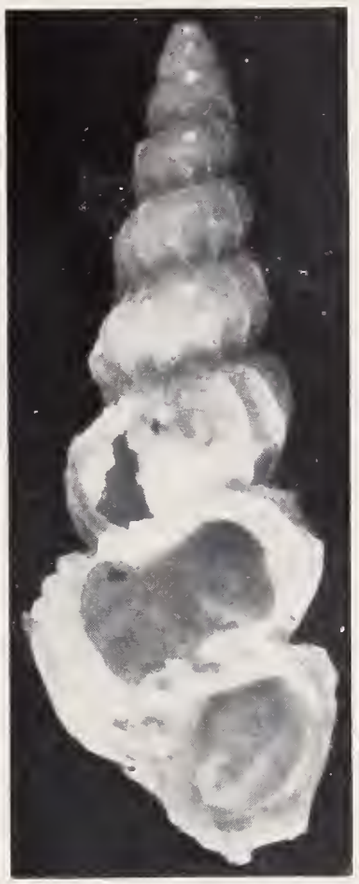

Plate 173. *Epitonium eulita* Dall and Simpson
Fish Hawk, station 6062, off Mayagüez, Puerto Rico in 25–30 fathoms. Holotype (25.7x).

Epitonium (Epitonium) albidum *d'Orbigny*

Plate 174

Scala undecimcostata Mörch 1874, Vidensk. Medd. Naturhist. Forening i Kjöbenhavn no. 17, p. 260 (St. Thomas [Virgin Islands]; Jamaica); Mörch 1875, Malakozoologische Blätter **22**, p. 148; Mörch 1876, Journal Academy Natural Sciences, Philadelphia (2) **8**, p. 198.

The above reference is to another synonym of *Epitonium albidum* d'Orb. (see *Johnsonia* **2**, 1951, no. 30, p. 260). We figure a lectotype kindly loaned to us by Dr. A. F. Bruun of the Universitetets Zoologiske Museum, Köbenhavn, Denmark. There is an additional paratype specimen in the Academy of Natural Sciences, Philadelphia.

Epitonium (Epitonium) dallianum *Verrill and Smith*

A specimen of this species was obtained by the *Eolis*, from off Miami in 120 fathoms. This extends the range from North Carolina south to off southern Florida. See this volume, p. 279.

Plate 174. *Epitonium albidum* d'Orbigny
Scalaria undecimcostata Mörch (=*albidum* d'Orbigny)
from St. Thomas, Virgin Islands. Holotype (8.8x).

* * * *

Anatomical Notes

All of the morphological structures shown in Plate 175 remained after the soft parts were completely macerated in boiling potassium hydroxide.

The entire radula (A) is composed of many rows of teeth and, so far as we can detect, all of these are marginal teeth, both the rachidian or central tooth and the lateral teeth have been lost.[1] The teeth, though usually similar in shape for the entire width of the ribbon, generally become somewhat smaller toward the lateral margins. There is usually a narrow, central band, devoid of teeth extending the entire length of the ribbon: this is probably the area of the missing lateral and central teeth. In a few cases, two somewhat different marginal teeth have been obtained from the same radula, a condition not at all unusual in the radulae of prosobranchs.

Between the radula and the esophagus there are two lateral plates (B) which are composed of chitin impregnated with calcium carbonate. The function of these plates is unknown but it is possible that they are attachment points for muscles which aid in keeping the forward portion of the esophagus open for the reception of food.

[1] In error we said marginal teeth were lost (p. 246).

The tube of the esophagus (C) that extends behind these plates is of a chitinized material and from its pleated appearance can be extended or retracted as the animal feeds. It would also appear that the esophagus may function as a crop. The very small size of the radula teeth and the inclusion of sand grains in the esophagus (Figs. 2 and 3) would indicate that these animals are detritus feeders and depend upon a long crop-like esophagus and sand grains to grind up the food. A single foraminifera shell is seen in fig. 2. Far more material is needed before any real understanding can be had of the soft parts.

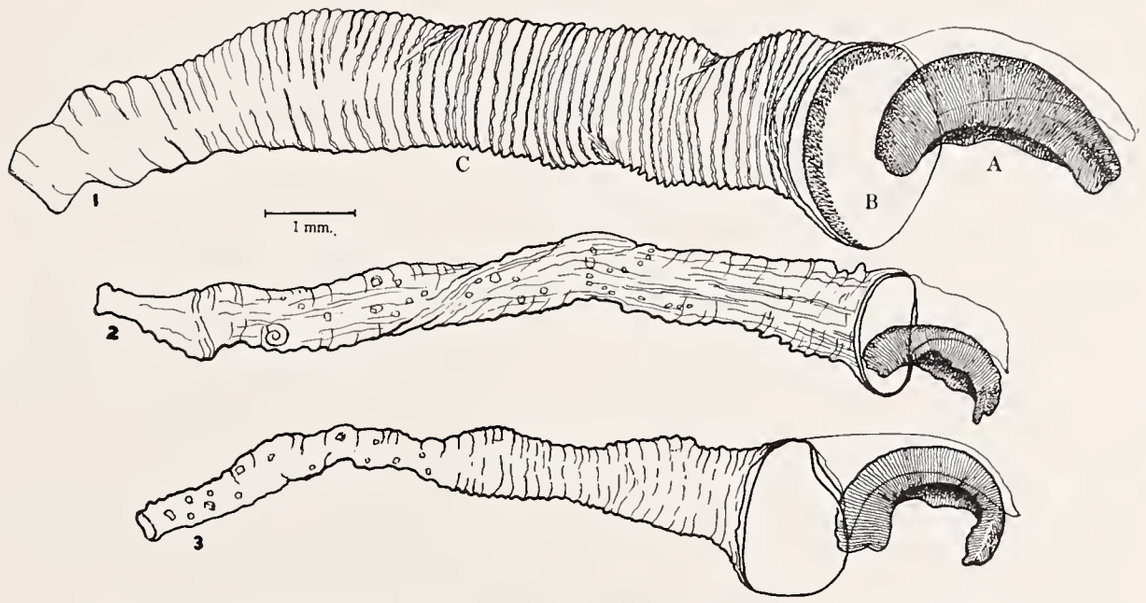

Plate 175. Esophagus, esophageal plates and radula of the Epitoniidae
Fig. 1. *Epitonium lamellosum* Lamarck. Fig. 2. *Epitonium greenlandicum* Perry. Fig. 3. *Epitonium angulatum* Say.

The taxonomic significance of these morphological structures is largely in the esophageal plates, that is, their general shape and sculpture, as both the entire radula and the esophagus are subject to variation as a result of the techniques involved in their preparation.

Troschel in his Das Gebiss der Schnecken 1875, **2**, pp. 153–154, pl. 15, figs. 1–3, mentions the esophageal tube and plates. The latter, on the basis of poor and inadequate material, he considered jaws. He also mentions that a Fritz Muller, writing him from Brasil, described two pointed rods, one found on either side of the radula. Trochel was unable to find these rods in the material sent by Muller and we have seen nothing resembling them. They were perhaps some bits of debris in Muller's preparation.

Thiele in 1928 when writing on the ptenoglossate snails illustrated the radula of several species of Epitoniidae and with these our own observations agree in general.

In the very few species examined in this complex family the radular teeth appear to have several characters of generic value. Far more species must be examined anatomically, however, to prove or disprove the validity of the enormous number of subgenera proposed in this family.

The series of teeth illustrated on Plate 176 show types of 4 genera in the Epitoniidae and indicate the general similarity in the shape of all the teeth except those of *Solutiscala* and *Cirsotrema*.

It was noticed when preparing the slides of the radulae that the radular ribbon of *E. lamellosum* was much broader for its length and the rows of teeth were placed much farther apart than in those of other species examined. In *Epitonium echinaticostum*, *E. foliacecostum* and *E. tollini* the teeth were very loosely attached to the membrane. The

radular ribbon of *E. foliaceicostum* had only 30 to 40 rows of teeth at the widest point of the ribbon while *lamellosum* and *greenlandicum* had over twice that number. The ribbon in all species, except *Solutiscala formosissima*, was generally cap-shaped, narrowing anteriorly and posteriorly, but wide and folded in the central portion. The teeth of all species, except *Solutiscala*, are flat and more or less sickle-shaped, varying little in thickness from the free end to the point of attachment. In *Solutiscala formosissima* the teeth are short and thick and arise from a very heavy bulbous base. The radular ribbon of *S. formosissima* is small, nearly equal in width for its entire length and it has relatively few large, heavy, loosely attached teeth. Unfortunately we were able to get the radula of only one species in the Nystiellinae. The teeth from this single species, however, indicate a substantial difference between the Nystiellinae and the Epitoniinae.

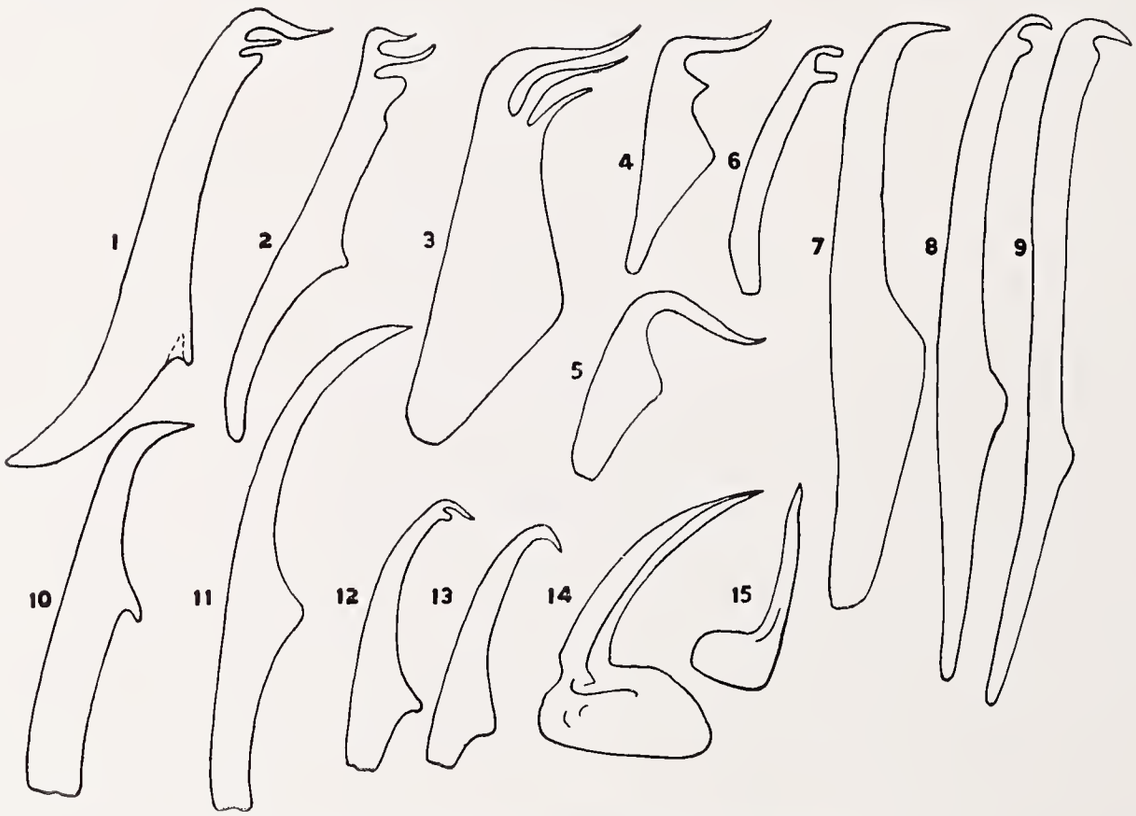

Plate 176. Radular teeth of the Epitoniidae

Fig. 1. *Epitonium angulatum* Say. Fig. 2. *E. humphreysii* Kiener. Fig. 3. *E. lamellosum* Lamarck. Figs. 4–5. *E. championi* Clench and Turner. Fig. 7. *E. tollini* Bartsch. Figs. 8–9. *E. echinaticostum* d'Orbigny. Fig. 11. *E. foliaceicostum* d'Orbigny. Figs. 12–13. *E. greenlandicum* Perry.

Fig. 6. *Cirsotrema dalli* Rehder. Fig. 10. *Opalia crenimarginata* Dall (a species from California). Figs. 14–15. *Solutiscala formosissima* Jeffreys.

All drawings made with the aid of a camera lucida and greatly enlarged.

* * * *

Notes

Epitonium acutum *Pfeiffer*

Scalaria acuta Pfeiffer 1840, Archiv für Naturgeschichte **6**, (1) p. 256 (Cuba); non Sowerby 1813; non Sowerby 1827.

This name has been applied often to Western Atlantic species, but Pfeiffer's description could apply to any of several species in the tropical Western Atlantic.

Epitonium brevis *d'Orbigny*

Scalaria brevis d'Orbigny 1840, Voyage dans l'Amérique Méridionale **5**, pt. 3, p. 390, pl. 75, figs. 22–24 (Iles Malouines [Falkland Islands]).

This species falls outside the region which we consider the Western Atlantic and we include the name only to complete the record. This species was based by d'Orbigny upon a very young specimen. It is widely umbilicated, axially costate and has rather well developed spiral threads. There appears to be no basal ridge.

Epitonium coronatum *Lamarck*

Scala coronata Lamarck 1816, Encyclopédie Méthodique, Vers **3**, pl. 451, fig. 5a–b, List p. 11 (no locality given).

This species has been listed occasionally as coming from the West Indies. Most modern authors, however, believe this to be a species from South Africa. The Western Atlantic references probably apply to *E. lamellosum* Lamarck.

Cerithidea costata *da Costa*

Plate 177

Scala (*Opalia*) *discobalaria* Dall 1889, Bulletin Museum Comparative Zoölogy **18**, p. 234, pl. 18, fig. 2 (off Bahía Honda, Cuba, *Blake*, station 20 (N. Lat. 23°02′; W. Long. 83°11′) in 220 fathoms).

It seems incredible that Dall should have attempted to describe this badly worn fragment. In our opinion, this is nothing more than a fragmented specimen of *Cerithidea costata* da Costa (*Johnsonia* **1**, no. 5, p. 2, pl. 2, figs. 1–7), an intertidal species which was advectitious at the locality where it was dredged.

Plate 177. *Scala discobolaria* Dall (=*Cerithidea costata* da Costa), off Bahía Honda, Cuba in 220 fathoms. Holotype ($14\frac{2}{3}$x).

Epitonium filare *Mörch*

Scalaria filaris Mörch 1874, Vidensk. Medd. Naturhist. Forening i Kjöbenhavn no. 17, p. 265 (St. Martins [Lesser Antilles]); Mörch 1875, Malakozoologische Blätter **22**, p. 152; Mörch 1876, Journal Academy Natural Sciences, Philadelphia (2) **8**, p. 203.

We are unable to recognize this species among the collections that we have studied from the Western Atlantic. The whereabouts of the type is unknown to us. In his description Mörch mentions a basal ridge and bands of color on both sides of the suture of an otherwise white shell. This description fits certain specimens we have seen of *Epitonium lamellosum* Lamarck.

Epitonium inconspicuum *Sowerby*

Scalaria inconspicua Sowerby 1844, Thesaurus Conchyliorum **1,** Scalaria, p. 90, pl. 33, fig. 53 (West Indies).

We are unable to recognize this species. Sowerby's description is practically useless as the few characters he mentions would fit many species in the Western Atlantic. His figure exhibits no detail at all.

Janthoscala *Mörch*

Janthoscala Mörch 1875, Malakozoologische Blätter **22,** p. 152.

Dall later designated *Scala modesta* 'C. B. Adams' Mörch (=*S. permodesta* Dall) as the sectional type, but this species is unrecognizable and as a consequence, the name *Janthoscala* has no standing. [See Dall 1889, Bulletin Museum of Comparative Zoölogy **18,** p. 311.]

Epitonium permodesta *Dall*

Scala permodesta Dall 1889, Bulletin Museum of Comparative Zoölogy **18,** p. 311. Based upon *Scalaria modesta* 'C. B. Adams' Mörch 1876, Journal Academy Natural Sciences Philadelphia (2) **8,** p. 203 (Puerta Plata [Hispaniola]); non *Scalaria modesta* C. B. Adams 1845.

This species is unrecognizable. It was not figured by Mörch and the very brief description would cover any of several species in the West Indian region. It is probably a very young specimen. See also remarks in *Johnsonia* **2,** p. 264.

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