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COLUMBARIIDAE



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THE GENUS COLUMBARIUM IN THE WESTERN ATLANTIC

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The family Columbariidae consists of but a single genus, *Columbarium*. Tomlin (1928, p. 330) established the family for this genus as it possessed several characteristics that sharply differentiated it from other genera in the Fasciolariidae, Muricidae and Conidae, the various families to which '*Fusus*' *pagodus* Lesson had been assigned.

The twelve known species of *Columbarium* are all found in moderate depths extending from 76 to 550 fathoms. Future dredgings will probably indicate both shallower as well as deeper ranges as our present data are based almost entirely upon single records for most of the species.

Genus *Columbarium* v. *Martens*

Columbarium v. Martens 1881, Conchologische Mittheilungen 2, p. 105.

Genotype, *Pleurotoma* (*Columbarium*) *spinicincta* v. Martens (here selected).

Shell generally small, proportionately long and possessing a long extended siphonal canal. Nuclear whorls (two) are bulbous and smooth, remaining whorls usually strongly carinated; the peripheral carina may or may not be serrated. Operculum subtriangular in shape with the nucleus located at the apex. Numerous growth lines are concentrically formed above the nucleus.

Columbarium sarissophorum Watson, Plate 1, fig. 1

Fusus sarissophorus Watson 1882, Jour. Linn. Soc. London 16, p. 392, (off Pernambuco [Brasil] in 350 fathoms); Watson 1886, Report H. M. S. Challenger 15, p. 196, pl. 14, fig. 1.

Description. Shell small, about $\frac{3}{4}$ of an inch in length; thin, imperforate and serrately carinated. Whorls 7 and strongly angulated at the periphery. Color a porcellaneous white. Aperture subquadrate in shape, with the base continued below into a long canal. Outer lip thin and sharp. Inner lip thinly glazed. Spire short and conical. Suture deep and well defined. Nuclear whorls 2, glassy, cylindrical and non-carinated. Sculpture consisting of five spiral lines above and five below the bluntly serrated keel or carina but formed some what more delicately above the carina. The spiral lines become obsolete on the base of the canal. Axial sculpture of very fine, thread-like growth lines. Operculum unknown.

height	width	aperture
19.3	7	13.8 × 2.7 mm. off Pernambuco, Brasil

Types. British Museum, obtained by the *Challenger*, station 122, (S. Lat. 9° 5'; W. Long. 34° 50') off Pernambuco, Brasil in 350 fathoms.

Remarks. The above description is based on both the description and figure of Watson in the *Challenger* report. Only a single specimen was obtained and no more have been secured since the dredging of the *Challenger* in 1873. In relationship, it appears nearest

to *C. bermudezi* Cl. and Ag. but differs in having a less produced spire, a more strongly serrated peripheral keel and a greater development of the spiral sculpture.

Range and Records. Known only from the type locality.

Columbarium bermudezi *Clench and Aguayo*, Plate 1, fig. 3

Columbarium bermudezi Clench and Aguayo 1938, Mem. Soc. Cubana Hist. Nat. **12**, p. 383, pl. 28, fig. 7 (off Sagua la Grande, Cuba in 360 fathoms).

Description. Shell imperforate, thin, elongated and keeled. Color a dull white or grayish white. Whorls 8, each with a peripheral keel strongly developed except on the two smooth nuclear whorls. Aperture subquadrate with the base continued with a greatly lengthened canal. Spire elevated. Palatal lip thin and simple. There is a peripheral keel which is at first initiated on the second whorl as a series of small tubercles or elevations along the periphery. Between the fourth and fifth whorls these tubercles are connected by a keel and beyond this point the keel becomes very strong and the tubercles much less so. On the last two whorls the tubercles form a series of rather evenly spaced crenulations. Sculpture of exceedingly fine growth lines. No spiral sculpture indicated other than a few faint spiral threads on the canal. Canal long, about as long as the shell from the base of the aperture to the spire tip. Operculum unknown.

length	width (including keel)	
27.5	7 mm.	Holotype

Types. Holotype, Museum of Comparative Zoölogy, no. 135007, *Atlantis*, station no. 2989, off Sagua la Grande, Santa Clara Province, Cuba (N. Lat. 23°10': W. Long. 80°04') in 360 fathoms. Paratype in the Museo Poey, Habana.

Remarks. This species appears nearest in its relationships to *C. sarissophorum* Watson. *C. bermudezi* is larger and proportionately narrower throughout with a more extended spire.

Range. Known only from off the North coast of Cuba.

Records. All records are from the *Atlantis* dredgings. CUBA: station 3475, off Cardenas (N. Lat. 23°18': W. Long. 80°48') in 400 fathoms; station 3457, off Sagua la Grande (N. Lat. 23°23': W. Long. 80°36') in 550 fathoms; station 3422, off Caibarién (N. Lat. 23°05': W. Long. 79°29') in 250 fathoms; station 2982A, off Punta Alegre (N. Lat. 22°48': W. Long. 78°50') in 210 fathoms.

Columbarium atlantis *Clench and Aguayo*, Plate 1, fig. 4

Columbarium atlantis Clench and Aguayo 1938, Mem. Soc. Cubana Hist. Nat. **12**, p. 382, pl. 12, fig. 1 (off Matanzas, Cuba in 421 fathoms).

Description. Shell rather thin, faintly shining, elongated and spinose. Color white. Whorls 9, regularly increasing in size. Nuclear whorls ($1\frac{1}{4}$ bulbous, smooth and glass-like, remaining whorls sculptured. Aperture semicircular, the lower portion continued into a greatly lengthened and narrowly opened canal. Spire extended. Palatal lip thin. Sculpture of numerous peripheral spines developed along a somewhat sharpened carina. The spines are large and deflected downwards and are eight in number on the body whorl. Spiral sculpture of rather coarse thread-like ridges which are slightly wavy above the periphery of each whorl. The ridges are more strongly developed below the periphery on the body whorl and continue spirally below for nearly half the length of the canal. Beyond this point the canal becomes smooth. Axial sculpture of fine and numerous growth lines. Operculum unknown. Periostracum thin and pale yellowish.

length	width (exclusive of spines)	
35.2	6 mm.	Holotype

Types. Holotype, Museum of Comparative Zoölogy, no. 135004. *Atlantis*, station no. 2999, off Matanzas, Cuba (N. Lat. $23^{\circ}10'$; W. Long. $81^{\circ}29'$) in 230 fathoms. Paratype from the same area in the Museo Poey, Habana.

Remarks. This species is superficially close in its appearance to *C. bartletti*, both being about the same size and both possessing a strongly spinose peripheral keel. However, *C. bartletti* has a deep channel at the suture, its outer rim supporting a series of strong bosses, thus giving the upper margin of the whorl a crenulated appearance.

Range and Records. Known only from off Matanzas, Cuba. See types.

***Columbarium bartletti* Clench and Aguayo, Plate 1, fig. 5**

Columbarium bartletti Clench and Aguayo 1940, Mem. Soc. Cubana Hist. Nat. 14, p. 86, pl. 14, fig. 3 (off Homer's Cove, Westmoreland, Jamaica, in 254 fathoms).

Description. Shell thin, probably dull, elongated and spinose. Color a creamy-yellow. Whorls 10, regularly increasing in size. Nuclear whorls (2) bulbous, smooth and glass-like, remaining whorls sculptured. Aperture subquadrate, the basal area near the axis extended to form a very lengthened and narrow canal. Spire extended. Outer or palatal lip of the aperture thin and not expanded. Columella straight and extended below to form the axis of the lengthened canal. Sculpture of rather numerous, long, horizontally flattened spines developed on the acutely keeled periphery. The spines are extended horizontally or slightly deflected downwardly. Sculpture on the earlier whorls consists

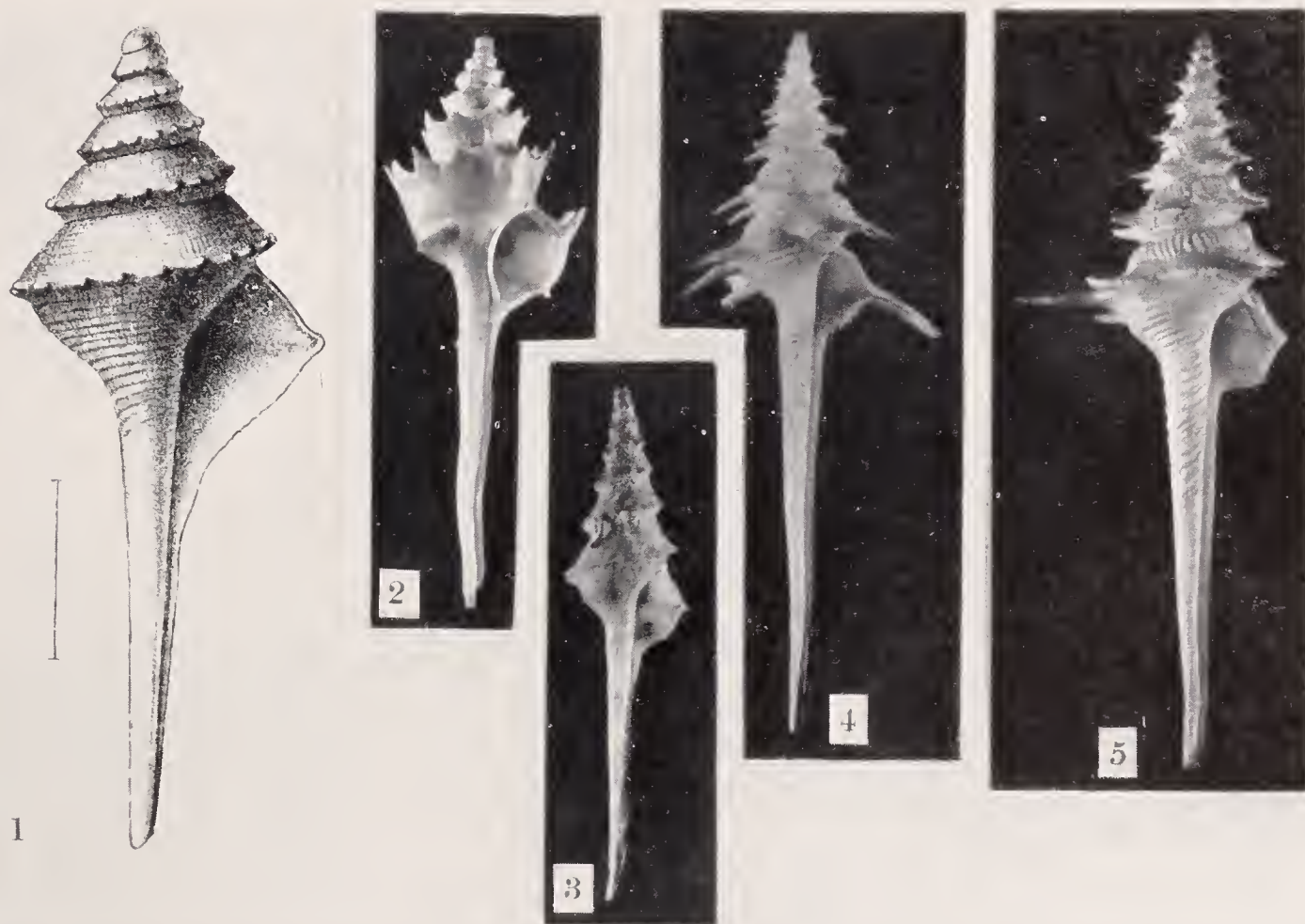


Plate 1, fig. 1. *Columbarium sarissophorum* Watson, Holotype, after Watson ($4.5\times$). Fig. 2. *C. pagoda* Lesson, Tosa, Japan (nat. size). Fig. 3. *C. bermudezi* Clench and Aguayo, Holotype, off Sagua la Grande, Santa Clara, Cuba ($2\times$). Fig. 4. *C. atlantis* Clench and Aguayo, Holotype, off Matanzas, Cuba ($2\times$). Fig. 5. *C. bartletti* Clench and Aguayo, Holotype, off Homer's Cove, Westmoreland, Jamaica ($2\times$).

of a few fine irregular threads above and below the periphery but most prominent near the base of the spines. Below the periphery on the body whorl the spiral sculpture is strong and consists of many regular oblique threads which extend halfway down the canal. Axial sculpture consists of numerous and very fine growth lines extending even out on the spines. Above the periphery there is a series of strong bosses which form a crenulated ridge free from the whorl above. These bosses appear distinctly at the fifth whorl, continuing and becoming increasingly stronger towards the last whorl. Operculum unknown. Periostracum a light yellowish.

length width (exclusive of spines)
39.3 8.2 mm. Holotype

Types. Holotype, Museum of Comparative Zoölogy, no. 104729, *Blake*, station 9 (N. Lat. 18°12': W. Long. 78°20') off Homer's Cove, Westmoreland, Jamaica, West Indies, in 254 fathoms. A paratype is in the Museo Poey, Habana.

Remarks. See under *Columbarium atlautis* Clench and Aguayo.

Range and Records. Known only from the type locality.

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A figure is given of *Columbarium pagoda* Lesson (Plate 1, fig. 2) from off Tosa, Japan. This was the first of the several species to be discovered.

The list below includes the remaining species known in this family so far described or recognized as belonging to the family. I concur with Iredale, that several small species both recent and fossil that have been described, mainly in the genus *Fusus*, will probably be found to be members of *Columbarium* when the type specimens can be reexamined.

Columbarium formosissimum Tomlin

Columbarium formosissimum Tomlin 1928, Ann. South African Mus. **25**, p. 331, pl. 25, fig. 1 (65 miles off Cape St. Blaize, Union of South Africa in 90 fathoms).

Columbarium hedleyi Iredale

Columbarium hedleyi Iredale 1936, Records of the Australian Mus. **19**, p. 316, pl. 24, fig. 18-18a (23 miles east of Sydney, New South Wales, Australia in 250 fathoms).

Columbarium natalense Tomlin

Columbarium natalense Tomlin 1928, Ann. South African Mus. **25**, p. 331, pl. 25, fig. 2 (12 miles off Cape Natal, Union of South Africa in 85 fathoms).

Columbarium pagoda Lesson, Plate 1, fig. 2

Fusus pagoda Lesson 1831, Illustrations de Zoologie, pl. 40 and text (locality not given); Kiener 1840, Icon. Coquilles Vivantes **5**, p. 7, pl. 5, fig. 2 (locality unknown); Reeve 1847, Conch. Icon. **4**, *Fusus*, pl. 8, fig. 32 (near Kiusu, Strait of Korea).

Fusus diadema 'Lesson' Sowerby 1880, Thesaurus Conchyliorum **4**, *Fusus*, p. 79, plate 410, fig. 53 (locality unknown).

Columbarium radiale Watson

Fusus radialis Watson 1882, Jour. Linn. Soc. London **16**, p. 382, (off Cape of Good Hope in 150 fathoms); Watson 1886 Rept. H. M. S. Challenger **15**, p. 195, pl. 14, fig. 2.

Columbarium pagodoïdes Watson

Fusus (Colus) pagodoïdes Watson 1882, Jour. Linn. Soc. London **16**, p. 383 (off Sydney, New South Wales, Australia in 410 fathoms); Watson 1886, Report H. M. S. Challenger **15**, p. 197, pl. 14, fig. 3: non *Fusus pagodoïdes* 'McCoy' Tenison-Woods 1877 [1878] (nude name).

Columbarium spinicinctum v. Martens

Pleurotoma (Columbarium) spinicincta v. Martens 1881, Conchologische Mittheilungen **2**, p. 105, pl. 21, fig. 1-3 (S. Lat. 26°51'; E. Long. 153° [off Moreton Bay, Queensland, Australia] in 76 fathoms).

Columbarium trabeatum Iredale

Columbarium trabeatum Iredale 1936, Records of the Australian Mus. **19**, p. 316, pl. 23, fig. 17 (east of Sydney, New South Wales in 110 fathoms).