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THE SCAPHOPOD MOLLUSKS COLLECTED BY
THE FIRST JOHNSON-SMITHSONIAN
DEEP-SEA EXPEDITION

(WITH ONE PLATE)

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THE SCAPHOPOD MOLLUSKS COLLECTED BY THE FIRST JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION¹

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A small but significant collection of scaphopods was obtained in 1933 by the First Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep, sponsored by the late Eldridge R. Johnson, of Philadelphia. Although only one new species was found, examples were obtained of several species that had been represented previously by unique specimens or by very few individuals. A better taxonomic understanding of several formerly little-known species has been made possible owing to the acquisition of numerous examples of these species. The expedition procured a total of 17 species, 2 of which are questionably identified. The species are listed both systematically and by station. The station data shed little light upon the natural associations of the species because of the great vertical depth range encompassed by many of the hauls. The specimens are all in the collection of the division of mollusks of the United States National Museum.

No attempt has been made to compile a complete synonymy of the species. The reader is referred to the excellent monograph of the eastern American scaphopods by John B. Henderson.² Reference is made to the original descriptions and to Henderson for the complete synonymies and descriptions. The classification used is essentially that of Henderson.

The author wishes to express his appreciation to Dr. Harald A. Rehder, curator, division of mollusks, United States National Museum, for having extended to him the use of the laboratory facilities

¹ Contribution No. 62 of the Allan Hancock Foundation, University of Southern California. Previous papers on the scientific results of this expedition were published in Smithsonian Misc. Coll., vol. 91. This report on the scaphopod mollusks was not completed in time to be included in that volume.

² Henderson, John B., A monograph of the east American scaphopod mollusks, U. S. Nat. Mus. Bull. 111, pp. i-vi, 1-177, pls. 1-20, 1920.

and collections in making this study, and to the administration of the Allan Hancock Foundation for material aid in its completion.

Family DENTALIIDAE

Genus DENTALIUM Linné, 1758

Dentalium LINNÉ, Syst. Nat., ed. 10, p. 785, 1758.

Dentalium MONTFORT, Conchyl. Syst., vol. 2, p. 23, 1810.

Genotype by subsequent designation, Montfort 1810, *Dentalium elephantium* Linné, 1758; Recent, Amboina and Philippine Islands.

DENTALIUM (DENTALIUM) GOULDII PORTORICENSE Henderson, 1920

Dentalium (Dentalium) gouldii portoricense HENDERSON, U. S. Nat. Mus. Bull. 111, p. 30, pl. 2, fig. 5, 1920 (Mayagüez Harbor, Puerto Rico).

Remarks.—A large series of over 100 specimens of this rare shell was taken at one station. Only five individuals were known previously. The material lacks the well-developed intercostal longitudinal striae of the typical subspecies. The hexagonal tip is simple, there being no slit or notch. Fresh specimens have a vitreous shell that has a glazed appearance.

Records.—Station 10, 18°29'20" N., 66°05'30" W., 120-160 fathoms (4). Station 26, 18°30'20" N., 66°22'05" W., 33-40 fathoms (1). Station 104, 18°30'40" N., 66°13'20" W., 80-120 fathoms (100±).

Subgenus COCCODENTALIUM Sacco, 1896

Coccodentalium SACCO, Boll. Mus. Univ. Torino, vol. 11, p. 98, 1896.

Coccodentalium SACCO, Moll. Terr. Terz. Piemonte e della Liguria, pt. 22, p. 110, 1897.

Subgenotype by original designation, *Dentalium radula* Schroeter, 1784; Miocene, Piedmont of Italy.

DENTALIUM (COCCODENTALIUM) CARDUUS Dall, 1889

Dentalium carduus DALL, Bull. Mus. Comp. Zool., vol. 18, pt. 2, p. 423, pl. 27, fig. 3, 1889 (off Santa Lucia).

Dentalium (Dentalium) carduus, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 33, pl. 3, figs. 4, 5, 7, 1920 (Little Bahama Bank; off Grenada).

Remarks.—A fragment representing the anterior portion of this rare species was collected. This specimen appears to be the sixth record, as Henderson (1920) states the species to be known from only five examples. This species is here placed in the subgenus *Coccoden-*

talium because of the possession of surface sculpture similar to *Dentalium radula* Schroeter, the subgenotype.

Record.—Station 100, 18°38'45" N., 64°53'45" W., 100-300 fathoms (1).

Subgenus DENTALE Da Costa, 1778³

Dentale DA COSTA, Hist. Nat. Test. Brit., p. 24, 1778.

Antalis HERRMANNSEN, Indicis Generum Malacoz., vol. 1, p. 63, 1846.

Antalis PILSBRY and SHARP, Man. Conch., vol. 17, p. 37, 1897.

Subgenotype by monotypy, *Dentale vulgare* Da Costa 1778; Recent, Mediterranean and Adriatic Seas, Atlantic Ocean from Spain to Belgium, etc.; Tertiary of Belgium and Italy.

DENTALIUM (DENTALE) BARTLETTI Henderson, 1920

Dentalium (Antalis) bartletti HENDERSON, U. S. Nat. Mus. Bull. III, p. 55, pl. 8, figs. 2, 7, 1920.

Remarks.—Only one lot containing five examples of this fragile deep-water species was taken. Henderson's (1920) West Indian records include specimens from off Havana, St. Vincent, and Martinique, in 357 to 464 fathoms.

Record.—Station 93, 18°38'00" N., 65°09'30" W., 350-400 fathoms, "cement-like mud" (5).

DENTALIUM (DENTALE) CERATUM Dall, 1881

Dentalium ceratum DALL, Bull. Mus. Comp. Zool., vol. 9, p. 38, 1881.

Dentalium (Antalis) ceratum, HENDERSON, U. S. Nat. Mus. Bull. III, p. 49, pl. 7, figs. 2, 4, 5, 6, 7, 1920.

Remarks.—Henderson divided this extremely variable species into several subspecies of doubtful validity. Though the few specimens obtained are poorly preserved, they appear to represent two of Henderson's subspecies, his "typical" and his southern "geographical race" from Barbados, *Dentalium ceratum tenax*.

Records.—Station 102, 18°50'30" N., 64°43'00" W., 90-500 fathoms (4). Station 104, 18°30'40" N., 66°13'20" W., 80-120 fathoms (2).

Subgenus LAEVIDENTALIUM Cossmann, 1888

Laevidentalium COSSMANN, Ann. Soc. Roy. Malacol. Belgique, vol. 23, p. 7, 1888.

Laevidentalium HENDERSON, U. S. Nat. Mus. Bull. III, p. 73, 1920.

Subgenotype by original designation, *Dentalium incertum* Deshayes, 1825; Eocene of the Paris Basin.

³ For the extensive synonymy of *Dentale*, see Emerson, Nautilus, vol. 64, p. 17, 1951.

DENTALIUM (LAEVIDENTALIUM) CALLIPEPLUM Dall, 1889

Dentalium callipeplum DALL, Bull. Mus. Comp. Zool., vol. 18, p. 419, pl. 27, fig. 12(b), 1889.

Dentalium (Laevidentalium) callipeplum, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 74, pl. 12, fig. 5, 1920.

Remarks.—A good series of well-preserved specimens representing this rather uncommon species was taken. The specimens range in size from fragments of the small, narrow, needlelike anterior portions to large, entire individuals, one of which is apparently the longest specimen known, measuring nearly 75 mm. in length. The specimens in a good state of preservation show clearly the development of microscopic incremental rings. These rings are in close association posteriorly and become progressively farther apart anteriorly for approximately one-third the length of the shell, after which they become irregularly spaced or nearly completely obscure in the remaining portion. The annulations are produced by slightly oblique incised lines. In adult specimens, the posterior orifice generally has a shallow, subtriangular notch on the concave face.

Records.—Station 23, 18°32'15" N., 66°17'45" W., 260-360 fathoms (8). Station 25, 18°32'15" N., 66°22'10" W., 240-300 fathoms (4). Station 62, 19°25'45" N., 69°09'00" W., 350 fathoms (10). Station 94, 18°37'45" N., 65°05'00" W., 300-470 fathoms (1).

DENTALIUM (LAEVIDENTALIUM) ?PERLONGUM Dall, 1881

Dentalium perlongum DALL, Bull. Mus. Comp. Zool., vol. 5, No. 6, p. 61, 1878 [name only].

Dentalium perlongum DALL, Bull. Mus. Comp. Zool., vol. 9, p. 36, 1881.

Dentalium (Laevidentalium) perlongum, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 75, pl. 9, fig. 1, 1920.

Remarks.—A few small, glossy, needlelike fragments which may represent the posterior tips of this species were taken. The largest fragment measures only 12 mm. in length.

Record.—Station 13, 18°31'05" N., 66°02'15" W., 200-300 fathoms (7).

Subgenus EPISIPHON Pilsbry and Sharp, 1897

Episiphon PILSBRY and SHARP, Man. Conch., vol. 17, p. 117, 1897.

Episiphon SUTER, Man. New Zealand Moll., p. 821, 1913.

Subgenotype by subsequent designation, Suter, 1913, *Dentalium sowerbyi* Guilding, 1834; Recent, southeastern United States and West Indies.

DENTALIUM (EPISIPHON) JOHNSONI Emerson, new species

Pl. 1, fig. 2

Diagnosis.—Shell slender, thin but not fragile, slightly but uniformly curved, strongly compressed laterally to form an ovate section; section more ovate posteriorly than anteriorly. Juvenile specimens slowly and regularly increasing in diameter, apex attenuated to a needlelike orifice, generally with no indication of a pipe; apex in adult stage often truncated with a very thin, rounded inner tube situated slightly off center toward the convex face and projecting from the orifice. Apical portion of mature individuals filled except for the space occupied by the tube. Aperture of truncated specimens only slightly larger in diameter than the apical orifice. Shell white, vitreous, semi-transparent or translucent where clouded by semiopaque growth rings. Surface glossy, essentially smooth, broken only by occasional irregular growth rings, without longitudinal sculpture. Measurements of the holotype: length, 24 mm.; diameter of apical orifice, 1 mm.; diameter of aperture, 1.3 mm. Mature specimens range from 17 to 28 mm. in length.

Remarks.—This relatively large species is one of the largest members of a subgenus composed primarily of small forms. However, it meets the other requirements of the group. The degree of curvature varies slightly with individuals, a few being moderately curved.

Comparisons.—No representative described from the Atlantic Ocean reaches the large size of this species. *Dentalium (Episiphon) sowerbyi*,⁴ from off the Florida coast and in the West Indies, is a minute species characterized by prominent, coarsely developed growth rings and a circular outline. The most closely related form among the fossil species of the Caribbean region appears to be the Miocene species, *Dentalium (Episiphon) macilentum*,⁵ which is a much smaller, more compressed species.

Type locality.—Off Puerto Rico, Station 25, 18°32'15" N., 66°22'10" W., 240-300 fathoms.

Type depository.—Holotype, U.S.N.M. No. 603543, Station 25, 18°32'15" N., 66°22'10" W., 240-300 fathoms. Paratypes, U.S.N.M. No. 429714, Station 25, 18°32'15" N., 66°22'10" W., 240-300 fathoms (72).

Other records.—Station 12, 18°31'00" N., 66°00'15" W., 200-300 fathoms, blue mud (1). Station 13, 18°31'05" N., 66°02'15" W.,

⁴ Guilding, Trans. Linn. Soc. London, vol. 17, p. 35, pl. 3, fig. 7, 1834.

⁵ Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, pp. 166-167, fig. 1-2, 1911 (Bowden, Jamaica).

200-300 fathoms, blue mud (12). Station 14, 18°31'00" N., 66°04'10" W., 240-340 fathoms (3). Station 23, 18°32'15" N., 66°17'45" W., 260-360 fathoms (4). Station 32, 18°25'50" N., 67°14'55" W., 200-280 fathoms (1). Station 67, 18°30'12" N., 65°45'48" W., 180-280 fathoms, mud (3). Station 84, 18°32'30" N., 65°18'30" W., 300-350 fathoms (1). Station 93, 18°38'00" N., 65°09'30" W., 350-400 fathoms, mud (30). Station 94, 18°37'45" N., 65°05'30" W., 300-470 fathoms (1).

Subgenus BATHOXIPHUS Pilsbry and Sharp, 1897

Bathoxiphus PILSBRY and SHARP, Man. Conch., vol. 17, p. 121, 1897.

Bathoxiphus BOISSEVAIN, *Siboga* Exped., vol. 54, Scaphopoda, p. 48, 1906.

Subgenotype by subsequent designation, Boissevain 1906, *Dentalium ensiculus* Jeffreys, 1877; Recent, Atlantic Ocean, in deep water.

DENTALIUM (BATHOXIPHUS) ENSICULUS Jeffreys, 1877

Dentalium ensiculus JEFFREYS, Ann. Mag. Nat. Hist., ser. 4, vol. 19, p. 154, 1877.

Dentalium (Bathoxiphus) ensiculus, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 81, pl. 14, figs. 1, 4, 5, 7, 9, 1920.

Remarks.—One lot containing 50 specimens was dredged in 350 to 400 fathoms. The character of these specimens substantiates Henderson's findings that the Antillean material tends to be somewhat more slender than the northern representatives. The largest specimen measures 30 mm. in length. This deep-water species apparently has an extensive geographical range, having been previously reported from off the New England coast to St. Bartholomew, W. I., and in the eastern Atlantic off the coasts of Portugal, Ireland, etc.

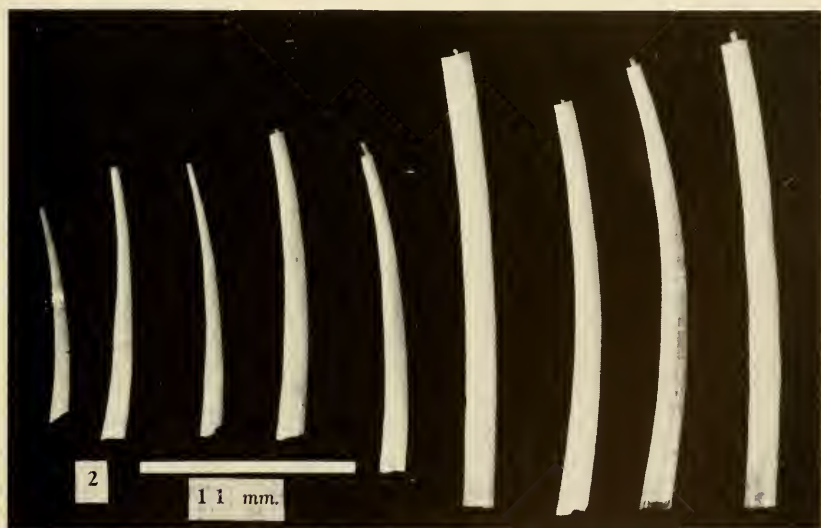
Record.—Station 93, 18°38'00" N., 65°09'30" W., 350-400 fathoms, "cement-like mud" (50).

Subgenus COMPRESSIDENS Pilsbry and Sharp, 1897

Compressidens PILSBRY and SHARP, Man. Conch., vol. 17, p. 123, 1897.

Type by original designation, *Dentalium pressum* Pilsbry and Sharp, 1897; Recent, West Indies to the Florida Keys region.

Remarks.—The western Atlantic representatives of this group may actually be members of the Siphonodentaliidae of the subgenus *Pulsellum*. However, since the soft parts are not available for study, the classification of Henderson (1920) is being followed.



SCAPHOPOD MOLLUSKS

1, Specimens of *Entalina platamodes* (Watson) shown attached to the membranous tubes of a polychaetous worm. 2, A series of *Dentalium (Episiphon) johnsoni*, new species, showing various stages of development and individual variation; specimen at extreme right is the holotype, the remaining specimens are paratypes.

DENTALIUM (COMPRESSIDENS) PRESSUM Pilsbry and Sharp, 1897

Dentalium compressum WATSON, Journ. Linn. Soc. Zool. London, vol. 14, p. 516, 1879 [not Orbigny, 1850].

Dentalium (Compressidens) pressum PILLSBRY and SHARP, Man. Conch., vol. 17, p. 124, pl. 7, fig. 11; pl. 22, figs. 50-52, 1897.

Dentalium (Compressidens) pressum, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 83, pl. 14, figs. 3, 6, 8, 1920.

Remarks.—Only one small specimen of this Antillean-continental slope species was found. It ranges north within the Gulf Stream to the Florida Keys.

Record.—Station 67, 18°30'12" N., 65°45'48" W., 180-280 fathoms, mud (1).

DENTALIUM (COMPRESSIDENS) OPHIODON Dall, 1881

Dentalium ophiodon DALL, Bull. Mus. Comp. Zool., vol. 9, p. 38, 1881.

Dentalium (Compressidens) ophiodon, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 84, pl. 14, fig. 2, 1920.

Remarks.—A representative series of this Antillean-continental slope species was taken. It is a smaller, more slender species with a much less degree of compression than *Dentalium (Compressidens) pressum* Pilsbry and Sharp, which has a similar range.

Records.—Station 13, 18°31'05" N., 66°02'15" W., 200-300 fathoms, "blue mud" (5). Station 25, 18°32'15" N., 66°22'10" W., 240-300 fathoms, "soft mud" (6).

Family SIPHONODONTALIIDAE

Genus **ENTALINA** Monterosato, 1872

Entalina MONTEROSATO, Notizie intorno alle Conch. Fossile di Monte Pellegrino e Ficarazzi, p. 27, 1872.

Entalina SACCO, Moll. Terr. Terz. Piemonte e della Liguria, pt. 22, p. 114, 1897.

Genotype by subsequent designation, Sacco, 1897, *Dentalium tetragona* Brocchi, 1814 (= ?*Dentalium quinquangulare* Forbes, 1843); Miocene, northern Italy.

ENTALINA PLATAMODES (Watson), 1879

Siphodontalium [sic] *platamodes* WATSON, Journ. Linn. Soc. Zool. London, vol. 14, p. 519, 1879.

Entalina platamodes, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 87, pl. 15, figs. 1, 4, 5, 7, 1920.

Entalina quadrata HENDERSON, U. S. Nat. Mus. Bull. 111, p. 88, pl. 15, figs. 2, 3, 6, 10, 1920.

Remarks.—Five lots totaling over 200 specimens of this unusual species were taken. A number of dead specimens were found attached to the sides of membranous tubes apparently belonging to a polychaetous annelid of the genus *Nothria*⁶ (see pl. I, fig. 1). This appears to be the first record of such an association.

Watson (1879) described *Entalina platamodes* (off Culebra Island, West Indies), from a poorly preserved specimen as indicated by his remarks, "neither end is fresh enough for description." However, the general characters of the shell were clearly defined by his statement, "shell five sided, with four sharp corners, which are nearly right angles, and one very obtuse angle along the concave curve . . . there are a few longitudinal striae . . . strongest near the angles, more or less obsolete as they recede from these." Henderson (1920) described *Entalina quadrata* from one well-preserved specimen which possesses a continuous quadrate section and many longitudinal riblets. The material at hand shows that the concave face varies considerably in the degree of medial keel development. Most specimens appear to be five-sided, owing to the presence of this ridge. However, some appear to have four sides when the ridge is not well developed. While the arrangement and number of the longitudinal riblets is more constant in most specimens, the pattern is often interrupted by wear. Apparently Watson's type specimens were badly worn, with the result that the riblets were less discernible, while Henderson's type specimen of *E. quadrata* chanced to be a well-preserved individual showing the complete arrangement of the riblets. Since the intergrading specimens appear to connect the two forms, the species are here considered to be conspecific.

This species is closely related to *Entalina quinquangularis* (Forbes) from the Mediterranean-Aegean Seas, and the northwestern Atlantic Ocean.

Records.—Station 13, 18°31'05" N., 66°02'15" W., 200-300 fathoms, blue mud (25). Station 23, 18°32'15" N., 66°17'45" W., 260-360 fathoms, mud (40±). Station 25, 18°32'15" N., 66°22'10" W., 240-300 fathoms, mud (60). Station 35, 18°23'40" N., 67°16'45" W., 180-280 fathoms (3). Station 67, 18°30'12" N., 65°45'48" W., 180-280 fathoms, mud (100±).

⁶ Provisionally identified by Dr. Olga Hartman, Allan Hancock Foundation, University of Southern California.

Genus **CADULUS** Philippi, 1844

Cadulus PHILIPPI, Enumeratio Molluscorum Sicilae, vol. 2, p. 209, 1844.

Genotype by monotypy, *Dentalium ovulum* Philippi, 1844 (= *Cadulus* (*Cadulus*) *ovulum* Philippi); Recent, Mediterranean Sea.

CADULUS (CADULUS) CONGRUENS Watson, 1879

Cadulus curtus congruens WATSON, Journ. Linn. Soc. Zool. London, vol. 14, p. 527, 1879.

Cadulus (*Cadulus*) *congruens*, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 142 pl. 20, fig. 10, 1920.

Remarks.—One lot containing 18 specimens, which apparently represent this species, was dredged in fairly deep water. This species was not previously represented in the United States National Museum collection.

The types were collected by the *Challenger* off Culebra Island, West Indies, in 390 fathoms with a pteropod-oöze bottom.

Record.—Station 67, 18°30'12" N., 65°45'48" W., 180-280 fathoms, mud (18).

CADULUS (CADULUS) EXIGUUS Watson, 1879

Cadulus exiguus WATSON, Journ. Linn. Soc. Zool. London, vol. 14, p. 528, 1879.

Cadulus (*Cadulus*) *exiguus*, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 145, pl. 20, fig. 9, 1920.

Remarks.—Three lots totaling 32 specimens were taken. This species was previously represented by only two specimens in the United States National Museum collection.

The type locality is off Culebra Island, West Indies, in 390 fathoms.

Records.—Station 13, 18°31'05" N., 66°02'15" W., 200-300 fathoms, blue mud (4). Station 35, 18°23'40" N., 67°16'45" W., 180-280 fathoms (5). Station 67, 18°30'12" N., 65°45'48" W., 180-280 fathoms (23).

CADULUS (CADULUS) ?TERSUS Henderson, 1920

Cadulus (*Cadulus*) *tersus* HENDERSON, U. S. Nat. Mus. Bull. 111, p. 149, pl. 20, fig. 4, 1920 (Barbados).

Remarks.—One fragment which may represent this species was dredged.

Record.—Station 67, 18°30'12" N., 65°45'48" W., 180-280 fathoms, mud (1).

Subgenus **GADILOPSIS** Woodring, 1925

Gadilopsis WOODRING, Carnegie Inst. Washington Publ. 366, p. 206, 1925.

Subgenotype by original designation, *Ditrupea dentalina* Guppy, 1873 (= *Cadulus* (*Gadilopsis*) *dentalinus* (Guppy)); Miocene, Jamaica.

CADULUS (GADILOPSIS) ACUS Dall, 1889

Cadulus acus DALL, Bull. Mus. Comp. Zool., vol. 18, p. 432, pl. 27, fig. 11, 1889.
Cadulus (*Gadila*) *acus*, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 140, pl. 20, figs. 11, 13, 1920.

Remarks.—Five lots of this uncommon species were taken. In this shallow-water species the oblique growth rings are developed moderately. There is a slight variation in width among individuals.

Records.—All Samaná Bay, Dominican Republic. Station 55, 19° 10' 12" N., 69° 27' 03" W., 17 fathoms (15). Station 56, 19° 10' 15" N., 69° 27' 20" W., 17 fathoms (35 ±). Station 57, 19° 10' 20" N., 69° 28' 35" W., 18 fathoms, mud (2). Station 58, 19° 10' 20" N., 69° 29' 15" W., 18 fathoms, mud (4). Station 59, 19° 10' 25" N., 69° 30' 05" W., 18-19 fathoms, mud (2).

Subgenus **PLATYSCHIDES** Henderson, 1920

Platyschides HENDERSON, U. S. Nat. Mus. Bull. 111, p. 104, 1920.

Subgenotype by original designation, *Cadulus grandis* Verrill, 1884; Recent, west Atlantic, north of Hatteras.

CADULUS (PLATYSCHIDES) ELEPHAS Henderson, 1920

Cadulus (*Platyschides*) *elephas* HENDERSON, U. S. Nat. Mus. Bull. 111, p. 107, pl. 17, fig. 10, 1920.

Remarks.—Six specimens were obtained that can be referred unquestionably to this species. It was previously known only from the unique, which was dredged in 464 fathoms off St. Vincent.

This large ivory-white shell appears to have a simple posterior orifice. The largest specimen measures 16 mm. in length, 1.5 mm. less than the type. In these additional specimens the hemisphere on the concave face is slightly more bulbous than in the type.

Records.—Station 25, 18° 32' 15" N., 66° 22' 10" W., 240-300 fathoms, mud (4). Station 67, 18° 30' 12" N., 65° 45' 48" W., 180-280 fathoms, mud (2).

CADULUS (PLATYSCHIDES) ?BUSHII Dall, 1889

Cadulus carolinensis bushii DALL, Bull. Mus. Comp. Zool., vol. 17, p. 430, 1889 (Barbados).

Cadulus (Platyschides) bushii, HENDERSON, U. S. Nat. Mus. Bull. 111, p. 125, pl. 19, fig. 10, 1920.

Remarks.—The one lot collected is questionably referred to this species. While the specimens are about the same size and have an outline similar to *Cadulus bushii*, they are heavy, rather opaque shells in which the oral aperture is quite constricted.

This may prove to be a new species.

Record.—Station 21, 18°30'20" N., 66°10'30" W., 140-200 fathoms (8).

LIST OF SPECIES COLLECTED, ARRANGED BY STATIONS⁷

- Station 10.** Lat. 18°29'20" N. Long. 66°05'30" W. February 2, 1933
 Lat. 18°30'24" N. Long. 66°04'15" W.
 Off San Juan, Puerto Rico, in 120-160 fathoms, tangle:
Dentalium (D.) gouldii portoricense.
- Station 12.** Lat. 18°31'00" N. Long. 66°00'15" W. February 2, 1933
 Lat. 18°30'30" N. Long. 66°01'45" W.
 Off Punta Maldonado, Puerto Rico, in 200-300 fathoms, beam trawl,
 blue mud:
Dentalium (Episiphon) johnsoni.
- Station 13.** Lat. 18°31'05" N. Long. 66°02'15" W. February 2, 1933
 Lat. 18°30'30" N. Long. 66°04'05" W.
 Off Punta Maldonado, Puerto Rico, in 200-300 fathoms, beam trawl,
 blue mud:
Dentalium (Laevidentalium) ?perlongum.
Dentalium (Episiphon) johnsoni.
Dentalium (Compressidens) ophiodon.
Entalina (E.) platamodes.
Cadulus (C.) exiguus.
- Station 14.** Lat. 18°31'00" N. Long. 66°04'10" W. February 2, 1933
 Lat. 18°30'30" N. Long. 66°03'15" W.
 Off Punta Maldonado, Puerto Rico, in 240-340 fathoms, beam trawl:
Dentalium (Episiphon) johnsoni.
- Station 21.** Lat. 18°30'20" N. Long. 66°10'30" W. February 4, 1933
 Lat. 18°31'15" N. Long. 66°12'20" W.
 Off Putna Salinas, Puerto Rico, in 140-200 fathoms, beam trawl:
Cadulus (Platyschides) ?bushii.

⁷ Bartsch, Paul, Station Records of the First Johnson-Smithsonian Deep-Sea Expedition, Smithsonian Misc. Coll., vol. 91, No. 1, pp. 1-31, 1 map, 1933.

- Station 23. Lat. $18^{\circ}32'15''$ N. Long. $66^{\circ}17'45''$ W. February 4, 1933
 Lat. $18^{\circ}32'00''$ N. Long. $66^{\circ}21'15''$ W.
 Off Punta Cerro Gordo, Puerto Rico, in 260-350 fathoms, otter
 trawl:
Dentalium (Laevidentalium) callipeplum.
Dentalium (Episiphon) johnsoni.
Entalina (E.) platamodes.
- Station 25. Lat. $18^{\circ}32'15''$ N. Long. $66^{\circ}22'10''$ W. February 7, 1933
 Lat. $18^{\circ}32'05''$ N. Long. $66^{\circ}22'10''$ W.
 Off Punta Cerro Gordo, Puerto Rico, in 240-300 fathoms, dredge,
 mud:
Dentalium (Laevidentalium) callipeplum.
Dentalium (Episiphon) johnsoni.
Dentalium (Compressidens) ophiodon.
Entalina (E.) platamodes.
Cadulus (Platyschides) elephas.
- Station 26. Lat. $18^{\circ}30'20''$ N. Long. $66^{\circ}22'05''$ W. February 7, 1933
 Lat. $18^{\circ}30'30''$ N. Long. $66^{\circ}23'05''$ W.
 Off Punta Cerro Gordo, Puerto Rico, in 33-40 fathoms, dredge,
 rock, etc.:
Dentalium (D.) gouldii portoricense.
- Station 32. Lat. $18^{\circ}25'50''$ N. Long. $67^{\circ}14'55''$ W. February 9, 1933
 Lat. $18^{\circ}23'50''$ N. Long. $67^{\circ}17'35''$ W.
 Off Punta Jiguero, Puerto Rico, in 200-280 fathoms, dredge:
Dentalium (Episiphon) johnsoni.
- Station 35. Lat. $18^{\circ}23'40''$ N. Long. $67^{\circ}16'45''$ W. February 9, 1933
 Lat. $18^{\circ}24'45''$ N. Long. $67^{\circ}14'15''$ W.
 Off Punta Jiguero, Puerto Rico, in 180-280 fathoms, beam trawl:
Entalina (E.) platamodes.
Cadulus (C.) exiguus.
- Station 55. Lat. $19^{\circ}10'12''$ N. Long. $67^{\circ}27'03''$ W. February 16, 1933
 Lat. $19^{\circ}10'15''$ N. Long. $69^{\circ}27'10''$ W.
 Samaná Bay, Dominican Republic, in 17 fathoms, dredge:
Cadulus (Gadilopsis) acus.
- Station 56. Lat. $19^{\circ}10'15''$ N. Long. $69^{\circ}27'20''$ W. February 16, 1933
 Lat. $19^{\circ}10'15''$ N. Long. $69^{\circ}28'05''$ W.
 Samaná Bay, Dominican Republic, in 17 fathoms, dredge:
Cadulus (Gadilopsis) acus.
- Station 57. Lat. $19^{\circ}10'20''$ N. Long. $69^{\circ}28'35''$ W. February 16, 1933
 Lat. $19^{\circ}10'20''$ N. Long. $69^{\circ}29'00''$ W.
 Samaná Bay, Dominican Republic, in 18 fathoms, dredge, mud:
Cadulus (Gadilopsis) acus.

- Station 58. Lat. $19^{\circ}10'20''$ N. Long. $69^{\circ}29'15''$ W. February 16, 1933
 Lat. $19^{\circ}10'25''$ N. Long. $69^{\circ}30'05''$ W.
 Samaná Bay, Dominican Republic, in 18 fathoms, dredge, mud:
Cadulus (Gadilopsis) acus.
- Station 59. Lat. $19^{\circ}10'25''$ N. Long. $69^{\circ}30'05''$ W. February 16, 1933
 Lat. $19^{\circ}10'35''$ N. Long. $69^{\circ}30'40''$ W.
 Samaná Bay, Dominican Republic, in 18-19 fathoms, dredge, mud:
Cadulus (Gadilopsis) acus.
- Station 62. Lat. $19^{\circ}25'45''$ N. Long. $69^{\circ}09'00''$ W. February 18, 1933
 Lat. $19^{\circ}27'45''$ N. Long. $69^{\circ}14'45''$ W.
 Off Punta Pescadores, Dominican Republic, in 350 fathoms, dredge:
Dentalium (Laevidentalium) callipeplum.
- Station 67. Lat. $18^{\circ}30'12''$ N. Long. $65^{\circ}45'48''$ W. February 23, 1933
 Lat. $18^{\circ}32'18''$ N. Long. $65^{\circ}46'12''$ W.
 Off Punta Picua, Puerto Rico, in 180-280 fathoms, dredge, mud:
Dentalium (Episiphon) johnsoni.
Dentalium (Compressidens) pressum.
Entalina (E.) platamodes.
Cadulus (C.) congruens.
Cadulus (C.) exiguus.
Cadulus (C.) ?tersus.
Cadulus (Platyschides) elephas.
- Station 84. Lat. $18^{\circ}32'30''$ N. Long. $65^{\circ}18'30''$ W. February 26, 1933
 Lat. $18^{\circ}39'00''$ N. Long. $65^{\circ}17'00''$ W.
 North of Culebra Island, in 300-350 fathoms, otter trawl:
Dentalium (Episiphon) johnsoni.
- Station 93. Lat. $18^{\circ}38'00''$ N. Long. $65^{\circ}09'30''$ W. March 2, 1933
 Lat. $18^{\circ}37'45''$ N. Long. $65^{\circ}05'00''$ W.
 North of St. Thomas, Virgin Islands, in 350-400 fathoms, dredge, mud:
Dentalium (Dentale) bartletti.
Dentalium (Episiphon) johnsoni.
Dentalium (Bathoxiphus) ensiculus.
- Station 94. Lat. $18^{\circ}37'45''$ N. Long. $65^{\circ}05'00''$ W. March 2, 1933
 Lat. $18^{\circ}39'00''$ N. Long. $65^{\circ}03'30''$ W.
 North of St. Thomas, Virgin Islands, in 300-470 fathoms, dredge:
Dentalium (Laevidentalium) callipeplum.
Dentalium (Episiphon) johnsoni.
- Station 100. Lat. $18^{\circ}38'45''$ N. Long. $64^{\circ}52'45''$ W. March 4, 1933
 Lat. $18^{\circ}40'15''$ N. Long. $64^{\circ}50'15''$ W.
 North of St. Thomas, Virgin Islands, in 100-300 fathoms, otter trawl:
Dentalium (Coccodentalium) carduus.

Station 102. Lat. $18^{\circ}50'30''$ N. Long. $64^{\circ}43'00''$ W. March 4, 1933

Lat. $18^{\circ}51'00''$ N. Long. $64^{\circ}33'00''$ W.

Northwest of Anegada Island, in 90-500 fathoms, otter trawl:

Dentalium (Dentale) ceratum.

Station 104. Lat. $18^{\circ}30'40''$ N. Long. $66^{\circ}13'20''$ W. March 8, 1933

Lat. $18^{\circ}30'10''$ N. Long. $66^{\circ}13'50''$ W.

Off Punta Boca Juana, Puerto Rico, in 80-120 fathoms, oyster dredge, mud:

Dentalium (D.) gouldii portoricense.

Dentalium (Dentale) ceratum.