

ABBREVIATIONS

Materials	Colors or Shades	Other qualities
M. - Mud	bl. - black	hd. - hard
S. - Sand	gr. - gray	sd. - soft
G. - Gravel	dk. - dark	sl. - fine
Sh. - Shells	gn. - green	cr. - coarse
Z. - Zircon	br. - brown	brk. - broken
Sp. - Spores	bl. - blue	ry. - rocky
C. - Clay	lt. - light	st. - sticky

TIDES

Mean High Water	Mean Low Water	Mean Tidal Range
11:00 A.M.	5:00 P.M.	6:00 H.
11:00 P.M.	5:00 A.M.	6:00 H.

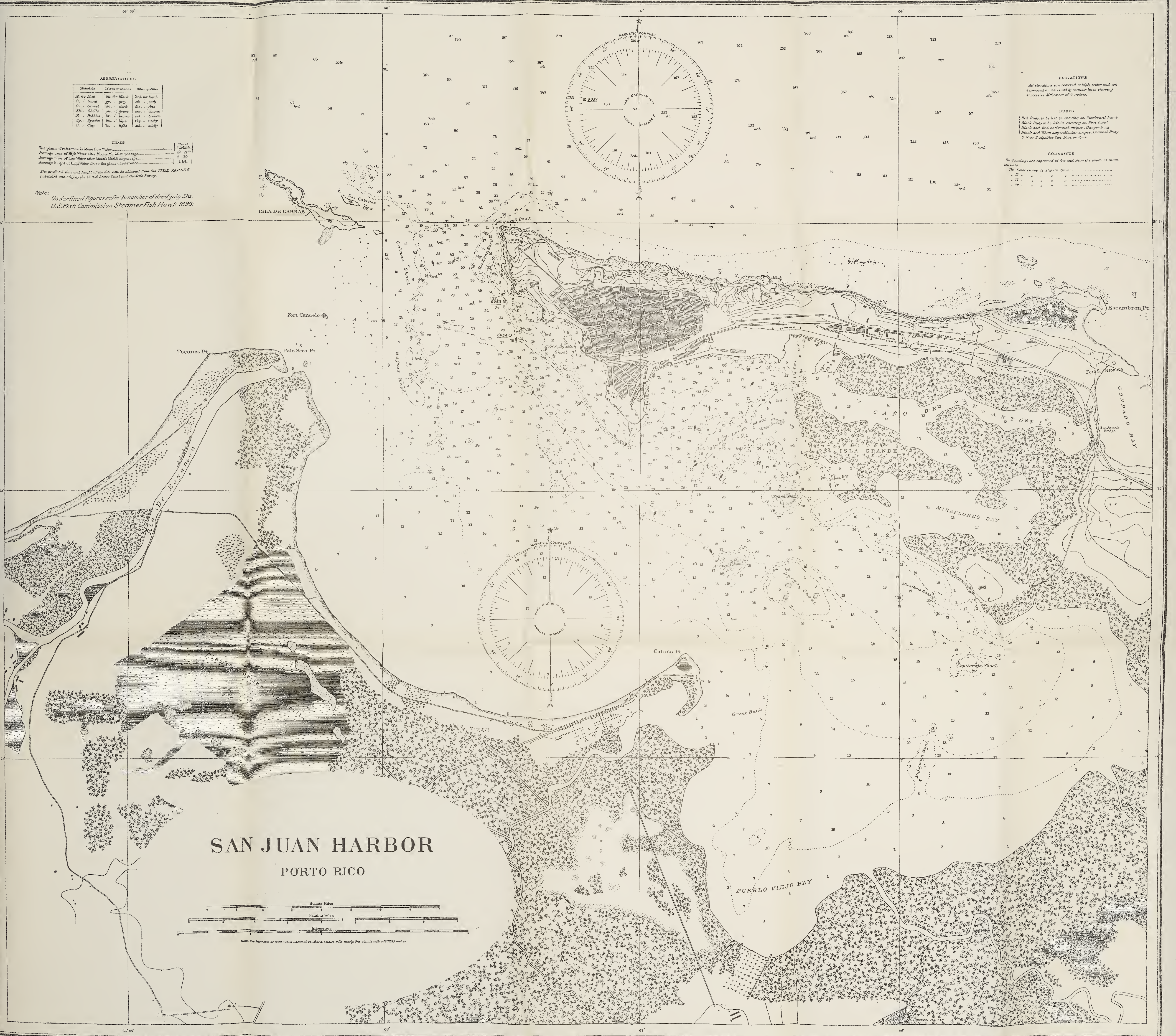
The present time and height of the tide can be obtained from the TIDE TABLES published annually by the United States Coast and Geodetic Survey.

Note: Underlined figures refer to number of dredging Sta. U.S. Fish Commission Steamer Fish Hawk 1899.

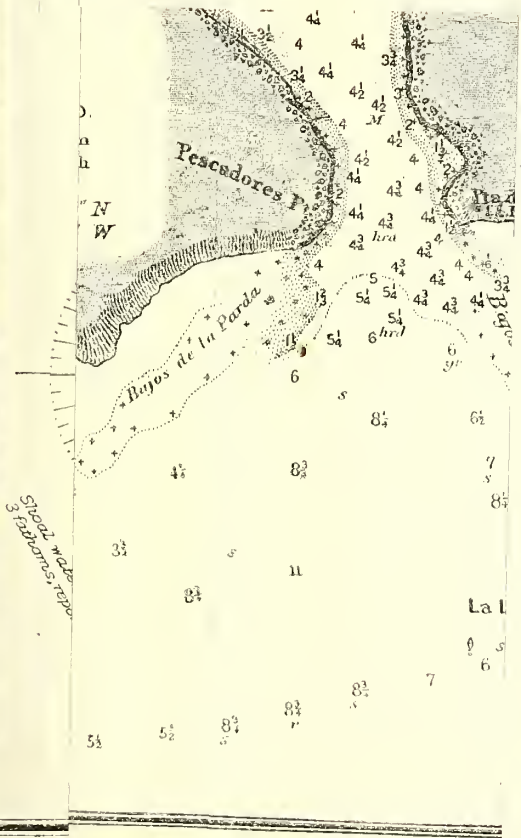
ELEVATIONS
All elevations are referred to high water and are expressed in meters and by contour lines showing successive differences of 1/2 meter.

BUOYS
Red Buoy to be left to starboard hand
Black Buoy to be left to port hand
Black and Red horizontal stripes - Danger Buoy
Black and White perpendicular stripes - Channel Buoy
C.N. or S. signal day, light or night

SOUNDINGS
The soundings are expressed in fathoms and show the depth at mean low water
The best course is shown thus:



Adapted from chart No. 908 U.S. Coast & Geodetic Survey Washington, D.C.
Additions by U.S. Fish Commission 1899

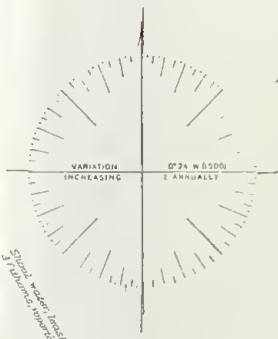


Note: ...ington, D.C.

MAYAGUEZ BAY

From a survey in 1836 by the Department of Public Works Porto Rico. Obs. Spot @ Lat 18° 11' 56" N Long 67° 09' 00" W

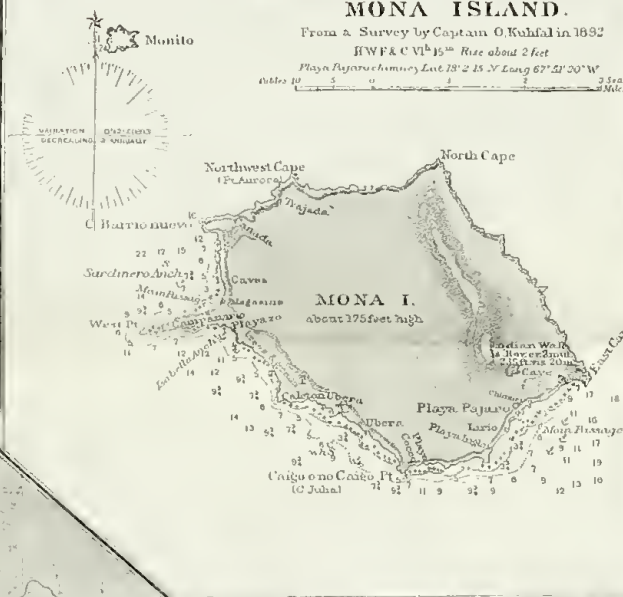
The coast line and soundings shown in hair-line are from earlier surveys by the French Government in 1846 and by Capt. O. Kuhl in 1851



6065

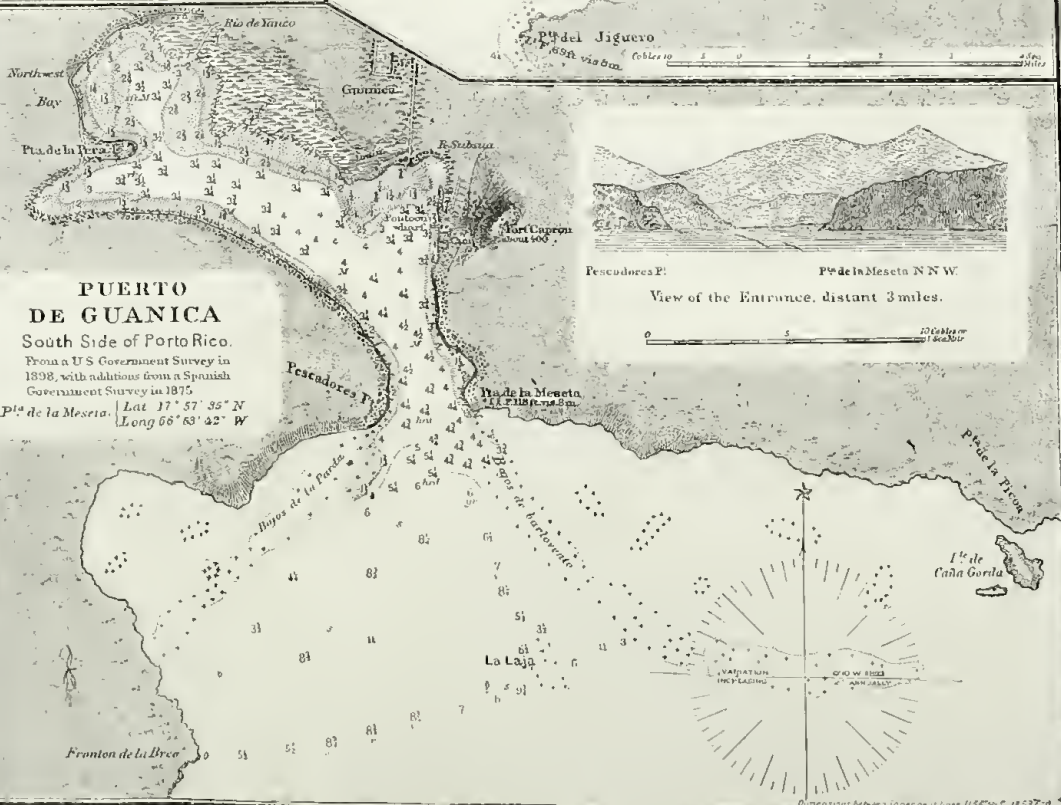
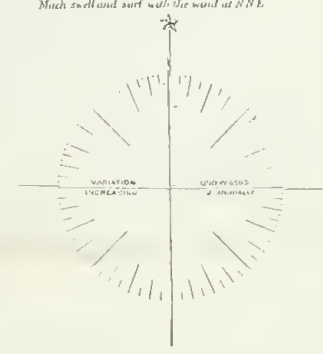
MONA ISLAND.

From a Survey by Captain O. Kuhl in 1832. H.W.F. & C. V. 15' Rise about 2 feet. Playa Pajaro chimney Lat 18° 2' 15" N Long 67° 21' 20" W



AGUADILLA BAY.

From the Spanish Portulano 1618. Aguadilla: Lat 18° 25' 20" N Long 67° 09' 24" W. Good Anchorage off the centre of the town in 10 to 14 fathoms. Much swell and surf with the wind at N.W.



PUERTO DE GUANICA

South Side of Porto Rico. From a U.S. Government Survey in 1838, with additions from a Spanish Government Survey in 1875. Pta de la Meseta: Lat 17° 57' 35" N Long 66° 03' 42" W



View of the Entrance, distant 3 miles.

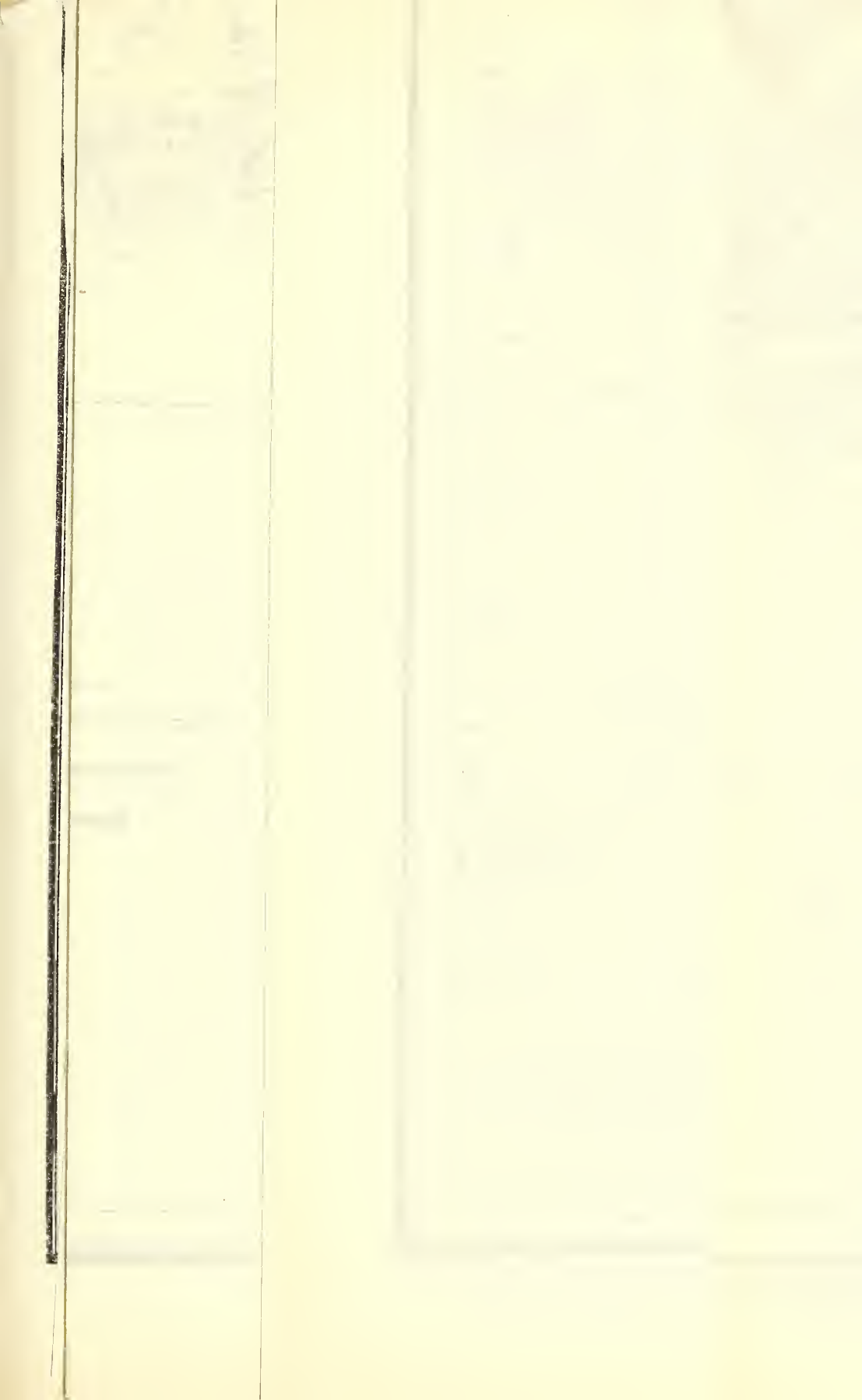


SOUNDINGS IN FATHOMS. HEIGHTS IN FEET.

Note: Underlined Figures refer to number of dredging Sta. U.S. Fish Commission Steamer Fish Hawk 1899.

Adapted from chart N° 372 Hydrographic Office Washington, D.C. Additions by U.S. Fish Commission, 1899.



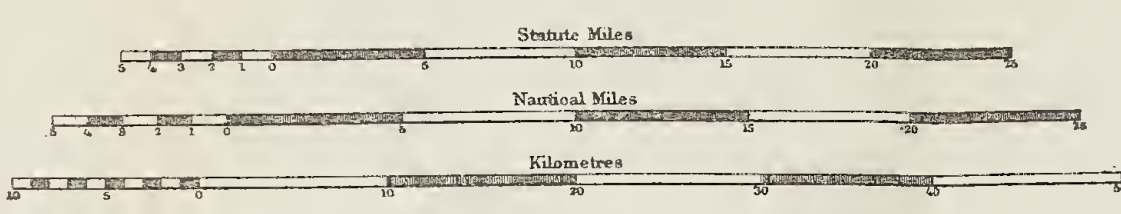




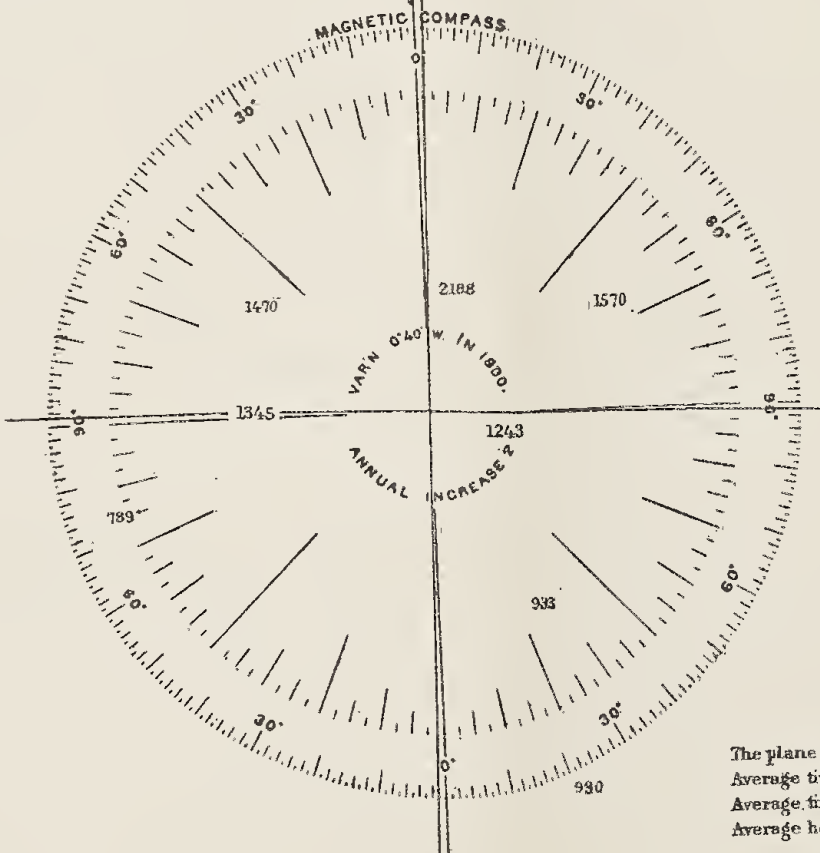
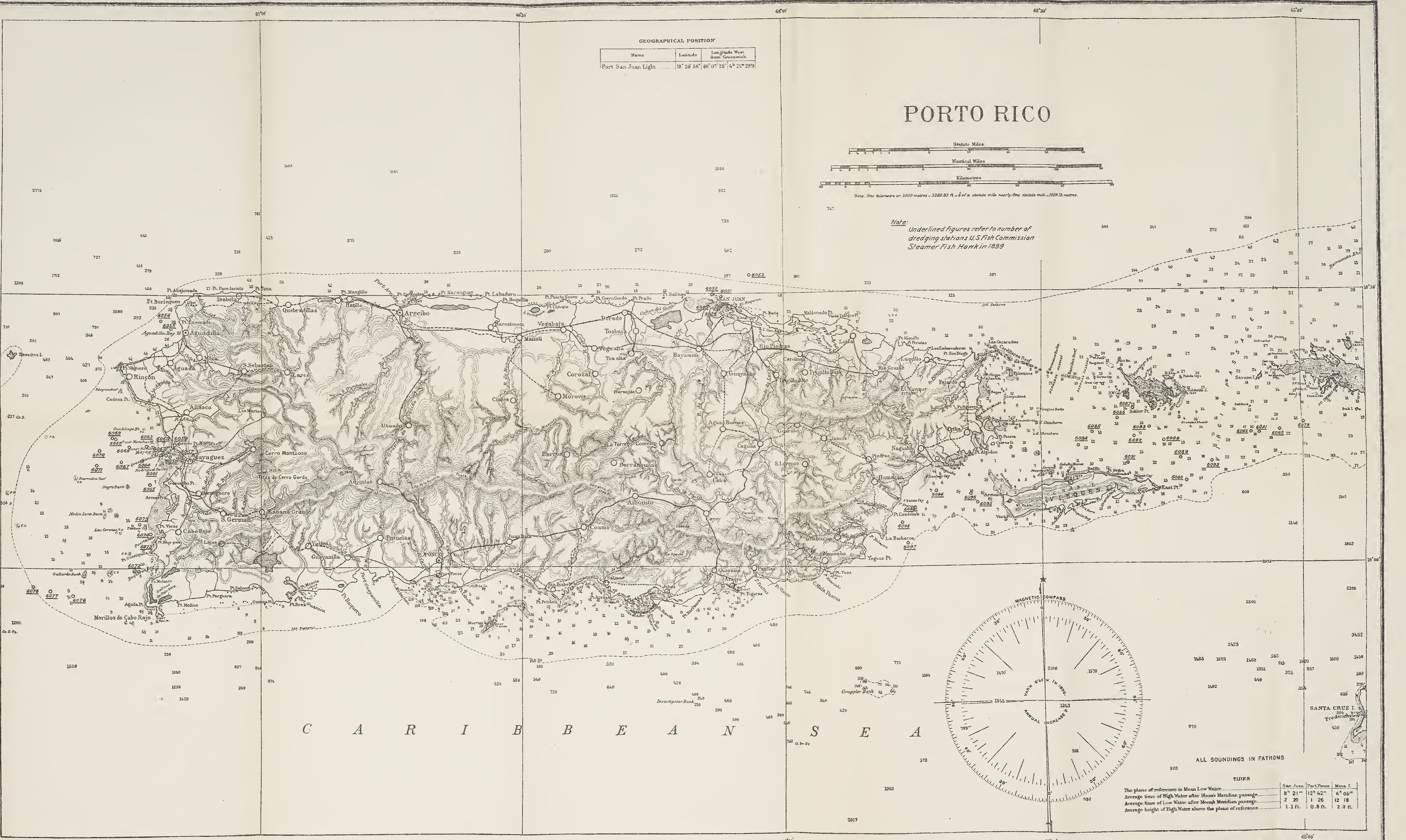
GEOGRAPHICAL POSITION

Name	Latitude	Longitude West from Greenwich
Port San Juan Light	18° 28' 58"	66° 07' 28" 4 24" 23.9"

PORTO RICO



Note: Underlined figures refer to number of dredging stations U.S. Fish Commission Steamer Fish Hawk in 1899



TIDES

	San Juan	Port Ponce	Moná I.
The plane of reference is Mean Low Water			
Average time of High Water after Moon's Meridian passage	8 ^h 21 ^m	12 ^h 42 ^m	6 ^h 05 ^m
Average time of Low Water after Moon's Meridian passage	2 20	1 25	12 18
Average height of High Water above the plane of reference	1.1 ft.	0.8 ft.	2.0 ft.

THE MOLLUSCA OF PORTO RICO.

BY

WILLIAM HEALEY DALL

AND

CHARLES TORREY SIMPSON.

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THE MOLLUSCA OF PORTO RICO.

BY W. H. DALL AND C. T. SIMPSON.

INTRODUCTION.

The following report on the mollusks of Porto Rico is the result of a study of collections made by the U. S. Fish Commission steamer *Fish Hawk* during explorations of that island in 1899, and of the antecedent literature. But little attention seems to have been paid to the Porto Rican marine mollusk-fauna, considered separately from that of the West Indies in general, and only the land shells are at all well known. The principal sources of information are: (1) a paper by Shuttleworth on some land shells of the island;¹ (2) a monographic summary of the land and fresh-water shells, by Crosse;² (3) a similar summary of the whole mollusk-fauna, including the marine forms, by Gundlach;³ (4) a brief paper on the land snails by von Martens.⁴ The rest of the information is scattered through the literature of the West Indies and mollusks in general, from very early times. As with the West Indian fauna in most branches, apart from the birds and land shells, information as to the species is fragmentary and unsatisfactory, no equal area of the shores of countries equally long known anywhere else in the world being so imperfectly explored and with the recorded data in such great confusion. The sea-shell fauna of the West Indies was the source of a large proportion of the shells known to the earliest writers, and may be said to rank third in the order of importance in its contributions to the early iconographies, coming next after the European and Indo-Pacific regions. The localities were often stated erroneously or as unknown, and the same may be said of the great iconography of Reeve and Sowerby, based on the Cumingian collection. Many West Indian shells are there depicted with erroneous localities, and shells not known in the Antillean region are referred to it. The similarity of Spanish names in the Pacific, Oriental, and East American regions is no doubt partly responsible for this confusion. A few later lists, such as those of Beau and Fischer for Guadeloupe; Krebs and Mörch for the West Indies; Guppy for Trinidad; Poulsen for St. Thomas; d'Orbigny, in Sagra, and Arango, for Cuba, have done something toward clearing up the subject, yet it is still in a deplorably unsatisfactory state.

Some years ago the senior author of this report published an index to the periodical literature and fugitive papers on the malacology of this region,⁵ in which

¹ Robert James Shuttleworth. Beiträge zur näheren Kenntniss der Land- und Süsswasser-Mollusken der Insel Porto Rico. Mitth. der Naturforschenden Gesellschaft in Bern, a. d. Jahre 1854. 8°. pp. 33-56, März 1854, and 89-103, Juni 1854.

² Joseph-Charles-Hippolyte Crosse. Fauna malacologique terrestre et fluviatile de l'île de Porto-Rico. Journ. de Conchyliologie, XI, pp. 6-71, 1892. Also issued separately in covers.

³ Don Juan Gundlach. Apuntes para la fauna Puerto-Riqueña. Partes cuarto y quinta. Anales de la Soc. Esp. de Hist. Nat., XII, pp. 5-58 and 441-484, 1883. Also issued separately. 8°.

⁴ Eduard von Martens. Land- und Süsswasser-Schnecken von Portorico. Jahrbuch der Deutschen malakologischen Gesellschaft, IV, pp. 340-367. 1877.

⁵ Bulletin of the U. S. Geological Survey, No. 24. List of the marine mollusca from American localities between Cape Hatteras and Cape Roque, including the Bermudas. By William Healey Dall. Washington (the Survey), 1885. 336 pp. 8°.

references only, without any attempt at synonymy, were given for all citations of species supposed to be from the West Indies and adjacent shores. Considerable additions have since been made in the Blake Reports, the Proceedings of the United States National Museum, the Nautilus, and elsewhere. A supplement to the bulletin referred to, which should include the species cited from this region in the iconographies and the later issues of the periodicals mentioned, would be of immense service in helping to bring order out of the existing chaos.

Meanwhile all carefully determined lists of species from definite localities are of the utmost value, and only when a large number of these have been made can we expect to utilize the facts of inter-island or bathymetric distribution. The present report is intended to be of this character. Great care has been taken to identify the species correctly, while the question of ultimate nomenclature has in great part been left in abeyance. It is believed that the names assigned in every case belong to the species designated; but whether in all cases the designation used is the first which was ever applied to the species in question we have not attempted to determine, though in most cases it is believed to be so.

At the request of the authorities of the Commission, who hoped this report might be to some extent utilized as a handbook for the mollusks of the island, a brief description has been prepared by Mr. Simpson of the genera, subgenera, and species present in the collection. This has been a work of considerable magnitude and has occupied a great deal of time. The portion of this report relating to the land shells is entirely the work of Mr. Simpson, who has also had the task of compiling the list of species not represented in the Fish Commission collection. The work of the senior author has been chiefly devoted to the revision and verification of references, the confirmation of the identifications of the marine forms, the description of new marine species, and general editorial supervision.

Our intention has been to give a reference to the place where a species was originally described, and to a figure, without attempting elaborate synonymy. Several species hitherto unfigured, though described half a century ago, have now been figured from the author's types. Nearly all the new species are figured, and also a few forms not new or unfigured, but which are especially characteristic of this island, such as *Pleurodonte carocolla*.

It has been one of the surprises that a number of species originally described from deep water in the Blake Reports turned up in less than 100 fathoms in Mayaguez Harbor or other localities. It is evident that a thorough exploration with the mollusks especially in view, and systematically conducted dredgings, would add very materially to the list now presented.

In a discussion of the number of marine species normal to a fauna in a given zone of temperature¹ the conclusion was arrived at that, omitting strictly abyssal species, the average marine American tropical shell-fauna comprises about 581 species, and, as none of the faunas cited could be regarded as thoroughly known, it would doubtless be well within the mark to call it in a round number 600 species.

Porto Rico has a sufficient variety of coast, with rocks, flats, sheltered harbors, currents, and submarine declivities, to sustain a fully average representation of the

¹ Bulletin of the U. S. Geological Survey No. 84. Correlation Papers. Neocene, by William Healey Dall and Gilbert Dennison Harris. Washington (the Survey), 1892. 8°. pp. 349. See pp. 25-31.

marine fauna of the region of which it forms a part. The extraordinary richness of some spots, as in Mayaguez Harbor, where a few hauls of the dredge were taken, affords sufficient evidence that there is no unusual paucity of molluscan life about the island in proper situations. Hence we may reasonably expect the total census of shell-bearing mollusks, when carefully made, not to fall short of the average above indicated for such faunas. Excluding land and fresh-water shells, and nudibranchs, the total number of species and well-marked varieties included in the present report is 530. We may therefore suspect that about 70 marine species, actually existing somewhere about the island, remain to be collected and identified before our catalogue can be regarded as approximately complete.

The most interesting feature of what we may call the West Indian fauna as a whole is its extent beyond the limits which have been ordinarily assigned to it. Off the eastern coast of North America, outside of the narrow strip of colder water which makes its way close inshore nearly to the coast of Georgia, the West Indian fauna in the warm waters of the Gulf and equatorial currents extends northward over the vast area of the continental plateau and slope fully to the latitude of Cape Hatteras, as has been proved by the dredgings of the U. S. Fish Commission. On the south the species extend along the coast of Brazil to the estuary of the River La Plata, though in constantly diminishing numbers.

As on the Pacific shore the Panamic fauna stretches from Point Conception, Cal., south to the Bay of Guayaquil, so the companion fauna of the West Indies covers an even greater extent of coast, on which it may doubtless hereafter be divided into a certain number of subordinate faunulæ. The fact that the stretch of coast now sterilized by the fresh waters of the Amazonas has not acted as a barrier is tolerably good evidence that the existing distribution, in its main features, antedates the formation of this immense river system.

The number of new species among the marine forms collected by the U. S. Fish Commission and described in this report is 42. The total number of species accounted for in the present report may be tabulated as follows:

Cephalopoda	6
Pteropoda	8
Gastropoda:	
Tectibranchiata	21, of which 2 are new.
Nudibranchiata	1, of which 1 is new.
Pulmonata:	
Akteophila	5
Ditremata	2
Limnophila	14
Geophila	76
Orthodonta, marine	129, of which 15 are new.
Streptodonta, marine	115, of which 9 are new.
Tænioglossa:	
Extra marine	14
Fluviatile	2
Docoglossa	4
Rhipidoglossa:	
Marine	42, of which 1 is new.
Terrestrial	10
Amphineura	20, of which 1 is new.
Solenocoencha	13
Pelecypoda	171, of which 13 are new.
Total	653, of which 42 are new.

Using the common colloquial designations, there are 16 fresh-water shells, 102 land gastropods, and of marine mollusks, including the *Auriculacea* and *Truncatellidae*, 535 species identified in this report.

The absence of *Pulmonata petrophila* is noticeable, but they undoubtedly exist, and will hereafter be detected on the shores of Porto Rico. The number of Nudi-branches is probably large, but, as in many other regions, they have not been collected and are therefore unknown. To some extent the same is probably true of the Cephalopods and Tectibranchs, while the census of the land and fresh-water shells is probably nearly complete. In Gundlach's list 212 marine species were enumerated, to which the researches of the United States Fish Commission now add 323, considerably more than doubling the number reported from Porto Rico, but no additions are made to the land shells enumerated in Crosse's catalogue.

The West Indies and Bahamas form a great conchological region, which is richer in species of land snails than any other area of equal size on the globe. The entire archipelago is estimated to contain about 95,000 square miles, and within it there are known something like 2,000 species of land and fresh-water mollusks. Of these less than a hundred are fresh-water forms.

The island of Cuba, with an area of 41,655 square miles, has nearly 700 species of land and fresh-water mollusks; Haiti, with 28,249 square miles, and which is not at all thoroughly explored, has about 270 species; Jamaica, with some 4,207 square miles, has not less than 500 species, and Porto Rico, with an area of 3,550 square miles, contains about 130 species. This region has been divided into a number of subregions by Fischeer as follows: (1) Bahamas; (2) Cuba and the Isle of Pines; (3) Jamaica; (4) Haiti and Navassa; (5) Porto Rico, Vieques, St. Croix, St. Thomas, St. Johns, Tortola, Anguilla, St. Martin, St. Bartholomew, and Sombrero; (6) Guadeloupe, Martinique, Dominica, St. Christopher, Antigua; (7) St. Vincent, St. Lucia, Barbados, Grenada, Trinidad; (8) Windward Islands, Curaçao, Buen Ayre.¹

While each of the four great islands Cuba, Haiti, Porto Rico, and Jamaica, and the groups of smaller islands given above, forms to some extent a subfauna, there is evidently a close relation between the faunas of these four islands and their small island dependencies, as far south as the Anegada Channel, and of the Bahamas. The character of the mollusks found to the south of this channel, which carries through a depth of not less than 900 fathoms, is markedly different and more South American in its relations.²

The northern part of the Lesser Antillean Chain is of volcanic origin, and is probably much more recent than the Greater Antillean Islands. While a few stragglers may have passed from the northern islands to the southeastern ones, it is not unlikely that there has been no land connection across the Anegada Channel within the period of the existing West Indian land-mollusk fauna.

One of the remarkable features of this fauna is the large proportion of operculated land mollusks. There are within this area not less than 600 species of these, or 30 per cent of the entire fauna. In Cuba and Jamaica they form one-half of the land-snail fauna, but only about one-fourth of that of Porto Rico.

¹ Manuel de Conchyliologie, p. 269. These divisions are founded in part on the studies of Bland.

²See Distribution and Classification of the Land and Fresh-water Mollusks of the West Indian Region, Proc. U. S. National Museum, xvii, pp. 424 and 443, 1894.

Another striking feature of the land-snail fauna of the region is the presence of large, generally dark-colored and solid snails of the genus *Pleurodonte*. They are all ground snails; they are usually abundant, and are probably found in all the subregions of the West Indies region. Another great and characteristic group, which, like *Pleurodonte*, has its metropolis in this region, is the old genus *Cylindrella*, but which is now divided into several genera forming the family *Urocoptidae*.

The land-snail fauna of Porto Rico is not especially striking, though there are a few very fine large species of *Pleurodonte*, notably *P. carocolla*, *P. angulata*, *P. luquillensis*, and *P. marginella*. The latter, or a closely related form, is found also in the islands of Haiti and Cuba.

The solitary *Circinaria concolor*, if it be a genuine *Circinaria*, is a remarkable case of geographical distribution, all the other species being confined to the United States. Equally remarkable is the single *Clausilia bicanaliculata*, which is found only in Porto Rico, there being no other species of the genus known from the West Indian region. The genus has its metropolis in southeastern Europe, where both species and individuals are very abundant. It is represented by numerous species in Eastern Asia, by a few in the Malay Archipelago, the Madeira Islands, and along the west coast of South America.

There is a single species of *Stoastoma* found in Porto Rico, another comes from Haiti, and about 80 species are found in Jamaica. All the species are minute, the largest being less than 5 millimeters in diameter. *Pineria viequensis* comes from the island of Vieques, but has not, so far as we know, been reported from Porto Rico. Two other species belong to Cuba and the Isle of Pines, and another is found in the Lesser Antilles. The genus *Gwotis*, with four species, the animal being large, broad, and depressed, with a fragile sigaretiform shell, is confined to the island of Porto Rico. There are a number of species of *Helicina*, *Cistula*, *Choanopoma*, and *Chondropoma* in the island, but they have no remarkable characters. *Planorbis* and *Planorbula* are largely represented, there being no less than ten species of the two genera.

In his account of the land and fresh-water mollusk fauna of Haiti,¹ Crosse divides the island into four subregions, as follows: First, that of the Sierra de Monte Cristo on the north, extending from Monte Cristo on the west to the Bahia Escocesa on the east. South of this there is a wide subarid plain. Second, the region of the Sierra del Cibao, extending from the Mole St. Nicholas on the west to Cape Engano, the extreme eastern end of the island. There is a third subregion extending from Cape Dame Marie, the extreme southwest point of the island, eastward to beyond the center of it, and a fourth lying between the two western peninsulas. The subregion on the southwest peninsula has a land-snail fauna closely allied to that of Jamaica; that of the Sierra del Cibao, which reaches from the extreme northwestern point to the eastern end, has a fauna which is much like that of eastern Cuba, and also much like that of Porto Rico. It is in this region of the Sierra del Cibao that the large, dark Pleurodontes are found, which are closely related to forms of the same genus in eastern Cuba and to those of Porto Rico. In fact, *Pleurodonte marginella*, or very closely allied forms, are found in eastern Cuba, throughout the

¹ Journ. de Conch., XXXIX, 1891, p. 195. See also the same, XI, 1892, p. 54.

Cibao region of Haiti and Porto Rico. *Cerion striatella*, *C. microstoma*, *Pseudobalea dominicensis*, *Guppya gundlachi*, and *Pupa pellucida* have a similar distribution, and the present distribution of these species would seem to be a hint at a period within their existence when there was a continuous land connection between the three islands.

The form of the catalogue needs no special explanation. It may be remarked that when there is no reference to any authority for the presence of a species in the Porto Rican fauna, it may be understood to have been collected by the United States Fish Commission.

For convenience of reference, a check list of the species included in the report follows the main body of the text, together with a list of the Fish Commission stations at which mollusks were collected.

We are under obligations to Mr. W. E. Hoyle, of the Owens College, Manchester, England, for examination of a species of *Octopus*, a group upon which he is regarded as an authority; also to Dr. Rudolph Bergh, of Copenhagen, Denmark, for the determination of a nudibranch.

U. S. NATIONAL MUSEUM, DIVISION OF MOLLUSKS,
January, 1901.

Class CEPHALOPODA.

Order DIBRANCHIATA.

Suborder OCTOPODA.

Family OCTOPODIDÆ.

Genus OCTOPUS Lamarck, 1799.

Animal with a rounded body; the eight long arms provided on their inner surfaces with two rows of suckers. The third right arm of the male is altered for sexual purposes. Type, *O. vulgaris* Lamarck.

Octopus americanus d'Orbigny.

Octopus vulgaris Lamarck, var. *americanus* d'Orbigny, in Sagra, Moll. Cubana, I, p. 14, pl. I, 1841.

One small specimen is in the Fish Commission collection, taken at Ensenada Honda, Culebra, but the arms are so badly mutilated that it can not be identified with certainty.

Octopus granulatus Lamarck.

Octopus granulatus Lam., Mém. Soc. Hist. Nat. Paris, I, p. 20, 1799.

Body slightly flattened, with a median ventral groove; mantle opening extending nearly half way round the body; head a little narrower than the body; eyes prominent; arms rather short, stout; the first three suckers in a nearly straight row; surface covered with small warts, violet brown; under a lens it is seen to be finely covered with dots. Our specimens are so contracted by the alcohol that measurements can not be given.

Porto Rico, no special locality, three fine specimens; San Juan Harbor, one specimen; Ensenada Honda, Culebra, several young specimens.

Octopus tehuelchus d'Orbigny.

Octopus tehuelchus d'Orbigny, Voy. Am. Mérid., p. 27, pl. I, figs. 6, 7, 1835.

Body slightly flattened and having a well-marked ventral groove, smooth; arms elongated, the upper pair shorter; umbrella extending one-fourth the length of the arms; siphon rather small. Color brownish, finely dotted. Entire length of largest specimen, 90 mm.

Ensenada Honda, Culebra, six specimens; Ponce, Porto Rico, one specimen.

The following form does not seem to agree with anything that has been described, and is perhaps new.

Octopus tuberculatus Blainville, junior?

? *Octopus tuberculatus* Blainville, Diet. Sci. Nat., XLIII, p. 187, 1826.

Body slightly flattened, with a well-marked median ventral groove; mantle opening extending about two-fifths of the way around the body; siphon rather long, nearly smooth, not attached along the base of the arms; head a little narrower than the body; eyes prominent; arms long, nearly equal in length; umbrella small, more developed at the sides than above; suckers small, prominent, radially ridged, first four in a slightly zigzag line; hectocotylized arm ending in a long, roughened spur; surface marked with somewhat scattered, small pustules and wrinkles, and having a few curious warty processes on the back of body and head; some of these are finger-like and two, situated close to the eyes and partly between them, are branched.

Color pale violet above, the whole surface sprinkled with minute dots; there are two eye-like circular dark spots, one on each lower side of the head, which appear to be permanent.

Length of body, 35 mm.; of arms, 60 mm.

St. Thomas, one specimen.

This small *Octopus* presented a very special appearance, owing to the two sharply defined dark spots on the head; and, suspecting that it might be new, it was submitted to Mr. W. E. Hoyle, of Manchester, England, an authority on these animals, for examination. He kindly reports that the specimen is young and may perhaps be the immature form of *O. tuberculatus* Blainville, but that it appears inadvisable to describe it as new in the absence of full-grown specimens.

O. tuberculatus has been recorded from the Antilles and, if found at St. Thomas, may probably also inhabit Porto Rico.

Suborder SEPIOPHORA.

Family LOLIGINIDÆ.

Genus LOLIGO Lamarck, 1799.

Loligo gahi d'Orbigny.

Loligo gahi d'Orbigny, Voy. Amér. Mérid., p. 60, pl. III, figs. 1, 2, 1835.

Four specimens of what are probably the above were taken in Mayaguez Harbor, Porto Rico, but they are not in condition to be described.

Family SPIRULIDÆ.

Genus SPIRULA Lamarck, 1801.

Spirula australis (Lamarck) Pelseneer. Plate 56, fig. 4.

Spirula australis Lam., An. sans. Vert, VII, p. 600, 1822; Eneye. Méth. pl. 465, fig. 5, a, b.

Several imperfect shells of the above were collected at Hucares, Porto Rico, and Ensenada Honda, Culebra. The species has an almost universal distribution in warm seas, and millions of shells are thrown up on the seashore. Few animals have ever been obtained, and these are for the most part in an imperfect condition.

There are several species of *Spirula* which can not be discriminated by the shells alone. In the paper by Huxley and Pelseneer on the *Spirula* of the *Challenger* voyage the name *australis* given by Lamarck is fixed on the Antillean species. Some additional data relating to this form are printed in Science, n. s., vol. III, No. 59, Feb. 14, 1896, pp. 243-245, from a specimen taken from the mouth of a fish trawled by the *Albatross* in the Gulf of Mexico, in 324 fathoms.

Class GASTROPODA.

Subclass ANISOPLEURA.

(EUTHYNEURA).

Order PTEROPODA.

Suborder THECOSOMATA.

Family CAVOLINIIDÆ.

Genus **CLEODORA** Péron & Lesueur, 1810.

Subgenus CRESEIS (Rang, 1828) Sowerby, 1833.

Shell elongate-conical, straight, with a slightly gyrate sulcus extending from the apex to the aperture where it is produced as a point projecting above the oblique margin of the aperture dorsally.

Type, *Creseis spinifera* Rang = *C. subula* Quoy & Gaimard.

Creseis subula Quoy & Gaimard. Plate 57, fig. 1.

Cleodora subula Quoy & Gaimard, Ann. Sci. Nat., x, p. 233, pl. VIII, D, figs. 1-3, 1827.

Styliola subula Pelseneer, Challenger Pteropods, II, p. 56, 1888.

The genus *Creseis* Rang was at first heterogeneous; one of the species was already the type of the genus *Vaginella* Daudin; the others comprised species of *Cadulus*, *Creseis*, and *Styliola*. In his Genera (pt. XXXIX, Pteropoda, 1833), Sowerby figured *C. subula* as an example of the genus *Creseis*, and in his Manual (1839, and 2d ed., 1842) again cites it as a type and specifies among the characters of the genus the dorsal sulcus. Finally Gray (Fig. Moll. An., IV, p. 122, 1850) defined the genus in harmony with the preceding, and at the same time defined *Styliola* (as in the original diagnosis of Blainville) as including those species with a cylindrical section and simple circular aperture. It will therefore be seen that there is no good ground for the view taken by Fol and Pelseneer for referring the present species to *Styliola*. The sulcus is reflected by a ridge on the interior of the shell, and the cross section of the shell is "heart" shaped. As the original description of *Styliola* states that the cross section of that genus is circular, the type can not have been a specimen of this species.

The present species is abundant in West Indian waters, and four specimens were obtained at Mayaguez, Porto Rico, by the Fish Commission party.

Genus **STYLIOLA** (Lesueur, 1826) Gray, 1850.

Shell elongate-conical, straight or curved, with a smooth surface, circular section and aperture; the plane of the simple aperture is at right angles to the longitudinal axis and the margin is not oblique, angular, or sulcate.

Type, *Styliola recta* Lesueur.

Styliola acicula Rang.

Cleodora (Creseis) acicula Rang, Ann. des Sci. Nat., XIII, p. 318, pl. XVII, fig. 6, 1828.

Styliola recta (Lesueur, 1826) *vide* Gray, *op. cit.*, 1850.

Shell thin, aciculate, elongated, with a polished surface; often slightly curved or flexuous; with the apical termination slightly bulbous; transparent or whitish.

Length, 10; max. diam. (at the aperture), 0.75 mm.

Mayaguez, many dead specimens.

The specimens agree with others, from the collection of Rang, in the National Museum. The slenderness of the specimens is variable, some being relatively stouter than others.

Genus **CUVIERINA** Boas, 1886.

Shells straight, subtransparent, subcylindrical, the apex sharp in the young but falling off in the adult state; aperture simple, slightly compressed.

Cuvierina columnella Rang.

Cuvierina columnella Rang, Ann. Sci. Nat., XIII, p. 323, pl. XLV, figs. 1-8, 1828.

Adult shell somewhat vase-shaped; aperture compressed a little and subtriangular, slightly expanded at the sides, upper end of the shell decollated, convex, showing the scar of the elongated pointed spire. Color milky white.

Length 10; greatest diameter, 3 mm.

Mayaguez, Porto Rico, one dead specimen.

Genus CAVOLINA Abildgaard, 1791.

Shell inflated, subglobular, thin; ventral face swollen; dorsal face longer than the ventral, drawn out in front; aperture compressed and continued as a fissure around each side of the shell.

Section DIACRIA Gray, 1842.**Cavolina trispinosa** Lesueur

Hyalva trispinosa Lesueur, Blainville Dict. Sci. Nat., XXII, p. 82, 1821.

Hyalva trispinosa Sowerby, Conch. Icon., XX, 1878, pl. III, fig. 15.

Shell compressed, with three strong, straight spines, one on each side at the posterior termination of the fissure, and a longer one behind, longitudinally ribbed on the ventral face; dorsal lip slightly recurved, ventral lip strongly recurved. Color whitish, nearly transparent, smoky tinted.

Length, 10; greatest width, 7 mm.

Off Aguadilla, one dead specimen.

Section CAVOLINA s. s.**Cavolina longirostris** Lesueur.

Hyalva longirostris Lesueur, Blainville Dict. Sci. Nat., XXII, p. 81, 1821.

Hyalva longirostris Sowerby, Conch. Icon., XX, pl. II, fig. 12, 1878.

Upper face of shell nearly hemispherical, marked with delicate concentric ridges; dorsal face longitudinally ribbed, prolonged in front into a long, somewhat folded, depressed beak; lateral spines compressed, central spine short, truncated.

Length, 4 mm.

Mayaguez, Porto Rico, many dead shells.

Cavolina uncinata Rang.

Hyalva uncinata Rang, d'Orbigny, Voy. Am. Mérid., v, p. 93, pl. v, figs. 11-15, 1836.

Shell much swollen ventrally, the surface delicately and regularly reticulated, with fine, concentric ridges in front; dorsal face with three low, radiating ribs, turned downward and nearly evenly rounded at the aperture; lateral spines compressed and curved slightly backward, central spine rather short, stout, and curved upward. Color pale amber.

Length, 9; breadth, 6 mm.

Mayaguez, six dead shells.

Cavolina inflexa Lesueur.

Hyalva inflexa Lesueur, Nouv. Bull. Soc. Philom., III, p. 285, pl. 5, fig. 3, 1813.

Shell elongated, compressed; ventral face but slightly inflated; ventral lip rounded, scarcely produced in the center, marked off by a deep sulcus; dorsal face faintly three-ribbed; dorsal lip nearly plain, somewhat produced in the center; lateral spines small, turned backward a little; central spine long and stout, curved upward.

Length, 5 mm.

Mayaguez Harbor, one dead shell.

Cavolina gibbosa Rang.

Hyalva gibbosa Rang in d'Orbigny, Voy. Am. MÉR., v, p. 95, pl. v, figs. 16-20, 1836.

Shell moderately inflated, ventral face produced in front into a high, almost sharp ridge, which is strongly, concentrically striated, the rest of its surface finely reticulated, its lip but slightly produced; dorsal face convex, nearly smooth or having about seven faint, longitudinal ridges; upper lip moderate or somewhat produced, turned sharply downward; lateral spines very short, rather near together, central spine short, stout, slightly curved upward.

Length, 9; breadth, 5; breadth across lateral spines, 4 mm.

Mayaguez Harbor, one broken specimen.

This is the *Hyalva flava* of d'Orbigny, 1836, and *H. gegenbauri* Pfeffer, 1880.

Order OPISTHOBRANCHIATA.

Suborder TECTIBRANCHIATA.

(Cephalaspidea).

Family ACTÆONIDÆ.

Genus ACTÆON Montfort, 1810.

Shell oval, spirally striate, with conical spire and channeled suture. Aperture long, narrow above, broadly rounded below; outer lip simple and acute; columella twisted into a strong spiral fold. Parietal wall without folds or teeth.

Type, *A. tornatilis* Linnæus.

Actæon punctostriatus C. B. Adams.

Tornatella punctostriata C. B. Adams, Boston Journ. Nat. Hist., III, p. 323, pl. III, fig. 9, 1840.

Shell small, elliptical; whorls about 4, the last showing revolving, punctate striæ on its basal half; the central part of the whorl is smooth, and there are sometimes a few subsutural lines; nucleus somewhat depressed, suture deep, bordered externally by revolving grooves, which show through on the inner side of the outer lip. There is a good deal of variation in the color, being sometimes variegated, nebulously banded, or white.

Length, 3 to 6 mm.

Mayaguez, Porto Rico, eight dead specimens.

Family RINGICULIDÆ.

Genus RINGICULA Deshayes, 1838.

Shell small, solid, nearly white, ovate globose with conical spire; aperture conspicuously notched and channeled at base; outer lip thickened, often dentate within, callous outside; columellar margin callous, with two to four strong entering folds.

Type, *R. ringens* Lamarck.

Ringicula semistriata d'Orbigny. Plate 57, fig. 11.

Ringicula semistriata d'Orbigny, Moll. Cubana, II, p. 103, pl. XXI, figs. 17-19, 1845.

Shell ovate-conic, solid, whitish, smooth above and having revolving striæ below; suture impressed, columella strongly biplicate, and there is a callous tooth on the parietal wall; outer lip greatly thickened, subtuberculate in the middle.

Height, 2; diameter, 1 mm.

Mayaguez, Porto Rico, two dead shells.

Family TORNATINIDÆ.

Genus TORNATINA A. Adams, 1850.

Shell cylindrical, with a conic or flattened spire, the apex projecting and mammillar, sinistral, tilted so that its axis lies at an angle of about 90 degrees with that of the shell. Suture channeled; aperture long, narrow above, dilated and rounded below; outer lip arched forward, retreating at the suture and base, columella with one spiral fold at its junction with the whorl.

Type, *T. voluta* Quoy & Gaimard.

Tornatina bullata Kiener. Plate 57, fig. 9.

Tornatella bullata Kiener, Sp. et Icon. Coq. Viv., p. 5, pl. I, fig. 4.

Shell cylindrical, rather solid, white; suture deeply channeled; body whorl having very minute, wavy, revolving sculpture; aperture long and narrow; outer lip advanced in the middle; columellar plication rather strong.

Length, 7; diameter, 3 mm.

Mayaguez, Porto Rico, one shell; Vieques, a single badly worn specimen. Both seem to be fully adult, but are probably a small variety. The revolving sculpture is distinct on the best preserved specimen.

Tornatina candei d'Orbigny. Plate 57, fig. 7.

Bulla candei d'Orbigny, Moll. Cubana, I, p. 128, pl. IV bis, figs. 1-4, 1842.

Shell small, subcylindrical, widest at the shoulder; spire low conical; surface smooth except for faint growth lines, shining, milky white. Outer lip advanced in the middle; columellar fold moderate. Length, 2.5; diameter, 1.5 mm.

Mayaguez, Porto Rico, five worn specimens.

Genus VOLVULA A. Adams, 1850.

Shell subcylindrical or long oval, tapering at both ends, body whorl produced into a beak or spine above. Spire concealed; aperture as long as shell, narrow, produced above, columella with a slight fold. Type, *V. acuminata* Bruguière.

Volvula oxytata Bush. Plate 57, fig. 8.

Volvula oxytata Bush, Trans. Conn. Acad. Sci., VI, p. 468, pl. LV, fig. 12, 1885.

Shell thin, cylindrical, with a sharp, spike-like apex and a tapering, rounded anterior end, shining, with four or five very fine, revolving, punctured lines at each end, and exceedingly faint microscopic striae on intervening surface. Inner lip slightly reflected anteriorly over an umbilical chink.

Length, 2.5; diameter, 1 mm.

Mayaguez, Porto Rico, three shells.

Volvula acuta d'Orbigny.

Bulla acuta d'Orbigny, Moll. Cubana, I, p. 126, pl. IV, figs. 17-20, 1842.

Shell obovate, being widest near the spire, attenuated above and below, thin, white, with revolving striae at the base, not perforated; columella scarcely flexuous.

Length, 2.5; diameter, 1 mm.

Mayaguez, Porto Rico, three worn shells.

Genus RETUSA Brown, 1827.

Shell small subcylindrical, with raised flat or sunken spire; aperture as long or nearly as long as the shell, narrow above, dilated below. Columella with or without a small fold.

Retusa cœlata Bush.

Cylichna cœlata Bush, Trans. Conn. Acad. Sci., VI, p. 468, pl. XLV, fig. 15, 1885.

Shell small, somewhat conical, truncated above; spire concealed in a deep pervious pit, within which one or two whorls are seen; the upper end of the shell is sculptured with beautiful, flexuous ribs which fade out a short distance down the body whorl; the basal part of the shell is rounded and sculptured with a few revolving, punctate lines; aperture narrow, suddenly becoming wider below, slightly drawn out at the base; columella faintly truncate below, with a minute chink behind it.

Length, 3; diameter, 1.5 mm.

Mayaguez, Porto Rico, two slightly worn specimens.

Family BULLIDÆ.

Genus BULLA Linnæus, 1758.

Shell elliptical or ovate, compactly involute, generally solid and with a mottled color pattern; spire sunken, umbilicated. Aperture as long as shell, rising above vertex, narrow above, expanded below; lip simple, columella short and concave. Type, *B. ampulla* Linnæus.

Bulla amygdala Dillwyn.

Bulla amygdalus Dillwyn, Descr. Cat. Rec. Sh., I, p. 480, 1817.

Bulla amygdala Pilsbry, Man., XV, p. 329, pl. XXXVIII, figs. 49, 50, 62-65, 1893.

Shell oblong, narrower toward the vertex, solid, rather dull, clouded and mottled with purplish on a pale ground. Surface generally without microscopic revolving striae, but having a few spaced lines at the base, and rarely a few at the vertex; umbilicus deep, striated within. Outer lip thick, callous where it rises from the vertex, its outer part straight. Columella arcuate, with a very heavy reflected callus, which has a chink behind it.

Length, 40; diameter, 23 mm.

Arroyo; San Geronimo; Boquero Bay; Agnadilla; Guanica; Porto Real; Ponce, Porto Rico.

The distinctions between this form and *B. striata* Brug. of the Mediterranean region are faint and somewhat inconstant. As a rule, *amygdala* is more inflated and has a smaller umbilicus at the vertex than *striata*, but this is not always the case. The *striata* is more apt to have revolving lines at the vertex and microscopic spiral lines on the body than *amygdala*, but specimens of the former occasionally exhibit these characters.

Family AKERATIDÆ.

Genus *HAMINEA* Leach, 1847.

Shell thin, fragile, unicolored, yellowish or greenish, globose, ovate or subcylindric; vertex concave, imperforate or minutely perforate; aperture as long as the shell, narrow above, wider below; umella concave, thin, showing a slight fold where it joins the body of the shell.

Type, *Bulla hydatis* Linnaeus

Haminea elegans Gray.

Bulla elegans Gray, Ann. of Philos., new ser., IX, p. 408, 1825.

Bulla guildingi Swainson, Mal., pp. 251, 360, fig. 46, 1840.

Shell roundly oval or subcylindrical; surface with irregular growth lines, and showing plainly close, spiral striation, which is usually straight but sometimes a little wavy; vertex concave, narrowly and deeply perforated, the outer lip rising from the left side of the perforation; outer lip well arched, rounded above and below; columella deeply arcuate; parietal callus thin, encircling the perforation at the vertex. Color brownish or greenish yellow, lighter above and below.

Length, 19; diameter, 13 mm.

One broken specimen in fresh condition was taken at Mayaguez Harbor, Porto Rico.

Haminea succinea Conrad.

Bulla succinea Conrad, Proc. Acad. Nat. Sci. Phila., III, p. 26, pl. 1, fig. 5, 1846.

Shell thin, horny, cylindrical, somewhat wider at the base; vertex truncated, narrowly, deeply impressed, minutely perforated, the lip inserted on right side of perforation; surface densely, evenly, spirally striated throughout, striae slightly wavy; aperture long, narrow and parallel sided above, wider below; columella very concave, folded above, the lip reflexed and appressed to the umbilical region.

Length, 10; diameter, 6 mm.

A single broken specimen was collected at Culebra Island, which seems to be this.

Family HYDATINIDÆ.

Genus *HYDATINA* Schumacher, 1817.

Hydatina physis Linnaeus.

Bulla physis Linnaeus, Syst. Nat., ed. X, p. 727, 1758.

Hydatina physis Pilsbry, Man., XV, p. 387, pl. XLV, figs. 14-17, 1893.

Porto Rico (Gundlach); West Indies; west Africa; central Pacific; Indian Ocean, etc.

Genus *MICROMELO* Pilsbry, 1894.

Micromelo undata Bruguière.

Bulla undata Bruguière, Enc. Meth., I, p. 380, 1791.

Micromelo undata Pilsbry, Man., XV, p. 392, pl. LIX, figs. 20-24, 1893.

Porto Rico (Gundlach); West Indies; Honduras (Simpson).

Family SCAPHANDRIDÆ.

Genus *ATYS* Montfort, 1810.

Shell solid, involute, oval, usually with spiral striae at both ends; aperture projecting beyond the vertex and base; columella plicate or concave, generally somewhat reflexed over the small umbilicus.

Type, *A. cymbulus* Montfort.

Subgenus *ATYS* s. s.***Atys guildinii* Sowerby.***Atys guildinii* Sowerby, Conch. Icon., XVII, pl. v, fig. 26, 1869.

Shell inflated, thin, dull grayish white, attenuated into a rounded ridge above, where it is perforated or closed, umbilicated below; wrinkled with growth lines and spirally striate, especially at ends, where it is sometimes reticulated; outer lip decidedly elevated above; columella thin, slightly folded.

Length, 8; diameter, 5 mm.

Mayaguez Harbor, Porto Rico, one specimen; Ensenada Honda, Culebra, one shell.

Atys sandersoni* Dall.Atys sandersoni* Dall, Bull. Mus. Comp. Zool., IX, p. 99, 1881; Blake Rep., II, p. 54, pl. XVII, fig. 7, 1889.

Shell thin, polished, translucent white, with the aperture longer than the axis of the shell; growth lines faint; spiral sculpture consisting of about a dozen lines at each end of the shell, becoming faint or obsolete at center; vertex having a deep pit, from the center of which the margin of outer lip arises; columella nearly straight, reflected over the umbilicus and closing it, or only leaving a chink.

Length, 4; diameter, 2 mm.

Two young specimens were obtained in Mayaguez Harbor, Porto Rico.

(Anaspidea.)

Tectibranchs without a fleshy head shield.

Family APLYSIIDÆ.

Animal not protected by a shell, the neck and head narrower than the body; mouth a vertical fissure; two tentacular folded lobes above the head; two elevated rhinophores behind these, in front of which are the small eyes. Pleuropodia curved over the back forming two lobes inclosing mantle and gill. Genital orifice within the dorsal slit; shell nearly or quite covered by the mantle, a mere concave plate.

Subfamily APLYSINÆ.**Genus TETHYS Linnæus, 1758.**

Pleuropodia arising in front of the middle of the animal's length, free, used as swimming lobes, mantle nearly covering the gill, having a median tube or orifice produced behind in a lobe or lobes forming an excurrent siphon; foot well developed; shell thin, with pointed, small apex, and having a concave posterior sinus.

It is better known under the generic name of *Aplysia*.

Tethys protea* Rang.Aplysia protea* Rang, Hist. Nat. Apl., p. 56, pl. x, figs. 1-3, 1828.

Back much swollen; swimming lobes large; neck slender; tail pointed; foot large; surface generally covered with scattered, ring-shaped, dark markings.

Length, from 4 to 16 cm.

Ensenada Honda, Culebra Island.; Ponce Reefs; San Antonio Bridge, San Juan; Mayaguez; reefs at Guanica, Porto Rico; Caballo Blanco Reef, Vieques.

This form varies greatly in color, and among our numerous specimens as to size, some of which are probably young. In certain specimens the rings of color are heavy and distinct; in others there is scarcely a tint of the dark rings and there is every variation between. The inner sides of the pleuropodia and the mantle are variously marked with dark patterns of color.

***Tethys cervina*, n. sp. Plate 56, fig. 2.**

Body elongated, flabby; mouth encircled by thick lips; tentacles short; eyes inserted in front of the tentacles. Swimming lobes thick, united behind at some distance in front of the hinder extremity; mantle orifice minute; mantle ending behind in a small fold; foot narrow, nearly smooth.

Colors: The body is a lurid gray overlaid with reticulations and blotches of darker color. It also has scattered, small, nearly round, smoky brown spots throughout its surface. The foot is smoky

brown, lighter colored than the spots. The inner edges of the swimming lobes are beautifully and distinctly maculate, with alternating light and dark patches. The mantle is colored like the body, but the dark spots are wanting, and the dark reticulations are somewhat radiating. Length, 7 cm.

Shell with a rather strong layer of lime, elliptical in outline; posterior sinus moderate. Length of shell, 30; breadth, 19 mm.

Mayaguez, Porto Rico.

Nine specimens in alcohol were obtained by the expedition, all probably young. The pattern of coloring is quite constant in all, though in some specimens there are but few of the dark, smoky, round spots. As the description is from alcoholic material only, it is impossible to tell what the colors may be in a living state. Most of the specimens are badly shrunken or drawn up by the alcohol.

Tethys parvula (Guilding) Mörch. Plate 53, fig. 14.

Aplysia parvula (Guilding MS.) Mörch, Journ. de Conch., 1863, p. 22.

Tethys parvula Pilsbry, Man., xvi, p. 83, pl. xxxvii, figs. 23-25, 1895.

Body higher than wide; mouth placed well forward, with slightly wrinkled, thickened lips; rhinophores large, folded; tentacles rather small; eyes not seen; foot elongated, extending to a point behind, its border crimped; swimming lobes wide and almost auricled in front, narrower and united behind, closely inclosing the very large shell; mantle having a large oval opening which exhibits the shell. Excurrent siphon lateral, opening at posterior sinus of shell. Color, a dirty greenish white; border of foot, pleuropodia, and mantle opening intense black, as are the tips of the rhinophores.

Length of animal, 20; diameter of mantle opening, 5; length of opening, 6 mm.

Shell very large, solid, concave, covered with a rather thick epidermis, which peels on exposure to air; posterior sinus moderate, overhung by the epidermis; apex much incurved, callous, but having no recurved process. Interior calcareous, slightly iridescent, pinkish white, externally straw colored.

Length, 13; breadth, 9; height, 5 mm. Length of sinus, 5 mm.

Caballo Blanco Reef, Vieques, one specimen.

This specimen is badly contracted by the alcohol, and is not in good condition to study. The species is remarkable for the great size and solidity of its shell, which is deeply concave and covers the whole animal.

Subfamily DOLABRIFERINÆ.

Genus DOLABRIFERA Gray, 1847.

Animal ovate-oblong or sack-like, tapering toward the head. Eyes as in *Tethys*. Pleuropodial lobes located behind the middle of the body, scarcely mobile, inclosing a large gill cavity. Mantle small; foot broad. Shell small, nonspiral, solid, and calcareous.

Type, *D. dolabrifera* Cuvier.

?*Dolabrifera ascifera* Rang. Plate 56, fig. 8.

Aplysia (Dolabella) ascifera Rang, Hist. Nat. Aplys., p. 51, pl. iv, figs. 7-9, 1828.

Body (in alcoholic specimens) elongate ovate, swollen behind, more or less covered with warts; foot very large, of the same dimensions as the body and bordered by an expanded, wavy edge; rhinophores and tentacles small, shrunken; eyes minute, between the rhinophores and tentacles, a little nearer to the latter; dorsal slit in the posterior third of the body, to the right of the middle, about one-fourth the length of the body, buttonhole-like at its two ends. Right pleuropodial lobe overlapping the left, both lobes small. Length, 50 mm.

Shell somewhat narrowed, the apex much callous with strong growth lines outside, dead white, within callous and shining, quite solid. Length, 14; breadth, 7 mm.

Reefs, Guanica; Ponce, Puerto Rico; Ensenada Honda, Culebra; Caballo Blanco Reef, Vieques.

All our numerous specimens, some of which are no doubt young, are contracted by the alcohol and are much shorter than the length given by Pilsbry in the monograph of the *Aplysiidae*. The shells, however, are longer than the measurement given by him, but have the general form of those figured by him for *D. ascifera*, though they vary considerably, some of them in the direction of *D. swiftii* Pilsbry. They are all solid and milky white outside.

?*Dolabrifera sowerbyi* Guilding.

Dolabrifera sowerbyi Guilding, Conch. Icon., xvi, pl. I, fig. 2, 1868.

Body in alcohol elongated, pear shaped, much swollen behind; foot wide, having a narrow, sharp border at its junction with body; head small; rhinophores and tentacles short, shrunken and wrinkled;

eyes about midway between them; mouth and lips small; dorsal furrow distinct in front, closed near dorsal slit, which is about one-third the length of the animal, situated behind the middle of the body, and not lateral; anus projecting as a large tube at the posterior end of slit; pleuropodia scarcely developed, of equal size, the right not projecting over the left. Surface pale lurid brown, covered with small mammilke and faint sharp pustules. Length, 50; diameter, 25; height, 18 mm.

Shell elongated, solid, narrow at and behind the apex, somewhat contorted, a concave depression running down the back, whitish and dull without, polished within. Length, 13; breadth, 5 mm.

Hucares, Porto Rico, one specimen.

Only the shell of *D. sowerbyi* has been described, and nothing is known of the soft parts of the species. The shell of this specimen agrees pretty well with Sowerby's figures.

Genus NOTARCHUS Cuvier, 1817.

Ovate or fusiform, swollen in the middle. Pleuropodia united behind over a large gill cavity; dorsal slit subcentral, short. Foot narrower than the body, acute behind. Shell minute or wanting.

Type *N. indicus* Schweigger.

Notarchus pleii Rang.

Aplysia pleii Rang, Hist. Nat. Aplys., p. 70, pl. XXI, 1828.

Body long ovate, very soft and flabby. Branchial cavity large, a little in front of the middle of the body; foot long, projecting behind, moderately wide. Surface more or less covered with filaments and variously lobed, ragged processes.

Length of animal, 10 to 12 cm.; of branchial cavity, 35 mm.

Boqueron Bay, Porto Rico, many specimens.

Specimens in alcohol are most disagreeable, shapeless, flabby objects, of a dirty, bottle green. There is quite a little variation in the development of the filaments and processes on the body, some specimens being nearly covered with them and in others they are almost wanting.

(Notaspidea.)

Tectibranchs having the dorsal surface protected by a large shield.

Family PLEUROBRANCHIDÆ.

Gill plume arising about the middle of the right side and extending backward; dorsal shield fleshy; animal shell-less or having a small Haliotiform shell.

Genus PLEUROBRANCHUS Cuvier, 1804.

Body oval; mantle about the size of the foot, free and projecting at the edges all around; rhinophores contiguous, inserted below the mantle. Gill bipinnate. Shell auriculate.

Type, *P. peronii* Cuvier.

Pleurobranchus lacteus, n. sp. Plate 56, fig. 6.

Body elliptical; mantle soft, inflated, faintly pustulous and wrinkled, semitransparent; foot smaller than the mantle, emarginate in front, having a wrinkled undulate border; rhinophores elongated, compressed, drooping and suddenly curved upward near the ends, extending in front of the veil and mouth; veil truncated in front, with a small projecting lobe at each corner; mouth round, with thick lips, extending as far forward as the veil; male and female orifices at the summit of a double mammilla situated just at the front of the gill plume; gill plume attached about midway back on the body, attached the front three-fifths of its length, and having about 20 pairs of plumelets; anus just above the hinder point of attachment of the gill. Length, 22; breadth, 15 mm.

Shell oblong, depressed, thin but solid, having about 2 whorls; spire full, mammillary; suture well marked and ending in an emargination behind; growth lines developed into well-marked irregular ridges; surface covered with a thin, iridescent, whitish, or straw-colored epidermis. Length of shell, 5.5; breadth, 3 mm.

Animal and shell milky white.

Ensenada Honda, Culebra, five specimens.

This species does not at all agree with any of the three forms described by Mörch from the West Indies, and is probably new.

Order NUDIBRANCHIATA.

DORIDIDÆ CRYPTOBRANCHIATÆ.

Genus **GEITODORIS** Bergh, 1892.*Geitodoris mollina* Bergh MS.

A single specimen of an undetermined nudibranch was obtained at Ensenada Honda, Culebra. A line from Dr. R. Bergh, to whom it was submitted, denominates it as above, but the description had not come to hand at date of printing.

Order PULMONATA.

Suborder **BASOMMATOPHORA.**Superfamily **AKTEOPHILA.**Family **AURICULIDÆ.**

Shell spiral, with reversed nucleus, covered with an epidermis, solid; spire more or less elevated; whorls flattened; aperture elongated, contracted by columellar teeth, often having teeth within the outer lip; columella generally twisted.

Genus **MELAMPUS** Montfort, 1810.

Shell oval conoidal; aperture elongated, narrow; columellar lip with several dentiform plications; columella plicate; outer lip sharp, with revolving ridges within; foot truncated in front, bifid behind. Type *Melampus coniformis* Bruguière = *Voluta coffea* Linn.

Subgenus **MELAMPUS** s. s.**Melampus coffeus** Linnaeus. Plate 53, fig. 13.*Bulla coffea* Linnaeus, Syst. Nat., ed. x, p. 729, 1758.*Melampus coffea* Binney, Bost. Journ. Nat. Hist., VII, p. 162, pl. LXXV, fig. 21, 25.

Shell conoidal, with a tolerably well-defined shoulder on last whorl above, which is ornamented with a narrow light-colored band; below this are generally two narrow, revolving, light bands, the general surface being lead color or lurid brownish; umbilical region sometimes rimate, at others entirely closed; on the columella is a single revolving lamina, and higher up on the parietal wall a double one; inner edge of outer lip brownish; within this are numerous elongated white teeth or lire.

Length, 18; diameter, 12 mm.

San Juan; Catona, Porto Rico. Widely distributed in the West Indies, Florida, etc.

The light-colored revolving bands are sometimes very faint and occasionally are absent. The double parietal tooth is a tolerably constant character.

Melampus flavus (Gmelin?) Binney. Plate 54, fig. 9.*?Voluta flava* Gmelin, Syst. Nat., p. 3436, 1792.*Melampus flavus* Binney, Bost. Journ. Nat. Hist., VII, p. 166, fig., p. 167, 1863.*?Melampus gundlachi* Pilsbry, Trans. Conn. Acad., x, p. 504, 1900.

Shell conoidal, brownish to chestnut, unicolorous, or with two, sometimes three, revolving, light bands, the upper on the well-marked shoulder; the base of the shell is sometimes white; there is a single revolving subvertical lamina on the columella, and generally another on the parietal wall; the lire inside the outer lip are white and irregular.

Length, 14; diameter, 9 mm.

San Juan; Ensenada Honda, Culebra Island; also West Indies; Florida, etc.

This and the preceding species vary much in form, color, and other characters, and there are specimens which can only be named with difficulty. Generally the *M. flavus* has a single lamina on the parietal wall, while that of *coffeus* is double, but this character is not absolutely constant. The former has generally irregular lire inside the outer lip. Occasionally *M. coffeus* has a white base. The nearly vertical columellar fold is tolerably constant and characteristic.

Genus *TRALIA* Gray, 1840.

Shell elongated, with a plait on the columella and two on the body whorl; outer lip thickened, not lirate; foot entire, elongated, simple behind.

Subgenus *TRALIA* s. s.*Tralia pusilla* Gmelin. Plate 54, fig. 13.

Voluta pusilla Gmelin, Syst. Nat., p. 3436, 1792.

Tralia pusilla Dall, Proc. U. S. Nat. Mus. 1885, p. 276, pl. xviii, fig. 5.

Shell a rich, deep chestnut color, varying from oval to somewhat elongate, with a single fold on the columella and two on the parietal wall; outer lip thickened, inflected in the middle, where there is a single revolving ridge on its inner side.

Length, 13; diameter, 6.5 mm.

Ensenada Honda, many specimens.

Genus *PEDIPIPES* Scopoli, 1777.

Shell imperforate, oval to subglobular, with somewhat rounded spirally lirate whorls; columella rather wide and bearing two lamellar teeth; parietal wall with a third elevated, compressed, revolving tooth or lamella; outer lip somewhat callous within, generally thickened, often toothed. Foot short, rounded before and behind, divided below by a deep sulcus.

Pedipes mirabilis Mühlfeld. Plate 53, fig. 8.

Turbo mirabilis Mühlfeld, Mag. Ges. Nat. Freunde, Berlin, VIII, p. 8, pl. II, fig. 13, *a, b*, 1818.

Pedipes mirabilis Pfr., Mon. Auric., p. 70.

Shell small, globular-conic, with about four rounded whorls, which are occasionally slightly shouldered; whorls closely, spirally lirate; outer lip sometimes callous and having a low entering tooth within, sometimes not at all thickened or toothed.

Length, 3; diameter, 2 mm.

Ensenada Honda, Culebra. Many specimens taken alive.

This species appears to vary in size and in the character of the outer lip, and no doubt includes a number of nominal species described from the West Indies and Florida. Specimens in the National Museum collection, labeled "Indo Pacific," are considerably larger than the above, but agree in other characteristics.

Genus *BLAUNERIA* Shuttleworth, 1854.*Blauneria heteroclita* Montagu.

Voluta heteroclita Montagu, Test. Brit., Suppl., p. 469, 1808.

Blauneria heteroclita Dall, Proc. U. S. Nat. Mus. 1885, p. 287, pl. xvii, fig. 6.

Shell slender, very minute, smooth, translucent, sinistral, with a single strongly marked fold.

Length, 3 mm.

Porto Rico; Arango; Cuba; Jamaica; Florida.

Superfamily *LIMNOPHILA*.Family *LIMNÆIDÆ*.

Shell variable, spiral, elevated or discoidal; color uniform. Jaw simple, composed of three segments; teeth of the radula in horizontal ranges; marginal teeth serrate.

Subfamily *LIMNÆINÆ*.Genus *LIMNÆA* Lamarck, 1801.*Limnæa cubensis* Pfeiffer.

Limnæa cubensis Pfeiffer, Weigm. Arch., I, 1839, p. 354.

Porto Rico, several localities (Crosse); Santo Domingo; Cuba.

Subfamily PLANORBINÆ.

Genus PLANORBIS Geoffroy, 1767.

Shell discoidal, biconcave, with the whorls visible on both sides; aperture small, rounded, oblique; peristome simple, generally thin; columella wanting. Jaw with three segments; foot straight, obtuse in front and behind.

Type, *P. corneus* Linnæus.

Planorbis guadaloupensis Sowerby. Plate 53, figs. 11, 12.

Planorbis guadaloupensis Sowerby, Gen., iv, p. 2 (no pagination), pl. II (plates not numbered), fig. 2, 1821.

Shell large, compressed, with six slowly increasing whorls, which are rounded on both sides and have very delicate incremental and revolving sculpture only visible under a glass; shining, ashy or horn-colored; aperture rounded, thin but slightly oblique; parietal callus distinct and well advanced on the penultimate whorl.

Greater diameter, 25; lesser, 21; height, 7 mm.

Rio Caguaitas, Caguas, Porto Rico; several living specimens; also Santo Domingo; Guadeloupe.

Planorbis tumidus Pfeiffer.

Planorbis tumidus Pfeiffer, Weigm. Arch., I, p. 354, 1839.

Planorbis caribæus d'Orbigny, Moll. Cuba, I, p. 193, pl. XIII, figs. 17, 19, 1842.

Porto Rico and Vieques (Crosse); Havana, Cuba; Mexico; southwestern United States; Florida.

Planorbis riisei Dunker.

Planorbis riisei Dunker & Clessin, Conch. Cab., Neue Ausg., Planorbis, p. 110, pl. XVII, fig. 7, 1886.

Porto Rico (Crosse); Jamaica.

Planorbis refulgens Dunker.

Planorbis refulgens Dunker, P. Z. S., 1853, p. 54.

Planorbis refulgens Dunker & Clessin, Chemnitz, Neue Ausg., p. 106, pl. XVIII, fig. 10, 1886.

Porto Rico (Crosse); Santo Domingo; Jamaica.

Planorbis haldemani C. B. Adams.

Planorbis haldemani C. B. Adams, Cont. to Conch., p. 43, 1849.

Humacao; Luquillo; Rio Blanco, Porto Rico (Crosse); Jamaica.

Planorbis schrammi Crosse.

Planorbis schrammi Crosse, Journ. de Conchyl., XII, p. 153, pl. VII, fig. 2, 1864.

Rio Añasco; Porto Rico (Crosse); Guadeloupe.

Planorbis lucidus Pfeiffer.

Planorbis lucidus Pfeiffer, Weigm. Arch., I, p. 354, 1839.

Humacao; Luquillo, Porto Rico (Crosse); Cuba; Jamaica; Guadeloupe.

Planorbis macnabianus C. B. Adams.

Planorbis macnabianus C. B. Adams, Cont. to Conch., p. 43, 1849.

Near San Juan, Porto Rico (Crosse); Jamaica.

Planorbis circumlineatus Shuttleworth.

Planorbis circumlineatus Shuttleworth, Diagn. Neue Moll. Berner Mitth., 1854, p. 96.

Near Humacao; Rio Blanco, Porto Rico (Crosse); Santo Domingo; St. Thomas.

Genus PLANORBULA Haldeman, 1842.

Planorbula albicans Pfeiffer.

Planorbula albicans Pfeiffer, Weigm. Arch., I, p. 354, 1839.

Porto Rico (Crosse); St. Thomas; Cuba.

Family ANCYLIDÆ.

Genus ANCYLUS Geoffroy, 1767.

Ancylus obscurus Haldeman.*Ancylus obscurus* Haldeman, Monog. Limnæidæ, p. 9, pl. 1, fig. 3, 1844.

Humacao, Porto Rico (Crosse); St. Thomas; Jamaica; eastern United States

Ancylus beaui Bourguignat.*Ancylus beaui* Bourguignat, Journ. de Conchyl., IV, p. 176, 1853.*Ancylus beaui* Clessin, Chemnitz, n. ed., p. 69, pl. VII, fig. 10.

Near Luquillo, Porto Rico (Crosse); Guadeloupe.

Family PHYSIDÆ.

Shell spiral, thin, horn-colored, sinistral; outer lip simple, sharp; tentacles acute, elongate; dentition complex.

Genus APLEXA Fleming, 1828.

Shell sinistral, thin, brilliant, apex pointed; whorls but slightly rounded; aperture somewhat elongated; columella slightly twisted.

Type, *Physa hypnorum* Linnæus.*Aplexa sowerbyana* d'Orbigny. Plate 54, fig. 11.*Physa sowerbyana* d'Orbigny, Moll. Cubana, I, p. 190, pl. X, figs. 11, 13, 1842.

Shell oblong-ovate, polished, dull amber, lighter when young; spire elevated, acuminate; columella thin, slightly tortuous.

Length, 14; diameter, 8 mm.

Rio Caguinas, Caguas, Porto Rico. A number of young specimens were obtained. Also found in Cuba, Jamaica, St. Thomas, and Guadeloupe.

Suborder STYLOMMATOPHORA.

Superfamily DITREMATA.

(VASOPULMONATA.)

Family ONCHIDIIDÆ.

Genus ONCHIDELLA Gray, 1850.

Animal with the dorsal surface nonpapilliferous, ovate, leathery, with no shell in the adult state; respiratory orifice above and on right side of vent, genital orifice to right of tentacles.

Type, *O. nigricans* Quoy & Gaimard.*Onchidella floridana* Dall.*Onchidium floridanum* Dall, Proc. U. S. Nat. Mus. 1885, p. 288.*Onchidium (Onchidella) transatlanticum* Heilprin, Proc. Acad. Nat. Sci. Phila. for 1888, p. 327, pl. 15, figs. 4, 4a; Pilsbry, Trans. Conn. Acad., x, p. 503, 1900.

Guanica, Porto Rico; Knights Key, Florida; Bermuda.

This form is stated by Sir Charles Eliot, of the British Legation, to be almost indistinguishable from *O. nigricans* Quoy & Gaimard, which he collected abundantly at Auckland, New Zealand. One specimen was obtained at Guanica by the United States Fish Commission.

Family VERONICELLIDÆ.

Genus VERONICELLA Blainville, 1817.

Body long, without shell or furrow above the margin of the foot; moderately rounded above, flattish below, the sole divided longitudinally into three areas by impressed lines; nocturnal.

Veronicella occidentalis Guilding.

Onchidium occidentale Guilding, Trans. Linn. Soc., XIV, p. 322, pl. xxxi, figs. 8-12, 1825.

Animal plumbeous or brownish, faintly pustulous, sometimes blackish; base lighter, often mottled with black; foot narrow. Length (in spirit), 45; breadth, 14 mm.
Añasco; Caguas; Porto Rico.

(ORTHURETHRA.)

Family PUPIDÆ.

Genus **BIFIDARIA** Sterki, 1891.

Bifidaria pellucida Pfeiffer.

Pupa pellucida Pfeiffer, Symb. 1, 1841, p. 46.

Porto Rico, generally; Vieques (Crosse); West Indies, generally; Yucatan; Texas.

Genus **PUPOIDES** Pfeiffer, 1854.

Pupoides marginatus Say.

Cyclostoma marginata Say, Jour. Acad. Phila., II, p. 172, 1821; Am. Journ. Conch., III, pl. xv, fig. 11.

Fajardo, Porto Rico; eastern United States; several of the West Indies. It is almost certain that the *Bulimus nitidulus* of Pfeiffer (Weigm. Arch., I, 1839, p. 352) is this species. Only a brief Latin description is given, which, however, agrees well with this species, and Reeve's description and figure in the Conchologia (v, 1849, *Bulimus*, 588) fit it exactly.

Genus **VERTIGO** Müller, 1774.

Vertigo hexodon C. B. Adams.

Pupa hexodon C. B. Adams, Cont. to Conch., p. 37, 1849.

Humacao, Porto Rico (Crosse); Jamaica.

(HETERURETHRA.)

Elasmognatha.

Family SUCCINEIDÆ.

Shell oblique, sometimes flattened, paucispiral, thin, subtransparent, and unicolorous.

Genus **SUCCINEA** Draparnaud, 1801.

Shell oval, fragile; spire short; whorls few and rapidly enlarging; aperture oval; outer lip thin, not reflected, united below by a broad curve with the thin, smooth columella.

Section **TAPADA** Studer, 1830.

Succinea hyalina Shuttleworth. Plate 54, fig. 15.

Succinea hyalina Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 56.

Shell shining, with rather strong, rude growth lines, short and inflated; whorls scarcely three, rapidly increasing; spire short; suture well defined but not deep; aperture large, regularly oval, much wider below. Color pale buff, the alcoholic specimen showing iridescent tints.

Length, 10; diameter, 6.5; length of aperture, 7.5; diameter, 5 mm.

Caguas, one specimen taken alive.

Succinea approximans Shuttleworth.

Succinea approximans Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 55.

Porto Rico, common (Crosse).

Succinea riisei Pfeiffer.

Succinea riisei Pfeiffer, Zeits. für Mal., x, 1853, p. 52.

Quebradillas, Porto Rico (Crosse); Santa Cruz.

(SIGMURETHRA.)

Aulacopoda.

Family ZONITIDÆ.

Genus VITREA Fitzinger, 1833.

Vitrea insecta von Martens.

Hyalina insecta E. von Martens, Jahrb. d. Deutsch. mal. Ges., IV, 1877, p. 345, pl. XII, fig. 3.

Caguana, near Utuado, Porto Rico (Crosse).

Bland reported *Vitrea indentata* from Porto Rico. Crosse states that this species is near to *indentata*, but perfectly distinct, and that it was probably the *insecta* that Bland mistook for *indentata*.

Vitrea bryodes Shuttleworth.

Zonites bryodes Shuttleworth, Diagn. neue Moll. Berner Mitth., 1834, p. 36.

This species has never been figured. Its generic position is a little uncertain, as is that of the preceding species. It is reported from various localities in Porto Rico (Crosse).

Genus ZONITOIDES Lehmann, 1862.

Zonitoides minusculus Biauuey.

Helix minuscula Binney, Bost. Journ. Nat. Hist., III, p. 345, pl. XXII, fig. 4, 1843.

Fajardo; Humacao, Porto Rico (Crosse).

Widely distributed over the United States, parts of Mexico, and various West Indian islands.

Genus GUPPYA Mörch, 1867.

Guppya gundlachi Pfeiffer.

Helix gundlachi Pfeiffer, Arch. für Naturg. I, 1840, p. 250.

Porto Rico, numerous localities; Vieques (Crosse); Santo Domingo; St. Thomas; Cuba; Nicaragua; Florida.

(AGNATHOMORPHA.)

Family GLANDINIDÆ.

Genus GLANDINA Schumacher, 1817.

Shell elongated with elevated, conical spire and lengthened body whorl, with the base usually attenuated; whorls but slightly rounded; aperture elongate, wider below; outer lip scarcely thickened; columella curved and inrolled, truncate at its base.

Type, *Glandina olivacea* Schumacher.

Glandina portoricensis Pfeiffer.

Glandina portoricensis Pfeiffer, P. Z. S. 1848, p. 111.

Achatina rüsei Pfeiffer, Chemnitz, Conch. Cab., n. ed., Achatina, pl. LXVII, figs. 3, 4.

Porto Rico, many localities (Crosse).

Glandina terebræformis Shuttleworth.

Glandina terebræformis Shuttleworth, Diagn. neue Moll. Berner Mitth., 1834, p. 52.

Ceiba; Rio Blanco; Vega Baja, Porto Rico (Crosse); Santo Domingo.

Glandina sulculosa Shuttleworth.

Glandina sulculosa Shuttleworth, Diagn. neue Moll. Berner Mitth., 1834, p. 52.

San Juan; Humacao; Utuado, Porto Rico (Crosse).

Glandina interrupta Shuttleworth.

Glandina interrupta Shuttleworth, Diagn. neue Moll. Berner Mitth., 1834, p. 51.

Easter part of Porto Rico (Crosse).

Glandina glabra Pfeiffer. Plate 53, fig. 9.

Achatina (Glandina) glabra Pfeiffer, Symb. Hel., III, 1846, p. 90.

Shell thin, smooth, shining, light corneous, with distant reddish strigations which fade out on the body whorl; whorls 8; suture distinct, finely crenulately margined; outer margin of the aperture not incurved in the middle.

Length, 28; diameter, 12 mm.

Under rocks in pastures, Bayamon, Porto Rico. One broken specimen.

Family CIRCINARIDÆ.

Genus CIRCINARIA Beck, 1837.

Shell thin, widely umbilicated, depressed, striate or wrinkled, generally uniform in color; whorls 4 to 5, the last broad, moderately deflexed in front; peristome slightly thickened.

Type, *Helix concava* Say.

Circinaria concolor Férussac. Plate 54, figs. 8, 10.

Helix concolor Férussac, Hist. Nat. Moll. Terr., 208, pl. 82, fig. 2, 1821.

Shell widely umbilicated, subdiscoidal, smooth, dark chocolate brown, feebly strigate with lighter brown; suture linear; whorls 4, rapidly increasing, the last obliquely depressed above; base convex.

Diameter, 22; height, 9 mm.

Bayamon, Porto Rico.

Holopoda.

Family STENOgyRIDÆ.

This group is frequently called *Achatinidae*.

Genus LEPTINARIA Beck, 1837.

Leptinaria antillarum Shuttleworth.

Leptinaria antillarum Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 50 (unfigured).

Humacao, Porto Rico (Crosse); Tortola, Guadeloupe.

Leptinaria stylodon Shuttleworth.

Leptinaria stylodon Shuttleworth, Diagn., neue Moll. Berner Mitth., 1854, p. 50 (unfigured).

Humacao, Porto Rico (Crosse).

Leptinaria opalescens Shuttleworth.

Leptinaria opalescens Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 50.

San Juan; Ceiba; Humacao, Porto Rico (Crosse).

Genus STENOgyRA Shuttleworth, 1854.

Small, elongated, translucent, many whorled, shells with an obtuse summit and simple peristome; mostly oviparous, laying very large eggs for the size of the shell.

Stenogyra terebraster Lamarck.

Bulimus terebraster Lamarck, An. sans Vert., VI, p. 124, 1822; Lister, Hist., pl. 20, fig. 15?

Porto Rico, numerous localities (Crosse); Cuba.

Stenogyra swiftiana Pfeiffer.

Bulimus swiftianus Pfeiffer, Monog. Hel., III, p. 399, 1853; Conch. Cab. *Bulimus*, pl. 69, figs. 9-11.

Porto Rico, many localities; Vieques (Crosse); St. Thomas.

Genus OPEAS Albers, 1850.

Opeas subula Pfeiffer.

Achatina subula Pfeiffer, Arch. für Naturg., I, 1839, p. 352.

Stenogyra subula Binney, Man. Am. L. Shells, p. 425, fig. 473, 1885.

San Juan; Fajardo, Porto Rico (Crosse); Santo Domingo; Cuba; Jamaica; Barbados; Antigua; St. John; St. Thomas; Mexico; Alabama; Cochin China.

Opeas micrus d'Orbigny.

Helix micra d'Orbigny, Mag. de Zoöl., 1835, p. 9, No. 49; Voy. Am. MÉR., p. 262, pl. XLI bis, figs. 18, 19.

Eastern Porto Rico; Vieques (Crosse); Cuba; Jamaica; Barbados; St. John; St. Thomas; Florida; South Carolina; Bolivian Andes; Rio Janeiro.

Opeas margaritaceus Shuttleworth.

Stenogyra (Opeas) margaritacea Shuttleworth, Diagn. Neue Moll. Berner Mitth., 1854, p. 47 (unfigured).

Rio Blanca in the Sierra de Luquillo, Porto Rico (Crosse).

Opeas alabastrinus Shuttleworth.

Stenogyra (Opeas) alabastrina Shuttleworth, Diagn. Neue Moll. Berner Mitth., 1854, p. 47 (unfigured).

San Juan, Porto Rico (Crosse).

Opeas gompharium Shuttleworth.

Stenogyra (Opeas) gompharium Shuttleworth, Diagn. Neue Moll. Berner Mitth., 1854, p. 47 (unfigured).

San Juan, Porto Rico (Crosse).

Opeas goodallii Miller.

Helix goodallii Miller, Ann. of Phil., VII, p. 381, 1822.

Bulinus goodallii Reeve, Conch. Icon., pl. LXXXIV, fig. 621, 1849.

Various localities in Porto Rico (Crosse).

Genus SUBULINA Beck, 1837.

Shell diaphanous, elongated, subcylindrical, with obtuse summit; whorls numerous; aperture oval; columella twisted, subarcuate and truncated below.

Type, *Subulina sulcata* Gray.

Subulina octona Bruguière.

Bulinus octona Bruguière, Enc. Méth., I, p. 325, No. 47, 1789; Chemnitz, Conch. Cab., IX, p. 90, pl. cxxxvi, fig. 1264.

This common and widely distributed species has from 8 to 9 well-rounded whorls, having delicate striae, which are more strongly developed in the deep suture, where they often form faint denticulations. When fresh the shell is horn colored and shining.

Caguas; under rocks in pastures, Bayamon; Ensenada Honda, Culebra; also West Indies generally, Mexico, and Central and South America.

This with other *Stenogyridæ* has no doubt been carried about the world on banana plants.

Subulina acicularis Shuttleworth.

Stenogyra (Subulina) acicularis Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 49.

Fajardo, Porto Rico (Crosse).

Genus SPIRAXIS C. B. Adams, 1850.**Spiraxis paludinoides** d'Orbigny.

Achatina paludinoides d'Orbigny, Moll. Cubana, I, p. 171, pl. xi, figs. 13-15, 1841.

Aguadilla, Porto Rico (Crosse); Cuba; Jamaica.

Genus PSEUDOBALÆA Shuttleworth, 1854.**Pseudobalæa dominicensis** Pfeiffer.

Balæa dominicensis Pfeiffer, P. Z. S., 1851, p. 140; Mon. Hel. Viv., IV, p. 454 (unfigured).

Porto Rico, many localities (Crosse); Haiti; Cuba, at Bayamon (Gundlach).

Family CLAUSILIIDÆ.**Genus CLAUSILIA** Draparnaud, 1805.

Shell elongated, many whorled, generally reversed; aperture oval or pear shaped, with a sinus above; peristome with a continuous border; columella oblique, furnished with lamella. The aperture is provided with a movable, shelly plate.

Type, *Clausilia plicatula* Draparnaud.

Section NENIA H. & A. Adams, 1855.

Clausilia bicanaliculata Férussac. Plate 54, fig. 14.*Clausilia bicanaliculata* Férussac, Tableau, p. 62, No. 523, 1821.*Turbo tridens* auctorum, as of Chemnitz; *Clausilia costulata* Lamarek, 1822; and *Clausilia labiata* Sowerby, not Dillwyn.

Shell with a slight umbilical depression, with about eight scarcely rounded whorls, the apex decollated, the last whorl much constricted and drawn out into a neck; sculpture of two kinds: a series of longitudinal, curved, rather strong ridges crossing which are oblique fine wrinkles; aperture directly in line with the axis of the shell, strongly reflexed, white, with two sharp, curved plications on the columella. The general color of the shell is a pale brown.

Length, 27; diameter, 5; of aperture, 6 mm.

El Yunque; Cayey, Porto Rico.

A member of a genus having over 700 species, its metropolis being in southeastern Europe. It is well represented in Japan, southeast Asia, and the East Indian Archipelago. Quite a number of species are found in western South America, and this single form inhabits the West Indies and is confined to Porto Rico.

Family UROCOPTIDÆ.

Genus **PINERIA** Poey, 1854.***Pineria viequensis*** Pfeiffer.*Bulimus viequensis* Pfeiffer, Mal. Blatt., III, p. 46, 1856; Novit. Conch., III, pl. 93, figs. 39-41.

Island of Vieques (Pfeiffer).

Genus **CERION** Bolten, 1798.

Shell rimate, cylindrical, or pupiform, generally vertically ribbed, solid; whorls scarcely rounded, the upper tapering rapidly to a point, the last narrowed at the base, usually ascending; aperture rounded, subquadrate, or oval, pointed above; peristome thick, reflexed; columella nearly always bearing a dentiform fold, and the parietal wall having a denticle.

Type, *Turbo uva* Linn.

Subgenus **STROPHIOPS** Dall, 1894.***Cerion crassilabre*** Sowerby.*Pupa crassilabris* Sowerby, Conch. Icon., XX, Pupa 14, pl. II, fig. 14, 1875.

Porto Rico; Virgin Islands. According to Pilsbry and Vanatta (Proc. Acad. Nat. Sci. Phila. 1896, p. 324) this species is found in Porto Rico. It is not given in the list of Crosse or Gundlach.

Cerion striatellum (Férussac) Guerin. Plate 53, fig. 4.*Pupa striatella* Férussac Mss. in Guerin, Icon. du Règne Anim. Moll., p. 16, pl. 6, fig. 12, 1832; Küster, Conch. Cabinet, Pupa, pl. 10, figs. 14, 15.

Shell rather short, cylindrical, with a rounded blunt summit; whorls about nine, scarcely convex, the first one and one-half to two smooth, milk white to corneous, the remainder with very numerous fine ridges, which are oblique above and vertical on the lower whorls; surface white or white variously blotched with horn color; aperture rather small, rounded or subquadrate, having a small, revolving, deep-seated lamellar tooth on the columella, and a short lamellar one on the parietal wall, white or brownish within; peristome moderately thickened, reflexed; base rounded and ending in an ill defined ridge around the small umbilical perforation.

Length, 23; diameter, 10; greatest length of aperture, 7 mm.

Cabo Rojo Light; Ponce, Porto Rico. The specimen from Ponce is longer, more tapering above, and more strongly ribbed than the shells from Cabo Rojo, and has ten whorls. The material examined agrees very well with the original description of *Pupa striatella*, and it is quite probable that it is that species. The material from Porto Rico collected by the Fish Commission belongs to the subgenus *Strophlops*. It certainly differs much from the description and figure of *Pupa crassilabris* in the Conchologia Iconica, which has a double lip. We have numerous specimens from Porto Rico, Tortola, and Anguilla in the National Museum collection, none of which have a double lip.

Pilsbry and Vanetta place *Cerion striatellum* in the subgenus *Diacerion*, and credit it to Cabo Cruz, Cuba, only.

Cerion microstoma Pfeiffer (var.).

Papa microstoma Pfeiffer, Mal. Blatt., I, p. 207, pl. III, figs. 15, 16, 1854.

Given in Crosse's list as a Porto Rican species on the authority of Pfeiffer. Crosse states that it is only the variety which comes from this island, the type being found in Cuba.

Genus MACROCERAMUS Guilding, 1828.**Macroceramus microdon** Pfeiffer.

Bulimus microdon Pfeiffer, P. Z. S., 1851, p. 261.

San Juan, Porto Rico (Crosse); St. Thomas; St. John.

Macroceramus shuttleworthi von Martens.

Macroceramus shuttleworthi E. von Martens, Jahrb. d. d. Malak. Ges., IV, p. 352, 1877.

Macroceramus microdon var. β Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 53.

Penuelas, Porto Rico (Crosse).

Macroceramus johannis Pfeiffer.

Macroceramus johannis Pfeiffer, Mal. Blatt., XXII, 1875, p. 119.

Aguadilla, Porto Rico.

Genus BRACHYPODELLA Beck, 1838.Section **BRACHYPODELLA** s. s.**Brachypodella pallida** Guilding.

Brachypus pallidus Guilding (MS.), *Cylindrella pallida* Pfeiffer, in Philippi, Abbild., II, p. 52, pl. II, fig. 14, 1845.

Near San Juan; Vega Baja; Penuelas, Porto Rico (Crosse); St. Thomas; Jamaica.

Brachypodella portoricensis Pfeiffer.

Cylindrella portoricensis Pfeiffer, Zeits. für Mal., IX, 1852, p. 151; Conch. Cab. *Cylindrella*, pl. IV, figs. 14-15.

Porto Rico, various localities (Crosse).

Brachypodella riisei Pfeiffer.

Cylindrella riisei Pfeiffer, Zeits. für Mal., IX, 1852, p. 133; Conch. Cab. *Cylindrella*, pl. V, figs. 18-20.

Porto Rico, many localities (Crosse).

Family **BULIMULIDÆ**.Subfamily **AMPHIBULIMINÆ**.**Genus SIMPULOPSIS** Beck, 1837.Subgenus **PLATYSUCCINEA** Ancey, 1881.**Simpulopsis portoricensis** Shuttleworth.

Simpulopsis portoricensis Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 55.

Sierra de Luquillo, Porto Rico, abundant on leaves of bananas (Crosse).

Simpulopsis psidii von Martens.

Bulimus (Eudioplus) psidii E. von Martens, Jahrb. d. Deutsche Malak. Ges., IV, p. 351, pl. XII, fig. 6, 1877.

Caguana, near Utuado, Porto Rico (Crosse).

Genus GÆOTIS Shuttleworth, 1854.**Gæotis nigrolineata** Shuttleworth.

Gæotis nigrolineata Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 127.

Sierra de Luquillo, Porto Rico, on banana leaves (Crosse).

Gæotis flavolineata Shuttleworth.

Gæotis flavolineata Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 127.

Sierra de Luquillo; Arecibo; Utuado, Porto Rico (Crosse).

Gæotis malleata Pilsbry.

Gæotis malleata Pilsbry, Manual, 2d ser., XII, p. 230, pl. LXII, figs. 36-40, 1899.

Near San Juan, Porto Rico (Pilsbry).

Gæotis albopunctulata Shuttleworth.

Gæotis albopunctulata Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 36.

Humacao, Porto Rico, on tree trunks (Crosse).

Subfamily **BULIMULINÆ**.Genus **BULIMULUS** Leach, 1815.

Shell varying from ovate-conic to oblong, columnar or lanceolate, umbilicate or imperforate; aperture with the lip thin, generally not expanded; columella expanded, rather straight; apical whorls either smooth, vertically costulate, or with the wrinkles interrupted and broken into granules. Type, *Bulimulus exilis* Gmelin.

Subgenus **BULIMULUS** s. s.**Bulimulus exilis** Gmelin. Plate 53, fig. 3.

Helix exilis Gmelin, Syst. Nat., p. 3668, 1792.

Shell narrowly perforated, somewhat elongated, thin to solid, dirty white or whitish with purple-brown spire and base, often with from one to three dark revolving bands, the upper and lower wide; surface nearly smooth; whorls about six, the first two delicately zigzag striate; sutures well marked; aperture about two-fifths length of shell, showing within markings of exterior; outer lip scarcely thickened or reflected; columella nearly straight, reflexed so as to partially cover umbilical opening.

Height, 20; diameter, 9; height of aperture, 9 mm.

Aguadilla; San Juan, Porto Rico.

Bulimulus exilis var. **eyriesii** Drouet.

Bulimulus eyriesii Drouet, Ess. Moll. Terr. Fluv. Guyane Fran., p. 63, pl. I, figs. 12, 13, 1859.

This form is slightly thinner than the type, is never banded but is nearly uniform colored and shows faint revolving striae. The lower part of the shell is generally a little wider than the type.

San Juan, Porto Rico.

Bulimulus diaphanus Pfeiffer. Plate 53, fig. 6.

Bulimulus diaphanus Pfeiffer, P. Z. S., 1854, p. 125.

Shell perforate, thin, fragile, covered with a delicate, horn-colored epidermis, which is pinched up throughout into broken, revolving liræ; whorls six, somewhat rounded; the apex punctately reticulated; aperture ovate, about three-sevenths of the length of the shell; outer lip thin, not expanded; columella reflexed over the umbilicus.

Height, 16; diameter, 7 mm.

Under rocks in pastures, Bayamon, Porto Rico; Caguas, under bricks in a garden.

Genus **DRYMÆUS** Albers, 1850.

Shell ovate or oblong, with conic spire, umbilicate or imperforate, rather thin; aperture triangular to ovate; lip simple or expanded; apical whorls with a minute, even grating of longitudinal and spiral striae. Type, *Drymæus hygrohyleus* d'Orbigny.

Subgenus **DRYMÆUS** s. s.**Drymæus hjalmarsoni** Pfeiffer.

Bulimulus hjalmarsoni Pfeiffer, Mal. Blätt., III, p. 51, 1856 (unfigured).

Pajas plantation, near Manati, Porto Rico (Crosse).

Drymæus liliaceus Férussac. Plate 53, fig. 10.

Helix (*Cochlogena*) *liliacea* Férussac, Prodr., 1821, p. 54; Hist. Nat. Moll. Terr., pl. 142 B, fig. 11.

Shell perforate, rather solid, shining, cretaceous or milky white, sometimes stained with bluish; whorls six and one-half to seven, scarcely rounded, with very fine, revolving, incised lines, the last somewhat swollen at the base; aperture ovate; peristome scarcely expanded, not thickened; columella deeply entering, slightly sinuous, reflected and pressed in over the umbilicus.

Height, 30; diameter, 14; length of aperture, 13 mm.

Cayey, Porto Rico. Many specimens living, mostly young.

Drymæus elongatus Bolten. Plate 53, fig. 5.

Helix elongata Bolten, Mus. Boltenianam, 1st ed., p. 107, 1798.

Shell perforate, solid, with delicate growth lines and sometimes with faint traces of revolving sculpture, white, salmon-colored, ashy or buff, often with three bands of dark color, which may be entire or broken, sometimes longitudinally streaked with brown; whorls six or seven, somewhat rounded; aperture ovate; peristome thick, slightly reflexed, advanced in the middle, showing within the outside pattern of coloring; columella faintly sinuous, often dark brown.

Height, 30; diameter, 14; length of aperture, 15 mm.

Huacres, Porto Rico, brownish and streaked varieties; Culebra Island, white variety.

Family HELICIDÆ.

Subfamily SAGDINÆ.

Genus **THYSANOPHORA** Strebel & Pfeffer, 1880.**Thysanophora dioscoricola** C. B. Adams.

Helix dioscoricola C. B. Adams, Proc. Bost. Soc. Nat. Hist., 1845, p. 16.

Zonites dioscoricola Tryon, Manual, II, p. 174, pl. LIII, figs. 46, 47, 1886.

Island of Vieques; Jamaica; the variety *cæca* in Florida, Texas, and Trinidad.

Thysanophora plagiptycha Shuttleworth.

Helix plagiptycha Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 37.

Zonites plagiptycha Tryon, Manual, II, p. 174, pl. LIII, fig. 51, 1886.

Humacao; Fajardo; Ceiba; Rio Blanco, Porto Rico; island of Vieques; the variety *grammum* in Florida, Mexico, and Yucatan.

Thysanophora krugiana von Martens.

Helix (*Microphysa*) *krugiana* E. von Martens, Jahrb. d. Deutsche Malak. Ges., IV, p. 346, pl. XI, fig. 4, 1877.

Caguana, near Utuado.

Thysanophora vortex Pfeiffer.

Helix vortex Pfeiffer, Arch. für Naturg., I, 1839, p. 351.

Helix vortex Tryon, Manual, III, p. 98, pl. XIX, figs. 25-28, 1887.

Porto Rico, many localities (Crosse); island of Vieques; St. Thomas; Barbados; St. Croix; Cuba; Santo Domingo; Florida.

Thysanophora subaquila Shuttleworth.

Helix subaquila Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 37.

Helix subaquila Tryon, Manual, III, p. 98, pl. XIX, fig. 31, 1887.

Porto Rico generally; Vieques (Crosse); St. Thomas.

Thysanophora euclasta Shuttleworth.

Helix euclasta Shuttleworth, Diagn. neue Moll., Berner Mitth., 1854, p. 38.

Helix euclasta Tryon, Manual, III, p. 97, pl. VIII, fig. 65, 1887.

Ponce, Porto Rico; Vieques; St. Thomas; Cuba.

Crosse states that only one of the varieties of this species has been found in Porto Rico.

Thysanophora musicola Shuttleworth.

Helix musicola Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 38.

Helix musicola Tryon, Manual, III, p. 97, pl. VIII, fig. 66, 1887.

Porto Rico, many localities (Crosse).

Thysanophora portoricensis Pfeiffer.*Helix portoricensis* Pfeiffer, Zeits. für Malak., IV, p. 13, 1847.*Helix portoricensis* Tryon, Manual, III, p. 96, pl. XIX, figs. 11, 12, 1887.

Porto Rico (Tryon).

Thysanophora velutina Lamarek.*Helix velutina* Lamarek, An. sans Vert., VI, pt. 2, 1822, p. 86.*Helix velutina* Tryon, Manual, III, 1887, p. 100, pl. XXII, figs. 30-32.

Humacao, Porto Rico (Crosse).

Thysanophora arecibensis Pfeiffer.*Helix arecibensis* Pfeiffer, Mal. Blätt., III, p. 44, 1856.*Helix arecibensis* Tryon, Manual, III, p. 58, pl. X, figs. 57-59, 1887.

Arecibo, Porto Rico (Tryon).

Subfamily **HELICINÆ**.Genus **CEPOLIS** Montfort, 1810.Section **JEANNERETIA** Pfeiffer, 1877.**Cepolis dermatina** Shuttleworth.*Helix dermatina* Shuttleworth, Diagn. neue Moll. Berner Mitth. 1854, p. 41.*Cepolis dermatina* Tryon, Manual, V, p. 50, pl. X, fig. 93, 1889.

Luquillo, on bananas; Quebradillas, Porto Rico (Pilsbry).

Cepolis squamosa Férussac.*Helix squamosa* Férussac, Prodr., 1821, p. 36; Hist. Nat. Moll. Terr., pl. 41, fig. 3.*Cepolis squamosa* Pilsbry, Manual, V, p. 95, pl. LVI, figs. 20-22, 1889.

San Juan and Luquillo, Porto Rico (Pfeiffer).

Section **PLAGIOPTYCHA**, Pfeiffer, 1856.**Cepolis riisei** Pfeiffer.*Helix riisei* Pfeiffer, Mal. Blätt., III, p. 44, 1856.*Cepolis riisei* Pilsbry, Manual, V, p. 16, pl. XI, figs. 33, 34, 1889.

Island of Vieques (Crosse).

Cepolis diaphana Lamarek.*Helix diaphana* Lamarek, An. sans Vert., VI, pt. 2, p. 85, 1822.*Cepolis diaphana* Pilsbry, Manual, V, p. 22, pl. XI, fig. 8; pl. XIX, figs. 51, 52, 1889.

Porto Rico, many localities; island of Vieques.

Subfamily **CAMÆNINÆ**.Genus **PLEURODONTE** Fischer de Waldheim, 1808.

Shell rather large and solid, depressed globose to lenticular, often toothed; periphery rounded or keeled; striate or granular, usually dark colored; jaw solid, arcuate.

Subgenus **PLEURODONTE** s. s.Section **CARACOLLUS** Montfort, 1810.**Pleurodonte carocolla** Linnæus. Plate 54, fig. 7.*Helix carocolla* Linnæus, Syst. Nat., ed. 10, p. 769, 1758; Chemnitz, Conch. Cab., IX, p. 95, pl. 125, figs. 1090, 1091.

This species, one of the largest and finest of the genus, is finely ribbed below and slightly granulous on the upper whorls. The sutures are scarcely impressed; it is always sharply keeled and is of a nearly uniform chestnut color throughout, the interior and lip being lighter.

Height, 25; diameter, 55 mm.

San Juan; Caguas; El Yunque, Porto Rico.

Pleurodonte bornii Pfeiffer. Plate 54, figs. 2, 3.

Helix bornii Pfeiffer, Conch. Cab., neue Ausg., pl. 8, figs. 5, 6, 1846; Mon. Hel. Vir., 1, p. 391, 1848.

Possibly only a variety of *P. marginella* Gmelin, which is distributed through eastern Cuba. There are two forms in Haiti which may be only varieties of *P. marginella*. *P. bornii* has delicate revolving striae which cut the upper surface of the shell into very fine granules. The umbilicus is wide; and there is a single, revolving, dark brown band above and below on a light ground.

Height, 15; diameter, 37 mm.

Caguas; San Juan, Porto Rico.

Subgenus **POLYDONTES** Montfort, 1810.Section **PARTHENA** Albers, 1850.**Pleurodonte angulata** Férussac. Plate 54, fig. 1.

Helix angulata Férussac, Prodr., No. 134, 1821; Hist. Nat. Moll. Terr., pl. 61, fig. 2.

Shell imperforate, lenticular, thin, slightly rounded above, more inflated below, especially in umbilical region; whorls four, rapidly increasing, flat, with strong growth lines, slightly granulous above and below; suture not at all impressed; periphery sharply keeled; aperture but slightly oblique, its lip reflected above and below; columella curved, deeply inserted; parietal callus thin. The general color of the shell is milky white, and when fresh it is covered with a very thin horn-colored epidermis. There are sometimes faint traces of revolving lines of color on the under surface.

Height, 20; greater diameter, 45; lesser, 34 mm.

El Yunque, Porto Rico.

Pleurodonte obliterated Férussac.

Helix obliterated Férussac, Prodr., p. 136, 1821; Hist. Nat. Moll. Terr., pl. 61, fig. 3.

Pleurodonte obliterated Pilsbry, Manual, v, p. 69, pl. VI, figs. 51, 52, 1889.

Closely allied to *P. angulata*, but is heavier, less inflated below, and does not have so sharp a keel. There are some half dozen revolving color bands on the base of the shell. This fine species is not given in Crosse's list, but is found in Porto Rico according to Pilsbry.

Section **LUQUILLIA** Crosse, 1892.**Pleurodonte luquillensis** Shuttleworth. Plate 2, fig. 16.

Helix luquillensis Shuttleworth, Diagn. neue Moll. Berner Mitth., 1854, p. 40.

Shell imperforate, conoidal, elevated, solid, dark, with rather feeble growth lines and covered with a very fine, microscopic reticulation; whorls five and one-half, the earliest scarcely convex, the later ones more rounded; last whorl rounded, flattened on the periphery, and having an almost obsolete carina; aperture oblique, rounded; peristome thick, slightly reflected, white; columella oblique, rather deeply entering, with a faint tooth at its base; parietal wall having a thin callus.

Height, 34; greater diameter, 34; lesser, 30 mm.

El Yunque, Porto Rico.

This fine species is of a nearly uniform dark-chestnut color throughout, but sometimes shows faint, darker spiral bands within the aperture.

Section **THELIDOMUS** Swainson, 1840.**Pleurodonte lima** Férussac. Plate 54, fig. 4.

Helix (Helicogena) lima Férussac, Prodr., p. 81, 1821; Hist. Nat. Moll. Terr., pl. 46, figs. 1, 2.

A well known and abundant species, closely related to *P. incerta* and *P. castrensis*. The earlier whorls are light colored and but slightly granular, the last whorl is covered with fine, sharp, whitish pustules on an ashy brown ground, sometimes having darker streaks following the growth lines.

Cayey; San Juan; Añasco; Aguadilla; San Geronimo; Catona; Caguas, Porto Rico.

Pleurodonte castrensis Pfeiffer. Plate 54, fig. 5.

Helix castrensis Pfeiffer, P. Z. S., 1856, p. 386.

Shell imperforate, with somewhat elevated spire and swollen base, the upper shell, except the earlier whorls, covered with very fine, revolving sculpture, making the surface reticulated; the base having faint scattered pustules near the aperture; whorls nearly five, slightly convex, the last

deflected at the aperture and bluntly carinated, the last two having faint, brown strigations and sometimes subobsolete, revolving bands on a lighter ground; aperture oblique; lip slightly reflexed, white; columella heavy, entering deeply, sometimes feebly toothed.

Height, 15; greater diameter, 25; lesser, 20 mm.

San Juan; near Caguas, Porto Rico.

Pilsbry makes this a variety of *P. lima*, while Crosse considers it a valid species. It seems to stand about midway between *lima* and *incerta*, and might as well or better be called a variety of the latter. *P. incerta* is decidedly granular throughout, has a narrow, dark peripheral band, and is generally higher and less carinate than *P. castrensis*. *P. lima* does not have revolving striae and is usually less elevated than *castrensis*.

Pleurodonte incerta Férussac.

Helix incerta Férussac, Hist. Nat. Moll. Terr., pl. cv, fig. 2, 1832.

Helix incerta Pilsbry, Manual, v, p. 57, pl. 1, figs. 1, 2; pl. IV, figs. 36, 37, 1889.

Not in Crosse's list, but reported from Porto Rico on the authority of Pilsbry.

Superorder STREPTONEURA.

Order CTENOBRANCHIATA.

Suborder ORTHODONTA.

Superfamily TOXOGLOSSA.

Family TEREBRIDÆ.

Genus TEREBRA Bruguière 1789.

Shell elongated, solid, many-whorled; whorls generally flattened; suture shallow; aperture small, notched below; columella without plaits above.

Type *T. subulata* Linnaeus.

Section HASTULA H. & A. Adams, 1857.

Terebra cinerea Born.

Buccinum cinereum Born, Test. Mus. Vind., p. 267, pl. x, figs. 11, 12, 1780.

An abundant, widespread species, which is quite variable and has received many names. It is found generally throughout the Indo-Pacific region, the West Coast of Africa, and the West Indies. A single worn specimen was collected by the *Fish Hawk* expedition at Aguadilla, Porto Rico.

Terebra hastata Gmelin.

Buccinum hastatum Gmelin, Syst. Nat., p. 3502, 1792; Tryon, Manual, VII, p. 34, pl. x, fig. 87, 1885.

Porto Rico (Gundlach); West Indies generally.

Section ACUS H. & A. Adams, 1857.

Terebra protexta Conrad.

Terebra protexta Conrad, Proc. Acad. Nat. Sci. Phila., III, p. 26, 1843; Tryon, Manual, VII, p. 25, pl. VI, fig. 98, 1885.

Whorls about fifteen, somewhat rounded, having about eighteen rather sharp, curved ribs, which are made slightly nodulous by numerous revolving liræ; sutural band obscure or wanting; apex smooth for the first two whorls; columella twisted; canal thrown backward; outer lip simple.

Color, brownish or purple brown.

Length, 18 to 20 mm.

Mayaguez Harbor, several young shells; also southern and southeastern United States.

Terebra juanica, n. sp. Plate 57, fig. 5.

Shell minute, slender, acute, with a minute subglobular apex, brilliantly polished, purplish brown with a paler presutural band. Whorls nine, with two additional nepionic turns, which are

smooth, pale, and inflated, then the more mature whorls following have at first rather strong, even, slightly flexuous axial ribs extending from suture to suture; these gradually become fainter and on the last whorl obsolete. The only spiral sculpture is a faint groove between the ribs marking the anterior border of the rather obscure sutural band; this groove becomes obsolete also on the anterior whorls. Pillar short, strong, simple, with no indication of any plait.

Length of largest specimen, 7.5; maximum diameter, 1.7 mm.

San Juan Harbor, Porto Rico.

This is perhaps the smallest species of *Terebra* yet described from the West Indies and is notable for its brilliant vitreous polish and obsolete sculpture.

***Terebra nassula* Dall.**

Terebra (Acus?) nassula Dall, Blake Report, II, p. 66, pl. XXXVI, fig. 8, 1889.

Shell slender, yellowish white or buff, the color paler at the sutural band; whorls eighteen, the nuclear smooth, remainder of the shell uniformly sculptured; in the earlier whorls the band is defined, but in the later ones it is faint; longitudinal ribs numerous, curved; spiral threads rather strong, forming slight nodules on the ribs, fainter on the base; aperture elongated, canal short, twisted.

Length, 55; diameter, 10 mm.

Mayaguez, Porto Rico; Vieques; Culebra. Several specimens were obtained, all young and more or less worn.

***Terebra limatula* var. *acrior* Dall. Plate 57, fig. 6.**

Terebra limatula var. *acrior* Dall, Blake Report, II, p. 66, 1889.

Four badly broken and worn specimens were obtained at Mayaguez Harbor, Porto Rico.

Family CONIDÆ.

Genus CONUS Linnæus, 1758.

Shell solid obconic; whorls enrolled upon themselves, the spire short, smooth, or tuberculate; aperture elongated, narrow, the margins parallel; lip simple, but having a slight sutural sinus.

? *Conus delesserti* Recluz.

Conus delesserti Recluz, Mag. de Zool., pl. LXXII, 1843.

A single badly broken and faded specimen from Boca Prieta, Porto Rico, was obtained, but it is not in condition to be identified with certainty.

***Conus agassizii* Dall.**

Conus agassizii Dall, Blake Report, I, 1886, pl. 1X, figs. 8, 8a, and explanation to plate; II, p. 68, 1889.

Shell spindle-shaped, the outline of the last whorl swollen a little at the middle; entire surface of this whorl except the extreme upper part grooved, the grooves stronger below; lower ridges shouldered; spire high, straight or a little concave; suture distinct, almost channeled; whorls on the spire channeled and sculptured with elegant curved riblets; shoulder sharp and dotted with reddish brown. There are faint revolving series of brown dots on the body whorl, and a few irregular longitudinal brown flames on the spire and body.

Length of specimen obtained, 27; diameter, 14 mm.

Mayaguez, Porto Rico, one fine young shell.

***Conus pygmæus* Reeve.**

Conus pygmæus Reeve, P. Z. S., 1843, p. 179; Kiener, Coq. Vivantes, *Conus*, p. 174, pl. CII, figs. 1, 1a, 1b, 1848.

Several specimens from Aguadilla, Porto Rico, may be this, but they are too badly worn to be determined with certainty. Reeve's figure in the *Conchologia* is utterly worthless.

***Conus verrucosus* Hwass.**

Conus verrucosus Hwass, Encyc. Méth., I, pt. II, p. 708, 1792; Kiener, Coq. Vivantes, *Conus*, p. 55, pl. LXVI, figs. 6, 6a, 1848.

Shell elongate-conical, with a high spire, composed of about ten grooved whorls; suture deep and distinct; shoulder sharp; body whorl nearly straight, grooved except at extreme upper part, each ridge generally bearing a row of small tubercles. Color whitish, irregularly clouded with brown.

Length, 27; diameter, 12 mm.

Mayaguez Harbor, one shell in fair condition.

Conus mus Hwass.

Conus mus Hwass, Encyc. Méth., pt. II, p. 630, 1792; Tryon, Manual, VI, p. 19, pl. v, figs. 72, 73, 1884.

Shell short, with a low, scarcely concave striate spire, which is often tuberculate; body whorl covered with low, revolving striae, which become more pronounced at the base; shoulder well defined. Color ashy or greenish white, with longitudinal brown clouding, which is broken so as to leave a light band on the shoulder and another at the middle of the shell. The whole is covered in a fresh state with a thick, dark epidermis.

Length, 30; diameter, 19 mm.

San Juan; San Geronimo; Aguadilla; Ponce, Porto Rico.

An abundant species, distributed throughout the West Indies, Mexico and Central America, and the Florida Keys.

Conus nebulosus Solander.

Conus nebulosus (Solander) Hwass, Encyc. Méth., II, pt. I, p. 607, 1792; Kiener, Coq. Vivantes, *Conus*, p. 16, pl. XXIV, figs. 2, 2a, 1848.

Spire elevated, concave, tuberculate, striate; shoulder well defined; body whorl generally somewhat granulous, especially at the base, where there may be elevated revolving tuberculated ridges. Color brownish, painted with irregular white spots and blotches, often so as to form a lighter central band. In some cases the white predominates.

Length, 35 to 65; diameter, 20 to 35 mm.

Aguadilla, Porto Rico, three young worn shells.

A beautiful species, having an almost infinite variety of coloring.

Conus testudinarius Hwass.

Conus testudinarius Hwass, Enc. Méth., I, p. 694, 1792.

Conus porto-ricanus Hwass, op. cit., No. 110, p. 714, II, pl. CCCXXVIII, fig. 4.

Porto Rico (Kiener).

Family **PLEUROTOMIDÆ**.Genus **PLEUROTOMA** Lamarck, 1822.

Shell turriculated fusiform; spire long, sharp; aperture ovate, columellar margin smooth, the outer lip with a narrow sinus situated at or above the peripheral keel; the operculum clawlike.

Subgenus **PLEUROTOMA** s. s.**Pleurotoma albida** Perry.

Pleurotoma albida Perry, Conch., Expl. pl. XXXII, fig. 4, 1811.

Shell elongated, with about fourteen or fifteen whorls, the first two nearly smooth, the remainder with fine longitudinal threads and strong, revolving ridges, of which there are three on each of the spire whorls, the central one the strongest. On the body whorl are many revolving ridges which become fainter at the base, and throughout the shell there are fine intermediate revolving threads. Sinus rather shallow, wide, placed at second ridge below the suture; canal long, rather narrow. Upper whorls brownish tinted, rest of the shell white; epidermis thin, horn colored.

Length, 100; diameter, 30 mm.

Boca Prieta; Mayaguez, Porto Rico; a number of young specimens of this fine species.

Subgenus **ANCISTROSYRIX** Dall, 1881.

Whorls concave below the suture, with a wide, deep sinus, bordered externally by an elevated frill, which is directed backward.

Pleurotoma radiata Dall.

Pleurotoma (Ancistrostylax) radiata Dall, Blake Report, II, p. 78, pl. XII, fig. 12, 1889.

Shell clouded pale brown and white, or pale uniform brown; nucleus consisting of two whorls, the first small, oblique and partly immersed, subsequent whorls nine or ten, at first with a sharp, dentate, peripheral keel, which afterwards becomes spinous and posteriorly directed; surface delicately

cancellated by spiral threads and growth lines; carina on last whorl with about twenty-six sharp sawtooth-like spines curved upward; halfway between this crown and the suture is a second smooth, sharp keel, and within is a deep sinus; aperture narrow, elongate.

Length, 18; diameter, 8 mm.

Mayaguez Harbor, Porto Rico, one young specimen.

Genus DRILLIA Gray, 1838.

Shell turriculated, with elevated spire, the last whorl generally shorter than the rest of the shell; outer lip thickened; sinus rather deep, rounded, placed a short distance below the suture. Operculum as in *Pleurotoma*.

***Drillia ostrearum* Stearns.**

Drillia ostrearum Stearns, Proc. Bost. Soc. Nat. Hist., xv, p. 22, 1872; Tryon, Man., vi, p. 197, pl. xxxiv, fig. 79, 1884.

Shell with about ten whorls, which are rather narrowly concavely shouldered above, with straight, strong, longitudinal ribs (about eighteen on the last whorl), which are crossed by numerous revolving threads of two sizes. On the last whorl, just behind the outer lip, there is a strong varix, which is continued upward to the suture; aperture moderately short; canal truncated below. Color varying from yellow to blackish.

Length, 18; diameter, 6.5 mm.

St. Thomas, one yellow-colored specimen.

***Drillia albicoma* Dall.**

Drillia albicoma Dall, Blake Report, II, p. 83, pl. x, fig. 8, 1889.

Shell solid, slender, acute, white, with a simple, polished nucleus of a whorl and a half, followed by nine slightly convex whorls, which have rather strong, flexuous, longitudinal ribs that extend from suture to suture; spiral sculpture consisting of exceedingly fine, wavy threads; last whorl having a stout, high varix near aperture; aperture more than one-third the length of shell, narrowed below.

Length, 25; diameter, 8 mm.

Aguadilla, Porto Rico; one broken shell.

***Drillia eucosmia* var. *canna* Dall.**

Drillia eucosmia var. *canna* Dall, Blake Report, II, p. 86, 1889.

Shell pale, with a peripheral lighter zone; whorls eight; longitudinal sculpture consisting of short, stout ribs, beginning at the fasciole and ending below the middle of the whorl; surface covered with revolving threads.

Length, 19; diameter, 6.5 mm.

Mayaguez, Porto Rico; one specimen of the variety *canna*, in bad condition. The variety is smaller and more slender than the type and has three peripheral spirals.

***Drillia nigrescens* Gray.**

Pleurotoma nigrescens (Gray MS.) Reeve, Couch, Icon., I, pl. xxvi, fig. 235, 1845.

Shell solid; whorls with rather a well-defined but low shoulder, above which they are excavated and finely reticulated. Below the suture there is a rather strong, revolving thread. Ribs numerous, fine and nearly straight, beginning at the shoulder and becoming fainter on the base of the body whorl. Between the ribs are strong revolving liræ, which become stronger and sometimes nodulous on the base; varix low; aperture short, truncate below. Color dark purplish or blackish.

Length, 12; diameter, 4.5 mm.

Mayaguez Harbor, Porto Rico; Ensenada Honda, Culebra; several worn shells.

***Drillia?* *actinocycla*, n. sp. Plate 57, fig. 15.**

Shell minute, thin, brilliant (the type immature), with about seven convex whorls separated by a deep suture; the first four whorls are smooth polished, nepionic and translucent, those following with numerous narrow deeply concave, emphatic, axial ribs, extending from suture to suture but obsolete on the base of the whorl; these are crossed by numerous fine, equal, evenly distributed spiral grooves

with equal threadlike interspaces covering the shell; the later whorls are white with three pale yellow-brown spiral bands, one presutural, one peripheral, and one basal, and wider in that order; pillar straight, white.

Length, 3.5; maximum diameter, 1.5 mm.

Mayaguez, Porto Rico; station 134.

This may prove to be a *Mangilia*, as the aperture is not mature, but is too elegant a shell to pass over on that account.

***Drillia gundlachi*, n. sp.** Plate 57, fig. 17.

Shell solid, slender, pale brown or whitish, with ten whorls (the nepionic whorls lost) strongly appressed at the suture; anal fasciole close to the suture, smooth or faintly spirally striated, rather wide and excavated, notch wide, not very deep; sculpture of about six strong, short, turgid ribs obsolete in front of the periphery and on the last half of the last whorl; these are crossed by from two to five spiral threads stronger on the summits of the ribs, especially the pair which first appear, and faint, finer, spiral striations between the ribs; lines of growth well marked; aperture elongate; outer lip moderately thickened, inner lip and throat white; canal rather wide.

Length, 34; maximum diameter, 9 mm.

Mayaguez Harbor, Porto Rico.

A strong and elegant species.

***Drillia ponciana*, n. sp.** Plate 57, fig. 19.

Shell small, solid, of a warm reddish brown, with the prominences of the sculpture paler, with one and a half smooth nepionic and six and a half subsequent sculptured whorls; a narrow, deep anal fasciole and reticulated sculpture of subequal axial and spiral threads minutely nodulous at the intersections; the spirals on the upper whorls increase from one to three between the sutures, and the posterior spiral is at first very marked; aperture as figured; pillar and throat deep reddish brown, outer lip heavy; notch short, subcircular.

Length, 6.5; maximum diameter, 2.5 mm.

Playa de Ponce, Porto Rico.

A small, solid, and very elegant shell, belonging in the group to which *D. nigrescens* Gray is referred, but different from anything in the National collection.

***Drillia melonesiana*, n. sp.** Plate 57, fig. 20.

Shell small, solid, strong, spindle-shaped, with one or two smooth nepionic and eight strongly sculptured subsequent whorls; type of an ashy brown (possibly in some cases nearly or quite black) with the sculptural prominences white; notch short, subcircular, leaving a narrow, strongly excavated fasciole separated from the suture behind it by a line of half-moon-shaped nodules, though the fasciole is so narrow and deep that at first sight it would be taken for the suture; sculpture essentially as figured, with fine interstitial spirals reticulated by the incremental lines; aperture narrow, not lirate, pillar and throat brownish.

Length, 10; maximum diameter, 4 mm.

Off Point Melones, Porto Rico, at station 144.

A solid, richly sculptured little shell, of which the brown color may be due to fading, though the type is quite fresh-looking. It does not appear to belong to the *D. albinodata* series, but has more sharply cut sculpture.

***Drillia interpleura*, n. sp.** Plate 57, fig. 21.

Shell small, solid, strongly sculptured, with two smooth nepionic and six subsequent whorls; region of the canal and prominences on the ribs whitish, the rest of the shell yellowish brown with a dark reddish brown flammule in the valley between each pair of ribs; sculpture essentially as figured, ribs seven or eight, the outer lip much thickened behind and thin at the outer edge, lirate within; pillar and throat yellowish.

Length, 10; maximum diameter, 4 mm.

Mayaguez Harbor, Porto Rico.

This very pretty little species has a general resemblance to several others, but when a close comparison was made seemed to be not identical with any recorded from the region or contained in the National Museum.

Drillia albinodata Reeve.

Pleurotoma albinodata Reeve, Conch. Icon., 1, pl. XXXVIII, fig. 352, 1846.

Shell solid, with about ten whorls; suture impressed but not deep, with a slight revolving ridge below it, followed by a wide, shallow groove; below this is a somewhat raised nodulous shoulder, the nodules are extended toward the base as faint ribs. Below the shoulder there are three or four feeble revolving ridges which are swollen into nodules where they cross the longitudinal ribs. Besides this the whole surface of the shell is sculptured with exceedingly fine, revolving threads. Varix heavy; aperture short; sinus deep, rounded, nearly closed in front, and above it the upper edge of the last whorl is raised on the penultimate whorl. On the shoulder there is a white band, and there are two white bands on the base of the shell; the rest of it is a dark brown.

Length of specimen from Porto Rico, 12; diameter, 5 mm.

One shell, Playa de Ponce reef.

Drillia albocincta C. B. Adams.

Pleurotoma albocincta C. B. Adams, Proc. Bost. Soc. Nat. Hist. II, p. 3, 1845; Tryon, Man., VI, p. 196, pl. XIV, fig. 6 (as *Drillia zebra* Lam.), 1884.

Shell small, solid, with about eight whorls, with a low shoulder bearing on it a series of tubercles which are sometimes elliptical, and at others form two nearly perfect series. Under the suture there is a low, slightly tuberculous ridge, and between this and the shoulder a wide, shallow groove. Below the shoulder there are several revolving nodulous threads; aperture short, truncate below. The general surface is covered with very fine, revolving threads and is dark brown; the nodules are white.

Length, 10; diameter, 4.5 mm.

Arroyo; Puerto Real; Mayaguez Harbor, Porto Rico.

The two foregoing species belong to a group of closely related and variable forms. Tryon throws a number of them into the synonymy of *Drillia zebra* Lamarck, and it is possible that both the above may be merely forms of that species.

Drillia solida C. B. Adams.

Pleurotoma solida C. B. Adams, Contr. to Conch., p. 61, 1850.

Drillia fuscescens Tryon (in part), Man., VI, p. 193, pl. XIV, fig. 98, 1884.

Shell with eight or nine whorls, with rather strong, oblique, slightly flexuous ribs, which end at the shoulder; above the shoulder is a wide, concave furrow, and between the furrow and the suture is a sharp ridge. Between the ribs are revolving threads which are stronger on the base; aperture short, narrowed below. Color dark brown, the spaces between the ribs on the shoulder lighter.

Length, 10; diameter, 4 mm.

Island of Vieques, one shell, slightly broken.

Drillia thea Dall.

Drillia thea Dall, Proc. U. S. Nat. Mus., VI, p. 328, pl. X, fig. 5, 1883.

Shell with eight whorls, the first one and a half smooth, the others with delicate growth lines, and having about seven or eight strong, slightly curved ribs; these ribs are nearly continuous from the apical whorls to the base of the shell, being only slightly cut by the narrow suture, and becoming a little fainter at the faintly impressed fasciole; varix distinct, canal somewhat drawn out. Color generally that of wet tea leaves.

Length, 15; diameter, 4.5 mm.

Aguadilla; Mayaguez, Porto Rico; one dead and broken shell from each locality.

? Drillia æpynota Dall.

Drillia æpynota Dall, Blake Report, II, p. 96, pl. XXXVI, fig. 10, 1889.

Two young, badly worn shells were obtained in Mayaguez, Porto Rico, which may be this.

Drillia lissotropis Dall.

Pleurotoma (Mangilia) lissotropis Dall, Bull. Mus. Comp. Zool., IX, p. 58, 1881.

Drillia lissotropis Dall, Blake Report, II, p. 91, pl. XI, figs. 3, 4, 1889.

Shell small, with about eight whorls which are slightly convex, and having ten to twelve nearly straight, strong, longitudinal ribs; spaces between the ribs either smooth or delicately spirally striate;

the ribs extend well down over the body whorl, where they fade out; the rather long base is strongly, spirally liriate; varix high; columella nearly straight. Color of the shell white, pink, or purplish.

Length of largest specimen, 8; diameter, 3 mm.

Mayaguez, Porto Rico.

Genus **BORSONIA** Bellardi.

Subgenus **CORDIERIA** Rouault.

? **Borsonia rouaulti** Dall.

Borsonia (Cordieria) rouaulti Dall, Blake Report, II, p. 98, pl. XXXVI, fig. 11, 1889.

Three young, worn specimens, which were obtained at Mayaguez, may be referable to this species, but they are not in condition to be identified with certainty.

Genus **MANGILIA** (Leach) Risso, 1826.

Shell fusiform, imperforate, terminated below in a rather short canal; aperture oval-elongate; lip more or less notched above; no operculum.

Subgenus **CYTHARA** Schumacher, 1817.

Shell longitudinally costate; external surface usually finely granulostriate; outer lip denticulated within; inner lip striate; aperture narrow, elongate.

Mangilia asarca, n. sp. Plate 57, fig. 14.

Shell minute, white, or with faint yellowish flammules, with six brilliantly polished, slender whorls; nepionic shell small, depressed, smooth, subsequent whorls with about ten axial riblets, slightly flexuous near the suture and becoming obsolete anteriorly, the peripheral part of the last whorl smooth or destitute of spiral sculpture, which on the base and canal is well developed and consists of fine striation; notch short, subcircular, leaving no fasciole; outer lip slightly thickened, not liriate within.

Length, 4.5; maximum diameter, 1.5 mm.

Mayaguez, Porto Rico.

This is a small but elegant species, which differs from the majority of its congeners in the absence of the fine, frosty granulation of the surface which is so characteristic of many of them, and in the somewhat obscure development of the axial ribs.

Mangilia balteata Reeve.

Mangilia balteata Reeve, Conch. Icon., III, pl. VII, fig. 57, 1846.

Spire elevated, whorls but slightly rounded, having about six strong, straight, longitudinal ribs, which are nearly continuous and are only partly interrupted by the suture; surface generally sculptured with faint, revolving threads; aperture two-fifths of the length of the shell; canal not lengthened. Color generally whitish, encircled with a median chestnut zone, which is sometimes wanting.

Length, 12; diameter, 4 mm.

Three fragments were obtained in Mayaguez Harbor.

Mangilia densistriata C. B. Adams.

Mangilia densistriata C. B. Adams, Contr. to Conch., 1850, p. 65.

Shell fusiform, with seven whorls, which are shouldered above, and have from eight to twelve strong, nearly straight ribs, the last whorl having but eight ribs; suture deep; surface everywhere covered with fine but sharp, high, revolving threads, which are not interrupted on the ribs; notch in the outer lip shallow; base slightly attenuated; canal wide. Color white; in one specimen there are three faint, broken, revolving bands on the body whorl, which show most distinctly on the ribs; in another there are only a few scarcely perceptible dots on the ribs in two rows.

Length, 6; diameter, 2.25 mm.

Mayaguez Harbor, Porto Rico, one perfect and one broken shell. This agrees very well with the description by C. B. Adams of his *Mangilia densicathrata*. His specimen or specimens were white.

Mangilia psila Bush.

Mangilia psila Bush, Trans. Conn. Acad. Sci., VI, p. 455, pl. XLV, fig. 2, 1885.

Shell elongated, with about nine whorls, each having six straight ribs which are barely interrupted by the suture; the ribs have a slight nodule at the middle of the whorl, and sometimes there is a single pinched-up, revolving ridge on this part of the shell; growth lines delicate; surface covered with very nearly obsolete revolving threads; notch in the outer lip feeble; base slightly attenuated. Color whitish; some specimens having a narrow, median, brownish, revolving band.

Length, 6; diameter, 2 mm.

Mayaguez, Porto Rico, five broken and worn shells.

Mangilia biconica C. B. Adams.

Mangilia biconica C. B. Adams, Contr. to Conch., 1850, p. 65.

Shell small, biconic, with about six longitudinally ribbed, subangular whorls; ribs nearly straight, nine or ten on the last whorl and forming a slight shoulder above, the spaces between the ribs filled with fine, spiral sculpture; aperture rather wide above, narrowed below into a short canal.

Length, 5; diameter, 2.5 mm.

Seven worn and broken specimens were obtained at Mayaguez, Porto Rico. They are in such bad condition that it is impossible to say whether they belong to the typical form, which is banded on the periphery and which sometimes has a secondary band below, or to the variety *alba*, which is entirely white. A specimen from San Juan has some indication of brown banding on the last whorl.

Subgenus DAPHNELLA Hinds, 1844.

Shell thin, fusiform, body whorl elongated; surface cancellated; lip simple, not varicose.

Mangilia morra Dall.

Pleurotoma (Drillia) morra Dall, Bull. Mus. Comp. Zool., IX, p. 69, 1881.

Daphnella morra Dall, Blake Rep., II, p. 105, pl. XII, fig. 1, 1889.

Shell short, fusiform, having six rounded whorls, with a deep suture; sculpture consisting of numerous slightly curved longitudinal riblets and many revolving threads, which cover the entire surface with a nearly evenly cancellated pattern; notch in the outer lip deep; base somewhat suddenly drawn in from the rather swollen body whorl; canal moderate, nearly straight. Color brown.

Length, 3; diameter, 1.25 mm.

A single, somewhat worn specimen was obtained from Mayaguez Harbor, Porto Rico.

Mangilia elata Dall. Plate 54, fig. 17.

? *Daphnella elata* Dall, Blake Report, II, p. 105, 1889.

Five badly broken, worn shells were received from Mayaguez, which are probably this species.

Subgenus GLYPHOSTOMA Gabb, 1872.

Shell fusiform; outer lip thickened into a varix, slightly dentate within, the notch deep and rounded; surface covered with longitudinal ribs crossed by strong, revolving striae, and marked besides with an exceedingly delicate pattern of decussated sculpture.

Mangilia aguadillana, n. sp. Plate 57, fig. 22.

Shell small, slender, solid, nine-whorled, of which the first three are nepionic, smooth and polished, the subsequent elegantly axially ribbed, with two to four primary spiral threads and fine interstitial spiral striation, essentially as figured. Shell white with a superficial brownish tinge on the larger whorls, apex and interior of outer lip of a delicate lilac; outer lip strongly thickened, inner lip and aperture smooth or destitute of the denticulations usually found in this genus.

Length, 14; maximum diameter, 4 mm. A variety *minor* is exactly similar in sculpture, but of a pale-straw color, and is 8.5 mm. long and 3 mm. in maximum diameter.

Aguadilla, Porto Rico; the variety from Mayaguez Harbor, station 6062.

If the absence of the oral processes is not due to immaturity, this form would better be referred to *Clathurella*.

Subgenus *MANGILIA* s. s.***Mangilia luctuosa* d'Orbigny.***Pleurotoma luctuosa* d'Orbigny, Moll. Cubana, II, p. 255, pl. XXIII, figs. 29-31, 1845.San Juan, Porto Rico (Gundlach); Cuba; Guadeloupe. This may not be a *Mangilia*.***Mangilia quadrata* Reeve.***Pleurotoma quadrata* Reeve, P. Z. S., 1845, p. 114; Conch. Icon., I, pl. XXVIII, fig. 253, 1845.

Shell short, fusiform, biangulate on the body whorl; surface covered with strong longitudinal ribs, there being about eight on the body whorl. The shell is cancellated with a set of sharp, revolving threads, that on the shoulder above being particularly strong; there are three of these threads on the body whorl that are stronger than the others, the lower one marking the lower angulation; those of the base becoming fainter; notch in the outer lip shallow; canal rather short.

Length, 4.5; diameter, nearly 2 mm.

Surface whitish, clouded with brown.

Mayaguez, Porto Rico, many worn shells; off Boca Prieta, one dead shell.

Two specimens of the variety *quadrata* were also obtained at Mayaguez.***Mangilia lavalleana* d'Orbigny.***Pleurotoma lavalleana* d'Orbigny, Moll. Cubana, II, p. 174, pl. XXIV, figs. 7, 9, 1845.

A single specimen was obtained at Mayaguez that may be this species, but it is in bad condition and can not be determined with certainty.

***Mangilia* sp.**

A single young, imperfect shell, something like *M. rubella* Kurtz & Stimpson, was obtained at Mayaguez.

Mangilia melanitica* Dall. Plate 58, fig. 10.Mangilia melanitica* (Dall, MS.) Bush, Trans. Conn. Acad. Sci., VI, p. 459, pl. XIV, figs. 3, 3a, 1885.

Shell with a rather slender spire and short base, with nine whorls, the first two rounded and smooth, the rest covered with revolving liræ, of which the median one is strongest, making the shell somewhat angular in the middle of the whorls and shouldered on the last whorl; the four lower whorls have faint, slightly oblique longitudinal ribs; aperture much wider above than below; outer lip slightly thickened; the notch large, deep, and rounded, the lip surrounding it inflated into a raised rim. Color whitish, stained with brown, the aperture and base darker.

Length, 4.5; diameter, 1.5 mm.

Mayaguez, Porto Rico, many worn shells.

Mangilia trilineata* C. B. Adams.Pleurotoma trilineata* C. B. Adams, Contr. to Conch., p. 55, 1845; Tryon, Man., VI, p. 247, pl. XXI, fig. 31, 1884.

Quebradillas, Porto Rico (Gundlach).

Family CANCELLARIIDÆ.

Genus CANCELLARIA Lamarck, 1822.

Shell oval, generally cancellated; last whorl ventricose, with a short canal and strong siphonal fasciole; columella with several oblique plications.

Type, *C. reticulata* Linnæus.

Subgenus CANCELLARIA s. s.

Cancellaria reticulata* Linnæus.Voluta reticulata* Linnæus, Syst. Nat., ed. XII, p. 1190, 1767.*Cancellaria reticulata* Tryon, Man. Conch., VII, p. 69, pl. II, figs. 25, 26, 1885.

Porto Rico (Gundlach); Florida.

Subgenus TRIGONOSTOMA Blainville, 1827.

Shell generally umbilicated, whorls wider and usually shouldered above; aperture trigonal; outer lip not contracted in front; canal obsolete. Type, *Murex scala* Gmelin.

Cancellaria agassizii Dall.

Trigenostoma agassizii Dall, Blake Report, II, p. 130, pl. xxxv, fig. 4, 1889.

Shell with five whorls, the first rounded and smooth, the second gradually becoming cancellated, the subsequent whorls somewhat roundly shouldered above, having very strong, slightly flexuous ribs, ten on the last whorl, and about sixteen strong, revolving lirae, which are slightly nodulous on the ridges; in addition to this there are very fine, longitudinal threads all over the surface; varix on the outer lip but little stronger than the ribs; aperture ovate; outer lip strongly ridged within; canal short, open; columella scarcely callous, the threads running over it into the aperture, and having three plaits; umbilicus nearly closed by the reflected columella. Color reddish brown or brownish orange.

Length, 8; diameter, 5 mm.

A single slightly worn and bleached shell was obtained at Mayaguez, Porto Rico. The species extends north to Cape Hatteras, North Carolina.

Superfamily RHACHIGLOSSA.**Family OLIVIDÆ.****Genus OLIVA Bruguières, 1789.**

Shell oblong, subcylindrical, brilliantly polished; spire rather short; last whorl covering the greater part of the others; aperture elongated, slightly dilated in front; columella vertical, callous, more or less plicate; lip simple, thick, not reflected or toothed within; a sinus above is continued as a canal along the suture; notch at the base short, but well marked. No operculum.

?*Oliva litterata* Lamarek.

Oliva litterata Lamarek, Ann. du Mus., XVI, p. 315, 1809.

Oliva literata Reeve, Conch. Icon., VI, pl. XI, fig. 18, 1850.

This species was found at San Juan, Porto Rico, according to Gundlach. It is quite probable that the specimens he so named were the nearly allied form described in this paper as *O. caribæensis*.

***Oliva reticularis* Lamarek.**

Oliva reticularis Lamarek, Ann. du Mus., XVI, p. 314, 1809.

Oliva reticularis Tryon, Man., V, p. 83, pl. xxx, figs. 90-95, 1883.

Shell rather slender, slightly swollen at the middle; spire somewhat elevated; ridges on the columella numerous and strong. Ground color whitish overlaid with a faint pattern of purplish brown reticulations, which sometimes shows the white as triangular spots. Frequently there are two darker bands near center of outer whorl, and under the suture are clusters of brownish, subvertical lines.

Length, 35 to 50; diameter, 15 to 20 mm.

Aguadilla; Mayaguez, Guanica, Porto Rico, many worn specimens; St. Thomas, one shell; Vieques, one fine specimen taken alive. A dark variety was found at Fajardo, Porto Rico.

***Oliva caribæensis*, n. s. Plate 56, fig. 9.**

Shell rather short and stout, its greatest diameter being near the shoulder; spire low, the suture being deeply channeled; outer lip heavy; columella having a strong white callus extending up for two-thirds of the length of the aperture, where it thins out; columellar plications numerous and distinct but not strong. The ground color is ashy yellow, becoming darker below, overlaid with a close faint reticulation of reddish brown. There are two faint bands of darker reticulations on the outside whorl and splashes and lines of this dark color under the suture. The interior is purplish; the columella is a little lighter colored.

Length, 32; diameter, 15 mm.

Mayaguez Harbor, Porto Rico.

A rather dull and inconspicuous species, the most cylindrical of the Antillean forms and perhaps nearest to *O. litterata* Lamarek.

Genus OLIVELLA Swainson, 1835.

Shell small, polished, oblong; spire acuminate; internal shell absorbed; suture canaliculate; aperture wider below; outer lip but slightly thickened; columella plicate below, with a stronger plication at or near its base. Operculum generally present, oval, elongated, obtuse at its extremities, nucleus subapical.

Olivella jaspidea Gmelin.

Voluta jaspidea Gmelin, Syst. Nat., p. 3442, 1792.

Oliva jaspidea Reeve, Conch. Icon., VI, pl. XXII, fig. 58, 1850.

Shell solid; spire rather elongated; whorls about five; base of the aperture moderately expanded; columella plicate throughout or nearly so, with a slightly thickened wide ridge at or near its base. Color generally ashy or whitish, overlaid with a slate-colored or purplish pattern. This pattern may be indistinct reticulations or zigzags or irregular dots and blotches, and it often shows the white ground in triangular patches. There is almost always a row of dark lines or spots below the suture; there are often faint bands on the body whorl, and sometimes dark markings on the base.

Length, 18; diameter, 8 mm.

Hucare; Aguadilla, Porto Rico; Caballo Blanco Reef, Vieques; Culebra Island.

It is almost impossible to write any description which will fully and accurately cover this abundant and variable species. Some specimens of it are quite slender and not very solid; others are shorter and heavier, and the color pattern varies from white with faint markings to very dark.

Olivella esther Duclos.

Olivella esther Duclos, Monog. Gen. Oliva, pl. III, figs. 7, 8, 1835.

Shell heavy, short, with a rather low spire whose sides are nearly straight; columella with a strong, high, narrow ridge near its base, and a heavy callus above, which extends to the upper part of the penultimate whorl; yellowish white overlaid with a pattern of brown markings, showing tentlike white spots, with darker, broken markings below the suture and near the base. Just at the base there is a distinct, solid band of brown.

Length, 16; diameter, 7 mm.

A large number of worn shells were found at Mayaguez, Porto Rico.

Olivella mutica Say.

Oliva mutica Say, Journ. Acad. Nat. Sci. Phila., II, p. 228, 1822.

Olivella mutica Tryon, Man., v, pl. XIV, figs. 43-55, 1883.

Shell rather small, heavy, with usually a rather short spire, though sometimes it is lengthened; columella feebly plicate, having a fold near its base, strongly callous above. Color ashy white, gray, or bluish, often more or less marked with brownish spots or zigzag lines. In some cases portions of the aperture are very dark.

Length, 7; diameter, 3.5 mm.

A single specimen was obtained in Mayaguez Harbor.

Olivella rotunda Dall. Plate 56, fig. 11.

Olivella jaspidea var. *rotunda* Dall, Blake Report, II, p. 134, 1889.

Shell inflated with a short, rounded but pointed spire; suture canaliculate, deep and narrow, aperture but slightly spread below; columellar area with a strong raised callus, which runs to the top of the penultimate whorl and continues around the upper whorls as a thickened glazing; the columellar callus is longitudinally sculptured with exceedingly delicate, microscopic lire, and is swollen just below its upper end. The columellar plications are numerous and strong, and between the upper and lower set there is an indentation of the columella within.

Color pale ashy yellowish, with faint, irregular, broken, zigzag markings of a darker tint, and there is a yellowish band near the base having a darker streak below it.

Length, 15 to 23; diameter, 7 to 11 mm.

Mayaguez Harbor; Aguadilla, Porto Rico; a number of fine specimens.

The series of fine shells collected by the *Fish Hawk* expedition seems to show that this is a valid species of *Olivella*, as good as the average species in this difficult genus. Its form is something like that of specimens of *O. buplicata* of the West Coast, but the spire is not so elevated as in that species, nor is its base so expanded.

Olivella oryza Lamarek.

Oliva oryza Lamarek, An. sans Vert., VII, p. 439, 1822; Chemnitz, Conch. Cab., II, 1771, pl. I, fig. 548.

Shell small; spire rather short; whorls somewhat rounded; obtuse; columella without teeth, or with but faint indications of them, twisted and ending in a distinct curved plait; columellar area narrowly callous. Color white or milky throughout.

Length, 4; diameter, 1.5 mm.

Mayaguez, Porto Rico, many slightly worn shells.

Lamarck's description is too brief to properly characterize this species, and the figure he refers to in the Conchylien Cabinet is a dorsal view and rather poor.

Olivella nivea Gmelin

Voluta nivea Gmelin, Syst. Nat., p. 3442, 1792.

Olivella nivea Tryon, Man., v, p. 67, pl. xv, figs. 74-88, 1883.

San Juan, Porto Rico (Gundlach); Florida; West Indies.

Olivella verreauxi Duclos.

Olivella verreauxi Duclos, Rev. Crit., p. 97, pl. III, figs. 86 a, b, 1857.

According to Gundlach this form is found at Aguadilla and Quebradillas, Porto Rico.

Family MARGINELLIDÆ.

Genus MARGINELLA Lamarck, 1801.

Shell imperforate, ovoid conical or subcylindrical, porcellanous, smooth and shining, sometimes having longitudinal ridges; spire rather short or often sunken; aperture long; outer lip thickened and sometimes toothed; columella with three or four plaits.

Marginella apicina Menke.

Marginella apicina Menke, Syn. Meth. Moll., p. 87, 1828.

Marginella conoidalis Reeve, Conch. Icon., xv, pl. XVIII, fig. 87.

Shell solid, conoidal; spire low, plane, the suture merely marked by a line; outer lip having a heavy, distinctly marked varix, smooth within; base rounded; columella with four strong, nearly equal plaits, the two lower a very little nearer together than the others; parietal wall callous above.

Color white, amber, or sometimes pale ashy reddish, the nucleus generally reddish and always translucent; there are usually three or four brown blotches just at the back of the varix, one of these on the spire and one at the base of the shell, but they are sometimes partly or wholly wanting.

Length, 12; diameter, 7.5 mm.

Three fine, small specimens were taken on the beach at Mayaguez.

A beautiful, common, and widely distributed species, quite variable in size and coloring. It is often faintly banded.

Marginella hematita Kiener.

Marginella hematita Kiener, Coq. Vivantes, genus *Marginella*, p. 11, pl. VII, fig. 31, 1841.

Shell conoidal, solid, with a rather elevated spire; whorls five, slightly rounded; outer lip heavily varicose, advanced in the middle, with about fifteen teeth inside; base rounded; columella with four very prominent strong, even plaits, which are evenly spaced; columellar area not calloused; surface smooth, sometimes slightly pustulous or pitted. Color purplish or deep red.

Length, 9; diameter, 5.5 mm.

Aguadilla, Porto Rico, one worn shell.

This is a beautiful species when fresh, and is often colored very brilliant deep red.

Marginella striata Sowerby.

Marginella striata Sowerby, Thes. Conch., I, pl. LXXV, figs. 81, 82, 1846.

Shell volutiform; spire moderately produced, the whorls slightly rounded; spire and body whorl covered with straight, longitudinal ribs; outer lip thickened into a distinct varix, strongly crenated within; columella with four strong, equal plaits. Color whitish.

Length, 3; diameter, 1.5 mm.

Mayaguez Harbor, Porto Rico, one worn, broken shell.

Marginella evadne, n. sp. Plate 57, fig. 10.

Shell minute, white, solid, polished; form and proportions essentially as figured; the whorls sculptured by fine, even, axial, close-set striae, obsolete anteriorly; the aperture narrow; the pillar lip with six or seven close-set plaits, enlarging anteriorly, the most anterior being considerably the largest; outer lip not marginate; in fully adult specimens minutely crenulate within.

Length, 2.5; maximum diameter, 1.5 mm.

Mayaguez Harbor, Porto Rico.

This species needs to be well magnified and closely scrutinized to reveal its peculiarities. When worn the striation is often destroyed. The specimen figured had not acquired the crenulation of the outer lip. There is an allied species with short rather prominent small riblets on the shoulder of the whorls which is found in the West Indies, but it can not be confounded with the present one if the characters be attended to.

Section VOLVARINA Kinds.

Marginella torticula Dall.

Marginella torticula Dall., Bull. Mus. Comp. Zool., IX, p. 73, 1881.

Marginella torticula Dall., Blake Report, II, p. 141, pl. XIX, fig. 7, 1889.

Shell slender, glossy, grayish waxen white, with about five whorls; spire roundly pointed, glazed so as to nearly cover the sutures, last whorl appressed on the shoulder; axis laterally curved so that the spire and base turn to the right; aperture long, narrow; columella with four very oblique plaits; outer lip simple, not reflected, slightly thickened and produced posteriorly; canal wide.

Length, 11.5; diameter, 3.75 mm.

Mayaguez Harbor, one young and one badly broken adult shell.

Marginella avena Valenciennes.

Marginella avena Valenciennes in Kiener, Coq. Viv., *Marginella*, p. 17, pl. VI, fig. 24, 1841.

Shell elongated, with an elevated, somewhat glazed spire; aperture long and narrowed above; outer lip thickened and slightly varicose, somewhat incurved at middle; columella curved, armed with four strong plaits, lower ones a little the heaviest. Color milky white or subtranslucent, generally having three wide, faint bands of yellowish brown on body whorl that are usually more or less broken.

Length, 12; diameter, 5 mm.

Aguadilla, Porto Rico, three worn shells; Ensenada Honda, Culebra, two shells.

Marginella albolineata d'Orbigny.

Marginella albolineata d'Orbigny, Moll. Cubana, II, p. 99, pl. XX, figs. 27-29, 1845.

Shell elongated, rounded and rather inflated above, somewhat narrowed below; spire low, bluntly pointed, glazed; aperture long, narrow above, wider below; outer lip incurved a little at the middle, slightly thickened and varicose; columella curved below, with four elevated plaits, the lower a little stronger. Color yellowish white or amber, with from three to five more or less developed brownish bands, which show more distinctly on the varix.

Length, 9; diameter, 4 mm.

Ensenada Honda, Culebra, one shell.

Marginella lactea Kiener.

Marginella lactea Kiener, Coq. Viv., *Marginella*, p. 42, pl. XIII, fig. 3, 1841.

Shell rather small, with a moderately developed glazed spire; outer lip thickened a little, scarcely varicose, incurved in the middle; columella nearly straight, with four strong, nearly even plaits. Color milky white throughout.

Length, 7; diameter, 3 mm.

Mayaguez, Porto Rico, one shell; Ensenada Honda, Culebra, six specimens. Close to the last, but having a rather higher spire and differing in color pattern.

Marginella fusca Sowerby.

Marginella fusca Sowerby, P. Z. S., 1846, p. 95.

Marginella fusca Sowerby, Conch. Icon., XV, pl. XVII, fig. 82, 1865.

Shell elongated, with rather elevated, glazed, pointed spire; outer lip with a delicate, narrow varix ascending the spire, decidedly incurved at the middle; columella nearly straight, with four oblique plaits, the lower the strongest; parietal callus widened below. Color smoky brownish, with two or more wide, faint, darker bands.

Length, 8; diameter, 3.5 mm.

Arroyo, Porto Rico, one specimen.

Marginella subtriplicata d'Orbigny.

Marginella subtriplicata d'Orbigny, Moll. Cubana, II, p. 99, pl. xx, figs. 30-32, 1845.

Shell elongated, subcylindrical; spire glazed, of moderate height; outer lip scarcely thickened, much advanced at the middle, where it is slightly inflected; aperture narrow, a very little wider below; columella straight, with three moderate, equal plaits, and sometimes a faint indication of a fourth one above; parietal wall with a narrow callus. Color yellowish white.

Length, 10; diameter, 4 mm.

Ensenada Honda, Culebra, one adult and two young specimens.

Marginella pallida Donovan.

Bulla pallida Donovan, Brit. Shells, pl. LXVI, fig. 527, 1800.

Shell cylindrical, thin but strong, with a low, bluntly pointed spire; outer lips scarcely thickened but rounded on its edge, very slightly incurved in the middle; columella rather sharply curved, with four moderate, very oblique plaits, the two lower a little nearer together and elevated on a twisted ridge that forms the termination of the columella. Color whitish or straw color.

Length, 15; diameter, 7 mm.

Mayaguez, Porto Rico, one shell; Caballo Blanco Reef, Vieques, one young specimen.

Subgenus **PERSICULA** Schumacher, 1817.

Shell bulliform, with spire depressed or sunken, generally marked with broken bands of color; outer lip denticulated; inner lip callous above, having four plaits below and smaller ones above them.

Marginella catenata Montagu.

Marginella catenata Montagu, Test. Brit., p. 236, pl. vi, fig. 2, 1803.

Shell obtusely ovate; spire concealed, covered by the last whorl, which incloses it with a plicate edge, and this is sometimes overlaid with callus; aperture narrow, curved, slightly wider below; outer lip having fine plications within; columella heavily callous, with four strong plaits below and a few fainter ones above; base slightly notched. Color whitish, with chain-like revolving bands of milk-white and brownish markings.

Length, 3.5; diameter, 2.5 mm.

Mayaguez, Porto Rico, two badly worn shells. The specimens are in such condition that they can only be referred to this species with doubt.

Marginella catenata var. **pulcherrima** Gaskoin.

Marginella pulcherrima Gaskoin, P. Z. S., 1849, p. 21.

Marginella pulcherrima Tryon, Man., v, p. 39, pl. XI, fig. 30, 1883.

Has the form of *M. catenata*, but the ground color is pale brown, with revolving rows of white spots. The callous nucleus is painted with a brown, many-pointed star, and there are two wide, whitish bands on the body whorl bearing vertical brown lines. At each edge of these light bands is a row of dark, minute spots, and there is a little dark color on the base.

Mayaguez, Porto Rico, one beautiful shell.

Marginella interrupte-lineata Muhlfield.

Marginella interrupte-lineata Muhlfield, Berl. Mag. Naturf. Fr., 1818, p. 6, figured.

Mayaguez, Porto Rico (Gundlach).

Subgenus **VOLUTECLA** Swainson.

Spire somewhat elevated, but wholly concealed by the last whorl; outer lip thickened and varicose; columella with three or four plaits.

Marginella ovuliformis d'Orbigny.

Marginella ovuliformis d'Orbigny, Moll. Cubana, II, p. 101, pl. xx, figs. 33-35, 1845.

Shell minute, glassy white, swollen above; outer lip heavy, developed into a well-marked varix which extends on to the spire and is feebly denticulated within; aperture narrow and of about even width throughout; columella with three plications.

Length, 1.75; diameter, 1 mm.

Mayaguez, three shells.

Family VOLUTIDÆ.

Genus **VOLUTA** (Linnæus, 1758) Lamarck, 1799.**Voluta musica** Linnæus.*Voluta musica* Linnæus, Syst. Nat., ed. x, p. 733, 1758; Reeve, Conch. Icon., vi, pl. VIII, 1849.

San Juan, Porto Rico (Gundlach); West Indies.

Family TURBINELLIDÆ.

Genus **TURBINELLA** Lamarck, 1799.Subgenus **VASUM** Link, 1807.**Turbinella muricata** Born.*Voluta muricata* Born, Mus. Vind., p. 233, 1780.*Turbinella muricata* Reeve, Conch. Icon., IV, pl. VII, fig. 35, 1847.

Mayaguez, Porto Rico (Gundlach); West Indies; Florida Keys.

Family MITRIDÆ.

Genus **MITRA** Lamarck, 1799.

Shell solid, fusiform; spire elevated, pointed; aperture narrow, notched in front; outer lip not reflected, thickened and smooth within; columella transversely, somewhat obliquely plicate; no operculum.

Mitra barbadensis Gmelin*Voluta barbadensis* Gmelin, Syst. Nat., p. 3455, 1792.*Mitra pieta* Reeve, Conch. Icon., II, pl. XVI, fig. 123, 1844.

Shell with about eight nearly flat whorls, covered with somewhat distant, raised, revolving threads; besides this the surface is covered with a pattern of microscopic revolving and longitudinal liræ, making the spaces between the larger threads decussated; suture shallow, but well marked; aperture elongated, wider below; columella with four whitish plaits, the lower one quite faint. Color light brown, sometimes with longitudinal white bands, and often blotched with white.

Length, 35; diameter, 13 mm.

Guanica, Porto Rico; Caballo Blanco Reef, Vieques.

Mitra nodulosa Gmelin.*Voluta nodulosa* Gmelin, Syst. Nat., p. 3445, 1792.*Mitra granulosa* Reeve, Conch. Icon., II, pl. IX, fig. 62, 1844.

Shell with about ten whorls, which are scarcely rounded but are narrowly shouldered above; suture distinct, impressed; surface sculptured by longitudinal ribs, which are cut by revolving furrows into coarse, rounded nodules, there being four of these furrows on the upper whorls and twelve on the body whorl; aperture scarcely widened below; basal notch deep; columella with four plaits, the upper strong, the lower faint. Color varying from pale to dark brown; the teeth whitish.

Length, 35; diameter, 13 mm.

Aguadilla, Porto Rico, one young shell.

Mitra hanleyi var. **gemmata** Sowerby.*Mitra gemmata* Sowerby, Thes. Conch., sp. 334, fig. 649, 1874.

Shell somewhat biconic, with about seven whorls, there being a single row of strong, somewhat longitudinal nodules on the center of the whorls; above the nodules the shoulder is slightly concave; the surface is sculptured with faint, longitudinal riblets crossed by almost obsolete microscopic striae; aperture rather short, slightly drawn out below; columella with three plaits.

General surface purplish black or very deep brown; the large nodules on center of whorls are white.

Length, 7; diameter, 3 mm.

Ensenada Honda, Culebra, two young shells.

A beautiful little form, probably a variety of *Mitra hanleyi* Dohrn (1862), not of Sowerby (1874).

Mitra straminea A. Adams.

Mitra straminea A. Adams, P. Z. S., p. 132, 1851.

Mitra straminea Tryon, Man., IV, p. 140, pl. XLI, fig. 188, 1882.

Shell small, slender, with about eight somewhat rounded whorls, which are sculptured by strong, sharp revolving ridges; there are four or five of these on the upper whorls and fourteen to sixteen on body whorl; between the revolving ridges the surface is sculptured with sharp, longitudinal threads; aperture elongated, scarcely wider below; columella three-plaited. Color yellowish white.

Length, 15; diameter, 5 mm.

Mayaguez, Porto Rico, three worn and broken young shells.

Mitra microzonias Lamarck.

Mitra microzonias Lamarck, An. sans Vert., VII, p. 320, 1822.

Mitra microzonias Tryon, Man., IV, p. 183, pl. LIV, figs. 568, 569, 1882.

San Juan, Porto Rico (Gundlach); West Indian region.

Genus MITROMORPHA A. Adams, 1865.

Shell small, somewhat elongate and biconic, with a globose nucleus; aperture scarcely or not at all notched behind; columella nearly straight, generally having faint vestiges of oblique plaits, which do not extend far into the shell; surface sculptured.

Mitromorpha buplicata Dall.

Mitromorpha buplicata Dall, Blake Report, II, p. 165, pl. xxxv, fig. 1, 1889.

Shell biconic, cancellated, yellowish or whitish, with brown flammules; nucleus glassy, of one and a half turns, other whorls five or six, slightly rounded; aperture not widened below; columella with two fairly strong plaits; outer lip lirate within.

Length, 7; diameter, 3 mm.

A fragment having a perfect aperture was found at Mayaguez.

Family FASCIOLARIIDÆ.

Genus FASCIOLARIA Lamarck, 1801.

Shell imperforate, fusiform, solid; spire rather elevated, sharp pointed; aperture oval-oblong, with a canal in front; outer lip simple, furnished with liræ internally; columella concave, having a few oblique plications at its base. Operculum oval, pointed at the summit; its nucleus apical.

Fasciolaria gigantea Kiener.

Fasciolaria gigantea Kiener, Coq. Viv., *Fasciolaria*, p. 5, pls. x, xi, 1840.

Shell very large, solid, fusiform, with about ten whorls; spire well elevated, pointed; growth lines strong and irregular; the surface is covered with a series of more or less strongly developed, rounded, revolving ribs, and between these there are fainter ones; near the center of the whorls there is a row of large nodules, which are somewhat distantly spaced and which fade out on the body whorl; aperture ovate-oblong, the outer lip more or less ridged within; canal long, open, and slightly recurved; columella incurved, furnished with three folds below. The surface is salmon or chamois colored, and is covered with a strong, reddish-brown epidermis, which cracks and peels off when the shell is dry. The aperture varies from dirty straw color to deep salmon or reddish. Animal deep red.

Length, 16 inches to 2 feet; diameter, 7 to 10 inches.

Mayaguez, Porto Rico, one very young shell.

This is one of the largest of the Gastropods, being excelled in size only by the *Megalatractus aruanus* of Australia. The species varies much in the development of the tubercles, in some cases being almost destitute of them, and in others they are very strong and scarcely diminish in size on the last whorl. It is abundant in the waters of the Southeastern States, and differs from the *F. princeps* of the Pacific coast by the smooth external surface of its operculum.

Fasciolaria tulipa Linnaeus.

Murex tulipa Linnaeus, Syst. Nat., ed. x, p. 754, 1758.

Fasciolaria tulipa Kiener, Coq. Viv., *Fasciolaria*, p. 2, pls. I, II, 1840.

Shell with about nine somewhat rounded whorls, with a deep, well-defined suture, with irregular, impressed growth lines and revolving sculpture. This sculpture may consist of rather sharp, close

ridges of various sizes, separated by concave furrows, or the surface may be scarcely marked by narrow, widely spaced grooves; the sculpture is stronger just below the suture, where it always becomes slightly nodulous, and on the base of the shell; spire of moderate height; aperture elongate-oval, the outer lip lirate within and marked on its inner edge with dark lines, which are often elevated into slight ridges and end in toothlike projections; canal of moderate length, slightly reflexed, open; columella incurved, with two or three folds below. The color pattern is variable. It is sometimes ash colored, overlaid with irregular, dull-brown markings and blotches, which may be disposed in faint wide bands. In other specimens the ground is nearly white, with blotches and cloudings of pale chocolate, salmon, or reddish, the revolving furrows being marked with darker color.

Length, 150; diameter, 65 mm.

Guanica; Ponce Reefs; Hucares; San Juan; Fajardo; Boqueron Bay, Porto Rico; Southeastern States; West Indies; Mexico and Central America.

The specimens living in brackish water are more strongly sculptured, duller colored, and rougher than those found living on open beaches, and are probably worthy of a varietal name. The species is larger than the allied *E. distans*, with which it has been sometimes confounded, and is always somewhat sculptured below the suture, while *distans* is not. As in the case of the *Strombus pugilis*, the more southeastern the locality the more pale the salmon coloration which characterizes the shell.

Genus *LATIRUS* Montfort, 1810.

Shell turriculated or oval fusiform; aperture oval-oblong; outer lip lirate within; columella with two or three faint folds below. Operculum oval-elongated, unguiculate, arcuate, concave at the columellar border; nucleus apical.

Subgenus *LEUCOZONIA* Gray, 1847.

Shell oval-fusiform, carinated, spire moderate, canal rather short; columella subflexuous.

Latirus cinguliferus Lamarek.

Turbinella cingulifera Lamarek, An. sans Vert., VII, p. 107, 1822.

Turbinella cingulifera Reeve, Conch. Icon., IV, pl. III, fig. 17, 1847.

Shell solid, with a moderately developed spire and having about eight whorls. The form and sculpture of the whorls vary remarkably. In some cases there is a revolving row of strong tubercles on the middle of the whorls, which forms a well-marked shoulder on the body whorl; in other cases the shell is absolutely destitute of nodules and the whorls are slightly rounded, and there is every possible variation between these extremes. The growth lines are strong and irregular, and the surface is covered with faint, revolving threads, so that it is more or less reticulated. The aperture is elliptical; the outer lip is generally lirate within, though sometimes it is nearly smooth. Above the base there is usually a sort of revolving ridge which ends in a small tooth or projection on the outer lip. The canal is rather short and recurved; the columella bears about four faint plaits, and the shell is often falsely umbilicate at its base. Color light brown to nearly black. There is generally a narrow, white band on the ridge just above the base.

Length, 55; diameter, 30 mm.

Guanica; Ponce reefs; Playa de Ponce; Cabo Rojo light, Porto Rico; Ensenada Honda, Culebra; West Indian region generally.

Latirus ocellatus Gmelin.

Buccinum ocellatum Gmelin, Syst. Nat., p. 3488, 1792.

Turbinella ocellata Reeve, Conch. Icon., IV, pl. VIII, fig. 38, 1847.

Shell solid, short, fusiform, with a row of nodules on the middle of the whorls, which becomes a strong ridge on the shoulder of the body whorl. There is a small, or secondary, row of nodules in the concave space above the shoulder. The surface of the shell is covered with small revolving ridges, and between these there are fine raised threads, and these are crossed by the distinctly marked growth lines, making the surface reticulate. Outer lip lirate within; canal short; columella with three folds. Color dark brown or bluish, the nodules white, and there are often broken white bands on the body whorl; aperture bluish white, with a dark-spotted border.

Length, 27; diameter, 18 mm.

Caballo Blanco, Vieques, two specimens; Puerto Real, Porto Rico, one shell; West Indian region generally.

Subgenus *LATIRUS* s. s.

Shell fusiform, turricated, subumbilicated; spire produced; whorls nodulous.

***Latirus brevicaudatus* Reeve.**

Turbinella brevicaudata Reeve, Conch. Icon., IV, pl. x, fig. 50, 1847.

Shell with about ten somewhat rounded whorls; spire elevated; whorls with about eight strong, rounded, nodulous, longitudinal ribs; surface covered with numerous, sharp, revolving ridges, and in the interstices of these there are smaller revolving ridges and liræ; aperture round-elliptic, the outer lip lirate within; canal rather short, recurved; columella with three or four plaits. Color reddish brown; revolving ridges darker.

Length, 40; diameter, 18 mm.

Off Point Melones, Porto Rico, one young shell.

***Latirus infundibulum* Gmelin.**

Murex infundibulum Gmelin, Syst. Nat., p. 3554, 1792.

Turbinella infundibulum Reeve, Conch. Icon., IV, pl. 1, fig. 3, 1847.

Shell elongate-fusiform, with about eleven whorls; spire elevated; whorls somewhat rounded, sculptured, with six or seven strong, nodulous, rounded, longitudinal ridges. On the upper whorls there are four or five strong, revolving ridges, and rarely a revolving thread in the interstices. Aperture long, ovate; outer lip strongly lirate within; parietal wall heavily callous, the callus sometimes being raised into a sharp lip; columellar plaits four; canal long, narrow. At the base of the shell there is a false umbilicus. Color reddish brown, the revolving ridges darker.

Length, 65; diameter, 23 mm.

Mayaguez Harbor; Porto Rico; off Vieques.

Family BUCCINIDÆ.

Genus *PISANIA* Bivona, 1852.

Shell oblong, smooth or spirally striated; spire prominent; outer lip thickened and crenated within; canal short; operculum ovate, nucleus apical.

***Pisania pusio* Linnæus.**

Murex pusio Linn, Syst. Nat., ed. x, p. 754, 1758.

Buccinum pusio Reeve, Conch. Icon., III, pl. VI, fig. 43, 1846.

Shell somewhat elongated, having about ten or eleven slightly convex whorls; growth lines strong and almost riblike on the upper whorls, the first one and one-half being nearly smooth, the next four or five nodulous, and the next one and a half reticulated. Below this the sculpture fades out until the lower whorls are smooth. The last whorl is a little concave below the suture. Aperture fully half the length of the shell; outer lip thickened and somewhat varicose, lirate within, toothed on its outer edge; canal short, truncated; inner lip callous, the callus rising into a lip. There are frequently a few denticles on the base of the columella. On the parietal wall at the upper end of the aperture there are two white plaits, and above this there is a canal. Color purplish brown, with narrow, revolving, darker bands, which are articulated with arrowheaded white spots.

Length, 45; diameter, 20 mm.

Caballo Blanco Reef, Vieques.

Genus *TRITONIDEA* Swainson, 1840

Shell bucciniform, generally cancellated, having a thick epidermis; spire pointed; aperture elliptical, canaliculate above; outer lip thickened and varicose, lirate within; columella concave; parietal wall with a tooth above. Operculum unguiculate.

***Tritonidea tinctoria* Conrad.**

Pollia tinctoria Conrad, Proc. Acad. Nat. Sci. Phila. 1846, p. 25, pl. 1, fig. 9, 1846.

Shell with a conical spire, the whorls but slightly convex, with low rounded longitudinal ribs, which are crossed by revolving riblets. Between these riblets there are revolving liræ, and there is a

constriction at the upper part of the shoulder which cuts off the longitudinal ribs and leaves a row of nodules. Outer lip thick, varicose, strongly ridged within; inner lip generally having a series of nodulous plaits, and one strong plait above just below the angle. Color purplish brown, variegated and clouded with white, the clouding often in somewhat longitudinal patterns.

Length, 25; diameter, 15 mm.

Cabo Rojo Light, Porto Rico, a few worn shells; West Indies; also found on the Florida coast.

Tritonidea tinctoria var. **bermudensis** Dall.

Tritonidea var. *bermudensis* Dall, U. S. Nat. Mus. Coll.

Shell smaller, more slender and delicate than the type and with rather sharper sculpture. Boqueron Bay, Porto Rico, one shell; also in Bermuda.

Tritonidea auritula Link.

Nassarina auritula Link, Besch. Rostock Samml., III, p. 124, 1807.

Buccinum coromandelianum Reeve, Conch. Icon., III, pl. IX, fig. 62, 1846.

Shell solid, rather short; spire conoidal; whorls slightly rounded, the last with about eleven strong longitudinal ribs which are carried up the spire; whorls high, shouldered, with the surface concave above; the revolving sculpture consists of strong ribs (ten to twelve on the last whorl), and besides these ribs there are everywhere intermediate threads that are slightly decussated by the growth lines. Just below the suture there is a row of strong nodules. Outer lip varicose; having a very prominent tubercle where the subsutural row ends, strongly ridged within. Columellar area tubercular with a strong, deep, entering plait above. Color brownish, clouded irregularly with white.

Length, 22; diameter, 15 mm.

Aguadilla, Porto Rico; Ensenada Honda, Culebra; Caballo Blanco Reef, Vieques; several dead shells.

Though normally quite different from *T. tinctoria*, the two forms often approach each other until it is difficult to separate them, and each has often been taken for the other. This species is shorter and in general stouter than *tinctoria*; it has a more pronounced shoulder, and the strong tubercle at the upper part of the outer lip is a decided character.

Tritonidea orbignyi Payraudeau.

Buccinum orbignyi Payraudeau, Cat. Moll. de Corse, p. 159, pl. VIII, figs. 4-6, 1826.

Shell rather small, with eight whorls which vary from flattened to rounded, covered with longitudinal rounded ribs (from twelve to fifteen on the last whorl) and numerous revolving ribs, the whole being overlaid with revolving threads; outer lip varicose, toothed within; aperture somewhat elongated; canal slightly produced; columella wrinkled. Color brownish yellow with darker markings on the back of and between the ribs, with a narrow white band below the periphery.

Length, 18; diameter, 10 mm.

Ponce, Porto Rico, one shell; Culebra, one young specimen.

An abundant form in the Mediterranean.

Genus NASSARINA Dall, 1886.

Shell with the general characters of *Nassarina* but more compact, spindle-shaped, and small; aperture long, columbelliform, and narrowed below; columellar margin elevated and united above by a high callus with the outer lip.

Nassarina glypta Bush.

Mangilia? glypta Bush, Trans. Conn. Acad. Sci., VI, p. 461, pl. XLV, figs. 5, 5a, 1885.

Shell with about eight whorls which are but slightly rounded, but which are separated by a very deep, sharply defined suture; sculpture consisting of rounded longitudinal ribs, and these are cut by shallow, revolving grooves into low, irregular nodules; aperture ovate-elongate, narrowed and turned back below. Color whitish, with a faint, revolving brown band below the suture and another on the base of the shell.

Length, 3.5; diameter, 1.5 mm.

Mayaguez, Porto Rico, one worn shell.

Nassarina metabrunnea, n. sp. Plate 57, fig. 16.

Shell small, solid, acute, whitish, with the apical region brown and also the pillar and canal; suture appressed; shell sculptured with numerous axially directed, narrow, close-set ribs, persistent to the base, crossed by fine spiral threads with wider interspaces, substantially as figured; nepionic whorls three, smooth, polished; sculptured whorls about five and a half; outer lip internally lirate; inner lip smooth.

Length, 6.5; maximum diameter, 2.5 mm.

Mayaguez Harbor, Porto Rico.

Much more delicate and different in sculpture from the preceding and the following species. The color may vary, but if not it would be well distinguished by its white shell with two brown ends.

Genus PHOS Montfort, 1810.

Shell oval-oblong, acuminate, turrlicated, cancellated; spire elevated; aperture oval-elongate; lip ridged within and having a small sinus below; base sharply notched; columella with one or two folds at the base. Operculum claw-shaped, slightly curved, nucleus apical.

Phos candei d'Orbigny.

Cancellaria candei d'Orbigny, Moll. Cuba., II, p. 129, pl. XXI, figs. 23-25, 1845.

Shell with nine or ten rounded whorls, the first two or two and a half having merely a sharp, revolving, central keel; below this it is sculptured with numerous slightly curved, longitudinal ribs (about sixteen on the last whorl), which are crossed by revolving threads of three sizes, alternating one with the other; and the surface is minutely decussated by fine growth lines; aperture ovate-elongate; outer lip thick, with a varix some distance back of its edge, and in some examples there are varices scattered over the shell; the liræ on the inner side of the outer lip extend in for half a whorl or more; notch near the base of the lip well marked, sometimes quite decided, as in *Strombus*; notch at the base deep; columella with two folds at its base, the upper faint; sometimes there are a few nodulous plaits above, and there is a plait at the upper part of the parietal wall. Color yellowish white to brownish, with darker, faint, broken bands.

Length, 25; diameter, 12 mm.

Aguadilla; Mayaguez, Porto Rico.

A large number of specimens were received, dry and alcoholic, showing a great deal of variation. In some specimens there are varices scattered over the shell, marking all the rest periods; in others there is only the one varix behind the outer lip. The degree of coarseness of the sculpture varies much, and in some shells the color is stronger where the bands cross the ribs.

Phos parvus C. B. Adams.

Triton parvus C. B. Adams, Contr. to Conch., 1850, p. 59.

Phos intricatus Dall, Proc. U. S. Nat. Mus., VI, p. 325, pl. x, fig. 9, 1883.

Shell rather small, with about eight whorls, which are separated by a deep suture; sculptured with eleven strong, distinct, elevated, rounded, longitudinal ribs; these are crossed by sharp, revolving riblets, which form nodules on the longitudinal ribs; one of these above the center of the whorls is stronger, causing the shell to be shouldered; there are fine, revolving threads between the ribs which cross the growth lines, making the surface finely reticulate; aperture elongate-ovate; varix just behind the outer lip very high and strong; the subbasal notch of the lip feeble; columella scarcely plicate below. Color pale brownish, the nodules darker; there is a white band below the middle of the body whorl that shows on the bases of the upper whorls.

Length, 16; diameter, 7 mm.

Mayaguez Harbor, Porto Rico, one shell.

Phos oxyglyptus, n. sp. Plate 57, fig. 18.

Shell small, delicately and sharply sculptured; nepionic whorls three, polished, peripherally keeled smooth; subsequent whorls six, sculptured as in *P. candei* d'Orbigny, with subequal axial and spiral ridges and occasional varices; between the primary spirals is usually a minute intercalary thread (not shown in the figure); aperture lirate on pillar, body and outer lip, the latter with a deep sinus, as in *Strombus*, near its anterior end.

Length, 17; maximum diameter, 6.5 mm.

Mayaguez, Porto Rico, two specimens.

This species is near to *P. candei*, from which it differs by its smaller size, more delicate sculpture, proportionally deeper labial sinus, and absence of brown flammulation. In a specimen of *P. candei* of the same length as the adult *P. oxyglyptus*, the shell is more conical and the last whorl emphatically wider.

Genus STRONGYLOCERA Mörch, 1852.

Shell with elevated, sharp spire, cancellated; the whorls slightly shouldered above; aperture long-ovate; outer lip somewhat thickened and lirate within, not emarginate below; columella sharply twisted and having one or two folds below. Operculum lozenge-shaped, pointed in front and behind, concentric with a nearly central nucleus, something like that of *Buccinum*.

Strongylocera uncinata Say.

Nassa uncinata Say, Journ. Acad. Nat. Sci. Phila., v, p. 211, 1826.

Phos guadeloupensis Tryon, Man., III, p. 219, pl. LXXXIII, figs. 512, 520, 1881.

Shell with eight or nine somewhat rounded, slightly shouldered whorls, with nearly straight, longitudinal, rounded ribs (about twelve on the last whorl); these are crossed by alternately coarser and finer revolving ridges; outer lip thickened, strongly ridged within; base deeply notched; aperture long-oval; columella raised into a slightly elevated inner lip, with one revolving rib on its base and a faint one above it. To the left of the columella near the base there is a strong, low, revolving ridge that ends at the basal notch; parietal wall without a ridge above. Color varying from whitish or bluish white to light or dark brown. There is generally a narrow dark band below the shoulder, and there are often dark blotches at the suture.

Length, 22; diameter, 11 mm.

Ponce; San Juan; Fajardo, Porto Rico.

This species has been placed in both *Nassa* and *Phos*, but the operculum is quite different from that of either.

Genus ENGINA Gray, 1839.

Shell oval-conic, thick, nodulous; spire acuminate; lip thick, denticulate within; canal truncated; columellar border wrinkled. Operculum claw-shaped, summit sharp, the nucleus apical.

Engina turbinella Kiener.

Purpura turbinella Kiener, Coq. Viv., p. 29, pl. IX, fig. 25, 1835.

Shell rather short, seven-whorled, with a nearly straight, conical spire; there is a well-defined ridge or carina at the periphery, and below this the shell tapers evenly to the base; there is a row of low tubercles just above the suture, extending around the periphery of the last whorl, and these tubercles sometimes are continued as faint, longitudinal ribs; the surface is finely reticulated with delicate, revolving threads which cross the growth lines; aperture long-ovate, somewhat narrowed and drawn out below; outer lip thickened and varicose, with from four to six nodules within, the upper separated some distance from the others; under lip having a sharp, raised edge, and slightly nodulous-wrinkled.

Color reddish brown to black. There is a white band at the row of nodules, which is often broken so that only the nodules are white.

Length, 11; diameter, 7 mm.

Ponce; Puerto Real; Aguadilla, Porto Rico; Ensenada Honda, Culebra; numerous dead and worn shells.

Family NASSIDÆ.

Genus NASSA Lamarck, 1799.

Shell imperforate, solid, oval to elongated; spire pointed; aperture oval; lip thickened by a varix, lirate within; border of the columella reflected over the ventral part of the shell, often forming a heavy, widespread callus; columella twisted and truncate at the base, with a single fold below. Operculum oval or unguiform, its edges toothed, truncate at the apex, its nucleus apical.

Nassa vibex Say.

Nassa vibex Say, Journ. Acad. Nat. Sci. Phila., II, p. 231, 1822.

Nassa vibex Say, Am. Conch., pl. LVII, fig. 2.

An exceedingly abundant, widespread, and variable species, and it is difficult to give a description which will cover all the mutations. The shell varies from being quite obese to elevated; it has eleven or twelve longitudinal ribs; these are crossed by finer, revolving ridges or threads which make the summits of the longitudinal ribs somewhat nodulous. The shell is somewhat shouldered and is sometimes almost concave above the shoulder; below the suture there is an elevated, revolving ridge, which is sometimes cut into nodules by the longitudinal sculpture. The aperture is short, with a canal above, and is somewhat rhomboidal in shape. The outer lip is thickened and has from four to ten liræ within. The columellar callus spreads over the under side of the shell, and is sometimes thick and strong, and sometimes thin; it is slightly nodulous or wrinkled within the opening. The color varies from nearly white through ashy to dark brown or nearly black, and there is generally a light band at and above the periphery; the callus and lip are whitish or yellowish.

Length, 10 to 15; diameter, 6 to 10 mm.

San Juan, Porto Rico, a number of specimens; West Indian region, and the southeastern United States.

Nassa ambigua Montagu.

Buccinum ambiguum Montagu, Test. Brit., pl. IX, fig. 7, 1803.

Another abundant and exceedingly variable species. It is a short, rather solid form, with generally well-rounded or shouldered whorls, and a distinct, deep suture, which is sometimes canaliculate. There are thirteen or fourteen nearly straight, well-defined, rounded ribs, which are continuous from suture to suture, or to the base of the shell, and in addition there are distinct growth lines. These are crossed by numerous fine, revolving ridges, which are sometimes even and occasionally larger and smaller alternately. The aperture is small and almost round; the outer lip is thickened. Color white or yellowish, generally spotted or irregularly banded with brown.

Length, 8 to 15; diameter, 5 to 9 mm.

Aguadilla; Mayaguez, Porto Rico; Ensenada Honda; West Indian region; also (incorrectly?) reported from the west coasts of Africa and southern Europe.

Nassa hotessieri d'Orbigny.

Nassa hotessieri d'Orbigny, Moll. Cuba, II, p. 142, atlas, pl. XXI, figs. 40-42, 1845.

A number of young specimens and shells in bad condition were taken at Mayaguez and Ponce, and off Vieques, which are probably the above, but are hardly well enough preserved for positive identification.

Family COLUMBELLIDÆ.

Genus COLUMBELLA Lamarek, 1799.

Shell oval, strombiform or somewhat elongated; aperture rather elongated, terminated by a short canal; outer lip thickened in the middle, generally toothed within; columella toothed or plicate; the base of the shell is narrowed.

Subgenus COLUMBELLA s. s.

Shell strombiform, with a rather short spire; aperture long, curved, narrow; outer lip thickened, incurved and swollen in the middle, toothed within, shouldered above; base notched; columella with several teeth or folds below; the lower part of the shell somewhat narrowed and drawn out; operculum unguiculate; nucleus apical.

Columbella mercatoria (Linnæus) Lamarek.

Voluta mercatoria, Linnæus, Syst. Nat., ed. x, p. 730, 1758.

Columbella mercatoria Lamarek, An. sans Vert., VII, p. 294, 1822.

Columbella mercatoria Kiener, Coq. Viv., Columbella, p. 23, pl. v, fig. 1, 1841.

This is one of the most abundant marine mollusks in the West Indian region. The shell is generally solid and somewhat cone-shaped; the spire is moderately elevated, the whorls are rounded

or sometimes shouldered; the surface is covered with strong, revolving ridges, though occasional specimens are nearly smooth, and it is marked by rather strong growth lines, which are most conspicuous between the ridges. The outer lip is thick and is somewhat shouldered and ascending above; it is decidedly thickened and incurved in the middle, and strongly toothed within throughout its length. The columella has six or eight teeth and is callous, and usually biphate within. The color pattern is infinitely variable; often white and brown or white and yellowish brown in irregular longitudinal clouds or zigzags. In many cases the dark color is found only on the ridges in dots or lengthened markings, and there are often two or more ridges with darker markings than the rest, or white and dark markings arranged alternately.

Length, 15 to 22; diameter, 10 to 15 mm.

San Juan; Aguadilla; Arroyo; Ponce; Mayaguez; Puerto Real, Porto Rico; Culebra. A small variety was obtained at Ponce and Boqueron Bay, Porto Rico.

Subgenus *ANACHIS* H. & A. Adams, 1853.

Shell oval fusiform, longitudinally ribbed; spire elevated; last whorl but little narrowed in front; outer lip nearly straight, crenulated within.

***Columbella pulchella* Kiener.**

Columbella pulchella Kiener, Thes. Conch., I, p. 131, pl. XXXIX, figs. 121, 122, 1847.

Shell with about eight slightly rounded whorls; spire acuminate, gradually tapering; delicately longitudinally ribbed, the ribs on the upper whorls strongest; covered throughout with fine, revolving line or threads; outer lip nearly straight in the middle, slightly thickened, nearly or quite smooth within, faintly notched above; columellar callus raised into a little lip at its edge, faintly nodulous. Color yellowish white variegated with brown, the brown pattern often inclosing rounded white spots of different sizes; there is generally an irregular white band just below the periphery.

Length, 9; diameter, 3 mm.

Playa de Ponce; Puerto Real, Porto Rico; Ensenada Honda, Culebra; Vieques.

***Columbella iontha* Ravenel.**

Columbella iontha Ravenel, Proc. Acad. Nat. Sci. Phila., 1861, p. 42; Tryon, Am. Mar. Conch., p. 40, 1873; Man., v, p. 144, pl. 52, fig. 76(?), 1883.

Mayaguez, Porto Rico, one specimen.

This may be identical with *C. pretrei* Duclos, which is probably prior to *C. albella* C. B. Adams (1850, as *Pleurotoma*), which appears to be merely a mutation of Duclos's species, as identified by cotypes from Adams.

***Columbella catenata* Sowerby.**

Columbella catenata Sowerby, P. Z. S., 1844, p. 52.

Columbella catenata Sowerby, Conch. Icon., XI, pl. XXI, fig. 119, 1858.

Shell with about eight nearly flat whorls, sculptured with rather strong, straight, longitudinal ribs and faint revolving line; outer lip slightly notched above, and below this notch it is thickened. Within it there are five or six denticles. Base of the shell slightly contracted; columella with feeble nodules. Color dirty white with a supramedian and basal band of dark, tessellated markings.

Length, 8; diameter, 3.5 mm.

Mayaguez Harbor, one shell.

***Columbella obesa* C. B. Adams.**

Buccinum obesum C. B. Adams, Proc. Bost. Soc. Nat. Hist., 1845, p. 2.

Columbella obesa Tryon, Man., v, p. 169, pl. LVII, figs. 7-9, 20, 1883.

Shell small, with nearly plain whorls, rather stout, sculptured with strong, straight ribs, which fade out on the back of the body whorl, and revolving threads; base contracted a little; outer lip varicose, feebly notched above and toothed within; columellar callus raised into an edge, smooth; yellowish or whitish, more or less banded with light or dark brown.

Length, 5; diameter, 2.5 mm.

San Juan Harbor, four specimens.

Columbella calliglypta, n. sp. Plate 57, fig. 13.

Shell small, stout, solid, yellowish white, polished, with rather short and acute spire and about seven whorls; the nepionic whorls (missing) are followed by five subsequent whorls, at first smooth, then axially ribbed, and finally reticulated by spiral sulci; on the antepenultimate whorl the ribbing is close and feeble, on the penultimate clear-cut, slightly flexuous, with a presutural sulcus; on the last whorl the ribbing extends nearly to the canal, with two presutural grooves, and in front of them a space without spirals, then that part of the shell which would be covered by the advancing whorl is evenly, regularly, sharply grooved to the anterior end of the canal; the ribs are slightly flexuous and feebly nodular at the suture and are separated on the last whorl by gradually widening interspaces; the outer and pillar lips are both thickened and lirate within.

Length, 6.5; maximum lat., 3.5 mm.

A single specimen at Aguadilla, Porto Rico.

This species belongs to the same group as *A. obesa* C. B. Adams, which is smaller, ruder, and much less elegantly sculptured. The color is probably variable; the type specimen seems more or less bleached.

Subgenus **ASTYRIS** H. & A. Adams.

Shell generally small, smooth, usually polished.

Columbella duclosiana d'Orbigny.

Columbella duclosiana d'Orbigny, Moll. Cubana, II, p. 136, pl. XXI, figs. 31-33, 1845, not of Sowerby, Thes. Conch., No. 8, 1847.

Shell small, with six slightly rounded whorls, rather short, smooth and shining; outer lip with a slightly thickened varix, feebly notched above, smooth within; base of the shell but little contracted; columella deeply excavated about at the middle; the few revolving ridges at the base are continued over it. Color white or yellowish white, sometimes maculated near the suture.

Length, 3; diameter, 1.5 mm.

Mayaguez, Porto Rico, one worn shell.

This is close to *C. lunata* and may be only a variety of it. The name *duclosiana* was also used for a *Columbella* by Sowerby for a species from Java, which, if valid, will have to receive a new name.

Columbella perpicta, n. sp. Plate 57, fig. 12.

Shell of moderate size, rather thin, nearly smooth, elegantly fusiform, waxen white with brown flammulations; whorls seven, the latter ones with a faint striation just in front of the suture and somewhat stronger spiral sulci on the canal and base; body of the whorl without spiral sculpture; outer lip externally marginate, internally delicately lirate; pillar lip smooth or feebly obliquely striated near the canal.

Length, 10.5; diameter, 4.5 mm.

Mayaguez, Porto Rico, not uncommon in about 100 fathoms.

The only Antillean species with which this can well be compared is *C. saintpairiana* Caillet, which is larger, of a different shape, and axially ribbed near the apex.

Genus NITIDELLA Swainson, 1840.

Shell oval to elongated, smooth, rather solid, with elevated spire; aperture somewhat effuse below; outer lip slightly thickened and swollen in the middle, toothed within; operculum oval; nucleus subcentral.

Nitidella nitidula Linnaeus.

Buccinum nitidulum Linn., Syst. Nat., ed. x, p. 741, 1758.

Columbella nitidula Sowerby, Genera, pl. XI, fig. 162, 1847.

Shell oblong-oval, with about seven slightly convex whorls; spire moderately elevated; aperture elongate, narrow above, somewhat effuse below; outer lip thickened a little, thicker in the middle, where it is straight or faintly incurved, ascending the spire above, toothed within, the spaces between the teeth darker. There are two small, scarcely oblique ridges below the middle of the columella. Shell smooth and shining throughout, reddish-brown blotched and spotted with white, the light markings generally forming a faint band below the suture and below middle of body whorl.

Length, 15; diameter, 8 mm.

Aguadilla; Playa de Ponce; Hucares; Guanica, Porto Rico; many shells.

Nitidella lævigata Linnæus.

Buccinum lævigatum Linn., Syst. Nat., ed. x, p. 741, 1758.

Columbella lævigata Tryon, Man., v, p. 113, pl. XLVI, figs. 16-21, 1883.

Shell with about six somewhat rounded whorls, which are faintly shouldered, smooth and shining; suture well marked, sometimes almost canaliculate; aperture long-ovate; outer lip slightly thickened, but not inflected or callous in the middle, toothed within; columella excavated above, with two folds at its base. Color rich reddish brown, with longitudinal zigzag white markings; sometimes the white predominates and the bands are brown. There is a row of very dark spots above the suture and on the middle of the body whorl, which often has alternating white spots, though it is sometimes wanting; sometimes there are two such bands on the body whorl. There is often a row of large white blotches below the suture; aperture white.

Length, 17; diameter, 8 mm.

Aguadilla; Hucares; Ponce; Arroyo, Porto Rico.

Nitidella cribraria Lamarck.

Buccinum cribrarium Lamarck, An. sans Vert., VII, p. 274, 1822.

Columbella cribraria Sowerby, Conch. Icon., XI, pl. XIII, fig. 62, 1858.

Shell solid, rather narrow, with faint, revolving striae, which are almost obsolete except at the base; whorls nearly flat, the upper one or two very often deollated; outer lip thickened, notched, and ascending above, toothed within, straight in the middle; columella nearly straight, slightly twisted, smooth, not plicate below. Color dark reddish brown, covered with white spots. There are sometimes one or two bands of lighter brown on the body whorl. There is frequently a narrow, darker band just below the suture, which is broken with large, squarish, white spots.

Length, 10; diameter, 4 mm.

Guanica; Puerto Real; Hucares, Porto Rico; many shells, all quite dark and deollated.

? Genus PYRENE Bolten, 1798.

Shell ovate or subconic, with a convex spire; outer lip thickened and inflected in the middle and toothed within; aperture long, narrow, incurved at the middle; columellar plications wanting; external surface smooth.

Type, *Columbella semipunctata* Lamarck.

Pyrene ovulata Lamarck.

Columbella ovulata Lamarck, An. sans Vert., VII, p. 295, 1822.

Columbella ovulata Kiener, Coq. Viv., *Columbella*, p. 40, pl. XIV, fig. 3, 1841.

Shell ovate-conic, moderately solid, with faint, revolving ridges, which are scarcely discernible on the middle of the body whorl, the shell appearing to be smooth; spire moderate, somewhat convex, the whorls being rounded a little and separated by a deep, almost canaliculate suture; aperture long, narrow, but little wider below; outer lip slightly swollen, thickened, and incurved a little in the middle toothed within, ascending the spire decidedly, sometimes to the suture above the penultimate whorl; columella slightly curved in the middle to correspond with the incurving of the outer lip, hardly plicate below. Color rich reddish brown, sometimes very dark, with irregular white clouds and spots, often forming an indistinct central band.

Length, 15; diameter, 8 mm.

Aguadilla, Porto Rico, one shell; West Indian region generally.

There is some variation in the form of this species, certain specimens being more or less attenuated.

Family MURICIDÆ.

Subfamily MURICINÆ.

Genus MUREX Linnæus, 1758.

Shell having a prominent, pointed spire; whorls convex, bearing longitudinal, spiny, foliaceous or tubereled varices; aperture round, terminated by a straight canal; operculum oval; nucleus subapical.

Subgenus MUREX s. s.

Canal long and straight; varices three, spinous or tuberculate.

Murex messorius Sowerby.

Murex messorius Sowerby, P. Z. S., 1840, p. 137.

Murex messorius Sowerby, Conch. Illus., *Murex*, fig. 93, 1839.

Shell with a moderate, conical spire, and a long, straight, or slightly recurved canal; varices three, with two to three intervarical ribs; the revolving sculpture consists of rather sharp ridges, with a single thread between; there is often a short spine near the upper end of the varices, and one or two below them on the canal; the lower spines are sometimes recurved; epidermis hispid; color purplish or pinkish.

A single young, broken specimen of what is probably this was obtained at Mayaguez.

Murex antillarum Hinds.

Murex antillarum Hinds, P. Z. S., 1843, p. 126.

Murex nodatus Reeve, Conch. Icon., III, 1845, pl. XXV, fig. 107.

Shell subfusiform, with about nine whorls, the first one and one-half smooth; the three varices are rounded, elevated, scarcely at all frilled, and have on the shoulder a short, nearly straight, sharp spine; there are often two other sharp, short spines at the bases of the varices on the canal, and sometimes a few short, spiny processes along the middle of the varices; canal moderately long, generally recurved, though sometimes straight; the surface is covered with larger and smaller alternating revolving ridges, and between the varices there are three or four low, longitudinal ribs, which are cut into rather sharp tubercles by the revolving sculpture. Color whitish, with broken, revolving, brown lines and markings, which sometimes form faint bands.

Length 50; diameter, measuring across the short spines, 25; diameter of the shell, 21 mm.

A single remarkably fine, living specimen was taken at Mayaguez.

Hinds described the species as *M. antillarum* in 1843 and referred to a figure in the Conchological Illustrations which Mr. Sowerby mentioned as a variety of *M. notacilla*. Reeve afterwards, in the Conchologia in 1845, described the same thing, calling it *M. nodatus*, and referred to the same figure in the Illustrations. Reeve gave a beautiful figure, and was probably not aware that Hinds had described this shell under another name.

Subgenus **CHICOREUS** Montfort, 1810.

Shell with elevated spire and a canal of moderate length; varices three, generally foliaceous; inner lip seldom raised into a lamella.

? **Murex rufus** Lamarck.

A single very young specimen in bad condition was obtained at Puerto Real, Porto Rico, which may be this species, which is widespread in the Antilles.

Murex brevifrons Lamarck.

Murex brevifrons Lamarck, An. sans Vert., VII, p. 161, 1822.

Murex calcitrapa Reeve, Conch. Icon., III, pl. III, fig. 13, 1845.

Shell large, solid, the three varices frondose; sometimes there is a row of secondary, smaller fronds in front of the larger ones. There is a single strong intervarical rib, which sometimes becomes almost a hump; the spire and canal are somewhat elongated and of about equal length; the latter is frondose to its base; the revolving sculpture consists of low, somewhat separated ridges, and besides this the shell is everywhere covered with revolving, roughened or slightly nodulous threads. The color is whitish or brownish, with revolving darker often blackish narrow bands, which are sometimes very distinct.

Length 100; diameter, 60 mm.

Off Point Melones; Mayaguez; Arroyo; Boqueron Bay, Porto Rico; Ensenada Honda, Culebra; West Indies generally.

Subgenus **PHYLLONOTUS** Swainson.

Shell generally more inflated than in *Chicoreus* and having from four to numerous varices; inner lip raised into a thin lamella.

Murex pomum Gmelin.

Murex pomum Gmelin (ex parte), Syst. Nat., p. 3527, 1792.

Murex pomum Reeve, Conch. Icon., III, 1845, pl. IX, fig. 35.

Shell variable in size, form, and coloring, rather solid, with a moderate spire and canal of equal length, with three to four heavy varices; there are one or two, sometimes three, intervarical ribs, which are generally strong and often knoblike. Throughout, the shell is covered with strong ribs, which often break into tubercles, and besides these there are generally revolving, broken threads. Frequently the growth lines are raised into lamellæ, and the entire surface becomes frilled. The surface is generally variegated with whitish and fulvous brown; sometimes the shell is imperfectly banded. The aperture may be nearly white, yellow, or brownish orange, and it is frequently marked with very dark brown.

Length, 50 to 85; diameter, 30 to 50 mm.

Cabo Rojo light, two badly worn shells; West Indian region; Florida, etc.

On the west coast of Florida and in some other localities this species seldom attains a large size, has usually three varices, and presents much the aspect of a *Chicoreus*. In the Bahamas and West Indies it often attains a much larger size and is more or less perfectly four-variced, and has the appearance of a true *Phyllonotus*.

Murex micromeris Dall. Plate 53, fig. 17.

Murex micromeris Dall, Trans. Wagner Inst., III, p. 141, pl. 12, fig. 12, 1890.

Shell small, with a somewhat elevated spire and a rather short canal, with about seven varices, and alternately larger and smaller revolving ridges; whorls about six; aperture ovate, canal slightly reflexed, rather open, bases of the former canals showing distinctly; inner lip scarcely elevated; outer lip lirate within. Color salmon red.

Length, 5.5; diam., 3 mm.

Boqueron Bay, Porto Rico, one shell.

The relationships of this little species are somewhat doubtful. The spire is more elevated and is larger in proportion to the size of the body whorl than is the case in most species of *Phyllonotus*, and the edge of the inner lip is appressed to the last whorl instead of being elevated as it generally is in that subgenus.

Subgenus **FAVARTIA** Jousseaume, 1880.

Shell small, with from four to eight varices and a series of revolving ridges; surface rasp-like, covered with longitudinal ribs, which are vaulted on the ridges, and which form pits in their interstices; canal short, recurved.

Murex cellulosus Conrad.

Murex cellulosa Conrad, Proc. Acad. Nat. Sci. Phila., III, p. 25, 1846.

Murex nucus Mörch, Cat. Kierulfi, p. 14, pl. I, fig. 9, 1850.

Shell with about seven whorls, the first one and a half smooth, the others with from six to eight varices, and covered with revolving ridges; in some cases the space between the longitudinal ribs is nearly smooth, there being a series of deep pits at each side of this smooth space; in other cases the revolving ribs are continuous. The longitudinal frills characteristic of the subgenus may be faint or excessively developed; these frills are strongest on the longitudinal ribs. Often they form a series of square pits where they cross the spaces between the ribs. The aperture is exactly elliptical; the canal is moderately short, reflexed, and nearly closed; the former canals stand out with great distinctness; the inner lip is generally somewhat raised. Whitish or brownish, sometimes banded with brown.

Length, 20; diameter, 10 mm.

Mayaguez, Porto Rico, one very fine shell and one young specimen.

Murex intermedius C. B. Adams.

? *Murex alveatus* Kiener, Icon., *Murex*, pl. 46, fig. 2.

Murex intermedius C. B. Adams, Cont. to Conch., 1850, p. 60.

Shell somewhat elongated, ovate fusiform, with about six or seven varices; the whorls are often more or less shouldered and are covered with a series of strong revolving ridges. Throughout the shell

there are delicately erimped longitudinal frills. Sometimes the revolving ridges between the larger ones are flattened as though they had been pressed when in a soft state; canal rather short, nearly closed when the shell is fully adult. Color ashy white, often faintly banded with brownish.

Length, 20; diameter, 10 mm.

Mayaguez, Porto Rico; Vieques. One young shell from each, that from the former having the ribs compressed.

This species is distinguished from Kiener's figure of *alveatus* by its more acute apex and its more dense and frothy sculpture of the revolving ridges; but we do not feel assured of their specific distinctness in the absence of specimens of *M. alveatus*.

Genus MURICIDEA (Swainson) Mörch, 1840.

Shell with elevated spire and a canal of moderate length, longitudinally ribbed, but lacking the primary varices of *Murex*; operculum fusoid, with an apical or almost apical nucleus.

A genus of doubtful homogeneity. In such species as *M. floridana* and *M. multangula* there are only longitudinal ribs, which are not at all varix-like. In others the ribs take on the nature of varices to some extent, and are sometimes as well developed as in the typical Murices.

Subgenus MURICIDEA s. s.

Muricidea hexagona Lamarek.

Murex hexagonus Lamarek, An. sans Vert., VII, p. 169, 1822.

Murex hexagonus Reeve, Conch. Icon., III, pl. xxvii, fig. 120, 1845.

Shell rather elongated, with eight or nine whorls, and six spiny rib-like varices; spines short, slightly upcurved, only a single one to each varix on the upper whorls, about six on each varix of the body whorl and the canal; these are open in front; sculpture consisting of low, rather sharp, revolving ribs, which on the varices develop into the spines; the spaces between these ribs is concave. Outer lip toothed within; inner lip generally somewhat raised at its edge. Color whitish; the spines often purple, and sometimes the shell has purplish tints.

Length, 35; diameter, across the spines 23, across the body whorl 15 mm.

Poncee Reefs, Gallardo Bank, Porto Rico.

Subgenus PSEUDONEPTUNEA Kobelt, 1882.

Muricidea multangula Philippi.

Fusus multangulus Philippi, Zeits. für Mal., v, 1849, p. 25; Abbild. und Beschr., III, p. 117, pl. xxiv, fig. 6, 1850.

Shell with eight somewhat shouldered whorls, which are crossed by about seven strong, rounded, longitudinal ribs; the surface is covered with revolving sculpture consisting of rather strong threads, of which about every fourth one is larger; aperture ovate-elongate; outer lip hardly thickened, feebly lirate within; canal short, open; columella curved, with a single ridge below; behind it there is a false umbilicus. Color yellowish or whitish, with small brown spots or blotchings, which are sometimes imperfectly arranged in longitudinal and revolving series. Sometimes there are faint longitudinal streaks, and occasionally the shell is feebly banded.

Length, 30; diameter, 17 mm.

One very young shell was obtained at Mayaguez.

Genus ASPELLA Mörch, 1877.

Shell elongated, with elevated spire and a short, recurved, nearly closed canal; surface of a peculiar spongy or chalky white character, which when worn away reveals a shell of solid texture, white or brownish; there is a set of two or three principal varices and often a smaller secondary set, and besides these there are sometimes irregular longitudinal ribs; surface covered with revolving striae, often somewhat pitted; aperture small, elliptical; outer lip usually feebly toothed; there is a false umbilicus at the base of the columella.

Type, *Ranella anceps* Lamarek.

There is a general agreement of the important characters of the species forming this group, the peculiar texture, form of canal and aperture, revolving sculpture, and varices being found in all of

them. There is much variation in the longitudinal sculpture of the species. *A. anceps* often has a double row of varices on each edge of the flattened shell, a larger and a smaller one; sometimes it has only a single row on each edge, and there is a tendency in the other species to occasionally assume this *Ranella*-like arrangement of the varices. Reeve's figure in the *Conchologia Iconica* of *Ranella hastula*, a member of this group, is somewhat misleading, as it represents a rich brown shell with yellow varices.

***Aspella scalaroides* Blainville.**

Murex scalaroides Blainville, Faune Française, p. 131, pl. v, figs. 5, 6, 1826.

Shell elongated, with elevated spire and short, recurved canal, with eight whorls; principal varices three, with three smaller, intermediate ones which sometimes degenerate into ribs, with strong revolving ridges; surface covered with fine revolving threads, the spaces between the revolving ridges pitted at the principal varices and sometimes at the smaller ones; surface chalky or spongy, whitish, revealing, when eroded, the hard, milky-white layer beneath; aperture elliptical; outer lip somewhat toothed within.

Length, 25; diameter, 10 mm.

Puerto Real, Porto Rico, one young shell.

The young shells of this species have a resemblance to *Trophon*.

Subfamily PURPURINÆ.

Genus PURPURA Bruguière, 1789.

Shell with short to moderate spire and large aperture; surface sculptured, but not varicose; columella arched, generally flattened, sometimes excavated; canal short, with a deep notch; operculum with the nucleus at the middle of one side.

***Purpura patula* Linnæus.**

Buccinum patulum Linnæus, Syst. Nat., ed. x, p. 739, 1758.

Purpura patula Reeve, Conch. Icon., III, pl. 1, fig. 3, 1846.

Shell large, ovate, with a short spire, the whorls rounded; sculpture consisting of revolving rows of rather sharp tubercles, which are less distinct in the mature shells, and in addition to this the whole surface is covered with revolving threads, which are slightly decussated by the growth lines; aperture very large, elliptical, patulous; outer lip with a series of short ridgelike teeth within the border; canal small, scarcely notched on the base; columella arched, very wide, and more or less excavated. Color blackish brown, often lined or irregularly banded with white. The adult shells are generally so eroded that the color can not be made out. The inside of the outer lip is bordered with dark brown, the interior is coppery or bluish, the columella is light brown sometimes shaded with white, and there is a very dark patch at its upper left-hand part.

Length, 80; diameter, 55; of aperture, 70; width of aperture, 50; width of columella, 23 mm.

Huacres; San Juan; Agnadilla; Guanica; San Geronimo, Porto Rico; West Indian region generally.

***Purpura hæmastoma* var. *undata* Lamarck.**

Purpura undata Lamarck, An. sans. Vert., VII, p. 238, 1822.

Purpura fasciata Reeve, Conch. Icon., III, pl. IX, fig. 45, 1846.

This variety of the common variable and widely distributed *P. hæmastoma* is common through the West Indian region and the Florida Keys. In general it is rather slender and has a couple of rows of low tubercles on the body whorl, one of these continuing up the spire, and from this it varies to forms that are almost smooth. All the specimens have low revolving threads more or less developed. The color is purplish brown, more or less fasciate or blotched with white, the aperture bluish and generally fasciate.

Length, 30; diameter, 20 mm.

Agnadilla; San Geronimo; Mayaguez; San Juan, Porto Rico; Caballo Blanco Reef, Vieques; Culebra.

Purpura hæmastoma var. floridana Conrad.

Purpura floridana Conrad, Journ. Acad. Nat. Sci., Phila., VII, pl. XX, fig. 21, 1837.

A little larger than the variety *undata*, with or without two rows of low tubercles, with rather strong, revolving sculpture. Whitish, variegated with reddish brown, the color sometimes in short, revolving blotches and sometimes in irregular longitudinal streaks. Inside the shell is usually pale brownish, with a white border on the inside of the lip.

Length, 55; diameter, 30 mm.

Mayaguez, three shells. A common form in the West Indian region and on the Florida Keys.

Purpura trinitatensis Guppy.

Purpura trinitatensis Guppy, Proc. Sci. Assoc. Trinidad, 1869; Ann. Mag. Nat. Hist., 4th ser., XV, p. 50, 1875.

Caballo Blanco Reef, one specimen; also Trinidad and the northern coast of Brazil.

This has the colors of *P. undata*, but with a much more solid and shorter shell, strongly sixdenticulate on the outer lip, the pillar with an obscure median fold, as in *P. columellaris*, but the pillar not excavated externally; the base of the pillar obliquely striate and brown tinted, most of the mouth callus white or purple brown. It recalls *P. deltoidea* in form and solidity, but has a differently colored and sculptured aperture.

Purpura deltoidea Lamarek.

Purpura deltoidea Lamarek, An. sans. Vert., VII, p. 247, 1822.

Purpura deltoidea Reeve, Conch. Icon., III, pl. IV, fig. 18, 1846.

Shell solid, short, with a single row of strong tubercles on the whorls, which forms a shoulder; sculptured throughout with revolving lire and fine grooves; aperture whitish, purple stained on the columella. Color white, with broad, irregular, broken, black bands.

Length, 45; diameter, 35 mm.

Aguadilla; Hucares; Puerto Real; San Juan; Guanica; Hucares; Cabo Rojo light, Porto Rico; Ensenada Honda, Culebra; Caballo Blanco Reef, Vieques. Abundant throughout the West Indian region and the Florida Keys.

Genus SISTRUM Montfort, 1810.

Shell oval, thick, tuberculous or spinose; aperture oblong, canaliculate above; outer lip furnished with strong teeth within; columella with slight plications. Operculum oval, straight, with lateral nucleus.

Sistrum nodulosum C. B. Adams.

Purpura nodulosa C. B. Adams, Proc. Bost. Soc. Nat. Hist., 1845, p. 2.

Ricincta nodulosa Tryon, Man., II, p. 190, pl. LIX, fig. 275, 1880.

Shell rather elongated, with about eight whorls, with ten or twelve longitudinal ribs, which are broken by revolving ridges into strong nodules; surface covered with fine, revolving, sometimes scaly threads; outer lip thickened and varicose, with four whitish teeth within; columella with two or three faint folds on its face, and there is a strong angular callus on the upper part of the parietal wall. Color black, with occasional white spots between the tubercles; the white spots sometimes form broken bands; aperture bluish and blackish within.

Length, 20; diameter, 9 mm.

Cabo Rojo light; Ponce Reefs; San Juan; Puerto Real; Porto Rico; Ensenada Honda, Culebra; West Indies, etc.

Family CORALLIOPHILIDÆ.**Genus CORALLIOPHILA** H. & A. Adams, 1853.

Shell irregular, purpuriform, with a short spire; aperture large; surface rasp-like; outer lip simple, liriate, or smooth within; columella flat or excavated, callous, with or without an umbilical opening at its base. Operculum with a lateral nucleus.

Coralliophila abbreviata Lamarck.

Pyrida abbreviata Lamarck, Enc. Méth. pl. ccccxv, fig. 2 a-b, 1795; An. sans. Vert., VII, p. 146, 1822.

Shell solid, variable in form and sculpture, generally with a ridge on the upper whorls, which may be somewhat sharp or rounded, and which makes the body whorl shouldered, with or without low longitudinal ribs; spire generally rather short; surface sculptured with fine, rather sharp, sometimes scaly revolving ribs; outer lip somewhat lirate within; canal short. There is generally a decided umbilicus, having a sharp ridge to the left of it. Color whitish, flesh color, or yellowish, the interior often purple.

Length, 30; diameter, 22 mm.

Mayaguez; Playa de Ponce, Porto Rico; Vieques, young and worn shells.

This species is widely distributed in warm seas. The young shells are generally more attenuated, sharper keeled, and more strongly ribbed than adult specimens. It is commonly known under the name of *Coralliophila galea*.

Superfamily STREPTODONTA.**Family SCALIDÆ.****Genus SCALA (Humphrey, 1797) Auct.**

Shell turriculated, rather solid, shining, generally more or less umbilicated; spire elongated; whorls numerous, rounded, in contact or partially separated, with numerous longitudinal varices; aperture circular; peristome entire reflected; operculum horny, spiral, its nucleus nearly central.

***Scala angulata* Say.**

Scala clathrus var. *angulata* Say, Am. Conch., III, pl. XXVII, 1831.

Shell white, shining, with from six to eleven whorls, which approach each other very closely, but touch only by the varical ribs, which number nine to eleven, slightly recurved, simple, slightly angulated above near the suture; aperture elliptic; base a little angular.

Length, 15 to 20; diameter, 6 to 8 mm.

Arroyo, Porto Rico, one young shell; Ensenada Honda, Culebra.

***Scala turricula* Sowerby.**

Scalaria turricula Sowerby, Thes. Conch., No. 37, fig. 62, 1847.

Shell rather slender, with the whorls scarcely touching, slightly umbilicated, covered with very fine spiral striations, with twelve or thirteen ribs to each whorl; part of ribs thin, others thicker, some rounded above, others shouldered or hooked; surface dull, with faint brownish tints.

Length, 18; diameter, 8 mm.

Mayaguez, one young shell.

***Scala unifasciata* Sowerby.**

Scalaria unifasciata Sowerby, Thes. Conch., I, pl. XXXIII, fig. 68, 1847.

Quebradillas, Porto Rico (Gundlach).

***Scala eulita*, n. sp. Plate 57, fig. 2.**

Shell small, very slender, white, polished, with nine whorls, nepionic part three-whorled, compact, white, without varices; subsequent whorls convex, smooth, with (on the ninth) about fifteen varices, which are very thin, sharp, and when perfect show a small angle near the suture; whorls adjacent, with no basal cord or disk.

Length, 4; maximum diameter, 1.2 mm.

Mayaguez Harbor, Porto Rico, one specimen.

The shell is remarkable for its acicular form and small size. The specimen is somewhat defective, and the figure hardly shows the little angular projection near the suture, which is normal to the varices.

Subgenus *ACRILLA* Adams, 1860.

Surface reticulated; shell thin.

Scala retifera Dall.

Scala (Acrilla) retifera Dall, Blake Report, Gastropoda, p. 312, 1889; Bull. 37, U. S. Nat. Mus., p. 124, 1889.

Mayaguez, Porto Rico, at station 6062, one specimen; also north to Cape Hatteras, North Carolina.

Superfamily GYMNOGLOSSA.**Family EULIMIDÆ.****Genus EULIMA** Risso, 1826.**Section EULIMA** s. s.

Shell imperforate, subulate, with many flat whorls, polished; spire often turned to one side, obscurely marked down one side with a series of traces of varices, which form ribs internally; aperture oval, pointed above; lip simple or slightly thickened; operculum horny, paucispiral; nucleus excentric.

Eulima oleacea Kurtz & Stimpson.

Eulima oleacea Kurtz & Stimpson, Proc. Bost. Soc. Nat. Hist., IV, p. 115, 1851.

Eulima intermedia Jeffreys, Brit. Conch., IV, p. 103, v, p. 214, pl. LXXVII, fig. 4.

Shell small, rather narrow, nearly straight, with eleven or twelve flat whorls; suture very faintly marked; aperture ovate, sharp above; lip well produced in the middle; columella slightly reflected, produced into a callus on the parietal wall. Color milky white, with a semitransparent band at the suture, glossy.

Length, 5; diameter, 1.25 mm.

Mayaguez, two shells and a fragment.

Eulima conoidea Kurtz & Stimpson.

Eulima conoidea Kurtz & Stimpson, Proc. Bost. Soc. Nat. Hist., IV, p. 115, 1851.

Eulima conoidea Tryon, Man., VIII, p. 273, pl. LXXIX, fig. 40, 1886.

Shell with twelve or thirteen slightly rounded whorls, nearly straight, moderately stout; last whorl sometimes faintly subangulate at the base; outer lip scarcely thickened, well advanced in the middle; aperture subrhomboid. Color shining white, the upper whorls sometimes flesh-colored.

Length, 8; diameter, 2 mm.

Puerto Real; Mayaguez, Porto Rico; three shells.

Subgenus LEOSTRACA H. & A. Adams, 1853.

Shell slender, polished, often ornamented with spiral colored bands, with a succession of slight varices on each side of the spire, not always apparent; aperture long, narrow.

Eulima patula n. sp. Plate 57, fig. 3.

Shell small, translucent white, with a rapidly diminishing spire, blunt at the extreme tip, but otherwise acute, the sides nearly rectilinear or even slightly concave; whorls about nine, the earliest ones slightly inflated; last whorl much the largest, the aperture large, pillar straight, outer lip nearly straight and, as it were, slightly pressed in at the periphery; the anterior part of the aperture very patulous.

Length, 4.5; maximum diameter, 1.5 mm.

Station 6062, Mayaguez Harbor, Porto Rico, five specimens.

Eulima acuta Sowerby.

Eulima acuta Sowerby, P. Z. S., 1834, p. 8.

Eulima acuta Tryon, Man., VIII, p. 280, pl. LXX, fig. 82, 1886.

Shell slender, straight, with about ten flat whorls, the suture barely discernible as a line; aperture long-ovate, slightly patulous; outer lip scarcely thickened, not advanced in the middle. Color white, sometimes showing one or two pale yellow bands.

Length, 5; diameter, 1 mm.

Mayaguez, Porto Rico, a half dozen specimens.

Genus *NISO* Risso, 1826.

Shell deeply umbilicated, long-conical, polished, many-whorled, the apex very sharp; whorls nearly flat; aperture oval, pointed above, somewhat drawn out below; lip thin; operculum as in *Eulima*.

Niso portoricensis, n. sp. Plate 57, fig. 4.

Shell small, brilliantly polished, with about thirteen whorls; sides rectilinear, base rounded, apex acute; umbilicus deep, funicular, the umbilical side of the whorls convex, the umbilical carina distinct but not sulcating the aperture; apex and upper part of the whorls brown, intensified at the lines marking the periodical resting stages. At the periphery is a narrow pale zone, while the base is brown under a whitish superficies; peripheral angle not sharp, the whorls microscopically sharply axially striate with rather distinct fine grooves.

Length, 9; diameter, 3.5 mm.

Station 6062, Mayaguez Harbor, Porto Rico.

This elegant shell is nearest to *N. wglees* Bush, but has a different system of coloration.

Family PYRAMIDELLIDÆ.

Genus *PYRAMIDELLA* Lamarck, 1799.

Shell with elevated, sharp-pointed spire, many-whorled, smooth; aperture suboval, entire, rounded in front; columella straight, with prominent spiral plications; operculum horny, semicircular, subspiral, the nucleus at the front end, its columellar edge notched to fit the folds of the columella.

Pyramidella subdolabrata Mörch.

Obeliscus subdolabratus Mörch, Mal. Blätt., XXII, p. 157; A. Adams, Thes. Conch., Pyramidella, p. 805, pl. CLXXI, figs. 1-3, 1854.

Shell of rather light structure, with about thirteen rounded whorls, which are narrowly shouldered below the suture; last whorl slightly ascending; surface apparently smooth, but seen to have fine, revolving sculpture under a lens, and this being crossed by the growth lines makes it faintly reticulate; aperture long-oval; outer lip slightly thickened, not toothed within; columella with a strong, sharp fold above, the two lower folds feebly developed; umbilicus narrow, deep. Color brownish white, with about three brown, revolving bands on the body whorl and two on the upper whorls; besides these there is a brown patch or band around the umbilicus.

Length, 30; diameter, 13 mm.

Fajardo, Porto Rico, one very fine shell.

This species has been mistaken for the *P. dolabrata* of Linnæus, but it has a duller color, lighter structure, and less strongly developed columella folds than that species. The bands of color are wider and less distinct than in *dolabrata*, and the reticulation of the surface is stronger.

Genus *TURBONILLA* Risso, 1826.

Shell slender, straight, many-whorled; whorls slightly convex, generally costulate; aperture simple, oval or subquadrangular; columella straight; lip thin; operculum having a spiral groove at its columellar border.

? *Turbonilla reticulata* C. B. Adams.

? *Chemnitzia reticulata* C. B. Adams, Contr., 1850, p. 75.

A fragment of a badly worn shell was obtained from dredgings taken at Mayaguez, which is probably this species.

Section *PYRGISCUS* Philippi, 1841.*Turbonilla portoricana*, n. sp. Plate 53, fig. 15.

Shell of medium size, moderately stout, of almost rectilinear outline, translucent, with a narrow yellowish or brownish-yellow spiral band around the whorls about one-fourth the breadth of the

whorl above its suture, and a second very pale one, which is almost obsolete, of about the same width on the middle of the base, which is best seen within the aperture by transmitted light; nuclear whorls two and one-half, helicoid, somewhat oblique, moderately prominent; the periphery of the last whorl projecting but slightly beyond the outline of the first post-nuclear whorl, not immersed but surmounting the later whorls, their axis being almost at right angles to the axis of the post-nuclear whorls. Post-nuclear whorls ten, flattened, slightly contracted at the sutures, traversed by strong, regular, more or less vertical, axial ribs, of which about fourteen appear upon the second, eighteen upon the fifth, twenty upon the seventh, and twenty-six upon the ninth whorls; these ribs pass almost undiminished in size over the periphery and base of the last whorl to the umbilical region. Intercostal spaces ornamented by six equally spaced, deep, broad spiral striations, which extend partly up on the sides of the ribs, but do not reach or cross their summits. Base similarly ornamented with six spiral striations which are placed much closer. Aperture subovate, somewhat effuse at the junction of the oblique, slightly revolute columella with the strongly curved outer lip, which meet almost at right angles; a well-marked callus covers the parietal wall within the aperture and connects the outer lip at the posterior angle with the columella. Columella provided with a quite prominent oblique fold near its insertion; outer lip pellucid, showing the external sculpture and color bands within.

Length, 4.7; length of spire, 4.3; diameter, 1.2 mm.

The type and three specimens are in every respect identical and are from Mayaguez, Porto Rico.

Turbonilla insularis, n. sp. Plate 53, fig. 21.

Shell of medium size, moderately stout, of almost rectilinear outline, milk white, with the upper whorls stained dusky. Nuclear whorls decolated; a small portion only remains, whose size would indicate a rather large nucleus. Post-nuclear whorls thirteen, very slightly convex, almost flattened, with about sixteen prominent more or less vertical, axial ribs on the fifth, eighteen on the tenth, twenty on the eleventh, and twenty-eight on the twelfth whorl, which pass over the well-rounded periphery of the last whorl, becoming feebler upon its base, finally vanishing just before reaching the umbilical region. Intercostal spaces broad and undulating, rather more than double the width of the ribs, except upon the twelfth whorl, which has a decided increase in the number of ribs and a consequent diminution in the breadth of the intercostal spaces; these spaces are traversed by about eleven quite regularly spaced, deep, spiral striations on the fifth whorl and twelve upon the succeeding volutions, where there is a tendency toward further division of the spaces between these striations by an occasional intercalation of a less pronounced line; these spiral lines do not pass over the axial ribs, but are confined to the troughs of the intercostal areas. Base traversed by about eight faint, reddish, wavy, spiral lines. Sutures well defined, rendered crenulate by the prominent summits of the ribs. Aperture irregularly rhomboidal, showing the external sculpture within. Outer lip gently curved, somewhat effuse at its junction with the twisted, oblique, and revolute columella.

Length, 7.1; length of spire, 6.4; diameter, 1.8 mm.

Locality, Mayaguez, Porto Rico.

Superfamily NUCLEOBRANCHIATA.

Family ATLANTIDÆ.

Genus ATLANTA Lesueur, 1817.

Shell fragile, transparent, discoidal, compressed, with a prominent carina; nucleus dextral; aperture oval, straight, deeply sulcate above at the carina; operculum subtriangular, bearing an apical nucleus.

Atlanta peronii Lesueur.

Atlanta peronii Lesueur, Journ. de Phys., LXXXV, pl. II, fig. 1, p. 390, 1817.

Shell discoidal, with numerous earlier whorls, which are elevated into a low spire on the upper side; later whorls openly coiled but connected by the carina; carina strong, obliquely striate; surface with delicate growth lines, glassy.

Greatest diameter, 12; of aperture, 5; lesser diameter of aperture, 3 mm.

Aguadilla; Boqueron Bay, Porto Rico; one shell from each locality; widely distributed.

Superfamily TÆNIOGLOSSA.

Family SEPTIDÆ.

Genus *DISTORTRIX* Link, 1807.

Shell subtorriculated, with cancellated sculpture; whorls irregularly turned and distorted; last whorl ascending the spire; outer lip wide and flattened; inner lip developed into a broad callus, which extends well up on the spire and to the base of the shell, showing the cancellated sculpture; the remains of these calluses and the outer lip form varices on the shell; aperture grimaced, the lip strongly toothed within; columella strongly curved, somewhat S-shaped, the lower part toothed; canal reflexed.

Distortrix reticulata Link.

Distortrix reticulata Link, Besch. Rostock Samml., III, p. 122, 1807.

Triton clathratum Lamarck, An. sans Vert., VII, p. 186, 1822; Enc. Méth., pl. 413, fig. 4.

Shell covered with a pale epidermis, sometimes having bristly hairs on the ribs; varices faint and appressed, showing the groove behind the former lip; surface cancellated by rather delicate longitudinal ribs crossed by revolving ridges; callus (including the lip) triangular; outer lip finely toothed within, with a few stronger teeth above; canal somewhat lengthened, slightly reflexed, whitish or brownish, the lip and callus whitish or buff color, sometimes a little variegated.

Length, 80; diameter, 40 mm.

Mayaguez.

Distortrix reticulata var. *clathrata* Dall.

Distortrix var. *clathrata* (Lam.) Dall, Blake Report, p. 222, 1889.

Two very young, somewhat worn shells were dredged at Mayaguez, which may be this variety.

Genus *GYRINEUM* Link, 1807.

Shell oval or oblong, compressed, nodulous, with two rows of varices opposite each other; aperture oval or elliptical, with a sulcus above; outer lip toothed, inner lip wrinkled; basal canal short, generally reflexed; operculum horny.

Gyrineum cruentatum Reeve.

Ranella cruentata Reeve, Conch. Icon., II, pl. v, fig. 20, 1844.

Shell short, solid, with revolving tubercled ridges, that on the periphery being strongest, the one immediately below it quite prominent; below the suture there are faint, irregular plications; upper canal small, not carried much upward; aperture elliptical, the inner lip with scattered plications; canal slightly reflexed. Color whitish, irregularly spotted and blotched with reddish brown; aperture white or purple, often with reddish maculations between the plicae on the parietal wall.

Length, 40; diameter, 30 mm.

One young specimen with purple aperture was obtained at Mayaguez Harbor.

Genus *SEPTA* Perry, 1811.

Shell oval, oblong or elongated, solid, furnished with scattered varices; outer lip thickened, toothed within; columella with numerous plications; canal long or short.

It is *Triton* Montfort, 1810, not Linnaeus, 1758; and *Tritonium* Cuvier, 1817, not Müller, 1776.

Septa tritonis var. *nobilis* Conrad.

Triton nobilis Conrad, Journ. Acad. Nat. Sci. Phila., 2d ser., I, p. 212, 1849.

Triton variegatus var. Reeve, Conch. Icon., II, pl. I, fig. 3a, 1844.

Porto Rico, various localities (Gundlach).

The variety *nobilis* is a shorter, heavier, more shouldered form than the type, which comes from the Indo-Pacific region.

Genus *COLUBRARIA* Schumacher, 1817.

Shell elongated, axis usually arcuate; aperture small; canal short.

Colubraria lanceolata Menke.

Ranella lanceolata Menke, Syn., p. 87, 1828.

Triton lanceolatus Reeve, Conch. Icon., II, pl. XVIII, fig. 79, 1844.

San Juan, Porto Rico (Gundlach).

Genus *RANULARIA* Schumacher, 1817.

Shell pyriform; spire short; canal long, straight or curved.

Ranularia tuberosa Lamarck.

Triton tuberosum Lamarck, An. sans Vert., VII, p. 185, 1822.

Triton antillarum d'Orbigny, Moll. Cubana, II, p. 161, pl. XXIII, fig. 20, 1845.

Shell rather short, with a moderate spire and recurved canal; whorls slightly rounded, the last ascending, sculptured with irregular, nodulous ribs, which are lirate in the interstices and are somewhat longitudinally plicate at the upper part of the shell and wrinkled below; there is often a strong hump on the back of the body whorl and one or two minor humps; outer lip varicose, toothed within; inner lip spreading in a wide callus over the base of the shell. Color dirty white, faintly marked with brown, sometimes brown banded; aperture white, rich reddish brown within.

Length, 55; diameter, 30; length of canal, 18 mm.

Mayaguez, Porto Rico; Ensenada Honda, Vieques, young shells; Indo-Pacific and West Indian regions.

Genus *LAMPUSIA* Schumacher, 1817.*Lampusia pilearis* Lamarck.

Triton pileare Lamarck, An. sans Vert., VII, p. 82, 1822.

Triton pileare Kiener, Icon. Coq. Viv., p. 15, pl. VII, fig. 1.

Shell with somewhat rounded whorls, which are often irregularly turned, sometimes with a row of nodules on the periphery, sculptured with finer and coarser revolving ridges, which are crossed by rather faint longitudinal ribs; outer lip heavy, toothed or strongly ridged within; columellar area strongly wrinkled, ridged; canal moderate, usually reflexed. Color tawny to dark brown, usually more or less white banded, sometimes having longitudinal dark flames; aperture varying from tawny to deep red or red brown, the teeth and folds whitish. The ground of the upper part of the inner lip is often blackish.

Length, 136; diameter, 55 mm.

Mayaguez Harbor; San Juan, Arroyo, Porto Rico.

An abundant and variable species distributed throughout the West Indian and Indo-Pacific regions.

Lampusia chlorostoma Lamarck.

Triton chlorostomum Lamarck, An. sans Vert., VII, p. 185, 1822.

Triton chlorostomum Kiener, Icon. Coq. Viv., p. 19, pl. XII, fig. 2.

Shell with shouldered, often irregularly turned whorls, with sculpture much like that of *T. pileare*, but with stronger, more nodulous longitudinal ribs, often decidedly humped behind on the body whorl; varices strong; outer lip very heavy; aperture small, usually with a double row of teeth within; inner lip wrinkled, plaited; canal moderate, recurved. Color dirty white to reddish ash, faintly variegated with brown, the aperture reddish.

Length, 90; diameter, 40 mm.

Arroyo; Poncee Reefs; Mayaguez; San Juan, Porto Rico; West Indian and Indo-Pacific regions.

Another abundant and variable species, with a distribution over the same area as the last. It has a more distinctly angled shoulder, heavier varices, stronger longitudinal knobbed ridges, and a smaller aperture than the *T. pileare*, though the two have many characters in common.

Lampusia cynocephala Lamarck.

Triton cynocephalum Lamarck, An. sans Vert., VII, p. 184, 1822.

Triton cynocephalus Reeve, Conch. Icon., II, pl. VIII, fig. 26, 1844.

Quebradillas; San Juan, Porto Rico (Gundlach); West Indies; Indo-Pacific region.

Genus *LOTORIUM* Montfort, 1810.*Lotorium femorale* Linnæus.

Murex femorale Linnæus, Syst. Nat., ed. X, p. 749, 1758.

Triton femorale Reeve, Conch. Icon., II, pl. VII, fig. 22, 1844.

Mayaguez; Quebradillas; San Juan, Porto Rico (Gundlach).

Family CASSIDIDÆ.

Genus CASSIS Lamarck, 1799.

Shell ovoid, inflated, generally bearing irregular varices; spire moderate to low; aperture elongated, the outer lip reflected and denticulated within; columella callous, wrinkled or nodulous; canal short, very sharply recurved; operculum elongate or semilunar; nucleus lateral and median.

Subgenus CASSIS s. s.

Cassis tuberosa Linnaeus.

Buccinum tuberosum Linnaeus, Syst. Nat., ed. x, p. 735, 1758.

Cassis tuberosa Reeve, Conch. Icon., v, pl. iii, fig. 7, 1848.

Mayaguez, Porto Rico (Gundlach).

Cassis flammea Linnaeus.

Buccinum flammeum Linnaeus, Syst. Nat., ed. x, p. 736, 1758.

Cassis flammea Reeve, Conch. Icon., v, pl. v, fig. 12, 1848.

San Juan, Porto Rico (Gundlach).

Subgenus CYPREACASSIS Stutchbury, 1837.

Spire short; aperture straight; varices reduced or wanting; no operculum.

Cassis testiculus Linnaeus

Buccinum testiculus Linnaeus, Syst. Nat., ed. x, p. 736, 1758.

Cassis testiculus Reeve, Conch. Icon., v, pl. iv, fig. 10, 1848.

Shell obovate, with low spire and rounded shoulder, covered with narrow longitudinal ribs, which are more or less broken by shallow, wide, distant, revolving furrows. Besides this the whole surface is covered with microscopic revolving threads; outer lip thick, reflexed, toothed within; there are often one or more faint varices on the body whorl; parietal wall covered with a heavy callus, which extends well over the base of the shell; columella wrinkled. Color pale reddish or rosy brown, with dark squarish or lunate blotches on the revolving ridges; outer lip white, with buff bands across it, which become blackish on its back.

Length, 60; diameter, 40 mm.

San Juan, Porto Rico, one fine young shell.

Subgenus SEMICASSIS Mörch, 1852.

Spire rather prominent; whorls with spiral sculpture; aperture large; lip reflexed, plicate; columella plicate and nodulous.

Cassis inflata Shaw.

Cassis inflata Shaw, Nat. Misc., vol. xxii, pl. 959, 1812.

Shell rather short, solid, scarcely obovate, with a moderate, sharp spire, the whorls of which are hardly rounded, the sculpture consisting of narrow, rather distant, revolving grooves crossed by more or less developed longitudinal ribs, making the spire and sometimes the body whorl cancellated. Outer lip thick, reflexed and becoming very heavy with age, strongly ridged within; columellar callus strong, granulate without; plicate within. Color purplish or bluish white, sometimes tinted brownish, with revolving rows of darker square spots.

Length, 60; diameter, 40 mm.

One young shell was taken at Mayaguez.

In general the specimens found along the shore are dead and bleached to a uniform white.

Genus SCONSIA Gray, 1847.

Shell elongate oval, with revolving striæ, bearing a single varix opposite the outer lip; canal short, slightly reflected; inner and outer lips plicate.

Sconsia striata Lamarck.

Cassidaria striata Lamarck, An. sans Vert., VII, p. 216, 1822.

Cassidaria striata Reeve, Conch. Icon., v, pl. 1, fig. 2, 1849.

Shell solid ovate, closely, spirally striate, made somewhat decussate by distinct growth lines; suture deep; aperture rather elongated; inner and outer lips strongly plicate, the latter thickened within; canal somewhat developed, but slightly reflexed; columellar callus thick, extending well over the base. Color whitish, with rows of square brown spots.

Length, 45; diameter, 25; of aperture and canal, 35 mm.

Mayaguez Harbor, one very young and one partly grown shell in bad condition.

The above measurements are taken from a fine, perfectly fresh shell in the National Museum collection.

Genus LAMBIDIUM Link, 1808.

Shell solid, subconical, covered with revolving rows of strong, warty nodules; spire varying from low to moderate; outer lip decidedly thickened, dentate within; canal short, scarcely recurved; columellar callus extending over the base of the shell, nodulous.

Lambidium oniscus Linnæus.

Strombus oniscus Linnæus, Syst. Nat., ed. XII, p. 1210, 1767.

Oniscia oniscus Reeve, Conch. Icon., v, pl. 1, fig. 1, 1849.

Shell obconic, with low spire, its whorls having a rather sharp shoulder which is sometimes nearly smooth, at others sculptured with revolving striæ, and often nodulous; on the body whorl are 3 revolving rows of strong tubercles; outer lip thickened, slightly ascending the spire, swollen within and without, toothed, sometimes cut away below; columellar callus strong, finely pustulous. Color whitish, variegated with brownish or dark gray, outer lip dotted; aperture white; callus white or purplish.

Length, 23; diameter, 15; length of aperture, 23; greatest width of aperture, 2.5 mm.

Hucares; Guanica; Agnadilla; Ponce, Porto Rico; Ensenada Honda, Culebra.

Family DOLIIDÆ.**Genus DOLIUM** Lamarck, 1801.

Shell large, thin, inflated, globular; spire short; whorls spirally sculptured; aperture very large; lip toothed and ridged internally; columellar callus reflexed; basal notch oblique, large.

Dolium perdix Linnæus.

Buccinum perdix Linnæus, Syst. Nat., ed. X, p. 734, 1758.

Dolium perdix Reeve, Conch. Icon., v, pl. VI, fig. 9, 1849.

Shell somewhat oval, with rather elevated spire, the whorls being rounded; suture deep; surface sculptured with narrow revolving grooves, which are generally rather widely spaced and with faint, revolving striæ; this is sometimes reticulated by the growth lines; outer lip scarcely thickened, basal notch shallow, wide; behind the reflexed curved columella there is an umbilicus. Color brownish or purple brown, the grooves often whitish and the ridges marked across with lunar white markings. Sometimes it is only faintly marked with white spots.

Length, 160; diameter, 110 mm.

Arroyo; San Geronimo, Porto Rico, one worn and broken shell from each locality; West Indian and Indo-Pacific regions generally.

Dolium galea Linnæus.

Buccinum galea Linnæus, Syst. Nat., ed. X, p. 734, 1758.

Dolium galea Reeve, Conch. Icon., v, pl. 1, 1848.

Shell nearly globular, with sharp-pointed spire rising but little above rounded outline; whorls rounded, sculptured with distant revolving grooves; suture deep; outer lip a little thickened, crenate on its edge, showing the ridges and grooves within; basal notch moderate; there is an umbilicus behind columellar reflection. Color whitish or fulvous, spire darker; columellar area with brown stains,

Length, 200; diameter, 160 mm.

Mayaguez, one young specimen; West Indies and Mediterranean.

Family AMPHIPERASIDÆ.

Genus *ULTIMUS* Montfort, 1810.

Shell solid, elongate-elliptical, the narrow aperture running its entire length; aperture edentulous, or nearly so; there is a strong, elevated, blunt ridge running across the back of the shell.

Ultimus gibbosus Linnæus.

Bulla gibbosa Linnæus, Syst. Nat., ed. x, p. 726, 1758.

Orulum gibbosum Reeve, Conch. Icon., xv, pl. vii, fig. 32, 1865.

Shell solid, narrower above; spire enrolled with the shell and completely concealed under a heavy callus; aperture reaching the entire length of the shell, narrow above, somewhat widened below; outer lip thickened, smooth within and without, arched over the upper end of the shell, where it is slightly canaliculate; dorsal ridge high and strong, placed a little above the center of the shell and running squarely across it; base somewhat canaliculate, the smooth, thick columella slightly truncated below. Color whitish, the sides and ends rich cream or buff color.

Length, 25; diameter, 14 mm.

Aguadilla; Mayaguez Harbor, Porto Rico; also West Indian region, Florida Keys, etc.

Family CYPRÆIDÆ.

Genus *CYPRÆA* Linnæus, 1758.

Shell ovoid, inflated, enrolled, covered with brilliant enamel; spire concealed by the last whorl, or very short and covered with enamel; aperture elongated, narrow, furnished with a short canal at each end; lip inflected and, with the columellar border, dentate.

Cypræa exanthema Linnæus.

Cypræa exanthema Linnæus, Syst. Nat., ed. xii, p. 1172, 1767.

Cypræa exanthema Reeve, Conch. Icon., iii, pl. v, fig. 16, 1848.

Shell rather elongated, subcylindrical; aperture slightly curved, a little wider below; inner and outer lips well raised above the spire, and separated above by a rounded canal; below, the outer lip and columella project each in a flattened process, with a short, open canal between; teeth moderately strong, very dark brown. Color pale chocolate, varying to tawny on the back, with numerous rather large, round, whitish spots. The meeting line of the lobes of the mantle is whitish and straight.

Length, 100; diameter, 50 mm.

A single specimen in very bad condition, without locality, was obtained by the *Fish Hawk* expedition.

A variable species, which probably includes the *Cypræa cervus* of Linnæus, a larger, more inflated shell, with smaller spots. The latter is reported from Porto Rico by Gundlach.

Cypræa cinerea Gmelin.

Cypræa cinerea Gmelin, Syst. Nat., p. 3404, 1792.

Cypræa cinerea Reeve, Conch. Icon., iii, pl. xxii, fig. 124, 1846.

Shell somewhat obovate, ventricose, inner and outer lips not greatly elevated above; teeth short, moderate; back ashy brown, with two faint lighter bands, and often sprinkled with black dots; sides and base purplish flesh-colored; interstices between the teeth purplish.

Length, 35; diameter, 20 mm.

Mayaguez Harbor; Aguadilla, Porto Rico; several badly worn shells.

Cypræa spurca Linnæus.

Cypræa spurca Linnæus, Syst. Nat., ed. x, p. 724, 1758.

Cypræa spurca Reeve, Conch. Icon., iii, pl. xiv, fig. 68, 1845.

Shell obovate, more or less inflated; lips not greatly produced above; aperture slightly curved, a very little wider below; teeth rather strong, short; sides pitted; back whitish or buff, clouded and mottled with fulvous yellow, the pits and sides often spotted with brown.

Length, 30; diameter, 18 mm.

Aguadilla, Porto Rico, six worn shells.

These specimens are probably the variety *flavcola* Lamarek, but are too much worn to be identified with certainty.

Family TRIVIIDÆ.

Genus TRIVIA Gray, 1832.

Shell generally small, oval or obovate, inflated, enrolled, transversely grooved and ridged above and below, with a longitudinal dorsal furrow, scarcely shining; aperture long, narrow, scarcely canaliculate above or below. Anatomy very distinct from that of *Cypræa*.

Trivia pediculus Linnaeus.

Cypræa pediculus Linnaeus, Syst. Nat., ed. x, p. 724, 1758.

Cypræa pediculus Reeve, Conch. Icon., III, pl. xxiii, fig. 131, 1846.

Shell rather solid, obovate, inflated, with a deep, straight, longitudinal, dorsal furrow, from which strong, subradial ridges run over the shell and extend into the aperture; these are subnodulous at the dorsal furrow; inner and outer lips thickened somewhat around the base; the space between the ridges above and below is faintly wrinkled and nodulous. Color purplish brown, with a dark spot at each end of the dorsal furrow and another on each side of it at the middle; these spots vary much in shape; the base is smoky tinted.

Length, 15; diameter, 11 mm.

Aguadilla, Porto Rico, several fine shells; West Indies; Florida.

Trivia quadripunctata Gray.

Trivia quadripunctata Gray, Zool. Journ., III, p. 368, 1827.

Cypræa quadripunctata Reeve, Conch. Icon., III, pl. xxv, fig. 146, 1846.

Shell small, obovate, slightly elongated; dorsal groove well marked; transverse ridges fine, slightly nodulous near the groove, with numerous intermediate ones which only reach part way up the back; outer lip thickened. Color purplish pink, often tinted darker on the extremities; on each side of the dorsal groove there are two darker spots, and these four spots form a zigzag row.

Length, 8; diameter, 5 mm.

Aguadilla, Porto Rico, one shell.

Trivia quadripunctata var. **rotunda** Kiener.

Cypræa rotunda Kiener, Coq. Viv., p. 141, pl. LIII, fig. 2.

More globose than the type. Mayaguez, Porto Rico, two shells.

Genus ERATO Risso, 1826.

Shell small, subpyriform or suboval, polished; spire always visible, conical; last whorl large; aperture nearly straight, narrow, nearly as long as the shell; outer lip thick, thicker in the middle, toothed within; columellar area sometimes toothed or plicate; base notched.

Erato maugerie Gray.

Erato maugerie Gray, in Sowerby, Conch. Illustr., p. 17, pl. VII, fig. 47, 1832.

Erato maugerie Tryon, Man., v, p. 9, pl. IV, figs. 42, 43, 1883.

Shell small, pyriform, with a moderate spire and flattened whorls; aperture narrow, long, nearly straight, and not spread below; the lip much thickened, slightly ascending the spire and heaviest in the middle, faintly toothed within; columellar area smooth, feebly plicate at base; canal somewhat drawn out, truncate. Color gray or livid, often tinted green, the lip whitish.

Length, 5; diameter, 3.5 mm.

Mayaguez, Porto Rico, two worn shells; West Indies; Florida.

Family STROMBIDÆ.

Subfamily STROMBINÆ.

Genus STROMBUS Linnaeus, 1758.

Shell ovoid, smooth, tuberculous or spinous, imperforate, solid, covered with an epidermis; spire with numerous whorls, elevated; aperture long, with a notch at the base and one on the outer lip above the base, somewhat canaliculate above; lip thickened, dilated; columellar border simple, enameled; operculum unguiculate, its edge roughened or toothed.

Strombus gigas* Linnaeus.Strombus gigas* Linnaeus, Syst. Nat., ed. x, p. 745, 1758.*Strombus gigas* Reeve, Conch. Icon., VI, pl. II, fig. 2, 1850.

Shell with about twelve whorls, which are concave on the spire, being furnished with a ridge near the base that on the later ones becomes nodulous, the nodules of the last two whorls strong and spiked; the surface has faint, revolving sculpture, which sometimes develops into low, indistinct ridges on body whorl; outer lip greatly expanded, rising above into a rounded or somewhat pointed wing as high as or higher than the spire; lip notch large, near base; basal notch wide. The shell is covered with a horn-colored epidermis which often peels and falls off; the shell is buff-colored to tawny; outer lip pale pink, becoming deep pink within the aperture; columella and parietal wall rich pink.

Length, 25; diameter, 20 cm.

Arroyo; San Antonio Bridge, San Juan; Ponce Reefs, Porto Rico; Ensenada Honda, Culebra, many young.

A magnificent shell. The animal is used extensively for food throughout the West Indian region, and the shells are manufactured into cameos and sometimes produce valuable pearls.

Strombus pugilis* Linnaeus.Strombus pugilis* Linnaeus, Syst. Nat., ed. x, p. 744, 1758.*Strombus pugilis* Reeve, Conch. Icon., VI, pl. XVI, figs. 39-41, 1851.

Shell with about eleven whorls, which are sculptured with revolving threads on the spire and the base of the body whorl; earlier whorls with fine, longitudinal ribs, which generally develop into nodules later, and into spines on the last two whorls; outer lip slightly thickened, winged and projecting forward above, widely spread, with an open canal next to the spire, notched below somewhat above the base, the base also notched, the shell being very thin at this part; columellar callus covering the base of the shell. The shell is covered with a rather thick epidermis, under which it is brownish, reddish, orange, or straw colored, the aperture and base being brilliantly colored.

Length, 80; diameter, 55 mm.

Mayaguez; Playa de Ponce; Boqueron Bay, Porto Rico.

An abundant and variable species, which is sometimes destitute of spines, and this form Gmelin called *S. alatus*. In most of the West Indian forms the spines stand at right angles to the axis of the shell. In a majority of the Floridian specimens they are less developed and point upward. Occasionally the shell is straw colored or nearly white within; in some of the Floridian shells the interior is blue purple, and without it is sometimes variegated with zigzag lines.

Specimens tend, in the West Indies, toward a smaller size, more prominent spines, and a pale salmon-pink tint, the more southern and eastern the locality from which they come.

Strombus costatus* Gmelin.Strombus costatus* Gmelin, Syst. Nat., p. 3520, 1792.*Strombus accipitrinus* Reeve, Conch. Icon., VI, pl. VII, fig. 12, 1850.

Shell sculptured with low, revolving ridges, which become mere threads on the spire; whorls of the spire nearly flat, with occasional, irregular tubercles; on the back of the shell at the shoulder there are several strong tubercles or knobs, and below these on the body whorl the surface is pinched up into wavy folds; lip very thick, smooth; the subbasal notch wide and shallow; basal notch shallow. Color white, sometimes marbled indistinctly with brown.

Length, 160; diameter, 110 mm.

Culebra Island, one adult; Mayaguez, one young; Aguadilla, Porto Rico (Gundlach); West Indies.

Strombus bituberculatus* Lamarck.Strombus bituberculatus* Lamarck, An. sans Vert., VII, p. 202, 1822.*Strombus bituberculatus* Reeve, Conch. Icon., VI, pl. XIII, figs. 30 a, b, 1851.

Aguadilla; Quebradillas; San Juan, Porto Rico (Gundlach).

Strombus gallus* Linnaeus.Strombus gallus* Linnaeus, Syst. Nat., ed., x, p. 743, 1758.*Strombus gallus* Reeve, Conch. Icon., VI, pl. IX, fig. 18, 1850.

Aguadilla, Porto Rico (Gundlach).

Family TRIFORIDÆ.

Genus TRIFORIS Deshayes (*em.*), 1824.

Shell small, turriculated, sharp-pointed, many-whorled, generally sinistral; aperture small, terminated by a short canal, and usually with a small canal at or near the posterior angle of the aperture; operculum paucispiral, nucleus subcentral.

Subgenus TRIFORIS *s. s.***Triforis turrithomæ** Dillwyn.

Turbo turrithomæ Chemn., Conch. Cab., xi, p. 310, pl. CCXIII, figs. 3022 *a-d*, 1795; Dillwyn, Descr. Cat. Rec. Sh., p. 873, 1817.
Cerithium (Triphora) mirabile C. B. Adams, Contr. to Conch., p. 118, 1850; Tryon, Man., ix, p. 188, pl. XXXIX, fig. 53, 1887.

Shell reversed, with about sixteen whorls which increase slowly; the suture is not impressed and the whorls are sculptured by two revolving rows of strong nodules, the upper row white, the lower chocolate-colored; the two rows of nodules cover the entire surface of the whorls and are separated from each other and at the suture by a groove; last whorl smaller than the penultimate one; aperture suborbicular, very small, with two small canals which are deflected nearly at right angles to the axis of the shell and are open only at the extremity.

Length, 6; diameter, 1.5 mm.

Mayaguez, Porto Rico, one shell with the aperture broken.

Section MASTONIA Hinds.

Triforis melanura C. B. Adams. Plate 58, fig. 7.

Cerithium melanura C. B. Adams, Contr. to Conch., p. 117, 1850.

Shell reversed, slender, conic, the sides regularly sloping to the apex; whorls about fourteen, sculptured by three revolving rows of nodules, which are arranged in slightly oblique rows longitudinally, the sutural furrow the deepest; the middle row of nodules is a little smaller than the others; aperture small, last whorl terminating abruptly; canal short, turning slightly to the right. Color snow white except the apex, which is dark brown.

Length, 5; diameter, 1.25 mm.

Mayaguez, Porto Rico, one young shell.

Triforis intermedia C. B. Adams.

Cerithium (Triphora) intermedium C. B. Adams, Contr. Conch., p. 119, 1850.

Cerithium turrithomæ d'Orbigny, Moll. Cubana, II, p. 155, pl. XXIII, figs. 10, 12, 1845; not of Dillwyn, 1817.

Shell with about sixteen whorls, the lower part nearly cylindrical, the upper somewhat concavely sloping to the sharp-pointed nucleus, with two revolving rows of nodules; on the lower whorls the space between the rows is widened and has an intermediate revolving thread; suture deep; tube at the base nearly opposite the aperture, pointing obliquely downward. The upper row of nodules is reddish brown, the lower is white.

Length, 6; diameter, 2 mm.

Mayaguez, Porto Rico, one young shell.

Section SYCHAR Hinds.

Triforis samanæ Dall. Plate 54, fig. 18.

Triforis (Sychar) samanæ Dall, Blake Report, II, p. 248, 1889.

Shell reversed, white, with twelve to fourteen whorls, cylindrical, but with the apex more rapidly tapered; sculpture consisting of three coarse, close-set spiral rows of tubercles, also arranged in longitudinal rows, covering the whole whorl; base having three rows of tubercular cords; canal short; aperture short, squarish.

Length, 10; diameter, 2.8 mm.

Mayaguez, one badly worn shell; Samana Bay, Santo Domingo.

Family CERITHIOPSIDÆ.

Genus SELLA A. Adams, 1861.

Shell small, with elevated, sharp, many-whorled spire, sculptured with strong revolving ridges; columella twisted, with a short, truncated canal below; outer lip not thickened.

Seila terebralis C. B. Adams.

Cerithium terebrate C. B. Adams, Bost. Journ. Nat. Hist., III, p. 320, pl. III, fig. 7, 1840.

Shell elongated, sharp-pointed, and regularly increasing, with about fourteen whorls, having four regular revolving ridges on the last whorl and three on the others; ridges even in size, the space between them sculptured with delicate, longitudinal costæ; aperture subquadrate; outer lip showing the ridges and furrows within; columella twisted; canal decidedly truncated; base of shell concave. Color brownish, lighter on the apex.

Length, 8; diameter, 2 mm.

Ensenada Honda, Culebra, two shells.

Genus CERITHIOPSIS Forbes & Hanley, 1849.

Shell imperforate, more or less cylindrical, straight, tuberculous, without varices; whorls numerous; aperture small; canal short, truncated, almost straight; operculum suboval, paucispiral, concave, nucleus sublateral.

Section **CERITHIOPSIS** s. s.

Cerithiopsis crystallina Dall.

Cerithiopsis ? crystallina Dall, Bull. Mus. Comp. Zool., IX, 1881, p. 89; Blake Report, II, p. 254, pl. XX, fig. 3, 1889.

Shell elongated, with twenty or more whorls, the tip of the nucleus being lost; there are three revolving rows of strong tubercles, that just below the suture being smaller than the other two; the two principal rows somewhat widely separated and having sometimes an intermediate, nodulous thread; columella slightly twisted; canal scarcely truncate below; base with fine, revolving liræ. Color white.

Length, 16; diameter, 2.25 mm.

Aguadilla, Porto Rico, one imperfect shell.

Cerithiopsis pulchella Jeffreys.

Cerithiopsis pulchella Jeffreys, Ann. and Mag. Nat. Hist., II, 1858, p. 129, pl. V, fig. 8 a-c.

Shell with the three nuclear whorls smooth and shining; the subsequent whorls have three revolving rows of nodules, of which the central row is most prominent; the last whorl has four rows of nodules, of which the two middle rows are stronger; suture deep; aperture small, subquadrate; canal deeply truncate, short; base below the last row of nodules smooth, concave. Color, pale brownish.

Length, 3; diameter, 0.75 mm.

Mayaguez, Porto Rico, one shell.

Cerithiopsis pupa, n. sp. Plate 53, fig. 16.

Shell minute pupiform, vitreous, white, with a yellow-brown row of large nodules just behind the suture; nepionic whorls missing; subsequent whorls six, with a row of small nodules in front of the suture, in front of which is a row of large ones, both white, then the single brown row forming the periphery; the base has three strong spirals, the posterior one somewhat nodulous; aperture contracted; pillar twisted; canal very short, deep; near the apex there are only two rows of nodules between the sutures; and the brown color of the anterior one is feebler.

Length, 2.5; diameter, 1 mm.

Mayaguez Harbor, at station 6062, Porto Rico, one specimen.

This very pretty little shell has much the same coloration as *Triforis turristhomæ*.

Section **EUMETA** Mörch.

Cerithiopsis subulata Montagu.

Murex subulatus Montagu, Test. Brit., Suppl., p. 115, pl. XXX, fig. 6, 1808.

Shell with about sixteen whorls, with a well-marked suture, below which is a revolving row of strong tubercles; on the earlier whorls this row of tubercles is connected by low, longitudinal ribs with a larger row of nodules at the base of the whorls; on the lower whorls the longitudinal ribs become faint, and there is a revolving, nodulous thread between the two rows of nodules; the last whorl has four revolving rows of nodules, and its base is concave, with curved radiating growth lines; columella twisted; canal rather long; aperture subquadrate. The upper whorls are purplish; the rest of the shell is brownish horn-colored, the upper row of nodules being darker.

Length, 12; diameter, 3 mm.

One specimen was dredged off Boca Prieta, Porto Rico.

Family CERITHIIDÆ.

Genus CERITHIUM Bruguière, 1789.

Shell imperforate, turriculated, many-whorled, straight; aperture semioval, prolonged into a short, posterior canal above; canal at the base short, oblique, well marked; lip more or less thickened; columella concave; operculum horny, oval, paucispiral, nucleus submarginal.

Cerithium algicola C. B. Adams.

Cerithium algicola C. B. Adams, Proc. Bost. Soc. Nat. Hist., II, p. 5, 1848.

Cerithium algicola Tryon, Man., IX, p. 129, pl. XXII, figs. 81, 82, 1887.

Whorls angular at the middle, sculptured with longitudinal ribs, which are developed into a more or less sharp knob where they cross the angle; surface covered with fine, revolving, raised threads; aperture rounded; columella concave. Color whitish, variegated with fulvous.

Length, 20; diameter, 9 mm.

Puerto Real, Porto Rico, two young shells; St. Thomas, two young specimens.

Cerithium uncinatum Gmelin.

Murex uncinatum Gmelin, Syst. Nat., p. 3542, 1792.

Cerithium uncinatum Tryon, Man., IX, p. 127, pl. XXII, figs. 60, 61, 1887.

Shell with revolving, thread-like sculpture, the middle of the whorls angular, with more or less perfectly developed longitudinal ribs, which generally develop into sharp knobs where they cross the angle of the whorls; the sculpture of the lower whorls sometimes consists of revolving rows of small nodules with intermediate threads; there is a varix on the body whorl opposite to the aperture, and scattered varices on the whorls; upper canal narrow; columella excavated; basal canal short, recurved. Color white, variegated with brown or black, sometimes entirely white.

Length, 22; diameter, 10 mm.

Fajardo; Playa de Ponce; Puerto Real; Guanica; Arroyo; Boqueron Bay; Cabo Rojo light, Porto Rico; Caballo Blanco Reef, Vieques; Ensenada Honda, Culebra.

A very abundant and variable species, which sometimes approaches the preceding one, but is generally more finely sculptured.

Cerithium atratum Born.

Cerithium atratum Born, Mus. Cæs. Vind., p. 324, pl. XI, figs. 17, 18, 1780.

Shell with a strong nodulous angle at the middle of the whorls, with a row of smaller nodules just below suture; the two rows of nodules sometimes united, forming short ribs; surface everywhere covered with strong, revolving, thread-like sculpture; upper canal small; basal canal short, reflexed. Color blackish, with broken, revolving white lines; aperture blue, becoming blackish farther in.

Length, 25; diameter, 10 mm.

Puerto Real; Mayaguez; Arroyo; Boqueron Bay; San Juan; Fajardo; Guanica; Ponce, Porto Rico; Ensenada Honda, Culebra.

Cerithium litteratum Born.

Cerithium litteratum Born, Mus. Cæs. Vind., p. 323, pl. XI, figs. 14, 15, 1780.

Shell sculptured with numerous rather fine nodulous revolving ridges; there is a shoulder just below the suture, on which the nodules are often quite strong; there is another nodulous shoulder just above the base of the body whorl; on the body whorl nearly opposite the lip there is a wide, low varix; outer lip thickened, ascending the penultimate whorl; aperture rather large; lower canal short. Color white, finely tessellated with black, the color pattern showing through within the aperture.

Length, 20; diameter, 11 mm.

San Juan; Guanica; Mayaguez; Fajardo, Porto Rico; Vieques; Culebra.

Cerithium litteratum var. **semiferrugineum** Lamarck.

Cerithium semiferrugineum Lamarck, An. sans Vert., VII, p. 74, 1822.

Cerithium semiferrugineum Sowerby, Conch. Icon., XV, pl. VI, fig. 38, 1865.

In this variety the ground is white, sometimes more or less tessellated with brown, and variegated with yellowish brown.

Vieques; Culebra; one shell from each locality.

Cerithium variabile C. B. Adams.

Cerithium variabile C. B. Adams, Proc. Bost. Soc. Nat. Hist., II, p. 5, 1848.

Cerithium variabile Sowerby, Conch. Icon., XV, pl. XIII, fig. 91, 1865.

Shell small, solid, with scarcely rounded whorls, which are sculptured by three revolving rows of tubercles, with about seven or eight rows on the last whorl; opposite the outer lip there is a varix, and there are varices scattered over the whorls; outer lip thick, varicose; aperture small. Color brownish or blackish, often variegated with white.

Length, 12; diameter, 5 mm.

Mayaguez; Boqueron Bay; Puerto Real; San Juan; Ponce; Arroyo, Porto Rico; Ensenada Honda, Culebra; Florida; West Indies.

Cerithium minimum Gmelin.

Murex minimus Gmelin, Syst. Nat., p. 3564, 1792.

Potamidex minimus Tryon, Man., IX, p. 167, pl. XXXIV, figs. 9-11, 1887.

Shell only moderately solid, with low, longitudinal ribs and faint revolving ridges, which cut the longitudinal ribs more or less into nodules. In addition to the revolving ridges there are fine revolving threads in their interstices. The aperture is rather large; the basal canal is turned sharply to the left. Color varying from jet black to ashy, variously banded.

Length, 15; diameter, 6 mm.

Puerto Real; Ponce; San Juan; Mayaguez, Porto Rico; Ensenada Honda, Culebra; West Indian region generally; Florida.

This species is quite close in appearance to *C. variabile*. It is generally less solid and more glossy than that species and has more distinct longitudinal ribs. Its aperture is generally larger and the basal canal more distinctly turned to the left. Still, there are specimens that are difficult to name.

Genus PYRAZUS Montfort, 1810.

Shell elongated; whorls angular; aperture subquadangular, prounged below; canal almost straight; lip dilated.

Pyrazus degeneratus Dall.

Cerithium (Pyrazus) septemstriatum var. *degeneratum* Dall, Bull. Mus. Comp. Zool., IX, p. 115, fig. 11, 1894.

Shell thin, brightly colored, finely spirally striate, scarcely sculptured longitudinally, with about six or seven whorls, which are slightly shouldered above; aperture subrhombic; outer lip thin, dilated; canal open.

Length, 12; diameter, 4 mm.

San Juan Harbor, Porto Rico, one shell.

Genus BITTIUM (Leach) Gray, 1847.

Shell small, elongated, with many granulous whorls, which have irregular varices; basal canal short, not curved; outer lip with a varix behind; columella simple; operculum subcircular, paucispiral; nucleus central.

Subgenus **DIASTOMA** Deshayes.**Bittium varium** Pfeiffer.

Cerithium varium Pfeiffer, Arch. für Naturg., 1840, p. 256.

Bittium varium Tryon, Man., IX, p. 152, pl. XXIX, fig. 86, 1887.

Shell with seven or eight more or less rounded whorls, with a distinctly marked suture; sculpture consisting of delicate, longitudinal, slightly curved ribs, which are cut into nodules by revolving grooves; there are about three of these grooves on each whorl; on the body whorl there are additional grooves extending over the base, which is scarcely nodulous; outer lip somewhat patulous; aperture oval; canal not produced, feeble; at some distance back of the lip there is a nearly smooth varix. Color varying from purplish white to purple brown, variously clouded.

Length, 5; diameter, 1.8 mm.

Mayaguez, Porto Rico, one broken shell.

Section ELACHISTA Dall, 1901.

This small group of forms, which seem referable to *Bittium*, was referred by Carpenter to the *Styliferina* of A. Adams, and the senior author of this paper followed this usage in several of his papers without investigation, a course which proves to be incorrect. It seems that each fauna in America, either recent or fossil, Atlantic or Pacific, in the warm-temperate or tropic zone, from the Oligocene to the present day, contains two or more forms of this sort, and the *Bittium elachistum* of the Paris Basin Eocene, described by Cossmann, would appear, from his figures, to belong here. These shells are characterized by their minute pupoid form, the axial sculpture faint and more or less confined to the apical portion, the aperture with hardly a trace of canal or varix. The type may be taken as *B. cerithioides* Dall (Trans. Wagner Inst., III, p. 276, pl. XVI, fig. 8, 1892). It may be mentioned that this figure is of an immature shell, in which the basal angle is much sharper than in the adult.

***Bittium cerithioides* Dall.**

? *Alaba cerithioides* Dall, Blake Report, II, p. 258, 1889; Trans. Wagner Inst., III, p. 276, pl. XVI, fig. 8, 1892.

Shell with nine or ten whorls, the first three smooth and increasing slightly, the next three carinated below the middle, the lower whorls rounded, those below the fourth generally having delicate, curved, longitudinal ribs; the base is sculptured with faint revolving grooves; aperture somewhat rounded; columella feebly curved and ending in a slight lip below, behind which is a small umbilical chink; outer lip not thickened. Color brownish.

Length, 3.5; diameter, 1.25 mm.

Mayaguez, Porto Rico, six worn and broken shells.

The shells have a strong resemblance to a minute *Cerithidea* before the lip has become thickened and reflexed.

Family MODULIDÆ.

Genus MODULUS Gray, 1840.

Shell perforate, lenticular, turbinate, or trochiform, porcellanous, solid, sculptured; aperture rounded; columella arcuate, ending at its base in a sharp tooth; operculum oval to rounded, multispiral, its nucleus subcentral.

***Modulus modulus* Linnaeus.**

Trochus modulus Linnaeus, Syst. Nat., ed. x, p. 757, 1758.

Modulus lenticularis Tryon, Man., IX, p. 261, pl. XLVIII, figs. 91, 92, 1887.

Shell solid, lenticular, with a low, rather sharp-pointed spire and a decided peripheral keel, the last whorl decidedly descending at the aperture; upper surface sculptured with low, revolving ridges and a series of rather strong radiating ribs; on the base there are from five to eight strong revolving ridges separated by deep grooves; lips strongly ridged within; basal tooth of the columella horizontally compressed. Color white with small brown spots; on the base the spots occur on the ribs.

Height, 10; diameter, 13 mm.

Boqueron Bay, off Humacao; Fajardo; Guanica; Ponce; Arroyo; Cabo Rojo light; Mayaguez; Puerto Real, Porto Rico; Ensenada Honda, Culebra; Vieques.

In the type the whorls are nearly flat above; in the variety *floridanus* they are somewhat convex and radiately ribbed.

***Modulus catenulatus* Philippi.**

Trochus catenulatus Philippi, Chemnitz Conch. Cab. neue Ausgabe, *Trochus*, p. 110, pl. XVIII, fig. 4, 1851.

Shell trochiform, solid, with a rather high, sharp-pointed spire and flat or slightly concave whorls, the last not descending at the aperture, with a very sharp peripheral keel; base inflated, but somewhat excavated around the small umbilicus, sculptured above and below with rather fine, revolving cords, which are made subnodulous by the crossing of the growth lines; basal tooth sharp, compressed; below it the basal edge of the shell is excavated. Color grayish or brownish, with white dots on the ribs, the base whitish.

Height, 15; diameter, 15 mm.

San Juan, Porto Rico, three worn shells.

The species is abundant on the west coast of tropical America from Panama northward.

Family PLANAXIDÆ.

Genus *PLANAXIS* Lamarck, 1822.

Shell imperforate, solid, with a thick epidermis, spirally sulcate, conical; spire sharp; aperture oval, notched at the base; lip thick, ridged within; columellar border with a ridge or tubercle above; operculum oval, paucispiral, the nucleus nearly terminal.

Planaxis nucleus Wood.

Buccinum nucleus Wood, Index Test., p. 110, No. 91, pl. XXIII, fig. 91, 1825.
Planaxis nucleus Sowerby, Conch. Icon., xx, pl. 1, figs. 7 a, b.

Shell solid, dark, reddish brown throughout, with six rounded whorls and a sharp spire, sculptured throughout with rather widely spaced grooves, which are well marked below the suture, on the base, and behind the outer lip, but are faint elsewhere; aperture ovate; lip thick, grooved within; basal notch deep and well marked.

Length, 12; diameter, 7 mm.

Ensenada Honda, Culebra; many.

Planaxis lineatus Da Costa.

Buccinum lineatum Da Costa, Brit. Conch., p. 130, 1776.
Planaxis lineatus Sowerby, Conch. Icon., xx, pl. III, fig. 20.

Shell small, solid, acuminate, with slightly convex whorls, the sculpture consisting of rather widely spaced spiral grooves, which are much more distinctly marked on the upper spire and base and which are often wanting elsewhere on the shell. Aperture oval; outer lip very thick, suddenly and briefly deflected above; columella reflexed into a lip below; basal notch round. Color generally whitish or yellowish, with close, revolving brown bands, sometimes uniform yellowish.

Length, 7; diameter, 3.5 mm.

San Juan; Puerto Real; Mayaguez; Hucares; Ponce, Porto Rico; Ensenada Honda, Culebra.

A uniformly yellow specimen was obtained at Hucares, Porto Rico.

Family VERMETIDÆ.

Genus *VERMICULARIA* Lamarck, 1799.

Shell free, regularly coiled in its earlier stages, like a *Turritella*; subsequently uncoiled and irregular, operculum filling the aperture, horny, circular, concave.

Vermicularia spirata Philippi.

Vermiculus spiratus Philippi, Arch. für Naturg., 1836, p. 244.
Vermetus spiratus Tryon, Man., VIII, p. 187, pl. LV, figs. 99, 100, 1886.

Shell when young closely coiled for the first six or eight whorls; these whorls are smooth and have a sharp, pinched-up carina below the center; the later whorls become uncoiled and irregular, the sculpture consisting of threads and ridges which are nearly parallel with the direction of the shell. Color brownish or purplish brown.

The species sometimes attains a length of 15 cm. and a diameter at the aperture of 12 or 14 mm. Mayaguez, several young specimens.

Genus *PETALOCONCHUS* Lea, 1843.

Shell solitary or a few clustered together, spirally and irregularly twisted, affixed, and usually decussated, with two internal ridges running spirally along the columella, which become obsolete near the aperture, operculum spiral.

Petalconchus erectus Dall.

Vermetus (Petalconchus) erectus Dall, Blake Report, II, p. 262, pl. XXXVIII, fig. 4, 1889.

Nucleus small, polished; early part of shell prone, irregularly contorted; longitudinally ridged and in fine specimens decussated; latter part of the tube rises vertically or nearly so, is smaller and nearly smooth. Color yellowish or grayish white. There are two internal laminæ near the apex.

Height of erect part, about 25; diameter of aperture, 2 mm.

Mayaguez Harbor, Porto Rico, several specimens.

Genus **BIVONIA** Gray, 1842.**Bivonia decussata** Lamarck.*Serpula decussata* Lamarck, *Atl. sans Vert.*, v, p. 363, 1818.*Vermetus conicus* var. *decussatus* Tryon, *Man.*, VIII, p. 170, pl. XLIX, fig. 24, 1886.

Quebradillas (Gundlach).

Family **TURRITELLIDÆ**.Genus **TURRITELLA** Lamarck, 1799.

Shell greatly elongated, many-whorled and evenly tapering, sculptured with spiral striæ or ridges; aperture rounded or subquadrate, entire, lip thin, externally flexuous; operculum horny, multispiral; nucleus central.

Section **HAUSTATOR** Montfort.**Turritella variegata** Linnaeus.*Turbo variegatus* Linnaeus, *Syst. Nat.*, ed. x, p. 767, 1758.*Turritella variegata* Reeve, *Conch. Icon.*, v, pl. v, fig. 19, 1849.

Shell with nearly flat whorls, but having the suture well marked by a slight shoulder above and below it; the sculpture consisting of fine, revolving threads and some seven or eight low but rather sharp ridges; aperture varying from rounded to subquadrate. Color pale brownish, variegated with indistinct longitudinal strigations of chocolate or purplish brown.

Length, 70; diameter, 18 mm.

Catona; Fajardo; Cabo Rojo light, Porto Rico; worn shells.

Section **TORCULA** Gray.**Turritella exoleta** Linnaeus.*Turbo exoletus* Linnaeus, *Syst. Nat.*, ed. x, p. 766, 1758.*Turritella exoleta* Reeve, *Conch. Icon.*, v, pl. vi, fig. 22, 1849.

Shell with sixteen or seventeen whorls, which are rudely ridged above and below and concave in the middle; this concave space is sometimes crossed by thin lamellæ; lower rib of the body whorl double; aperture sinuate in the middle of the outer lip, subquadrate. Color yellowish white, obscurely flamed with orange brown.

Length, 60; diameter, 15 mm.

Mayaguez, Porto Rico, two young, worn specimens.

Family **LITORINIDÆ**.Genus **LITORINA** Férussac, 1821.

Shell imperforate, turbate, colored; aperture rounded, not notched below, the outer lip not thickened; columella flattened or excavated; operculum horny, paucispiral; nucleus more or less excentric.

Section **MELARAPHE** Muhlfeld, 1828.

Shell rather thin, conical, with pointed spire; surface with revolving sculpture, usually variegated.

Litorina ziczac Gmelin.*Trochus ziczac* Gmelin, *Syst. Nat.*, p. 3587, 1792.*Littorina ziczac* Reeve, *Conch. Icon.*, x, pl. xi, fig. 57, 1857.

Shell with scarcely rounded whorls and a well-defined peripheral keel near the base of the last whorl; the whole surface is covered with delicate, rather widely spaced grooves; aperture small, irregularly oval; the thin lip extends upward above the keel on the body whorl, forming a canal; base a little produced. Color whitish, with close, sharply defined, longitudinal, wavy or zigzag stripes of brownish; sometimes the shell is faintly banded; aperture dark, with a light band.

Length, 15; diameter, 9 mm.

Aguadilla; San Geronimo; San Juan, Porto Rico; Ensenada Honda, Culebra,

Litorina ziczac var. **lineata** Lamarek.

Phasianella lineata Lamarek, An. sans Vert., VII, p. 54, 1822.

Littorina ziczac var. *lineata* Tryon Man., IX, p. 251, pl. XLV, fig. 7.

Shell smoother than the type, the whorls more convex and less sharply angulate at the base. The color pattern is generally less distinct than in the *ziczac*.

Aguadilla; San Juan; Hucares; Puerto Real, Porto Rico.

Litorina tessellata Philippi.

Littorina tessellata Philippi, Abbild. und Beschr., Heft VIII, p. 226, pl. v, fig. 26, 1847.

Shell with convex whorls, which are sometimes slightly shouldered above, and a sharp apex, the suture plainly marked; last whorl bluntly angulated at base, sculptured throughout with delicate, evenly spaced grooves; aperture irregularly oval, the lip extending above angle of penultimate whorl; columella flattened, ending in a ridge below, behind which the parietal wall is excavated. Color bluish or greenish white, alternating with square, brown tessellations, the tessellations in oblique or zigzag rows; aperture brownish purple, the inside of outer lip showing the outside color pattern.

Length, 15; diameter, 10 mm.

Ensenada Honda, Culebra, two specimens.

This species resembles *L. ziczac* in many respects, but is rather shorter in proportion, has more rounded whorls, which are often slightly shouldered above; the aperture is more purplish and has no white band within.

Litorina angulifera Lamarek.

Phasianella angulifera Lamarek, An. sans Vert., VII, p. 54, 1822.

Littorina scabra var. *lineata* Tryon, Man., IX, p. 243, pl. XLII, figs. 11-13, 15-17, 1887.

Shell thin, with rounded whorls and a sharp-pointed spire; the surface everywhere covered with fine, revolving, engraved lines, which are sometimes so near together that the ridges between them appear as close revolving threads; surface generally slightly decussated by the growth lines; aperture nearly evenly oval; outer lip thin; columella often a little excavated below. The color pattern varies greatly; the ground may be gray, yellowish, reddish, or purplish, and is generally marked with darker, oblique strigations, which are often only faintly defined; columella usually tinted with violet.

Length, 30; diameter, 17 mm.

Ponce, Porto Rico; Ensenada Honda, Culebra; a small, slender, light-colored variety was obtained at San Juan, Porto Rico; West Indies; Florida.

Litorina columellaris d'Orbigny.

Littorina columellaris d'Orbigny, Voy. Amér. MÉR., p. 392, 1840; Moll. Cubana, I, p. 213, pl. XIII, figs. 18-20, 1841.

Shell rather solid, sharp-pointed, with rounded whorls, the last generally compressed or a little concave just below the suture, covered everywhere with fine, revolving threads, and slightly decussated by growth lines; aperture suboval; outer lip not greatly thickened; columella wide, nearly straight, excavated below. Color yellowish to ashy, the upper whorls marked with darker color, in tessellations, lines, or clouds; columella purple.

Length, 25; diameter, 16 mm.

San Juan, Porto Rico; many young shells; West Indies; mainland of northern South America to Mexico.

Often close to *L. angulifera*, but a solid shell, with a wider, straighter columella.

Section **LITORINA** s. s.**Litorina guttata** Philippi.

Littorina guttata Philippi, Abbild. und Beschr., II, p. 197, pl. IV, fig. 7, 1847.

Quebradillas, Porto Rico (Gundlach).

Litorina mespilum Muhlfeld.

Helix mespilum Muhlfeld, Verh. Berl. Ges. Nat., I, 1824, p. 219, pl. VIII, fig. 8.

San Juan, Porto Rico (Gundlach).

Genus **TECTARIUS** Valenciennes, 1833.

Shell perforate or imperforate, turbinata, solid, subconic, tuberculous or spinose; spire pointed; aperture oval, entire; operculum paucispiral.

Tectarius muricatus Linnæus.

Turbo muricatus Linnæus, Syst. Nat., ed. x, p. 761, 1758.

Littorina muricata Reeve, Conch. Icon., x, pl. II, fig. 11, 1857.

Shell perforate, with about eight somewhat rounded whorls, which are slightly shouldered above, the sculpture consisting of about four revolving rows of somewhat sharp nodules, with from five to eight rows of flatter nodules on the base, which fade out into mere ribs at the umbilicus; aperture ovate; outer lip thickened, scarcely produced at the base; the umbilicus continuing down the columella as a groove. Color ashy, the interior of the aperture brown.

Length, 20; diameter, 15 mm.

Cabo Rojo light; San Geronimo; San Juan; Arroyo; Puerto Real; Aguadilla, Porto Rico; Caballo Blanco, Vieques; Ensenada Honda, Culebra; West Indian region; Florida Keys.

Tectarius trochiformis Dillwyn.

Turbo trochiformis Dillwyn, Cat. Rec. Sh., II, p. 826, 1817.

Tectarius nodulosus Tryon (part), Man., IX, p. 258, pl. XLVIII, fig. 72, 1887.

Shell imperforate solid, with about eight whorls, which are sculptured with revolving rows of strong, sharp nodules. There are two rather pronounced rows of nodules on the upper whorls, one just below the suture, another lower down forming a shoulder. On the last whorl there are three of these more conspicuous rows, the two lower ones forming a biangulation on the periphery. Besides these there are revolving threads and rows of small nodules covering the entire shell; aperture suboval, outer lip rather thin; columella wide, excavated, base produced; operculum paucispiral. The shell is generally dark lead-color, the nodules lighter; aperture dark brown with a white stripe below.

Length 18; diameter, 13 mm.

San Geronimo; Aguadilla; Puerto Real, Porto Rico.

This mollusk is quite common on the lower Keys of Florida, and is often confounded with *Echinella nodulosa* Pfeiffer, which it somewhat resembles. The former has a paucispiral operculum, while that of the latter is multispiral.

Family LITIOPIDÆ.

Genus **ALABA** A. Adams, 1862.

Shell elongated, pointed, with numerous rounded whorls which may be smooth or spirally lineate, with irregularly distributed varices; aperture oval; lip scarcely thickened, smooth within; columella subtruncate at the base.

Alaba tervaricosa C. B. Adams. Plate 58, fig. 8.

Alaba tervaricosa Mörch, Malak. Blatt. XXIII, p. 57, 1876.

Rissoa tervaricosa C. B. Adams, Proc. Bost. Soc. Nat. Hist., II, p. 6, 1845.

Shell with about thirteen rounded whorls which gradually increase, the first five or six dark colored and smooth, the remainder whitish or ashy, often marked with brownish, and sculptured with very delicate revolving threads, which are reticulated by the growth lines; there are a number of rounded varices on the whorls; aperture oval; columella slightly truncate below.

Length, 6; diameter, 2.5 mm.

San Juan Harbor, Porto Rico; one shell; widely distributed.

A. melanura Adams appears to be only a more slender variety of the same species.

Family SOLARIIDÆ.

Genus **SOLARIUM** Lamareck, 1799.

Shell widely umbilicated, conic, depressed, angular at the periphery, solid; nucleus sinistral, oblique, whorls sculptured; aperture subquadrangular; umbilicus funicular bordered by a crenulated carina; columella vertical; operculum horny, spiral, concave, or flat externally, with a tubercle on its internal face.

Solarium nobile Hanley.

Solarium nobile Hanley, Thes. Conch., III, p. 230, fig. 35, 1866.

Umbilicus rather narrow, deep, the crenulations surrounding it very strong; the suture well marked; there are four strong rows of elongated tubercles on the whorls, and on the upper whorls here are two fainter rows in the sutures; periphery narrow, rounded; base with five or six revolving

rows of tubercles. Purplish flesh color, with scattered brown markings on the rows of nodules; periphery whitish, occasionally spotted above.

Diameter, 40; height, 20 mm.

San Juan Harbor; Mayaguez, Porto Rico; Texas.

Solarium bisulcatum d'Orbigny.

Solarium bisulcatum d'Orbigny, Moll. Cubana, II, p. 66, pl. XIX, figs. 17-20, 1845.

Shell small, depressed, with a wide umbilicus; spire scarcely elevated, with flat whorls; these are sculptured with revolving grooves which are cut by radiating furrows into granules, the rows just above and below the suture being strongest; on the periphery there are two nearly equal rows of nodules; the sculpture of the base is much like that above; crenations around the umbilicus moderate; aperture nearly round. Color dirty white.

Diameter, 10; height, 2 mm.

Mayaguez, Porto Rico; several worn shells.

Section **PHILIPPIA** Mörch.

Solarium krebsii Mörch.

Solarium Krebsii Mörch, Malak. Blatt., 1875, p. 155.

Quebradillas, Porto Rico (Gundlach).

Genus **TORINIA** Gray, 1840.

Shell varying from planorbiform to turbinately elevated, umbilicus perspective; its margins slightly crenate; operculum corneous, generally conically elevated, externally spiral, with projecting edges; internal face smooth, with a spirally twisted elevation.

Torinia cylindrica Gmelin.

Trochus cylindricus Gmelin, Syst. Nat., p. 3572, 1792.

Torinia cylindrica Marshall, Tryon's Man., IX, p. 17, pl. v, fig. 82, 1887.

Shell conic, elevated; whorls somewhat rounded, with spiral sulcations, ten-ribbed, the three peripheral ribs the strongest; umbilicus deep, scarcely diminishing, its border feebly crenate. Color chestnut brown, sparingly mottled with white at the periphery and above the suture.

Height, 13; diameter, 13 mm.

Puerto Real; Cabo Rojo light; Guanica, Porto Rico; one specimen in bad condition from each locality.

Torinia æthiops Menke.

Solarium æthiops Menke, Syn. Moll., ed. II, p. 147, 1830.

Torinia æthiops Marshall, Tryon's Man., IX, p. 18, pl. v, figs. 85, 86, 1887.

Porto Rico (Gundlach, Menke).

Genus **OMALAXIS** Deshayes, 1830.

Shell discoidal, more or less uncoiled, flat or concave above, the last whorl bicarinated or quadrate in section; nucleus sinistral, papillose, depressed; aperture subquadrate, lip sharp.

Omalaxis exquisita, n. sp. Plate 54, fig. 12.

Shell minute, with discontinuous whorls in one plane, subquadrate in section, with a minutely serrate keel at each angle; whorls three, the nepionic one sinistral and depressed, the others free; pellucid whitish, with indications of brown flammulae; whorl four-keeled, the inner keels nearer each other than the peripheral pair; shell between the keels polished, smooth; above and below slightly convex, but between the peripheral keels somewhat concave.

Maximum diameter of shell, 3; minimum diameter, 2; height, 1 mm.

Mayaguez Harbor, Porto Rico, at station 6062, in 25 fathoms, four specimens.

This is one of the most exquisite little gems of the sea that can be imagined.

Family RISSOIDÆ.

Genus RISSOA Fréminville, 1813

Section ALVANIA Leach, 1826.

Surface reticulate.

Rissoa epima, n. sp.

Shell small, subtranslucent, pinkish white, with a touch of purple brown on the pillar lip, reticulated, five-whorled; two nepionic whorls whitish, smooth, not polished; subsequent whorls with narrow, hardly flexuous, rounded axial ribs, with slightly wider interspaces extending from suture to suture but not over the base, and crossed above the suture by three subequal, nearly equally spaced, spiral threads, slightly tumid at the intersections; the posterior one nodulous at the intersections; on the base five simple threads, the posterior one of which marks the line of the suture and the anterior ending of the axial ribs; aperture rounded ovate, the lip continuous, simple, moderately thickened; throat not lirate; suture deep.

Length of shell, 2; of last whorl, 1.25; maximum diameter, 1.12 mm.

Mayaguez Harbor, Porto Rico, at station 6062, in about 25 fathoms, sand, one specimen.

Although this species has no very strong characteristics, it does not seem practicable to unite it with any of the species of *Alvania* known from the West Indies. It is more slender than any of the others, proportionally, and has a different number of spirals from any mentioned by Mörch.

Section THAPSIA Monterosato, 1884.

Rissoa portoricana, n. sp. Plate 53, fig. 20.

Shell small, thin, rather slender, bluish white, with five sculptured whorls; sutures rather deep, whorls convex, the nepionic smooth and inflated, the subsequent minutely spirally threaded with rather distant threads crossing feeble and rather irregular axial ridges, which become obsolete near the periphery; aperture with the margin slightly thickened; a minute chink behind the callus at the pillar.

Length, 3; maximum diameter, 1 mm.

Mayaguez Harbor, Porto Rico, at station 6062, in 25 fathoms, one specimen.

A small and inconspicuous species, but unlike any other yet known from the region.

Genus RISSOINA d'Orbigny, 1840.

Shell rissoiform, turriculated, with numerous whorls which are somewhat convex; apex mammillar; aperture oval, semilunar; lip thickened within and without, canaliculate or subcanaliculate at the base; operculum oval, elongate, horny, paucispiral, with an excentric nucleus; its internal face bearing a club-shaped appendage.

Rissoina decussata Montagu.

Turbo decussatus Montagu, Test. Brit., p. 399, 1803.

Rissoina decussata Tryon, Man., IX, p. 385, pl. LVIII, figs. 15-17, 1887.

Shell with about twelve nearly flat whorls, with an elevated, sharp spire, sculptured with from twenty-five to twenty-eight delicate, longitudinal riblets, which are crossed by very fine revolving striae; outer lip very heavy; aperture almost semilunar; columella nearly straight, somewhat excavated in the middle; basal canal feeble. Color white.

Length, 6; diameter, 2.5 mm.

San Juan Harbor, Porto Rico; several broken specimens.

Tryon's figures do not accurately represent the aperture of this species. It was erroneously described as a British species by Montagu.

Rissoina browniana d'Orbigny.

Rissoina browniana d'Orbigny Moll. Cubana, p. 28, pl. XII, figs. 33, 35, 1842.

Rissoa levissima C. B. Adams, Contr. to Conch., 1850, p. 115.

Shell smooth, with eight nearly flat whorls, highly polished, slightly curved; apex acute; aperture rather small; outer lip much thickened. Color white, sometimes with two or three pale bands, which are, however, quite evanescent.

Length, 4; diameter, 1.5 mm.

Mayaguez, Porto Rico; two shells.

Rissoina chesnelii Michaud.

Rissoia chesnelii Michaud, Desc. des Coq. Nouv., p. 17, 1832.

Rissoina chesnelii Schwartz v. Mohr., Mon. Rissoina, p. 73, pl. v, figs. 38, 39, 1860.

Shell white, with eight somewhat rounded whorls, having about fourteen strong, longitudinal costæ with about equal interspaces which are scarcely spirally striate; columellar callus solid, elevated. There is a revolving oblique ridge at the base of the shell. Length, 4; diameter, 1.5 mm.

Mayaguez, Porto Rico; a fragment.

Rissoina cancellata Philippi.

Rissoina cancellata Philippi, Zeits. für Mal., 1847, p. 127; Schwartz v. Mohr., Mon. Rissoina, p. 89, pl. vii, fig. 52, 1860.

Shell white, with ten convex whorls which are cancellated with sixteen to eighteen longitudinal ribs and four or five revolving ridges; revolving ridges on the base numerous; outer lip strong; basal notch well developed. There is a faint revolving rib at the base of the shell. Length, 8; diameter, 3 mm.

Mayaguez, Porto Rico; Vieques.

Subfamily HYDROBIINÆ.

Genus **POTAMOPYRGUS** Stimpson, 1865.**Potamopyrgus coronatus** Pfeiffer.

Paludina coronata Pfeiffer, Arch. für Naturg., 1, 1840, p. 253.

Amnicola coronata Fischer & Crosse, Mission Sci. Mexique, pt. vii, vol. II, p. 266, pl. I, figs. 6 a-c, 1891.

Several localities in Porto Rico; Vieques; Cuba, and other localities in the West Indies (Fischer & Crosse); Texas; Mexico; Central America; Colombia; Venezuela, etc.

The variety *crystallinus* Shuttleworth is also reported from Porto Rico.

Family CYCLOPHORIDÆ.

Shell variable in form, turbinate, turriculated, or subdiscoidal; aperture rounded; peristome simple or reflexed; operculum circular; jaw formed of two triangular pieces.

Genus **MEGALOMASTOMA** Guilding, 1840.

Shell perforate, elongate, turriculate, or pupiform; apex generally decollated; aperture subcircular; peristome continuous; operculum horny, circular, flat, arctispiral, with a central nucleus.

Type, *Megalomastoma antillarum* Sowerby.

Megalomastoma croceum Gmelin. Plate 53, fig. 1.

Helix crocea Gmelin, Syst. Nat., p. 3655, 1792; Chemnitz, Conch. Cab., ix, pl. 135, fig. 1233.

Megalomastoma cylindraceum Sowerby, Conch. Icon., xx, pl. x, fig. 91, 1878.

Shell elongated, subcylindrical, with fine, oblique, flexuous striæ, which, with the epidermis, are usually eroded away; whorls remaining from six to eight, scarcely convex, the first one to one and a half decollated; aperture nearly circular; peristome continuous, appressed to the last whorl, but little thickened, slightly reflexed; umbilicus a mere chink. The surface, where not eroded, is generally horn colored, but ordinarily it is a dirty white or reddish ash. Sometimes the last whorl or two are flushed with reddish brown or violet.

Length, 30; diameter, 12; length of aperture, 7 mm.

El Yunque, Porto Rico; several dead specimens.

Megalomastoma croceum var. **curtum** Dall & Simpson. Plate 53, fig. 2.

A small variety, having only six remaining whorls, was found at Hucares, Porto Rico.

Length, 21; diameter, 10 mm.

Megalomastoma hjalmarsoni Pfeiffer.

Megalomastoma hjalmarsoni Pfeiffer, Mal. Blätt., xxii, p. 119, 1875.

Lares; Mayaguez, western Porto Rico (Crosse).

Megalomastoma verruculosum Shuttleworth.

Cyclostoma (Megalomastoma) verruculosum Shuttleworth, Diagn. neue Moll., Berner Mitth., 1854, p. 90.

Eastern Porto Rico (Crosse).

Family CYCLOSTOMATIDÆ.

Genus CHOANOPOMA Pfeiffer.

Choanopoma decussatum Lamarek.*Cyclostoma decussata* Lamarek, An. sans Vert., vi, p. 147, 1822.

Porto Rico, many localities (Crosse).

Choanopoma senticosum Shuttleworth.*Cyclostoma (Choanopoma) senticosum* Shuttleworth, Diagn. neue Moll., Berner Mitth., 1854, p. 90.

Porto Rico; Isle of Vieques (Crosse).

Choanopoma sulculosum Pfeiffer.*Cyclostoma sulculosum* (Férussac ms.) Pfeiffer, in Conch. Cab., *Cyclostoma*, p. 313, pl. XLII, figs. 15-17, 1853.

Isle of Vieques; St. Bartholouew (Crosse).

Genus CISTULA Gray, 1850.

Cistula riisei Pfeiffer.*Cistula riisei* Pfeiffer, Mon. Pneum. Viv., p. 417, 1852.

Porto Rico, several localities (Crosse).

Cistula aguadillensis Pfeiffer.*Cistula aguadillensis* Pfeiffer, Mal. Blätt., XXII, p. 207, 1875.

Aguadilla; Pennelas, Porto Rico (Crosse).

Cistula lineolata Lamarek.*Cyclostoma lineolata* Lamarek, An. sans Vert., iv, p. 147, 1822.

Puerto Rico (Crosse).

Genus CHONDROPOMA Pfeiffer, 1847.

Chondropoma terebra Pfeiffer.*Chondropoma terebra* Pfeiffer, Mal. Blätt., VIII, p. 74, pl. II, figs. 4-6, 1861.

Sierra Morales, Porto Rico (Crosse).

Chondropoma blauneri Shuttleworth.*Cyclostoma (Chondropoma) blauneri* Shuttleworth, Diagn. neue Moll., Berner Mitth., 1854, p. 91.

Humacao, Porto Rico (Crosse).

Chondropoma swifti Shuttleworth.*Cyclostoma (Chondropoma) swifti* Shuttleworth, Diagn. neue Moll., Berner Mitth., 1854, p. 91.

Near Ponce, Porto Rico (Crosse).

Chondropoma newtoni Shuttleworth.*Cyclostoma (Chondropoma?) newtoni* Shuttleworth, Diagn. neue Moll., Berner Mitth., 1854, p. 92.

Near Arecibo, Porto Rico (Crosse).

Family TRUNCATELLIDÆ.

Shell cylindrical, truncated in an adult state; aperture entire, oval; peristome continuous, thickened; operculum oval, paucispiral, its nucleus excentric.

Genus TRUNCATELLA Risso, 1826.

Shell with longitudinal ribs, shining; operculum horny.

Type, *T. truncatula* Draparnaud.

Truncatella caribæensis Sowerby. Plate 53, fig. 7.

Truncatella caribæensis (Sowerby mss.) Reeve, Conch. Syst., II, pl. CLXXXII, fig. 7, 1842.

Shell subimbrate, subcylindrical, in the adult state, but slightly decreasing in size toward the apex; amber colored, with delicate, scarcely curved ribs, which are often faint on the middle of the whorls; whorls three and one-half to four, but little rounded, the last with a feeble basal carination; aperture subvertical, oval; peristome thickened on its inner lip and pressed in to the last whorl; outer lip reflexed.

Length, 7; diameter, 2.5 to 3 mm.

Ensenada Honda, Culebra, one specimen; also various West Indian localities; Florida, etc.

Truncatella subcylindrica Linnaeus.

Helix subcylindrica Linnaeus, Syst. Nat., ed. XII, p. 1248, 1767; Pultney, Cat. Dorset, p. 49, 1799; Montagu, Test. Brit., II, p. 393, 1803 (Ed. Chenu, p. 173); Hanley, Ips. Lin. Conch., p. 379, 1855.

Truncatella subcylindrica Gray, in Turton, Man., p. 295, fig. 72, 1857.

Truncatella montagu Lowe, Zool. Journ., v, p. 303, 1831; Thorpe, Brit. Marine Conch., p. 146, fig. 75, 1844.

Turbo truncatus Montagu, II, p. 300, pl. X, fig. 7, 1803; Turton, Conch. Diet., p. 218, 1819.

Turritella truncata Fleming, Brit. An., p. 303, 1828.

Turbo subtruncatus Montagu, p. 300, pl. X, fig. 1 (young), 1803; Turton, Conch. Diet., p. 219, 1819.

? *Truncatella subcylindrica* Pfeiffer, Mon. Anric., p. 186, 1833; Binney, Bost. Journ. Nat. Hist., VII, p. 186 (ex parte), pl. LXXV, fig. 6 (only), 1859.

Porto Rico; adventitious in England; common in Florida and many localities in the West Indies.¹

Truncatella pulchella Pfeiffer.

Truncatella pulchella Pfeiffer, Archiv. für Naturg., I, 1839, p. 356; Binney, Bost. Journ. Nat. Hist., VII, p. 189, pl. LXXV, figs. 1, 9, 10, 1859.

Fajardo, Porto Rico (Crosse); other localities in the West Indies; also Florida.

Truncatella clathrus Lowe.

Truncatella clathrus Lowe, Zool. Journ., v, p. 303, 1831; Reeve, Conch. Syst., II, pl. 182, fig. 3, 1842; Küster, Conch. Cab., p. 15, 1855.

Rare in Porto Rico (Crosse); St. Thomas; Bermuda (Verrill).

Family CALYPTRÆIDÆ.

Genus CHEILEA Modeer, 1793.

Shell conical, irregular, lamellated or rayed; the summit subcentral; nucleus subspiral, dextral, slightly posterior, within bearing a half cup-shaped appendage, attached behind the summit and open in front; edge of the shell irregular; opercular plate basal, calcareous.

This is better known by the name of *Mitularia* Schumacher.

Cheilea equestris Linnaeus.

Patella equestris Linnaeus, Syst. Nat., ed. X, p. 780, 1758.

Mitularia equestris Tryon, Man., III, p. 137, pl. XII, figs. 25-32, 1886.

Shell irregularly conical, thin or subsolid, pure dead white without and shining white within, sculptured with fine radiating threads and strong, very irregular, oblique corrugations or wrinkles, which sometimes break up into frills near the base; apex spiral, with one to one and a half whorls, posterior; interior process attached along the posterior part of the shell, elongated, so that the points may reach below the base of the shell, obliquely truncated.

Diameter, 40; height, 23 mm.

Aguadilla; San Juan, Porto Rico; St. Thomas.

Genus CALYPTRÆA Lamarck, 1799.

Shell low conical, with central spiral apex; aperture basal, circular, entire; interior having a spiral diaphragm, the columellar margin of which is twisted, forming a false umbilicus.

¹ The synonymy found in Pfeiffer, Binney, and the usual works of reference contains so many errors that it was thought best to expand it more than we have usually attempted in this report.

Calyptrea candeana d'Orbigny.

Infundibulum candeanum d'Orbigny, Moll. Cubana, II, p. 190, pl. xxv, figs. 28-29, 1845.

Shell small, rounded, thin; spire elevated; growth lines rugose; sometimes obsolete, finely, radiately striate; white within and without.

Diameter, 5; height, 2 mm.

Mayaguez, Porto Rico, a great number of dead shells.

Genus CREPIDULA Lamarck, 1799.

Shell oval to oblong; apex posterior, oblique; interior porcellanous, shining; a thin, horizontal septum or shelf occupies nearly the posterior half of the shell within; free border of shelf straight or arcuate.

Crepidula aculeata Gmelin.

Patella aculeata Gmelin, Syst. Nat., p. 3693, 1792.

Crepidula aculeata Tryon, Man., VIII, p. 129, pl. XXXIX, figs. 61-65, 1886.

Shell irregularly oval, with one and a half to two whorls, the nuclear whorl smooth and very distinct from the rest of the shell; growth lines rough, sometimes a little imbricated; the surface is generally covered with subspiral lines of erect, prickly, often tubular scales; growth lines of the shelf finely marked, and with the edge of the shelf shaped something like a brace (—). Color whitish, variegated with brown; the shelf white, with translucent lines.

Length, 28; breadth, 21; height, 10 mm.

Arroyo and off Point Melones, Porto Rico. Distributed almost universally throughout the warm seas of the globe. Young specimens of one or two other species were obtained by the *Fish Hawk* expedition, but not in condition to be satisfactorily named.

Crepidula riisei Dunker.

Crepidula riisei Dunker, Zeitschr. Mal., p. 59, 1852; Mörch, Mal. Blätt., XXIV, p. 105, 1877.

Crepidula protea d'Orbigny (ex parte), Moll. Cubana, II, p. 192, pl. XXIV, figs. 32, 33, 1845.

San Juan, Porto Rico, Riise; Mayaguez Harbor, U. S. Fish Commission.

This form much resembles the *Crepidula plana* Say, being a resident of the inside of dead shells, but may be distinguished by its traces of longitudinal brown lines near the apex and its fringed and conspicuous periostracum.

Crepidula protea d'Orbigny.

Crepidula protea d'Orbigny, Moll. Cubana, II, p. 192 (ex parte), pl. XXIV, figs. 30, 31, 1845.

A single specimen of this species was obtained at Mayaguez, Porto Rico.

Family AMALTHEIDÆ.**Genus AMALTHEA** Schumacher, 1817.

Shell irregular, conic, with the apex curved and directed to the rear, sometimes coiled; surface irregular; muscular impression horseshoe-shaped; base thick or excavated.

Amalthea antiquata Linnaeus.

Patella antiquata Linnaeus, Syst. Nat., ed. XII, p. 1259, 1767.

Hippomyx antiquatus Tryon, Man., VIII, p. 134, pl. XL, figs. 93-99, 1886.

Shell white, the apex posterior; concentrically rudely and closely lamellated, more or less radiately striate; epidermis pilose.

Length, 18; height, 7 mm.

Puerto Real; Arroyo; Aguadilla, Porto Rico; Ensenada Honda, Culebra.

Amalthea subrufa Lamarck.

Pleopsis subrufa Lamarck, An. sans Vert., VI, part II, p. 18, 1822.

Hippomyx subrufus Tryon, Man., VIII, p. 134, pl. XL, fig. 1, 1886.

Quebradillas, Porto Rico (Gundlach).

A young specimen of what is probably this species was obtained by the *Fish Hawk* expedition at Mayaguez, Porto Rico.

Family XENOPHORIDÆ.

Genus XENOPHORA Fischer de Waldheim, 1807.

Shell trochiform, concave or flat below; whorls flat, bearing a row of extraneous objects, which are attached near the suture; sometimes these are placed all over the upper part of the shell; last whorl compressed and carinated at the periphery; aperture large, oblique; operculum suboval or trapezoidal.

Xenophora caribæa Petit.

Xenophora caribæa Petit, Journ. de Conchyl., 1856, p. 248, pl. x, figs. 1, 2.

Thin, pale yellowish brown or whitish, white beneath; the carina of the last whorl extended much beyond the base; the surface sculptured with fine, oblique, corrugated wrinkles, and having an interrupted row of fragments agglutinated along the suture; base with faint, revolving lines, crossed by very fine growth lines; umbilicus moderate.

Diameter, 60; height, 30 mm.

One young specimen was obtained at Aguadilla, Porto Rico.

Family NATICIDÆ.

Genus NATICA Scopoli, 1777.

Shell oval or globular, porcellanous, shining, solid, generally smooth, umbilicated, the umbilicus spirally ribbed; aperture semilunar or oval, entire; columellar edge subvertical; operculum semilunar, calcareous, paucispiral, its nucleus excentric, the outer surface often spirally ribbed.

Natica canrena (Linnaeus) Auctorum.

Nerita canrena Linnaeus, Syst. Nat., ed. x, p. 776, 1758 (ex parte).

Natica canrena Reeve, Conch. Icon., IX, pl. IV, fig. 14, 1855.

Shell with five and a half rounded whorls, the suture well impressed, the surface below it slightly flattened and wrinkled, last whorl descending; aperture large, semioval; umbilicus narrow, spirally entering; upper callus of the columella short, separated from the lower callus by a square notch. The ground color varies from whitish to tawny; the last whorl has three rather broad, darker bands about its middle, and over entire shell, except the base, there are wavy or zigzag, longitudinal strigations, which show through the dark bands to some extent; base white. Sometimes it has very faint revolving sculpture.

Height, 45; diameter, 40 mm.

Mayaguez, Porto Rico; one large, broken shell and two young ones.

The original *N. canrena* of Linnaeus comprised several species.

Natica sagraiana d'Orbigny.

Natica sagraiana d'Orbigny, Moll. Cubana, II, p. 34, pl. XVIII, figs. 20, 22, 1842.

San Juan; Quebradillas, Porto Rico (Gundlach).

Section STIGMAULAX Mörch, 1852.

Natica sulcata Born.

Nerita sulcata Born, Mus. Cæs. Vind., p. 400, pl. XVII, figs. 5, 6, 1780.

Shell with six rounded whorls which are not flattened on the shoulder, shining, sculptured throughout with strong, longitudinal ribs; these are crossed by rather fine, impressed striæ, which give the surface a somewhat cancellated appearance; umbilicus rather strong and opening near the upper end of the columella, the revolving ridge within it wide and rounded. Color pale fulvous, irregularly banded with darker color, often marked with wavy, longitudinal markings; sometimes the shell is nearly a uniform livid brown; base white.

Height, 20; diameter, 18 mm.

Porto Rico, no special locality, two shells.

Genus POLINICES Montfort, 1810.

Shell oval elongate, subglobular or depressed, generally smooth, umbilicated or having the umbilicus closed by a callus. Operculum corneous, paucispiral, semilunar, having the nucleus nearly lateral, concave externally.

Subgenus PAYRAUDEAUTIA Bucquoy, Dautzenberg & Dollfus.

Polinices nubila Dall. Plate 58, fig. 6.

Nevrita nubila Dall, Blake Report, II, p. 294, 1889.

Shell with four and a half convex whorls which are slightly concave below the suture, with strong growth lines which are somewhat plicate above, but are smoother below; it is also sculptured with exceedingly faint spiral lines; aperture semilunar; columella straight; umbilicus moderately open, surrounded by a revolving ridge at its base, which projects within, partly closing it. Color dirty milky white, faintly clouded with brownish.

Height, 10; diameter, 10 mm.

Mayaguez, Porto Rico; two slightly worn shells; also Barbados and the Gulf of Mexico.

Subgenus MAMMILLA Schumacher, 1817.

Shell rather thin, ovate, with a partially open umbilicus and a conspicuous epidermis when living.

Polinices uberina d'Orbigny.

Natica uberina d'Orbigny, Moll. Cubana, II, p. 31, pl. XVII, fig. 19, 1842.

Shell white, covered with a thin, horn-colored epidermis, subovate; the last whorl large; whorls flattened or slightly excavated above, with very fine growth lines, and sometimes exceedingly faint revolving striae; aperture semilunar; outer lip thin; columella straight; umbilicus small, situated below the middle of the shell.

Height, 20; diameter, 17 mm.

Mayaguez, Porto Rico; Ensenada Honda, Culebra.

Polinices lactea Guilding.

Natica lactea Guilding, Linn. Trans., XVII, p. 29, 1833.

Natica lactea Tryon, Man., VIII, p. 49, pl. XVI, figs. 54-57, 1886.

San Juan, Porto Rico (Gundlach).

Extremely close to the preceding species.

Polinices mamillaris Lamarck.

Natica mamillaris Lamarck, An. sans Vert., VI, part 2, p. 197, 1822.

Natica mamillaris Tryon, Man., VIII, p. 43, pl. XVIII, fig. 74, 1886.

Shell solid, conic ovate, the whorls scarcely rounded, flattened or faintly excavated above, with fine growth striae and still finer revolving lines; umbilicus wide, with a broad entering callus, the columella having an elevated callus above. The upper surface of the shell is chocolate colored and is covered with a thin epidermis; when worn smooth it generally shows faint longitudinal whitish narrow bands or lines; the base of the shell and the columella are white; within the outer lip the external color is seen.

Height, 40; diameter, 31 mm.

Aguadilla, Porto Rico, one young shell.

Genus SIGARETUS Lamarck, 1799.

Shell auriform, depressed, perforate or imperforate, spirally grooved; aperture very large, oval; columellar border regularly arcuate; operculum corneous, small, paucispiral, prolonged below.

Sigaretus martinianus Philippi.

Sigaretus martinianus Philippi, Abbild. und Beschr., I, p. 144, pl. I, fig. 5, 1844.

San Juan, Porto Rico (Gundlach).

Superfamily **DOCOGLOSSA**.Family **ACMÆIDÆ**.Genus **ACMÆA** Eschscholtz. 1828.

Shell patelliform, solid, oval or circular, summit anteriorly directed and more or less in front of the middle; interior not iridescent and generally having an internal marginal border of color.

Acmaea candeana d'Orbigny.

Patella candeana d'Orbigny, Moll. Cubana, II, p. 199, pl. xxv, figs. 1-3, 1845.

Shell ovate, depressed, the apex in front of the middle, the slopes convex; surface whitish, finely regularly radiately striate, with radiating dark lines or sometimes broad irregular rays. Inside with a broad, light-colored translucent border, usually showing the outside rays; the central area brownish and often marbled.

Length, 25; breadth, 21; height, 8 mm.

Aguadilla, Porto Rico.

Acmaea punctulata Gmelin.

Patella punctulata Gmelin, Syst. Nat., XIII, pp. 3705, 3717, 1792.

Acmaea punctulata Pilsbry, Man., XIII, p. 37, pl. v, figs. 99-113, 1891.

Shell depressed, oval to nearly round, the apex sharp and subcentral; surface sculptured with low radiating ribs, every third or fourth one being larger. Color yellowish or pinkish, with distinct red dots between the ribs.

Length, 24; breadth, 18; height, 7 mm.

Puerto Real; San Geronimo; Hucares; San Juan, Porto Rico.

Acmaea punctulata* var. *pulcherrima Guilding.

Smaller, smoother, more depressed, and more delicate than the type.

Puerto Real; Aguadilla, Porto Rico.

Acmaea leucopleura Gmelin.

Patella leucopleura Gmelin, Syst. Nat., XIII, p. 3699, 1792.

Acmaea leucopleura Pilsbry, Man., XIII, p. 40, pl. v, figs. 16-26, 1891.

Shell solid, round-oval, rather sharply conical, though sometimes depressed, with about twelve strong primary ribs and shorter interposed ribs at the base which do not reach the apex. Ribs white, the interstices brown or black.

Length, 20; diameter, 16; height, 8 mm.

One young shell was taken at Hucares, Porto Rico.

Superfamily **RHIPIDOGLOSSA**.Family **COCCULINIDÆ**.Genus **COCCULINA** Dall. 1882.

Shell patelliform, not nacreous, colorless, with decussated sculpture, symmetrical, with an entire nonsinuuated margin and a posteriorly inclined apex, with a spiral, usually deciduous nucleus; muscular impression horseshoe-shaped, interrupted over the head; radula rhipidoglossate.

Cocculina portoricensis, n. sp. Plate 53, figs. 18, 19.

Shell white, covered with a papery, pale olive-gray periostracum; apex subcentral, minute, hardly prominent; sculpture of rather sparse and feeble radial threads, incremental lines, and an almost microscopic sagination without definite pattern, but chiefly concentric and occasionally microscopically pustular. Interior white, smooth, the muscular horseshoe-shaped impression very broad and high up in the shell, its anterior end directed in a contrary sense to the apex of the shell.

Length from anterior end to apex, 5.7; of whole shell, 12; breadth, 8; height, 4.7 mm.

Station 6052, San Juan Harbor, Porto Rico, in 310 fathoms.

This species is similar in many respects to the other known members of the genus, and perhaps most like *C. rathbuni*, but has a different sculpture, the *C. rathbuni* showing none of the curious vermiculate or sagginate markings. The animal is blind, with a large verge projecting from the right tentacle and the ctenidium carried over so that it appears to spring from the right side of the animal. There are two rather long epipodial processes between the mantle and the foot behind.

Family PHASIANELLIDÆ.

Genus PHASIANELLA Lamarck, 1804.

Shell generally imperforate, without epidermis, porcellanous, bulimiform, usually polished and variegated with bright colors. Aperture entire; operculum solid, calcareous, internally paucispiral, with the nucleus near its base, externally white and convex.

Phasianella umbilicata d'Orbigny.

Phasianella umbilicata d'Orbigny, Moll. Cubana, II, p. 77, pl. XIX, figs. 32, 34, 1842.

Shell small, with five to five and a half rounded whorls; suture deep; sometimes sculptured with revolving lines, at others smooth; sometimes the whorls are slightly angular on account of the prominence of one or more of the revolving lines; last whorl obscurely angular below; aperture short, oval; umbilical area perforated. Color whitish, dotted with reddish or brownish, with longitudinal or zigzag reddish or brownish streaks.

Height, 5; diameter, 3 mm.

Vieques, one shell.

Phasianella tessellata Potiez & Michaud.

Phasianella tessellata Potiez & Michaud, Galerie de Douai, I, p. 312, pl. XXIX, figs. 7, 8, 1838.

Shell solid, smooth, ovate; apex obtuse; whorls four or five, somewhat convex, the last large and obtusely angulate on the periphery; aperture oblique, ovate; columella with a white callus; umbilical region excavated, often perforate. Color white, yellow, or reddish, longitudinally clouded with white, red, or brown, encircled with close, narrow, revolving and obliquely descending orange or red lines.

Height, 5.5; diameter, 3 mm.

Mayaguez, Porto Rico, one broken shell.

Family TURBINIDÆ.

Genus TURBO Linnæus, 1758.

Shell turbate or depressed, nacreous, with or without an umbilicus, the young not carinate or spinose; base convex; operculum flat or concave within, paucispiral, but having a multispiral nucleus, the outside convex, smooth, tuberculate, or with concentric ribs.

Turbo castaneus Gmelin.

Turbo castaneus Gmelin, Syst. Nat., p. 3595, 1792.

Turbo castaneus Pilsbry, Man., X, p. 203, pl. XLV, figs. 88-90, 1888.

Shell turbate, with five to six and a half whorls which are generally rounded, imperforate, and having a round aperture; the sculpture consisting of revolving, nodulous ridges everywhere closely set; two of these on the upper whorls and three on the body whorl are stronger than the rest, and often rise into knobs or vaulted scales, making the shell somewhat angulate. There is often a row of knobs just below the suture; columella thickened and rounded, the base of the shell projecting a little. The color pattern is much diversified, the ground being gray, orange, orange brown or greenish variously blotched with whitish. The operculum is chestnut colored within.

Height, 30; diameter, 23 mm.

Boqueron Bay; Ponce Reefs; Puerto Real; Fajardo; Mayaguez; Catona; San Juan; Guanica, Porto Rico. An abundant, widely distributed form.

Genus ASTRALIUM Link, 1807.

Shell trochiform, more or less flattened below, sometimes depressed above; the young shell is always carinated and spinose at the margin; operculum oval or oblong, with generally submarginal or terminal multispiral nucleus, usually with one to several external ribs.

Astralium cælatum Gmelin.

Trochus cælatus, etc., Chemnitz, Conch. Cab., v. p. 33, pl. CLXII, figs. 1536, 1537.

Trochus cælatus Gmelin, Syst. Nat., p. 3581, 1792.

Shell solid, imperforate, pyramidal, with slightly convex whorls and subcarinate periphery, with flattened base, having immediately below the suture a series of strong, oblique, subradiating ribs, with finer oblique ribs between; the rest of the shell is sculptured with strong, revolving ridges, which are everywhere crossed by oblique, scaly lines of growth. Above the periphery these frequently form vaulted or subtubular processes; aperture very oblique; columella wide, curved, often having one or more grooves on its face. Color dirty white or greenish, radiately maculate with brown.

Operculum oval; nucleus submarginal; the outside convex, white or brown tinted, coarsely granulose. It is much like that of *Turbo*, but the young shells are carinated and usually spiny on the periphery.

Height, 80; diameter, 80 mm.

Guanica; Playa de Ponce; Arroyo, Puerto Real, Porto Rico; Caballo Blanco Reef, Vieques; Ensenada Honda, Culebra.

Astralium tuber Linnaeus.

Trochus tuber Linnaeus, Syst. Nat., ed. x, p. 759, 1758.

Astralium tuber Pilsbry, Tryon's Man., x, p. 223, pl. LVI, figs. 79, 80, 1888.

Shell solid, often rather elevated, with about six flattened or somewhat rounded whorls, sometimes a little shouldered, sculptured by fine and coarse, oblique ridges on the upper part of the whorls; base of the shell somewhat rounded, imperforate; columella wide, often excavated, bituberculate below. Color dirty white or greenish radiately maculate with brown.

Height, 45; diameter, 45 mm.

Guanica; Hucares; San Geronimo, Porto Rico; Caballo Blanco Reef, Vieques; West Indian region generally.

This shell has much the appearance of a *Turbo*, but the young are subspinose at the periphery.

Astralium longispinum Lamarek.

Trochus longispinus Lamarek, An. sans Vert., vii, p. 10, 1822.

Astralium longispina Pilsbry, Tryon's Man., x, p. 221, pl. LI, figs 1-9, 1888.

Shell subenticular, low, rounded above, less convex, sometimes nearly flat below; whorls six to seven, often obliquely rigid below the sutures, then with several revolving series of granules or vaulted scales; periphery sharply carinate, armed with strong, triangular, flattened spines which extend over the sutures to near the summit of the shell, there being about sixteen on the last whorl; base having strong radiating lamellae, which cross the five or six revolving tuberculous ridges; aperture transverse, rounded, channeled at the outer edge; umbilical region often excavated, but generally imperforate; aperture and columella silvery. Color white, yellowish, or light brown.

Height, 20; diameter, 37 mm. Another shell, height, 16; diameter, 60 mm.

Mayaguez Harbor; Puerto Real, Porto Rico; Culebra, West Indies; Florida Keys, etc.

Astralium americanum Gmelin.

Trochus americanus Gmelin, Syst. Nat., p. 3581, 1792.

Astralium americanum Pilsbry, Man., x, p. 224, pl. LII, figs. 18-20, 1888.

Shell trochiform, elevated conical, with about nine nearly plane whorls, having the suture well marked, with strong, oblique growth lines, with irregular, obliquely radiate, often curved ridges throughout as far down as the periphery; there is generally a slightly defined revolving ridge just above the suture; aperture oblique, somewhat angulated at the rather sharp periphery, silvery; base with about eight revolving, scaly ridges. Color white or yellowish.

Height, 27; diameter, 27 mm.

Aguadilla, Porto Rico, one young shell; West Indies, Florida Keys.

Family TROCHIDÆ.

Genus CHLOROSTOMA Swainson, 1840.

Shell conical, nacreous, umbilicate or imperforate, solid; aperture oblique, subrhomboid, the outer lip smooth within; columella arcuate, continued over or part way around the umbilicus, which, when open, shows one or more spiral ribs within; base of columella with two or more tubercles; operculum horny, circular, multispiral.

Subgenus OMPHALIUS.

Chlorostoma scalare Anton.

Trochus scalaris Anton (in) Philippi, *Abbild. und Besch.*, 1, *Trochus*, pl. IV, fig. 11, 1844.

Shell trochiform, with pointed summit; whorls seven, rounded or sometimes slightly shouldered, the last subcarinate on the periphery, sculptured with close, revolving threads which are usually subnodulous; some of these threads are stronger than others and cause the shell sometimes to be slightly angular on the upper part of the whorls; aperture oblique; lip thickened; umbilicus wide, with two or three strong, revolving ribs within; columella concave, ending in two or more teeth below. Color grayish or greenish gray, with mottlings of darker color.

Height, 16; diameter, 20 mm.

Playa de Ponce; Puerto Real; Guanica; Arroyo, Porto Rico; Caballo Blanco Reef, Vieques; Ensenada Honda, Culebra.

Chlorostoma fasciatum Born.

Trochus fasciatus Born, *Mus. Cæs. Vind.*, p. 331, pl. XII, figs. 3, 4, 1780.

Shell depressed conical, with a somewhat rounded spire and rather blunt apex; whorls rounded below, and flattened or faintly concave above, smooth, with the exception of very faint, wavy, revolving lines and equally faint growth lines; lip thick, sometimes double and faintly ridged within; umbilicus moderate, with one strong ridge within. The shell shows a great variety of coloring; the ground may be yellowish red or various shades of brown, with fine, revolving rows of small, angular white spots. There is generally a light band on the rounded periphery, and there may be blotches or irregular, radiating, whitish flames above.

Height, 12; diameter, 15 mm.

Playa de Ponce; Guanica; Puerto Real; Arroyo, Porto Rico; Ensenada Honda, Culebra.

Chlorostoma excavatum Lamarck.

Trochus excavatus Lamarck, *An. sans Vert.*, VII, p. 29, 1822.

Chlorostoma excavatum Pilsbry, *Man.*, XII, p. 187, pl. LXIII, figs. 3-5, 1899.

Shell trochoidal, sides slightly convex; whorls but little rounded, the last strongly but not sharply carinate at base, sculptured with wide, low, revolving ribs; aperture very oblique; outer lip not much thickened; columella sinuous, scarcely swollen; umbilicus moderate, half surrounded with sickle-shaped callus; base generally concave, with strongly marked, revolving lines. The apex is usually eroded, the rest of the shell above is grayish or pinkish, with irregular, subradial, broken, brown markings.

Height, 10; diameter, 15 mm.

Aguadilla; Hucares, Porto Rico; Ensenada Honda, Culebra.

The upper half of the shell is generally much eroded.

Chlorostoma maculostriatum C. B. Adams.

Monodonta maculostrata C. B. Adams, *Proc. Bost. Soc. Nat. Hist.*, v, p. 6, 1845.

Chlorostoma maculostriatum Pilsbry, *Man.*, XI, p. 184, pl. XXIV, figs. 88, 89, 1889.

Shell umbilicate, low conical; whorls slightly convex, the last feebly angulate at the base; the surface is covered with fine, but distinct, revolving striae; base concave around the umbilicus; aperture subquadrate; columella with a callus above and two rather strong teeth below. Color dark green, olivaceous or brownish, more or less dotted with white, sometimes flamulate with white; a light tract at the umbilicus is dotted with brown.

Height, 9; diameter, 10 mm.

Hucares; Arroyo, Porto Rico, one young shell.

Genus LIVONA Gray, 1842.

Shell large, turbinata, solid, the surface mottled; aperture oblique, smooth within; umbilicus large; columella arcuate, with a callus above which extends half way around the umbilicus and is notched in the middle; operculum with very numerous whorls.

Livona pica Linnæus.

Turbo pica Linnæus, *Syst. Nat.*, X, p. 763, 1758.

Livona pica Pilsbry, *Man.*, XI, p. 277, pl. LXI, fig. 24, 1889.

Shell large, solid, conical, with about six rounded whorls, the surface generally slightly corrugated; aperture suborbicular, oblique, umbilicus rather wide; operculum circular, multispiral, often

with a large green patch. Shell whitish or greenish, with maculations or zigzag stripes of black; often the whole of the upper surface is nearly or entirely black.

Height, 70; diameter, 80 mm.

San Geronimo; Cabo Rojo light; Aguadilla; Ponce; Hucares; San Juan; Guanica, Porto Rico; Caballo Blanco Reef, Vieques.

This beautiful species is extremely abundant on the coral rocks of the entire West Indian region, and is used for food in many places. The operculum is a lovely object.

Genus MICROGAZA Dall, 1881.

Shell flattened, rotelliform, nacreous within and without, umbilicated; lip thin; columella without a callus.

Microgaza rotella Dall.

Microgaza rotella Dall, Bull. Mus. Comp. Zool., IX, p. 51, 1881; XXIX, p. 357, pl. XXII, figs. 5, 5a, 1889.

Shell depressed, lenticular; whorls about five, the earlier two or three rounded, the apex elevated; at the suture of the later whorls there is an elegant row of small nodules; last whorl subcarinate on the periphery; umbilicus wide, bounded at its edge by a sharp, crenated angle; aperture nearly semilunar; columella short, nearly straight. The shell sometimes has traces of very fine, revolving threads. It is beautifully iridescent throughout and is often marked with zigzag brown flames.

Diameter, 6; height, 4 mm.

Aguadilla; Mayaguez, Porto Rico.

Genus SOLARIELLA Searles Wood, 1842.

Shell umbilicated, conical; whorls with spiral granose liræ; umbilicus with a carinated margin. Type, *S. carinata* S. Wood.

Solariella amabilis Jeffreys.

Trochus amabilis Jeffreys, Brit. Conch., III, p. 300, 1865; V, pl. LXI, fig. 6.

Shell pyramidal, pearly, somewhat iridescent, with two spiral ridges on the upper part of the last three or four whorls, with several finer irregular ridges on the base of the shell; the suture is deep and narrow, and below it on the sloping shoulder are numerous radiating ridges; aperture small, nearly round, the last whorl but slightly joined to the penultimate whorl; umbilicus rather large, funnel-shaped.

Height, 8; diameter, 7 mm.

Mayaguez, Porto Rico, one broken shell.

Genus CALLIOSTOMA Swainson, 1840.

Shell generally imperforate, conical, rather thin; whorls smooth, spirally ridged or granular, the last generally angular at the periphery; aperture subquadrangular; columella generally ending in an obscure tooth.

Type, *Trochus zizyphinus* Linnaeus.

Calliostoma jujubinum Gmelin.

Trochus jujubinus Gmelin, Syst. Nat., p. 3570, 1792.

Calliostoma jujubinum Pilsbry, Man., XI, p. 404, pl. XL, fig. 16, 1889.

Shell pyramidal, rather solid, with nearly flat whorls, the last roundly carinate below. They are generally a little concave and swollen on the base and are sculptured with numerous spiral, beaded liræ, with finer beaded threads between; aperture subquadrate; umbilicus narrow, slightly funnel-shaped. The lip is generally lirate within. Color chestnut or purple brown, with narrow curved longitudinal white streaks, the base generally dotted with white.

Height, 33; diameter, 26 mm.

Mayaguez, Porto Rico, the lower part of a shell of one of the varieties.

Calliostoma jujubinum var. rawsoni Dall.

Calliostoma jujubinum var. *rawsoni* Dall, Blake Report, II, p. 369, 1889.

Smaller, with narrower umbilicus; columella thin, and the tooth which is found in the type is weak or absent. Shell more conical than the type and much darker in color.

Vieques, one shell.

Family LIOTIDÆ.

Genus LIOTIA Gray, 1842.

Shell turbiniform or discoidal, longitudinally ribbed or clathrate; aperture slightly nacreous, with continuous peristome, which is thickened and callous. Operculum multispiral, corneous, hispid, with a calcareous layer of pearly particles spirally disposed.

Liотia gemma Tuomey & Holmes.

Trochus gemma T. & H., Pleioc. Fos. S. Car., p. 118, pl. xxvi, fig. 4, 1856.
Architectonica tricarinata Stearns, Proc. Bost. Soc. Nat. Hist. for 1872, p. 23.

Shell low conical, with four whorls, which are sloping above and have on the wide periphery three revolving carinas; these carinas are slightly beaded; there is a revolving row of beads just below the deep suture; there are on the body whorl additional fine beaded ridges; aperture round, the lip but slightly thickened, with a sulcus separating it from the previous whorl; umbilicus moderate, with a beaded carina. Surface whitish pink or purplish, maculated with darker color. There is a row of reddish spots on the lower peripheral carina.

Diameter, 3; height, 2 mm.

Mayaguez, Porto Rico, one slightly broken and worn shell.

Family VITRINELLIDÆ.

Genus LEPTOGYRA Bush, 1897.

Shell minute, dull, dirty white or pale brown, covered with a thin straw-colored epidermis; whorls few, convex; spire elevated, with twisted nuclear whorl; umbilicus large; aperture very oblique; lip simple, continuous.

Leptogyra inconspicua Bush.

Leptogyra inconspicua Bush,? Trans. Conn. Acad. Sci., x, p. 137, 1897.

Shell with two and a half whorls, with low obtuse apex; surface nearly smooth, with microscopic growth lines and ill-defined wrinkles extending from the suture some distance down the shell.

Diameter, 1.3; height, 1.8 mm.

Mayaguez, Porto Rico, one young shell, of which the identification is doubtful.

Family NERITIDÆ.

Genus NERITA (Linnæus, 1758) Lamarek, 1799.

Shell imperforate, globular or oval, solid, smooth or with spiral sculpture; spire short; aperture semilunar, entire; lip thick, generally toothed within; columellar area large, flattened, often sculptured, its border dentate. Operculum calcareous, the external face granulous or sculptured, paucispiral; nucleus excentric; internal face callous; apical and claviform apophyses well developed.

Nerita peloronta Linnæus.

Nerita peloronta Linnæus, Syst. Nat., x, p. 778, 1758.
Nerita peloronta Reeve, Conch. Icon., ix, pl. II, figs. 8, 86, 1855.

Shell with a sharp-pointed spire and somewhat rounded whorls, the last concave just below the shallow suture; sculptured with revolving ridges which are strong and sharp on the earlier whorls but which become rounded and rather faint toward the aperture; within the lip there are two teeth above, a larger and a smaller, and one at the base, and between these there are vestigial teeth; there are two strong teeth on the columella, the upper the larger; the columellar face is slightly ridged, and at its upper termination there is a small canal. Color whitish, yellowish, or purplish, variously mottled and zigzagged with red or black. The columellar area is stained red as if with blood, hence the popular name "Bleeding tooth shell."

Height, 40; diameter, 45 mm.

San Juan; Hucares; Aguadilla, Porto Rico; Culebra Island.

Nerita tessellata Gmelin.

Nerita tessellata Gmelin, Syst. Nat., p. 3685, 1792.

Nerita tessellata Reeve, Conch. Icon., IX, pl. IX, figs. 43, 43a, 1855.

Shell with rather low bluntly pointed spire and from three to three and a half whorls which are scarcely convex, the last flattened or a little concave above; the sculpture consists of strong, rounded ridges throughout; lip thick, grooved within, with two teeth above; columellar area excavated pustulous; outline of columella somewhat incurved, with one or two faint teeth in middle. Color white, tessellated with black. Sometimes the entire shell is black, with a few white markings; interior bluish.

Height, 20; diameter, 17 mm.

This abundant species was taken at thirteen different stations about Porto Rico; West Indies; Florida Keys.

Nerita tessellata var. **præcognita** C. B. Adams.

Nerita præcognita Reeve, Conch. Icon., IX, pl. VII, figs. 30a, 30b, 1855.

In the variety the spire is generally lower than in the type, the columella is straighter and more strongly toothed, and the area is less excavated.

Height, 20; diameter, 23 mm.

Culebra, four shells.

Nerita versicolor Lamarck.

Nerita versicolor Lamarck, An. sans Vert., VI, p. 193, 1882.

Nerita versicolor Reeve, Conch. Icon., IX, pl. XII, figs. 56, a, b, c, d, 1855.

Shell with a somewhat elevated, pointed spire, the last whorl slightly concave below the suture; sculptured with strong, revolving ridges throughout; aperture crescentic; lip within with one strong tooth above and one below, with a row of smaller ones between; columellar area full or flat, wrinkles, which are slightly pustulous; columella convex, with four strong teeth. Color of the ground whitish, often brilliantly tinted with red; ribs marked with square or elongated violet or black spots.

Height, 20; diameter 17 mm.

Found abundantly at nearly all the stations around Porto Rico.

Genus NERITINA Lamarck, 1809.

Shell relatively thin, subglobose or oval, whorls generally smooth, sometimes rough or spinose; aperture semicircular; columellar border straight, finely toothed or smooth; lip sharp, not toothed or ridged within; operculum shelly, with a flexible border, exhibiting two processes which have been called a rib and a peg.

Neritina reclinata Say.

Neritina reclinata Say, Journ. Acad. Nat. Sci. Phila., III, 1822, p. 257.

Neritina reclinata Tryon, Man., X, p. 39, pl. XII, figs. 25-30, 1888.

Shell globose conical; spire somewhat produced but obtuse; whorls concavely slanting on the shoulder; suture well defined; aperture semilunar, patulous; inner lip nearly straight, faintly toothed in the middle. Color olivaceous, greenish, or brownish, with oblique, undulating dark lines which are sometimes reticulated. Height, 20; diameter, 7 mm. Vieques, one worn shell.

Neritina virginea Linnæus.

Nerita virginea Linnæus, Syst. Nat., ed. X, p. 778, 1758.

Neritina virginea Reeve, Conch. Icon., IX, pl. XXI, fig. 92, a to d. 1855.

Shell smooth, polished, usually white, sage colored, yellowish, or violaceous, with a fine, close pattern of parallel, longitudinal darker or lighter lines; these sometimes are reticulated, or give the markings the appearance of scales on a fish. The shell may be variously spotted or zoned; in fact there is an endless variety in coloring. The spire is generally low or only moderately developed and obtuse; the whorls below the suture are usually a little sloped, the lip is sharp, the columella is straight, with a number of rather strong teeth.

Diameter, from 6 to 20 mm.; height about the same as the diameter, sometimes a little greater.

San Juan; Mayaguez, Porto Rico; a number of shells.

Neritina viridis Linnæus.

Nerita viridis Linnæus, Syst. Nat., ed. X, p. 778, 1758.

Neritina (Smargadia) viridis Tryon, Man., X, p. 54, pl. XVIII, fig. 88, 1888.

Mayaguez, Porto Rico, one dead specimen.

Family HELICINIDÆ.

Shell turbinated, heliciform, or globular; spire short; aperture semicircular; interior walls absorbed by the animal; operculum horny or calcareous, nonspiral.

Genus **HELICINA** Lamarek, 1799.

Shell imperforate, having a callus on the inner wall of the aperture; whorls few, peristome thickened, reflected; operculum corneous or shelly.

Type, *H. neritella* Lamarek.

Helicina vinosa Shuttleworth.

Helicina vinosa Shuttleworth, Diagn. neue Moll., 1854, p. 92.

Helicina vinosa Sowerby, Conch. Icon., XIX, pl. XIV, fig. 118, a, b, 1873.

Porto Rico; Vieques.

Helicina umbonata Shuttleworth.

Helicina umbonata Shuttleworth, Diagn. neue Moll., p. 93, 1854.

Porto Rico.

Helicina hjalmarsoni Pfeiffer.

Helicina hjalmarsoni Pfeiffer, Mal. Blätt., III, 1856, p. 50.

Helicina hjalmarsoni Sowerby, Conch. Icon., XIX, pl. XXV, fig. 223, 1873.

Arecibo; Ponce; near Utuado, Porto Rico.

Helicina striata Lamarek.

Helicina striata Lamarek, An. sans Vert., VI, p. 103, 1822.

Helicina striata Sowerby, Conch. Icon., XIX, pl. XXII, fig. 191, 1873.

Porto Rico, several localities.

Helicina subfusca Menke. Plate 54, fig. 6.

Helicina subfusca Menke, Synopsis, 1828, p. 79.

Shell depressed globose, with distinct growth striæ, amber colored to brownish; whorls five and a half, nearly flat or sometimes having a faint revolving depression at some distance below the suture; suture distinct but not deep; periphery rounded or slightly subcarinate; aperture semicircular, outer lip sharp; basal callus granular.

Height, 7; diameter, 9 mm.

Under rocks in pastures, Bayamon, Porto Rico, and also at St. John and St. Thomas.

Helicina fasciata Lamarek.

Helicina fasciata Lamarek, An. sans Vert., VI, p. 103, 1822.

Helicina fasciata Sowerby, Conch. Icon., XIX, pl. IX, fig. 73, 1873.

Porto Rico; St. John; possibly found in some of the Lesser Antilles.

Helicina phasianella Sowerby.

Helicina phasianella Sowerby in Pfeiffer, Mal. Blätt., III, p. 50, 1856.

Helicina phasianella Sowerby, Conch. Icon., XIX, pl. XXX, fig. 270, 1873.

Vega Baja; Aguadilla, Porto Rico; Vieques.

Helicina trochulina d'Orbigny.

Helicina trochulina d'Orbigny, Moll. Cubana, I, p. 249, pl. XX, figs. 10, 12, 1841.

Helicina trochulina Sowerby, Conch. Icon., XIX, pl. XVI, fig. 138, 1873.

Porto Rico.

Helicina foveata Pfeiffer.

Helicina foveata Pfeiffer, P. Z. S., 1853, p. 35.

Vieques; St. Thomas.

Genus **STOASTOMA** C. B. Adams, 1849.**Stoastoma portoricense** Pfeiffer.

Stoastoma portoricense Pfeiffer, Mal. Blätt., III, p. 51, 1856.

Manati, in the Delicias plantation, Porto Rico.

Superfamily ZYGORANCHIA.

Family FISSURELLIDÆ.

Subfamily FISSURELLINÆ.

Genus FISSURELLA Brugnière, 1791.

Subgenus FISSURELLA s. s.

Shell conical, its base oval or elliptical; apex spiral in the young, removed in the adult, having a rounded or elliptical anal opening which is bounded inside by a callus with entire margins, not truncate or excavated behind. Shell capable of containing the entire animal.

Section CREMIDES H. & A. Adams.

Fissurella barbadensis Gmelin.

Patella barbadensis Gmelin, Syst. Nat., p. 3729, 1792.

Fissurella barbadensis Pilsbry, Man., XII, p. 164, pl. XXXVII, figs. 40-49, 1890.

Shell solid, low, conical, with ovate base; apex subcentral, with rounded opening. Surface sculptured with radiating ribs; eleven of these are generally stronger, and all are more or less rudely scaly. Color whitish, variegated with brown or purplish markings; interior generally greenish, often zoned.

Greatest length, 38; breadth, 26; height, 15 mm.

San Juan; San Geronimo; Ponce; Aguadilla; Guanica, Porto Rico; West Indies; Florida Keys.

The species is variable in the degree of elevation, sculpture, and in coloring, and very abundant. One shell from San Geronimo measures as follows: Length, 26; breadth, 15; height, 6 mm.; and the principal ribs are white.

Fissurella rosea Gmelin.

Patella rosea Gmelin, Syst. Nat., p. 3730, 1792.

Fissurella rosea Pilsbry, Man., XII, p. 166, pl. LXII, figs. 19-21, 1890.

Shell rather thin, low, conical, ovate, narrowed in front; apex a little in front of the middle of the shell; anal perforation elliptical; surface sculptured with numerous low, rounded, sometimes slightly scaly riblets; internal callus not inflated. Color grayish, with ten to twelve broad, purple rays; sometimes almost the entire surface is purplish; interior greenish, often purple or rose-tinted.

Length, 26; diameter, 18; height, 7 mm. San Geronimo; Aguadilla, Porto Rico.

This species is close to *F. barbadensis*, but is a thinner, more delicate, and generally smoother form.

Fissurella nodosa Born.

Patella nodosa Born, Mus. Cas. Vind., p. 429, 1780.

Fissurella nodosa Pilsbry, Man., XII, p. 164, pl. XXXVII, figs. 46-48, 1890.

Shell oval, solid, conical, considerably elevated; apex subcentral, with a keyhole-shaped orifice; surface sculptured with strong, radiating, nodose ribs. Color uniform brownish or white. The internal callus is distinctly marked but not swollen, and from it there are generally faint radiating grooves that mark the position of the ribs.

Length, 30; breadth, 22; height, 17 mm.

San Geronimo; San Juan; Aguadilla, Porto Rico; West Indian region generally.

Subgenus CLYPIDELLA Swainson.

Fissurella fascicularis Lamarck.

Fissurella fascicularis Lamarck, An. sans Vert., VI, p. 14, 1822.

Fissurella fascicularis Pilsbry, Man., XII, pl. 177, p. XXXVII, figs. 59, 60, 1890.

Shell depressed, oval, moderately solid, the ends slightly raised; orifice somewhat cross-shaped, elongated, narrow, and with a wider area in the middle; surface sculptured with numerous fine, radiating, roughened, or nodulous ribs which are reddish brown or crimson, usually darker than the intervening spaces; within the border is thickened and nearly smooth; the callus is distinct and radiately ridged and the color is pink, purplish, and whitish, often shaded green.

Length, 21; diameter, 17; height, 6 mm. San Juan; San Geronimo, Porto Rico.

A lovely, somewhat saddle-shaped species; close to and easily mistaken for *F. pustula* Lamarck. The latter, however, is decidedly truncated in front, while the species under consideration is rounded.

Subfamily FISSURELLIDINÆ.

Genus LUCAPINELLA Pilsbry, 1890.

Shell oblong, depressed, narrowed in front, cancellated; apex with a large opening, which is margined within by a strong, entire, nontruncate border. The shell characters are essentially the same as in *Fissurella*, the differences between the two genera being mostly anatomical.

Type, *Clypidella callomarginata* Carpenter.

Lucapinella limatula Reeve.

Fissurella limatula Reeve, Conch. Icon., *Fissurella*, fig. 115, 1850.

Shell oblong, narrowed and rounded in front, depressed, the summit subcentral, with a large opening of the same shape as the shell; surface sculptured with alternately larger and smaller radiating ribs; sometimes there are two or three small ribs between the larger ones, and all are crossed by regular concentric laminae which rise into erect scales over the ribs; white or rayed with ashen purple or blackish. The callus around the opening is heavy and continuous.

Length, 26; breadth, 15; height, 6 mm.

Catano; Mayaguez Harbor, Porto Rico.

One specimen of the dimensions given above came from the former locality.

Genus LUCAPINA Gray, 1857.

Shell oblong oval, embedded in mantle but covering most of the animal; apex in front of middle, having a large oval perforation; edges of shell not thickened, regularly and finely crenulated.

Section CHLAMYDOGLYPHIS Pilsbry, 1890.

Lucapina adspersa Philippi.

Fissurella adspersa Philippi, Abbild. und Besch., II, p. 34, pl. 1, fig. 3, 1845.

Shell oblong, depressed, conical, narrower in front, the sides a little convex, the apex in front of the middle of the shell; surface sculptured with radiating, alternately larger and smaller ribs, which are crossed by strong, concentric, regular ridges; perforation oval, much the shape of the shell; inner border strongly crenulate, the teeth arranged in pairs; callus strong, swollen, truncated behind, and having a greenish streak along each side. Color whitish or pale brownish, with from seven to nine broad rays of darker color; bluish white within, showing the rays.

Length, 21; breadth, 11; height, 5 mm.

San Geronimo, one shell, not adult.

Lucapina cancellata Sowerby.

Fissurella cancellata Sowerby, Conch. Ill., fig. 29, 1839.

Shell oblong, scarcely narrowed in front, low conical, sculptured with numerous radiating ribs which are alternately larger and smaller, and strong, regular, concentric threads, which form flattened nodules where they cross the ribs; orifice rather large in front of the middle, long oval, stained blue black; inside white, the callus bluish black, slightly truncate behind. Color white throughout or faintly rayed or flecked with brown.

Length, 25; breadth, 15; height, 7 mm.

One fine alcoholic specimen was obtained from the reefs at Ponce.

Subfamily EMARGINULINÆ.

Genus FISSURIDEA Swainson, 1840.

Shell ovate, conical, the orifice in front of the middle; apex spiral, inclined backward when young; surface cancellated; internal opening having a strong callus within, which is truncated behind or has a pit. The shell characters of several of the genera of the *Fissurellidæ* are not well differentiated, the classification being based largely on the anatomy.

Fissuridea listeri d'Orbigny.

Fissurella listeri d'Orbigny, Moll. Cubana, II, p. 197, pl. XXIV, figs. 37-39, 1845.

Shell solid, conic, moderately elevated; sides nearly straight; sculpture consisting of radiating ribs which are alternately larger and smaller; sometimes there are three sets of them of different sizes;

they are crossed by concentric ridges which are often nodose at the crossings; perforation keyhole-shaped, bounded by a black line without and a callus within that is distinctly truncated behind; inner edge of the shell toothed, and from the edge there are grooves running inward that mark the place of the ribs; white within the hole, callus sometimes bounded with a dark line; the outside of the shell is whitish, unicolored, or with radial dark stripes.

Length, 35; breadth, 26; height, 15 mm.

San Juan; San Geronimo, Porto Rico.

Fissuridea alternata Say.

Fissurella alternata Say, Journ. Acad. Nat. Sci., Phila., II, p. 281, 1822.

Glyphis alternata Pilsbry, Man., XII, p. 211, pl. XXXVII, figs. 50-53, 1890.

Shell oval, elevated, conical; front slope straight or concave; back slope generally convex; surface closely sculptured by radiating ribs, of which three are small and every fourth one is larger; these are crossed by fine, concentric laminae which form little scales where they pass over the ribs. Color white, grayish, or yellowish, radiately marked with pink, brown, or black stripes which are often somewhat broken. The summit is in front of the middle, more or less inclined forward; opening keyhole-shaped, the front part of it appearing as if it had been broken away for some distance down the shell. Inside white; margin toothed.

Length, 36; breadth, 22; height, 16 mm.

Ensenada Honda, Culebra.

Fissuridea alternata var. **dysoni** Reeve.

Fissurella dysoni Reeve, Conch. Icon., VI, fig. 63.

A form with very strong, sharp sculpture and intensely black, broken, radiating stripes, which become brownish at the base of the shell.

Ensenada Honda, Culebra.

Fissuridea alternata var. **sayi** Dall.

Fissurella alternata var. *sayi* Dall, Blake Report, II, p. 407, 1889.

This form differs from the *F. alternata* of Say in being smaller and generally without color or only having a faint olivaceous tint and in having a more delicate shell.

Mayaguez, Puerto Real, Porto Rico.

Fissuridea variegata Sowerby.

Fissurella variegata Sowerby, Thes. Conch., p. 200, figs. 172, 173.

Shell small, oblong, depressed, back slope a little rounded, front slope nearly straight, sculptured with alternating, radiate ribs and strong concentric threads; opening long, somewhat cross-shaped. Interior toothed at border. The ground is whitish, and there are about seven wide bottle-green or brownish radiating stripes which do not reach the summit, and these show through on inside of shell.

Length, 10; breadth, 5; height, 2.5 mm.

Mayaguez Harbor, one immature shell.

Fissuridea viridula Lamarck.

Fissurella viridula Lamarck, An. sans Vert., VI, p. 13, 1822.

Glyphis viridula Pilsbry, Man., XII, p. 226, pl. LXII, figs. 22-25, 1890.

Mayaguez; Aguadilla, Porto Rico (Gundlach).

Genus SUBEMARGINULA Blainville, 1825.

Shell round-oval, conical; apex near the middle, curved backward; surface radiately ribbed; anal notch generally short, continuing upward as a groove inside, the groove covered by a prominent rib outside; muscle scar horseshoe-shaped, its anterior ends recurved and pointed towards the summit of the shell.

Subemarginula octoradiata (Gmelin) A. Adams.

Patella octoradiata Gmelin (part), Syst. Nat., p. 3699, 1792.

Subemarginula octoradiata Pilsbry, Man., XII, 273, pl. XXIX, figs. 17, 18, 37, 1890.

Shell oval, solid, conical; apex subcentral, inclined backward and to the right; there are eight principal radiating ribs with smaller intermediate ones which are generally roughly nodulous. Whitish without, olive or brownish green, sometimes bluish within. Anterior groove narrow; border toothed.

Length, 23; breadth, 20; height, 10 mm. San Geronimo; Ponce; Fajardo; San Juan, Porto Rico.

Submarginula notata Linnaeus.*Patella notata* Linnaeus, Syst. Nat., ed. X, p. 784, 1758.*Submarginula notata* Pilsbry, Man., XII, p. 282, pl. LXIV, figs. 34, 35, 1890.

San Juan, Porto Rico (Gundlach).

Submarginula rollandii Fischer.*Emarginula rollandii* Fischer, Journ. de Conchy., v, p. 356, pl. XII, fig. 10, 1856.

Shell small, oval, with the apex subcentral, recurved, sculptured with unequal, radiating ribs, and crossed by coarse, low, concentric cords; anterior fissure deep, straight, its sides nearly parallel. Color white, greenish or pinkish; interior whitish, with white rays.

Length, 8; width, 6.5; height, 3 mm.

Ensenada Honda, Culebra, one specimen.

Subclass AMPHINEURA.

Order POLYPLACOPHORA.

Mollusks whose dorsal surface bears eight imbricating shelly plates embedded in an outer zone or girdle; head divided from the body; gills numerous, occupying a groove on each side between the foot and mantle; foot adapted to creeping.

Family LEPIDOPLEURIDÆ.

Genus LEPIDOPLEURUS Risso, 1826.

Girdle with minute, gravelly, smooth or striated scales, usually with a fringe of longer scales, valves without insertion plates, or with the inserted margin entire.

Lepidopleurus pergranatus Dall. Plate 58, figs. 1, *a-c*.*Leptochiton pergranatus* Dall, Blake Report, II, p. 414, 1889.

Shell elongated, slightly elevated, regularly arcuate, without a jugum; valves wide, without apices; front and back valves more or less concave; posterior valve without elevated apex. The whole surface of the shell is covered with close, granular sculpture; the lateral areas slightly raised, and in addition to the granulation sculptured with curved furrows which become fainter on the central areas and are carried around parallel with the sides and back of the valves. Girdle wide, covered with delicate scales; entire shell waxen or white.

Length, 12; breadth, 6.5 mm.

Off San Juan, Porto Rico; also near Dominica, in 138 fathoms.

Family CHITONIDÆ.

Subfamily ISCHNOCHITONINÆ.

Genus CHÆTOPLEURA Shuttleworth, 1853.

Valves external, having sharp, slit insertion plates (at the place of insertion of the girdle); girdle leathery, more or less hairy; gills extending almost or entirely to the front end of the foot.

Chætopeura janeirensis Gray.*Chiton janeirensis* Gray, Spic. Zool., p. 6, pl. III, fig. 8, 1828.

Shell oblong, elevated, rather narrow; dorsal ridge somewhat angular, ashen, olive or brownish, strongly sculptured; the mucro in front of the middle, rather prominent; lateral areas strongly elevated, sculptured, with four coarse, granose ribs; anterior valve having eleven to eighteen such ribs; central areas with about twelve granose, acute threads on each side of the jugum; girdle with a few short, delicate hairs.

Length, 18; diameter, 9 mm.

Ensenada Honda, Culebra.

Genus **ISCHNOCHITON** Gray, 1847.

Valves external, with sharp, slit insertion plates, the teeth not buttressed. Eaves generally solid; girdle covered with imbricating scales, flat or convex, smooth or striated.

Subgenus **STENOPLAX** Carpenter, 1878.

Ischnochiton limaciformis Sowerby.

Chiton limaciformis Sowerby, P. Z. S., 1832, p. 26.

Ischnochiton limaciformis Pilsbry, Man., XIV, p. 57, pl. XVI, figs. 9-16, 1892.

Shell elongated, narrow, elevated, buff gray, or greenish, marbled indistinctly with darker color, occasionally blotched with red, longitudinally costellate but not granose; girdle scales minute; sculpture of the central areas consisting of fine, smooth longitudinal riblets; these continue on the lateral areas, becoming broader and flat, and are waved on the slope between the two areas. End valves sculptured with close, flattened, concentric ridges, which are somewhat wavy.

Length, 35; breadth, 12 mm.

Ponce Reefs, Porto Rico.

Ischnochiton purpurascens C. B. Adams.

Chiton purpurascens C. B. Adams, Proc. Bost. Soc. Nat. Hist., 1845, p. 9.

Ischnochiton purpurascens Pilsbry, Man., XIV, p. 58, pl. XVII, figs. 23, 24, 1892.

Eastern Porto Rico (Gundlach).

Ischnochiton floridanus Pilsbry.

Ischnochiton floridanus Pilsbry, Man., XIV, p. 58, pl. XVII, figs. 19-22, 1892.

Shell elongated, narrow, elevated, the valves roundly arched, not carinated; lateral areas raised, longitudinally costellate, the riblets cut into granules by radiating, impressed lines over the whole area or the forward part of it. End valves cut into granules; central areas longitudinally ribbed; posterior valve large, rather depressed, the mucro slightly posterior; girdle delicately marbled with bluish and gray, densely covered with rounded, solid, striated scales. Color whitish or pale green, variously mottled with olive, blackish, or gray.

Length, 35; breadth, 11.5 mm.

Ensenada Honda, Culebra, one small specimen.

Subgenus **TRACHYDERMON** Carpenter, 1863.

Ischnochiton liozonis, n. sp.

Animal small, girdle nearly smooth, reddish brown; valves dark red, more or less flecked with white, or white and gray; surface of the valves nearly smooth, minutely granulose, the granules more evident on the lateral areas which are slightly raised; anterior valve small, with ten slits, above with some obscure radiating ridges; middle valves with moderately prominent mucro, wide dorsal angle, no radial sculpture, the insertion plates with one slit, interior of valve pinkish white, sinus wide, the valve callus forming a strong bow-shaped ridge; posterior with a moderately elevated mucro, narrower sinus, ten or eleven slits, the tegmentum much the shape of a watermelon seed. Gills median.

Length, about 10; width, about 7 mm.

Ensenada Honda, Culebra; Porto Rico, two specimens.

Subgenus **ISCHNOCHITON** Gray.

Ischnochiton striolatus Gray.

Chiton striolatus Gray, Spic. Zool., p. 6, 1828.

Chiton striolatus Reeve, Conch. Icon., *Chiton*, pl. XXII, fig. 144, 1847.

Shell oblong, the back distinctly or faintly keeled, side slopes convex. Surface apparently smooth, the lateral areas moderately distinct, somewhat raised, sculptured longitudinally with narrow zigzag grooves; central areas having excessively fine quincuncial granulation; end valves with concentric, zigzag grooves and minute granulation; girdle whitish, clouded blue with orange flecks generally, and densely covered with striate scales. Color variable, usually olive green, slaty or cream-colored, more or less mottled.

Length, 14; breadth, 8 mm.

Arroyo; Ponce, Porto Rico; Ensenada Honda, Culebra.

Ischnochiton striolatus var. **funiculatus** Carpenter.*Ischnochiton funiculatus* Carpenter MS.

One specimen was taken at Puerto Real which is probably this. Mr. Pilsbry regards it as a variety of *I. striolatus* Gray.

Ischnochiton papillosus C. B. Adams.*Chiton papillosus* C. B. Adams, Proc. Bost. Soc. Nat. Hist., 1845, p. 9.*Ischnochiton papillosus* Pilsbry, Man., XIV, p. 114, pl. XXI, figs. 40, 41, 1892.

Shell small, oval, carinated, the side slopes faintly convex; surface not divided into distinct areas, apparently smooth but really closely granulate throughout. Color whitish, mottled with olive green, or uniform greenish or brownish.

Length, 8; breadth, 5 mm.

Ensenada Honda, Culebra.

Ischnochiton reticulatus Reeve.*Chiton reticulatus* Reeve, Conch. Icon., pl. XV, fig. 83, 1847.

Eastern Porto Rico (Gundlach).

Subfamily **CHITONINÆ**.Genus **CHITON** Linnæus, 1758.

Valves wholly external, the beak of the tail valve median or anterior; insertion plates longer than the eaves, slit into deeply and finely pectinated teeth. Girdle covered with closely imbricating convex, smooth, or striated scales.

Chiton tuberculatus Linnæus.*Chiton tuberculatus* Linnæus, Syst. Nat., ed. x, p. 667, 1758.*Chiton tuberculatus* Pilsbry, Man., XIV, p. 153, pl. XXXIII, figs. 58-60, 1892.

Shell oval-oblong, rather elevated, carinated; the side slopes nearly straight; lateral areas raised, sculptured with about five cord-like, radiating riblets, which are usually interrupted and broken and bear low tubercles; central areas smooth along the ridge, the sides sculptured with longitudinal riblets curving inward; end valves closely tuberculate.

Color varying from light olive to dark green, sometimes unicolorous, generally speckled on the side areas and end valves; some of the valves have a dark stripe on the ridge.

Length, 60; breadth, 33 mm.

Hucares; San Juan; Ponce Reefs; Aguadilla; Guanica, Porto Rico; Caballo Blanco, Vieques.

Chiton tuberculatus var. **assimilis** Reeve.*Chiton assimilis* Reeve, Conch. Icon., pl. XIV, fig. 76 (right-hand figure), 77b, 1847.

Fawn-colored, with white dots on the lateral areas; carina banded with brown; girdle light green; central areas sculptured with fine, close riblets.

Guanica, Porto Rico.

Chiton squamosus Linnæus.*Chiton squamosus* Linnæus, Mus. Ludov. Ulricæ, p. 465, 1764.*Chiton squamosus* Pilsbry, Man., XIV, p. 155, pl. XXXV, figs. 80-82, 1892.

Shell oblong, elevated or depressed, carinated, the side slopes somewhat convex; surface of lateral areas minutely beaded; central area smooth, lusterless. Color buff, the central areas regularly and conspicuously striped longitudinally with gray or black.

Length, 60; breadth, 32 mm.

Aguadilla; San Juan; Hucares, Porto Rico.

Chiton viridis Spengler.*Chiton viridis* Spengler, Skriv. af Nat. Selsk., IV, p. 70, pl. VI, fig. v, 1797.

Shell oval, somewhat elevated and carinated, side slopes slightly convex; lateral areas strongly raised, sculptured with three or four low, radiating ribs, bearing low, rounded pustules, sometimes without radiating ribs; central areas smooth in the middle but sculptured along the diagonal lines with

S-shaped ribs; end valves with radiating series of tubercles, which are sometimes scattered. Color gray-white to olive, irregularly marked on central areas or ridge with blackish; sometimes all blackish.

Length, 36; breadth, 22 mm.

Ponce Reefs, Porto Rico, one specimen.

Chiton marmoratus Gmelin

Chiton marmoratus Gmelin, Syst. Nat., p. 3205, 1792.

Chiton marmoratus Pilsbry, Man., XIV, p. 158, pl. XXXIV, figs. 72-76, 1892.

Shell oval, rather elevated; dorsal ridge round-angular to carinate; side slopes convex or straight; surface smooth, polished; lateral areas a little raised. Color olive to dark brown or purple brown, variously marked with darker blotches and longitudinal lines; girdle blotched alternately green and light blue.

Length, 56; breadth, 32 mm.

Guanica; Aguadilla; San Juan, Porto Rico.

Genus ACANTHOPLEURA Guilding.

Valves exposed, beaked, generally lusterless or eroded; provided with eyes on the forward part of the lateral areas and the end valves; insertion plates all conspicuously pectinated outside; girdle thick, covered with calcareous spines.

Acanthopleura granulata Gmelin.

Chiton granulatus Gmelin, Syst. Nat., p. 3205, 1792.

Acanthopleura granulata Pilsbry, Man., XIV, p. 227, pl. I, 1892.

Shell large, oblong, moderately elevated or roundly arched; valves solid, with faintly marked lateral areas, granulated all over; the color is generally ashy or brownish, usually darker on the ridge; girdle wide, composed of various-sized spines, looking like a growth of very fine lichens, ashy, blotched with brownish or blackish.

Length, 65; breadth, 38 mm.

One of the most abundant of American chitons, found on almost every rocky coast from lower Florida to northern South America. The valves are almost invariably eroded, even in young specimens, so that little or no sculpture can be seen. The material collected by the *Fish Hawk* expedition was taken at nearly every locality visited in Porto Rico and on the island of Culebra.

Acanthopleura granulata var. **mucronulata** Shuttleworth.

Chiton (Acanthopleura) mucronulatus Shuttleworth, Berner Mitth., p. 79, 1853.

Eastern Porto Rico (Gundlach).

Genus CERATOZONA Dall, 1882.

Shell with strong, exposed valves. Insertion plates of anterior valve long, sharp, rough outside, thickened at the slits, which correspond in position to the external ribs; middle valves with similar propped teeth. Girdle tough, bearing peculiar hornlike spines, generally sparsely bunched at the sutures.

Ceratozona rugosa Sowerby.

Chiton rugosus (Gray) Sowerby, Conch. Ill., No. 6, fig. 49, 1841?

Shell oblong, rather convex; surface generally eroded; green, olive, or blackish, the central areas whitish along the middle, flamed with blackish or green at the sides; tail valve with a broad, pink ray behind; lateral areas defined by a strong rounded rib, having a sculpture of irregular, wavy wrinkles over ribs and interval and on the sides of the center.

Length, 40; breadth, 25 mm.

Aguadilla, Porto Rico, two specimens.

Genus ACANTHOCHITES Risso, 1826.

Valves partly buried in the girdle, the exposed part consisting of a smooth or striated dorsal band and granulated side areas, the latter sometimes lacking; anterior valve with five symmetrically placed slits; median valves with one slit on each side; posterior valve with two to several slits; girdle hairy to naked, but always having four bristle-bearing pores around the head valve and a series of pores on each side at the sutures.

Acanthochites spiculosus Reeve.

Chiton spiculosus Reeve, Conch. Icon., pl. IX, fig. 47, 1847.

Shell elongate-ovate; valves semilunar, rough throughout; blackish brown; ligament horny, furnished with thick tufts of bright greenish glassy spiculae.

Acanthochites spiculosus var. **astriger** Reeve.

Chiton astriger Reeve, Conch. Icon., *Chiton*, pl. XVIII, fig. 109, 1847.

Shell oblong, rather depressed, not carinated; valves variously colored, often with rather wide white stripes on the sides; girdle velvety, olive green, with eighteen large tufts of greenish spicules, the periphery having a fringe of spicules.

Length, 20; breadth, 9 mm.

Fajardo, Porto Rico; Ensenada Honda, Culebra. Only one variety was collected.

Acanthochites hemphilli Pilsbry.

Acanthochites hemphilli Pilsbry, Man., XIV, p. 34, pl. XIII, figs. 65-67, 1892.

Animal elongated; the shell narrow, not exceeding one-fourth the total width in alcoholic specimens, scarcely carinated, somewhat ovate, truncated behind, brownish red marked with white; girdle pale brown, roughened with minute scales or spicules, with a fringe of longer white spicules at its edge and containing eighteen small tufts of red-brown or whitish spicules.

Length, 35; breadth, 17 mm. Other specimens are smaller.

Ensenada Honda, Culebra.

Class SCAPHOPODA.

Order SOLENOCONCHA.

Family DENTALIDÆ.

Genus **DENTALIUM** Linnæus, 1758.

Shell tubelike, curved, but not spiral, attenuated posteriorly; anterior orifice larger than that at the posterior end; dorsal face concave; ventral face convex; no operculum.

Subgenus **DENTALIUM** s. s.**Dentalium gouldi** Dall.

Dentalium gouldi Dall, Blake Report, II, p. 424, pl. XXVI, fig. 4, 1889.

Shell elongated, slender, slightly or considerably curved; surface polished, sometimes having longitudinal microscopic striæ, hexagonal throughout most of its length but often round at the aperture, the angles pinched up into distinct ribs. Color vitreous or milky white.

Length, 42; diameter, 2.5 mm.

Mayaguez Harbor, Porto Rico, one fine specimen and two small ones.

This has been more or less generally known under the name of *D. hexagonum* Gould, but it is not the original *D. hexagonum*, which comes from China.

Subgenus **ANTALIS** H. & A. Adams, 1854.**Dentalium taphrium** Dall. Plate 54, fig. 19.

Dentalium taphrium Dall, Bull. Mus. Comp. Zool., XVIII, p. 422, 1889.

Dentalium taphrium Pilsby & Sharp, Man., XVII, p. 58, 1897.

Shell small, rather stout, moderately curved, with thirty or more low ribs, those of the dorsal face stronger; posteriorly every alternate rib becomes weaker and finally disappears; incremental lines close, fine, and sharp. Color pale apple-green. Both orifices are circular.

Length, 17; diameter, 2.25 mm.

Mayaguez, Porto Rico, two half-grown dead shells.

Dentalium disparile d'Orbigny.

Dentalium disparile d'Orbigny, Moll. Cubana, II, p. 202, pl. xxv, figs. 14-17, 1845.

Shell small, solid, somewhat curved, opaque white, the ribs often blotched with gray, with nine or ten primary ribs, often with intermediate ribs at the smaller end; aperture circular, showing the riblets on its border; anal orifice small, entire.

Length, 20; diameter, 2 mm.

A fragment of the posterior end of a shell was obtained at Mayaguez, Porto Rico.

Dentalium ceratum Dall.

Dentalium ceratum Dall, Bull. Mus. Comp. Zool., IX, p. 38, 1881.

Dentalium ceratum Dall, Blake Report, II, p. 424, pl. xxvi, fig. 5, 1889.

Shell moderately curved, the anterior part smooth and shining, milky white; posterior part dull greenish; there are from seven to ten well-developed ribs at the posterior end, and there are intermediate riblets farther up the shell; all the ribs fade out on the upper third; apertures simple.

Length, 30; diameter, 5 mm.

Two fine shells were obtained at Mayaguez Harbor, Porto Rico.

Dentalium antillarum d'Orbigny.

Dentalium antillarum d'Orbigny, Moll. Cubana, II, p. 202, pl. xxv, figs. 10-13, 1845.

Shell small, solid, and stout; last third more strongly curved than the remainder; white or greenish yellow; ribs numerous, subequal or alternately larger and smaller, low, rounded; aperture circular. The ribs are often marked with gray.

Length, 23; diameter, 2.5 mm.

Mayaguez, Porto Rico, two dead shells.

Subgenus *LÆIDENTALIUM* Cossmann, 1888.

Dentalium callipeplum Dall.

Dentalium callipeplum Dall, Blake Report, II, p. 419, pl. xxvii, fig. 12b, 1889.

Shell ivory white or flesh color, polished, evenly curved, rapidly increasing; sculpture of faint, scattered, incremental lines; apertures round; in the adult that of the posterior end has a wide, shallow notch on the concave side.

Length, 61; diameter, 5 mm.

Mayaguez, Porto Rico, two young, worn shells and one beautiful specimen two-thirds grown.

Dentalium matara Dall.

Dentalium matara Dall, Blake Report, II, p. 420, 1889.

Dentalium matara Pilsbry & Sharp, Man., XVII, 8, p. 105, pl. xviii, figs. 14-18, 1897.

Shell slender, moderately and evenly curved, polished, salmon or flesh colored, becoming lighter anteriorly, with very faint lines of growth; aperture circular; anal opening notched on the concave and convex sides, the latter notch is carried up the tube as a slit.

Length, 40; diameter, 2.75 mm.

San Juan; Mayaguez, Porto Rico, a few specimens in an immature state.

Subgenus *EPISIPHON* Pilsbry & Sharp, 1897.

Dentalium filum Sowerby.

Dentalium filum Sowerby, Thes. Conch., III, p. 89, pl. ccxxv, fig. 45, 1860.

Shell delicate, slender, white, moderately curved, nearly transparent, glossy, sculptured with very fine microscopic concentric lines which are seen most plainly at the posterior end; aperture circular, the margin more or less irregular; posterior end truncated, with an internal pipe, slightly notched.

Length, 12.5; diameter, 1.25 mm.

Mayaguez, Porto Rico, two worn shells.

Subgenus *FUSTIARIA* Stoliczka, 1868.***Dentalium stenoschizum* Pilsbry & Sharp.***Dentalium stenoschizum* Pilsbry & Sharp, Man., XVII, p. 128, pl. XIX, figs. 18-21, 1897.

Shell considerably curved especially toward the smaller end, the earlier part slender, rapidly increasing in the maturer part; smooth and polished throughout, aperture somewhat oblique, compressed a trifle laterally, peristome thin; anal opening circular, having a very long, narrow slit on the convex side of the shell and nearly one-third of its length. Color milk white, tinted a little with brownish on the earlier growth.

Length, 35; greatest diameter, 3.4 mm.

Mayaguez, Porto Rico, one fine, half-grown shell.

Genus **CADULUS** Philippi, 1844.

Shell small, tubular or oval in section, somewhat arcuate, more or less swollen at or above the middle, contracting toward the aperture; surface smooth or delicately striate.

Section **POLYSCHIDES** Pilsbry & Sharp, 1897.***Cadulus carolinensis* var. *bushii* Dall.***Cadulus (carolinensis* var. ?) *bushii* Dall, Blake Report, II, p. 430, 1889.*Cadulus carolinensis* var. *bushii* Pilsbry & Sharp, Man., XVII, p. 153, pl. XXXIII, figs. 58, 59, 1897.

Shell of medium size, semitransparent, glossy, bluish white, nearly circular throughout; greatest diameter about at the anterior third, abruptly constricted behind the swollen part, well curved; aperture oblique, subcircular, inflexed along the convex margin.

Length, 6.5; diameter, 1.25 mm.

Mayaguez, Porto Rico, a large number of specimens.

Section **GADILA** Gray, 1847.***Cadulus minusculus* Dall.***Cadulus minusculus* Dall, Blake Report, II, p. 432, 1889.*Cadulus minusculus* Pilsbry & Sharp, Man., XVII, p. 164, pl. XXXII, figs. 42, 43, 1898.

Shell minute, curved, moderately swollen near the middle, regularly curved on the convex side, but slightly curved on the concave side, both ends small; surface smooth, glossy whitish; aperture circular.

Length, 2.3; diameter, a little more than 0.5 mm.

Mayaguez, Porto Rico, one shell.

Cadulus amiantus* Dall.Cadulus amiantus* Dall, Blake Report, II, p. 431, pl. XXVII, fig. 7, 1889.

Shell rather elongated, moderately curved, the very gradual swelling about one-fourth of the way back from the anterior end; mouth not oblique, with the posterior opening circular. Color milky white, somewhat translucent.

Length, 5.75; diameter, 1.5 mm.

Mayaguez, Porto Rico, a large number of shells.

Cadulus acus* Dall.Cadulus acus* Dall, Blake Report, II, p. 432, pl. XXVII, fig. 11, 1889.

Shell small, slender, curved, milky white, variegated with translucent patches and markings on the anterior half which is smooth and shining; posterior half or third of the shell sculptured with very fine, annular grooves; greatest diameter immediately behind the aperture, from which there is a gradual diminution in size to the posterior end; the slope from the swelling to the anterior end is rapid.

Length, 8; diameter of aperture, 0.5; greatest diameter, 0.75 mm.

Mayaguez, Porto Rico, three specimens.

Besides the above, a number of broken specimens of *Cadulus* were obtained at Mayaguez which are not in a condition to be identified.

Class PELECYPODA.

Order PRIONODESMACEA.

Superfamily NUCULACEA.

Family NUCULIDÆ.

Genus NUCULA Lamarck, 1799.

Shell equivalve, closed, triangular, inequilateral, the posterior end short; beaks generally inclined to the rear; surface smooth or ornamentally sculptured; hinge with an internal, triangular fossette, containing a resilium and having on each side a row of sharp teeth; internal shell layer nacreous.

Nucula ægeënsis Jeffreys.

Nucula ægeënsis Jeffreys, P. Z. S., 1879, p. 581; Dall, Blake Report, I, p. 246, 1886.

Shell rather small, thin, nearly regularly ovate, scarcely oblique, uniformly convex, and having a low, rounded posterior ridge; beaks projecting but little beyond the rest of the shell, straight; sculpture of exceedingly fine concentric ridges; hinge line rather broad; teeth few; cartilage pit small.

Length, 10.7; height, 8; diameter, 4.7 mm.

Mayaguez, Porto Rico, one young left valve. The species is close to *N. tenuis* Montagu.

Family LEDIDÆ.

Genus LEDA Schumacher, 1817.

Shell solid, oval-oblong, more or less beaked behind; beaks somewhat turned backward; surface concentrically and obliquely furrowed, with a posterior ridge or carina; hinge teeth numerous, similar fossette containing the resilium internal, placed below the beaks; pallial line feebly sinuous; internal layer porcellanous.

Leda acuta Conrad.

Nucula acuta Conrad, Am. Marine Conch., p. 32, pl. VI, fig. 3, 1831.

Shell inflated, irregularly long oval; anterior end rounded, but somewhat drawn out, with a ridge running from the beaks to the anterior base; posterior ridge strong, curved downward in the middle, the dorsal slope truncated and partly sunken so as to form a sort of escutcheon; beaks full, about two-fifths of the length of the shell from anterior end; sculpture consisting of fine, well-defined ridges, which are more or less concentric, but often oblique at the ends; hinge strong and wide, divided about midway by the fossette, with strong V-shaped teeth; interior of the shell shining. Color greenish olive.

Length, 9; height, 5; diameter, 3.5 mm.

Mayaguez Harbor, Porto Rico, a great number of specimens.

The character of the sculpture is variable. In some specimens there are traces of cancellation in front.

Genus NEILONELLA Dall, 1881.

Shell inflated, the ends drawn out but rounded, with a single ligament directly between the beaks, chiefly external, but its base dividing the hinge line while the upper surface extends about equally before and behind the beaks; teeth strong.

Neilonella corpulenta Dall.

Leda (Neilonella) corpulenta Dall, Bull. Mus. Zool., IX, 1881, p. 125; Blake Report, I, p. 254, pl. VII, figs. 1a, 1b, 1886.

Shell irregularly elliptical, inflated, solid, with rather high, full beaks; the posterior ridge low and close to the hinge; surface covered with well-defined, concentric ridges; hinge moderately strong, the posterior part a little longer than the anterior; teeth sharp, elongated, much reduced in size under the beaks; interior of the shell smooth and shining.

Length, 10, height, 6.5; diameter, 4.5 mm.

Mayaguez, Porto Rico, two opposite worn valves.

Superfamily **ARCACEA**.Family **ARCIDÆ**.Subfamily **PECTUNCULINÆ**.Genus **GLYCYMERIS** Da Costa, 1778.

Shell suborbicular, solid, equivalve, subequilateral, convex, with a velvety epidermis; area moderate; within porcellanous; hinge wide, flat, curved, bearing divergent, taxodont teeth, which are faint under the beaks; muscular impressions subequal; pallial line simple.

Glycymeris pennaceus Lamarck.

Pectunculus pennaceus Lamarck, An. sans Vert., VI, p. 51, 1819.

Pectunculus pennaceus Reeve, Conch. Icon., pl. v, fig. 24, 1843.

Shell solid, suborbicular, somewhat inflated, with rather full, high beaks which are placed slightly in front of the center; ligamental area rather narrow; ligament strong; surface with very low, wide, radiating ribs, which, with the spaces between them, are covered with delicate, radiating liræ; growth lines fine and varied, forming a peculiarly reticulated or latticed pattern of sculpture; hinge line less curved than remaining border of shell; teeth not numerous, faint, or wanting under the beaks interior faintly radially striate within the pallial line. The surface is covered with a delicate, velvety epidermis, which is often wanting at the umbonal region and soon becomes worn off after the death of the animal. Color whitish, with irregular, subradial markings and cloudings of chestnut.

Length, 60; height, 55; diameter, 35 mm.

San Juan Harbor; Boqueron Bay, Porto Rico; Culebra; Vieques.

This species, which is not at all common, was obtained abundantly living and in very fine condition at Vieques. Some of these specimens considerably exceed the measurements given.

Glycymeris pectinatus Gmelin.

Arca pectinata Gmelin, Syst. Nat., p. 1313, 1792.

Pectunculus charlestonensis Holmes, P. Pl. Foss. S. Car., p. 16, pl. III, fig. 5, 1860.

Shell somewhat fan-shaped, solid, scarcely inflated, with high beaks and a narrow area, subequilateral, with about twenty-four rounded, often slightly curved ribs, which are crossed by fine, concentric striæ; teeth fainter and sometimes wanting under the beaks; margin of shell decidedly toothed. Color whitish, variously blotched with chestnut, the blotches sometimes zigzagged and subconcentric.

Length, 20; height, 20; diameter, 10 mm.

Mayaguez, Porto Rico, a few dead valves.

Subfamily **ARCINÆ**.Genus **ARCA** Linnæus, 1758.

Shell generally equivalve, thick, subrhomboid, inflated, ribbed or cancellate, covered with a thick epidermis; valves closed below, or open for the passage of a byssus; hinge straight, with a nearly or quite continuous row of numerous, almost straight, subradiating teeth; beaks prominent, incurved, separated by a lozenge-shaped area, with numerous cartilages embedded in grooves.

Subgenus **ARCA** s. s.**Arca occidentalis** Philippi.

Arca occidentalis Philippi, Abbild. und Beschr., III, p. 14, pl. XVII, B, figs. 4 a-c, 1847.

Shell oblong, wider and truncated behind, solid, inflated, with a moderate posterior ridge, the basal and posterior parts covered with a shaggy epidermis; in front of the middle of the base there is a long, narrow gap through which the byssus passes; surface decidedly ribbed; in the middle of the shell there are large ribs with three or four smaller ones between; hinge long and straight, with a lozenge-shaped central area covered with dark ligament, with resilary threads embedded in grooves;

hinge teeth very numerous and even; inside the surface is slightly grooved within the pallial line. Color pale brownish, often purple tinted, with wide, wavy, or zigzag, zebra-like stripes of brown.

Length, 90; height, 40; diameter, 50 mm.

Mayaguez, many specimens; off Point Melones; Arroyo, Porto Rico.

Arca umbonata Lamarek.

Arca umbonata Lamarek, An. sans Vert., VI, p. 37, 1819.

Arca umbonata Philippi, Abbild., III, p. 13, pl. XVII, B, fig. 3 a-c, 1847.

Shell rhomboid, solid, inflated, with a high, sharp posterior ridge and obliquely truncated behind; surface in front of the posterior ridge sculptured with rather fine, radiating ribs which are crossed by irregular, concentric ridges and rendered subcancellate; behind the posterior ridge are about eight stronger, subnodulous ridges; base of shell gaping in front of middle; beaks separated by a rather wide, lozenge-shaped area; epidermis blackish, shaggy, standing out in long, striate, leaf-like projections on posterior ridge; beak cavities deep. Color purplish brown within and without.

Length, 50; height, 20; diameter, 20 mm.

Puerto Real; Boca Prieta; San Juan; Guanica; Mayaguez, Porto Rico.

Subgenus BARBATIA (Gray) Adams, 1858.

Arca barbata Linnæus.

Arca barbata Linnæus, Syst. Nat., ed. X, p. 693, 1758.

Arca barbata Reeve, Conch. Icon., IV, pl. XIII, fig. 83, 1844.

Shell subsolid, oblong, or long-rhomboid, generally rounded at each end, moderately inflated, slightly gaping below; beaks rather high, situated one-fourth of the way back from the anterior end and separated by a rather narrow ligamental area; surface closely sculptured by various-sized radiating ribs, which are crossed by concentric ridges making it cancellated or reticulated, the nodules on the ribs often bead-like; posterior ridge low and rounded; epidermis shaggy at the base and posterior end; hinge teeth rather few, not strongly developed. Color chestnut, often with lighter clouds, sometimes with white rays at the beaks and occasionally one or more of these rays extends to the edge of the shell.

Length, 50; height, 28; diameter, 17 mm.

San Geronimó; Guanica; Fajardo, Porto Rico; Ensenada Honda, Culebra; Caballo Blanco Reef, Vieques.

Arca candida Gmelin.

Arca candida heblingi Chemnitz, VII, p. 195, pl. LV, fig. 542.

Arca candida Gmelin, Syst. Nat., p. 3311, 1792.

Shell thin to solid, rather compressed, subtrapezoidal, gaping at the anterior base; anterior end generally truncate; posterior end pointed and obliquely truncate above; beaks high, separated by a moderately wide area; surface sculptured with fine to rather strong double or single, large or small ribs which are heavier on the posterior slope. These are crossed by rude, irregular growth lines and ridges, causing the surface to appear somewhat cancellated and beaded; epidermis heavy, shaggy; teeth feebly developed. Color white.

Length, 60; height, 35; diameter, 28 mm.

Puerto Real; reefs at Ponce; Mayaguez; San Juan Harbor, Porto Rico.

Arca reticulata Gmelin.

Arca reticulata, etc., Chemnitz, Conch. Cab., VII, p. 193, pl. LIV, fig. 540.

Arca reticulata Gmelin, Syst. Nat., p. 3311, 1792.

Shell small, solid, inflated, subrhomboid, with a well-defined posterior ridge which ends in a point at the posterior base; anterior end rounded; beaks full, placed well forward, the area between them narrow; sculpture consisting of rather strong, radiating ridges which cross still stronger concentric ones, the ridges sometimes scaly, and this is especially the case on the somewhat truncated posterior end; hinge rather short; the teeth moderately developed; border of shell denticulate. Color whitish.

Length, 20; height, 11; diameter, 9 mm.

Reefs at Ponce; Mayaguez; Guanica; San Juan Harbor; Hucares, Porto Rico; Caballo Blanco Reef, Vieques.

Arca adamsi (Shuttleworth) Smith.

Arca (Acar) adamsi (Shuttleworth) Smith, Journ. Lin. Soc., Zool., xx, p. 499, pl. xxx, figs. 6, 6a, 1888.

Shell moderately solid, rhomboid, inflated, rounded in front, the hinge and base line parallel, the posterior end obliquely subtruncated; posterior ridge high but rounded; beaks only moderately full, turned forward, separated by a narrow area; surface having numerous pseudo-ribs consisting of more or less connected blisters, with strong, concentric sculpture; teeth few, rather strong.

Color whitish or brownish. There is a curved ridge below and inside of the muscular impressions.

Length, 12; height, 7.5; diameter, 7.5 mm.

Aguadilla; Ponce; Mayaguez; San Juan Harbor, Porto Rico; Vieques.

Subgenus **SCAPHARCA** (Gray, 1847) Dall.**Arca campechensis** Gmelin.

Arca campechensis Gmelin, Syst. Nat., p. 3312, 1792.

Arca americana Reeve, Conch. Icon., II, *Arca*, fig. 21, 1844.

Aguadilla; San Juan, Porto Rico (Gundlach).

Arca deshayesii Hanley.

Arca deshayesii Hanley, Ill. Cat. Biv. Shells, p. 157, 1842.

Arca deshayesii Reeve, Conch. Icon., II, pl. VII, fig. 47, 1844.

Shell oblong, inflated, solid, subrhomboid, with high, full beaks which are separated by a rather narrow area, angled at the hinge line in front, with about twenty-seven strong, rounded ribs which are crossed by concentric threads; hinge teeth rather numerous, well developed. Color whitish, covered with a silky, brown epidermis.

Length, 65; height, 45; diameter, 45 mm.

Mayaguez; San Juan, Porto Rico; Vieques.

Arca secticostata Reeve.

Arca secticostata Reeve, Conch. Icon., *Arca*, fig. 38, 1844.

Shell irregularly rhomboid, somewhat elongated, with high, rather full beaks, situated at one-fourth of the distance from the anterior to the posterior end, solid, inflated, with a moderately wide area; posterior ridge not elevated, somewhat rounded; anterior end angular at the hinge; posterior end obliquely truncate below the hinge; surface sculptured with about thirty-five ribs, those of the middle and anterior end grooved; posterior ribs rounded; all except those on the posterior slope are more or less beaded; hinge long; the teeth numerous and well defined, but not high; the border within the shell is strongly denticulate. Color white; epidermis brownish, shaggy.

Length, 85; height, 52; diameter, 52 mm.

Mayaguez, Porto Rico, several young and worn valves.

Arca chemnitzii Philippi.

Arca chemnitzii Philippi, Zeitschr. für Mal., VIII, p. 50, 1851.

Arca d'orbigny Kobelt, Mart. Chemn. Conch. Cab., 2te Ausg., p. 57, No. 41, pl. XVI, figs. 7, 8, 1891.

Shell irregularly triangular, slightly inequivalve, solid, with very high incurved beaks, with a lozenge-shaped area; anterior end angular at the hinge, but the angle projects but little beyond the general outline; posterior ridge high, somewhat rounded; surface sculptured with about twenty-five nodulous ribs, which are often flattened; epidermis softly spinose in the grooves of the anterior half of the shell, thick and lamellar on the posterior part; hinge short, teeth distinct; beak cavities deep; inner edge of the shell strongly dentate. Color white.

Length, 30; height, 30; diameter, 30 mm.

Playa de Ponce; Mayaguez Harbor; off San Juan; Catano; Boqueron Bay, Porto Rico; Culebra Island; Vieques.

Some of these specimens are much larger than any of this species which have hitherto been reported.

Superfamily PTERIACEA

Family PINNIDÆ.

Genus PINNA (Linnæus) Lamarck, 1799.

Shell thin, attached by a byssus, elongate, triangular, not auriculate, with pointed terminal beaks; posterior part truncated, gaping; ligament linear, elongated, lodged in a furrow. The middle of the shell is longitudinally sulcate and the inner nacreous layer is deeply bilobed at this sulcation.

Pinna carnea Gmelin.

Pinna carnea Gmelin, Syst. Nat., p. 3365, 1792.

Pinna flabellum Reeve, Conch. Icon., pl. x, fig. 18, 1858

Mayaguez, Porto Rico (Gundlach).

Genus ATRINA Gray, 1840.

Shell attached, elongate, triangular, thin, with pointed terminal beaks, truncated or rounded posteriorly, generally more or less covered with scales; valves unsulcate or without a median carina, and the internal nacreous layer is entire.

Atrina rigida Dillwyn.

Pinna rigida (Solander mss.) Dillwyn, Cat., 1, p. 327, 1817.

Pinna subviridis Reeve, Conch. Icon., *Pinna*, pl. xvii, fig. 32, 1858.

Shell somewhat elongately triangular, thin or somewhat thickened, slightly inflated; hinge line straight or incurved; ventral margin rounded at the middle; posterior end truncate or subtruncate, gaping; all of the shell except the ventral region is covered with low radiating ribs, which may be smooth or covered with more or less elevated scales; the scales sometimes become elongated and almost tubular; ventral area smoother, without ribs, often having prickly scales; inner layer smoky brown, faintly iridescent. Color blackish, olive brown, or ashy.

Length, 25; height, 13; diameter, 4 cm. Mayaguez Harbor, Porto Rico, two fragments and a young shell.

Family MELINIDÆ.

Genus MELINA Retzius, 1788.

Shell attached, subequivalve, inequilateral, compressed, with a posterior wing, somewhat subrhomboid or subquadrate; ligament multiple, lodged in a series of vertical, parallel pits along the hinge line; muscular impression subcentral; right valve with a byssal sinus below the hinge.

Melina alata Gmelin.

Ostrea alata Gmelin, Syst. Nat., p. 3339, 1792; Chemnitz, Conch. Cab., vii, pl. 59, fig. 581.

Perna ephippium Reeve, Conch. Icon., xi, pl. ii, fig. 8, 1858.

Shell subquadrate or subtrapezoidal, greatly compressed, moderately solid; right valve nearly flat; left valve slightly convex; posterior wing low; hinge line short, with from seven to fifteen pits in each valve; left valve much thickened in front below the hinge; the right with a small byssal sinus opposite the swelling; exterior either nearly smooth or somewhat scaly; inner pearly layer of the shell not reaching the shell border. Color brownish, purple, or blackish, often marked with lighter color and white on the earlier part of the shell, which, when young, is sometimes rayed.

Length, 80; height, 80; diameter, 8 mm.

Puerto Real; Mayaguez, Porto Rico; Ensenada Honda, Culebra. At the former locality great numbers of fine specimens were found attached to the roots of mangroves and to each other.

Melina listeri Hanley.

Perna listeri Hanley, Ill. Cat. Rec. Biv. Shells, p. 259, 1846; Lister, pl. 228, fig. 63.

Shell irregular, subquadrate, greatly drawn out and developed at the base; hinge line with from three to seven pits in each valve; posterior wing small; sinus of the right valve wide and rounded; left valve fuller than the right. The base of the shell is developed into a long, irregular, tongue-like process of porcellanous matter; the nacreous part does not extend more than half way from the hinge to the base. Color ashy, brownish, or purple brown, irregularly rayed with lighter color.

Length, 25; height, 60; diameter, 7 mm.

Puerto Real; Mayaguez; Ponce; Guanica; Hucare; Arroyo, Porto Rico; Ensenada Honda, Culebra.

Melina semiaurita Linnæus.

Ostrea semiaurita Linnæus, Mus. Lud. Ulric., p. 535, 1764.

Perna bicolor C. B. Adams, Proc. Bost. Soc. Nat. Hist., v, 1845, p. 9.

Concha semiaurita Chemnitz, Conch. Cab., VII, p. 250, pl. 59, fig. 580, 1784 (nonbinomial).

Shell small, subquadrate, solid, somewhat inflated, very irregular, hinge line having three or four large pits in each valve; byssal notch small. The surface is covered with strong, irregular, scaly ridges; the base in adult shells often projects somewhat tongue-like, and to some distance below the nacreous layer. Color ashy to blackish.

Length, 12; height, 16; diameter, 8 mm.

San Juan, two specimens.

This species grows in the crevices of corals and rocks and is as variable in form as any oyster. It may prove to be only a littoral form of the preceding species. It is the *Perna chemnitziana* of d'Orbigny, 1846.

Family PTERIIDÆ.

Genus PTERIA Scopoli, 1777.

Shell suborbicular or oblique, thin or solid, slightly inequivalve, the left valve being more convex than the right; right valve with a distinct byssal notch and sinus near its upper anterior part; valves winged before and behind; hinge with rudimentary pseudocardinals and laterals; ligament elastic, placed in an oblique fossette; inner shell layer brilliantly nacreous, not extending to the shell border.

Pteria radiata Leach.

Avicula radiata Leach, Zool. Miscellany, I, p. 98, pl. XLIII, 1814.

Shell suborbicular or subquadrate, rather thin, somewhat inflated, more or less oblique, the hinge about as long as the body of the shell, moderately winged before and behind; surface, especially toward the edges of the shell, having radiating rows of strong, somewhat elongated scales, more or less variegated with purple, brown, and whitish, sometimes feebly rayed; pseudocardinals faint, single in each valve; laterals single in the left valve and double in the right; nacre brilliant, surrounded by a wide, prismatic border.

Length, 40; height, 38; diameter, 16 mm. Length of another, 50; height, 50; diameter, 18 mm.

Off Boca Prieta; Mayaguez Harbor, Porto Rico.

Sometimes the surface is almost smooth.

Superfamily OSTRACEA.

Family OSTREIDÆ.

Genus OSTREA Linnæus, 1758.

Shell irregular, fixed by the left or lower valve which is excavated; right valve generally plane or concave, always less convex than the left, often plaited or foliaceous, and having a prominent beak; ligamental area triangular or elongated; structure subnacreous; hinge edentulous; adductor impression single.

Ostrea virginica Gmelin.

Ostrea virginica Gmelin, Syst. Nat., p. 3336, 1792.

Ostrea rostrata Sowerby, Conch. Icon., XVIII, pl. VI, 1871.

Shell elongated, irregular, elliptical oval, or nearly circular, straight or curved; left valve usually excavated; right valve generally flat, sometimes concave or a little convex; lower valve with a strong, usually elongated beak, its hinge having a wide channel in center and marked with lines exhibiting the successive removals of the cartilage; upper valve with a shorter beak, with a faint ridge in the hinge area opposite channel of left valve; muscular impression near center strong and large, often dark.

Mayaguez; Puerto Real, Porto Rico; Ensenada Honda, Culebra.

It is almost impossible to give a description that will cover all the forms of this protean species, which varies infinitely with the locality and environment in which it grows. Specimens in northern waters attain a length of a foot, and where they are crowded in the beds are long and tongue-like. Those living on flat stones and timber are often nearly circular. The Porto Rican specimens for the most part are attached to the swinging aerial roots of the mangroves.

Ostrea cristata Born.

Ostrea cristata Born, Mus. Vind., p. 112, pl. VII, fig. 3, 1780.

Shell moderately solid, exceedingly irregular, elongated, rounded or oval; upper valve sometimes concave, at other times convex; lower valve convex; valves often furnished with elongated, tubular, or solid, clasping processes, by means of which the shell is attached to mangrove roots or other objects; edges of the valves strongly and sharply plicate-serrate, forming closely interlocking teeth; within, the border is often pustulose ridged, or striate; beaks very irregular, that of the lower valve the longer, its hinge area centrally grooved; muscular scars not deep. Color reddish, purplish, or brownish.

Specimens attain a diameter of 90 mm.

Gallardo Bank, Porto Rico.

This species is even more irregular and variable in its growth than *O. virginica*.

Ostrea frons Linnæus.

Mytilus frons Linnæus, Syst. Nat., ed. x, p. 704, 1758.

Ostrea frons Sowerby, Conch. Icon., XVIII, pl. XIX, fig. 41, 1871.

San Juan, Porto Rico (Gundlach). The *Ostrea parasitica* Gmelin, credited to Porto Rico by Gundlach, is probably a form of *O. cristata* Born.

Family PECTINIDÆ.

Genus PECTEN Müller, 1776.

Shell suborbicular, inequivalve, not gaping nor attached, sculpture usually radial; auriculate; right valve convex, with a notch below the anterior ear, generally inflated at the beak; left valve concave, flat or slightly convex; hinge margins straight, united by a narrow ligament: resilium internal, in a central pit; adductor impression duplex.

Subgenus PECTEN s. s.

Section EUVOLA Dall.

Pecten laurentii Gmelin.

Ostrea laurentii Gmelin, Syst. Nat., p. 3317, 1792.

Pecten laurentii Reeve, Conch. Icon., VIII, pl. XVI, fig. 58, 1853.

Shell nearly orbicular, equilateral, rather thin, decidedly inequivalve, smooth and shining; left valve nearly flat in an anterior and posterior direction, but inflated in a direction from the beaks to the base, having a decided radial shoulder above on each side under the ears. It has very faint, low, wide, radiating ridges, and in addition minute radial threads, which are crossed by feeble concentric growth lines, ridged within with numerous radiating bars; right valve evenly convex, externally sculptured like left valve, with fine, radial ribs within arranged in pairs; ears nearly equal. The left valve is dark purplish red, with faint, radiating, lighter-colored rays; toward its upper part it is beautifully mottled with yellowish or pinkish white, and occasionally marked with oblique, light-colored strigations. There are also a few dark reddish-brown spots on the upper part of the shell. The right valve is whitish or buff, feebly rayed with brownish.

Height, 90; length, 90 mm.

A number of adult living specimens of this very fine and rare species were dredged in 7 fathoms in the harbor of Mayaguez.

Pecten ziczac Linnæus.

Ostrea ziczac Linnæus, Syst. Nat., ed. x, p. 696, 1758.

Pecten ziczac Reeve, Conch. Icon., VIII, pl. VI, fig. 29, 1852.

Shell rather solid, nearly orbicular, equilateral; left valve slightly concave, with a low but decided radiating shoulder on each side below the ears, with wide, low, distinct radiating ribs, crossed by faintly squamose growth lines, radiately ridged within around the border; right valve deeply convex, with widely spaced radiating grooves, the radiating ridges within inclined to be somewhat double; ears nearly equal, slightly radially ribbed. Both valves with faint crura at the bases of the ears. Left valve painted with red-brown, buff, lilac and white, in broken, radiating patterns, brown bordered within; right valve reddish brown, becoming dusky at the border, marbled with white near the beaks.

Length, 100; height, 90; diameter, 26 mm.

Mayaguez Harbor, Porto Rico, one young specimen.

Pecten medius Lamarck.

Pecten medius Lamarck, An. sans Vert., VI, 1819, p. 163; Chemnitz, Conch. Cab., VII, pl. LX, figs. 586, 587, 589, 1784.

Shell nearly orbicular, rather solid; left valve decidedly concave, with strong, radial shoulders, sculptured with well developed, rounded ribs and delicate, somewhat lamellar growth lines, which are fainter on the ribs, deeply, radially grooved within at the border; right valve strongly convex, with wide, rounded or flattened ribs, which are sometimes broken up into smaller ridges; interior ribs of right valve somewhat double; both valves with faint crura at the base of the ears; ears nearly even, ridged. Left valve red or purplish sometimes variegated with small, lighter blotches, generally having a lighter, well-marked area at the beak; right valve purplish or whitish, sometimes faintly marbled.

Length, 50; height, 47; diameter, 13 mm.

Mayaguez Harbor, Porto Rico, two young opposite valves; off St. Thomas, one specimen.

Subgenus **CHLAMYS** Bolten, 1798.

Section **PLAGIOCTENIUM** Dall, 1898.

Pecten mayaguezensis, n. sp. Plate 55, figs. 7, 8, 9.

Shell small, solid, slightly inequilateral, inequivalve; the left or upper valve less convex, polished, white, with beautiful zigzag, subconcentric, linear, or flecked painting of dark red; ribs eighteen or nineteen, angular at the summit, with subequal, not channeled interspaces, the whole without sculpture except microscopic incremental and obsolete fine radial lines; ears practically smooth, the posterior longer; lower valve more convex, white except near the umbo, where there are a few brown flecks; sculpture about the same, except that the summits of the ribs are more rounded; anterior ear with two or three radial threads, a shallow sulcus and short ctenolium; submargins smooth; interior channeled near margin with well-marked auricular crura; hinge in right valve strong, with a long, horizontal ridge on each side of the resiliary pit corresponding to a similarly placed sulcus in the opposite valve; above the last-mentioned sulci in left valve is a similar pair of ridges; hinge showing strong provincial cross striation; cavity of left valve reddish, of right valve white or yellowish.

Length of shell, 21; height, 19; diameter, 8.5 mm. Living in 7 to 15 fathoms, sand and mud, Mayaguez Harbor, Porto Rico, at stations 6058 and 6061.

This is an extremely elegant little shell, perfectly distinct from any recorded species.

Pecten gibbus Linnaeus.

Ostrea gibba Linnaeus, Syst. Nat., ed. X, p. 698, 1758.

Pecten gibbus Reeve, Conch. Icon., VIII, pl. IX, fig. 37a, 1852.

Aguadilla, Arecibo; San Juan, Porto Rico (Gundlach).

Section **NODIPECTEN** Dall, 1898.

Pecten nodosus Linnaeus.

Ostrea nodosa Linnaeus, Syst. Nat., ed. X, p. 697, 1758.

Pecten nodosus Reeve, Conch. Icon., VIII, pl. III, fig. 15, 1852.

Shell suborbicular, nearly equivalve, sculptured with eight or nine strong, rounded, nodose ribs, which are separated by rounded grooves of nearly equal width with the ribs; the entire surface is also covered with fine, distinct, riblets and concentric lamellar growth lines, which are faint on the ribs; nodules very strong, usually faint or wanting on the upper part of the shell; interior of the valves ribbed but otherwise smooth; ears unequal, strongly ridged, the posterior pair smaller; anterior ear of right valve deeply notched at its base. Color dark purplish, red, or scarlet, the young shell sometimes irregularly concentrically banded with white.

Length, 75; height, 80 mm. St. Thomas, one young valve.

Sometimes the nodules become blistered and the outer shell is broken at the blisters.

Section **CHLAMYS** s. s.

Pecten ornatus Lamarck.

Pecten ornatus Lamarck, An. sans Vert., VI, p. 176, 1819 (Enc. Method., pl. CCXIV, fig. 5).

Shell rather thin, high, inequilateral, nearly equivalve, with elevated, smooth, or scaly ribs, which are separated by deep, excavated channels; sometimes the ribs are compound, consisting of three or more small riblets raised to form a large rib; the interior is ridged to correspond with the external sculpture; posterior ears small, slopingly cut away; anterior ears large and projecting, so that the whole shell is somewhat oblique; that of the right valve deeply notched, all of them covered with

scabrous ribs. Color whitish yellow, orange, reddish, or purplish; sometimes uniform in coloring, often beautifully maculated with red, purple, or brown.

Length, 20; height, 23; diameter, 8 mm. Mayaguez, Porto Rico, a number of young valves.

A beautiful and variable little species, with an infinite variety of coloring. The valves are sometimes made quite rough by the sharp scales on the ribs.

Pecten lemniscatus Reeve.

Pecten lemniscatus Reeve, Conch. Icon., VIII, pl. XXXV, fig. 170 (see Errata), 1853.

Shell elevated, thin, somewhat fan-shaped, compressed, nearly equivalve and equilateral, with small, slopingly cut posterior and large, projecting anterior ears, that of the right valve with a large, deep, byssal notch; surface sculptured with numerous, rather low, unequal ribs and riblets, the principal ones sharply and often strongly scaly; valves with a well-defined radiating shoulder below the ears and ridged on the interior to correspond with the external sculpture; ears with small, feeble ribs, which are roughly scaly. Color very variable, much as in *P. ornatus*, but not so distinctly marked.

Length, 35; height, 40; diameter, 10 mm.

San Juan Harbor, Porto Rico, one young valve.

This species is close to *P. ornatus*, but differs in the ribs, which are rather low and are never separated by deep, excavated grooves. The color pattern is generally less distinct. *P. effluens* Dall is probably the same species, though *P. lemniscatus* is also found in Mauritius. The sculpture of the lower valve is generally more feeble than that on the upper valve.

Pecten sp.

A single right valve was obtained in Mayaguez Harbor of a form which seems to approach *P. darwini*, but is probably undescribed. The specimen is too young and imperfect to be described.

Pecten exasperatus Sowerby.

Pecten exasperatus Sowerby, Thes. Conch., p. 54, pl. XVIII, figs. 183-186, 1846.

San Juan, Porto Rico (Gundlach).

Pecten antillarum Recluz.

Pecten antillarum Recluz, Journ. de Conchyl., IV, p. 53, pl. v, fig. 1, 1853.

San Juan, Porto Rico (Gundlach).

Subgenus **AMUSIUM** Bolten, 1798.

Section **PROPEAMUSIUM** De Gregorio, 1883.

Pecten nanus Verrill & Bush.

Cyclopecten nanus Verrill & Bush, Trans. Conn. Acad. Sci., X, pp. 85, 92, pl. XVI, figs. 12-12c, 1897.

Shell very small, nearly orbicular, compressed, subequivalve, equilateral, with rather small, nearly equal ears; surface apparently smooth, but generally (in adult shells) seen to be sculptured with very fine, close riblets; in other specimens the sculpture consists of microscopic, concentric striae; ears generally having delicate, radial sculpture, the anterior one on the right valve sometimes slightly cancellated; within there are generally exceedingly faint radial ridges. Color semitransparent whitish or horny, often clouded, mottled, or irregularly rayed with milky white.

Length, 5.5; height, 5.5; diameter, 1.75 mm.

Mayaguez, Porto Rico, many partly worn valves.

Pecten pourtalesianum Dall.

Pecten (Propeamusium) pourtalesianum Dall, Blake Report, 1, p. 211, pl. IV, fig. 3, v, fig. 12, 1886.

Shell small, thin, compressed, suborbicular, with small, nearly even ears; right valve with well-developed concentric ridges; the left appearing smooth, but having microscopic, concentric lines and radiating riblets; within there are from nine to eleven slender, somewhat club-shaped, radiating ribs in each valve which do not extend to edge of shell. Color generally milky white and subtranslucent, the ribs showing through, but sometimes brownish or reddish brown and dotted with white.

Length, 13; height, 13; diameter, 2.5 mm.

There was a single specimen and a left valve obtained at Mayaguez Harbor of the var. *striatulum* Dall. (See Blake Report, 1, p. 212.)

As in other allied species, the right valve is not completely calcified near the border and it collapses just outside of the ribs, so that its outer portion lies in contact with the left valve.

Family SPONDYLIDÆ.

Genus SPONDYLUS Linnæus, 1758.

Shell irregular, inequivalve, attached by the right valve, which has a triangular area, auriculate, with radial, generally spinous or foliaceous ridges; resilium in a central pit; hinge with two curved, interlocking teeth in each valve; adductor impression duplex.

Spondylus echinatus Martyn.

Ostrea echinata Martyn, Univ. Conch., II, fig. 154, 1784.

Shell with four to eight radial spinose ridges, which are sometimes small and narrow or they may be large and foliaceous; between the ridges are smaller ones, often bearing small spines, and in addition there is a third set of minute ridges, which are scaly and reticulated by the growth lines; lower valve often foliaceous, especially on earlier growth; border of valves dentate, often edged with yellow, orange, scarlet, or purple. Interior sometimes delicately iridescent. Color whitish yellow, or orange, scarlet, or purple. In the lighter-colored shells the beaks are often richly colored.

Length, 80; over all, 120; height, 90; over all, 120; diameter, 40; over all, 60 mm.

Boca Prieta; off Point Melones, Porto Rico.

Genus PLICATULA Lamarck, 1801.

Shell irregular attached by the beak of the right or left valve; valves plaited; hinge area obscure; resilium internal; right valve having a longitudinal cardinal on each side of the resilium and outside of these teeth a socket which receives the teeth of the other valve; muscular impressions single.

Plicatula gibbosa Lamarck.

Plicatula gibbosa Lamarck, Syst. An. sans Vert., p. 132, 1801.

Plicatula vexillata Guppy, Geol. Mag. Dec., II, vol. I, p. 444, pl. XVII, fig. 7, 1874.

Shell solid, irregular, somewhat fan-shaped, with strong, radiating, often divaricate plications, which end in serrations; whitish or brownish, commonly marked on the ribs with irregular, radiating, dark brown lines.

Length, 25; height, 25; diameter, 10 mm.

Aguadilla, Porto Rico, one valve.

This is the well-known *Plicatula ramosa* of Lamarck, but the name *gibbosa* was applied by him to the same species previously. It is often gregarious, and a half-dozen specimens are sometimes found attached to a single shell or to each other.

Family LIMIDÆ.

Genus LIMA (Bruguère) Cuvier, 1798.

Shell equivalve, compressed, white, obliquely oval, having rayed ribs or striæ, auriculate; anterior side generally straight, gaping; posterior side rounded, usually closed; hinge area triangular, with a central resilium; muscular impressions lateral, duplex, large.

Lima scabra Born.

Ostrea scabra Born, Test. Mus. Vind., p. 110, 1780.

Lima scabra Sowerby, Conch. Icon., XVIII, pl. II, fig. 8, 1872.

Shell nearly equilateral, being but slightly oblique, the hinge line nearly horizontal, decidedly gaping and reflexed at the upper, anterior portion, nearly closed posteriorly; hinge area low, triangular; cartilage triangular; surface covered everywhere with fine, radiating ridges, which are prickly-scaly; edges of the shell serrate by the sculpture. Epidermis brown.

Length, 45; height, 55; diameter, 17 mm.

Aguadilla; Ponce; Mayaguez Harbor, Porto Rico; Ensenada Honda, Culebra.

Lima scabra var. *tenera* Sowerby.

Lima tenera Sowerby, Thes. Conch., p. 84, pl. XXI, figs. 10, 11, 1846.

Shell subovate, subcompressed, thin, roughened with delicate scabrous ribs, which are somewhat interrupted; gaping anteriorly, the shell thickened at the opening.

A smaller, more delicate and more finely ribbed form than the typical *L. scabra*.

Mayaguez Harbor, Porto Rico, valves.

Lima lima Linnæus.

Ostrea lima Linnæus, Syst. Nat., ed. X, p. 699, 1758.

Lima squamosa Sowerby, Conch. Icon., XVIII, pl. II, fig. 10, 1872.

Shell solid, inequilateral, the anterior side straight and slightly gaping, the posterior side irregularly rounded, nearly closed; ears oblique; beaks elevated, having below them a low, triangular area and a triangular ligament. Surface sculptured with about thirty strong, radiating ribs, which are covered with large, rough, elevated scales; the ribs of the anterior and posterior portions not so strong or rough as are those of the rest of the shell; within the shell the ribs show distinctly and the edges of the shell are strongly dentate.

Length, 45; height, 55; diameter, 22 mm.

Mayaguez, Porto Rico.

Lima inflata Lamarek.

Lima inflata Lamarek, An. sans Vert., VI, p. 156, 1819.

Lima fasciata Sowerby, Conch. Icon., XVIII, pl. IV, fig. 17, 1872.

Shell very oblique, thin, inflated, with a wide, long gap before and behind, so that the valves touch only at the hinge and base; nearly straight in front, rounded on the base and posterior border, having a somewhat rounded angle about midway between the anterior base and the posterior ear; hinge line very oblique; area low, triangular, with a wide, triangular ligament; surface sculptured with rather low, delicate ribs, often with finer riblets between them, their edges somewhat roughened or nodulous; inner border of the shell scarcely serrate, interior showing traces of the ribs.

Length, 32; height, 40; diameter, 25 mm.

Mayaguez, Porto Rico; Ensenada Honda, Culebra.

Lima hians Gmelin.

Ostrea hians Gmelin, Syst. Nat., p. 3333, 1792.

Lima fragilis Sowerby, Conch. Icon., XVIII, pl. IV, fig. 18, 1872.

Aguadilla, Porto Rico (Gundlach).

Genus LIMATULA S. Wood, 1839.

Shell equilateral, or nearly so; valves closed, small; hinge edentulous.

Limatula subauriculata Montagu.

Pecten subauriculata Montagu, Test. Brit. Suppl., p. 63, pl. XXIX, fig. 2, 1808.

Lima subauriculata Jeffreys, Brit. Conch., II, p. 82; V, p. 169, pl. XXV, fig. 3.

Limatula subauriculata S. Wood, Mag. Nat. Hist., n. s., III, p. 236, pl. III, fig. 6, 1839. Crag Moll., II, p. 47, pl. VII, figs. 3 a-c, 1850.

Mayaguez Harbor, Porto Rico, at station 6062, in 25 fathoms; also northward to the Arctic seas.

Superfamily ANOMIACEA.**Family ANOMIIDÆ.****Genus ANOMIA** (Linnæus, 1758) Müller, 1775.

Shell irregular, subcircular or oblong, often imitating the object to which it is attached; thin, subtransparent, the interior somewhat nacreous; left valve entire, convex, having a ligamental fossette below the summit and bearing four muscular impressions; right valve flat, having a large sinus on its upper border through which the pluglike byssus passes, and having a single muscular impression.

Anomia simplex d'Orbigny.

Anomia simplex d'Orbigny, Moll. Cubana, II, p. 367, pl. XXXVIII, figs. 31-33, 1845.

Shell irregular, fitting and often imitating the object to which it is attached, suborbicular, thin, semitransparent; left valve generally convex and thicker than the right, with an elongated ligamental fossette, one muscle scar just below the ligament, and three subcentral situated on an oblong callus; right valve generally flat or concave, with an oval opening for the byssal plug, which is surrounded by an oblong callus, on which there is a single muscle scar; interior of valves nacreous and shining; exterior having concentric scaly ridges. Color whitish, silvery, greenish straw, or pale brownish.

Height, 35; length, 35; diameter, 7 mm.

Mayaguez, Porto Rico.

Genus **PODODESMUS** Philippi, 1837.

Shell with the appearance of *Anomia*, but the left valve with only two muscular impressions.

Pododesmus rudis Broderip.

Placunanomia rudis Broderip, P. Z. S., 1834, p. 2.

Placunanomia rudis Reeve, Conch. Icon., XI, pl. 1, fig. 2, 1859.

Shell very irregular, compressed, suborbicular, oval, oblong or somewhat elongate, moderately solid; lower valve normally flatter than the upper; byssal opening round oval or closed in old specimens; surface wide, with irregular, broken, rather fine ridges crossed by scaly or foliaceous growth lines; within shining, the lower valve generally having a brown blotch in its center. Color whitish or greenish.

Length, 40; height, 40; diameter, 6 mm. Length of another specimen, 30; height, 35; diameter, 4 mm.

Aguadilla; San Juan Harbor; off Point Melones, Porto Rico.

Superfamily **MYTILACEA**.Family **MYTILIDÆ**.Genus **MYTILUS** (Linnaeus, 1758) Bolten, 1798.Section **HORMOMYA** Mörch, 1853.

Shell wedge-shaped, rounded behind, with terminal beaks, plicately sculptured; hinge teeth minute or obsolete; pedal impressions two in each valve; anterior adductor impression small, placed under the beaks; posterior adductor elongated, placed at the posterior end of the shell.

Mytilus hamatus Say.

Mytilus hamatus Say, Journ. Acad. Nat. Sci. Phila., II, p. 265, 1822; Binney's Say, pp. 91, 204, pl. I, fig. 18.

Shell irregularly triangular, rather solid, elongated and generally falcate, the anterior side being usually incurved, the posterior side angular where it joins the hinge; there is a more or less prominent rounded ridge back of the anterior part of the shell, and the radiating ribs with which the whole shell is sculptured spread from this ridge, curving to the front and the back of the shell; these ribs are numerous and somewhat bifurcate; they are finely beaded and often wavy; inner border of the shell crenulate. The thick epidermis is blackish or brownish, sometimes tinted green and sometimes a little tawny; the interior is usually dark violet, with a lighter border.

Length, 30; height, 50; diameter, 19 mm.

San Juan, Porto Rico; Ensenada Honda, Culebra; Sailrock, between Culebra and St. Thomas.

These specimens are more delicate and less curved than the ordinary manifestation of this species.

Mytilus exustus Linnaeus.

Mytilus exustus Linnaeus, Syst. Nat., ed. x, p. 705, 1758.

Mytilus striatulus Schröter, Einleitung, III, p. 449, pl. IX, fig. 16.

Shell small, rather solid, inflated, irregularly triangular, somewhat elongated; beaks curved inward and forward; there is a high, rounded ridge beginning at the beaks, then curving backward, then downward and forward to the posterior base of the shell; the surface is sculptured with numerous curved ribs, which follow the course of the ridge and curve each way from it to the anterior and posterior sides; these ribs are beaded and somewhat bifurcated; at the byssal region in front there is a somewhat smooth area; the growth lines are often deeply impressed at intervals. Color brownish, blackish and tawny, often somewhat clouded.

Length, 10; height, 18; diameter, 10 mm.

Puerto Real; Hucares; Ponce; San Juan, Mayaguez, Porto Rico; Ensenada Honda, Culebra.

Genus **MODIOLUS** Lamarck, 1799.

Shell much as in *Mytilus*, but the beaks are not terminal; there are no hinge teeth; the epidermis is hirsute, and the animals generally nestle in a mass of byssal fibers. The valves have usually, if sculptured, a smoother central area.

Section **MODIOLUS** s. s.**Modiolus tulipus** Lamarck

Modiola tulipa Lamarck, An. sans Vert., VI, p. 114, 1819; Reeve, Conch. Icon., x, pl. IV, fig. 15, 1857.

Shell subtrapezoidal, somewhat elongated, inflated, subsolid, with a faint posterior wing; a nearly straight rounded posterior ridge runs from the beaks to the posterior base of the shell; in front of this ridge the base is slightly incurved; epidermis somewhat concentrically striate, covered with a scaly growth, which develops into bristly hairs that part near the byssus, smooth. There is generally a broad reddish stripe on the posterior ridge, with a lighter one in front of it, though this area and the posterior part may be radiately banded red and white in narrow streaks. The anterior part of the shell is often a chestnut or burnt brown.

Length, 85; height, 40; diameter, 40 mm.

San Juan; Boca Prieta; Mayaguez Harbor, Porto Rico.

Section **AMYGDALUM** Megerle, 1811.**Modiolus arborescens** Dillwyn.

Mytilus arborescens Dillwyn, Deser. Catalogue Rec. Shells, I, p. 306, 1817.

Modiola arborescens Reeve, Conch. Icon., x, 1857, pl. VI, fig. 30.

Shell very thin, slightly inflated, long-obovate, smooth except for faint growth lines, brilliant; beaks low; posterior ridge scarcely developed. Color pale straw or ashy, lighter on the posterior ridge, the posterior slope being beautifully marked with arborescent, blackish lines. Sometimes this area is marked so that the dark lines inclose various-sized, triangular spots of the color of the shell.

Length, 50; height, 20; diameter, 13 mm.

Mayaguez; San Juan, Porto Rico.

An exceedingly delicate and beautiful species.

Section **BOTULA** Mörch, 1853.**Modiolus cinnamomeus** Lamarck.

Mytilus cinnamomeus, etc., Chemnitz, Conch. Cab., VIII, p. 152, pl. LXXXII, fig. 371, 1785.

Modiola cinnamomea Lamarck, An. sans Vert., VI, p. 114, 1819.

Shell small, nearly smooth, subrhomboidally and somewhat elongated, slightly arcuate, inflated, with a thick, dark chestnut epidermis, which shows distinct, often dark, rest periods, and is darker colored at the posterior end and anterior base; beaks full and high, placed at the upper anterior extremity of the shell and projecting in front of the anterior end; hinge line curved, the line extending around to the anterior base in an unbroken curve.

Length, 10; height, 5; diameter, 6 mm.

Mayaguez Harbor, Porto Rico, one shell.

Section **GREGARIELLA** Monterosato, 1884.**Modiolus coralliophagus** Gmelin.

Mytilus coralliophagus Gmelin, Syst. Nat., p. 3359, 1792.

Shell small, oblong, much inflated, varying much in form, generally higher and more inflated in front, with a high posterior ridge, from which radiating striae curve backward and downward, those on the posterior slope stronger, crossed by heavy growth lines and subnodulous, those in front of the ridge fine and unbroken; from the beaks to about the center of the base there is a constriction, and in front of this there is a space without radial sculpture but showing plainly concentric lines; at the rounded anterior end there are fine radiating ribs; beaks curved inward and forward, placed at the extreme anterior end; the inner edges of the shell are finely serrate. Color dirty white or brownish.

Length, 20; height, 8; diameter, 9 mm.

Mayaguez; Guanica; Boqeron Bay; Arroyo, Porto Rico; Ensenada Honda, Culebra.

This species nests in coral sand and frequently has a part of the nest attached, especially at the posterior ridge. It is the *Botula semen* of authors and the *Modiola opifex* of Say.

Genus **LITHOPHAGA** Bolten, 1798.

Shell cylindrical, having a thick epidermis, the low beaks placed at or near rounded anterior end; posterior end pointed or wedge-shaped; hinge line linear, without teeth; ligament marginal, internal.

Section LITHOPHAGA Bolten, s. s.

Lithophaga antillarum d'Orbigny.

Lithodomus antillarum d'Orbigny, Moll. Cubana, II, 1847, p. 332, pl. XXVIII, figs. 12, 13.

Shell elongated, rounded in front and behind, wedge-shaped when viewed from above; the beaks placed at the extreme upper anterior border; surface sculptured with concentric furrows, especially the posterior part; the anterior and anterior basal portion having fine vertical ribs which fade out at the extreme anterior end of the shell; epidermis rich dark chestnut, becoming almost black at the posterior end and anterior base.

Length, 30; height, 10; diameter, 8 mm.

Puerto Real; Guanica; Arroyo, Porto Rico.

Section DIBERUS Dall.

Lithophaga bisulcata d'Orbigny.

Lithodomus bisulcatus d'Orbigny, Moll. Cubana, II, p. 133, pl. XXVIII, figs. 14-16, 1845.

Shell elongated, subcylindrical, the anterior and posterior ends rounded, the latter with two faint, radiating sulcations, one above and the other below the low rounded posterior ridge; growth lines somewhat impressed, especially on the posterior portion, otherwise the shell itself is smooth and shining, the epidermis being a light chestnut color; beaks low, anterior, but not at the extreme end of the shell. The greater part of the surface of the shell is covered with a calcareous incrustation, which is thin in front and thick behind, and is especially strong on the posterior ridge; its surface is partly covered with fine wrinkles or corrugations, and it is pointed behind.

Length over all, 30; of shell, 25; height, 10; diameter, 8 mm.

Guanica; Puerto Real; Arroyo, Porto Rico.

Genus CRENELLA Brown, 1827.

Shell oval or rhomboidal, with a thick epidermis; surface sculptured with longitudinal and concentric striae; beaks straight; ligament small; hinge area crenulate.

Crenella divaricata d'Orbigny.

Naculocardia divaricata d'Orbigny, Moll. Cubana, II, p. 311, pl. XXVII, figs. 56-59, 1845.

Shell small, equilateral, solid, inflated, with an elliptical outline; umbonal region high, the beaks straight, curved in to the hinge line; surface sculptured by delicate radial ribs, which are somewhat divaricate along a line from the beaks to the middle base; near the anterior and posterior there is a curved rib, and from this the ribs in front and behind are sharply divaricate; there is also delicate concentric sculpture, which causes the ribs to appear as if slightly beaded; inner edge crenate throughout. Color brownish yellow.

Length, 3; height, 3.5; diameter, 3 mm.

Mayaguez, Porto Rico, several worn valves.

Genus MODIOLARIA Beck, 1840.

Shell rhomboid, inflated, generally with three areas on the disk, the two at the ends radially sculptured, that of the center smooth or only feebly radially sculptured; sometimes the surface is radiately ribbed throughout or it may be smooth; beaks incurved, placed near the anterior end. The genus is close to *Crenella* and differs from it principally in anatomical characters.

Modiolaria lateralis Say.

Mytilus lateralis Say, Journ. Acad. Nat. Sci. Phila., II, p. 264, 1822.

Shell small, long-rhomboid, inflated, subsolid; umbonal region full; beaks curved forward, projecting slightly in front of the anterior end of the shell; surface sculptured with fine, concentric growth lines throughout, anterior and posterior areas sculptured with fine, beaded ribs, the posterior area wide and including the rounded posterior ridge; the anterior area narrow; central area slightly depressed and showing only concentric striae; inner edge crenate, except at the ligamental and central areas. Color greenish or reddish, often marbled with brown.

Length, 6; height, 3.5; diameter, 3 mm.

San Juan Harbor; Mayaguez, Porto Rico; Vieques, and off Vieques.

Order TELEODESMACEA.

Superfamily MYACEA.

Family GASTROCHÆNIDÆ.

Genus **GASTROCHÆNA** (Spengler) Cuvier, 1817.

Shell regular, equivalve, inequilateral, ovoid, with the beaks anterior, widely gaping at the anterior base. Sculpture concentric. The animal forms flask-shaped excavations in shells, corals, and coral rocks; sometimes it is without a burrow, when it forms a shelly, inclosing tube covered with extraneous material.

Gastrochæna cuneiformis Spengler.

Gastrochæna cuneiformis Spengler, Nova Act. Soc. Hafn., II, p. 179, figs. 8-11, 1788.

Shell much inflated, subsolid, subovate or pear-shaped, gaping excessively at the anterior base, the gap narrowing and extending nearly or quite to the posterior end; beaks low, placed at the extreme anterior part of the shell, which is narrow and sharply angular below at the gap; there is sometimes a wide, shallow depression running from the beaks to the posterior base; sculpture rudely, irregularly concentric. Color white.

Length, 18; height, 10; diameter, 8 mm.

Several specimens in coral, Mayaguez, Porto Rico.

Family SAXICAVIDÆ.

Genus **SAXICAVELLA** Fischer, 1870.

Shell small, equivalve, thin, inequilateral, gaping, subtrapezoidal, obliquely angular behind; hinge with a subobsolete tooth in the right valve, fitting into a cavity in the left cardinal margin; ligament short, prominent; pallial line with a wide shallow sinuosity.

Saxicavella sagrinata, n. sp. Plate 55, fig. 16.

Shell small, rounded triangular, compressed, umbones small, flattened; anterior end shorter; surface irregularly concentrically undulated as if by stages of growth, dull, minutely granular or sagriate, as if dusted; form as figured, with no defined angle or carina extending downward and backward from the umbo; periostracum very thin, pale yellowish, hardly discernible; the substance of the shell subtranslucent; interior polished; hinge with a single obscure tooth in front of a small nymph for the ligament.

Length, 5.5; height, 3.7; diameter, 2 mm.

One right valve at station 6062, Mayaguez Harbor, Porto Rico, in 30 fathoms, sand.

This species is shorter, more compressed, and less angular than the *S. plicata* of Europe; it somewhat resembles a *Basterotia*, but has a different hinge.

Family CORBULIDÆ.

Genus **CORBULA** (Brugnière) Lamarek, 1797.

Valves unequal, the right usually larger, both more or less beaked behind; in the right valve there is a single, large tooth below the beak, with a deep resiliary pit behind it and no lateral laminae; left valve with a deep pit below the beak, into which the tooth of the right valve falls, having an elevated process in front of it and sometimes a sort of tooth behind the pit; beaks prominent, that of the right valve usually superior to that of the left; sculpture often discrepant; pallial line with or without a sinus.

Section **ALOIDIS** Megerle, 1811.**Corbula disparilis** d'Orbigny.

Corbula disparilis d'Orbigny, Moll. Cubana, II, p. 283, pl. XXVII, figs. 1-4, 1845.

Shell solid, very inequivalve, the right valve gibbous, with a very high beak, which is curved inward and forward, and a high, sharp, posterior ridge sculptured with strong concentric ridges which mostly fade out on the posterior slope; hinge tooth small, placed well forward; ligamental pit large; left valve much smaller and less convex than the right, having faint, concentric sculpture and few to rather numerous radiating ribs which do not reach to the beak, which often look like cracks in the

shell; it is covered with a thick epidermis, which is thinner above and shows the sculpture in an exaggerated way; pallial line with a wide shallow sinus. Color grayish, whitish, or purplish.

Length, 9; height, 7; diameter, 5 mm.

Mayaguez Harbor; San Juan, Porto Rico.

Section **CUNEOCORBULA** Cossmann, 1886.

Corbula dietziana C. B. Adams.

Corbula dietziana C. B. Adams, Contr. to Conch., XII, p. 235, 1852; Dall, Bull. U. S. Nat. Mus., No. 37, p. 70, pl. II, figs. 7 a-c, 1889.

Shell solid, triangular, distorted, moderately inequivalve at first, afterwards very inequivalve, somewhat inequilateral, rounded in front, with a high, sharp, posterior ridge on the left valve that ends in a point at the posterior base; in the first stage of growth there are low, wide, concentric ridges, with fine radiating riblets in their interstices; the concentric ridges of the second stage of growth are finer, and this part of the shell is rayed with whitish and reddish or purplish rays; in the second stage the small valve is merely striated; beaks prominent, turned inward and forward; the umbonal region is somewhat flattened; teeth rather strong.

Length, 13; height, 9; diameter, 5 mm.

Mayaguez Harbor, Porto Rico, one left valve.

Corbula swiftiana C. B. Adams.

Corbula swiftiana C. B. Adams, Contr. to Conch., p. 236, 1852; Dall, Blake Report, I, pl. II, figs. 5 a-c, 1886.

Shell subsolid to solid, triangular, nearly equilateral, inequivalve; posterior ridge sharp and well developed in each valve, ending in a sharp beak at the posterior base; younger shell nearly smooth, concentric striae becoming stronger as the shell grows older, and having faint radial riblets; beaks rather sharp, prominent; teeth moderately strong. Color whitish.

Length, 9; height, 7; diameter, 4 mm.

Mayaguez, Porto Rico, a great number of worn valves; off Puerto Real, one entire specimen, a somewhat inflated variety.

Corbula æquivalvis Philippi.

Corbula æquivalvis Philippi, Arch. für Naturg., II, p. 227, pl. VII, fig. 4, 1836.

Corbula cubaniana d'Orbigny, Moll. Cubana, II, p. 283, pl. XXVI, figs. 51-54, 1845.

Corbula knorriana C. B. Adams, Dall, Blake Report, I, pl. I, figs. 3, 3 a-c, 1886.

Shell solid, elongate-triangular, nearly equilateral, with a strong, sharp, posterior ridge, behind which the margin is decidedly truncated; in fact it is sunk below the posterior ridge until it almost becomes a lunule; beaks curved inward and forward; surface sculptured with strong, rather regular, rounded, concentric ridges, that of the posterior slope has finer ridges; tooth of right valve strong and curved upward; that of the left bifid. Color whitish.

Length, 10; height, 7; diameter, 5.5 mm.

Beach at Mayaguez, Porto Rico, one broken valve.

Corbula caribæa d'Orbigny.

Corbula caribæa d'Orbigny, Moll. Cubana, II, p. 284, pl. XXVII, figs. 5-8, 1845.

Shell solid and much inflated when fully adult, thinner and subcompressed when immature, subtriangular, drawn out into a decided point behind; beaks rather full, curved inward and forward; surface sculptured with rather strong, irregular, concentric ridges, those of the lunule-like posterior slope finer. In addition there are scattered, very narrow, radiating threads on the surface. On the base there is a wide, flattened area where the valves join that is scarcely sculptured; the right valve incloses the left, and throughout its posterior portion it projects widely over the left; beak cavities deep; teeth rather strong. There is a well-marked posterior sinus. Color whitish.

Length, 16; height, 10; diameter, 10 mm.

Mayaguez, Porto Rico, two shells, one immature and one fully adult.

Family **MYACIDÆ**.

Genus **SPHENIA** Turton, 1822.

Shell inequivalve, inequilateral, irregular rostrate behind, roughened; right valve a little larger than the left, having a single small tooth in front of the resilium pit; muscle impressions large; pallial line feeble.

Sphenia antillensis, n. sp. Plate 55, fig. 14.

Shell small, subquadrate, rather compressed, white, covered with a yellowish periostracum; surface dull, sculptured only by incremental lines and a low obscure thread running from the umbo backward and downward; shell thin, interior white, polished; hinge normal, general form as figured.

Length, 4; height, 2.5; diameter, 1.5 mm.

One perfect shell, Playa de Ponce, Porto Rico.

There is nothing striking in the characters of this little shell, but it does not seem identifiable with any of the other species. The species from Cuba referred to this genus by d'Orbigny are referable to the genus *Cuspidaria*.

Superfamily **MACTRACEA**.Family **MACTRIDÆ**.Subfamily **MACTRINÆ**.Genus **MACTRA** (Linnæus, 1758), Lamarek.**Mactra fragilis** Gmelin.

Mactra fragilis Gmelin, Syst. Nat., p. 3261, 1792.

Mactra fragilis Reeve, Conch. Icon., VIII, pl. XI, fig. 47, 1854.

Mayaguez, Porto Rico (Gundlach).

Mactra alata Spengler.

Mactra alata Spengler, Skrivt. Nat. Selsk., v, pl. II, p. 99.

Mactra alata Reeve, Conch. Icon., VIII, 1854, pl. VIII, fig. 29.

Mayaguez, Porto Rico (Gundlach).

Family **MESODESMATIDÆ**.Subfamily **ERVILIINÆ**.Genus **ERVILIA** Turton, 1822.

Shell small, concentrically striate, sometimes brightly colored; ligament obsolete; resilium small; laterals small; dorsal anterior lamina absent, the ventral more or less coalescing with the anterior arm of the right cardinal; left cardinal large, bifid; pallial sinus well marked.

Ervillea concentrica Gould. Plate 58, fig. 12.

Ervillea concentrica Gould, Otia Conch., p. 329; Proc. Boston Soc. Nat. Hist., VIII, p. 280, 1862.

Shell small, scarcely inflated, long-triangular, the posterior end narrower; beaks rather high but not full; surface finely, concentrically ridged, and having more delicate radial riblets which are most conspicuous on the anterior end; right valve with a single triangular tooth in front of the small, triangular resilium and a feeble one behind it; left valve with a double cardinal; pallial sinus faint, deep. Color whitish or pink.

Length, 5; height, 3.5; diameter, 2 mm.

San Juan; Mayaguez, Porto Rico, a number of worn valves. Off Georgia (Gould).

Superfamily **SOLENACEA**.Family **SOLENIDÆ**.Genus **PSAMMOLEN** Risso, 1826.

Shell transversely oblong, gaping at the extremities, obliquely sculptured, more or less invested with an epidermis; beaks subcentral; upper and lower shell margins nearly parallel; one or sometimes two cardinal teeth in each valve; ligament prominent; pallial impression large.

Psammosolen sanctæ-marthæ d'Orbigny.

Solen sanctæ-marthæ Chemnitz, Conch. Cab., XI, p. 203, pl. CXCVIII, fig. 1938, 1795. d'Orbigny, Moll. Cubana, II, p. 232, pl. XXV, figs. 31, 32, 1845.

Shell long-quadrate, gaping widely at each end, the valves only touching at the hinge and central base; beaks low; ligament extending in front of and behind the beaks, inflated into a rounded ridge immediately behind them and then suddenly flattened; growth lines rather rude; all the shell except its extreme anterior portion is obliquely sculptured, the ridges dividing on the low, rounded posterior ridge; epidermis yellowish or horn-colored, wearing off except around the margin of the shell; left valve with one high, compressed cardinal just behind the beak; right valve with a similar cardinal under the beak; pallial sinus wide and deep. Color whitish.

Length, 37; height, 20; diameter, 12 mm.

Mayaguez, one young broken valve.

There are sometimes vestiges of a second cardinal in each valve.

Genus SOLEN Linnæus, 1758.

Shell very long, subcylindrical; the dorsal and ventral edges parallel, inequilateral, straight or nearly so; surface more or less sculptured with the growth lines; divided by an oblique line running from the beaks to the post base; extremities widely gaping; hinge with a single cardinal in each valve; ligament elongated, external; anterior muscle impression elongated, parallel with the dorsal border, pallial sinus short.

Section **SOLENA** Mörch, 1853.

Solen obliquus Spengler.

Solen obliquus Spengler, Skrift. Nat. Selsk., III, p. 104, 1794.

Solen ambiguus Sowerby, Conch. Icon., XIX, pl. v, fig. 21, 1874.

Shell rather solid, subcylindrical, straight, the beaks placed at one-sixth of the length of the shell from the anterior end; anterior end obliquely truncated, longer below; the shell is decidedly thickened at this part and appears as if cut off; posterior end nearly squarely truncate, thin; epidermis rudely wrinkled, growing beyond the shell, ashy or brownish; there is one high, straight tooth in each valve under the beaks, that of the right valve in front of the one in the left; anterior muscle scars elongate, placed under the beaks; posterior scars semilunar, the dorsal edge straight, the wide pallial line connecting with the center of its base and forming a < in the fork of this is the small pallial sinus.

Length, 110; height, 22; diameter, 14 mm.

Cabo Rojo light, Porto Rico, one specimen.

Superfamily TELLINACEA.**Family PSAMMOBIDÆ.****Genus HETERODONAX** Mörch, 1852.**Heterodonax bimaculatus** Linnæus.

Tellina bimaculata Linnæus, Syst. Nat., ed. X, p. 677, 1758; Sowerby, Conch. Icon., XVII, 1866, pl. XVIII, fig. 94 a-c.

San Juan, Porto Rico (Gundlach).

Genus TAGELUS Gray, 1847.**Tagelus gibbus** Spengler.

Solen gibbus Spengler, Skrift. Nat. Selsk., III, p. 104, 1794.

Solecurtus caribæus Sowerby, Conch. Icon., XIX, pl. IV, fig. 21, 1874.

Mayaguez, Porto Rico (Gundlach).

Genus ASAPHIS Modeer, 1793.

Shell transverse, somewhat rhomboid, subequilateral, beaks rather prominent; hinge having two cardinals in each valve, the anterior in the left and the posterior in the right bifid; ligament thick; adductor scars near the dorsal edge; pallial sinus deep, rounded.

Asaphis coccinea Martyn.

Cardium coccinea Martyn, Univ. Conch., No. 135, pl. 135, 1784; Ed. Chenu, pl. 41, fig. 2; Mörch, Journ. de Conchyl., VII, p. 140, 1858.

Shell oblong, subrhomboid, somewhat inflated, subsolid, with rather full, high beaks, with a well-developed, rounded posterior ridge; the surface is covered with numerous radiating, wavy ribs which are stronger on the posterior slope and are generally somewhat cancellated at the anterior and posterior ends by the crossing of the growth lines; they are sometimes a little scaly at the hinder part of the shell; nymph rather narrow but deep; pallial sinus large, rounded. Color whitish, straw colored, salmon, reddish or violet, sometimes faintly rayed; within white, straw colored, yellow, red, or violet; the hinder part of the interior and nymphs almost always deep violet.

Length, 70; height, 45; diameter, 32 mm.; length of another, 90; height, 60; diameter, 43 mm. Fajardo; Ponce Reefs, Porto Rico; Ensenada Honda, Culebra.

Family DONACIDÆ.

Genus **DONAX** Linnaeus, 1758.

Shell inequilateral, triangular; anterior side longer than the posterior which is short and obliquely truncated; border of the valves generally crenated; hinge having in the right valve one anterior lateral and two cardinals, the posterior bifid, and a short posterior tooth. The left valve has a faint anterior lateral and two cardinals, with sometimes a small intermediate tooth and one posterior lateral; ligament short; sinus deep, rounded.

Section **CHION** Scopoli, 1777.**Donax denticulata** Linnaeus.

Donax denticulata Linnaeus, Syst. Nat., ed. x, p. 683, 1758; Reeve, Conch. Icon., VIII, pl. VII, figs. 48 a, b, 1854.

Shell solid, subinflated, long triangular, inequilateral, the anterior and posterior dorsal lines straight, the anterior end narrow and rounded, the base line slightly curved, with a faint angulation near its center; ligament short, small; surface covered with fine radiating ridges; these ridges are flattened except at the posterior part of the shell and are peculiarly serrate on their edges; posterior ridge double, the anterior part sharply angled, the area between the two angles ribbed and delicately sculptured between the ribs; posterior slope sculptured with rather strong oblique ridges, and between them are fine, raised, radial threads; inner edge of the shell dentate; pallial sinus deep. The range of color is great; white, straw, salmon, brown, and violet, variously and often brightly rayed.

Length, 28; height, 19; diameter, 11 mm.

Aguadilla; San Juan Harbor; Mayaguez, Porto Rico. A great number of beautiful living specimens were obtained at Mayaguez.

Genus **IPHIGENIA** Schumacher, 1817.

Shell subsolid, subtriangular, subequilateral; inner edge of the valves smooth; hinge with two cardinals in each valve, the posterior in the right and the anterior in the left bifid; laterals wanting; ligament external; pallial sinus deep, rounded.

Iphigenia brasiliensis Lamarek.

Capsa brasiliensis Lamarek, An. sans Vert., v, p. 553, 1818; figured in Enc. Méth., pl. CCLXI, fig. 10.

Shell rather solid, subinflated, the beaks a little nearer to the posterior ends, of a somewhat triangular or rhomboid form; posterior ridge moderately developed, ending in a blunt point at the posterior base; from this the basal line runs forward parallel with the anterior dorsal line to the center of the shell, from which it curves upward to the anterior point; surface showing the growth lines and having fainter, radial sculpture; epidermis smooth, livid or greenish ash color, often wearing off in old specimens; posterior cardinal of the right valve triangular, bifid; anterior cardinal narrow, and there is sometimes a low posterior lateral; anterior cardinal of left valve oblique, bifid, the left lamellar; interior whitish or purplish, the teeth often violet.

Length, 60; height, 40; diameter, 23 mm.

Catano, San Juan Harbor, Porto Rico, one specimen. Other specimens were bought in San Juan at the market.

Family SEMELIDÆ.

Genus SEMELE Schumacher, 1817.

Shell suborbicular or elliptical, slightly inequivalve; beaks small, curved forward; two cardinals in each valve; two distinct laterals in the right valve; resilium oblique, internal; ligament short; muscle scars large; sinus deep.

Semele proficua Pulteney.

Tellina proficua Pulteney, in Hutchin's Dorset, p. 29, pl. v, fig. 4, 1799.

Amphidesma reticulata Reeve, Conch. Icon., VIII, pl. v, fig. 29, 1853.

Shell nearly equilateral, a little longer in front, suborbicular, a little longer than high, subsolid and subinflated; ligament small, placed in a sort of escutcheon; there is a decided lunule in front of the beaks; the posterior part of shell is slightly flexed; surface sculptured with rather strong, concentric growth lines; these are sometimes elevated into ridges and have fine radial striae which give it a somewhat wrinkled appearance; left valve with two direct compressed cardinals, the anterior the larger, and two laterals; resilium pit deep; right valve with two cardinals, the hinder the larger, and two strong laterals. Color whitish, straw, or purplish, sometimes variegated.

Length, 30; height, 27; diameter, 14 mm.

San Juan, Porto Rico, one young specimen.

Semele purpurascens Gmelin.

Venus purpurascens Gmelin, Syst. Nat., p. 3288, 1792.

Tellina obliqua Wood, Gen. Conch., pl. XLI, figs. 1, 2, 1815.

San Juan, Porto Rico (Gundlach).

Semele bellastrata Conrad.

Amphidesma bellastrata Conrad, Journ. Acad. Nat. Sci. Phila., VII, p. 239, pl. XX, fig. 1, 1837.

Amphidesma cancellata d'Orbigny, Moll. Cubana, II, p. 241, pl. XXV, figs. 42-44, 1845.

Shell compressed, elliptical, the anterior side much the longer; surface covered with distinct, radiating ribs which are crossed by rather strong, concentric ridges that often form small tubercles where they meet the ribs; left valve with a strong bifid cardinal, with a faint lamellar one in front of it and two faint laterals; right valve with two cardinals, the posterior larger and slightly bifid, and two elongated, elevated laterals; pallial sinus deep and rounded. Color ashy purple, often rayed violet within.

Length, 25; height, 20; diameter, 9 mm.

Mayaguez, Porto Rico, one young, worn valve.

Section SEMELINA Dall, 1900.

Semele nuculoides Conrad.

Amphidesma nuculoides Conrad, Am. Journ. Sci., XLI, p. 347, 1841; Fos. Medial Tert., p. 73, pl. 41, fig. 6, 1845.

Shell small, solid, ovate, subcompressed, the beaks near to the anterior end; surface covered with fine, sharp, concentric ridges and a delicate, straw-colored epidermis; left valve with two divergent cardinals, the posterior slightly bifid, and a faint anterior lateral; right valve with two cardinals, the posterior bifid, and two strong laterals; pallial sinus large and rounded.

Length, 4.5; height, 3; diameter, 1.5 mm.

San Juan Harbor; Mayaguez, Porto Rico.

Genus ABRA (Leach) Lamarck, 1818.

Shell rather compressed, oval, subtriangular or subquadrate, whitish, shining, smooth; posterior side shortest; resilium lodged in a cardinal pit; right valve with two cardinals and generally two lamellar laterals; left with one cardinal and sometimes a rudiment of a posterior lateral.

Abra æqualis Say.

Amphidesma æqualis Say, Journ. Acad. Nat. Sci. Phila., II, p. 307, 1822; Am. Conch., III, pl. XXVIII, 1831.

Shell somewhat quadrate, subinflated, rather thin; beaks nearer the posterior end which is subtruncated above; surface with delicate growth lines; smooth, dirty yellowish white, scarcely shining; left valve with one strong cardinal, a vestige of a second in front, and no laterals; right valve with one cardinal and a feeble one behind it, without laterals; pallial sinus deep.

Length, 10; height, 8; diameter, 4 mm.

Mayaguez Harbor, Porto Rico.

Abra lioica Dall.

Syndosmya lioica Dall, Bull. Mus. Comp. Zool., IX, p. 133, 1881.

Abra lioica Dall, Blake Report, I, pl. IV, fig. 8, 1886.

Shell subquadrangular, thin, rather inflated, with full, prominent beaks, with faint growth striæ; smooth, whitish, and shining; posterior end subtruncate from above, and the beaks are considerably nearer to this end; the shell is faintly flexed to the right behind; the anterior end is broadly rounded; left valve with one strong cardinal and a small one behind, with no laterals; right valve with two rather strong, divergent cardinals and no laterals.

Length, 7; height, 4.5; diameter, 3.5 mm.

Mayaguez, Porto Rico.

More inequilateral and inflated, and with higher beaks than *A. equalis*, and a more polished species.

Abra longicallus Scacchi.

Tellina longicallus Scacchi, Notiz., p. 16, pl. I, fig. 7, 1836.

Shell elongately subtriangular, thin, subcompressed, nearly equilateral, the beaks a little nearer to the posterior end, which is bluntly pointed and turned a little to the left; surface with delicate incremental striæ and faint vestiges of radial striæ; smooth and shining, straw-colored; there is a faint lunule in front, and the low, almost sharp, posterior ridges inclose a slight depression behind, in which is situated the small ligament; there is a single somewhat bifid cardinal in the left valve and vestiges of two laterals; the right valve has two divergent cardinals and two well-developed laterals; behind the beaks there is a short nymph; resilium small.

Length, 25; height, 17; diameter, 8 mm.

Mayaguez, Porto Rico.

Genus CUMINGIA Sowerby, 1833.

Shell triangular or transversely oval, rounded in front, substrate and slightly gaping behind, sometimes a little irregular, generally sculptured with concentric lamellæ, flexuous behind; hinge with a small cardinal in each valve and two elongated laterals, having a spoon-shaped resilium pit; pallial sinus wide.

Cumingia (tellinoides Conrad, var.?) **coarctata** Sowerby.

Cumingia tellinoides Conrad, Journ. Acad. Nat. Sci. Phila., VI, p. 258, pl. IX, figs. 2, 3, 1830.

Cumingia coarctata Sowerby, P. Z. S., 1833, p. 34.

Shell often irregular, with the dorsal and basal lines nearly parallel, the anterior end rounded, the posterior end obliquely truncated from above, ending at the posterior base in a blunt point, subsolid, subinflated, gaping a little behind; posterior ridge well defined, rounded; the ligament is scarcely discernible; the surface is covered with raised concentric threads or lamellæ, whitish; beaks pointed, a little nearer the posterior end; under the beaks in each valve there is a spoon-shaped resilium pit; in front of it in the left valve is a compressed cardinal, and there are two faint laterals in this valve; right valve with a double cardinal behind the pit and having two strong laterals.

Length, 21; height, 14; diameter, 8 mm.

San Juan Harbor, two young valves.

The variety is confined to the Antilles and may eventually be proved to be a distinct species.

Family TELLINIDÆ.**Genus TELLINA** (Linnæus, 1758), Lamarck.

Shell subequivalve, rather compressed, suborbicular or transversely elongated, obliquely flexed behind; beaks subcentral; hinge with two cardinals and generally two laterals in each valve, one lateral anterior and one posterior, the laterals most distinct in the right valve; pallial sinus wide and deep; ligament external, prominent.

Section LIOTELLINA Fischer.**Tellina radiata** Linnæus.

Tellina radiata Linnæus, Syst. Nat., ed. X, p. 675, 1758; Sowerby, Conch. Icon., XVII, pl. III, fig. 8b, 1866.

San Juan; Aguadilla, Porto Rico (Gundlach).

Subgenus *ARCOPAGIA* Leach, 1827.

Section *CYCLOTELLINA* Cossmann, 1886.

***Tellina fausta* Donovan.**

Tellina fausta Donovan, Nat. Hist. Brit. Shells, p. 10, pl. xxv, figs. 13, 14, 180.

Mayaguez, Porto Rico (Gundlach).

Section *PHYLLODINA* Dall, 1900.

***Tellina persica*, n. sp. Plate 55, fig. 1.**

Shell small, rather thin, compressed, white, suffused with apricot yellow, paler on the umbones; form as figured; umbones small, nepionic shell smooth, polished, glassy, remainder of the surface sculptured by concentric, narrow, rounded, low, adjacent ridges, which on the dorsal areas become lamellose but not much elevated, and on the anterior lunular margin form a series of rather inconspicuous serrations; on the anterior dorsal margin is a very narrow lunular depression, but the escutcheon is almost linear; interior brilliantly polished, pallial sinus free from the pallial line below, except for a very short distance, rising high in the middle of the valve, rounded but rather narrow in front; interior of the disk apricot color; hinge normal, ligament long, on a narrow nymph.

Length, 20.5; height, 13; diameter 5.5 mm.; the right valve slightly flatter than the left.

Mayaguez Harbor, Porto Rico, in 20 to 30 fathoms, sand, at stations 6062 and 6064.

This very elegant little shell resembles some of the Pliocene Tertiary species of the Antillean region, but there are no recent forms which approach it at all closely. It seems to be rather abundant.

Section *MERISCA* Dall, 1900.

***Tellina linteae* Conrad.**

Tellina linteae Conrad, Journ. Acad. Nat. Sci. Phila., vii, p. 259, pl. xx, fig. 3, 1837.

Shell subrhomboid, subsolid, short, compressed, sharply flexed behind, with unusually high, sharp beaks; posterior end with a straight truncation above, ended by a sharp ridge on each valve; between this and the posterior ridge there is a shallow depression; postbasal point sharply triangulate; surface covered with rather close, sharp, concentric ridges; left valve with a slightly bifid anterior cardinal and a smaller posterior one; laterals scarcely developed; right valve with a bilobed posterior cardinal, a lamellar one in front of it, and two well-developed laterals. Color white.

Length, 20; height, 13; diameter, 5 mm.

Mayaguez, Porto Rico, two worn valves; Florida and Gulf coast.

Section *EURYTELLINA* Fischer, 1887.

***Tellina alternata* Say.**

Tellina alternata Say, Journ. Acad. Nat. Sci. Phila., iv, p. 275, 1822; Am. Conch., pl. lxxv, fig. 1.

Shell rather solid, compressed, nearly twice as long as high; beaks a little behind the center; ligament prominent; dorsal and ventral lines nearly parallel, anterior end almost evenly rounded; posterior end with a long, straight truncation above; posterior ridge somewhat double, the hinder sharply defined, ending at the post-base in a narrow, ill-defined triangulation; surface sculptured with rather wide, irregular, concentric ridges, often with faint indications of radial sculpture; left valve with two cardinals, the anterior small, the posterior larger and bifid, with two faint laterals; right valve with a strong bifid posterior cardinal and a narrow anterior one, a strong near anterior and a remote posterior lateral; muscle scars well marked. Color whitish to deep pink.

Length, 65; height, 35; diameter, 12 mm.

Mayaguez, Porto Rico, one young white valve.

***Tellina georgiana* Dall.**

Tellina (Eurytellina) georgiana Dall, Proc. U. S. Nat. Mus., xxiii, No. 1210, p. 310, pl. ii, fig. 3, 1900.

Shell oblong, slightly rhomboid, compressed, thin, with a low posterior ridge which ends in a rounded point at posterior basal end of shell; surface more or less covered with wide, faint, flattened ridges, reddish or pinkish, sometimes with one or two faint white rays behind, shining, iridescent; left valve with a stronger anterior and a fainter posterior cardinal, with scarcely developed laterals; right valve with two cardinals, the hinder bifid, with a strong anterior and a faint posterior lateral.

Length, 17; height, 10; diameter, 4 mm.

Mayaguez; Aguadilla, Porto Rico.

Tellina vespuciana d'Orbigny.

Tellina vespuciana d'Orbigny, Moll. Cubana, II, p. 254, pl. XXVI, figs. 12-14, 1845.

Shell small, subrhomboid, rather solid, with a long, nearly straight posterior truncation; posterior ridge well developed, slightly duplex, ending below in a feeble biangulation; surface with rather fine, faint, concentric ridges, appearing smooth to the eye; shining, deep pinkish, or red, lighter at the beaks; left valve with a double posterior and a small anterior cardinal, and the laterals obsolete; right valve with a strong bifid posterior and a well-developed anterior cardinal, and two distinct laterals; the anterior high and compressed; interior deep red, brilliantly polished.

Length, 11; height, 6.5; diameter, 3 mm.

Mayaguez, Porto Rico, one fine, fresh specimen.

Tellina lineata Turton.

Tellina lineata Turton, Conch. Dict., p. 168, pl. IV, fig. 16, 1819; Sowerby, Conch. Icon., XVII, pl. XVIII, figs. 89 a-c.

Shell two-thirds as high as long, subsolid, subcompressed, with dorsal and basal lines parallel; posterior end with a well-defined ridge; above this is a sharp, short ridge, and the two hinder ridges inclose a small escutcheon in which is placed the ligament; base of shell feebly biangulate behind; surface covered with close, concentric ridges; valves flexed to the right; left valve with an anterior cardinal and a faint, compressed one behind it; anterior lateral feeble, posterior one strong; right valve with two cardinals, the hinder bifid, two strong laterals and a nymph. Color white, buff, or pink, the umbonal region of the pink variety generally deeper-colored.

Length, 30; height, 20; diameter, 7 mm.

Mayaguez, Porto Rico, one broken valve.

This species, which varies much in color, is better known by Lamarck's name, *T. brasiliانا*.

Tellina martinicensis d'Orbigny.

Tellina martinicensis d'Orbigny, Moll. Cubana, II, p. 253, pl. XXVI, figs. 6, 8, 1845.

Shell small, short, decidedly rhomboid, rather solid, subinflated, with high, sharp beaks, with a nearly straight, oblique truncation behind, the anterior end rounded, a little prolonged above; there is a sharp posterior ridge in each valve at the edge of the truncation, and these ridges inclose a long, narrow escutcheon; from the beaks toward the center of the base the shell is much swollen; behind this it is flattened; the posterior basal point is somewhat biangulate; surface covered with rather widely spaced narrow ridges; white, not shining; left valve with two cardinals, the hinder higher and bifid, and two rather feebly developed laterals; right valve with two cardinals, the posterior widely bifid, and two laterals, all strongly developed.

Length, 10; height, 8; diameter, 4 mm.

San Juan Harbor; off Puerto Real, Porto Rico.

Subgenus **ANGULUS** Megerle, 1811.**Tellina sybaritica** Dall.

Tellina sybaritica Dall, Bull. Mus. Comp. Zool., IX, p. 134, 1881; Blake, Report, I, pl. VI, fig. 11, 1886.

Shell small, somewhat elongated, subrhomboid, with a single rather sharply defined posterior ridge some distance below the edge, truncate above behind, a little rounded at base of truncation; beaks a little behind center; surface finely concentrically ridged; left valve with a feeble posterior and a strong bifid anterior cardinal and two moderate laterals; right valve with a strong posterior bifid cardinal and a smaller one in front, and two strong laterals. Color white or crimson.

Length, 6.5; height, 3.5; diameter, 2 mm.

Mayaguez; San Juan, Porto Rico.

Tellina consobrina d'Orbigny.

Tellina consobrina d'Orbigny, Moll. Cubana, II, p. 254, pl. XXVI, fig. 911, 1845.

Shell oblong, thin, the upper and lower edges parallel, with a rounded posterior ridge, above which the outline is a low curve from the beak to the base; surface with faint, fine, and somewhat irregular concentric lines; smooth to the eye and shining, semitransparent, whitish or pink tinted, with two broad, faint, red rays behind and sometimes two fainter ones in front; left valve with two cardinals, laterals almost wanting; right valve with a bifid posterior cardinal and a smaller one in front, a strong anterior lateral and a fainter posterior one.

Length, 15; height, 8; diameter, 4 mm.

Mayaguez, Porto Rico, numerous valves. Probably a variety of *T. versicolor* Cozzens, 1843.

Tellina vitrea d'Orbigny.

Tellina vitrea d'Orbigny, Moll. Cubana, II, p. 253, pl. XXVI, figs. 4, 5, 1845.

Shell subsolid, nearly twice as long as high, compressed, a little narrowed and rounded in front, truncate above behind; beaks somewhat back of the center; posterior ridge low, with a second faint ridge above it near the edge of the shell; the hinder part of the shell subbiangulate below; surface with low fine ribs; in some specimens these are quite distinct, in others they are scarcely more than growth lines; the whole is polished and shining. Color pink, often tinted with yellow, deep pink within; left valve with two divergent cardinals, that in front bifid, and two faint laterals; right valve with two cardinals, the hinder bifid, and two well-developed laterals; pallial line very deep.

Length, 33; height, 18; diameter, 6 mm.

Mayaguez, one right valve; Boqueron Bay, Porto Rico, one specimen.

Genus MACOMA Leach, 1819.

Valves with a marked posterior flexure, usually subtriangular, and with a smooth or concentrically striate surface; hinge without lateral teeth; the siphons naked; the pallial sinus deep and usually coalescent with the pallial line below. Type, *M. tenera* Leach = *Tellina calcarea* Gmelin.

Macoma constricta Bruguière.

Solen constrictus Bruguière, Mém. Soc. d'hist. Nat. Paris, I, p. 126, 1799.

Tellina cayennensis Hanley, Thes. Conch., p. 312, pl. LXII, fig. 190, 1846.

Quebradillas, Porto Rico (Gundlach).

Macoma tenta Say, var. **souleyetiana** Recluz.

Tellina souleyetiana Recluz, Journ. de Conchyl., III, p. 253, pl. x, figs. 5, 5', 1852.

Shell thin, rather elongated, with dorsal and ventral lines parallel, rounded in front, truncate above behind, the posterior end somewhat drawn out, having two low posterior ridges ending in a truncated point a little above the base of the shell; the surface is nearly smooth and, though scarcely shining, it is faintly iridescent; around the outer part of the shell there is a fuscous epidermis; left valve with two cardinals, the anterior the larger; right valve with two cardinals, the posterior very small; pallial sinus rising high under the beaks, as in *M. tageliformis*. Color generally white.

Length, 18; height, 10; diameter, 6 mm. Mayaguez, Porto Rico, many shells.

Resembles a small *M. brevifrons* Say, but the posterior end is more strongly flexed than in the species and considerably more drawn out. The hinder end is narrow and distinctly truncated, while in *M. brevifrons* it is wider and irregularly rounded. It is probably a southern variety of *M. tenta* Say.

Macoma pseudomera, n. sp. Plate 56, fig. 5.

Shell small, rather thin, solid, white, inequilateral, subequivalve; surface smooth except for fine, close, incremental lines and faint radial striations, but not polished; beaks not prominent; valves moderately convex, form as figured; interior white, polished, usually with well-defined scars, frequently dotted over the middle of the disk with a multitude of microscopic punctations; pallial sinus subcircular, almost wholly free from the pallial line and extending but little behind the middle of the shell; ligament short; hinge normal.

Length, 16; height, 12; diameter, 6 mm.

Mayaguez Harbor, Porto Rico, at station 6062, in 30 fathoms, sand, rather abundant; San Juan Harbor at station 6053, in 7½ fathoms, sand. Also at Bermuda and Jamaica (Vendryes).

This species bears a close external resemblance to *Angulus mera* Say, but has no lateral teeth and the form of the pallial sinus is entirely different. The periostracum is hardly noticeable, but is pale yellowish and papery, sometimes pubescent near the margin.

Subgenus **PSAMMACOMA** Dall, 1900.**Macoma brevifrons** Say. Plate 55, figs. 3, 12, 13.

Tellina brevifrons Say, Am. Conch., VII, p. 227, pl. 64, fig. 7 (bad), 1834.

Shell oblong, subsolid, somewhat rhomboidal; the dorsal and ventral lines nearly parallel, subinflated; posterior slope truncated; the posterior end turned to the right, irregularly rounded and gaping; umbonal region smooth, whitish, somewhat shining and iridescent, the later growth covered with a cloth-like cinereous epidermis; left valve with a bifid cardinal under the beak and a small one

before it; right valve with two cardinals, the hinder bifid; interior white, often salmon tinted or yellowish; pallial sinus bluntly rounded in front, high under the beaks.

Length, 35; height, 18; diameter, 10 mm.

Playa de Ponce; San Juan; Agnadilla, Porto Rico. It ranges from New Jersey south to Rio de Janeiro.

Macoma tageliformis Dall. Plate 55, figs. 10, 11, 15.

Macoma tageliformis Dall, Proc. U. S. Nat. Mus., XXIII, p. 300, 1900.

Shell oblong, solid, subrhomboid; dorsal and ventral lines nearly parallel; posterior end with a straight truncation above, which is bounded on each side by a well-defined ridge forming a sort of escutcheon behind; posterior basal part rounded; surface with close, irregular growth lines, whitish, rather dull; left valve with a bifid anterior cardinal and a compressed one behind it; right valve with two nearly equal cardinals, the hinder bifid; nymphs feeble with a ridge on their outer edges; pallial sinus rounded above under the beaks; interior white, never tinted.

Length, 46; height, 28; diameter, 13 mm.

Mayaguez, Porto Rico, one shell. Found also on the coast of Texas.

Differs from *M. brevifrons* in being heavier, higher in proportion, in having a straighter truncation, and in the pallial sinus, which is not carried up almost to a point under the beaks, as in that species. In *M. brevifrons* the posterior end is more attenuated.

Genus STRIGILLA Turton, 1822.

Shell suborbicular, the surface separated into two or three differently sculptured areas in which the ridges are divergent or convergent; posterior end not flexed; hinge as in *Tellina*; two laterals in each valve; pallial sinus angular, deep, coalescent below with the pallial line.

Strigilla carnaria Linnæus. Plate 58, fig. 3.

Tellina carnaria Linnæus, Syst. Nat., ed. x, p. 676, 1758.

Strigilla carnaria Turton, Dithyra Brit., p. 117, pl. VII, fig. 15, 1822.

Aguadilla; Quebradillas, Porto Rico (Gundlach).

It is possible that the specimens which Gundlach believed to be this are the next species. In *S. carnaria* the upper line of the pallial sinus connects the two adductor scars and is wholly coalescent below.

Strigilla rombergi Mörch. Plate 58, fig. 2.

Strigilla rombergi Mörch, Yoldi Cat., II, p. 15, 1853.

Very young specimens from San Juan are probably this species, in which the pallial sinus does not reach the adductor in front.

Strigilla flexuosa Say.

Tellina flexuosa Say, Journ. Acad. Nat. Sci. Phila., II, p. 303, 1822; Hanley, Thes. Conch., p. 261, pl. LVI, figs. 28, 29, 1846.

Shell small, short-oval, inflated, rather solid; beaks high, nearer the anterior end; the surface is covered with fine, low ribs which run obliquely and flexuously from the anterior end forward and downward to the low posterior ridge; behind the ridge they are zigzagged to the hinder end of the shell; left valve with two cardinals, the anterior erect, strong, slightly bifid, the posterior small and oblique, with two laterals; right valve with two cardinals, the posterior strong and somewhat bifid, and two strong laterals. Color whitish, cream or lemon yellow.

Length, 11; height, 10; diameter, 6.5 mm.

San Juan Harbor, Porto Rico, two young specimens.

Strigilla pisiformis Linnæus.

Tellina pisiformis Linnæus, Syst. Nat., ed. x, p. 677, 1758; Hanley, Thes. Conch., p. 261, pl. LVI, fig. 30, 1846.

Shell small, short-oval, somewhat inflated, rather solid; beaks high, nearer the anterior end, with a distinct lunule in front of them; surface sculptured with fine, low, flexuous ridges running obliquely from the anterior end downward and backward to the low posterior ridge; at that line they are diverted sharply upward and slightly backward, and near edge of shell they are again turned sharply, passing downward and curving out to hinder edge of shell. The series of upturned ridges just back of the posterior ridge is finer than the others; hinder series rather coarse and somewhat corrugated; left valve with an erect, bifid cardinal and a small tooth behind it; right valve with two cardinals; two laterals in each valve. Color pinkish, the umbonal region and cavity of shell red.

Length, 9, height, 8; diameter, 5 mm.

Aguadilla; San Juan Harbor, Porto Rico.

Superfamily VENERACEA.

Family PETRICOLIDÆ.

Genus PETRICOLA Lamarek, 1801.

Shell rude, nestling or boring; hinge without lateral teeth, with three left cardinals, the middle one larger and bifid; and two right cardinals, the posterior bifid; ligament external, pallial sinus present, shells earthy, usually white, the nepionic young sometimes bright colored.

Petricola lapicida Gmelin.

Venus lapicida Gmelin, Syst. Nat., vi, p. 3269, 1792; Wood, Index Test., pl. 8, fig. 72, 1825.
Petricola costata Lamarek, Syst. An. sans Vert., p. 121, 1801.

San Juan Harbor, Porto Rico, in dead coral.

Family VENERIDÆ.

Subfamily VENERINÆ.

Genus VENUS Linnæus, 1758.

Shell thick, oval, generally inflated; valves ornamented with concentric ribs or lamellæ; lunule distinct; inner edge of the valves finely crenulated; hinge with three divergent cardinals in each valve, without laterals; pallial sinus deep, angular, ascending.

Venus rugatina Heilprin.

Venus rugatina Heilprin, Trans. Wagner Inst., i, p. 92, pl. xi, fig. 24, 1887.

Shell large, irregularly short—elliptical or suborbicular, solid, inflated; umbonal region full; beaks turned forward and outward; lunule very deep and wide; there is a decided projection of the front part of the shell just below it; left valve with a sharp ridge near its upper posterior edge; in the right valve the corresponding ridge is low, and the shell overlaps the left valve at the lower part of this ridge. Surface covered with peculiar lamellar ridges in two series; there is a set of larger sloping ridges on which are developed from four to eight smaller ridges, all lamellate and having the lamella reflexed backwards; sometimes every seventh or eighth ridge is slightly stronger than the rest; left valve having the hinder cardinal lamellar, the middle bifid, and the anterior compressed, with a faint anterior tubercle; right valve with the posterior and middle cardinals slightly bifid, the anterior compressed; beak cavities deep and wide; pallial sinus small, angular; border crenulations fine. Pale brownish with a few faint, broad rays.

Length, 90; height, 75; diameter, 60 mm.

Mayaguez, Porto Rico, a number of young, worn valves.

None of the recent specimens seen by the writers are more than a fourth grown. It is found in the Pliocene beds of the Caloosahatchie, and the dimensions given above are from a specimen from that locality.

? **Venus rugosa** Gmelin.

Venus rugosa Gmelin, Syst. Nat., p. 3276, 1792; Reeve, Conch. Icon., xi, pl. vii, fig. 23, 1863.

San Juan, Porto Rico (Gundlach).

This is perhaps the nearly allied *V. rugatina* instead of *rugosa*.

Venus brasiliana Gmelin.

Venus brasiliana Gmelin, Syst. Nat., p. 3289, 1792; Encycl. Méth., pl. 275, fig. 5.

San Juan, Porto Rico (Gundlach).

Venus cancellata Linnæus.

Venus cancellata Linnæus, Syst. Nat., ed. XII, p. 1130, 1767; Reeve, Conch. Icon., xi, 1863, pl. XIX, fig. 88.

Shell somewhat triangular, solid, inflated, with a high posterior ridge and a long, wide, posterior groove; beaks almost flattened in the adult shells, pointed forward toward the well-marked lunule; surface sculptured with from twenty to twenty-five strong, concentric, lamellar ridges and with numerous well-defined radiating ribs, those in front often clustered; the space behind the posterior ridge is smooth. Color, ashy, sometimes irregularly rayed with brown; rarely the brown predomi-

nates; crenulations of the inner border variable in size, somewhat clustered; pallial sinus very small, angular; interior white or often violet, with a light border.

Length, 38; height, 30; diameter, 25 mm.

Puerto Real; Mayaguez; San Juan; Boqueron Bay, Porto Rico; Vieques.

Venus granulata Gmelin.

Venus granulata Gmelin, Syst. Nat., p. 3277, 1792; Reeve, Conch. Icon., XIV, pl. XVI, fig. 62, 1863.

Shell rounded to subtriangular, inflated, solid, with a distinct lunule and a narrow posterior excavation; surface covered with radiating ribs which are crossed by concentric ridges, forming rather sharp nodules on the ribs. Color ashy, variously marked with brown, dotted, blotched, or sometimes in angular or chevron-shaped patterns, sometimes in irregular bands; rarely nearly the whole shell is brown. In the left valve the central cardinal is slightly bifid; in the right the two anterior ones are somewhat divided; interior variously marked with violet and white; border crenulations minute.

Length, 26; height, 23; diameter, 17 mm.

San Antonio Bridge, San Juan, Porto Rico, one specimen.

Venus latilirata Conrad.

Venus latilirata Conrad, Proc. Acad. Nat. Sci. Phila., I, p. 28, 1841.

Venus varicosa Sowerby, Thes. Conch., II, p. 723, pl. CLV, fig. 67, 1853.

Shell subtriangular, solid, inflated, with high umbonal region, though the beaks are rather compressed; lunule large; surface sculptured with nine or ten very strong, wide, concentric ridges; these are rounded and have a deep canal at their upper bases. Color dirty white or buff, with faint, various-sized pale-brown radiations; teeth entire; beak cavities deep; pallial sinus very small; border crenulations fine; interior white, with salmon or red tinting in the beak cavities.

Length, 33; height, 29; diameter, 22 mm.

Mayaguez, Porto Rico, dead young valves, possibly of this species.

Venus paphia Linnæus.

Venus paphia Linnæus, Syst. Nat., ed. XII, p. 1129, 1767; Reeve, Conch. Icon., XIV, pl. XIX, fig. 89, 1863.

Shell triangular, inflated, solid, with a well-developed posterior ridge in each valve, the area behind the ridges wide and shallow; lunule depressed so that the outline of that part of the shell inclosing it is incurved; surface covered with strong concentric ribs which are furrowed at the upper side and are nearly smooth over the anterior three-fourths of the shell; behind this and extending to the posterior area the ridges are lamellar. Color ashy or dirty white, variously marked with brown, the markings having a tendency to radiation, and they are often somewhat chevron-shaped. There are generally three more or less distinct dark radial bands; cardinals entire; pallial sinus very small.

Length, 45; height, 37; diameter, 26 mm.

Mayaguez, Porto Rico, one young specimen; Vieques, a number of beautiful examples.

This well-known species is near to the much rarer *V. latilirata*. The latter is smaller and has much heavier, wider ribs, which do not break into laminae at their posterior ends.

Venus pygmæa Lamarck.

Venus pygmæa Lamarck, An. sans Vert., v, p. 585, 1818; Reeve, Conch. Icon., XIV, pl. XXVI, figs. 138 a-c, 1864.

Quebradillas, Porto Rico (Gundlach).

Subgenus ANOMALOCARDIA Schumacher, 1817.

Venus flexuosa Linnæus.

Venus flexuosa Linnæus, Syst. Nat., ed. XII, p. 1131, 1767.

Venus macrodon Reeve, Conch. Icon., XIV, pl. XXI, figs. 98 b-d, 1863.

Shell triangular, inflated, solid, with a high posterior ridge, which is almost pinched up in the earlier stages of growth, but which fades out near the base in the adult state; posterior end truncated, lunule large and shallow; surface more or less covered with strong, irregular, concentric ridges, which are often divaricate just in front of the posterior ridge, and having fine, radial sculpture above; the region toward the posterior base is always smooth. Color bluish or ashy white, variously marked with brownish or lead color; pallial sinus small and angular; crenulations on the inner border strong.

Length, 33; height, 28; diameter, 20 mm.

Mayaguez; Puerto Real, Porto Rico, worn valves.

Genus *MERETRIX* Lamarck, 1799.

Shell oval subtriangular, smooth or concentrically ridged, with a well-marked lunule; hinge with three cardinals in each valve, with two unequal anterior laterals in the right valve and one lateral in the anterior part of the left hinge; ligament external, prominent; pallial line sinuous.

Meretrix albida Gmelin.

Venus albida Gmelin, Syst. Nat., p. 3287, 1792.

Dione albida Reeve, Conch. Icon., XIV, pl. x, fig. 39, 1863.

Shell nearly elliptical, subinflated, subsolid; umbonal region rather prominent, the beaks turned inward and forward; lunule not impressed, but well marked; surface nearly smooth on the earlier growth, but becoming finely concentrically ridged on the later growth; anterior end a little narrowed and rounded, straight along the line of the lunule; posterior end broadly rounded. Color, externally, white, chalky, or somewhat polished; within, milky white; left valve with three radial cardinals, the two anterior united above so as to form an inverted V, the single lateral elevated and rounded or compressed; posterior cardinal of the right valve bifid, united above to the anterior cardinal; the two anterior laterals small; pallial sinus deep.

Length, 45; height, 35; diameter, 20 mm.

Mayaguez, Porto Rico, a number of young specimens and valves and one large valve; San Juan Harbor, young valves.

Meretrix aresta, n. sp. Plate 56, figs. 1, 7.

Shell large, solid, inflated, white or yellowish, very inequilateral, with prominent much incurved prosogyrate umbones, rounded in front, arcuate and almost rostrate behind, the base arcuate; lunule cordiform, hardly defined by an obsolete impressed line, but there is no defined escutcheon; ligament deeply immersed, very little of it visible externally; surface sculptured with fine, somewhat irregular concentric sulci in harmony with the incremental lines, but coarser and more excavated, with often a few narrow undulations near basal margin; umbonal region somewhat smoother and often appears polished by attrition; interior dull white, not polished, with a short anteriorly rounded subtriangular pallial sinus; hinge normal, with a subconic left anterior lateral fitting into a pit in the right valve.

Length, 51; height, 50; diameter, 28 mm.; a larger valve is 58 mm. long.

Mayaguez Harbor, Porto Rico, at stations 6061 and 6062, in 12 to 30 fathoms, abundant; a single young pair off Puerto Real at station 6074.

Nearest to *M. albida*, but with a rougher surface, a different outline, and attaining a larger size.

Meretrix hebræa Lamarck.

Cytherea hebræa Lamarck, An. sans Vert., v, p. 568, 1818.

Circe hebræa Reeve, Conch. Icon., XIV, pl. VIII, fig. 34, 1863.

San Juan, Porto Rico (Gundlach).

Meretrix maculata Linnæus.

Venus maculata Linnæus, Syst. Nat., ed. x, p. 686, 1758.

Dione maculata Reeve, Conch. Icon., XV, pl. III, fig. 11, 1863.

Quebradillas, Porto Rico (Gundlach).

Subgenus *DIONE* Gray, 1847.*Meretrix circinata* Born.

Venus circinata Born, Test. Mus. Vind., p. 61, pl. IV, fig. 8, 1780.

Mayaguez, Porto Rico (Gundlach).

Meretrix dione Linnæus. Plate 56, figs. 3, 10.

Venus dione Linnæus, Syst. Nat., ed. x, p. 684, 1758.

Dione veneris Reeve, Conch. Icon., XV, pl. VI, fig. 24, 1863.

Shell triangular-ovate, inflated, subsolid, with high, full beaks, which are curved forward over a well-impressed lunule; ligament lodged within a decided escutcheon; surface covered with strong, reflected, concentric ribs, which are especially high in front and much reduced on the posterior slope; on a posterior radial ridge there is a row of long spines which project outward and backward, and behind these, on a second fainter ridge, there is another row of smaller spines; left valve with three cardinals, the central one heavy and somewhat bifid, with a short, erect anterior lateral; right

valve with three cardinals, the posterior one bifid, with two faint anterior laterals separated by a deep pit; pallial sinus deep. Color violet and whitish, the posterior end often quite dark.

Length, 50; height, 40; diameter, 28 mm.

Fajardo, Porto Rico, two fine specimens.

The spines are often somewhat curved; sometimes they are much reduced, so that they are in reality merely elevated scales.

Subgenus *TRANSENNELLA* Dall, 1883.

Internal margins tangentially sulcate.

***Meretrix eubaniana* d'Orbigny.**

Venus eubaniana d'Orbigny, Moll. Cubana, II, pl. XXVI, figs. 44-46, 1845.

Shell rather small, triangular-ovate, solid, rather compressed, inequilateral, with high beaks, slightly turned forward over a large, well-defined lunule; surface covered with low, irregular, concentric ridges; left valve with three cardinals, the central tooth strong, and a high, compressed anterior lateral; right valve having the two anterior cardinals separated by a narrow fissure and two small anterior laterals with a deep pit between them; pallial sinus deep. Color white, generally with a few irregular brown markings.

Length, 8; height, 6; diameter, 4 mm.

Mayaguez, Porto Rico, a few worn valves.

The internal margins of the valves are sharply grooved, but not in harmony with the lines of growth, which is the characteristic of this subgenus, of which the species are all small shells.

***Meretrix culebrana*, n. sp. Plate 55, fig. 5.**

Shell small, solid, subtriangular, with elevated beaks, nearly equilateral, moderately convex; periostracum rather thick, yellowish brown, paler on the umbones and posterior dorsal area; surface obsoletely minutely concentrically undulated, with a rather large, ovate-cordate, somewhat depressed lunule defined by a well-impressed line, but no perceptible escutcheon; form as figured; interior white; hinge strong, normal, a prominent, anterior lateral in each valve; pallial sinus subtriangular, rounded in front; marginal grooving well marked.

Length, 7; height, 5.7; diameter, 3.8 mm.

At station 6087, in 14 to 18 fathoms, coral sand, off Culebra Island, Porto Rico.

A very pretty and characteristic species of this peculiar group, which can not be confounded with either of the other described species.

Genus *DOSINIA* Scopoli, 1777.

Shell suborbicular, compressed or slightly inflated, concentrically sculptured, with prominent beaks and a well-defined lunule; hinge with three cardinal teeth in each valve; left valve with an anterior lateral close to the front cardinal; right valve with two vestiges of anterior laterals; pallial sinus deep; border of the shell without crenulations.

***Dosinia elegans* Conrad.**

Artemis elegans Conrad, Proc. Acad. Nat. Sci. Phila., VI, p. 320, 1853.

Artemis concentrica Reeve, Conch. Icon., VI, pl. II, fig. 8, 1850; not of Born, 1780.

Shell suborbicular, rather solid, subtruncated posteriorly and almost angular at the posterior end of the ligament; lunule small and distinct; ligament nearly immersed; beaks high and rather sharp, turned forward; surface covered with rather strong, close, concentric ridges and showing faint traces of radial sculpture on earlier growth; left valve having central cardinal wide and flattened, the anterior lateral small and tubercular; right valve with posterior cardinal bifid; beak cavities deep, compressed; muscle scars elongated, smooth; pallial sinus deep, triangular. Color whitish; epidermis straw-colored.

Length, 75; height, 68; diameter, 30 mm.

Playa de Ponce, Porto Rico, three dead shells.

Genus *MYSIA* Leach, 1818.

Shell suborbicular, concentrically striate, with a faint lunule and high beaks; hinge with two to three divergent cardinals in the right valve and three in the left; laterals wanting; pallial sinus large, subvertical.

Mysia tenuis Recluz.

Dosinia (Artemis) tenuis Recluz., Journ. de Conchyl., III, p. 250, pl. x, fig. 1, 1853.

Shell nearly orbicular, thin to subsolid, subinflated; beaks pointed and turned slightly forward over a faint lunule; ligament nearly immersed; surface finely and irregularly concentrically striate, whitish; left valve with three diverging cardinals, the anterior with a deep pit in front of it, sometimes slightly bifid; right valve with three divergent cardinals, the posterior bifid; hinge plate wide and flattened behind when the shell is adult; beak cavities deep; anterior muscle scars elongated; posterior scars oval; pallial sinus triangular.

Length, 42; height, 41; diameter, 21 mm.

Playa de Ponce, Porto Rico, one dead, badly discolored specimen; Mayaguez, one left valve.

Subfamily **CIRCINÆ**.Genus **CIRCE** Schumacher, 1817.

Shell subtriangular or subcircular, compressed or slightly inflated, with concentric and sometimes radial sculpture; beaks pointed; lunule lanceolate; ligament immersed; hinge teeth like those of *Meretric*; pallial line entire or showing a slight indication of a sinus.

Subgenus **GOULDIA** C. B. Adams, 1847.

Shell small, subinflated, the surface wholly or distally reticulate.

Circe cerina C. B. Adams.

Thetis cerina C. B. Adams, Proc. Bost. Soc. Nat. Hist., Jan., 1845, p. 9.

Gouldia cerina C. B. Adams, Cat. Coll., p. 29, 1847; Dall, Bull. Mus. Comp. Zool., IX, p. 130, 1881; Dall, Blake Report, I, p. 263, pl. VII, figs. 4a, 4b, 1886.

Shell small, rounded-triangular, scarcely inflated, with high beaks which scarcely turn forward; lunule well defined but not impressed; ligament mostly immersed; surface covered with faint, concentric ridges and indistinct distal radial ribs, leaving the surface delicately decussated; cardinal teeth, three in each valve, rather feeble; left valve with an anterior lateral which fits into a socket in the right valve which is placed between two faint teeth. Color whitish or yellowish, usually marked with brown on the dorsal region, and often with irregular patches on the disk.

Length, 11; height, 9.5; diameter, 4.6 mm.

Culebra Island, one shell, at station 6087.

Circe insularis, n. sp. Plate 55, fig. 2.

Shell small, yellowish white, quite inequilateral, moderately convex, with a prominent, rather anterior, beak; sculpture of small, close-set, subequal, concentric undulations, with narrower interspaces and less pronounced on the umbones, crossed by fine radial striae, which are stronger toward the ends of the valves, where the interspaces sometimes become threadlike; lunule small, sharply defined, rather long and narrow; escutcheon absent; interior white, the margin in many specimens with a fine sulcus, parallel to it around the shell; hinge normal; pallial line entire, but slightly truncate behind.

Length, 5.5; height, 5; diameter, 3 mm.

San Juan and Mayaguez harbors, Porto Rico; in the latter abundantly at station 6061, in 30 fathoms, coral sand, but no living specimens were taken.

Well distinguished from the other American species by its form and size.

Superfamily **CARDIACEA**.Family **CARDIIDÆ**.Genus **CARDIUM** Linnæus, 1758.

Shell ventricose, closed or gaping posteriorly; beaks prominent, subcentral; surface radiately ribbed; posterior slope sculptured differently from the front and sides; margins toothed; there are two interlocking cardinals and an anterior and posterior lateral in each valve; pallial line simple.

Subgenus **TRACHYCARDIUM** Mörch, 1853.

Cardium muricatum Linnæus.

Cardium muricatum Linnæus, Syst. Nat., ed. x, p. 680, 1758; Reeve, Conch. Icon., II, pl. VI, fig. 33, 1844.

Shell subsolid, slightly oblique, scarcely gaping behind, having from thirty to forty ribs, each of which bears a row of solid, oblique scales; about eleven of the anterior ribs have these scales sloping

toward the anterior base; on the fourteenth rib there are two rows of scales, and on the ribs behind this they point toward the posterior base; the rest of the surface of the ribs and the grooves between them are nearly smooth; within the central ribs are distinctly shown; serrations around the edges of the shell strong. Color whitish, buff, tawny, or brownish, sometimes variegated; within, whitish or yellowish, sometimes streaked or marked with brownish purple.

Length, 35; height, 40; diameter, 28 mm.

San Antonio Bridge; San Juan; Mayaguez, Porto Rico.

Cardium leucostoma Born.

Cardium leucostomum Born, Test. Mus. Cæs. Vind., p. 46, pl. III, fig. 6, 1780.

San Juan Harbor, Porto Rico, one young shell.

This species was regarded by Wood, with much probability, as being the original *C. magnum* of Linnæus (not of Born), but there is no way of proving this and so the name is best left as it is. The species in a general way resembles *C. isocardia*, but wants the spinose sculpture, has the sides of the ribs crenulate, and is more compressed. It is found in collections labeled *C. marmorcum* Lamarek and *C. elongatum* Wood, or *C. subelongatum* Sowerby, all later names than that of Born.

Cardium isocardia (Linnæus) Reeve.

Cardium isocardia Linnæus (ex parte), Syst. Nat., ed. x, p. 679, 1758; Reeve, Conch. Icon., II, Mon. *Cardium*, pl. xvii, fig. 84, 1845.

Off Boca Prieta, Porto Rico, in 8 fathoms, sand, at station 6075, living.

The form common in Florida has 27 to 30 ribs, and the spinose decoration is less dense than that in the typical West Indian form, which has 30 to 35 ribs. In the former the periostracum is more dense and dull colored, and the channels between the ribs, owing to the less-developed sculpture, appear wider. This variety was named *C. egmontianum* by Shuttleworth, and the name seems worthy of retention in a varietal sense. The typical *C. isocardia* is brighter colored and has more yellow inside than the variety. *C. charriferum* Guppy appears identical with the typical *C. isocardia*.

Subgenus FRAGUM Boltzen, 1798.

Section TRIGONICARDIA Dall, 1900.

Cardium antillarum d'Orbigny.

Cardium antillarum d'Orbigny, Moll. Cubana, II, p. 309, pl. xxvii, figs. 53-55, 1845.

Cardium ceramidum Dall, Bull. Mus. Comp. Zool., Cambridge, XII, 1886, p. 269, pl. IV, fig. 6.

Shell small, quite inequilateral, solid, moderately inflated, with from eighteen to twenty ribs, the last six or seven on the posterior area crossed by fine, irregular, sharp, concentric threads. Of these the last four or five are nodulous; the next two are without nodules; the central ribs are very strong, gradually becoming smaller toward the anterior end; they all have a row of nodules or heavy scales and the spaces between them are concentrically grooved; sometimes the ribs, if worn, are nearly destitute of scales, and in other cases they are all more or less scaly; within, the ribs show faintly; beak cavities deep; hinge and teeth strong. Color white or yellowish throughout.

Length, 10; height, 9.5; diameter, 7 mm.

Mayaguez Harbor, Porto Rico, many dead valves at stations 6058, 6061, 6062; San Juan Harbor, one valve.

Section FRAGUM s. s.

Cardium medium Linnæus.

Cardium medium Linnæus, Syst. Nat., ed. x, p. 678, 1758; Reeve, Conch. Icon., II, pl. vi, fig. 30, 1844.

Shell inequilateral, subrhomboid, solid, with a high, rounded posterior ridge, behind which it is subtruncate, with thirty-five or thirty-six moderately strong, nearly smooth ribs; about ten of these, which are on the posterior slope, are rounded and have rather deep grooves between; those of the rest of the shell overhang the deep, rounded grooves between them; teeth strong. Color whitish or buff, variously painted with brown or brownish purple.

Length, 85; height, 37; diameter, 30 mm.

Mayaguez Harbor, Porto Rico, at station 6062; Vieques.

Subgenus PAPHYRIDEA Swainson.

Cardium spinosum Meuschen.*Cardia spinosum* Meuschen, Mns. Gevers., p. 442, 1787.*Solen bullatum* Chemnitz, Conch. Cab., VI, p. 65, figs. 49, 50, 1782; not of Linnaeus.*Cardium bullatum* Reeve, Conch. Icon., II, pl. II, fig. 8, 1844.

San Juan, Porto Rico (Gundlach).

Cardium semisulcatum Gray.*Cardium semisulcatum* Gray, Ann. Phil., IX, p. 137, 1825.*Cardium petitiatum* d'Orbigny, Moll. Cubana, II, p. 309, pl. XXVII, figs. 50-52, 1845.

Shell small, elliptical, thin, very inequilateral, moderately inflated, with numerous low ribs, and with more or less perfectly developed smaller ribs between the larger ones, the margin at the posterior end sharply toothed; surface covered with fine concentric growth lines, which are stronger on the anterior part of the shell; interior showing the sculpture; hinge teeth compressed. Color whitish or yellowish, with faint brown blotches and spots.

Length, 10; height, 6.5; diameter, 5 mm.

San Juan, Porto Rico, one valve; off Boca Prieta, Porto Rico, one specimen on *Spondylus*.

Subgenus LÆVICARDIUM Swainson, 1840.

Cardium serratum Linnaeus.*Cardium serratum* Linnaeus, Syst. Nat., ed. X, p. 680, 1758.*Cardium serratum* Reeve, Conch. Icon., II, pl. I, fig. 1, 1844.

Shell subsolid, suboval or subquadrate, the posterior edge being less curved than the anterior; the low, rounded, posterior ridge being slightly produced at the base of the shell; surface nearly smooth, shining and polished, with only faint vestiges of ribs, which appear on the border of the shell which scarcely gapes and has delicate serrations within; laterals high and strong; cardinals small; interior of the shell polished; in a fresh state the surface is usually covered with a thin, brownish epidermis; the shell is beautifully polished, whitish, straw-colored, lemon-yellow, purplish or reddish, and it is slightly clouded with brown near the beaks; within it has much the same range of colors, and it is one of the most delicate and lovely shells of the Antilles.

Length, 37; height, 45; diameter, 30 mm.

Vieques, a number of very fine specimens; Mayaguez, two young valves; Culebra, several young shells.

Cardium (serratum var.?) sybariticum Dall. Plate 58, fig. 11.*Cardium serratum* var. *sybariticum* Dall, Bull. Mus. Comp. Zool., Cambridge, XII, p. 271, 1886.

Shell much smaller and more delicate than the type, more compressed, pale or faintly flecked with pink or purple; beaks often deep pink.

Length, 11; height, 14; diameter, 7 mm.

Mayaguez Harbor, Porto Rico, a number of dead valves.

Cardium serratum var. *laevigatum* Lamarck.*Cardium laevigatum* Lamarck, An. sans Vert., pt. I, p. 11, 1819; not of Linnaeus, 1758, nor of Born, 1780.

Shell rather large, subsolid, moderately inflated, subquadrate, usually, though not always, faintly ribbed; ribs numerous when developed, strongest around the outer part of the shell; there is an area at the anterior and posterior parts of the shell which is generally smoother than the rest of it, which is outlined by a shallow groove, forming a sort of lunule and escutcheon; laterals rather strong, especially the anterior ones; edges of the shell serrated within.

Color generally whitish, cream or pale buff, with a few faint subconcentric cloudings of brown.

Length, 50; height, 63; diameter, 40 mm.

One dead shell having the above measurements was taken at Playa de Ponce, Porto Rico.

Generally larger, more quadrate, duller colored, and more painted with brownish, nebulous bands than typical *serratum*, yet there are intermediate specimens which can be assigned to one form about as well as to the other. This form is one of the characteristic species of west Florida.

Cardium serratum var. *multilineatum*, n. var.*Cardium lineatum* Krebs, W. I. Marine Sh., p. 115, 1864; not of Gmelin.

Smaller, more nearly round than the type. The smoother anterior and posterior areas are distinctly marked out and are tawny or buff colored; the rest of the shell is dirty straw colored, and

the narrow spaces between the scarcely developed ribs are pale brown; the beaks are purple, clouded. The interior is much the color of the yolk of an egg, with purple cloudings at the cavities of the beaks.

Length, 40; height, 45; diameter, 32 mm.

Mayaguez Harbor, Porto Rico, stations 6058 and 6061.

Genus PROTOCARDIA Beyrich, 1845.

Sculpture radial anteriorly; posterior area with reticulate or spinose sculpture; shells thin and usually small; foot carinate.

Protocardia peramabilis Dall.

Cardium peramabile Dall, Bull. Mus. Comp. Zool., Cambridge, IX, p. 132, 1881; Bull. Mus. Comp. Zool., Cambridge, XII, p. 269, pl. IV, fig. 7, 1886.

Shell small, slightly inequilateral, rather thin and fragile, inflated; posterior area sculptured with a great number of fine, radiating, nearly smooth ribs, the spaces between them being slightly pitted, the whole being covered with a fine epidermis, which is scaly on the ribs; the anterior three-fifths of the shell is sculptured with equally fine, radiating ribs, and these are crossed by very numerous somewhat fainter, concentric ridges, leaving the surface everywhere minutely beaded; borders of the shell delicately and sharply serrate, not gaping; within the shell the outside patterns of sculpture may be plainly seen. Color whitish.

Length, 10; height, 11; diameter 9 mm.

Mayaguez Harbor, Porto Rico, two shells; Aguadilla, one worn valve.

The foot is keeled below but not serrate.

Protocardia tinctoria Dall. Plate 58, fig. 4.

Cardium peramabile var. *tinctoria* Dall, Bull. Mus. Comp. Zool., Cambridge, XII, p. 270, 1886.

Shell small, fragile, nearly equilateral, considerably inflated; posterior area sculptured with minute, radiating ribs; every second, third, fourth, or fifth one bears a row of sharp, elevated spines or scales; the spaces between these ribs are crossed by delicate scales, making them pitted; the remainder of the shell is sculptured with very finely beaded ribs, as in *P. peramabilis*; borders of the shell finely and sharply serrate, not gaping; outside sculpture showing faintly within; anterior laterals showing as long arched ridges within, entering far within the cavity of the beaks. Color whitish, beautifully tinted and clouded with pink or red.

Length, 13; height, 12; diameter, 9 mm.

Mayaguez Harbor, Porto Rico, in 25 to 30 fathoms. Quite a number of valves were taken.

This beautiful form is certainly distinct from *P. peramabilis*. It is not so high in proportion to its width, is a little less inflated, the line between the two areas of sculpture is not so distinctly marked out, and when perfect it has the scaly spines on the posterior area finely developed. The anterior lateral teeth are different from those of *P. peramabilis*.

Family THYASIRIDÆ.

Genus THYASIRA Leach, 1818.

Shell thin to subsolid, subglobular, earthy; beaks turned forward; posterior side furrowed; lunule absent; ligament placed in a groove in the hinge line, partly external; hinge edentulous; muscular impressions superficial, elongated; pallial line simple; borders of the shell closed, simple.

It is *Cryptodon* and *Aximus* of authors.

Thyasira trisinuata d'Orbigny.

Lucina trisinuata d'Orbigny, Moll. Cubana, II, p. 300, pl. XXVII, figs. 46-49, 1846.

Cryptodon obesus Verrill, Am. Journ. Sci., III, p. 287, pl. 7, fig. 2, 1872; Trans. Conn. Acad. Sci., III, p. 11, pl. 1, fig. 11 (not of Sars).

Shell rather small, scarcely subsolid, inflated, higher than long, somewhat produced at the middle of the base; beaks high and rather full, turned forward over a feebly developed lunule; posterior slope with two deep, distinct, radial grooves; surface finely, concentrically striated; ligament lodged in a groove in the edentulous hinge; back cavities rather deep. Color white throughout.

Length, 12; height, 14; diameter, 10 mm.

Mayaguez, Porto Rico, several immature, worn valves, which appear to be of this species.

Thyasira conia n. sp.

Shell small, thin, rather compressed, inequilateral, the anterior end longer, somewhat impressed above, the posterior high and arcuate above, abruptly truncate in front, base rounded; shell white,

with a light grayish periostracum and some specimens a little rusty; posterior dorsal fold narrow and pronounced, but not very deep; surface covered with a fine dustlike granulation; the young proportionately more elongated, interior white, dull, with a polished margin outside the more or less broken and irregular pallial line; ligament elongated, brown, almost internal, set in a deep sulcus; resilium blackish, short, subumbonal, set on an obscure prominence on the hinge line in each valve, which, if the resilium were lost, would resemble obscure teeth; soft parts typical, with arborescent visceral appendages.

Length, 6; height, 6; diameter, 3 mm.

Off the entrance to San Juan Harbor, Porto Rico, in 310 fathoms, sandy mud, at station 6052.

A well-marked species, easily discriminated by its form and surface from any other among the American species. See Dall, Synopsis of the Lucinacea, pl. XLII, fig. 2, 1901.

Family LUCINIDÆ.

Genus CODAKIA Scopoli, 1777.

Codakia orbicularis Linnæus.

Venus orbicularis Linnæus, Syst. Nat., ed. X, p. 688, 1758.

Lucina tigrina Reeve, Conch. Icon., VI, pl. I, fig. 3, 1850, not of Linnæus, 1758.

Shell large, suborbicular, rather solid, lenticular, with rather low but sharp beaks, which are turned forward over a small lunule, with a shallow, wide, radial posterior furrow and numerous radiating ribs or narrow, radiating furrows which cut the surface into ridges of different widths; the growth lines are elevated into fine, concentric ridges which leave the surface somewhat cancellated; ligament deeply inset; left valve with two radial cardinals and two low anterior laterals separated by a deep pit; right valve with two cardinals and a single anterior lateral; beak cavities rather deep, compressed; anterior muscle scars long, oblique; posterior scars oval; pallial line deep, crenated, disk rather rough, with numerous small pits. Color whitish or yellowish, often tinted with purple on the dorsal border, within white or yellow, often rich purple on the border, especially above.

Length, 80; height, 70; diameter, 30 mm.

Puerto Real, San Geronimo, Hucares, Mayaguez, Porto Rico (Gundlach); West Indian region generally.

A fine species very abundant on sandy bottom in shallow water throughout the West Indian region and in the Florida Keys. It is close to the East Indian *C. tigrina*, but is not so strongly cancellated or so nearly orbicular as is that species.

Subgenus JAGONIA Recluz, 1869.

Codakia orbiculata Montagu.

Venus orbiculata Montagu, Test. Brit. Suppl., p. 42, 1808.

Lucina pecten Lamarek, An. sans Vert. V, p. 543, 1818; Reeve, Conch. Icon., VI, pl. X, fig. 38, 1850.

Shell suborbicular, inequilateral, compressed, rather solid, with sharp beaks, which are turned slightly forward over a large, indistinct lunule; ligament partly immersed, short; surface covered with numerous radiating ribs which are crossed by a large number of concentric finer ridges; these ridges sometimes form elevated scales where they cross the ribs, especially on the anterior and posterior portions of the shell; left valve with two radial cardinals, the anterior the larger, with two anterior and two posterior laterals; right valve with two cardinals, the posterior slightly bifid, with one anterior and one posterior lateral; beak cavities deep, compressed; anterior scars long, oblique; posterior scars oval; cavity of the shell rough, sometimes showing the ribbing of the shell; border crenate. Color whitish or yellowish.

Length, 13; height, 12; diameter, 5.5 mm.

Ensenada Honda, Culebra, one specimen.

The beaks of this species are placed considerably behind the center of the shell, which is compressed and quite rough.

Codakia portoricana Dall.

Codakia (Jagonia) portoricana Dall, Synopsis of the Lucinacea, p. 822, pl. XXXIX, fig. 6, 1901.

San Juan Harbor, and the harbor of Mayaguez, Porto Rico.

This inconspicuous little species appears to be rare and comes nearest to *Jagonia costata* d'Orbigny, than which it is more finely and evenly sculptured, besides being a more tumid and much smaller shell, measuring not over 8 mm. in length.

Codakia costata d'Orbigny.

Lucina costata d'Orbigny, Moll. Cubana, II, p. 296, pl. XXVII, figs. 40-42, 1846.

Shell suborbicular, somewhat inflated, rather solid, with moderately high beaks placed just behind the middle of the shell, and turned forward over a small, elongated lunule; surface covered with fascisulate, radiating ridges, which are often alternately larger and smaller; these are crossed by finer, concentric threads, which cause the shell to be rough and finely cancellated; left valve with two cardinals, the hinder smaller, and two anterior and two posterior laterals; right valve with one cardinal, a faint posterior ridge that extends from the beak to form a lateral and one anterior lateral; beak cavities deep; anterior scars long, somewhat oblique; posterior scars semicircular; pallial line deep, somewhat crenated; interior rough; border distinctly serrate. Whitish or pale lemon color.

Length, 9; height, 8; diameter, 5 mm.

Arroyo, Hucares, Porto Rico, one valve from each locality.

The beaks are nearer the center than in *C. pectinella*, the shell is solid, and the sculpture is fascisulated. It is the *Lucina antillarum* of Reeve.

Codakia pectinella C. B. Adams. Plate 58, fig. 9.

Lucina pectinella C. B. Adams, Contr. to Conch., p. 246, 1852.

Shell small, short elliptical, inflated, subsolid, with full beaks placed somewhat behind the middle of the shell and turned forward over a small lunule, with numerous, radiating, wider and narrower ribs, which are crossed by a great number of concentric, raised threads; the ribs are almost wanting at the anterior and posterior ends; left valve with two cardinals and two anterior and two posterior laterals; right valve with one cardinal, one anterior and two posterior laterals; anterior muscle scars somewhat elongated and oblique; posterior scar oval; interior of the shell roughened; border crenate. Color white or yellowish.

Length, 7.5; height, 8; diameter, 4 mm.

Mayaguez, one adult valve and a number of small ones; San Juan Harbor, one valve. A single alcoholic specimen was obtained at Mayaguez.

The species is now figured for the first time from a specimen named by Professor Adams.

Genus LUCINA (Bruguière 1792) Lamarek 1799.

Shell suborbicular, almost equilateral, rather thin, concentrically striate; ligament in a groove; lunule short; teeth all obsolete or rudimentary, often wanting.

Lucina chrysostoma Mörch.

Loripes chrysostoma Mörch, Yoldi Cat., II, p. 32, 1853; Chemnitz, Conch. Cab., VII, figs. 427-429.

San Juan, Porto Rico (Gundlach).

Mörch cites this name as of Meuschen, but the Museum Geversianum uses a peculiar nomenclature not Linnean. It is the *Anodontia alba* of Link. The shell is recognizable by its large size and mellow orange suffusion, from which the early conchologists came to call it "The apricot."

Lucina phenax, n. sp.

Shell small, suborbicular, inflated, thin, with the hinge teeth obsolete. Color white, with a grayish papery periostracum chiefly in evidence near the margins; beaks polished, prosogyrate, with a deeply impressed, rather long and narrow lunule in front of them, especially in the right valve; disk sculptured by rather distant, evenly spaced, low, concentric elevated lines, which become more or less lamellose near the hinge margin, and more crowded toward the base; interior of shell white, not punctate, hinge margin narrow with no traces of laterals, and only a trace of an obsolete cardinal tooth; margins thin, smooth.

Length, 9; height, 8; diameter, 5.5 mm.

Station 6062, Mayaguez Harbor, Porto Rico, in 30 fathoms, sand; also in San Juan Harbor, at station 6054, in 5 fathoms.

This shell has a deceptive likeness externally to a young *Phacoides pennsylvanicus*, but differs from it in its edentulous hinge and thinner valves. It is figured by Dall in the *Synopsis of the Lucinacea*, pl. XL, fig. 3.

Genus *MYRTÆA* Turton, 1822.*Myrtæa pristiphora*, n. sp. Plate 55, figs. 4, 6.

Shell small, solid, white, moderately convex, with small, conspicuous beaks; surface of the beaks nearly smooth, the remainder of the disk sculptured with fine, concentric, close set, rather uniform lamellæ, which, toward the hinge line at each end of the shell, become more elevated and sparser; at hinge line these lamellæ in perfect specimens are produced into little triangular projections, which form a saw-like series along the hinge line; lunule lanceolate, very small and narrow; interior of disk punctate; lateral and cardinal teeth moderately developed, margins finely radially striate or smooth.

Length, 7; height, 7.5; diameter, 4 mm.

Mayaguez Harbor, Porto Rico, at station 6062, in 30 fathoms, sand; also in San Juan Harbor in 45 fathoms, at station 123.

Genus *PHACOIDES* Blainville, 1825.

Shell suborbicular, white, solid, concentrically lamellated or sculptured, and often having radial or oblique sculpture; beaks compressed; margins smooth or crenulate; hinge teeth, 2.2; laterals, 1.1 and 2.2, or obsolete; muscular impressions rugose, the anterior elongated within the pallial line; umbonal area with an oblique furrow.

Phacoides pectinatus Gmelin.

Tollina pectinata Gmelin, Syst. Nat., vi, p. 3236, No. 41, 1792.

Lucina jamaicensis Lamarek, An. sans Vert., v, p. 539, 1818; Reeve, Conch. Icon., vi, pl. II, figs. 7, a, b, 1850.

Shell suborbicular, scarcely inflated, rather solid, sculptured throughout with concentric ridges, which are sometimes close and irregular and at other times widely spaced and lamellar; beaks rather low, turned forward over a small lunule; ligament partly immersed in the hinge plate; there is a wide radiating furrow beginning at the lunule and ending in front in a decided sinus at the edge of the shell, and there is a radiating posterior depression just behind the posterior ridge; left valve with two small oblique cardinals, which are sometimes faint or wanting, with two anterior laterals, the lower the larger, and two very small remote posterior laterals; right valve with one oblique, small cardinal, which may be feeble or wanting, with one anterior and one posterior lateral; cavity of the shell often radially rugose and slightly pustulose; anterior muscle scars long, narrow, and rather smooth; posterior scars oval. Color dirty white or pale salmon, within and without.

Length, 55; height, 50; diameter, 30 mm.

San Juan market, San Antonio Bridge, San Juan, Quebradillas, Porto Rico (Gundlach); West Indies and Florida; abundant in shallow bays, on sandy muddy bottom.

Subgenus *HERE* Gabb, 1866.*Phacoides pensylvanicus* Linnaeus.

Venus pensylvanica Linnaeus, Syst. Nat., ed. x, p. 688, 1758.

Lucina pensylvanica Reeve, Conch. Icon., vi, pl. VI, fig. 29, 1850.

Shell suborbicular, inflated, solid, with rather high, sharp beaks turned forward over a large lunule, with a distinct radial posterior furrow, which ends in a sinus above the base; epidermis raised into numerous concentric, elevated laminae, the outer edges of the laminae developed into wide, reflexed fimbriations; ligament mostly imbedded; left valve with two elevated cardinals and one anterior and two posterior laterals; right valve with a bifid cardinal, a high anterior, and double posterior lateral; anterior and posterior scars elongated; cavity of the shell rough, sometimes pitted, having a diagonal, impressed line running from near the base of the ligament toward the anterior base. Color white throughout, the epidermis becoming brownish in old shells.

Length, 54; height, 53; diameter, 40 mm. Mayaguez, Porto Rico, a number of young valves.

The outline from the beaks to the anterior point of the shell is nearly straight or slightly incurved as a result of the deeply impressed lunule.

Section *CAVILUCINA* Fischer, 1887.*Phacoides trisulcatus* Conrad, var. *blandus* Dall. Plate 58, fig. 13.

Lucina trisulcata Conrad, Am. Journ. Sci., n. s., I, p. 404, 1846.

Shell obliquely subtriangular, higher than long, with the beaks placed behind the center, considerably elevated, and arched forward over a decidedly deep lunule; ligament short, nearly buried; there is a shallow radial furrow on the posterior slope; surface finely concentrically ridged, also with three or four deeper sulci generally having traces of radiating grooves which do not cut to the bottom

of the concentric ridges; left valve with two cardinals, two anterior and two posterior laterals; right valve with two cardinals, one anterior and one posterior lateral; beak cavities moderately deep. Color white, yellowish, or salmon.

Length, 12; height, 13; diameter, 8 mm. San Juan Harbor, Porto Rico.

The deep sulci, usually three in number, seem to indicate resting stages. The typical *trisulcatus* is a Miocene fossil.

Subgenus LUCINISCA Dall, 1901.

Phacoides muricatus Spengler.

Tellina muricata Spengler, Skrift. Nat. Selsk., 1798, p. 120.

Lucina scabra Lamarck, An. sans Vert., VI, p. 542, 1819; Reeve, Conch. Icon., VI, pl. VIII, fig. 45, 1850.

Shell suborbicular, compressed, rather solid, slightly truncated posteriorly, with numerous radiating rows of ridges alternately larger and smaller, the larger and sometimes the smaller rows beset with elevated, prickly scales; beaks pointed forward and having a few concentric lamellæ; lunule small; left valve with two cardinals, two anterior and two posterior laterals; right valve with two cardinals, the anterior bifid, with one anterior and one posterior lateral; anterior muscle scar long; posterior scar oval; border crenated. Color white.

Length, 13; height, 12; diameter, 4 mm. Mayaguez Harbor, Porto Rico.

Subgenus LUCINOMA Dall, 1901.

Phacoides radians Conrad.

Lucina radians Conrad, Am. Journ. Sci., XLI, p. 347, 1841.

Lucina radiata Conrad, Fos. Medial Tert., p. 70, pl. XL, fig. 3, 1845.

Shell suborbicular, subinflated, rather solid, with moderately high beaks, which are turned forward over a deep lunule; surface everywhere covered with regular, concentric, fine, threadlike ribs, and these are cut by faint, radiating depressions; left valve with two radial, compressed cardinals and a feeble anterior lateral at the base of the lunule; right valve with one compressed cardinal, which is sometimes slightly bifid; beak cavities moderately deep, compressed; anterior muscle scar oblique, rather elongated; posterior scar oval; pallial line deep; border of the shell crenate. Color white.

Length, 18; height, 17.5; diameter, 10 mm.

San Geronimo, Porto Rico, two worn valves.

Genus DIVARICELLA von Martens.

Divaricella quadrisulcata d'Orbigny.

Lucina quadrisulcata d'Orbigny, Voy. Am. MÉR., p. 584, 1846; Moll. Cubana, II, p. 294, pl. XXVII, figs. 34-36, 1853.

Shell nearly orbicular, the beaks projecting but slightly above the general outline, subsolid, somewhat inflated, with a very small, imperfectly developed lunule; surface sculptured throughout with rather sharp chevron-shaped ridges whose most elevated points are in a line running from the beaks to a little in front of the middle base; besides it is marked with faint, concentric growth lines and somewhat stronger rest lines; ligament nearly imbedded in a groove of the hinge; right valve with a divided cardinal and a feeble one in front of it; left valve with two cardinals; laterals wanting; borders of the shell finely, often feebly, crenulate. The shell is white throughout, covered, when perfectly fresh, with a thin, straw-colored epidermis.

Length, 25; height, 24; diameter, 14 mm.

Hucares, Porto Rico, one young worn valve.

Very close to *D. dentata* Wood, which has deeper rest marks and is strongly dentate at the rest periods and on the edges.

Family CYRENELLIDÆ.

Genus CYRENOIDA Joannis, 1835.

Cyrenoida americana Morelet. Plate 58, fig. 5.

Cyrenoides americanus Morelet, Test. Nov., II, p. 26, 1851.

Cyrenella americana Shuttleworth, Diagn. Neuer Moll., No. VII, p. 163, 1854.

One specimen in the U. S. National Museum collection was contributed by Walton from Arecibo, Porto Rico, being part of the material from which the species was described. It was first discovered at the Isle of Pines, near Cuba.

Family DIPLODONTIDÆ.

Genus DIPLODONTA Bronn, 1831.

Shell suborbicular, rather thin, white, concentrically striate, without a lunule; hinge with two cardinals in each valve, the posterior in the right and the anterior of the left bifid; lateral teeth wanting; muscular impressions oval, elongated; margins of the shell smooth.

Section DIPLODONTA s. s.

Diplodonta nucleiformis Wagner.

Mysia nucleiformis Wagner, Journ. Acad. Nat. Sci. Phila., VIII, p. 52, pl. 1, fig. 4, 1838.

Cytherea sphaerica H. C. Lea, Trans. Am. Phil. Soc., 2d series, IX, p. 241, pl. XXXIV, fig. 22, 1845.

Mayaguez Harbor, Porto Rico, at station 6062, in 30 fathoms, sand, and off Culebra Island. Also at St. Thomas and northward to the vicinity of Cape Hatteras, North Carolina, in 15 to 52 fathoms; fossil in the Miocene and upper Oligocene of the eastern United States.

Section PHLYCTIDERMA Dall, 1899.

Diplodonta notata, n. sp.

Shell suborbicular, with rather high, nearly central beaks, scarcely inflated; surface with very delicate growth lines, minutely pitted throughout excepting in the umbonal region; left valve with two cardinals, the hinder compressed, the anterior triangular and deeply bifid; right valve with the hinder tooth bifid and the anterior compressed; ligament almost wholly internal, narrow; muscle scars somewhat elongated; interior rather smooth. Color white.

Length, 9; height, 8.5; diameter, 3.5 mm.

Mayaguez Harbor, Porto Rico, one pair and a single valve. It ranges from Marco, Florida, south to Porto Rico.

Diplodonta puncturella Dall.

Diplodonta puncturella Dall, Trans. Wagner Inst., III, p. 1183, pl. XLV, fig. 26, 1900.

San Juan Harbor, Porto Rico; also Jamaica.

Family CHAMIDÆ.

Genus CHAMA (Linnæus) Lamarck, 1799.

Shell attached, irregular, inequivalve, thick; beaks spiral or subspiral, that of the fixed valve always the longer; surface lamellated; the free valve operculiform, slightly convex, sometimes right and sometimes left; hinge thick, bearing an anterior groove, an oblique, arched cardinal, and an oblique, straight furrow; fixed valve more convex and larger than the other; hinge plate thick, with one strong anterior cardinal and a curved posterior tooth; border of the valves crenated.

Chama macrophylla Gmelin.

Chama macrophylla Gmelin, Syst. Nat., p. 3304, 1792; Chemnitz, Conch. Cab., VII, p. 149, pl. LII, figs. 514, 515.

Quebradillas, Porto Rico (Gundlach).

Chama sarda Reeve.

Chama sarda Reeve, Conch. Icon., IV, pl. VII, fig. 40, 1847.

Shell small, somewhat orbicular; attached valve deeper than the free one, irregular; surface bearing subconcentric rows of wavy scales, white, clouded with brown and white, crimson and white, or crimson, the upper valve often having curved radiating rays of red on a white ground; ligament short, curved; left valve with an anterior tooth, behind which is a pit; right with an anterior pit and behind it a tooth; teeth blunt and rounded; beak cavity of the lower valve deep, that of the upper valve often deep; muscle scars rather long; border faintly crenate.

Length, 27; height, 30; diameter, 23 mm.

San Geronimo, Mayaguez, San Juan, Porto Rico; Vieques; mostly young and worn valves.

This species is much smaller than *C. macrophylla*, and may generally be distinguished by its different and often beautiful color patterns and the crimson and white staining of the free valve.

Subgenus *ECHINOCHEMA* Fischer, 1887.

Shell nearly regular and equivalve, attached when young by the right valve; lunule large.

Chama arcinella Linnæus.

Chama arcinella Linnæus, Syst. Nat., ed. XII, p. 1139, 1767; Reeve, Conch. Icon., IV, pl. v, fig. 26, a, b, 1846.

Shell somewhat quadrate, inflated, solid, nearly equivalve, with the beaks curved forward over a large, wide lunule; ligament partly buried; surface covered with very coarse granulations or small pustules, often arranged in rows, and having from eight to twenty curved, radiating, more or less spinose ribs; left valve with one curved cardinal, in front of which is a wide pit with small, radial crenations within it; right valve with a large, sculptured cardinal, which fits into the pit of the left valve; anterior muscle scar elongated; posterior scar oval; beak cavities deep or shallow; border of the valves crenate. Color white without, white or purple within.

Length of a large shell without the spines, 43; height, 40; diameter, 30 mm. Same shell, measuring over all, length, 53; height, 55; diameter, 40 mm.

Mayaguez Harbor, Porto Rico, a number of valves.

The shell is attached when young by the right valve in front of the beak, generally to a piece of shell or to a specimen of its own species. Usually before it becomes adult it is detached, but still carries the scar or a fragment of the object to which it was fastened. Reeve figures a cluster of specimens of this species attached to each other. The nepionic shell is crimson or brown, unattached, and distinctly carditoid.

Family **VESICOMYACIDÆ**.Genus **VESICOMYA** Dall, 1864.

Shell small, smooth, or concentrically striate; hinge like that of *Meciocardia*, but without lateral teeth; epidermis polished; beaks moderately prominent; lunule circumscribed by a groove.

Mr. Smith, of the British Museum, has removed this group from the vicinity of the original *Callocardia* which, according to his observations and those of Sowerby, would belong to *Caryatis* Roemer and be placed in the *Veneridæ*. As the gill of *Vesicomya* is remarkably distinct in structure from any of the *Veneridæ* and indicates that it must be placed in a distinct family, the family name is here modified to accord with the present arrangement, having previously been used as *Callocardiidæ*.

Vesicomya pilula Dall.

Diplodonta pilula Dall, Bull. Mus. Comp. Zool., IX, p. 136, 1881.

Callocardia (*Vesicomya*) *pilula* Dall, Blake Report, pt. 1, p. 274, pl. VIII, fig. 13, 1886.

A few broken, worn valves of this species were obtained at Mayaguez.

Family **PLEUROPHORIDÆ**.Genus **CORALLIOPHAGA** Blainville, 1824.

Shell irregular, oblong, oval, or subcylindrical, rayed, smooth or lamellar, very inequilateral, thin; anterior side short; posterior end inflated; beaks rather prominent; hinge with two oblique cardinals in each valve and one posterior lateral; pallial line with a wide but shallow sinus.

Coralliophaga coralliophaga Gmelin.

Chama coralliophaga Gmelin, Syst. Nat., p. 3305, 1792; Chemnitz, Conch. Cat., X, p. 359, pl. 172, figs. 1673, 1674; Blainville Man., pl. 76, fig. 3, 1825.

A fragment of a bivalve, consisting of the beaks and a small part of the valves, which may be this species, was obtained at Puerto Real, Porto Rico. It is common in coral throughout the West Indies.

Family **CRASSATELLITIDÆ**.Genus **CRASSATELLITES** Krüger, 1823.

Shell equivalve, solid, subtriangular, with a distinct lunule; resilium in an internal groove; hinge usually with three cardinals in the right valve and two in the left; adductor muscle scars deep and rounded. It is *Crassatella* of authors, but not of Lamarek, 1799.

Subgenus **CRASSINELLA** Guppy, 1874.

Shells small, compressed, subtriangular, with two cardinals in each valve, the posterior one often obsolete.

Crassatellites guadelupensis d'Orbigny.

Crassatella guadelupensis d'Orbigny, Moll. Cubana, II, p. 289, pl. XXVII, figs. 24-26, 1845.

Shell small, somewhat inequilateral, irregularly triangular, rather solid, compressed, with sharp, high beaks, which are curved slightly backward over a long escutcheon; lunule long and shallow; surface with a few concentric, raised laminae, left valve with two cardinals and a posterior lateral with a deep groove above it; right valve with two cardinals and a long anterior lateral with a deep groove above it. Color whitish or brown, sometimes variegated.

Length, 4; height, 3; diameter, 1.5 mm.

Mayaguez, Porto Rico, four worn valves.

The posterior dorsal side is longer than the anterior dorsal side, and its outline is incurved. There are eight or ten concentric lamellae on adult shells.

Crassatellites martinicensis d'Orbigny.

Crassatella martinicensis d'Orbigny, Moll. Cubana, II, p. 288, pl. XXVII, figs. 21-23, 1845.

Shell very small, with high sharp beaks, the anterior and posterior slopes straight from the beaks, the two standing at a right angle with each other, compressed, the basal line from the lower end of the anterior and posterior slopes well rounded; surface with eight to ten raised, sharp, concentric lamellae, sometimes ornamented with a few feeble brown rays; hinge much as in *C. guadelupensis*. Color generally whitish.

Length, 2.25; height, 2; diameter, 1 mm.

Mayaguez, a number of valves.

In *C. guadelupensis* the outline of the anterior dorsal truncation is a little convex and that of the posterior dorsal truncation is concave. In *C. martinicensis* both outlines are straight, and the shell is more nearly equilateral.

Order ANOMALODESMACEA.

Superfamily POROMYACEA.

Family CUSPIDARIIDÆ.

Genus CUSPIDARIA Nardo, 1840.

Shell small, corbuliform, rostrate, smooth or sculptured, the radial sculpture, if any, predominant. Gills obsolete, and their remnants seated on a muscular septum between the perivisceral and anal chambers.

Subgenus CUSPIDARIA S. S.

Shell smooth.

Cuspidaria obesa Lovén.

Nucra obesa Lovén, Ind. Moll. Scand., p. 48, 1846; G. O. Sars, Moll. Reg. Arct. Norveg., p. 86, pl. 6, fig. 4 a-c.

Mayaguez Harbor, Porto Rico, at station 6062, in 30 fathoms, sand; also at Barbados, 100 fathoms, and at many localities in the North Atlantic and arctic seas, commonly in deep water. The presence of this shell and a number of others in comparatively shallow water of high temperature (75.8° F.) is one of the surprises afforded by this collection.

Subgenus CARDIOMYA A. ADAMS.

Shell with radial sculpture.

Cuspidaria perrostrata Dall.

Cuspidaria perrostrata Dall, Blake Report, Biv., p. 296, pl. II, figs. 3a, 3b, 1881.

Mayaguez Harbor, Porto Rico, in 30 fathoms, at station 6062.

Cuspidaria costellata Deshayes.

Corbula costellata Deshayes, Explor. Sci. Morée, Géol., p. 86, pl. VII, figs. 1-3, 1837.

Sphena alternata d'Orbigny, Moll. Cubana, II, p. 286, pl. XXVII, figs. 17-20, 1845.

With the last; also northward to North Carolina, in the Mediterranean, etc.

Cuspidaria ornatissima d'Orbigny.

Sphæra ornatissima d'Orbigny, Moll. Cubana, II, p. 286, pl. XXVII, figs. 13-16, 1845.
Næra costata Bush, Trans. Conn. Acad., VI, pt. II, p. 472, pl. XLV, fig. 21, 1885.

Mayaguez Harbor, Porto Rico, at station 6062, in 30 fathoms; also at St. Thomas, Guadeloupe, Martinique, and Cuba (d'Orbigny), and northward to Cape Hatteras, North Carolina.

Family VERTICORDIIDÆ.

Genus VERTICORDIA Wood, 1844.

Subgenus TRIGONULINA d'Orbigny, 1845.

Shell compressed laterally, small, very pearly, suborbicular, with a few very strong arcuate radial ribs, granular surface, and deep lunule; ossiculum long and narrow.

Verticordia ornata d'Orbigny.

Trigonulina ornata d'Orbigny, Moll. Cubana, II, p. 292, pl. XXVII, figs. 30-33, 1845.
Verticordia cæolata Verrill, Trans. Conn. Acad., V, p. 566, 1884; VI, pl. XXX, figs. 9, 9a.

Mayaguez Harbor, Porto Rico, at station 6062, in 30 fathoms, sand; also at Barbados, Cuba, Florida, and north to Marthas Vineyard, Massachusetts, and in Japan, California, and the Mediterranean.

Superfamily ANATINACEA.

Family LYONSIIDÆ.

Genus LYONSIA Turton, 1822.

Shell thin, pearly, longer than high, inequivalve, inequilateral, truncate behind; hinge edentulous, with the ligament in a sulcus, and a large lithodesma; pallial sinus obscure, angular.

Subgenus ENTODESMA Philippi, 1845.

Shell with a strong periostracum, gaping behind, the anterior end short, the surface without notable radial sculpture.

Section ENTODESMA s. s.

Shell large, coarse, opaque, irregular, nestling, subquadrate, with a very large lithodesma. Type, *E. chilense* Philippi.

Section PHILIPPINA Dall, 1901.

Shell small, thin, polished, very inequilateral, anterior end attenuated, very short; gaping below, compressed behind, commensal with sponges or compound ascidians. Type, *L. beana* d'Orbigny.

This is a small but peculiar group which often shows color painting, which the other sections of *Lyonsia* do not. *L. picta* Gray, *L. diaphana* Carpenter, and *L. inflata* Conrad are also probably referable to it.

Lyonsia beana d'Orbigny.

Lyonsia beana d'Orbigny, Moll. Cubana, II, p. 225, pl. XXV, figs. 26-28, 1845.

Vieques; also Cuba and other islands of the West Indies, and north to North Carolina.

It is probable that d'Orbigny intended to name this species after M. Beau, who collected it, but the name is spelled in his text as above and also on the legend to his plate.

SYSTEMATIC CATALOGUE OF THE MOLLUSKS OF PORTO RICO.

Subkingdom MOLLUSCA.

Class CEPHALOPODA.

Order DIBRANCHIATA.

Suborder OCTOPODA.

Family OCTOPODIDÆ.

Genus OCTOPUS Lamarck.

Octopus americanus d'Orbigny.*Octopus granulatus* Lamarck.*Octopus tchuelchus* d'Orbigny.*Octopus tuberculatus* Blainville?

Suborder SEPIOPHORA.

Family LOLIGINIDÆ.

Genus LOLIGO Lamarck.

Loligo gahi d'Orbigny.

Family SPIRULIDÆ.

Genus SPIRULA Lamarck.

Spirula australis Lamarck.

Class GASTROPODA.

Subclass ANISOPLEURA.

(EUTHYNEURA.)

Order PTEROPODA.

Suborder THECOSOMATA.

Family CAVOLINIDÆ.

Genus CLEODORA Peron & Lesueur.

Subgenus CRESEIS Rang.

Creseis subula Quoy & Gaimard.

Genus STYLIOLA (Lesueur) Gray.

Styliola acicula Rang.

Genus CUVIERINA Boas.

Cuvierina columella Rang.

Genus CAVOLINA Abildgaard.

Carolina trispinosa Lesueur.*Carolina longirostris* Lesueur.*Carolina uncinata* Rang.*Carolina inflexa* Lesueur.*Carolina gibbosa* Rang.

Order OPISTHOBRANCHIATA.

Suborder TECTIBRANCHIATA.

(CEPHALASPIDEA.)

Family ACTÆONIDÆ.

Genus ACTÆON Montfort.

Actæon punctostriatus C. B. Adams.

Family RINGICULIDÆ.

Genus RINGICULA Deshayes.

Ringicula semistriata d'Orbigny.

Family TORNATINIDÆ.

Genus TORNATINA A. Adams.

Tornatina bullata Kiener.*Tornatina camdei* d'Orbigny.

Genus VOLVULA A. Adams.

Volvula oxytata Bush.*Volvula acuta* d'Orbigny.

Genus RETUSA Brown.

Retusa calata Bush.

Family BULLIDÆ.

Genus BULLA Linnaeus.

Bulla amygdala Dillwyn.

Family AKERATIDÆ.

Genus HAMINEA Leach.

Haminea elegans Gray.*Haminea succinea* Conrad.

Family HYDATINIDÆ.

Genus HYDATINA Schumacher.

Hydatina physis Linnaeus.

Genus MICROMELO Pilsbry.

Micromelo undata Bruguière.

Family SCAPHANDRIDÆ.

Genus ATYS Montfort.

Subgenus ATYS s. s.

Atys guildinii Sowerby.*Atys sandersoni* Dall.

Systematic catalogue of the mollusks of Porto Rico—Continued.

(ANASPIDEA.)

Family APLYSIDÆ.

Subfamily APLYSINÆ.

Genus TETHYS Linnaeus.

Tethys protea Rang.*Tethys cervina* Dall & Simpson.*Tethys parvula* (Guilding) Mörch.

Subfamily DOLABRIFERINÆ.

Genus DOLABRIFERA Gray.

Dolabrifera ascifera Rang.*Dolabrifera sowerbyi* Guilding.

Genus NOTARCHUS Cuvier.

Notarchus pleii Rang.

(NOTASPIDEA.)

Family PLEUROBRANCHIDÆ.

Genus PLEUROBRANCHUS Cuvier.

Pleurobranchus lacteus Dall & Simpson.

Order NUDIBRANCHIATA.

Family DORIDIDÆ CRYPTOBRANCHIATÆ.

Genus GEITODORIS Bergh.

Geitodoris mollina Bergh.

Order PULMONATA.

Suborder BASOMMATOPHORA.

Superfamily AKTEOPHILA.

Family AURICULIDÆ.

Genus MELAMPUS Montfort.

Subgenus MELAMPUS s. s.

Melampus coffeus Linnaeus.*Melampus flavus* (Gmelin?) Binney.

Genus TRALIA Gray.

Subgenus TRALIA s. s.

Tralia pusilla Gmelin.

Genus PEDIPES Scopoli.

Pedipes mirabilis Mühlfeld.

Genus BLAUNERIA Shuttleworth.

Blauneria heteroclita Montagu.

Superfamily LIMNOPHILA.

Family LIMNÆIDÆ.

Subfamily LIMNÆINÆ.

Genus LIMNÆA Lamarck.

Limnæa cubensis Pfeiffer.

Subfamily PLANORBINÆ.

Genus PLANORBIS Geoffroy.

Planorbis guadaloupensis Sowerby.*Planorbis tumidus* Pfeiffer.*Planorbis riisei* Dunker.*Planorbis refulgens* Dunker.*Planorbis haldemani* C. B. Adams.*Planorbis schrammi* Crosse.*Planorbis lucidus* Pfeiffer.*Planorbis macnabianus* C. B. Adams.*Planorbis circumlineatus* Shuttleworth.

Genus PLANORBULA Haldeman.

Planorbula albicans Pfeiffer.

Family ANCYLIDÆ.

Genus ANCYLUS Geoffroy.

Ancylus obscurus Haldeman.*Ancylus beau* Bourguignat.

Family PLYSIDÆ.

Genus APLEXA Fleming.

Aplexa sowerbyana d'Orbigny.

Suborder STYLOMMATOPHORA.

Superfamily DITREMATA.

(VASOPULMONATA).

Family ONCHIDIIDÆ.

Genus ONCHIDELLA Gray.

Onchidella floridana Dall.

Family VERONICELLIDÆ.

Genus VERONICELLA Blainville.

Veronicella occidentalis Guilding.

(ORTHURETHRA.)

Family PUPIDÆ.

Genus BIFIDARIA Sterki.

Bifidaria pellucida Pfeiffer.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Genus PUPOIDES Pfeiffer.

Pupoides marginatus Say.

Genus VERTIGO Müller.

Vertigo hexodon C. B. Adams.

(HETERURETHRA.)

ELASMOGNATHA.

Family SUCCINEIDÆ.

Genus SUCCINEA Draparnaud.

Succinea hyalina Shuttleworth.*Succinea approximans* Shuttleworth.*Succinea riisei* Pfeiffer.

(SIGMURETHRA.)

AULACOPODA.

Family ZONITIDÆ.

Genus VITREA Fitzinger.

Vitrea insecta von Martens.*Vitrea bryodes* Shuttleworth.

Genus ZONITOIDES Lehmann.

Zonitoides minusculus Binney.

Genus GUPPYA Mörch.

Guppya gundlachi Pfeiffer.

(AGNATHOMORPHIA.)

Family GLANDINIDÆ.

Genus GLANDINA Schumacher.

Glandina portoricensis Pfeiffer.*Glandina terebraformis* Shuttleworth.*Glandina sulculosa* Shuttleworth.*Glandina interrupta* Shuttleworth.*Glandina glabra* Pfeiffer.

Family CIRCINARIIDÆ.

Genus CIRCINARIA Beck.

Circinaria concolor Férussac.

(HOLOPODA.)

Family STENOGYRIDÆ.

Genus LEPTINARIA Beck.

Leptinaria antillarum Shuttleworth.*Leptinaria stylodon* Shuttleworth.*Leptinaria opalescens* Shuttleworth.

Genus STENOGYRA Shuttleworth.

Stenogyra terebraster Lamarck.*Stenogyra swifftiana* Pfeiffer.

Genus OPEAS Albers.

Opeas subula Pfeiffer.*Opeas micrus* d'Orbigny.*Opeas margaritaceus* Shuttleworth.*Opeas alabastrinus* Shuttleworth.*Opeas gompharium* Shuttleworth.*Opeas goodalli* Miller.

Genus SUBULINA Beck.

Subulina octona Bruguière.*Subulina acicularis* Shuttleworth.

Genus SPIRAXIS C. B. Adams.

Spiraxis paludinoïdes d'Orbigny.

Genus PSEUDOBALEA Shuttleworth.

Pseudobalea dominicensis Pfeiffer.

Family CLAUSILIIDÆ.

Genus CLAUSILIA Draparnaud.

Clausilia bicanaliculata Férussac.

Family UROCOPTIDÆ.

Genus PINERIA Poey.

Pinercia viequensis Pfeiffer.

Genus CERION Bolten.

Subgenus STROPHIOPS Dall.

Cerion crassilabre Sowerby.*Cerion striatellum* (Férussac) Guérin.*Cerion microstoma* Pfeiffer.

Genus MACROCERAMUS Guilding.

Macroceramus microdon Pfeiffer.*Macroceramus shuttleworthi* von Martens.*Macroceramus johannis* Pfeiffer.

Genus BRACHYPODELLA Beck.

Brachypodella pallida Guilding.*Brachypodella portoricensis* Pfeiffer.*Brachypodella riisei* Pfeiffer.

Family BULIMULIDÆ.

Subfamily AMPHIBULIMINÆ.

Genus SIMPULOPSIS Beck.

Subgenus PLATYSUCCINEA Ancy.

Simpulopsis portoricensis Shuttleworth.*Simpulopsis psidii* von Martens.

Genus GÆOTIS Shuttleworth.

Gæotis nigrolineata Shuttleworth.*Gæotis flavolineata* Shuttleworth.*Gæotis malleata* Pilsbry.*Gæotis albopunctulata* Shuttleworth.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Subfamily BULIMULINÆ.

Genus BULIMULUS Leach.

Subgenus BULIMULUS s. s.

Bulimulus exilis Gmelin.*Bulimulus exilis* var. *eyriesii* Drouet.*Bulimulus diaphanus* Pfeiffer.

Genus DRYMÆUS Albers.

Subgenus DRYMÆUS s. s.

Drymæus hjalmarsoni Pfeiffer.*Drymæus lilaceus* Férussac.*Drymæus elongatus* Bolten.

Family HELICIDÆ.

Subfamily SAGDINÆ.

Genus THYSANOPHORA Strebel & Pfeiffer.

Thysanophora dioscoricola C. B. Adams.*Thysanophora plagiptycha* Shuttleworth.*Thysanophora krugiana* von Martens.*Thysanophora vortex* Pfeiffer.*Thysanophora subaquila* Shuttleworth.*Thysanophora euclasta* Shuttleworth.*Thysanophora musicola* Shuttleworth.*Thysanophora portoricensis* Pfeiffer.*Thysanophora velutina* Lamarck.*Thysanophora arecibensis* Pfeiffer.

Subfamily HELICINÆ.

Genus CEPOLIS Montfort.

Cepolis dermatina Shuttleworth.*Cepolis squamosa* Férussac.*Cepolis roisei* Pfeiffer.*Cepolis diaphana* Lamarck.

Subfamily CAMÆNINÆ.

Genus PLEURODONTE F. de Waldheim.

Subgenus PLEURODONTE s. s.

Pleurodonte carocolla Linnaeus.*Pleurodonte bornii* Pfeiffer.

Subgenus POLYDONTES Montfort.

Pleurodonte angulata Férussac.*Pleurodonte obliterata* Férussac.*Pleurodonte lugullensis* Shuttleworth.*Pleurodonte lima* Férussac.*Pleurodonte custrensis* Pfeiffer.*Pleurodonte incerta* Férussac.

Superorder STREPTONEURA.

Order CTENOBRANCHIATA.

Suborder ORTHODONTA.

Superfamily TOXOGLOSSA.

Family TEREBRIDÆ.

Genus TEREBRA Bruguière.

Terebra cinerea Born.*Terebra hastata* Gmelin.*Terebra protexta* Conrad.*Terebra juanica* Dall & Simpson.*Terebra nassula* Dall.*Terebra limatula* var. *aerrior* Dall.

Family CONIDÆ.

Genus CONUS Linnaeus.

Conus delesserti Recluz.*Conus agassizii* Dall.*Conus pygmaeus* Reeve.*Conus verrucosus* Hwass.*Conus mus* Hwass.*Conus nebulosus* Solander.*Conus testudinarius* Hwass.

Family PLEUROTOMIDÆ.

Genus PLEUROTOMA Lamarck.

Subgenus PLEUROTOMA s. s.

Pleurotoma albida Perry.

Subgenus ANCISTROSYRINX Dall.

Pleurotoma radiata Dall.

Genus DRILLIA Gray.

Drillia ostrrearum Stearns.*Drillia albicoma* Dall.*Drillia eucosmia* Dall, var. *canna* Dall.*Drillia nigrescens* Gray.*Drillia? actinocyela* Dall & Simpson.*Drillia gundlachi* Dall & Simpson.*Drillia ponciana* Dall & Simpson.*Drillia melonesiana* Dall & Simpson.*Drillia interpleura* Dall & Simpson.*Drillia albinodata* Reeve.*Drillia albocincta* C. B. Adams.*Drillia solida* C. B. Adams.*Drillia thea* Dall.*Drillia apynota* Dall.*Drillia lissotropis* Dall.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Genus BORSONIA Bellardi.

Subgenus CORDIERIA Rouault.

Borsonia rouaulti Dall.

Genus MANGILIA (Leach) Risso.

Subgenus CYTHARA Schumacher.

Mangilia asarca Dall & Simpson.*Mangilia balteata* Reeve.*Mangilia densestriata* C. B. Adams.*Mangilia psila* Bush.*Mangilia biconica* C. B. Adams.

Subgenus DAPHNELLA Hinds.

Mangilia morra Dall.*Mangilia elata* Dall.

Subgenus GLYPHOSTOMA Gabb.

Mangilia aquadillana Dall & Simpson.

Subgenus MANGILIA s. s.

Mangilia luctuosa d'Orbigny.*Mangilia quadrata* Reeve.*Mangilia lavalleana* d'Orbigny.*Mangilia rubella* Kurtz & Stimpson?*Mangilia melanitica* Dall.*Mangilia trilineata* C. B. Adams.

Family CANCELLARIIDÆ.

Genus CANCELLARIA Lamarck.

Subgenus CANCELLARIA s. s.

Cancellaria reticulata Linnæus.

Subgenus TRIGONOSTOMA Blainville.

Cancellaria agassizii Dall.

Superfamily RACHIGLOSSA.

Family OLIVIDÆ.

Genus OLIVA Bruguière.

?Oliva litterata Lamarck.*Olivea reticularis* Lamarck.*Olivea caribæensis* Dall & Simpson.

Genus OLIVELLA Swainson.

Olivella jaspidea Gmelin.*Olivella esther* Duclos.*Olivella mutica* Say.*Olivella rotunda* Dall.*Olivella oryza* Lamarck.*Olivella nivea* Gmelin.*Olivella verreauxi* Duclos.

Family MARGINELLIDÆ.

Genus MARGINELLA Lamarck.

Marginella apicina Menke.*Marginella hematita* Kiener.*Marginella striata* Sowerby.*Marginella evadne* Dall & Simpson.*Marginella torticula* Dall.*Marginella avena* Valenciennes.*Marginella albolineata* d'Orbigny.*Marginella lactea* Kiener.*Marginella fusca* Sowerby.*Marginella subtriplicata* d'Orbigny.*Marginella pallida* Donovan.

Subgenus PERSICULA Schumacher.

Marginella catenata Montagu.*Marginella catenata* var. *pulcherrima* Gas-
koin.*Marginella interruptelineata* Mühlfeld.

Subgenus VOLUTELLA Swainson.

Marginella ovuliformis d'Orbigny.

Family VOLUTIDÆ.

Genus VOLUTA (Linnæus) Lamarck.

Voluta musica Linnæus.

Family TURBINELLIDÆ.

Genus TURBINELLA Lamarck.

Subgenus VASUM Link.

Turbinella muricata Born.

Family MITRIDÆ.

Genus MITRA Lamarck.

Mitra barbadensis Gmelin.*Mitra nodulosa* Gmelin.*Mitra hanleyi* var. *gemmata* Sowerby.*Mitra straminea* A. Adams.*Mitra microzonius* Lamarck.

Genus MITROMORPHA A. Adams.

Mitromorpha biplicata Dall.

Family FASCIOLARIIDÆ.

Genus FASCIOLARIA Lamarck.

Fasciolaria gigantea Kiener.*Fasciolaria tulipa* Linnæus.

Genus LATIRUS Montfort.

Subgenus LEUCOZONIA Gray.

Latirus cinguliferus Lamarck.*Latirus ocellatus* Gmelin.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Subgenus LATIRUS s. s.

Latirus brevicaudatus Reeve.
Latirus infundibulum Gmelin.

Family BUCCINIDÆ.

Genus PISANIA Bivona.

Pisania pusio Linnæus.

Genus TRITONIDEA Swainson.

Tritonidea tincta Conrad.
Tritonidea tincta var. *bermudensis* Dall.
Tritonidea auritula Link.
Tritonidea orbignyi Payraudeau.

Genus NASSARINA Dall.

Nassarina glypta Bush.
Nassarina melabrunnea Dall & Simpson.

Genus PHOS Montfort.

Phos caudei d'Orbigny.
Phos parvus C. B. Adams.
Phos oxyglyptus Dall & Simpson.

Genus STRONGYLOCERA Mörch.

Strongylocera unicineta Say.

Genus ENGINA Gray.

Engina turbinella Kiener.

Family NASSIDÆ.

Genus NASSA Lamarek.

Nassa vibex Say.
Nassa ambigua Montagu.
Nassa hotessieri d'Orbigny.

Family COLUMBELLIDÆ.

Genus COLUMBELLA Lamarek.

Subgenus COLUMBELLA s. s.

Columbella mercatoria (Linnæus) Lam.

Subgenus ANACHIS H. & A. Adams.

Columbella pulchella Kiener.
Columbella iontha Ravenel.
Columbella catenata Sowerby.
Columbella obesa C. B. Adams.
Columbella calliglypta Dall & Simpson.

Subgenus ASTYRIS H. & A. Adams.

Columbella ducclosiana d'Orbigny.
Columbella perpicta Dall & Simpson.

Genus NITIDELLA Swainson.

Nitidella nitidula Linnæus.
Nitidella levigata Linnæus.
Nitidella cribraria Lamarek.

Genus PYRENE Bolten.

Pyrene ovulata Lamarek.

Family MURICIDÆ.

Subfamily MURICINÆ.

Genus MUREX Linnæus.

Subgenus MUREX s. s.

Murex messorius Sowerby.
Murex antillarum Hinds.

Subgenus CHICOREUS Montfort.

? *Murex rufus* Lamarek.
Murex brevifrons Lamarek.

Subgenus PHYLONOTUS Swainson.

Murex pomum Gmelin.
Murex micromeris Dall.

Subgenus FAVARTIA Jousseauine.

Murex cellulosus Conrad.
Murex intermedius C. B. Adams.

Genus MURICIDEA (Swainson) Mörch.

Subgenus MURICIDEA s. s.

Muricidea hexagona Lamarek.

Subgenus PSEUDONEPTUNEA Kobelt.

Muricidea multangula Philippi.

Genus ASPELLA Mörch.

Aspella scalaroides Blainville.

Subfamily PURPURINÆ.

Genus PURPURA Bruguière.

Purpura patula Linnæus.
Purpura hæmastoma var. *undata* Lam.
Purpura hæmastoma var. *floridana* Conrad.
Purpura trinitatensis Guppy.
Purpura deltoidea Lamarek.

Genus SISTRUM Montfort.

Sistrum nodulosum C. B. Adams.

Family CORALLIOPHILIDÆ.

Genus CORALLIOPHILA H. & A. Adams.

Coralliophila abbreviata Lamarek.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Superfamily STREPTODONTA.

Family SCALIDÆ.

Genus SCALA (Humphrey) auctorum.

- Scala angulata* Say.
Scala turricula Sowerby.
Scala unifasciata Sowerby.
Scala eulita Dall & Simpson.

Subgenus ACRILLA Adams.

- Scala retifera* Dall.

Superfamily GYMNOGLOSSA.

Family EULIMIDÆ.

Genus EULIMA Risso.

- Eulima oleacea* Kurtz & Stimpson.
Eulima conoidea Kurtz & Stimpson.

Subgenus LEOSTRACA H. & A. Adams.

- Eulima patula* Dall & Simpson.
Eulima acuta Sowerby.

Genus NISO Risso.

- Niso portoricensis* Dall & Simpson.

Family PYRAMIDELLIDÆ.

Genus PYRAMIDELLA Lamarek.

- Pyramidella subdolabrata* Mörch.

Genus TURBONILLA Risso.

- Turbonilla reticulata* C. B. Adams?
Turbonilla portoricana Dall & Simpson.
Turbonilla insularis Dall & Simpson.

Superfamily NUCLEBRANCHIATA.

Family ATLANTIDÆ.

Genus ATLANTA Lesueur.

- Atlanta peronii* Lesueur.

Superfamily TÆNIOGLOSSA.

Family SEPTIDÆ.

Genus DISTORTRIX Link.

- Distortrix reticulata* Link.
Distortrix reticulata var. *clathrata* Dall.

Genus GYRINEUM Link.

- Gyrineum cruentatum* Reeve.

Genus SEPTA Perry.

- Septa tritonis* var. *nobilis* Conrad.

Genus COLUBRARIA Schumacher.

- Colubraria lanceolata* Menke.

Genus RANULARIA Schumacher

- Ranularia tuberosa* Lamarek.

Genus LAMPUSIA Schumacher.

- Lampusia pilearis* Lamarek.
Lampusia chlorostoma Lamarek.
Lampusia cynocephala Lamarek.

Genus LOTORIUM Montfort.

- Lotorium femorale* Linnæus.

Family CASSIDIDÆ.

Genus CASSIS Lamarek.

Subgenus CASSIS s. s.

- Cassis tuberosa* Linnæus.
Cassis flammea Linnæus.

Subgenus CYPRÆCASSIS Stutchbury.

- Cassis testiculus* Linnæus.

Subgenus SEMICASSIS Mörch.

- Cassis inflata* Shaw.

Genus SCONSIA Gray.

- Sconsia striata* Lamarek.

Genus LAMBIDIUM Link.

- Lambidium oniscus* Linnæus.

Family DOLIIDÆ.

Genus DOLIUM Lamarek.

- Dolium perdia* Linnæus.
Dolium galea Linnæus.

Family AMPHIPERASIDÆ.

Genus ULTIMUS Montfort.

- Ultimus gibbosus* Linnæus.

Family CYPREIDÆ.

Genus CYPRÆA Linnæus.

- Cypræa exanthema* Linnæus.
Cypræa cinerea Gmelin.
Cypræa spurca Linnæus.

Family TRIVIIDÆ.

Genus TRIVIA Gray

- Trivia pediculus* Linnæus.
Trivia quadripunctata Gray.
Trivia quadripunctata var. *rotunda*
 Kiener.

Genus ERATO Risso.

- Erato maugerie* Gray.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Family STROMBIDÆ.

Subfamily STROMBINÆ.

Genus STROMBUS Linnæus.

- Strombus gigas* Linnæus.
Strombus pugilis Linnæus.
Strombus costatus Gmelin.
Strombus bituberculatus Lamarck.
Strombus gallus Linnæus.

Family TRIFORIDÆ.

Genus TRIFORIS Deshayes.

Subgenus TRIFORIS s. s.

- Triforis turristhoma* Dillwyn.
Triforis melanura C. B. Adams.
Triforis intermedia C. B. Adams.
Triforis samana Dall.

Family CERITHIOPSISIDÆ.

Genus SEILA A. Adams.

- Seila terebralis* C. B. Adams.

Genus CERITHIOPSIS Forbes & Hanley.

- Cerithiopsis crystallina* Dall.
Cerithiopsis pulchella Jeffreys.
Cerithiopsis pupa Dall & Simpson.
Cerithiopsis subulata Montagu.

Family CERITHIIDÆ.

Genus CERITHIUM Bruguière.

- Cerithium algicola* C. B. Adams.
Cerithium uncinatum Gmelin.
Cerithium atratum Born.
Cerithium litteratum Born.
Cerithium litteratum var. *semiferrugineum* Lamarck.
Cerithium variabile C. B. Adams.
Cerithium minimum Gmelin.

Genus PYRAZUS Montfort.

- Pyrazus degeneratus* Dall.

Genus BITTIUM (Leach) Gray.

Subgenus DIASTOMA Deshayes.

- Bittium varium* Pfeiffer.
Bittium cerithioides Dall.

Family MODULIDÆ.

Genus MODULUS Gray.

- Modulus modulus* Linnæus.
Modulus catenulatus Philippi.

Family PLANAXIDÆ.

Genus PLANAXIS Lamarck.

- Planaxis nucleus* Wood.
Planaxis lineatus Da Costa.

Family VERMETIDÆ.

Genus VERMICULARIA Lamarck.

- Vermicularia spirata* Philippi.

Genus PETALOCOCHUS Lea.

- Petalocochnus erectus* Dall.

Genus BIVONIA Gray.

- Bivonia decussata* Lamarck.

Family TURRITELLIDÆ.

Genus TURRITELLA Lamarck.

- Turritella variegata* Linnæus.
Turritella exoleta Linnæus.

Family LITORINIDÆ.

Genus LITORINA Férussac.

- Litorina ziczac* Gmelin.
Litorina ziczac var. *lineata* Lamarck.
Litorina tessellata Philippi.
Litorina angulifera Lamarck.
Litorina columellaris d'Orbigny.
Litorina guttata Philippi.
Litorina mespilum Muhlfield.

Genus TECTARIUS Valenciennes.

- Tectarius muricatus* Linnæus.
Tectarius trochiformis Dillwyn.

Family LITIOPIDÆ.

Genus ALABA A. Adams.

- Alaba tervaricosa* C. B. Adams.

Family SOLARIIDÆ.

Genus SOLARIUM Lamarck.

- Solarium nobile* Hanley.
Solarium bisulcatum d'Orbigny.
Solarium krebsii Mörch.

Genus TORINIA Gray.

- Torinia cylindrica* Gmelin.
Torinia aethiops Menke.

Genus OMALAXIS Deshayes.

- Omalaxis exquisita* Dall & Simpson.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Family RISSOIDÆ.

Genus RISSOA Fréminville.

Rissoa epima Dall & Simpson.*Rissoa portoricana* Dall & Simpson.

Genus RISSOINA d'Orbigny.

Rissoina decussata Montagu.*Rissoina browniana* d'Orbigny.*Rissoina chesnelii* Michaud.*Rissoina cancellata* Philippi.

Subfamily HYDROBIINÆ.

Genus POTAMOPYRGUS Stimpson.

Potamopyrgus coronatus Pfeiffer.*Potamopyrgus coronatus* var. *crystallinus*
Shuttleworth.

Family CYCLOPHORIDÆ.

Genus MEGALOMASTOMA Guilding.

Megalomastoma croceum Gmelin.*Megalomastoma croceum* var. *curtum* Dall
& Simpson.*Megalomastoma hjalmarsoni* Pfeiffer.*Megalomastoma verruculosum* Shuttlew.

Family CYCLOSTOMATIDÆ.

Genus CHOANOPOMA Pfeiffer.

Choanopoma decussatum Lamarek.*Choanopoma senticosum* Shuttleworth.*Choanopoma sulculosum* Pfeiffer.

Genus CISTULA Gray.

Cistula riisei Pfeiffer.*Cistula aquadillensis* Pfeiffer.*Cistula lineolata* Lamarek.

Genus CHONDROPOMA Pfeiffer.

Chondropoma terebra Pfeiffer.*Chondropoma blauneri* Shuttleworth.*Chondropoma swifti* Shuttleworth.*Chondropoma newtoni* Shuttleworth.

Family TRUNCATELLIDÆ.

Genus TRUNCATELLA Risso.

Truncatella caribænsis Sowerby.*Truncatella subcylindrica* Linnaeus.*Truncatella pulchella* Pfeiffer.*Truncatella clathrus* Lowe.

Family CALYPTRÆIDÆ.

Genus CHEILEA Modeer.

Cheilea equestris Linnaeus.

Genus CALYPTRÆA Lamarek.

Calyptrea candeana d'Orbigny.

Genus CREPIDULA Lamarek.

Crepidula aculeata Gmelin.*Crepidula riisei* Dunker.*Crepidula protea* d'Orbigny.

Family AMALTHEIDÆ.

Genus AMALTHEA Schumacher.

Amalthea antiquata Linnaeus.*Amalthea subrufa* Lamarek.

Family XENOPHORIDÆ.

Genus XENOPHORA Fischer de Waldheim.

Xenophora caribæa Petit.

Family NATICIDÆ.

Genus NATICA Scopoli.

Natica carrena (Linnaeus) auctororum.*Natica sagraiana* d'Orbigny.

Section STIGMAULAX Mörch.

Natica sulcata Born.

Genus POLINICES Montfort.

Subgenus PAYRAUDEAUTIA Bucquoy,
Dautzenberg & Dollfus.*Polinices nubila* Dall.

Subgenus MAMILLA Schumacher.

Polinices uberina d'Orbigny.*Polinices lactea* Guilding.*Polinices mamillaris* Lamarek.

Genus SIGARETUS Lamarek.

Sigaretus martinianus Philippi.

Superfamily DOCOGLOSSA.

Family ACMÆIDÆ.

Genus ACMÆA Eschscholtz.

Acmaea candeana d'Orbigny.*Acmaea punctulata* Gmelin.*Acmaea punctulata* var. *pulcherrima* Guil-
ding.*Acmaea leucopleura* Gmelin.

Superfamily RHIPIDOGLOSSA.

Family COCCULINIDÆ.

Genus COCCULINA Dall.

Cocculina portoricensis Dall & Simpson.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Family PHASIANELLIDÆ.

Genus PHASIANELLA Lamarck.

Phasianella umbilicata d'Orbigny.
Phasianella tessellata Potiez & Michaud.

Family TURBINIDÆ.

Genus TURBO Linnaeus.

Turbo castaneus Gmelin.

Genus ASTRALIUM Link.

Astraliium calatum Gmelin.
Astraliium tuber Linnaeus.
Astraliium longispinatum Lamarck.
Astraliium americanum Gmelin.

Family TROCHIDÆ.

Genus CHLOROSTOMA Swainson.

Subgenus OMPHALIUS Philippi.

Chlorostoma scalare Anton.
Chlorostoma fasciatum Born.
Chlorostoma excavatum Lamarck.
Chlorostoma maculostriatum C. B. Adams.

Genus LIVONA Gray.

Livona pica Linnaeus.

Genus MICROGAZA Dall.

Microgaza rotella Dall.

Genus SOLARIELLA Searles Wood.

Solariella amabilis Jeffreys.

Genus CALLIOSTOMA Swainson.

Calliostoma jujubinum Gmelin.
Calliostoma jujubinum var. *rawsoni* Dall.

Family LIOTIDÆ.

Genus LIOTIA Gray.

Liotia gemma Tuomey & Holmes.

Family VITRINELLIDÆ.

Genus LEPTOGYRA Bush.

Leptogyra inconspicua Bush.

Family NERITIDÆ.

Genus NERITA (Linnaeus) Lamarck.

Nerita peloronta Linnaeus.
Nerita tessellata Gmelin.
Nerita tessellata var. *præcognita* C. B. Adams.
Nerita versicolor Lamarck.

Genus NERITINA Lamarck.

Neritina reclinata Say.
Neritina virginea Linnaeus.
Neritina viridis Linnaeus.

Family HELICINIDÆ.

Genus HELICINA Lamarck.

Helicina vinosa Shuttleworth.
Helicina umbonata Shuttleworth.
Helicina hjalmarsoni Pfeiffer.
Helicina striata Lamarck.
Helicina subfusca Menke.
Helicina fasciata Lamarck.
Helicina phasianella Sowerby.
Helicina trochulina d'Orbigny.
Helicina foveata Pfeiffer.

Genus STOASTOMA C. B. Adams.

Stoastoma portoricense Pfeiffer.

Superfamily ZYGOBRANCHIA.

Family FISSURELLIDÆ.

Subfamily FISSURELLINÆ.

Genus FISSURELLA Bruguière.

Subgenus FISSURELLA s. s.

Fissurella barbadiensis Gmelin.
Fissurella rosea Gmelin.
Fissurella nodosa Born.

Subgenus CLYPIDELLA Swainson.

Fissurella fascicularis Lamarck.

Subfamily FISSURELLIDINÆ.

Genus LUCAPINELLA Pilsbry.

Lucapinella limatula Reeve.

Genus LUCAPINA Gray.

Lucapina adspersa Philippi.
Lucapina cancellata Sowerby.

Subfamily EMARGINULINÆ.

Genus FISSURIDEA Swainson.

Fissuridea listeri d'Orbigny.
Fissuridea alternata Say.
Fissuridea alternata var. *dysoni* Reeve.
Fissuridea alternata var. *sayi* Dall.
Fissuridea variegata Sowerby.
Fissuridea viridula Lamarck.

Genus SUBEMARGINULA Blainville.

Submarginula octoradiata A. Adams.
Submarginula notata Linnaeus.
Submarginula rollandi Fischer.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Subclass AMPHINEURA.

Order POLYPLACOPHORA.

Family LEPIDOPLEURIDÆ.

Genus LEPIDOPLEURUS Risso.

Lepidopleurus pergranatus Dall.

Family CHITONIDÆ.

Subfamily ISCHNOCHITONINÆ.

Genus CHÆTOPLEURA Shuttleworth.

Chætopleura janeirensis Gray.

Genus ISCHNOCHITON Gray.

Subgenus STENOPLAX Carpenter.

Ischnochiton limaciformis Sowerby.
Ischnochiton purpurascens C. B. Adams.
Ischnochiton floridanus Pilsbry.

Subgenus TRACHYDERMON Carpenter.

Ischnochiton liozonis Dall & Simpson.

Subgenus ISCHNOCHITON s. s.

Ischnochiton striolatus Gray.
Ischnochiton striolatus var. *funiculatus*
Carpenter.
Ischnochiton papillosus C. B. Adams.
Ischnochiton reticulatus Reeve.

Subfamily CHITONIDÆ.

Genus CHITON Linnaeus.

Chiton tuberculatus Linnaeus.
Chiton tuberculatus var. *assimilis* Reeve.
Chiton squamosus Linnaeus.
Chiton viridis Spengler.
Chiton marmoratus Gmelin.

Genus ACANTHOPLEURA Guldin.

Acanthopleura granulata Gmelin.
Acanthopleura granulata var. *mucronu-*
lata Shuttleworth.

Genus CERATOZONA Dall.

Ceratozona rugosa Sowerby.

Genus ACANTHOCHITES Risso.

Acanthochites spiculosus Reeve.
Acanthochites spiculosus var. *astriger*
Reeve.
Acanthochites hemphilli Pilsbry.

Class SCAPHOPODA.

Order SOLENOCONCHA.

Family DENTALIIDÆ.

Genus DENTALIUM Linnaeus.

Subgenus DENTALIUM s. s.

Dentalium gouldii Dall.

Subgenus ANTALIS H. & A. Adams.

Dentalium taphrium Dall.
Dentalium disparile d'Orbigny.
Dentalium ceratum Dall.
Dentalium antillarum d'Orbigny.

Subgenus LÆVIDENTALIUM Cossmann.

Dentalium callipeplum Dall.
Dentalium matara Dall.

Subgenus EPISIPHON Pilsbry & Sharp.

Dentalium flum Sowerby.

Subgenus FUSTIARIA Stoliczka.

Dentalium stenoschisma Pilsb. & Sh.

Genus CADULUS Philippi.

Cadulus carolinensis var. *bushii* Dall.
Cadulus minusculus Dall.
Cadulus amiantus Dall.
Cadulus acus Dall.

Class PELECYPODA.

Order PRIONODESMACEA.

Superfamily NUCULACEA.

Family NUCULIDÆ.

Genus NUCULA Lamarck.

Nucula ageënsis Jeffreys.

Family LEDIDÆ.

Genus LEDA Schumacher.

Leda acuta Conrad.

Genus NEILONELLA Dall.

Neilonella corpulenta Dall.

Superfamily ARCACEA.

Family ARCIDÆ.

Subfamily PECTUNCULINÆ.

Genus GLYCYMERIS Da Costa.

Glycymeris pennaceus Lamarck.
Glycymeris pectinatus Gmelin.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Subfamily ARCAINÆ.

Genus ARCA Linnæus.

Subgenus ARCA Linnæus.

Arca occidentalis Philippi.
Arca umbonata Lamarck.

Subgenus BARBATIA (Gray) Adams.

Arca barbata Linnæus.
Arca candida Gmelin.
Arca reticulata Gmelin.
Arca adamsi (Shuttleworth) Smith.

Subgenus SCAPHARCA (Gray) Dall.

Arca campechensis Gmelin.
Arca deshayesi Hanley.
Arca secticostata Reeve.
Arca chemnitzii Philippi.

Superfamily PTERIACEA.

Genus PINNA Lamarck.

Pinna carnea Gmelin.

Genus ATRINA Gray.

Atrina rigida Dillwyn.

Family MELINIDÆ.

Genus MELINA Retzius.

Melina alata Gmelin.
Melina listeri Hanley.
Melina semiaurita Linnæus.

Family PTERIIDÆ.

Genus PTERIA Scopoli.

Pteria radiata Leach.

Superfamily OSTREIDÆ.

Family OSTREIDÆ.

Genus OSTREA Linnæus.

Ostrea virginica Gmelin.
Ostrea cristata Born.
Ostrea frons Linnæus.

Family PECTINIDÆ.

Genus PECTEN Müller.

Subgenus PECTEN s. s.

Pecten laurenti Gmelin.
Pecten ziczac Linnæus.
Pecten medius Lamarck.

Subgenus CHLAMYS Bolten.

Pecten mayaguezensis Dall & Simpson.
Pecten gibbus Linnæus.
Pecten nodosus Linnæus.
Pecten ornatus Lamarck.
Pecten lemniscatus Reeve.
Pecten caasperatus Sowerby.
Pecten antillarum Recluz.

Subgenus AMUSIUM Bolten.

Pecten nanus Verrill & Smith.
Pecten pourtalesianus Dall.

Family SPONDYLIDÆ.

Genus SPONDYLUS Linnæus.

Spondylus echinatus Martyn.

Genus PLICATULA Lamarck.

Plicatula gibbosa Lamarck.

Family LIMIDÆ.

Genus LIMA (Brugière) Cuvier.

Lima scabra Born.
Lima scabra var. *tenera* Sowerby.
Lima lima Linnæus.
Lima inflata Lamarck.
Lima hians Gmelin.

Genus LIMATULA S. Wood.

Limatula subauriculata Montagu.

Superfamily ANOMIACEA.

Family ANOMIIDÆ.

Genus ANOMIA (Linnæus) Müller.

Anomia simplex d'Orbigny.

Genus PODODESMUS Philippi.

Pododesmus rudis Broderip.

Superfamily MYTILACEA.

Family MYTILIDÆ.

Genus MYTILUS Bolten.

Mytilus hamatus Say.
Mytilus exustus Linnæus.

Genus MODIOLUS Lamarck.

Modiolus tulipus Lamarck.
Modiolus arborescens Dillwyn.
Modiolus cinnamomeus Lamarck.
Modiolus coralliophagus Gmelin.

Systematic catalogue of the mollusks of Porto Rico—Continued.

- Genus LITHOPHAGA Bolten.
Lithophaga antillarum d'Orbigny.
Lithophaga bisulcata d'Orbigny.
- Genus CRENELLA Brown.
Crenella divaricata d'Orbigny.
- Genus MODIOLARIA Beck.
Modiolaria lateralis Say.
- Order TELEODESMACEA.
 Superfamily MYACEA.
 Family GASTROCHLÆNIDÆ.
 Genus GASTROCHLÆNA Cuvier.
Gastrochæna cuneiformis Spengler.
 Family SAXICAVIDÆ.
 Genus SAXICAVELLA Fischer.
Saxicavella sagrinata Dall & Simpson.
 Family CORBULIDÆ.
 Genus CORBULA Lamarck.
Corbula disparilis d'Orbigny.
Corbula dietziana C. B. Adams.
Corbula sciffiana C. B. Adams.
Corbula aequivalvis Philippi.
Corbula caribæa d'Orbigny.
 Family MYACIDÆ.
 Genus SPHENIA Turton.
Sphenia antillensis Dall & Simpson.
 Superfamily MACTRACEA.
 Family MACTRIDÆ.
 Subfamily MACTRINÆ.
 Genus MACTRA (Linnaeus) Lamarck.
Mactra fragilis Gmelin.
Mactra alata Spengler.
 Family MESODESMATIDÆ.
 Subfamily ERVILIINÆ.
 Genus ERVILIA Turton.
Ervilia concentrica Gould.
 Superfamily SOLENACEA.
 Family SOLENIDÆ.
 Genus PSAMMOSOLEN Risso.
Psammosolen sanctæ-marthæ d'Orbigny.
- Genus SOLEN Linnaeus.
Solen obliquus Spengler.
 Superfamily TELLINACEA.
 Family PSAMMOBIIDÆ.
 Genus HETERODONAX Mörch.
Heterodomar bimaculatus Linnaeus.
 Genus TAGELUS Gray.
Tagelus gibbus Spengler.
 Genus ASAPHIS Modest.
Asaphis coccinea Martyn.
 Family DONACIDÆ.
 Genus DONAX Linnaeus.
Donax denticulata Linnaeus.
 Genus IPHIGENIA Schumacher.
Iphigenia brasiliensis Lamarck.
 Family SEMELIDÆ.
 Genus SEMELE Schumacher.
Semele proficua Pulteney.
Semele purpurascens Gmelin.
Semele bellastrata Conrad.
Semele nuculoides Conrad.
 Genus ABRA (Leach) Lamarck.
Abra equalis Say.
Abra lioica Dall.
Abra longicallus Scacchi.
 Genus CUMINGIA Sowerby.
Cumingia tellinoides Conrad var. *coarctata* Sowerby.
 Family TELLINIDÆ.
 Genus TELLINA Linnaeus.
Tellina radiata Linnaeus.
 Subgenus ARCOPAGIA Leach.
Tellina fausta Donovan.
Tellina persica Dall & Simpson.
Tellina linteæ Conrad.
Tellina alternata Say.
Tellina georgiana Dall.
Tellina respiciens d'Orbigny.
Tellina lineata Turton.
Tellina martinicensis d'Orbigny.
 Subgenus ANGULUS Megerle.
Tellina sybaritica Dall.
Tellina consobrina d'Orbigny.
Tellina vitrea d'Orbigny.

Systematic catalogue of the mollusks of Porto Rico—Continued.

Genus MACOMA Leach.

- Macoma constricta* Bruguière.
Macoma tenta Say var. *souleyetiana* Recluz.
Macoma pseudomera Dall & Simpson.

Subgenus PSAMMACOMA Dall.

- Macoma tageliformis* Dall.
Macoma brevifrons Say.

Genus STRIGILLA Turton.

- Strigilla carnaria* Linnæus.
Strigilla rombergii Mörch.
Strigilla fleuosa Say.
Strigilla pisiformis Linnæus.

Superfamily VENERACEA.

Family PETRICOLIDÆ.

Genus PETRICOLA Lamarck.

- Petricola lapicida* Gmelin.

Family VENERIDÆ.

Subfamily VENERINÆ.

Genus VENUS Linnæus.

- Venus rugatina* Heilprin.
Venus rugosa Gmelin.
Venus brasiliiana Gmelin.
Venus cancellata Linnæus.
Venus granulata Gmelin.
Venus latilirata Conrad.
Venus paphia Linnæus.
Venus pygmaea Lamarck.

Subgenus ANOMALOCARDIA Schumacher.

- Venus fleuosa* Linnæus.

Genus MERETRIX Lamarck.

- Meretrix albida* Gmelin.
Meretrix arista Dall & Simpson.
Meretrix hebraea Lamarck.
Meretrix maculata Linnæus.

Subgenus DIONE Gray.

- Meretrix circumata* Born.
Meretrix dione Linnæus.

Subgenus TRANSENNELLA Dall.

- Meretrix cubaniana* d'Orbigny.
Meretrix culabrana Dall & Simpson.

Genus DOSINIA Scopoli.

- Dosinia elegans* Conrad.

Genus MYSIA Leach.

- Mysia tenuis* Recluz.

Subfamily CIRCINÆ.

Genus CIRCE Schumacher.

Subgenus GOULDIA C. B. Adams.

- Gouldia cerina* C. B. Adams.
Gouldia insularis Dall & Simpson.

Superfamily CARDIACEA.

Family CARDIIDÆ.

Genus CARDIUM Linnæus.

Subgenus TRACHYCARDIUM Mörch.

- Cardium muricatum* Lamarck.
Cardium leucostoma Born.
Cardium isocardia Linnæus.

Subgenus FRAGUM Bolten.

- Cardium antillarum* d'Orbigny.
Cardium medium Linnæus.

Subgenus PAPHYRIDEA Swainson.

- Cardium spinosum* Meuschen.
Cardium semisulcatum Gray.

Subgenus LEVICARDIUM Swainson.

- Cardium serratum* Linnæus.
Cardium (serratum var.?) sybariticum Dall.
Cardium serratum var. *levigatum* Lam.
Cardium serratum var. *multilineatum* Dall & Simpson.

Genus PROTOCARDIA Beyrich.

- Protocardia peramabilis* Dall.
Protocardia tinctoria Dall.

Family THYASIRIDÆ.

Genus THYASIRA Leach.

- Thyasira trisinuata* d'Orbigny.
Thyasira conia Dall & Simpson.

Family LUCINIDÆ.

Genus CODAKIA Scopoli.

- Codakia orbicularis* Linnæus.

Subgenus JAGONIA Recluz.

- Codakia orbiculata* Montagu.
Codakia portoricana Dall.
Codakia costata d'Orbigny.
Codakia pectinella C. B. Adams.

Systematic catalogue of the mollusks of Porto Rico—Continued.

- Genus LUCINA (Bruguière) Lamarck.
Lucina chrysostoma Philippi.
Lucina phenax Dall & Simpson.
- Genus MYRTÆA Turton.
Myrtæa pristiphora Dall & Simpson.
- Genus PHACOIDES Blainville.
Phacoides pectinatus Gmelin.
- Subgenus HERE Gabb.
Phacoides pennsylvanicus Linnaeus.
Phacoides trisulcatus Conrad, var. *blan-*
chus Dall.
- Subgenus LUCINISCA Dall.
Phacoides muricatus Spengler.
- Subgenus LUCINOMA Dall.
Phacoides radians Conrad.
- Genus DIVARICELLA von Martens.
Divaricella quadrisulcata d'Orbigny.
- Family CYRENELLIDÆ.
 Genus CYRENOIDA Joannis.
Cyrenoida americana Morelet.
- Family DIPLODONTIDÆ.
 Genus DIPLODONTA Bronn.
Diplodonta nucleiformis Wagner.
Diplodonta notata Dall & Simpson.
Diplodonta puncturella Dall.
- Family CHAMIDÆ.
 Genus CHAMA (Linnaeus) Lamarck.
Chama macrophylla Gmelin.
Chama sarla Reeve.
- Subgenus ECHINOCHEMA Fischer.
Chama arcinella Linnaeus.

- Family VESICOMYACIDÆ.
 Genus VESICOMYA Dall.
Vesicomya pilula Dall.
- Family PLEUROPHORIDÆ.
 Genus CORALLIOPHAGA Blainville.
Coralliophaga coralliophaga Gmelin.
- Family CRASSATELLITIDÆ.
 Genus CRASSATELLITES Kruger.
 Subgenus CRASSINELLA Guppy.
Crassatellites guadelupensis d'Orbigny.
Crassatellites martinicensis d'Orbigny.
- Order ANOMALODESMACEA.
 Superfamily POROMYACEA.
 Family CUSPIDARIIDÆ.
 Genus CUSPIDARIA Nardo.
 Subgenus CUSPIDARIA s. s.
Cuspidaria obesa Lovèn.
- Subgenus CARDIOMYA A. Adams
Cuspidaria perrostrata Dall.
Cuspidaria costellata Deshayes.
Cuspidaria ornatissima d'Orbigny.
- Family VERTICORDIIDÆ.
 Genus VERTICORDIA Wood.
 Subgenus TRIGONULINA d'Orbigny.
Verticordia ornata d'Orbigny.
- Superfamily ANATINACEA.
 Family LYONSIDÆ.
 Genus LYONSIA Turton.
 Subgenus ENTODESMA Philippi.
Lyonsia beana d'Orbigny.

List of dredging stations of the U. S. Fish Commission steamer Fish Hawk about the island of Porto Rico, 1899.

Station No.	Date.	Locality.	Depth in fathoms.	Bottom.	Density at bottom.	Temperature at surface.	Temperature at bottom.
	1899.					°F.	°F.
6050	Jan. 13	Off San Juan	91	Sand, mud	1.026	77.0	79.0
6051	do	do	45	do	1.027	75.0	77.0
6052	do	do	310	do	1.028	79.0	73.2
6053	Jan. 16	San Juan Harbor	4-7½	Fine sand	1.0242	79.0	78.6
6054	do	do	4½-5½	Sand and mud	1.025	75.8	76.8
6055	Jan. 18	Off Aguadilla	137	Sand, mud, and shells	1.0248	79.0	75.0
6056	do	do	248	do	1.025	79.0	75.9
6057	Jan. 19	Mayaguez Harbor	4½	Sticky mud	1.028	75.8	77.0
6058	do	do	7¼	do	1.025	78.6	78.6
6059	do	do	7	do	1.027	78.6	84.0
6060	do	do	12	do	1.245	79.0	84.0
6061	Jan. 20	do	12-18	Sand and mud	1.024	79.0	78.6
6062	do	do	25-30	Sand, mud, and shells	1.024	78.6	75.8
6063	do	do	45-76	Rocky sand coral	1.025	78.5	68.5
6064	do	do	22-33	Sand and mud	1.0243	78.5	76.5
6065	do	do	4-6	Coral	1.0236	78.6	68.0
6066	do	do	16-17	Mud and sand	1.0246	78.6	73.2
6067	do	do	97-120	Coral	1.025	79.0	75.2
6068	Jan. 21	do	224-237	(?)	1.0242	82.0	73.5
6069	do	do	223-231	Sand and mud	1.0242	79.0	75.8
6070	do	do	220-225	Rocky	1.0242	78.6	75.9
6071	Jan. 24	Outside Mayaguez Harbor		(?)	1.0245	84.0	77.0
6072	Jan. 25	Off Point Melones	7¼	Coral, sand, shelly	1.023	78.6	78.6
6073	do	do	8	(?)	1.023	78.6	80.4
6074	do	Off Puerto Real	8½	Coral and sand	1.023	78.6	78.6
6075	do	Off Boca Prieta	8¼	do	1.023	78.6	76.8
6076	Jan. 26	Off Gallardo Bank	10	do	1.023	78.6	79.0
6077	do	do	10½	do	1.023	78.6	78.6
6078	do	do	11½	do	1.023	78.6	79.5
6079	Feb. 6	Off St. Thomas	20-23	Coral	1.0235	76.8	78.2
6080	do	do	20	do	1.0232	78.2	76.8
6081	do	Off Culebra Island	17	do	1.0232	78.2	80.0
6082	do	do	18	Rocky and coral	1.0232	77.2	79.6
6083	do	Off Vieques Island	25	(?)	1.0232	78.6	78.6
6084	Feb. 8	do	11	Coral, sand, shells	1.023	77.2	78.8
6085	do	do	14	do	1.0232	77.6	78.0
6086	do	Off Culebra Island	14½	Coral and sand	1.0232	77.8	77.8
6087	do	do	15½	do	1.0232	76.8	76.8
6088	Feb. 10	Off Vieques Island	23	Coral	1.024	76.8	77.6
6089	do	do	21	do	1.0233	76.8	78.2
6090	do	Off Culebra Island	16	do	1.0232	77.2	79.0
6091	do	Off Vieques Island	15	do	1.023	77.8	78.6
6092	do	do	16	do	1.023	76.8	77.2
6093	do	Off Culebra Island	15	do	1.0232	76.8	77.2
6094	Feb. 14	Off Vieques Island	12	do	1.0235	78.6	80.4
6095	do	do	12½	do	1.0236	78.6	80.4
6096	do	do	6	do	1.0236	79.5	81.1
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6098	do	do	12½	do	1.0232	78.6	79.5
6099	do	do	9½	do	1.0232	78.6	78.6

NOTE.—Owing to an inadvertence the series of numbers representing the stations, beginning with 6050 and ending with 6099, is represented on the Register of Mollusks of the U. S. National Museum, where the types illustrating this paper are preserved, by a series beginning with No. 122 and ending with No. 171. The latter numbers also appear on the labels.

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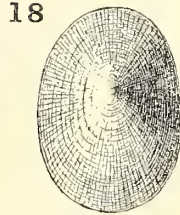
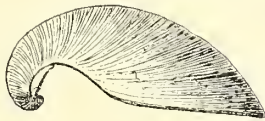
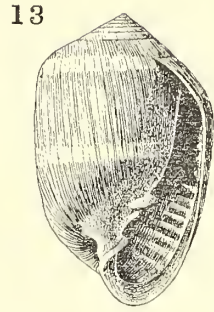
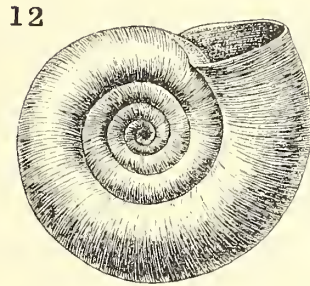
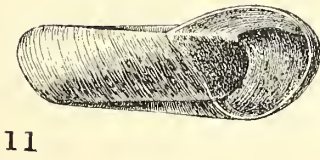
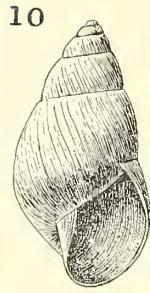
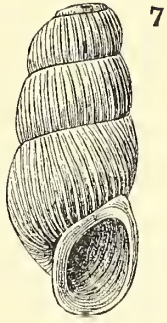
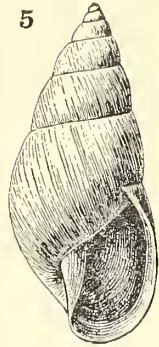
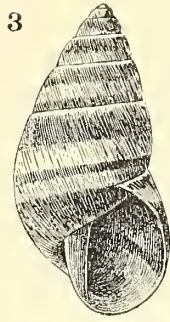
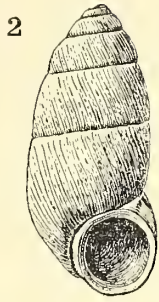
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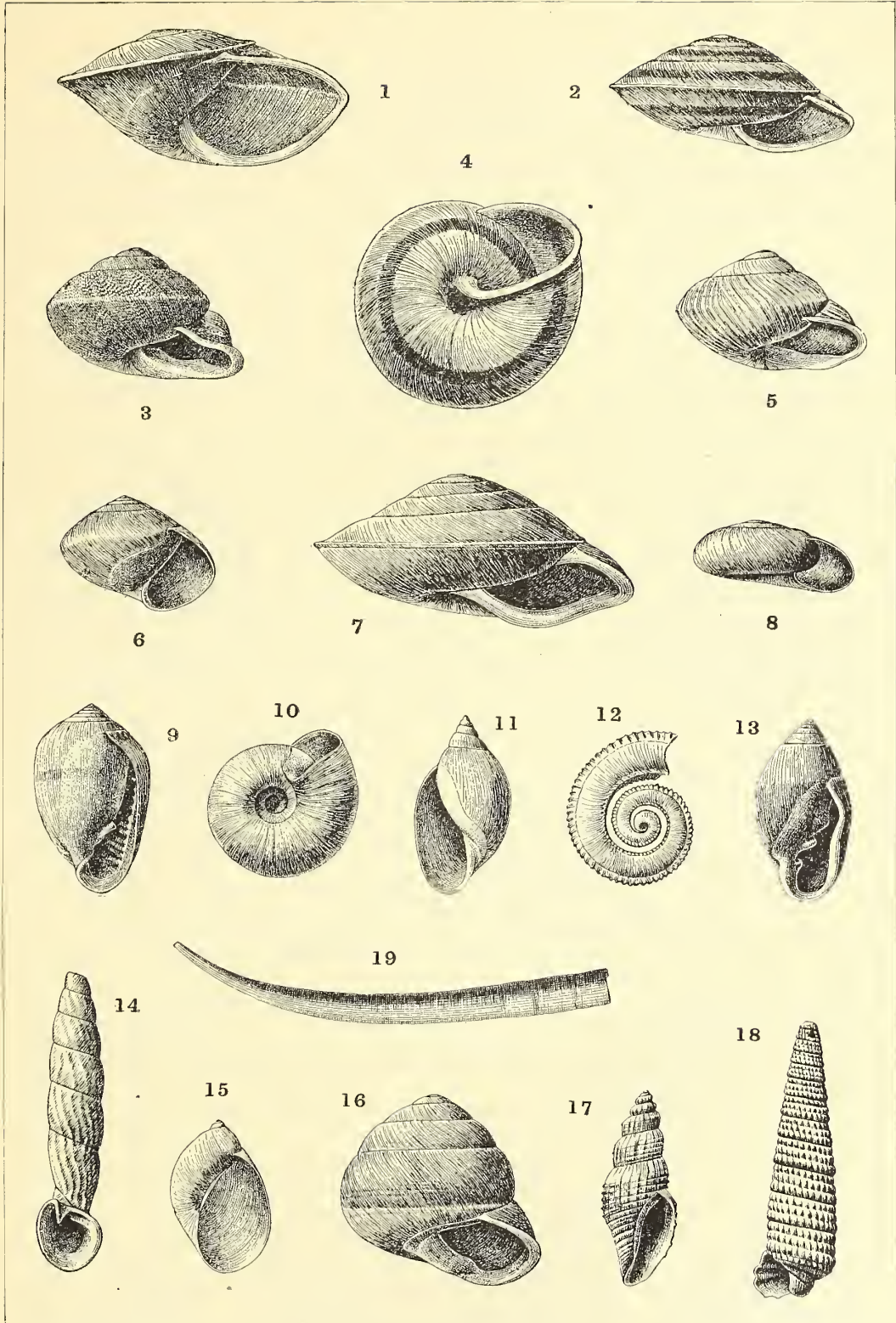
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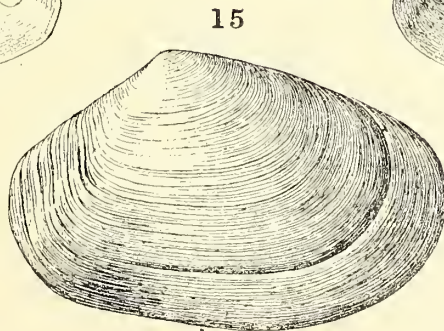
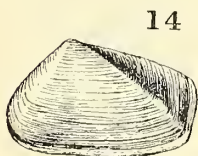
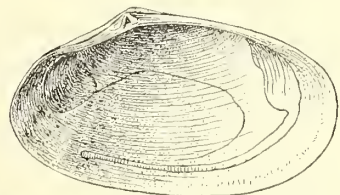
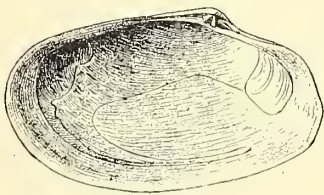
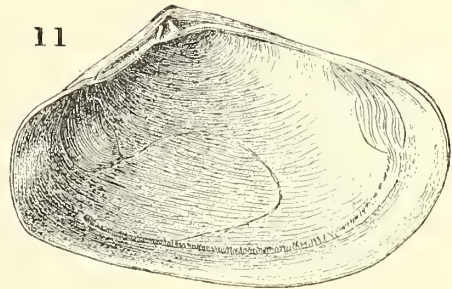
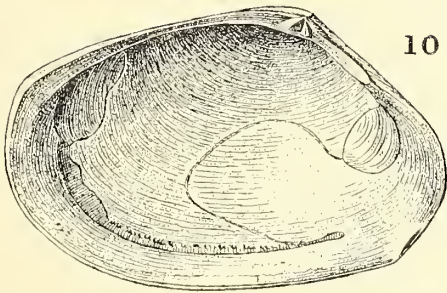
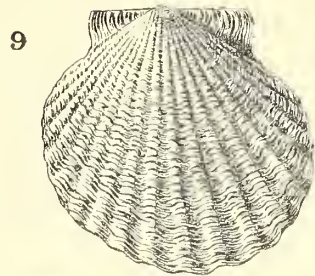
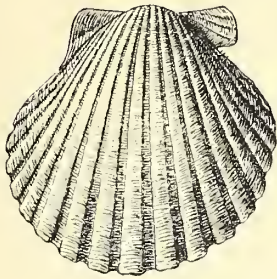
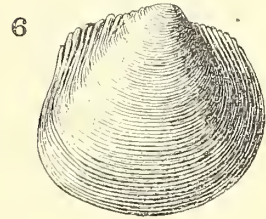
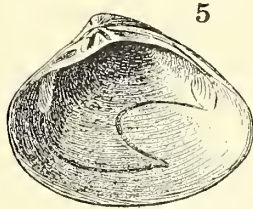
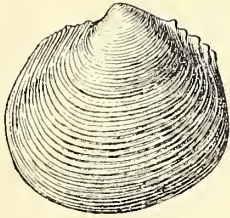
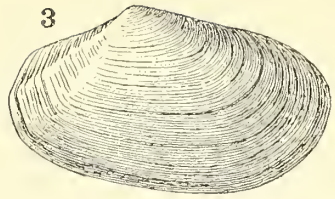
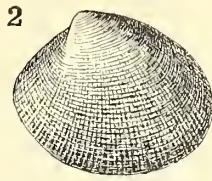
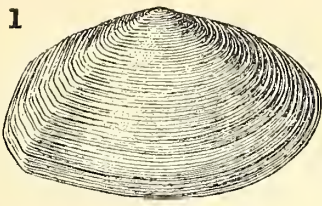
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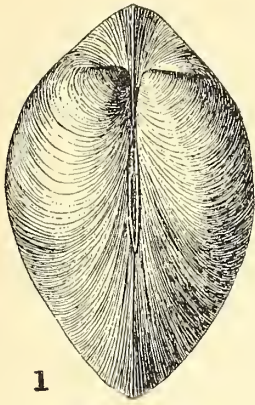
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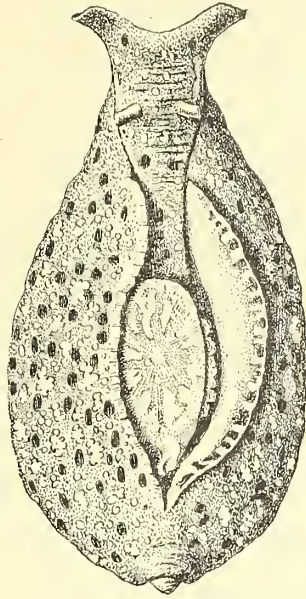




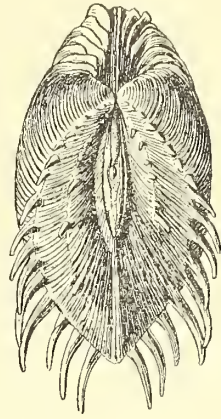




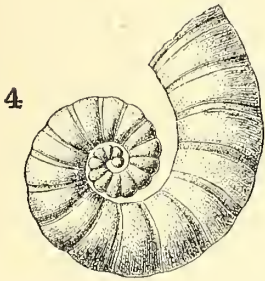
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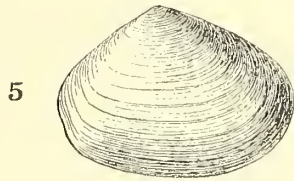
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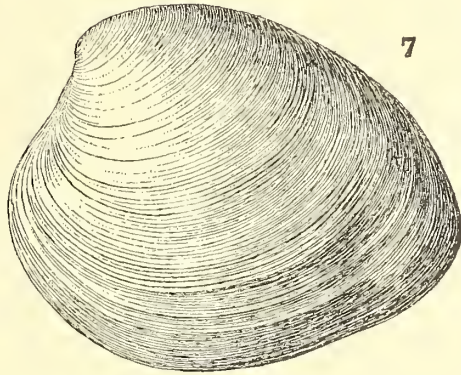
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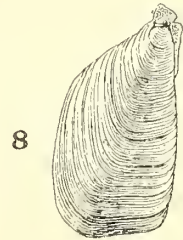
5



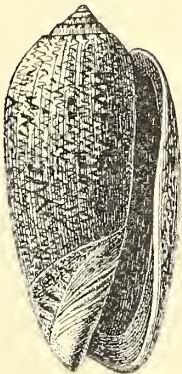
7



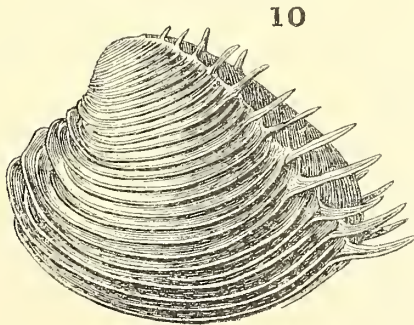
6



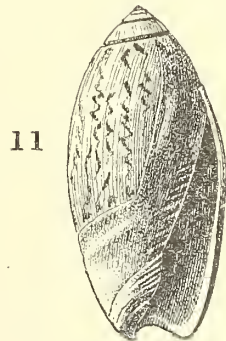
8



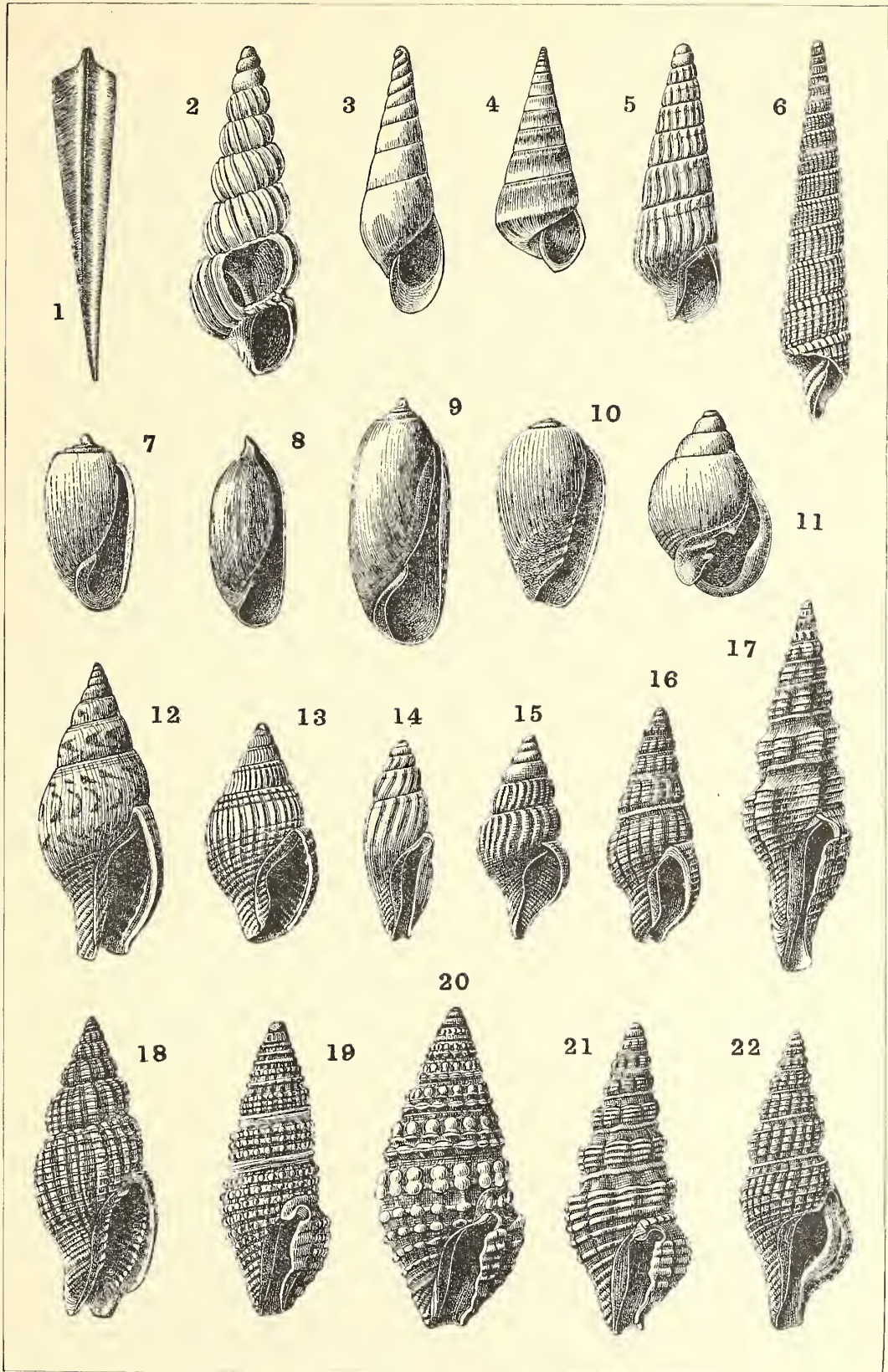
9

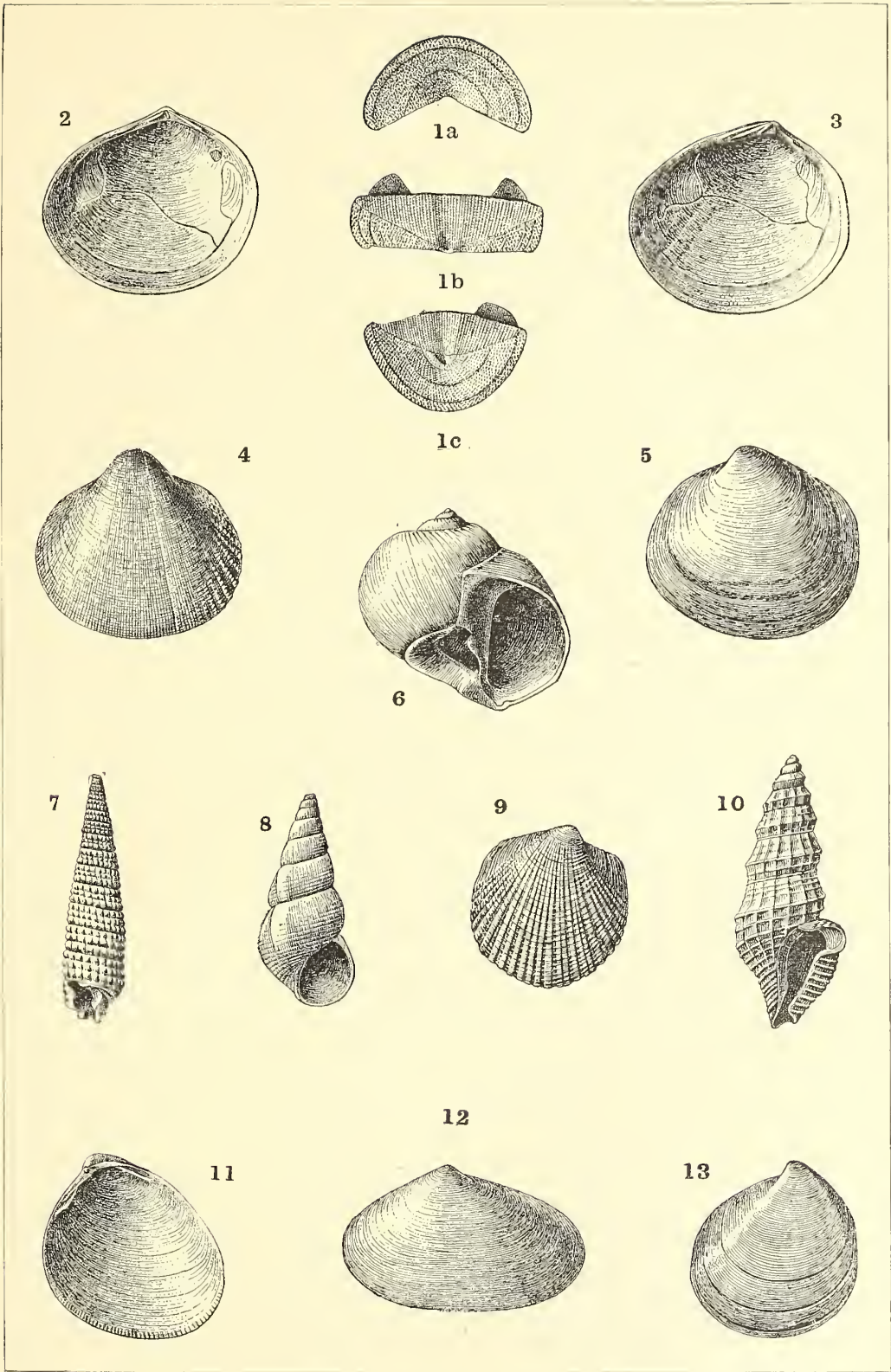


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