is 84^{mm} long, exclusive of the arms; the body is 72^{mm} long, 15^{mm} broad; the caudal fin is 25^{mm} long and 36^{mm} broad.

A fresh specimen, caught in Casco Bay, had the following proportions: Length of head and body, not including the arms, 221^{mm}; length of caudal fin, 86^{mm}; breadth of fin, 90^{mm}; diameter of body, 35^{mm}; length of upper arms, 80^{mm}; of second pair, 100^{mm}; of third pair, 100^{mm}; of extensile arms, 182^{mm}; of the ventral pair, 90^{mm}.

Greenport, Long Island, (Sanderson Smith); Newport, Rhode Island; Provincetown, Massachusetts; Casco Bay; Mount Desert, Maine; Bay of Fundy.

Ommastrephes Bartramii (Lesueur, sp.) is found in the Gulf Stream off our coasts, and may sometimes occur accidentally on our shores. It is a more slender and elongated species than the preceding, with a relatively shorter caudal fin. It is also darker colored. The figure given by Binney in the last edition of Gould's Invertebrata of Massachusetts (Plate 25, fig. 340) does not represent this species.

LOLIGO PEALII Lesueur. Plate XX, figs. 102–105. (p. 440.)

Journal Acad. Natural Sciences, Philadelphia, vol. ii, p. 92, Pl. 8, 1821; Dekay, Natural History of New York, Mollusca, p. 4, Pl. 38, fig. 354 (copied from Lesueur); Binney, in Gould's Invertebrata of Mass., ed. ii, p. 514 (Pl. 25, fig. 340,) probably represents this species, certainly not *O. Bartramii.*)

South Carolina to Massachusetts Bay. Very common in Long Island Sound and Vineyard Sound.

The young, from an inch to two inches in length, were taken from the middle of July to the last of August in great numbers, at the surface, in Vineyard Sound, by Mr. Vinal N. Edwards.

LOLIGO PUNCTATA Dekay.

Natural History of New York, Mollusca, p. 3, Pl. I, fig. 1, 1843; Binney, in Gould's Invertebrata of Mass., ed. ii, p. 513.

This is probably identical with the preceding species. The slight differences noticed are probably sexual, but as I have not been able to fully satisfy myself in regard to this, I have not thought it proper to unite them at this time.

Long Island Sound.

LOLIGO PALLIDA Verrill, sp. nov. Plate XX, figs. 101, 101*a*. (p. 441.)

Body stout, tapering rapidly backward. Anterior border of mantle with a prominent, obtusely rounded, median dorsal lobe, from which the margin recedes on each side; on the lower side the margin is concave in the middle, with a projecting angle on each side. Caudal fin large, about as broad as long, more than half as long as the body. Siphon large and stout; upper pair of arms considerably smaller and shorter than the others, slender at tips, margined along the inner dorsal ridge with a thin membrane. Second pair of arms stouter and longer, triquetral, slightly margined on the outer angle. Third pair much stouter and considerably longer, with a membranous fold along the middle of the

outer surface, which expands into a thin membrane toward the end. Tentacular arms long and slender, in extension longer than the body, the portion that bears suckers forming about one-third the whole length; in the female the larger suckers on the middle of this portion are not so large as the largest on the other arms, and are arranged in about four rows; those near the tips of the arms are very small and crowded. In the male the principal suckers of the tentacular arms are very much larger than in the female, and considerably exceed those of the other arms; they form two alternating rows along the middle of the arm, and external to them there is a row of smaller suckers on each side, alternating with them; the suckers toward the tips are very numerous, small, and crowded; outside of the suckers, on each side, there is a marginal membrane with a scolloped edge; another membranous fold runs along the outer surface and expands into a broad membrane near the end; the arms of the ventral pair are intermediate in length between those of the second and third pairs. Ground-color of body, head, arms, and fins pale, translucent, yellowish white; entire ventral surface pale, with small, distant, brownish circular spots, which are nearly obsolete on the siphon and arms; the upper surface is covered with pale brown, unequal, circular spots which are not crowded, having spaces of whitish between them; the spots are more sparse on the head and arms, but somewhat clustered above the eyes. The general appearance of the animal when fresh is unusually pale and gelatinous. The "pen" is broad, quill-shaped, translucent, and amber-colored. A medium-sized male specimen preserved in alcohol measures 145^{mm} from the base of the dorsal arms to the posterior end of the body; length of body, 120^{mm}; length of caudal fin, 70^{mm}; breadth of fin, 75^{mm}; length of first pair of arms, 42^{mm}; of second pair, 50^{mm}; of third, 60^{mm}; of tentacular arms, 150^{mm}; of ventral pair, 53^{mm}.

Long Island Sound.

The *Spirula Peronii* Lamarck, (*Spirula fragilis* in Binney's Gould, p. 516, fig. 755), is occasionally cast up, on the outer beaches of Nantucket, but it probably does not occur alive in our waters.

GASTROPODA.

PECTINIBRANCHIATA.

BELA HARPULARIA Adams. Plate XXI, fig. 108. (p. 508.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 92, 1858; Gould's Invertebrata of Mass., ed. ii, p. 352, fig. 191. *Fusus harpularius* Couthouy, Boston Journal Natural History, vol. ii, p. 106, Pl. 1, fig. 10, 1838; Gould's Invertebrata of Mass., ed. i, p. 291, fig. 191, 1841. *Mangelia harpularia* Stimpson, Shells of New England, page 48, 1851.

Massachusetts Bay to Labrador and Greenland. Off Gay Head, 10 to 19 fathoms; in the Bay of Fundy frequent in from 1 to 80 fathoms. Fossil in the Post-Pliocene "Leda-clays" of Labrador (Packard); and Canada (Dawson).

BELA PLEUROTOMARIA Adams.

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 92, 1858; Gould, Invert. of Mass., ed. ii, p. 355, fig. 625. *Fusus pleurotomarius* Couthouy, Boston Journal of Natural History, vol. ii, p. 107, Plate 1, fig. 9, 1838. *Fusus rufus* Gould, Invert. of Mass., ed. i, p. 190, fig. 192 (*non* Montagu). *Buccinum pyramidale* Ström, N. A. Dan. iii, p. 296, fig. 22 (t. Loven). *Defrancia Vahlii* (Beck) Möller, 1842 (t. Loven). *Mangelia pryamidalis* Stimpson, Shells of New England, p. 49.

Off the coast of Long Island, in 46 fathoms (Stimpson). Massachusetts Bay to Labrador; in Casco Bay and the Bay of Fundy not uncommon in 18 to 60 fathoms. Greenland (Möller). Finmark (Lovén). Fossil in the Post-Pliocene deposits of Canada, Labrador, Great Britain, and Scandinavia.

The identification of this species with the *Buccinum pyramidale* Ström, is somewhat uncertain; if correct, the latter name has priority.

BELA PLICATA Adams. Plate XXI, fig. 107. (p. 383.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 92, 1858. *Pleurotoma plicata* C. B. Adams, Boston Journal of Natural History, vol. iii, p. 318, Plate 3, fig. 6; Gould, Invert. of Mass., ed. i, p. 282, fig. 187; ed. ii, p. 350, fig. 612. *Pleurotoma plicosa* C. B. Adams, Contributions to Conchology, vol. i, p. 54, 1850; Jay, Catalogue, ed. iv, p. 327. *Pleurotoma brunnea* Perkins, Proc. Boston Soc. Nat. History, vol. xiii, p. 121, 1869.

Near New Haven, rare. Huntington and Greenport, Long Island (Sanderson Smith). New York (Dekay). Dartmouth, Massachusetts, and New Bedford Harbor, in mud, (C. B. Adams). Beaufort, N. C. (Dr. E. Coues). Indian Pass, Florida (E. Jewett).

MANGELIA CERINA. (p. 432.)

Verrill, American Journal of Science, vol. iii, p. 210, 1872. *Pleurotoma cerinum* Kurtz and Stimpson, Proceedings of the Boston Society of Natural History, vol. iv, p. 115, 1851; Stimpson, Shells of New England, p. 49, Pl. 2, fig. 2, 1851.

Shell elongated, fusiform, rather acute at apex, composed of about seven whorls; apical whorls smooth, the others angulated in the middle and decidedly flattened just below the suture; suture distinct, but shallow, undulated; the body whorl has about eleven prominent, longitudinal, sub-acute plications or ribs, separated by wide, concave interspaces. The ribs are most prominent at the angulation above the middle of the lower whorl, and do not extend on the flattened sub-sutural band. The whole surface is covered by fine, raised, revolving lines, often alternately larger and smaller, separated by wider striæ, and crossed by fine, distinct lines of growth, rendering them slightly nodulous. The revolving lines are most distinct on the sub-sutural band, and are often nearly obsolete over the summits of the ribs. Outer lip acute, with a decided angle at about the posterior fourth, where it recedes to form a decided, rounded notch, at and just above the angle; middle portion nearly straight, gradually curving and receding toward the anterior end; canal short, straight, and somewhat contracted. Color whitish, or slightly yellow; inner surface light wax-yellow. Length, 6.5^{mm}; breadth, 3^{mm}; length of aperture, 3^{mm}.

Vineyard Sound, 3 to 10 fathoms; near New Haven. New Bedford, Mass., and Charleston, S. C. (Stimpson). Staten Island; Greenport and Huntington, Long Island, low water to 3 fathoms, (S. Smith). Beaufort, N. C. (Coues). Fossil in the Post-Pliocene of South Carolina.

PLEUROTOMA BICARINATUM Couthouy. Plate XXI, fig. 106. (p. 418.)

Boston Journal of Natural History, vol. ii, p. 104, Plate 1, fig. 11, 1838; Gould, Invert. of Mass., ed. i, p. 281, fig. 186; ed. ii, p. 349, fig. 618. *Mangelia bicarinata* Stimpson, Shells of New England, p. 49. *Defrancia bicarinata* H. and A. Adams, Genera of Mollusca, vol. i, p. 95.

Stonington, Conn. (Linsley). Vineyard Sound, 6 to 12 fathoms, rare; Massachusetts Bay; Bay of Fundy. This is a rare and imperfectly known species. I have never had opportunities to examine the living animal.

The generic relations of this and the two preceding shells are still doubtful.

BUCCINUM UNDATUM Linné. Plate XXI, fig. 121. (p. 494.)

Systema Naturæ, ed. xii, p. 1204. Gould, Invertebrata of Massachusetts, ed. i, p. 305; ed. ii, p. 366, fig. 634. *Buccinum undulatum* Möller, in Kroyer's Tidsskrift, vol. iv, p. 84, 1842 (t. Stimpson). Stimpson, Review of the Northern Buccinums, in Canadian Naturalist, October, 1865. *Buccinum Labradorense* Reeve, Conch. Icon., vol. iii, Buc. i, 5, 1846 (t. Stimpson).

Mouth of Vineyard Sound and off Gay Head, 6 to 19 fathoms. Off New Jersey, north latitude 40°, west longitude 73°, in 32 fathoms, sandy bottom, (Captain Gedney).

Near Stonington, Conn. (Linsley); Montauk Point, Long Island, and Little Gull Island (S. Smith). Not common south of Cape Cod, except on the outer islands and in deep water; common in Massachusetts Bay; and very abundant on the coast of Maine, and northward to Greenland. On the European coast it occurs from Iceland and the North Cape to France, and from low water to 650 fathoms. In the Bay of Fundy it is abundant from above low-water mark to 100 fathoms.

As a fossil it is common in the Post-Pliocene deposits of Maine, Canada, Labrador, and Great Britain. Mr. Desor obtained it from the Post-Pliocene formation of Nantucket Island.

The ordinary American specimens from shallow water differ considerably in form from the typical European specimens, but the species is quite variable on both coasts, and I have examined large specimens from Saint George's Bank and La Have Bank, dredged by Mr. S. I. Smith, which differ very little from the common European form, and it is easy to form series connecting these with our common shore specimens. I am, therefore, unable to agree with Dr. Stimpson, who considered our shell distinct from the European, and adopted the name *undulatum* for it.

NEPTUNEA CURTA Verrill.

Fusus corneus Say, Amer. Conch., iii, Plate 29, 1831 (*non* Linné, Pennant, etc.). *Fusus Islandicus* Gould, Invert. of Mass., ed. i, p. 284; ed. ii, p. 371, fig. 638 (*non* Chemnitz, Gmelin, etc.). *Fusus curtus* Jeffreys, British Conchology, vol. iv, p. 336, 1867.

Massachusetts Bay to Labrador. Casco Bay, 6 to 50 fathoms; common in the Bay of Fundy from low-water mark to 80 fathoms. Linsley reports it, as *F. corneus*, from fish-stomachs at Stonington, Connecticut. In the Yale Museum are dead shells of this species, which have been occupied by *Eupaguri*, found on Fire Island Beach, on the south side of Long Island, by Mr. S. I. Smith. It probably inhabits the deep water off Block Island.

The dentition of this species is decidedly buccinoid. The central plates are transversely oblong, deeply concave above, with the lateral angles produced; below armed with three small, nearly equal, short teeth, the central one largest, beyond which, on each side, it is concave, the outer angles being a little prominent. The lateral plates are large, with an outer, very strong, curved tooth, and two much smaller, slightly curved ones near the inner end, the innermost being slightly the largest.

The dentition agrees very closely with that of *N. antiqua*, the type both of the genus *Neptunea*, Bolton, 1798, and *Chrysodomus*, Swainson, 1840, but it is very different from that of *Sipho Berniciensis* (*S. Islandicus* Trosch.), which Troschel refers to the Faciolaridæ. The latter is evidently the type of a genus (*Sipho*) very distinct from *Neptunea;* but among the European species, *gracilis*, *propinqua*, *buccinata*, and the true *Islandica* (as described by Jeffreys) are closely related to *curta*, and belong to the genus *Neptunea*, in the family Buccinidæ.

NEPTUNÈA (*Neptunella*) PYGMÆA. Plate XXI, fig. 115. (p. 508.)

Fusus Islandicus, var. pygmæus, Gould, Invert. of Mass., ed. i, p. 284, fig. 199, 1841. *Tritonium pygmæum* Stimpson, Shells of New England, p. 46, 1851. *Fusus Trumbullii* Linsley, Amer. Journal Science, ser. i, vol. xlviii, p. 28, fig. 1, 2, 1845 (*non* Gould, 1848). *Fusus pygmæus* Gould, Invert. of Mass., ed. ii, p. 372, fig. 639. *Neptunea* (*Sipho*) *pygmæa* H. and A. Adams, Genera Recent Mollusca, vol. i, p. 81, 1858. *Chrysodomus pygmæus* Dall, Proc. Boston Soc. Nat. Hist., vol. xiii, p. 242, 1870.

Deep water off New London and Stonington, Connecticut, northward to the Gulf of Saint Lawrence. East of Block Island, 29 fathoms, sandy mud; off Buzzard's Bay, 25 fathoms; off Gay Head, 19 fathoms, mud, abundant and large; off Edgarton, 18 to 20 fathoms; Casco Bay, 10 to 40 fathoms, common; Eastport, Maine, and Bay of Fundy, low water to 100 fathoms (A. E. V.). Near Saint George's Bank, 40 to 150 fathoms; east of Saint George's Bank, 430 fathoms; and off Halifax (S. I. Smith).

The odontophore in this species is long and slender; the dentition is buccinoid. The middle plate is small, transversely oblong, concave above, below convex, with one very small central tooth; lateral plates relatively large and strong, with a large, curved outer tooth, and a smaller bifid inner tooth, widely separated from the outer one.

The peculiarities in the dentition of this species, in connection with the singular wooly or velvety epidermis, indicate that this species should form the type of a sub-genus, or perhaps even a distinct genus. For the group I would propose the name *Neptunella*.

FULGUR CARICA Conrad. Pl. XXII, fig. 127. (p. 355.)

Proceedings of the Academy of Nat. Sciences, Philadelphia, vol. vi, p. 319, 1853; Gill, on the Genus Fulgur and its Allies, in American Journal of Conchology, vol. iii, p. 145, 1867. *Murex carica* Gmelin, Syst. Nat., p. 3545, 1788. *Fulgur eliceans* (*pars*) Montfort, Conch. Syst., vol. ii, p. 503, 1810, fig. (t. Gill). *Pyrula carica* Lamarck, Anim. sans Vert., ed. i, vol. vii, p. 138, 1822; Gould, Invert. of Mass., ed. i, p. 296. *Busycon carica* Gould, op. cit., ed. ii, p. 383, fig. 646; Stimpson, in American Journal of Conchology, vol. i, p. 61, 1865.

Eastern coast of the United States; northward to Cape Cod; southward to northern Florida, and west Florida. Abundant in Vineyard Sound, in 1 to 10 fathoms; also in Long Island Sound, near New Haven. Nantucket (Adams); St. Augustine, Florida (H. S. Williams); west Florida (E. Jewett.) It occurs in the Miocene formation of Maryland and Virginia, and in the Post-Pliocene deposits of Virginia, North Carolina, South Carolina, and Florida.

SYCOTYPUS CANALICULATUS Gill. (p. 355.)

American Journal of Conchology, vol. iii, p. 149, 1867. *Murex canaliculatus* Linné, Syst. Nat., ed. xii, p. 1222. *Pyrula canaliculata* Lamarck, Anim. sans Vert., vol. vii, p. 137, 1822; Gould, Invert. of Mass., ed. i, p. 294, fig. 206. *Busycon canaliculatum* H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 151, 1858; Gould, Invert. of Mass., ed. ii, p. 380, fig. 645. *Fulgur canaliculata* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, 1822; Conrad, Proc. Phil. Acad., vol. vi, p. 219, 1853.

Eastern coast of the United States; northward to Cape Cod and Nantucket; southward to Georgia and Northern Florida, Western Florida, and northern shores of Gulf of Mexico. Abundant in Vineyard Sound, Long Island Sound, &c., in 1 to 8 fathoms. St. Augustine, Florida (H. S. Williams). Found fossil in the Post-Pliocene of Virginia, North and South Carolina, and Northern Florida; in the Pliocene of South Carolina; and Miocene of Maryland.

NASSA VIBEX Say. Plate XXI, fig. 114. (p. 371).

Journal Academy Nat. Sciences, Philadelphia, vol. ii, p. 231, 1822; Gould, Invertebrata of Mass., ed. ii, p. 365, fig. 633. *Nassa fretensis* Perkins, Proceedings Boston Soc. Nat. History, vol. xiii, p. 117, figure, 1869 (variety).

Eastern coast of the United States; northward to Vineyard Sound; southward to Florida, and the Gulf of Mexico; not abundant north of Cape Hatteras. In Vineyard Sound and Long Island Sound, found sparingly in shallow water among eel-grass. New Bedford (Adams). Lloyd's Harbor, Huntington, and Northport, Long Island (S. Smith); Egmont Key, Florida (Jewett). It has been found in the Pliocene and Post-Pliocene of South Carolina.

Some of Say's original specimens were from South Carolina, others from Great Egg Harbor, New Jersey. At the latter locality I have also collected among eel-grass, in shallow water, the variety described by Dr. Perkins as *N. fretensis*, which is the most common form in all the more northern localities. Specimens intermediate between these and the ordinary southern forms are, however, of frequent occurrence, and the typical form also occurred in Vineyard Sound, with the variety.

TRITIA TRIVITTATA Adams. Plate XXI, fig. 112. (p. 354.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 122, 1858. *Nassa trivittata* Say, Journal Acad. Natural Sciences, Philadelphia, vol. ii, p. 231; Gould, Invert. of Mass., ed. ii, p. 364, fig. 632. *Buccinum trivittatum* Adams, Boston Journal of Nat. Hist., vol. ii, p. 265; Gould, op. cit., ed. i, p. 309, fig. 211.

Gulf of Saint Lawrence to Northern Florida. Eastport, Maine, and Bay of Fundy, 3 to 30 fathoms, not abundant; Casco Bay, 1 to 40 fathoms, abundant; Vineyard Sound and Buzzard's Bay, 0 to 14 fathoms, abundant; off Block Island, 29 fathoms; Long Island Sound, common. Gaspé, Canada (Dawson). Fossil in the Post-Pliocene of Point Shirley, Mass., Nantucket (Desor), Gull Island (Smith), Virginia, South Carolina, and North Carolina; in the Pliocene of South Carolina; and in the Miocene of Maryland, Virginia, and South Carolina.

ILYANASSA OBSOLETA Stimpson. Plate XXI, fig. 113. (p. 468.)

American Journal of Conchology, vol. i, p. 61, Plate 9, figs. 11, 12, 1865. *Nassa obsoleta* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 232, 1822; Binney's Say, p. 77, 1858; Gould, Invertebrata of Mass., ed. ii, p. 362, fig. 631; *Buccinum obsoletum* Gould, Invert. of Mass., ed. i, p. 308, fig. 210; *Tritia obsoleta* H. and A. Adams, Genera, p. 122, 1858.

Eastern and southern coasts of the United States; northward to Casco Bay, Maine, and the mouth of the Kennebeck River, and local in the southern part of the Gulf of Saint Lawrence; southward to Florida and the northern shores of the Gulf of Mexico. Extremely abundant on the whole coast south of Cape Cod; more local farther north, and mostly restricted to sheltered bays and harbors. It has not been found on the eastern part of the coast of Maine nor in the Bay of Fundy. An isolated colony of this species is found on the western and southern shores of the Gulf of Saint Lawrence and Prince Edward's Island (Bell, Dawson).

As a fossil it has been found in the Post-Pliocene deposits at Point Shirley, in Chelsea, Massachusetts (Stimpson); at Nantucket Island (Desor); Virginia; and South Carolina. It is also reported from the Pliocene of South Carolina.

UROSALPINX CINEREA Stimpson. Plate XXI, fig. 116. (p. 306.)

American Journal of Conchology, vol. i, p. 58, Plate 8, figs. 6 and 7, 1865. *Fusus cinereus* Say, Journal Academy Nat. Science, Philadelphia, vol. ii, p. 236, 1822; American Conchology, Plate 29, 1831. *Buccinum plicosum* Menke, Syn., ed. ii, p. 69, 1830, (t. Gould); Gould, Invertebrata of Mass., ed. i, p. 303, fig. 213. *Buccinum cinereum* Gould, op. cit., ed. ii, p. 370, fig. 637.

Eastern coast of the United States; northward to Massachusetts Bay, and local farther north, to the Gulf of Saint Lawrence; southward to Georgia and Northern Florida, and on the west coast of Florida, at Tampa Bay. Abundant in Vineyard Sound, Buzzard's Bay, Long Island Sound, and along the coast of the Middle States, especially on oyster-beds. In Vineyard Sound it occurs from above low-water mark to 8 fathoms. It occurs in some of the shallow and sheltered branches

of Casco Bay, especially at the upper end of Quahog Bay, but has not been found on the islands, nor farther eastward along the coast of Maine, nor in the Bay of Fundy. A colony exists, however, in the southern part of the Gulf of Saint Lawrence, associated with the preceding and other southern species. It is found fossil in the Post-Pliocene of Point Shirley, Massachusetts, Nantucket, Gardiner's Island, Virginia, North Carolina, and South Carolina; in the Pliocene of South Carolina; and in the Miocene of Maryland.

EUPLEURA CAUDATA H. and A. Adams. Plate XXI, fig. 117. (p. 371.)

Genera of Recent Mollusca, vol. i, p. 107, 1858; Stimpson, Amer. Journal of Conchology, vol. i, p. 58, Plate 8, fig. 5 (dentition), 1865. *Ranella caudata* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 236, 1822; Gould, Invert. of Mass., ed. i, p. 297, fig. 176; ed. ii, p. 386, fig. 648.

Eastern coast of the United States; northward to Nantucket and Cape Cod; southward to northern Florida, and western Florida, at Tampa Bay. At Vineyard Sound it occurred living in considerable numbers in the shallow ditches on the marshes, as well as in the sound itself, in 1 to 8 fathoms; off New Haven, in 1 to 5 fathoms, not abundant; Great Egg Harbor, frequent among eel-grass in shallow water. Egmont Key, Florida (Jewett).

In the fossil state this species has been found in the Post-Pliocene of Virginia, North and South Carolina, and Florida; in the Pliocene of South Carolina; and in the Miocene of Maryland and South Carolina.

PURPURA LAPILLUS Lamarck. Plate XXI, figs. 118 to 120. (p. 306.)

Anim. sans Vert., ed. i, vol. vi, 1822; ed. ii, vol. x, p. 79; Gould, Invert. of Mass., ed. i, p. 301; ed. ii, p. 360, fig. 630. *Buccinum lapillus* Linné, Syst. Naturæ, ed. xii, p. 1202, 1767.

Watch Hill, Rhode Island; Montauk Point, Long Island; Cuttyhunk Island; shores of Vineyard Sound, at Nobsca Point; northward to the Arctic Ocean. On the European coast southward to Portugal. Northeastern coast of Asia. Sitka (Middendorff). This species is local south of Cape Cod, and has not been found to the eastward of Stonington, Connecticut, in Long Island Sound. It is extremely abundant along the northern coasts of New England and Nova Scotia, often nearly covering the surface of the rocks toward low-water mark, where they are encrusted by *Balanus balanoides*, upon which it chiefly feeds, inserting its proboscis between the opercular valves of the barnacle.

This shell has been found in the Post-Pliocene deposits at Waterville, Maine, and at Gardiner's Island, but is not a common fossil in this country. In England it is found in the Red-Crag and all later formations; it also occurs in the Post-Pliocene deposits of Scandinavia. The fossils show the same variations that are seen in the recent shells.

PTYCHATRACTUS LIGATUS Stimpson.

American Journal of Conchology, vol. i, p. 59, plate 8, fig. 8 (dentition), 1865. *Fasciolaria ligata* Mighels and Adams, Boston Journal of Nat. History, vol. iv, p. 51, Plate 4, fig. 17, 1843; Gould, Invert. of Mass., ed. ii, p. 385, fig. 647.

Casco Bay, Maine, to Labrador. Stonington, Connecticut (Linsley).

Casco Bay, 20 to 40 fathoms; Bay of Fundy, 15 to 60 fathoms. Halifax (Willis); Gaspé (Whiteaves); Murray Bay (Dawson); Mingan (Foote). This shell occurs sparingly at all these localities. It has not been recorded from south of Cape Cod by any one except Linsley, and it must be regarded as a very doubtful member of the fauna of Southern New England until rediscovered.

Dr. Dawson records one broken specimen from the Post-Pliocene of Montreal.

ANACHIS AVARA Perkins. (p. 306.)

Proceedings, Boston Soc. Nat. History, vol. xiii, p. 113, 1869 (in part). *Columbella avara* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 230, 1822; (in part) Gould, Invert. of Mass., ed. i, p. 313; ed. ii, p. 356 (in part).

Cape Cod to Northern Florida; Western Florida and the northern shores of the Gulf of Mexico. Vineyard Sound, from 0 to 10 fathoms; Long Island Sound; Great Egg Harbor, New Jersey; Nantucket (Adams); Fort Macon (Coues); South Carolina (Gibbes); Georgia (Couper); Western Florida (Jewett). North of Cape Cod, it is local and rare; Massachusetts Bay (Stimpson).

Fossil in the Post-Pliocene of North and South Carolina, and in the Pliocene of South Carolina.

Among the shells usually referred to this species there are great variations in form and sculpture, and the color is quite inconstant. The numerous specimens that I have examined from various localities can, however, be arranged in two groups, between which I have found no specimens that can be regarded as truly intermediate, although most of their distinctive characters are variable in each series. For the present, therefore, I have with some hesitation followed Mr. Ravenel in regarding these two principal forms as distinct species. As these species (or varieties) have not been distinguished by most writers, it is probable that some of the northern localities given above should properly go under the next species, which is far more abundant in Vineyard Sound and Long Island Sound than the typical *avara*, while the latter predominates in the collections from Fort Macon, North Carolina, and southward. The figures given by Dr. Gould represent the ordinary northern form of the following species. In the first part of this report both forms are included under *avara*.

From Fort Macon I have specimens that agree perfectly with Say's original description of *avara*. These are less elongated than the next species, and rather fusiform, the thickest part being but little below the middle, with the spire acute. The mature shells have ten flattened whorls; the first three or nuclear whorls are smooth; some of the succeeding ones usually have numerous vertical costæ; the last whorl has 10 to 13 more or less prominent, smooth obtusely rounded, somewhat curved costæ, separated by wider concave intervals, and gradually disappearing below the middle; below the costæ are numerous, well im-

pressed revolving grooves, of which 8 or 10 are wider and deeper than the rest; similar but finer grooves cross the spaces between the costæ, but are mostly obsolete on the costæ; the middle whorls usually have a similar number of costæ, which are less prominent, and often more or less obsolete, while the spaces between are crossed by numerous fine revolving striæ. The canal is short, broad, and nearly straight; the outer lip well rounded, not incurved anteriorly, but with a decided emargination posteriorly. Length of mature shells, 13^{mm}; diameter, 6^{mm}, often smaller.

Specimens of the same size and form from Vineyard Sound and New Haven agree closely with the above description in most respects, but have 14 or 15 costæ on the last whorl, and about 20 on the preceding ones, where the costæ are so crowded that the spaces between are often narrower than the costæ.

ANACHIS SIMILIS Verrill. Plate XXI, fig. 109.

Columbella similis Ravenel, Proc. Acad. Nat. Sci., Philad., 1861, p. 41. *Columbella translirata* Ravenel, op. cit., p. 42. *Columbella avara* (in part) Gould, Invert., ed. i, p. 313, fig. 197; ed. ii, p. 356, fig. 726.

Massachusetts Bay to Georgia. Abundant in Vineyard Sound and Long Island Sound; Great Egg Harbor. Fort Macon (Dr. Yarrow.) This species is usually much more elongated than the preceding, with a more elevated spire, the broadest place being a little above the lower third of the length. Whorls, 10; flattened; the nuclear whorls smooth The canal is longer, and usually distinctly excurved; the outer lip is more or less incurved anteriorly, so as to slightly narrow the canal; the body-whorl has 18 to 20 or more rather regular, obtuse costæ, separated by spaces of about the same width, generally slightly nodular close to the suture; at some distance below the middle of the whorl they gradually disappear, but sometimes there are also smaller intermediate costæ below the middle of the whorl (var. *translirata*); the lower part of the whorl is covered with numerous well-impressed, revolving grooves, which cross the lower ends of the costæ, rendering them nodulous; on the upper part of the whorls the revolving grooves are larger and more distinct than in the preceding species, and usually continue over the costæ; the one next below the suture is usually larger than the rest, and thus produces the subsutural nodules; the grooves are generally least distinct in the middle of the lower whorl, which is sometimes slightly angulated. On the middle whorls there are numerous (usually more than 25) regular costæ, like those of the last one, and crossed by about 5 distinct revolving grooves, more conspicuous in the spaces between; the upper one largest, usually producing a distinct series of nodules on each whorl. Color exceedingly variable, generally dark reddish brown, chestnut, or light yellowish brown, more or less mottled and specked with whitish; there is often a subsutural band of white, or the nodules are white, and also a band of white around the middle

of the last whorl, but these are frequently absent. Length of a rather large specimen, 17^{mm}; breadth, 7^{mm}; length of an average specimen, 13^{mm}; breadth, 5^{mm}; length of a slender specimen, 15^{mm}; breadth, 5^{mm}.

ASTYRIS LUNATA Dall. Plate XXI, fig. 110. (p. 306.)

Proceedings Boston Soc. Natural History, vol. xiii, p. 242, 1870. *Nassa lunata* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. v, p. 213, 1826. *Buccinum lunatum* Adams, Boston Journ. Nat. Hist., vol. ii, p. 226; Gould, Invert. of Mass., ed i., p. 312, fig. 196. *Columbella lunata* Gould, op. cit., ed. ii, p. 359, fig. 629. *Fusus Trumbulli* Gould, Amer. Journ. Science, vol. vi, p. 235, fig. 7, 1848, (*non* Linsley). *Buccinum Wheatleyi* Dekay, Nat. Hist. of New York, Mollusca, p. 132, Plate 7, fig. 162, 1843. *Columbella Gouldiana* Ag. MSS.; Stimpson, Shells of New England, p. 48, 1851; Smith, Annals Lyceum Nat. Hist. of New York, vol. viii, p. 398, fig. 5, 1865. *Astyris* "*limata* Say" and *A.* "*Turnbullii* Linsl.," H. and A. Adams, Genera, vol. i, p. 187 (typographical errors).

Massachusetts Bay to Northern Florida and the northern shores of the Gulf of Mexico; local and not abundant north of Cape Cod, at Provincetown, Nahant, and Swampscott, Massachusetts. Very abundant in Vineyard Sound, from low-water to 10 fathoms; and in Long Island Sound; Great South Bay, Long Island; and Great Egg Harbor, New Jersey; Fort Macon, North Carolina, and southward. Estella Pass, Florida (Jewett); Georgia (Couper).

Fossil in the Post-Pliocene deposits of South Carolina; and at Gardiner's Island, New York (S. Smith); and in the Pliocene of South Carolina.

The color-variety, separated by several writers as *C. Gouldiana*, is identical with the *Wheatleyi* of Dekay.

ASTYRIS ZONALIS Verrill. Plate XXI, fig. 111. (p. 399.)

Buccinum zonalis Linsley, American Journal of Science, ser. i, vol. xlviii, p. 285, 1845 (no description); Gould, Amer. Journ. Science, series ii, vol. vi, p. 236, fig. 8, 1848. *Columbella dissimilis* Stimpson, Proceedings Boston Soc. Nat. History, vol. iv, p. 114, 1851; Shells of New England, p. 47, 1851; Gould, Invert. of Mass., ed. ii, p. 358, fig. 628.

Long Island Sound, near New Haven; Vineyard Sound; Casco Bay; Eastport, Maine, 10 to 60 fathoms. Grand Menan, New Brunswick, in 8 fathoms, sand, (Stimpson). Stonington (Linsley).

ASTYRIS ROSACEA H. and A. Adams. (p. 508.)

Genera of Recent Mollusca, vol. i, p. 187, 1858. *Buccinum rosaceum* Gould, American Journal of Science, xxxviii, p. 197, 1840; Invert. of Mass., ed. i, p. 311, fig. 195, 1841. *Columbella rosacea* Stimpson, Shells of New England, p. 47, 1851; Gould, Invert. of Mass., ed. ii, p. 257, fig. 627. (?)*Fusus Holböllii* Möller, Naturhistorisk Tidsskrift, vol. iv, p. 88, 1842.

East of Block Island, 29 fathoms, fine sandy mud; Stonington, Connecticut (Linsley); Massachusetts Bay to Gulf of Saint Lawrence; Isles of Shoals, 20 fathoms, and West Isles, 10 fathoms (Stimpson); Casco Bay, 10 to 20 fathoms; Bay of Fundy, 8 to 60 fathoms; Sable Island, Nova Scotia (Willis); Grand Menan, in deep water, (Stimpson).

The identity of *A. Holböllii*, from Greenland, with this species, is very doubtful, for it was described as smooth, with a firm corneus, fusco-luteus epidermis.

LUNATIA HEROS Adams. Plate XXIII, figs. 133 to 136. (p. 353.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 207, 1858; Gould, Invert. of Mass., ed. ii, p. 338, figs. 608, 609. *Natica heros* Say, Jour. Acad. Nat. Sci., Philadelphia, vol. ii, p. 248, 1822; Gould, Invert., ed. i, p. 231. *Natica triseriata* Say, op. cit., vol. v. p. 209 (color-variety); Gould, Invert., ed. i, p. 233. *Lunatia triseriata* Gould, op. cit., ed. ii, p. 340, fig. 610.

Georgia to Gulf of Saint Lawrence and southern coast of Labrador. Coast of New Jersey, near Great Egg Harbor, abundant and large, (A. E. V.) ;southern side of Long Island, at Fire Island beach, abundant, (S. I. Smith); Long Island Sound, at New Haven, not common; Vineyard Sound, abundant from low-water to 10 fathoms; Casco Bay, common; Bay of Fundy, common from low-water to 40 fathoms; Saint George's Bank, common, (S. I. Smith); Gaspé (Dawson); Georgia (Couper). The variety *triseriata* has the same distribution, and is the more common form in the deeper waters, but is also found on the sand-flats at low-water. It is common in Casco Bay and Bay of Fundy, in 1 to 40 fathoms; off Martha's Vineyard, 10 to 20 fathoms; and off New London, Connecticut, 10 fathoms.

This species has been found fossil in the Miocene of Maryland, Virginia, and South Carolina; in the Pliocene of South Carolina; and in the Post-Pliocene of Canada and South Carolina.

LUNATIA IMMACULATA Adams. Plate XXIII, fig. 131. (p. 508.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 207. *Natica immaculata* Totten, American Journal of Science, ser. i, vol. xxviii, p. 351, fig. 6, 1835; Gould, Invertebrata, ed. i, p. 234, fig. 168, 1841. *Mamma (?) immaculata* Gould, ed. ii, p. 344, fig. 614.

Stonington, Connecticut, and eastern end of Long Island, to Gulf of Saint Lawrence. Off Martha's Vineyard, 20 fathoms; east of Block Island, 29 fathoms. Stonington (Linsley); Off Napeague Point, Long Island (S. Smith); Newport, R. I. (Totten). Massachusetts Bay, Casco Bay, and Bay of Fundy, 5 to 80 fathoms, common; often found living at low-water mark in the Bay of Fundy.

NEVERITA DUPLICATA Stimpson. Plate XXIII, fig. 130. (p. 354.)

Smithsonian Check List, p. 5, 1860; Gould, Invert. of Mass., ed. ii, p. 345, fig. 615. *Natica duplicata* Say, Jour. Acad. Nat. Sciences, Philadelphia, vol. ii, p. 247, 1822; Gould, Invert., ed. i, p. 236, fig. 164, 1841. *Lunatia duplicata* H. and A. Adams, Genera Recent Mollusca, vol. i, p. 207, 1858.

Massachusetts Bay to Northern Florida; northwestern Florida to Yucatan. Local and not common north of Cape Cod. Abundant at Nantucket; Vineyard Sound; Long Island Sound; southern coast of Long Island; New Jersey; and southward. Saint Augustine, Florida (Williams). Tampa Bay, Florida, and Egmont Key, abundant, (Jewett). Texas (Schott). Near Vera Cruz, Mexico (coll. T. Salt).

Fossil in the Miocene of Maryland, Virginia, North and South Carolina; Pliocene of South Carolina; and Post-Pliocene of Virginia, North Carolina, South Carolina, Saint John's River, and Tampa Bay, Florida.

NATICA PUSILLA Say. Plate XXIII, fig. 132. (p. 417.)

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 257, 1822; Stimpson, Shells of New England, p. 43, 1851; Gould, Invert. of Mass., ed. ii, p. 344, fig. 613, (*not* of ed. i); Sanderson Smith, in Annals Lyc. Nat. History, New York, vol. ix, p. 396, fig. 4, 1870.

Vineyard Sound to Northern Florida. In Vineyard Sound and Buzzard's Bay this species is common in 2 to 10 fathoms. Huntington and Gardiner's Bay, Long Island, 4 to 5 fathoms, (S. Smith). South Carolina (Kurtz). Fort Macon, North Carolina (Coues). Georgia (Couper).

Acrybia flava H. and A. Adams, = *Natica flava* Gould, Invert., ed. i, p. 239, fig. 162; *Bulbus flavus* Gould, op. cit., ed. ii, p. 347, fig. 616. This species was catalogued by Linsley (1845) as from the stomachs of haddock taken off Stonington, Connecticut. It has not been subsequently recorded from south of Cape Cod by any one. It is not improbable that there was some mistake, either in respect to the locality or the identity of the specimens referred to by Linsley. It is an arctic species, found in the Bay of Fundy and at Saint George's Bank; northward to Greenland (Möller, as *N. nana*).

Natica clausa Brod. and Sowerby, was erroneously given by Mr. Perkins (Proc. Boston Soc. Nat. Hist., vol. xiii, p. 162) as from "Stonington, Connecticut, Linsley." It does not occur in Mr. Linsley's list, nor has it been found living, to my knowledge, south of Cape Cod. It occurs in Massachusetts Bay and northward to the Arctic Ocean. It is not uncommon in the Bay of Fundy from 6 to 109 fathoms; and in Casco Bay from 9 to 60 fathoms. One small dead specimen was dredged by us in 19 fathoms, off Gay Head.

CERITHIOPSIS GREENII Verrill. Plate XXIV, fig. 153. (p. 383.)

Cerithium Greenii C. B. Adams, Boston Journal of Natural History, vol. ii, p. 287, Plate 4, fig. 12, 1838; Gould, Invert., ed. i, p. 579, fig. 184. *Bittium Greenii* H. and A. Adams, Genera, vol. i, p. 287, 1858; Gould, Invert., ed. ii, p. 322, fig. 591.

Massachusetts Bay to South Carolina. Vineyard Sound and Buzzard's Bay, 3 to 10 fathoms; Long Island Sound, near New Haven. Dartmouth Harbor (Adams); Boston Harbor (Stimpson); Long Island (S. Smith); Fort Macon, North Carolina (Coues). Also reported from Bermuda.

Jeffreys (in Annals and Mag. Nat. Hist., Oct., 1872, p. 244) regards this as identical with the European *C. tubercularis*, and gives it a northern distribution. Both opinions appear to be incorrect.

CERITHIOPSIS EMERSONII Adams. Plate XXIV, fig. 151. (p. 417.)

H. and A. Adams, Genera, p. 240, 1858; Gould, Invert., ed. ii, p. 387, fig. 649 *Cerithium Emersonii* C. B. Adams, op. cit., p. 284, Plate 4, fig. 10, 1838; Gould, Invert., ed. i, p. 275, fig. 180.

Cape Cod to South Carolina. Vineyard Sound and Buzzard's Bay, 3 to 10 fathoms, shelly. Nantucket (Adams); Huntington and Greenport, Long Island (S. Smith). Fossil in the Miocene of North Carolina, (Conrad). Jeffreys (in British Conchology, vol. iv, p. 257) regards this species as identical with *Cerithium metula* Lovén, 1846, on the authority of Danielssen. This appears to be an erroneous identification.

CERITHIOPSIS TEREBRALIS Adams. Plate XXIV, fig. 150. (p. 417.)

H. and A. Adams, Genera, vol. i, p. 241, 1858; Gould, Invert., ed. ii, p. 389, fig. 650. *Cerithium terebrale* C. B. Adams, Boston Journal Nat. Hist., vol. iii, p, 320, Plate 3, fig. 7, 1840; Gould, Invert., ed. i, p. 276, fig. 181. *Cerithium terebellum* C. B. Adams, Catalogue Genera and Species of Recent Shells in Collection of C. B. A., p. 13, 1847.

Cape Cod to South Carolina. Vineyard Sound and Buzzard's Bay, 2 to 12 fathoms, not uncommon. New Bedford, Massachusetts (Adams). Greenport and Huntington, Long Island (S. Smith). Fort Macon, North Carolina (Coues).

TRIFORIS NIGROCINCTUS Stimpson. Plate XXIV, fig. 152. (p. 305.)

Smithsonian Check-List, p. 5, 1860; Gould, Invert., ed. ii, p. 323, fig. 592. *Cerithium nigrocinctum* C. B. Adams, Boston Jour. Nat. Hist., vol. ii, p. 286, Plate 4, fig. 11, 1838; Gould, Invert., ed. i, p. 277, fig. 182.

Cape Cod to South Carolina. Vineyard Sound and Buzzard's Bay, low-water to 10 fathoms, not uncommon; near New Haven; and Great Egg Harbor, New Jersey. Dartmouth, Massachusetts (Adams). Huntington and Greenport, Long Island (S. Smith). Fort Macon (Coues).

BITTIUM NIGRUM Stimpson. Plate XXIV, fig. 154. (p. 305.)

Smithsonian Check-List, p. 5, 1860; Gould, Invert., ed. ii, p. 321, fig. 590. *Pasithea nigra* Totten, American Jour. of Science, vol. xxvi, p. 369, Plate 1, fig. 7, 1834. *Cerithium reticulatum* Totten, op. cit., vol. xxviii, p. 352, fig. 8, 1835 (*non* Da Costa). *Cerithium Sayi* Menke (t. Gould); Gould, Invert., ed. i, p. 278, fig. 183.

Massachusetts Bay to South Carolina; local north of Cape Cod, in Boston Harbor (Totten), and in the Gulf of Saint Lawrence, at Pictou and Prince Edward's Island (Dawson). It is not found on the coast of Maine nor in the Bay of Fundy. Vineyard Sound and Buzzard's Bay, abundant, low-water to 8 fathoms, among algæ and eel-grass; Long Island Sound; and Great Egg Harbor, New Jersey, abundant. Fort Macon (Coues).

The *Bittium alternatum* (*Turritella alternata* Say, 1822) is a very closely related species, and probably identical with this.

Turritella erosa Couthouy, recorded, with a mark of doubt, by Linley, as from the stomach of a cod, off Stonington, Conn., was perhaps

incorrectly identified. It may have been a worn *Cerithiopsis terebralis.* The true *T. erosa* is a decidedly northern species, common in Casco Bay and the Bay of Fundy, and extending northward to the Arctic Ocean, and southward on the northern coasts of Europe, and on the North Pacific coast of America. It has not been recorded from south of Cape Cod by any one except Linsley.

VERMETUS RADICULA Stimpson. Plate XXIV, fig. 157. (p. 417.)

Shells of New England, p. 37, 1851; Gould, Invert., ed ii, p. 316, fig. 584. *Vermetus lumbricalis* Gould, ed. i, p. 246, and various other American authors, (*non* Lamarck).

Cape Cod to Florida. Vineyard Sound and Buzzard's Bay, 3 to 10 fathoms, not uncommon; Long Island Sound. Fort Macon, North Carolina, common, (Coues).

Fossil in the Post-Pliocene of North Carolina.

CÆCUM PULCHELLUM Stimpson. Plate XXIV, fig. 158. (p. 417.)

Proceedings Boston Society of Natural History, vol. iv, p. 112, 1851; Shells of New England, p. 36, Plate 2, fig. 3, 1851; Gould, Invert., ed. ii, p. 315, fig. 583.

Vineyard Sound, 1 to 4 fathoms, and dead on shore at Nobsca Beach. New Bedford (Stimpson). Greenport, Long Island, 10 fathoms, sand, (S. Smith).

Dead shells of this species readily lose the outer layer, in which the annulations are formed; they then become white and smooth, without any trace of annulations, and might be mistaken for a different species.

CÆCUM COOPERI Smith.

Sanderson Smith, Annals Lyceum Nat. Hist., New York, vol. vii, p. 154, 1860; op. cit., vol. ix, p. 393, fig. 3, 1870, (*non* Carpenter, 1864). *Cœcum costatum* Verrill, American Journal of Science, vol. iii, p. 283, 1872; this Report, p. 417.

Vineyard Sound, 8 to 10 fathoms. Gardiner's Bay, Long Island, 4 to 5 fathoms, sand, (Smith).

The first description of this species was formerly overlooked by me; as it antedates the description of the Californian species to which Dr. Carpenter gave the same name, the present species must be called *Cooperi.*

In the adolescent stage of growth this species enlarges rather rapidly, and has 12 or 13, distinct, elevated, rounded costæ, narrower than the intervals between; the circular grooves are numerous, unequal, interrupted over the costæ, and broader toward the aperture. The aperture is rounded within; its margin is stellated externally by the costæ.

CREPIDULA FORNICATA Lamarck. Plate XXIII, fig. 129. (p. 417.)

Animaux sans Vert., vol. vii, p. 641; Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 225, 1822; Gould, Invert., ed. i, p. 158, fig. 17; ed. ii, p. 271, fig. 532(?). *Patella fornicata* Linné, Syst. Nat., ed. xii, p. 1257.

Casco Bay, Maine, to Florida, and the northern shores of the Gulf of Mexico. Local north of Massachusetts Bay; in the southern part of

the Gulf of Saint Lawrence, at Prince Edward's Island, &c. Halifax (Willis). Saint George's Bank (S. I. Smith). It is common in the shallow and sheltered parts of Casco Bay, but has not been found east of the Kennebeck River, on the coast of Maine, nor in the Bay of Fundy. Very abundant in Vineyard Sound and Buzzard's Bay, from low-water to 12 fathoms; in Long Island Sound, near New Haven, low-water to 6 fathoms; Great Egg Harbor, New Jersey; and everywhere southward. Egmont Key and Tampa Bay, Florida (E. Jewett).

Fossil in the Miocene of Maryland, North and South Carolina; Pliocene of South Carolina; and Post-Pliocene of North and South Carolina, Gardiner's Island, New York, and Nantucket Island.

The *fornicata* of Linné was described as a Mediterranean species, and may not be identical with the American shell.

CREPIDULA PLANA Say. Plate XXIII, fig. 127.

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 226, 1822; Gould, Invert., ed. i, p. 159, fig. 16; ed. ii, p. 272, fig. 533. *Crepidula unguiformis* Stimpson, Shells of New England, p. 30, 1851; this Report, pp. 355, 417 (*non* Lamarck, 1822).

Massachusetts Bay to Florida and the northern shores of the Gulf of Mexico. Local and less abundant farther north, in Casco Bay, Maine; Nova Scotia (Willis); Gulf of Saint Lawrence (Bell, Dawson); and Saint George's Bank (S. I. Smith). Not found on the eastern part of the coast of Maine, nor in the Bay of Fundy. Very common in Vineyard Sound, Buzzard's Bay, and Long Island Sound, from low-water mark to 12 fathoms, on the *outside* of oysters, *Limuli*, and various dead shells, as well as on the *inside* of various dead univalve shells; in all these situations frequently associated with the preceding species, but no intermediate forms have been observed.

Fossil in the Miocene of North and South Carolina; Pliocene of South Carolina; and in the Post-Pliocene of Gardiner's Island, New York, North Carolina, South Carolina, and Florida.

The Mediterranean shell, *C. unguiformis* Lamarck, is a distinct species.

CREPIDULA CONVEXA Say. Plate XXIII, fig. 128. (p. 355.)

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 227, 1822; Gould, Invert., ed. i, p. 160, fig. 15; ed. ii, p. 273, fig. 534. *Crepidula glauca* Say, op. cit., p. 226; Gould, Invert., ed. ii, p. 274, fig. 535; ed. i, p. 151, fig. 14. *Crepidula acuta* H. C. Lea, American Jour. Science, ser. i, vol. xlii, p. 108, Plate 1, fig. 4, 1842.

Massachusetts Bay to Florida. Less abundant and local farther north; at Quahog Bay, Maine; Nova Scotia (Willis); and Gulf of Saint Lawrence. Very common in Vineyard Sound, Buzzard's Bay, Long Island Sound, shores of Long Island, and Great Egg Harbor, New Jersey. Fort Macon, North Carolina (Coues). Georgia (Couper).

Fossil in the Post-Pliocene of Virginia and South Carolina.

The distribution of this species is probably identical with that of *Eupagurus longicarpus* and *Ilyanassa obsoleta*, with which it is nearly always

associated. At Quahog Bay, Maine, this species occurs on the back of the dead shells of *I. obsoleta*, which are occupied by the hermit-crab, just as in the waters of Southern New England; and these, with numerous other southern forms associated with them, constitute a genuine southern colony, occupying a warm, sheltered bay, surrounded on all sides by the northern fauna.

The depressed variety (*glauca*) is found chiefly on broad and nearly flat surfaces of large bivalve shells, stones, &c. The very convex varieties adhere mainly to the surfaces of small convex univalves.

CRUCIBULUM STRIATUM Adams. Plate XXIII, figs. 125, 126. (p. 417.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 366; Gould, Invert., ed. ii, p. 275, fig. 536. *Calyptræa* (*Dispotæa*) *striata* Say, Journ. Acad. Nat. Sciences Philadelphia, vol. v, p. 216, 1836. *Crucibulum* (*Dispotæa*) *striata* H. and A. Adams, Genera, vol. i, p. 366, 1858.

Bay of Fundy to New Jersey. Eastport Harbor and Bay of Fundy, low-water mark to 30 fathoms, common; Frenchman's Bay and Mount Desert, Maine, 3 to 10 fathoms, common; Casco Bay, Maine, 6 to 40 fathoms; Vineyard Sound and Buzzard's Bay, 3 to 12 fathoms, not uncommon. Gardiner's Bay and Montauk Point, Long Island (S. Smith). Off New London, Conn. (coll. T. M. Prudden). Saint George's Bank (S. I. Smith). Northern New Jersey (Say).

LITTORINA IRRORATA Gray. (p. 372.)

Zoology of Captain Beechey's Voyage, p. 138, Plate 38, fig. 1, 1839. Gould, Invert., ed. ii, p. 311, fig. 579. *Turbo irroratus* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 239, July, 1822; Binney's Say, p. 81. *Phasianella sulcata* Lamarck, Animaux sans Vert., ed. i, vol. vii, p. 54, Aug., 1822; ed. ii, vol. ix, p. 244. *Littorina sulcata* Deshayes, in Lamarck, op. cit., vol. ix, p. 203, 1843.

Vineyard Sound to Florida and the northern shores of the Gulf of Mexico. Vineyard Sound, sparingly; Long Island Sound, near New Haven, rare. Stratford, Connecticut, on high sedge (Linsley). Huntington, Long Island (S. Smith). Comparatively rare and local north of Maryland; very abundant farther south.

Many of the shells of this species found on our shores have undoubtedly been brought from Virginia and Maryland with the southern oysters planted in our waters, but it is probably indigenous in certain localities.

LITTORINA RUDIS. Plate XXIV, fig. 137. (p. 305.)

Gould, Invert., ed. i, p. 257, fig. 165, 1841; ed. ii, p. 304, fig. 575. *Turbo rudis* Maton, Nat. Hist. and Antiq. West. Count., vol. i, p. 277, 1797, (t. Jeffreys); Donovan, British Shells, vol. i, Plate 33, fig. 3, 1800, (t. Gould.) *Turbo obligatus* Say, Jour. Acad. Nat. Sci., Philad., vol. ii, p. 241, 1822. *Turbo vestitus* Say, op. cit., p. 241, 1822 (variety *tenebrosa*). *Littorina Grönlandica* Möller, in Kroyer's Tidsskrift, vol. iv, p. 82, 1842. *Turbo tenebrosus* Montagu, Test. Brit., p. 303, Plate 20, fig. 4, 1803 (variety). *Littorina tenebrosa* Gould, ed. i, p. 259, fig. 166; ed. ii, p. 306, fig. 576.

Among the additional names that appear to have been applied to the various

states of this variable species are: *L. saxatilis* Johnson; *Turbo sulcatus* Leach; *Turbo jugosus* Montagu; *L. patula (var.)* Jeffreys; *L. neglecta* Bean; *T. ventricosus* Brown; *L. marmorata* Pfeiffer; *Nerita littorea* Fabricius (*non* Linné); *L. Grönlandica* Möller, Lovén, Mörch; *L. rudissima* Bean; *L. zonaria* Bean; *L. neglecta* Bean, etc.

Great Egg Harbor, New Jersey, northward to the Arctic Ocean; Greenland; Iceland; Spitzbergen. Northern coasts of Europe to Great Britain and Spain. Local south of Long Island Sound; abundant on all the rocky shores of Southern New England, from New York to Cape Cod, and at the eastern end of Long Island; local at Great Egg Harbor, among *Fucus*, on the stones of an old pier. Extremely abundant on all the northern shores of New England and northward. Fossil in the Post-Pliocene of Canada, Great Britain, and Scandinavia.

LITTORINA PALLIATA. Plate XXIV, fig. 138. (p. 305.)

Gould, Invert. of Mass., ed. i, p. 260, fig. 167, 1841; ed. ii, p. 309, fig. 578. *Turbo palliatus* Say, op. cit., p. 240, 1822. *Littorina neritoidea* Dekay, Mollusca New York, p. 105, Plate 6, figs. 109–111 (*non Turbo neritoidea* Linné). *Littorina littoralis* Stimpson, Shells of New England, p. 33, (*non* Forbes and Hanley; *non Nerita littoralis* Linné). *Turbo littoralis* Fabricius, Fauna Grœnlandica, p. 402, 1780 (*non* Linné). *Littorina arctica* Möller, Kroyer's Tidsskrift, vol. iv, p. 82, 1842. (?) *Littorina limata* Lovén, Ofversigt af Kongl. Vet.-Akad. Förhandlingar, vol. iii, p. 154, 1846. *Littorina Peconica* S. Smith, Annals Lyceum Nat. Hist., New York, vol. vii, p. 155, 1860.

Great Egg Harbor, New Jersey, to the Arctic Ocean; Greenland, Spitzbergen, Finmark, and Norway. Very abundant from New York to Cape Cod and northward, wherever *Fuci* grow on rocks between tides; local and less abundant south of Long Island Sound.

Fossil in the Post-Pliocene of Great Britain and Scandinavia.

Should this species prove to be identical with *L. obtusata* (Linné, sp.) of Europe, as there is reason to anticipate, its range will be nearly coincident with that of *L. rudis*, with which it is always found associated on our coast. Several writers have already united the two forms, but no satisfactory comparisons of large series of specimens, from many localities on both coasts, have been made.

LACUNA VINCTA Turton. Plate XXIV, fig. 139. (p. 305.)

Gould, Invert., ed. i, p. 262, figs. 169, 178*, 1841; ed. ii, p. 302, fig. 573. *Turbo vincta* Montagu, Test. Brit., p. 307, Plate 20, fig. 3, (t. Gould). *Trochus divaricatus* Fabricius, Fauna Grönlandica, p. 392, 1780 (*non* Linné). *Lacuna divaricata* Lovén, op. cit., p. 155, 1846; Jeffreys, British Conchology, vol. iii, p. 346.

According to Jeffreys, the following are among the synonyms or varieties of this species: *Turbo canalis* Montagu; *T. quadrifasciata* Mont.; *Phasianella fasciata*, *P. bifasciata*, *P. cornea*, and *P. striata* Brown; *Lacuna solidula* Lovén; *L. labiosa* Lovén; *L. frigida* Lovén.

New York to the Arctic Ocean; Greenland, Iceland, Lapland, Scandinavia, Great Britain, France; on the Pacific coast of America southward to Puget Sound. Long Island Sound, common, but rather local; Watch Hill, Rhode Island, among algæ, in 4 to 5 fathoms; Vineyard

Sound; Buzzard's Bay. Very abundant north of Massachusetts Bay, in Casco Bay, Bay of Fundy, Labrador, etc. Staten Island and Long Island (S. Smith).

Fossil in the Post-Pliocene of northern Great Britain and Scandinavia.

Lacuna neritoidea Gould.

American Journ. of Science, vol. xxxviii, p. 197, 1840; Invert., ed. i, p. 263, fig. 170; ed. ii, p. 303, fig. 574.

This species is a very doubtful inhabitant of this region, having been recorded by no one except Linsley, 1845, who reports it from Long Island Sound (Oyster River and Long Beach, Stratford, Connecticut). I have never been able to find it in the same region, nor has any one else had better success. Linsley's specimens may have been incorrectly named. It occurs in Massachusetts Bay; at Cape Elizabeth, Casco Bay; Grand Menan Island, etc.; northward to Greenland; and on the northern shore of Europe.

LITTORINELLA MINUTA Stimpson. Plate XXIV, fig. 140. (p. 469.)

Researches upon the Hydrobiinæ and Allied Forms, p. 42, May, 1865, in the Smithsonian Miscellaneous Collections. *Turbo minutus* Totten, American Journ. Science, ser. i, vol. xxvi, p. 369, fig. 6, 1834. *Cingula minuta* Gould, Invert., ed. i, p. 265, fig. 171. *Rissoa minuta* Gould, op. cit., ed. ii, p. 298, fig. 566. *Ecrobia minuta* (provisional name) Stimpson, op. cit., p. 42, 1865. *? Cingula modesta* Lea, Boston Journal of Natural History, vol. v, p. 288, Plate 24, fig. 5.

The tentacles in this species are rather short, scarcely exceeding the breadth of the head, slightly tapering, blunt; the eyes are on low prominences on the outer side of the bases of the tentacles; rostrum large, stout, transversely wrinkled, longer than the tentacles, tapering somewhat, but divided at the end by a deep emargination into two rounded lobes, which are often somewhat expanded. Foot short and broad, subtruncate anteriorly, with the angles broad and but little produced, posterior end broadly rounded.

New Jersey to Nova Scotia and Gulf of Saint Lawrence. Abundant along the brackish and muddy shores of Long Island Sound, Buzzard's Bay, Vineyard Sound, Massachusetts Bay, Casco Bay, and Bay of Fundy.

It is not confined to brackish waters, but often occurs also on the ocean shores, under stones between tides.

LITTORINELLA LÆVIS Verrill.

Cingula lævis Dekay, Natural History of New York, Mollusca, p. 111, Plate 6, fig. 118 (poor), 1843. *Odostomia limnoidea* (Dekay, MSS.), Linsley, Amer. Journ. Science, ser. i, vol. xlviii, p. 284, 1845 (no description). (?)*Rissoa Stimpsoni* S. Smith, Annals Lyceum Nat. Hist., New York, vol. ix, p. 393, fig. 2, 1870.

Long Island Sound, near New Haven. Stratford, Connecticut (Linsley); near New York (Dekay); Greenport, Long Island (S. Smith).

RISSOA ACULEUS Stimpson. Plate XXIV, fig. 141. (p. 306.)

Proc. Boston Soc. Nat. Hist., vol. iv, p. 15, 1851; Shells of New England, p. 34; Gould, Invert., ed. ii, p. 299, fig. 568. *Cingula aculeus* Gould, Invert., ed. i, p. 266, fig. 172, 1841. *Trochus striatellus* Fabricius, Fauna Grönl., p. 393, (*non* Linné). (?)*Rissoa saxatilis* Möller, Index Mollusca Grönl., in Kroyer's Tidsskrift, vol. iv, p. 82, 1843. (?)*Rissoa arctica* Lovén, Ofversigt af Kongl., Vet.-Akad. Förhandlingar, vol. iii, p. 156, 1846.

Long Island Sound to Greenland. New Haven, Connecticut, and vicinity, common. Watch Hill, Rhode Island; Vineyard Sound; Stratford, Connecticut (Linsley); Gull Island (Smith). Common on the shores of Massachusetts Bay, Casco Bay, and Bay of Fundy.

Lovén's *R. arctica* was from Finmark, and, to judge from the descriptions, may not be identical with our species. Mr. Jeffreys regards it as a variety of *R. striata* of Europe. He also unites the American shell with *R. striata*, thus: "The variety *arctica* (under the specific name *aculeus* given to it by Professor Stimpson) inhabits the northern sea-board of the United States." (See British Conchology, vol. iv, p. 38). It is natural to infer that a writer who does not appear to have seen the accurate description and figure of this species published in the well-known work of Dr. Gould, ten years previous to Dr. Stimpson's earliest publications, cannot have devoted much time or attention to the American shells, and therefore his opinions should not have too much weight in such cases.

In reality, our shell differs widely from *R. striata*. It agrees more nearly with the English *R. proxima* (Alder, Forbes and Hanley), but apparently differs from it in the soft parts. The foot in our shell is broadly and slightly rounded anteriorly, with the angles only slightly produced, and tapers backward to a bluntly-rounded posterior end. The tentacles are long, slender, slightly tapering, with blunt tips. The eyes are situated near their bases on the dorso lateral aspect, and are scarcely elevated above the general surface. The snout is rather long, often a little expanded at the end, and divided by a deep emargination into two lobes, which often, in a dorsal view, show a slight emargination on their outer surface. No opercular cirrus was observed. This species belongs to the genus *Onoba* of H. and A. Adams. The *R. saxatilis* was described by Möller as having the whorls *smooth*, but he refers to *T. striatellus* of Fabricius, which had spiral striations, as in our species.

RISSOA EXARATA Stimpson. (p. 495.)

Proceedings Boston Soc. Nat. Hist., vol. iv, p. 15, 1851; Shells of New England, p. 34, Plate 1, fig. 3, 1851; Gould, Invert., ed. ii, p. 301, fig. 571. *Cingula arenaria* Mighels and Adams, Boston Jour. Nat. Hist., vol. iv, p. 49, Plate 4, fig. 24, 1842 (*non* Montagu, sp.). *Rissoa Mighelsii* Stimpson, Proc. Bost. Soc. Nat. Hist., vol. iv, p. 15, 1851; Shells of New England, p. 34; Gould, Invert., ed. ii, p. 301, (but not figure 570, which is probably *R. sulcosa*).

Stonington, Connecticut, to Gulf of Saint Lawrence. Watch Hill, Rhode Island, 4 to 5 fathoms, among rocks and algæ (white variety); Casco Bay,