

Seashells of North Carolina

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For many people, seashells are just part of the beach scenery — thousands of pretty but nameless objects strewn along the shore. Other people know the names of shells but often wonder how they were formed and what type of animal lived inside. Such incidental knowledge may not seem important, but it can encourage people to observe their environment more closely and to gain a better understanding of it. As a result, they may become better fishers, more informed teachers or more conscientious stewards of our coast. To this end, the seashell guide was produced.

Many collectors get started when they find an intriguing shell, perhaps after a storm, and search for it in a guide. Others, by chance, meet an experienced sheller on the beach. Talking with a collector passionate about shells is likely to spark an interest in anyone who has spent time at the coast.

A walk down the beach is never the same once you begin to recognize a few shells. Gradually, you learn to use certain marks to solve the puzzle of shell identification. The walk becomes more satisfying as you recognize familiar shells like old friends, and it becomes more exciting as you look for new ones.

Experienced shell collectors know a piece of wet driftwood may be full of wood-boring clams. Shellers carefully search sea fans for tiny simnias. They scan fields of marsh grass for periwinkles. With practice, their sharpened eyes spot clam holes in the mud and identify tracks left by moonsnails. They

recognize some new shells from pictures they have seen. Others send them scurrying for their guides.

The tides continually wash ashore and expose shells, some beautifully sculptured or colorful and others just unusual. It's as if the sea provides beachgoers with a natural treasure hunt. At any time, a group of shells lying inconspicuously in the sand may contain a rarity, just waiting to catch someone's eye.

Collectors learn more than just the names of shells. They become familiar with the animals that live inside and when and where certain shells are likely to be found. Shell collectors learn about tides and the physical features of the coast. They discover that many shell identification marks relate to the animal's anatomy and provide clues to its lifestyle and behavior. Before long, collectors have learned biology, physics and geography without even realizing it.

The animal that lives inside a shell is called a mollusk. More than 1,000 kinds of mollusks reportedly live in North Carolina's estuaries and ocean. Many shells are small and rare, found only in deep offshore waters. The 179 species included in the original version of this book were limited to shells of unusual interest and to common species large enough to be spotted easily by collectors. To this revision, 82 species have been added. Some were observed or collected by scuba divers, while others were small shells often found in oceanfront beach drift. In January 1995,

author Hugh Porter scraped up a bucketful of shell hash from a low tide area of Bogue Banks. It contained whole shells and pieces representing 109 species.

• Mollusks

General features: Mollusk means soft-bodied. A mollusk has no skeleton — rather, its shell acts as an external skeleton. Mollusks usually have some version of a head, soft body and foot, but these features vary among groups. Bivalves, such as oysters and clams, have a mouth but no head. Clams have a strong foot for digging; oysters, however, don't need one because they attach to a surface and remain there permanently.

One important part of a mollusk's body is the mantle, the fleshy tissue that lines the inside of the shell. It is responsible for shell growth and color, and it assists in other functions such as respiration.

Most shells have a brownish "outer skin" called a periostracum while they are alive. Interestingly, the shell's beautiful colors and patterns are hidden by this covering during life. Only after the animal dies and the periostracum is lost is the shell's surface revealed.

A prime characteristic of the mollusca is its variability. Collectors must be aware of the variations possible in the shell and soft parts used to identify mollusk species.

Bivalves

Bivalves are mollusks with two shells, called valves, hinged together. One or more strong muscles inside the shell keep it closed, and a rubbery ligament near the hinge holds the shell open.

Respiration: A bivalve breathes by circulating water within its shell. The incoming water brings oxygen, and the outgoing water takes away carbon dioxide and other wastes. In some bivalves, the mantle extends into the water as a pair of tubes, called siphons. Water enters one siphon, and wastes leave through the other. In bivalves without siphons, water is exchanged through openings in the mantle.

Feeding: Bivalves generally depend on water circulation for food. Incoming water contains tiny particles of plants and animals. The gills collect this matter and move it toward the mouth. Some bivalves — oysters, scallops, mussels, venus clams and cockles — are suspension feeders. Their siphons draw in particles suspended in the water. Other bivalves — such as tellin clams, macomas and abras — are deposit feeders. Their siphons act as vacuum cleaners, sucking in the surrounding particle-filled mud. Because these animals can ingest contaminants along with the water and mud they take in, it is important to keep rivers and coastal waters clean.

Locomotion: Some bivalves have a strong foot that they expand and contract to pull themselves along the

bottom or to burrow into sand or mud. Others spin a strong thread, called a byssus, that they use to anchor to rocks and other objects. Some scallops and limas "swim" by clapping their two valves together and ejecting water from the back of their shells.

Reproduction: Most bivalves have separate sexes, but some are hermaphrodites, which means they are both male and female. Depending on the species, hermaphrodites may have male and female organs or they may switch sexes at different stages of their lives. Species with simultaneous male and female organs usually release eggs and sperm at different times so they do not fertilize themselves. This allows for more genetic variation in the young.

Most bivalves release eggs and sperm directly into the water, where fertilization takes place. The fertilized eggs hatch into young called larvae that swim with other microscopic animals in the plankton. The animal matures within several weeks and settles on the bottom to develop into an adult.

The amount of time the young spend swimming differs by species, but the longer they swim, the greater the chances the currents will carry them to new environments. Many young are "wasted" because they arrive at a location where they can't survive. But this dispersal strategy has advantages because it allows populations to colonize suitable new habitats. These new populations are especially important if disaster eliminates the species from its parent habitat.

Identification aids: Both the outside and inside of a shell provide clues for identifying the bivalve and understanding how its inhabitant lived. The number and arrangement of teeth on the hinge can be used to identify and classify a bivalve. Oval-shaped muscle scars inside the shell show where the muscles attached. When two muscle scars are present, a line can connect them. This pallial line indicates where the animal's mantle, or fleshy tissue, attached to the shell. In some shells, the line curves inward, forming a pallial sinus. The size of the sinus shows how far aside the animal had to move its mantle to make room for the siphons when it closed its shell.

A large pallial sinus identifies an animal that burrowed deep into the sand or mud. To do so, it needed long siphons. Similarly, a small pallial sinus indicates that the animal had short siphons and burrowed just below the surface. A shell with no pallial sinus once housed an animal that had no siphons and lived on top of the sand or mud or attached to hard surfaces such as rocks or other shells.

Gastropods

A gastropod, or univalve, is a mollusk covered by a single coiled shell in its earliest stages and generally throughout its adult life. However, in some gastropods, the shell is present only during the larval period. The gastropod body emerges from an opening, or aperture, to eat and move.

The outside edge of the aperture is called a lip.

Each turn of a gastropod's spiral shell is a whorl. The last and usually largest whorl is the body whorl. All whorls above the body whorl make up the spire. The aperture is at the front of the shell; the spire is at the back.

Unlike bivalves, gastropods have a head with tentacles. The tentacles bear sense organs such as the eyes, which detect shadows and movement.

Many gastropods have a trap door, or operculum, attached to their foot.

This structure seals the aperture opening when the animal retreats into its shell.

Respiration: Like bivalves, most gastropods breathe by taking in oxygen from the water. They may have one or two siphons.

Feeding: Gastropods have more structures for feeding than bivalves, so they don't depend on water circulation for food. Most gastropods are carnivores that feed on other animals. A few primitive gastropods are herbivores, or plant-eaters. A few are omnivores, which eat both plants and animals. Others are scavengers or detritivores, which eat dead plant and animal matter.

A gastropod's head has a tubelike extension called a proboscis with a mouth and a ribbonlike strip of teeth called a radula. Both are used for feeding. Herbivores use the radula to scrape algae off rocks, while carnivores use it to tear flesh or to drill holes in shells.

In most of the cones, terebras and turrids, the radular teeth are poisonous stingers or darts capable of narcotizing or killing their prey. Some cones have poison-carrying darts that they toss at their prey. No cones in North Carolina waters are documented as poisonous to humans, but a few Pacific cones are capable of killing people.

Because they vary little within a species, radula are important indicators of gastropod identity and relationship to other species.

Locomotion: Most gastropods move along the bottom by sending a series of ripples through their muscular foot. Janthinas, however, spend their lives floating in the open ocean attached to "rafts" of bubbles.

Reproduction: Fertilization of gastropod eggs occurs both inside and outside the body. The eggs are frequently laid in gelatinlike blobs or in one of many types of egg capsules. Egg capsules are often seen washed up on the beach and mistaken for seaweed. In some species, the eggs hatch into swimming forms. In others, they hatch into crawling forms that resemble adults. Some females bear live young.

• Shell Growth

A mollusk produces its shell from glands in the edge of the mantle. The basic component of a shell is calcium carbonate. Another ingredient is a protein substance called conchiolin. The mantle uses minerals from seawater and

its food to form a matrix, or latticework, of conchiolin. The shell grows as calcium carbonate crystals form on the conchiolin lattice or on other calcium crystals.

The smoothness of the shell depends on the smoothness of the mantle. Shells with large spines or ridges are formed in species with ruffy mantles. As the animal grows, the mantle and the shell grow too.

Most mollusks attain their mature size in one to six years. The bay scallop reaches its maximum size in two years and rarely survives a third season. Some periwinkles have been kept in captivity for more than 10 years. Yet growth ring counts of a southern quahog from offshore Stackpole Banks suggest it lived 77 years or more.

• Shell Color

Both the shell and the mantle contain color pigments. Pigments from food eaten by the mollusk concentrate in color cells along the mantle's edge. These cells produce patterns on the shell such as dots, circles and stripes. Bands of color occur when a group of cells stays in one place and produces pigment. Spots or patches result when groups of these color cells turn off and on. Zigzags occur when the cells move up and down the mantle's edge. The shell color may change slightly if a mollusk changes diet or location.

Iridescent interiors are caused not by color pigments but by the way light enters and reflects from layers of the shell's structure.

• Mollusk Habitats

Mollusks live in a variety of habitats. This guide covers mollusks that live in salt and brackish waters, but many also live in fresh water and on land.

Marine and estuarine mollusks have also adapted to many different habitats: sandy beaches, intertidal sand and mud flats, rocky bottoms, eelgrass flats and shallow to deeper water habitats.

• Studying and Collecting Shells

Although few mollusks live on sandy beaches, the shoreline is a good place to search for empty shells that have washed ashore. The best time to look is early spring after winter storms and in September when hurricanes are active. The best time of day is an hour before or after low tide, especially during spring tides that occur on new and full moons. Walk the beaches frequently. It's good for your health, and the shells can change with every turn of the tide. Collecting can also be done on the intertidal flats of the state's many bays and estuaries. Scuba-assisted collections from offshore rocks and shipwrecks have produced species rarely found on beaches.

With permission, search the decks of offshore fishing boats and the shucking piles of seafood dealers who handle fish, shrimp or offshore scallop

catches. A.F. Chestnut, an early director of the University of North Carolina Institute of Marine Sciences, found the first known living specimen of the rare *Coronado bonnet* on the deck of a trawler that had been fishing off Winkle Shoals near Oregon Inlet. Excellent mollusk specimens are sometimes found in piles at commercial scallop shucking plants in Carteret County. However, be aware that many of these shells may have been harvested from waters off New Jersey, Virginia, South Carolina, Georgia, Florida or the Gulf of Mexico. Also, protect yourself from cuts or bruises because the decaying flesh remaining on these shells could be covered with bacteria and viruses.

Don't take live specimens unless you plan to document your collection carefully enough that a scientist could use it. Only after you have collected beach shells for a while and have a well-documented collection should you begin taking live specimens. Remember, few things smell worse than a dead mollusk left in a car or a jacket pocket. If you take a live mollusk for your collection, clean or preserve it immediately.

Always take a pen and notebook to describe the shell and where and how you collected it. This is essential for anyone starting a serious collection. The most important information to record is the date, the shell's location — such as "one mile south of Cape Hatteras" — and whether the mollusk

was taken dead or alive. The shell's name can be added later. It is helpful to include other details, such as the tidal conditions, habitat, what the mollusk was doing and other animals present. It's fun to look back through the notebook and reminisce about a walk on the beach after a bad storm or a warm afternoon wading in a tidal pool. Shell clubs are also interested in compiling this information.

Instead of taking live mollusks, try observing the appearance, habitat and behavior of the animals. Naturalist Rachel Carson, author of *Silent Spring*, did this as she wrote books such as *The Edge of the Sea* and *The Sea Around Us*. She used words to collect the sea life she found in tidal pools, on rocks and in estuaries. Those interested in photography can collect the animals on film. Patient observation may reveal activities such as a whelk pounding open a bivalve or a moonshell drilling a hole into another mollusk. People interested in learning more about the mollusca would be advised to read *Living Marine Mollusca* by C.M. Yonge and T.E. Thompson or *The Shell Makers* by G. Alan Solem.

When can mollusks be observed? Unfortunately, many of them are active at night, making observation difficult. In daylight, some mollusks can be found by shoveling mud into a kitchen colander and draining it with seawater. Others can be found under rocks, which should be returned so that the tiny plants and animals living there won't perish.

0 • **rough scallop** *Aequipecten muscosus* (W. Wood)
(= *Chlamys muscosus*)

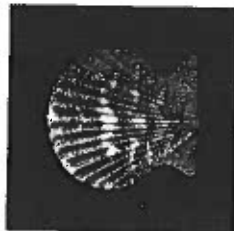
Description: (1 3/4 inches) Small, scallop-shaped shell. About 20 strong ribs with many erect scales or small spines near the margin. Hinge line with ears.

Color: Pink to dark red exterior, occasionally mixed with other colors — sometimes bright lemon-yellow.

Habitat: Lives offshore. Rarely found on ocean beaches.

Range: North Carolina to the West Indies.

Notes: It was frequently netted as incidental catch in the Atlantic calico scallop fishery.



rough scallop

• **sea scallop** *Placopecten magellanicus* (Gmelin)
Description: (6 1/2 inches) Large, smooth shell. Hinge line with ears. Many fine concentric lines. Lower valve almost flat, and upper valve only slightly inflated.

Color: Exterior of top valve reddish brown, sometimes rayed; bottom valve glossy pinkish white. Whitish interior.

Habitat: Lives offshore. Might occur on ocean beaches north of Cape Hatteras.

Range: Labrador, Canada, to Cape Hatteras, N.C.

Notes: Also called the Atlantic deep-sea scallop, it was fished commercially for its delicious meat. It is much larger than other North Carolina scallops. Specimens from Virginia and New Jersey were once common in piles near commercial scallop-shucking plants in Carteret County. Early Native Americans used the valves as dishes. Today, tourists often purchase them to use as ashtrays.



sea scallop

• **Ravenel scallop** *Pecten ravenelii* Dall
Description: (2 3/4 inches) Hinge line with ears. Lower valve very cupped; upper valve flat. Smooth, radial ribs with wide spaces between them.

Color: Pinkish, purple or sometimes yellow. Upper valve darker with irregular dark markings.

Habitat: Lives offshore.

Range: North Carolina to the West Indies.

Notes: This scallop was once mistaken by shellfishers as a sick Atlantic calico scallop because of its flat upper valve. Today, it is a popular shell among tourists.



Ravenel scallop

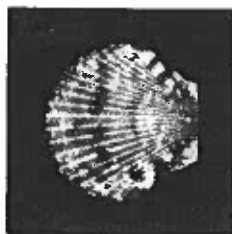
• **Atlantic calico scallop** *Argopecten gibbus* (Linnaeus)
Description: (3 inches) Similar in shape and sculpturing to the Atlantic bay scallop. Both valves cupped. Hinge line with ears. About 20 radial ribs sometimes roughened by growth lines.

Color: Exterior of upper (left) valve dark yellow or pink with striking combinations of red in stripes or blotches. Lower (right) valve whitish with small reddish or purple spots. White interior, often with brown patches on ears and top edge.

Habitat: Lives only in ocean, east of Cape Lookout and southwest of Beaufort Inlet in 100-foot depths. Commonly found on sand and ocean beaches.

Range: Delaware to Brazil.

Notes: It is occasionally fished commercially and popular among tourists.



Atlantic calico scallop

• **Atlantic bay scallop** *Argopecten irradians concentricus* (Say)
Description: (3 1/2 inches) Similar in shape and sculpturing to Atlantic calico scallop (note color differences). Both valves cupped. Fifteen to 22 smooth radial ribs.

Color: Upper valve gray, brown or blackish, sometimes with only the upper surface of ribs colored. Lower valve usually with less color than the upper valve.

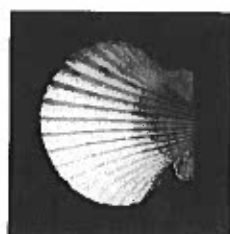
Habitat: In North Carolina, lives only in sounds and estuaries.

Range: Massachusetts to Mexico.

Notes: A major commercial fishery in North Carolina sounds and estuaries, it can be collected by dragging a rake or small oyster dredge through eelgrass beds. The loss of eelgrass, however, has caused a decline in the bay scallop. It is one of three subspecies of bay scallop recognized in the North Atlantic from Massachusetts to Mexico; see Abbott (1974) and Walter (1969) for detailed differences. The two other subspecies are:

(1) **Northern Atlantic bay scallop**, *Argopecten irradians irradians* (Lamarck), found from Cape Cod, Mass., to Maryland. It has flatter, thinner valves than the one in North Carolina waters.

(2) **Texas bay scallop**, *Argopecten irradians amplicostatus* (Dall), found from Galveston, Texas, to the Mexican coast. It has thicker, more convex valves and fewer radial ribs (13 to 16) than the one in North Carolina waters.



Atlantic bay scallop

• **flattened cardiid** *Pleuromeris perplana* (Conrad)

(= *Venericardia perplana*)

Description: (3/8 inch) Small, somewhat flattened, obliquely oval or triangular shell. Beak back of center. Strong, broad, rough radial ribs that curve toward front of the shell. Ribs sometimes beaded. Hinge teeth similar to **threetooth cardiid**. Inside edge of shell crenulated. No pallial sinus.

Color: Creamish exterior with occasional pink concentric bands. Cream interior with occasional pink to strong violet.

Habitat: Lives in 20- to 30-foot depths south of Cape Hatteras. Occasionally found on ocean beaches.

Range: North Carolina to Florida.



flattened cardiid

OYSTER-SHAPED - wing-oysters (Preniidae)

• **Atlantic wing-oyster** *Pleria colymbus* (Röding)

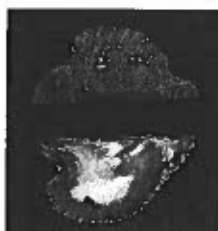
Description: (3 3/4 inches) Triangular shell with winglike extension from the straight hinge line. Other side rounded. Hinge longest part of shell with few teeth. Wrinkled exterior.

Color: Brownish purple exterior. Indescent interior.

Habitat: Lives in sounds and offshore, commonly attached to shells, rocks, sea whips or floating docks. Often found on sea whips washed ashore after storms. Occasionally found on sand and ocean beaches.

Range: North Carolina to Brazil.

Notes: Closely related to pearl oysters, its pearls are rare and usually too small to be valuable. The mantle produces mother-of-pearl, or nacre. Pearls form when a grain of sand or other particle enters the shell and is coated with layers of nacre.



Atlantic wing-oyster

• **Atlantic pearl-oyster** *Pinctada imbricata* Röding

(= *P. radiata* Leach)

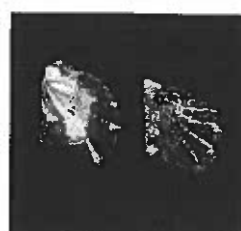
Description: (1 1/2 inches) Nearly circular shell with long, flattened hinge line forming a winglike extension. Small, below small triangular ear of the right valve. Thin-shelled and brittle. Thin, scaly, concentric spines sometimes on perostracum.

Color: Exterior yellow or green with dark radial streaks or dark brownish purple with white streaks. Pearly interior.

Description: Attaches to sargassum or other drifting objects. Often found on ocean beaches where sargassum washes ashore.

Range: North Carolina to Florida, Texas and Brazil.

Notes: See Atlantic wing-oyster **Notes**.



Atlantic pearl-oyster

OYSTER-SHAPED - edible oysters (Ostreidae)

• **eastern oyster** *Crassostrea virginica* (Gmelin)

Description: (8 1/2 inches) Shell elongate and usually heavy. Shaped by surface to which it attaches (usually another oyster). Lacks pimplelike depressions on either side of hinge and lacks hinge teeth. Prominent muscle scar inside. Lower valve cemented to another hard surface.

Color: Dirty white to dark gray or purple exterior. Grayish white interior with dark purple muscle scar.

Habitat: Lives in intertidal areas near mouths of sounds and estuaries. Common on sand and ocean beaches.

Range: New Brunswick, Canada, to the Gulf of Mexico.

Notes: The eastern oyster is an important fishery in North Carolina's estuarine waters. A hermaphrodite, it may change sex several times during life. It sheds sperm and eggs into water, where fertilization and development take place. Larvae swim freely for about two weeks, cement to a hard object and remain for life. For a brief period after attachment, they are called "spat." Thousands of spat have been recorded attached to one oyster shell, but generally only one or two will survive. The mantle does not produce nacre, or mother-of-pearl, so pearls found in them are not valuable. They are called **coon oysters** when they grow long, narrow and thin-shelled from crowded conditions in intertidal areas.



eastern oyster

• **crested oyster** *Ostreola equestris* (Say)

(= *Ostrea equestris*)

Description: (2 inches) Shell very similar to eastern oyster except more round than elongate with small pimplelike depressions on either side of hinge.

Color: Brownish gray exterior. Greenish gray interior.

Muscle scar generally not colored.

Habitat: Lives in high-salinity areas, such as mouths of sounds, estuaries and offshore. Common on sand and ocean beaches.

Range: Virginia to Argentina.

Notes: Rarely used commercially, it is only an incidental catch from high-salinity sounds or inlets. It has an excellent taste and is closely related to commercial oysters in Europe and on the northwestern U.S. coast. Unlike the eastern oyster, which releases eggs and sperm into the water, sperm enter the female's mantle cavity through her siphon. The fertilized eggs of the **crested oyster** incubate in the mantle until they hatch and are released into surrounding waters. In both species, the young develop similarly, and sex reversal is common.



crested oyster



ribbed mussel

- **ribbed mussel** *Geukensia demissa* (Dillwyn)
Description: (5 1/4 inches) Elongate, obliquely oval shell with one end narrower than the other. Strong, heavy radial ribs sometimes branch. Toothless hinge.
Color: Dark brown to purple exterior. Blue-white interior.
Habitat: Lives in large groups in muddy intertidal areas of brackish marshes. Often found among the roots of the marsh cord grass, *Spartina*.
Range: Nova Scotia, Canada, to Florida.
Notes: It attaches to cord grass stems and other substrates by its byssus. It grows well in polluted areas.



Atlantic papermussel

- **Atlantic papermussel** *Amygdalum papyrium* (Conrad)
Description: (1 inch) Elongate, fragile shell generally more than twice as long as high. Smooth exterior with fine concentric growth lines.
Color: Shiny light blue and tan exterior with brown cobwebby design. Indescent interior. Light green perostracum.
Habitat: Lives in estuaries and offshore.
Range: Maryland to Texas.
Notes: It uses its byssal threads to build nests.

MUSSEL-SHAPED – gastrochaenas (Gastrochaenidae)



Atlantic rocellaria

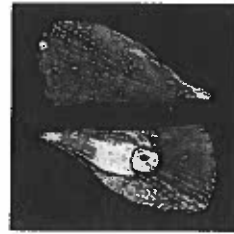
- **Atlantic rocellaria** *Gastrochaena hians* (Gmelin) (= *Roccellaria hians*)
Description: (5/8 inch) Elliptical shell. Resembles a mussel or piddock with beak close to the front end. Large gape just behind beak. Thin-shelled. Small hinge teeth.
Color: Chalky white exterior. White interior.
Habitat: Lives offshore burrowed inside coral rock. Occasionally lives in high-salinity estuarine areas such as Wreck Point and Cape Lookout. Collected by scuba divers at a 70-foot depth off Wightsville Beach (burrowed into rock).
Range: North Carolina to Brazil.
Notes: Also called an **Atlantic gastrochaena**. This species forms burrows in coral rock that are flasklike and lined with a calcareous substance. It has long siphons.

PENSHELL-SHAPED – penshells (Pinnidae)



sawtooth penshell

- **sawtooth penshell** *Atrina serrata* (Sowerby)
Description: (10 inches) Large and fan-shaped shell with one side straight and the other rounded. Fragile and scaly. About 30 ribs covered with small spines.
Color: Green to yellowish brown exterior. Pearly interior.
Habitat: Lives offshore in sandy mud. Commonly found on ocean beaches after winter storms.
Range: North Carolina to Colombia.
Notes: Brittleness makes this shell difficult to keep in collections. Its edible meat is considered valuable in some parts of the world. Penshell muscle is sometimes sold as "scallop." Byssal threads, which help hold it in the sand, are woven into cloth for small garments in Mediterranean countries. Penshells are the only shellfish in North Carolina's marine waters known to produce a valuable pearl.



stiff penshell

- **stiff penshell** *Atrina rigida* (Lightfoot)
Description: (10 inches) Large, fragile, fan-shaped shell. Fewer than 20 ribs, some with large spines. One side straight and the other rounded. Resembles half-naked penshell except on mid-interior of shell, where large muscle scar borders the edge of nacreous area.
Color: Dark purplish black exterior. Pearly interior.
Habitat: Lives in sounds. Found on sand and ocean beaches after winter storms.
Range: North Carolina to Florida.
Notes: Also called a **rigid penshell**. See sawtooth penshell.
Notes: See the photograph for an outline of the muscle scar and nacreous area on the left valve.



half-naked penshell

- **half-naked penshell** *Atrina seminuda* (Lamarck)
Description: (10 inches) Similar to stiff penshell except on mid-interior of shell. Large muscle scar surrounded by nacreous area, which extends to the narrow beak end of the shell. (On stiff penshell, large muscle scar on the edge of nacreous area.)
Color: Dark purplish black exterior. Pearly interior.
Habitat: Lives offshore in sandy mud. Occasionally found on ocean beaches after winter storms.
Range: North Carolina to Argentina.
Notes: See sawtooth penshell. Notes: See the photograph for an outline of the muscle scar and nacreous area.



cross-barred venus

• **cross-barred venus** *Chione cancellata* (Linnaeus)
Description: (1 3/4 inches) Rounded, triangular shell. Strong concentric ridges and strong radial ribbing form a raised crisscross pattern of ridges. Crenulations on bottom edge. Lateral and cardinal teeth on hinge. Lunule and small pallial sinus.
Color: Grayish yellow-white exterior. Occasionally has a few lavender radial stripes. Interior usually purple.
Habitat: Commonly lives on sandy bottoms of sounds and shallow offshore waters. Shells common on sound and ocean beaches.
Range: North Carolina to Brazil.
Notes: Although it is sweeter-tasting than the northern quahog, it is eaten only rarely.



lady-in-waiting venus

• **lady-in-waiting venus** *Chione intapurea* (Conrad)
Description: (1 1/2 inches) Round, thick shell. Many concentric ridges closer-set than those on the cross-barred venus. Serrated lower edges of concentric ridges give appearance of being crossed by light ribbing. Lateral and cardinal teeth on hinge. Lunule and pallial sinus. Fine crenulations on bottom edge of shell.
Color: Creamy white exterior, often with broken radial lavender stripes. White interior with purple markings.
Habitat: Lives offshore. Occasionally found on ocean beaches.
Range: North Carolina to Brazil.



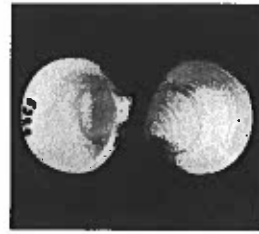
imperial venus

• **imperial venus** *Chione latirata* (Conrad)
Description: (1 1/2 inches) Rounded, triangular and well-inflated shell. Large, heavy concentric ridges rounded and often sharply shelved at the top. Ridges fragile on dry specimens. Bottom edge of ridges not serrated. Bottom edge of shell finely grooved. Cardinal and lateral teeth on hinge. Lunule and pallial sinus.
Color: Tan exterior with lavender blotches and radial stripes.
Habitat: Lives offshore, south of Cape Hatteras, in 60- to 120-foot depths. Occasionally found on ocean beaches.
Range: North Carolina to Brazil.
Notes: This species was frequently found among catches of the Atlantic calico scallop fishery.



gray pygmy-venus

• **gray pygmy-venus** *Chione grus* (Holmes)
Description: (3/8 inch) Oblong shell. Beak about one-quarter of the shell length from the rounded front end. Squarish back end. Surface with many fine radial ribs crossed by equally fine concentric lines. Lateral and cardinal teeth on hinge. Narrow, heart-shaped lunule. Small pallial sinus.
Color: Exterior gray to white (sometimes light pink) with purplish brown near both ends of the hinge. Dark brown lunule. White interior with purplish brown near one end.
Habitat: Lives in sand and mud in high-salinity estuaries south of Cape Hatteras and also in offshore waters up to 100 feet deep. Attaches to shells in shell-reef areas. Common on ocean beaches.
Range: North Carolina to Florida and Texas.



disk dosinia

• **disk dosinia** *Dosinia discus* (Reeve)
Description: (3 inches) Round, flat, disklike shell similar to elegant dosinia. Fine concentric ridges — about 50 ridges per inch. Beak curves forward. Cardinal teeth on hinge. Lunule and pallial sinus.
Color: Shiny white interior and exterior. Thin, yellow periostracum.
Habitat: Lives in sounds and just offshore on shallow sand flats. Commonly found on sound and ocean beaches.
Range: Virginia to Yucatan.



elegant dosinia

• **elegant dosinia** *Dosinia elegans* Conrad (= *Dosinia concentrica* Born)
Description: (4 inches) Round, flat, disklike shell. Similar to disk dosinia except for larger and less crowded concentric ridges — about 25 ridges per inch. Beak curves forward. Cardinal teeth on hinge. Lunule and pallial sinus.
Color: Pure white exterior and interior.
Habitat: Lives offshore in deeper waters than those reported for the disk dosinia. Often found on Cape Lookout ocean beaches.
Range: North Carolina to Brazil.
Notes: Empty shells found on beaches are often still attached at the hinge.



Dietz corbula

- **Dietz corbula** *Corbula dietziana* C.B. Adams
Description: (1/2 inch) Similar to contracted *corbula* except (1) heavier and thicker shell, (2) coarser concentric ridges with microscopic threads between them and (3) very angular back ridge and back end.
Color: Gray to pinkish exterior. Pink rays often on bottom edges.
Habitat: Lives offshore in sand to depths of about 100 feet. Commonly on ocean beaches.

Range: North Carolina to Florida and Brazil.
Notes: This species is occasionally found in the stomach of the sea star, *Astropecten articulatus*. It has two growth phases. The first is that of a typical bivalve, with both valves growing at the same rate. In the second phase, the right valve grows nearly three times as much as the left valve. This change in growth produces part of the shell that is thicker and more angular than it was in the earlier phase.

CLAM-SHAPED – soft-shell clams (Myidae)



soft-shell

- **soft-shell** *Mya arenaria* Linnaeus
Description: (3 1/2 inches) Elliptical shell with fine concentric lines. Left valve has spoon-shaped cavity on a horizontal shelf that projects from the hinge area. Beak near center. Deep pallial sinus.
Color: White to gray exterior. White interior. Grayish brown perostracum.
Habitat: Lives in sounds and inlets with small specimens found south of Cape Hatteras. Large fossil shells frequently found on ocean beaches. Lives buried in mud and has long siphons. Adaptations allow it to survive exposure to air twice a day in the intertidal zone.
Range: Labrador, Canada, to South Carolina.
Notes: Also known as the **steamer clam**, it is a major fishery in some Northern states. Its delicious meat is the source of the famous Howard Johnson fried clams.



subovate soft-shell

- **subovate soft-shell** *Paramya subovata* (Conrad)
Description: (3/8 inch) Small, rectangular shell with rough concentric lines on surface. Beak slightly swollen and just off-center. Triangular depression on hinge with a raised tooth on either side. The major identifying mark: noticeable extension of the triangular depression into the shell cavity.
Color: Gray.
Habitat: Lives offshore at depths up to 75 feet. Commonly found on ocean beaches.

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- Range:** Delaware to Florida and Texas.
Notes: This species has been reported to live beside the burrows of the marine worm *Thalassoma harmani*.

CLAM-SHAPED – crassinellas (Crassatellidae)



beautiful crassinella

- **beautiful crassinella** *Eucrassatella speciosa* (A. Adams)
Description: (2 1/2 inches) Thick shell with one end rounded and the other pulled out to form a blunt, hooklike extension. Closely spaced, heavy concentric ridges on surface. Beak near center. Two deep muscle scars on inside. No pallial sinus.
Color: Brown exterior. Interior usually pinkish.
Habitat: Lives offshore. Occasionally brought in by calico scallop fishers as incidental catch.
Range: North Carolina to West Indies.
Notes: Also called Gibbs's clam.



lunate crassinella

- **lunate crassinella** *Crassinella lunulata* (Conrad)
Description: (1/4 inch) Small, solid, flat shell. Top edge straight but diverges from the beak at a sharp 90-degree angle. About 15 to 20 low, sharp, concentric ribs on surface.
Color: Cream to pink exterior, sometimes with brownish rays. Interior mostly brown.
Habitat: Lives offshore at depths greater than 100 feet. Commonly found on ocean beaches.
Range: Massachusetts to Florida, Texas and Brazil.

CLAM-SHAPED – semeles (Semelidae)



cancellate semele

- **cancellate semele** *Semele bellastrata* (Conrad)
Description: (1 inch) Small, oval, narrow shell. Radial and concentric ribbing on exterior, creating a beaded look. Beak subcentral. Hinge teeth. Ligament embedded in spoon-shaped cavity in hinge area. Pallial sinus deep and rounded. Narrow lunule.
Color: Cream exterior with pinkish purple specks or blotches. Occasionally solid purplish gray. Shiny interior, often bright yellow or lavender.
Habitat: Lives offshore in sand and mud and has long siphons. Known at depths up to 300 feet. Occasionally found on ocean beaches south of Cape Hatteras.
Range: North Carolina to Florida, Texas and Brazil.
Notes: This species tastes good but isn't abundant enough to be commercially valuable.



many-line lucine

• **many-line lucine** *Parvilucina multilineata* (Tuomey & Holmes)

Description: (3/8 inch) Small, circular, robust shell with low ridge from the prominent beak to the back bottom edge of the shell. Sculptured surface with many incised concentric lines crossed by many finely incised radial lines. Cardinal and lateral teeth on hinge. Small and smooth lunule. Bottom edge of shell crenulated. No pallial sinus.

Color: White.

Habitat: Lives in moderate- to high-salinity estuaries and offshore (common in 50-foot depths and occasionally in 100-foot depths). Commonly washed onto ocean beaches.

Range: Virginia to Florida and Brazil.

Notes: This species is often found in the stomach of the sea star, *Astropecten articulatus*.



Pennsylvania lucine

• **Pennsylvania lucine** *Linga pennsylvanica* (Linnaeus)
Description: (2 1/2 inches) Round, thick shell with delicate to strong concentric ridges on outer surface. Pronounced furrow from beak to back bottom edge of the shell. Well-marked lunule with a raised center. Cardinal and lateral hinge teeth present. No pallial sinus but well-marked pallial line. On recently living specimens, the thin periostracum may be ridged concentrically outward and flaked off easily.

Color: White exterior and interior. Yellow periostracum.

Habitat: Known living in sand offshore of Core Banks and Cape Fear. Rarely found on ocean beaches.

Range: North Carolina to Florida and Brazil.

Notes: The large size allows it to wash ashore occasionally.



dosinia lucine

• **dosinia lucine** *Lucinia keenae* Chavan (= *L. radians* Conrad)

Description: (3/4 inch) Disklike shell with many fine concentric ridges on the surface. Ridges cut by finer radial lines, especially near the beak and front edge. Moderately high beak points over a submerged lunule. Inside edge often lightly crenulated. Weak lateral and strong cardinal teeth on hinge. No pallial sinus.

Color: White.

Habitat: Known living from 50- to 100-foot depths offshore of Beaufort Inlet. Collected by divers from 40 feet.

Range: North Carolina to Florida and West Indies.



woven lucine

• **woven lucine** *Lucinia nastula* (Conrad) (= *Phacoides nastula*)

Description: (1/2 inch) Moderately compressed, disklike shell. Rough, reticulated surface often with raised scales at the juncture of concentric and radial lines. Moderately high beak with small pit in front. Strong lateral and cardinal teeth on hinge. No pallial sinus. Strongly crenulated inside edge.

Color: White.

Habitat: Known living off Beaufort Inlet at depths from 30 to 100 feet. Occasionally washed onto ocean beaches.

Range: North Carolina to Florida, Texas and Bahamas.

CLAM-SHAPED - diplodons (Ungulinidae)



Atlantic diplodon

• **Atlantic diplodon** *Diplodonta punctata* (Say)

Description: (1/2 inch or more) Strongly inflated, round shell. Smooth surface incised with fine concentric growth lines. Thin-shelled. Two cardinal teeth on hinge of each valve, one of them split. No lateral teeth on hinge.

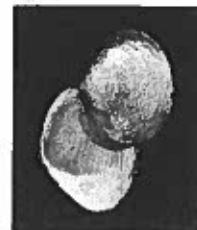
Color: White.

Habitat: Lives offshore in sand at depths of 50 feet or more. Occasionally washed onto ocean beaches.

Range: North Carolina to Florida and Brazil.

Notes: Note the drill hole made by moonshells in the photo.

CLAM-SHAPED - tellins (Tellinidae)



Balthica macoma

• **Balthica macoma** *Macoma balthica* (Linnaeus)

Description: (1 inch) Small, oval to round, almost wedge-shaped shell. Many fine concentric lines. Central beak not bulbous. Thin-shelled. Hinge with cardinal teeth only.

Color: Dull pinkish white exterior. Shiny white interior.

Habitat: Lives commonly on mud bottoms in low salinity areas, such as coastal creeks, rivers and sounds. Occasionally found on sand beaches.

Range: Arctic Sea to Georgia.

Notes: A deposit feeder, it burrows into mud and has a long incurrent siphon and a short excurrent siphon.

CLAM-SHAPED – coquinas (Donacidae)



variable coquina

• **variable coquina** *Donax variabilis* Say (= *D. roemerii* protracta Conrad)
Description: (1 inch) Small, elongate, triangular shell. Smooth exterior with ribbing at beak end of shell. Hinge teeth.
Color: Extremely variable coloration — white, yellow, orange, pink, red and purple in solids, ringed or rayed patterns.
Habitat: Lives in the intertidal zone of sandy ocean beaches.
Range: New York to Texas.

Notes: Also called a **Florida coquina**, **butterfly shell**, **wedge shell** or **pompano**. Often seen along the tide line of sandy beaches, where waves continually uncover these shallowly buried clams and wash them farther up the beach. Each time the coquina is exposed, its small, muscular foot immediately emerges and stands the animal on end as it burrows down an inch or two into the wet sand. Coquinas can survive in dry sand for up to three days. They make a delicious broth.



parvula coquina

• **parvula coquina** *Donax parvula* Philippi
Description: (1/2 inch) Resembles the variable coquina except slightly elliptical and less triangular with a smoother and more rounded beak end.

Color: Similar to that of the variable coquina.
Habitat: Near and just below the low tide line of ocean inlet beaches (lower on the beach than the variable coquina).

Range: South of Cape Lookout, N.C., to Florida.
Notes: Populations of this shell are known at the mouth of the Newport River at Fort Macon State Park. It should also be found at similar inlet locations farther south.

CLAM-SHAPED – wedgedlams (Mesodesmatidae)



concentric erillia

• **concentric erillia** *Erillia concentrica* (Holmes)
Description: (1/4 inch) Oval shell with a slightly off-center beak. Many fine concentric ridges on surface. Triangular ligament pit on hinge and a prominent cardinal tooth on both valves. Large pallial sinus.

Color: Cream exterior. Shiny and translucent interior.
Habitat: Lives offshore at 30- to 100-foot depths. Also has been found in the estuarine waters of Bogue Sound. Occasionally to commonly washed onto ocean beaches.
Range: North Carolina to Florida and Brazil.

CLAM-SHAPED – spoonclams (Periplomatidae)



Lea spoonclam

• **Lea spoonclam** *Periploma leatum* (Conrad)
Description: (1 3/4 inches) Oval shell with one end slightly squared off. Left valve less convex than right valve. Spoon-shaped cavity in hinge area of both valves, beginning as a narrow slit in the beak and extending into the shell cavity. Blunt end of shell has internal rib or crease running from hinge cavity to about halfway down the lower edge. Fine, raised rib running parallel to crease reinforces the spoon-shaped cavity. No cardinal or lateral teeth on hinge. Small pallial sinus.
Color: White exterior and interior. Yellow periostracum.
Habitat: Lives just offshore. Not commonly washed onto ocean beaches.
Range: Nova Scotia, Canada, to North Carolina.

CLAM-SHAPED – pandoras (Pandoridae)



threeline pandora

• **threeline pandora** *Pandora trilineata* Say
Description: (1 inch) Small, crescent-shaped, flat shell with one end shaped like a small tube. Concave upper edge. Rough concentric growth lines on surface. Strong cardinal teeth radiating from beak. Worn shells with pearly layer below. No pallial sinus.

Color: White exterior. Pearly interior.
Habitat: Lives buried just below the surface in sounds and shallow offshore areas. Rarely seen on beaches by collectors.
Range: Virginia to Texas.

Notes: Also called Say's **pandora**. It is one of five similar species found in this habitat. Animal has short, united siphons.

CLAM-SHAPED – lyonsias (Lyonsiidae)



glassy lyonsia

• **glassy lyonsia** *Lyonsia hyalina* Conrad
Description: (3/4 inch) Small, very fragile shell with rounded ends. Beak not central but located about one-third of the way in from shell's end. Fine radial ribbing on surface. No teeth on hinge. Sand grains often stuck to the periostracum.
Color: Pearly grayish white exterior. White interior. Yellowish brown periostracum.

Habitat: Lives in estuaries and offshore.
Range: Canada to South Carolina.
Notes: A closely related species, the **pearly entodesma** or

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ANGELWING-SHAPED - rupellarias (Petricolidae)

- **false angelwing** *Petricola pholadiformis* Lamarck
Description: (2 3/4 inches) Thin, elongate shell resembling a small angelwing but lacks the rolled-out hinge area. Beak at one end of shell. Strong radial ribbing on the beak end. Teeth on hinge. Deep pallial sinus.
Color: White exterior and interior.
Habitat: Lives in intertidal zone, burrowed into hard clay or peat. Commonly found on sounds and ocean beaches.
Range: Canada to Uruguay.
Notes: It burrows into hard surfaces and has long, partially united siphons.



false angelwing

- **Atlantic rupellaria** *Rupellaria typica* (Jonas)
(= *Petricola typica*)
Description: (1 inch) Variable shape, usually oblong. Coarse radial ribs. Beak about one-quarter of length from front end. Deep pallial sinus. No good lateral teeth.
Color: Grayish white exterior and brownish interior.
Habitat: Lives offshore in rock, shell or coral.
Range: North Carolina to Brazil.
Notes: Shell shape varies because it does not bore its own hole. Instead, it occupies crevices or holes bored by other animals and adopts the shape of the crevice or hole.



Atlantic rupellaria

RAZOR-SHAPED - tagelus (Solecurtidae)

- **purplish tagelus** *Tagelus divinus* (Spengler)
Description: (1 1/4 inches) Fragile, rectangular shell with rounded ends. Smooth surface with concentric growth lines not overlain by oblique lines. Beak almost central. Small hinge teeth. Purplish raised rib in interior running from the beak to the lower shell edge. Large pallial sinus.
Color: Pale purplish gray exterior, often with a faint reddish brown streak near the edge. Purplish interior. Yellowish to greenish brown periostracum.
Habitat: Lives in sounds and offshore. Commonly found washed onto sounds and ocean beaches.
Range: Massachusetts to Brazil.
Notes: It lives in vertical burrows and has long siphons that extend up to the surface. It is a suspension feeder.



purplish tagelus

- **stout tagelus** *Tagelus plebeius* (Lightfoot)
Description: (3 1/2 inches) Strong, stout, rectangular shell resembling the corrugate solecurtus. Smooth surface with fine concentric lines not overlain by oblique lines. Beak almost central. Teeth on hinge. No vertical raised rib inside shell as in the purplish tagelus. Large pallial sinus.
Color: Whitish exterior with no purplish rays.
Habitat: Lives in sounds. Commonly found washed onto sound and ocean beaches.
Range: Massachusetts to Argentina.
Notes: See purplish tagelus Notes.



stout tagelus

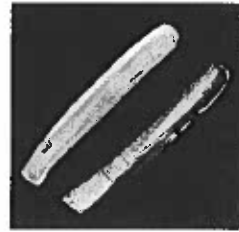
- **corrugate solecurtus** *Solecurtus cumingianus* Dunker
Description: (2 3/4 inches) Rectangular, gaping shell with bluntly rounded ends. Similar to stout tagelus except ends more rounded and the coarse concentric lines overlain by sharp, oblique lines. Beak almost central. Small hinge teeth.
Color: White exterior. Yellowish gray periostracum.
Habitat: Lives offshore in sand or mud. Rarely found on ocean beaches.
Range: North Carolina to Brazil.
Notes: Also called a corrugated razor clam. It is able to burrow rapidly into sand.



corrugate solecurtus

RAZOR-SHAPED - jackknives (Solenidae)

- **Atlantic jackknife** *Ensis directus* Conrad
Description: (5 inches) Long, slender shell six times as long as high. Slightly curved with blunt ends. Looks like an old-fashioned razor. Cardinal and lateral hinge teeth at back end of beak.
Color: Whitish exterior. White and violet interior. Shiny olive to brown periostracum.
Habitat: Lives in sounds and offshore burrowing in muddy sand. Common on ocean beaches, particularly above Cape Hatteras. Often found in shell drift at tide line.
Range: Canada to South Carolina.
Notes: This species is excellent tasting but not fished commercially. It burrows rapidly into sand and swims in an erratic manner. Edges of the shell are sharp.



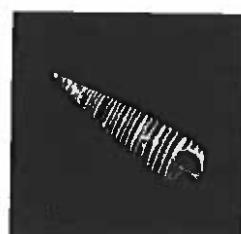
Atlantic jackknife



grass cerith

• **grass cerith** *Bitium varium* (Pfeiffer) (= *Diastoma varium*)
Description: (1/4 inch) Very small shell. A long, slender spire. Network pattern on surface created by spiral lines crossing vertical ribs. Usually one thickened rib on body whorl.
Color: Grayish brown and white exterior.
Habitat: Lives in high-salinity estuaries.
Range: Canada to Brazil.
Notes: Also called a **variable bitium**. This species is commonly seen crawling on hard substrates during early summer. It feeds on detritus and algae.

AUGER-SHAPED - miniature ceriths (Cerithiopsidae)



Adam's miniature cerith

• **Adam's miniature cerith** *Seila adamsi* (H.C. Lea)
Description: (3/8 inch) Small, slender shell. Flat whorls, each with three raised spiral threads. About three, smooth, glassy early whorls. Smooth, concave base. Aperture length about one-fifth of total shell length. Short, twisted, open canal.
Color: Dark brown to orangish brown.
Habitat: Lives offshore to depths of about 100 feet and occasionally on shelly bottoms of high-salinity estuaries such as Bogue Sound and Beaufort Inlet. Commonly washed onto ocean beaches.
Range: Massachusetts to Florida, Texas and Brazil.
Notes: Also called a **wood screw shell**.

AUGER-SHAPED - pyrams (Pyramidellidae)



half-smooth odostome

• **half-smooth odostome** *Boonea seminuda* (C.B. Adams)
 (= *Odostomia seminuda*)
Description: (less than 1/4 inch) Very small shell with a high spire. Four to six strong spiral cords on whorls crossed by equally strong axial ribs, creating a waffled appearance. Only the spiral cords strong on the whorl base. Oval aperture almost half the length of the shell.
Color: White.
Habitat: Lives in estuaries and offshore waters. Occasionally found on sand and ocean beaches.
Range: Nova Scotia, Canada, to Florida and Texas.
Notes: A parasite, it uses a piercing spine and long proboscis to suck up fluids and soft tissue at the valve edges of Atlantic bay scallops and Atlantic calico scallops. When a scallop's valves are slightly open, the snail will feed on its mantle tissue. It also may feed on slippersnails.



impressed odostome

• **impressed odostome** *Boonea impressa* (Say)
 (= *Odostomia impressa*)
Description: (less than 1/4 inch) Very small shell with a high spire. Three or four strong spiral cords on each of the six or seven whorls. Oval aperture about one-third the length of the shell.
Color: Milky white.
Habitat: Lives in estuaries, often feeding on eastern oysters. Occasionally found on sand and ocean beaches.
Range: Massachusetts to Florida and Gulf of Mexico.
Notes: A parasite, it uses its proboscis and spine to feed on the mantle tissue of oysters when their valves are slightly open. If too many are feeding on one oyster, the oyster's condition can become weakened. This species also may feed on sea squirts (tunicates).



crenulated pyram

• **crenulated pyram** *Pyramidella crenulata* (Holmes)
Description: (1/2 inch) Slender, conical shell with a spire about three to four times the aperture length. About 12 smooth, flat whorls with deeply channeled sutures. Body whorl slightly angular at one end. Oval aperture. Horny operculum.
Color: Cream with tan blotches.
Habitat: Lives in high-salinity estuaries and on offshore sandy bottoms. Can be commonly found washed onto beaches below Cape Hatteras.
Range: North Carolina to Florida and Texas.
Notes: A parasite, it uses its proboscis and spine to feed on soft tissues of mollusks and other marine animals.

AUGER-SHAPED - turrids (Turridae)



white-band drillia

• **white-band drillia** *Pilsbryspira albomaculata* (d'Orbigny) (= *Crassispira albomaculata*)
Description: (3/8 inch) Chunky, spindle-shaped shell with a spire about two-thirds the total shell length. About two spiral cords on each whorl — lower cord larger and knobbed. Spiral canal that reach from shoulder of the body whorl to upper notch at upper end of aperture (turrid notch).
Color: Dark brown shell with a whitish or yellowish band (following the knobbed spiral cord).
Habitat: Known in North Carolina waters at depths of 35 to 55 feet. Found by scuba divers with floris-paw scallops in the offshore Cape Fear area. Rare on ocean beaches.

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Range: North Carolina to Brazil.

Notes: Also called a **gaudy lesser whelk**. A carnivore, it feeds on small mollusks, worms and barnacles. See also **Florida rocksnail Notes**.

♂ • **ribbed cantharus** *Cantharus multiangulus* (Philippi) (= *Pisania multiangula*)

Description: (1 1/2 inches) Rough exterior. Axial ribs large and equal in size, but squarer than those on the Caribbean coralsnail. Spiral cords on ribs. Angular whorl shoulders. Wide aperture, about half the total length of the shell, ends in a short lower canal. Smooth inner margin with a spiral rib near the base. Horny operculum.

Color: Cream-orange exterior, usually with some brownish specks.

Habitat: Lives offshore.

Range: North Carolina to West Indies.

Notes: Also called a **false drill**. A carnivore, it probably feeds on small mollusks and barnacles below the low tide line. Females lay funnel-shaped egg capsules with spiny ridges around the top. Hatched young crawl away.



ribbed cantharus

MUDSNAIL-SHAPED - coralsnails (Coralliophilidae)

• **Caribbean coralsnail** *Coralliophila caribaea* Abbott (= *C. pilcata*)

Description: (1 inch) Rough exterior. Large axial ribs equal in size. Whorls with angular shoulders. Wide aperture, more than half the total length of shell, ends in a short, slitlike lower canal. Smooth inner margin. Pointed apex.

Color: Frosty or chalky white exterior. Interior sometimes violet. Reddish operculum.

Habitat: Lives offshore. Has been found associated with Atlantic calico scallop beds.

Range: North Carolina to Brazil.

Notes: Also called a **Caribbean coral shell**. This species may resemble a **ribbed cantharus**. It is probably a carnivore. Members of this family have no radula. They feed on the coral and sea fans that they live among. Females keep egg capsules inside their shells until free-swimming young emerge.



Caribbean coralsnail

• **staircase coralsnail** *Coralliophila scalariformis* (Lamarck) (?) (= *Babelomurex mansfieldi* (McGinny), *Laticaris mansfieldi*)

Description: (1 1/8 inches) Robust shell varied in shape. Seven to nine axial ribs with sharp spines on whorl shoulders. All whorls with moderate to strong, raised, scaly concentric cords (particularly strong on body whorl). Fine axial lines on nuclear whorls. Aperture somewhat longer than spire length. Rough edge on outer aperture lip. Open umbilicus.

Color: Grayish white exterior (light brown if perostracum is present). Shiny white aperture. Yellowish operculum.

Habitat: Lives south of Cape Lookout in depths of 55 to 360 feet. Associated with coral formations. Collected by scuba divers near the shipwreck of *John D. Gill*.

Range: North Carolina to Florida and West Indies.

Notes: Also called a **pagoda coral shell**. See **Caribbean coralsnail Notes** for feeding method.



staircase coralsnail

MUDSNAIL-SHAPED - miters (Costellariidae)

♂ • **harlequin miter** *Vexillum histrio* (Reeve) (= *Pusta histrio* or *Pusta albocincta* (C.B. Adams))

Description: (5/8 inch) Stout, spindle-shaped shell. Spire and aperture about the same length. Many axial ribs extending more than halfway down the base of the body whorl.

Concentric lines across axial ribs and spaces between ribs.

Four folds on inner lip of aperture (upper fold the strongest). **Color:** Chocolate brown with a narrow white spiral band covering part of the axial ribbing.

Habitat: Collected by scuba divers on sandy bottom with **lions-paw scallops** at 100-foot depth off Wrightsville Beach. **Range:** North Carolina, Florida to West Indies.

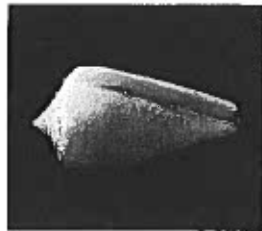
Notes: Also called a **painted miter**, **scalate miter** or **white-lined miter**. This species may be confused in North Carolina waters with the **gem miter**, *Vexillum gemmatum* (Sowerby) (= *V. hanleyi* (Dall)), which has been found in similar areas and deeper waters off Beaufort Inlet. The **gem miter** is smaller, with a spire slightly longer than half the total shell length and several noded ribs in a slightly concave area between the whorl suture and the axial ribbing below the suture.



harlequin miter



Sozon cone



Julia cone



dusky cone

♦ ♦ ♦ **Sozon cone** *Conus delessertii* Recluz (= *C. sozoni* Bartsch)
Description: (4 inches) Smooth, shiny, cone-shaped shell with a well-developed spire. Narrow aperture almost the length of the shell. Resembles the **Floridensis cone** but larger with different markings (see **Color**).
Color: Yellow-orange with two large white spiral bands. Many rows of irregular brown lines and spots encircle the shell.
Habitat: Lives offshore. Rarely found on ocean beaches.
Range: North Carolina to Florida.
Notes: See **Floridensis cone** **Notes**. This species was commonly brought in with **Atlantic calico scallop** catches.

♦ ♦ ♦ **Julia cone** *Conus amphiprurius juliae* Clench
Description: (2 inches) Smooth, shiny, cone-shaped shell with a fairly high spire. Sides of whorls flattened. Body whorl sculptured by finely incised spiral lines and irregular growth lines. Slightly rounded shoulders. Narrow aperture almost length of shell.
Color: Body whorl a light pinkish brown to orange with a creamy white spiral band at the middle. Middle band interrupted with axial bars of the body color, making it appear flecked with brown or broken spiral lines. Whitish spire with red streaks on the shoulder.
Habitat: Lives in deep offshore waters in rubble and sand. Collected by scuba divers on sandy bottom at 100-foot depths.
Range: South of Cape Lookout, N.C., to Texas and West Indies.
Notes: This species is rare. It is usually found by divers.

♦ ♦ ♦ **dusky cone** *Conus stearnsi* Conrad
Description: (3/4 inch) Small, cone-shaped shell with a high spire that makes up about one-third the shell length. Sides of the spire form a 70-degree angle. Shoulders of early whorls concave with flat sides, making spire slightly concave. Body whorl sculptured with about 13 incised spiral lines.
Color: Gray body whorl; brownish dots on incised spiral lines.
Habitat: Collected by scuba divers on sandy bottom at 65-foot depths.
Range: South of Cape Lookout, N.C., to Florida and Yucatan.

OLIVE-SHAPED – marginellas (Marginellidae)

♦ ♦ ♦ **common Atlantic marginella** *Marginella apicina* Menke (= *Prunum apicinum*)
Description: (1/2 inch) Tiny, glossy, cone-shaped shell with a tiny spire. Narrow aperture almost the length of the shell. Four folds on inner lip. Similar to **seaboard marginella** except wider, lacks white specks and teeth on the thickened outer lip. No operculum.

Color: Golden brown exterior, usually with two to three darker spiral bands. White outer lip with two to four brownish spots. Living specimens considerably lighter than living specimens of the **seaboard marginella**.
Habitat: Lives near inlets and offshore.

Range: North Carolina to Brazil. Author believes many earlier published North Carolina records of this species are in error and should be of the **seaboard marginella**.
Notes: Also called an **Atlantic margin shell**. A carnivore, it moves quickly over the sand in search of food. Females lay dome-shaped, pimpled egg capsules. Hatched young crawl away. Early Native Americans often crafted necklaces from margin shells and used them in trading.

♦ ♦ ♦ **seaboard marginella** *Marginella rosicida* Redfield (= *Prunum rosicidum*)
Description: (1/2 inch) Tiny, glossy, cone-shaped shell with a tiny spire. Very narrow aperture almost the length of shell. Four folds on inner lip. Similar to **common Atlantic marginella** but narrower, with white specks and teeth on the thickened outer aperture lip. No operculum.

Color: Cream exterior with three brownish spiral bands and covering of white flecks. Outer lip with four brown spots.
Habitat: Lives near inlets and offshore. Occasionally found on sand and ocean beaches.

Range: North Carolina to South Carolina.
Notes: Also called a **Jersey marginella**. See **common Atlantic marginella** **Notes**.



common Atlantic marginella



seaboard marginella



colorful moonsnail

• **colorful moonsnail** *Natica carrenra* (Linnaeus)
Description: (1 3/4 inches) Smooth, globe-shaped shell with a small spire. Umbilicus area almost covered by a calcareous pad. Large and elliptical aperture. Calcareous operculum.
Color: Yellow-tan with broad tan or brown spiral bands crossed by narrow dark-brown axial zigzags or marks. White umbilicus, calcareous pad and operculum. Interior not induscent.

Habitat: Lives offshore.

Range: North Carolina to Uruguay.

Notes: Also known as the colorful Atlantic natica. See shark eye *Notes*.



miniature moonsnail

• **miniature moonsnail** *Tectonatica pusilla* (Say) (= *Natica pusilla*)

Description: (1/4 inch) Small, stout, oval shell with a short spire. Narrow umbilicus almost covered by a callus. Oval aperture with flattened inner lip. Flattened calcareous operculum.

Color: Shiny tan exterior. Body whorl with a light brown mid-band of solid or irregular axial markings.

Habitat: Lives just offshore. Occasionally washed onto ocean beaches.

Range: Maine to Florida and Brazil.

Notes: Frequently found in stomach of the orange and blue sea star, *Astropecten articulatus*. See shark eye *Notes* for feeding habits.



northern moonsnail

• **northern moonsnail** *Euspira heros* (Say) (= *Lunatia heros*)

Description: (4 1/4 inches) Smooth, globe-shaped shell. Small, deep umbilicus covered only slightly by a button-shaped lobe. Large elliptical aperture. Horny operculum.

Color: Bluish gray with gray umbilicus. Light brown operculum. Yellowish periostracum.

Habitat: Occasionally washed onto ocean beaches.

Range: Canada to Cape Hatteras, N.C.

Notes: See shark eye *Notes*. Specimens found on beaches south of Cape Hatteras are probably fossil shells.



white baby-ear

• **white baby-ear** *Sinum perspicuum* (Say)
Description: (1 3/4 inches) Flat, smooth, ovate shell. Well-named. Low spiral cords on upper side of whorl. When alive, almost completely covered by mantle; resembles a piece of white gristle. No umbilicus. Large, round aperture. No operculum.

Color: White exterior. Pale brown periostracum. Yellowish cream mantle.

Habitat: Commonly found in shallow offshore waters and washed onto ocean beaches.

Range: Maryland to Brazil.

Notes: Also called a common Atlantic baby-ear. See shark eye *Notes*.



brown baby-ear

• **brown baby-ear** *Sinum maculatum* (Say)

Description: (1 3/4 inches) Similar to white baby-ear but not as flat (spire protrudes slightly). Low spiral cords on upper side of whorl. When alive, mantle almost completely surrounds shell. No umbilicus. Large, round aperture. No operculum.

Color: Light brown exterior. Mantle spotted with reddish brown.

Habitat: Lives offshore.

Range: North Carolina to Brazil.

Notes: Also called a maculated baby-ear or spotted baby-ear. See shark eye *Notes*.

MOONSNAIL-SHAPED – janthinas (Janthinidae)



janthina

• **janthina** *Janthina janthina* (Linnaeus)

Description: (1 inch) Smooth, fragile shell with three or four sloping whorls that are rounded but slightly angular. Large aperture round or elliptical. Thin lip hangs below whorls. Inner margin of aperture extends downward, forming a rounded intersection with the outer lip. No umbilicus or operculum.

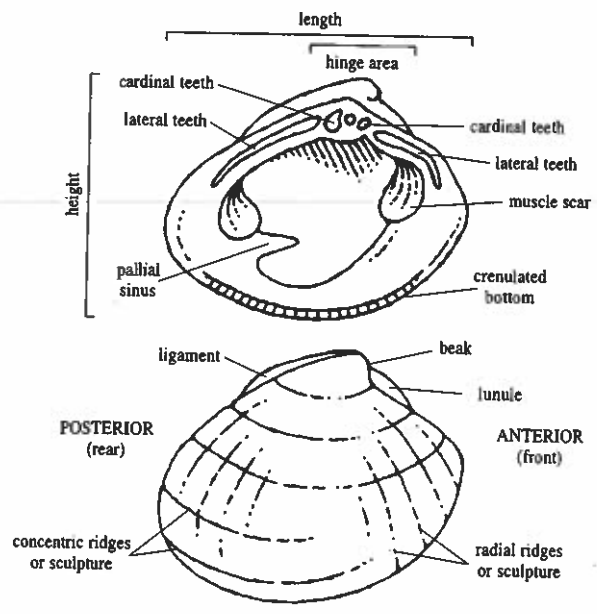
Color: Top half of shell light purple. Lower half deep purple. Interior not induscent.

Habitat: Lives suspended upside down from a "raft" of bubbles on the ocean surface. Sometimes found washed onto beaches after storms.

Range: Warm Atlantic and Pacific waters.

Continued on next page

• PARTS OF A BIVALVE (CLAM) •



• PARTS OF A GASTROPOD (SNAIL) •

