

A Guide to the Larger  
Marine Gastropods of Florida, the Gulf of Mexico, and  
the Caribbean Region.

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Lee Opresko  
Ronald Thomas  
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Photographs by Roger Hanlon  
Drawing by Susan Suarez

Edited by Gilbert Voss



**UNIVERSITY  
OF MIAMI  
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## Foreword

The University of Miami Sea Grant Field Guide Series is published to make available to the commercial and sports fishermen, the general public, and fisheries and conservation personnel easily usable, non-technical, well-illustrated guides for the identification of the marine life of the area. Every means has been used to avoid technical terms where possible. When these must be used to avoid confusion, they are carefully explained and often illustrated. Glossaries are included when necessary.

But the guides go further than just identification. Where such knowledge is available, information is given on geographical distribution, depth distribution, abundance, time of spawning, present utilization, means of harvesting, and mariculture methods, besides other useful information.

The format is uniform in the series for greater ease of use. Actual photographs are used where possible but when greater clarity is required, drawings are used. In general we have attempted to illustrate each species, but, in cases where two or more species are very similar, this is noted, a single illustration is used, and distinguishing characters are given in the text.

The principle used in selection of species has been not whether the species are now commercially exploited, but whether the animal or plant is of sufficient size and occurs in large enough numbers to make it potentially capable of exploitation. In some cases, species are included that are known to be harmful or poisonous. This is done to draw attention to their presence and to avoid their mistaken use as food.

The Sea Grant office, University of Miami, will appreciate comments from users of this series for the betterment of the guides, for the inclusion in future printings of species possibly overlooked by the compilers, and especially for suggestions concerning other groups of organisms for which guides are desired. Your comments are solicited.

## To Users of the Guide Series

The purpose of field guides is to make possible identification of animals or plants in the field without the need for other reference works, dictionaries, microscopes, or dissecting equipment. Most field guides fall short of these objectives mainly because of the use of unexplained technical terms and references to characters not discernible to the naked eye.

In this guide we have attempted to use terms in general use; where a technical word is necessary, it is explained at its first use and is illustrated in the introduction. Characters are used that are visible to anyone having normal vision, or in special cases, by use of a simple hand lens or magnifying glass.

We suggest that users first read the introduction in order to find the scope of the guide-area covered, kind of species included, characters used, and to familiarize themselves with the words used in the descriptions and keys.

There are two ways to use this guide. One is to simply thumb through the pages looking at the illustrations until one is found that matches the specimen in front of the reader. When this or a series of species illustrations is found, the descriptions should then be read in search of further identifying remarks paying attention to the notes on distribution, depth of capture, and type of bottom. If all of these fit reasonably well, it is likely that your specimen belongs to that species.

The second method is to use the key first, and when a reasonable match is found, turn to the page number given in the key and follow the procedure as described in the paragraph above. In using the key, one must be aware that species not covered in this guide may apparently be identified by the key. This is why it is essential that, when a specimen is identified by the key, the illustrations and descriptions must be used also. If the name given in the key does not correspond to the species illustration and description, either your use of the key was wrong and another alternative is correct or the species is not considered to be potentially valuable and is not included in this guide. If key, illustration, and description agree, you may reasonably expect that your identification is correct.

When using the keys, always be sure to read both alternatives and choose the one most fitting your specimen before going to the next set of choices. In closely related species, each choice will be somewhat fitting to your specimen, but only one will fit it correctly.

Finally, do not expect your specimen to be exactly like the illustration, especially as to position of bands, ridges, shape, and other characteristics. No two human beings are exactly alike; marine species have similar ranges of differences between individuals.

If at last you are unable to identify your specimen from this guide, but you are certain that it belongs to the group included in it, your final recourse is to bring or send it to a specialist for identification.

Frederick M. Bayer

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University of Miami

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Florida, the Gulf of Mexico  
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## Introduction

This is the second of a projected series of identification guides to the commercial or potentially important edible mollusks of southern Florida and geographically related regions. As mollusks are so generally usable as food, a complete guide to these animals would be prohibitively large and costly to prepare. We therefore have selected 20 of the largest, most conspicuous, most widely distributed and commonest gastropods for this booklet. A similar one covering the octopus and squid already has been issued, and another on the common large clams and other bivalves is in preparation. Further booklets on the smaller but equally usable kinds of mollusks will be prepared in months to come.

Because the identification of gastropods rests chiefly upon the external features of the shell, the photographs presented for each species are the primary means of identification. Comments about coloration and other features helpful for recognition are given opposite each picture. Identification keys, which are so useful for other kinds of animals, are very difficult to prepare and to use in the case of gastropods, and accordingly have been omitted.

We must reemphasize that this booklet is not complete, and that many other potentially edible or commercial species occur in the southern Florida area.

While most or all of the mollusks listed in this guide are edible and are eaten in various places within their range, two species, the West Indian top-shell, Livona pica, and the pink conch, Strombus gigas, are widely used as food and the latter is served in one form or another in restaurants throughout its range.

The meat of the pink conch can be bought already cleaned in markets throughout the West Indies and even in some of the fish markets and supermarkets in Florida. While the animals are protected by law in Florida and the Bahamas, local regulations permit individual collecting. Fresh conch taken directly from the shell must be cleaned and skinned before it is ready for cooking; conch purchased in the markets requires no further cleaning. Conch meat is widely used in the preparation of four dishes: conch salad, conch chowder, conch fritters, and conch steak. There are as many variations to the recipes as there are cooks. Some conch chowders are made from cut-up conch, not ground, and some versions require long hours of slow cooking in a black iron pot over a buttonwood fire; others are more suited to modern kitchens. The following recipes are standard, proven ones which will initiate the novice to these exotic dishes. After that one may start collecting conch recipes with all the variations of the West Indies to cull from.

### Raw Conch Salad

1 pound fresh cleaned conch  
1 large onion  
salt, pepper  
Key lime juice or Old Sour

Either dice conch or slice into narrow short strips and marinate in lime juice or Old Sour (lime juice and salt fermented in a bottle for several months) for several hours in refrigerator, changing lime juice once. Drain the conch, mix with chopped onion, salt to taste. A dash of tabasco or hot pepper will add spice to this tasty dish. Variations add chopped tomatoes, celery, and green pepper but these are frowned upon by natives and purists.

### Conch Fritters

1 cup finely chopped or ground conch  
1 egg  
1/3 cup milk  
1 1/3 cup flour  
2 teaspoons baking powder  
1/2 teaspoon salt  
1 tablespoon minced onion  
1/4 teaspoon tabasco or 1/8 teaspoon black pepper

Add flour, baking powder and salt to well beaten egg and milk. Add all other ingredients. Drop half or one teaspoonful of mixture into deep hot fat and cook until golden brown. Drain and serve.

### Conch Steaks

Several dressed conch  
Lime juice  
Salt, pepper  
Butter  
Tabasco

Lightly beat out conch into thin steaks and cut into suitable portions. Season with salt and pepper. Panbroil very lightly and quickly in heavy frying pan in melted butter to which has been added a little lime juice and tabasco. The secret of tender steaks lies in the beating and very rapid cooking; longer cooking toughens the meat. Some cooks marinate the steaks briefly in lime juice before cooking; others cook the steaks in a light egg batter but this may tend to obscure the delicate conch flavor.

## Conch Chowder

1/4 pound salt pork  
4 medium size conchs  
1 large onion  
1/2 can tomatoes  
3-4 medium potatoes  
1 bay leaf  
salt, pepper

Dice salt pork and fry out in pot, add chopped onion and cook until tender. Pound out conch, cut into squares or pass through meat grinder, add to pot along with salt, pepper, and bay leaf, and cover with water. Cook slowly until conch is tender. Add diced potatoes, tomatoes, and additional water and cook until potatoes disintegrate and thicken chowder, approximately one hour. Remove and let stand. Chowder should preferably be cooked in morning and let stand all day, to be reheated when ready to eat. A Bahamian variation is to add diced celery and cut up green peppers and cook down along with the conch before adding last ingredients.

## West Indian Top-shell Stew

Collect several dozen top-shells and boil in a bucket of water until the animals can be pulled from their shells. Clean animals by removing soft parts and the operculum. Wash and put in pot with about half an inch of water over them. Large animals need to be put through a grinder, others should be cooked whole. Add salt and pepper to taste and boil until tender, adding a small amount of cooking oil when pot first begins to boil. This assists in tenderizing. When meat is tender stir in a little flour and water paste to thicken. Serve separately or over rice. For a sea pie, cover with thin sheet of dough and bake briefly.

The editor wishes to thank Mr. John Hines, mate of the R/V CALANUS, for the top-shell recipe and Mr. Gregg Waugh for comments on the conch recipes.

## Glossary

aperture - the opening of the gastropod shell through which the animal protrudes the head and foot; sometimes called "mouth."

anterior canal - the projecting, gutterlike extension of the shell opposite the spire; it points downward when the shell is held with the spire uppermost.

axial - in the direction of the vertical axis of the shell; growth-lines, sculptural ribs, and color markings may take an axial direction.

calcareous - made of calcium carbonate (limestone), the same substance that makes up the shell.

callus - a shelly thickening, usually deposited near the aperture of the shell.

cancellate - sculpture consisting of ridges lying in the axial direction crossing raised cords lying in the spiral direction, producing a crosshatched appearance.

columella - the axis around which the gastropod shell is twisted; it usually corresponds to the inner lip or margin of the aperture.

columellar folds - spiral ridges on the columella, forming "teeth" or "plaits" on the inner, or columellar, lip of the aperture.

corneous - made of a hornlike substance, usually yellowish or brownish in color.

lip - the outer rim of the aperture of the shell; the outer lip.

nodules - rounded knobs or blunt projections on the outer surface of the shell.

operculum - the "trap door" that closes the aperture of many gastropod shells; it may be corneous or shelly (calcareous).

periostracum - the leathery or fibrous outer organic coating of many gastropod shells; not present in polished shells such as cowries.

serrated - saw-toothed.

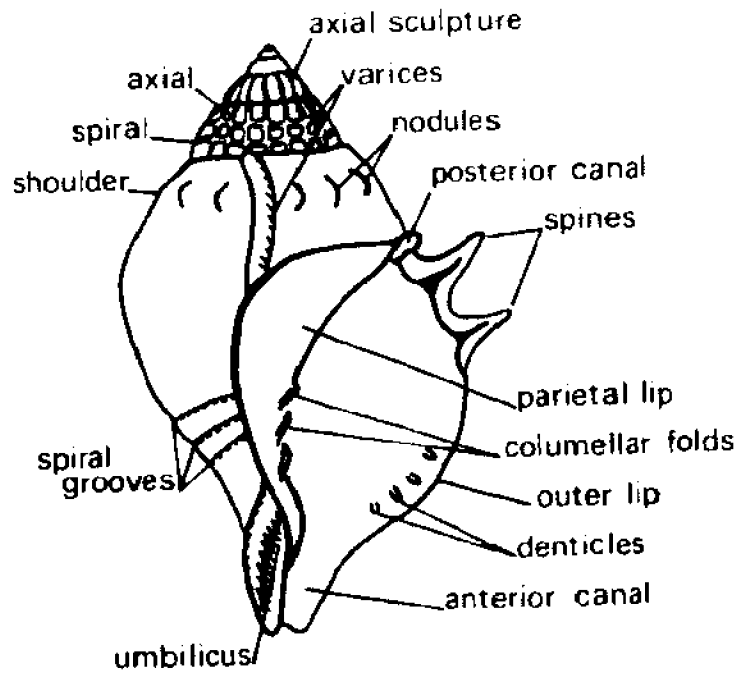
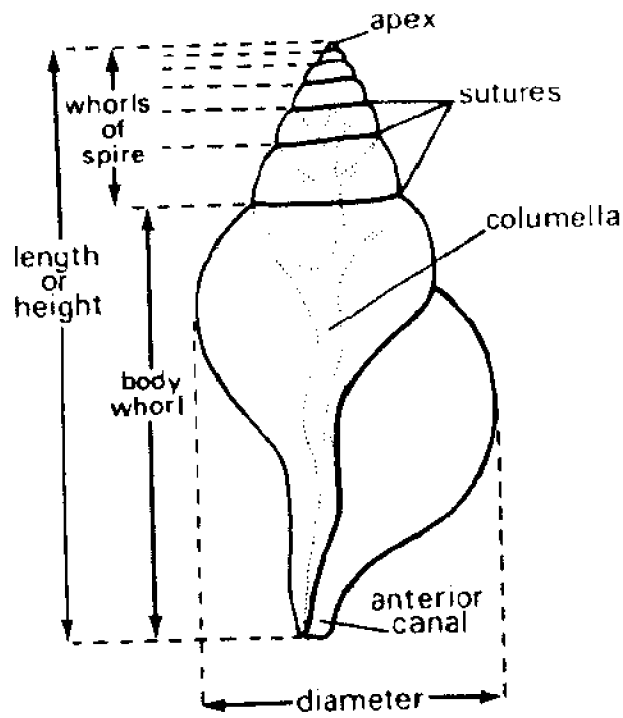
shoulder - the angle formed by the upper surface of each whorl and the outer wall of the whorl; in some shells the whorls are gently rounded, so that no shoulder is present.

spiral - following the direction of the coiling of the shell.

spire - the upper, often pointed, spiral portion of the shell.

umbilicus - the opening in the base of the shell around which the whorls are wound.

whorl - one turn of the spiral shell; the last turn, in which the anterior part of the animal is accommodated, is the "body whorl."



Key Figure

Family Trochidae

Livona pica (Linnaeus)

West Indian Top-shell

Whelk (Bahamas): burgao (Puerto Rico)

Recognition Features.--Color pattern of irregular black blotches on a whitish background; interior pearly; umbilicus open, conspicuous; operculum corneous, round, blackish brown with greenish sheen when animal is alive.

Size.--Height up to 4 inches (about 10 cm).

Comparisons.--Differs from Astraea tuber and A. caelata by its horny operculum, open umbilicus, color pattern, and larger size when fully grown.

Geographical Range.--Bahamas and the West Indies.

Habitat and Depth Range.--Young are found in the intertidal zone; adults from the surface to several feet below, in areas exposed to surf on rocky bottom.

Reproduction.--Spawning takes place throughout the year with a peak in December. Growth is at a rate of about 1.5 mm per year with an estimated 5 years to reach maturity.

Economic Importance.--The animal is eaten throughout the West Indies and Bahamas. There are a number of local recipes for preparing delicious dishes. The shells, often acid-dipped, are commonly sold in curio stores.

Other Names.--Cittarium pica (Linnaeus).

References.--Abbott, 1954, American Seashells (1st Edition) p. 117; same, 1974 (2nd Edition), p. 49.--Warmke and Abbott, 1961, Caribbean Seashells, p. 43.--Randall, H., 1964, pp. 424-433 (biology).

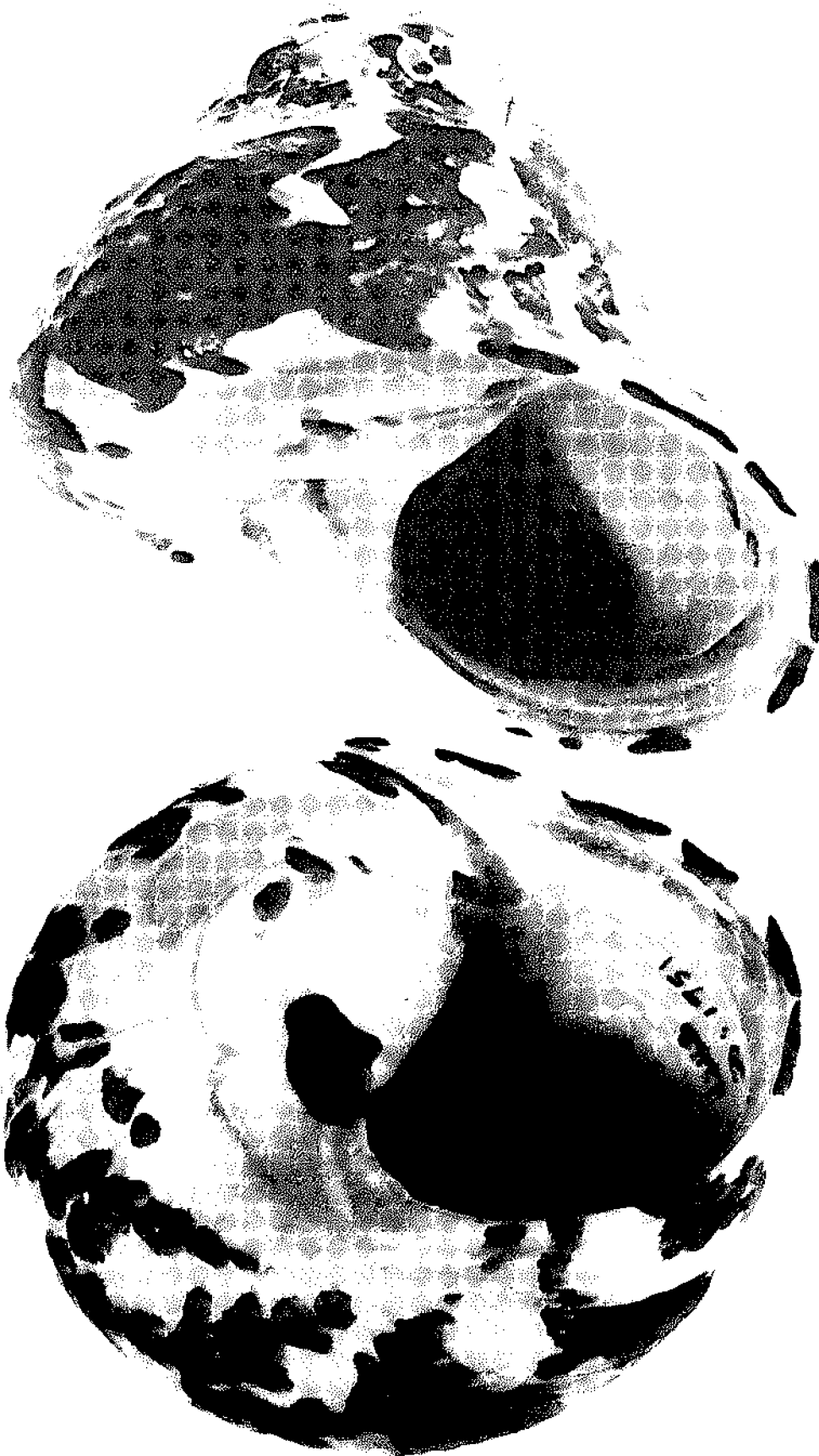


Figure 1: West Indian Top-shell



Family Turbinidae

Astraea caelata (Gmelin)

Carved Star-shell

Recognition Features.--Color greenish or grayish white with reddish brown mottling; surface covered with numerous hollow, scalelike spines arranged in spiral rows; interior pearly; umbilicus closed; operculum calcareous, white, thick, convex externally.

Size.--Height up to 3 inches (about 7.6 cm).

Comparisons.--Easily distinguished from the green and West Indian top-shells by the hollow, scale-like spines.

Geographical Range.--Florida Keys and West Indies.

Habitat and Depth Range.--Reefs and rocky areas exposed to wave action from below the tide mark to shallow depths.

Economic Importance.--The shells are commonly sold in the curio trade.

References.--Abbott, 1954, American Seashells (1st Edition), p. 124; same, 1974 (2nd Edition), p. 59.--Warmke and Abbott, 1961, Caribbean Seashells, p. 47.

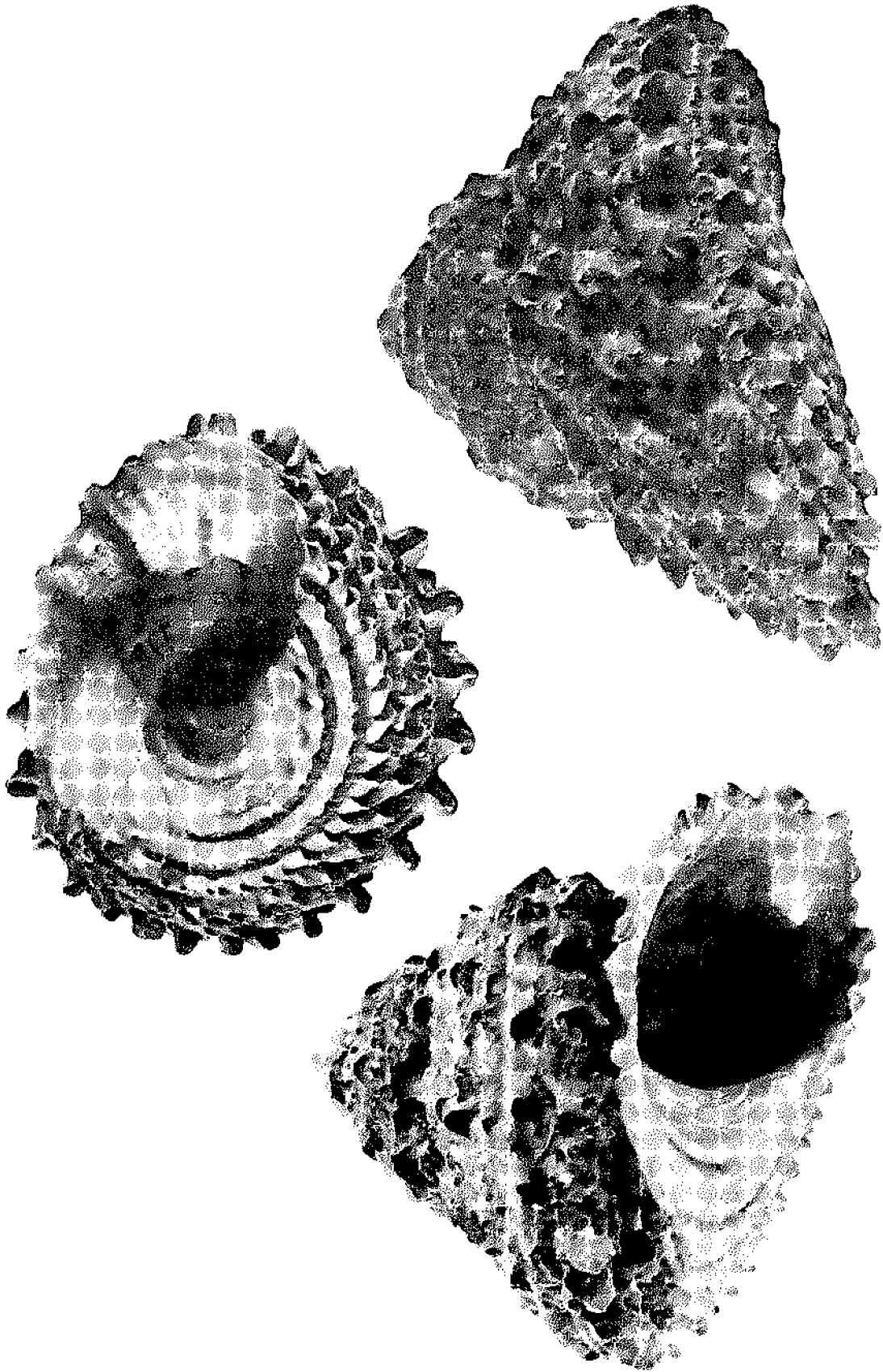


Figure 2: Carved Star-shell

Family Turbinidae

Astraea tuber (Linnaeus)

Green Top-shell

Recognition Features.--Green color pattern on a pale background; interior pearly; umbilicus closed; operculum calcareous, white, thick, externally convex with a curved raised ridge.

Size.--Height up to 2 inches (about 5 cm).

Comparisons.--Easily distinguished from Livona pica by its stony operculum and color pattern, and from Astraea caelata by its smoother surface and green color.

Geographical Range.--Southeastern Florida and the West Indies.

Habitat and Depth Range.--In rocky areas exposed to surf; from the level of low tide down to a depth of about 30 feet.

Economic Importance.--The shells of this species are usually dipped in acid to remove the outer layer and expose the pearly nacreous inner layer. They are widely sold in the curio trade.

References.--Abbott, 1954, American Seashells (1st Edition), p. 124; same, 1974 (2nd Edition), p. 59.--Warmke and Abbott, 1961, Caribbean Seashells, p. 47.

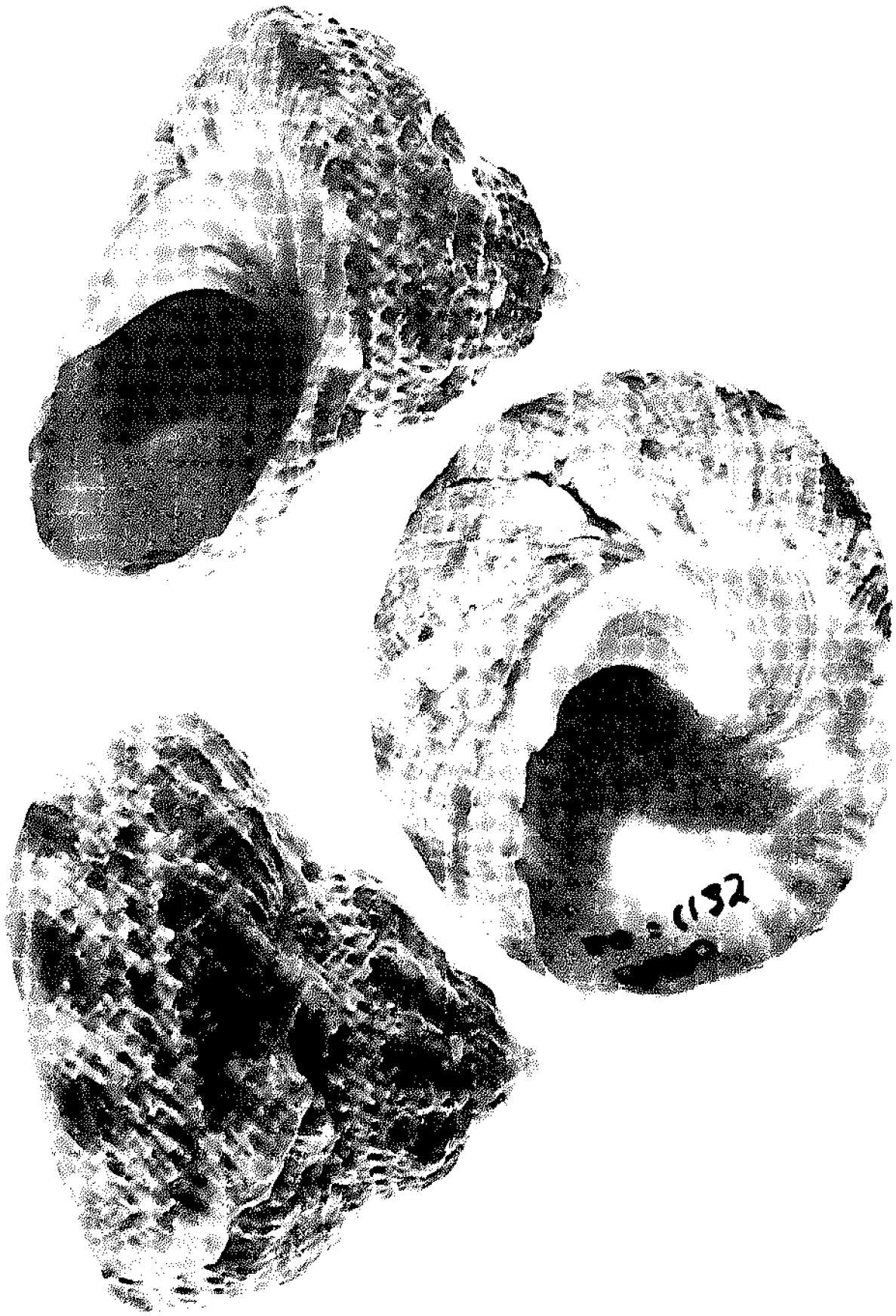


Figure 3: Green Top-shell

Family Strombidae

Strombus pugilis Linnaeus

Fighting Conch

Recognition Features.--Orange or salmon color, deep interior of aperture white grading to orange toward the edge of the lip, with a purplish or bluish patch of color near the anterior canal. The spines at the shoulder of the whorl preceding the body whorl are strong and more prominent than those of the body whorl.

Size.--Adult specimens usually are 3-4 inches (7.5-10 cm) long. Dwarf forms, under 2 inches, sometimes occur.

Comparisons.--Because of its lower spire and more flaring outer lip, S. pugilis has a broader shell than the closely related S. alatus. It is uniform orange or salmon-colored rather than streaked with brown.

Geographical Range.--Southern Florida, Caribbean Sea and West Indies south through most of Brazil.

Habitat and Depth Range.--Sandy and grassy bottoms in shallow water, down to about 30 feet (9 meters).

Economic Importance.--Too small for food; the shells are common in curio stores.

Other Names.--Abnormal shells with flattened, square-tipped spines have been named S. sloani Leach and S. pugilis peculiaris Maxwell Smith.

References.--Abbott, 1954, American Seashells (1st Edition), p. 173; same, 1974 (2nd Edition), p. 143.--Warmke and Abbott, 1961, Caribbean Seashells, p. 88.

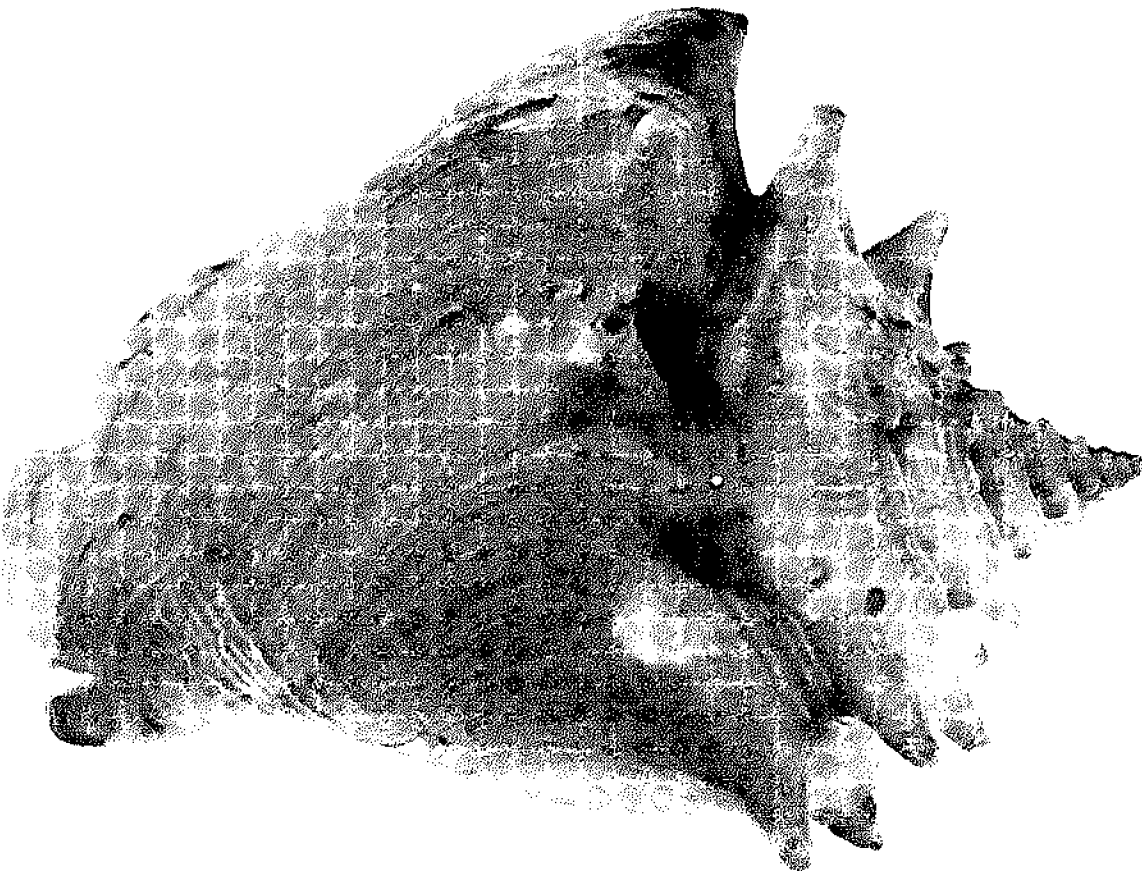
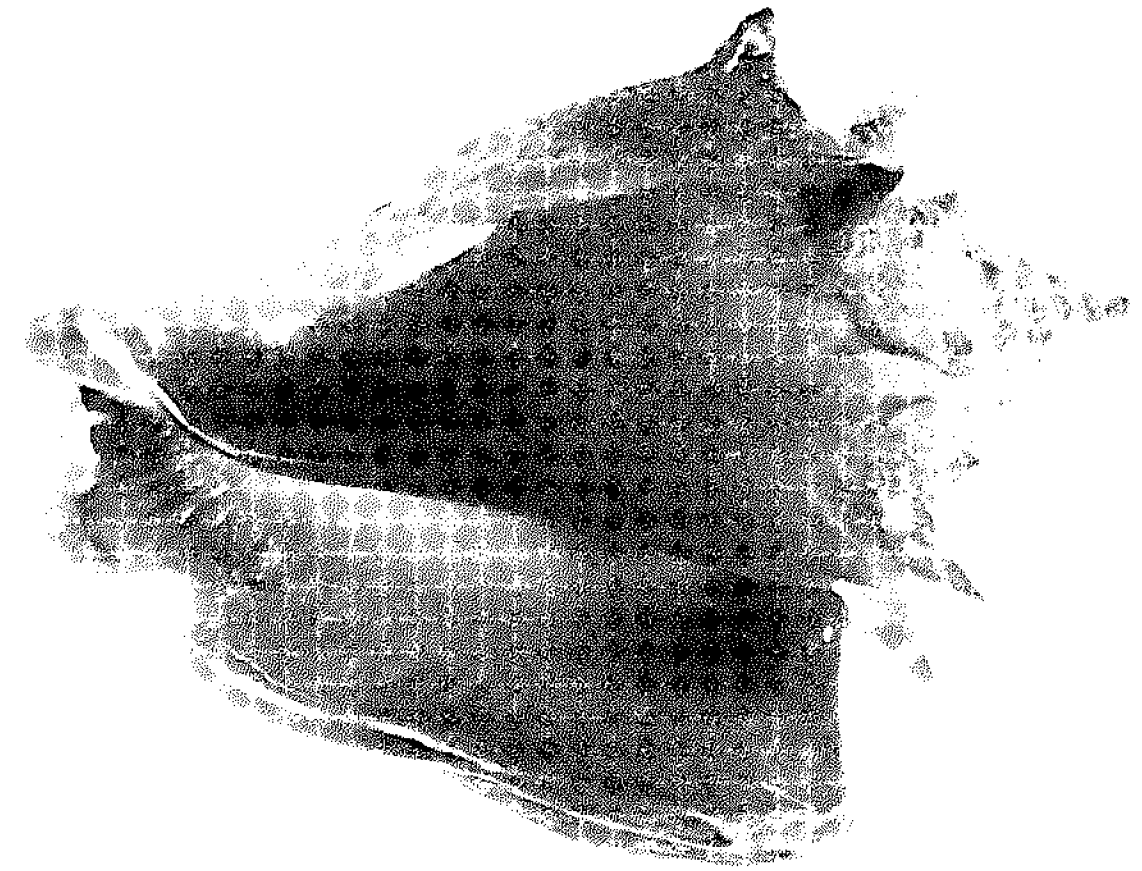


Figure 4: Fighting Conch

Family Strombidae

Strombus alatus (Gmelin)

Florida Fighting Conch

Recognition Features.--Color mahogany brown or dark reddish brown, sometimes with pale mottlings and zigzag streaks. The spines of the body whorl are shorter than those of the preceding whorl and are completely absent in some specimens.

Size.--Adult specimens usually are 3-4 inches long (7.5-10 cm).

Comparisons.--The shell usually has a narrower outline than the closely related S. pugilis, with a taller spire, less flared outer lip, and shorter spines on the whorl preceding the body whorl. The color of alatus is mainly brown and commonly streaked, whereas that of pugilis is uniform orange or salmon.

Geographical Range.--North Carolina to Florida, and the Gulf coast westward to Texas. Not present in the West Indies or southward.

Habitat and Depth Range.--Common in shallow inshore waters on sandy or grassy bottom; commonly exposed on flats at low tide.

Economic Importance.--Widely sold in Florida in the curio trade.

Other Names.--Treated as a subspecies, Strombus pugilis alatus, in some works.

References.--Abbott, 1954, American Seashells (1st Edition), p. 174; same, 1974 (2nd Edition), p. 144.

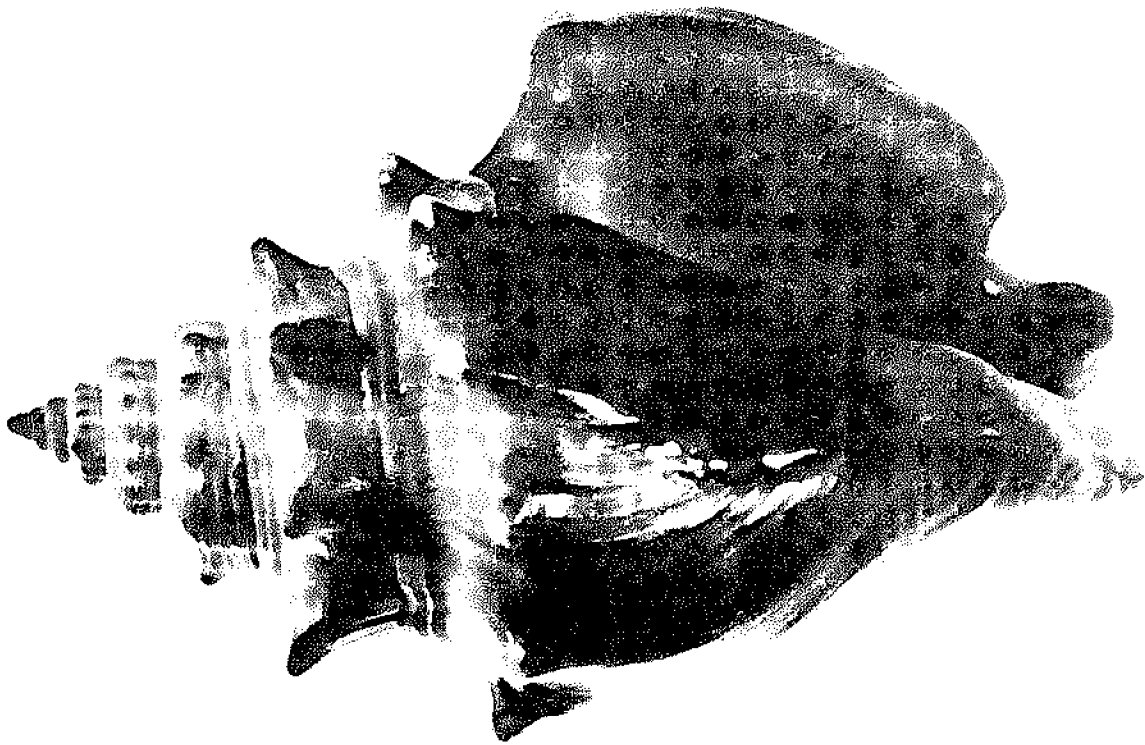
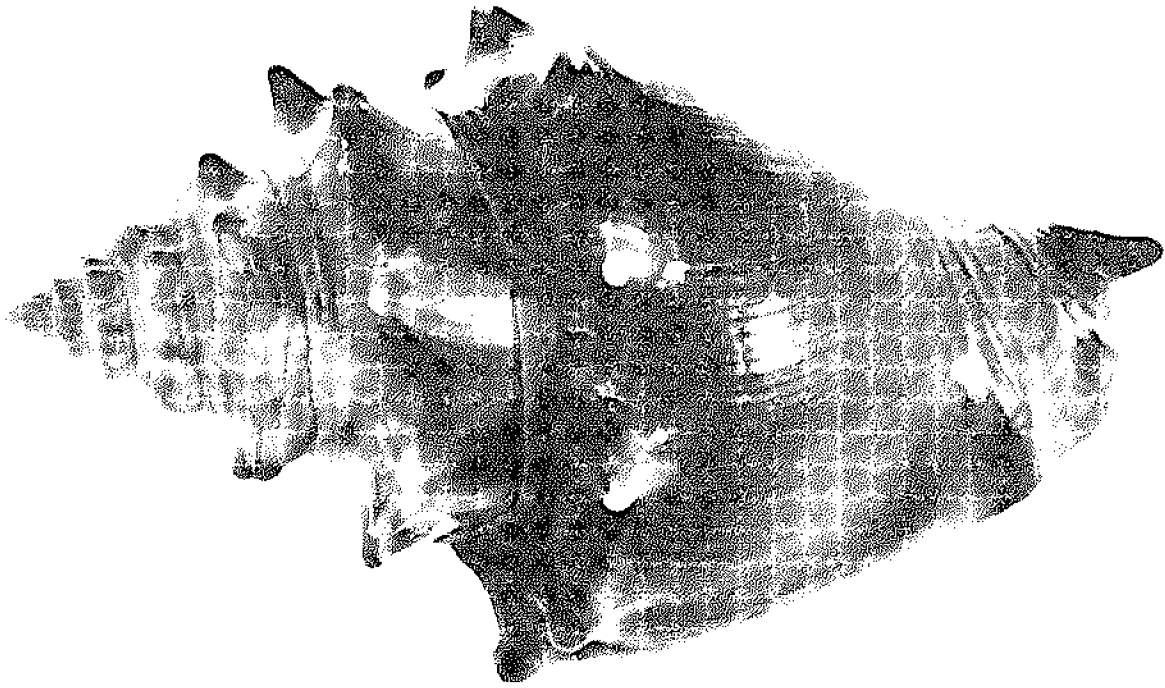


Figure 5: Florida Fighting Conch



Family Strombidae

Strombus gigas (Linnaeus)

Pink Conch, carrucho

Recognition Features.--Large conch with aperture and flared outer lip colored bright pink.

Size.--Adults with flared lip range from 6 to 12 inches (15-30 cm) in length.

Comparisons.--Adult shells are larger than those of any other West Indian species of Strombus. The pink color of the aperture is characteristic.

Geographical Range.--Bermuda; southeastern Florida, Bahamas, Caribbean Sea and West Indies.

Habitat and Depth Range.--In or near turtle grass beds in the vicinity of coral reefs, at depths down to about 40 feet (12 meters).

Reproduction.--Egg masses, formed of a long slender transparent string convoluted into a single mass, are laid all year except for a brief interruption during the colder months. As many as 500,000 eggs may be contained in a single mass. The masses are buried in coral sand. Growth is slow and S. gigas seems to require about 2½ years to reach maturity.

Economic Importance.--Widely fished for food in the Bahamas and parts of the Caribbean. Much of the conch meat sold in Miami comes from Honduras. The shells are sold in the curio trade. Populations are declining throughout its range because of overfishing. Favorite recipes are for conch chowder, salad, steaks, and fritters. Properly prepared, the meat is tender and delicious.

Other Names.--Strombus samba Clench is considered by some authorities to be only a variant. The abnormality with flattened, square-tipped spines was called S. gigas horridus Maxwell Smith.

References.--Abbott, 1954, American Seashells (1st Edition), p. 144; same, 1974 (2nd Edition), p. 144.--Warmke and Abbott, 1961, Caribbean Seashells, p. 88.--Randall, 1964, p. 244-295 (biology).--Little, 1965, pp. 338-358 (anatomy).--D'Asaro, 1965, pp. 359-416 (development).

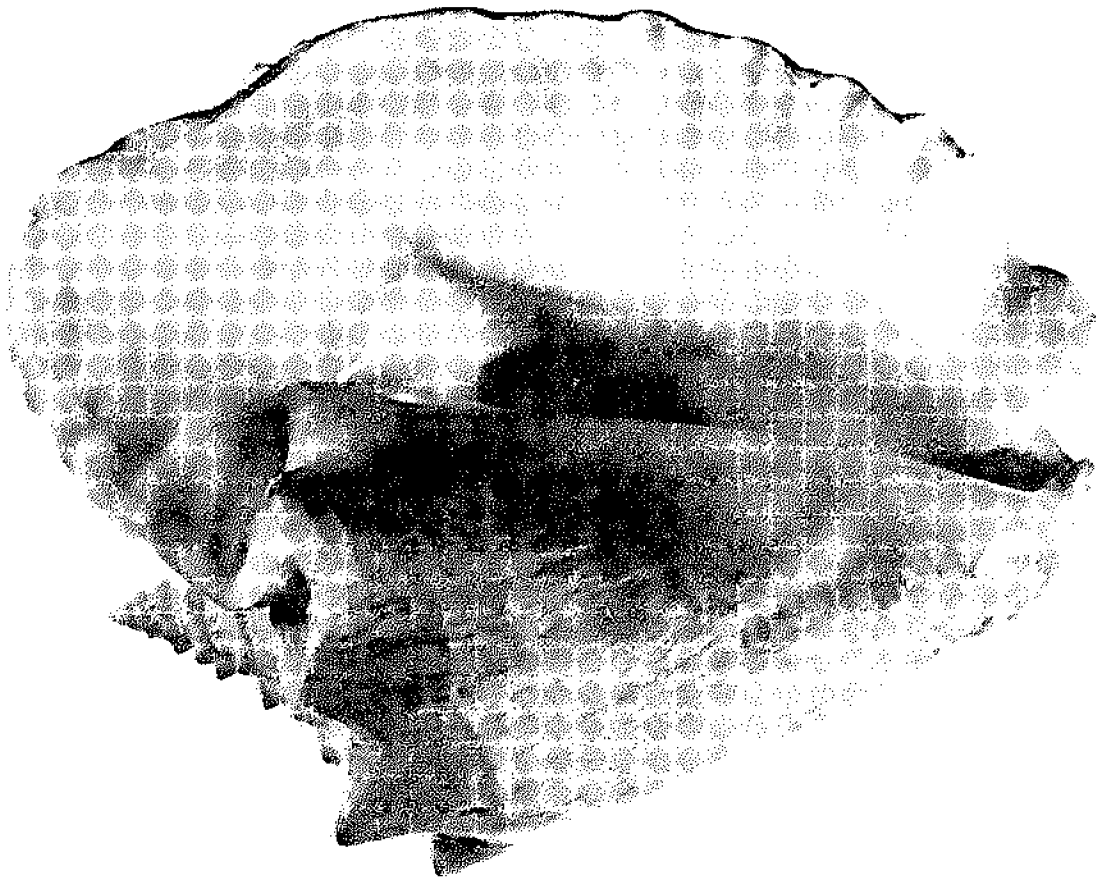
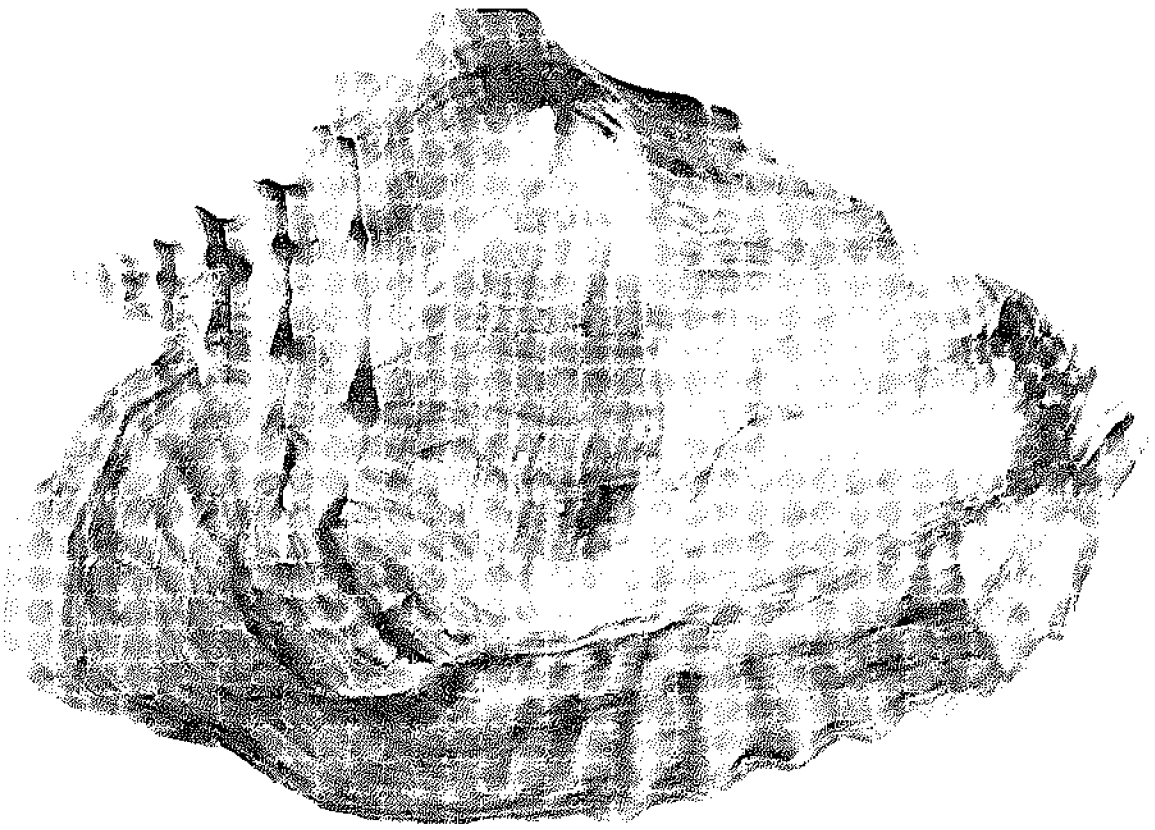


Figure 6: Pink Conch

Family Strombidae

Strombus costatus (Gmelin)

Milk Conch

Recognition Features.--Medium-sized conch with aperture and inside of flared lip of adults creamy white; outer surface of shell pale yellowish white, sometimes yellow, orange, or pinkish violet, but interior of aperture always white.

Size.--Adults with flared lip range from 4 to 7 inches (10-18 cm) in length.

Comparisons.--Although the larger adult S. costatus are about the same size as the smallest adult S. gigas, the color of the aperture readily distinguishes the two. In addition, S. costatus has only low nodules on the spire, whereas S. gigas has prominent, blunt-conical spines.

Geographical Range.--Bermuda; southern Florida to Brazil.

Habitat and Depth Range.--Shallow water near reefs as in the Florida Keys and West Indies; sometimes in coastal lagoons and inlets, as in Lake Worth Inlet, Biscayne Bay, and similar situations in Florida.

Economic Importance.--Too small and too scarce for commercial exploitation; perhaps used locally for food, as the meat is similar to that of S. gigas.

Other Names.--Strombus spectabilis A. H. Verrill and S. accipitrinus Lamarck are synonyms of S. costatus.

References.--Abbott, 1954, American Seashells (1st Edition), p. 174, same, 1974 (2nd Edition), p. 144.--Warmke and Abbott, 1961, Caribbean Seashells, p. 89.



Figure 7: Milk Conch

Family Strombidae

Strombus raninus Gmelin

Hawk-wing Conch

Recognition Features.--Small conch with salmon pink aperture and cream-colored outer lip; exterior pale grayish or tan mottled with chocolate brown, rarely orange or purplish brown; last two knobs on shoulder of body whorl are usually strongly developed, but in some specimens may be inconspicuous or completely absent; the upper tip of the outer lip is usually equal to or a little taller than the spire.

Size.--Adult specimens are usually 2-4 inches (5-10 cm) long.

Comparisons.--This species most closely resembles Strombus gallus, a West Indian species rarely found in Florida waters. That species has a much longer projection at the upper tip of the outer lip, which conspicuously exceeds the height of the spire. Also it may be more brightly colored exteriorly.

Geographical Range.--Bermuda; southern Florida; West Indies southward to northwestern Brazil.

Habitat and Depth Range.--On sandy and grassy bottoms in shallow water down to about 8 fathoms (15 meters).

Economic Importance.--Perhaps eaten locally but mainly important in the shell trade.

Other Names.--Listed as Strombus bituberculatus Lamarck in many books. The small individuals, which seem to predominate in some areas, have been called S. raninus nanus Bales, but probably are not subspecifically distinct.

References.--Abbott, 1954, American Seashells (1st Edition), p. 175; same, 1974 (2nd Edition), p. 144.-- Warmke and Abbott, 1961, Caribbean Seashells, p. 89.

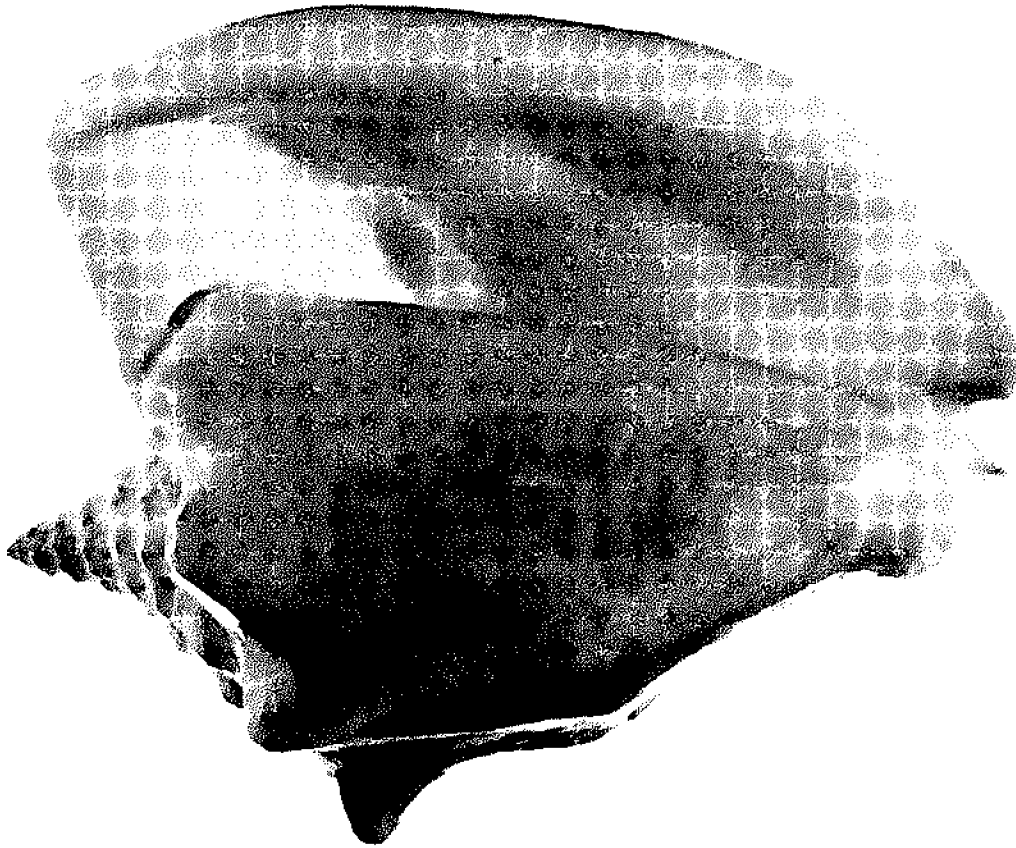
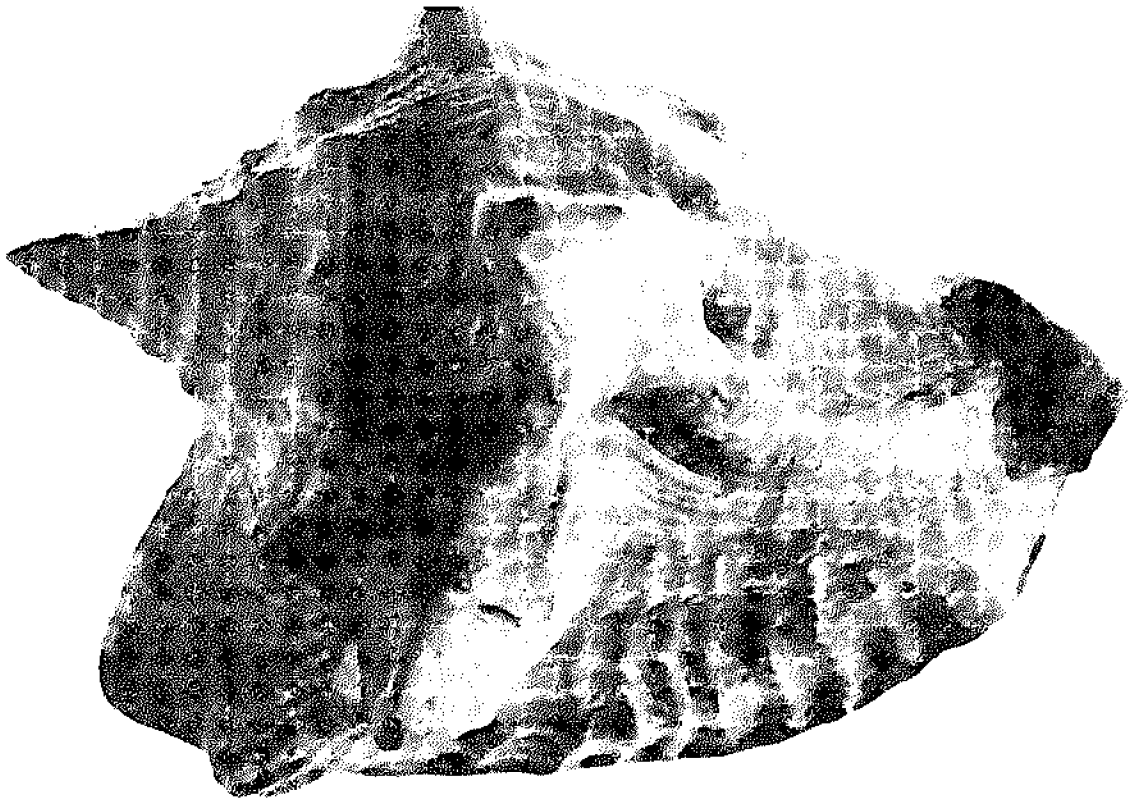


Figure 8: Hawk-wing Conch

Family Naticidae

Natica canrena (Linnaeus)

Moon Shell

Recognition Features.--Brown, wavy axial lines on a lighter brown background; four pale spiral bands with brown spots varying from squarish to V- or U-shaped; umbilicus open, partly filled with a plug of white callus; operculum flat, shelly, semicircular and fitting the apertures, with about 10 spiral grooves on the white outer surface. Soft parts creamy white marked with an elaborate pattern of reddish brown spots and lines.

Size.--Shells 1-2 inches in height at maturity (2.5-5 cm).

Comparisons.--Differs from Polinices duplicatus by its smaller size and more globose shell, by its distinctive brown color pattern and its shelly operculum.

Geographical Range.--Bermuda; North Carolina to southern Florida, through the West Indies to southern Brazil.

Habitat and Depth Range.--Lives in shallow water, where it burrows in sand in search of bivalves and other gastropods on which it feeds.

Economic Importance.--Sold in curio stores and shell shops.

Other Names.--None.

References.--Abbott, 1954, American Seashells (1st Edition), p. 191; same, 1974 (2nd Edition), p. 158.--Warmke and Abbott, 1961, Caribbean Seashells, p. 96.



Figure 9: Moon Shell



Family Naticidae

Polinices duplicatus (Say)

Shark-eye

Recognition Features.--Color bluish gray, tan, to grayish brown; brown callus partially filling umbilicus; operculum thin, corneous, translucent brown, fitting the aperture.

Size.--Diameter about 3 inches (7.5 cm), height about 2½ inches (6.2 cm).

Comparisons.--The shell is flatter and not so globose as that of Lunatia heros, the common large moon shell of the Atlantic coast from the Carolinas northward. Young specimens resemble the smaller Natica livida, which differs in having a higher spire and shelly operculum.

Geographical Range.--Massachusetts to Florida, Alabama, Mississippi and Texas.

Habitat and Depth Range.--Lives in sand in shallow water. It is a predator on other mollusks.

Economic Importance.--The shells are sold in the curio trade. This species is a heavy predator upon the clam, Mya, and in places is responsible for nearly destroying local clam populations.

Other Names.--None.

References.--Abbott, 1954, American Seashells (1st Edition), p. 186; same, 1974 (2nd Edition), p. 154.

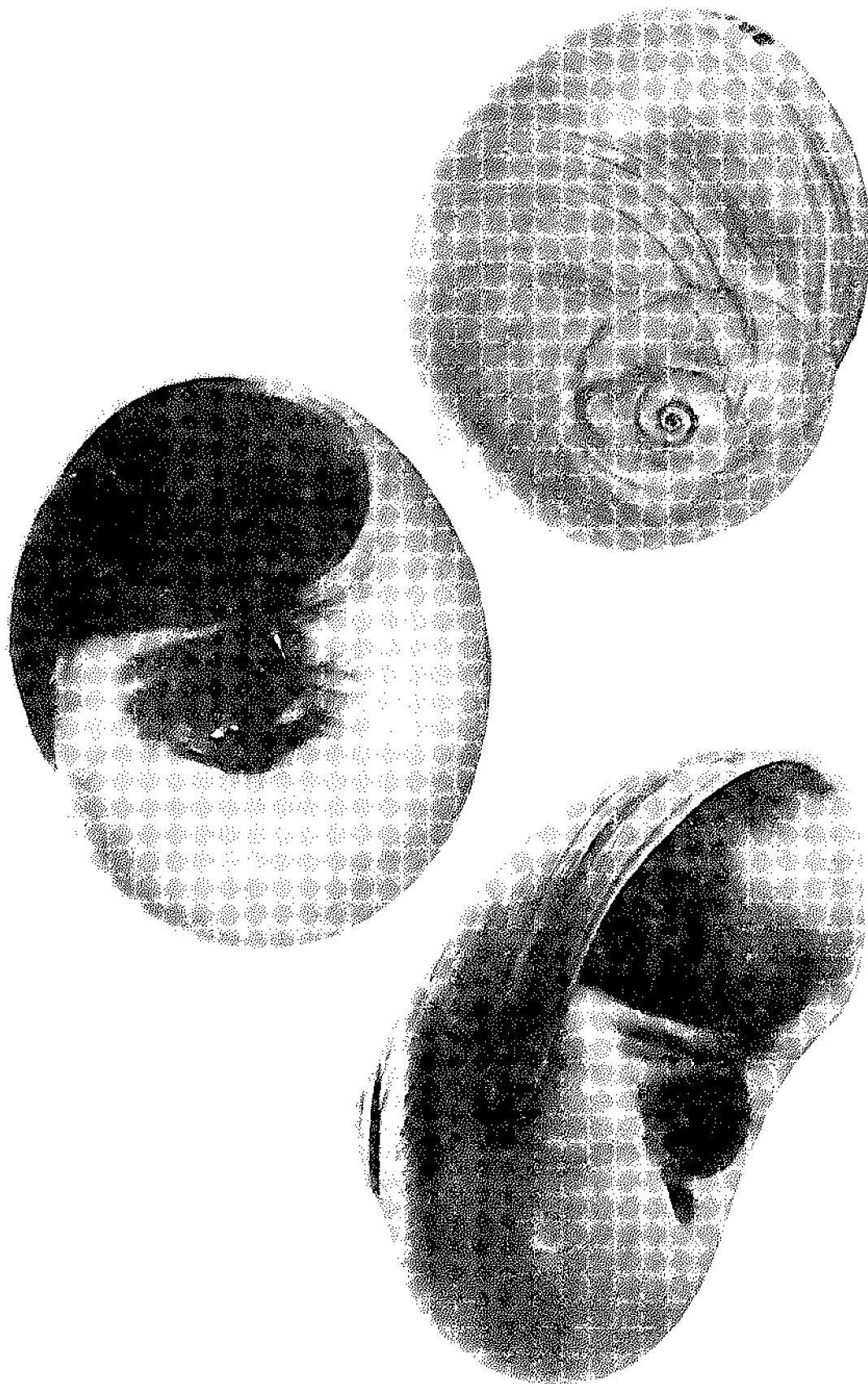


Figure 10: Shark-eye

Family Cassidae

Cassis flammea (Linnaeus)

Princess Conch; Flame Helmet-shell

Recognition Features.--Back of shell with flamelike markings of brown on a paler ground; apertural face oval, spaces between teeth of outer lip not colored dark brown. Surface of body whorl without fine, cancellate sculpture.

Size.--Up to 5 inches (about 13 cm).

Comparisons.--Distinguished from C. tuberosa by smaller size of adults, the oval apertural face, absence of brown between teeth of outer lip, and lack of cancellate sculpture on body whorl. Smaller and more darkly pigmented than C. madagascariensis and C. madagascariensis spinella.

Geographical Range.--Bermuda; Florida Keys to Brazil.

Habitat and Depth Range.--Sandy areas on and near reefs.

Economic Importance.--Much sought after in the shell trade.

Other Names.--None.

References.--Abbott, 1974, American Seashells (2nd Edition), p. 162.--  
Warmke and Abbott, 1961, Caribbean Seashells, p. 98.

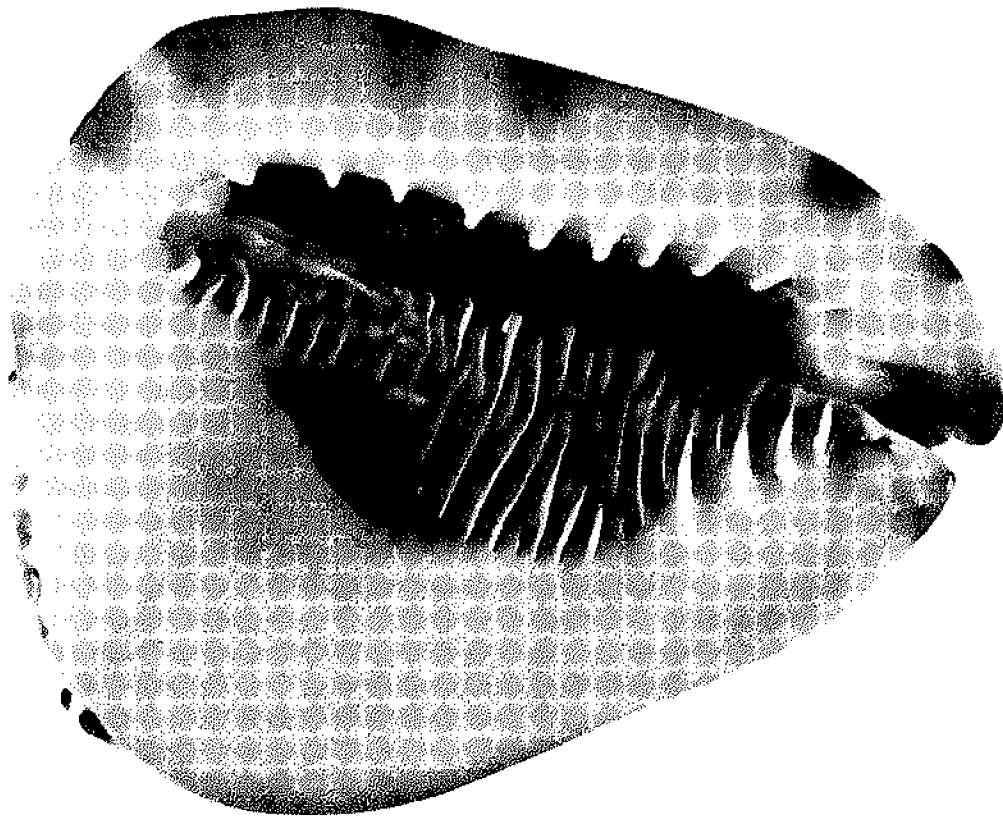
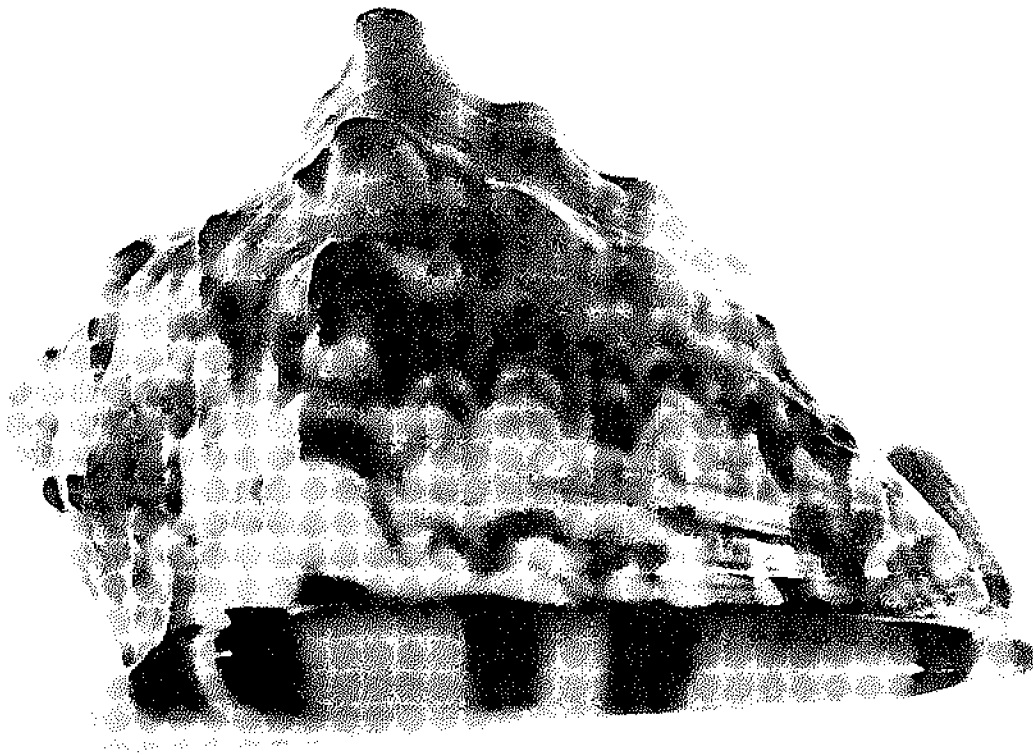


Figure II: Princess Conch

Family Cassidae

Cassis madagascariensis Lamarck

Queen Conch; Queen Helmet-shell

Recognition Features.—Back of shell pale cream-colored, apertural face salmon with dark brown clouding. Conical projections on shoulder of body whorl strong, the middle one strongest, those on either side progressively smaller.

Size.—Length up to about 9 inches (23 cm).

Comparisons.—Distinguished from C. madagascariensis spinella Clench by the stronger projections around the shoulder, and from C. flammea and C. tuberosa by the pale cream color without brown blotching.

Geographical Range.—Bermuda; North Carolina to the Greater Antilles.

Habitat and Depth Range.—In sandy areas, especially those protected by reefs, where the burrowing sea-urchins on which it feeds are abundant.

Economic Importance.—Much sought after in the shell trade.

Other Names.—None.

References.—Abbott, 1954, *American Seashells* (1st Edition), p. 193; same, 1974 (2nd Edition), p. 161.—Warmke and Abbott, 1961, *Caribbean Seashells*, p. 98.—D'Asaro, 1970, *Bull. Mar. Sci.*, 19, p. 905 (description of egg capsules).

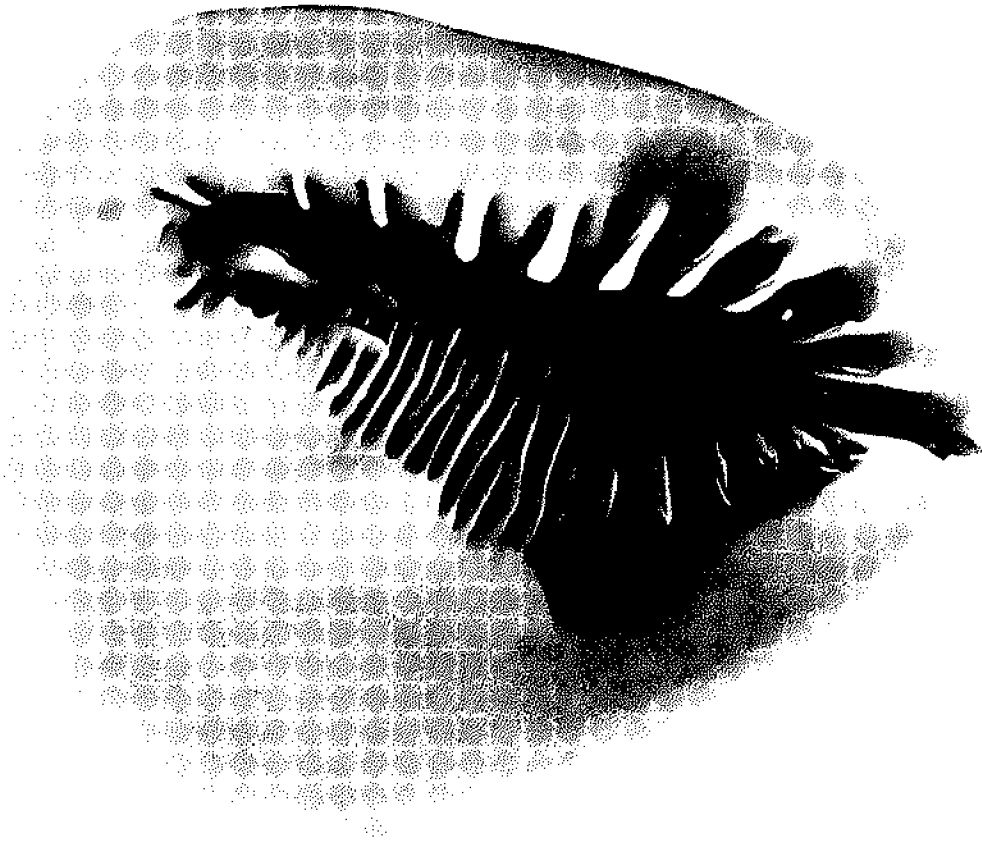
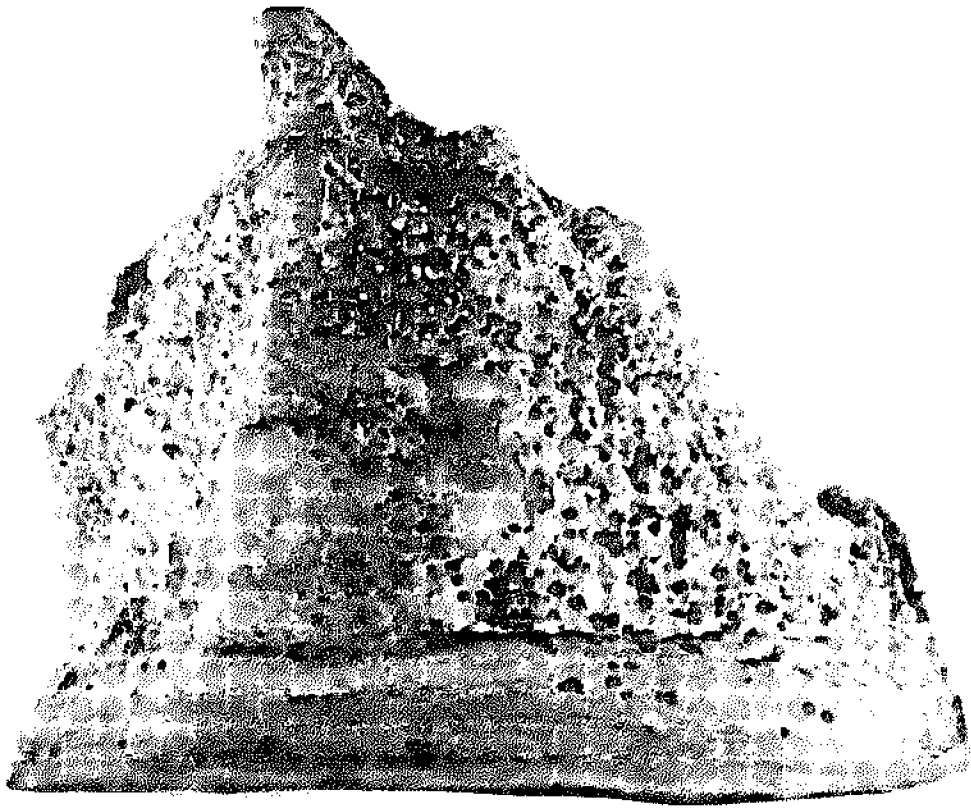


Figure 12: Queen Conch

Family Cassidae

Cassis madagascariensis spinella Clench

Clench's Helmet-shell

Recognition Features.—Like C. madagascariensis in size and color, but the conical projections around the shoulder of the body whorl are smaller, more numerous, and more nearly equal in size.

Size.—Length up to about 9 inches (23 cm).

Comparisons.—Distinguished from typical madagascariensis by the smaller and more uniform shoulder spines, and from C. tuberosa and C. flammea by the presence of brown markings on the body whorl.

Geographical Range.—Florida Keys; also Bermuda, North Carolina, and Puerto Rico.

Habitat and Depth Range.—In sandy areas behind reefs in the Florida Keys; feeds on sand-burrowing sea urchins.

Economic Importance.—Much sought after in the shell trade.

Other Names.—None.

References.—Abbott, 1954, American Seashells (1st Edition), p. 194; same, 1974 (2nd Edition), p. 162.—Warmke and Abbott, 1961, Caribbean Seashells, p. 99.

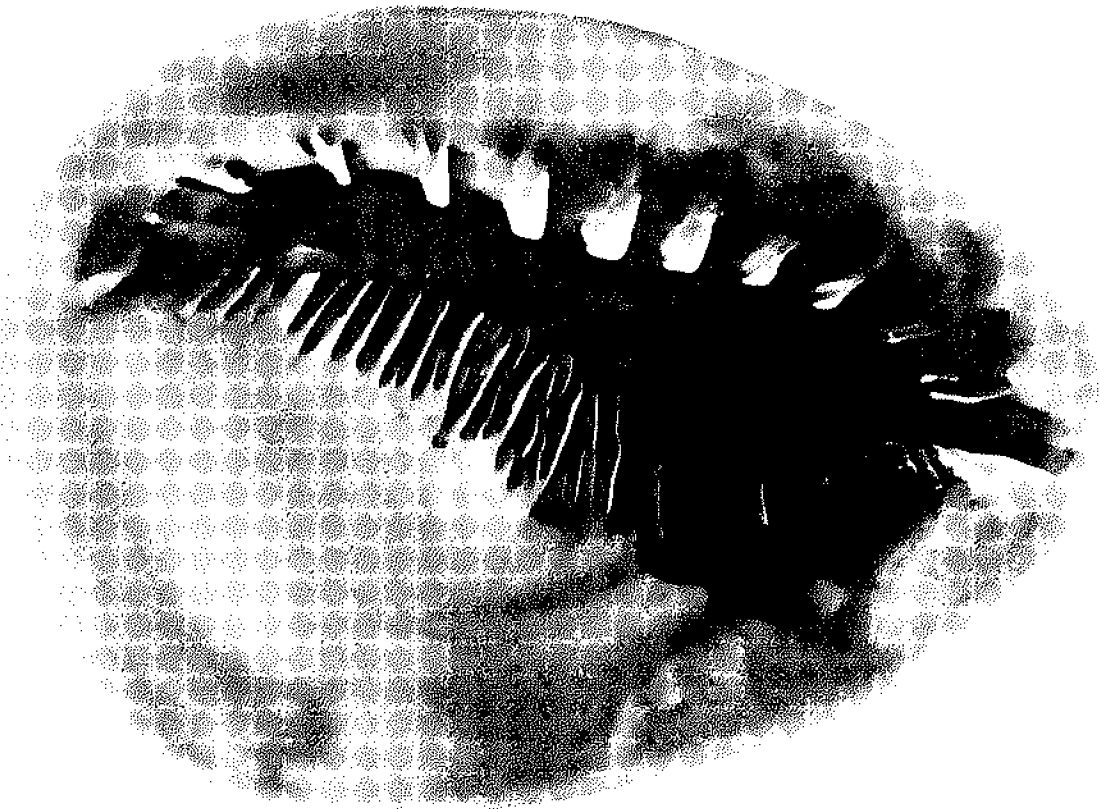
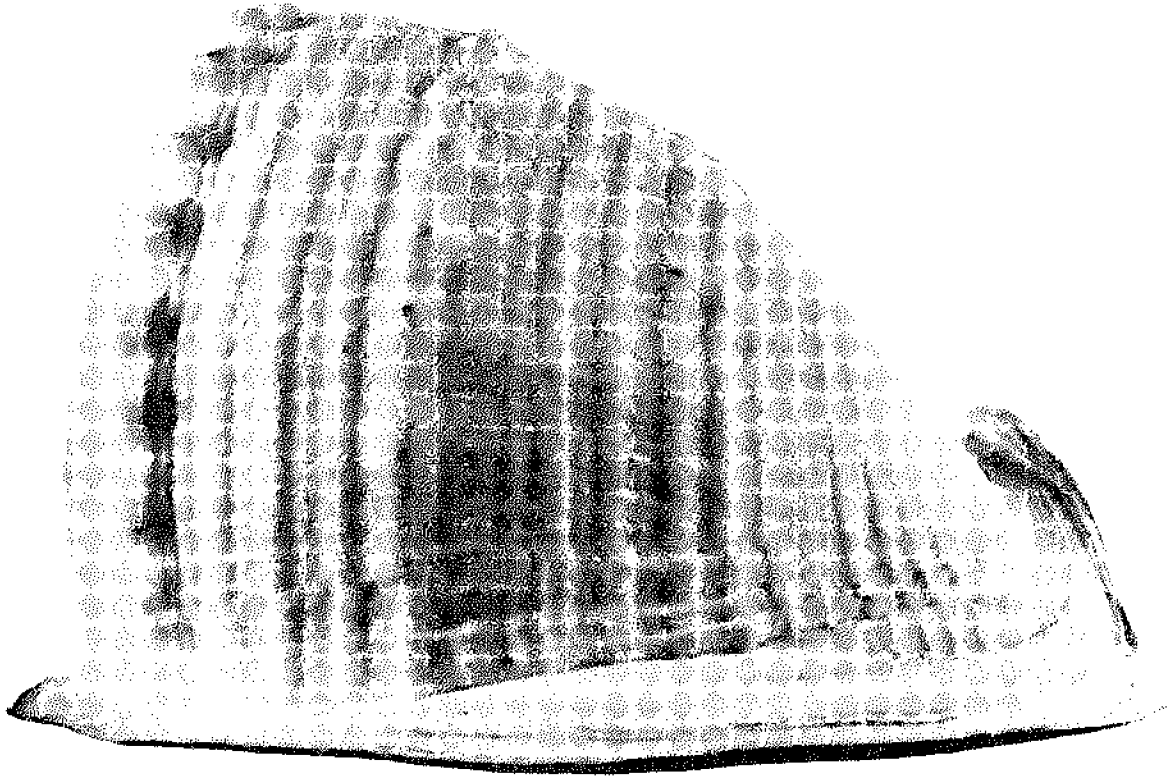


Figure 13: Clench's Helmet-shell



Family Cassidae

Cassis tuberosa (Linnaeus)

King Conch; King Helmet-shell

Recognition Features.—Back of shell with brown blotches and flamelike markings on a paler ground; apertural face triangular, brownish cream with a larger blotch of dark brown; spaces between teeth of outer lip distinctly colored brown. Surface of body whorl with fine, raised, cancellated sculpture.

Size.—Length up to about 9 inches (23 cm).

Comparisons.—Distinguished from C. madagascariensis and C. madagascariensis spinella by the dark, flamelike markings of the body whorl, and from C. flammea by the triangular apertural face and the fine cancellate sculpture.

Geographical Range.—Bermuda; North Carolina to Brazil.

Habitat and Depth Range.—In sandy areas in the vicinity of reefs.

Economic Importance.—Much sought after in the shell trade.

Other Names.—None.

References.—Abbott, 1954, *American Seashells* (1st Edition), p. 193; same, 1974 (2nd Edition), p. 161.—Warmke and Abbott, 1961, *Caribbean Seashells*, p. 98.



Figure 14: King Conch

Family Cassidae

Phalium granulatum (Born)

Scotch Bonnet

Recognition Features.--Yellowish brown, squarish spots arranged in spiral rows on a creamy white background. Operculum yellowish brown, corneous, fan-shaped, serrated along the curved edge, not entirely filling the aperture. Some individuals have thinner, smoother shells without the pronounced spiral grooves; these have been given the name P. cicatricosum Gmelin. The smooth form with nodules at the shoulder was called peristephes Pilsbry and McGinty. All seem to be variants of a single species, Phalium granulatum.

Size.--Mature shells are from 1½ to 3 inches (3.8-7.6 cm).

Comparisons.--Three other species of small cassids occur in the range of P. granulatum. Casmaria ponderosa atlantica Clench is smaller (1 inch, or 2.5 cm), smooth, with a narrower shell having several small teeth on the edge of the outer lip near the anterior canal. Sconsia striata, always from deeper water (50-255 fathoms or 92-466 meters) than P. granulatum, has a shell that is narrower and more tapered anteriorly, with finer spiral grooves and larger, more irregular brown markings. Cypraecassis testiculus has a pinkish brown shell mottled with chocolate brown, with a more elongate, cowry-like shape.

Geographical Range.--Bermuda; North Carolina to Brazil.

Habitat and Depth Range.--Shallow water, along ocean beaches and in open bays and inlets not far from the sea, living on sandy bottoms and sometimes exposed on sandbars at low tide.

Economic Importance.--Much sought after in the shell trade.

Other Names.--Semicassis abbreviata (Lamarck); Cassis inflata Shaw.

References.--Abbott, 1954, American Seashells (1st Edition), p. 192; same, 1974 (2nd Edition), p. 161.--Warmke and Abbott, 1961, Caribbean Seashells, p. 98.

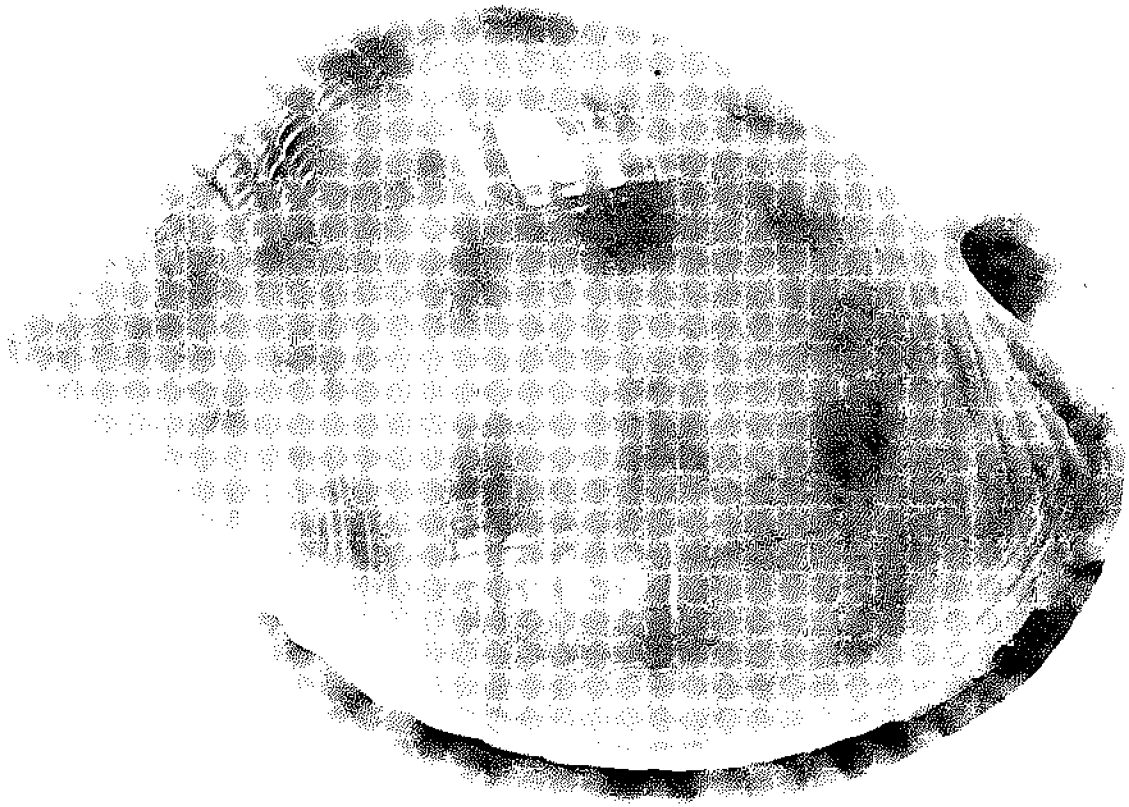


Figure 15: Scotch Bonnet

Family Fasciolaridae

Fasciolaria liliium G. Fischer

Banded Tulip-shell

Recognition Features.--Uninterrupted purple-brown spiral lines on buff, grayish or whitish background more or less clouded with axial streaks of yellowish, mauve, or reddish color.

Size.--Length up to 5 inches (12.7 cm).

Comparisons.--Distinguished from F. tulipa by its smaller size, usually unbroken spiral lines, and smoother surface.

Geographical Range.--North Carolina to Yucatan.

Habitat and Depth Range.--Shallow continental shelf but overlapping in habitat with F. tulipa.

Economic Importance.--Common in the curio trade.

Other Names.--In most older books called Fasciolaria distans or F. hunteria. Variations in size, shape, and color have resulted in the recognition of four forms in addition to the typical one: hunteria Perry, branhamae Rehder, tortugana Hollister, and bullisi Lyons.

References.--Abbott, 1954, American Seashells (1st Edition), p. 242; same, 1974 (2nd Edition), p. 228.

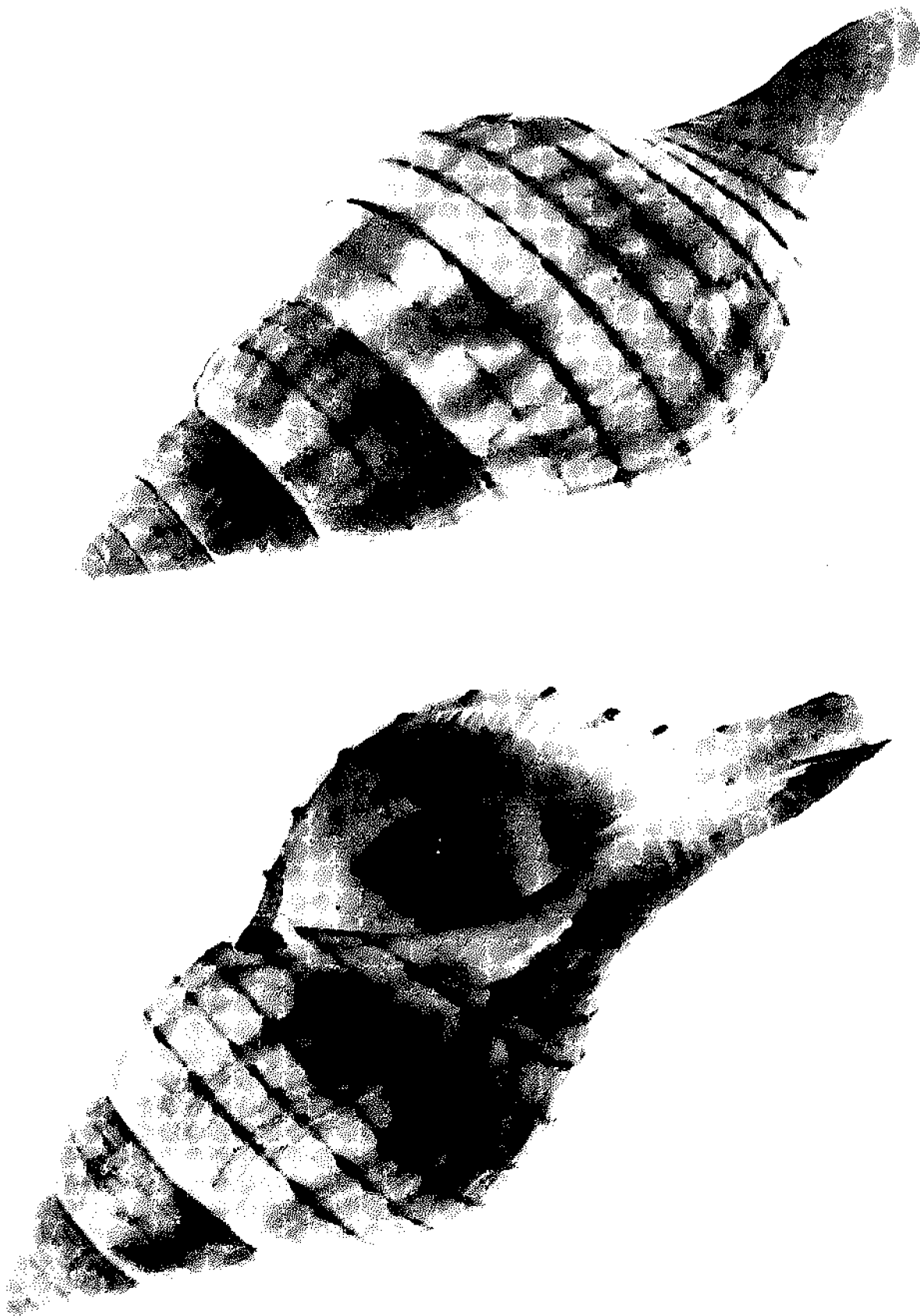


Figure 16: Banded Tulip Shell

Family Fasciolaridae

Fasciolaria tulipa (Linnaeus)

Tulip Shell

Recognition Features.—Brown mottling on a buff background, usually with narrow, dark brown interrupted spiral lines. An uncommon color form is russet or orange-red instead of brown.

Size.—Length up to 10 inches (25.4 cm) in very large specimens, but more commonly about 8 inches (20.3 cm).

Comparisons.—Distinguished from Fasciolaria liliium by its larger size, interrupted spiral color lines, and less smooth surface.

Geographical Range.—North Carolina to Florida, Texas and the West Indies; Brazil.

Habitat and Depth Range.—In shallow bays, lagoons, and channels behind reefs, often in beds of sea grasses; sometimes on grassy tidal flats.

Other Names.—None.

References.—Abbott, 1954, American Seashells (1st Edition), p. 242; same, 1974 (2nd Edition), p. 227.—Warmke and Abbott, 1961, Caribbean Seashells, p. 119.

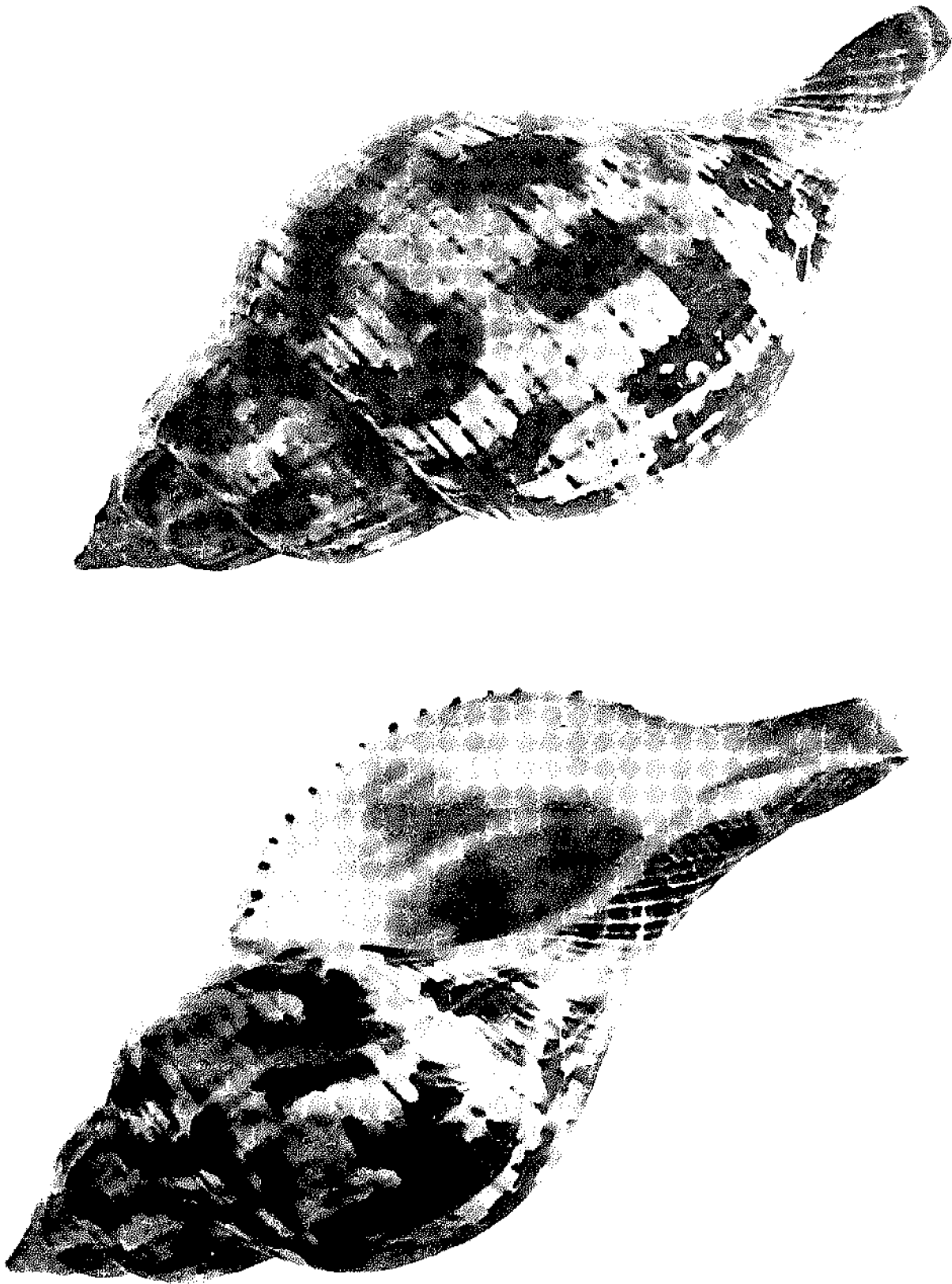


Figure 17: Tulip Shell



Family Fascioliidae

Pleuroploca gigantea (Kiener)

Horse Conch

Recognition Features.—Large size, cream white or straw-colored to light salmon pink, with a conspicuous blackish brown periostracum covering the outer surface of the shell of living specimens. Operculum strong, corneous, dark brown, conforming to the aperture in shape. Soft parts of living animals bright red.

Size.—Very large specimens almost 2 feet long (about 60 cm), but average adults are much smaller.

Comparisons.—The only other Caribbean gastropod of similar size and shape is Turbonella angulata, which has a shorter spire, more heavily shouldered body whorl, and three strong columellar folds. Its soft parts are not red.

Geographical Range.—North Carolina to Florida; Texas to Yucatan.

Habitat and Depth Range.—Shallow water, often on or near reefs. A predaceous species that commonly preys on other large mollusks.

Economic Importance.—This is the official state shell of Florida. It is prized in the shell trade and throughout our area was formerly used as a boat horn.

Other Names.—Fasciolaria gigantea in older works. The form lacking nodules on the shoulder of the last whorl was named Fasciolaria reevei Philippi.

References.—Abbott, 1954, American Seashells (1st Edition), p. 242; same, 1974 (2nd Edition), p. 228.

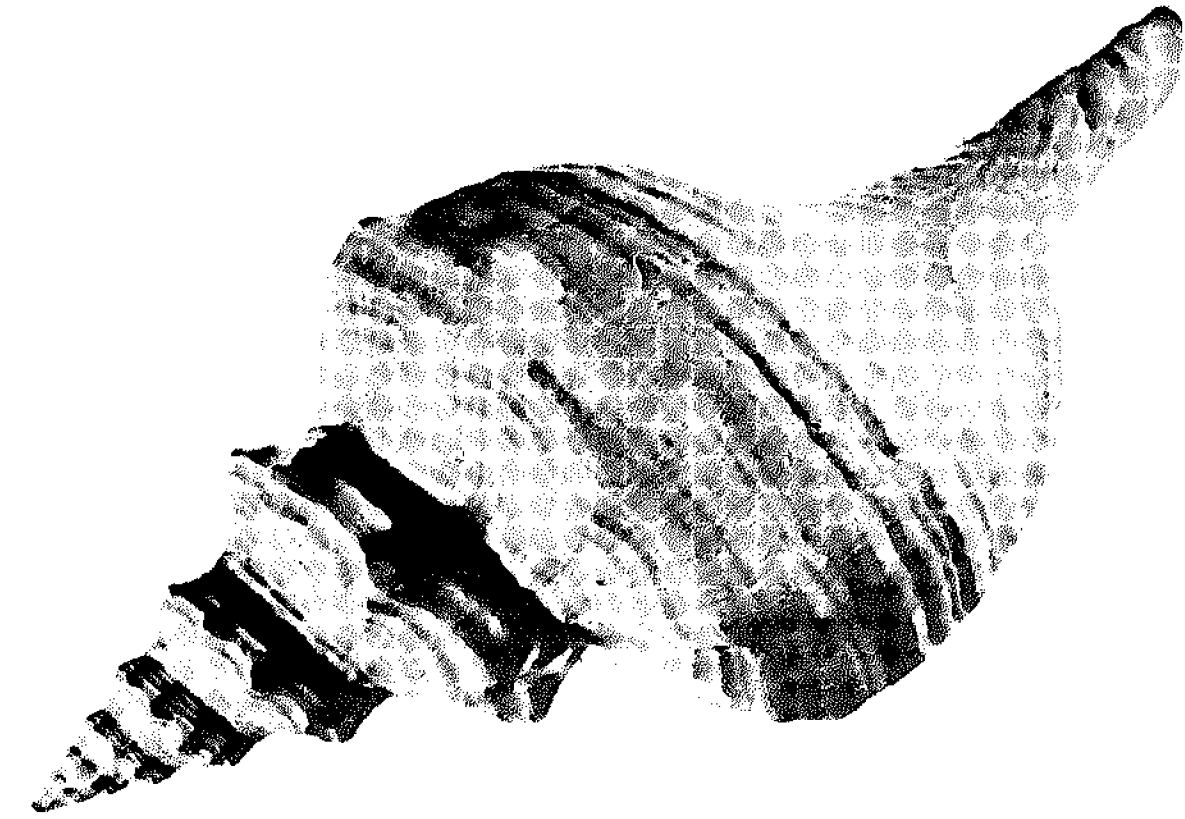


Figure 18: Horse Conch

Family Turbinellidae

Turbinella angulata (Lightfoot)

Recognition Features.—Large, broadly fusiform, heavy shell with prominent nodules on the shoulder and three strong columellar folds. Color creamy white under a thick brown periostracum; aperture may be tinged with pink or orange.

Size.—Adults reach a length of about 14 inches (35 cm).

Comparisons.—This species slightly resembles the horse conch, Pleuroploca gigantea, which has a taller spire, less strongly shouldered body whorl, narrower anterior canal, and no strong columellar folds. The soft parts are tan or brown, not red as in the horse conch.

Geographical Range.—Bahamas; northern Cuba; Yucatan to Panama.

Habitat and Depth Range.—At moderate depths, apparently on sandy bottoms, reef-associated.

Other Names.—Called Xancus angulatus in many older publications. The generic name Xancus was suppressed in favor of Turbinella by the International Commission on Zoological Nomenclature.

Remarks.—Turbinella laevigata Anton, a species with slenderer, less knobby but similarly heavy shell, occurs along the coast of Brazil from Amapa to Espirito Santo.

References.—Abbott, 1954, American Seashells (1st Edition), p. 244; same, 1974 (2nd Edition), p. 241.

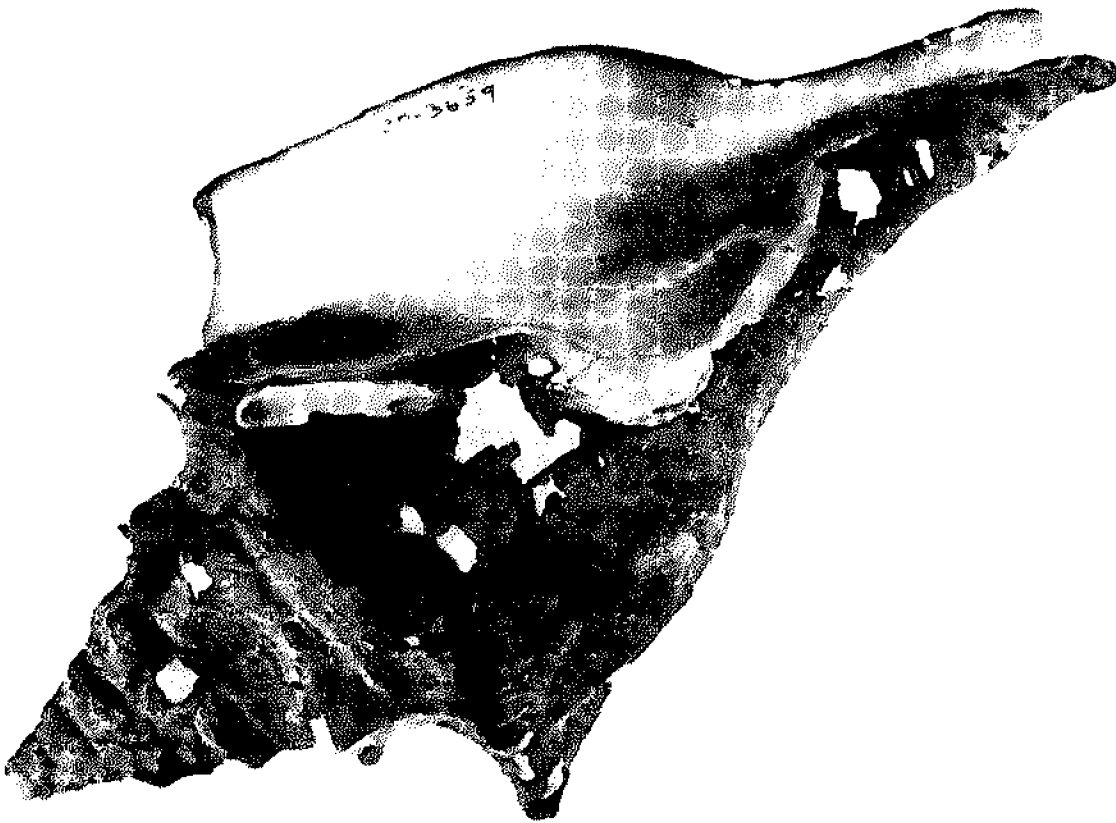
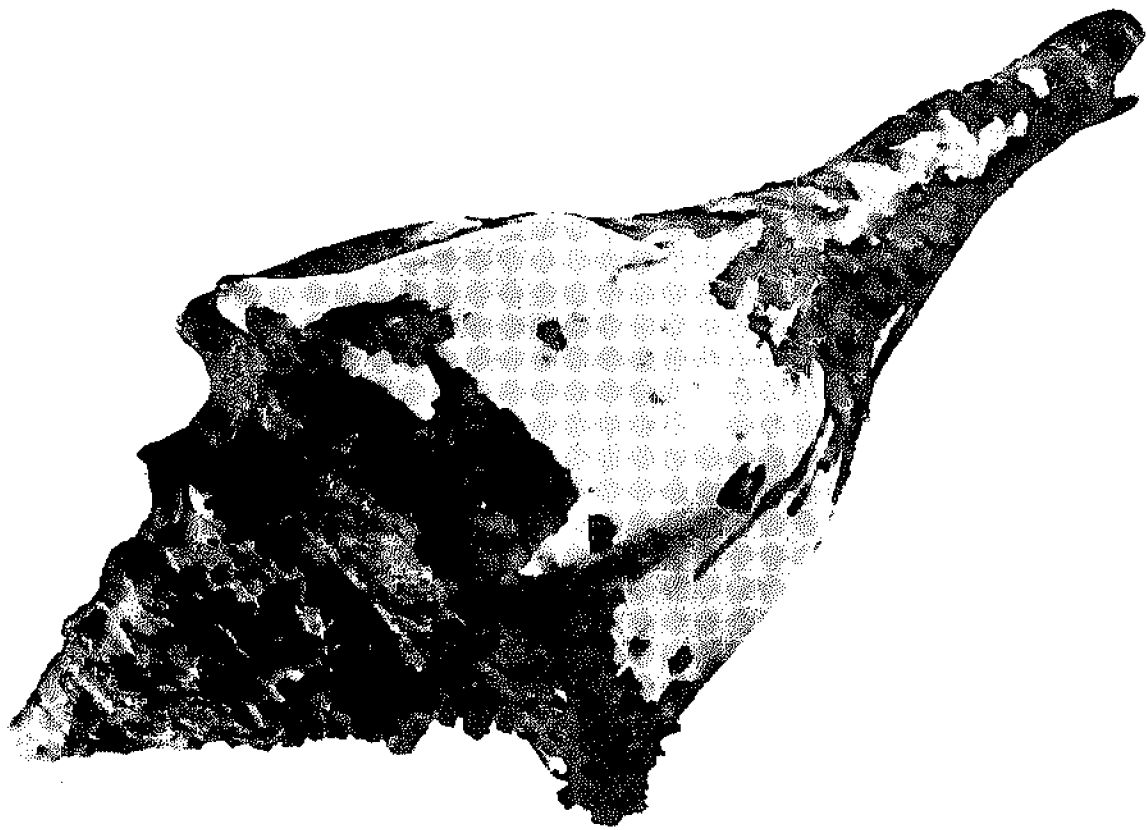


Figure 19: West Indian Chank

Family Turbinellidae

Vasum muricatum Born

Spiny Vase Shell

Recognition Features.—Very heavy, double conical shell of moderate size, with a row of blunt spines at the shoulder and 2 or 3 rows at the base near the anterior canal; five folds on the columella. Color white under a coarse, dark brown periostracum.

Size.—Adults reach a length of about 5 inches (12.5 cm).

Comparisons.—No other Caribbean gastropod is likely to be confused with Vasum muricatum. Four other species of Vasum occur in the Caribbean, but are rather uncommon.

Geographical Range.—Southern Florida and the West Indies.

Habitat and Depth Range.—In shallow water, often on reef flats and back-reef channels. A predaceous species, feeding on other mollusks and invertebrates.

Other Names.—None.

References.—Abbott, 1954, *American Seashells* (1st Edition), p. 245; same, 1974 (2nd Edition), p. 241.—Warmke and Abbott, 1961, *Caribbean Seashells*, p. 121.

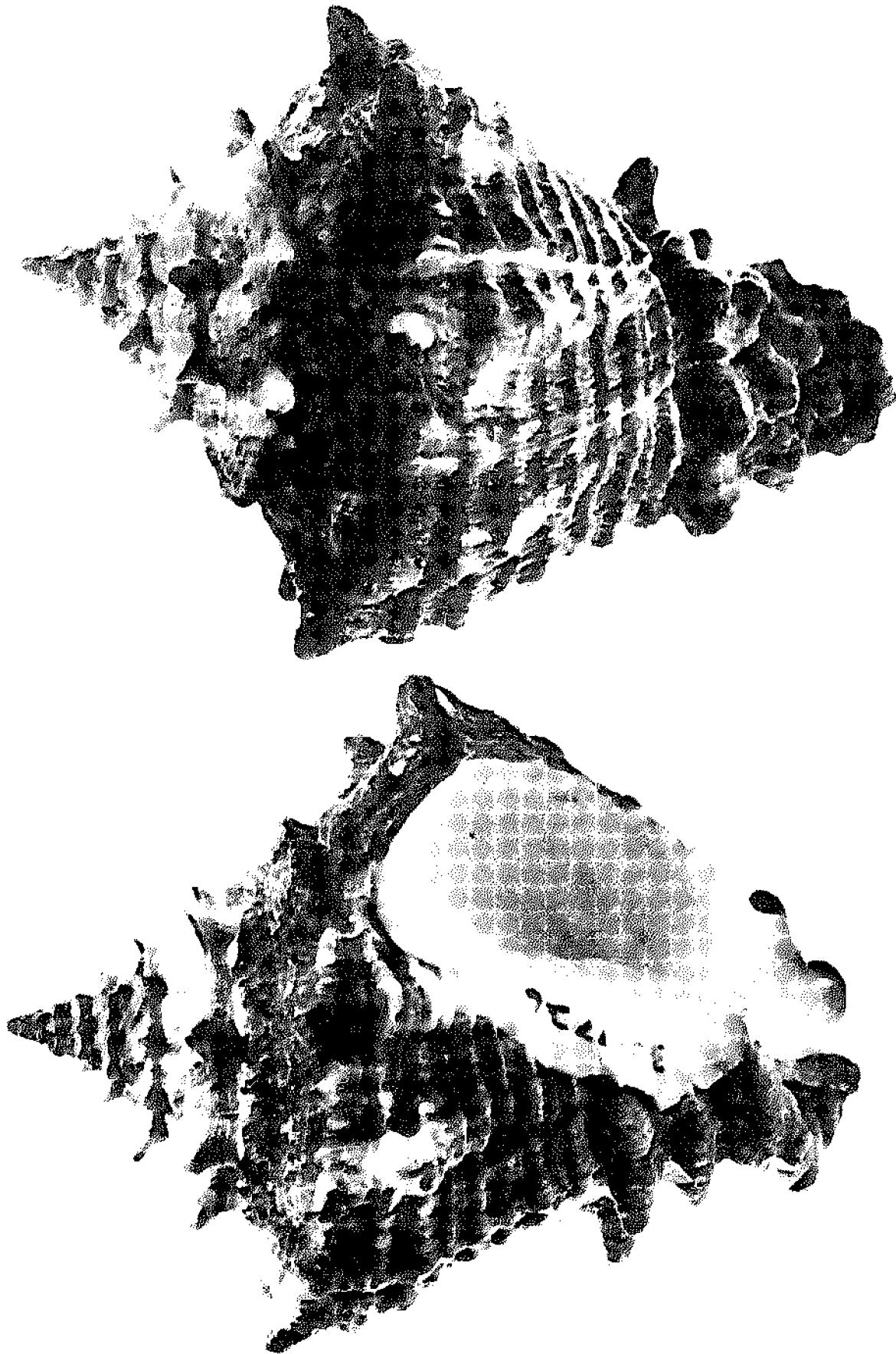


Figure 20: Spiny Vase Shell

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## Notes